White House Environmental Justice Advisory Council

Public Meeting Summary

Virtual public meeting
February 24, 2022

Contents

Preface

The White House Environmental Justice Advisory Council (WHEJAC) was established in 2021 through President Biden's executive order 14008 to advise the Council of Environmental Quality (CEQ) and White House Environmental Justice Interagency Council (IAC) to increase the federal government's efforts to address current and historic environmental injustice.

As a federal advisory committee, the WHEJAC is governed by the provisions of the 1972 Federal Advisory Committee Act.

This brief summarizes the WHEJAC public meeting convened via Zoom on Wednesday, February 24, 2022. The public announcement may be viewed in appendix 1.

Please see appendix 2 for the agenda.

Welcome, Introductions, and Opening Remarks

Karen L. Martin, Designated Federal Officer (DFO), opened the meeting.

WHEJAC Co-Chair **Richard Moore** greeted members and attendees and acknowledged those involved in the struggle who have now passed. He said there is a long list of individuals whose shoulders they stand on. He thanked the regular participants from federal agencies who joined the call and said he looked forward to a fruitful meeting.

WHEJAC Co-Chair **Peggy Shepard** greeted members and said that the WHEJAC has been working hard to fulfil its mandate to make recommendations on the scorecard that will evaluate the Administration's progress on implementing the Justice40 Initiative and advancing environmental justice in all government policies. She noted the purpose of the present meeting is to hear from the public about methods and metrics that the WHEJAC should consider in developing its recommendations. She thanked everyone for their engagement on the issues.

Catherine Coleman Flowers, WHEJAC Vice Chair, welcomed everyone and said she looked forward to discussing how to measure which communities are impacted by funding and how that can be improved upon.

Roll Call

WHEJAC members

LaTricea Adams - *Black Millennials for Flint*

Jade Begay - *NDN Collective*

Robert Bullard - *Department of Urban Planning & Environmental Policy Texas Southern University*

Tom Cormons - *Appalachian Voices*

Catherine Coleman Flowers - *Center for Rural Enterprise and Environmental Justice*

Kim Havey - *City of Minneapolis, Office of Sustainability*

Angelo Logan - *Moving Forward Network*

Maria López-Nuñez - *Ironbound Community Corporation*

Harold Mitchell - *ReGenesis*
Richard Moore - *Los Jardines Institute*
Michele Roberts - *Environmental Justice and Health Alliance for Chemical Policy Reform*
Ruth Santiago - *Comité Dialogo Ambiental and El Puente, Latino Climate Action Network*
Nicky Sheats - *Kean University*
Peggy Shepard - *WE ACT for Environmental Justice*
Carletta Tilousi - *Havusapai Tribal*
Viola Waghiyi - *Alaska Community Action on Toxics*
Kyle Whyte - *University of Michigan*
Beverly Wright - *Deep South Center for Environmental Justice*

Government participants

Karen Martin, DFO
Paula Flores Gregg, EPA
George Ward, EPA
Corey Solow, CEQ

Julie Drucker (interpreter)
Jacqueline Moore (interpreter)

Brenda Mallory, Chair, Council on Environmental Quality: Thanks so much, everyone. Appreciate you all being here, as usual. I should start off by saying good afternoon, and thank you, as usual, for inviting me to join the meeting. I also want to just welcome everyone else from the public who is attending the White House Environmental Justice Advisory Council. As always, I begin by expressing my immense gratitude to the WHEJAC members for the incredible work that is going on that you all are doing and making towards these efforts in delivering environmental justice to communities across the country. Your dedication in the public meetings, but also in the workgroup meetings that occur late at night, I just can't thank you enough for that commitment to all of us. Today's meeting will focus on a critical set of recommendations for the environmental justice scorecard, an important accountability and transparency measure that is an important element of President Biden's environmental justice agenda. So, I'll start off by sharing a few thoughts on this scorecard to kick off the discussion but really look forward to learning what you all discuss today and your views on this topic.

But before I turn to that, let me just reflect on a couple of things that have really struck me over the past few weeks that are connected to other work that's going on in CEQ. First, as we are coming to the end of Black History Month, I've had several opportunities in the past few weeks to consider and discuss what it means to be the first Black person to serve in a position in this administration at this moment. And I usually note the sense of purpose and pride that I feel, as well as the added responsibility to advance the President's agenda, particularly on issues relating to justice and equity more broadly. I felt that same sense of purpose last week as I traveled to Mississippi with our Secretary of Interior Deb Haalland. And together we were visiting the home of the civil rights leaders Medgar and Myrlie Evers, and we visited the sites associated with the kidnapping and murder of Emmett Till, including the Tallahatchie courthouse where the murderers of a 14-year-old boy were swiftly acquitted. Secretary Haalland, a 35th-generation New Mexican and an enrolled member of the Laguna Pueblo, speaks about generational trauma,

how the oppression and struggles and violence and tragedy that have come before us affect who we are, even as we work towards a more just society. And that really resonated with me as we visited the Civil Rights sites and I think about my own story and the way that my ancestors, known and unknown, found ways to continue moving forward as they endured the injustices of the time. And that's why when I think of Black history, I think of resilience. I think of a people who, in the face of the unspeakable, find a way to persist and to keep pushing forward to build communities that are better for themselves and their children. That enduring spirit, that grit, that tenacity, and ultimately that resilience is what it will take to overcome the environmental injustices that have plagued our communities for far too long. Clean air and clean water are basic human rights, and we must fight for them every single day. And for those of us in roles helping to develop and implement environmental policy, it is a particular responsibility to put the interests of the overburden and underserved communities at the center of everything that we do.

That's why I am proud that last week we were able to release the beta version of the Climate and Economic Justice Screening Tool. The Climate and Economic Justice Screening Tool is an interactive map, but it's a lot more than that. It is a key element to helping us identify which communities have been marginalized, underserved, and overburdened by pollution so that the federal government can do a better job of delivering the benefits of programs and investments to the places that need them most. In particular, the Climate and Economic Justice Screening Tool is critical for implementing the President's Justice40 initiative because it provides federal agencies with a clear and consistent definition of disadvantaged communities so that agencies can ensure that the benefits of climate, clean energy, affordable housing, and other environmental investments are reaching these communities.

The WHEJAC's recommendations have already been immensely helpful in developing the screening tool, and we hope that over the course of the next 60-day comment period we will receive additional feedback to ensure that the tool is capturing the reality on the ground. I also hope that you will share the beta tool with your networks, analyze the data, explore the map, click on the census tracts that you know, and let us know what looks right and what doesn't. That's the kind of input that's really going to be helpful in refining and improving the tool as we move forward to finalize it as quickly as we can. I wanted to just touch on those two things because both are on my mind. I think that it feeds into what the environmental justice scorecard is all about and the importance of having a mechanism like a scorecard to really track whether we are succeeding at what we are trying to accomplish. The WHEJAC is obviously a critical partner in the development of this first-ever scorecard, so I was pleased to see that it's a major focus of today's meeting. We all know that it's one thing to set an ambitious environmental justice agenda, but that ambition has to be accompanied by transparency and accountability. So, I'm looking forward to hearing more about the vision, your vision and recommendations for the scorecard and how we can ensure that it serves the purpose that ultimately we want.

But let me start just telling you about a couple of the things that I think are important and that we're striving for as we are talking within CEQ and in the agencies in general. And first and foremost, it's that the environmental justice scorecard should track progress and work across the entire federal government and across the full breadth of our environmental justice agenda. That will include evaluating whether we're reducing environmental burdens, delivering clean energy and climate benefits, and undertaking institutional reforms that can ensure that the voices of

communities are reflected in the decision making. In other words, the scorecard is a way that we're going to be able to hold ourselves accountable for the progress that we're making. And I say that understanding that the scorecard itself will evolve over the next couple of years because what we're able to measure in the first scorecard is not as broad as what we'll be striving to be able to accomplish when we do subsequent versions of the card.

A second priority for the scorecard is to provide information that is accessible and usable to anyone and everyone. It shouldn't be—and we're aiming not to have it be—a website that is really only of value to other government entities. We want it to be something that students or community members can use to understand how their government is advancing environmental justice and find out where there is more work to be done.

And then third is to make sure that the environmental justice scorecard is something that we can build on and improve on year after year, which is what I said at the top. I think that's a really important element of thinking about how the scorecard is going to work. The scorecard we release this year will be a starting point and a foundation for that building. We'll take some time to digest the recommendations that we receive from you all. But we'll then be publishing this initial and first scorecard shortly thereafter. To be effective tools for accountability, each of these annual scorecards will need to get more and more detailed about the progress the federal government is making on the implementation of Justice40, in delivering meaningful change on the ground and embedding environmental justice in all the work that we do. I'm excited that we are at this juncture, and that we're going to have the benefit of your recommendations today. With that, let me close where I started, which is to express my appreciation again for the work that you're doing. There's a lot going on at CEQ right now that's very important, but there's really nothing as important as the work that you all are helping us with. I thank you for that. And I turn it back over to you, Richard.

Richard Moore: Thank you, Chairwoman. And we realize that you have another appointment that you must move on to. I just wanted to, before we move on, say that—what you said—that the historical significance of the White House Council has been extremely crucial to the work that this council has been engaged in. And I know you realize, and other staff at CEQ and within the White House also realize what I'm referring to as that political significance. Because many of our grassroots communities, both urban and rural, have been asking for many, many years for environmental and economic justice to be lifted to the highest level within the administration. And the Biden–Harris Administration has made a commitment to do that. Each of these pieces of work thus far that the council has done—the screening tool, the scorecard of the Justice40, the implementation of the interim guidance, and the executive order—each one of those, along with other pieces, are somewhat connected to each other. We appreciate your commitment, your contribution, and the other staff at CEQ for the work that everyone has been able to do thus far. And we'll be discussing other issues today regarding several of those pieces. And then in our business section, we'll be diving into two other pieces of the work. Thank you very much for those opening remarks. And we're going to let you go to your other appointment. Thank you.

Richard Moore: Take care. Thank you. Karen, I think we're ready to proceed with public comment.

Karen Martin: Yes, thank you, Richard. Just a couple of announcements before we get started. We will only hear from our pre-registered public commenters in this meeting today. The deadline to speak was 11:59 p.m. on Monday, February 21. We will hear from as many public commenters as possible in the time we have on the agenda today. We will continue to accept public comments in writing through March 10, 2022. And all comments we receive, we will share them with WHEJAC members in the Scorecard workgroup. Kurd Ali is on the call with us today helping us with the public comment period. So please listen for your name. He's going to call three public commenters at a time, and he'll also send you a note in the chat. So please pay attention. Please remember to state your name and your organization. You'll have three minutes to speak. We'll have a timer on the screen to remind you of the time that you have remaining. And Kurd, I think we're ready to get started.

Richard Moore: Thank you. Kurd, if you could name those three that are up so we get them on board. And then before that testimony, I'd like to make a comment.

Kurd Ali, WHEJAC support: Okay. Thanks, Richard. Our first three public commenters today is Alyssa Garza; the second one is Claire Barnett; and the third is Mario Atencio. Go ahead, Richard, if you'd like to make a comment.

Richard Moore: Yes, a very brief comment. I've been receiving text messages and so on from some of our folks that have registered for public comment. And I just wanted to mention this because this is what we've been able, thus far, to put in place. And some would think that they registered early, for example, but they're 55—or whatever the number is—and I just wanted to make a comment while we open it up. One of the things that we've been looking at is who has made previous comments in the past because in several different moments in public comment, some have testified two or three times, and so we've asked the staff to watch the registration and then to, in some cases, move the other folks up that haven't had the opportunity to make public comment before, and so I wanted to make that comment before we opened it up. So, Kurd, we're ready to proceed.

Public Comment

Eighty-one individuals registered to provide verbal comments; 25 individuals provided comments. See appendix 3 for a list of pre-registered public commenters. See appendix 4 for information on how to access the summary of written comments submitted by the March 10, 2022, deadline.

Alyssa Garza, public commenter: One of the things that I wanted to mention and touch up on is that I live in the borderline region; El Paso, Texas, to be specific. And one of the things that I would just like to emphasize is how our community continues to be marginalized by refineries and people who pollute our city continuously. And I think it's important that the southwest region has a seat at the table, especially when we're advancing environmental justice, and what that looks like. So, making sure that this region is included in the climate justice movement, and making sure that our community is heard as well, because we are also located in the Permian Basin area, which is known for fracking and oil. And that is creating earthquakes. They're not

extreme earthquakes, yet, but it has led to an increase in small earthquakes. So, I just wanted to emphasize that, and thank you.

Claire Barnett, public commenter: What we're hearing is just, really, an amazing amount of work over many years, which has led to the political impact that this particular Advisory Council is having. I was very taken by CEQ Chair Mallory's comments about clean air and clean water and having rights to those, only to bring up the children in schools who don't have those rights. And it's very significant. The conditions of schools have always been a profound environmental justice and civil rights issue going back decades. Today, we know just from the past two years that schools have never been pandemic ready, and they certainly are not climate ready. There 98,000 public school buildings in the country; 95% of the occupants are women and children. More than half of all the children in public schools today are children of color; 40% of school-aged children, according to CDC, have pre-existing chronic health conditions, obviously impacted by problems like indoor air and ventilation and sanitation and drinking water and so forth. These are profound topics. So, in terms of the scorecard, which is a terrific idea, I hope there's a way for the scorecard to develop methods and metrics around the environmental conditions of schools, where the poorest children in the poorest communities must attend on a regular basis. These are not new subjects. For us, if you're looking at how well the Administration has done on this topic, aside from the COVID bailout money, it has not done nearly enough. Most schools were—by a number of different local surveys—were unable to meet or to even implement CDC reopening guidance. That's extraordinary. Why weren't they able to? Who tried to figure that out? Very few people did. We hope you will join us as the White House council on environmental justice, calling on this administration to establish and fund a permanent Healthy Schools initiative within EPA, also to address the elimination of legacy toxics within all those schools, PCBs, lead, mercury, whatever. And finally, we also hope that there will be funding to rebuild America's schools, particularly in the lowest income communities. There is not nearly enough money and time to be able to do that in very short order. But the design and construction and repair of America's schools should be done with very strict federal guidelines that prioritize children's health and the ability to learn. Anything less is more injustice. We thank you very much and look forward to learning more about the methods and metrics of a scorecard. Thank you.

Mario Atencio, public commenter: My name is Mario Atencio. I am the Vice President for the Torreon/Star Lake chapter of the Navajo Nation government and part of the Protect Greater Chaco landscape coalition. I'm really thankful that this group is taking on the work to develop a scorecard. The scorecard really needs to take into the new guidance out of the White House regarding tribal consultation. Local chapters of government like Torreon/Star Lake really need to be involved in the environmental justice analysis. Because they are at times consulting parties on federal actions such as Resource Management Plan and Resource Management Plan amendments. Greater Chaco is incredibly sacred landscape. And in the EJ guidance, it says NEPA, and NEPA specialists need to have a complete cultural understanding of federal actions being taken place in the landscape. And so, these cultural impacts can only be fully realized and understood by NEPA specialists if they communicate with local governments such as chapters of Navajo Nation government. And so all of the Navajo Nation chapters in the Farmington Field Office of the Bureau of Land Management are considered environmental justice communities, and as a local leader, we have never been communicated as this being so and all of the rights and

privileges therein, and ability to properly weigh in on federal actions such as increasing oil and gas drilling into the Greater Chaco landscape. We have yet to really engage on that level. And so this behooves, that, you know, from the White House, the Bureau of Indian Affairs can't be the main lead agency; there needs to be a clear initiative that pushes this idea forward. And so co-chairs and members of the advisory committee, I just really wanted to recap that this process needs to follow a different level of tribal consultation, and possibly even thinking about free and prior informed consent for these communities to properly engage and weigh in on highly impactful federal actions that may or may not affect communities. Thank you.

Kathy Andrews, public commenter: My name is Kathy Andrews, and I am director of the Blue Ridge Environmental Defense League. I'm calling from Myrtle Beach, South Carolina. But we cover six states, South Carolina, Georgia, North Carolina, Alabama, Tennessee. And I'm calling because I'm not sure what to do with Biden and the scorecard. Maybe he's trying, but we don't see it. In the southeast, we don't see any type of penalties for companies like Dominion Energy, that Dominion Energy was just defeated with the Atlantic Coast pipeline, and Virginia, North Carolina. Now they're in South Carolina, trying to do the same thing. They're trying to put up pipeline in Ayers property, predominantly a Black area. They're intimidating people. And the only reason they're giving for this pipeline is development. They are offering people $300 and some $1,000. And they pay off legislators; they've given legislators in Virginia over a million dollars. So what we need the Biden Administration to do is penalize these companies like Dominion Energy, trying to put a pipeline through a predominantly Black area in South Carolina—it's called the River Neck to Kingsburg Project—and penalize them with fines and executive orders. And if there is a community that's already compromised, stop these industries from coming there. That's why they target places like Pamplico, South Carolina, where there's also a cancer alley, which Michael Regan didn't come to, he went to Louisiana, but we've got cancer alleys all across the southeast. And we're being inundated with industries that want to pollute to profit. And these industries are already—people there already have cancer and other problems. And so now they're going to have more cancer, more kidney disease, more respiratory problems. So we need real legislation to stop these industries from coming to places like Pamplico, South Carolina, and Augusta, Georgia, and putting landfills and huge chicken and hog industries down here. We need real legislation. So when it comes to a scorecard, I can't give them anything in the southeast. Nothing, absolutely zero. And we'll be sending a full report so that you can understand what I'm talking about.

Laurene Conteras, public commenter: My name is Laurene Conteras. I am a member of the Confederated Tribes of the Yakima Nation located in central Washington State. I am the Program Administrator for Yakima Nation Environmental Restoration Waste Management, which deals with the Hanford Nuclear reservation cleanup. We work in coordination with Department of Energy. And I guess my comment today is, you know, the frustration as a tribal member that lives in close proximity to the Hanford Nuclear reservation, which is 580 square miles. And our tribe has been instrumental in obtaining a voice to deal with cleanup at the Hanford site. The Hanford Nuclear reservation is the most contaminated site in the nation. And so my concerns, recent, are the high-level waste redefinition in that Department of Energy and GAO has supported because of cost savings. And the contamination, which was created by the Manhattan Project back in the 1940s, basically impacts the ceded territory of the recommendation that guarantees us rights through the Treaty of 1855. And contamination has

left a huge impact on the environmental footprint in the area. The areas there are sacred to the Yakima Nation because of the natural resources, cultural resources, burial sites that are there, that we continue to try to do our best to protect. Hanford has over 56 million gallons of contaminated waste, and I guess what we would like to see is that the Biden Administration take measures to clearly protect the safe health and sustainability of this area for the Yakima nation and surrounding communities. The Tri Cities area has a huge population. So it's not just about the Yakima Nation. I mean, it's primarily our concern because that's our ceded territory. And we've been here since time immemorial, and we're not going anywhere. So, the impacts of the contamination are going to impact future generations for millions of years. And so my time here on Earth, I'm spending my time working towards trying to protect and preserve what is there and clean it up to the standard that will prevent future impacts to health in our environment and our natural resources, religious resources there. So, thank you for allowing me to speak today. And I'm hoping that a small voice can be heard throughout the nation, here in Washington State. Thank you.

Syrah Scott, public commenter: I appreciate the new council and its willingness to make sure that federal agencies are operating at their fullest potential when addressing environmental injustices. My name is Sierra Scott, as mentioned, and I'm the founder and Executive Chairman of the National Clean Water Collective. We're a grassroots organization that's helping to provide short- and long-term relief to communities across the nation experiencing a water crisis. We started in Flint, Michigan, and have since expanded our efforts into New Jersey, Newark, Houston, Dallas, Austin, Jackson, Mississippi, and the Bahamas.

I believe that the federal agencies should be graded on the following: how well they are disseminating information to the public and the community that they are serving? Do the residents know what's happening in their community? Before and after they complete a project, are they getting feedback from organizations like myself and even local organizations? Or are they hosting focus groups in the community to make sure that they're getting honest feedback from the participants in the community? And are they holding municipalities accountable when it comes to a maintaining the water, the lead levels, and the copper levels? I know that there has been a recent push to make sure that these municipalities are making sure that they're within the federal guidelines. But are they going back to check to see if these cities and municipalities are basically doing what they're supposed to be doing? Because to be quite honest, there is no level of lead that's safe for human consumption. How well are they assessing the pipe replacements that are done in communities like Newark and Flint, for instance; have they checked to see that the work is being done? There are residents in New York and even Flint that are complaining that the work has not been done and that they're just digging up the ground and they're not really doing the work. I know that Vice President Kamala Harris went to Newark, but has she really checked to see that the work was done? Also, when performing the pipe replacements, how are they containing the area so that people are not really exposed to all the contaminants and particulates that are in the air? Because we know that that causes cancer and other harmful issues, like, even asthma. And then, are we going to include race because I saw the article about how it was going to be excluded. That is concerned because, as Miss Mallory said, it's very important. And we're marking a very important historic time. So, it's important for me to include race. And then lastly, how well are they sharing grant and funding opportunities to grassroots

organizations like myself, that are led by black and brown people? Thank you so much. I appreciate the time.

Wig Zamore, public commenter: I want to focus on highways and airports and the primary exposures to ultrafine particles and noise from those sources. I'm part of two grassroots groups in Somerville; we have no paid staff. We have caused very large local land-use changes that have advanced dense, mixed-use, transit-oriented, built the first subway station in Massachusetts in 30 years. And then we moved on to consideration of environmental epidemiology at near-source scales and started a program with Tufts, two professors who had never worked together, had never studied ultrafine or cardiovascular inflammation. And we were able to show with a series of studies, a significant relationship between inflammatory biomarkers of cardiovascular disease and our near-highway residents, as opposed to residents more than a kilometer away. Our studies have been done with five doctorates who have moved on and several postdocs as well as Doug Brogy, John Durant and others at the research universities in Boston. We do those studies at 500 million times the spatial temporal density of the Harvard six-city study. But because the populations are so small, we are not able to drive regulatory progress at national and state levels. In other words, the difficulty of the research is preventing focus on primary exposures, as opposed to regional PM 2.5 exposures, which are flat in our spatial temporal domains. And I understand that we are now moving with great speed into climate and protecting the planet and people who are in vulnerable places on the planet, but we are not yet framing protection for the people who live next to big highways, live next to large airports or under the flight paths. And those health effect gradients are roughly 10 times the health effect gradients in our PM 2.5 variants within the US and in normal metropolitan areas. I know my time is about to go. I just would plead with you to work with grassroots groups and USEPA to actually do the research that at regional metropolitan level can show statistically significant relationships between primary ultrafine and large transportation sources of noise and health outcomes. Those are the populations which are most intensely environmental justice, most intensely immigrant in the US, and most intensely affected now by our pollution levels. Thank you very much.

Peter Williams, public commenter: I'd like to comment about the Executive Order 14008, which I've seen over the last year in regulations that on HFC phase down, that is a “wink wink, nod nod” in the preamble and has nothing behind it. Since 2013, I've worked and gotten the attention of the NAACP and other minorities in this space to try and get minority black and brown people involved in the rule and to benefit from trying to straighten out some of the issues that we faced with HFC and refrigerant releases. I'd like to note that I'm asking the council to try and put greater emphasis on the use of this executive order, whereby we engage HBCUs to do the research and development on things such as air conditioning units, disposal, different elements of the HFC use, which has not been there. We look at the financial benefits that large white enviro groups extend to large organizations in the air conditioning and refrigeration industry and find that there's very little if any, Black-, brown- or female-owned businesses that benefit from these types of rules that are that are going into place. We keep on struggling with this issue. We look at the way that EPA has—you know, they talk about fenceline communities and the effects, but there's not a full accounting of it. So essentially, I'm wondering if the council would, in its report card, look at how this executive order is placed into and incorporated for real time impact on environmental policy.

Dr. Arnold Wendroff, public commenter: I'm going to talk about the failures, intentional failures of EPA, etc. And I'm going to read this. I'm taking this opportunity to inform you of the hypocrisy, nonfeasance, and rejection of the hallowed precautionary principle by EPA Office of Environmental Justice and children's health protection, as well as the CDC ATSDR, and a plethora of governmental and nongovernmental organizations and individuals all aware of domestic mercury contamination resulting from the magical religious sprinkling of elemental mercury on floors of homes as practiced in several Caribbean and Latinx racial, ethnic, and religious minorities communities. These ritualistic mercury spills semi-permanently contaminate dwellings with toxic—especially developmentally neurotoxic—levels of mercury vapor, which is inhaled by all current and future occupants, most problematically maternal-fetal pairs. The domestic mercury vapor evacuation level is 10 micrograms per cubic meters, or a portable biomarker level is only 20 micrograms per liter of urine. The cost of decontamination of these homes is great, but the cost of the damage to the developing brains of exposed fetuses, infants, and children is far greater, as is the case of pediatric lead exposure—the latter as American as apple pie—to address and label an environmental injustice when the source of the toxin is exogenous to the impacted minority. However, in this case of magical religious mercury contamination, minority community members are themselves directly, albeit unwilling, unwittingly, the source of the contamination. And government has fostered their ignorance of the damage that they have caused and the danger they incur from occupying mercury-contaminated dwellings. The elites of these communities, including many of you who are on the line there now, your environmental justice advocates are exquisitely embarrassed by this problematic practice and have individually and collectively acted to suppress any action to assess and address the problem, thereby keeping their communities in ignorance of secondhand exposure from prior ritualistic mercury spills. Manifold government agencies, including CDC ATSDR, and IHS, EPA and city and state agencies and NGOs for decades have all participated in this cover up. Information on the issue is readily available online using the keywords mercury and Santeria in your favorite search engine or Google Scholar. And in 1999, ATSDR wrote, “There is an urgent need to obtain information on the levels of exposure from these practices to determine if children or adults are at risk.” But to date, the government has refused to gather the data. And Karen Martin and Peggy Shepard know all about it and have refused to do anything to lift a finger to assist in getting the data.

Ayesha Franklin, public commenter: Thank you. I'm Ayesha Franklin Covington, and I'm with Brooklyn Neighborhood Association. I live in Duval County, in Jacksonville, Florida. And I'm calling as a concerned citizen and community activist regarding the Forest Street Incinerator site. We currently have a project where the City of Jacksonville has entered into an agreement with a private entity to clean the McCoy Creek; it’s called the McCoy’s Creek Restoration Project. However, as I watched them engaged in this process, they are re-exposing the community to contaminants. And as I had the conversation with the stakeholder, Groundwork Jacksonville, I was told that the area was not that contaminated; it wasn't that bad. They built a new school over here by us on the original site. Also, the Fairfax area, it was still contaminated with lead and with different contaminants that we found in the soil, which when the EPA cleaned it up, the soil was re-contaminated again. My concern is with these new projects that the city wants to undertake, and old areas that had once been cleaned up by the Environmental Protection Agency. Who is giving them oversight to ensure that the public is not re-affected or contaminated due to their

lack of following EPA guidelines? We will observe them not using water, openly carrying contaminants out in trucks, and we were being told, oh, it's not their truck.

I would like to see on the scorecard, if the city engages in opening an old area of contamination, that someone gives them direct oversight on how to not contaminate another area, another generation. We've had a lot of cancers that occurred as of the exposures. And there were no medical studies done. But the only thing that we had in common was we lived in the direct area of exposure. So, I don't want to see another area exposed. How do we make sure that these areas are being protected in the future? And I would like to see that addressed by the Biden Administration. I would like to see these cities held accountable because they allowed us to live in these areas for years. And then they did not settle these agreements until the federal government came in to assist with the cleanup. And I was one that sat at the table, and they ignored all of our concerns. And now they're building new concrete dwellings; those children are still being exposed to those contaminants that are seeping into the concrete. Thank you.

Brian Ansari, public commenter: One of the things that I noticed is the omission of the businesses in these communities that have not had an opportunity to be able to add value to the projects. And when I think about workforce, and I think about community benefits, the thing that leaps out at me as a disadvantaged business owner myself, is how can we contribute to the advancement or implementation of this expectation, as businesses; the path to be able to do that is not clear at all in the criteria for environmental justice, And, frankly, there's a lot of applications and solutions that are going to be developed. And, as businesses, there's a lot of other vendors that are going to be coming into our communities and designing what success is going to look like and intimating that success, and continuing a pattern of behavior, or at least conduct that's sponsored by public policy, that prevents vendors in that community from being able to provide services in a tangible way that is defined as a value, as a cultural value and as an expectation that agencies are going to examine and then integrate into their response.

But also, with respect to any new technologies or new infrastructure that’s going to be developed to respond to these things, if there's no clear path defined for the participation of firms like mine in the governance, then most assuredly we're going to be excluded both from economic benefits and we’ll be excluded from the knowledge transfer that could have occurred that would have stayed in the community. My headquarters is in Newark, New Jersey. And we've seen their significant issues with lead pipes and other vendors. The fact of the matter is that those are turned into a crisis that have disproportionately benefited firms outside the community and adversely impacted firms like mine, and many others that would like to participate in the remediation of these issues, both from a policy standpoint, as well as an implementation standpoint. So, I would encourage those who are looking at this to, when they think about disadvantaged communities, do not omit the disadvantaged businesses that are specifically identified in statute as being disadvantaged. And so, they represent a community as well that are often embedded within the larger communities that, if given a voice to participate, would be active in making sure that they were workforce value adds and that communities are being engaged, and there would be opportunities to be able to hire union labor by firms that are going to be a participant in the supply chain. But without an intentional stakeholder engagement plan or other kinds of considerations identified in Section C of the guidance, and even the structure of the grants—I mean, when you're putting out the NOFOs, you guys have made provisions for

being able to give scoring benefits for certain considerations, but to the degree that there's a scoring benefit that can be provided or incorporated that allow businesses that have invested in these communities and that are invested in those community outcomes to participate in these projects, that's a significant value add, as well. And that also reinforces a lot of the community's small business or local business activities, and I know many municipalities and communities are hoping that this will be an opportunity for them to be able to meaningfully engage members of their business community to support things in their supply chain. Thank you.

Felipe Franchini, public commenter: I am a whistleblower. I was employed by a federal contractor for the Department of Energy. I worked for eight years from 2000 to 2008. I was exposed to lead for a period of eight years. As I became ill and started getting sick, I attempted to get a medical evaluation from our medical department. I was told that I was crazy, that I was dreaming things, and that if I wasn't happy, and if I felt in danger, that I could find another job. As I reported, I became a victim of racial harassment; constant efforts to be disposed of forced me to quit. So, I blew the whistle to the Department of Energy Office of Inspector General. I was told that they were similar to the FBI, they'll take complaints and do nothing about it. As my harassment intensified, I contacted them again. They sent the case to the internal investigator. My case was pretty much—she pretty much swept me under the table, under the carpet, and made my work environment unbearable.

During this time, I recorded my interactions, I have a total of 50 recordings addressing my issues. I have a total of close to 10,000 pages of documents that prove that I was exposed to lead. I have never received one minute of training in lead handling. At the time of my employment. When I began my employment, my wife was pregnant with my last daughter. I worked there for a period of eight years. After working long hours plus the 12 [inaudible], I came home, carry my infant child not knowing that I was contaminated with not just lead but radioactive contaminated lead. When I addressed the issue, they claimed that I never worked with lead. And I said I brought the issues and filed a complaint with OSHA and Department of Labor. They doctored my file to make it appear as if I have received lead training when they have claimed that I did not work with them. It's sad how the Department of Labor and OSHA further victimized the whistleblower such as me. I became a victim repeatedly. And up till this day, I have not been heard by anyone. I had attempted to contact Congress in our local area. Unfortunately, congress members get bought by these federal contractors that contribute to their political campaigns. And they look the other way, and we continue to be victimized. I dumped the contaminated waste that I removed from floors into the storm sewer. I have documents that prove that I rented a machine to remove such contamination. And yet they claim it never happened. My recordings will prove I have filed for disability, and even with my medical conditions I plan on moving to Washington to advocate for the whistleblowers who have not been heard and have been victimized by the system time after time. I have traveled to Washington on several occasions. I have participated and Whistleblower Recognition Day only to sadly look at how the little whistleblowers get ignored and only those whistleblowers who are paying high dollars to the attorneys are heard. Thank you for giving me the opportunity to be here. And I think you need to do more for employees who become victims of your federal agencies all across the board, not just the EPA, but the Department of Labor, Department of Energy, and Human Service. It's sad, and I hope you do what [inaudible] doing each time. Thank you.

Pamela Mullens, public commenter: My name is Pamela Mullens. I am a resident of Covington, Kentucky. I'm speaking today about environmental injustice regarding landfills and water seeping into disadvantaged communities, which is a community that I live in. We call it the East Side of Covington. We are located adjacent to a levee flood wall. We are in—I believe it's correct—to be region number four, as far as the district, when it comes to watershed and part of the Ohio River Basin. I am serving on a committee this time that involves volunteers. And we have listed some priorities that we believe that you should be paying attention to and held accountable for when funds are giving to communities to help eradicate any of the injustice that has been done to it from an environmental perspective, particularly to the soil. We want to be sure that public engagement happens before decisions are made. And that's at the local level. But also, with your level when you are granting dollars to these entities to be sure that there's some type of cleanup. We also want to be sure that you are accountable with the reporting back to the local entities and to the local residents so that we stay informed about what are the results of these testing, and that someone is accountable to be sure that meetings are held, and that you come back to the communities that are impacted so that we have a clearer understanding of what these tests mean.

Some of these tools that are being provided to use to try to determine where there are areas of disparity, there are not very easy to use. Technical assistance needs to be provided to communities who get grants for these different projects. But even more than that, adequate funding needs to be provided because many of these communities after the federal funds for whatever must be done as far as cleanup, they are strapped with trying to figure out how to raise some local funds many times to finish up projects that have not been totally brought to closure. So, I would like to see that adequate funding be provided to these communities beyond whatever you're currently doing now to eradicate, you know, what's been left behind from brownfield damage, so that the communities, when they come back and apply again to do more and to clean up more, they've got a good opportunity to get more dollars and it's going the right way, and it's tracked appropriately. And the appropriate authorities are held accountable for tracking and knowing where those dollars went. I see my time is about up. I thank you so much for the opportunity to provide this public comment.

David DiGiacomo, public commenter: I am David DiGiacomo. I'm talking to you from St. John and the United States Virgin Islands, where today it's 84 degrees and every day it's 84. I'm not speaking to you on behalf of a number of boards that I'm on, but I am on the Friends of the Virgin Islands National Park Board. I am on the Unitarian Universalist Fellowship Church board here. I am on the School for the Arts Board, and I had previously been on an environmental board, a board called Island Green Living, focused on a number of environmental issues. I wanted to alert you all to the uniqueness of the Virgin Islands. We are citizens of the United States, but we have no voting representative in Congress. And we have no United States Senator. There are millions of people in the Virgin Islands and Puerto Rico who have similar interests and challenges, but limited access to government and government resources. We also have populations who are descended from slaves and Taino peoples who emigrated from Central America over 3000 years ago. Whatever system that you ended up devising should seek a true representation of all the peoples, including the peoples of our territory. Our rate of poverty is higher than almost all the US, and the people who live here are overwhelmingly people who are black and brown. We have unique data collection problems here in the territories. We have areas

that are geographically unique. We have endangered species, including turtles. We have problems obtaining accurate information from the territorial government regarding environmental problems or issues. We also have a lack of enforcement of environmental laws that has resulted in toxic wastes and dump sites that are not in compliance with federal laws. And there's been failures to remediate those known hazardous waste sites, including the largest, what was recently the largest single refinery in the world located on St. Croix, which is one of the US Virgin Islands. We also want you to design a system that will address the fact that we have limited resources here to address environmental conditions. Whatever scorecard that you create, we hope will reflect the special interests of ours, which, while not entirely unique, are unique in many ways. And thank you for the opportunity to speak today.

Kathy Yuknavage, public commenter: I'm a board member of our Commonwealth 670, a grassroots organization on the island of Saipan in the Commonwealth of the Northern Mariana Islands. Our primary concern is substandard EIS review processes by the Department of Defense. This has allowed increasing US military expansion in the region, and DOD's constant, flippant responses to Commonwealth concerns. We have had five EIS reviews from the late 1990s to present, which state their purpose is meeting military training requirements in the western Pacific. Their need was using the CMIs location for this purpose. This purported need precludes consideration of other alternative sites with existing installations on larger land masses elsewhere in the Pacific that can provide this training and are less susceptible to impacts as our small archipelago of less than 184 square miles. World War Two and current exercises have left military debris, unexploded ordnance, and contamination of our islands. DOD is now proposing new lease designs despite the acknowledgment within the CMI covenant with the US that no additional lands would be leased for such purposes. This disregards Indigenous sovereignty. Allowing live fire training on leased lands that will be returned even more polluted than after World War Two is problematic from both a socioeconomic and environmental justice perspective.

DOD has made clear that removing unexploded ordnance and contaminants of leased lands is not a requirement or a priority. DOD should be required to complete baseline studies of [inaudible] and biota contamination to demonstrate past and current levels to ensure accountability for remediation and restoration of leased lands. Activity should support cultural norms, incorporate best practices to meet local environmental requirements, and abide by local laws and regulations. DOD has foregone attaining coastal management permits. Although allowed legally, it doesn't offset socioeconomic impacts for underserved and Indigenous populations when their proposed actions are inconsistent with their interest in resource protection. All pertinent research must be considered in the EIS process, not just those studies that DOD have funded or that support their preferred activities, and they cannot just disregard other peer reviewed research cited by local agencies that does not support these activities. Public hearings should have knowledgeable panels capable of answering substantive questions posed by participants. Should a panel not be able to answer most questions, then this should not be considered a public hearing or engaged public discourse for comments. DOD continues to offer higher salaries to entice experienced local professionals that used to review the EISs on behalf of the CMI to now make assessments for them. Federal agencies should provide proportionate funding to local governments to hire experienced experts and make necessary purchases to enable thorough reviews or adjust assessment of environmental concerns. I see that my time has run out. I do have a few other

comments. Federal resources should provide in [inaudible] broad participation in public hearings, including social media and radio and provide pertinent information and plans and accessible and timely manner in the responses to comments. There should be translation services. Federal agencies should provide pertinent information on plans in an accessible and timely manner. And in their response to comments, there should be translation service and Indigenous people should be given time to express themselves consistent with and respectful of local culture. Consent should always be a primary goal before consultation. We thank you for this opportunity to reach out to the Advisory Council.

Audrey Adams, public commenter: I'm Audrey Adams in Renton, Washington, and I'm one of eight plaintiffs suing the EPA to ban fluoridation on behalf of my son Kyle who has autism and severe chemical sensitivities. I discovered fluorides harmed Kyle when he was 14, and he's now 36. He suffered profound pain that resulted in wild, erratic behaviors. His chronic headaches affected both home and school and I'd already put him on an organic diet. When a mom of a child with autism suggested I try eliminating fluoridated water, we switched to fluoride-free water. Kyle's pain diminished in three days, the screaming, jumping, and wild racing was no longer the norm. With the pain of fluoride gone, I could identify other toxins he reacted to. By his early 20s, Kyle's ability to detoxify decreased and his reactivity to chemicals increased. The severe headaches had gradually returned mostly following his morning shower. Then another autism mom told me about her terrible reactions to bathing and fluoridated water and her son's pain, too. I hadn't even thought of skin exposure. We had a filter on the shower that remove chlorine but not fluoride. When I switch Kyle shower to the evening, the screaming headaches followed that shower. After installing a shower filter that removed most of the fluoride his pain vastly diminished. Kyle's sensitivity to fluoride is well documented by the state DDD, his two doctors, and his dentist. A 2019 study reports 60% of those with autism are hypersensitive to chemicals. It is an unconscionable injustice to put a toxic chemical in public water, drugging everyone regardless of medical differences. Most families coping with autism never discovered that their child's pain is literally in the water. It took me 14 years, and I didn't fully understand for another nine while Kyle suffered terribly. The CDC says one in 44 kids have autism. More than half of those have chemical sensitivities. Fluoride is a presumed neurodevelopmental neurotoxin, according to the National Toxicology Program. Seventy-four studies, including 11 at amounts of fluoridated water show lowered IQ and higher rates of ADHD. How does a mom without a car carry her baby, food, plus gallons of bottled water on a bus? Fluoride's toxicity gram for gram sits between lead and arsenic. Those most harmed by fluoridation are low-income families trying to avoid fluoride for their babies for those who have children with autism. Fluoride is more than an injustice. It's an environmental crime against the most vulnerable. And I thank you very much for listening to this and for doing the work that you do.

Kyle Kajihiro, public commenter: My name is Kyle Kajihiro. I'm a Japanese settler in the occupied Hawaiian Kingdom on Kanaka Maoli lands. I'm a lecturer at the University of Hawaii at Manoa in geography and ethnic studies. And we work with Hawaii Peace and Justice and a group called the O'ahu Water Protectors. We have an environmental justice crisis in Hawaii at this moment. The Navy's giant Red Hill fuel tanks have leaked into our aquifer, affecting about 93,000 users of the Navy water system, and about 4,000 families have been displaced from their homes. But this is only a small warning shot of what could happen. There are about 200 million gallons of fuel in these 80-year-old fuel tanks sitting 100 feet above the aquifer, which supplies

77% of O'ahu's drinking water. It's a ticking time bomb that could destroy life on our island as we know it. And communities have become united to demand that the Navy defuel the tanks immediately and permanently decommission them. They have fought the emergency order of the state and refused to abide by these orders. And so, we're appealing to the Biden Administration, the President, to order the Navy to defuel the tanks and to decommission these tanks permanently. But the Red Hill issue is only one of thousands of military contamination sites in Hawaii. One of the issues that we have—and this is a legacy of the history of settler colonialism here—the military leases about 30,000 plus acres of Hawaiian trust lands for $1 for 65 years. These leases expire in 2029. And many of these lands are contaminated with unexploded ordnance and other contaminants. So, we are pushing for the military to begin cleaning up and restoring these lands so that they can be returned to the Hawaiian people. Regarding the scorecard, a couple points I want to make. EJ issues have been typically weakly enforced in Hawaii because we're blessed with a diversity in our community where there's no majority, typically, environmental justice gets overlooked. Second, cumulative impacts are never adequately addressed. Third, the military has been a bad actor, consistently polluting our environment and trying to get exceptions whenever they get caught, as in this case, where they are refusing the order to defuel. And finally, I think that free, prior, and informed consent as defined in the UN Declaration on the Rights of Indigenous Peoples should be the standard for any kind of environmental review and consultation. Thank you for this opportunity to share my thoughts.

Wilda Anagal, public commenter: My name is Wilda Anagal, and I'm with the Grand Canyon Trust. The Colorado Plateau is a region with enriched cultural and natural resources, home to generations of Native American communities expanding across the plateau. These communities are at the frontlines of the climate crisis and the transition away from a fossil-fueled dependent based economy. The mining and combustion of Black Mesa coal created jobs and revenue for the Navajo and Hopi tribes for several decades. The shuttered closure of Navajo Generating Station in 2019, along with the mine that supplied coal left behind lingering environmental, social, and cultural impacts. At Kayenta Mine, there are years of reclamation that needs to be addressed, and there needs to be federal oversight. The community members and community-led organizations are concerned about ongoing environmental impacts, including the process of reclamation, water resources, and the commitment for foregoing a significant permit revision. The land needs restoration and healing, as well as the community. An all-of-government approach to a just transition should be carried forth with the inclusion of reclaiming lands and restoring tribal and local economies. And thank you for the opportunity to provide a comment.

Diana Umpierre, public commenter: My name is Diana Umpierre; I'm in Florida. I am coming to you in a very vulnerable moment. I'm going to try not to cry. At the last WHEJAC meeting, Dr. Bullard highlighted the importance to organize, to mobilize to build the justice framework, to be laser focused so that we don't keep getting what we're getting: nothing. So, it was with that sentiment of "stay on it" that I am here back again today because I didn't get to speak last time. I did send a comment letter to each of you, and I want to appreciate Catherine Flowers who responded and acknowledged receipt and made me feel seen. I have a dear coworker that just a few days ago was wrongfully arrested from her home, treated like a murderer by the police, imprisoned for 26 hours, deprived of her prescription eyeglasses and publicly attacked by the city of Brownsville mayor for opposing SpaceX environmental and gentrification injustice in in

her community where he's building this spaceship in Boca Chica. And all of that because of the [inaudible] charge that she spray painted "Gentrified, stop SpaceX" on a wall. Okay, the Musk and SpaceX cult is hurting people. It's hurting the entire planet, or like all the other injustices and all the other forms of pollution, it hurts some communities more than others. And it is happening all over again. And I don't know what else to do, and that's why I'm pleading to you. I don't know how you fit this in the scorecard. All I know is that I hope that at the end of my quick three minutes, one of you will get to somebody in the White House and say we cannot allow the rush to commercialize into industrialized space to give us the same of nothing and this time to hurt far more communities. I asked in my comments to you to imagine the future in your children's own lifetime, where we could no longer launch an Earth observation satellite, that we could no longer even know the weather, that there's a hurricane coming, that we can no longer even launch GPS satellites to know the location and to know where to send rescue resources. And I mentioned that just to make you realize the reality of what is happening. All this is happening because basically the US government as well as other governments on the planet don't have the policies in place to make sure that they properly regulate the commercialization of space. So, this future is really not fiction. The FCC is categorically excluding data constellations of commercial satellites. The FAA is barely doing any environmental assessments of spaceports such as what's happening in Boca Chica. And I have a friend right now who was being ridiculed just for speaking up. So, I am pleading this. I don't know what else to do. And I'll be glad to provide more information as much as you want or as little as you want, because I'm begging for help. We're begging for help. Thank you.

Will Patterson, public commenter: Thank you to the WHEJAC, to the committee, to everyone listening in, to the public listening in today. I just want to first say that my heart goes out to the previous speaker, and to those that are struggling with looking for answers to the various environmental injustice issues that have taken place. On somewhat of a different note, what I'd like to say is there are organizations—first, let me let me back up; sorry. I represent a number of faith-based and community-based organizations more along the faith-based side of things. We're out here in region nine in Northern California, in the San Francisco, Oakland Bay Area, mostly East Bay, on the Oakland side of the bridge. And there are organizations that are really doing some great work. And one of those is East Bay MUD, East Bay Municipal Utility District; they are responsible for the water delivery in our geographic location. And one of the things that would be great in the development of your scorecard would be that there's an effort within that to reach out to the organizations that are doing the good work, not just the—you know, there is lots of good work, there's lots of good work being done as far as bringing the environmental justice efforts to the forefront. But organizations, for example, like East Bay MUD that have really gone out of their way to be at the forefront of looking out for environmental justice, while they're providing good quality water to both residents of underserved communities and those that fall outside of underserved communities. And so that's a lot of times the struggle when you're an agency or municipality responsible for these services is being able to provide them in a quality way for underserved communities as well as those that live, reside, outside underserved communities. So not just with the development of your current scorecard, but we want to be able to be an example that the overall Administration's national scorecard to point to as far as this success is, so just something within your scorecard, and along the lines of a national scorecard, if you will, really reaching out to organizations that are making an effort, forward thinking, looking at really engaging and providing services that better work, that are really working, for example,

in the area of water. Organizations like East Bay MUD, they're providing one of the, you know, among the top-quality water in the nation, while adhering to the environmental standards, the highest environmental standards. Thank you very much.

William Patterson, public commenter: I'm William B. Patterson. I'm a board member of the East Bay Municipal Utility District, and our district is a special district. It encompasses both water that is clean, the cleanest drinking water in the nation, and it also does the wastewater services. What I want to just to engage the WHEJAC in is that I would like to encourage you to work along with agencies like East Bay MUD. We serve 3.6 million people in water, and about 780,000 people in wastewater services. We're already hooked up with projects that we've done in the upcountry, Calaveras County, where our water comes from. We had to do cleanup from the old gold mining that was threatening our water supply coming off the Mokelumne River. And we did that; cost millions of dollars to dig it out and work with Department of Federal Lands in making that happen. That was in the interest of all the people in the water component of our department and bringing them the best water. In the wastewater end, we've been given many awards for our protection of the Bay. We are currently working with EPA, and we are involved in a project called a consent decree of 2010–2014. And that is all the water that is draining off the surface of the East Bay within our jurisdiction, seven or eight cities and all the agencies therein, in making sure that water goes back into the bay in pristine conditions. So, these are some examples of things that we are doing. And we'd like to encourage EPA through the WHEJAC to work with the larger agencies, and you can get miles down the road from what we've already done. And I want to just thank you for the continuous support and working relationship over the years. That's my story this morning, and it's very positive. Thank you.

Dan Solitz, public commenter: I'm from the northwest. But I'm calling regarding the Department of Energy Environmental Management sites restoration of the legacy Cold War effort to develop more bomb material, particularly Hanford, which is the largest and most contaminated site. It's complicated, but we need a place for the wastes from those sites that is suitable for their final deposition. And that doesn't seem to be happening on a national scale, which is where it needs to be happening. Reactor spent fuel at this point is supposed to be mixed with high-level waste from legacy Cold War plutonium production sites. There needs to be an effort to revive the effort in Congress to get this this geologic disposal matter further down the road after what's happened with Yucca, and I'm hoping that the White House can apply some leverage to move this down the line not only for the generations now, but for the generations in the future and also to do it in a way that is fair to all of the different regions in the country. Thank you.

Brandi Crawford-Johnson, public commenter: I feel like the EPA needs to do a lot more enforcement. And everyone should just be going down to these disadvantaged communities. We have all of them labeled on the new climate justice tool and start doing enforcement on these polluters, start revoking permits so that these disadvantaged communities can stop suffering these severe health risks and start living healthier lives. I just don't see a lot of action happening. WHEJAC's put their plan through, last May, and there's just not any action happening. CEQ needs to get in here and start implementing these plans that are being put forth to help these environmental justice communities. We don't have a lot of time. Our earth is on fire for God's sakes. Climate change and environmental justice go hand in hand. And we can say that, you

know, all these false promises, saying, we're going to do this, or we're going to do that—if we don't see action that's happening right now, then everyone's screwed. We need to get these actions implemented as soon as possible. Any recommendation that WHEJAC has put forth has got to be implemented right now. We cannot wait for this. We have to have actions, and environmental justice. Thank you.

Rachel Makleff, public commenter: Thank you so much. My name is Rachel Makleff, and I volunteer to work for clean, renewable energy as well as the prevention and remediation of environmental justice communities. In renewing the Paris Agreement, the United States pledged to reduce emissions in environmental communities worldwide. It was a group effort; the agreement is an agreement with a group. But looking at the Advisory Council, and its scorecard Working Group—which is terrific, really terrific—neither seems to pay attention to the strange lack of logic in the US trade agreements. And I'm talking about things like NAFTA. If reduction in a factory abroad hurts the factory worker in some permutation of NAFTA, the product is prohibited to be imported into the United States under fair trade, the Fair-Trade concept. But when the health and safety of people living near the factory occurs, there may be no such refusal. And I talked last time about a project here in New York City to import electricity from Canada. The people living in Canada who are who are First Nation people are harmed by all of this production process. And I won't go on and on because last time I did, but there's something very weird about it, because we're also helping other countries. I just read something in the news about John Kerry helping other countries. So, here's my challenge to WHEJAC and to the Scorecard Working Group: please announce, have President Biden announce, that the whole system that creates EJ communities abroad needs to be brought into the vision of what we're doing here. Certainly, we can't clean up, we can't pay. But we certainly should be able to say, this project creates an environmental justice community abroad by the process, and therefore we will not give a trade permit to this project. Thank you very much.

Vincent Martin, public commenter: My name is Vincent Martin and I'm calling from Detroit, representing 48217 community, one of the most polluted areas of in Michigan. And I'm really concerned about all this money being invested in these new green screening tools. And we already know the information of where the worst areas are. Spending money that could be going for action. Again, let's see some solution on the ground where it counts. And we do not need any more data extracting information from our communities because it has not been helping us. So, what I want to talk about now is we have two Riverside docks that collapsed into the Detroit River. And our research has found out that our areas were pegged for the creation of the atom bomb. And we will try to get some information on what was done with the nuclear waste while the radiation was being pulled out the area. Well, I got information from the Department of Energy that says they don't have no information. Now, radiation is something that has a life span of millions and millions of years, and radiation waste being hauled off and placed where we cannot find it is a big problem. So, do we have environmental justice from the EPA and Department of Energy in our government, or are we just another specimen in a petri dish? So, we need to actually get our act together because I've been at this now for a lot of years, and we've been getting a lot of talk, rhetoric, and no action from our government. And we need solutions now. We can't wait for tomorrow like the previous caller said. We need some actions today. And thank you for your time.

Kurd Ali: thanked commenters and said that anyone interested in providing public comments can send it to the WHEJAC via email to whejac@epa.com.

WHEJAC Scorecard Workgroup Update and Discussion

Richard Moore: Again, on behalf of all of us, thank to those that made public comment. And the struggle continues, and stories continues, the issues continue, the lives in some cases of people don't continue, and we just keep on keeping on going. And so, we just wanted to thank those that made public comment, and then just say that we take public comment very seriously. And as you listen into the rest of the next couple of hours, that public comment is something that's very, very important to this council. And believe me, at the end of the day that we totally understand the issues that have been discussed during public comment. For many of us, we're living those issues on a day-to-day basis. So, I'm going to pass it on to Dr. Kyle, and to Peggy are who are co-chairs of the scorecard workgroup. So, I will turn it over at this particular point. Thank you to both of you.

Kyle Whyte: I respect greatly everybody that took their time to make public comments. And this part of the meeting is going to be a discussion regarding the scorecard. So just very, very briefly, we are submitting recommendations in two different phases regarding the scorecard. The first phase we completed last public meeting. And those were base, foundational recommendations about what a scorecard should be, what it should do, the scale and scope of the scorecard. Those recommendations will be transmitted to CEQ next week. I appreciate and respect greatly all of the revisions that WHEJAC members provided in that last public meeting, and all revisions were made to the final recommendations for phase one.

Phase two, which we'd like to discuss right now, has to do with getting to the specifics of very particular scoring measures and metrics, actual things that need to be scored and how to score them, affecting almost all agencies given the mandate of the of the White House for environmental justice work.

And so, for the next few minutes, we'd like to open things up to WHEJAC members, and we requested everybody make comments about two different things. One, we would really like to hear your comments regarding what our tremendously valued colleagues in the public comments period shared about the scorecard. If you have further comments or ideas or things that you want to lift up about what was shared in the public comments, this is the time to or at least one time to do that. The second thing is if you do have ideas or comments to share just regarding the scorecard, and again, the specifics, the particularities what needs to be scored how, we'd like to have that conversation and hear from you as well in this time period. So, before we move into the to this discussion, period, I just wanted to see if chairperson Shepherd wanted to make further comments or share anything further at this point.

Peggy Shepard: I would just like to say that I really appreciated the remarks that Chair Mallory made in addressing the scorecard. She referenced an across-agencies scorecard that would address government-wide how environmental justice and Justice40 was being advanced. And I just want to put a pin on that, that the summary card can only be done if there's a card done for every agency. And so, I just want to put that clarification there that we cannot do a summary

without understanding the scorecard for every single agency that is subject to the executive order. So just want to make that point. And as many of the members of the scorecard group know, we have only met with maybe two or three of the agencies to really understand what they are beginning to do. So, again, without meeting with the Interagency Working Group, which we have put in a request for, I believe some time ago, without meeting with those people who are representing every federal agency, it becomes very difficult to finalize our work without that information and expertise.

Kyle Whyte: Thank you, and, Karen, I believe we can go ahead and open it up. So, I look forward to discussing and learning from the WHEJAC members about the topics that myself and chairperson Shepherd opened up for discussion.

Karen Martin: If members could use the raise your hand feature. Please remember to state your name when you're speaking and remember to speak slowly for our interpreters. Do you want to call names, Kyle, or you want me to help you with that? Or Richard, you want to do that?

Richard Moore: I think on my end, not speaking for Dr. Kyle or for Peggy, I would appreciate some backup on the hands raising.

Peggy Shepard: I can see them. I see Dr. Bullard, Ruth Santiago, Vi, and I'm not sure which order. So forgive me if I go in the wrong order. I'll start with Ruth Santiago.

Ruth Santiago: I think that, as it has been stated before, we certainly need a lot more information from the agencies and hopefully meetings with the Interagency Council in order to have an idea about the specific kinds of metrics for each of the agencies. But there is one crosscutting metric, I think, that we can use, which was alluded to in the public comments that have to do—I think it's sort of an engagement metric, a public engagement metric of the agencies to reach out and I guess, and I think they're saying, work with community-based organizations that are doing really beneficial work in those communities. So, one commenter emphasized that, or a couple of them emphasize that quite a bit. I totally agree that agencies should be evaluated on the basis of how they are doing this engagement, this outreach in the communities. And further than that, actually working and partnering with and providing resources to community-based organizations that are addressing as the commenters mentioned, water supply. And of course, there are many other areas and other services that community-based organizations provide that should be supported by the respective agencies, depending on their area of expertise. Thank you.

Peggy Shepard: Okay, Vi.

Viola Waghiyi: We heard some very moving comments. I understand the urgency that we heard from some of the callers. I can relate to that, personally, of what is happening in my community with the climate crisis. We heard over and over the climate change, but I just wanted to say—I believe it was one of the last commenters talking about no more data, and that there's an urgency for action. However, there is no data in some instances, there is no data, like no data on what is happening in my community. You know, as far as health disparities, the cancer registry does not work for communities small like mine, and they blame cigarette smoke for all our cancers with

the cancer crisis we're facing. There's no data on persistent organic pollutants that are sequestered in permafrost, ice, and glaciers that are melting. And, you know, I understand the urgency; however, it's important that we identify and seek from grassroots and community-based organizations that are doing science collection on the ground. It's so important; the existing data doesn't have all that we need to identify these EJ communities.

And the other I heard about that stood out was the injured worker, trying to get help for to himself, you know, with the Department of Energy. This is shameful. And we need to find ways to hold federal agencies accountable for the health harms caused by their actions. And to sweep it under the rug, shame on them. And also, legacy pollution. As we heard today, yet another war has erupted, right? We still have legacy military toxics harming the health and well-being of my people, and globally. And we call them Superfund sites. But we need to call it out as it is military toxics, their occupation and activities. We heard about Cold War era, but also unexploded ordnances; we heard about underground tanks in Hawaii at the Red Hill, and the Pentagon not willing to take responsibility. And these are people and individuals who have a human right to health and human rights to free and prior informed consent. We heard—we've been hearing about it over and over. And the other scorecard I would like to bring awareness to is with the Department Health and Human Services, agencies who are supposed to look out for our health and well-being; they should be going to Congress to make sure that any new development or any new industry or plant or permits that there's money put aside for impending health harms because it won't be a matter of time, too many lives have been lost already. And health harms we hear about over and over. And because, federal agencies are not addressing their health harms, there needs to be proper screening, treatment, and diagnosis of environmental health effects. Thank you.

Robert Bullard: I had a question and more of a critique. The scorecard is going to get sent up; there are comments going to be made. And how the scorecard will be used within the various agencies and within the culture of those agencies, and the priority programs and the agencies and the different mandates that the agencies have—and so my question and concern is, to what extent will this tool—even in a beta form—be looked at in a way that can garner interagency collaboration? And viewing how the various programs within the various departments can use a scorecard like this to assist and supporting targeting monies that, when you put them together, will have a multiplier effect, as opposed to one agency setting priorities and using the scorecard to just—I'm not saying this will happen, but it could happen—just blindly target their programs in a way that may not have any kind of assessments done or plans to partner or to make companion kinds of funding so that you get the biggest bang for the buck. I'm looking at, for example, communities that have legacy pollution, communities that have historically had infrastructure needs that have not been met. And these are the same types of communities, communities that have energy poverty. So that's EPA and as, for example, transportation infrastructure, that's DOT. Communities that have high energy, poverty, energy insecurity, I would say that's DOE. And so, when you start targeting the resources, and having the agencies talk to each other and talk about their programs, HUD is housing and, and CDBG monies, community development block grant monies, that's for dealing with housing issues for low-income families. And if you talk about issues around communities that have been hit hard with disasters, like flooding and droughts, heat waves, you name the climate disasters, that's FEMA. And so, FEMA involves housing, it involves a whole lot of things. When you start scoring these

things, are the agencies going to be talking to each other so that the FEMA dollars that would go to an area—and that money goes to the state, and then the state dolls it back out—will the scorecard for housing, transportation, workforce development, that's Department of Labor—and other kinds of elements that create this advantage that you're calling the community that's being targeted? Will there be an analysis done to talk about how the monies that these six agencies could put toward targeting these communities in a way that you could hit a lot of the areas, and you could get, you know, if you're talking about the multiplier effect of this when you start evaluating and assessing what this would mean? And I'm thinking about a program in the Department of Labor, which could be a training program, a program that's in NIEHS, a training program, a program that's in DOE, a training program, are all of these training programs aligned in a way that you're thinking about jobs, sustainability, livability, health, et cetera? And I would hope that there would be thinking along the lines of, that interagency working to maximize where the problems are so that you can get the programs with the money—we're not talking money, we're talking benefits—can align with those communities, those neighborhoods, those areas that have maybe a bunch of those highly ranked factors that would make them eligible for the programs. I know, I was rambling, but I have thought about this. And I've seen too often where these agencies really don't talk. You know, there's one program that's over here. And you say, well, why don't you work together? Why isn't the job training program, the weatherization program, the program for green jobs, programs for health, blah, blah, blah, working on these things together and talking? And they said, well, that's our money, and we don't work—that's *our* money. Departments are very— When you talk about jurisdictions and that kind of thing. So that was my question and comment.

Peggy Shepard: I just want to remind you, as well as the members, that the scorecard is not just about Justice40 benefits of investments; it's about how the administration has advanced environmental justice. And so, your thought about how agencies are collaborating to advance effectiveness is one of those generic environmental justice metrics that we can use. So, we need to be thinking about some of those environmental justice metrics, not just Justice40. And, of course, thinking about the EJ metrics really allows us to be much more expansive and to talk about dollars, and to talk about—a young man in the public session talked about disadvantaged businesspeople. We can figure out that if DOE's putting forward a lot of contracts about weatherization or energy efficiencies, will those go to those big-time contractors? Or will the smaller folks who generally just get a subcontract, will we be able to lift them up to be primes? So those are also metrics that we need to be thinking about. So, Thanks, Bob, on that. Dr. Nicky Sheats.

Nicky Sheats: Oh, thanks, Peggy. I thought what you said starting out the session was really interesting, Peggy, and I was just going to ask for clarification. So, is the workgroup thinking that there should be a separate scorecard for each agency? And then maybe an overall scorecard somehow that brings them together? And if that's the case, then should the workgroup and WHEJAC be commenting on scorecard giving recommendations for a scorecard on each agency then and on the overall scorecard? I was just interested in what you were saying, Peggy. Excuse me if I got it wrong.

Peggy Shepard: No, that is correct, Nicky. I don't see how we score the administration if we aren't scoring each agency that is subject to the executive order, especially given how different

many of them may be from each other in terms of their mission, in terms of their programs. I don't know how we would do one generic scorecard that really reached into the operations of each agency. But certainly, I'd love to hear more discussion about that point. So those are my thoughts on Nicky. Dr. Beverly Wright. And then Angelo Logan.

Beverly Wright: I wanted to make certain that I wouldn't be redundant with my concerns that just recently, a large study came out that showed the connection between redlining and PM 2.5 and pollution. And all the questions that people ask me about this, I basically tell them it's not surprising, because the communities that are redlined are mostly African American or other people color. So African Americans and other people of color live with more pollution, then of course, all these things are correlated. So, when I think about the scorecard, I'm thinking about things like that, how do we capture that? Would redlining be something that we would even think about? And certainly, we need to think about, if you're talking about environmental justice, things like PM 2.5, especially the way we see it being connected to COVID-19 and health. So, if you're looking at the health of a community, if you're looking at housing, and redlining certainly ought to be something that's involved in it. All these things are so connected. And I'm trying to figure out, like, to me, at some point, I think that as Bob was trying to also talk about the connectivity of all of this as it relates to environmental justice communities, and climate impacted communities and protecting them, or improving their quality of life, there are things that are interconnected, and it all goes back to race.

So, I still say, you know, I don't want to bring this up, and I know that Administrator Mallory was really speaking to this whole issue that those of us specifically who are African American are upset about race not being included in the screening tool. So how do we deal with race in scoring? And our committee member who's very smart in dealing with this, Rachel, said to us, that we would be able to use race as a metric in the scoring card. My question is, how are we going to use it, and I don't just mean race with Black people. Native Americans, I think there's special circumstances, with Latinos there's special circumstances. We must use race in the scorecard to be able to show what's happening with different racial and ethnic groups, as it relates to the programs that they have coming out. So I want to make certain because I think that, you know, scorecard discussions—and when I finally calmed down about the point of not including race in the screening tool and asking the question: if you have a program that was put in place to deal with race, and disproportionality, and all these things because of race, how in the world do you score race without saying race? I think it's impossible, especially now looking at this latest study with some things like redlining being connected to PM 2.5. And, you know, the connectedness of all of this is the same people by race. You know, I'm very interested in us figuring out on a matrix where we will place race to be in that scorecard. And I haven't figured it out; I think Rachel has. And so, I was hoping I get a response. I don't know if she's on now. But this is something that's really important to me. I want us to get it right in all the ways that everybody's been talking about. But if we don't include race, what did we get right? When that's why we're here?

Peggy Shepard: I just wanted to go back to a question that Vi asked; she asked what redlining is. Redlining has been the procedure that banks have used to reject loans in certain neighborhoods, and generally, that was in Black neighborhoods where Black applicants could not get a loan to buy a home or to renovate a home, and they kind of redlined certain

neighborhoods that were generally Black neighborhoods. And that's what redlining is. That's how you defined redlining.

Robert Bullard: Banks, insurance companies, and businesses; it's not just mortgages. It's also insurance companies redline. If you do get insured, it costs more, exorbitant. They don't put the infrastructure in. They don't build the parks and the other infrastructure in terms of trees, in terms of flood protection and other kinds of what people call amenities, they don't put that stuff in our communities. And it was planned that way. And that's how you ended up having all kinds of urban heat islands and flooding, et cetera.

Viola Waghiyi: Food deserts can be used like in gentrification.

Beverly Wright: You went right to it, Vi; that is the point. It creates communities that are ready for gentrification. And they are usually in coveted areas within the city limit.

Peggy Shepard: And you also won't see grocery stores in some areas because the insurance companies want to charge so much if it's, you know, a Black or community of color. There are many ways that that plays out.

Viola Waghiyi: Racism.

Peggy Shepard: Yes, exactly. Our next speaker is Angela Logan.

Angelo Logan: I wanted to comment on the multi-agency approach. So, I wanted to just voice my support for the scorecard to apply to multiple agencies and departments across the administration, both individually and as a blanket, so maybe one blanket scorecard as well, that has criteria that reaches across all the different departments. But I think drilling into each of the departments will be very important as well. If this this particular scorecard is to assess the effectiveness of the administration, you know, at best we have, like, what, another six years or something like that, right? And we've been kind of accumulating this problem for over 500 years. So, we're not going to resolve this issue within the next four to six years. And so, I think that it's important for us to really institutionalize the scorecard across all the departments. So, to the best of the administration's ability, institutionalize it into the function of each of the departments and agencies, so that it can exist over a long period of time, so that we can have long-term assessments, along with short-term assessments. So, we have the four-year assessment to understand the existing administration. But what happens in 20 years? I started doing this work over 20 years ago, I thought, by 20 years, we're going to see some progress. We have the assessment tool in place, we might see very little progress in the overall issue of environmental racism. So, I wanted to place support and consideration for those two types of approaches within the scorecard.

Peggy Shepard: I think at one of our last public meetings, the issue of how we evaluate senior staff at agencies came up, that they should be evaluated based on diversity, equity, and such. And so, as you said, Angelo, if we institutionalize the scorecard into agency functions and operations, we will also see the directors of some of those programs and departments perhaps being

evaluated based on what happens with the scorecard for their department or their operations. So that would be another way to get to the personnel issue, as well. Dr. Kyle White.

Kyle Whyte: Thank you. I just wanted to add a further response to the question line that Dr. Sheats began and that, Chairperson Shepherd, you'd responded to and then also Angelo and others made very relevant comments on the topic of the individual agency scorecards and interagency scoring. I was going to mention that in our base recommendations and Phase One that go to CEQ next week, we did state that when we refer to the EJ scorecard, what we're referring to is all the different individual agency scorecards, but we also said that that includes the need for whole-of-government interagency scoring for issues that we need to advance through interagency coordination. And so, in our future discussions, including this discussion, we should be developing metrics and scoring that speak to the type of interagency collaborations that are needed both in relation—Peggy made a good point in response to Dr. Bullard—both in relation to Justice40, but also for all of the other EJ issues that require that coordination. So, given our base recommendations, all of these points that you all have been making, I think are very, very critical. And the more we can specify and particularize and get to the bottom of this, I think we'll be able to make some compelling recommendations.

Tom Cormons: Yes, this is such a critically important conversation. And as those of us in the Justice40 workgroup are thinking about forthcoming sets of recommendations on Justice40, one of the biggest considerations, I think, for us is what the accountability mechanisms are going to be to incentivize agencies to do their very best under Justice40. And, you know, I think accountability is helpful, not just in cases where your entities or individuals may not want to do the right thing, but also where they really do want to do the right thing. And it's extremely helpful to be evaluated for the right things one is doing, and to include the right things that we want to prioritize in how individuals are evaluated. And, you know, on up the chain to how full agencies are evaluated.

There are two areas I want to lean in on in relation to that, certainly not the only two that are important, but two that have come up a lot in conversation with community members and are not always traditionally emphasized as much as I think that the Biden Administration wants to, and we all want the administration to. The first is local economic benefits. And this goes to a point made by one of the public commenters that if we're really going to be transformative, we need to look at investing in businesses and building wealth in impacted disadvantaged communities themselves. It's very easy to make investments for projects in disadvantaged communities that may go to outside companies or even large corporations. And you know, even if they're hiring local folks, are they really building wealth in those places? So, I'm really interested in thinking from an accountability standpoint on how actually building wealth in local communities—as opposed to just employing people in local communities—is accounted for in terms of the accountability metrics. The other area that really deserves to be underscored here is effectiveness of public outreach and grassroots engagement. Because the way to do things impactfully is in a way that's informed by sensitivities on the ground, and wisdom on the ground, and people who are impacted on the ground. So, I'm interested in thinking about accountability metrics that look not only at strictly the outputs of agencies in relation to public engagement—you know, did you hold a public hearing or not? How many public hearings did you hear? —but the outcomes of that public engagement. Because if you're looking at the outcomes in terms of how many people

were actually engaged, how many constructive comments were received, and considered and influenced the project, I think that provides a greater incentive to do public engagement in the most impactful way to make sure that you've got the best people on staff who are really great at doing it and not just jumping through hoops in a rote way, but really striving for impact. So, thinking about, you know, outcome-based metrics for public engagement, community engagement, I think is really important. Thank you.

Michele Roberts: I'll make my comments very brief. I just want to echo what everyone else has said. And you know, it seems we're able to see some of this in real time as we speak right now, I won't go into the specifics. But one thing is important to making sure that we look at . . . make sure that we have scorecards, as everyone has said, for the various agencies and then an overarching one. The reason being is continuous use, as we all said, continue to help us really look at these metrics and identify them. But one of the things that we're doing in some of our work right now is taking it back to the tuberculosis epidemic. So thereby looking at those who have been left behind with TB, as we're speaking about the disparity with COVID-19. So, this gives us one of those baseline examples and reasons why, even with the onset of that, of legacy communities, redlining, and flat-out racial segregation, it helps us to track as best we can to see the spikes and numbers and consistencies thereof from epidemic to pandemic, and all our other legacy issues in between. I'll just leave it there. But I just want to echo what everyone said and say that it is very important for us to have various measures of making sure— and then last, have some type of tracking mechanism within those processes that tracks the community input. Therefore, the communities constantly see themselves in this [inaudible]. In addition to that, the agencies themselves can even see where they're making strides of efforts, or the lack thereof, and it gives a deeper level of accountability and transparency, as well as engagement for everyone around. I'll leave it there. Thank you.

Nicky Sheats: I just wanted to comment on what Dr. Wright brought up, what Beverly brought up about indicators you could use to track race. Where you don't specifically use percentage of people of color in the census track. And redlining could be one of them. Another one that people talk about is there a history of racially restrictive land covenants? There are some measures of segregation. That gets tricky though, because then you're not only talking about people of color. And then also you can think about other indicators that are not race-conscious but that also may track the impacts of race, like PM 2.5 concentrations themselves might, or you could also think of unemployment, or maybe educational attainment. And I think we're probably going to have our next screening tool workgroup meeting soon. And I anticipate that's going to be a hot topic of discussion. And I think that the two workgroups should have a lot of cross-pollination between the scorecard workgroup, and the screening tool workgroup about this particular topic, in particular, and we should talk about how to how to make that happen, I think.

Kyle Whyte: Just quickly given Dr. Sheats and others, and I believe Dr. Wright had mentioned the race-conscious data, and I just wanted to clarify that for the scorecard, we can use race-conscious data. And so, I just wanted to clarify that and so I appreciate Dr. Sheats your point about what that means for the coordination between the screening tool's work and the scorecard work.

Beverly Wright: I was going to say the same thing, Peggy. My hand was up. We're talking about using race for the scorecard because it's not being used in the screening tool, and the screening tool coming up with other measures that better get at race if that's the way this is going to go, which I still stand in disagreement on. I don't know how many times I have to say it but yeah, I just—

Nicky Sheats: Because in the scorecard you're not giving out benefits, but you're actually analyzing something. So that's very different.

Beverly Wright: But the whole reason for the screening tool is to get to problems that exist because of race. So you we will never agree on this, Nicky. I think that is a wimpish approach. I think we should stand up for what's right and fight. But that's me.

Nicky Sheats: I don't think we disagree. I think the question is how to do it.

Peggy Shepard: Okay. I don't know if that's the last word. Kyle? I'm not seeing any more hands up.

Kyle Whyte: Neither am I. Chairperson Shepherd, should we request to move to the next segment the business meeting?

Richard Moore: I think it was a very, very important discussion. And we may necessarily not agree about everything. But the question at the end of the day, is how we are going to deal with the concerns of our people, and not only those that have made public comment, but the hundreds and hundreds upon hundreds of others to be able to get the job done that we want to get done. And so, I think with that said, that we're ready to move to the business section.

I'm going turn it back over to Peggy in just in a second. But just let me just make this comment. Again, it's extremely important that we maintain quorum, so I need to keep bringing that up. Because we're going to go into the business section now, again, and we need to have quorum.

So, what we'll do is we'll use this time to do a couple of things. One is, is reflect on the proceedings and public comment period, you'll see that when Peggy gives us some guidance of how to move forward, and then we'll provide workgroup updates. And we'll discuss action items and finalize next steps. So, Peggy, that's how we're going to tighten up this piece and run through it, and I will turn it back to you.

Ruth Santiago: All right. I don't want to hold it up or anything. But I just wanted to say that, in this discussion of the scorecard, I wanted to mention that the data collection in the territories is especially deficient. It's been documented many times here in Puerto Rico. We heard from the Virgin Islands. So that is, I guess, crucial, right? The inputs that you might have for a scorecard depend on what kind of data that an agency is or is not collecting. And we have a real problem with that in the territories. And also wanted to mention and highlight that during the public comment. There was a lot of reference in the territories as well and in the [inaudible] areas about military pollution and unwillingness of the military to decontaminate properly, etc. So, the

scorecard, the specific scorecard for DOD needs to reflect those criteria. And sorry to wait till the last minute for that comment.

WHEJAC Business Meeting

Peggy Shepard introduced the two key actions under discussion:

1. Finalize WHEJAC Action on Public Comments
2. Finalize WHEJAC Letter

WHEJAC Action on Public Comments

Peggy Shepard said the group had discussed the public comment process in the November 2021 and December 2022 public meetings but did not vote on an action at those times, so that vote is on the agenda. The issue is that, although the WHEJAC is not required to respond to individual public comments, they would like to ensure the government is more responsive to public comments offered at WHEJAC meetings.

Members were asked to vote for one of the three following options (which were shared with members before the meeting):

1. Request CEQ/IAC to establish a point of contact for each agency to attend public meetings to hear public comments, and prepare to follow up with the WHEJAC at the next public meeting on actions taken on public comments received
2. Request CEA/IAC to develop a process on how they will respond to public comments and report back to the WHEJAC. Set a timeframe for CEQ/IAC to report back to the WHEJAC on the process
3. Set up a WHEJAC workgroup to draft recommendations for a system for following up and tracking public comments

Several members immediately voiced their opposition to option 3, establishing another workgroup.

Peggy Shepard called for a vote on Option 1. Option 1 passed.

Peggy Shepard raised the issue of the time frame within which agencies will need to respond, and suggested three weeks. Karen Martin said the next public meeting is a month out. Peggy Shepard said she would prefer if there were a response by the next business meeting, and then the agency representatives could attend the public meeting. Peggy Shepard clarified that the process would start at the March 30 meeting.

Next step: The WHEJAC will notify CEQ that they will have to establish a point of contact for agencies and prepare to follow up with the WHEJAC.

WHEJAC Letter

Peggy Shepard explained that this action item is to request resources for WHEJAC workgroups, such as contractors, writers, editors, graphic designers, and expertise around federal agencies.

The letter requests timelines for key deliverables and recommends an increase in CEQ budget and staff. A draft of this letter was shared with members the evening before (see appendix 5).

Ruth Santiago suggested a minor edit.

Peggy Shepard called for a vote on the letter with edits. **Karen Martin** confirmed there was consensus.

Next step: The letter will be sent to CEQ.

Next Public Meeting

March 30–31, 2022

Closing Remarks

Closing remarks were delivered by Peggy Shepard, Corey Solow, Richard Moore, and Catherine Coleman Flowers.

Karen Martin adjourned the meeting.

Appendix 1. Public Announcement

phone, and webform. For further information about the EPA's public docket, Docket Center services and the current status, please visit us online at *https://www.epa.gov/dockets.* The telephone number for the Docket Center is 202–566–1744.

Abstract: This information collection request pertains to trade secrecy claims submitted under section 322 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). EPCRA contains provisions requiring facilities to report to state and local authorities, and EPA, the presence of extremely hazardous substances (section 302), inventory of hazardous chemicals (sections 311 and 312) and manufacture, process and use of toxic chemicals (section 313). Section 322 of EPCRA allows a facility to withhold the specific chemical identity from these EPCRA reports if the facility asserts a trade secret claim for that chemical identity. The provisions in section 322 establish the requirements and procedures that facilities must follow to request trade secret treatment of chemical identities, as well as the procedures for submitting public petitions to the Agency for review of the ''sufficiency'' of trade secret claims.

Trade secret protection is provided for specific chemical identities contained in reports submitted under each of the following sections of EPCRA: (1) Section 303(d)(2)—Facility notification of changes that have or are about to occur; (2) section 303(d)(3)—Local Emergency Planning Committee (LEPC) requests for facility information to develop or implement emergency plans; (3) section 311—Material Safety Data Sheets (MSDSs) submitted by facilities, or lists of those chemicals submitted in place of the MSDSs; (4) section 312—Emergency and Hazardous Chemical Inventory forms (Tier I and Tier II); and (5) section 313—Toxic Chemical Release Inventory form.

Form Numbers: EPA Form 9510–1.

Respondents/affected entities: Entities potentially affected by this action are manufacturer and non-manufacturer facilities subject to reporting under sections 303, 311, 312 or 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA).

Respondent's obligation to respond: Mandatory if a respondent decides to make a trade secret claim for the chemical identity for any of the chemicals in any of the reports the respondent is required to submit under EPCRA sections 303, 311, 312 or 313.

Estimated number of respondents: 283 trade secret claims.

Frequency of response: Annual, with reports submitted under sections 312 and 313.

Total estimated burden: 2,689 hours (per year). Burden is defined at 5 CFR 1320.03(b).

Total estimated cost: $164,989 (per year). There are no capital or operation and maintenance costs associated with this ICR.

Changes in estimates: The small increase in estimated burden from the previous ICR is because the actual number of claims submitted was slightly higher than what EPA estimated it would receive in the previous ICR. Therefore, the number of trade secret claims EPA expects to receive in the upcoming three-year renewal period is also higher.

Courtney Kerwin,

Director, Regulatory Support Division.

[FR Doc. 2022–03375 Filed 2–15–22; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[EPA–HQ–OA–2022–0050; FRL–9568–01–OA]

White House Environmental Justice Advisory Council; Notification of Virtual Public Meeting

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notification for a public meeting.

SUMMARY: Pursuant to the Federal Advisory Committee Act (FACA), the U.S. Environmental Protection Agency (EPA) hereby provides notice that the White House Environmental Justice Advisory Council (WHEJAC) will meet on the dates and times described below. Due to unforeseen administrative circumstances, EPA is announcing this meeting with less than 15 calendar days public notice. EPA is announcing a meeting on February 24, 2022. The meeting is open to the public. Members of the public are encouraged to provide comments relevant to the scorecard that is being developed by the White House Environmental Justice Interagency Council (IAC) to assess the progress of federal agencies' in addressing current and historic environmental injustice. For additional information about registering to attend the meetings or to provide public comment, please see ''REGISTRATION'' under **SUPPLEMENTARY INFORMATION** Pre-registration is required.

DATES: The WHEJAC will hold a virtual public meeting on Thursday, February 24, 2022, from approximately 3 p.m.–7 p.m., Eastern Time. A public comment period relevant to the scorecard will be considered by the WHEJAC during the meeting. (see **SUPPLEMENTARY INFORMATION**). Members of the public who wish to participate during the public comment period must pre-register by 11:59 p.m., Eastern Time, February 21, 2022.

FOR FURTHER INFORMATION CONTACT: Karen L. Martin, WHEJAC Designated Federal Officer, U.S. EPA; email: *whejac@epa.gov;* telephone: (202) 564–0203. Additional information about the WHEJAC is available at *https://www.epa.gov/environmentaljustice/white-house-environmental-justice-advisory-council.*

SUPPLEMENTARY INFORMATION: The meeting discussion will focus on the performance scorecard that is being developed by the White House Environmental Justice Interagency Council to assess the progress of federal agencies' in addressing current and historic environmental injustice. Executive Order 14008, Section 220 (d) tasks the IAC to develop clear performance metrics to ensure accountability, in consultation with the White House Environmental Justice Advisory Council.

The Charter of the WHEJAC states that the advisory committee will provide independent advice and recommendations to the Chair of the Council on Environmental Quality and to the White House Environmental Justice Interagency Council. The WHEJAC will provide advice and recommendations about broad cross-cutting issues, related but not limited to, issues of environmental justice and pollution reduction, energy, climate change mitigation and resiliency, environmental health, and racial inequity. The WHEJAC's efforts will include a broad range of strategic, scientific, technological, regulatory, community engagement, and economic issues related to environmental justice.

Registration: Individual registration is required for the virtual public meeting. Information on how to register is located at *https://www.epa.gov/environmentaljustice/white-house-environmental-justice-advisory-council.* Registration for the meeting is available through the scheduled end time of the meeting. Registration to speak during the public comment period will close 11:59 p.m., Eastern Time, on February 21, 2022. When registering, please provide your name, organization, city and state, and email address for follow up. Please also indicate whether you would like to provide public comment

during the meeting, and whether you are submitting written comments at the time of registration.

A. Public Comment

The WHEJAC is interested in receiving public comments specific to the development of an annual public performance scorecard and the types of indicators or data that would be useful in a scorecard. This scorecard will provide a method for evaluation and accountability to assess progress on agencies' progress in addressing historic environmental justice. Every effort will be made to hear from as many registered public commenters during the time specified on the agenda. Individuals or groups making remarks during the public comment period will be limited to three (3) minutes. Please be prepared to briefly describe your issue and what you want the WHEJAC to advise CEQ and IAC to do. Submitting written comments for the record are strongly encouraged. You can submit your written comments in three different ways, (1.) by creating comments in the Docket ID No. EPA–HQ–OA–2022–0050 at *http://www.regulations.gov,* (2.) by using the webform at *https://www.epa.gov/environmentaljustice/white-house-environmental-justice-advisory-council#whejacmeeting,* and (3.) by sending comments via email to *wheja@epa.gov* . Written comments can be submitted through March 10, 2022.

B. Information About Services for Individuals With Disabilities or Requiring English Language Translation Assistance

For information about access or services for individuals requiring assistance, please contact Karen L. Martin, via email at *whejac@epa.gov* or contact by phone at (202) 564–0203. To request special accommodations for a disability or other assistance, please submit your request at least seven (7) working days prior to the meeting, to give EPA sufficient time to process your request. All requests should be sent to the email listed in the **FOR FURTHER INFORMATION CONTACT** section.

Matthew Tejada,

Director for the Office of Environmental Justice.

[FR Doc. 2022–03262 Filed 2–15–22; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–9564–01–R6]

Clean Air Act Operating Permit Program; Petitions for Objection to State Operating Permit for ETC Texas Pipeline, Ltd, Waha Gas Plant, Pecos County, Texas

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of final Order on Petition for objection to Clean Air Act title V operating permit.

SUMMARY: The Environmental Protection Agency (EPA) Administrator signed an Order dated January 28, 2022, granting a Petition dated March 10, 2020 from the Environmental Integrity Project, Sierra Club, Environment Texas, and Texas Campaign for the Environment (the Petitioners). The Petition requested that the EPA object to a Clean Air Act (CAA) title V operating permit issued by the Texas Commission on Environmental Quality (TCEQ) to ETC Texas Pipeline, Ltd (ETC) for its Waha Gas Plant located in Pecos County, Texas.

ADDRESSES: The EPA requests that you contact the individual listed in the **FOR FURTHER INFORMATION CONTACT** section to view copies of the final Order, the Petition, and other supporting information. Out of an abundance of caution for members of the public and our staff, the EPA Region 6 office is currently closed to the public to reduce the risk of transmitting COVID–19. Please call or email the contact listed below if you need alternative access to the final Order and Petition, which are available electronically at: *https://www.epa.gov/title-v-operating-permits/title-v-petition-database.*

FOR FURTHER INFORMATION CONTACT: Aimee Wilson, EPA Region 6 Office, Air Permits Section, (214) 665–7596, *wilson.aimee@epa.gov.*

SUPPLEMENTARY INFORMATION: The CAA affords EPA a 45-day period to review and object to, as appropriate, operating permits proposed by state permitting authorities under title V of the CAA. Section 505(b)(2) of the CAA authorizes any person to petition the EPA Administrator to object to a title V operating permit within 60 days after the expiration of the EPA's 45-day review period if the EPA has not objected on its own initiative. Petitions must be based only on objections to the permit that were raised with reasonable specificity during the public comment period provided by the state, unless the petitioner demonstrates that it was impracticable to raise these issues during the comment period or unless the grounds for the issue arose after this period.

The EPA received the Petition from the Petitioners dated March 10, 2020, requesting that the EPA object to the issuance of operating permit no. O2546, issued by TCEQ to the Waha Gas Plant in Pecos County, Texas. The Petition claims the proposed permit must include a schedule addressing noncompliance at the Waha Gas Plant, fails to identify any emission unit(s) authorized by one Permit by Rule (PBR) and three Standard Exemptions incorporated as applicable requirements, fails to establish monitoring, testing, and recordkeeping provisions that assure compliance with PBR and Standard Exemption requirements, fails to include specific enforceable terms and conditions for applicable NSPS requirements, and the proposed permit's incorporation of ETC's PBR registrations is deficient.

On January 28, 2022, the EPA Administrator issued an Order granting the Petition. The Order explains the basis for EPA's decision.

Dated: February 9, 2022.

David Garcia,

Director, Air and Radiation Division, Region 6.

[FR Doc. 2022–03265 Filed 2–15–22; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[EPA–HQ–SFUND–2005–0008; FRL–9582–01–OMS]

Information Collection Request Submitted to OMB for Review and Approval; Comment Request; Emergency Planning and Release Notification Requirements (EPCRA Sections 302, 303, and 304) (Renewal)

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The Environmental Protection Agency (EPA) has submitted an information collection request (ICR), Emergency Planning and Release Notification Requirements (EPA ICR Number 1395.11, OMB Control Number 2050–0092) to the Office of Management and Budget (OMB) for review and approval in accordance with the Paperwork Reduction Act. This is a proposed extension of the ICR, which is currently approved through April 30, 2022. Public comments were previously requested via the **Federal Register** on

Appendix 2. Agenda

The Council on Environmental Quality
White House Environmental Justice Advisory Council Virtual Public Meeting
February 24, 2022
3:00 P.M. – 7:30 P.M. ET

3:00 p.m. - 3:15 p.m.	**WELCOME, INTRODUCTIONS & OPENING REMARKS** • Karen L. Martin, Designated Federal Officer – U.S. Environmental Protection Agency • Richard Moore, White House Environmental Justice Council Co-Chair – Los Jardines Institute • Peggy Shepard, White House Environmental Justice Council Co-Chair – WE ACT for Environmental Justice o Catherine Coleman Flowers, White House Environmental Justice Council Vice Chair – Center for Rural Enterprise and Environmental Justice • Carletta Tilousi, White House Environmental Justice Council Vice Chair – Havasupai Tribal Council
3:15 p.m. - 3:30 p.m.	**WELCOME & OPENING REMARKS** Brenda Mallory, Chair – *The Council on Environmental Quality*
3:30 p.m. – 5:00 p.m.	**PUBLIC COMMENT PERIOD** *Members of the public will be given three (3) minutes to present comments relevant to the development of a scorecard to assess the progress of federal agencies in addressing environmental injustice.*
5:00 p.m. - 5:15 p.m.	BREAK
5:15 p.m. – 6:15 p.m.	**WHEJAC SCORECARD WORKGROUP UPDATE & DISCUSSION** • Dr. Kyle Whyte, Scorecard Workgroup Co-Chair – *University of Michigan* • Peggy Shepard, Workgroup Co-Chair – WE ACT for Environmental Justice
6:15 p.m. – 7:15 p.m.	**WHEJAC BUSINESS MEETING REFLECTION & CONVERSATION** The WHEJAC will use this time to reflect on the meeting proceedings and public comment period; provide workgroup updates; discuss action items and finalize next steps. • Karen L. Martin, Designated Federal Officer – U.S. Environmental Protection Agency • Richard Moore, White House Environmental Justice Council Co-Chair – Los Jardines Institute • Peggy Shepard, White House Environmental Justice Council Co-Chair – WE ACT for Environmental Justice • Catherine Coleman Flowers, White House Environmental Justice Council Vice Chair – Center for Rural Enterprise and Environmental Justice

	• Carletta Tilousi, White House Environmental Justice Council Vice Chair – Havasupai Tribal Council
7:15 p.m. - 7:30 p.m.	**CLOSING REMARKS & ADJOURN** • Corey Solow, Deputy Director for Environmental Justice – The Council on Environmental Quality o Richard Moore, White House Environmental Justice Council Co-Chair – Los Jardines Institute • Peggy Shepard, White House Environmental Justice Council Co-Chair – WE ACT for Environmental Justice • Catherine Coleman Flowers, White House Environmental Justice Council Vice Chair – Center for Rural Enterprise and Environmental Justice • Carletta Tilousi, White House Environmental Justice Council Vice Chair – Havasupai Tribal Council • Karen L. Martin, Designated Federal Officer – U.S. Environmental Protection Agency

Appendix 3. Attendee List

First Name	Last Name	Organization
Gilbert	Sabater	Grow New York Renewables - NO Hydro Quebec
Chris	Moore	Eastman Chemical
Angela	Berry-Roberson	WSP USA
Jason	Poe	U.S. EPA
Joan	Vanhala	Hennepin County
Feleena	Sutton	Aera Energy
Erin	Broussard	Arizona Electric Power Cooperative
Pamela	Winston	US DHHS/ASPE
Ana Isabel	Baptista	Tishman Environment & Design Center
Kim	Lambert	U.S. Fish and Wildlife Service
Katherine	Mlika	US Digital Service
Jill	Harrison	University of Colorado Boulder
Krista	Mantsch	GAO
Sharunda	Buchanan	CDC/ATSDR
Ann	Stephanos	U.S. Environmental Protection Agency
Adrian	Herder	Tó Nizhóní Ání (Sacred Water Speaks)
Elliott	Rouillard	Virginia Department of Transportation
Chad	Whiteman	U.S. Chamber of Commerce
Claire	Williams	Stinson LLP
Brian	Ansari	BrianAnsari and Associates Inc.
Kathy	Sessions	Health and Environmental Funders Network (HEFN)
Annette	HInes	Appalachian Game Changers
Jess	Wallace	U.S. EPA
Danielle	Espiritu	Private Citizen
Vittoria	Totaro	UNM
Andrea	Thi	DOJ
Sara	Mar	Private Citizen
Karina	Castillo	Miami-Dade County
Victoria	Kurker	U.S. EPA
Sarah	Bishop Merrill	SAVERGV
Stephanie	Herron	EJHA
Kevin	Wickersham	Hudson Center for Community and Environment
Marilynn	Marsh-Robinson	EDF
David	DiGiacomo	Friends of the Park, Unitarian Church, School of Arts
Hazel	Choi	Green 2.0
Shane	Palmer	Peter Damon Group
Mikayla	Spencer	Ocean Conservancy
Derek	Rockett	Ecology
Pratima	Gangopadhyay	Toyota Motor North America
Florence	Parker	OKI Regional Council of Governments

Nicole	Horvath	WSSC Water
Wilda	Anagal	Grand Canyon Trust
Andrea	Price	U.S. EPA
Catrice	Jefferson	U.S. EPA
Brandon	Morton	Dallas College
Gloria	McNair	Groundwork Jacksonville, Inc.
Naadiya	Hutchinson	Congressman Donald McEachin
Peter	Williams	New Era Group
Larissa	Mark	VDOT
Tom	Hollenhorst	U.S. EPA
Maria	Rahim	Chevron
Sacoby	Wilson	University of Maryland College Park
Lauren	Thie	North Carolina Department of Health and Human Services
Reginald	Butler	DHEC's Bureau of water
Melodie	Aduja	Environmental Caucus of the Democratic Party of Hawai`i
Giuseppe	Grillo	Sustainable Jersey, A NJ Nonprofit Organization
Erica	Le Doux	U.S. EPA
Brad	Sims	Exxon Mobil Corporation
Mary	Daly	Surrey Environmental Consulting, LLC
Brittany	Bianco	FDOT
Daniel	Doxzon	Deloitte
Bonita	Johnson	U.S. EPA
Scott	Petty	Webco Industries
Kristien	Knapp	Committee on Oversight and Reform
Janene	Yazzie	Sixth World Solutions
Stephanie	Hammonds	WVDEP-DAQ
Carisa	McLaney	Steptoe & Johnson LLP
Dylan	Ramos	Private Citizen
Kris	Rusch	Endyna
Enrique	Valencia	The New School
Ericka	Farrell	U.S. EPA
Traci	Baker	FHWA
Emily	Federer	Port of New Orleans
Nayyirah	Shariff	flint rising
Chanele	Holbrook	WA Dept of Ecology
Ariana	Gonzalez	NRDC
Caitlin	McHale	National Mining Association
Steve	Zuiss	Koch
Katasha	Cornwell	FDOT
Deirdre	Courtney Nieves	Education
Erin	Stanforth	Mecklenburg County
Theresa	Coffey	Private citizen
Pete	Doktor	Wai Ola Alliance

Catherine	Capitman-	USDA Forest Service
Tania	Ellersick	USDA Forest Service
Vanessa	Leiby	WWEMA
Crystal	Upperman	AECOM
Sean	Joyner	HUD
Stacey	Murray	Webco Industries Inc., Stainless Division
Eric	Choi	GHGSat Inc.
Caleb	Beers	Webco Industries Inc.
Jennifer	Mccord	Alabama Dept of Environmental Management
Naomi	Yoder	Healthy Gulf
Joshua	Singh	Deloitte & Touche
Brandi	Johnson	EJ Activist
Winifred	Carson-Smith	WY Carson Company
Charles	Lee	US Environmental Protection Agency
Isabel G.	Trevino	Harris County Attorney
Catherine	Johnson	Department of Veterans Affairs
Jessica	Loya	Private Citizen
Shantha	Alonso	U.S. Department of the Interior
Lori	Dowil	Corteva
Perdita	Chavis	Houston City Council District K
Lara	Hakki	Hogan Lovells LLP
Ayako	Nagano	Private Citizen
Kimberly	Craven	Reno-Sparks Indian Colony
Rachel	Hanes	USBR
Rachel	Makleff	Grow Renewable New York: No Canadian Hydro
Yasmin	Yacoby	U.S. Department of Energy
Amanda	Aguirre	Rooted & Reimagined Strategies
Nia	Harper	Sage Futures CDC
Claire	Bergenholtz	University of Washington Bothell
Anahi	Naranjo	CEED
David	SYKES	Quiet Communities Inc.
Mike	Moltzen	U.S. EPA
Mary	McCullough	U.S. EPA
Cynthia	Peurifoy	Private Citizen
Megan	Smith	shift7
Susan	Alzner	shift7
Lori	Llewellyn	CDP North America
Denise	Sarchiapone	B&D Environmental Consulting LLC
Ngani	Ndimbie	Pennsylvania DEP
Ari	Lewis	Gradient
Nate	Curtisbrown	Advanced Energy Economy
Joi	Ross	APEX Direct Inc.
Michael	Snyder	Dow

Xavier	Barraza	Valle de Oro EJLT
Rosalind	Moore	City of Forest Park Ohio
Anna	O'Driscoll	Partnership for Southern Equity
Amy	Witherall	U.S. DOI, Bureau of Reclamation
Abigail	Talboy	DOJ
Olga	Naidenko	ENVIRONMENTAL WORKING GROUP
Kristen	Haitaian	Freshwater Future
Adrienne	Bandlow	Washington State Department of Commerce
Sasha	Forbes	SPARCC
Jocelyn	Brannon	SC DHEC
Sheri	Deal-Tyne	Physicians for Social Responsibility-Iowa
Camille	Moore	Peter Damon Group
Sara	Jordan	CEQ
Emily	Gallo	HNTB
Maeve	Flynn	LSR
Matthew	Greene	U.S. Fish and Wildlife Service
Gretchen	Fitzgerald	Hudson Center for the Community and Environment
Laurie	Gelman	Department of Justice
Crystal	Lee Pow Jackson	RTI International
Joanna	Stancil	USDA-FS
William	Patterson	EBMUD (East Bay Municipal Utility District)
Nakiya	Clausell	Deloitte
Majidah	Cochran	Beveridge & Diamond, P.C.
Shem	Teya	Texas Tech University School of Nursing
Ngozi	Nwosu	City of Dallas
Louise	Kitamura	U.S. EPA
A	Sung	Greenbank Associates
Kay	Anderson	American Bottoms Regional Treatment
Yukyan	Lam	NRDC
Dewayne	Harley	General Services Administration
Kartik	Sheth	WH EOP / OSTP
Dawn	Reeves	Inside EPA
Steven	Nelson	Smithsonian Institution
Sarah	Jareczek	Intermountain Fair Housing Council
Stephanie	Herron	EJHA
Vernice	Miller-Travis	Metropolitan Group
Phillip	Washington	USDA
Alyssa	Garza	Green 2.0
Dan	Solitz	Private citizen
Leslie	Reed	Brightwater Strategies
Kelly	Crawford	DC Department of Energy and Environment
Aidan	Fife	U.S. EPA
Elizabeth	Mathis	The Chisholm Legacy Project

Mario	Sengco	U.S. EPA
William	Charouhis	We Are Forces of Nature
William	Nichols	U.S. EPA
Greg	Lovato	Nevada Division of Environmental Protection
Monisha	Shah	NREL
Elliot	Blaufuss	University of Washington
Josephine	Mogeni	Texas Tech University school of Nursing
Vick	Mohanka	The Chisholm Legacy Project
Gloria	Vaughn	U.S. EPA
Justin	Thompson	NAACP
Clarence	Williams	Private Citizen
Syrah	Scott	National Clean Water Collective
Ryan	Bahnfleth	Esri
Justin	Dula	PA Dept. Of Enviro. Protection
Jamesa	Johnson Greer	Michigan Environmental Justice Coalition
Darien	Siddall	Federal Highway Administration (FHWA)
Nancy	Lui	DOE
Holly	Ravesloot	ACF
Devin	Araujo	Private Citizen
Kevin	Rosseel	U.S. EPA
Karen	Martin	Private Citizen
Aluanda	Drain	GSA
Kesha	Braunskill	Delaware Forest Service
Eric	Frankowski	Western Clean Energy Campaign
Nicole	Horseherder	To Nizhoni Ani
Joanie	Steinhaus	Turtle Island Restoration Network
Ali	Dominguez	Deloitte
Nicolette	Fertakis	U.S. EPA
Diana	Mendes	HNTB
Charissee	Ridgeway	CEQ
Gwen	Collman	NIEHS
Sonja	Favors	ADEM
Samantha	DiNatale	U.S. EPA
Betsy	Biffl	U.S. EPA
Angela	Harris	Southeast care
Erica	Brown	AMWA
Spencer	Keats	Deloitte
Brenda	Staudenmaier	CWAC
Melissa	Sturdivant	USDA - Rural Development
Janice	Horn	Tennessee Valley Authority
Dean	Scott	Bloomberg Environment
Tasha	Lo Porto	USDA Forest Service
Patricia	Iscaro	Politico Agency IQ

Judy	Ackerman	Private Citizen
Dinesh	Senghani	U.S. EPA
Laurel A.	Royer	Private Citizen
Jenn	Alexander	U.S. EPA
Elizabeth	Berg	ORISE
Janelle	Anderson	Washington State Department of Ecology
Bria	Crawford	Environmental Protection Agency
C	Cunningham	DOI-USBR
Ariela	Zycherman	NOAA
Marva	King	Private Citizen
James	Haussener	CMANC
Cristina	Villa	Department of the Interior
Regan	Patterson	Congressional Black Caucus Foundation
Alanis	Allen	CT DEEP
Isa	Arriola	Our Common Wealth 670
Theresa	Yarber	DoD
Kathy	Andrews	Blue Ridge Environmental Defense League
Karen L	Williams	League of Women Voters of the Virgin Islands
Nona	Schaffner	FL Dept. of Transportation
Obrian	Murray	University of Guyana
Evelyn	Britton	U.S. General Services Administration
Aleah	Holt	U.S. EPA
Kelsey	Sisko	Maryland Department of the Environment
Lauren	Branum	Webco
Kate	Dowling	Department of Justice
Leslie	Vasquez	CEQ
Audrey	Adams	Private Citizen
Jamie	Banks	Quiet Communities
Douglas	Meiklejohn	Conservation Voters New Mexico
Gabriella	Mabayyed	EPIC
Kendra	Pinto	Earthworks
Rebecca	Truka	Hexion Inc
Lisa	Stuart	DOL
Kay	Jowers	Duke Univ
Kyle	Kajihiro	University of Hawai‘i
Kristin	Gimbel	Metropolitan Group
David	Meierhenry	Tyson Foods, Inc.
Richard	Hamel	ALL4, LLC
Clark	Watson	Webco Industries
Vanessa	Gordon	USDA
John	Wiggins	U.S. EPA
Cyd	Curtis	U.S. EPA
Cara	Thuringer	The Chisholm Legacy Project

Karmen	Robinson	ENRD
Coline	Bodenreider	Private Citizen
Felipe	Franchini	Private Citizen
Jane	Williams	California Communities Against Toxics
Kristin	Lehman	FEMA
Elizabeth	Small	CDP North America Inc.
Kathleen	Toolan	FDOT
Sherry	Pollack	private citizen
Kyle	Bryant	R4 EPA/ORA/SPO/EJCHS
John	Gardella	CMBG3 Law
Tyler	Jenkins	Senate EPW
Jake	Hesseling	OKI
Melissa	Kaminski	Ocean Conservancy
Pamela	Mullins	Private Citizen
Laura	Bretheim	Private Citizen
Olivia	Balandran	U.S. EPA
Suzanne	Yohannan	Inside EPA
Catherine	Villa	US Environmental Protection Agency
Brian	Parrish	CBP
Kelsey	Brugger	E&E News
Britney	Rithvixay	University of Washington Bothell
Roxanne	Welch	U.S. EPA
Judith	Kendall	U.S. EPA
Bridgitte	Prince	Independent African-American Woman Filmmaker
Carla	Walker	World Resources Institute
Carolyn	Slaughter	APPA
Vincent	Martin	V Martin Environmental Justice LLC
Marian	Rice	Salt Lake City Department of Public Utilities
Joe	Gallenstein	Kentuckians For The Commonwealth
Emma	Kurnat-Thoma	Georgetown University NHS
Lena	Epps-Price	U.S. EPA
Adam	Carpenter	American Water Works Association
JAROD D	DAVIS	Dow Inc.
Lew	Daly	Roosevelt Institute
Arsenio	Mataka	HHS
Kim	Carter	Fed
Krystal	Laymon	CEQ
Elyse	Salinas	U.S. EPA
Maisa	Tisdale	The Mary & Eliza Freeman Center for History and Community
Demi	Gary	Oak Ridge Institute/EPA
Olivia	Morgan	Private Citizen
Chelsea	Barnes	Appalachian Voices
Lea	Kosnik	University of Missouri

Natalie	Rivas	The Chisholm Legacy Project
Janette	Marsh	U.S. EPA
Nikki	Saccoccia	Mystic Aquarium
Jenn	Tribble	TDEC
Morgan	Capilla	U.S. EPA
Richard	Falcon	United Latinos
Patricia	Duft	Medtronic
Venu	Ghanta	Duke Energy
Cheryl	Kelly	Department of the Interior
Mikyla	Reta	CAP
Katherine	Kane	USDOJ
Robert	Skoglund	Covestro LLC
Anil	Gurcan	Private Citizen
May	Bhetraratana	California Air Resources Board
Keyna	Cory	Public Affairs Consultants
Kathy	Yuknavage	Our Common Wealth 670
Sara	Adelsberg	Deloitte
Rebecca	Miserendino	Lewis Burke Associates
Bruce	Lum	Save Ala Moana Beach Park Hui
Molly	Updegrove	ReImagine Appalachia
Stacey	Callaway	Ecology
Sara	Miller	U.S. EPA
Robert	Dinterman	USDA
Mary	McCarron	Ohio EPA
Colonel Ann	Wright	O'ahu Water Protectors & Veterans for Peace
Stacy	Allen	Ameren
Gavin	Pauley	Environmental Protection Agency
Chris	Whitehead	ESI
Marisa	Hazell	US DOJ
Alfred	Saucedo	U.S. EPA
Brian	Holtzclaw	U.S. EPA
Lynn	Battle	ADEM
Carlyn	Petrella	Center for the New Energy Economy
Wig	Zamore	Somerville Transportation Equity Partnership
Kameron	Kerger	U.S. digital service
Elizabeth	Bradford	Michael Baker International
Elisabeth	Grinspoon	USDA Forest Service
Robyn	Rose	USDA FPAC BC
Bronson	Azama	Hawaiian Kingdom
Sean	Schrag-Toso	Department of the Interior
Steven	Menoff	Civil & Environmental Consultants, Inc.
John	Tolos	WaterProsper, Inc
Melissa	Muroff	Delaware County District Attorney's Office

Doug	Brune	U.S. EPA
Charles	Alsdorf	Deloitte
Mario	Atencio	Diné Citizens Against Ruining our Environment (CARE)
Aurora	Aparicio Collazo	The Packard Foundation
Adriana	Reynolds	Ramboll
Taylor	Schoenhofer	University of Kansas
Laurene	Contreras	Yakama Nation
David	Smith	NASA/Leidos
Emily	Phillips	Georgia EPD
Janus	Herrera	Rocky Mountain Youth Corps
Paul	Lee	LA Mayor's Office
Emily	Brooks	USGS
Cynthia	Ferguson	US Dept. of Justice/ Environment and Natural Resources Division
Deborah	Cohen	U.S. EPA
Katy	Super	EJHA
John	Mueller	Supporter, Fluoride Action Network
L.	Watchempino	Multicultural Alliance for a Safe Environment
Jane	Kloeckner	Kansas University
Wesley	Watson	Michigan Sustainable Business Forum
Farrah	Court	TCEQ
Jumana	Vasi	Private Citizen
Yvonne	White-Morey	BIG, NFP
Sabrina	Johnson	U.S. EPA
Charles	Pearson	Syngenta Crop Protection, LLC
Andrea	Lauden	WA State Dept of Ecology
Timothy	Fields	MDB, Inc.
Jingsheng	Tuo	NIH
EFatimah	Hasan	MD-National Capital Park and Planning Commission
Beattra	Wilson	USDA Forest Service
Deborah	Cullins-Threets	U.S. GSA
Arnold	Wendroff	Mercury Poisoning Project
Nicole	Briggs	Nez Perce Tribe
Will	Patterson	Continuing Faith Center (Faith Based)
Benjamin	Nuvamsa	KIVA Institute, LLC
Jamie	Gobreski	U.S. EPA
Devon	Trotter	Institute for Sustainable Communities
Rachel	Turney-Work	ENERCON
Diana	Umpierre	Private Citizen
Kirsten	Cook	Partnership for Southern Equity
John	Kinsman	Edison Electric Institute
Sarah	Eisenlord	LanzaTech
Faith	Boyer	Steptoe & Johnson LLP
Laura	Betts	The CLEO Institute

Anna	Chua	The Sierra Club of Hawai'i
Ayesha	Franklin	Brooklyn Neighborhood Association
Claire	Barnett	HEALTHY SCHOOLS NETWORK
Eric	Boyle	Department of Energy
David	Lonnberg	shift7
Carly	Sincavitch	Arnold and Porter
Chad	Gorman	US GAO
Katharine	Morris	CT Equity Now
Tiffany	Wallace	USDA
Chris	Espinosa	House Committee on Natural Resources
Marissa	Naranjo	High Watermark LLC
Margaret	Motheral	Skipping Stone Media LLC
Sean	McGinnis	COEFFICIENT
Alexis	Guibani	University of Washington
Andrew	George	UNC Chapel Hill Institute for the Environment
Sheila	Lewis	USEPA/Office of Environmental Justice
Kay	Nelson	Northwest Indiana Forum
Lydia	Heye	US Department of Justice
Oral	Saulters	Tribal TAB
Paige	Lieberman	U.S. EPA
Rebecca	McNaughton	University of Chicago
Roddy	Hughes	Sierra Club
Monika	King	NYS DOH
Brian	Chalfant	Pennsylvania Department of Environmental Protection
Mary	Raulerson	Kittelson & Associates Inc.
Adriane	Busby	Friends of the Earth, DC
Hiilei	Casco	Private Citizen
Center for	Communities	Center for Sustainable Communities
Louis	Zeller	Blue Ridge Environmental Defense League
Angela	Chalk	Healthy Community Services
Ryan	Hathaway	Department of the Interior
Lisa	Pellett	Washington Military Department
Rashida	Manuel	Institute for Sustainable Communities
Thomas	Regan-Lefebvre	Center for Latino Progress
Katherine	Wolf	University of California at Berkeley
Greg	Rose	Stellantis
Boris	Ricks	CSUN
Shea	Zwerver	PA DCNR
Aaron	Bell	U.S. EPA
Sheila	Babauta	22nd CNMI House of Representatives
Elizabeth	Perera	Sierra Club
C.	Liv	HHS
Lauren	Tamboer	WA Dept. of Ecology

Ericka	Popovich	West Michigan Environmental Action Council
Shannon	Anderson	University of Illinois
Jade	Lu	Massachusetts Clean Energy Center
Ray	Hall	UNA-USA Bmforflint coosa nation
Michael	Jensen	Waste Management
Ronald	Moore	Cincinnati Children's Hospital Medical Center
Liza	Sternik	US DOJ, ENRD, EES
Andrea	Vidaurre	Peoples Collective for Environmental Justice
Brian	Kristofic	Ardagh group
Patricia	Taylor	Environment and Human Health, Inc.
Salvador	Gandara	EPA Region 6
Felicia	Beltran	Arizona Department of Transportation
Christopher	Smith	Interstate Natural Gas Association of America
Jessica	Arika	Hennepin County
Connie	Dula	Private Citizen
Taylor	Mayes	Black Environmental Activist Movement
Jose	Almanzar	Private Citizen
Jason	Husveth	Human Beings Advocating for Native Plant Communities
Melinda	Downing	Department of Energy
Negin	Sobhani	National Academy of Sciences
Carl	Baker	Tri-city Democrats
Sara	Lips	Georgia EPD
Drue	Pearce	Holland & Hart LLP
William	Hsu	CDP
Marti	Townsend	Sierra Club
Karen	Campblin	Private Citizen
Atenas	Mena	CleanAirNow
Gregory	Mason	Defense Logistics Agency
Andrew	Patros	community citizens
Rachel	Vranizan	California Environmental Justice Alliance
Jorge	Acevedo	MI EGLE
John	Quade	US HUD
Cynthia	Jennings	Connecticut Coalition for Environmental Justice
Jeffrey	Schub	Coalition for Green Capital
MacKensey	King	CDP
DARIA	GRAYER	AAMC
Charles	Garrison	Hogan Lovells
Zeno	Guerrero Jr	Our Commonwealth 670
Fona	Ou	UC Berkeley
Adamarie	Acevedo	University of Idaho
Pamela	Pérez, PhD	California State University, Northridge (CSUN)
Reagan	Swaine	CDP North America
JL	Andrepont	350.org

Cameron	Baker	Fortress Control
Carolyn	Yee	California Environmental Protection Agency, Department of Toxic Substances Control
Kimi	Wei	The Wei LLC
Dannie	Bolden	Pioneer Bay Community Development Corporation
Marilyn	Elliott	Adrm
Tanya	Abrahamian	U.S. EPA
Ian	Pope	WM
Harry	Stone	Ohio River Basin Alliance
Annetta	Thompson	Private Citizen
Demitrous	Blount	Dept of Energy
Grant	Gutierrez	Dartmouth College
Francisco	Donez	U.S. EPA
Samyukta	Iyer	Wheeler High School
Donna	Chavis	Friends of the Earth/RedTailed Hawk Collective
Danilo	Morales	DOER
Jonathan	Cruz	Multnomah County Environmental Health
Lisa	Buglione	Association for the Improvement of American Infrastructure
Zoe	Gabrielson	Duke University
Rebecca	Huff	U.S. EPA
Matthew	Young	BeechWood Inc.
Stuart	Spencer	Tyson Foods, Inc.
Sarah	Sieloff	Maul Foster Alongi
Katherine	Welty	DOJ ENRD
Allison	Zejnati	Private Citizen
Jenna	Mel	NCUIH
Claire	Woods	Greenfield Environmental
Virginia	Johnson	KFTC
Astrika	Adams	SBA OA
David	Magdangal	U.S. EPA
Annika	Gacnik	Hive Brands
Lauren	Owan	Black Millennials 4 Flint
Janie	Cisneros	Singleton United/Unidos
Nefeli Maria	Bompoti	University of Connecticut
Valerie	Amor	Private Citizen
Melissa	Kaminski	Ocean Conservancy
Hank	Fergerstrom	Na Kupuna Moku O Keawe
Alex	Guillen	POLITICO
Bud	McAllister	Partners in Healthy Communities
Arielle	Benjamin	U.S. EPA
Linda	Belton	NOAA
Joanne	Chiu	Private Citizen
Sarah	Barr	U.S. EPA

Leo	Goldsmith	ICF
Taylor	Gillespie	EPA
Mark	Fite	U.S. EPA
Maggie	Coulter	Center for Biological Diversity
John	Abbott	Syngenta
Denise	Bennett	Louisiana Department of Environmental Quality
Briana	Wendland	Private Citizen
Daria	Neal	U.S. Dept. of Justice
Lawrence	Friedman	American Institutes for Research
Kevin	Lambert	NPS
Brittany	McCubbin	Kentuckians for the Commonwealth
Trish	Porter	Resilient Virginia
Melissa	Brandenburg	UNM / student
Elizabeth	O'Nan	Protect All Children's Environment
Maya	Nye	Coming Clean
Sunny	Dooley	Private Citizen
Avery	Lavoie	Oakridge Research Institute for Science and Education
Nicki	Alexander	U.S. EPA
Kalauna	Carter	FAMU-SOE STUDENT
Crystal	Myers-Wilkins	Private Citizen
Jenny	Heeter	National Renewable Energy Laboratory
Jane	Mantey	Ceres
Deyadira	Arellano	People's Collective for Environmental Justice
Sheryl	Good	U.S. EPA
Edith	Pestana	CTDEEP
Dondre	Young	Office of U.S. Senator Debbie Stabenow
Reginald	Butler	DHEC's Bureau of Water
Brendan	Mascarenhas	American Chemistry Council
Gina	Hara	Oahu Water Protector
Rebecca	Spellissy	Ramboll
Kristin	Aldred Cheek	Stericycle
Hanaloa	Helelā	Ka’ohewai
James	Courtney	Arnold & Porter, LLP
Rosemary	Ahtuangaruak	Nuiqsut
Rachel	Gonsenhauser	U.S. EPA
Sara	Schwartz	U.S. EPA
Cheyenne	Antonio	The Red Nation
Renee	Kramer	NCDEQ
Darcy	Sharp	FBI
Jessica	Bielecki	NRC
Katherine	Diaz	Private Citizen
Amy	Turner	ODOT
Teresa	Acuna	DOL

Melissa	Horton	Southern Company
Carlos	Anchondo	E&E News
Amelia	McCall	U.S. EPA
Jessica	Borden	TVA
Jeffrey	Knishkowy	Federal Govt
Tamara	Freeman	U.S. EPA
Alan	Walts	U.S. EPA
Kate	Friedman	Louisiana Dept. of Health Env. Epi.
Kimberly	Wilson	U.S. EPA
Donald	Ami	DOE/NNSA/Los Alamos
Cara	Cook	Alliance of Nurses for Healthy Environments
Hilda	Nieves	Private citizen
Briana	Garcia	Temboo
Virginia	Necochea	NMELC
Leilani	Lindsey-Kaapuni	Hui Aloha Aina
Millie	Piazza	Dept. of Ecology
Ashley	James	Private Citizen
Sarah	Kleypas	Lone Star Legal Aid
Gail	Orendorff	DOT/FAA
Caitlin	Macomber	WRI
Charles	Mason	Pacific Gas and Electric
Anjuli	Jain Figueroa	DOE
Maureen	Munoz	U.S. EPA
Dean	Alonistiotis	MWRD
Lara	Spader	VA
Megan	Kohler	ADEC
Lin	Nelson	Evergreen State College
Jahi	Wise	WHO
Samantha	Beers	U.S. EPA
Ann Marie	Chischilly	Institute for Tribal Environmental Professionals
Luciana	Paz	USDA
Courtney	Rutledge	Legal Aid of Western Ohio
Jordan	Creed	DOI/BSEE
Leila	Heidari	Boston University School of Public Health
Nancy	Beck	Private Citizen
Shelby	Stults	Advanced Energy Economy

Appendix 4. Comments and Documents Submitted by March 10, 2022

Appendix 4. Documents and Comments Submitted by March 10, 2022

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February 7, 2022

Rick Woychik, Ph.D.
Director
National Toxicology Program and the
National Institute of Environmental Health Sciences
111 TW Alexander Drive
Durham, NC 27709

Re: State-of-the-Science Report on Fluoride Exposure

Dear Dr. Woychik:

On behalf of our 162,000 members, we would like to express our concern about the National Toxicology Program's forthcoming state-of-the-science report examining whether there is a causal relationship between fluoride exposure and potential neurodevelopmental and cognitive effects. Specifically, we ask you to exclude—or carefully consider how to characterize—any neurotoxin claims lingering from NTP's now-abandoned monograph, even if placed in a forward or executive summary.

For the last several years, NTP has been examining the literature to determine whether there is a causal relationship between fluoride exposure and neurocognitive health. The work culminated in a proposed monograph titled Systematic Review of Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects. Both the first and revised drafts contained the unqualified statement that fluoride is a "potential" neurotoxin *at any exposure level*.[1-2]

The National Academies of Sciences, Engineering and Medicine issued scathing peer reviews of both drafts, questioning whether the claim could withstand scientific scrutiny. NASEM noted that NTP failed to provide adequate scientific evidence for its conclusion, noting difficulty following the review methods, inability to find key data, "worrisome" inconsistencies, and concerns about the wording of some conclusions.[3-4]

NTP's blanket claim about *any level of exposure* was based on a "low-to-moderate level of evidence" examining exposure to abnormally high levels of fluoride (≥1.5 mg/L). Those levels are more than double of what Centers for Disease Control and Prevention and the U.S. Public Health Service recommends for community water fluoridation (0.7 mg/L). It prompted NASEM to write in its second peer review:

> "NTP did not conduct a formal dose-response assessment that could inform a discussion on water fluoridation. NTP needs to state clearly that the monograph is not designed to be informative with respect to decisions about the concentrations of fluoride that are used for water fluoridation. That point should be reiterated at the end of the monograph with some indication that…[the monograph] does not draw any conclusions regarding drinking-water fluoridation or other fluoride sources, such as toothpaste or other dental treatments… [T]he context into which the monograph falls calls for much more carefully developed and articulated communication on this issue."

The ADA is concerned that the monograph's risk biased claim about fluoride being a "potential" neurotoxin *at any exposure level* will resurface in NTP's state-of-the-science report. An unqualified claim of this nature would only add to the many myths and misperceptions about community water fluoridation (0.7 mg/L)—and undermine national, state, and local efforts to expand the practice.

The CDC hailed community water fluoridation as one of ten great public health achievements of the 20th century.[5-6] It is an inexpensive way to reduce tooth decay by at least 25 percent in the population.[7] It would be a shame to distract from over 75 years of public health success over a simple matter of communicating the science, which is often more nuanced than a sound bite can convey.

We would welcome the opportunity to meet with you to discuss our concerns. In the meantime, we ask you to exclude—or carefully consider how to characterize—any neurotoxin claims lingering from NTP's now-abandoned monograph, even if placed in a forward or executive summary.

If you have any questions, please contact Mr. Robert J. Burns at 202-789-5176 or burnsr@ada.org.

Sincerely,

/s/

Cesar R. Sabates, D.D.S.
President

/s/

Raymond A. Cohlmia, D.D.S.
Executive Director

CRS:RAC:rjb

cc: ADM Rachel Levine, Assistant Secretary for Health

---

[1] National Toxicology Program. 2019. Draft NTP Monograph on the Systematic Review of Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects. Office of Health Assessment and Translation, Division of the NTP, National Institute of Environmental Health Sciences, National Institutes of Health, U.S. Department of Health and Human Services.

[2] National Toxicology Program. 2020. Revised Draft NTP Monograph on the Systematic Review of Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects. Office of Health Assessment and Translation, Division of the NTP, National Institute of Environmental Health Sciences, National Institutes of Health, U.S. Department of Health and Human Services.

[3] National Academies of Sciences, Engineering, and Medicine. 2020. *Review of the Draft NTP Monograph: Systematic Review of Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects*. Washington, DC: The National Academies Press.

[4] National Academies of Sciences, Engineering, and Medicine. 2021. *Review of the Revised NTP Monograph on the Systematic Review of Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects*: A Letter Report. Washington, DC: The National Academies Press.

[5] Centers for Disease Control and Prevention. Ten Great Public Health Achievements -- United States, 1900-1999. MMWR 1999; 48 (12): 241-243.

[6] Vivek H. Murthy, Surgeon General's Perspectives: Community Water Fluoridation—One of CDC's 10 Great Public Health Achievements of the 20th Century, *Public Health Rep* 2015; 130(4): 296-298.

[7] American Dental Association, *Fluoridation Facts*, 2018.

Alaska Community Action on Toxics
Comments to the WHEJAC
February 9, 2022

Alaska Community Action on Toxics (ACAT) is an environmental health and justice research and advocacy organization based in Anchorage, Alaska, USA. We are a participating organization of the International Pollutants Elimination Network (IPEN) and endorse the IPEN submission. We will focus our submission on the particular vulnerability of Arctic ecosystems and Indigenous peoples related to the toxic lifecycle of plastics, impacts on health, and implications for human rights.

Alaska and the circumpolar Arctic are warming at least twice as fast as the rest of the planet as a whole. Climate warming is exacerbating the mobilization and transport of persistent and toxic chemicals as well as plastics/microplastics within and into the north/Arctic. Accelerated melting of sea ice, permafrost, and glaciers is mobilizing sequestered contaminants and microplastics, threatening the health of our oceans, fish, wildlife, and peoples of the north. The north/Arctic is a hemispheric sink for persistent industrial chemicals and microplastics that are transported into the north on atmospheric and oceanic currents from lower latitudes through global distillation. Arctic Indigenous Peoples have some of the highest levels of persistent pollutants of any population on earth because of their reliance on traditional foods from the sea. Plastics and microplastics convey toxic substances that are additives or absorbed into the plastics into the food web, thus presenting a hazard to the health of fish, wildlife, and people. Microplastic particles have been revealed in the placentas of developing babies for the first time, which the researchers said was "a matter of great concern." Scientists said they could carry chemicals that could cause long-term damage or upset the baby's developing immune system.[1]

Delbert Pungowiyi, a Yupik tribal leader from Savoonga on Sivuqaq (St. Lawrence Island) highlighted the threats to health and human rights in the Arctic caused by the interconnected issues of chemicals, plastics, and climate change**: "*We are overwhelmed with concern about the health harms associated with climate change, the loss of sea ice and melting permafrost and the mobilization of chemicals and plastics — these are all interconnected. We are running out of time!*"**

The petrochemical industry projects exponential increases in production of chemicals and plastics over the next three decades, as they see transition to renewable energy reducing the demand for oil as an energy source. Thus, petrochemicals are becoming a huge driver of global oil and natural

[1] Ragusa et al. 2021. Plasticenta: First evidence of microplastics in human placenta. Env. Int'l. https://doi.org/10.1016/j.envint.2020.106274

gas production and use and major sources of climate-altering emissions. Investments in renewable energy must be accompanied by phase out of classes of persistent and toxic chemicals; investments and innovations in green chemistry and safe alternatives; as well as curbing the production and use of plastics.

Production of plastics exacerbates climate warming: 99% of plastics are derived from fossil fuels. The lifecycle of plastics will add more than 850 million metric tons of greenhouse gases to the atmosphere in the current year, an amount equal to the emissions from 189 five-hundred megawatt coal-fired power plants.[2]

Plastics in the Arctic:

- A recent study on the global microplastic transportation patterns revealed that the concentrations of microplastics were higher in the Arctic Basin compared to any other ocean basin in the world.[3] As all plastic persists for hundreds of years, in the Arctic, the lifespan of plastic is dramatically longer due to colder water and the low concentration of oxygen combined with an absence of sunlight.
- "Thousands of particles of microplastic were in nearly every sample from the Arctic; a single liter of snow contained 14,000 grains of the stuff." "A recent study found more than 12,000 microplastic particles per liter of sea ice. That amount is similar to the highest reported concentrations floating off polluted urban coasts. And it's surpassed by the 14,000 particles per liter recently found in the snow on top of Fram Strait sea ice. Arctic sea ice is a major global sink for microplastic particles."[4]
- 100% of beluga whales hunted in the Arctic had microplastics in their stomachs and intestines.[5]
- Arctic seabirds are exposed to hormone disrupting chemicals by eating plastics.[6]

Plastics and associated toxic chemicals threaten the health, well-being, and food security of Arctic Indigenous Peoples. Urgent action is needed to curb fossil fuel, chemicals and plastics production and to prevent these threats and further harm, protect health, and human rights. Climate warming, toxic chemicals, and plastics are interconnected and existential threats to the health and safety of northern and Arctic Indigenous peoples.

[2] https://theintercept.com/2019/07/20/plastics-industry-plastic-recycling/
[3] https://www.sciencedirect.com/science/article/abs/pii/S0269749117349400?via%3Dihub
[4] https://www.nationalgeographic.com/science/article/remote-arctic-contains-more-plastic-than-most-places-on-earth
[5] https://pubmed.ncbi.nlm.nih.gov/31733906/
[6] https://pubmed.ncbi.nlm.nih.gov/32753218/

ANDREW YOUNG FOUNDATION

October 6, 2016

Georgia Governor Nathan Deal
206 Washington Street
111 State Capitol
Atlanta, Georgia 30334

House Speaker David Ralston
332 State Capitol
Atlanta GA 30334

Copy to: American Water Works Association

RE: Fluoridegate Scandal Documents and Repeal of GA's Water Fluoridation Law

Dear Governor Deal and Speaker Ralston:

As a person deeply involved in civil and human rights, I am writing to ask for a written response from you in light of the Fluoridegate scandal developing here in Georgia. What's clear to me is that we need a repeal of Georgia's water fluoridation law, and hearings to look into how fluoridation has continued all these years, long after there were plenty of reasons to end it. This is a civil rights issue, and the people have a right to have the full story given to them, rather than highly edited, misleading talking points.

When someone's story keeps changing, there are quite often motivations behind their changed stance that may not be aligned with the best interests of the public. The story offered by water fluoridation promoters keeps changing...and changing...and changing. There are key groups such as seniors, kidney patients, diabetics, communities of color, thyroid patients and people who drink a lot of water due to their occupation that are especially affected by Fluoridegate.

Consider how the story has changed, repeatedly.

- Dentists said there has been extensive research for 60 years on the safety of fluoridation. Now a document from the American Dental Association has surfaced, calling for very basic research on how kidney patients, diabetics, seniors and other groups are affected – topics that should have been settled before fluoridation commenced. So, no, fluoridation was not extensively researched.

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- Discoloration of teeth by fluoride was called a pathologic condition in the American Dental Association's journal. Now it's dismissed by dentists as just a "cosmetic" issue and "barely visible." Strange, isn't it, to go from pathology to inconsequential?

- Dentists said we need to ingest fluoride systemically for it to help prevent cavities, so this was the justification for putting it in drinking water. Now dentists tell us that the primary way fluorides work is topical, when they touch teeth in the mouth. They also said the concentration of fluoride in saliva resulting from fluoride in water is too weak to do much. So why is fluoridation continuing? Are we sacrificing the health and safety of our communities simply because dentists don't want to be embarrassed, or sued?

- Dentists said fluoridation would help level the playing field for minority communities, but now we see in documents publicized by The Lillie Center that African Americans and other groups are actually disproportionately harmed by fluorides causing all forms of dental fluorosis teeth disfigurement. Plus we have more diabetics and kidney patients in African American communities, and they deserve to not be kept in the dark and forced to drink fluorides because the state mandates it.

- Dentists led us to believe fluoridation is highly effective, but dental journals admit that fluorides do very little to prevent cavities where more than 80% occur, in the back molars. Dental journals say it: tooth sealants are dramatically more effective. So, no, once again, we don't need fluoridated water.

I am calling for Fluoridegate hearings, here, in Georgia. And I am calling for a repeal of Georgia's fluoridation law, immediately. I look forward to your written response. I am copying this letter to the American Water Works Association, because I would also like to know what their response is, given the ever-changing story offered to continue fluoridation and the documents that have come to light. Water fluoridation clearly has not stemmed the cavity epidemic in our cities, and millions of people don't know the ways that uncontrolled dosing of fluorides in drinking water can impact them.

Thank you for your help.

Sincerely,

CC: CEO David B. LaFrance, American Water Works Association, 6666 West Quincy Avenue, Denver CO 80235-3098

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Curriculum Vitae

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Education

CUNY Graduate Center Ph.D. (Sociology of Medicine) October 1985

CUNY Graduate Center M.Phil. (Sociology) June 1981

Brooklyn College, CUNY M.Sc.Ed. (Education) February 1971

Brooklyn College, CUNY B.A. (Biology) February 1964

Erasmus Hall High School, Regents Diploma, June 1959

Employment

Visiting Scientist, Chitedze Agricultural Research Station, Ministry of Agriculture, Malawi. April-May 1998, May-June 2002.

Co-Principal Investigator, Woodhull Medical and Mental Health Center, Department of Pediatrics, Mercury Absorption Study. 1999 - 2001. (Pro bono)

Co-Principal Investigator, EPA Environmental Justice / Pollution grant to Medgar Evers College/CUNY. October 1998 - October 2000

Research Associate, Geology Department, Brooklyn College/CUNY, 1997-2002

Consultant, Mercury Poisoning Project, EPA Office of Environmental Justice Grant to Puerto Rican Family Institute, Queens, NY. 1997- 1998 (Pro bono)

Science Teacher (various Brooklyn junior high schools) NYC Board of Education, 1970-1996. Retired.

Adjunct Lecturer, Department of Rehabilitation Medicine (Occupational Therapy) Columbia University, College of Physicians and Surgeons, 1985-1991.

Assistant to the President, CUNY Academy for the Humanities and Sciences, 1980.

Adjunct Lecturer, Sociology Department, Brooklyn College/CUNY, 1975.

Primary School Science Curriculum Developer, Domasi Science Centre, Malawi (U.S. Peace Corps) July 1967-December 1968.

Secondary School Science Teacher, Livingstonia Secondary School, Malawi (U.S. Peace Corps) January 1967-June 1967.

Biology Laboratory Assistant, Erasmus Hall High School, Brooklyn, NY 1964-5.

Science Laboratory Technician, Berriman Junior High School, Brooklyn, NY 1963.

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"Environmental Health Effects of Magico-Religious Mercury Use in Caribbean and Latino Communities, & Social factors precluding its assessment." Lecture: Environmental & Occupational Health Sciences Institute, Rutgers University, Piscataway, NJ 03/01/19

"Magico-Religious Mercury Use in Caribbean & Latin American Communities: Another Inconvenient Truth, & Why Social Scientists Should Investigate It." Metropolitan Medical Anthropology Association. CUNY Graduate Center 02/07/18

"Neurotoxic Sequelae of Magico-Religious Mercury Use in Caribbean and Latino Communities: A Latent Epidemic of Mercury Poisoning?" Grand Rounds, Institute for Neurosciences, New York Methodist Hospital, 11/24/14

"Environmental Health Issues Surrounding Magico-Religious and Ethnomedical Mercury Use in Caribbean and Latino Communities" Grand Rounds: Department of Obstetrics & Gynecology, Brookdale Medical Center, 04/23/14

"Environmental Health Effects of Magico-Religious Mercury Use in Caribbean and Latino Communities & Factors Impeding its Assessment" Lecture: Environmental & Occupational Health Sciences Institute, Rutgers University, Piscataway, NJ 01/07/14

"Magico-Religious Mercury Use Contaminates Latino Homes and Poisons Their Occupants." Latino Health: Social Justice & Latino Health, 4th Annual Conference. N.Y.U. School of Medicine Centers for Health Disparities Research. New York, 10/28-29/05.

"Magico-Religious and Ethnomedical Mercury Use in the Caribbean Communities." Caribbean American Medical and Scientific Association. Conference on "Impact of Environment on Health: A Caribbean Perspective." Methodist Hospital, Brooklyn, NY

"Mercury and Birth Defects: What You Should Know." Presentation. Combined Meeting of the Brooklyn Healthy Start Initiative Project and Comprehensive Prenatal Perinatal Services Network. Brookdale Medical Center, Brooklyn, NY 12/3/03.

"Cultural Uses of Mercury–An Update." Panel Session. Eighth Annual Conference On Environmental Issues: Safety from the Environmental Hazards in the Home, School and City. Medgar Evers College/CUNY Brooklyn, NY 3/8/03.

The AfriCart: Conference presentation and handcart and handcart building demonstrations: Workshop on Improving Mobility for Rural Poor: Achieving Sustainable Motorised and Non-Motorised Transport. Organized by the International Forum for Rural Transport and Development. Morogoro, Tanzania. January 20-23 2003.

Pediatric Magico-Religious Mercury Exposure. Poster Session, Children's Environmental Health II: A Global Forum for Action. Children's Environmental Health Network & Canadian Institute of Child Health. Washington DC 9/9/01.

Hearing (held at my request) on the Ritualistic Mercury Problem. Congresswoman Nydia Velazquez. I submitted written and oral testimony. Brooklyn, NY 2/9/01.

New York City Council, Housing & Buildings Committee. Invited to testify and submit a written statement at hearing on Int. 832 to ban the testing of gas piping systems with gauges that use mercury. 11/09/00.

Demonstration of bicycle-wheel handcarts to the President of Malawi, H.E. Dr. Bakili Muluzi at Mzuzu Stadium, during the 125th Anniversary Celebrations of the founding of the Livingstonia Mission. 7/29/00.

Radio Program: "Radio House call," Gerald Deas, MD Moderator, WLIB New York,119.0 AM. Six five-minute interviews to be aired daily on 3/20-3/24 and 3/27/00 (Taped 3/13/00) [aired 3/14/00]

Environmental Justice Implications of Magico-Religious Mercury Use. Seminar, Ramapo College, NJ 2/23/00

"Dangers of Magico-Religious Mercury Use." Cable television interview, SUNY Health Science Center at Brooklyn. Gerald Deas, M.D., interviewer. 9/15/99.

Lecture/Grand Rounds: **"Reproductive Effects of Magico-Religious Mercury Exposure."** Department of Obstetrics and Gynecology, Woodhull Hospital. [Invited: 5/21/99].

Religious and Mystic Uses of Mercury. Presentation to Southern States Mercury Task Force. Destin FL. 5/6/99

"Magico-Religious Mercury Use in Caribbean & Hispanic Homes." Presentation to , New Jersey D.E.P. Mercury Task Force, Trenton, NJ 4/9/99

"Toxicology and Sociology of Magico-Religious Mercury Exposure in Caribbean and Hispanic Homes." Lecture Woodhull Medical Center, Brooklyn NY 3/11/99.

"Magico-Religious Mercury Use in Caribbean & Hispanic Homes: *Why Have Governmental Agencies, Community and Environmental Justice Groups Failed to Address This Issue?*" Community-Based Research for Environmental Justice: Conference. The Community/University Consortium for Regional Environmental Justice. Rutgers University, Newark, NJ 2/27-28/99. Poster.

"Neuropsychological Effects of Magico-Religious Mercury Use." Lecture, Brooklyn Psychiatric Centers, Inc. 2/9/99.

"Religious Mercury Use: Implications for Environmental Health" Panel discussion. Third Annual Conference on Environmental Issues. Medgar Evers College. 3/14/98.

"Magico-Religious Mercury Use." Lecture, CUNY Language Immersion Program, Manhattan. 3/2/98.

"Magico-Religious Mercury Use." Lecture, Wolfe Institute, Brooklyn College / CUNY 2/26/98.

Panelist**: "Toxics in Your Homes."** Harlem Environmental Impact Project, Inc. 2/20/98.

Panelist: **"PCB/Mercury Poisoned Fish From the Hudson/East Rivers."** Harlem Environmental Impact Project, Inc. 3/11/98.

"Magico-Religious Mercury Exposures." Lecture to Environmental Toxicology Class, Hunter College / Health Sciences Campus. 3/4/98.

"Toxicology and Sociology of Magico-Religious Exposure to Mercury in Caribbean and Hispanic Homes." Faculty Development Program, Department of Occupational Therapy, SUNY Health Science Center at Brooklyn. 1/29/98.

Lecture to Health & Nutrition Science Club, Health and Nutrition Science Department, Brooklyn College / CUNY on the Mercury Poisoning Project. 12/1/97.

"Health Implications of Magico-Religious Mercury Use." Health and Nutrition Sciences Seminar, Center for Health Promotion, Brooklyn College /CUNY 11/12/97.

"Toxic Cures." Videotaped television shoot for Strange Universe Productions. (Not aired) 7/15/97.

"Magico-religious mercury use in Hispanic homes: a novel but significant exposure route." International Conference on Human Health Effects of Mercury Exposure, Torshavn, Faroe Islands, 6/22-26/97.

"What are the Neurodevelopmental Sequelae of Magico-Religious Mercury Use in Hispanic and Caribbean Homes?" 1st National Research Conference on Children's Environmental Health. Washington, DC 2/22/97. Poster.

"Mercury Exposure from Magico-Religious Use in Latino Homes." Poster presentation, American Public Health Association, 124th Annual Meeting, New York City. 11/19/96.

"Mercury Poisoning in Haitian Homes." Poster presented at The Health of the Haitian Community conference, Arthur Ashe Institute for Urban Health, SUNY-Health Science Center at Brooklyn, NY 4/27/96.

"Mercury Exposure from Magico-Religious Use in the Home: Research and Policy Issues." Lecture presented at the Southeastern United States Mercury Conference, University of Miami, Coral Gables, FL 2/24/96.

"Traditional Health Beliefs: Implications for Healthcare Policy in Africa." Paper presented at the Institute on African Affairs, Third Annual Conference on African Policy Issues. Carnegie International Conference Center, Washington DC 2/24/93.

"The Garden Cart: An Appropriate Technology for African Health and Welfare." Poster presented at the Institute on African Affairs, Third Annual Conference on African Policy Issues. Washington DC 2/24-26, 1993.

"Human Powered Garden Carts: Appropriate Farm Transportation." Workshop: Human and Draught Animal Power in Crop Production: Experiences, Present Status and Research Priorities. Harare, Zimbabwe. 1/20/93. *In absentia*.

"Pediatric Mercury Poisoning: An Unrecognized Epidemic?" Poster. Conference on The High Risk Child: Environmental Issues in Developmental Delay. Albert Einstein College of Medicine, New York, NY 6/3/92.

"Toxics and Children." Panelist, Northern Manhattan Environmental Health Conference. Hunter College School of Health Sciences, Community Environmental Health Center. New York, 4/25/92.

"Bodies at Rest: Rousing Officialdom to the Peril of Domestic Mercury Pollution." Poster. Fourth National Conference on Health Care for the Poor and Underserved. Meharry Medical College, Nashville, TN 10/7-8/91.

Articles / Books / Radio / Television Citing My Work

Setting Out (Again): Ethnographic Deliverance in Malawi Jason J. Price. Doctoral Dissertation, Anthropology, University of California, Berkeley. Fall, 2017

"**When Religion Pollutes- How Should Law Respond When Religious Practice Threatens Public Health?**" Jay Wexler. in: Law Religion, and Health in the United States Chapter 29, pp. 414-415. Cambridge University Press, July 2017.

"**An Analysis of Water Collection Labor among Women and Children in 24 Sub-Saharan African Countries"** Jay P. Graham et al. *PLOS ONE* June 1, 2016. Lightening the Water-Carrier's Load" Comment by Ed Austin: Posted June 8, 2016. https://journals.plos.org/plosone/article/comment?id=10.1371/annotation/59532852-0dd3-490b-bd79-ebbd0f17f519

Weekly Newsletter: April 22, 2016 - APHA Environment Section, Emailed Newsletter (re Wexler book & articles cited below).

When God Isn't Green - A World-Wide Journey to Places Where Religious Practice and Environmentalism Collide Jay Wexler, Beacon Press, Boston, 2016 pp. 5, 11, 16-18, 198-199

"Is Religion Wrecking Our Air?" Jay Wexler, *Religion Dispatches* 03/04/16
http://religiondispatches.org/is-religion-wrecking-our-air/

"End indifference and bureaucratic inertia" Akwete Sande *The Daily Times* [Malawi] 04/15/13
http://www.bnltimes.com/index.php/sunday-times/headlines/columns/319-hard-tackle/14730-end-indifference-and-bureaucratic-inertia-

"Head-loading: An old habit that restricts efficiency" Akwete Sande *The Daily Times* [Malawi] 03/27/13
http://www.bnltimes.com/index.php/daily-times/headlines/features/14356-head-loading-an-old-habit-that-restricts-efficiency

"An unfinished take of the handcart" Akwete Sande *The Daily Times* [Malawi] 02/28/13
http://www.bnltimes.com/index.php/daily-times/headlines/features/13981-an-unfinished-tale-of-the-handcart

"EPA Weighs Threats Posed by Mercury Used in Religious Rituals" Emily Yehle, *Greenwire / The New York Times* 05/18/11

Children's Exposure to Elemental Mercury: A National Review of Exposure Events Agency for Toxic Substances and Disease Registry/CDC 02/09

"Thousands of kids exposed to dangerous liquid mercury in schools, homes. Contamination can last years, and cleanups are costly" Jessica A. Knoblauch *Environmental Health News / Scientific American* (on line) 5/5/09

Rural transport and traction enterprises for improved livelihoods Peter Crossley, Tim Chamen, Josef Kienzle. Rural Infrastructure and Agro-Industries Division, Food and Agriculture Organization of the United Nations, Rome 2009. CASE STUDY 8 "Wheelbarrows vs hand carts in sub-Saharan Africa" p. 33 http://www.fao.org/3/a-i0525e.pdf

Mercury: A priority of action. Module 5 - Cultural Uses of Mercury United Nations Environment Program 2008

"**Mercury vapor in residential building common areas in communities where mercury is used for cultural purposes versus a reference community**" Gary Garetano, Alan H. Stern, Mark Robson, Michael Gochfeld *Science of the Total Environment* 07/08 pp. 131-139

"His study on ritual use of mercury is out of Africa" Clem Richardson *Daily News* (Brooklyn edition) 05/30/08

"Side effects of Santeria" Darryl R. Isherwood & Eva Loayza *The Times of Trenton* 12/17/07

"Mercury scare: *Santeria, and other religions in UC, WNY [Union City, West New York] can employ toxic rituals"* Jessica Rosero *Hudson Reporter* 12/17/06

"**Mercury Use and Exposure among Santeria Practitioners: Religious versus Folk Practice in Northern New Jersey, USA**" C. Alison Newby , Donna M. Riley , Tomás O. Leal-Almeraz *Ethnicity and Health* 08/06 pp. 287-304

"Comparison of Indoor Mercury Vapor in Common Areas of Residential Buildings with Outdoor Levels in a Community Where Mercury Is Used for Cultural Purposes" Gary Garetano, Michael Gochfeld, Alan H. Stern Environmental Health Perspectives 01/06 pp. 59-62

"It's Traditional. It's Religious. It's Poison." Anthony DePalma, *The New York Times* 12/7/05

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"**Magic Mercury Monster**" CUNY Honors College Class of 2005 at Brooklyn College/CUNY. Web site on magico-religious mercury use.

"Network Africa" radio news program. BBC Africa Service. Coverage of the Malawi Handcart Project. Interview by Leslie Goffe on 9/21/02 Broadcast week of 9/24/02.

"Everywoman" radio news program. BBC World Service. London. Host Anna Umbima covers the Malawi Handcart Project. Interview 9/17/02. Broadcast week of 9/23/02.

"The World" radio news program. BBC/WGBH Boston. Host Lisa Mullins covers the Malawi Handcart Project. Interview and broadcast 9/17/02.

"**A Brooklyn Inventor Eases an African Headache: An Inexpensive Handcart Catches On in Malawi, Where Women Have Long Used Their Heads.**" Robert F. Worth *The New York Times* p.B1-2 9/14/02

"**Ritual Mercury: Bad for What Ails You**." C.B. Gaines, J. Motavalli. *E Magazine* XIII:3:32. May/June 2002.

"**I chose the oft-maligned Superfund program**" *fellowship focus* American Association for the Advancement of Science. Donna Riley Letter. 2:6:1 April 2002

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"**Assessing Elemental Mercury Vapor Exposure from Cultural and Religious Practices**." D.M. Riley, C. A. Newby, T.O. Leal, V.M. Thomas. *Environmental Health Perspectives* 109:8:779-784 8/01

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"Primer Impacto" news program coverage of botanica mercury sales and contamination. Univision TV Network. Cenia Alvarado reporter. Sunday, 3/25/01.

"**Sin resloverse el problama del mercurio**" Marco Vinicio *el diario/La Prensa* p.6 2/12/01

"**Planean estrategia el mercurio**" Marco Vinicio *el diario/La Prensa* p.6 2/10/01

"**Urge descontaminar hogares de Mercurio**" Marco Vinicio *el diario/La Prensa* p.5 2/8/01

"**Urge la education sobre el mercurio**" Marco Vinicio *el diario/La Prensa* p.5 2/1/01

"**Un problema sin solucion definitiva**" Marco Vinicio *el diario/La Prensa* p.3 1/31/01

"**Una bomba de tiempo**" Marco Vinicio *el diario/La Prensa* pp.1-3 1/30/01

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"**A Little-Known Threat**" Robert Worth *The New York Times* (Westchester edition) [Discusses mercury spills from plumber's manometers.] p.6 10/8/00.

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"The Week in Review" news program, Television Malawi (TVM), coverage of my meeting with President of Malawi demonstrating bicycle-wheel "Livingstonia-Carts" at Mzuzu Stadium, 7/29/00. Aired 8/5/00.

"Morning Basket" interview program, Malawi Broadcasting Corporation (MBC), hostess Ms. Siphiwe Banda. Interview on Malawi Handcart Project on 7/21/00. Aired 7/27/00

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"**Good-luck capsules carry lethal liquid**." Paula Lugones *The Bronx Beat* ColumbiaGraduate School of Journalism 5/8-14/00

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"**Peligroso el uso casero del mercurio de botanicas**." Vinicio, M. *el diario/la Prensa* 8/24/99.

"**Mercury Hazard Widespread in Magico-Religious Practices in U.S.**" *Emergency Medicine News*. Greenberg, M., XXI:8:24-25. 8/99.

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"**The Spiritual Use of Poisonous Mercury**." Rauch, K.D. *Washington Post*, Health Section, 8/13/91

"**Children face mercury danger**." Gee, H. *The Times* [London] Science & Technology 10/18/90

"**Vudu provoca intoxicacoes de mercurio**." Antonio Granado. *Journal Publico*, Lisbon, Portugal. 10/22/90

Research and Development Experience Overseas

Extensive fieldwork in traditional medicine and allied topics in Malawi (19 field trips totaling 33 months) and Nepal (4 months).

Invited by Malawi's Minister of Agriculture to demonstrate feasibility of handcarts for smallholder farmers. Worked with Department of Research and Technical Services to design, fabricate and evaluate handcarts at Chitedze Agricultural Research Station, Lilongwe, Malawi.. April - May 1998; May-June 2002, June-July 2003, June-July 2004. Development and demonstration in Malawi of the "Malawi-Cart," handcart-goat cart-bicycle trailer fabricated from wood and bicycle wheels. The only handcart to be developed in sub-Sahara Africa using locally available materials and capable of being made by local carpenters, at a cost affordable to significant numbers of the population. Trained carpenters to build handcarts. Carts demonstrated to representatives of CARE, World Bank, National Smallholder Farmers' Association of Malawi and Malawi Rural Travel and Transport Programme, FAO, GTZ, etc.. Carts demonstrated in Uganda and Tanzania. AfriCart assessment by Millennium Villages Project/Earth Institute - Columbia University.

Honors & Miscellany

Peer Reviewer, *Environmental Health*, 4/15

EPA Region 2 Environmental Quality Award, April 24, 2003
Peer Reviewer, *Environmental Health Perspectives*, National Institute of Environmental Health Sciences, 9/00, 8/03
One of the "Twenty Brooklyn Heroes." Brooklyn Center for the Urban Environment. 5/7/99.
Member, EPA Ritualistic Uses of Mercury Task Force 1/99-8/01
Sigma Xi, The Scientific Research Society, Associate Member, Brooklyn College Chapter, 1987.
New York State Regents Scholarship, 1959

Grants

U.S. Environmental Protection Agency, Office of Environmental Justice. Mercury Poisoning Project: Exposure in Hispanic Homes (Grant to Puerto Rican Family Institute. Approval Date 7/24/97) Consultant.

U.S. Environmental Protection Agency, Office of Environmental Justice. Preventing Mercury Pollution from Magico-Religious Uses in Brooklyn's Crown Heights and Sunset Park Neighborhoods. (Grant to Medgar Evers College, CUNY.) Co-Principal Investigator.

Current Research, Development and Advocacy Activities

Advisor to the Dedza East Trust [Malawi] 2014 - 2016.

Appropriate Transportation Technology Project: Introducing inexpensive handcarts to African peasant farmers. I am currently sponsoring assessment and dissemination of handcarts for use in Malawi, working with the Agricultural Engineering Department of Bunda College, LUANAR. (1989 - present).

Poisoning from elemental (magico-religious) mercury exposure: Clinical and environmental research and advocacy. (1990 - present)

Ethnomedicine, Magic and Traditional Religion in Malawi. (1972 - present)

Websites

Mercury Poisoning Project www.mercurypoisoningproject.org

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VITA.APW 10/25/18

Ali, Asghar

Working Paper

A conceptual framework for environmental justice based on shared but differentiated responsibilities

CSERGE Working Paper EDM, No. 01-02

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A CONCEPTUAL FRAMEWORK FOR ENVIRONMENTAL JUSTICE BASED ON SHARED BUT DIFFERENTIATED RESPONSIBILITIES

by

Asghar Ali

CSERGE Working Paper EDM 01-02

A CONCEPTUAL FRAMEWORK FOR ENVIRONMENTAL JUSTICE BASED ON SHARED BUT DIFFERENTIATED RESPONSIBILITIES

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Abstract

Environmental justice has become a major issue in the discourses of environment. The calls for environmental equity and justice are now part of major environmental negotiations like the UNFCCC and the Kyoto Protocol, to give some examples. In this paper I locate the issues of environmental justice within the broader framework of environmental sustainability and the contemporary debates about theories of justice. The environmental justice movement in the USA, which has gained popular momentum in recent years, is briefly studied. This particular grassroots movement appears to be redefining the sustainability agenda with a strong social justice content. It has similarities with environmentally informed social justice movements in the developing world, the so- called 'environmentalism of the poor'. Employing a critical discursive methodology I briefly and critically review some of the well-known theories of justice based on different principles of justice like need, desert and entitlement. These are looked at within the contemporary debates of universalism versus particularism or the 'abstract' liberal versus communitarian theories and some other critical perspectives on justice. I argue for a broader conception of environmental justice that takes into account particularities but is also sensitive to the global nature of many of the environmental problems that are spread and have impacts across regions, territories and even countries. In such situations it becomes necessary as a matter of justice to take into account differentiated impacts arising out of disproportionate contributions to environmental harms or 'bads'. I further argue that a theory of justice, which will recognize this fact, will also have to consider differentiated responsibilities.

Key words: Sustainability, sustainable development, equity, justice, distributive justice, vulnerabilities, responsibility.

1. Introduction

Justice seems to be an ever-present societal issue. It is often seen as a foremost desirable social virtue. The universal presence of the calls for justice is evidence that there are unresolved issues at different levels of human interaction and sociality. There are conflicts and disagreements, which tell us that society and its institutions have to keep grappling with matters that provide the bases and the reasons for these complaints and for the cries for justice. These are issues that define and often legitimize justice claims; grievances that are voiced by those to whom injustice - as understood by them but not necessarily endorsed by others - has been done. Justice is therefore, a historically present phenomenon that in turn signifies the societal presence of harm, exploitation and oppression on the one hand and a quest to rectify these failings on the other hand.

When we talk of justice, it is almost always about justice among human beings. Justice as we know it is typically as a human affair, involving human-human interactions and relationships. As such, in a broad and general sense, it is understood as a *social* concept. It is a claim put forward by some members of society about or against the actions, or intentions, of others. A sense of (*in*)justice arises out of a situation of competing, often rights-based, claims. The struggles for justice are reflections of problems both old and new and the way these are understood, experienced and defined by different actors. Every era's concerns have had influence on, or more importantly influenced by, the way justice has been understood, demanded and achieved. The concept of justice, because of its very nature and because in the way it is being defined and redefined in the context of complex, diverse contemporary societies has become the subject of intense debates and disagreements in recent decades. There are always differing perspectives and actors involved in these contestations. Contemporary issues of economic and political significance are bound to have influence on, or be influenced by, such inherently political and contested issue like justice. One such area is the environment and the discourses that shape the way environment is defined, understood and used or abused.

As the nature of risks and harms changes with the transformations in science and technology and the social and economic polarizations both within and across societies influencing a new understanding and redefinition of problems, for example, the calls for justice are also being framed in new ways. Environmental justice is one such area where the focus is now on the distribution of environmental quality; a focus on harms caused and aggravated by anthropogenic environmental bads and well being protected and enhanced by environmental goods. Here, justice is demanded by or on behalf of 'environmental victims'. Environmental victims are 'those who are harmed by natural processes, by anthropogenic processes mediated by the natural environment,

and by restrictions in access to the environment' (Penz 1998, p.42). Justice in its narrower sense is, therefore, about the distribution or maldistribution of or access to environmental quality - just like any other commodity - among different groups who question and protest these distributions, because they have real consequences on the quality of their lives and on their environments. In a broader sense, environmental justice may well connect with broader issues of social justice that questions socio-political and economic institutional arrangements of societies, or even of the world as a whole. An important feature of these (mal)distributions is that they often have both spatial and temporal features. On a different level, there are indeed some big ontological questions or big picture issues, for example our relationship as species with other species and with nature. Distinct but not totally unrelated from these are the specific situations, which have immediate consequences and impacts upon people's lives in their neighborhoods and communities; situations reflecting lived and experienced instances of injuries and victimization than being theoretical speculations.

Justice as concerned with the interaction and relationship of human beings with each other, as a social concept, is still, correctly so, the primary focus of attention and study for many theorists and activists. But now there is a realization of another relational aspect to the struggles for justice; that of our relationship as species - as human beings - to the rest of the natural world. Low and Gleeson (1998) term the first as 'environmental justice' and the latter as 'ecological justice' but point out that 'They are really two aspects of the same relationship' (p.2). In this paper, following this distinction, which also stresses the significant interrelated and interdependent nature of the two aspects of justice, I will mainly focus on 'environmental justice'; justice as concerned with human-human relationships. I accept that stressing this kind of dichotomy too much and too far can be misleading and may even be unnecessary. This is because eventually all environmental and ecological problems have their roots in social problems as also suggested by a 'social ecology' perspective that rejects a dualistic thinking whereby nature and society are often seen as antagonistic towards each other. Thus, 'The divisions between society and nature have their deepest roots in divisions within the social realm, namely deep-seated conflicts between human and human that are often obscured by our broad use of the word "humanity"' (Bookchin 1990: 32). The injuries done to the non-human world has a close relationship to the injustices in the human world. An ecological sensibility developing out of such understanding and based on a dialectical view of self, history, nature and society that enriches and broadens thought and action does not see aspects of a phenomenon exclusively and in isolation from other phenomenon.

Given the scope and limitations of this work, I will attempt to focus on environmental justice within a broader framework of environmental sustainability and in doing so hope that the connections between the two forms of justice (human-human and human-non human) also become visible to a certain extent. After a brief critical review of some prominent theories of justice, their principles and bases and focusing on the ensuing debates that have taken different, often clashing forms, I will argue for a broader conception of environmental justice based on the notion of shared but differentiated responsibility which is sensitive to particularities as well as supportive of a new, truly democratic universalism which will have to be debated and established dialogically through fair, active and meaningful participation of different actors and/or stakeholders with their equally different and diverse cultures, traditions or worldviews.

2. Justice and Sustainable Development

In a now cliched and much quoted paragraph, Lele says that sustainable development

> is a "metafix" that will unite everybody from the profit-minded industrialist and risk minimising subsistence farmer to the equity seeking social worker, the pollution-concerned or wildlife-loving First Worlder, the growth-maximising policy maker, the goal-oriented bureaucrat, and therefore, the vote-counting politician (1991, p.613).

If one follows Lele, then it becomes evident from such a view of sustainable development that it is inherently a political and 'contested concept' (O'Riordan 1988; Jacobs 1999). This is, primarily, because the stakes around which the concept revolves, and is often constructed, are very high. Ever since the term was elevated by events such as the publication of the Brundtland Report (WCED) in 1987 and the Earth Summit of 1992 in Rio de Janeiro, this catch phrase has become one of the most talked about ideas of contemporary times. For example, among contemporary issues of universal importance the concept of a sustainable society is second only to the idea of an information society as the most prominent image of the future (McKenzie-Mohr and Marien, 1994 cited in Olson 1995, p.19).

The rise of environmentalism and many green movements since the 1960s around the world but especially in the North, have all, to one degree or another, rallied around the different forms and varieties of this concept. The concept has also been embraced by big commercial interests who are in turn, accused by many green groups for being the very cause of much of environmental degradations. From grassroots and local level groups to international organizations, transnational corporations and national governments all equally claim this concept as their 'vision' and guiding philosophy. While often it is seen as an isolated, single issue, end-of-the-pipe pollution problem, some radical perspectives understand environmental unsustainability as a symptom of a wider and much deeper malaise. Thus, we get different prescriptions for the differently diagnosed problems. The politics of sustainable development in such a contested environment is, therefore, very complex and at the end of the day is as much in need of critical political and ethical considerations as of technical and managerialist issues of say, efficiency, best practice and improvement in resource use etc., themselves political issues.

But most often these accounts and reviews of sustainable development have been narratives and according to Dobson (1998) these have been 'bought at the cost of a degree of analytical weakness' (p.8). In such analyses, it is often the

multiplicity of the meanings of sustainable development which are hinted at but the narrow generalizations leave out some very specific questions unanswered and the linkages, for example, between issues like justice, equity and environmental protection remain sketchy if not at all ignored. Because of the fact that the term is so open and easily co-opted by different interests, confusions can be created easily and issues central to the discourse get glossed over.

It is argued here that because sustainable development (SD) embodies a human, social dimension, it needs to be understood in a broader sense. In fact, its openness to interpretation and vagueness may well be its strength. The vague-ness so characteristic of sustainable development, despite a steady proliferation of definitions, allows for dialogue and participation in discussing environmental issues and herein lies its political strength and also its analytical weakness (Cohen *et al.,* 1998). The human dimension means taking into account world-views, perceptions, rights and choices and their accompanying responsibilities about environmental change and impacts at different scales and by different actors involved although how some perceptions and choices become dominant over others and acquire legitimacy, often through systematic institutionalization, is a more specific and critical issue that needs to be understood. Human choice could be viewed at different levels; individual, communal, societal, national and global. These are interrelated and all have consequences not only for the present but also for the future of life on this planet. But what is clear is that there are some 'core ideas' that feature in most, if not all, explications of sustainability, however tinged they may be with different ideological hues.

Some of these core issues stem from the seminal document that is very much responsible for the popularization of the term. Among other things, the Brundtland Report's affirmation that 'inequality is the planet's main "environmental" problem' (WCED 1987, p.6) has given rise to different interpretations and understanding of sustainable development that often link issues of social justice with unsustainability. The Report's observations, for example, that 'poverty itself pollutes the environment, creating environmental stress in a different way. Those who are poor and hungry will often destroy their immediate environment in order to survive' (p.28) and that 'It is futile to attempt to deal with environmental problems without a broader perspective that encompasses the factors underlying world poverty and international inequality' (p.3) may be controversial and even seen as superficially concerned with symptoms rather than causes by some radical perspectives[1], but has,

[1] Some of these perspectives are, for example, social ecology and the works of social ecologists like Murray Bookchin, *'The Ecology of Freedom'*, 1991, Montreal: Black Rose Books, *Re-enchanting Humanity*, 1995, London: Cassell, *Remaking Society*, 1990, Boston: South End Press, and numerous articles in *Green Left Weekly*), ecosocialism and the works of ecosocialists like James O'Connor (ed.), 1994, *Is Capitalism Sustainable ? Political Economy*

nevertheless, made it possible to talk about social justice and environmental sustainability as related issues.

But is sustainable development the same as sustainability? Dobson (1998) views the first as a narrower, second-level focus while the latter as a broader issue:

> …sustainable development amounts to one conception or theory of environmental sustainability rather than the two things being synonymous. It is a *conception* of sustainability in that it contains views on what is to be sustained, on why, on what the object(s) of concern are, and (often implicitly) on the degree of substitutability of human made capital for natural capital….It is a *theory* of environmental sustainability in that it argues that a particular interpretation of the causes of unsustainability leads to a determinate view of the remedies for it (p. 60, original emphasis).

While this may be a better way forward, given the highly ideological and contested nature of sustainable development, the problem is not much solved. 'Sustainability' itself is amenable to the same kind of disagreements and has at least as much potential to become a 'metafix' and therefore, contested, as its any 'theory'. For example, sustainability even though understood scientifically and 'objectively', something that Dobson seems to be suggesting, could potentially become yet another contestation depending on different deeper ontological and epistemological understanding of 'environment', 'nature', or society-nature relationship, out of which stems conceptions of self, other, freedom, needs, justice, contentment or happiness etc.

Many justice discourses in the environmental sustainability debate, as in other debates outside the sustainability discourse, appear to be primarily concerned with distribution; distribution of something. This is perhaps because many discourses of justice still remain within the distributive paradigm. Given the fact that there are all sorts of disparities and asymmetries not only within societies but also between societies, the cry for distributional justice remains the dominant form of protest. But justice exclusively seen in the context of a

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and Political Ecology, New York: Guilford, David Pepper , 1993, *Eco-socialism, from deep Ecology to Social Justice*, London: Routledge, and numerous articles in the journal '*Capitalism, Nature, Socialism*, and some Third World perspectives like Shiva, V., *Staying Alive: Women, ecology and development*, London: Zed, Ramachandra Guha with Juan Martinez-Alier, 1997, *Varieties of Environmentalism*, London: Earthscan. For a brief and useful comparison of some of these perspectives with other sustainable development (SD) discourses like 'Market Environmentalism' and 'Ecological Modernization' see Nicholas Low and Brenden Gleeson, 1998, '*Justice, Society and Nature*, London: Routledge, chapter 7.

distributive paradigm is reductive and problematic[2], and may actually deter or distract us from other ways of looking at justice. This theme will be taken up in the following sections. Also, what is often counterpoised to this paradigm itself has its limitations, another aspect of my discussion of the issues in the sections that follow.

[2] In recent years a strong critique of the distributive paradigm has been carried out by some feminist and communitarian writers arguing for different, more concrete, contextual and less abstract approaches to issues of justice. See, especially, Iris Marion Young, 1990, '*Justice and the Politics of Difference*', Princeton University Press, New Jersey; Carol Gilligan, 1982, '*In a Different Voice: Psychological Theory and Women's Development*, Harvard University Press, Cambridge, Massachusetts; Seyla Benhabib, 1987, 'The generalized and the concrete other: The Kohlberg-Gilligan controversy in Feminist Theory', in *Feminism as Critique: On the Politics of Gender*, edited by Seyla Benhabib and Drucilla Cornell, University of Minnesota Press, Minneapolis; Amitai Etzioni, 1993, '*The Spirit of Community*', Simon and Schuster.

3. Distribution of What?

An important question, therefore, arises 'what is to be distributed?' if justice is to be done. This is perhaps the most important question in the sustainability-social justice nexus. At the Earth Summit in 1992 and following that, at almost all other major international events related to development and environment for example, the Cairo Conference, Habitat II, Beijing Conference on Women, the question of fairness and justice remain as central issues for many of the voices especially those of the developing world, although it is articulated in different vocabularies of justice. There and elsewhere, for the poor and marginalised distribution is as much about resources as about fair access to these resources. Issues of trade, rules of trade, investment, development credits, loans and aid etc. as incorporated in the international governance regime consisting of institutions like The World Trade Organization (WTO), IMF, The World Bank, NAFTA are often found unjust and discriminatory by these dissenting voices. Moreover, the contemporary globalized tendency of production systems that concentrate not only benefits of modernised development but also its harms is often the core target of many of these criticisms. It is in this area, particularly the claims about the unfair or potentially unfair, disproportionate spreading and sharing of harms or risks that the distributional demands seem to have taken a new turn within the environmentalist discourse of justice. This new form of understanding of maldistribution is somewhat different from the old ones whereby the focus was mainly on access to resources, wealth etc. This is not to say that they are not connected. Of course, the distribution of wealth and power has got a lot to do in determining the distribution of social and environmental goods and harms (Boyce 1994). But what is notable is that with a change in the nature of injustices, there seems to have been a parallel shift, or rather a broadening, in the conception and language of distributive justice.

Inside the distributive perspectives of justice the question 'what is to be distributed?' cannot be seen in separation from 'what is to be sustained?'. Within the politics of environment, claims of distributive justice often are bound to come face to face with the claims of sustainability. This seems unavoidable because of the fact that the very concept of sustainable development, or even sustainability, has an important normative feature and unless one talks about this feature, the concept does not make much sense unless one wants to reduce the whole notion to pure technical matters. Such an encounter seems inevitable as concern for environment become a major, if not the most important, driving force and arena of power politics, struggles and conflicts. While to some quarters it is increasingly becoming clear that it is no longer rational and desirable to talk of development, progress, resource use, security and stability, in short, environmental sustainability, without talking about equity and social justice, to others such as the narrow techno-managerialist and purely

economistic perspectives equity and justice appear to be less important issues at best and non-issues at worst.

In a very general sense, it can be said that, 'On any account of sustainability…something or other is supposed to be kept going, or at any rate not allowed to decline, over time' (Holland 1994: 169). The problem seems to be that there are different understandings of this 'something or other' and how it must be 'kept going' or sustained. One idea suggests the sustainability of a scarce natural 'capital' which can be termed as 'critical natural capital'. Similar to earlier definitions of 'critical natural capital'[3] Dobson (1998) defines it as 'Critical natural capital is capital critical for the maintenance of human life' and that '"critical natural capital" is *radically indeterminate*, of course, and it might refer us (in the detail) to any number of features of the non-human world' (p. 43, emphasis added). These, according to Dobson are mostly understood and argued for in the industrialized world in terms of overarching 'ecological processes' (Norton 1992: 97), 'biogeochemical cycles' (Pearce 1993: 16), or 'global life support systems' (Bowers 1990: 8), ecological 'glue' (Pearce 1995: 52) and 'ecosystem health' (all cited in Dobson 1998: 43-44). This kind of a radical understanding of a 'critical natural capital', meaning that it is the very scarce foundational base on which all life depends and on which all life activity is carried out can indeed have very deep implications for any discussion of sustainability and social justice. The implication in such arguments is that this understanding of 'criticality' is born out of the very scarcity and limited nature of that which is crucial for life, human or otherwise, and because of this, some form of preservation and/or conservation is imperative if humanity in particular or life in general is to survive.

A further complication in such an understanding of 'critical natural capital' is that whether it is always substitutable in any way by other things or not. This is also at the heart of the debates that have been going on recently among economists and philosophers of different schools of thought and ideological persuasions. The reference here is especially to the *complementarity* versus *substitutability* debate. This means that complementarity or substitutability of

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[3] See R.K. Turner and D. Pearce, 1993, 'Sustainable Economic Development: Economic and Ethical Principles' in E. Barbier (ed.), *Economics and Ecology: New Frontiers and Sustainable Development*, London: Chapman and Hall, and English Nature, 1994, 'Sustainability in Practice: Planning for Environmental Sustainability, Peterborough: English Nature. English Nature defines "critical natural capital" as 'those assets, stock levels or quality levels that are highly valued; and also either essential to human health, essential to the efficient functioning of life-support systems, or irreplaceable or unsubstitutable for all practical purposes', quoted by A.Holland, 1999, p. 286, Note.15, in A. Dobson (ed.), *Fairness and Futurity: Essays on Environmental Sustainability and Social Justice*, Oxford: Oxford University Press

natural capital by human made capital. Among other things, the arguments have mostly got knitted around the concepts of 'weak' and 'strong' sustainability. Daly who champions the 'strong' sustainability and complementarity position has argued: 'weak sustainability assumes that manmade and natural capital are basically substitutes….Strong sustainability assumes that manmade and natural capital are basically complements' (1995: 49) or 'the basic relation of man-made and natural capital is one of complementarity, not substitutability' (1994 in Sagoff 1995:613). Elsewhere it is argued: 'Capital cannot ultimately substitute for resources…labour and capital complement the material resources that are transformed into a product' (Daly and Cobb 1989: 409).

On the other side of the debate is the substitutability school, so to speak, to which the 'weak', the 'very weak' sustainability positions, or the so-called 'mainstream economists' subscribe in one form or another with different degrees of affiliations. Sagoff (1995) claims that a typical argument belonging to such a position says:

> The standard model of economic growth assumes that human knowledge and ingenuity can always alleviate resource shortages so that natural capital sets no limit on economic growth' (p.613) and,…if there is a limiting factor in economic production, it is knowledge, and that as long as knowledge advances, the economy can expand (1995: 610).

Holland (1999) is critical of the economic natural capital approach to sustainability and suggests a 'physical stock' approach. It is an inventory approach whereby 'informed judgments' are made 'to decide whether and in what sense there has been any depletion' (p.63). This approach, it is claimed, will overcome the problems of measurement and economic valuation, often identified with the former approach and that 'it is to lay stress on a different kind of valuation' (p.64). Norton (1999), in turn, identifies 'keystone natural resources', as a form of capital that is not interchangeable with other forms of capital and that are distinctive and defining features of a place and culture. These should be sustained because they are crucial for regional development and also because 'their loss erodes the distinctiveness of the landscape and the diversity of available habitats in the region' (p.146).

On a different level of analysis one can ask as to how and why 'nature' or what constitutes 'nature' and 'environment' have become 'capitalised' or become to be seen as 'stocks' and 'assets'. Nature as 'capital', 'stock', 'assets', 'resources' are all one or another type of valuations based on and informed by different conceptions of self, nature, and the relationship of society with nature. Some valuations are more quantitative while others are qualitative and still others as mixtures of quantitative and qualitative approaches. There are problems with

measurements of nature especially as 'natural capital'. Since measurement has always been a first stepping-stone towards control, prediction and exploitation of resources as well as peoples, it may be asked that once nature has been inventoried, stocked, counted or measured and capitalized, what is there to stop its exploitation and abuse? In other words, why would it be safe to assume that there would be no overexploitation of those parts of nature that are commercially viable and profitable in a now globalized capitalist economy that thrives on a short term future-discounted exploitation with profit as its central axiom and which is hostile to all non-market understanding of these 'stocks' upon which all life depends? It may be useful and even necessary to 'inventory' nature for the sake of sustainability in such a manner but these must be complemented by other, essentially non-instrumental and non-capitalised conceptions of nature in order to be in tune with the essence of 'criticality' mentioned above.

The underlying commonality of all these approaches is the problematic notion of scarcity; something 'critical', something scarce, a 'keystone resource' that needs to be counted/inventoried, measured, sustained and passed on, often as a rationale for intergenerational justice. The worry and concern is often to be responsible and to do justice to the future generations. Compared to such needed and understandable concerns for the future generations there is rather a critical scarcity of similar resources (in the form of research studies, for example) that scrutinize similarly from every nook and cranny and analyse in detail for example, issues of international justice or justice among the present generations across societies and nations. The moral and economic concerns for the future generations' well being is relatively overemphasized and overtheorised, often at the cost of concerns for justice here and now. Low and Gleeson (1998: 19) argue this to be rather inconsistent:

> It seems more than a little inconsistent to show moral concern for future generations when the worst environmental conditions imaginable are already present in places on this planet.

Now, given the high degree of concern for 'critical natural capital' conception of sustainability, and for the future generations, how can, or should, these critically scarce resources be understood from a justice perspective? How they are to be reconciled with justice claims made by groups of presently living generations as opposed to the yet unborn and therefore yet to make justice claims? There are many problems with the whole idea of critical natural capital and many difficult questions lurk beneath the concept of criticality. For example, Owen (1994) argues that 'who decides what is critical and why…to designate natural assets as critical requires *someone* to judge what is so important that it should be preserved intact, whatever the weight of other

considerations' (p.449 original emphasis). It is worth noting that claims to preserve and sustain some scarce or 'critical natural capital' for the sake of future generations can also easily mutate into justifying calls for sustaining present inequalities and injustices; inequalities which are already so visibly marked and extreme that place a fourth of humanity in absolute conditions of poverty. Since the very idea of scarcity is so 'radically indeterminate' and therefore, challengeable[4] , it can be argued that even if there is an 'objectively' established 'criticality', then perhaps such 'criticality' or access to it should be distributed, or distributing scarcity ought to become the absolute and even radical focus of discourses of environmental justice.

[4] Mark Sagoff (1995), for example appears to be against such a notion of 'critical natural capital' or, in general, against a 'limits to growth' concept conceding that 'the thesis that there are significant natural limits to growth remains *intuitively* appealing', 'Carrying capacity and ecological economics', *Bioscience*, 45(9) p.612, (emphasis added). This skepticism may well be objectionable but at the same time there are other perspectives that challenge such scarcity theories by questioning the very conception of nature and nature-society relationship that inform them. For example, from a social ecology perspective, Murray Bookchin (1996) argues that based on a dialectical and ethical understanding of self, nature and society-nature relationship (as opposed to an instrumental one), nature may well be a realm of abundance and freedom. He argues: 'One of the most entrenched ideas in Western thought is the notion that nature is a harsh realm of necessity, a domain of unrelenting lawfulness and compulsion. From this underlying idea, two extreme attitudes have emerged. Either humanity must yield with religious or "ecological" humility to the dicta of "natural law" and take its abject place side by side with the lowly ants…or it must "conquer" nature by means of its technological and rational astuteness, in a shared project ultimately to "liberate" all of humanity from the compulsion of natural "necessity" - an enterprise that may well entail the subjugation of human by human' (*The Philosophy of Social Ecology: Essays in Dialectical Naturalism*, Montreal: Black Rose Books, p.71). The conceptual contrast between such views and the atomist, cost-benefit calculus view of self and nature could not be sharper and profound; a contrast that will inform and eventually influence discourses of environmental politics and justice.

4. The Environmental Justice Movement

The Brundtland Report (1987) on numerous occasions claims causal type linkages between poverty, inequality and environmental degradations. It does attempt, however inadequately, to bring a wider focus on these issues which are often absent from the discourse of the mainstream environmentalism and the numerous conservation movements. For example, sustainable development as advocated by international organizations like the International Institute for Environment and Development (IIED) and especially, by the IUCN's World Conservation Strategy (WCS) is a clearly narrow concept that lacks some of the more social and political insights. The overemphasis for more conservation and preservation, necessary as they are, nevertheless, come at the cost of a holistic analysis of the situation. Adams has pointed to this weakness and writes that the WCS was " pious, liberal and benign, inevitably ideological and disastrously naïve " (1990, p.51 in O'Riordan 1993, p.50). Here, environmental issues are usually taken as single issue problems and relatively seen in isolation from their broader social milieus. The claims about the linkages between poverty and environmental degradation not only shift the focus but also complicate issues of justice. Such claims are repeatedly made in the Brundtland Report (WCED 1987), for example, that 'poverty itself pollutes the environment, creating environmental stress in a different way. Those who are poor and hungry will often destroy their immediate environment in order to survive' (p.28) and that 'It is futile to attempt to deal with environmental problems without a broader perspective that encompasses the factors underlying world poverty and international inequality' (p.3). To what extent poverty 'pollutes' the environment and why so, is an open question. But in the context of justice claims it is not only this question but also who pollutes whose environment that matter equally if not more. These issues while themselves reflective of distinct understandings of the environment and their social and political discourses, have been influential in shaping the agendas of many sustainable development movements with strong social justice character around the world. In the United States the 'environmental justice' movement can be seen as a similar social justice movement which is not exclusively concerned with conservation and preservation causes that otherwise make up the agendas of so many other influential Northern sustainability groups. The apparent absence of a strong conservation element in such justice movements is at the heart of the growing suspicion that the agendas of social justice and sustainability may not be the same.

This points to the importance of social justice, democracy and human rights, for a more broader and inclusive discourse of sustainability meaning that the environmental cannot be seen in isolation from the social and the political. The environmental justice movement emphasizes the same. It asserts that 'social justice and environmental issues are inseparable, both conceptually and politic-

ally' (Grass 1995). The cost of ignoring these linkages, no matter how much un- or under-explored, both at local, national, regional and even international levels can only result in the aggravation of the situation, both environmental and social. This concern also appears to be behind the WCED arguments cited earlier. The environmental justice movement in the USA is the outcome of the 'struggle of low-class, often black communities against the incinerators and toxic waste dumps that, by accident and frequently by design, come to be sited near them (and away from affluent neighborhoods)' (Guha and Martinez-Alier, 1997, p.19). The movement is often seen to be in contrast to the more well known environmentalism of the middle class Americans who have showed less concern with the disproportionate burden of toxic wastes and risks on minority communities (Hofrichter, 1993; Low and Gleeson, 1998). Hofrichter (1993) has argued that these minority communities have been unfairly at the receiving end of 'unregulated, often racist, activities of major corporations who target them for high technology industries, incinerators and waste' (p.2). Although the contexts and their historical development are different, the grassroots, activist nature of this movement has much in common with many similar movements for social justice in the developing world, whether prefixed by sustainable development or not.

Environmental justice as a movement has mainly been a US based phenomenon. The term 'environmental racism' is also sometimes used interchangeably with environmental justice and environmental equity. In the context of US some have claimed that, 'statistics show that race is a better indicator than income in determining the probability that a community is polluted' (Collin, 1993:41). 'Environmental racism' was coined by Benjamin Chavis, then head of the United Church of Christ's Commission on Racial Justice (Mushak, 1993 cited in Cutter 1995, p. 112). The Commission carried out a study, *Toxic Wastes and Race in the United States* that concluded that 'race was consistently a more prominent factor in the location of commercial hazardous waste facilities than any other factor examined' (quoted in Collins 1993, p. 41). Environmental racism in this case is seen 'as an extension of racism in household, land use, employment, and education policies and therefore as part of the larger web of institutionalized racism' (Collins 1993, p.41). Reverend Chavis who headed the Commission on the toxic waste study states:

> Environmental racism is racial discrimination in environmental policy-making and enforcement of regulations and laws, the deliberate targeting of communities of color for toxic waste facilities, the official sanctioning of the presence of life threatening poisons and pollutants in communities of color, and the history of excluding people of color from leadership of the environmental movement (quoted in Cutter 1995, p. 112).

Other authors and activists prefer the term environmental justice because they see environmental racism as 'too restrictive a term' and also because 'environmental justice…moves beyond racism to include others (regardless of race or ethnicity) who are deprived of their environmental rights, such as women, children and the poor' (Cutter 1995, p.113). Some have challenged this notion on methodological grounds (Been, 1993, Boerner and Lambert, 1995). However, these studies, funded by risk producing industries have been questioned by Goldman (1996). Robert Bullard is one of the main activist and theorist of the environmental justice movement and he has identified equity issues that are procedural, geographic, and social (Bullard 1994). According to Bullard (1994) environmental justice 'is a more politically charged term, one that connotes some remedial action to correct an injustice imposed on a specific group of people, mostly people of color in the USA' (quoted in Cutter 1995, p. 112). Bullard (1994) goes on to suggest five principles of environmental justice to promote procedural, geographic, and social equity and it must be said here that these have remarkable similarity with those proposals that are often put forward by the developing countries, for example, regarding potential disasters from toxic wastes or climate change and their effects on the vulnerable and the poor:

1. guaranteeing the right to environmental protection;
2. preventing harm before it occurs;
3. shifting the burden of proof of contamination to polluters not the residents;
4. obviating proof of intent to discriminate; and
5. redressing existing inequities (p.15).

As with so many other social issues to which attention is often drawn by social justice movements and which are expressed in a vocabulary of protestation so is the case with the environmental justice movement. In the US case the environmental justice movement clearly has strong civil rights character. It has attempted to connect with or incorporate broader social justice vocabulary from outside the conventional conservation movements that often either ignore these issues in their quest for 'wilderness' or pristine nature preservation or subsume and collapse all differential impacts and burdens in abstractions like 'human beings', 'homo sapiens' or 'we'. It may well be that in such latter instances the concern is with the macro level, a concern with what will happen to the planet and its life forms as a whole, but that need not come at the cost of these localized, concrete, micro level situations of struggles that are more visible definitions of the human condition; conditions of disproportionate and undeserved harm and injury, of deprivation and suffering, which are equally, if not more, important and urgently in need of redress. Dowie (1995) makes a similar point:

> During the early years of the movement, in an understandable attempt to build the broadest possible constituency, environmentalists often described the issues as one that affected everyone equally. We all live in the same biosphere, said the gospel, breathing the same thin layer of air, eating food grown in the same soil. Our water is drawn from the same aquifers, and acid rain falls on the estates of the rich as forcefully as on the ghettos of the poor. On closer examination, however, massive inequities in environmental degradation and injustices in the policies used to correct them became evident. While created equal, all Americans were not, as things turned out, being poisoned equally (p.141, quoted in Dobson 1998: 19).

What is so remarkable is that the environmental justice movement is based in the richest country (in terms of aggregate incomes and GDP, although a society where wealth and resources are highly concentrated in few hands), in the world. What would it be like in more materially deprived societies with highly polarized groups in terms of wealth and its ubiquitous adjunct, power? Or since many environmental problems do not respect regional and national boundaries, what would it be like in a highly polarized world? A world where inequalities of everything from wealth to knowledge are the dominant defining features as also witnessed by the critical discourse of globalization and the figures of poverty published year after year by international agencies like the different UN organizations, the World Bank and others?

It becomes obvious that the claims for equity and justice are about the distribution of real as well as perceived environmental benefits and burdens or of the mechanisms and means of protection from the burdens or harms; claims made by the poor who also want prevention of and protection from the deleterious effects of environmental degradation. One aspect of the claims are that to these spatial and temporal dislocations their contribution is often meager compared to those who live more wasteful lifestyles and who have the ‘ability to pay’ for protection from these harmful effects. These claims make clear ‘the environmental justice belief that the “environment” is no more - and certainly no less - than a particular form of goods and bads that society must divide among its members’ (Dobson 1998: 20).

There are similarities between the environmental justice movement in a country like the USA and other environmentally oriented protests and struggles in the developing world. The latter can collectively be called as the ‘environmentalism of the poor’. Some authors, in comparing the two types of environmentalism - that of the ‘rich’ and of the ‘poor’ - have taken a view according to which the ‘environmentalism of the rich’ is seen as a partial shift from a materialist to a ‘post materialist’ or ‘post industrial’ society and the ‘environmentalism of the

poor' mostly concerned with 'nature/resource based conflicts' (Guha and Martinez-Alier, 1997). It is argued:

> Origins and political style notwithstanding, the two varieties of environmentalism perhaps differ most markedly in their ideologies. The environmentalism of the poor originates as a clash over productive resources: a third kind of class conflict, so to speak, but one with deep ecological implications. Red on the outside, but green on the inside…. In contrast, the wilderness movement in the North originates outside the production process. It is in this respect more of a single-issue movement, calling for a change in attitudes (towards the natural world) rather than a change in systems of social production or distribution (p.18).

The different conflicts that occur in such situations as referred to in the quote, have strong ecological basis. Perhaps this is because the 'environment' has a radically different meaning and implication in such situations. In the South, for example, 'forests are not wilderness areas but habitats for the poorest of the poor' (CSE 1992: 265). The issues are complex with a highly social and political content than just aesthetic or technical matters of protecting and preserving the wild flora and fauna. At the core of these conflicts are the historical, as well as, contemporary issues of equity, access and distributional justice at all levels from the local to the global. An example of India:

> The inequities in contemporary India relate not only to control over land, water, fish, forest or minerals, but also to access to education, jobs in the bureaucracy, and the process of political decision-making. There are growing social conflicts focused on each one of these concerns. Conflicts grow primarily because the gulf between omnivores and the dispossessed is continually widening (Gadgil and Guha, 1995, p.96).

Distribution then takes the form of 'ecological distribution' which refers to 'the social, spatial and temporal asymmetries or inequalities in the use by humans of environmental resources and services, i.e. in the depletion of natural resources (including the loss of biodiversity) and the burdens of pollution' (Guha and Martinez-Alier, 1997, p.31). The ensuing discontent and conflicts often suggest a strong linkage between resource use and the social and economic disparities. Environmental injustices from such a perspective are therefore, first and foremost, equity and access issues implying a broader and better understanding of these historical and structural disparities as crucial pre-requisites for any ameliorative or mitigation measure that claims to be just, inclusive and non-coercive. This kind of thinking has wider implications for the understanding of environmental justice, especially in the global context, because they import and emphasize the socio-political, in addition to the economic dimension.

The environmental justice movement, although a localized, country specific protest movement not only reflects structural arrangements of that particular society but also gives legitimacy to the voices and concerns of the less privileged and environmental victims - or potentially vulnerable to such victimization - of the world at large; a world where the economic and political order resembles the same structures in its exclusion, marginalization and oppression of its lower one fifth population. For the message of the movement to have any real impact and meaning in its truly globalized sense, it has to show awareness of and solidarity with the big pictures of injustices and will have to transcend the 'politics of place' (Low and Gleeson, 1998). Without doing that, there is a real danger that it can itself become a net contributor to injustices beyond the borders of its particular community of justice. This already happens through the *displacement* of hazardous facilities to other lesser influential and powerful communities both within and outside state borders. The movement is also a much needed correction to the worldview of the 'environmentalism of the rich'. Like its counterparts in the peripheral world, the environmental justice movement may be theoretically unsophisticated in making its case to the powers that be, but its real strength is its grassroots nature, its closeness to real life experiences of injustice and its bearing of disproportionate burdens of (ab)use of environmental resources and functions. These experiences and realities do signify situations of injustice calling for an ethical and moral concern by any humane and rational account or theory of justice; a call for a historically informed new understanding and ways of coming to terms with these issues. These situations not only call our attention to our moral faculty but also to our rational capacities to act differently and collectively since never before the world, its peoples and resources have been faced with situations with potential for disasters of enormous proportions. The responses to make just the unjust are, however, very much varied and the perspectives cover a broad spectrum of thinking as will be discussed in the next sections.

5. A Brief Critical Review of Some Principles of Justice

Justice or international justice especially in the context of environment and related issues for example international trade, is often interchangeably used with the concept of equity, both intra- and intergenerational. Because equity and justice issues are often intertwined and in a complementary relationship, therefore, associated with the demands for equity are the demands for justice. Equity in its broadest sense, means 'the quality of being fair or impartial' or 'something that is fair and just'. The meaning of justice is often not far from that of equity or from the idea of fairness. As the 'first of social virtues' (Bullock *et al.,* 1988) it also means 'the quality of being right and fair' (Oxford Advanced Learner's Dictionary 1985).

However, beyond the simple dictionary definitions, justice is now a much more complex issue and the subject of intense arguments. Justice has many dimensions. For example, many accounts of justice as a desirable social virtue aspire towards and demand, although to different degrees and through different means, the establishment of appropriate political institutions and giving consideration to a shared public ethos that result in a social order that is acceptable and enjoyed by the majority if not all. An order where people's safety and liberties are maximized and social evils are kept at a minimum if not totally eradicated. Achieving these pose enormous challenges for any theory of justice, environmental or otherwise; challenges that have become more profound with the recent critiques of some of the more dominant justice theories. In the following brief critical discussion of these theories we shall see how these theories grapple with justice issues and in doing so, how they agree and disagree with each other.

It is perhaps the principles of justice, or the bases of justice which are often at the core of most discussions about distributive justice, for example need, desert, rights, entitlements and a range of virtues depending on the overall view of justice. These are also the central feature of the political philosophies and/or traditions like liberalism and socialism for example. In recent times, some of the most influential works on justice have been those by John Rawls (*A Theory of Justice*, 1971, *Political Liberalism*, 1993), Robert Nozick (*Anarchy, State, and Utopia*, 1974) and in recent years, Michael Walzer (*Spheres of Justice*, 1984). In the case of Rawls, it can be said that his major attempt has been at the formuation of a theory of justice which proposes the idea of a kind of 'well ordered' society which is so not because the aggregate figures about that society present a healthy picture which is what conventional utilitarian measures of progress and development often do but, a society where the well being of each and every

individual is a concern of justice, although based on an 'abstract' understanding of the individual[5].

Rawls' "difference principle" is at the center of his theory of justice. In its stricter meaning 'the difference principle is satisfied by a given economic system only if those who are worst off under it are not more badly off than the worst off would be under any alternative to it' (Cohen 1986: 133). Defining 'Justice as Fairness' Rawls based his theory on the following two principles:

> First, each person participating in a practice, or affected by it, has an equal right to the most extensive liberty compatible with a like liberty for all; and second, inequalities are arbitrary unless it is reasonable to expect that they will work out for everyone's advantage, and provided the positions and offices to which they attach, or from which they may be gained, are open to all (1976: 30)

Rawls (1976) further enunciates the second principle by stressing that:

> It should be noted that the second principle holds that an inequality is allowed only if there is reason to believe that the practice with the inequality, or resulting in it, will work for the advantage of *every* party engaging in it. Here it is important to stress that *every* party must gain from that inequality (p. 32, original emphasis).

In fact, it was in his earlier seminal work, *A Theory of Justice* (1973) that Rawls first enunciated his principles of justice in much more detail. The second principle there reads like this:

> …social and economic inequalities are to be arranged so that they are both:

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[5] The literature on these theories of justice is monumental, especially those that either support or critique Rawls' theory. I shall, therefore restrict my discussion to some salient and relevant features of these theories. The critique of Rawls' theory has been carried out by feminists as well as communitarians (See note 2). From another perspective, there are also critics who criticize the overall dominant framework of liberalism, individualism and secularism within which Rawls formulates his theory. See, for example, William Galston, 1991, *Liberal Purposes: Goods, Virtues and Diversity in the Liberal State*, Cambridge: Cambridge University Press; Veit Bader, 'The Cultural Conditions of Transnational Citizenship: On the Interdependence of Political and Ethnic Cultures', *Political Theory* 25(6), 1997, 771-813; For a criticism of the liberal states' myths of 'difference blindness' and 'neutrality' see Veit Bader, 'Religious Pluralism: Secularism or Priority for Democracy?', *Political Theory* 27(5), 1999, 597-633; For a critical perspective on secularism see, T. Modood, ed., 1996, *Church, state and religious minorities*, London: Policy Studies Institute; R. Bhargava, ed., 1998, *Secularism and its critics*, Delhi: Oxford University Press.

a). to the greatest benefit of the least advantaged, consistent with the just savings principle, and

b). attached to offices and positions open to all under conditions of fair equality of opportunity (Rawls 1973: 302)

Rawls's 'difference principle' and his overall theory appears to be emphasizing the principle of need especially through his concept of 'primary goods'. Primary goods are, 'things it is supposed a rational man wants whatever else he wants' including, 'the basic liberties', 'freedom of movement and choice of occupation', 'powers and prerogatives of office and positions of responsibility', 'income and wealth' and 'the social bases of self-respect' (1971: 61-65, in Sen 1988: 277). In his later work, Rawls (1993) defines primary goods as,

> things which is supposed a rational man wants whatever else he wants. Regardless of what an individual's rational plans are in detail, it is assumed that there are various things which he would prefer more of rather than less (p.92).

If Rawls's 'primary goods' is understood to have the quality of something that is required as a condition of survival or for the sustenance of human life, then it is rather hard to conceive what principle of justice other than basic need could be more legitimate for the distribution of those primary goods. Indeed, 'basic needs', the kind that is conditional or prerequisite for life has to figure strongly in any discussion of poverty alleviation and in theories of equality and distributive justice. The most famous articulation of justice based on the principle of need is of course, the Marxist notion of "to each according to his needs" whereby in a free and egalitarian society, as the culmination of human reason and ethics, there will be no need for a principle of distributive justice.

Desert as a principle of justice seems to be very much prevalent although not often explicitly expressed in modern capitalist and individualist societies. The overriding emphasis on individualism suggests a rational entity who possesses capacities, talents and skills for the contribution of which he/she expects to be justly rewarded. Also, because there are differentials in each individual's capacities and abilities out of which will result 'just differentials', this notion of desert does make sense, although very superficially. This is also referred to in a similar vein as the 'merit principle' or the meritocratic view of an ideal society; to do justice is to distribute something in accordance with ability and hard work etc. A criticism of this view objects that while it points to individual qualities, talents and potentials, it ignores their 'social origins'. It also claims that '"merit" is not a neutral and objective criterion for settling which of several candidates should be given sought-after position, but instead socially con-

structed notion that works in favour of those already entrenched in positions of power' and that 'it replaces a concern for equality of outcome with a concern of opportunity' (Miller 1999, p.197-80). The reductionist tendencies that are so much a hallmark of contemporary industrialized societies can and in fact do view 'merit' in a very narrow sense and therein lies the danger with this view of justice and an ideal society. Miller rightly criticizes this tendency in the talk about the justice of meritocracy:

> The danger inherent in meritocracy is that one dimension of merit will be given too great an emphasis, both in terms of the esteem that attaches to it, and in terms of the material rewards that it commands. Someone who has the skill to make arts and crafts, say, that people want to buy gets recognized and rewarded; someone whose skills are less tangible but from a wider social point of view just as valuable…is liable to have her merits ignored' (1999, p.199).

One can think of a situation where an enthusiastic, if not outright predatory, financial speculator is given more 'merit' points for his 'contribution' than a devoted teacher or social worker, a scenario not too much far away from contemporary reality.

In an extreme version of such an individualist/atomist perspective (already a feature of many advanced societies) each individual sees himself/herself as an island, capable of surviving on his/her own and because of this, nobody has any obligation to anybody else. The notion of individual here is often that of the economically rational consumer, the so-called rational *homo economicus*, with preferences rather than a social and public being say, a whole citizen whose 'developed capacities and their value owe something to society' (Taylor 1986: 60) a society, to which his/her relationship is complex and mutually developmental, in a dialectical sense. Taylor (1986) calls this desert based concept of justice the 'contribution principle' and argues that:

> This is not a doctrine that is anywhere spelled out. Rather what I am trying to do…is sketch what I think is the implicit background to a widely held principle of distributive justice in our society, which we can call the contribution principle. This is (at least partly) what lies behind the widely felt intuition that highly talented people ought to be paid more than the ordinary, that professions requiring high skill and extensive training should be more highly remunerated, and in general that complete equality of income, or distribution according to need, would be wrong (p.53).

Taylor sees this 'contribution principle' as a prominent feature of what he calls the 'atomist' view of western industrial society which has brought about a

"privatization" of life and that this privatization 'naturally makes us tend to look at society as a set of necessary instruments rather than as the locus in which we can develop our most important potential' (1986: 51). However, his conclusion is that

> Justice involves giving appropriate weight to both of these principles [equalization/ principle of equal sharing and "differentials" or the contribution principle]…in any society that is *inter alia* an enterprise of economic collaboration, and in which the economic contributions are not equal, as they cannot be in an advanced technological society, some form of the contribution principle is valid (p. 63 original emphasis)

This seems to be the kind of approach that is advocated by many other justice theorists although in different formulations and with mixtures of principles. For example Galston (1986) argues on similar lines and proposes two principles that according to him typifies modern liberal societies:

> First, goods and services that fall within the sphere of basic needs are to be distributed on the basis of need, and the needs of all individuals are to be regarded as equally important. Secondly, many opportunities outside the sphere of need are to be allocated to individuals through a competition in which all have a fair chance to participate (p.89).

For his part, Michael Walzer in his seminal work *Spheres of Justice* (1983) has argued that 'Desert does not have the urgency of need and it does not involve having (owning and consuming) in the same way', and that, 'it is a strong claim, but it calls for difficult judgments; and only under very special conditions does it yield specific distributions' (p.24-25)

While the equality of opportunity, as implied by the second principle in the above quote by Galston (1986), should not be confused with equality of endowment (individuals with similar naturally endowed capacities etc. rather than unique ones with varied natural capacities) and/or equality of outcome (similar and equal outcomes), it can however, be argued that there is a substantial relationship between equality of opportunity and equality of outcome in modern societies many of which are far from egalitarian and are in fact, increasingly becoming polarized. For example, in such modern societies the contemporary available opportunities have a causative relationship to and depend upon the outcomes of the previous ones or, as an egalitarian perspective would argue opportunity in a hierarchical society depends 'not only on an open road but also upon an equal start'.

It is thus, the "equality of conditions", the background conditions, or the equality of circumstances which influence the opportunities and the outcomes and which are then evaluated in a manner that makes the equality of opportunity concept relevant and meaningful. From the emphasis that an "equal start is also important in addition to an open road" or that because of the injustices or barriers and obstacles created by previous outcomes, the implication is that some sort of corrective measures (compensation?) will be needed if distributive justice is to mean anything. A clearer version of the same view can be found in Walzer (1986) who says:

> Today's inequalities of opportunity derive from yesterday's victories and defeats; they are inherited from the past, carried not by genetic but by social structures, by organized power, wealth, and professional standing (p. 144).

These and other similar observations are at the center of the disagreements in the discourses of not only domestic but also of international justice. For instance, regarding greenhouse gas emissions in particular and other environmental goods and bads in general (the waste trade or the 'traffic in risk') an important bone of contention between the states at international fora is that of demand for responsibility based justice, especially, both contemporary and 'historical responsibility'. The concept of 'natural debt' also refers to history and the historical patterns of use of nature and global natural commons.

Another perspective on justice is that which focuses on the principle of entitlement and its most well known advocate is Robert Nozick through his well-known work *Anarchy, State, and Utopia* (1974). Nozick's theory is basically a defense of private property rights. The justifications of ownership are reflected in Nozick's entitlement view in the following quotes (all cited in Dobson 1998: 77, 144):

> 'Things come into the world already attached to people having entitlements over them'
>
> 'The general outlines of the entitlement theory illuminates the nature and defects of the other conceptions of distributive justice. The entitlement theory of justice is *historical*; whether a distribution is just depends upon how it came about' (original emphasis)
>
> 'Justice in holdings is historical; it depends on what actually happened'
>
> 'Whatever arises from a just situation is itself just'

and

> In a free society, diverse persons control different resources, and new holdings arise out of the voluntary exchanges and actions of persons. There is no more a distributing or distribution of shares than there is a distributing of mates in a society in which persons choose whom they will marry. The result is the product of many individual decisions which the different individuals are entitled to make (Nozick, 1974: 149-150, cited in Low and Gleeson 1998: 79).

Nozick and before him Fredrick Hayek have argued for a property-based approach to justice meaning entitlement to property. Justice is about the acquisition and transfer of private property. In their view justice is frequently seen in its procedural sense; the justice of the outcomes are not relevant as long as the procedures have been just. Moreover, if the 'original' acquisition and the subsequent transfers of property was just, then claims made on other principles of justice like need for example, are less important or irrelevant. This 'original' acquisition of property draws from a 'Lockean proviso' according to which an acquisition should not worsen the position of others by preventing them from acquiring the same.

The entitlement approach to justice has its fair share of critics[6]. An obvious problem arises with its claims regarding the legitimacy of the initial 'original' acquisition of property. The Lockean proviso that it draws upon may hold true for certain situations where resources are in abundant supply but where resources are scarce and are of vital nature, such 'original' acquisitions can become monopolistic, with no concern for vital and basic human needs and can, therefore, be deemed unjust and unethical. Furthermore, the kind of accurate and 'just' information needed to make such a claim may not be always available. The element of uncertainty and distortion, therefore, creep in as regards the legitimacy of much of existing private property. Cohen (1985) makes a seemingly insignificant point but which has validity if one takes into account recent centuries of world history which is full of stories of exploitation, plunder and coercive occupations of land and other resources:

> Take, for example, the shirt that I am wearing. Superior force, nothing more, is the likely means whereby whoever first privatized the land from

[6] 6. Among others, see the works of the Marxist writer G.A. Cohen especially his essay, 'Self-ownership, world-ownership and equality', in F.S. Lucash, ed., *Justice and Equality: Here and Now*, Ithaca NY and London: Cornell University Press, 1986, and G.A.Cohen, 'Nozick on appropriation', *New Left Review*, 150, March/April 1985, 89-107; Amartya Sen's work is also critical of the entitlement theory of justice. See, *'Poverty and famines : an essay on entitlement and deprivation'*, Oxford : Clarendon, 1981.

> which came the cotton out of which it is made secured his title to it (p.92).

The economist Amartya Sen's work on famines and his observation regarding entitlements critically shows that how under such "justly held" or "unrestricted" or "inalienable" property rights famines can and have occurred and have left a track of detrimental consequences for the victims of starvation. In a situation of hunger and starvation 'there was no overall decline in food availability at all, and the famines occurred precisely because of shifts in entitlement resulting from exercises of rights that are perfectly legitimate' (Sen, 1984: 311-2). But while entitlements can result in certain terrible and undesirable outcomes, in terms of global commons or 'environmental space' like the emissions of greenhouse gases it is often the choice principle of justice for those who demand 'equal rights of all individuals on earth to the use of the atmosphere' (CSE 1992: 276). For example, the Indian non governmental organization the Center for Science and Environment (CSE) one of the most vocal NGOs from South, argued for such entitlements in their statement issued prior to the UNCED sponsored Earth Summit in Rio in 1992. In proposing an equal rights to the atmosphere, the CSE argued - and still insists on such a principle - that the 'South should be demanding compensatory measures from the north for errant behaviour as a question of its right over global resources' (p. 278). Further, it maintains, among other things, that its proposed scheme should be attractive to all parties because:

1. it is consistent with the norms of human rights and equality, [and that]
2. it is a system built on rights, not on aid or charity or undue and unequal obligations (CSE 1992, p.278).

An exclusive insistence on entitlements or rights may well be disadvantageous for those who do not possess the necessary capacities and tools either because of 'historical barriers' or previous injustices, or because of naturally unequal endowments, which are often made even more unequal because of the existing structural and systemic unequal arrangements. It is also important to note that, given the fact that the principle of 'poor sell cheap' is a prominent feature of the rapidly globalizing capitalist world economy, there is no good reason to think that the environmental resources and their associated functions that the poor would come to own as a result of property rights (in itself unlikely the way things stand at present), will be sold or exchanged at socially just and 'ecologically correct' prices. There will always be incentives for abuse of these 'rights' as long as there are no mechanisms against exploitation in an economically polarized and unequal world. The weaker parties' acquiescence to sell cheap to the powerful (because there are immediate survival needs or because there is a lack of information and knowledge about the nature of the

agreements and the long term consequences of such selling) could itself be a reflection of background injustices (Shue, 1992). It is these background issues that compound the discourses of justice. Or in other word, a historical and inherently political understanding and theorizing about justice stand in sharp contrast to a narrowly rational and ‘pragmatic’ approach to justice. For example, from a game theoretical perspective leverage in negotiations depend exactly on how justice is viewed and, more importantly, on how issues are linked to arrive at definitions and perspectives on justice. While history matters, it can be argued that historical type arguments can well be amenable to abuse by entrenched interests parading as the voice of the poor.

6. Environment, International Justice and the Universal/Particular Debate

Jamieson (1994:203) has suggested: 'Perhaps the most important idea of global environmental justice views the environment as a commodity whose distribution should be governed by principles of justice'. But can there be such a justice? This is a very contentious issue and some think it is impossible to talk about such a thing as 'international justice'. One such view is that identified with the 'realist school' of international relations that deny the application of any kind of ethical or moral principles across societies and on a global scale. This perspective remains the dominant normative view of international relations (Baylis and Rengerr 1992, p.9). The idea is that since there is no global 'community', there cannot be international justice and that politics should be seen separately from ethics. It stresses order and survival (often seen as the 'morality of states') and not justice, national interests and security and not moral and ethical considerations. The perspective is supported by a Hobbesian and Machiavellian state-centric worldview with narrow, inadequate and essentially egoistical assumptions about human nature. This kind of view especially in relation to matters of inter-state justice, although with different political commitments and ethical foundations, is also reflected in many other theories of justice especially those that have now come to be known as the 'communitarian' theories. These perspectives critique universalist and 'abstract' idea and 'seek to derive justice from "history, tradition or local context"' (Attfiled and Wilkins, 1992:6). For example, Michael Walzer's influential *Sphere of Justice* (1983) is one such theory. Walzer who is one of the most radically liberal and pluralist communitarians, puts forward a 'pluralistic' approach that argues for different 'spheres' and principles of justice:

> I want to argue…that the principles of justice are themselves pluralistic in form; that different social goods ought to be distributed for different reasons, in accordance with different procedures, by different agents; and that all these differences derive from different understandings of social goods themselves - the inevitable product of historical cultural particularism (1983: 6).

For Walzer (1983:5) 'Justice is a human construction, and it is doubtful that it can be made in only one way'. Goods have different social meanings and they are all social in nature. 'Goods in the world have shared meanings because conceptions and creation are social processes. For the same reason, goods have different meanings in different societies. The same "thing" is valued for different reasons, or it is valued here and disvalued there' (p.7). Also:

> A single necessary good, and one that is always necessary - food, for example - carries different meanings in different places. Bread is the staff

> of life, the body of Christ, the symbol of the Sabbath, the means of hospitality, and so on (p.8).

Walzer is correct as regards the different social meanings and values of goods in different places. But if one may ask why in certain concrete situations something as necessary, a "staff of life" like bread, has different value and meaning in different places or, why a starving person sees bread in a different light from someone else who is not faced with the same predicament? It is then, not difficult to see that it is basically the circumstances, some of then life threatening, that produce these different understandings of the otherwise same thing. In such extreme cases most ethical positions and systems would suggest that *need* be the choice principle of distribution. But Walzer casts doubts: 'If the religious uses of bread were to conflict with its nutritional uses - if the gods demanded that bread be baked and burned rather than eaten - it is by no means clear which use would be primary' (p.8). While Walzer is certainly not implying this, an ironic meaning could be read into the 'religious uses' of basic commodities or resources to mean as those uses which are dictated by the instrumental and narrow calculus of capitalist market economy that see nothing wrong in channeling critical resources into non-basic needs investments and by 'gods' to mean as the powerful terrestrial entities that have vested interests in such investments! After all, according to this kind of rationality, it indeed becomes very much clear which use would be primary because it makes much more sense to invest in producing 'nutritious' food for the pets of the wealthy that will bring more returns to the investor(s) than to invest in food crops or in other ventures that may not bring the same kind of profits but will surely save starving lives and reduce human misery.

The recent debates between liberal and the communitarian theorists of justice is of particular interest here regarding international justice. Liberal theories have recently been accused of being too 'abstract' not grounded in social reality, not context sensitive and that they avoid taking into account the differences among communities, societies and states etc. Their apparent attempt to look for a single principle or single set of principles of justice is particularly criticized. In this way, its communitarian critics are increasingly questioning the 'universalism' of liberal theories of justice. Rawls' 'impartiality' and 'justice as fairness' and liberal secularism's apparent 'neutrality' have come under critical scrutiny. Moreover, most liberal theorists are accused of being too staunch advocates of the secular 'wall of separation' between say, religion and public affairs at the cost of undermining cultural, religious diversity and democratic pluralism (Bader, 1999). Bader (1999) suggests that liberal theorists should be concerned more with the 'priority for democracy' rather than with the myths of 'neutrality' and a 'hands-off' approach to justice. Carens (1999) argues on similar lines and thinks that a better approach to issues of justice would be one of 'immersion'

rather than abstraction and 'neutral' distance. The similarities of this view with some feminist perspectives like the 'ethics of care' (Gilligan 1982) are striking. 'Immersion' or inclusiveness is a feature of Iris Young's (1990) conception of justice, which is also very critical of the 'neutrality' and 'impartiality' thesis. Young's argument can be seen as a standard critique of the strict 'impartiality' position like that of Rawls :

> Rawls presents us with not so flashy a fiction, but the original position which he constructs as the point of view of impartiality is…utopian….The ideal of impartiality is an idealist fiction. It is impossible to adopt an unsituated moral point of view, and if a point of view is situated, then it cannot be universal, it cannot stand apart from and understand all points of view (1990: 104).

Among other things, the communitarian perspectives seem to be attempting to bring back a substantial ethical outlook into conceptions of justice; a virtue based outlook on issues of justice. This is particularly visible in the work of Alasdair MacIntyre (1981) which argues for a 'virtue ethic'. For MacIntyre cultural traditions, their vocabularies and narratives are indispensable and cannot be discarded if we want to conduct a meaningful discourse of justice and rationality. Communitarian theories appear to be reluctant to talk about universal justice based on a theory that will have a universal descriptive and prescriptive reach. While the idea of international justice seems to be unattractive to communitarian theorists they do, however, express their concerns and call for international charity and aid.

What is often being suggested is that while there should be international concern in the form of charity and humanitarian action, there can be no international justice. But is it possible, to achieve ends of justice through charitable means and if it is, should it be? What is the normative and substantive difference between the two and how they relate to and affect the dignity or the sense of that dignity of a person, a group or community to whom a charitable 'justice' is done? Is charity and aid the way to go in addressing the cumulative products of past injustices which are, ironically, so well captured in a previous quote by Walzer (1986) himself?

> Today's inequalities of opportunity derive from yesterday's victories and defeats; they are inherited from the past, carried not by genetic but by social structures, by organized power, wealth, and professional standing (p.144).

Belsey (1992) replies with an example of famine:

> It is a truth, though a depressing one, that even if the immediate and desperate crisis of famine and starvation could be solved, the underlying problem of widespread absolute poverty would remain, and with it the constant threat of breakdown into further famines. Famine relief is of course vital, but because it is treating the symptoms rather than tackling the underlying causes, it is only amelioration and not a cure (p. 36).

George (1992) who has explored the politics of food and hunger also argues for justice because charity as a 'stop-gap' does not address structural and systemic causes of injustice.

There is something disturbing when the two are conflated and confused with each other. Although in a sense justice cannot be separated from virtues like care, concern and compassion for instance, it cannot be replaced with them either without changing its substantial meaning and its intrinsic essence radically; the kind of essence that is constitutive of these virtues yet is something more. A similar sense permeates, for example, the Kantian notion of 'moral equality' of all persons. Perhaps this is what substantive theories of justice also argue for, that is, to have some general concept of the good, the ethical and the rational as one dialectically synthesized concept which would guide justice essentially because as 'morally equals' humans are ends in themselves and when these ends are intentionally violated by some, anywhere and at any time, injustice is done. But what the 'recipients', if not the victims, deem unjust because of the circumstances that they find themselves in - circumstances which are not 'natural' or 'inevitable', which are 'carried not by genetic but by social structures' - solution has to come through a framework or theory of justice and not charity. It is always possible that in such situations charity, however necessary and desirable, could actually legitimize injustice. Moreover, and perhaps more relevant here, it is perfectly possible - in fact a feature of certain strands of environmentalism - to talk passionately and benevolently about 'care' and 'concern' for the environment, for 'wildlife' preservation, even about sustainability, without ever talking about social justice in any substantial and meaningful sense.

Another objection made to the universalist views of justice is that by the dominant 'realist' school on the grounds of reciprocity which, in a nutshell, means that because there is no real reciprocity (of power and not moral) therefore, there are and can be no obligations of the powerful towards the weak. Nielsen (1992) has argued that instead of such a reciprocity there is a need for 'moral reciprocity' based on the Kantian conception of moral equality. The 'realist' school is realist in that it takes for granted, even justifies, contemporary power structures and power-relations often in an ahistorical framework. But history matters and historical contexts matter. It matters everywhere. Claims based on conceptions of histories matter. It (the realist position) discounts all

this and it fails to see how the dialectic of power has developed through the ages and in that development process who and how some were systematically trampled down and disempowered through unjust practices and abusive exercise of power. Justice is not just about 'here and now' but equally about 'there and then'. But for such perspectives it appears that justice is not an issue to be argued from grounds with such implicitly judgmental orientations, as if there was such a thing as 'ethical neutrality' or some imagined view from nowhere to talk about such inherently normative issues. This kind of outlook with its own logic of reciprocity of power might as well disregard all claims of justice and obligation towards the weak (therefore, all) non-human life forms because just like their weak and oppressed human counterparts, they are also unable to reciprocate enough to counter 'real' and existing power.

The dominant reductionist views about international relations, politics and the deafening silence about historical, structural nature of oppression, exploitation and discrimination makes any talk of international justice irrelevant. The state-centric conception of world politics with obsolete and particularistic political forms refuses to acknowledge new, complex and dangerous problems that potentially threaten the possibility and the character of life forms not just within confined borders but also on the planet as a whole. But this refusal in itself becomes an injustice because it ignores the changed nature of the interaction of states and non-state actors in the global arena and the resulting benefits and burdens that are produced and shared, often disproportionately and undeservedly, by the parties. The very word 'interdependence' has taken a new meaning. A world in which states are seen as autarkic with exclusive concern for what happens within the domestic borders is a world blind to injustices at other supra-state levels. Beitz (1979) while criticizing the passing concern shown by liberal theorists for international justice has argued that 'In an interdependent world, confining principles of social justice to domestic societies has the effect of taxing the poor nations so that others may benefit from living in "just" regimes' (p.150). In the context of migration and border controls in liberal/democratic societies Bader (1995) has termed this kind of attitude as 'collective welfare chauvinism' (p.215).

The realist state-centric position with its over-emphasis on the twin principles of territoriality and sovereignty while suitable for the management of more localized natural resources is dangerously at odds with many areas of the biosphere that needs collaboration or joint action. These areas are commonly known as the global 'commons' or within the theoretical constructs of social science as 'collective goods' (Rowlands 1992, p.290). This kind of understanding of global resources and their management calls into question the conventional unilateralist attitude towards global issues. In recent years this critical challenge has been partially gaining some acceptance, as also evident in certain environ-

mental treaties and agreements, but it has a long way to go in order to replace the entrenched worldviews that dominate global politics of international relations. If such issues cut across national boundaries and there is growing degree of interdependence, then with each interaction complexity of issues is bound to grow and within each interaction there are normative issues involved that defy isolationist and reductionist disciplinary thinking. The proper tools of analysis needed must then be diverse and cross-or trans-disciplinary. For example, Rowlands (1992), in pointing out the growing interest in 'trans-boundary material flow' has argued that 'this issue has increased the challenge to our traditional interpretation of international relations by clearly revealing the true "interdependence" of the global environment: trans-boundary actions can effect another state' and that 'it further illustrates the permeability of the realist's billiard ball by demonstrating that international issues can have their origins in domestic concerns' (p.295).

Returning to the universal/particular debate, if it appears that the circumstances of justice are plural and complex then it would be rather futile to argue for a single principle to be valid universally and for all situations. But this complexity and diversity need not lead us to a silence and surrender in the face of pervasive issues of oppressions and injustice with global reach and effects. Regarding the now much dissected incompatibility thesis of universal 'abstraction' and particular 'sensitivity to context', O'Neill (1992) using the example of poor women in impoverished economies, who she identifies as the 'impoverished providers', has cogently and convincingly suggested that this dichotomy is unnecessary and can be avoided. She distinguishes between 'idealization' and 'abstraction' and argues that abstraction is possible and perhaps necessary for an international theory of justice without idealization: 'Abstract principles can guide context-sensitive judgment without lapsing into relativism' (p.53). She argues:

> Idealizations may privilege certain sorts of human agent and life and certain sorts of society by covertly presenting (enhanced versions of) their specific characteristics as true of all human action and life. In this way covert gender chauvinism and an exaggerated view of state sovereignty can be combined with liberal principles. Idealization masquerading as abstraction yields theories that appear to apply widely, but which covertly exclude those who do not match a certain ideal, or match it less well than others. Those who are excluded are then seen as defective or inadequate (p.58).

Moreover,

> Idealized conceptions both of state sovereignty and of state boundaries limit discussions of international distributive justice….The only way to find theories that have a wide scope is to abstract from the particularities

> of agents; but, when abstraction is displaced by idealization, we are not led to theories with wide scope but to theories that apply to idealized agents (O'Neill 1992, p.61).

Whether this kind of 'abstraction without idealization' remains an open question. But it does hint towards a way forward to establish general human interests, for example, in the context of global environmental issues and the situations of justice arising therein. The particularistic corrections to strict 'neutrality', 'impartiality' or 'difference-blind' positions of liberalism should be welcomed but without creating a false dichotomy that sees all types of universal conceptions as impossible at best and totalitarian or oppressive at worst. The other extreme that puts too much emphasis on the particular and the specific at the cost of the universal and the general, may itself become an obstacle to the elaboration of an inclusive and immersed conception of justice at all levels, which is so much needed to address the contemporary human condition. Oppression and injustice have many faces as Young (1990) has argued. They affect at different levels, their victims live in different places and the victimizers, either people or institutions are sometimes different and at other times the same. While some of these faces are easily visible and recognizable, others, more pervasive and structural ones are not. Harvey (1999) calls these subtle, non-violent but deeply damaging forms of oppressions as 'civilized oppression'. Harvey argues that 'Western societies generally and specific institutions within them may pride themselves on being examples of civilization in practice, yet oppressive relationships may pervade some of these institutions, even though the absence of force and of overt denials makes their analysis challenging and their recognition a matter of skill' (p.180). If one ignores, or fails to talk about one kind of oppression and protest against another, then one is not doing much justice after all. Moreover, one should always try to keep the big and historical picture of injustice in mind while at the same time being critically aware of the local and particular forms and of all the other faces, sometimes changing faces, of oppressions and injustices. The big picture injustices are those that are reflected in the contemporary world in the form of oppressive neo-imperialist institutions and relationships.

The universalist-particularist debate about justice issues has implications for any discourse of international (environmental) justice. For example, whether the liberal/communitarian debate can lead us to a new understanding of a rapidly changing world throwing up complex and complicated social and environmental problems with deep ethical implications, remain to be seen. So far, it seems that these debates are not adequately engaged with these issues but have been more focused on methodological and philosophical arguments. Some of the implications will become clear in the following sections.

7. Towards a 'Shared but Differentiated Responsibilities' Conception of Environmental Justice

7.1 Vulnerabilities, capabilities and environmental victims

The Brundtland Report (WCED) claims that "inequality is the planet's main environmental problem" (1987:5). One could as well think of it as a social and historical 'problem', as a cumulative end-product of historical events and processes. A more deeper view would think of it as an ethical problem. But one must ask, 'inequality of what ?' Or more precisely, 'Equality of what?,' as Amartya Sen has done. Sen's work on capabilities, freedom of choice and alternatives and their effects on well being and quality of life are major contributions to moral philosophy and welfare economics. In addition to his contribution to the understanding of famines and how and why they occur, Sen has also significantly added to the ethical basis of justice which he 'locates not so much in needs, interests or rights but in human capabilities and their facilitation' (Attfield and Wilkins 1992:2). In a series of publications and lectures Sen has tried to establish the relationship between freedom and capabilities and their overall influence on and relationship with people's quality of lives and well being. On the one hand, Sen makes a distinction between 'negative' and 'positive' freedoms based on Isiah Berlin's concepts of the two terms and, on the other hand, between 'instrumental' and 'intrinsic' freedoms. Negative freedom is understood as the non-interference of others in an individual's affairs whereas positive freedom has a more substantial meaning and is understood as a person's actual capacities to do something or to be. Sen defines the latter set as:

> In the 'instrumental' view, freedom is taken to be important precisely because of its being a means to other ends, rather than being valuable in itself. In contrast, the 'intrinsic' view of the importance of freedom asserts that freedom is valuable in itself, and not only because of what it permits us to achieve or do. The good life may be seen to be a life of freedom, and in that context freedom is not just a way of achieving good life, it is *constitutive* of the good life itself (1995:92).

Sen has particularly been concerned with positive and intrinsic freedoms because in his work on poverty and famines he has shown that a focus on negative freedom is inadequate. Recently, Sen (1999) has stressed upon the role of freedom as the determinant of the quality of our lives and that this quality in particular and development in general should not only be measured with narrower indicators but by our freedoms to do and be. This means that not only the inequality of wealth but also that of freedom and capabilities be of concern to us, although there are important linkages between the two. If there is a positive relationship between quality of life and quality of environment, it can

be argued that the range and quality of one's freedoms, particularly positive freedom, may also be measured by one's environment - especially when it directly and critically supports subsistence. That is, where there is better environment there is more freedom, or vice versa.

This kind of relationship has also been shown by the Environmental Kuznets Curve, the EKC[7] although that quality and therefore, the freedom that makes it possible, may be "imported" or appropriated. Such ecological appropriations for example, have been shown in studies like 'ecological footprints', 'appropriated carrying capacity' and 'environmental space' which give estimates of how much one region depends and appropriates resources of other regions (Rees and Wackernagel, 1994). Ecological footprints simply means 'resources consumed per person'. For example, Rees estimates that 4-6 hectares of land are needed to maintain the average consumer lifestyle in the North ore the developed countries. Yet in 1990 the total available productive land globally was only 1.7 hectares per person. Giving the example of Netherlands, Rees estimates that it consumes the output equivalent to 14 times as much productive land as is contained within its own borders (figures cited in *New Internationalist* 1996, p. 19). The deficits in this case and most other similar ones are usually expropriated for example, from the resources of lower-income countries usually through 'free' trade in primary products.

Before exploring the implications of all this for a proposed theory of environmental justice let us turn to some other similar findings regarding differential impacts. According to Boyce (1994), 'environmental degradation per unit consumption is not necessarily constant across income classes….Indeed, it is conceivable that degradation per unit consumption is *greater* for the rich; compare, for example, bicycles and automobiles' (original emphasis, p.173). This kind of observation is also similar to the claims of environmental justice movement. Boyce introduces a 'political-economy framework' in the argument by pointing to the important big divider - power. For instance, since, in the real world, power more often than not, correlates positively with wealth, Boyce (1994) believes that 'situations in which the winners are powerful can be expected to occur more frequently than situations in which the losers are powerful' and that 'the greater the inequality of power, the greater the extent

[7] EKC describes 'the relationship between some pollutants and income as an inverted-U increasing levels of pollution for people living in lower income countries and declining levels of pollution for higher per capita incomes', (Rothman and de Bruyn, 1998, 'Probing into the environmental Kuznets curve hypothesis' *Ecological Economics* 25, p.143). The relationship derives its name from the works of Simon Kuznets who first proposed a relationship between income and economic growth. See S. Kuznets, 1955, 'Economic growth and income inequality, *American Economic Review*, 45, pp:1-28.

and social cost of environmental degradation' (p.173). He therefore, concludes that 'democracy and equity are important not only as ends in themselves, but also as means to environmental protection' (Boyce 1994:178).

Torras and Boyce (1998) who have carried out a critical reassessment of the Environmental Kuznet's Curve (EKC) argue that 'changes in the distribution of power are central to the connection between the two phenomenon [income and pollution in the EKC]' (p.149). The authors make an important observation in their conclusion that, 'as average income in a given country rises, pollution-intensive production may be relocated to lower income countries. If so, this may reflect power inequalities among countries, as well as within them' (p.158). Since the capitalist world economy is very much infused with risk, and there is a growing hostility of communities in the industrialized world towards the siting of risk-producing land uses an 'efficient' 'traffic in risk' is just a logical out-come. Low and Gleeson (1998) have argued that 'given these centrifugal social and regulatory pressures, it should be no surprise that environmental organizations are reporting a flourishing trade in toxic wastes, exported mainly from developed countries to developing countries' (p.122). Today many of the persistent environmental harms and risks are not 'solved' but the impacts are simply shifted from one locality to another. Dryzek (1987) has shown this tendency of 'displacement' using the case of acid rain in USA. It is solved by building tall smokestacks: 'Instead of polluting areas adjacent to copper smelters in Utah or coal-burning power stations in Ohio, the sulfur dioxide ends up in the form of acid rain in rural areas such as the Rocky Mountains or the Adinrondacks' (p. 16).

Dryzek notes three forms of displacement:

1. Spatial displacement. For example shifting waste dumps from one place to another
2. Displacement through shifting the problem to another medium. For example dumping in the sea instead of on land
3. Temporal displacement; Problem is delayed and displaced into the future. For example the long-term effects of nuclear testing (cited in Low and Gleeson 1998, p.35).

What makes these situations more problematic and unjust is the difficulty in attributing responsibility for ecological disasters. The tragic incidences like the one that happened in Bhopal in India is a good example to see how risk-producing entities can get away without shouldering responsibility for their acts. Multinatonal capital in this particular case was able to solve the issue outside court and cheaply: 'Indeed, as the Indian government argued when seeking to have Bhopal case heard in a US court, multinational capital is able to use its

deterritorialised organizational structure to maximize the advantages of the "organized non-liability"' (Low and Gleeson 1998, p.127).

But there is a more pernicious form of ecocide that is not all too visible; a kind of slow death that occurs through sustained poisoning and degradation of environments and life support systems. More than 100 million people are displaced every year from their local environments by mega-development projects in the developing world. Valleys are flooded, villages drowned, land appropriated for more commercial projects the fruits of which are not justly shared. There are numerous small, unreported but equally lethal Bhopals that happen in many of these places. Weir (1987) notes:

> Bhopal is being repeated, not just as explosions, infernos, and deadly clouds heard, felt, and seen, the world over, but as 'mini-Bhopals - smaller industrial accidents that occur with disturbing frequency in chemical plants in both developed and developing countries. Even more numerous and deadly are the 'slow-motion Bhopals' - unseen and chronic poisoning from industrial pollution that causes irreversible pain, suffering, and death (p. xi-xii).

Returning to Sen (1988), if 'The freedom to choose between alternative functioning bundles reflects a person's "advantage" - his or her "capability" to function' (1988: 279), then, conversely, it can be argued that the unfreedom, or the lack or absence of freedom to choose between alternatives will reflect a person's 'disadvantage' - his or her 'incapability' to function or function properly. This incapability will also be a reflection and a cause of the person's vulnerabilities. A major share of these vulnerabilities could well be due to social-political, institutional/structural constraints, which incapacitate and dis-empower. Moreover, due to ecological dislocations both of local and global nature - themselves reflections of these arrangements - these vulnerabilities could further be worsened.

A good example of this kind of scenario has been presented by Onora O'Neill (992) whose focus on the poor women in poor countries, the 'impoverished providers', raises crucial issues of justice. It is argued:

> Women's lives are not well conceived just as those of idealized individuals. A world of such individuals assumes away relations of dependence and interdependence; yet these are central to most lives actually available to women….These women may depend on others but lack the supposed securities of dependence….They are powerless, yet others who are yet more vulnerable depend on them for protection (O'Neill 1992:51)

There are similarities between demands for gender and international justice. In the global context, the vulnerabilities of the 'impoverished providers' and those of the 'impoverished' in general are similar in the sense that while the difference certainly exist in degree, it may not exist so much in kind under certain circumstances. It is possible to think of a situation in which while those who are not the most vulnerable 'impoverished providers' in the domestic sphere are, nevertheless, absolutely vulnerable and 'impoverished' on a different scale, in a different bigger circle or sphere to which they also belong and depend upon in addition to the smaller ones. This comparison is not meant to belittle the experiences and the predicaments of the former and it should not be seen as a condonation or justification of the existence of domestic or local structures of oppression. But that these local spheres of injustice are also situated in and are part of a wider, bigger unjust sphere the workings of which affect *all* the impoverished - impoverished to different degrees, but nevertheless impoverished. O'Neill (1992:51) argues:

> They may find that they are relegated to and subordinated within a domestic sphere, whose separate and distinctive existence is legitimated not by appeals to justice but by entrenched views of family life and honour. They may also find that this domestic sphere is embedded in an economy that is sub-ordinate to distant and richer economies…their rewards fluctuating to the beat of distant economic forces.

A serious and just account of justice cannot ignore the plight of O'Neill's 'impoverished providers' in marginalized and developing economies but that account of justice cannot also gloss over the predicaments of the impoverished in general, who may be the oppressors in one sphere but the absolutely vulnerable and oppressed in another and who may suffer equally in the wake of ecological disasters not necessarily, and more important, not *equally* of their own making. Such a conception of justice needs, perhaps, a kind of 'contribution principle', like the one discussed earlier, not only for environmental 'goods' and the consequent rewards but also for environmental 'bads' and the say, consequent penalties, to strike a fair balance.

Because the weak and vulnerable are not equal partners in power relations and lack not only the resources that are the determinants of capabilities but also the freedoms to exercise them or the power of agency to employ them, they are always in a disadvantaged position. For example, in negotiations and transactions the existence of such vulnerabilities cannot give rise to a legitimate consent or agreement because of the disparities in access to information and knowledge, the security to dissent and to have an equal say in the change or modification of arrangements. If the present circumstances of justice are 'ethical diversity' (O'Neill 1988:718), then it is important to note that this 'ethical

diversity' is, however, shaped by the equally diverse universe of experiences and encounters some of which are enabling and empowering while others disabling and disempowering; some enhance capabilities and freedoms while others restrict and stunt these capabilities which are potentially latent and reside in every human being. The internal, local and domestic *as well as* the external, universal relations, unequal exchanges and interdependencies contribute to these circumstances of (in)justice and inequity, environmental or otherwise. If such is the contemporary state of affairs at local/national as well as global levels, then what kind of a theory of justice is required? How can justice be deliberated and established in an unequal world with such 'impoverished' vulnerable agents?

7.2 Responsibility: shared but differentiated

In our contemporary, rapidly globalizing world, in all spheres of commerce, culture and communications, if one consider the nature, scope and reach of most accompanying social and environmental influences and the impacts that arise out of the pursuance of different interests through the complex mechanisms of interdependencies and interactions, then one is faced with a rather novel situation. This is a situation of mutual involvement of agents, be they individuals, groups, states or multinational corporations, and their corresponding mutual claims of rights and obligations. That these impacts can be, and actually are, variable within and across boundaries and spheres both in degree and in kind and which are coped with by agents with different vulnerabilities and capabilities cannot be overemphasized. In such scenarios (which are not too unrealistic but arguably contemporary and existing), while obligations to others decrease in strength as one moves away from one's immediate circle, as we are told (Wenz 1988)[8], the impacts and consequences of actions of some may not necessarily decrease with distance from the inner most core. In fact, the very

[8] Peter Wenz writes: 'The closer our relationship is to someone or something, the greater the number of our obligations in that relationship, and/or the stronger our obligations in that relationship ….My obligations toward a person increase with proximity to me of the circle on which the person exists (Wenz 1988, '*Environmental Justice*, New York: SUNY Press, p. 316). This has remarkable resemblance to Sidgwick's nineteenth-century 'common-sense morality'. Sidgwick, long before Wenz's 'concentric circles' theory was formulated, said (failings of gender aside):' We should all agree that each of us is bound to show kindness to his parents and spouse and children, and to other kinsmen in a less degree: and to those who have rendered services to him, and any others whom he may have admitted to his intimacy and called friends: and to neighbors and to fellow-countrymen more than others: and perhaps we may say to those of our own race more than to black or yellow men, and generally to human beings in proportion to their affinity to ourselves', quoted in A. Belsey 1992, 'World Poverty, justice and equality', in Attfield, R. and Wilkins, B. (eds.) *International Justice and the Third World*, Routledge, London p.38)**.** Belsey rightly objects to such views that it is indeed true that most people's behaviors are exactly of that nature but is it justified to make a virtue out of this kind of rationalization of self-centeredness and then base a theory of justice on it especially in relation to issues and actions that have impacts, some of them very harmful, across boundaries, territories - national or otherwise - and 'circles'?

commonality of many environmental resources and services they provide gives them a global reach. The extent of an action's impact therefore, can no longer be restricted to a certain 'sphere' or 'circle' and this obviously creates an 'imperative of responsibility' among people who may or may not be the inhabitants of same ecological space or geographical, or for that matter, of emotional kinship 'circles'. As mentioned earlier, in Dryzek's view these problems are merely moved around or 'displaced' rather than dealt with in a meaningful way.

In the context of the contemporary patterns of social and economic change, if the extent of an action's impact goes far beyond the conventional political units and forms like the state, then what conceptions of community, justice and ethics are needed? For example, instead of tinkering with the dominant logic of international relations which precludes any attempt of expanding the notion of community, should we not be asking more fundamental questions about these issues? Linklater (1990) asks:

> Does the state exhaust our political obligations, or are there wider and more fundamental obligations that survive, so to speak, the fragmentation of the human race into sovereign states? If there are surviving obligations, are they the obligations that states owe one another as members of a society of states? Are there duties that the individual owes to the whole of humanity, and are there rights that individuals can claim to turn against the human species and its political representatives? To what extent are there universal obligations not just to uphold the rights of human beings as far as possible within the current system, but to construct new global institutions and practices capable of realizing higher levels of human community and solidarity?' (p.136-37).

Fain (1987) has argued for a 'task-theoretic' normative politics. Fain sees the globalness of tasks as an appropriate defining category for these concepts of community, moral obligations and global responsibility. Fain has argued against 'legal conceptualism' and sees a normative imperative behind global problems. Since certain tasks cannot be solved by individuals and nation states, what we need is a notion of belonging and responsibility to a larger community. Similarly, Warner (1993) has suggested that 'The parameters of the community to whom one is responsible…vary according to the issue' and that 'the relationship between community and responsibility becomes crucial once we leave the liberal individual/state' (p.441). But I would argue that the relationship *between the individual and the world* - social as well as natural world - also becomes crucial once we move away from the individualist notions of the self. With the complex patterns of changes in the world today there must also come

an expansion in the notions of self, community, belonging, responsibility and the justice of these circumstances.

However, 'because engagement with the world is necessarily "global" in its scope, but the world is characterized by a multiplicity of agents none of whom can single-handedly bear the burden of global responsibility, the way in which our ethical responsibility is to be acted upon has to be contested and negotiated' (Campbell, 1993, p.99). These multiple agents with different capabilities to cope and handle burdens may find themselves in a world that thrusts upon them a disproportionate amount of risks and dangers. Because of the essentially differentiated impacts on the common ecological resources and functions by different agents with different capabilities and vulnerabilities, it is argued here, a theory of justice, which is compatible with a critical conception of ecological sustainability must be based on the principle of shared but differentiated responsibilities. Responsibility as not merely shared but differently shared because of differences and asymmetries that are the main, even definitive feature of societies and of the world in large. This is also because 'responsibility…is a function of power and knowledge' (Jonas 1984:123) and it is only too well known a fact that power and knowledge (already a determinant of much power, the 'information gap') have never been so unequally and disproportionately wielded as it is today. Jonas (1984) has argued that 'Power conjoined with reason carries responsibility with it' (p.138) or, that

> …responsibility is a correlate of power, so that the scope and kind of power determine the scope and kind of responsibility. When power and its constant exercise grow to certain dimensions, then not only the magnitude but also the qualitative nature of responsibility changes, with the effect that deeds of power generate the contents of the "ought", which thus is essentially in answer to what is being done (p.128).

Jonas's concern was about the future, the future generations and future of the planet itself but his thesis on the 'imperative of responsibility' and his exploration of an 'ethics for a technological age' can equally well apply to the contemporary world of impoverished and vulnerable agents; to the intra-generational and international scene as well as to the intergeneration scenario. He put his thesis by making the following basic distinctions:

> The first and most general condition of responsibility is causal power, that is, that acting makes an impact on the world; the second, that such acting is under the agent's control; and third, that he can foresee its consequences to some extent (1984:90).

Jonas's generalizations can be zoomed in or viewed in a more detailed manner whereby the asymmetries of power wielded by different agents, their differentiated capacities, capabilities, the consequent disproportionate impacts, and freedoms to control and foresee consequences become more visible. And what will be revealed under the magnifying lens will have implications for a theory of justice based on the principle of shared but differentiated responsibilities.

In such a schema, justice requires that the vulnerable be at least capable and have the freedom to cope and function, let's say, in an environmental emergency. This may well require an unequal treatment, a biased and impartial treatment in *favour* of the vulnerable. This kind of thinking about justice may actually contradict with, for example, the often strictly and exclusively reward (desert) based 'contribution principle', but it will be in agreement with a compensatory principle of rational as well as ethical and responsible sharing of both the benefits and costs of that which is global and common without unnecessarily denying rewards for contributions of individuals and groups. This kind of compensation - not to be confused with aid and charity - will be legitimate given the fact that the contemporary injustices and inequalities, of opportunities and freedoms are not sudden phenomena but are accumulations that carry a historical baggage. This is not an entirely new insight. For example, in many democratic societies the system of taxing (in an egalitarian conception the more progressive taxing) of income and wealth, more or less, performs the same function. It appears that among other reasons, it is done because there is a public value system that demands it as a matter of justice. In historical terms, most societies have functioned under similar principles of justice as Bookchin has also argued. Bookchin (1991) refers to the principles of 'irreducible minimum' (Radin 1960) and the 'equality of unequals' as inherent features of many organic societies:

> The principle of the irreducible minimum thus affirms the existence of inequality within the group - *inequality* of physical and mental powers, of skills and virtuosity, of psyches and proclivities. It does so not to ignore these inequalities or denigrate them, but on the contrary, to *compensate* for them…organic society tends to operate unconsciously according to the *equality of unequals* - that is, a freely given, unreflective form of social behaviour and distribution that compensates inequalities and does not yield to the fictive claim…that everyone is equal (p.144, original emphasis).

But in modern liberal tradition the blindfolded Justitia and her scales must dispenses 'equal and exact' justice. All competing and conflicting claims and interests are equalized and must be resolved blindly in a balancing manner:

> Indeed, all scales can *ever* do is to reduce qualitative difference to quantitative ones. Accordingly, everyone must be equal before Justitia; her blindfold prevents her from drawing any distinctions between [and]…from making any changes of measure due to difference among her supplicants….But persons are very different indeed, as the primordial equality of unequals had recognized. Justitia's rule of equality - of equivalence - thus completely reverses the old principle. Inasmuch as all are theoretically "equal" in her unseeing eyes, although often grossly unequal in fact, she turns the equality of unequals into *the inequality of equals*….Accordingly, the rule of equivalence, as symbolized by the scales in Justitia's hand, calls for *balance*, not compensation (Bookchin 1991:148 original emphasis).

Thinking in such a radical way about distributive justice '*demands more, not less, to be just to the vulnerable'* (O'Neill 1992:69 original emphasis). In the context of environmental damages since these vulnerabilities are exacerbated and capabilities and freedoms diminished variedly due to the differential impacts on the commonly shared environmental goods and services, the so called global commons and the 'services' they provide, distributive justice can therefore be seen as the call for the distribution of responsibilities. It would also be a call for the distribution of freedoms, the freedoms that are reflective of advantages and capabilities as well as of the disadvantages and vulnerabilities to cope with 'produced' ecological dislocations. Because these freedoms and capabilities are infringed upon differently by these 'produced' environmental bads, which are proportionately more detrimental to the vulnerable agents when compared with their contribution to these environmental bads, this demand is seen to be as fair and just. Justice is here, first and foremost, a matter of responsibility, of shared but differentiated responsibility; differentiated in proportion to the power of the agents and its reach and negative impacts upon vulnerable others. To these vulnerable others one may as well add the non-human life forms.

So where does all this leave us with a conception of sustainability that often sees the protection of a limited or scarce 'critical natural capital' as essential if humanity is to move towards a sustainable future which is also just? What kind of a theory of justice can we pin our hopes to for such a sustainable future? A particularist, local, communitarian theory which while provides the required correction to a strictly abstract 'contextually insensitive' stance but which ignores other broader and wider contexts. Or a theory that has universal concern; that abstracts without idealization as O'Neill has pointed out; that while avoids collapsing all specific circumstances of injustice and diversity of ethics, culture, tradition and identity into uniformity and standardization, identifies not only everybody's shared and mutual general interests in the

environment and its sustainability but also their differentiated responsibilities towards those general interests? Perhaps this dichotomy, if emphasised too much, itself is misleading. If one must play with geometric shapes then, one has to ask whether a ‘concentric circles’, a ‘spherical’ type of a theory of justice with their parochial orientations (important as they are in certain contexts but rather less meaningful when it comes to other, global, transnational and trans-communal issues like many of the ecological issues inherently are) makes sense or one that has a big circle that encapsulates and encircles all the other circles and spheres inside it. Some of these circles will be concentric while most others eccentric and overlapping with each other but, nevertheless, all embedded in and dependent on that one big circle.

This kind of an approach to reach to a theory of justice based on a general human interest and such a conception of responsibilities is essential if sustainability and social justice, not only within societies but also among societies have to be achieved. This could be an essential element of an ‘ecological sensibility’, ‘ecological rationality’ and of ‘ecological virtue‘ as part of a new reconstitution of human subjectivity. The suspicion that the agendas of environmental sustainability and social justice may diverge may or may not prove to be right. It will all depend upon what we eventually mean by sustainability, social justice but more important, upon our understanding of self, other and society-nature relationship. But, on another note, dealing with such a substantially normative issue like justice one has to ask whether a sustainable world where social justice is denied to the majority of its inhabitants would also be desirable if it was possible, proven ‘scientifically’ or otherwise? This denial could well be through ideological distortions as Kai Nielsn has pointed out: ‘Ideological mystification leads us to believe that there is nothing significant that could be done about these matters or nothing that could be done short of impoverishing us all or undermining our civil liberties. But that is just ideological mystification’ (1992:32).

8. By Way of Conclusion

There is no escape from ethical dilemmas in these times of complex transformations and fragmentations. As Stanley Hoffman put it: 'the claims of ordinary morality, the clamour for a kind of state conduct that does not almost inevitably lead to deceit and violence, cannot be suppressed. We must remember that states are led by human beings whose actions affect human beings within and outside: considerations of good and evil, right and wrong are therefore both inevitable and legitimate' (cited in Goulet 1992, p. 231).

The contemporary human condition demands our attention to justice. Justice is important. It is important not only in its narrow, contractarian-legalistic and distributive sense but also in its more substantially ethical and moral aspects. Approximately a quarter of humanity is trapped into absolute poverty and exclusion. We have entered the twenty first century with all of humanity's achievements and glories but injustices of all kinds in all societies stare us right in the face. But now there is a new twist to all these circumstances of injustice in the form of ecological degradations that can potentially threaten - are already threatening in some places - the very survival of all life including ours, on this planet.

Justice is understood differently depending upon so many things some of which I have briefly discussed in this paper. The principles or bases of justice are diverse. The seemingly strict and opposing dichotomies like universal and particular, abstract and concrete/context sensitive etc. not only criticize and therefore, inform and correct each other but importantly, they also complement each other in many ways although it may not appear so. Each can be enriched and broadened by the critical stance taken by the other. In the context of environmental justice I have tried to argue that it is not helpful to stick to one or the other in a strict manner. For example, the postmodernist criticism of abstract universalism and universal solutions to issues of justice should be welcomed but with caution. If the so called 'grand narratives' of the old universalism were faulty, as is often argued, and did not deliver as expected and hoped, then we need a new universalism and alternative grand narratives. The critiques of universalism should now focus more on what type of universalism rather than universalism *per se*. Or, whose universalism? We must go through a pre-universalistic period, with all its attending anxieties, disagreements, frustrations before arriving to a truly inclusive universalism. There is no escaping, or perhaps should not be, from grand narratives if there is to be a universal solution to injustices that arise out of events, interactions and arrangements that influence different peoples at different places some of whom are within the boundaries of the nation-states and some without as in the case of many environmental problems. There is some truth in Fredrick Jameson's observation

that grand narratives merely go underground but they do not disappear completely.

It may be objected, rightly so, that the differences - methodological, theoretical and especially ideological, for example - are not trivial between positions usually taken as we have already seen in this paper especially the universal/ particular debate about justice. But again, it can be argued that if the old universalism and its baggage which many contemporary theorists, including theorists of justice, are so critical of did not fulfill all promises, then perhaps it is because it was not truly universal in the first place, some of the insistent claims notwithstanding. For example, Bader (1995) argues that 'Historically, all known forms of "liberal-democratic" or "republican universalism" up till now are badly disguised versions of chauvinism' (p.232). For instance, these forms did not include or at times even did not acknowledge the visions, hopes and modes of thoughts of all peoples. It was flawed because it was built on some wrong or distorted assumptions about all 'others', especially oppressive views about the victims of history. It had a tendency to extend particular notions to universal proportions and to insist that that particular was 'objective', 'neutral' and 'impartial'. But what is more important is that this kind of new universalism out of which a comprehensive and inclusive theory of justice will have a good chance to emerge with new grand narratives will not be given; it will have to be established through democratic deliberations and inclusive participation, through a 'dialogue of visions'. In other words, these truly democratic narratives will have to be established dialogically and discursively which may well mean a radical revision, even inversion, of the old assumptions about self, society, nature and particularly about the others of nature and society. This is one pre-requisite, a crucial one, for a theory of justice, environmental or otherwise and applicable at different levels. It is so, because after all is said and done, sustainability, however defined, requires no less a definition of community than one that includes humanity - all of it and all peoples - as its members. In a discursively reached conception of justice the particular as well as the universal is the planet itself.

The State, as it has developed from the European experience through the treaty of Westphaplia in 1648 and onwards, along with all its monopolistic para-phernalia of violence has historically 'sought to limit the scope of both sub-national and transnational solidarities and identities' (Linklater 1990, p.149). Because of the fear of its internationalization, the idea of community has thus remained limited to the boundary of the nation-state. As Linklater (1990) has argued that 'states have sought a monopoly over the right to define political identity, because 'their survival and their success have largely depended upon it' (p.149). If within this kind of framework moral and political inclusion remains fixated with concern for human beings within state boundaries, it is

almost impossible to imagine the inclusion of non-human species to make up a ‘community’ of life forms, a dominant concern of ‘ecological justice’ (Low and Gleeson 1998).

In the end we as human beings and as peoples are all responsible for what happens to this planet. But since, as people, and groups of people, our contributions, both historical and contemporary and both towards environmental goods and bads, are not of the same order and kind, the corresponding responsibilities especially for harms, must also not be the same and equal but differentiated, *justly differentiated* if justice is to be done. The past of the species was not shared responsibly and justly by all its members, but both rationality and ethics demand that its future destiny, it there is to be one, a sustainable one, must be shared *responsibly*.

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Children's Exposure to Elemental Mercury Title Page
CHILDREN'S EXPOSURE to ELEMENTAL MERCURY
A NATIONAL REVIEW of EXPOSURE EVENTS
The Agency for Toxic Substances and Disease Registry
Centers for Disease Control and Prevention
Mercury Workgroup
February 2009
Children's Exposure to Elemental Mercury:

A National Review of Exposure Events

Reported by: The Agency for Toxic Substances and Disease Registry and Centers for Disease Control and Prevention Mercury Workgroup

Richard E. Besser, M.D.

February 2009

WORKGROUP MEMBERS

This report, titled "Children's Exposure to Elemental Mercury: A National Review of Exposure Events," was prepared by the Agency for Toxic Substances and Disease Registry (ATSDR) and the Centers for Disease Control and Prevention (CDC). The members of the internally convened workgroup have expertise in biomonitoring, environmental epidemiology, medicine, statistics, exposure investigation and assessment, state-led initiatives, toxicology, and management of mercury contamination in the environment.

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p.8
The objectives of the workgroup were to:

1) identify the common sources of elemental mercury exposure in children; and
2) describe the location, demographics, and proportion of children exposed or potentially exposed to elemental mercury in the United States.

p.10
4.6. Discussion and Conclusions

Review of the data sources and literature found three categories of exposure scenarios. The first two categories are scenarios in the home and those at school, two common locations for childhood elemental mercury exposures. The third category includes exposures at other locations, such as medical clinics and property that was not adequately remediated. The sources of exposure in the home include mercury-containing devices, cultural or ceremonial uses of mercury, …

p.12
5.2. Objectives

The objectives of the Mercury Workgroup were to:

1) identify the exposure sources associated with elemental mercury exposure in children; and

2) describe the location, demographics, and proportion of children exposed or potentially exposed to elemental mercury in the United States.

The Mercury Workgroup reported on elemental mercury exposures that typically occur when children inhale mercury vapor related to:

- disposal or damage to mercury devices (e.g., thermometers or lightbulbs);
- off-gassing of mercury vapors from flooring materials;
- proximity to industrial sites or hazardous waste sites contaminated with mercury;
- reuse of industrial property contaminated with mercury;
- residential contamination caused by religious or cultural practices; and
- release of mercury found in school science laboratories or health care facilities.

p.13
Indoor mercury spills that are not properly cleaned up can release mercury vapors into the air for weeks or even years [ATSDR 1999].

6.2. Toxicokinetics of Elemental Mercury

When human volunteers were exposed to mercury vapor, the estimated uptake rate through the skin was approximately 2% of the uptake rate through the lungs [Hursh et al. 1989].

Even the small amount of mercury in a typical thermometer (0.5 to 3.0 g mercury or 0.04 to

0.22 ml mercury) can create hazardous conditions if spilled indoors and improperly cleaned [Smart 1986; von Muhlendahl 1990].

p.14
Some Caribbean religions and folk healers use mercury for religious or ceremonial purposes [Wendroff 2005]. The ceremonial uses of mercury include applying it to the skin, adding it to candles, or sprinkling it around the home. Elemental mercury is easily dispersed into fine beads that sink into carpets, furniture, cracks in the floor, or other porous materials (Figure 1a, 1b). Mercury tracked from room to room produces widespread contamination throughout the house. These practices can potentially expose practitioners and their children. Following indoor spills, mercury can persist for months and even years [Carpi and Chen 2001]. Therefore ceremonial use of mercury in the home could also expose future occupants and their children. Occasionally, mercury contamination is so extensive that adequate cleaning is not possible and the building must be demolished [Orloff et al. 1997].

In addition, school science laboratories may store elemental mercury and various types of mercury-containing equipment, such as thermometers and barometers.

p.15
Mercury is also measurable in hair. However, these tests primarily measure organic mercury [Aposhian et al. 1992; ATSDR 2001c; Cianciola et al. 1997; Kingman et al. 1998], and are not useful for assessing recent exposures to elemental mercury.

p.28
10.1. **Exposure at Home**

The sources of exposure in the home include … cultural or ceremonial uses of mercury, …

A mercury vapor absorbing filter system was used in the bedroom for 3 months to remove residual mercury vapors.

p.29
Cultural or Ceremonial Uses. Some practitioners of certain Caribbean and Latin American religions, such as Voodoo, Santeria, Palo, and Espiritismo, use mercury ceremonially [EPA 2002; Johnson 1999; Newby et al. 2006; Wendroff 2005; Zayas and Ozuah 1996]. Ceremonial uses of mercury include applying it to the skin, adding it to candles, or sprinkling it around the home. These practices can potentially expose practitioners and their families. Because mercury contamination in the home can persist for years, ceremonial use of mercury in the home could expose future occupants and their children, contributing to health disparities in these populations.

Previous reports document the ceremonial use of mercury in neighborhoods whose residents are largely Hispanic [JSI 2003; Ozuah et al. 2003; Rogers et al. 2008; Rogers et al. 2007; Zayas and Ozuah 1996]. The John Snow, Inc. Center for Environmental Health Studies [2003] reported a survey of 898 persons, most of whom had Latino or Caribbean backgrounds. In this survey, 344 of the 898 people (38%) reported that they used or knew someone who used mercury for religious, spiritual, or health purposes. Garetano et al. [2008] found that mercury vapor levels were higher among residential common areas belonging to communities likely to use

mercury for cultural practices than control areas where cultural mercury use is uncommon. However, all mercury vapor levels observed by Garetano et al. [2008] were below the ATSDR minimum risk level for chronic inhalation of metallic mercury [ATSDR 1999]. An exposure assessment by Rogers et al. [2007] tested the urine mercury levels of 306 children who lived in an area where elemental mercury [p.30] was commonly sold for ritualistic use. Although no relationship between ritualistic use and mercury exposure was evident, Rogers et al. [2007] concluded that potential health hazards remain when mercury is readily available. In a similar study, urine mercury levels were measured in 100 children that resided in an area where elemental mercury was commonly sold for religious practices. Five percent of these children had urine mercury levels above 5 µg/L [Ozuah et al. 2003; Zayas and Ozuah 1996].

10.2. Exposure at School

The most common elemental mercury sources in schools are mercury stored in science laboratories, mercury found in broken instruments, and mercury brought to school from other locations.

p.31
10.3. Exposures in Other Locations

Prior Industrial Mercury Contamination. In most situations the reuse of industrial property **does not result** in childhood mercury exposure.

p.33
11. LIMITATIONS

Concerns regarding personal responsibility for causing a spill or having to clean up a spill may influence the quality and completeness of the information reported. Spills in private residences may be under reported because the residents are unaware of the health hazard and the need to report spills … In addition, the published literature is likely biased toward reporting worst-case scenarios, as opposed to **the more typical exposures that do not cause symptoms or attract attention.**

Case reports from the literature provide more information about risk factors, exposure scenarios, and associated health outcomes. The specifics relate to the individual cases and are not representative of all exposure scenarios.

p. 34
12. DISCUSSION

p.35
12.2. Describing the Location, Demographics, and Proportion of Children Affected

Neither urine nor blood mercury levels correlate well with the presence or severity of symptoms [Cherry et al. 2002; Gattineni et al. 2007; Tominack et al. 2002].

Although the extent of mercury use in the home for religious purposes is not well characterized, **such use may lead to chronic mercury exposure among those who use it in this manner and for subsequent occupants** of the contaminated homes. Some

evidence suggests that attempting to ban mercury could drive its use and sales underground, making the risks of using mercury and the benefits of mercury-free alternatives difficult for local health officials to communicate [Riley et al. 2001]. **The individuals affected are most likely to be members of minority populations, raising concerns about environmental injustice in these communities.**

13. CONCLUSIONS

p.36
Although credibly estimating the frequency of elemental mercury exposures among children in the United States is not possible, such exposures are occurring. These incidents typically result from the misuse of mercury-containing equipment or a lack of knowledge regarding the hazard.

Initiatives that affect the number of children exposed have focused on reducing or removing mercury from consumer products, eliminating mercury from school science laboratories, and educating the public and school officials about its toxicity.

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"**There is an urgent need to obtain information on the levels of exposure from these practices to determine if children or adults are at risk.** Mercury vapor concentrations may be much higher after use during the winter months when the heat is turned on and the windows are closed, so data that reflect a variety of possible exposure scenarios are also needed." **p. 480**

TOXICOLOGICAL PROFILE FOR MERCURY

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Agency for Toxic Substances and Disease Registry

March 1999

p.7

Some religions have practices that may include the use of metallic mercury. Examples of these religions include Santeria (a Cuban-based religion whose followers worship both African deities and Catholic saints), Voodoo (a Haitian-based set of beliefs and rituals), Palo Mayombe (a secret form of ancestor worship practiced mainly in the Caribbean), and Espiritismo (a spiritual belief system native to Puerto Rico). Not all people who observe these religions use mercury, but when mercury is used in religious, ethnic, or ritualistic practices, exposure to mercury may occur both at the time of the practice and afterwards from contaminated indoor air. Metallic mercury is sold under the name "azogue" (pronounced ah-SEW-gay) in stores called “botanicas.” Botanicas are common in Hispanic and Haitian communities, where azogue may be sold as an herbal remedy or for spiritual practices. The metallic mercury is often sold in capsules or in glass containers. It may be placed in a sealed pouch to be worn on a necklace or in a pocket, or it may be sprinkled in the home or car. Some people may mix azogue in bath water or perfume, or place azogue in devotional candles. Because metallic mercury evaporates into the air, these practices may put anyone breathing the air in the room at risk of exposure to mercury. The longer people breathe the contaminated air, the greater their risk will be. The use of metallic mercury in a home or an apartment not only threatens the health of the people who live there now, but also threatens the health of future residents who may unknowingly be exposed to further release of mercury vapors from contaminated floors or walls.

p. 20

If you use metallic mercury or azogue in religious practices, you may expose your children or unborn child to mercury or contaminate your home. Such practices in which mercury containing substances have traditionally been used include Santeria (a Cuban-based religion whose followers worship both African deities and Catholic saints), Voodoo (a Haitian-based set of beliefs and rituals), Palo Mayombe (a secret form of ancestor worship practiced mainly in the Caribbean), or Espiritismo (a spiritual belief system native to Puerto Rico).

p. 227

Some religions have practices that may include the use of metallic mercury. Examples of these religions include Santeria (a Cuban-based religion that worships both African deities and Catholic saints), Voodoo (a Haitian-based set of beliefs and rituals), Palo Mayombe (a secret form of ancestor worship practiced mainly in the Caribbean), and Espiritismo (a spiritual belief system native to Puerto Rico). Not all people who observe these religions use mercury, but when mercury is used in religious, folk, or ritualistic practices, exposure to mercury may occur both at the time of the practice and afterwards from breathing in contaminated indoor air. Metallic mercury is sold under the name "azogue" (pronounced ah-SEW-gay) in stores called “botanicas.” Botanicas are common in Hispanic and Haitian communities, where azogue maybe sold as an herbal remedy or for spiritual practices. The metallic mercury is often sold in capsules or in glass containers. It may be placed in a sealed pouch to be worn on a necklace or carried in a pocket, or it may be sprinkled in the home or car. Some store owners may also suggest mixing azogue in bath water or perfume, and some people place azogue in devotional candles. The use of metallic mercury in a home or apartment not only threatens the health of the current residents, but also poses health risks to future residents, who may unknowingly be exposed to further release of mercury vapors from contaminated floors, carpeting, or walls.

p. 378

In addition, unknown quantities of metallic mercury used in religious or ethnic ceremonies, rituals, and practices (see Sections 5.4.4, 5.6, and 5.7) may reach municipal landfill sites by being improperly disposed of in domestic garbage, or may reach POTWs by being improperly discarded into domestic toilets or sink drains (Johnson [in press]). A survey was conducted to determine the use patterns of elemental mercury in the Latin American and Caribbean communities in New York City (Johnson [in press]). In a survey of 203 adults, about 54% used elemental mercury in various religious and ethnic practices. Of these users, 64% disposed of the mercury in household garbage, 27% flushed the mercury down the toilet, and 9% disposed of the mercury outdoors. It is commonly thought that the high mercury load found in sewage and garbage in New York City comes from dental clinics; however, improper disposal of mercury by religious practitioners in the Latin American and Caribbean communities may also contribute to this load (Johnson [in press]).

p. 429

Metallic mercury has been used by Mexican American and Asian populations in traditional remedies for chronic stomach disorders (Espinoza et al. 1995; 1996; Geffner and Sandler 1980; Trotter 1985). Most recently, Perharic et al. (1994) reported cases of poisonings resulting from exposure to traditional remedies and food supplements reported to the National Poisons Unit in London, England. From 1989 to 1991,elemental mercury was implicated in several poisonings following exposure to traditional Asian medicines. In one case, the mercury concentration in the medicinal product taken orally was 540 mg/g (540,000 ppm). The mercury was in its elemental or metallic form. Espinoza et al. (1995, 1996) reported that while examining imported Chinese herbal balls for the presence of products from endangered species, the authors detected potentially toxic levels of arsenic and mercury in certain herbal ball preparations. Herbal balls are aromatic, malleable, earth-toned, roughly spherical, hand-rolled mixtures primarily composed of herbs and honey that are used to make medicinal teas. These herbal balls are used as a self-medication for a wide variety of conditions, including fever, rheumatism, apoplexy, and cataracts. Herbal balls similar to those analyzed are readily available in specialty markets throughout the United States. Mercury (probably mercury sulfide) was detected in 8 of the 9 herbal balls tested. The recommended adult dose for the herbal balls is two per day. Ingesting two herbal balls could theoretically provide a dose of up to 1,200 mg of mercury.

p. 430

Religious and Ethnic Rituals, Ceremonies, and Practices. While some of medicinal and pharmaceutical uses of mercury compounds have been replaced in recent years, individuals in some ethnic or religious groups may still use mercury in various religious or ethnic rituals, practices, and ceremonies that can expose them to elevated mercury concentrations in room air. Metallic mercury has been used in Latin American and Caribbean communities as part of certain religious practices (e.g., Voodoo, Santeria, and Espiritismo), predominantly in domestic settings (Wendroff 1990). This use of mercury can contaminate a dwelling or automobile if the mercury is not completely removed from flooring, carpeting, and woodwork in an appropriate manner. Metallic mercury (sometimes under the name *azogue)* currently is sold in shops called botanicas which stock medicinal plants, traditional medicines, incense, candles, and perfumes. Botanicas typically dispense mercury in gelatin capsules or sometimes in small glass vials. Some religious practices involve sprinkling metallic mercury on the floor of the dwelling or of a car, mixing metallic mercury with soap and water to wash the floor, or placing it in an open container to rid the house of evil spirits. Other practices involve carrying a small amount of mercury in a vial on the person, or mixing mercury in bath water or perfumed soaps, devotional candles, ammonia or camphor. Any of these practices can liberate mercury vapor into the room air, exposing the occupants to elevated levels of mercury vapors (ATSDR 1997; Wendroff 1990, 1991). In addition to the individuals that intentionally use mercury in their dwellings, the opportunity exists for nonusers to be inadvertently exposed when they visit the dwelling, or purchase or rent dwellings in which the former tenants used mercury for religious purposes. The issuance of cautionary notices and information by health departments to members of these user populations is appropriate.

p. 457

Children can be exposed to various forms of mercury in a variety of ways, including playing with unsecured elemental mercury, inhalation of mercury vapors via the religious or ethnic practices of their parents or unintentional spills of elemental mercury, oral ingestion of herbal or ethnic remedies or mercury-containing consumer products, ...

p. 459

Children may be exposed to mercury vapors when they play with metallic mercury. Metallic mercury is a heavy, shiny, silver liquid and when spilled, forms little balls or beads which fascinate children. ...

Metallic mercury is traditionally used in some religious rituals or remedies, including religions such as Santeria (a Cuban-based religion that worships both African deities and Catholic saints), voodoo (a Haitian based set of beliefs and secret rites), Palo Mayombe (a secret form of ancestor worship practiced mainly in the Caribbean), or Espiritismo (a spiritual belief system native to Puerto Rico) (Wendroff 1990). If these rituals or spiritual remedies containing mercury are used in the home, children may be exposed and the house may be contaminated with mercury (ATSDR 1997; Johnson [in press]; Wendroff 1990, 1991; Zayas and Ozuah 1996). Metallic mercury is sold under the name "azogue" (pronounced ah-SEW-gay) in stores (sometimes called botanicas) which specialize in religious items and ethnic remedies (Johnson [in press]; Wendroff 1990; Zayas and Ozuah 1996). Azogue may be recommended by family members, spiritualists, card readers, and santeros. Typically, azogue is carried on one's person in a sealed pouch, or it is ritually sprinkled in the home or car. Some store owners suggest mixing azogue in bath water or perfume. Some people place azogue in devotional candles. Because metallic mercury evaporates into the air, there is a potential health risk from exposure to mercury vapors in a room where the mercury is sprinkled or spilled onto the floor, put in candles, or where open containers of metallic mercury are present (ATSDR 1997; Wendroff 1990, 1991). Young children spend a lot of time crawling on the floor

and carpeting, so they maybe subject to a higher risk of exposure, especially when mercury is sprinkled on the floors or carpets. Very small amounts of metallic mercury (i.e., a few drops) may raise air concentrations of mercury to levels that could be harmful to health (ATSDR 1997). Metallic mercury and its vapors are extremely difficult to remove from clothes, furniture, carpet, floors, walls, and other such items. The mercury contamination can remain for months or years, and may pose a significant health risk for people continually exposed (ATSDR 1997; Johnson [in press]; Wendroff 1990, 1991).

p. 473

Individuals Exposed to Consumer Products and Medicinal Products Containing Mercury. Individual who use various consumer products containing mercury (i.e., medicinal herbal remedies, skin lightening creams and soaps, laxatives, tattoo dyes, fingerpaints, and make-up paints) are also exposed to higher mercury levels than the general population (Barr et al. 1973; Dyall-Smith and Scurry 1990; Espinoza et al. 1995; Geffner and Sandler 1980; Lauwerys et al. 1987; Rastogi 1992; Wendroff 1990). Metallic mercury has been used by Mexican American and Asian populations in traditional remedies for a variety of medical conditions, including chronic stomach disorders. Several papers have been published related to the use of metallic mercury as a folk remedy (ATSDR 1992, 1997; Department of Health 1997; Geffner and Sandler 1980; Hartman 1995; Johnson [in press]; Trotter 1985; Wendroff 1990, 1991; Zayas and Ozuah 1996). Some Mexican-Americans believe that disorders of the alimentary tract may be caused by a bolus of food adhering to the stomach wall, a condition known as *empacho*. Geffner and Sandler (1980) reported cases of two young patients with acute gastroenteritis who received traditional remedies of oral administration of metallic mercury, presumably to dislodge the bolus. Both patients were successfully treated and released from the hospital after 2 and 10 days of treatment, respectively. Trotter (1985) reported that metallic mercury known as *azogue* is in common use in New Mexico and the bordering areas for treating this gastrointestinal condition, *empacho.*

p. 474

Individuals that Use Mercury in Religious Ceremonies and/or Ethnic Practices or Live in Dwellings where Intentional or Unintentional Elemental Mercury Spills have Occurred. Metallic mercury has been used in Latin American and Caribbean communities as part of certain religious practices (e.g., Voodoo, Santeria, and Espiritismo) predominantly in domestic settings (Wendroff 1990). Metallic mercury is sold in shops called botanicas (sometimes under the name *azogue)* which stock medicinal plants, magical medicines, incense, candles, and perfumes. Botanicas typically dispense mercury in gelatin capsules or, sometimes, in small glass vials. Some practices involve sprinkling metallic mercury on the floor of the dwelling or of a car, mixing elemental mercury with soap and water to wash the floor, or placing it in an open container to rid the house of evil spirits. Other practices involve carrying a small amount of mercury in a vial on the person or mixing mercury in bath water or perfumed soaps, devotional candles, ammonia, or camphor. Any of these practices can liberate mercury vapor into the room air exposing the occupants to unnecessarily elevated levels of mercury vapors (ATSDR 1997; Wendroff 1990, 1991). The issuance of cautionary notices by health departments to members of these user populations may be appropriate. While some medicinal and pharmaceutical uses of mercury compounds have been replaced in recent years, individuals in some religious and ethnic groups may still use mercury in various rituals. This use of mercury can contaminate the dwelling if the mercury is not removed from flooring, carpeting, and woodwork in an appropriate manner.

p. 480

A unique exposure pathway that has received little research attention is the exposure to children from religious and ethnic uses in homes and cars or in remedies containing metallic mercury (ATSDR 1997; Johnson [in press]; Wendroff 1990, 1991). In some religious practices of Latin American or Caribbean origin, there are traditional rituals or remedies that involve mercury. These include intentional sprinkling of liquid elemental mercury on the floor, burning candles made with mercury, using mercury in baths, adding it to perfume, or wearing small containers of mercury around the neck for good luck. **There is an urgent need to obtain information on the levels of exposure from these practices to determine if children or adults are at risk.** Mercury vapor concentrations may be much higher after use during the winter months when the heat is turned on and the windows are closed, so data that reflect a variety of possible exposure scenarios are also needed.

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

FOOD & WATER WATCH, INC., *et al.*, Plaintiffs, v. ENVIRONMENTAL PROTECTION AGENCY, *et al.*, Defendants.	)	Case No. 17-cv-02162-EMC DECLARATION OF AUDREY ADAMS

I, AUDREY ADAMS, declare as follows:

1. I am over the age of eighteen years and am competent to make this declaration. All the facts stated herein are within my personal knowledge.

2. I am the legal guardian and primary caretaker of my son, Kyle, age 33, who lives with me and my husband at our home in Renton, which is located in King County, Washington. The water has been fluoridated here ever since my husband and I purchased our house in 1978.

3. Kyle is severely hypersensitive to fluoride. I did not realize this for the first 14 years of Kyle's life, nor did I know of his countless other chemical sensitivities. We've traveled a long

and painful road together, his pain physical (and profound), my pain emotional (when I can't stop his suffering).

4. In 1999, when Kyle was 13 and 14 years old, he was in pain constantly, particularly in his extremities (hands, feet, lips, and tongue) and back of his head. Kyle's pain had increased considerably in the aftermath of a horrific reaction to a doctor prescribed "over the counter" (OTC) treatment that is completely benign to most people. After this reaction, Kyle developed incapacitating pain in his fingers that forced him to stop playing his beloved cello in the school orchestra. His school sent him home repeatedly with horrific headaches during this time, and he would scream and race around the house as if pursued by killer bees. At night the house shook with Kyle's leg-pounding that was more like a grand mal seizure than "restless leg."

5. We went to numerous medical specialists during this time and not one of them could diagnose the source of Kyle's pain, let alone help relieve it. We tried using Tylenol, but this always seemed to result in a migraine the next day; other pain-relievers were ineffective.

6. During this time, I began experimenting with removing chemicals from Kyle's food and environment. Among other things, I changed Kyle's diet to organically grown food, stopped using chemical cleaners or scented products, and got Kyle's school to cooperate with providing him a low-chemical environment. These changes improved Kyle's symptoms, but he still manifested symptoms of intense pain each day and continued to report pain in the back of his head, though less often and less severe.

7. In or about May 2000, a mom from Beaverton, Oregon, with two autistic teenagers of her own, recommended that I stop Kyle's exposure to fluoridated water. Since Kyle's only beverage was tap water and because I was willing to try anything that could help relieve Kyle's pain, I followed her recommendation. Within three days of drinking filtered, fluoride-free water, Kyle experienced a substantial improvement in his symptoms, including the pain he had been

suffering in his extremities. After eliminating fluoridated drinking water, Kyle was able to resume playing cello in the school orchestra, and his remaining high school and transition school years were more successful and productive than they otherwise would have been.

8. Having observed first-hand the dramatic improvement that Kyle experienced after we eliminated fluoridated drinking water, I have gone to great lengths to ensure that he is never again exposed to fluoridated drinking water. I consider this of paramount importance to protecting Kyle.

9. In April 2007, after 7 years of hauling thousands of gallons of reverse osmosis and spring water to my home for drinking and cooking, Kyle's improved quality of life enabled him to work a part-time office job at Highline Community College, where he continues to work to the present day, scanning and archiving documents to a computer. I am convinced that this would not have been possible if we had not eliminated fluoridated drinking water.

10. To be clear, Kyle was not (and is not) free of all pain. Indeed, Kyle still regularly experiences pain when he is exposed to a variety of chemical and food triggers; such as chemicals, pesticides and toxins that are hidden in food; airborne fumes, such as auto exhaust or perfumes; and certain allergic foods; as well as for reasons I cannot always identify. Kyle also experienced pain as the result of Lyme Disease (diagnosed in 2007 but now resolved), as well as gut dysbiosis and acute infections, including ear infections. But, by providing Kyle with fluoride-free water, the severity, frequency and consistency of his pain was notably reduced. This allowed me, in turn, to better detect other triggers of Kyle's symptoms.

11. In or about 2008/2009, I discovered that one of the triggers of Kyle's symptoms was another source of fluoride that I did not previously appreciate: skin contact to fluoridated water in the shower. The discovery was prompted after Kyle began experiencing regular morning headaches. Each morning he woke up without a headache, but a headache would inevitably seem

to set in prior to leaving for work or starting his day. We had multiple conversations with his doctor about it, and over several months, we investigated various possible causes, such as possible mold or toxins in his bedroom, and experimented with his already organic, highly specialized breakfast.

12. Prior to, and during the time when Kyle developed the morning headaches, I was not filtering fluoride out of Kyle's shower water, as I did not believe at that time that skin contact to fluoride could pose a problem. I did have a carbon filter on the shower to prevent chlorine fumes, but this filter did not remove fluoride.

13. After hearing of Kyle's headaches, a mother of a child with autism from Snoqualmie, WA persuaded me to limit Kyle's exposure to fluoridated water in the shower. The next day after this conversation I had Kyle skip his morning shower and the morning headache that had become a routine did not develop. That evening, I had Kyle shower before bed, and the headache returned. Based on this initial "shower trial," I heated bottled water on the stove for Kyle to sponge bathe over the course of the next week. There were no morning headaches at all during this week.

14. These "trials," which included several more tests of the shower water (each of which were followed by headaches), convinced me that Kyle was sensitive to fluoride in shower water. For the next 8 to 10 months, therefore, I continued to heat bottled spring water on the stove for sponge bathing, intermittently experimenting on ways to limit Kyle's exposure to fluoridated water during showers. After many failed attempts with various filtering products, I finally purchased a filter that removed enough fluoride to avoid Kyle's headaches if I do all of the following four things: (1) Set a timer and limit the shower to 4 minutes; (2) Use warm water, not hot; (3) Keep water pressure at the lowest possible, about 1 gal/min, for maximum filtration contact; and (4) Change the filter at 3 months, not 6 as the manufacturer suggests..

15. Kyle has camped with our family in state and national parks for all of his 33 years, usually 25 or more nights per year, showering daily in those campgrounds. After I became aware of Kyle's pain from fluoridated water, I'd call ahead and ask about the fluoridation status. Based on my experience, campgrounds almost never have water with added fluoride, but they do have chlorine. Kyle does not get headaches when showering at campgrounds or when we visit relatives near Portland (an area with no fluoridation). Likewise, when we stay at motels in areas with chlorinated, but not fluoridated, water, Kyle does not report head pain and does not demonstrate symptoms of headaches following a shower.

16. On one family camping trip, I wrongly assumed that the campground we visited did not use fluoridated water. I let Kyle take a shower at the campground, assuming it was safe. To my horror, he had a very painful reaction to the shower; with the manifestations of the pain lasting over a day—which is longer than the pain used to last. I asked the park ranger about the water and he informed me that the campground used fluoridated municipal water. This experience left me concerned that Kyle's sensitivity to fluoride has increased over time.

17. Based on Kyle's longstanding sensitivity to fluoride, his two current treating doctors (Dr. Charles Butler and Dr. Nooshin Darvish) have both advised that he continue refraining from exposure to fluoridated water, and other forms of fluoride ingestion. (**Exhibits A, B, C, D, E**). Consistent with this, the Washington State Department of Health & Human Services, in its annual care needs assessments of Kyle, called Person Centered Service Plans (PCSP), has recognized the need to limit Kyle's exposure to fluoride, including fluoridated water. (**Exhibit F**).

18. Ever since 2000, I have incurred whatever financial expense is necessary to protect Kyle from the fluoridation chemicals contained in the tap water in our home; and most other communities in King County, including the nearby cities where he works, attends medical

appointments and recreates in Special Olympics sports and other recreational activities with the Renton Parks Department. He cannot leave the house without carrying an adequate supply of fluoride-free water in his backpack. When we travel we must pack multiple gallons of fluoride-free water and buy spring water at grocery stores during our trip. I will continue incurring these expenses so long as fluoridation chemicals pose a risk to Kyle.

19. A small fraction of the financial costs I have incurred purchasing fluoride-free spring water, and filtering fluoride from our home water, are reflected in the documents included in **Exhibit G.**

20. The cost of my time and extraordinary inconvenience providing safe, fluoride-free water for Kyle's drinking, cooking and bathing needs is incalculable.

21. Far more important to me than the financial costs and physical burden associated with avoiding fluoridated water is the painful reactions Kyle experiences when exposed to fluoridated water and other sources of fluoride ingestion. As Kyle's legal guardian and primary caregiver, it causes me profound distress to see my son suffer, and I will continue to do whatever I can to keep him out of harm's way.

22. I am concerned that the presence of fluoride in the tap water of nearly every community in King County will jeopardize Kyle's future home care placement options. With the help of Kyle's case manager, we are targeting a move in the next 2-3 years out of my home to a state residential placement. However, the type of living arrangements available to Kyle are limited because the Adult Family Homes that Kyle currently qualifies for are paid a flat rate and are not paid extra to provide fluoride-free water for drinking, cooking and bathing. Moreover, the Adult Family Homes do not have any allowances for special filtration equipment. Further, all caregivers in any future living arrangement will have to become fluoride-avoidance experts—an extreme expectation when that means tap water avoidance—and will expect to be paid for the

complex fluoride-removal tasks that I currently do. Obtaining the state funding for such a high level of care, which is exacerbated by wide-spread water fluoridation in our area, is very challenging.

23. I am a supporting member of the Food and Water Watch, Fluoride Action Network, and Moms Against Fluoridation. Examples of my membership contributions are attached as **Exhibit H.**

I declare under penalty of perjury, under the laws of the United States of America, that the foregoing is true and correct. Executed this ___ day of _____, 2018 in Renton, Washington.

_____

AUDREY ADAMS

Thank you for allowing me to speak with you about the environmental injustice of water fluoridation.

I'm Audrey Adams, in Renton, Washington. I am one of 8 plaintiffs suing the EPA to ban fluoridation on behalf of my son, Kyle, who has autism and severe chemical sensitivities.

I discovered fluoride's harm to Kyle when he was 14---he is now 36. He suffered profound pain that resulted in wild, erratic behaviors. His chronic headaches affected both home and school. I had already put him on an organic diet, then a mom of a child with autism suggested I try eliminating fluoridated water.

Switching to fluoride-free water, Kyle's pain diminished in 3 days. The screaming, jumping and wild racing was no longer the norm. With the pain of fluoride gone, I could identify other toxins he reacted to.

By his early 20's, Kyle's ability to detoxify decreased and his reactivity to chemicals increased. The severe headaches had gradually returned, mostly following his morning shower.

Then another "autism mom" told me about her terrible reactions to bathing in fluoridated water and her son's pain, too. I hadn't even thought of skin exposure! We had a filter on the shower that removed chlorine, but not fluoride. When I switched Kyle's shower *to the evening*, screaming headaches followed.

After installing a shower filter that removed most of the fluoride, his pain vastly diminished.

Kyle's sensitivity to fluoride is well documented by State DDD, his two doctors and his dentist.

A 2019 study reports 60% of those with autism are hyper-sensitive to chemicals. It is an unconscionable injustice to put a toxic chemical in public water, drugging everyone, without consent, regardless of medical differences. Most families coping with autism never discover that their child's pain is in the water. It took me 14 years and didn't fully understand for another 9, while Kyle suffered terribly.

The CDC says 1 in 44 kids have autism. More than half of those have chemical sensitivities.

Fluoride is a presumed developmental neurotoxin, according to the National Toxicology Program: 74 studies, including 11 at amounts in fluoridated water, show lower IQ and higher rates of ADHD. How does a mom without a car carry her baby, food, plus gallons of bottled water on a bus?

Fluoride's toxicity, gram for gram, sits between lead and arsenic. Those most harmed by fluoridation are low-income families trying to avoid fluoride for their babies or those with children with autism.

Fluoridation is more than an injustice---it's an environmental crime against the most vulnerable.

Thank you very much.

TO: Members of the White House Environmental Justice Advisory Council
RE: Comments in Docket No. EPA-HQ-OA-2022-0050
DATE: March 10, 2022

> *Without proper remediation, the land devastated by the Black Mesa and Kayenta mines may never fully recover. On that point, we believe OSMRE has been negligent in duties to hold Peabody accountable for the damage they have done to our land and our people.*
>
> – *Navajo Nation President Jonathan Nez and Vice President Myron Lizer*
> *Letter to the House Subcommittee on Energy and Mineral Resources*
> *June 29, 2021*

> *I believe that the regulators have never really sought form the people themselves what troubles them most. … We live in fear that we are going to be left with no water, coal dust, no improved roads and the health problems we have suffered under all these years.*
>
> – *The Honorable Herb Yazzie, Former Chief Justice of the Navajo Supreme Court*
> *January 2021*

> *OSMRE can demonstrate its respect for the people of Black Mesa and the Hopi Tribe, and ensure that the Hopi Tribe and others will have a fair opportunity to participate in the key decisions that will impact our land and water resources long after Peabody is gone, by designating Kayenta's closure as a significant permit revision. We believe that after 50 years of sacrifice, we are entitled to that respect.*
>
> – *Former Hopi Tribal Chairmen Vernon Masayesva and Benjamin Nuvamsa*
> *Letter to OSMRE*
> *June 10, 2020*

Dear Members of the White House Environmental Justice Advisory Council (WHEJAC),

We are writing collectively to bring your attention to important environmental justice issues related to federal oversight of coal mine reclamation activities on Black Mesa in northern Arizona, our home. The two mines in question, Black Mesa and Kayenta – which are operated by Peabody Western Coal Company, a subsidiary of Peabody Energy – encompass nearly 65,000 acres, spanning a hundred square miles of both the Navajo and Hopi tribal nations, a land area bigger than the city and county of Denver, Colorado.

After nearly a half century in operation, both mines are now closed, yet none of the lands and waters mined by Peabody have been permanently reclaimed to a pre-mine condition and there is currently no timetable or meaningful plan for achieving this legal requirement. The federal Office of Surface Mining, Reclamation and Enforcement (OSMRE) is responsible for overseeing mine cleanup at both sites, but so far, the agency has not lived up to trust obligations owed to our tribes and tribal communities, nor the environmental justice obligations included in Executive Order 14008.

In the context of the WHEJAC scorecard, the Biden Administration warrants a failing grade for its failure to ensure that the basic tenets of environmental justice set forward by the President are carried forward and achieved, and that our tribal lands and waters, exploited by decades of coal strip-mining by Peabody, are given back to the Navajo and Hopi in a condition that fosters the return and prosperity of the tribal communities that once lived there.

We request your assistance in ending ongoing injustice and in aiding our communities with the creation of a process for reconciliation, transparency and meaningful public and community involvement in the recovery and restoration of mined land and waters on our tribal homelands.

We have raised these issues at the federal level in numerous ways and for many years. In the past year alone, we've written twice to Interior Secretary Deb Haaland, once in January 2021[1] prior to her appointment and again this past September.[2] We addressed coal mine reclamation issues in a Congressional subcommittee hearing in June of 2021.[3] And we have raised detailed concerns about the progress and adequacy of mine cleanup with officials at OSMRE in dozens of conversations and written comments.[4]

All to no avail. The concerns we've raised for years about reclamation remain unaddressed. Despite the fact that Peabody permanently ceased coal production at the Black Mesa Mine in 2005 and Kayenta Mine in August of 2019, OSMRE has ***never*** provided our Tribes and tribal communities the opportunity to have a meaningful voice in planning the reclamation and timely return of lands and waters to our people in their pre-mine condition.

Instead, OSMRE decisions that affect the return of our land and water are made in consultation with Peabody behind closed doors. Impacted communities are left out of conversations and decisions that greatly affect their futures. The reclamation work that is being done is inadequate. Significant and possibly permanent damage to one of the primary sources of water for our people is dismissed, explained away and even blamed on the very communities that depend on this resource, even though their water use amounts to a fraction of what was consumed by Peabody's strip-mining for coal.

Decades of environmental injustice are ongoing and fostered by OSMRE's bureaucratic intransigence and cozy relationship with Peabody, which OSMRE's Western Regional Office treats like a customer or client instead of a regulated entity. We raise these issues again with you in the hope that the WHEJAC will be able to bring our concerns directly to the attention of the President and decision-makers who can correct decades of injustice and make the Biden Administration's commitment to equity, fairness and environmental justice more than empty words. More specifically, we seek your assistance on the issues of:

Aquifer damage

For nearly a half century, Peabody drained ***millions of gallons of water a day*** from the pristine Navajo Aquifer, the main source of domestic water on Black Mesa. The depletion is well documented, with the water table in many areas now 100 feet or more below its historic levels.

[1] See Exhibit A
[2] See Exhibit B
[3] Testimony of Nicole Horseherder and Ben Nuvamsa, House Subcommittee on Energy and Mineral Resources, oversight hearing on "Environmental Justice for Coal Country: Supporting Communities Through the Energy Transition." June 15, 2021. https://naturalresources.house.gov/download/testimony_-ms-nicole-horseherder-and-mr-ben-nuvamsa---emr-ov-hrg-061521pdf
[4] See, for example, Exhibits C, D, E. F

Seeps and springs that once nourished corn and other crops and supported livestock and wildlife have dried up and disappeared, as have wells that provided water for Navajo and Hopi families living on Black Mesa. Yet, OSMRE has ignored and covered up the damage done to the aquifer by using models – developed by Peabody – that manipulate data to minimize the impacts of mining. We have no confidence that the OSMRE can objectively lead an analysis on the hydrological impacts of mining and what is needed to restore the aquifer or mitigate the damage. An independent expert is needed to conduct the much-needed assessment of the cumulative hydrologic impacts of Peabody's half-century of strip-mining on Black Mesa.

Permitting injustice

The operating permit for Kayenta Mine expired in July of 2020. The last major update of the reclamation plan was in 1990, meaning that cleanup work is now proceeding under an expired permit that is more than 30 years out of date. But in lieu of conducting a comprehensive assessment of what is needed to return land and water to our Tribes properly, OSMRE for the past three years has been consistently signing off on numerous requests by Peabody for "minor permit revisions" that do not require public notice and that are by default approved behind closed doors.[5] Their approval negates the ability of communities that are directly impacted by reclamation activities to participate in decisions that affect their future. These "minor" revisions include non-minor activities like altering the five-year reclamation schedule to allow delays that put reclamation work years behind where it should be. Cumulatively, these changes add up to significant alterations to how reclamation is being conducted. True environmental justice would mean treating the closure of the mine as a "significant mine permit revision" and initiating a comprehensive review of mine reclamation as part of the permit renewal process.

Inappropriate reclamation standards

The mine reclamation work that is being conducted is wholly inappropriate for the arid landscape of Black Mesa. Navajo and Hopi families once lived in the areas that were mined, yet the benchmark for the return of these lands to the Tribes is only that they support "grazing" as the final end use, not people returning home. On top of that, the grazing standards are based on reseeding and vegetation criteria that are appropriate for the humid Midwest not the arid Southwest, and that were put in place by non-Indian bureaucrats without any consultation with local communities possessing traditional cultural knowledge of the region's ecology. The main vegetative cover being used in Peabody's reclamation, for example, is non-native grass. Additionally, there is nothing in Peabody's reclamation plan for long-term monitoring. Once OSMRE signs off on releasing Peabody from its reclamation obligations, there will be no recourse if the reclaimed lands deteriorate – as they almost certainly will given the mismatch between what is being utilized for reseeding and the local climate, not to mention the decimation of the aquifer that can support a healthy habitat. Resources for long-term monitoring must be an essential part of any reclamation plan revision.

Lack of transparency and consultation

We already have noted the lack of transparency in OSMRE's decision-making around minor permit revisions, but the issue is much deeper and more systemic than that. As a general practice, the agency makes it extremely difficult to obtain documentation, data, reports and communications that are critical to understanding what is happening on our lands. As an example, OSMRE has a Kayenta-Black Mesa Initiative web page that could easily serve as a clearinghouse for the voluminous information on the two mines. However, the most recent documents posted on it are

[5] See Exhibit H

from 2014.[6] Since then, Peabody has gone bankrupt twice, Kayenta Mine has permanently closed, numerous permit revisions have been enacted, and Kayenta Mine's operating permit has expired. Yet none of the relevant information on these significant developments is publicly accessible. More recently, Peabody applied to OSMRE to have more than $25 million in reclamation bonds released. Under the federal Surface Mining, Reclamation and Control Act (SMCRA), in-person meetings are supposed to be held in the impacted communities to discuss the bond release applications, and a request was made for just such a meeting last July,[7] well within the statutory window. Follow-up requests were made again in October[8] and in January,[9] yet OSMRE outright denied our request, saying it was made out the regulatory timeframe.[10] Instead, it chose to host a two-hour virtual meeting, all but locking out participation by the community members most directly impacted, many of whom lack internet access and even electricity. This decision was a textbook example of the environmental injustice that President Biden and Secretary Haaland have vowed to confront.

Our Tribes and communities across Black Mesa have been living with the social and environmental impacts from Peabody's coal mining operations for a half century. We deserve a plan that meaningfully addresses ***when*** our land and water will be returned to us, explains ***how*** Peabody will reclaim our land and water to its pre-mining condition, and adequately analyzes ***how much*** it will cost to do the necessary reclamation work so we can be confident that clean-up operations are adequately bonded. We deserve a transparent and public process that will ensure the people who live on Black Mesa and continue to be directly affected by the impacts of decades of coal mining can understand and meaningfully participate in efforts to reclaim and restore our lands and water.

The Interior Department, which oversees the OSMRE, has set as a priority playing "a central role in how the United States…increases environmental protections, ***pursues environmental justice and honors our nation-to-nation relationship with Tribes.***" [11] The agency also touts that "the President knows that the intersecting health, economic, racial justice and climate crises disproportionately impact American Indians and Alaska Natives, which is why he has directed the entire federal workforce to take a whole-of-government approach to supporting Indian Country." [12]

It is past time to put such words into action, and we trust that as appointed members of the President's Advisory Council, you understand how profoundly important it is not to repeat the pattern of broken promises to American Indians that litter our nation's history. At a minimum, we respectfully request that you communicate to the Council on Environmental Quality the major shortcomings by OSMRE in carrying out the Administration's commitment to environmental justice.

Given that there already is a regulatory pathway under existing federal surface-mining laws to correct these deficiencies, we respectfully request that you additionally recommend the Administration make a determination, as required by law, that the permanent closure of Kayenta Mine constitutes a "significant mine permit revision" under SMCRA, which in turn will create a comprehensive,

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[6] See https://www.wrcc.osmre.gov/initiatives/kayentaMineComplex.shtm
[7] See Exhibit D
[8] See Exhibit E
[9] See Exhibit F
[10] See Exhibit G
[11] See www.doi.gov/ourpriorities
[12] U.S. Department of the Interior blog. March 2, 2021. www.doi.gov/blog/enduring-partnership-interiors-commitment-honoring-our-nation-nation-relationshiptribes

transparent and inclusive process for reviewing and revising the current state of affairs related to Black Mesa and Kayenta Mine cleanup.

However, answering the bell on environmental justice must encompass far more than just conducting government-to-government conversations. Any action to correct the injustices currently plaguing mine reclamation on Black Mesa must, without compromise, give impacted Navajo and Hopi community members a seat at the table. The President recognized the importance of local voices on his first day in office, declaring through Executive Order that in order "to redress inequities in their policies and programs that serve as barriers to equal opportunity," agencies in his Administration "***shall consult with members of communities that have been historically underrepresented in the Federal Government and underserved by, or subject to discrimination in, Federal policies and programs***." [13]

After more than 50 years of mining at Kayenta and Black Mesa, it is time to repair the land, restore the Navajo Aquifer, which is vital for the continued prosperity of our Tribal communities, and return mined land and waters to the people of Navajo and Hopi in their pre-mining condition. The commitment made by the Biden Administration to environmental justice is encouraging but incomplete. We are eager to work with any and all agencies to see that the promise of meaningful engagement, cooperation and an honoring of relationships – what we Diné call *Hózhó* and we Hopi call *Sumi'na'gnwa* – is put into practice on Black Mesa.

Thank you for your attention to these important issues.

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Copy: U.S. Secretary of Interior Deb Haaland
Jonathon Nez, President of the Navajo Nation
Timothy L. Nuvangyaoma, Hopi Chairman
Steve Feldgus, Deputy Assistant Secretary for Land and Minerals Management, U.S. Department of Interior
Glenda H. Owens, Deputy Director, Office of Surface Mining Reclamation and Enforcement

[13] See *Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, signed Jan. 20, 2021. https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government/

EXHIBIT LIST

- Exhibit A – Letter to then-Interior Secretary-designee Deb Haaland and the Biden Transition Team, Jan. 14, 2020.
- Exhibit B – Letter to Interior Secretary Deb Haaland, Sept. 22, 2021.
- Exhibit C – Letter to OSMRE, June 10, 2020.
- Exhibit D – Letter to OSMRE, July 9, 2021.
- Exhibit E – Letter to OSMRE, Oct. 6, 2021.
- Exhibit F – Boycott Letter to OSMRE, Jan. 27, 2022
- Exhibit G – OSMRE Letter to Nicole Horseherder and Ben Nuvamsa, Jan. 25, 2022
- Exhibit H – Letter to OSMRE, March 10, 2022

Exhibit A

To: DOI Secretary-designee Deb Haaland
David Hayes, incoming Special Advisor to the President on Climate Policy
Cecilia Martinez, incoming Senior Director for Environmental Justice, CEQ
To: DOI Transition Team
Kevin Washburn; Clara Pratte; Bob Anderson; Bret Birdsong; Janie Hipp; Amanda Leiter
To: EPA Transition Team
Patrice Simms
Cc: The Honorable Raul Grijalva, Chairman, House Natural Resources Committee; The Honorable Tom O'Halleran; The Honorable Mark Kelly; The Honorable Kyrsten Sinema; The Honorable Martin Heinrich; The Honorable Ben Ray Luján

From: Benjamin Nuvamsa, former Hopi Chairman; Nicole Horseherder, Executive Director, Tó Nizhóní Ání; Carol Davis, Executive Director, Diné C.A.R.E.; Vernon Masayesva, former Hopi Chairman and Executive Director, Black Mesa Trust; Herb Yazzie, former Chief Justice of the Navajo Nation Supreme Court; Percy Deal, former Navajo County Supervisor and former Navajo Nation Council Delegate

Date: Jan. 14, 2021

Re: **Navajo and Hopi Community Leaders ask for an "all-of-government" approach led by the Interior Department for the Reclamation, Restoration and Revitalization of the Lands, Waters, and Communities Impacted by Coal Mining on Black Mesa**

> What is required for *both* cultures to survive and prosper is a deepened regard for the *spirit* of laws and trust responsibilities in order to successfully guarantee protection of indigenous peoples' spiritual concerns. Furthermore, beyond scrupulous legal attention to the *letter* of the law, simple justice demands that those in power attend the way these words are understood by their legal charges: those most affected by them.
>
> *– The Honorable Vernon Masayesva, Former Hopi Tribal Chairman and Executive Director of Black Mesa Trust, From the essay Western Science vs. Native Science, January 2021*

> I believe that the regulators have never really sought from the people themselves what troubles them most. … We live in fear that we are going to be left with no water, coal dust, no improved roads and the health problems we have suffered under all these years.
>
> *– The Honorable Herb Yazzie, Former Chief Justice of the Navajo Supreme Court, January 2021*

President-elect Biden has made the issue of environmental justice, overlooked for far too long, a centerpiece of his platform and a central tenet of his policies and practices aimed at accelerating efforts to combat the climate crisis. We trust that the members of his transition team tasked with building the programs that will put the President-elect's priorities into action, you understand how profoundly meaningful this commitment to environmental justice is, and how important it is for his administration to walk the talk. Highlights of the Transition Plan that focus on environmental justice include:

- Rooting out systemic racism in our laws, policies, and institutions;
- Using an inclusive, collaborative and empowering All-of-Government approach;
- Making decisions that are driven by data and science;
- Targeting resources in a way that is consistent with prioritization of environmental and climate justice, and;
- Assessing and addressing risks to communities from the next public health emergency.

These priorities have particular and immediate relevance to the reclamation of now-closed coal mines that sprawl across thousands of acres of Navajo and Hopi lands in northern Arizona. For nearly a half century, our communities and people have borne the direct impacts of operations at Black Mesa Mine and Kayenta Mine. Now that these mines are closed, we are calling on the Biden administration to make them shining examples of how environmental justice policies can be meaningfully enacted by making the cleanup of both mines a priority.

Reclamation on Black Mesa is a distinct endeavor because of tribal land status, the removal of human remains and artifacts, and the sacrifices made by our people to provide Arizona with cheap water and cities across the Southwest with cheap power. Five decades of coal mining have left indelible marks on the Navajo and Hopi, scarring not only our land, but also our water and cultural resources.

Now, after over half a century of mining, deteriorating economics have ended the era of coal on Black Mesa. Navajo Generating Station (NGS) – for nearly five decades the largest coal-burning power plant in the Western U.S. – shuttered its doors on November 18, 2019. Coal for the plant was supplied by Peabody Western Coal Company (Peabody) from Kayenta Mine, which closed on August 26, 2019. Prior to that, Mohave Generating Station shut its operations in December 2005, which forced the closure of Black Mesa Mine. At their peaks, about 12 million tons of coal was mined annually from Black Mesa and Kayenta mines (4 million from the former to power Mohave and about 8 million tons from the latter for NGS).

Considerable time has passed since the closure of both mines, yet neither the Office of Surface Mining, Enforcement and Reclamation (OSMRE), nor Peabody have completed the steps to fully and appropriately reclaim both mine sites as required by the site leases and the Surface Mining, Reclamation and Control Act (SMCRA). Reclamation at Black Mesa Mine is still incomplete 16 years after closure. And the massive scars from the most recent mining at Kayenta still stretch across thousands of acres, with hardly any clean-up work done since it shut down nearly a year and half ago.

Without a serious change in the status quo of federal oversight, the injustices and harm endured by Navajo and Hopi will continue. Without intervention that alters the current course of enforcement, the many families that were forced to move to make way for mining will not be able to return to their ancestral homes. The water they need for survival will not be available. And basic amenities that were lost when mining began will remain inaccessible. Reclamation must mean more than what has already been done; Peabody cannot be allowed to walk away from hundreds of residents without any basic assistance for their survival as a community.

With President-Elect Biden's vision and Secretary Haaland's leadership, it is time for the Department of the Interior to rectify these injustices by living up to its tribal trust responsibilities and legal obligations by bringing together people from across all of its agencies (Bureau of Reclamation; Bureau of Indian Affairs; Bureau of Land Management; Office of Surface Mining,

Reclamation and Enforcement; and the National Park Service), along with the Indian Health Service within the Department of Health and Human Services, the Environmental Protection Agency and the Department of Energy to work cooperatively with community and tribal leaders. This effort must hold Peabody and the utility owners of NGS accountable for the restoration of Black Mesa Mine and Kayenta Mine lands and waters, to address the exploitative legacy of coal mining, and to create a path to a sustainable and sustaining future for the land, water and people that have been affected by decades of coal mining.

We, community leaders from both tribes, jointly request that the Department of the Interior lead an all-of-government approach to support robust reclamation, restoration and revitalization of the lands and waters of Black Mesa that have been scraped, drilled, dug up and dewatered in the name of coal that for decades powered far away western cities and pumped the water that has allowed Arizona to thrive for the past half century.

In the past, the Department of the Interior, Department of Energy, and Environmental Protection Agency, in a joint statement signed by the secretaries and administrator (Exhibit A), committed to working together to address the impacts of NGS and the mines on tribal communities. It is time to pull together again in a renewed and cooperative all-of-government approach.

Actions Needed

Consistent with President Clinton's November 6, 2000 Executive Order 13175 on Consultation and Coordination With Indian Tribal Governments and President Obama's November 5, 2009 Presidential Memorandum on Tribal Consultation, ***we ask that the Interior Department work with Navajo and Hopi tribal governments, their members and impacted communities to develop a comprehensive approach to mine reclamation, restoration and revitalization on Black Mesa that includes robust input from impacted people and communities.*** A coordinated, multi-agency approach to these issues is one important way to begin addressing numerous injustices. These are the areas in which coordinated federal interagency action should begin immediately:

Launch a significant permit revision/comprehensive reclamation plan for Kayenta Mine and Black Mesa Mine (Lead DOI Agency: Office of Surface Mining Reclamation and Enforcement. Other Agencies: Bureau of Reclamation, U.S. Geological Survey)

> Kayenta Mine ceased mining in August 2019 in advance of the permanent closure of NGS, the power plant for which it was the sole source of coal. Since that time, little to no reclamation has occurred at the mine. In fact, Peabody has submitted formal requests to delay much of the current reclamation work for another two to four years. At Black Mesa Mine, which closed in 2005, the U.S. Bureau of Indian Affairs has determined that reclamation remains "inconsistent and often unacceptable, with considerable acreages remaining as raw ungraded and eroding spoil piles, largely void of vegetation." [1]
>
> On June 10, 2020, former Hopi tribal chairmen Vernon Masayesva and Benjamin Nuvamsa wrote to OSMRE Western Region Director David Berry (Exhibit C) to remind the agency of its trust duty to move toward full reclamation and recovery of the Black

[1] June 9, 2015 letter from the director of the U.S. Bureau of Indian Affairs Navajo Regional Office to Peabody Energy's Environmental Services Director re: Indian Lands Lease Relinquishment Requirements – Mined Land Revegetation Standards. Attached as Exhibit B.

Mesa mined lands. They requested that OSMRE initiate a "significant permit revision" under the Surface Mining, Control and Reclamation Act (SMCRA) that would provide for a comprehensive Environmental Impact Statement (EIS) and full compliance with the National Environmental Policy Act (NEPA). A "significant permit revision" would provide the Hopi Tribe, Navajo Nation and other interested members of the public an opportunity to engage OSMRE over Peabody's plans to carry out the final reclamation and closure of the mine sites.

A comprehensive approach to mine reclamation is necessary, and it ***must*** include protection and restoration of the groundwater aquifer from which billions of gallons of water were drawn to support mine operations over the course of more than five decades. The aquifer is the main source of drinking and irrigation water for Navajo and Hopi living on Black Mesa, and mining-related depletions have had a measurable impact on water availability.

OSMRE must ensure that Peabody is held to account for complete and thorough reclamation and restoration of the lands and waters at both Black Mesa and Kayenta Mines. ***We urge DOI, through OSMRE, to work with the Navajo and Hopi tribes and their members to enact a significant permit revision as the agency considers renewal of Peabody's permit at Kayenta Mine, which expired in July 2020, and to collaboratively develop with community members a comprehensive reclamation plan that addresses all the remaining issues at both mines.***

Convene representatives from the tribes, communities and agencies to facilitate respectful repatriation, reburial or other disposition of Hopi and Navajo ancestral remains and artifacts and restoration of traditional cultural properties (Lead DOI Agency: National Park Service. Other agencies: Office of Surface Mining Reclamation and Enforcement, Bureau of Indian Affairs).

To the Hopi and Navajo, Black Mesa (known as Nayavuwaltsa to the Hopi and Dzilijiin to the Navajo) is sacred, a defining cultural resource due to its role in our traditional stories and ceremonial and clan traditions. It connects past with present, and under the Native American Graves Protection and Repatriation Act (NAGPRA), the Department of the Interior must consult with the two tribes on how they want the numerous human remains and associated artifacts that were removed for mining activities returned and reinterred. While a major repatriation and re-interment occurred in May 2019 for remains disturbed between 1977 and 1983 (during a massive series of archaeological digs at Black Mesa led by Southern Illinois University-Carbondale), further disturbance of burial and cultural sites at Black Mesa and Kayenta continued in the years since as mining expanded. To date, archaeological surveys have identified roughly 3,000 sites of cultural importance.[2]

As Hopi and Navajo people, we support reinterment in locations as close as possible to where remains of our ancestors were found and we call on the federal government to provide resources to help facilitate the remaining work on repatriation. Now that Kayenta Mine is closed, we request that a comprehensive consultation, plan and program under NAGPRA and the National Historic Preservation Action be initiated immediately.

[2] Draft Environmental Impact Statement for Navajo Generating Station-Kayenta Mine Complex Project, Sept. 2016. https://www.usbr.gov/ngs/docs/NGS-KMC-DEIS-Text.pdf (Page ES 17-18)

Use authority within DOI and other agencies (*e.g.*, EPA sole source designation) to take action to protect and restore vital water resources.

For 50 years, Peabody Coal pumped thousands of acre-feet a year of pristine drinking water from the main groundwater source on Black Mesa, the Navajo, or N, Aquifer. The N Aquifer is the sole source of potable water for the residents of Black Mesa and surrounding communities; the people of Black Mesa rely on it for both domestic and agricultural purposes, and the springs, seeps and washes that historically have arisen from it are culturally and spiritually central to both Navajo and Hopi beliefs. The lives of the people of Black Mesa and surrounding communities, as well as future generations, depend on the water and its sustainability into the future.

Due to withdrawals from the N Aquifer, Navajo and Hopi wells near the Kayenta and Black Mesa Mines have declined more than 100 feet and the majority of monitored artesian spring discharges have decreased over 50 percent. The N Aquifer and related spring and wash discharge shows continued evidence of declining integrity.[3,4] yet OSMRE to date has completely dismissed the impacts of a half century of mining on water levels, choosing instead to blame community use for depletions (Exhibit D).[5]

Surface waters on Black Mesa are also vital. Currently, EPA is preparing to reissue Peabody's National Pollution Discharge and Elimination System (NPDES) permit for Kayenta Mine. Our organizations are deeply concerned about how surface waters impacted by a half-century of strip-mining will be fully remediated by Peabody to a pre-mine condition. The comment period for this permit closed on December 23, 2020. Our organizations and the Hopi Tribe both provided critical comments while also asking for an extension of time to further review and comment on this proposal.

Water is the foundation to the way of life for the Diné and Hopi people, spiritually, physically and emotionally. Water is life – it is evident throughout our cultures, teachings and ceremonies. For the Hopi, the lack of water in our springs has directly impacted the ceremonies we perform. In addition to the depletion, Hopi also face the dangers of having arsenic in our drinking water at Second Mesa and now First Mesa.

We ask the Interior Department to coordinate the use of its authorities within the Interior Department and with other agencies (e.g., through the designation by EPA of the N Aquifer as sole source aquifer and through strict enforcement of Kayenta Mine's NPDES permit) to take action to restore and protect the Navajo Aquifer, D Aquifer, springs, and surface waters.

Create a DOI-EPA-DOE Just Transition Working Group for Navajo Generating Station/Kayenta-Black Mesa Mines (NGS/Coal Mines Just Transition Working Group) and task it with working with stakeholders to develop a Just Transition Roadmap

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[3] Groundwater Mining of Black Mesa. Natural Resources Defense Council (NRDC). 2001. https://www.nrdc.org/sites/default/files/draw.pdf

[4] As cited in "A Confluence of Anticolonial Pathways for Indigenous Sacred Site Protection." Ellis, R. and Perry, D. (2020). Journal of Contemporary Water Research & Education, 169: 8-26. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1936-704X.2020.03329.x.

[5] See response from OSMRE to letter from Vernon Masayesva and Ben Nuvamsa. Sept. 25, 2020. Attached as Exhibit D.

We ask the Department of the Interior, EPA, and Department of Energy to establish an NGS/Coal Mines Working Group to work with stakeholders, including the Navajo Nation, Hopi Tribe, NGS plant owners and former plant owners, Central Arizona Project (CAP), Gila River Indian Community and other Arizona Indian tribes who receive water from CAP, non-Indian CAP water users, tribal members and environmental and community groups.

We recommend the goal of this Working Group be to develop a roadmap for a Just and Equitable Transition for affected communities to post-coal economies. The roadmap should include action recommendations and oversee initial steps to begin implementing key recommendations. It should be consistent with federal trust responsibilities to federally recognized Indian tribes in the region.

Reform OSMRE's oversight of mining on tribal lands so that transparency and access to critical filings and documentation is readily available to members of impacted communities and the general public.

OSMRE is responsible for regulation of coal mining and cleanup activities on Indian lands. Unlike most states, no tribe has received delegation authority to regulate coal mining under SMCRA. OSMRE's Indian lands program provides funds to tribes to assist it in regulating surface coal mining and reclamation but the agency is ultimately responsible for all regulatory decisions affecting tribes, including permit application review, determination of performance bond amounts, inspection and enforcement, bond release, and maintaining a staff to coordinate with the individual tribes and other federal agencies. Approximately 65% of all coal mine lands regulated by OSMRE's Indian Lands Program nationwide are within the Kayenta Mine/Black Mesa Mine complex.[6]

Despite its trust responsibilities to tribes, however, OSMRE is failing in its regulatory responsibilities. Through its oversight of state mining offices such as in Montana, pending applications and environmental assessments are available to the public online. Such accessibility is not provided to Navajo or Hopi who are looking for information on Black Mesa or Kayenta mines. Anyone wanting to view pending applications or other documentation must do so at OSMRE's office in Denver or at the offices of the Navajo Nation Minerals Department in Window Rock, Arizona, the Hopi Tribe Minerals Department or the Forest Lake Chapter of the Navajo Nation. No public notice of applications for minor permit revisions is provided. For example, OSMRE did not provide public notice of Peabody's "minor" permit revision application to substantially change the permit schedule for final reclamation by delaying 70% of backfilling and grading for two years or more.

We respectfully request the Interior Department to mandate that OSMRE immediately make available online all documentation as required by federal administrative procedures so that our people and communities can more fully participate in reclamation decisions that affect their lives, the land and water they depend on, and future generations.

;

[6] Source: Office of Surface Mining FY 2021 Budget Justification Green Book p. 57-58, https://www.doi.gov/sites/doi.gov/files/uploads/fy2021-budget-justification-osmre.pdf

Conclusion

For nearly half a century, coal extracted and electricity generated on lands of Navajo and Hopi were the underpinning of growth and prosperity in the Southwestern United States. The federal government authorized the creation of Navajo Generating Station and Kayenta Mine to provide key resources of water and electricity that fueled the aggressive growth of Phoenix, Las Vegas, Tucson and other cities. Mining and combustion of coal has been outcompeted by less expensive alternatives. The era of coal for Navajo and Hopi has passed, but the nearly 50 years of damage done by mining remains. There is an enormous amount of work to be done to return tens of thousands of acres to pre-mining conditions that will allow Navajo and Hopi communities to once again make use of their land. Many artifacts and ancestral remains still must be repatriated. And the critically important source of groundwater that thousands of Navajo and Hopi depend on for domestic and agricultural use has been severely depleted by industrial use. These impacts and damages must be remedied, and we are putting our trust in the incoming Biden Administration to use its authority to ensure that appropriate policies are enacted and undertaken for a full reclamation, restoration and revitalization of coal-impacted land, water and resources, and that our people are given an opportunity to fully participate in these efforts.

ABOUT THE HOPI AND NAVAJO LEADERS

Benjamin Nuvamsa and **Vernon Masayesva** are both former Chairmen of the Hopi Tribe, a federally recognized American Indian tribe. The chairmen are working in support of their Tribe's interest in ensuring proper consultation with their tribal government, as well as securing meaningful public participation opportunities for tribal citizens related to Peabody Western Coal Company's closure of Kayenta Mine in August 2019.

Nicole Horseherder, Executive Director, Tó Nizhóní Áni., which translates to "Beautiful Water Speaks." TNA provides community education on the Black Mesa mine and mobilizes the Black Mesa community in advocacy for sustainable economic development. TNA's mission is consistent with the philosophy of traditional Diné and seeks a more sustainable future. Many members of TNA reside on Black Mesa and have families that were displaced and relocated in order to accommodate the Kayenta Mine operation.

Carol Davis, Executive Director, Diné C.A.R.E. Diné C.A.R.E. is a nonprofit Navajo grassroots organization comprising tribal members who work with Navajo communities affected by energy and environmental issues. Diné C.A.R.E.'s mission is to advocate for our traditional teachings by protecting and providing a voice for all life within and beyond the Four Sacred Mountains of the Diné (Navajo).

Percy Deal is a lifelong resident of Black Mesa on the Navajo Nation, where he raises cattle and crops. He is a former Navajo Nation Council Delegate, former Navajo County Supervisor, former Hard Rock Chapter President, and former director of the Navajo Hopi Land Commission.

Herb Yazzie is a resident of Black Mesa and retired Chief Justice of the Navajo Nation. He also served the Navajo Nation as its Attorney General and as its Chief Legislative Counsel and was an attorney for the Yavapai-Apache Nation. He is a veteran, having served a tour in Vietnam as an Army lieutenant. He graduated from Arizona State University College of Law in 1975.

Exhibit B

September 22, 2021

Via Electronic Mail (PDF)/Certified Mail

Honorable Deb Haaland, U.S. Secretary of the Interior
U.S. Department of Interior
1849 C Street, N.W.
Washington, D.C. 20240

Re: Permanent Closure of Peabody Western Coal Company's Kayenta Mine and Reclamation of Tribal Homelands

Honorable Secretary Haaland:

We very much appreciate the time Steve Feldgus, Deputy Assistant Secretary for Land and Minerals Management within U.S. Department of Interior ("Interior") and Glenda H. Owens, Deputy Director, Office of Surface Mining Reclamation and Enforcement ("OSMRE") took to speak with us regarding the closure of Peabody Western Coal Company's half-century old Kayenta Mine and ongoing efforts to reclaim our Tribal homelands.

Our Navajo and Hopi Tribal communities are **deeply** concerned about the current status and future plans for reclamation of Tribal lands currently occupied by Peabody's sprawling Kayenta and Black Mesa surface coal mines. Despite the fact that Peabody permanently ceased coal production at Kayenta in August of 2019, Federal regulators have **never** provided our Tribes or Tribal communities the opportunity to have a meaningful voice in the end of Peabody's coal production and the planning for reclamation and timely return of mined lands and waters to our people in their pre-mine condition.

Navajo Nation President Nez and Vice-President Lizer recently told Congress, "[w]ithout proper remediation, the land devastated by the Black Mesa and Kayenta mines may never fully recover. On that point, we believe OSMRE has been negligent in duties to hold Peabody accountable for the damage they have done to our land and our people. Peabody did not hold to their end of the bargain in our lease, and they should be denied the opportunity to renew leases or obtain new permits until a plan is put in place to begin the remediation process now. We have already waited more than 2 years since all operations in the area ceased. We shouldn't have to wait any longer." [1] Numerous Navajo Nation local governments have passed resolutions expressing similar concerns.[2]

We believe the Biden Administration has the opportunity to correct a historic wrong, put its environmental justice commitments into practice, and meaningfully engage our communities on how best to restore our lands and return them to Native people after more than 50 years of strip mining.

[1] *See* Exhibit 1.

[2] *Id.*

Under your leadership, Interior asserts it is "playing a central role in how the United States…increases environmental protections, pursues environmental justice and honors our nation-to-nation relationship with Tribes." [3] And it also touts that "the President knows that the intersecting health, economic, racial justice and climate crises disproportionately impact American Indians and Alaska Natives, which is why he has directed the entire federal workforce to take a whole-of-government approach to supporting Indian Country." [4]

Similarly, the President has ordered "that the Federal Government should pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality" and that the administration is advancing "a systematic approach to embedding fairness in decision-making processes, executive departments and agencies (agencies) must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity." [5] Further, "[i]n carrying out this order, **agencies shall consult with members of communities that have been historically underrepresented in the Federal Government and underserved by, or subject to discrimination in, Federal policies and programs**."

We're asking Interior to ensure these are not empty promises; to finally engage Tribal communities on Black Mesa, to listen to community concerns, openly discuss the process of reclaiming and returning our lands and water and ensure our Tribal communities have a meaningful voice in this process. We believe that these goals can be accomplished through regular public meetings with the communities most directly impacted by the mines, and that there is an existing regulatory framework under Federal surface mining laws and the "significant permit revision" process that can provide substantive protections for our lands and waters as well as opportunities for public engagement. Although we have received a letter from OSMRE indicating it intends to hold a virtual public hearing on Peabody's requested bond release on October 21, 2021, initiating a process to return millions of dollars in reclamation bonds to Peabody *before* holding discussions with the affected community of Navajo and Hopi people about the restoration and return of our lands and waters is not appropriate. That puts the cart squarely before the horse and tells us that OSMRE values Peabody's bottom line more than it respects the input of Navajo and Hopi communities that are directly impacted by decades of Peabody's pollution.

Our Tribes and communities across Black Mesa have been living with the social and environmental impacts from Peabody's coal mining operations for a half century. We deserve a plan from Peabody that meaningfully addresses **when** our land and water will be returned to us,

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[3] https://www.doi.gov/blog/meeting-moment-interiors-bold-action-preserve-public-lands-and-waters-invest-clean-energy.

[4] https://www.doi.gov/blog/enduring-partnership-interiors-commitment-honoring-our-nation-nation-relationship-tribes

[5] *See Order Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government* (January 20, 2021) https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government/

explains **how** Peabody will reclaim our land and water for return to our people and community to its pre-mining condition, and adequately analyzes **how much it will cost** Peabody and other entities to do the necessary reclamation work so that our communities can be confident that Peabody's clean-up operations are adequately bonded. And we deserve **a transparent and public process** that will ensure the people who live on Black Mesa and continue to be directly affected by Peabody's mine operations can understand and meaningfully participate in efforts to reclaim and restore our lands and water as they are returned our people.

As explained in greater detail below, we believe that means treating Peabody's permanent cessation of active coal mining operations in August of 2019 as a "*significant* permit revision" under the Surface Mining Control and Reclamation Act ("SMCRA") and that Interior and OSMRE begin that process *now*.

BACKGROUND

The Kayenta Mine sits on top of Black Mesa, located above the Navajo Aquifer, and has disproportionately impacted our families, our communities, and our lands and waters for a half-century. Most of us have lived on Black Mesa for the majority of our lives. We all know families, including some of our own relatives, that were relocated in the early 1970s to make way for the coal mine, and we want to ensure that our families and communities can return to these lands after Peabody leaves and find more than a scarred, barren, waterless landscape.

In October of 2017 when OSMRE approved yet another in a long line of 5-year permit renewals for the Kayenta Mine dating back to 1990, the agency told our communities and the public that permanent closure of Kayenta was "uncertain at this time" and "therefore does not necessitate the submission of an application for revision of the mine permit at this time." [6] In assuming no changes to Peabody's mine operation for purposes of "renewal" of Peabody's operating permit at **maximum** coal production, OSMRE circumvented permitting procedures for addressing permanent cessation of coal production and intentionally limited the scope of its environmental assessment to "mining and reclamation operations during the [renewal] period of July 6, 2015 through July 5, 2020."[7]

By contrast, OSMRE's sister agencies within Interior – the Bureau of Reclamation ("BOR") and Bureau of Indian Affairs ("BIA") – prepared an environmental assessment in 2017 that analyzed *in toto* permanent retirement and remediation of the Navajo Generating Station ("NGS") to begin

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[6] Additionally, OSMRE told the public that "[t]he proposed Renewal application does **not** include any revisions to the mining and operations plan or the addition of any new mining areas and is therefore under 30 CFR 774.15(b)(2)(4) is not subject to processing as a permit revision. For the proposed Renewal period, coal-mining operations would be **assumed** to continue at the recent historical pace of approximately 8 mtpy and existing facilities would be used for ongoing operations." *See* OSMRE Kayenta Mine SMCRA Permit Renewal Environmental Assessment (August 17, 2017) at Appendix H page 5, ¶17 (emphasis supplied) (Exhibit 2).

[7] *See* OSMRE Kayenta Mine SMCRA Permit Renewal Environmental Assessment (August 17, 2017) at 1-1. The environmental assessment and underlying permit documents are no longer publicly available on OSMRE's website.

in 2020 and end in 2025 ("NGS Retirement EA").[8] OSMRE excused itself from this process, and did not serve as a cooperating agency on the NGS Retirement EA. The plan governing retirement of NGS was finalized on November 27, 2017 and, unlike Peabody's Kayenta mine, NGS is now on a glidepath to timely completing remediation of the facility.

Since mine closure, Peabody has exacerbated public confusion around permanent closure of the Kayenta Mine by seeking yet another 5-year permit renewal from OSMRE for continued coal production.[9] Additionally, since mine closure in August of 2019, Peabody appears to have submitted numerous "revisions" to its operating permit addressing mine reclamation for which OSMRE has provided no public participation opportunities or environmental analysis.[10] More recently, Peabody has now demanded $25 million in bond release while offering negligible public participation and oversight opportunities and no environmental analysis.[11]

Based on our review of documents obtained from OSMRE, it is not clear to us whether Peabody has ever meaningfully notified OSMRE that it permanently stopped mining at Kayenta.[12]

We do not expect reclamation will be easy, but at a minimum it must be transparent and involve the public and impacted community. The Kayenta mine area is roughly 44,000 acres and once housed livable Native communities; it is indeed a city-sized coal mine.[13] The mine opened in 1973, and now a half-century later, **Peabody has made little progress in restoring mined lands on Black Mesa to a pre-mine condition**.

As of April 20, 2017, and of the more than 17,000 acres of Tribal homelands disturbed by mining and regulated under the OSMRE's Permanent Regulatory Program, **no lands whatsoever** had been permanently reclaimed to a pre-mine condition (*i.e.* achieved Phase III bond release). Further, and of the 5,400 acres of mined lands at Kayenta regulated under OSMRE's antiquated

[8] Unlike OSMRE, BIA and BOR had the prescience to recognize that "[w]hen NGS operations cease on or before December 22, 2019, it is assumed that closure and reclamation of the [Kayenta Mine] also would occur because the NGS is the sole commercial customer of coal produced at the [Kayenta Mine]"). NGS Retirement EA at 13. The NGS Retirement EA can be found here: https://www.usbr.gov/lc/phoenix/reports/NGS/nepa.html

[9] Peabody's demand for an additional 5-year permit renewal and continued coal production which was submitted to OSMRE on February 20, 2020 is not publicly available on OSMRE's website.

[10] None of Peabody's permit revisions are available on OSMRE's website.

[11] https://www.wrcc.OSMREre.gov/initiatives/kayentaBlackMesa.shtm

[12] Notably, Peabody failed to notify the Bureau of Land Management ("BLM") of the cessation of coal production until January 31, 2020 – four months **after** mine closure. Exhibit 3. Peabody's notification was triggered by a December 19, 2019 letter from the BLM requesting that Peabody "submit a modification to its current coal Resource Recovery and Protection Plan (R2P2) for the Kayenta mine, last approved in 2016." *Id.* Upon information and belief, OSMRE has **never** sent a similar request to Peabody.

[13] 44,000 acres is approximately 68 square miles; for reference, the city of San Francisco, California is only about 47 square miles.

initial regulatory program, only 2,400 acres, or less than half, have seen OSMRE "terminate jurisdiction" over Peabody's operation.[14]

With regard to water resources, and in particular Peabody's drawdown of the Navajo Aquifer over the last half-century which has led to dried up springs and surface land subsidence in our communities, there simply is no timeframe or estimate of **when or how (if at all)** Peabody can and will restore our critical Tribal water resources to their pre-mine condition, as required by law.

Peabody's track record is shameful. Peabody has not been a good neighbor. Most of us can barely remember a time without mine pollution. We cannot remember a time without the heavy equipment or the dust and chemicals from blasting. But in our dried-up wells, in the daily commutes to get adequate water for our livestock and homes, and in the health of our children, we see daily reminders of what Peabody has taken from our land and what it has left behind.

COMMUNITY CONCERNS

Going forward, we have several specific concerns that we want to bring to your attention.

First, and because Peabody failed to notify OSMRE of permanent cessation of mine operations when OSMRE authorized a 5-year Permit Renewal for the Kayenta Mine on October 3, 2017, the environmental impacts of mine closure have **never** been analyzed and Peabody was **not** required to complete an updated reclamation plan governing mine closure. Specifically, Peabody was **not required to provide a "detailed timetable"** for the completion of each major step in the reclamation process post-closure in August of 2019 including:

(1) Backfilling;
(2) Grading;
(3) Establishment of the surface drainage pattern and stream-channel configuration;
(4) Soil redistribution;
(5) Planting of all vegetation;
(6) Demonstration of revegetation success;
(7) Demonstration of restoration of the ecological function of all reconstructed perennial and intermittent stream segments; and,
(8) Application for each phase of bond release.

See 30 C.F.R. § 780.18(b). As it currently stands, there is no timetable (enforceable or otherwise) for Peabody to achieve permanent reclamation of mined land and water to a pre-mine condition. The reclamation schedule in Peabody's operating permit was last revised in October 2012 and only runs through 2019.[15] Importantly, the schedule does **not** provide precise

[14] *See* Exhibits 4 and 5. The situation at Peabody's Black Mesa Mine, where active mining ceased in 2005, is no different. Of the 5,780 acres of mined lands at Black Mesa regulated under OSMRE's initial regulatory program and after nearly 15 years of alleged reclamation operations by Peabody, only 1,600 acres, or 27%, have seen OSMRE "terminate jurisdiction" over Peabody's mine operation. Exhibit 6.

[15] *See* Exhibit 7.

specification of the timing or area for each reclamation phase in each mining area, which OSMRE asserts "is not possible" due to ongoing coal production by Peabody.

Second, and although Peabody prepared a "final reclamation cost valuation" for the Kayenta Mine in early 2017, that cost valuation was not provided to OSMRE during the 2017 renewal permitting process and has never been made public.[16] As it currently stands, we have no way of assessing whether Peabody's behind-closed-doors cost estimate adequately reflects Peabody's full reclamation costs at the Kayenta Mine – costs which we believe to be significant and necessarily include hydrologic reclamation of our people's water resources to a pre-mine condition.

Third, while Peabody's bond will presumably cover land disturbances, we have no indication that Peabody's reclamation bond is sufficient to restore the quality and quantity of Black Mesa's water resources, in particular the N-Aquifer that our communities depend on, to a pre-mine condition. We need assurances from OSMRE, Peabody, and the owners of NGS that our lands and water will be fully, and timely, reclaimed to their pre-mining condition.

These are serious concerns that directly affect the communities that live on Black Mesa and are compounded by Peabody's own statements that the mine company's reclamation bond was "underfunded." [17]

OUR REQUEST TO U.S. DEPARTMENT OF THE INTERIOR

Peabody's permanent cessation of coal production in August of 2019 must be treated by OSMRE as a *significant* permit revision.[18] Treating Peabody's permanent closure of the Kayenta Mine as a *significant* permit revision is critical for three reasons:

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[16] *See* Chris Walker, Peabody Letter to Navajo Generating Station Owners at 1 (April 17, 2017), Exhibit 8. The final reclamation cost valuation referenced in the letter has never been made publicly available, analyzed in any impact statement, or incorporated into Peabody's operating permit.

[17] At a May 16, 2017 meeting in Chandler, Arizona on the long-term future of NGS, Peabody representative Chris Walker told officials from the Department of Interior, Bureau of Reclamation, and other entities that Peabody's reclamation bond was at that time "underfunded," and that the owners of NGS were contractually responsible for 70 percent of final reclamation costs and 100 percent of employer health-care costs at the Kayenta mine. Peabody made similar statements in an April 4, 2017 letter signed by Mr. Walker to the owners of NGS. The letter asserts that based on a reclamation cost study prepared by Golder and Associates – which has never been made available to the public – that the owners of NGS were responsible for $137 million of the $191 million in expected reclamation costs. *See* Chris Walker, Peabody Letter to Navajo Generating Station Owners at 1 (April 17, 2017), Exhibit 8.

[18] In determining whether a permit revision is "significant," OSMRE "**shall consider**" the following factors:

(1) Changes in production or recoverability of the coal resource;
(2) the environmental effects;
(3) the public interest in the operation, or likely interest in the proposed revision; and,
(4) possible adverse impacts from the proposed revision on fish or wildlife, endangered species, bald or golden eagles or cultural resources.

See 30 C.F.R. § 750.12(c)(3)(ii)(B) ("OSMRE **shall determine** if the application for revision is complete and **if the proposed revision is significant**.") (emphasis supplied).

1. Peabody must "affirmatively demonstrate" and OSMRE find "in writing" "that reclamation as required by the Surface Mining Control and Reclamation Act and the regulatory program **can be accomplished under the reclamation plan contained in the permit application**."[19]

2. OSMRE is required to "[d]etermine[ ] that the proposed operation has been **designed to prevent material damage to the hydrologic balance outside the permit area**."[20]

3. OSMRE is required "**to determine if the findings which were made in issuing the original permit are still valid**."[21]

CONCLUSION

After more than 50 years of mining at Kayenta and Black Mesa, it is time to repair the land, restore the Navajo Aquifer, which is vital for the continued prosperity of our Tribal communities, and return Peabody's mined land and waters to the people of Navajo and Hopi in their pre-mining condition. Six years ago, then-Interior Secretary Sally Jewell promised the American people "an open and honest conversation" about the Federal coal program. The Hopi and Navajo communities on Black Mesa deserve an open and honest conversation about how to reclaim our lands and waters and return them to displaced communities. We deserve to have our voices heard in that process.

Secretary Haaland, we are pleased that the Biden administration has made environmental justice and redress of historic wrongs in Indian Country a priority, and we're eager to see that promise of meaningful engagement, cooperation and an honoring of relationships – what we Diné call *Hózhó* and we Hopi call *Sumi'na'gnwa* – put into practice here. Toward that end, it would be an honor to meet with you so you can hear our concerns in person. Beyond that, we trust that your team at Interior will honor your commitment to pursue environmental justice and meaningfully engage our communities in the significant permit revision process necessary for addressing permanent closure of Peabody's Kayenta and Black Mesa mines and currently occupying our homelands.

Thank you for your attention to these important issues. We look forward to hearing from you after you have had a chance to review this letter.

[19] 30 C.F.R. § 773.15(b) (emphasis supplied).

[20] 30 C.F.R. § 773.15(e) (emphasis supplied).

[21] 30 C.F.R. § 750.12(c)(3)(ii)(C) (emphasis supplied).

Respectfully,

Nicole Horseherder, Director
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Former Hopi Tribal Chairman
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Phone: 928-380-6677

Exhibits:

1. Navajo Nation Letter to House Natural Resources Committee (June 29, 2021) and Navajo Nation Chapter resolutions;
2. OSMRE, Kayenta Mine SMCRA Permit Renewal, Environmental Assessment, Appendix H: Response to Comments (August 17, 2017);
3. BLM, Letter to OSMRE (July 24, 2020);
4. Peabody Western Coal Company, Table 2. Reclamation Status of Areas Disturbed Under the Permanent Regulatory Program at Kayenta Surface Mine (April 20, 2017);
5. Peabody Western Coal Company, Table 1. Reclamation Status of Areas Disturbed Under the Initial Regulatory Program at Kayenta Surface Mine (April 20, 2017);
6. Peabody Western Coal Company, Table 3. Reclamation Status of Areas Disturbed Under the Initial Regulatory Program at Black Mesa Surface Mine (April 20, 2017);
7. Peabody, Kayenta Mine Reclamation Schedule, (October 12, 2012);
8. Peabody Letter to NGS Participants Regarding Reclamation Liabilities at Kayenta Mine (April 3, 2017).

Copy: Johnathon Nez, President of the Navajo Nation
Timothy L. Nuvangyaoma, Hopi Chairman
Bryan Newland, Assistant Secretary of Indian Affairs
Steve Feldgus, Deputy Assistant Secretary for Land and Minerals Management, U.S. Department of Interior
Glenda H. Owens, Deputy Director, Office of Surface Mining Reclamation and Enforcement
David Palumbo, Deputy Commissioner, U.S. Bureau of Reclamation
U.S. Senator Mark Kelly
U.S. Senator Kyrsten Sinema
U.S. Senator Martin Heinrich
U.S. Senator Ben Ray Luján
U.S. Congressman Tom O'Halleran
U.S. Congressman Raúl Manuel Grijalva
U.S. Congresswoman Teresa Leger Fernandez

Exhibit C

VIA CERTIFIED MAIL

June 10, 2020

Mr. David Berry, Director
Office of the Regional Director
Office of Surface Mining and Reclamation and Enforcement
Western Region
1999 Broadway, Suite 3320
Denver, CO 80202-3050

Dear Mr. Berry,

In the spirit of environmental, social and economic justice, and on behalf of the Hopi people, we write to ask that you treat the closure nearly nine (9) months ago of Peabody Western Coal Company's (Peabody) Kayenta Mine as a "***significant permit revision***" under Section 511 (a)(2) of the Surface Mining Control and Reclamation Act (SMCRA). 30 U.S.C. § 1261(a)(2). The process for reviewing and acting upon this revision must also include preparation of an Environmental Impact Statement (EIS) and full compliance with the National Environmental Policy Act (NEPA) and its implementing regulations.

As you know, in early 2019, Peabody announced its intent to close the Kayenta Mine by October of that year. Now more than one year later and more than eight months after mine production has ceased, Peabody has failed to lay out a clear, substantive plan for the safe closure and reclamation of the Kayenta Mine and the remaining Black Mesa Mine lands as required by SMCRA. See https://www.eenews.net/energywire/2019/02/07/stories/1060119893.

The cessation of coal production at Kayenta has had a significant adverse impact on the economic health and well-being of the Hopi Tribe; and was not contemplated when the Kayenta mine permit was last renewed in 2015. In fact, even though prior to approving the Renewal Permit in October 2017, Peabody notified OSM that it would cease coal mining at Kayenta in 2019. The permit renewal was approved anyway, with no modifications addressing the cessation of mining and the onset of reclamation work. The permanent halt to mining activities should have triggered a fundamental shift

toward reclamation and closure. Yet, Peabody seems a long way from completing – or even starting – its reclamation work, having utterly failed to meet its legal obligation to reclaim both the Kayenta and Black Mesa mines "as contemporaneously as practicable" with mining.

A comprehensive environmental impact assessment process would at least ensure a thorough assessment of reclamation activities, a realistic but aggressive timetable for carrying them out, and alternative approaches to reclamation. Just as importantly, it would afford the Hopi Tribe and other interested members of the public an opportunity to engage the Office of Surface Mining Reclamation and Enforcement (OSMRE) over Peabody's plans to carry out final reclamation and closure of the mine site.

Our concern about public participation is not hypothetical. Already, the Hopi Tribe has been denied the opportunity to comment on and object to Peabody's revised reclamation schedule due to OSMRE's treatment of this revision as "minor." Yet, in that supposedly minor revision, Peabody proposes to delay reclamation for five years, and it does not intend even to begin backfilling and grading on more than 70% of the disturbed land until 2022 or later. This is unacceptable and a flagrant violation of SMCRA's requirement that Peabody "insure that all reclamation efforts proceed in an environmentally sound manner and *as contemporaneously as practicable with the surface coal mining operations*…." 30 U.S.C. § 1265(b).

The Kayenta Mine has been closed for more than eight (8) months. Black Mesa Mine (BMM) has been closed since 2005, prior to closure, BMM was operating on an interim program permit. And yet Peabody has effectively ignored its contemporaneous reclamation obligation on these sites. We cannot understand why OSMRE has failed to recognize this fact and demand a reclamation schedule that is in line with SMCRA's requirements. But it illustrates why affording the Hopi Tribe and other interested parties' fair opportunities for civic engagement is so important.

Peabody is also currently in violation of 30 C.F.R. §780.18(b)(1). This provision requires Peabody to provide "[a] detailed timetable for the completion of each major step in the reclamation plan." Yet Peabody has offered no clear plan or detailed timetable for: (1) backfilling and grading; (2) protection and restoration of the hydrologic balance for surface and groundwater resources (30 CFR §780.21 & 816.41-42): and (3) redistribution of topsoil or approved topsoil substitutes (30 CFR §8165.22(d)). Moreover, we have special concerns about several specific matters, including:

1. The restoration of springs, some of which are used for religious ceremonial purposes;

2. The restoration of water which flowed through Moenkopi Wash and was the main source of irrigation for Moenkopi fields. Moenkopi Wash is now dry due to the construction of over 165 impoundment dams on Peabody's leasehold under the Nation-Wide permit in violation of Section 404 of Clean Water Act, which requires Individual Permit;

3. Ameliorating the high levels of arsenic in deep wells at First and Second Mesa villages due to over-drafting of billions of gallons of water from the Navajo Aquifer for mining uses over the past half century;

4. The construction of a facility to store all archaeological artifacts and remains of our ancestors who settled on Black Mesa over 1,000 years ago that were recovered during mining; and

5. An alternatives analysis, a review, and reconsideration of the post-mining land use to consider options that might better address the dire economic condition facing the Hopi Tribe as a result of the closure of the Kayenta Mine.

A comprehensive environmental impact assessment that addresses Peabody's plans for reclaiming and closing the Kayenta Mine would provide the Hopi Tribe and the Hopi people, and others with an opportunity to engage with OSMRE on these and other issues that might be raised by interested parties.

Peabody's lack of transparency regarding its plans are further revealed by its failure to release the "final reclamation cost valuation" for the Kayenta Mine that it prepared in early 2017. As it currently stands, neither we, nor the Hopi Tribe have any way of assessing whether Peabody's secret cost estimate adequately reflects Peabody's full reclamation costs at the Kayenta Mine. We do know, however, that these costs will be significant as they must include the restoration of the hydrologic balance of our people's water resources (including the Navajo Aquifer) to their pre-mining condition. All of this can be addressed in the environmental impact assessment that we are requesting and requiring.

We also want to express our deep concern that Peabody's reclamation bond will not prove sufficient to restore the quality and quantity of Black Mesa's water resources, including the Navajo Aquifer that our villages depend upon. The adequacy of Peabody's bonds is a critical issue for the Hopi people that must be reviewed during the impact assessment process.

Finally, OSMRE appears to be in violation of the National Historic Preservation Act (NHPA) for its failure to consult with the Cultural Preservation Office (CPO), or the equivalent of a Tribal Historic Preservation Office (THPO), over "historic properties" that have been adversely affected during the reclamation process at the Black Mesa and Kayenta mines.

As OSMRE surely knows, the mine site is host to many historic and cultural sites protected under the NHPA; and OSMRE has a legal obligation to make reasonable and good faith effort to identify those sites and to work with us to ensure their protection. While the Hopi Tribe may not have a veto over OSMRE's approval of a reclamation plan, it certainly has the right to consult with OSMRE; and if they cannot agree on an appropriate plan to avoid or reduce adverse effects, to enlist the assistance of the Advisory Council on Historic Preservation to help reach an appropriate agreement. See 36 C.F.R. §§ 800.4 and 800.5.

If OSMRE is serious about its legal obligation to address these critical issues and protect the Hopi Tribe and other affected parties from the adverse impacts from Peabody's activities at the Kayenta and Black Mesa mine sites, then it must recognize that Peabody's permanent cessation of coal production at Kayenta, by statutory mandate, requires a significant permit revision under SMCRA. Indeed, Kayenta's closure in 2019 represented a stark change from Peabody's public statement that it expected to produce coal at Kayenta and "generate significant economic benefits for tribal communities from 2020-2044." The loss of these economic benefits and alternative closure strategies that might help secure the Hopi Tribe's financial future are therefore, fair subjects for review during the impact assessment process. See https://mscusppegrs01.blob.core.windows.net/mmfiles/files/factsheets/kayenta.pdf.

It is our view that the designation of a significant permit revision at Kayenta is NOT discretionary. It is required in light of the halt to production at the mine. OSMRE can demonstrate its respect for the people of Black Mesa and the Hopi Tribe, and ensure that the Hopi Tribe and others will have a fair opportunity to participate in the key decisions that will impact our land and water resources long after Peabody is gone, by designating Kayenta's closure as a significant permit revision.

We believe that after 50 years of sacrifice, we are entitled to that respect. If OSMRE chooses to deny this request, we and the Hopi Tribe will pursue other avenues to ensure that our views are given the respect that we are due. But our strong preference is to have OSMRE accept our request and move forward promptly with the environmental impact assessment process.

Respectfully submitted,

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Benjamin H. Nuvamsa
Former Chairman, Hopi Tribe

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Vernon Masayesva
Former Chairman, Hopi Tribe

Cc: Honorable Timothy L. Nuvangyaoma, Chairman, Hopi Tribe
Honorable Clark Tenakhongva, Vice Chairman, Hopi Tribe
Honorable Jonathan Nez, President, Navajo Nation
Honorable Myron Lizer, Vice President Navajo Nation
Honorable Tara Sweeney, Assistant Secretary – Indian Affairs
Hopi Tribal Council Secretary, Hopi Tribe
Hopi – Tewa Villages

Exhibit D

July 9, 2021

Mr. Marcelo Calle
Division Chief, Program Support Division
OSMRE, Western Region
mcalle@osmre.gov

Mr. Jeremy Spangler
Civil Engineer, Indian Program Branch, Program Support Division
OSMRE, Western Region
jspangler@osmre.gov

Ms. Amy McGregor
Kayenta Mine Team Leader
Indian Program Branch
OSMRE, Western Region
amcgregor@osmre.gov

Re: Termination of Jurisdiction and Bond Release Applications for Kayenta Mine:
J1, N6, J16, and N14 – Termination of Jurisdiction (TOJ)
J16, J19 and J21 – Phase II Release
J19, J19W and N9 – Phase I Release

Via email

Dear Mr. Calle, Ms. McGregor and Mr. Spangler:

We are writing to indicate our interest in participating in the bond release processes currently underway at Kayenta Mine, to request the opportunity for site visits, and to request more time to provide comments.

We are concerned that too many bond release applications, covering too many areas are moving too fast for our communities to meaningfully engage. At the same time, we are concerned that OSMRE and Peabody have so far refused to commit to a significant permit revision that would allow our communities to understand what is needed to fully reclaim the lands and waters of Black Mesa and to make a plan to ensure full reclamation becomes a reality.

For nearly a half century, our communities and people have borne the direct impacts of operations at Black Mesa Mine and Kayenta Mine. Now that the mines are closed, the federal government must finally live up to its trust responsibilities and ensure that our sacrifices of our tribal land and water, the removal of our ancestors and their artifacts, and the contribution made by our people to provide Arizona with cheap water and cities across the Southwest with cheap power are recognized and addressed.

Five decades of coal mining have left indelible marks on the Navajo and Hopi, scarring not only our land, but also our water and cultural resources. It is OSMRE's and the Department of the Interior's responsibility to ensure that our lands and waters, which have been used for decades to provide energy to fuel development of the West, are returned to us in as good condition as they were received when Peabody first leased these lands. This is what is required by the company's leases with the Navajo Nation and Hopi Tribe.

Last month, OSMRE moved forward with multiple applications submitted by Peabody for termination of jurisdiction and bond release at Kayenta Mine. These applications were all submitted after the mine closed and one of them was submitted during COVID closures. Each of these applications is substantial in terms of acres affected (6,560 in total), in terms of technical documentation that we must review (933 pages), and in terms of the impact these decisions will have on the future of our lands and waters. And together, they create a huge burden on individuals, communities and organizations who want to participate in assuring reclamation of the lands and waters of Black Mesa.

These proposals cover more than 10 square miles across eight distinct mining areas in the heart of the Kayenta Mine. Though OSMRE has now posted these applications online at https://www.wrcc.osmre.gov/initiatives/kayentaBlackMesa.shtm, no electronic notice was provided, and no announcement is posted on OSMRE's home page. That Peabody followed the antiquated rules for notice by posting public notices in two paper newspapers—newspapers that do not make their public notices available in their online versions of the publications—is the equivalent of no notice at all. The notices to the Navajo Chapters and Navajo Nation were apparently sent on June 17, 2021 — during the pandemic when chapter and tribal offices were still largely closed and access to records and notifications was all but impossible.

We intend to fully participate in these bond release processes. To do so, we request the following from OSMRE:

- An **opportunity to visit each of the areas** proposed for bond release for a field inspection, pursuant to CFR §800.40(b)(1).
- Copies of any and all **reports that result from OSMRE's field inspection(s)** scheduled to begin on June 15, 2021. The comment period for these bond release applications should not begin until we have copies of the results of the field inspections.
- **Copies of public notices** posted by Peabody in the Navajo Times and the Navajo Hopi Observer, confirmation of the date they were posted, and the expected date for the final posting of the notices, which will start the clock ticking on the 30-day regulatory comment period.
- **A public meeting convened by OSMRE** to explain the Termination of Jurisdiction and bond release processes and these proposals and for the public to ask questions. Given that these proposals could result in the release of almost $25 million in Peabody's bond obligations, we do not believe Peabody will provide a fair forum for the public — the meeting must be hosted and run by OSMRE. Again, the comment period should NOT begin until the community has had an opportunity to hear from OSMRE (not Peabody) about the process for and the substance of the pending bond release applications.
- **More time to review and comment** on the voluminous Termination of Jurisdiction and bond release applications. COVID — and OSMRE's practice of not providing public notice of applications by Peabody and not making those applications available on the internet in a timely manner — has limited our awareness of and our opportunity to review these significant proposals. We request a meaningful extension of time to comment.
- A summary of the reclamation and other actions actually taken in each bond release areas and the planned next steps in the process. This will provide the information residents are asking about the most, what and how is reclamation being done and evaluated.
- A copy of the revegetation plan, including how plants are selected and why. In addition, where and why native are plants not being reseeded.

And perhaps most importantly, we are requesting a comprehensive approach to the closure and reclamation of Kayenta Mine as part of signification permit revision associated with the now overdue permit renewal for the mine. OSMRE's practice of moving forward piecemeal under "minor permit revisions" and bond releases in the absence of significant permit revision that allows the public the

opportunity to participate in planning for the future of the mine areas excludes us from shaping our future.

Please respond as soon as possible so we can plan for our participation in these processes.

Respectfully,

Nicole Horseherder
Executive Director
Tó Nizhóní Ání
nhorseherder@gmail.com

Ben Nuvamsa
Former Hopi Council Chair
ben@kivainstitute.com

Carol Davis
Director
Diné C.A.R.E.
carol.davis@dine-care.org

'Ahtza D. Chavez
Executive Director
NAVA Education Project
ahtza@NAVAEducationProject.org

Vernon Masayesva
Former Hopi Council Chair
Executive Director
Black Mesa Trust
kuuyi@aol.com

CC:
The Honorable Deb Haaland, Secretary of the Interior
The Honorable Jonathan Nez, President, Navajo Nation
The Honorable Timothy L. Nuvangyaoma, Chairman, Hopi Council
The Honorable Jimmy Yellowhair, Navajo Nation Council Delegate
The Honorable Raúl Grijalva, Chairman, House Natural Resources Committee
The Honorable Tom O'Halleran, Representative, Arizona House District 1
The Honorable Alan Lowenthal, Chairman, House Subcommittee on Energy and Mineral Resources
The Honorable Kyrsten Sinema, Senator, Arizona
The Honorable Mark Kelly, Senator, Arizona
The Honorable Martin Heinrich, Senator, New Mexico
The Honorable Ben Ray Luján, Senator, New Mexico
The Honorable Teresa Leger Fernández, Representative, New Mexico House District 3
Steve Feldgus, Deputy Assistant Secretary, Lands and Minerals, Department of the Interior
Glenda Owens, Acting Director, OSMRE
Johnna Blackhair, Acting Director, Bureau of Indian Affairs
Peter Kozelka, EPA Region IX, NPDES Permits Section
Rowena Cheromiah, Manager, Navajo Nation Minerals Dept.

Exhibit E

October 6, 2021

Via Electronic Mail (PDF)/Certified Mail

Mr. Marcelo Calle, Manager
Program Support Division
Office of Surface Mining Control and Enforcement

Re: Peabody Western Coal Company's Applications for Bond Release and Termination of Jurisdiction for the Kayenta and Black Mines

Dear Mr. Calle:

We appreciate the response of the Office of Surface Mining Reclamation and Enforcement ("OSMRE") to our July 9, 2021 letter regarding the applications by Peabody Western Coal Company ("PWCC") for bond release and termination of jurisdiction for the Kayenta and Black Mesa Mines. Our communities remain deeply concerned that OSMRE is not taking our concerns seriously and is instead moving forward with a process to return tens of millions of dollars in reclamation bonds to Peabody while giving empty talk to meaningful engagement of affected Navajo and Hopi communities about the restoration and return of our lands and waters.

OSMRE's September 20, 2021 response letter is an indignation, and wholly inconsistent with the Biden Administration's stated commitment to American Indian tribes and tribal communities.

First, our July 9, 2021 letter specifically requested **a public meeting** so that the community has an opportunity to hear from OSMRE about the process and substance of the pending bond release applications. Under OSMRE's regulation governing bond release, OSMRE "**shall** hold a public hearing within 30 days after receipt of the request for the hearing" and, at the option of the objector, the public hearing "**shall** be held in the locality of the surface coal mining operation from which bond release is sought…"[1]

We are requesting that OSMRE hold **two** public hearings **in our communities** so that we can hear directly from OSMRE. The meetings can be held out-of-doors if you are concerned about COVID-19, and we are willing to work with OSMRE to identify potential meeting locations and dates.

Second, and with regard to the inspection and evaluation of PWCC's reclamation work scheduled for Tuesday, October 19, 2021, the three-hour drive-by inspection offered by OSMRE is simply **not** adequate. PWCC's leasehold covers 65,858 acres and the areas covered by PWCC's bond release application cover over 6,500 acres. OSMRE's suggestion that an inspection of the mined lands can be completed in just three (3) hours is impracticable – especially given OSMRE's acknowledgement that we will be traveling "over 20 miles of dirt road and two track." At a minimum, the inspection needs to be scheduled for a **full-day** from 8 a.m.- 5 p.m. and should include the option for an additional half-day follow up at the inspector's request.

Further, there is no legal basis for OSMRE's demand that we limit attendance at the inspection to the signatories of the July 9, 2021 letter. We will provide OSMRE with the names of the attendees

[1] 30 C.F.R. §800.40(f) (emphasis added).

seventy-two (72) hours prior to the inspection and expect OSMRE to work with and accommodate the inspectors identified by our communities.

Additionally, and in order that we may prepare for the inspection and evaluation, please provide the following documents **no later than** October 15, 2021: all OSMRE inspection reports of the bond release areas; PWCC's approved reclamation plan; and, the Full Reclamation Cost Full Interim True-Up valuation study (2017) prepared by Golder Associates. Failure to provide these documents in advance of the inspection could result in delay or cancelation of the inspection.

Third, and finally, we believe that OSMRE's scheduling of a "virtual" informal conference on October 21, 2021 violates the Surface Mining Control and Reclamation Act ("SMCRA") and is premature. SMCRA mandates that any informal conference be held in our community.[2] As such, OSMRE's decision to hold a two-hour "virtual" informal conference violates SMCRA. A virtual conference is especially unhelpful on the Navajo Nation, where internet access is extremely limited.

Finally, and while we may be open to waiving the statutory requirement and holding an informal conference at OSMRE's offices in Denver, Colorado, we are deferring that decision at this time. Once OSMRE has held public hearings in our communities, allowed for a full-day inspection of PWCC's mined lands to be released from bond, and received our written comments/objections will the agency be in a position to hold an informal conference necessary to resolve any outstanding issues raised by our tribes and tribal communities as provided in Section 513(b) of SMCRA.

Thank you for your attention to these important issues. We look forward to hearing from you after you have had a chance to review this letter.

Sincerely,

Nicole Horseherder, Director
Tó Nizhóní Ání ("Sacred Water Speaks")
www.tonizhoniani.org
Email: nhorseherder@gmail.com
Phone: 928-675-1851

Ben H. Nuvamasa,
Former Hopi Tribal Chairman
Email: ben@kivainstitute.com
Phone: 928-380-6677

Copy: Jonathon Nez, President of the Navajo Nation
Timothy L. Nuvangyaoma, Hopi Chairman
Steve Feldgus, Deputy Assistant Secretary for Land and Minerals Management, U.S. Department of Interior
Glenda H. Owens, Deputy Director, Office of Surface Mining Reclamation and Enforcement

[2] 30 U.S.C. §1263(b) (OSMRE "**shall**…hold an informal conference in the locality of the proposed mining…") (emphasis added).

Exhibit F

January 27, 2022

Via Electronic Mail (PDF)/Certified Mail

Glenda H. Owens, Deputy Director
Office of Surface Mining, Control and Enforcement
U.S. Department of the Interior
1849 C Street NW
Washington, D.C. 20240
Email: gowens@osmre.gov

Re: Kayenta and Black Mesa Mine: Virtual Informal Conference, January 27, 2022

Deputy Director Owens:

By this letter and for the reasons set forward herein, the undersigned objectors hereby notify you and the Office of Surface Mining Reclamation and Enforcement ("OSMRE") of our intent to boycott OSMRE's two-hour "virtual informal conference to receive comments on two proposed Surface Mining Control and Reclamation Act (SMCRA) performance bond release applications submitted by Peabody Western Coal Company (PWCC)" scheduled for January 27, 2022.

Simply put, we will not allow our participation in OSMRE's sham virtual informal conference to be used as proof by OSMRE that meaningful consultation with our communities is occurring. It's not.

OSMRE's (mis)handling of permitting matters related to permanent mine closure, reclamation, and bond release at PWCC's Kayenta and Black Mesa mines is an outrage, and does tremendous injustice to the tribal communities who have borne the brunt of PWCC's strip mine operations for the last half-century and who will be forced to live with OSMRE's regulatory failures long after PWCC has been allowed by the U.S. government to abandon its duty to restore tribal lands and waters to a pre-mine condition.

Requests for Public Meetings

Since July of 2021, our tribal communities have ***repeatedly*** requested that OSMRE hold meetings in the local community to discuss PWCC's applications for bond release and as expressly mandated by our nation's bedrock mining law, SMCRA.[1]

Our letter dated July 9, 2021 explicitly requests "*a* ***public meeting convened by OSMRE*** to explain the Termination of Jurisdiction and bond release processes and these proposals and for the public to ask questions." We reiterated that request in our October 6, 2021 letter, specifically requesting "***a public meeting*** so that the community has an opportunity to hear from OSMRE about the process and substance of the pending bond release applications." Under SMCRA, a public hearing must be convened within 30 days of receipt of the request. That, of course, would

[1] *See* 30 U.S.C. §1263(b); 30 C.F.R. §800.40(f), (g), & (h).

have been impossible considering that OSMRE did not respond to our initial communication until seventy-three (73) days later, on September 20, 2021.

Now, OSMRE is outright denying the request for a public hearing and any form of in-person engagement for the Navajo and Hopi residents of Black Mesa, the communities OSMRE's decisions will most directly impact. In its January 25, 2022 communication, OSMRE states that objector's "request for a public hearing at this juncture is not timely," citing as reasons that it fell outside the 30-day window beginning July 1, 2021, and the health concerns associated with COVID-19. OSMRE's statement is infuriating, unjustifiable and beyond belief.

Our request for a public meeting came within eight (8) days of OSMRE's notice in July 2021, and had the agency acted in a timely manner as required under SMCRA, OSMRE could have held a public meeting in August 2021 outdoors on Black Mesa and/or using precautions that reduced COVID-19 transmission. Now the agency is pushing forward as if it our original request was never made and in late January 2022 when convening safely outdoors is impossible.

All of this adds up to a serious neglect of the agency's trust responsibilities. ***Tellingly, during the last decade, OSMRE has failed to hold or conduct a single public meeting with local tribal communities or the public and in an effort hear or address our ongoing concerns about the fate of PWCC's Kayenta and Black Mesa Mines.*** And yet, during this same decade, PWCC permanently ceased coal-strip mining operations at Kayenta in August of 2019, and thereafter began submitting numerous permit applications to OSMRE requesting revisions to its operating permit to address permanent reclamation of mined land and waters at Kayenta, as well as release from its performance bond obligations.

OSMRE's decade-long failure to hold public meetings in our communities to discuss the fate of PWCC's mine operations is in are an affront to our Indian communities and tell us that OSMRE has placed PWCC's corporate interests above the interests of the people who will have to live in perpetuity with the legacy of PWCC's half-century of coal strip mining.

Requests for Public Records

Our experience with requesting access to public documents is similarly frustrating. Site inspections for PWCC's bond release applications were conducted in June 2021. However, the associated reports were not provided to us until October 14, 2021, providing just five (5) days to review the technical documentation and reclamation maps before our October 19, 2021 site inspection. As of that date, PWCC's full Permit Application Package (or PAP), along with the mine reclamation plan, was not electronically available.

Instead, we were instructed that paper copies could be accessed at three different locations on the Navajo Nation and Hopi. However, ***none*** of those locations could certify that they had complete copies of PWCC's PAP nor could they identify which provisions of the PAP governed permanent reclamation of mined land and waters at Kayenta and Black Mesa. Not until January 13, 2022, were we notified that PWCC's PAPs would be made available to us electronically. Together, these files encompass 933 pages and appear to be a half-centuries worth of assorted documents thrown together helter-skelter by OSMRE.

Aside from the bond release documents, we note that OSMRE's Kayenta/Black Mesa Mine Initiative web page is woefully out of date and functionally obsolete. ***The last documents posted on OSMRE's website are from 2014***. In the intervening eight years, PWCC has declared bankruptcy twice, the mine has been through two permit renewals (one of which is now overdue by almost two years), the mine has shut down, and numerous permit revisions appear to have been submitted and approved by OSMRE behind closed doors and without public knowledge or input, leaving the Indian communities most impacted by OSMRE's decisions completely in the dark.

A thorough search of OSMRE's Oversight Document Database turns up no documentation. Searching under the Navajo Nation heading from 2020 and 2021 in all 15 categories of documentation[2] for the keyword "reclamation" returns not a single document. In every instance, the resulting search says "No records match query." Given all that has transpired at Kayenta Mine over the past two years, we're not sure how it is possible that there is zero documentation available to the public.

As with the public meetings, we have ***repeatedly*** requested that documentation relevant to the Kayenta and Black Mesa reclamation work, including minor permit revisions, be posted online for public access and to encourage greater public involvement. These are documents critical to our understanding of reclamation activities and timing, to our engagement in the public process, and to ensuring that the restoration of our land and water is timely and adequately achieved. And our requests have been ignored. We should not have to fight for access to information that is so critical to securing the return of our land and water in a condition that will once again allow our people to live on it.

Moving Forward

OSMRE has simply ignored pleas from our communities for meaningful engagement in OSMRE's regulatory decisions, and instead has continued to embrace and employ the failed policies of obfuscation, secrecy, and disenfranchisement of the Trump administration.

Over the last year, and when it comes to our tribal communities who have long suffered the impacts of PWCC's strip mine operations at Kayenta and Black Mesa, the Biden administration has done nothing more than pay lip-service to embedding fairness and transparency in OSMRE's decision-making processes, and utterly failed to redress the ***very real*** racial and environmental injustice in our Indian communities from OSMRE's clandestine regulatory and permitting decisions.

Instead of creating a process for reconciliation with our tribal communities, OSMRE has allowed bureaucratic intransigence to dictate its policies at Kayenta and Black Mesa and, in so doing, denied the affected community of Navajo and Hopi people a meaningful voice in the restoration

[2] The 15 categories of searchable documents are: Action Plans, Annual Performance Agreements, Annual Evaluation Reports, Correspondence, Inspectable Units/Inspections Conducted, Meeting Summaries, Oversight Guidance, Public Comments, Summary of Citizen Complaints, Topic Specific Oversight Reports, State Comments, Work Plans, AML Site Visits, AML NEPA Documents, Federal Program Permitting Actions.

of mined lands and waters on our homelands. Under these circumstances we cannot in good conscience participate in a process that has short-changed our efforts at meaningful engagement at every turn and thus allow OSMRE to check a box that meaningful consultation with our communities is occurring.

Moving forward, we implore OSMRE to hold public meetings in and with our communities to discuss PWCC's bond release applications; provide transparency and create public participation opportunities around PWCC's numerous permit revision applications addressing mine reclamation activities; comply with the National Environmental Policy Act (or NEPA) and analyze the impact of OSMRE's permitting decisions; and, more generally, abide by President Biden's executive orders on advancing racial equity and supporting our underserved communities.[3]

Beyond that, and as we have continually prescribed, we believe PWCC's permanent cessation of coal production in August of 2019 must be treated by OSMRE as a significant permit revision and warrants development of a supplemental Environmental Impact Statement to address and inform PWCC's permanent mine closure and reclamation. This action alone would go a long way toward reconciling community concern with OSMRE's taciturn handling of PWCC's permanent mine closure.

Thank you for your consideration of this matter. ***Objectors respectfully request the ability to submit written comments on PWCC's bond release applications within thirty (30) days of the informal conference or within ten (10) days of any public meetings held by OSMRE in our communities.***

Sincerely,

Nicole Horseherder, Director
Tó Nizhóní Áni ("Sacred Water Speaks")
www.tonizhoniani.org
Email: nhorseherder@gmail.com
Phone: 928-675-1851

Ben H. Nuvamasa,
Former Hopi Tribal Chairman
Email: ben@kivainstitute.com
Phone: 928-380-6677

Copy: Honorable Deb Haaland, U.S. Secretary of Interior
Steve Feldgus, Deputy Assistant Secretary for Land and Minerals Management, U.S. Department of Interior
Marcelo Calle, Manager, Office of Surface Mining Reclamation and Enforcement
Honorable Johnathon Nez, President of the Navajo Nation
Honorable Timothy L. Nuvangyaoma, Hopi Chairman

[3] *See Order Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government* (January 20, 2021) https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government/

Exhibit G

United States Department of the Interior

OFFICE OF SURFACE MINING
RECLAMATION AND ENFORCEMENT
Interior Region 7
Lakewood, CO 80225

January 25, 2022

CERTIFIED RECEIPT REQUESTED
Ms. Nicole Horseherder
Director, To Nizhoni Ani
P.O. Box 483
Kykotsmovi Village, AZ 86039

Mr. Benjamin H. Nuvamsa
KIVA Institute, LLC
P.O. Box 1320
Pinetop, AZ 85935

Re: Kayenta and Black Mesa mines bond release and termination of jurisdiction applications

Dear Ms. Horseherder and Mr. Nuvamsa:

This letter is in response to your letter dated January 21, 2022. As we informed you on January 13, 2022, OSMRE will be hosting an informal conference virtually on Thursday, January 27, 2022, from 4 to 6 PM mountain standard time (MST) in accordance with the regulations defining bond release procedures at 30 C.F.R. § 800.40.

Regarding your reference to a public hearing and appurtenant hearing information, under 30 C.F.R. § 800.40, requests for a public hearing must be submitted within 30 days from the date the last required notice is published in a newspaper of general circulation. Here, the last newspaper notice was published on July 1, 2021, and the 30-day period for requesting a public hearing expired on August 1, 2021. Accordingly, your request for a public hearing at this juncture is not timely.

The informal conference will be recorded and OSMRE will provide you a written transcript of the informal conference. OSMRE previously provided the records you are requesting in your January 21, 2022 letter to Ms. Pamela Eaton, who we understand is acting on your behalf. We will, however, provide you any records not previously provided.

The Navajo Nation's declared state of emergency related to the pandemic and surging infections remains in effect. OSMRE has taken several factors into account in determining that an "in-person" informal conference is neither required nor prudent at this time and would be contrary to public health and safety measures. An in-person meeting would also be inconsistent with the Nez-Lizer recommended

precautions and approved resolution reauthorizing chapters to continue conducting public teleconference meetings due to COVID-19, issued on January 19, 2022 (CJA-01-22).

Questions on the informal conference should be addressed to Amy Ryser, OSMRE, One Denver Federal Center, Building 41, Lakewood, CO 80225 or at (303) 236-4690 or amcgregor@osmre.gov.

Respectfully,

MARCELO CALLE Digitally signed by MARCELO CALLE Date: 2022.01.25 12:49:56 -07'00'

Marcelo Calle, Manager
Program Support Division

Electronic Copy:

Nicole Horseherder, Executive Director, Tó Nizhóní Ání, nhorseherder@gmail.com
Ben Nuvamsa, Former Hopi Council Chair, ben@kivainstitute.com

Exhibit H

March 10, 2022

Via Electronic Mail (PDF)

Marcelo Calle, Regional Director
Amy Ryser, Kayenta and Black Mesa Mine Team Leader
Office of Surface Mining Reclamation and Enforcement
Western Regional Office
One Denver Federal Center, Building 41
Lakewood, CO 80225
Email: mcalle@osmre.gov
Email: amcgregor@osmre.gov

Re: OSMRE Western Regional Office's Sham Permit Revisions Process for PWCC's Kayenta Mine

Dear Regional Director Calle and Team Leader Ryser:

We are writing to draw attention to actions by the Western Regional Office of the Office of Surface Mining Reclamation and Enforcement's ("OSMRE) that have undermined public confidence in the agency's leadership and ability to meaningfully regulate and permit mine activities at Peabody Western Coal Company's ("PWCC's") Kayenta Mine.

Specifically, your office has established a sham permit revision process which acts as a subterfuge to avoid triggering a much-needed significant permit revision process addressing permanent mine closure and reclamation of the Kayenta Mine and which denies the public and local impacted communities the opportunity to participate in numerous permitting decisions that are critical to informed evaluation of reclamation at the Kayenta Mine. **By this letter, we demand that the Western Regional Office provide greater transparency and public participation opportunities in its permitting activities for the Kayenta Mine.**

On February 27, 2020, PWCC submitted a permit renewal application to OSMRE. On June 25, 2020, OSMRE "administratively delayed" noticing the application for public review and comment, and ultimate decision. OSMRE action on PWCC's permit renewal application has now been stalled for over two years.

In the meantime, PWCC has used OSMRE's administrative delay on the permit renewal application as an opportunity to submit numerous piecemeal permit revision applications addressing mine reclamation activities – activities which collectively would trigger a significant permit revision process. Instead of treating PWCC's permanent cessation of coal production as a whole and undertaking a meaningful significant permit revision process, OSMRE has instead allowed PWCC to submit numerous permit revision applications addressing different aspects of mine closure that are reviewed and approved by your office behind closed doors with no public participation opportunities whatsoever.

Specifically, since PWCC stopped producing coal at the Kayenta Mine in August of 2019, PWCC has submitted at least **nine** separate permit revisions to your office addressing various aspects of mine closure. These include,

1. 5-year Reclamation Schedule Permit Revision;
2. N-9 Pit Estimated Postmining Topography (PMT) Map Permit Revision;
3. N9-B Pond Permit Revision;

4. J-19 Postmining Topography (PMT) Permit Revision;
5. J19-D Temporary Sedimentation Impoundment Permit Revision;
6. J-21 Postmining Topography (PMT) Permit Revision;
7. J21-G and H Temporary Sedimentation Structure Permit Revisions;
8. Sediment Control Plans Permit Revision, and;
9. Blasting Permit Revision.

Upon information and belief, at least three (and possibly more) of PWCC's permit revisions have already been approved by your office. ***None*** of PWCC's revision applications and OSMRE's subsequent decisions on the applications have been subject to public notice and comment procedures and National Environmental Policy Act ("NEPA") analytical requirements – let alone appear on OSMRE's website.

It's well-past time for OSMRE's Western Regional Office to stop coddling PWCC as if they are a patron, customer, or client and instead start treating PWCC like a regulated entity. At a minimum, PWCC's permit revision applications need to be publicly noticed and your office needs to create meaningful public participation opportunities. Further, those revision applications that have already been approved by your office need to be re-noticed so that the public has an opportunity to meaningfully participate in the agency's decisions.

That said, and as we have repeatedly told OSMRE, we believe there is a regulatory pathway under existing federal surface-mining laws to address PWCC's permanent cessation of coal production at the Kayenta Mine, and we again ask that the Western Regional Office treat PWCC's permanent closure of the Kayenta Mine as a ***significant permit revision*** under the Surface Mining Control and Reclamation Act, which in turn will create a comprehensive, transparent and inclusive process for reviewing and addressing permanent mine closure and cleanup.

Thank you for your consideration of these comments. We look forward to your written response.

Sincerely,

Nicole Horseherder, Director
Tó Nizhóní Áni ("Sacred Water Speaks")
www.tonizhoniani.org
Email: nhorseherder@gmail.com
Phone: 928-675-1851

Ben H. Nuvamasa,
Former Hopi Tribal Chairman
Email: ben@kivainstitute.com
Phone: 928-380-6677

Copy: Steve Feldgus, Deputy Assistant Secretary for Land and Minerals Management, U.S. Department of Interior
Glenda H. Owens, Deputy Director, Office of Surface Mining Reclamation and Enforcement
Honorable Jonathon Nez, President of the Navajo Nation
Honorable Timothy L. Nuvangyaoma, Hopi Chairman

To: White House Environmental Justice Advisory Council Chairs Richard Moore & Peggy Shepard

CC: Administrative staff

From: Beyond Extreme Energy (BXE)

RE: Docket ID No. EPA-HQ-OA-2021-0683 Request for public hearing on the Federal Energy Regulatory Commission, and the potential to replace it with a Federal Renewable Energy Commission

---

Chairs Moore & Shepard, all the distinguished members of the WHEJAC:

Greetings and good wishes from Beyond Extreme Energy -- we are an activist network of organizations and individuals that came together in the summer of 2014 to protest at the Federal Energy Regulatory Commission (FERC). For the last 8 years we have worked, across 3 presidential Administrations, to change FERC from an agency that rubber stamps fossil fuel infrastructure and related environmental injustice, into something that can and will take action to protect our communities, climate, and common home.

Over the years we have been pleased and privileged to work with many WHEJAC members – including recently interviewing Mr Phillips, now confirmed as the 5th commissioner and 3rd Democrat FERC Commissioner – with Chair Peggy Shepard and WHEJAC members Dr Bullard, Dr. Wright, and Mr Parras. We have also worked with many of your members on individual campaigns to oppose infrastructure that FERC reviews and (in all but 2 instances) inevitably approves.

And thus we come to the crux of our problem with FERC, an independent regulatory agency within the Department of Energy, and therefore, we think, within the jurisdiction of this Advisory Council.

For the last two years we have been speaking to members of Congress about a bold new idea: **If FERC cannot be reformed, then it must be re-made**. To this end we have researched and proposed a new agency to take FERC's place -- a Federal Renewable Energy Commission (FREC).

FREC would be given a fresh mandate rooted in the challenges of the 21st century, and not operating within the legal and energy paradigms of 1978 or 1999.[1]

FREC would be focused on:

- Addressing the climate crisis;
- Transitioning to 100% renewable energy (wind, solar, moving water, and geothermal);
- Decarbonization and the sunsetting of fossil fuel infrastructure;
- Environmental justice and decolonization; And
- Community decision-making and DER integration.

Often suggestions that institutions be “dismantled” or “abolished” are not treated seriously. But FERC itself was created by an act of Congress in 1977, and numerous members of Congress have been interested in talking with BXE and working with us on policies up to and including replacing FERC with FREC.

- The Federal Power Commission (FPC) was created in 1930, to formalize energy regulation policies from the 1920s.
- In 1977 Congress deemed the FPC was ineffective and enacted the Department of Energy Organization Act to dismantle the FPC and create the Federal Energy Regulatory Commission.

44 years later, FERC sits amongst the wreckage wrought by the fossil fuel industry and failed energy and environmental justice policy. FERC has played no small part in the fossil fuel buildout that destroys our communities, our health, and our planet.

For more details on FREC, check out the Legislative Case for A Federal Renewable Energy Commission and our 30 Legislative Points for a Federal Renewable Energy Commission. Since launching the FERC Into FREC Campaign in 2019, BXE has received the support of frontline communities and presidential candidates.

We are now pleased to invite the White House Environmental Justice Advisory Council to join us in co-hosting a Congressional hearing and inquiry into FERC,

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Sincerely,

Beyond Extreme Energy

Elemental Mercury Poisoning Presenting as Hypertension in a Young Child

Elizabeth H. Brannan, MD, Sharon Su, MD,*† and Brian K. Alverson, MD*†*

Abstract: Mercury intoxication is an uncommon cause of hypertension in children and can mimic several other diseases, such as pheochromocytoma and vasculitis. Mercury intoxication can present as a diagnostic challenge because levels of catecholamines may be elevated, suggesting that the etiology is a catecholamine-secreting tumor. Once acrodynia is identified as a primary symptom, a 24-hour urine mercury level can confirm the diagnosis. Inclusion of mercury intoxication in the differential diagnosis early on can help avoid unnecessary and invasive diagnostic tests and therapeutic interventions. We discuss a case of mercury intoxication in a 3-year-old girl presenting with hypertension and acrodynia, without a known history of exposure. Chelation therapy successfully treated our patient's mercury intoxication. However, it was also necessary to concurrently treat her hypertension and the pain associated with her acrodynia. Because there were no known risk factors for mercury poisoning in this case, and because ritual use of mercury is common in much of the United States, we recommend high clinical suspicion and subsequent testing in all cases of acrodynia.

Key Words: mercury poisoning/toxicity, hypertension, acrodynia, chelation therapy

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Elemental mercury intoxication is a rare cause of hypertension in children[1] but has potential for serious morbidity and can mimic several other serious conditions, including catecholamine-secreting tumors, Kawasaki disease, stimulant ingestion, and vasculitis. Elemental mercury intoxication affects, with varying degrees, the central and peripheral nervous systems, the cardiovascular system, the kidneys, the lungs, the gastrointestinal tract, and the skin, depending on the dose and chronicity of exposure.[2,3]

In the 19th and early 20th centuries in the United States, children in particular were exposed to elemental mercury in the form of laxatives and diaper and teething powders.[2] Present-day sources of elemental mercury exposure include thermometers, disk batteries, fluorescent light bulbs, sphygmomanometers, latex paint, and dental amalgams, as well as certain cultural and religious practices and industrial processes.[2–4] We present here a case of a child with elemental mercury intoxication that raises implications for the differential diagnosis and evaluation of hypertension in children and highlights the need for further evidence-based recommendations for treatment of mercury intoxication and interim management of mercury-induced hypertension and acrodynia.

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CASE

A 3-year-old girl presented with 3 weeks of intermittent abdominal pain, diaphoresis, and tachycardia. Four days before admission, she developed pain in her hands and feet. On presentation she was hypertensive, with blood pressure of 158/100 mm Hg while calm. The patient's initial examination revealed a thin, diaphoretic girl with tachycardia and a hyperdynamic precordium, a diffusely tender but soft abdomen, and a normal result in the neurological examination aside from irritability. She had warm, erythematous, edematous palms and soles with intermittently appearing papules and desquamation, as well as a pruritic, erythematous, maculopapular rash over her chest and back. Her systemic symptoms were episodic throughout the day, and she appeared anxious during the episodes. Her extremity findings were consistent with acrodynia—an idiosyncratic hypersensitivity reaction to mercury exposure.[5] On further examination of history, the patient's mother reported that there had been no fish ingestion in the last month. They also denied any broken thermometers in the house, burning of batteries or fluorescent lamps, contact with miners, steel workers, or with people working in cement factories or crematoria. They denied the patient had any recent ingestion of paint or new toys and stated that the patient did not regularly put toys in her mouth. The mother did, however, note that the family moved into a new apartment 2 months before presentation.

The patient had symmetrically elevated blood pressure in 4 extremities, unremarkable echocardiogram and electrocardiogram, and a normal result on fundoscopic examination. Her initial electrolytes, creatinine, and urinalysis were all normal and remained so on serial evaluations. Urine drug screen was negative. Thyroid function panel and levels of renin and aldosterone were normal. An abdominal plain film was unremarkable. Plasma metanephrine and plasma and urine catecholamine levels were elevated, suggestive of pheochromocytoma (Table 1). A magnetic resonance imaging (MRI)/angiography of the abdomen and MRI of the chest and pelvis showed no masses or renal artery stenosis, and an MRI of the brain and neck showed no masses or other abnormalities. Given the patient's persistent hypertension, tachycardia, diaphoresis, irritability, acrodynia, and elevated catecholamine levels without evidence of a tumor on imaging, mercury toxicity was suspected, despite absence of any known exposure. A 24-hour urine mercury sample was elevated at 60 μg (reference range, 0–20 μg/24 h).

The patient was started on oral chelation therapy with dimercaptosuccinic acid (DMSA) 16 mg/kg divided twice daily. Her hypertension was controlled with labetalol and amlodipine. One week after initiation of therapy, her urine mercury level rose to 178 μg, but after 2 weeks on therapy, it began to drop and she was continued on therapy for approximately 2.5 months (Fig. 1). Creatinine levels and results in liver function tests during chelation therapy remained normal. She required antihypertensive therapy for 2 months. At 3 months of follow-up, the patient was normotensive off medication, her acrodynia and irritability had resolved, and plasma metanephrine levels normalized.

TABLE 1. Laboratory Evaluation

Free T_4 (reference range, 0.8–1.8 ng/dL)	1.8 ng/dL
TSH (reference range, 0.35–5.5 uIU/mL)	3.85 uIU/mL
Plasma renin activity (reference range, 100–650 ng/dL per hour)	542 ng/dL per hour
Aldosterone (reference range, 2–37 ng/dL)	16 ng/dL
Plasma	
Total metanephrine (reference range, ≤205 pg/mL)	424 pg/mL
Normetanephrine (reference range, ≤148 pg/mL)	392 pg/mL
Dopamine (reference range, 0–135 pg/mL)	<20 pg/mL
Norepinephrine (reference range, 0–600 pg/mL)	1474 pg/mL
Epinephrine (reference range, 0–90 pg/mL)	149 pg/mL
24-h urine	
Total metanephrine (reference range, 0–900 μg/d)	797 μg/d
Norepinephrine (reference range, 4–29 μg/d)	119 μg/d
Epinephrine (reference range, 0–6 μg/d)	33 μg/d
Dopamine (reference range, 40–260 μg/d)	284 μg/d

T_4 indicates thyroxine; TSH, thyroid-stimulating hormone.

The state Department of Health was notified when the patient's urine mercury level returned elevated, and investigation by the Department of Environmental Management revealed elevated mercury levels throughout the home and levels above 30,000 ng/m^3 in the master bedroom, whereas a limit of 1000 ng/m^3 has been set as the safe level for occupancy. Neighbors reported that the previous tenant was a Columbian woman who practiced rituals in the home that involved the use of mercury. Such practices are well described in the literature, and elemental mercury is obtainable at community botanicas.[4]

DISCUSSION

This case report highlights the importance of including mercury intoxication in the differential diagnosis of children with hypertension, even in the absence of known exposure, and particularly when symptoms suggest pheochromocytoma. Mercury interferes with the catabolism of catecholamines by inactivating a coenzyme used by catecholamine-*O*-methyltransferase, resulting in accumulation of norepinephrine, epinephrine, and dopamine in the blood and urine.[1] This is responsible for both the pheochromocytoma-like symptoms (hypertension, diaphoresis, tachycardia) and the laboratory findings (elevated levels of plasma and urine catecholamines and metanephrines) associated with mercury intoxication. Mercury intoxication should be considered in any child in whom a catecholamine-secreting tumor is suspected.

In this particular case, with no tumor visible on MRI and before the result of the urine mercury level, the diagnosis of erythromelalgia was also considered. Erythromelalgia is a rare condition composed of episodic erythema, warmth, and burning pain in the extremities.[6] Primary erythromelalgia can begin spontaneously at any age. and new research suggests a hereditary component involving mutation in the $Na_v1.7$ voltage-gated sodium channel.[7] Secondary forms are associated with underlying illness such as myeloproliferative and autoimmune diseases. Symptoms are triggered by warm temperatures, and patients often find relief by cooling the affected extremities. Interestingly, our patient did find comfort in running her hands under cold water. The pathophysiology has yet to be fully characterized but is believed to be due to vascular shunting and reactive hyperemia.[6]

Management of this patient's hypertension was complicated by the combination of increased sympathetic nervous system activity and persistent pain resulting from this patient's acrodynia. In addition, the choice of antihypertensive agents had an impact on imaging modalities. Given that her symptoms were most suggestive of an elevated catecholamine-like state, labetalol was chosen because of its combined blockade of α- and β-adrenergic activities. Selectively blocking only α- or β-adrenoreceptors can result in overstimulation of the unblocked pathway, so it is recommended that both adrenoreceptors be inhibited. Her blood pressures were only partially controlled on labetalol. When imaging failed to demonstrate a tumor and vasculitis was suspected, calcium channel blockers (CCB)—amlodipine and isradipine—were added to her antihypertensive regimen. It was postulated that hypertension from vasculitis may result from endothelial dysfunction of the vasculature, and CCBs may inhibit this process. When no laboratory data supported a diagnosis of vasculitis, meta-iodobenzylguanidine (MIBG) scan was considered to identify any catecholamine-secreting tumor. However, labetalol and CCBs have been shown to reduce uptake of MIBG and lead to false-negative scans,[8] so there was consideration of switching her to other blood pressure agents, such as an angiotensin-converting enzyme inhibitor and a vasodilator. Fortunately, her urine mercury level came back elevated, and a MIBG scan was no longer indicated.

Hypertension resulting from mercury toxicity often requires more than 1 class of antihypertensive medication. Case reports have described the simultaneous use of up to 4 different antihypertensives.[1,5] Our report describes the successful management of this patient's hypertension with the dual therapy of labetalol 4.5 mg/kg per day and amlodipine 0.4 mg/kg per day. The emphasis placed on adequate pain management and the use of topical mexiletine to the hands and feet and oral gabapentin may have contributed to the successful control of her blood pressures.

In the literature, nephrotoxic effects from mercury exposure often present as nephrotic syndrome.[9–12] Occasionally, reversible renal tubular dysfunction has also been reported.[13] Fortunately, the patient did not develop either sign of renal toxicity. There is no specific therapy to treat the nephrotoxic effects of

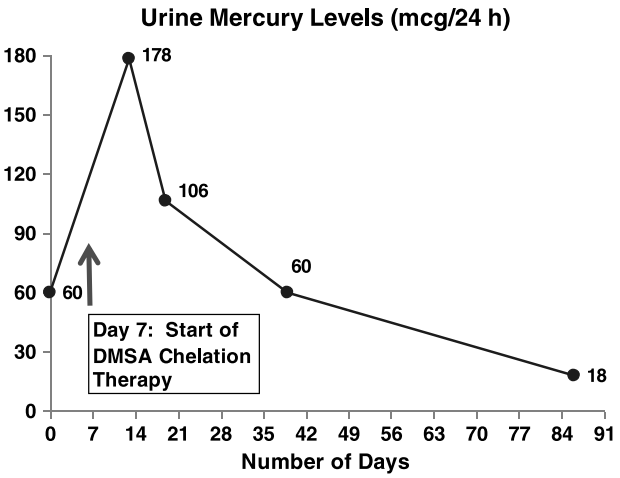

FIGURE 1. Urine mercury levels from diagnosis through treatment with DMSA.

mercury poisoning, but removal of the heavy metal by chelation can reverse the nephrotic syndrome and tubular defects.[14,15]

The patient received chelation therapy with DMSA. As expected, her urine mercury level initially rose on starting chelation therapy (Fig. 1) because the mercury was liberated from her body tissues, but then it began to drop and eventually normalized. Of note, DMSA is the most frequently used oral chelation therapy for mercury toxicity in children, but treatment remains controversial, and several studies suggest no clear clinical benefit of chelation with DMSA in people with elemental mercury poisoning.[16] Some suggest that natural clearance of mercury in the urine follows a linear 1-compartment elimination model.[17] In our case, the fact that the urine levels rose after DMSA administration implies that chelation was effective.

Clinical suspicion for mercury toxicity should remain high in the absence of risk factors. The use of mercury in religious practice is well described; however, the extent of this problem is hard to understand or measure.[18] Sale of elemental mercury from botanicas for the purposes of sprinkling about the home is not uncommon.[4,19] One screening study in New York City demonstrated that 5% of healthy pediatric volunteers had unexpected elevated urinary mercury levels.[20]

CONCLUSIONS

This case illustrates that evaluation for mercury exposure should be considered when there is presentation of hypertension and acrodynia, even in the absence of a known exposure. Selection of appropriate antihypertensive medications in the setting of increased catecholamines is challenging given the diagnostic possibilities. Management of mercury toxicity includes not only chelation therapy but also supportive care, particularly providing adequate pain control for the patient. The availability of elemental mercury at community botanicas and its use in cultural practices also represents a public health concern that warrants further attention.

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Elemental Mercury Use in Religious and Ethnic Practices in Latin American and Caribbean Communities in New York City

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Elemental mercury is used in folk medicine and in certain religious practices in the Latin American and Caribbean communities. However, exposure to mercury can cause serious health problems including neurotoxicity. There are, therefore, concerns that mercury users are exposing themselves to dangerous levels of this toxicant. A survey was conducted to determine the use pattern of elemental mercury in the Latin American and Caribbean communities in New York City. Two hundred and three adults participated in the survey. Forty-four percent of the respondents from the Caribbean and 27% from Latin America stated that they have knowledge of such cultural uses.

INTRODUCTION

Mercury has long been known as a human toxicant. Paracelsus reported on mercury poisoning among miners several centuries ago (Goldwater, 1972). It has also been associated in other occupational exposures such as "Mad Hatters" disease. Elemental mercury is a heavy, silvery liquid at room temperature and pressure. It is remarkably volatile for a heavy metal, with a vapor pressure of 0.002 mm Hg at 20°C. Mercury can exist in three oxidation states: Hg^0 (metallic), Hg_2^{2+} (mercurous) and Hg^{2+} (mer-

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curic)[2] (Cotton et al., 1972; EPA, 1996). Most of the mercury encountered in the atmosphere is monatomic elemental mercury vapor.

Mercury has many uses including in fluorescent lamps, wiring devices and switches (e.g., thermostats) mercuric oxide batteries, instruments that measure temperature and pressure (thermometers, barometers, etc.), as a component of dental amalgams used in repairing dental caries (cavities). Some of these uses contribute to the ambient, and in some cases, the indoor air mercury levels.

Elemental mercury is a toxic substance that causes many serious health problems. These include neurotoxicity, learning disabilities in children, sleeplessness, acrodynia, lung disease and respiratory failure (Fagala et al., 1992; Karpathios et al., 1991; Schwartz et al., 1992; Klassen et al., 1986). Very young children and fetuses are most vulnerable (Dencker et al., 1983). Exposure to elemental mercury can occur through the air, water, food (usually from contaminated fish) and direct contact (absorption through the skin). Human exposure to elemental mercury occurs primarily from breathing contaminated air. Recently, The Agency for Toxic Substances and Disease Registry (ATSDR) and the Environmental Protection Agency (EPA) jointly issued a mercury alert to the general public (ATSDR, 1997).

It is common knowledge in the Latin American and Caribbean communities that elemental mercury is used in ethnic folk medicine and for religious practices. Elemental mercury is sold under the name "azogue," "azoge" or "quicksilver" in stores (sometimes called Botanicas) which specialize in religious items used in Esperitismo (a spiritual belief system native to Puerto Rico), Santeria (a Cuban and Brazilian-based religion that venerates both African deities and Catholic saints) and voodoo. The use of mercury in religious practices is recommended in some Latin American and Caribbean communities by family members, spiritualists, card readers and santeros.

In the present work, a survey was conducted to determine the use pattern of elemental mercury among Latin American and Caribbean communities in New York City. Two hundred and three (203) adults (128 Caribbean, 75 Latin American) age 19–56 years were asked about their knowledge or use of mercury in religious/ethnic practices in their homes. Forty-four percent of the respondents from the Caribbean and 27% from Latin America stated that elemental mercury is used in their homes, cars or carried on their person in these cultural practices.

In 1994, the Agency for Toxic Substances and Disease Registry (ATSDR) collaborated with the Hispanic Health Council of Hartford and the Connecticut Department of Health Services (CTDHS) in a project inves-

tigating the use of metallic mercury during spiritual rituals (ATSDR, 1994). Azogue is the term used by the Hispanic community when referring to metallic mercury. Santeria is the product of the syncretism of the worship of the Yoruban deity called the Oricha and the cult of the saints characteristic of Spanish Catholicism. This study found some evidence of mercury use inside homes (14%) and a limited number of persons have been identified who actually use azogue. The Connecticut study focused on the use of mercury among Santeria believers in the Hispanic community of Hartford. Our survey focused on mercury use in folk medicine and in religious and ethnic practices in Latin American and Caribbean communities in New York City.

METHOD

Fourteen (14) Environmental Science students from Hostos Community College in the Bronx, New York, conducted personal interviews with 203 adults in ten sections of New York City. Respondents had to meet two criteria to participate in this survey: (a) be an adult, and (b) be Latin American or Caribbean or of Latin American or Caribbean ancestry. Latin America includes all countries south of the United States of America: Central and South America. The Caribbean is made up of all the islands in the Caribbean Sea. Guyana, which is in South America, was grouped with the Caribbean nations. The survey was conducted in the following areas in New York City: Manhattan—Clinton, Harlem and Hamilton Heights; Bronx—High Bridge, Morris Heights, Concourse Village, Mott Haven, Longwood and East Crotona Park; Brooklyn—Wingate.

After establishing that respondents met the study criteria, they were asked the following questions: (a) is mercury being used in your home in religious/ethnic practices, (b) how is mercury used in the home, (c) how often is mercury used in the home, (d) would you be willing to have your home tested for mercury, (e) how many children are in the home, (f) what are the ages of the children, (g) would you be willing to have your children tested for mercury, (h) from where did you obtain the mercury, (i) what is your or ancestors' place of origin (Latin America or Caribbean) and (j) how do you dispose of "used" or surplus mercury.

Students were instructed on the sensitive nature of this survey and on the importance of being nonjudgemental and professional. They were instructed to focus on and emphasize the Environmental Science and Public Health concerns of our research. Informed consent was obtained after the research objectives were explained to participants. Because of the sensitive

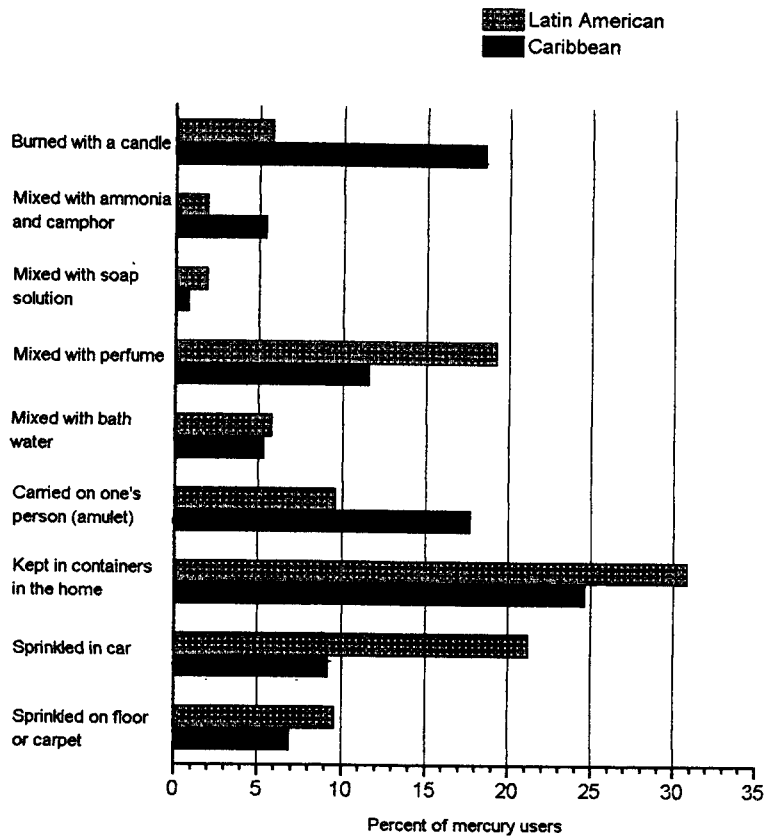

FIGURE 1. Elemental mercury use in religious and ethnic practices in Latin American and Caribbean Communities in New York City.

nature of such a survey, the names of the respondents were not requested and information about their specific country of origin was optional.

RESULTS

Fifty-four percent (54%) of those respondents who are users said that they use mercury in several different religious and ethnic practices. Some sprinkle it in their homes and cars, burn it with candles, add it to their bath water, soap solution and perfume, or wear an amulet containing mercury. Figure 1 lists the different uses. Thus, exposure is from multiple sources.

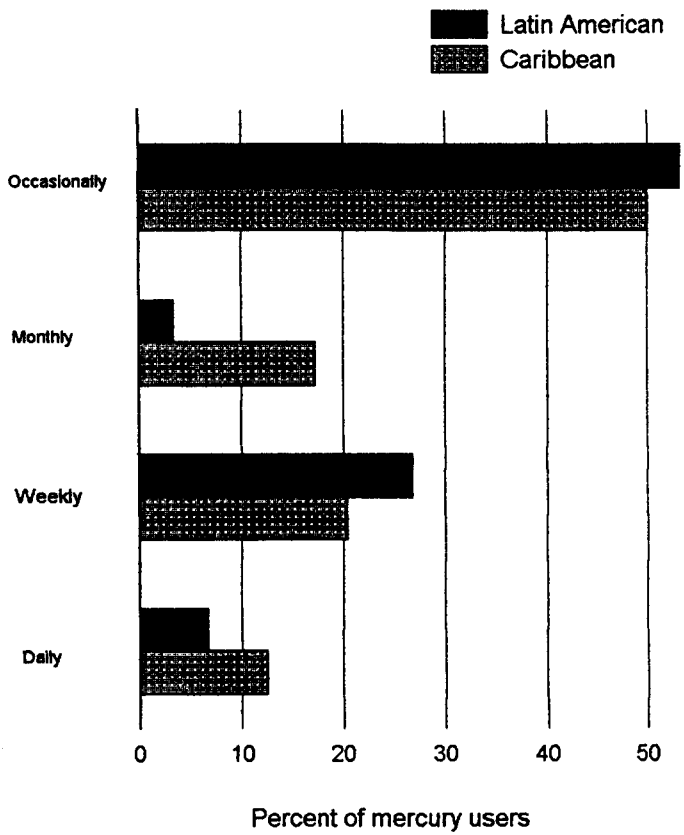

FIGURE 2. Frequency of elemental mercury use in religious and ethnic practices in Latin American and Caribbean Communities in New York City.

Figure 2 gives the frequency of mercury use in the Latin American and Caribbean communities. Fifty-four percent (54%) of the Latin American and 50% of the Caribbean practitioners use it occasionally. Twelve percent of the Caribbean and 6% of the Latino practitioners use mercury daily. The second largest groups of users in both communities are the weekly users. It is important to note here that exposure to mercury may not be limited to religious practitioners and their families, but includes all visitors to contaminated homes and passengers in contaminated cars. During the survey, we asked respondents how they disposed of their mercury and learned that "used" or "surplus" mercury was being disposed of improperly. Sixty-four

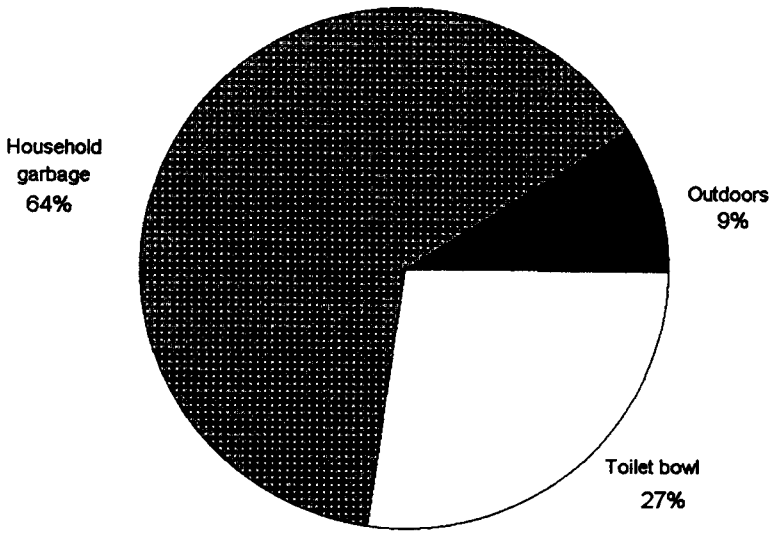

FIGURE 3. Methods of disposal of elemental mercury used in religious and ethnic practices in Latin American and Caribbean Communities in New York City.

percent said they threw it in the garbage, 27% flushed it down the toilet and 9% threw it outdoors (Figure 3).

Table 1 shows that 66% of the respondents who use mercury in religious practices and 64% of the respondents who are nonusers would welcome indoor air measurement for this metal. Sixty-one percent (61%) of mercury users and 63% of nonusers want their children tested for mercury. Thus, most users and nonusers alike are interested in indoor air measurement and biological testing.

Eighty-two percent (82%) of the respondents said they obtained elemental mercury from a Botanica, 3% brought it with them when they migrated to the US, while a total of 6% got it from their job (unspecified), a pharmacy, their landlord or their parents. The other 9% got it from unnamed sources. Twenty-six percent (26%) of the respondents gave specific country of origin data. Figure 4 gives us a sampling of nationalities involved in these practices. However, this is not truly representative since this information was optional and it was found that Puerto Ricans and Dominicans were more likely to give their country of origin.

TABLE 1

Respondents from the Latin American and Caribbean Communities in New York City Who Were Asked Whether They Want Their Homes and Children Tested for Mercury

	Indoor Air (% of Respondents)	Biological Testing (% of Respondents)	Want Test Done
Mercury users	66	61	Yes
	34	39	No
Mercury nonusers	64	63	Yes
	36	37	No

DISCUSSION

The results suggest that elemental mercury is ever present in the living environment of frequent users who are almost certainly receiving high and continuous doses. The highest exposure levels of mercury vapor are probably associated with burning elemental mercury with a candle. The temperature of a typical candle flame normally exceeds 500°C. The boiling point of liquid mercury is 356.9°C. This means that if the mercury is in contact with the flame for an appreciable amount of time, at least some of it will vaporize and fill the room with harmful vapors. This practice is theoretically the most hazardous. Adding mercury to bath water and soap solution may result in multiple exposures from inhalation, skin absorption and accidental swallowing of bath water. Mercury can also adhere to skin, and will contaminate towels and clothes.

Most human exposure to elemental mercury is by inhalation. Oral and dermal exposure, however, are also important routes of entry (Hursh et al., 1989). Mercury vapor is readily absorbed through the lungs. Studies have shown that 75–85% of inhaled doses of elemental mercury vapor were absorbed by the body (Hursh et al., 1985; Hursh, 1985; Oikawa et al., 1982). Because of its appreciable lipid solubility, the vapor readily diffuses across the alveolar membranes having an affinity for red blood cells and the central nervous system (Berlin, 1986).

The high temperature inside a contaminated car that is parked outdoors on a sunny day will result in very high mercury levels—exposing

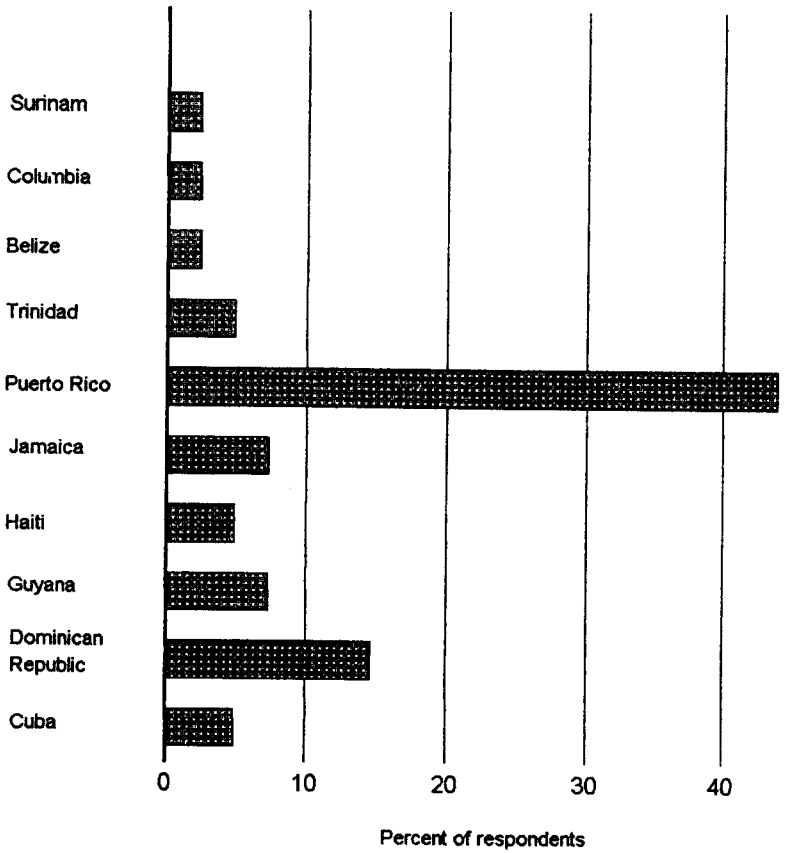

FIGURE 4. Country of origin of 26% of the respondents from the Latin American and Caribbean communities in New York City who use elemental mercury in religious and ethnic practices.

riders to potentially high doses. Some mercury-containing folk medicines are taken orally. Oral exposure is thought to be of little toxicologic consequence since metallic mercury is only slowly absorbed from the gastrointestinal tract (0.01 percent) (Fagala et al., 1992). Frequent mercury users are probably receiving very high and continuous doses.

Elemental mercury and its vapor are extremely difficult to remove from skin, clothes, furniture, carpet, floors and walls. It accumulates in electronic equipment such as computers where it vaporizes and condenses as the instrument is turned on and off in a continuing cycle depending on the temperature. Additionally, since some people use mercury frequently

and the residence life of mercury is estimated to be much longer than one year; when that mercury user vacates the property, the new occupants are unwittingly exposed to mercury for many months.

Improper disposal of mercury down the toilet bowl or in the garbage, contributes to the high mercury load found in sewage and garbage (Figure 3). It is commonly thought that the high mercury levels in sewage and garbage in New York City come from dental clinics. Our survey suggests that improper disposal by religious practitioners in the Latin American and Caribbean communities may contribute to this burden. Outdoor disposal is likely to contribute to the mercury load in the local atmosphere.

The Clean Air Act Amendments (CAA) of 1990 requires the United States Environmental Protection Agency (EPA) to study mercury emissions from electric utility steam generators, municipal and medical waste generators and other sources, including area sources. The U.S. EPA interpreted the phrase ". . . and other sources . . ." to mean that a comprehensive examination of mercury sources should be made and to the extent that data were available, air emissions should be quantified. Religious and ethnic uses of metallic mercury may pose a health problem but data are not available to assign a quantitative estimate of exposure, dose and health effects.

Very little data exists on the dynamics of mercury cycling in indoor air. For ambient air, studies indicate that the residence time of mercury in the atmosphere may be in the order of a year, allowing its distribution over long distances, both regionally and globally, before being deposited to the earth (EPA, 1996). Even after it deposits, mercury commonly is emitted back to the atmosphere either as a gas or in association with particulates to be re-deposited elsewhere. Humans, plants and animals are routinely exposed to mercury and accumulate the metal during this cycle, potentially resulting in a variety of ecological and human health impacts (EPA, 1996). Sprinkling or accidentally spilling elemental mercury on clothes, furniture, carpet, floors, walls, in cars, the natural environment and even the human body will result in contamination. The use of elemental mercury in homes and apartments poses a health risk to anyone who spends time in these locations. It has been shown that accidental exposures to elemental mercury vapors in private homes have led to interstitial pneumonia, dyspnea, lung disease and respiratory failure (Hallee, 1969; Snodgrass et al., 1981; Taueg et al., 1992). The results of this survey suggest that moderate to extensive contamination of dwellings and cars can occur following religious/ethnic use of mercury.

There is evidence that the EPA's Mercury Study Report overlooked or underestimated the contributions of elemental mercury from religious use

to indoor air contamination. The EPA has finalized mercury emission limits for municipal waste combustors, and has proposed mercury emission limits for medical waste incinerators. These emission limits are expected to reduce mercury emissions from these sources by 90% *(3)*. No action is recommended for sources from religious and ethnic uses at this time, but there is a potential public health problem here. The EPA took this position, in part, because of a lack of data. The present study suggests that a comprehensive study of the religious and ethnic uses of elemental mercury should be undertaken including indoor air measurements. Such a study should be given high priority and should be done with the full support and cooperation of the Latin American and Caribbean communities.

ACKNOWLEDGMENTS

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Congress of the United States
House of Representatives
Washington, DC 20515

COMMITTEES
JUDICIARY
BANKING AND FINANCIAL SERVICES
WHIP-AT-LARGE

September 23, 1997

Benjamin Mojica, M.D., M.P.H.
Acting Commissioner
New York City Department of Health
125 Worth Street
New York, NY 10013

Dear Dr. Mojica,

I am writing to you today due to my concern over the suspected increase in the use of unlabeled mercury.

Through the diligent work of one of my constituents, Dr. Arnold P. Wendroff, many elected officials, including myself, have been made aware of the possibility of increased usage of unlabeled mercury by unaware New Yorkers. These anonymous vials are being sold for medicinal and religious purposes. The seriousness of this matter cannot be underscored enough.

As you know, exposure to mercury is an extreme health hazard. Studies have shown links between levels of mercury and birth defects, both neurological and physical, in children.

If Dr. Wendroff is correct, then many New York children are needlessly being put at risk. Therefore, I am suggesting that you do three things; ensure the proper labeling of mercury by either creating strict procedures or strongly enforcing current labeling standards, alert "at-risk" consumers to the dangers of mercury poisoning, and lastly, start a program which would test mercury exposure in children.

Thank you for your time. I look forward to hearing your responses to these suggestions.

Sincerely,

Charles E. Schumer
Member of Congress

CES:BCD

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COMMITTEES:
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Congress of the United States
House of Representatives
Washington, DC 20515

January 14, 1998

Benjamin Mojica, M.D., M.P.H.
Acting Commissioner
New York City Department of Health
125 Worth Street
New York, NY 10013

Dear Dr. Mojica,

This letter is in regards to your October 6, 1997 response to my initial inquiry on the subject of mercury poisoning problems in New York City.

In that letter, Ms. Enid L. Carruth, the Deputy Commissioner of Environmental Health Services, states that the "DOH visited six botanicas in Manhattan and Brooklyn and measured mercury levels in the air ... In five of the six botanicas no mercury was detected. In the sixth shop only trace amounts or mercury were detected."

To my dismay, I found that nearly identical language was used to allay an inquiry made to Mayor David Dinkins by Dr. Arnold Wendroff in 1993. I would be greatly disappointed if the Department of Health was using age-old data to respond to my recent inquiry. The health of New York's residents, especially those of our children, deserve constant vigilance, not laissez-faire attitudes.

I would also like to draw the Department's attention to a December 14th article in the New York Times. It is mentioned within the article that "A 1995 survey of 41 botanicas found that nearly 93 percent of them sold about one to four capsules of mercury daily. ..." This published data obviously contradicts the DOH's efforts to find botanicas that sell mercury. It appears that the DOH was looking in the wrong places, if they were looking anywhere at all.

In my original letter, I offered a couple of suggestions, such as ensuring the proper labeling of mercury by either creating strict procedures or strongly enforcing current labeling standards and alerting "at-risk" consumers to the dangers of mercury poisoning. In light of your insufficient response, I again offer up these suggestions.

I look forward to reading your response.

Sincerely,

Charles E. Schumer
Member of Congress

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WHIP-AT-LARGE

NEW YORK STATE
CONGRESSIONAL DELEGATION
TREASURER

June 22, 1994

Dr. Arnold Wendroff
544 8th St.
Brooklyn, N.Y. 11215

Dear Dr. Wendroff:

Thank you for contacting me concerning warning labels on products with mercury metal. I appreciate you sending me the information outlining the dangers of this substance.

Your concerns about mercury metal used in household products are certainly valid and I agree with you that warning labels are a simple solution. As you outline in your letter, mercury metal is a highly toxic material that is especially dangerous for pregnant women and young children. It simply does not make sense that we regulate labelling of a multitude of dangerous household products and we do not have any regulation of this potentially hazardous material.

I want you to know that I have passed along your suggestion to the Food and Drug Administration and the Consumer Product Safety Commission. I depend on professionals like you, with "real world" experience, for some of the best ideas for legislation on health and safety of consumers.

Again, thank you for taking the time to write me about this issue. If I can be of further assistance, please let me know.

Sincerely,

Charles E. Schumer
Member of Congress

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Directed to The Michigan Department of Environment, Great Lakes, and Energy,

We are writing from Waawiyomtonag, where the curved shores meet, a.k.a. Detroit and metro areas. This is the traditional homelands of the Anishinaabe 3 Fires Confederacy which is made up of the Ojibwe, Odawa and Bodewadmi peoples.

When it comes to the future of Michigan, we must also think of the safety and future of the Great Lakes in every move we make. Our contributions to its maintenance, renewal and living safety are priceless. We must craft a future full of renewable and alternative energies free from radioactive waste.

To avoid long term pollution, contamination and health impacts related to long term radionuclides and nuclear energy generation related chemicals into our lands, waters, airs, and fellow beings, we need pollution free energy. We can do better than 50% resolution of renewables by 2030 - we can do more, faster.

Support should go where it is most needed, where solutions would continue to be unaffordable otherwise. The process must be inclusive of peoples and solutions, as well as keep in heart and mind the wellbeing of all creatures and elements we impact. The plan must have community voices, solutions and demands implemented as a part of any facility/energy system siting process. Environmental Justice, poor working class and already impacted communities must have first and last word.

Just Transition support, jobs, and job training should have community involvement and implementation lead by affected and frontline communities. There should be no tradeoffs and no recruiting people from frontline communities to work in factories that will bring in harmful technologies regarding energy production and manufacturing jobs.

With this we follow with our comments and recommendations in **RED** …….

Jesse Deer In Water
Community Organizer
Citizens Resistance At Fermi Two

James Sherman
Co-Chair
Citizens Resistance At Fermi Two

MI Healthy Climate plan(link to plan)

COMMENTS BEGIN ON NEXT PAGE IN RED

Table of contents

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Table of contents

We like the global science-based benchmark for reducing Greenhouse Gas Emissions (GHG) to avoid the most devastating and costly impacts of climate change.

We refuse to leave it up to your creativity and ingenuity, our futures are no longer your playgrounds. Nuclear power advocates frequently point to such economic arguments despite the greater number of jobs in renewable energy and the potential harm posed to the nuclear workforce. We have tested, workable solutions that do not pose the threat level inherent in nuclear. Also, a decommission now approach would increase workloads at the plant through the decommissioning process

The process was off. If this is a living document, then let us put some life into it.
Yes, proven clean renewable distributed generation and storage is the path already known to us.

-Awesome to see the notice of lowering greenhouse gas emissions. It would only make sense to exclude Small modular nuclear from plans. Proposed Advanced Modular Reactors (AMRs) have never operated successfully anywhere in the world.

- helium-cooled graphite-moderated high-temperature reactors (HTGR).
-sodium-cooled fast reactors (FBR).
-molten salt reactors.
- lead-cooled fast reactors.

All the above are contributors of Halogens and other greenhouse gas emissions as well as anthropogenic heat sources as well, and major producers of highly radioactive waste.

Nuclear falsely claims carbon neutrality. While the reactor's fission reaction only releases Carbon Dioxide in the form of Carbon-14, it is dependent on a fuel stream rife with carbon emissions, a carbon-free economy is not possible with it in play. Whereas the impact of Carbon Dioxide is global, geographic displacement of carbon emissions is futile, it doesn't matter where the carbon emissions are released, it equally contributes to global impacts and must be considered as a carbon emission embedded in the final accounting of the related generation.

Nuclear energy is NOT clean or carbon-free. The nuclear fuel chain is responsible for carbon emissions during mining, milling, enriching, construction, transportation, and decommissioning. From cradle to grave, nuclear reactors pollute the environment and threaten human health and safety. Uranium fuel is mined in or near Indigenous communities and communities of color. After mining, milling generates vast amounts of radioactive and toxic tailings that are deposited on the ground or in open ponds. The nuclear fuel is then enriched in an energy-intensive process. Approximately 25,000 pounds of mining waste (rock, mill tailings, and depleted uranium) are generated for each pound of nuclear fuel delivered to Michigan's reactors. Nuclear plants routinely and accidentally release radioactive isotopes to air and water, including newly generated radioactive carbon, C-14, which results from nuclear fission. The so-called "spent" nuclear fuel rods, which emerge from the reactor, are approximately one million times more radioactive than when they entered, and must be stored on-site indefinitely, with inadequate decommissioning plans or funds to ensure that this is done safely. The Nuclear Regulatory Commission's legal limit for radiation exposure to the public from the routine operation of a reactor is 100 millirems per year – a dose rate which the agency itself believes will result in one additional cancer fatality per 286 people exposed. There is no safe level of radiation exposure. Subsidizing nuclear power will increase the amount of deadly fuel rods that each host communities will have to store over time. Bailing out nuclear reactors is corporate welfare subsidized by ratepayers:

b. Climate change is an urgent global challenge that is already impacting Michigan in unique ways.

-Yes, man-made climate catastrophes are here and more on the way, the Fermi Two reactor in Monroe uses 45 million gallons of water a day for its processes, it also releases that water back into Lake Erie as waste and treated wastewater. This ratio of water to waste is 10:1, leaving 4.5 million of those 45 million gallons being chemicals and toxins that are contributing to the pollution that our freshwater and freshwater beings call home. This water is also released at temperatures up to 70 degrees hotter than the western basin of Lake Erie. The international Joint Commission has identified thermal pollution such as fermi 2's a major contributor to the degradation of The Great Lakes. Toxic Algal blooms form right off the coast of fermi every year and it will only get worse if we continue to pump heat and poison into our waters while taking water out of them for major processes.

The United Nations Intergovernmental Panel on Climate Change (IPCC) predicts that human-caused climate change will highly likely both increase and intensify severe weather.

Nuclear reactors and radioactive waste storage sites contain enormous amounts of hazardous radioactivity. This could be catastrophically unleashed during accidents caused by severe weather disasters, threatening to kill or injure tens to

hundreds of thousands of people living downwind and downstream, and contaminate vast regions, causing hundreds of billions of dollars in property damage.

Hurricanes, tornadoes, and floods threaten reactors and waste

• Severe weather-related events, and resulting power outages, also require reactors to shut down for extended periods for safety reasons. Hurricane Katrina forced reactors in Louisiana and Mississippi to power off, when electricity was needed most. The 2003 Northeast power outage spread to 50 million people as dozens of reactors in the U.S. and Canada were forced to shut down for safety reasons due to electric grid instability

• Floods at the Cooper reactor on the Missouri River in Nebraska, and the Prairie Island nuclear plant on the Mississippi River in Minnesota, in the 1990s showed the risks of loss of emergency systems, spread of radioactive contamination, and even loss of evacuation routes for neighboring communities.

• Flooding has spread contamination at radioactive waste dumps as well. While the proposed national dumpsite for high-level radioactive waste at Yucca Mountain is already geologically and hydrologically unsuitable, water flow through and radioactivity leakage from the site will only grow worse as climate change increases precipitation in Nevada. Droughts and heat waves strain reactors and ecosystems

c. Creating good jobs for Michigan workers, increasing our state's economic competitiveness, and improving quality of life as we pursue carbon neutrality.

Nuclear power is expensive.

Many of the jobs come from the refueling and fix process which brings in workers from out of state.

Further, the jobs argument is equally faulty. Most of the workers at these facilities will need to be retained during closure and decommissioning, and those few who are downsized should be retrained for jobs in the emerging green energy economy through a planned and just transition.

d. Putting equity front and center in Michigan's climate change Response.

"For this reason, Governor Whitmer called on those developing the MI Healthy Climate Plan to design and recommend decarbonization strategies that will advance equity." The Nuclear Industry is and has been historically known as anti-equity, pro monopoly and disproportionately impacts marginalized communities through its regular practice.

FOR THIS SECTION WE SUPPORT THE RECOMMENDATIONS OF THE MICHIGAN ENVIRONMENTAL JUSTICE COALITION, ESPECIALLY AROUND "PROCESS".

We also ask that environmental orgs are not required to file Freedom of Information Acts to gain access to what the heck is being dumped yearly by fermi 2, we already know what it is, we should know exactly how much as well.

The plan must have community voices, solutions and demands implemented as a part of any facility/energy system siting process. Environmental justice, poor working class and already impacted communities must have first and last words. Communities need support with technological understanding of viable solutions to resist the predictable onslaught of false solutions like small untested unproven modular reactors.

Nuclear falsely claims carbon neutrality. While the reactor's fission reaction does not release Carbon Dioxide besides Carbon-14, it is dependent on a fuel stream rife with carbon emissions. Whereas the impact of Carbon Dioxide is global, geographic displacement of carbon emissions is futile

Everything about this would prevent nuclear power as a consideration.

Holistic statewide energy planning-Definition of clean renewable energy needs to be part of the plan. More specificity to head off coming attacks on renewable standards. Tested tech being those that are already in use (renewable etc.)

-clean energy resources-we can do better than 50% res by 2030, we can do more faster with it. Michigan can expand and create renewable manufacturing like silicon wafer production to help the flow of products. Also define and use only truly clean energy sources that don't cause harm to communities in Michigan and as well as communities that take the brunt of the impacts from dirty extraction processes. Nuclear power is based on a stream of highly toxic and radioactive material. It is not based on a circular economy. With heavy mining, processing, transportation, heavy industrial generating footprint, and thousands of years of waste storage, nuclear is the exemplar of non-circular.

-state electricity use-sounds good if implemented and followed thru. Ideal goal as state can mandate. This will prove that the rest of the state can use rapid deployment time frames to support the general welfare of state residents and businesses. Proving there is no reason to drag our feet till 2050.

-siting-must have community voices, solutions and demands implemented as a part of any facility/energy system siting process- environmental justice, poor working class and already affected communities must have first and last word. Communities need support with technological understanding of workable solutions to resist the predictable onslaught of false solutions like SMRs.

c. Transportation

d. Businesses and Homes

e. Environmental Justice

Environmental Justice is the concept that major polluting projects should not have a disproportionate impact on Black, Indigenous, People of Color and low-wealth communities.

Uranium mines, nuclear waste dumps, toxic incinerators, atomic reactors and other such facilities typically are located where there is cheap land, cheap facilities, and little organized opposition. Too often, this has been in Black, Indigenous, People of Color and low-wealth communities that have felt powerless to oppose corporate giants.

In February 1994, President Clinton issued an Executive Order requiring federal agencies to consider environmental justice issues when issuing permits for new polluting facilities. Although as an independent agency the Nuclear Regulatory Commission was exempt from that order, then-Chairman Ivan Selin committed the NRC to implement the order. One result was a victory defeating the proposed Louisiana Energy Services uranium enrichment plant for Homer, Louisiana, which violated environmental justice principles. It became the first license applicant before the NRC ever to be denied a license.

Reeling from that blow—after all, one denial in 45,000 applications might show a trend—the nuclear industry suggested to the NRC that it remove environmental justice from further licensing consideration. The result is a new NRC policy that tries to do just that.

We continue to fight for environmental justice in all our work.

-JUSTICE 40-minority of money going to people with majority of the issues, 60% of the resources going to entities that are already well positioned to leverage solutions now. Support should go where it is most needed, where solutions would continue to be unaffordable otherwise. We live the injustices, who in the state is getting educated on environmental justice? You all out here making decisions for us.

-Just Transition Support-should have community involvement and implementation lead by communities

-Job Training-No tradeoffs, no recruiting people from frontline communities to work in factories that will bring in harmful technologies regarding energy production and manufacturing jobs.

f. Leadership and Innovation

Nuclear power advocates often point to such economic arguments despite the greater number of jobs in renewable energy and the potential harm posed to the nuclear workforce. We have tested, workable solutions that do not pose the threat level inherent in nuclear. Also, a decommission now approach would increase workloads at the plant through the decommissioning process

With the huge payback from modest investments thus far, further investment is solidly justified

Too much focus on GHG and only passing mention of "reducing harmful emissions". More attention needs to be paid to toxic pollutants, water use, air quality, thermal pollution, and all the negative externalities of dirty, extracted energy.

● A sound energy and economic policy must be founded upon a rapid transition to 100% renewable energy, energy efficiency, and a modern, smart electricity grid

. ● Advances in renewable energy now make it possible to both grow an equitable economy and phase out greenhouse gas emissions at the lowest cost.

● Policy makers and regulators must pursue this path to the fullest extent possible, in pursuit of decarbonization, economic development, pollution reduction, public health and protection of the environment

More attention needs to be directed at the role of IOU (investor-owned utilities) and how protecting monopolistic control of infrastructure is working counter to the stated goals of this plan. DTE and Consumers a lauded for their stated goals, but there's no mention of their renewable energy obstructionist tactics (historical and/or current).

Investing in renewables is the best choice now and in the future. Keeping uncompetitive nuclear reactors online through subsidies would squeeze out and delay the growth of renewables for decades. The costs of nuclear power are high and rising, reducing spending and jobs economy-wide, affecting families' disposable income, and increasing utility costs for consumers. Bailing out existing nuclear reactors would forgo approximately 80% of economic benefits of the transformation and still

require future replacement of nuclear facilities, further increasing the cost and risk. Further, the nuclear industry is sitting on $64 billion in decommissioning trust funds which can be used to keep nuclear workers employed and help communities transition to the clean energy economy. The cumulative value of federal subsidies for nuclear power dwarfs the value of subsidies for renewables and efficiency by 10 to 1. With a much smaller level of subsidy, renewables have achieved dramatically declining costs in a little over a decade, a result that has eluded the nuclear industry for half a century. The right choice is to let nothing stand in the way of the transition to renewables and get it done as quickly as possible.

b. Transportation: Putting Michigan on the road and rails to carbon neutral mobility

i. Navigating a pivotal decade of transition in automotive history

ii. Taking a broad, all-options approach to transportation to put Michigan on track to achieve its decarbonization goals

iii. State-level policies and programs across the country supply a bank of options and experiences for a Michigan-specific approach

iv. Strategic transportation planning will help knit traditional and advanced transportation options into an integrated system that serves all Michiganders

c. Businesses and Homes: Reducing energy demand and waste in Michigan homes, commercial buildings, and factories

Mass timber buildings: Timber frame buildings are beautiful and efficient when built right, but is increasing deforestation a clever idea in a GHG reduction plan? Any such plan must have prohibitions on clearcutting mature forests and should focus on selective cutting and reforestation with a focus on replacing mechanically planted and non-indigenous species with species diverse natural to the ecosystem. With advancements in engineered wood alternatives, we should focus on leading a shift to non-forest product building products using agricultural fiber products.

i. Michigan needs to invest in upgrading existing homes and buildings

ii. Proven energy waste reduction programs can save Michiganders millions while driving decarbonization

iii. Reducing GHG emissions in how we operate buildings – like cars, trucks, and other vehicles – will depend on our success in transitioning to clean energy

iv. Local units of government are leading the way in reducing their energy use and they need support for transformative water infrastructure projects

d. Innovation: Areas of opportunity and need-

We can do better than a 50% Renewable Energy Standard (RES) by 2030, we can do more faster with it. Michigan can expand and create renewable manufacturing like silicon wafer production to help the flow of products. Also define and use only

truly clean energy sources that don't cause harm to communities in Michigan and as well as communities that take the brunt of the impacts from dirty extraction processes.

Must have community voices, solutions and demands implemented as a part of any facility/energy system siting process-environmental justice, poor working class and already affected communities must have first and last word. Communities need support with technological understanding of viable solutions to resist the predictable onslaught of false solutions like Small Modular Nuclear Reactors (SMNRs).

i. Clean industrial hubs

Clean industrial hubs should not put local communities in harm's way, the reuse of GHG and pollutants cannot be one that would put forth harm to human, beings and elements by capturing, releasing or transporting unreleased materials and byproducts by way of manufacturing combined with energy sources.

Definition of clean renewable energy needs to be part of the plan. More specificity to head off coming attacks on renewable standards. Evaluated tech being those that are already in use (renewable etc.). These defined clean renewable energy sources can't cause harm to communities here in Michigan and also don't extend harm to communities that take the brunt of dirty extraction and transport processes.

Pg16 line 28 "Renewable energy is dependable and cost effective. As deployment has increased and the wind, solar, and related industries have scaled up, the cost of renewable energy has continued to fall"

Nuclear Power is heavily centralized. SMRs are unproven, not clean, cancer risk, vulnerable to terrorism. Nothing reasonable or prudent about nuclear power

ii. Electrification of buildings and homes

Shifting needs like heating to electrical energy sources is a vital solution in many applications. Natural gas infrastructure is leaking vast amounts of extremely potent GHGs and need to be retrofitted or decommissioned. A mere reduction of dependence on this infrastructure without addressing leakage would increase leakage as resources for maintenance diminish. Keeping this infrastructure while reducing GHG emissions would require addressing leaks and inputs, such as generating more natural gas from organic wastes and agricultural products. Heat pumps are not a one size fits all solution. This plan is missing one of the most vital areas for savings directly from distributed energy: passive and thermal solar heating. When people think of solar, they typically think of PV (photovoltaics). Passive and

thermal solar (such as evacuated tube solar thermal) operate at much higher efficiency rates than PV. Maximizing the efficiency of renewable energy deployments require site specific considerations. Is the site shaded, for example? Cutting mature trees for solar will increase cooling needs and decrease biological carbon capture. For heavily shaded or multi story tenant structures, direct solar is a challenge, so switching heating to electric makes sense. For structures with solar resources, passive and thermal solar offer a better return on investment and reduce grid demand. Geothermal is also a high return investment that can reduce grid demand and can be deployed at single dwelling to a larger district scale.

iii. Closing the digital broadband divide

iv. Natural features and food

"Similarly, Michigan's forests currently store approximately 2,045 million tons of total forest ecosystem carbon while also sequestering atmospheric carbon every year. In addition to their sequestration value, planting trees in our cities and towns can reduce the urban heat island effect, reduce tree inequity, and improve the health and well-being of urban residents" This will require planning to not conflict with solar installations. Trees grow, fixed panels stay fixed. Tightly spaced urban areas will require community solar deployments to allow for urban forestry to coexist with distributed solar.

Nuclear power is based on a stream of highly toxic and radioactive material. It is not based on a circular economy. With heavy mining, processing, transportation, heavy industrial generating footprint, and thousands of years of waste storage, nuclear is the exemplar of non-circular.

a. Leading by Example

More attention needs to be directed at the role of IOU (investor-owned utilities) and how protecting monopolistic control of infrastructure is working counter to the stated goals of this plan. DTE and Consumers a lauded for their stated goals, but there's no mention of their renewable energy obstructionist tactics (historical and/or current).

b. Incorporating climate into state programs

Nuclear is not clean and not renewable when considering a goal is to achieve 100% clean, renewable electricity paired with robust energy storage.

With the wealth of Traditional Ecological and Ancestral Knowledge of the 12 federally recognized tribes of Michigan, whose traditional homelands we occupy, there is much already known about how to steward the land and our primarily recommendations include working with the tribes and using that knowledge to help sustain, regenerate and protect the land, water, beings and elements.

Stanford Recommendations for 100% Wind, Water, Solar Roadmap

Nuclear power is a wasteful energy source, today's energy systems are wasteful, up to 70% of the heat is released in the atmosphere and only 30% being used. Making it a major contributor to the anthropogenic heat sources that are intersecting within climate change.

The grids of the future
-Solar and wind mainstays of energy system,
-Increased efficiency
-Storage, combined heat and power, microgrids
-Demand response
-Control consumption to minimize bills
-Electrified transportation and HVAC
-Provide services to the grid, including via V2G and local storage ownership

Support offshore wind. Michigan has enormous offshore wind potential to meet a goal of 50 percent renewable energy generation by 2030.

A Renewable Energy Standard should be dedicated to accelerating the development of offshore wind and renewable energy, not to subsidizing nuclear power. Set aggressive energy efficiency goals.

Energy efficiency is a key component of a low-carbon energy future. It is the most affordable way to reduce greenhouse gas emissions and displace fossil fuel and nuclear generators.

Please consider these resources
https://ieer.org/resource/climate-change/renewable-minnesota-technical/
https://ieer.org/resource/economic-issues/100-renewable-electricity-supply-maryland/
https://web.stanford.edu/group/efmh/jacobson/WWSBook/WWSBook.html

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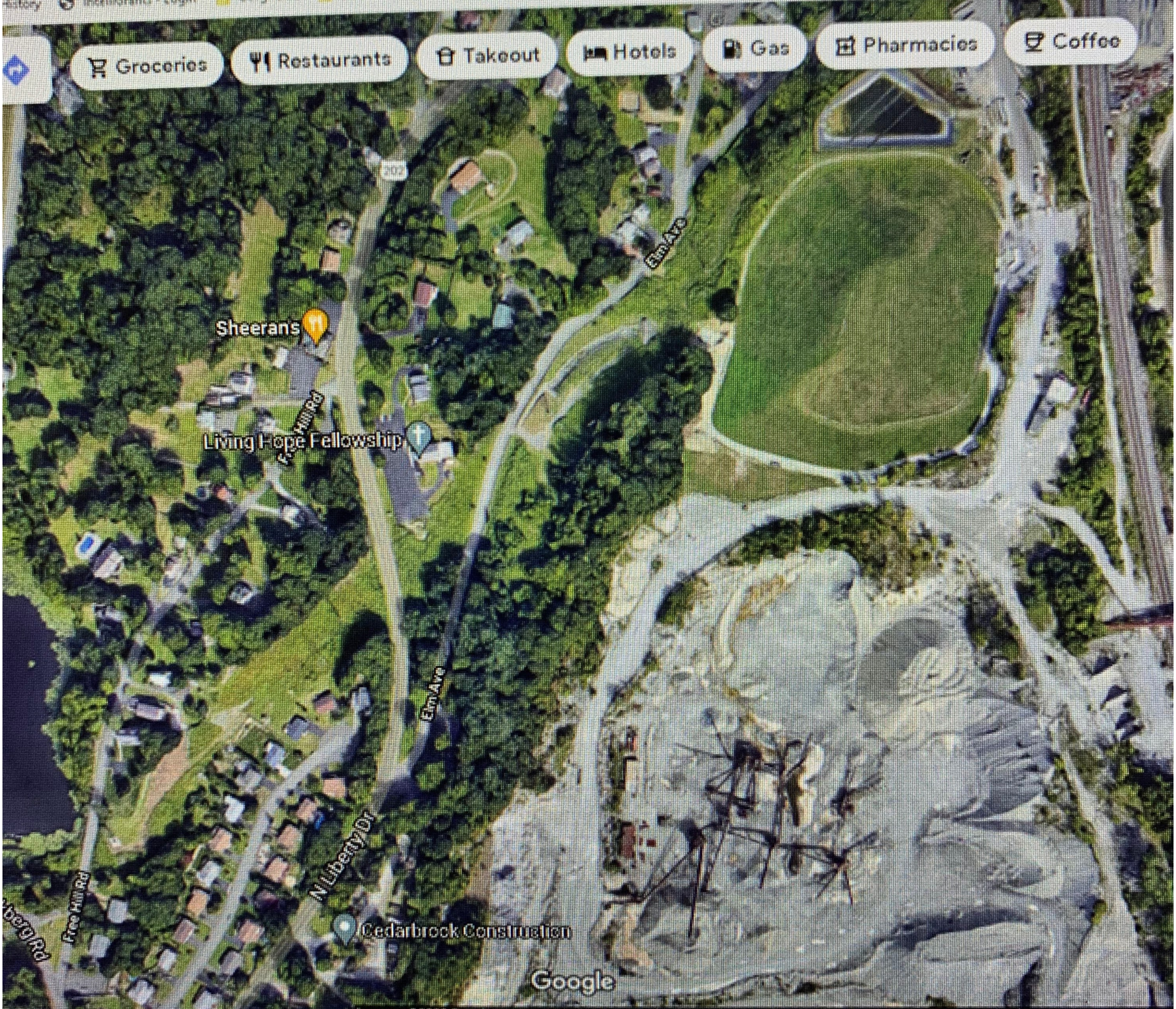
The nuclear elephant in the room

There is no direct mention of nuclear power. There are statements that would preclude nuclear power if taken at face value. There are also statements that would appear to leave a door open to false nuclear "solutions".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Coffee
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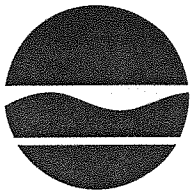
Living Hope Fellowship
Cedarbrook Construction
Elm Ave
N Liberty Dr
Google

New York State Department of Environmental Conservation
Region 3 Office/Solid Waste Program
21 South Putt Corners Road, New Paltz, New York 12561-1620
Phone: (845) 256-3126 $ **FAX:** (845) 255-3414
Website: www.dec.ny.gov **E-mail:** sxparisi@gw.dec.state.ny.us



Joe Martens
Commissioner

October 5, 2011

Burt McCullough
Manager of Environmental Projects
Mirant Corporation
1155 Perimeter Center West
Atlanta, GA 30338-5416

Re: Mirant-Lovett LLC, T-Stony Point, Rockland County - Consent Order No. 3-20080414-15
Site Characterization Report

Dear Mr. McCullough:

The Department has reviewed the May 15, 2010 Site Characterization Report (the Report), prepared by HDR, and submitted on behalf of Mirant Lovett LLC, in connection with the Mirant-Lovett site in the Town of Stony Point, Rockland County and Order on Consent # 00320080414-15 (dated July 17, 2009). The Department's findings relative to the report are outlined below.

In general, the investigation was carried out in conformance with the approved site investigation work plan (the Work Plan) previously approved by the Department. Deviations from the Work Plan are discussed in section 2.2 of the Report and, in most cases, concurrence from Department staff is documented in the Report. Significant exceptions include monitoring well MW-J2 which was located approximately 25 feet northeast of the location shown in the approved Work Plan, MW-L which is located 85 feet to the east of the location shown in the approved Work Plan, MW-H2 which is located 25 feet to the northeast of the location shown in the approved Work Plan and MW-K2 which is located approximately 30 feet south of the location shown in the approved Work Plan. These deficiencies notwithstanding, the Report is considered to be adequate to serve as a basis for identifying environmental damage caused by the facility which will require remedial action and is therefore approved. Specifically, the following are the environmental issues identified by Department staff based on review of the report and/or observations made at the site which require remedial action or additional investigative work to serve as a basis for remedial design:

1. A plume of groundwater contamination including sulfate, boron, selenium, arsenic and other coal or coal ash derived contaminants which is migrating southward from the former coal storage pile area, the former coal ash settling lagoons and the CAMF to where it may enter the capture zone of the dewatering system of the Tilcon mine;

2. Soil contamination including PAHs, PCBs and toxic metals associated with several AOCs;

3. A groundwater contamination plume of petroleum-related contamination migrating southward from the former PBS area under the influence of the Tilcon mine dewatering system;

4. A residue of C&D debris, other than the waste types allowed at exempt C&D debris disposal sites, which is observable at the surface throughout the areas where facility buildings were demolished (see August 12, 2009 inspection report, attached);

5. Pockets of waste coal which were not removed due to proximity to the active railroad tracks or other reasons; and

6. Release of contamination from the CAMF to surface water as indicated by the increase in sulfate between the upstream sample (17 mg/L) and downstream sample (67 mg/L).

The Report is hereby approved and, in accordance with paragraph II.D.3, is incorporated into the Order on Consent as Appendix B. Mirant has already satisfied the requirement of paragraph II.D.5 to submit the report is an suitable electronic format.

The investigation which has been completed was extensive in scope and represents an important milestone in the process of addressing the various environmental impacts resulting from a long and varied site history. The next step in the process will be the development of a proposed plan of remedial action to mitigate the impacts which have been identified and to monitor the effectiveness of the remedial measures.

Department staff would like to continue our cooperative working relationship as we move forward into the remedial design phase at the Site.

Please indicate whether Mirant Lovett LLC is willing to develop a remedial action plan to address the environmental issues outlined above. To accomplish this we will need your continued cooperation and we request your response within thirty (30) days. A meeting can then be scheduled to discuss the details and timeframe for development of an approvable site remediation plan and an Order on Consent to provide the necessary legal framework. I look forward to your response and to working with you to build on the progress which was made during the investigative phase of the project.

Sincerely,

Steven Parisio

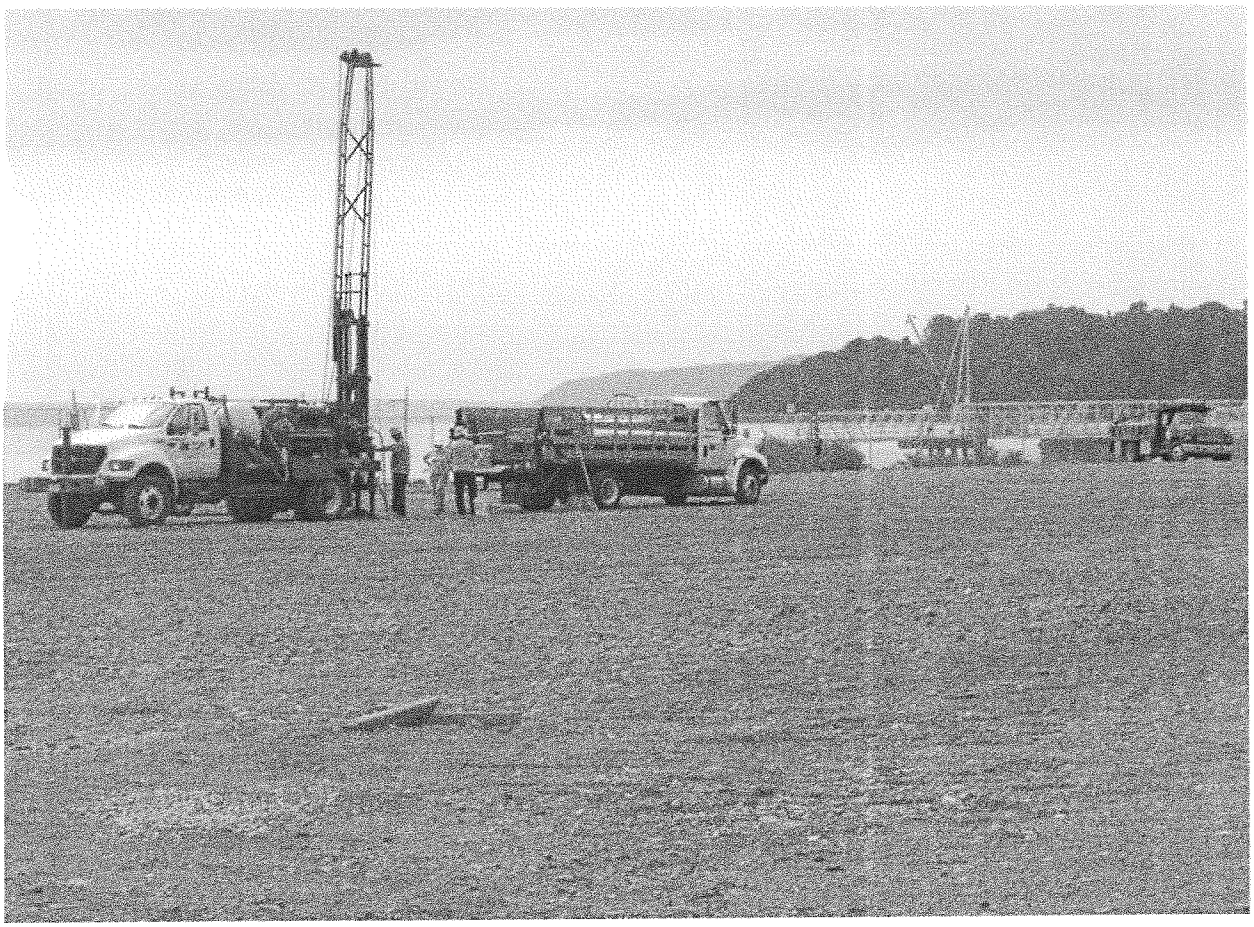
Steven Parisio
Regional Solid Waste Geologist

Attachment

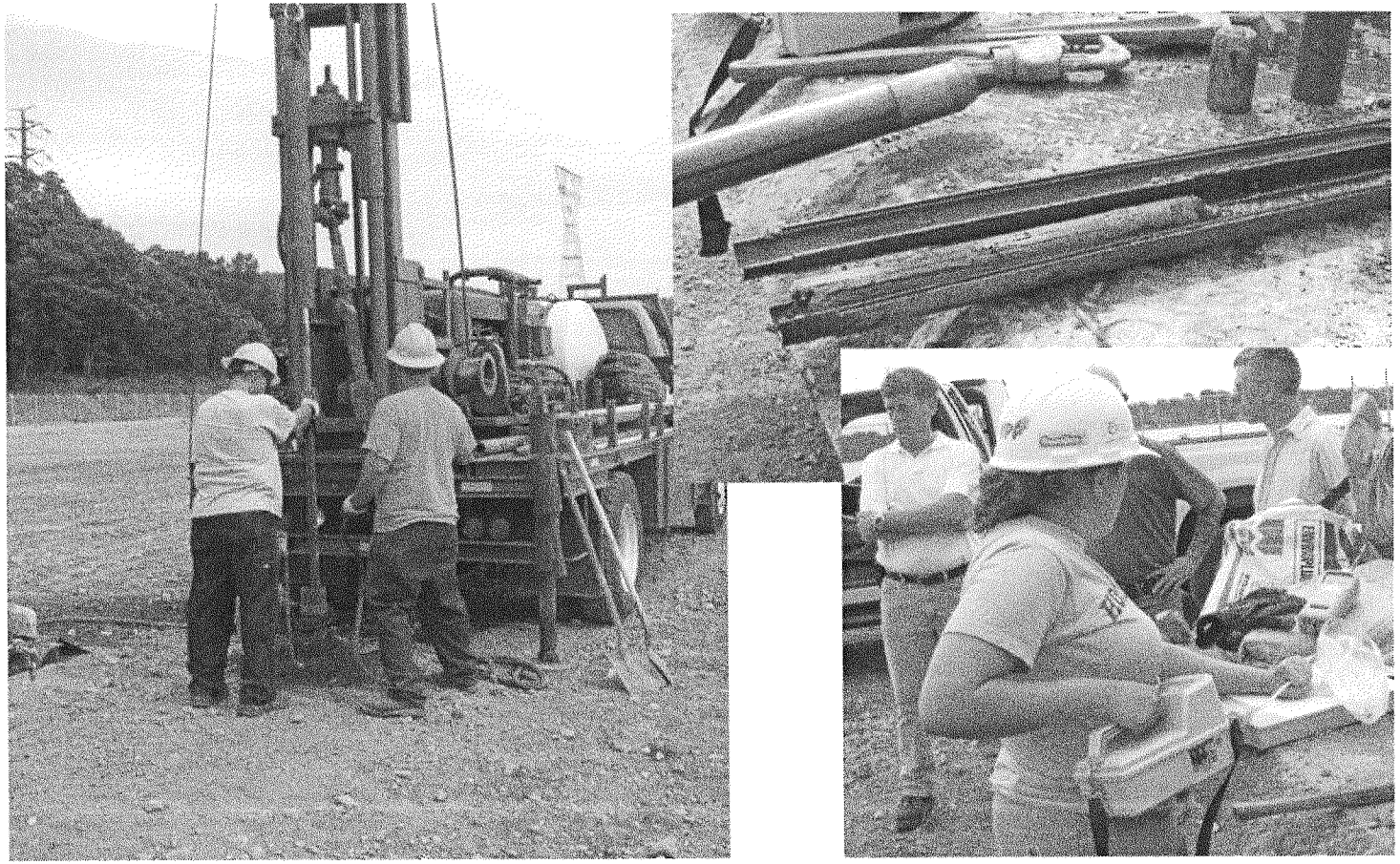
Ecc w/attachment:
Kevin P. Maher, Town Engineer, T-Stony Point
Maureen Leary, Office of the Attorney General
Mauricio Roma, Office of the Attorney General
W. Janeway
M. Caruso
S. Crisafulli
J. Parker
M. Brand
D. Pollock

Region 3/Solid Waste Program
Solid Waste Management Facility Site Visit Report

Facility Name/Location:	Mirant-Lovett former power plant, Town of Stony Point, Rockland County
Date of Site Visit:	August 12, 2009
DEC Staff Present:	Steven Parisio Mauricio Roma, Office of the Attorney General
Facility Representatives:	Burt McCullough, Mirant Corp Michael Pantliano, HDR Tanya Goehring, HDR
Background Information:	The power plant has been demolished and removed from the site. The Consent Order requiring a remedial investigation of the site was executed on July 16, 2009. Installation of groundwater monitoring wells is underway. Several of the monitoring well locations shown in the approved investigative work plan need to be modified due to power lines and other physical constraints encountered in the field.
Purpose of Site Visit:	To discuss changes in monitoring well locations and oversee monitoring well installation.
New Issues and Follow-up Required:	Modified locations for monitoring wells MW-C2, MW-E (couplet), MW-P and MW-O were agreed to in the field. The consultant will need to verify the feasibility of these locations with the driller and obtain permisson for those wells not on Mirant property. (MW-E, MW-P, MW-O). The modified locations for MW-E, MW-P and MW-O are not significantly different from what is shown in the approved work plan. The new location for MW-C2 could be either 75 feet to the east or 150 feet to the south. If the latter location is selected, a deeper well would be needed to reach the target depth because of the higher ground elevation and because of groundwater flow lines which are presumed to be plunging to the south. HDR will provide a GIS shape file showing the modified monitoring well locations. After demolition of the power plant buildings, C&D debris was used as grading material throughout the site. Inspection of the ground surface shows minor but consistent amounts of waste types which are not acceptable for this purpose. This presence of this material is a violation of applicable 6 NYCRR Part 360 regulations which will need to be resolved, along with any soil and groundwater contamination identified during the investigation, when remedial measures are negotiated.
Report prepared by:	S. Parisio
Report Date:	August 12, 2009

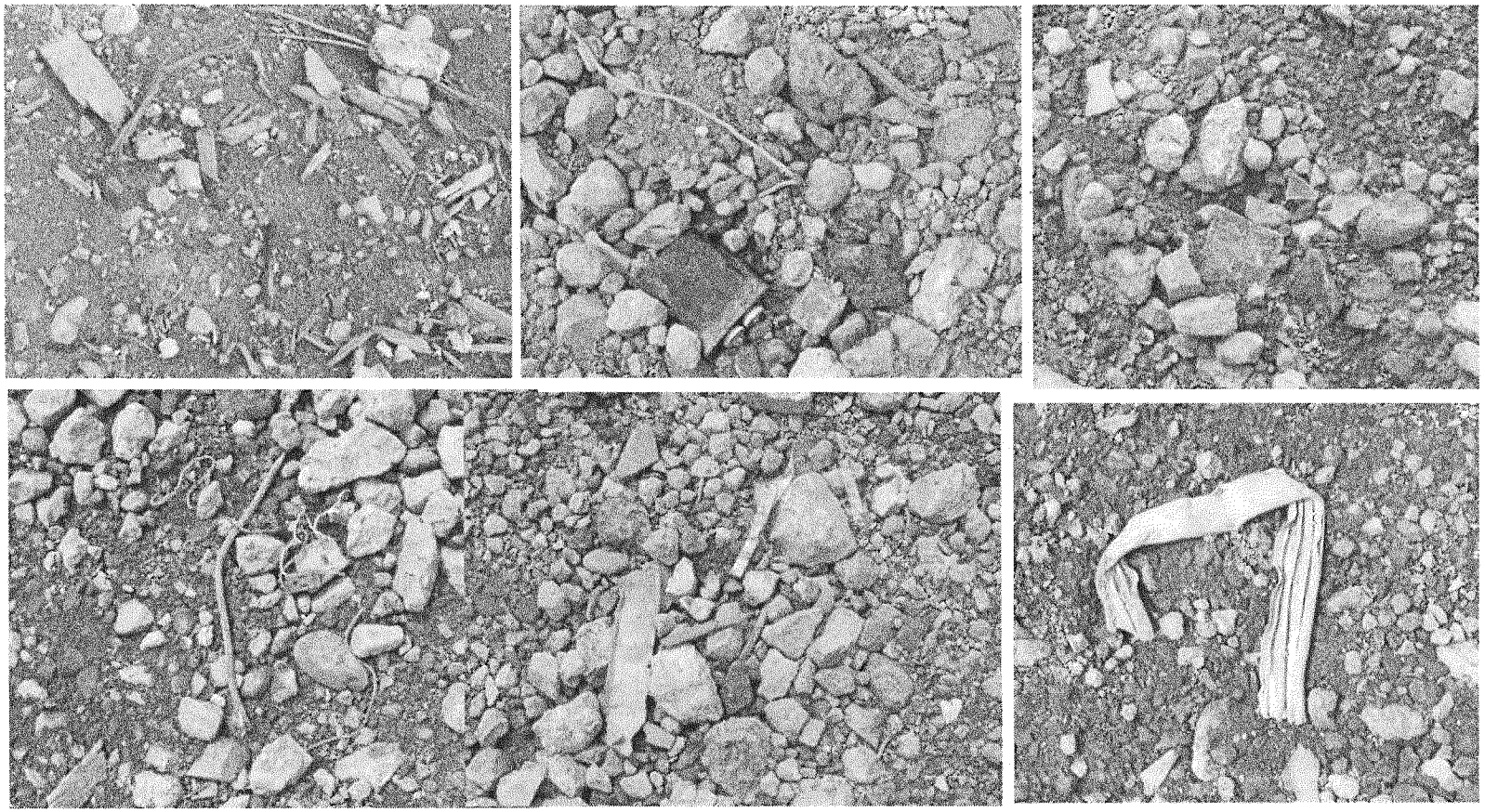


The power plant has been completely demolished and removed from the site along with waste piles previously staged. The site has been regarded and the surface is covered with a layer of C&D debris generated during the building demolition activities. The driller is onsite and is in the process of installing groundwater monitoring wells for the remedial site investigation.



Hollow stem augers are being use to drill borings for monitoring wells. Continuous split spoon samples are being collected and logged by the HDR geologist. A gray clayey silt was encountered below the historical fill layer in the boring for MW-L, at a depth of 12-14 feet. The water table was encountered near the interface between the fill material and native substrate. A PID is being used to screen the samples for volatile organic compounds using the head-space method

A number of monitoring well locations have to be modified because of access problems created by the many power transmission lines which crisscross the site and the setback distance which is required between drilling equipment and the power lines in order to avoid a safety hazard. At the location for monitoring well couplet MW-E, power lines are of the low voltage type and it may be possible to decrease the setback distance by placing a temporary shield over the power lines.



A layer of C&D debris generated by the demolition of the power plant buildings has been used as grading material and spread across the site. Concrete, brick, asphalt pavement and ceramic tile are acceptable for this purpose. (A case-specific BUD was issued for the tile.) As shown in these photos, minor amounts of unacceptable waste types, including metal and wood fragments, wiring and electrical system components, are commingled with the otherwise acceptable fill materials and are dispersed throughout the site.

Coalition *for* Healthier Schools

...providing the national platform and the forum for environmental health at school, since 2001...

Coordinated by Healthy Schools Network

February 15, 2022 -via email

President Joseph R. Biden, Jr.
The White House
1600 Pennsylvania Avenue
Washington, DC 20500

Vice President Kamala D. Harris
The White House
1600 Pennsylvania Avenue
Washington, DC 20500

Dear President Biden and Vice President Harris:

As you prepare your funding requests for Fiscal Year 2023, we strongly encourage you to provide at least $60 million to the US Environmental Protection Agency (EPA) to help protect children from environmental risks that have been ignored for far too long, especially in view of both the climate and COVID disasters that have impacted so many K-12 school facilities.

Despite decades-long efforts by Congress to address polychlorinated biphenyls (PCBs), asbestos, lead in drinking water, mercury, pesticides, and other highly hazardous substances, millions of school children in the nation's 130,000 schools (98,000 public) enrolling 54M students (49M public) (NCES data) continue to be exposed to toxic chemicals and poor indoor air quality (IAQ) every day. The Center for Disease Control and Prevention (CDC) estimates that 40 percent of kids in schools have existing chronic health conditions that can be exacerbated by unhealthy indoor environments,[1] including an estimated 6 million American children with asthma -- the leading cause of absenteeism due to chronic illness. Unhealthy school environments are not only a public health concern, but also negatively impact thinking and learning.[2]

Children are especially susceptible to harm from chemical exposure and unhealthy indoor air. Yet many U.S. schools, particularly in disadvantaged communities, lack the information, tools, and resources necessary to prevent or identify prevent and effectively address environmental risks to children.

While the bipartisan infrastructure law provides funding to address energy retrofits in schools and low emission school buses, federal funds for technical assistance, training, and tools to help schools address indoor air and environmental quality problems and toxic exposures are woefully inadequate. Schools need help, as evidenced by the inability of most schools to follow CDC's guidelines for re-opening after COVID closures.[3]

We urge you to request $50 million/year to fund US EPA Indoor Environments Division's proven "IAQ Tools for Schools" program. EPA's program helps schools both prevent and solve common environmental problems such as mold, cleaning and disinfectant exposure, air quality and ventilation, and other school environmental health concerns, as well as how to protect IAQ during energy retrofits. We urge an addition $10 million in FY 2023 for EPA's Office of Children's Health Protection to advance

[1] https://www.cdc.gov/healthyschools/chronicconditions.htm
[2] https://forhealth.org/Harvard.Schools_For_Health.Foundations_for_Student_Success.pdf
[3] https://www.edweek.org/leadership/you-cant-follow-cdc-guidelines-what-schools-really-look-like-during-covid-19/2021/03. See also: https://www.ashrae.org/about/news/2021/ashrae-supports-usgbc-iaq-schools-survey-and-report

research and educational outreach to families and providers via the CDC-EPA jointly designated network of pediatric environmental health units.

Finally, we strongly support funding for EPA's regional offices to help schools address PCBs present in light ballasts, ceiling tiles, and window and door caulking in thousands of facilities built or remodeled between 1950 and 1979, as well as other legacy toxics common to school facilities.

While funding to rebuild school infrastructure is desperately needed and must remain a priority for this administration, the FY 2023 budget request for EPA provides an opportunity to ensure that all schools, and especially those in environmental justice communities, and in other economically disadvantaged and rural-remote areas, are provided information, training, and tools to improve children's health and learning through addressing unjust, inequitable, and all-to-common school environmental hazards.

Thank you for considering these views.

Sincerely,

Kenneth Mendez, MBA, President & CEO, **Asthma and Allergy Foundation of America**

Nsedu Obot Witherspoon, MPH, Executive Director, **Children's Environmental Health Network**

John E. Reeder, Vice President for Federal Affairs, **Environmental Working Group**

Bruce Lesley, President, **First Focus on Children**

Claire L. Barnett, MBA, Executive Director, **Healthy Schools Network**

Tracy Gregoire, Healthy Children Project Director, **Learning Disabilities Association of America**

Veronika Carella, Legislative Director, **Maryland Children's Environmental Health Coalition**

Donna Mazyck, MS, RN, Executive Director, **National Association of School Nurses**

cc: US EPA Office of the Administrator; EPA/OAR/IED; EPA/OCHP

White House Council on Environmental Quality

White House Office of Management and Budget

White House Council on Environmental Justice

Contact: Claire L. Barnett, cbarnett@healthyschools.org, 202-543-7555

Mosaic™

8813 Hwy 41 South
Riverview, FL
Telephone: (813) 677-9111 - TELX52666
Fax: (813) 671-6283 ACCOUNTING

This product was produced at the
Production Plant - Riverview facility

CAR NO: GATX011210

Deliveries: 5001084843

Material: Our / Your reference
200011 FLUOROSILICIC ACID /

Quality Certificate
Date
03/20/2013
Purchase order item/date

Delivery item/date
5001084843 000010 / 03/08/2013
Order item/date

Customer number
2445

Inspection lot 110000002967 from 03/20/2013

Chemical Analysis		
Net H2SiF6	24.20	%
P2O5	0.04	%
Free Acid	0.35	%
Lead	0.00	ppm
Arsenic	52.00	ppm
Physical Analysis		
Density	1.2230	g/cm3
APHA	30	CU

"We certify that product shipped with this Certificate of Analysis meets AWWA B703-11"

NSF

Certified to ANSI/NSF 60 | Max. Use: 9 mg/L

Kwasi Sakyi-Amfo
QC Lab Supervisor - Riverview

Division
Location **Riverview**
Product **FSA**

Element	Cd	Hg	Se	Co	Mo	V	Ba	W	Cu	Pb	As	Ni	Sb	B	Zn	Bi	Mn	Cr	U	Be	Ag	Tl	Fe	Al	Na	SO_4
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Sample Period																										
01/11 06/11	<0.20	<0.07	<0.50	<0.35	<1.00	0.37	<0.10	<1.00	0.14	<0.27	47.5	<0.45	<0.12	<3.24	<0.92	<0.01	<0.24	<0.54	<0.30	<0.03	<0.01	<0.01				
07/11 12/11	<0.20	<0.07	<0.50	<0.35	<1.00	<0.36	<0.10	<1.00	<0.37	<0.27	43.8	<0.45	<0.12	<3.24	<0.92	<0.01	0.72	<0.54	<0.30	<0.03	<0.01	<0.01				
01/12 06/12	0.01	<0.09	<0.27	<0.04	<0.22	0.24	0.05	<1.11	<0.10	0.02	44.9	<0.15	<0.22	<1.70	<0.29	<0.02	0.55	0.17	0.23	<0.03	<0.01	<0.01	13.7	13.5	59.3	457
07/12 12/12	0.01	<0.09	<0.27	<0.04	<0.22	0.28	0.07	<1.11	<0.10	0.01	47.8	<0.15	<0.22	<1.70	<0.29	<0.02	0.73	0.22	0.28	<0.03	<0.01	<0.01	17.3	18.4	85.6	680
01/13 06/13	0.01	<0.04	<0.04	0.01	0.09	0.28	0.06	<0.07	0.05	0.01	60.1	0.12	0.03	0.24	0.27	0.001	0.89	0.27	0.25	0.002	<0.001	0.0004	20.3	19.4	105	713

< - Less than Method Detection Limit

March 7, 2022

By electronic mail
(whejac@epa.gov)

Richard Moore, Co-Chair
Carletta Tilousi, Vice-Chair

Peggy Shepard, Co-Chair
Catherine Coleman Flowers, Vice-Chair

Angelo Logan, Member
Viola Waghiyi, Member
Kim Havey, Member
Hli Xyooj, Member
LaTricea Adams, Member
Beverly Wright, PhD, Member
Jade Begay, Member
Juan Parras, Member
Jerome Foster, Member
Michele Roberts, Member
Ruth Santiago, Member

Rachel Morello-Frosch, PhD, Member
Miya Yoshitani, Member
Kyle Whyte, PhD, Member
Tom Cormons, Member
Harold Mitchell, Member
Susana Almanza, Member
Robert Bullard, PhD, Member
Maria Belen Power, Member
Maria López-Núñez, Member
Nicky Sheats, PhD, Member

White House Environmental Justice Advisory Council

Dear Co-Chairs Moore and Shepard, Vice-Chairs Tilousi and Coleman Flowers, and Members of the White House Environmental Justice Advisory Council:

I write for Conservation Voters New Mexico to address one issue that should be included in the White House Environmental Justice Advisory Council scorecard for federal agencies' efforts to address environmental injustice. We sought to raise this issue during your meeting on February 24th, but Douglas Meiklejohn, who was our spokesperson, was not one of the commenters called upon to speak.

Introduction

Conservation Voters New Mexico ("CVNM") is a statewide non-profit non-partisan organization that values responsible stewardship of New Mexico's water, land, and other natural resources. CVNM believes that ecological health and social equity among New Mexico's diverse and culturally rich communities protect our state's quality of life. CVNM is dedicated to ensuring democratic accountability and access for all New Mexicans in decision making at all levels of government. CVNM supports policies that promote long-term ecological and economic sustainability. This is CVNM's responsibility to future generations.

Based on these values, CVNM supports the concept of a scorecard for use in evaluating the progress made by federal agencies to address environmental injustice. In addition, it is CVNM's view that such a scorecard must include evaluation of federal agencies' performance based on the measures used by the agencies to involve and communicate with the residents of underserved and overburdened communities ("environmental justice communities").

More specifically, the scorecard should evaluate the performance of federal agencies based on the extent to which the agencies use measures to announce their proposals, decisions, and other activities that are actually likely to reach the residents of environmental justice communities. The need for agencies to use appropriate measures, and CVNM's recommendations for such measures, are outlined below.

Argument

I. Federal agencies' traditional measures for giving notice are not adequate to reach residents of environmental justice communities.

In the past, many federal agencies have given notice of their proposals, decisions, and other activities by two means: publication in the *Federal Register* and announcements in written English on the agencies' websites. Although publication in the *Federal Register* is required in many instances, neither it nor announcements in written English on federal agency websites are adequate to reach residents of environmental justice communities.

A. Publication in the *Federal Register* does not provide adequate notice to environmental justice community residents.

The *Federal Register* is a publication that is read almost exclusively by attorneys, employees of regulatory agencies, analysts for regulated industries, and advocacy groups. It is seldom, if ever, read by members of the general public, and it is even less likely to be read by residents of environmental justice communities. The residents of those communities usually do not have access to the *Federal Register*. Moreover, even if they do have that access, the demands of their jobs and daily lives are such that they are not likely to have the time to track down and read the *Federal Register*.

For those reasons, although publication in the *Federal Register* may be required for certain federal agencies, it is not an effective means of reaching residents of environmental justice communities.

B. Notice in written English by electronic means will fail to reach many residents of environmental justice communities.

In addition, giving notice of federal agency activities in written English on agency websites is inadequate to reach residents of environmental justice communities for two reasons.

First, providing announcements on agency websites fails to account for the limited access to the internet of residents of environmental justice communities. For example, according to the U.S. Census estimates, during 2015 to 2019 only 74.6% of households in New Mexico had broadband access. That means that the notice given by electronic means would not reach 25.4% of New Mexico's residents. Although CVNM does not have statistics indicating how many New Mexico residents without internet access live in environmental justice communities, CVNM understands that many of those New Mexico residents who lack internet access live in such communities. In addition, CVNM understands that this is true in other states as well.

Second, providing notice of agency activities in written English fails to take into account populations in which written English is not the primary means of communication. In New Mexico, for example, there are communities – such as immigrant communities – in which communicate primarily by means of other written languages, such as Spanish and Vietnamese. There also are communities – such as Navajo and Pueblo communities – in which residents communicate primarily be means of languages that are not written. In all of these

communities, announcements made only in written English will not reach residents effectively.

Moreover, giving public notice by such limited means as those used by federal agencies in the past fail to comply with the requirements which were made applicable to federal agencies by the federal Executive Order 12898 signed by then President Bill Clinton in 1994. It provides that:

> Each Federal agency shall work to ensure that public documents, notices, and hearings relating to human health or the environment are concise, understandable, and readily accessible to the public.

U.S. Executive Order 12898, paragraph 5-5(c).

Thus federal agencies must do more than announce their activities in the *Federal Register* and on websites in written English.

II. Federal agencies should announce their proposals, decisions, and other activities using methods that are actually likely to reach residents of environmental justice communities.

The points outlined above mean that federal agencies must provide notice of their proposals, decisions, and other activities in two ways if the agencies are going to be effective in addressing environmental injustice by reaching the residents of environmental justice communities.

First, the agencies must actually reach into environmental justice communities using means of communication that are used by the residents of those communities. This means using methods of communication such as announcements on radio, television, and other media used by the residents of environmental justice communities. It also means having agency representatives attend and speak at meetings held in places where people gather in those communities such as Chapter Houses on the Navajo Nation, Pueblo Council meeting halls on Pueblo Nations, community centers, libraries, and public schools in immigrant communities, and other similar venues in environmental justice communities.

Second, agencies must communicate the announcements of their activities in the languages used in the environmental justice communities that the agencies

are trying to reach. This means using translators to provide announcements and to respond to questions in media used in the environmental justice communities and at meetings in those communities. Moreover, the translators must be able to deal with the technical issues that the agencies' announcements address so that realistic and understandable information can be provided to the community residents.

Conclusion

Thank you for your concern about whether federal agencies are addressing environmental injustice effectively. Thank you also for giving CVNM the opportunity to address this issue, and for your attention to CVNM's concerns and recommendations.

Please do not hesitate to contact me if you have questions about any of CVNM's analysis or recommendations.

Conservation Voters New Mexico

Demis Foster

Demis Foster
Executive Director

Paul Piperato, County Clerk
1 South Main St., Ste. 100
New City, NY 10956
(845) 638-5070

Rockland County Clerk Recording Cover Sheet

Received From :
JADE ABSTRACT
151 SOUTH MAIN ST
NEW CITY, NY 10956

Return To :
JADE ABSTRACT
151 SOUTH MAIN ST
NEW CITY, NY 10956

Method Returned : ERECORDING

First GRANTOR
TILCON INC

First GRANTEE
CHAMPLAIN HUDSON POWER EXPRESS INC

Index Type : Land Records

Instr Number : 2018-00027760

Book : **Page :**

Type of Instrument : Option
Type of Transaction : Ease, R-Way, Asmt Rent-Lease
Recording Fee: $81.00
Recording Pages : 7

The Property affected by this instrument is situated in Stony Point, in the County of Rockland, New York

Real Estate Transfer Tax	
RETT # :	1048
Deed Amount :	$25,000.00
RETT Amount :	$100.00
Total Fees :	$181.00

State of New York

County of Rockland

I hereby certify that the within and foregoing was recorded in the Clerk's office for Rockland County, New York

On (Recorded Date) : 09/21/2018

At (Recorded Time) : 2:11:00 PM

Paul Piperato, County Clerk

This sheet constitutes the Clerks endorsement required by Section 319 of Real Property Law of the State of New York

Entered By: NYROCKLANDUSER19 Printed On : 09/21/2018 At : 2:11:23PM

34967 ACC

Memorandum of Option Agreement

Notice is hereby given of an Option Agreement (the "Agreement") dated September 11, 2018, by and between **TILCON INC., f/k/a/ TILCON MINERALS, INC.,** a Delaware corporation (the "Grantor"), and **CHAMPLAIN HUDSON POWER EXPRESS, INC.**, a New York corporation, its successors and assigns (the "Grantee").

R+R Bousquet Holstein PLLC (ELS)
110 West Fayette Street
One Lincoln Center, STE 1000
Syracuse, NY 13202-1190

1. The names and addresses of the parties to the Agreement are as follows:

Grantor: **TILCON INC.**
Attn: President
9 Entin Road
Parsippany, NJ 07054

Grantee: **CHAMPLAIN HUDSON POWER EXPRESS, INC.**
Attention: William S. Helmer
600 Broadway
Albany, New York 12207

2. The date of the Agreement is as set forth above.

3. The Grantor has granted the Grantee an option (the "Option") to purchase a permanent and temporary easement (the "Easement") over, on, under, and through the real property owned by the Grantor which real property is located at: 1 Elm Avenue, in the Town of Stony Point, County Rockland, State of New York, which is tax parcel number 15.02-4-59, and consisting of approximately 203.36 acres and depicted on the attached **Exhibit A** the ("Real Property"). The location of the Easement on the Real Property is depicted on the attached **Exhibit B.**

4. The initial term for the exercise of the Option is three (3) years from the date hereof.

5. A copy of the Agreement is on file with the Grantor and the Grantee.

[Document continues on the following pages. The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the parties have executed this Memorandum of Option Agreement this 11th day of September, 2018.

GRANTOR:

TILCON INC.,
F/K/A TILCON MINERALS, INC.

By: _____
Title: CFO/SECRETARY
ROBERT BOBENHAUSEN, CFO/SEC.

GRANTEE:

CHAMPLAIN HUDSON POWER EXPRESS, INC.

By: _____
Title Executive Vice President
WILLIAM S. HELMER, VP

STATE OF ~~NEW YORK~~ CONNECTICUT)
) SS.: New Britain
COUNTY OF Hartford)

On the 28th day of August in the year 2018, before me, the undersigned, a Notary Public in and for said State, personally appeared Robert Bobenhausen personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument, and that such individual made such appearance before the undersigned.

_____
Notary Public

KATHLEEN M. NOURY
NOTARY PUBLIC
State of Connecticut
My Commission Expires
January 31, 2022

STATE OF NEW YORK)
) SS.:
COUNTY OF Albany)

On the 11th day of September in the year 2018, before me, the undersigned, a Notary Public in and for said State, personally appeared William S. Helmer, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument, and that such individual made such appearance before the undersigned.

_____
Notary Public

TRACIE A. CHASE
Notary Public, State of New York
Qualified in Albany Co. No. 01CH4989574
My Commission Expires 12/9/21

EXHIBIT A

Map of Real Property

TILCON
an Oldcastle company

Operations Support
9 ENTIN RD.
PARSIPPANY, NJ 07054

Tomkins Cove

Aerial Photo

drawn by	checked by	date	scale
ELC		09-19-2017	1" = 150'

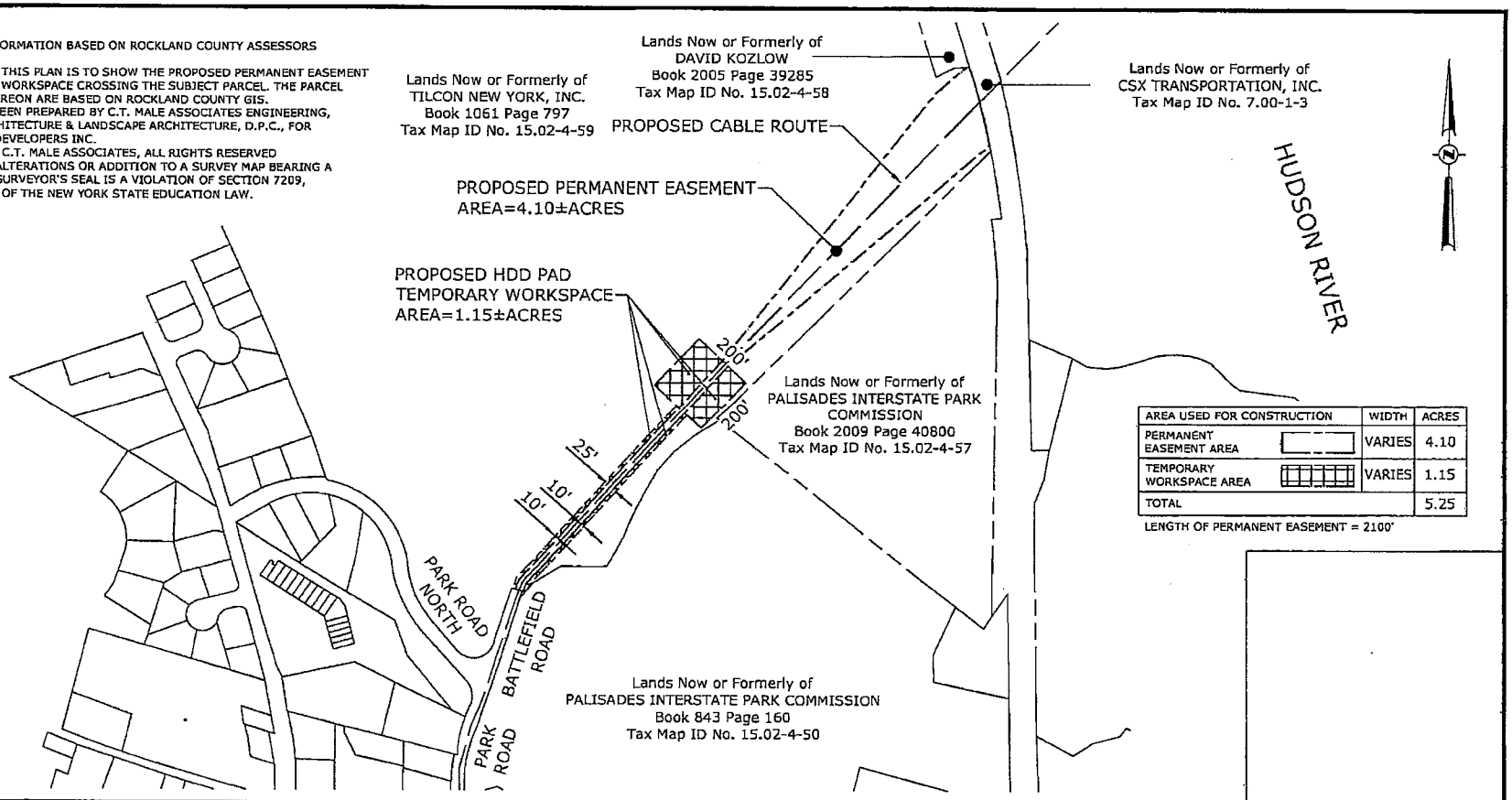
sheet no: 1 OF 1
sheet size: D

EXHIBIT B

Map of Easement Location

GENERAL NOTES:

1. LAND OWNER INFORMATION BASED ON ROCKLAND COUNTY ASSESSORS INFORMATION.
2. THE PURPOSE OF THIS PLAN IS TO SHOW THE PROPOSED PERMANENT EASEMENT AND TEMPORARY WORKSPACE CROSSING THE SUBJECT PARCEL. THE PARCEL LINES SHOWN HEREON ARE BASED ON ROCKLAND COUNTY GIS.
3. THIS PLAN HAS BEEN PREPARED BY C.T. MALE ASSOCIATES ENGINEERING, SURVEYING, ARCHITECTURE & LANDSCAPE ARCHITECTURE, D.P.C., FOR TRANSMISSION DEVELOPERS INC.
4. COPYRIGHT 2017 C.T. MALE ASSOCIATES, ALL RIGHTS RESERVED UNAUTHORIZED ALTERATIONS OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUB-DIVISION 2, OF THE NEW YORK STATE EDUCATION LAW.



AREA USED FOR CONSTRUCTION	WIDTH	ACRES
PERMANENT EASEMENT AREA	VARIES	4.10
TEMPORARY WORKSPACE AREA	VARIES	1.15
TOTAL		5.25

LENGTH OF PERMANENT EASEMENT = 2100'

REVISIONS			
NO.	DATE	BY	DESCRIPTION
4			
3			
2			
1	9-11-17	DGD	REVISED EASEMENTS

DFT: GLB	DATE: 02-17-17	PROJECT NO. 10.1457	
CHK: DGD	DATE: 02-17-17	SCALE: 1" = 400'	
APPR: WJN	DATE: 02-17-17		

CHAMPLAIN HUDSON POWER EXPRESS
PROPOSED UNDERGROUND ELECTRIC TRANSMISSION LINE
CROSSING PROPERTY OF:
TILCON NEW YORK, INC.
TOWN OF STONY POINT
ROCKLAND COUNTY, NEW YORK

DWG. NO. 17-159	SHEET: 1 OF 1	1
DWG. NAME:TILCON NY	TYPE: ACAD	

Submitted electronically to whejac@epa.gov, ward.george@epa.gov, and via regulations.gov
Docket ID No. EPA-HQ-OA-2021-0683

February 9, 2022

Dear WHEJAC members,

At the January 26, 2022 WHEJAC meeting, I heard Dr. Bullard highlight the need for guardrails in the spending of federal infrastructure funding and the need to organize, to mobilize, to build the justice framework into that funding. As I waited for my turn to speak (which never came), that message resonated a lot for me: *to be laser-focused, so we don't get what we are always getting: nothing; to make sure we are on this and stay on it every day, 24/7*.

Inspired by the call to *"stay on it"*, I submit the following comments to ask that you consider them as you continue to provide advice and make recommendations to the White House on environmental injustices that is likely few have commented on, but that are in urgent need of "guardrails" so that federal agencies, and states receiving federal funding, like Florida where I reside, don't add more harm and marginalization in our communities. The EJ issues I present below are within the scope of the WHEJAC charter.

Recommend Environmentally Just Policies to Build Back Better Nights!

A few days before the WHEJAC hearing, driving back from the Everglades, my son & I made a stop to take pictures of the enormous quantity of WASTED but "energy efficient" LED lighting, at a sports field at the very edge of the Everglades, illuminating even the clouds at night. Earlier that night, we also took photos of white fog and clouds illuminated by the bright bluish white "energy-efficient" LEDs in a Florida Power & Light *solar* farm within one of the last remaining natural dark sky areas in the Everglades, and primary habitat for the federally endangered Florida Panther, our FL state animal.

These environmental impacts are happening in many communities, but like most forms of pollution, harmful artificial light at night tends to affect our EJ communities disproportionally more. And NEPA is failing in this regard, as many federally-funded transportation projects are adding new unnecessary, inappropriate, excessive and harmful LED lighting, to the detriment of people and wildlife, as documented by plenty of peer-reviewed research. There is NO environmental justice, *in energy efficiency and renewable energy*, if the health & quality of the night is NOT taken into account. **We need to Build Back Better Nights!**

To that end, I ask you to please include these in your recommendations to the Chair of the Council on Environmental Quality (CEQ) and to the White House Interagency Council on Environmental Justice (Interagency Council):

(1) All federal agencies, particularly the US Dept of Transportation and US Dept of Energy, must improve their guidance and regulations, to ensure they adequately evaluate and address the potential direct, indirect and cumulative impacts of harmful light at night in our communities and our sensitive habitats. Particular attention is needed to meaningfully address the huge increase of light pollution, including agency policies that bias our federal government to install harmful blue-rich white LED lighting because they tend to consider them more energy efficient than other alternatives. This is happening in many communities, including low income communities of color where excessive bright and low-quality glaring lighting often ends up serving as yet another form of targeted policing that in addition cause detrimental impacts to the wellbeing of people and wildlife. Federally-funded infrastructure projects should in fact do the opposite: they should be opportunities to remove or replace lighting that is harmful to people, wildlife and the environment. A book by Simone Browne, titled *Dark Matters: On the Surveillance of Blackness*, explains the roots of this form of artificial light environmental injustice.

(2) In the EPA EJ Screen Tool, include data layers that depict artificial light pollution at night. Data also exists to help tackle the inequity of access to nearby nature at night. Low income families should *not* have to settle for overlit urban communities, including glaring LED billboards outside bedroom windows, like many do in downtown Miami. We all deserve the benefits of healthy lighting at night, when and where needed, and affordable nearby access, without long drives to far away areas, to enjoy the wonder of stars, the sight of fireflies and the songs of wildlife at night.

Recommend Policies to Prevent Harm by the Rush to Commercialize & Industrialize Space

I ask you to imagine a future in our children's lifetime without Earth observation satellites to monitor the vital signs of our planet, such weather, ***and*** without GPS satellites providing location services. Imagine our future adult children no longer able to get early warnings for hurricanes, tornadoes, or wildfires. Imagine them not being able to know where to bring relief after natural or climate-fueled disasters, like Hurricane Maria that affected my family in the island of Puerto Rico. Imagine an enormous amount of dangerous debris, orbiting Earth's atmosphere at speeds many times faster than bullets, that no longer allows people to put any satellites in orbit, to explore space, or to even defend the only planet they will ever truly call home.

That future is NOT fiction. A few months ago (October 2021), a former NASA administrator said "*if we don't take action now to mitigate the debris problem.... space will no longer be accessible*". This nightmare is happening because the USA government lacks comprehensive national laws and regulations to prevent commercial exploitation at or near spaceport sites, and at our very own atmosphere and near-Earth orbital environment: all to our detriment. For instance, the FCC is categorically excluding megaconstellations (swarms) of commercial satellites from companies like SpaceX. That means there are no NEPA environmental impact assessments, no analysis of alternatives, no meaningful public participation, and little to no involvement by other federal agencies, including EPA, NOAA, USGS, DOI and others that should have a say. This is further compounded by the FAA having a conflicting mandate that encourages the agency to promote expansions of and new commercial spaceports from which to launch rockets with big payloads carrying large numbers of satellites (and other objects) for private profit. This is playing out right now in places like Boca Chica, near Brownsville at the TX border, that have long experienced environmental injustices. I ask that you "*Look Up*" for our EJ communities being impacted by a billionaire space industry with no guardrails, threatening the future of us all.

To that end, I ask that you also address this matter in your recommendations to CEQ and the Interagency Council by including the following:

(3) To prevent yet another crisis, and one that will make it next to impossible to solve the social and environmental injustices already in our EJ communities, the USA federal government should pause how it is regulating space commercialization to urgently examine and improve our national policies, in a comprehensive and transparent process and in concert with other countries and the United Nations: because we all stand to lose if we don't do this right.

I hope my plea to you leads to meaningful actions on these important matters. I don't want anyone to ever say *"I'm grateful we tried"* while saying goodbye to the wonder of starry nights, to the sight of "cucubanos" enchanting Puerto Rico nocturnal landscapes, to the songs of coquis singing at night, or to the hopes of children dreaming of becoming astronauts while looking up.

For further reference, I'm attaching excerpts from a report prepared last year by the United Nations Office for Outer Space Affairs (UNOOSA), and excerpts from a report to which I contributed as part of an effort funded by the National Science Foundation to understand some of the impacts to science and society from the growing number of satellite constellations (SATCONs).

Sincerely,

Diana Umpierre, AICP, GISP
Pembroke Pines, Florida
nightskyconservancy@gmail.com

Dear Esteemed Members of the White House Environmental Justice Advisory Council,

In response to the WHEJAC public meeting on developing a scorecard for federal agencies as they try to address environmental justice issues, **I, Dr. Sacoby Wilson, Director of the Center for Community Engagement, Environmental Justice, and Health (CEEJH) at the University of Maryland School of Public Health, would like to provide written recommendations.** Federal agencies should be reviewed across criteria developed from the 17 Principles of Environmental Justice and CEJA's 8 Principles of Collaboration.[1-2] Agencies should be evaluated for each criteria on a scale of 0-5 points using publicly available information on the agency website, and interviews with agency representatives. The full breakdown of scoring should include the following elements:

1. **Require each agency to develop an environmental justice strategic plan**.
    a. This should resemble the call for federal agencies to identify and address environmental injustices as declared in Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations - first issued by President Clinton in 1994 and commemorated by President Obama in 2014. This executive order addresses the impacts of climate change by undertaking actions to enhance climate preparedness and resilience. This ties into President Biden's Executive Order on Tackling the Climate Crisis at Home and Abroad (2021).
    b. Strategic plans would benefit from having a logic model to outline and track agency inputs, goal outputs, activities to achieve specific objectives, as well as short-term, midterm, and long-term goals. Moreover, the Prince George's County 2025 Plan provides useful examples on potential metric systems for assessing milestone achievement, particularly at a local level. These include: (1) the reduction of lead in or near other sites with vulnerable groups from 63 ppm to <25 ppm by 2025; and (2) reducing the number of wastewater treatment plants that are not meeting the EPA water quality standards from 5% to 0% by 2025. Federal agencies should adopt similar tangible metrics pertinent to their priority areas. Other useful indicators for a metric system can include Gnuine Progress Indicator (GPI) and Index of Sustainable Economic Welfare (ISEW). These indicators help form a broader perspective of human welfare, rather than simply rely on GDP performance. The U.S Environmental Protection Agency Plan EJ 2014 report is a great reference for national agencies.
    c. Agencies should make financial tracking transparent to ensure equity in resource distribution, particularly as it relates to environmental justice planning.
2. **Agencies must set measurable outcome benchmarks to track the efficacy of their environmental justice efforts.** This should apply to goals and activities outlined in the strategic plan, as well as other agency initiatives that will impact underserved, overburdened, and/or disadvantaged populations. Environmental justice outcomes to track include but are not limited to: improved water and air quality, legacy pollution and toxic exposure reduction, improved food/nutrition security, increasing climate resilient infrastructure, environmental remediation, and

[1] The First National People of Color Environmental Leadership Summit. (1991). *The Principles of Environmental Justice (EJ)*. EJNET. Retrieved from https://www.ejnet.org/ej/principles.pdf

[2] CEJA. (n.d.). *Principles of Collaboration*. California Environmental Justice Alliance. Retrieved from https://caleja.org/wp-content/uploads/2014/03/Principles-of-Collaboration.pdf

a just transition to efficient green energy. Outcomes should remediate the impacts of systemic environmental racism and strengthen climate action and preparedness.

3. **Require environmental justice and racial equity training workshops for agency employees.** Echoing President Biden's Executive Order 14035 on Diversity, Equity, Inclusion, and Accessibility in the Federal Workforce (2021), agencies should possess training programs that enable Federal employees, managers, and leaders to have knowledge of systemic and institutional racism and bias against underserved communities, be supported in building skill-sets to promote respectful and inclusive workplaces and eliminate workplace harassment, have knowledge of agency accessibility practices, and have increased understanding of implicit and unconscious bias. This should entail including environmental justice metrics to be weighed in performance reviews for both process and impact evaluation. Moreover this should take an intersectional approach to be intentional about addressing the needs of vulnerable identities which will subsequently address disparities and encourage equitable living for all.
4. **Utilize EJSM tools to microtarget areas in greatest need of program and policy intervention**. Agency employees can be trained to use environmental justice screening and mapping tools to evaluate cumulative impacts of multiple burdens or the paucity of health promoting infrastructure. These data can guide equitable decision making. Developing screening methodologies can ensure that agency actions do not create or exacerbate health, environmental, or racial inequities which harm historically disadvantaged groups.
5. **Agencies should have an EJ advisory council which prioritizes meaningful community engagement.** Agencies should maintain a solid, direct line of communication with the members of frontline communities. Moreover, agency EJ advisory councils must include seats for community members. Dialogue should be continuous to develop programming that is responsive to the needs of the community. Additionally, soliciting feedback from the community is necessary to best inform future decision making. Leaving community members out of important decision making harms attitudes and health outcomes. Every agency should have a national EJAC and regional EJACs to ensure EJ plans are implemented effectively and provide guidance on metrics and indicators to inform scorecards
6. **Agencies should integrate environmental justice language and/or information in their mission or vision statements.** Each agency should have detailed, extensive information available on the work they're doing to earn positive points, and the agency's work for is effective, up to date, and evidence-based
7. **Measure demographic representation and trends related to diversity in the agency's overall workforce composition.** As emphasized in EO 14035, this should include senior workforce composition, hiring decisions, promotions, pay and compensation, professional development programs, and attrition rates.

I hope to see these recommendations integrated into the development of WHEJAC's EJ Scorecard so that we can hold federal agencies accountable for their environmental actions, as well as highlight those that have been EJ champions.

Sincerely,
Dr. Sacoby Wilson

For the WHEJAC, Comments re: SCORECARD 02/24/22
Dr. Sarah Bishop Merrill (SAVERGV)

I propose EPA perhaps in conjunction with DHHS create environmental testing programs and promote data based free TRAINING sessions to empower local communities to test air and water quality, for contractors who will actually remedy these situations, and health care providers who can design mitigation. As our infrastructure grows, so does noise pollution, including that from the SPACE-X test launches from our Boca Chica site here. Buildings on South Padre Island already show cracks in windows, and we expect the noise and debris of the new Starship (Super Heavy) will be 1,000 times worse. This Musk project will be the largest rocket ever launched from Earth. Scorecards should include the number of local workers trained in sustainable building, sustainable agriculture, and Air Quality.

Harvard Sick City study may not be the model for our underserved communities, but we do need a yardstick for making progress. I think that a simple pre- and post-intervention questionnaire might be workable here for the needs assessment and determining whether environmental mitigation and adaptation are improving lives. Agencies like Projecto Azteca have been effective in training people to build their own houses with technical assistance. They should be involved in the scorecard creation, and the on-going data-based trainings for IAQ and noise pollution. Needs assessment must flow seamlessly into mitigation, restoration, and clean up. We agree that CEQ needs to implement WHEJAC plans.

But measuring the climate risks from the 2 proposed LNG plants, the destruction of habitat for more obsolete and useless Border Wall, and SpaceX activities in fragile eco-systems near the Bahia Grande is very difficult. Counting the increasing number of 100 degree days, and the above normal summer temperatures, e.g. many days when I was teaching at UTRGV, holding office hours in the Café attached to the Library, the thermometer for the campus showed +13 degrees many days. If we measure only the AVERAGES, the mean is dominated by the extremes of weather worsened by Climate Change. Like the Global South, we suffer here from Climate Change worse than others due to the failure to insulate buildings here, so that air conditioning is costly and sometimes non-existent in many workplaces, and recent colder extremes of weather with the Texas grid failure in February of 2021 take a higher toll on us. We could count buildings needing insulation and energy efficiency, so that cities don't end up owing $650,000 as Harlingen does, just to heat buildings during two extreme weeks. Even in Harlingen, TX, we have a building with 45 types of fungi, mildew, and mold, e.g. Stachybotrys, causing illness in teachers, students, and administrators. I was fired after I blew the whistle about this.

With regard to measuring whether appropriate agencies are taking major steps to mitigate and adapt, we must note that in Texas, the TCEQ has little effect, mere EAs are used for major fossil fuel projects, due to the authority of FERC in permitting, instead of full EIS with EPA involvement. We are grateful that EPA has intervened when it became clear TCEQ could not function effectively, even though they are trying harder now, since they are under review by our TX Sunset Commission. There are at least 4 fossil fuel projects planned for the Bahia Grande region, near Laguna Atascosa National Wildlife Refuge, Brownsville Ship Channel, and the town of Boca Chica which has now been "bought", along with Cameron County, by Elon Musk.

Like other commenters today, I am concerned that we measure or at least locate sources of mercury contamination, especially in the Rio Grande Delta. Here, in our dumps, managed and used by many illiterate and ignorant people, mercury sits in dumps unnoticed, and its containers bulldozed willy nilly, no doubt leaching into ground water and soils. Surely this also is true in the dumps at Matamoros, near the new Mexican dumps, border okra fields where farmer are not fully informed of the risks, nor are the consumers of the Mexican Okra, either. So teams of trained local people with instruments for testing and calibration need to be installed to prevent far more expensive harms.

Communities here are not being protected and held to federal standards of safety. We urgently need measurement of the true costs of the TXLNG and RioGrandeLNG, and Jupiter projects near the Brownsville Ship Channel, Bahia Grande, and the Corrizo Comecrudo sacred site, using full EIS, not just EAs where FERC and others at the state level see "no significant impact," using metrics that simply block out cumulative impacts and fair and true measures of Methane releases, …even the risk of VCEs of a catastrophic nature. Scorecards must have negative numbers for clear conclusions about the net negative impacts. LNG is *not a "transitional fuel."* Carbon and water footprints of LNG and Fracking for the feed gas for such projects, and oil and gas pipelines designed to serve the planned LNG export facilities. The Emergency Firefighting and Police Services have not been trained, nor is training for them on risks of LNG including VCEs, included in permitting processes, although in law and writing, they are required. FERC has some new members, but still need close advice and consent of the EPA, who should not be subordinated to these state agencies. Texas is in urgent need of honest measurement and help for our colonias without sewers. Qualified testers, reporters, and contractors must be trained and certified with periodic in-service testing and training. Literacy training must include toxics identification.

Texas has a number of Water and water policy meetings which we attend, including through TX Parks and Wildlife, and the branch of the US State Dept. which interacts with Mexican and Canadian engineers, in the International Boundary and Water Commission, meeting in Weslaco, TX here monthly, with a Citizen's Forum. Studies are often presented, showing that the Rio Grande is the most polluted river in the world. It is, however, the water source for all our towns and cities Valley wide here in South Texas. The IBWC representative stated at the last meeting, in response to my questions about flooding, even in an era of alternating disastrous droughts, that she did not know that concrete channels (more impervious cover) caused flooding! We need to rate this agency on a scorecard that shows their failure to use the latest riverine habitat data, or to collect more, before laying down more impervious cover and using their tunnel-visioned yardstick of "speed of flow" rather than recognizing the data on the uptake of water by trees (one large tree takes up 56,000 gallons of water in one flood event).

Report to the Washington State Governor and Legislature

Environmental Justice Task Force

Recommendations for Prioritizing EJ in Washington State Government

Fall 2020

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Task Force Staff

- Elise Rasmussen, Project Manager
- Esmael Lopez, Community Engagement Coordinator
- Hannah Fernald, Administrative Coordinator

For more information / Para más información:

Environmental Justice Task Force Information Page:
https://healthequity.wa.gov/TheCouncilsWork/EnvironmentalJusticeTaskForceInformation

Environmental Justice Task Force Meeting Agendas, Minutes, and Materials Page:
https://healthequity.wa.gov/TaskForceMeetings/EnvironmentalJusticeTaskForceMaterials

Christy Curwick Hoff |Manager, Governor's Interagency Council on Health Disparities

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Governor's Interagency Council on Health Disparities Website:
www.healthequity.wa.gov

Contents

"We've got to decide that we want to live in a world that is sane and happy and healthy, and that everyone deserves that."

-Majora Carter, Environmental Justice Advocate

Acronyms

List of Common Terms/Titles and their Acronyms	
Acronym	**Full Term/Title**
ADA	Americans with Disabilities Act (e.g. ADA accessible)
BIPOC	Black, Indigenous, and People of Color
CIA	Cumulative Impact Analysis (e.g. Environmental Health Disparities Map)
COVID-19	Coronavirus Disease 2019, also known as 2019 novel coronavirus
EHD Map	Environmental Health Disparities Map
EJ	Environmental Justice
EJTF	EJ Task Force
ESHB 1109	Engrossed Substitute House Bill 1109 (2019-21 State Operating Budget)
GARE	Government Alliance on Race and Equity
LEP	Limited English Proficiency
SEP	Supplemental Environmental Project
USEPA	United States Environmental Protection Agency
WA	Washington (as in Washington State)
WTN	Washington Tracking Network

Acknowledgement

The Environmental Justice Task Force (EJTF) recognizes that the fight for environmental justice is ongoing—it did not begin with the EJTF, and it will not end with the EJTF. We express our sincerest gratitude to the communities across Washington state who have been on the frontlines fighting for environmental justice. The EJTF has greatly benefitted from community knowledge, wisdom, and expertise, and our hope is that communities see themselves in this report. We acknowledge that every step closer to environmental justice for Washingtonians is because of the power that community holds.

Executive Summary

The EJTF's Authorizing Budget Proviso & Responsibilities

The Environmental Justice Task Force (EJTF) was created through a proviso in the state's 2019-2021 operating budget (Engrossed Substitute House Bill 1109, section 221, subsection 48). In accordance with the budget proviso quoted below, this report includes:

I. **Measurable Goal Recommendations:** "Measurable goals for reducing environmental health disparities for each community in Washington state and ways in which state agencies may focus their work towards meeting those goals."
II. **Model Policy Recommendations:** "Model policies that prioritize highly impacted communities and vulnerable populations for the purpose of reducing environmental health disparities and advancing a healthy environment for all residents."
III. **Environmental Health Disparities Map Recommendations:** "Guidance for using the Washington Environmental Health Disparity Map to identify communities that are highly impacted by EJ issues with current demographic data."
IV. **Community Engagement Recommendations:** "Best practices for increasing meaningful and inclusive community engagement that takes into account barriers to participation that may arise due to race, color, ethnicity, religion, income, or education level."[1]

Report Overview

The first chapter of the EJTF report provides context for what environmental justice (EJ) is, how to build on existing EJ work in Washington, and why state government must prioritize addressing EJ issues and environmental health disparities. The second chapter focuses on the EJTF's process for developing recommendations, a statewide EJ definition, and EJ principles. The final chapter of the report includes all EJTF recommendations. The report appendices include additional resources, including guidance developed by the EJTF's Community Engagement Subcommittee for how state agencies can develop their own community engagement plans (Appendix C).

Environmental Justice Definition

The EJTF developed a recommended statewide definition for EJ that builds upon the U.S. Environmental Protection Agency's (USEPA) definition by adding the outcomes we want to see in Washington state. The EJTF recommends that the definition be adopted by all Washington state agencies to

Recommended Statewide EJ Definition

The fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. This includes using an intersectional lens to address disproportionate environmental and health impacts by prioritizing highly impacted populations, equitably distributing resources and benefits, and eliminating harm.

[1] Engrossed Substitute House Bill 1109, section 221, subsection 48.

identify and address current environmental injustices and to ensure future decisions and actions promote EJ.

Environmental Justice Principles

The EJTF also developed five EJ principles to serve as an initial blueprint for a shared vision for EJ in Washington state. The following EJ principles were informed by communities across the state and with recognition and reflection of the Principles of Environmental Justice adopted at the 1991 First National People of Color Environmental Leadership Summit. The EJ principles section in this report defines each of these principles in more depth, including actions state agencies can take to work toward each principle.

EJ Principles

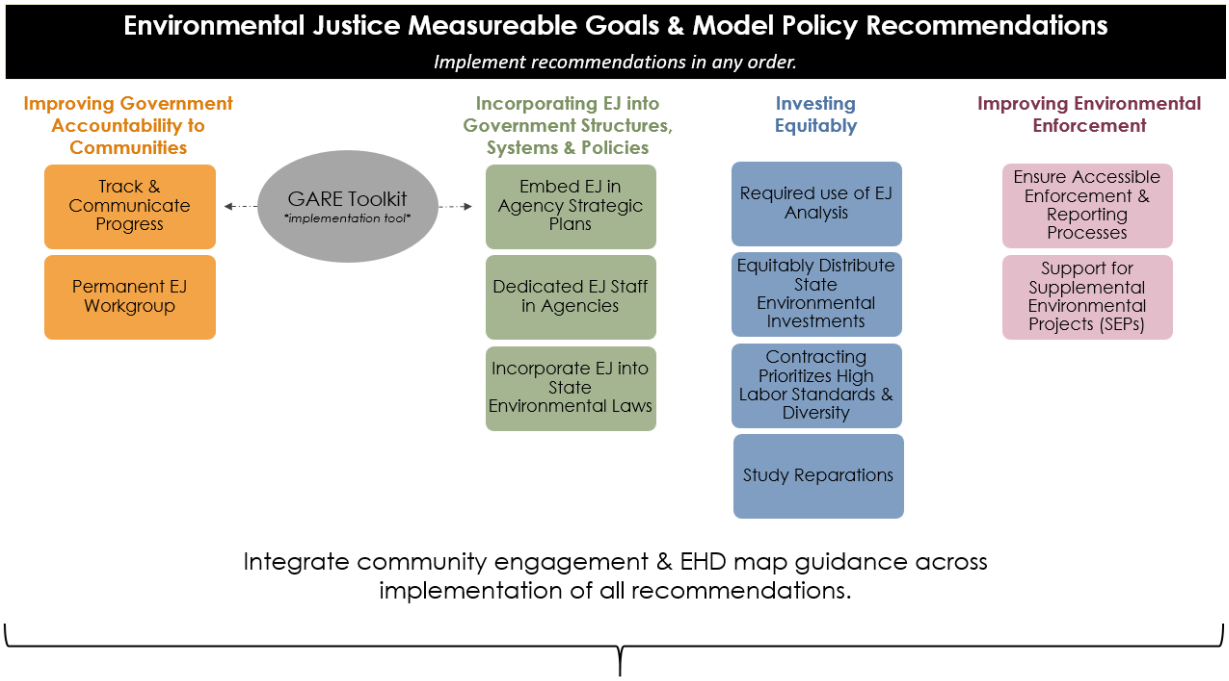
1. Achieve the highest attainable environmental quality and health outcomes for all people.
2. Adopt a racial justice lens.
3. Engage community meaningfully.
4. Be transparent.
5. Be accountable.

Measurable Goals and Model Policy Recommendations

The first set of recommendations in this report focus on measurable goals and model policies. These recommendations are further organized into four categories that name the intended outcomes the EJTF would like to see enhanced in state government:

- Improving Government Accountability to Communities
- Incorporating EJ into Government Structures, Systems, and Policies
- Investing Equitably
- Improving Environmental Enforcement

Additionally, the report includes guidance for using the Government Alliance on Race and Equity's (GARE) Racial Equity Toolkit as an implementation tool to assist agencies with tracking and communicating progress toward EJ and embedding EJ in agency strategic plans.



Measurable Goals & Model Policy Recommendations to Reduce Environmental Health Disparities	
Improving Government Accountability to Communities	**1. Measurable Goals: Track & Communicate Progress** In partnership with communities, agencies should create a standard method to develop, track, evaluate, and publish EJ and health goals focused on pollution reduction, eliminating environmental health disparities, and improving community engagement. **2. Model Policy: Permanent EJ Workgroup** Convene a permanent EJ interagency workgroup of relevant agency staff that includes members representing overburdened communities.
Incorporating EJ into Government Structures, Systems, and Policies	**3. Model Policy: Embed EJ in Strategic Plans** Agencies shall make achieving EJ part of their strategic plans in order to integrate EJ into agencies' protocols and processes. **4. Model Policy: Dedicated EJ Staff in State Agencies** Agencies will have at least one staff position dedicated to integrating EJ principles specifically, and equity more broadly, into agency actions. **5. Model Policy: Incorporate EJ in State Environmental Laws** EJ considerations should be incorporated into a range of state environmental laws. Further, environmental and natural resource state agencies should consider EJ in developing agency request legislation, analyzing bills during legislative session, and conducting rule reviews.
Investing Equitably	**6. Model Policy: Required use of EJ Analysis** Agencies should adopt, and the Legislature should consider, requiring EJ analyses, including but not limited to the use of the Environmental Health Disparity Map, that combine the cumulative impact of environmental health indicators such as environmental exposures, environmental effects, impact on sensitive populations, and other socioeconomic factors. **7. Model Policy: Equitably Distribute State Environmental Investments** For new and existing revenue and expenditures with an environmental nexus, the state Legislature and agencies should equitably distribute investments ensuring that resources are allocated to the most overburdened communities. **8. Model Policy: Contracting Prioritizes High Labor Standards & Diversity** Work funded by state environmental investments should increase inclusion in contracting with minority, women, and veteran-owned enterprises in alignment with the Governor's Subcabinet on Business Diversity led by the Office of Minority and Women's Business Enterprises, and have high labor standard requirements that value workers' health and safety, regardless of whether a public or private entity is the beneficiary of the new spending, except where legally prohibited from doing so. **9. Model Policy: Study Opportunities for Reparations in WA** As one strategy for achieving EJ, WA state government should study reparations as a mechanism to address health disparities and historical harms affecting overburdened communities. The state should focus on the unpaid debts from slavery and colonization, the legacy of redlining, treaty violations, forced exclusion, and neighborhood segregation in Washington, as well as the impact that systemic racism has had on Black, Native, Indigenous, Latinx, Asian communities and others.

Improving Environmental Enforcement	**10. Model Policy: Ensure Accessible Enforcement & Reporting Processes** The EJTF recommends ensuring that enforcement and reporting processes are accessible to overburdened communities by elevating awareness and addressing barriers to access (such as technology, literacy, and language). **11. Model Policy: Support for Supplemental Environmental Projects** Agencies with enforcement responsibilities should, to the extent practicable and appropriate, support the inclusion of "Supplemental Environmental Projects" (SEPs) in settlement agreements.

Environmental Health Disparities Map Recommendations

The second set of recommendations in this report focus on the Environmental Health Disparities (EHD) map. The Washington Tracking Network (WTN) and the EHD Map are publicly available tools that bring much needed attention to environmental and human health conditions statewide, and integrate data and analyses that can support pro-equity planning in a number of agency activities. While individual agencies will determine how best to integrate these tools, one approach is to prioritize the integration of the EHD map into community engagement, grants programs, rulemaking, capital investment, and other activities that have direct impacts on communities.

Recommendations for How to use the EHD Map to Identify Overburdened Communities	**12. EHD Map:** The EJTF recommends that state agencies consider four initial ways of using the WTN mapping tools and EHD data in agency activities. These suggestions are based on using the map as it currently exists, either in its online form or as exported map EHD data tables for integration with agency data. I. Build demographic and environmental context to guide and inform place-based activities. II. Conduct EJ review and analysis as routine practice for programs and projects. III. Center EJ as the priority intended outcome in resource allocation decision processes. IV. Evaluate and measure reductions in disparities through service equity improvements. **13. EHD Map:** Use the overall EHD map rank 9 and 10 as a starting point to identify overburdened communities. **14. EHD Map:** Develop technical guidance for practitioners. **15. EHD Map:** Adopt equity tools and analyses in agency practices. **16. EHD Map:** Set environmental health disparity reduction goals and track progress towards those goals.

Key Recommendations for Addressing Structural Barriers to Community Engagement

The third and final set of recommendations in this report address common barriers to meaningful community engagement (CE), based on barriers identified with input from EJTF members and the public. Refer to the *Community Engagement Plan Guidance* (Appendix C) developed by the EJTF's Community Engagement Subcommittee to assist with the implementation of these CE recommendations.

Recommendations for Addressing Structural Barriers to Community Engagement	**17. CE:** Each agency develops a community engagement plan, which must include the elements outlined in the EJTF's *Community Engagement Plan Guidance* (Appendix C). **18. CE:** Agencies evaluate new and existing services and programs for community engagement using a systematic process to determine outreach goals. These evaluations weigh the goals of the service or program, potential for its impact on the public, its importance to the community/ies being impacted, and the makeup of the impacted community. These evaluations determine the agency's level of engagement for the project and the potential for outcomes the public can see from their engagement in the process. **19. CE:** When planning outreach activities, agencies use screening tools that integrate spatial, demographic, and health disparities data to understand the nature and needs of the people who may be impacted by agency decisions. The Task Force's recommended use of the Environmental Health Disparities map to build the demographic and environmental context to guide and inform place-based activities is a key example. This initial screening is followed by further research with local people and organizations as needed. **20. CE:** When agency decisions have potential to significantly impact a specific community (as determined by the evaluation described above in recommendation 18), agencies should work with representatives of that community to identify appropriate outreach and communication methods. Significant impact includes potential changes to critical determinants of health such as legal rights, finances, housing, and safety. It is particularly valuable to include community members in oversight, advisory, program planning, and other processes. Washington's Department of Health community health worker program serves as one model. **21. CE:** When agencies ask for representation from a specific geographic or cultural community, the agencies actively support such representation in recognition of the costs of engagement borne by community members where allowable by state law and agency policy. Doing so would reduce barriers to engagement presented by trading time and/or money to learn about and engage in the agency's process, such as taking time from work, finding childcare, and arranging for transportation.

CONTINUED: **Recommendations for Addressing Structural Barriers to Community Engagement**	**22. CE:** In alignment with the Office of Financial Management's Model Diversity, Equity, and Inclusion Policy, agencies should use equity-focused hiring practices and inclusion-focused professional development to build and support an internal staff that represents the cultural and racial makeup of the population they serve. **23. CE:** When an agency's program or service has potential to impact Tribal and/or Indigenous people or their resources, the agency includes those groups in their community engagement work, using tailored approaches based on the needs of the Tribe. Note that community engagement is distinct from and not a substitute for formal government-to-government or cultural resource consultation. **24. CE:** Agencies conduct compliance reviews of existing laws and policies that guide community engagement, and where gaps exist, ensure compliance for the following laws in agency service and program budgets: • Title VI of the Civil Rights Act, prohibiting discrimination based on race, color, or national origin and requiring meaningful access to people with limited English proficiency. • Executive Order 05-03 requiring Plain Talk when communicating with the public. • Executive Order 13166, requiring meaningful access to agency programs and services for people with limited English proficiency. **25. CE:** Change state laws that restrict agencies from purchasing goods and services, such as childcare and food, which support broad community participation. **26. CE:** In cooperation with the Governor's Subcabinet on Business Diversity, led by the Office of Minority and Women's Business Enterprises, agencies should increase contracting diversity by proactively engaging and contracting with local organizations that are community-based, community-rooted, and community-led to improve community health outcomes and eliminate environmental injustices across Washington state.

Addressing EJ Means Addressing Current Crises

Now is the time to take action. The EJTF acknowledges that Washington state is in the midst of four concurrent crises: COVID-19, police use of force and racial injustices, climate change, and an economic recession. Each of these crises adds disproportionate burden to the already overburdened communities at the center of the environmental justice movement. An EJ framework is useful in addressing these crises, and if state government chooses to prioritize its collective resources and expertise, we can make great strides toward a more equitable and resilient Washington.

Words Hold Power

The Environmental Justice Task Force (EJTF) is committed to an asset-based framing throughout this report, particularly when it comes to communities experiencing environmental injustices. Words have the power to be divisive, as well as create and perpetuate harm. Words also have the power to uplift, affirm, and value one another and our lived experiences.[2] In the environmental justice (EJ) discipline, there are many terms that are used to describe communities who experience disproportionate exposure to environmental burdens such as "EJ communities", "fenceline communities", and "highly impacted communities".

After careful consideration and community input, the EJTF is using the term "overburdened" when referring to communities or populations with EJ concerns.

"Overburdened communities" are communities who experience disproportionate environmental harms and risks due to exposures, greater vulnerability to environmental hazards, or cumulative impacts from multiple stressors.

The term "overburdened" recognizes that society has decided, implicitly and explicitly, to value some communities and populations more than others. Overburdened communities are exposed to more environmental hazards. They live with the risks and consequences of decisions outside their control and experience far fewer benefits. Conversely, other communities and populations experience far more benefits with far fewer burdens.

"Overburdened" forces us to ask: *What* are the burdens faced by these communities, *who* is benefiting from the burdens, and *why* are these particular communities burdened in the first place? The term "overburdened" recognizes that a community may be facing the cumulative impacts of social, environmental, and economic burdens.

The EJTF understands that this term may evolve as engagement with overburdened communities continues in Washington state.

Prioritizing Environmental Justice in Washington

What is Environmental Justice?

Environmental justice is rooted in the belief that everyone—regardless of race, ethnicity, language, income, or other demographic factors—has the right to live, learn, work, and play in a clean, safe, and healthy environment. We will know that we have successfully achieved EJ when we eradicate health inequities caused by environmental hazards.

[2] Refer to Appendix A for a glossary of key terms used in this report.

Black, Indigenous, and People of Color (BIPOC) communities have been, and continue to be, the primary leaders of the EJ movement in the United States. Civil Rights giants such as Cesar Chavez, Dolores Huerta, and Larry Itliong created the United Farm Workers labor union in 1962 in part to fight for greater protection from toxic chemicals for farmworkers.[3] In the final moments of his life, Dr. Martin Luther King Jr. marched with Black sanitation workers in Memphis to protest low wages and unsafe working conditions.[4]

The fight for EJ caught traction in 1982 in a low-income, Black community in Warren County, North Carolina where residents and their allies protested against bringing 6,000 truckloads of soil laced with toxic polychlorinated biphenyls (PCBs) into their community. Six weeks of protests, including the first ever arrests over the siting of a landfill, put more than 500 people in jail in the name of EJ. The people of Warren County ultimately lost the battle in their backyards, but this injustice ignited the fight for EJ across the country. EJ activists organized and educated the nation about environmental racism throughout the 1980s and 1990s (Figure 1) leading up to President Clinton's EJ Executive Order (EO).[5] This activism led to further study of environmental hazards, which unveiled that pollution producing facilities were disproportionately and intentionally placed in poor communities of color.

Figure 1. Brief History of Early EJ Milestones

[3] "UFW History". 2020. *UFW*. https://ufw.org/research/history/ufw-history/.
[4] "Memphis Sanitation Workers' Strike". 2020. *The Martin Luther King, Jr., Research and Education Institute*. https://kinginstitute.stanford.edu/encyclopedia/memphis-sanitation-workers-strike.
[5] Renee Skelton and Vernice Miller. 2020. "The Environmental Justice Movement". *NRDC*. https://www.nrdc.org/stories/environmental-justice-movement.

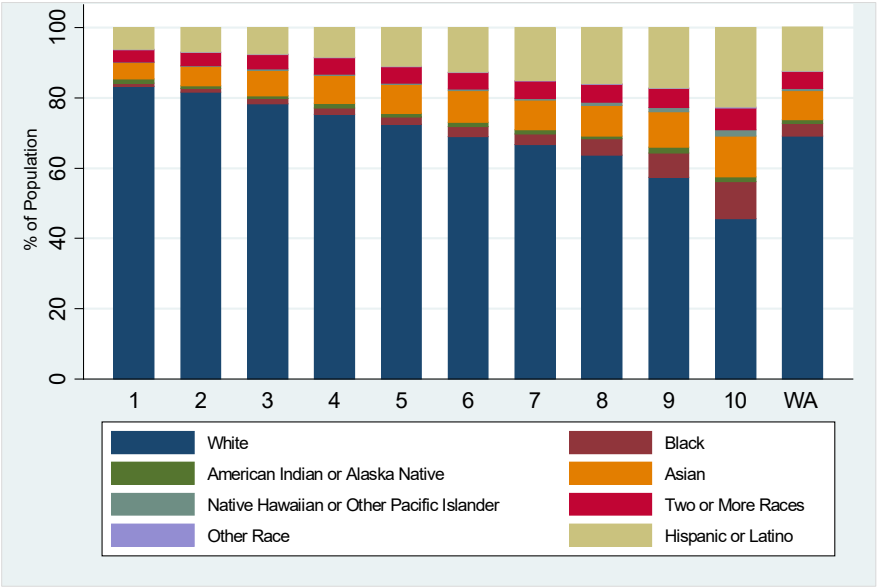
Disproportionate Environmental Exposures

Achieving health equity requires that Washington prioritize and strategically address environmental injustice. Racially and economically segregated neighborhoods across the United States are the resulting legacy of redlining and other racist and discriminatory policies. These policies have led to the continued divestment of BIPOC neighborhoods which has contributed to the racial wealth gap[6] and has made it exceptionally difficult for BIPOC and low-income communities to access safe and healthy homes, schools, jobs, and community spaces.

Washington state studies reflect the findings of national EJ research,[7,8] that people of color and low-income people continue to be disproportionately exposed to environmental hazards in their communities.

The 1995 Washington State Department of Ecology's Environmental Equity Study and the 2001 Washington State Board of Health's EJ report concluded that contaminated sites, entities that produce regulated hazardous waste, incinerators, and solid waste landfills are more concentrated in low-income and BIPOC communities. Furthermore, these reports also stated that the disproportionate number of facilities in these communities likely result in higher levels of exposures to environmental hazards and potentially assume a higher risk of adverse health outcomes.[9,10] These exposures are compounded with factors

Figure 2. Race and Ethnicity by Environmental Health Disparity Rank



[6] Kriston McIntosh, et al., "Examining the Black-White Wealth Gap," Brookings, February 27, 2020, https://www.brookings.edu/blog/up-front/2020/02/27/examining-the-black-white-wealth-gap/.
[7] Commission for Racial Justice, United Church of Christ, "Toxic Wastes and Race in the United States: A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites," (1987): https://www.nrc.gov/docs/ML1310/ML13109A339.pdf.
[8] Robert D. Bullard, et al., "Toxic Waste and Race at Twenty: Why Race Still Maters After All of These Years," (Spring 2008), https://www.jstor.org/stable/43267204?seq=1.
[9] https://p2infohouse.org/ref/14/13244.pdf Environmental Equity Study in Washington State. Department of Ecology. Publication Number 95-413. October 1995.
[10] Committee Final Report State Board of Health Priority: Environmental Justice (June 2001), https://www.digitalarchives.wa.gov/do/F093B7854B3FFB31174507C2F873DC56.pdf.

such as racism, stress, and poverty that, on their own, are associated with poorer health outcomes and shorter life expectancies.

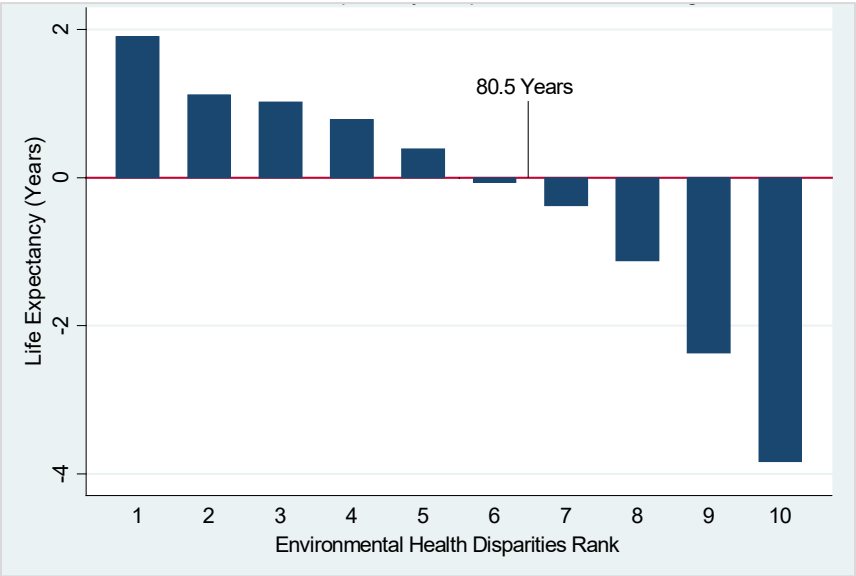
Race/Ethnicity and Environmental Health Disparities

Examining publicly available data from the Washington Tracking Network (WTN) illustrates the disproportionate burdens faced by BIPOC communities and people living in poverty. These data show that census tracts with greater environmental health disparities (EHDs) also have greater percentages of BIPOC communities than census tracts with fewer EHDs when analyzing the environmental health disparities rank for communities. Figure 2[11] shows that census tracts with the lowest EHD rank are 83.2% white, 0.9% Black, and 6.2% Hispanic or Latino, while census tracts with the highest EHD rank are 45.6% white, 10.5% Black, and 22.7% Hispanic or Latino. Black Washingtonians were ten times respectively more likely to live in the highest ranked census tract than the lowest ranked census tract. If race was not associated with EHDs, one would expect the census tracts to have similar racial proportions.

Life Expectancy and Environmental Health Disparities

Living in areas with more environmental hazards and pollution is associated with a shorter lifespan. Figure 3 illustrates the difference in life expectancy compared to the state average. These data show a linear association between a census tract's EHD rank and life expectancy. Namely, the data indicate a 5.7 year difference in life expectancy among census tracts.[12] In other words, the population in census tracts with the lowest environmental health disparities (rank 1) on average lived 5.7 years longer than those in census tracts with the highest environmental health disparities (rank 10).

Figure 3. Difference in Life Expectancy by EHD Rank Compared to the State Average



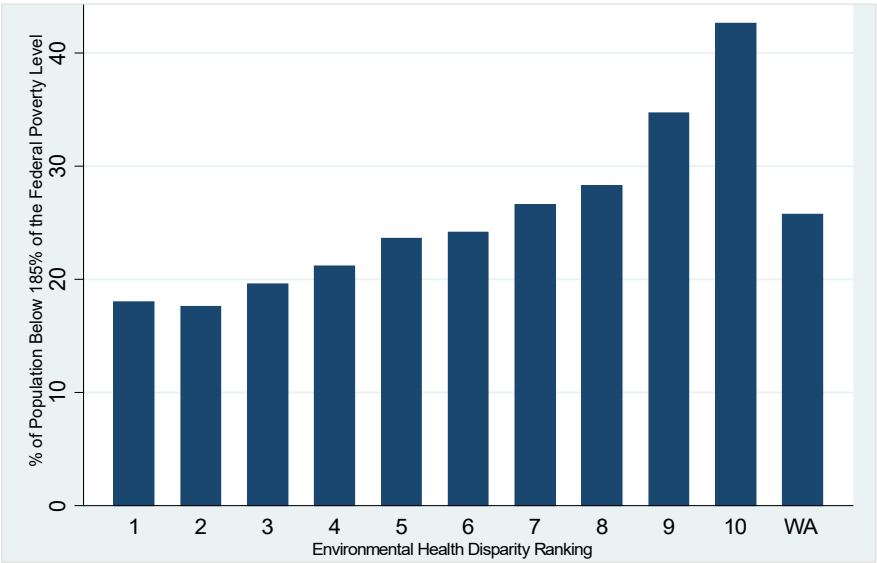
[11] See Appendix F for more information on the methods and analysis used to create the bar graphs (Figures 2-4) from WTN data.

[12] The U.S. Census Bureau defines census tracts as, "…small, relatively permanent statistical subdivisions of a county or equivalent entity….Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people." For more information visit: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_13.

Poverty and Environmental Health Disparities

There is also a linear association between EHD rank and poverty. Figure 4 shows that the poverty rate in the highest EHD ranked census tract (rank 10) is more than double that of the lowest EHD ranked census tract (rank 1).

Figure 4. Poverty by Environmental Health Disparity Ranking



While the EHD map plays an important role in raising awareness and contributing to our understanding of environmental and health disparities, these data cannot and do not reflect the lived experiences of communities. Nor are the findings above surprising for frontline communities and social justice advocates across the state. Environmentally overburdened communities have given voice to the challenges they face, and demand accountability for the impacts to their health and environment.

Foundational to the EJ movement, and essential to our collective work towards equity, is grounding our efforts in a community led vision and centering the voices of those most impacted. The following EJ concerns and observations are from community members who shared their stories during EJTF public meetings or with the EJTF's community engagement coordinator. These accounts highlight only a couple of the issues communities across Washington have raised. The following are intended to provide brief, illustrative examples of concerns voiced by community members who participated in EJTF meetings and discussion.

Lower Yakima Valley: Water and Soil Contamination

Concerns were raised by the public during EJTF meetings that communities in the Yakima Valley are overburdened by pollution and have EJ issues affecting their health and daily lives. During the EJTF's public meeting in Yakima, a community member shared her family's experience with contaminated well water due to high nitrate levels that she attributed to neighboring farms. She reported that several of her family members became seriously ill as a result.

Her family replaced their well, yet continue to be concerned about unsafe drinking water after over 1,800 cows died nearby during a severe blizzard in 2019. She described that while some carcasses were sent to Oregon and local landfills, 950 dead cows remained on two Lower Yakima Valley dairies after exhausting all other composting options, which created the potential for environmental health hazards. Community advocates are now worried about pathogens and

endotoxins potentially infiltrating the water supply, as well as other hazards that might cause adverse health outcomes in the region. They have been vocal about their concerns of insufficient monitoring of air, water, and soil after they witnessed composting cow carcasses in their communities. Lower Yakima Valley community members are asking for increased monitoring of domestic wells for nitrate and bacterial contamination.

Farmworkers: Working and Living Conditions during a Pandemic

Farmworkers, who feed our state and are a critical contributor to our economy, were designated as essential workers and have continued to work during the COVID-19 pandemic. Agricultural workers and advocates have spotlighted the injustice of working in conditions where laborers and their families risk exposure to pesticides, wildfire smoke, and the coronavirus each day – often without adequate compensation or access to affordable health care. The COVID-19 crisis has also elevated attention to the inadequacies of housing for farmworkers. Densely populated farmworker housing may not allow for physical distancing, or safely quarantining when individuals within a housing unit are exposed to COVID-19 or test positive for the virus.

In Washington, farmworkers are disproportionately people of color, the majority of whom are Latinx. There are many reasons workers may be less willing to raise concerns or organize for their health and safety, including language barriers, overt intimidation, fear of retaliation, and concerns about jeopardizing immigration or their H-2A visa status. However, farmworkers in Yakima went on strike in the spring of 2020 to bring attention to their working and living conditions and demands for COVID-19 safety measures such as improving physical distancing while at work, a hazard pay increase, employer-provided masks, and protection from retaliation for protesting.

Environmental Justice in Washington State

Washington state has a rich environmental justice history built by leaders from community, advocacy organizations, and government who challenged injustice and fought for change. This critical work continues to grow and transform Washington into a place where all people thrive in safe and healthy homes, neighborhoods, schools, and jobs. The EJTF builds upon this foundation. The following highlights some of the key EJ efforts that has shaped this work in WA.

Community Activism in Washington State

Organizing in Washington around EJ gained momentum in the early 1990s, elevating public awareness about the devastating legacy of US Government uranium mining on the Spokane Indian Reservation and 40 years of federal military plutonium production at the Hanford site, dairy farm waste and farmworkers protections in the Yakima Valley, air pollution in south Seattle and the International District, and industrial chemical contaminants in the Duwamish Waterway, to name a few. In 1993, the Community Coalition for Environmental Justice was established by people of color organizing for social, economic, environmental, and health

justice in Washington. This advocacy continues to grow across the state, championed by organizations such as Got Green and Puget Sound Sage. In 2014, the coalition Front & Centered was formed to harness the collective power of advocates united by the common goals of racial and economic justice, climate justice, and environmental justice and stewardship. Front & Centered currently has 63 member organizations across the state, and has a representative who is serving as Co-Chair of the EJTF.

Legislative Study

In 1993, the Honorable Senator Rosa Franklin[13] proposed that Washington conduct an environmental equity study. The Legislature funded the Department of Ecology to assess whether the distribution of facilities and toxic chemical releases were distributed equally. Results of this study showed that low-income communities and communities of color were disproportionally impacted by pollution in Washington state.[14]

Washington State Board of Health

The Washington State Board of Health identified EJ as a top priority in 2000-2001, promoting the concept of "One Washington" – the goal that all residents experience the benefits of a healthy environment. The Board focused on raising awareness of EJ issues by publishing articles, giving presentations, and attending numerous community forums related to EJ. The Board also encouraged state and local agencies to incorporate EJ principles into agency practices and convened a short-term Interagency Workgroup on EJ that focused on creating a set of guidelines to promote EJ in government decision making for agency staff.[15]

Governor's Interagency Council on Health Disparities

The Council was established in 2006, and is responsible for identifying priorities and creating recommendations for the Governor and Legislature on ways to promote health equity and eliminate health disparities in Washington. The Council has and continues to serve as one of the only state agency forums to engage and communicate with the public on issues of health equity. In 2012, the Council convened an Environmental Exposures and Hazards Advisory Committee to identify actions to reduce the disproportionate health impacts from environmental exposures and hazards. Based on the work of this Advisory Committee, the Council's 2012 Action Plan's leading recommendation was that "Washington state should make a clear commitment to environmental justice."[16]

[13] Washington State Senator (D-Tacoma) from 1993 to 2010. She led state efforts addressing EJ and health equity.
[14] Environmental Equity Study in Washington State. Department of Ecology. Publication Number 95-413. (1995): https://p2infohouse.org/ref/14/13244.pdf.
[15] Committee Final Report State Board of Health Priority: Environmental Justice (2001): https://www.digitalarchives.wa.gov/do/F093B7854B3FFB31174507C2F873DC56.pdf.
[16] Governor's Interagency Council on Health Disparities. "State Policy Action Plan to Eliminate Health Disparities". (2012): http://healthequity.wa.gov/Portals/9/Doc/Publications/Reports/HDC-Reports-2012-Action-Plan.pdf.

Washington State Department of Ecology

After Ecology's publication of Washington's first statewide EJ study in 1995, the agency has continued to expand its EJ commitments and capacity. An Environmental Justice & Title VI Senior Advisor, EJ Committee, and Civil Rights Compliance Team currently support these efforts at the agency. EJ and equity are core elements of Ecology's strategic plan, integrated into its rulemaking and public engagement processes, and is also prioritized in several grant programs. The agency strives to support EJ through collaboration with various external partners, and was a core partner in the development the EHD map.

Washington State Department of Health

In 2006, the Department of Health convened the Environmental Public Health Community Equity Workgroup to address EJ. In 2010, they committed to the "Agenda for Change",[17] which focused on providing equal opportunities for all residents to live in healthy environments no matter what background they come from.

Creation of the Washington Environmental Health Disparity Map

In 2017, Front & Centered worked with community organizations across Washington state to identify opportunities to listen to and understand EJ concerns in overburdened communities. The goal of these listening sessions was 1) to identify and prioritize community driven solutions and 2) to develop and advocate for equitable strategies. Communities of color, low-income households, immigrants, refugees, and linguistically isolated groups participated in these listening sessions. Community listening sessions took place across the state in 11 different communities with 178 participants from July to November 2017. Communities expressed concerns about the presence of air pollution, water and soil contamination, housing, and healthy food access.[18]

Following the conclusion of the 2017 listening sessions, Front & Centered and the University of Washington Department of Environmental & Occupational Health Sciences brought together partners from the Washington State Department of Health, the Department of Ecology and the Puget Sound Clean Air Agency. This group undertook a two-year process to develop a statewide map reflecting Washington's environmental health disparities. The EJ Mapping Work Group's primary goal was to develop a way to identify communities most affected by cumulative environmental health impacts, and resulted in the Environmental Health Disparities map (EHD map). Details and guidance for how to use the EHD map are provided later in this report.

[17] Washington State Department of Health. "Agenda for Change". 2010. https://www.doh.wa.gov/ForPublicHealthandHealthcareProviders/PublicHealthSystemResourcesandServices/PublicHealthImprovementPartnership/ProductsandResources/AgendaforChange.

[18] Washington State Department of Health. "Environmental Health Disparities Map." https://deohs.washington.edu/sites/default/files/images/Washington_Environmental_Health_Disparities_Map.pdf.

The Healthy Environment for All (HEAL) Act – SB 5289 & HB 2009

Soon after the EHD Map was finalized, Senator Rebecca Saldaña and Representative Kristine Reeves sponsored The Healthy Environment for All (HEAL) Act. The bill would have created a definition of EJ in Washington state law; required the use of EHD map in a range of agency activities including policy development, enforcement, and investments; and would have created a community-agency task force to develop guidance for agencies on implementing this requirement. Furthermore, the HEAL Act would have made recommendations to the Governor, Commissioner of Public Lands, and the Legislature on how to incorporate EJ principles and policies into state law and government processes. While each bill passed their respective houses, the Legislature did not ultimately pass the bill.

However, a budget proviso was included in the 2019-2021 biennial operating budget (ESHB 1109, section 221, subsection 48) that directed the Governor's Interagency Council on Health Disparities to convene and staff the EJTF. Details on the membership, responsibilities, and processes are included later in this report.

Clean Energy Transformation Act (SB 5116)

In 2019 the Washington State Legislature passed the Clean Energy Transformation Act (CETA),[19] accelerating a move to 100% clean electricity use in WA. The law addresses EJ in a number of ways, including requiring equitable distribution of clean energy benefits and reduction of burdens to highly impacted populations. CETA requires utilities to do an analysis based on the cumulative impacts of communities overburdened by fossil fuel pollution and climate change in WA for integrated resource planning.[20] The Washington State Department of Commerce and the Utilities and Transportation Commission are currently developing rules to implement this requirement. The legislation also requires the Washington State Department of Health to develop another map on the Washington Tracking Network (WTN) to designate communities that are highly impacted by climate change and fossil fuels. The Department of Commerce is also updating the State Energy Strategy, which includes a focus on improving the quality of life for people of color and low-income communities and ensuring frontline communities and communities of color equitably benefit from the transition to clean energy.[21]

Local Government Initiatives

City of Tacoma's EJ Leaders Workgroup

[19] "Chapter 19.405 RCW: Washington Clean Energy Transformation Act". 2019. *Washington State Legislature*. https://app.leg.wa.gov/RCW/default.aspx?cite=19.405.

[20] "RCW 19.280.030: Development Of A Resource Plan—Requirements Of A Resource Plan—Clean Energy Action Plan". 2019. *Washington State Legislature*. https://app.leg.wa.gov/RCW/default.aspx?cite=19.280.030.

[21] "2021 State Energy Strategy". 2020. *Washington State Department of Commerce.* https://www.commerce.wa.gov/growing-the-economy/energy/2021-state-energy-strategy/.

In 2016, the Tacoma City Council published the Environmental Action Plan and pledged to provide guidance and investments to meet the plan's goals, which include transportation, reducing emissions, air and local food, waste reduction, and buildings and energy.[22]

City of Seattle's Office of Sustainability and Environment's *EJ* Committe*e (EJC)*
The EJC is local committee that engaged over 1000 residents to develop its "Equity and Environment Agenda".[23] This committee is made up of individuals who are directly connected to the communities who disproportionately face EJ issues.[24]

King County Equity and Social Justice Initiative and Strategic Climate Action Plan
In 2016, King County published their "Equity and Social Justice Strategic Plan",[25] which developed tools to assist in equity impact assessments, community engagement, and translation policies to guide social equity and EJ work. Additionally, King County updates its "Strategic Climate Action Plan"[26] (SCAP) every 5 years, with the most recent update in 2020. The 2020 SCAP outlines the County's priorities, strategies, and commitments for climate action, with the goal to make King County more resilient, sustainable, and equitable.

Paving the Path towards EJ in Washington

Washington state government has steadily addressed EJ since the early 1990s. Each major EJ-focused effort prior to the EJTF has drawn similar conclusions to the EJTF with respect to the state of EJ in WA, and has developed comparable recommendations for how to achieve EJ. State government has examined how to embed EJ into laws, policies, programs, and processes for nearly three decades. **Now is the time to take action.**

Building room in government decision-making for the voices of underserved and overburdened communities is one necessary component of correcting current and historical harms that communities of color, low-income communities, and other affected populations in Washington have endured. The Government Alliance on Race and Equity (GARE) names the responsibility that government has in reversing these injustices and building community trust in government systems and institutions.

[22] City Of Tacoma. "Environmental Action Plan". https://www.cityoftacoma.org/government/city_departments/environmentalservices/office_of_environmental_policy_and_sustainability/climate/environmental_action_plan.
[23] City Of Seattle. "Equity And Environment Agenda." https://www.seattle.gov/Documents/Departments/OSE/SeattleEquityAgenda.pdf.
[24] City of Seattle. "Environmental Justice Committee". 2020. https://www.seattle.gov/environment/equity-and-environment/environmental-justice-committee.
[25] King County. "Equity and Social Justice Strategic Plan". (2016): https://kingcounty.gov/elected/executive/equity-social-justice/strategic-plan.aspx.
[26] King County. "King County Climate Action." (2020): https://www.kingcounty.gov/services/environment/climate/actions-strategies/strategic-climate-action-plan.aspx.

"From the inception of our country, government at the local, regional, state, and federal level has played a role in creating and maintaining racial inequity. A wide range of laws and policies were passed, including everything from who could vote, who could be a citizen, who could own property, who was property, where one could live, whose land was whose and more. With the Civil Rights movement, laws and policies were passed that helped to create positive changes, including making acts of discrimination illegal. However, despite progress in addressing explicit discrimination, racial inequities continue to be deep, pervasive, and persistent across the country…Institutions and structures have continued to create and perpetuate inequities, despite the lack of explicit intention. Without intentional intervention, institutions and structures will continue to perpetuate racial inequities."[27]

Washington state cannot achieve equity without achieving EJ. The EJTF understands that the pathway to reaching an equitable Washington is only possible through ongoing anti-racism, environmental conservation, public health, and community engagement work.

The goals of the EJ movement are clear:

- Ensure equitable protection and access.
- Undo institutional discrimination.
- Dismantle environmental racism.
- Eliminate environmental health disparities.

Addressing EJ Means Addressing Current Crises

The EJTF acknowledges that we are in the midst of four concurrent global crises: COVID-19, police use of force[28] and racial injustices, climate change, and an economic recession. An EJ framework is useful in addressing these crises, and if state government chooses to prioritize its collective resources and expertise, we can make great strides toward a more

"I'm am extremely impressed with the depth of the work the EJTF has carried out in collecting data, opinions, and then collating that into a report that draws attention to the work that must be done by the state government to move us forward. The crises facing us of climate change – visible today in our fires, COVID crisis, economic crisis as a result of the COVID crisis that highlight the economic inequities that have been with us all along, and finally the racial crisis with police brutality that have come to a boil. More and more people are having their awareness raised of the inequities in our society based on race, that has led to economic disparity, health disparity, and opportunities disparity on several fronts that just cycle back and make things worse."
-Community Member

[27] Government Alliance on Race and Equity. "GARE Racial Equity Toolkit". https://www.racialequityalliance.org/wp-content/uploads/2015/10/GARE-Racial_Equity_Toolkit.pdf.

[28] The Office of the Governor. "Governor's Task Force on Independent Investigations of Policy use of Force." https://www.governor.wa.gov/boards-commissions/workgroups-task-forces/governor%E2%80%99s-task-force-independent-investigations-police.

equitable and resilient Washington.

1. **COVID-19**: Recent scientific publications suggest that air pollutant exposure worsens COVID-19 symptoms and outcomes,[29] and a Harvard University study concluded that, "…a small increase in long-term exposure to PM2.5 leads to a large increase in the COVID-19 death rate."[30] Furthermore federal data show that there have been racial disparities in coronavirus infections and deaths nationwide.[31] Washington's Latinx population is experiencing COVID case rates that are about seven times higher, hospitalization rates that are eight times higher, and death rates that are four times higher than white Washingtonians.[32] We know our essential workers who are keeping our economy afloat often come from BIPOC communities, and are also risking their own health as they may experience unsafe work environments and overcrowded housing that contribute to the spread of the virus. If we do not incorporate an EJ and equity lens to the State's COVID-19 response and relief efforts, we can expect to see people of color and people with low-incomes experience the most adverse health and economic outcomes as a result of this pandemic.[33]

2. **Police Use of Force:**[34] Combating racism is at the heart of all EJ work, and addressing police use of force, specifically in Black communities, continues to be a key anti-racist priority. The historic origins of American policing are traced to slavery,[35,36] and racial prejudice, bias, and profiling continue to be well-documented in

> *"Until we can all breathe in every sense of the word, we cannot achieve environmental equity."*
>
> -Kurtis Robinson, President of the Spokane Chapter of the NAACP

[29] Centers for Disease Control and Prevention. "Wildfire Smoke and COVID-19: Frequently Asked Questions and Resources for Air Resource Advisors and Other Environmental Health Professionals". 2020. https://www.cdc.gov/coronavirus/2019-ncov/php/smoke-faq.html.
[30] Wu, X., et al. "COVID-19 PM2.5: A National Study on Long-Term Exposure to Air Pollution and COVID-19 Mortality in the United States". Harvard University. 2020. https://projects.iq.harvard.edu/covid-pm.
[31] Oppel, Richard, et al. The Fullest Look Yet at the Racial Inequity of Coronavirus. The New York Times. 2020. https://www.nytimes.com/interactive/2020/07/05/us/coronavirus-latinos-african-americans-cdc-data.html?action=click.
[32] Washington State Department of Health. "COVID-19 Morbidity and Mortality by Race, Ethnicity and Language in Washington State". 2020. https://www.doh.wa.gov/Portals/1/Documents/1600/coronavirus/data-tables/COVID-19MorbidityMortalityRaceEthnicityLanguageWAState.pdf.
[33] For more information on the intersection between EJ and COVID-19, see the EJTF Co-Chairs' letter to the Governor in Appendix H.
[34] The Office of the Governor. "Governor's Task Force on Independent Investigations of Policy use of Force." https://www.governor.wa.gov/boards-commissions/workgroups-task-forces/governor%E2%80%99s-task-force-independent-investigations-police.
[35] Kappeler, Victor. "A Brief History of Slavery and the Origins of American Policing". https://plsonline.eku.edu/insidelook/brief-history-slavery-and-origins-american-policing.
[36] American Police. NPR, June 4, 2020. https://www.npr.org/2020/06/03/869046127/american-police.

research on disparities in the criminal justice system, sentencing, incarceration, and policing outcomes for Black, Indigenous, and other people of color.[37,38,39] The persistent role of race in modern day policing is evident, especially in the most extreme cases, where the use of deadly force has cut too many lives short.[40] A 2020 study by researchers at Harvard found that Black Americans were over three times more likely than white Americans to be killed by police.[41] The psychological[42] and physical harms to individuals, families, and communities is multi-generational and devastating. The failure to address these inequities has, again, led to an uprising against racism following the killings of George Floyd and Breonna Taylor by police officers.[43]

3. **Climate Change**: Climate change is affecting Washingtonians now. The Quinault people, whose ancestors lived and fished on their traditional land since time immemorial, are facing environmental threats due to tsunami risk, storm surge, and riverine flooding along the WA coastline. These reoccurring natural disasters have forced the Quinault Nation to relocate to higher ground.[44] Tragically, these circumstances are not unique to the Quinault as many of Washington's Tribal Nations are experiencing the life-changing effects of environmental degradation.[45] Furthermore, climate change has contributed to an even more dangerous wildfire season which is especially challenging during the COVID-19 pandemic.[46] The Washington State Department of Health (DOH) recognizes the, "…concern about the health impacts of wildfire smoke overlapping with COVID-19 because both impact respiratory and immune systems. COVID-19 restrictions limit how

[37] Katherine B. Spencer , Amanda K. Charbonneau and Jack Glaser. "Implicit Bias and Policing". Social and Personality Psychology Compass. (2016): 50–63, 10.1111/spc3.12210. https://oag.ca.gov/sites/all/files/agweb/pdfs/ripa/study-glaser.pdf.

[38] Jelani Jefferson Exum. "Sentencing Disparities and the Dangerous Perpetuation of Racial Bias". 26 Wash. & Lee J. Civ. Rts. & Soc. Just. 491 (2020). https://scholarlycommons.law.wlu.edu/crsj/vol26/iss2/5.

[39] Omori, M., & Johnson, O. "Racial Inequality in Punishment." Oxford Research Encyclopedia of Criminology. (2019): https://oxfordre.com/criminology/view/10.1093/acrefore/9780190264079.001.0001/acrefore-9780190264079-e-241.

[40] "Say Their Names List 2020". https://sayevery.name/.

[41] Schwartz GL, Jahn JL (2020) Mapping fatal police violence across U.S. metropolitan areas: Overall rates and racial/ethnic inequities, 2013-2017. PLoS ONE 15(6): e0229686. https://doi.org/10.1371/journal.pone.0229686

[42] Bowleg, L. et al. "Negative Police Encounters and Police Avoidance as Pathways to Depressive Symptoms Among US Black Men, 2015–2016". American Journal of Public Health. 2020. https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2019.305460.

[43] Williamson, V., Trump, K., & Einstein, K. (2018). Black Lives Matter: Evidence that Police-Caused Deaths Predict Protest Activity. Perspectives on Politics, 16(2), 400-415. doi:10.1017/S1537592717004273.

[44] Quinault Indian Reservation. "Taholah Village Relocation Master Plan". http://www.quinaultindiannation.com/planning/projectinfo.html.

[45] Northwest Treaty Tribes. "Climate Change Impacts to Tribal Rights and Resources". 2016. https://nwtreatytribes.org/climatechange/.

[46] Centers for Disease Control and Prevention. "Wildfire Smoke and COVID-19: Frequently Asked Questions and Resources for Air Resource Advisors and Other Environmental Health Professionals". 2020. https://www.cdc.gov/coronavirus/2019-ncov/php/smoke-faq.html.

we can reduce our exposure to wildfire smoke."[47] There are several shared goals between the climate and environmental justice movements. The cumulative effects of climate change and environmental injustices are most adversely affecting BIPOC and low-income communities.[48] As Washington continues to take climate change seriously, we need to prioritize the communities that are most overburdened by pollution.

4. **Economic Recession**: Washington state's decision makers will need to make tough budget decisions due to the steep, and likely long-lasting, economic downturn due to COVID-19. The EJTF has had several conversations about prioritizing overburdened communities through the equitable distribution of resources and investments, which is reflected in our recommendations. The year 2020 has highlighted and exacerbated numerous challenges and has presented several urgent, competing priorities. However, one thing remains consistently apparent: our economy is reliant on the health of our people and the health of our environment. We are reckoning with the fact that our economy would collapse without our essential workers, many of whom do not earn livable wages and are often a part of BIPOC communities who often also experience environmental injustices. Washington state government has the power to lift up those who have kept us afloat throughout this pandemic and economic recession by ensuring their right to safe, clean, and healthy environments. The state budget explicitly articulates the State's priorities, which means the State's decision makers have the opportunity to reaffirm their commitment to social and racial justice in the actions they take next.

"We seem to forget that everything that is good for the environment is a job. Solar panels don't put themselves up. Wind turbines don't manufacture themselves. Houses don't retrofit themselves and put in their own new boilers and furnaces and better-fitting windows and doors. Advanced biofuel crops don't plant themselves. Community gardens don't tend themselves. Farmers' markets don't run themselves. Every single thing that is good for the environment is actually a job, a contract, or an entrepreneurial opportunity."
- Van Jones, Social Justice Advocate

The Work that Lies Ahead

Often it is the responsibility of state agencies whose work directly touches the environment and public health to achieve EJ. However, EJ is clearly connected to many different facets of our government, from our education system to our police force. In order to make lasting change

[47] Washington State Department of Health. "COVID-19 and Wildfire Smoke". 2020. https://www.doh.wa.gov/CommunityandEnvironment/AirQuality/SmokeFromFires.
[48] University of Washington. An Unfair Share Exploring the Disproportionate Risks from Climate Change Facing Washington State Communities. (2018): https://cig.uw.edu/wp-content/uploads/sites/2/2018/08/AnUnfairShare_WashingtonState_August2018.pdf.

happen for Washington's overburdened communities who experience the most extreme environmental health disparities, **it will take the work of *all* state agencies** to meaningfully partner with communities and identify how they can take an active role in addressing EJ by promoting safe, clean, and healthy environments for all.

Meaningful engagement and government transparency are central tenets of EJ. The following questions can help guide state government as it continues to advance EJ in Washington.

1. How is state government increasing transparency?
2. How is state government institutionalizing and demonstrating intentionality to eliminate disparities?
3. How is state government creating standards for accountability to communities, and adhering to those standards?

It is clear throughout the EJTF work that future study is needed to fully answer these questions, however, the EJTF's recommendations are focused on creating the infrastructure across the state to begin doing the necessary anti-racism, environmental conservation, public health, and community engagement work.

The Environmental Justice Task Force

Authorizing Budget Proviso

The EJTF was created through a proviso in the State's 2019-2021 operating budget (Engrossed Substitute House Bill 1109). Section 221, subsection 48 directed the Governor's Interagency Council on Health disparities to convene and staff the EJTF and outlined the EJTF's membership and reporting requirements to the Governor and Legislature. In accordance with the budget proviso quoted below, this final report includes:

- **Measurable Goal Recommendations:** "Measurable goals for reducing environmental health disparities for each community in Washington state and ways in which state agencies may focus their work towards meeting those goals."
- **Model Policy Recommendations:** "Model policies that prioritize highly impacted communities and vulnerable populations for the purpose of reducing environmental health disparities and advancing a healthy environment for all residents."
- **Environmental Health Disparities Map Recommendations:** "Guidance for using the Washington Environmental Health Disparity Map to identify communities that are highly impacted by EJ issues with current demographic data."
- **Community Engagement Recommendations:** "Best practices for increasing meaningful and inclusive community engagement that takes into account barriers to participation that may arise due to race, color, ethnicity, religion, income, or education level."

Membership

The EJTF's authorizing budget proviso outlines membership. The EJTF has two designated Co-Chairs. One Co-Chair is a community representative serving on the Governor's Interagency Council on Health Disparities. The other Co-Chair position was designated for an organization

Community Representatives

- **Co-Chair:** The Governor's Interagency Council on Health Disparities, Statewide
- **Co-Chair:** Front & Centered, Statewide
- Community to Community Development, Bellingham
- Tacoma League of Young Professionals
- Asian Pacific Islander Coalition, Spokane Chapter

Washington State Agency Representatives

- Department of Agriculture
- Department of Commerce
- Department of Ecology
- Department of Health
- Department of Natural Resources
- Department of Transportation
- Energy Facility Site Evaluation Council
- Puget Sound Partnership

Business, Labor, and Agricultural Representatives

- UAW, Local 4121 – The Union of Academic Student Employees and Postdocs at the University of Washington
- Association of Washington Businesses
- Washington State Farm Bureau

representing statewide EJ issues, which was assigned to Front & Centered.

Additionally, the EJTF includes representatives from select state agencies, a business association, an organization representing statewide agricultural interests, a labor organization, and communities across the state. The full EJTF membership list is included in Appendix B.

Bylaws and Operating Principles

Bylaws describe the operation and management of EJTF business whereas operating principles are the values that guided the EJTF throughout our work. The operating principles were adapted from those of the Governor's Interagency Council on Health Disparities, and EJTF members thoughtfully engaged with each principle to ensure the final product is reflective of our aspirations and commitment. The EJTF's operating principles are included below to highlight the EJTF's commitments and priorities.

Environmental Justice Task Force Operating Principles, Adopted November 2019

EMBRACE EQUITY

We use equity to strive for fairness and justice to ensure that everyone has the opportunity to meet their full potential. This includes the right to live and work in a healthy environment and shape decisions that improve the health of their environments. Equity takes into account disadvantage experienced by groups.[49] Equity is not equality. Equity is achievable, but requires prioritizing resources and support towards communities facing inequities. Our work prioritizes communities of color, workers, and low-income communities in both urban and rural regions of Washington. Embracing equity requires us to identify, name, and dismantle institutional racism, economic injustice, and oppression.

FOCUS ON RACISM

We are committed to promoting equity for all historically marginalized communities. We recognize that different forms of discrimination and oppression are related to each other, and we will take the intersections of various identities such as, but not limited to: the LGBTQIA+ community, women, people who are limited English proficient, people with low incomes and limited wealth, and people with disabilities into account. We also recognize that racism is ingrained in our history and deeply embedded in our institutions today, leading to the inequities we see across all sectors. We will seek to challenge and undo all forms of oppression, and are committed to making anti-racism work a primary focus.

CENTER COMMUNITY

We recognize that we can only achieve equity if the communities suffering from inequities where they live and work are at the center of our work. We acknowledge that each community knows their assets, and needs, and as such, can speak best to the viability and impact of proposed solutions. This is especially true when we build relationships with Tribal governments

[49] Governor's Interagency Council on Health Disparities. "Equity Language Guide". 2018. https://healthequity.wa.gov/Portals/9/Doc/Publications/Reports/EquityLanguageGuide_Final_.pdf

and respect treaty rights. We strive to transparently recognize and share the power we have as representatives of our organizations, and to structure our meetings to foster meaningful, community-oriented engagement. Stakeholder and community engagement will be intentional. We will create opportunities as a Task Force, individual members, and staff to listen, learn, and seek input to guide our work. We will strive to incorporate stories of lived experience into our reports and recommendations.

COMMIT TO BOLD ACTION

Inequities exist because of racism, economic injustice, and systemic oppression that hinder opportunities for individuals and communities to thrive. Eliminating racism, economic injustice, and oppression requires bold change. We commit to using our power, privilege, and collective influence to propose changes that interrupt and dismantle historical systems of oppression. We will use our time in Task Force meetings to engage in discussions that lead to actionable recommendations. We will commit as individual Task Force members to be bold and serve as champions for equity in our respective roles.

BE VIGILANT FOR UNINTENDED CONSEQUENCES

Policy, program, and budget decisions can have adverse, unintended consequences if principles of equity are not intentionally and systematically considered. We commit to using an equity lens in the development of recommendations as a Task Force and in our decisions as individual members. We, as a government entity, seek to understand that our decisions have long-term impacts. An example of that is the Seven Generation Principle[50] as standing in the present while looking back three generations to the wisdom and experience of our ancestors, thinking about issues in the current context, and planning forward for three generations for the protection of our children and the generations to come.

Task Force Meetings

The EJTF held regular public meetings throughout 2019 and 2020. The EJTF had originally planned to meet in communities across the state, but had to begin meeting virtually due to the COVID-19 statewide physical distancing mandates. In addition to the open public meetings listed in Table 1, the EJTF hosted two community listening sessions; one in

Table 1. 2019-2020 EJTF Public Meeting Dates & Locations

Date	Location
September 30, 2019	Lakewood, WA
November 21, 2019	Yakima, WA
January 14, 2020	Vancouver, WA
April 2, 2020	Virtual
May 18, 2020	Virtual
June 22, 2020	Virtual
August 7, 2020	Virtual
September 11, 2020	Virtual
September 25, 2020	Virtual

[50] The EJTF acknowledges the Tribal and Urban Indian Pulling Together for Wellness Leadership Advisory Council and the American Indian Health Commission for Washington State for sharing this articulation of the Seven Generation Principle.

Everett at the beginning of the EJTF's work in September 2019, and another in July 2020 which was held virtually.

Mapping and Community Engagement Subcommittees

The EJTF work was supported by two Subcommittees. One Subcommittee focused on the development of guidance for the EHD map (Mapping Subcommittee), and the other focused on the development of best practices related to community engagement (Community Engagement Subcommittee). Both Subcommittees were Co-Chaired by at least one EJTF member, and included a mix of EJTF members, state and local government staff, academics, EJ advocates, and community members across Washington.[51]

The Community Engagement and Mapping Subcommittees both held monthly open public meetings from December 2019 through July 2020. Subcommittee work informed the EJTF's final EHD map and community engagement recommendations. The EJTF and the public provided feedback and guidance to both Subcommittees during EJTF meetings, and after thoughtful and thorough consideration across several Task Force and Subcommittee meetings, the full EJTF formally approved Subcommittee draft recommendations.

Member Engagement

EJTF Co-Chairs and staff sought TF member feedback throughout the year. This included:

- Several one-on-one meetings with each member to better understand their agency or organization's perspectives, priorities, feedback, and ideas for consideration.
- Multiple opportunities for members to provide written comment on developing recommendations, report drafts, and general feedback.
- Invitations for members to join monthly Subcommittee meetings and to contribute to Subcommittee work.

Member Voting and Feedback Processes

Due to the diversity of perspectives, priorities, and opinions represented on the EJTF, all decisions were made with a simple majority vote. Members had the option to include a verbal or written non-majority statement in instances where their vote did not align with the majority opinion. See the *Non-Majority Opinion* and *Member Statements* sections of this report for member-provided context for where they may not have aligned with the majority opinion, or where they provided their perspectives about their experiences serving on the EJTF.

[51] See Appendix B for the Subcommittees' respective membership lists.

The EJTF "tentatively approved" each draft recommendation, which meant that members could continue to provide feedback on the recommendations until the formal adoption of the final report, when the recommendations were then considered final.

Community Engagement Strategy

The EJTF was supported by a Community Engagement Coordinator to bring in community perspectives from across the state throughout the EJTF's work. This section outlines the process the coordinator used to engage communities. With this said, the coordinator altered this general approach based on specific community needs and asks.

Figure 5. Community Engagement Process for the EJTF

1. **Broad community engagement: 6-8 weeks prior to EJTF public meeting**

Objectives: Get the word out as far and wide as possible and garner interest for participating in the EJTF's process, either in listening sessions[52] or during EJTF public meetings via: social media and website posts, emails to the EJTF listserv, and meeting invitations.

2. **Attend community, cultural, and Tribal meetings: 3-6 weeks before EJTF public meeting**

Objectives: Listen to stories, lessons, and feedback from grassroots organizations and overburdened communities. Share EJTF public meeting invitations with community representatives so they can share their stories, lessons, and feedback with the EJTF directly.

3. **EJTF Public Meeting**

Objectives: Include community voice throughout EJTF public meetings by encouraging community members to speak and participate throughout meetings. Strive for transparency by informing communities about the EJTF process and the work to date. The EJTF did not require prepared statements in order to give public comment, and when the EJTF met in-person, there was dedicated time for a community dinner, community presentations, and small group discussions between communities and EJTF members. When the EJTF held virtual meetings due

[52] EJTF staff were invited to listening sessions funded by Front & Centered, a statewide convener of community advocates working toward environmental, racial, economic, and climate justice. Front & Centered worked with local organizations and advocates to organize and lead these listening sessions in a manner that best suited their own communities. EJTF staff attended these listening sessions to learn about EJ issues across the state from community leaders and community members. EJTF staff hosted two additional listening sessions.

to COVID-19, community members were encouraged to contribute verbally and in the chat function of the virtual meeting platform.

4. After meeting follow-up

Objectives: Synthesize community stories, lessons, feedback, and desired action items for the report back to the EJTF during the next public meeting and for other community members who were not able to attend the EJTF meetings via multiple mediums. Provide information to communities about future opportunities to participate in and contribute to the EJTF's work.

Letter from the Community Engagement Coordinator

The Environmental Task Force has been working to improve how state agencies improve community engagement. This work was divided into two distinct paths, direct engagement with communities and the Community Engagement Subcommittee. I led the direct community engagement piece, which meant going out into communities and working directly with members and organizations across Washington.

An important thing to note is that I led community engagement for two statewide Task Forces, which meant I was often only able to devote 50% of my time to the EJTF. I appreciated the beautiful, synergetic way both Task Force managers and the Co-Chairs of each Task Force allowed me to work collaboratively and spend as much time as possible in communities. We worked to hold as many consecutive public meetings across the two Task Forces in the same geographic area as possible, which meant I was often able to spend multiple weeks in a community. First building connections and getting the word out to communities about an upcoming Task Force meeting, and then I often stayed the following week in the same community to do engagement work for the other Task Force.

Why is this important? It takes time to build strong relationships with communities. The most consistent feedback we heard from communities was that agencies should spend more time and resources to build relationships and develop trust with community members and organizations.

We held regional public and community meetings in Everett, Lakewood, Yakima and Vancouver before the COVID-19 pandemic. We had to transition to online and phone engagement due to COVID-19. This was difficult, but we were still able to hear from communities all across the state. I also participated in almost every community listening session that Front & Centered sponsored, which allowed me to meet and learn about even more community members and organizations across the state. In each of the Task Force's public meetings, we heard public comment from a wide variety of people with different concerns. There was also space for community voice throughout each EJTF meeting that enriched the Task Force process. Almost every EJTF meeting had a standing agenda item for a community engagement update that allowed me to report what I heard from people leading

up to the meeting during one-on-one conversations and from people who might not have been able to attend the public meeting.

Our meetings with communities often served as workshops for community members and organizations to develop and conceptualize what EJ is, identify community concerns, discuss the value of the EHD map, and improve how state agencies do community engagement. The process of distilling all the information gathered at meetings across the state gave us insight into community-identified community engagement goals.

I made a deliberate decision against reporting quantitative data such as, “This many people said x, and this many people said z”. Quantitative methodology often may not provide transformational information about *why* communities are experiencing hardships or what solutions they have to address these hardships. I do not want to discount the importance of quantitative information, but I know that I am uniquely qualified to bring a different perspective.

My grandparents and parents were farmworkers; they all got sick and never made it out of their 60s. I grew up in an agricultural community steeped in institutional racism and lived in a tough neighborhood influenced by gang culture, but at the same time, I lived in a neighborhood filled with cooperation, talent, love, and hope. I know when certain people hear my story, they understand what I mean by the contradiction that is “the struggle”. I share my story to articulate why I chose to use a qualitative methodology approach to this work.

In my experience, it is very difficult for non-BIPOC individuals to understand the nuances, attitudes and pressures facing BIPOC communities. My work as the EJTF’s community engagement coordinator has been to listen, learn, and find ways to support existing work in communities across Washington state. Through conversations, community meetings and existing work groups, I worked with communities to understand the most important EJ issues they are currently facing.

This report addresses several issues that were of high importance to communities. Communities identified barriers to their participation such as a lack of childcare, food, transportation, and language assistance at public meetings. The EJTF has made the recommendation to amend state laws in order to address these common barriers. The community shared their concerns about government oversight and its accountability to communities. The EJTF’s recommendation to incorporate environmental justice into state environmental laws, as well as equitable investment in overburdened communities are good starting places to address these concerns. This report also includes thorough guidance for developing an agency-specific community engagement plan to ensure that community voice is centered in government practices and processes.

Aside from these issues, communities have two major concerns: racism and environmental conservation. I repeatedly heard that people want to make sure that this world is a better

place for future generations, and they want the help of state agencies to make that happen—this all begins with trust.

We learned that it's about building relationships. This may seem like an oversimplification, and I imagine the initial reaction to this statement may be, "You did all this work to come up with this obvious realization?" To this, I would respond that I could go back to these communities and connect with people today, tomorrow, or next year. I am sure that many people in these communities will be more responsive to state agencies after having a positive experience with how we engaged with communities throughout the EJTF's work. We cannot erase hundreds of years of colonialism, racism, inequities, and violence committed by the government in a year, but we can do things differently. We can make an honest effort to honor people's pain and be vulnerable in a way that inspires connection and healing. People and agencies working together will lead to change, one step at a time.

--Esmael Lopez, Community Engagement Coordinator

Limitations to the EJTF Process

Tribes, Indigenous communities, and other groups who are vital to the EJ conversation were not at the decision-making table:

Tribes and Indigenous people were among the founding activists and advocates for environmental justice, but these perspectives are notably absent from this report. The EJTF acknowledges these gaps in the EJTF's recommendations and the limitations of an environmental justice report that does not include the invaluable expertise, historical perspective, and ecological knowledge of Tribes and Indigenous people. EJTF staff reached out to Puyallup, Upper Skagit, Swinomish, Yakama, and Tulalip Tribal members and government officials through visits, emails, and personal contacts. Unfortunately, staff and EJTF members were unsuccessful in filling the designated Tribal representative seat on the EJTF. The EJTF recognizes that it did not have the appropriate political standing to engage with sovereign Tribal nations, nor did it have established trusting relationships with Tribal and Indigenous organizations or representatives. This is a substantive shortcoming of the EJTF report. State government is accountable to repairing the environmental harms done to Tribes and Indigenous communities, and the path towards healing that harm includes meaningful and authentic relationships.

Due to limited staff time and the inability to conduct in-person meetings that are essential to relationship building in the wake of the COVID-19 pandemic, a more comprehensive approach to engagement ultimately was not possible. While we made every effort toward inclusion and representation of overburdened communities, our work is inherently limited to the perspectives of those who were able to participate most. Namely, the perspectives most represented in this document are from people whose time was supported financially by their jobs and whose workload allowed time to participate. In this document, there are many

instances when the EJTF speaks for people whose needs and experiences we do not fully understand, and we recognize that as a limitation to this work.

Timeframe:
The bulk of the EJTF work occurred in one year. A single year is not enough time to build relationships and trust with overburdened communities across the state, or fully understand the myriad of pressing EJ issues in Washington. Further discussion is needed to critically think about how to thoughtfully work toward environmental justice with coordination among communities, Tribes, state government, and other stakeholders.

COVID-19 Pandemic:
The EJTF had originally planned to hold at least six public meetings in different regions across Washington, but was only able to hold three in-person public meetings due to the COVID-19 pandemic. This made it difficult for EJTF members to build relationships with one another and with overburdened communities. In addition to the physical distancing mandates that made it challenging to conduct meaningful community engagement, communities overburdened by environmental hazards are often also highly impacted by COVID-19 and may not have had the capacity to participate in the EJTF process as a result. With this said, the virtual meetings did make it easier for broader community participation in public meetings, which likely would not have been possible with in-person meetings in different corners of the state. The EJTF had very large turnouts at all our virtual public meetings, including consistent participation across meetings for several community members.

Many EJTF and Subcommittee members' responsibilities shifted to directly responding to the COVID crisis. On a number of occasions, including mandatory state government furloughs for several EJTF members and staff, the EJTF's work was delayed due to the urgent nature of the COVID-19 response.

Environmental Justice Definition

Many EJ definitions exist and no single definition can perfectly capture expectations and goals that communities have been fighting for decades. The EJTF developed a recommended statewide definition for EJ that builds upon the U.S. Environmental Protection Agency's (USEPA) definition by adding the outcomes we want to see in Washington state. The EJTF recommends that the definition be adopted by all Washington state agencies to identify and address current environmental injustices and to ensure future decisions and actions promote EJ.

EJ Definition

"The fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. This includes using an intersectional lens to address disproportionate environmental and health impacts by prioritizing highly impacted populations, equitably distributing resources and benefits, and eliminating harm."

Environmental Justice Principles

The EJTF also developed EJ principles to serve as an initial blueprint for a shared vision of environmental justice in Washington State. The following EJ principles were informed by communities across the state and with recognition and reflection of the Principles of Environmental Justice adopted at the First National People of Color Environmental Leadership Summit in 1991.

Recommended use for EJ Principles

Washington state agencies and decision makers should consider these EJ principles when creating and implementing agency-specific or enterprise-wide EJ goals. The principles can also assist agencies in implementing many of the EJTF's recommendations.

Environmental Justice Principles

I. Achieve the highest attainable environmental quality and health outcomes for all people.

- Prioritize health of the land, humans, animals, air, water, and marine ecosystems.
- Create sustainable systems for production, consumption, processing, and distribution.
- Recognize the ecological unity and the interdependence of all species.
- Ensure the ethical, balanced, and responsible uses of land and resources in the interest of a sustainable Washington.
- Commit to actions that ensure all children have opportunities to reach their full health and life potential.

II. Adopt a racial justice lens.

- Commit to identifying and disrupting racism embedded in your organization, policies, protocols, practices, and decision-making.
- Dismantle all forms of racism, including environmental racism, by meaningfully partnering with communities to eliminate environmental and health disparities for Black people, Native and Indigenous people, and people of color.
- Develop public policy based on mutual respect and justice for all peoples, free from any form of discrimination or bias.
- Recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination.

III. Engage community meaningfully.

- Prioritize continuous engagement with communities who face environmental injustices and continue to be underinvested and underserved.
- Recognize that people and communities hold intersecting identities that have been subject to systemic oppression including but not limited to gender, ethnicity, and disability status.
- Focus engagement on building long-term, trust-based relationships with cultural humility.
- Adequately fund opportunities for meaningful community engagement by supporting and providing opportunities for civic voice and community capacity building that builds on existing community priorities, research, and expertise. Value different "ways of knowing"[53] and share power between governments, Tribal nations,[54] and Indigenous communities in decision-making, needs assessment, planning, implementation, enforcement, and evaluation to find community-driven solutions that are sustainable and amplify community assets.

IV. Be transparent.

- Ensure participation and decision-making processes are equitable and accessible.
- Make information easily accessible and relevant to the public and ensure communications are culturally and linguistically grounded.
- Engage community in processes early and often (e.g. planning, funding, policy, evaluation).
- Provide clarity on how the community engagement process informs government processes.

V. Be accountable.

- Embed equity and the elimination of environmental and health disparities into mission, planning, goals, and measures of progress.[55]
- Center the community in identifying the problems, solutions, and successes.
- "Close the loop" with communities by sharing how their involvement shaped and informed decisions, and by gathering feedback on how the government can continue to improve service delivery and engagement.

[53] The EJTF values epistemological differences.
[54] The EJTF recognizes the importance of engaging meaningfully with non-federally recognized Tribes, urban Natives, and the global Indigenous diaspora.
[55] Refer to the EJTF's recommendations for creating measurable goals and embedding EJ into strategic plans for guidance.

Environmental Justice Task Force Recommendations

This chapter of the report includes all EJTF recommendations for how to embed EJ into state government actions and processes. This chapter has three sections:

- **Section I:** Measurable Goals and Model Policy Recommendations
- **Section II:** Environmental Health Disparities Map Recommendations and Guidance
- **Section III:** Community Engagement Recommendations and Guidance

Each section in this chapter includes a brief description of the EJTF's responsibilities with respect to that specific set of recommendations.

I. Measurable Goals and Model Policy Recommendations

Section Overview

The Task Force is responsible for providing:

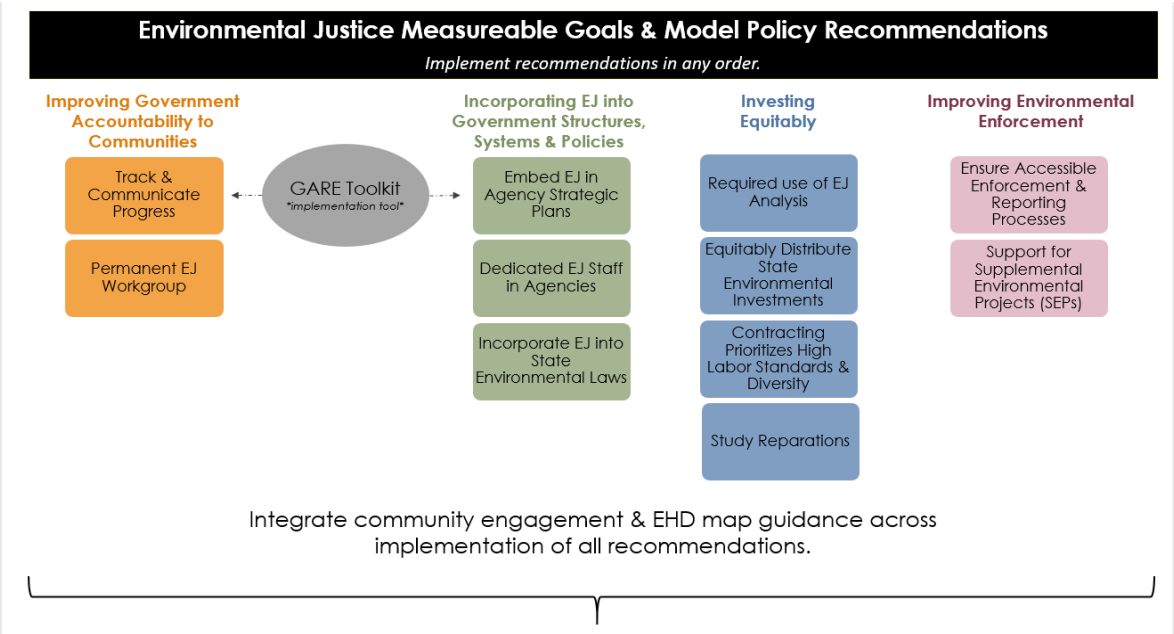
- **Measurable goals recommendations:** *"Measurable goals for reducing environmental health disparities for each community in Washington state and ways in which state agencies may focus their work towards meeting those goals."*

- **Model policy recommendations:** *"Model policies that prioritize highly impacted communities and vulnerable populations for the purpose of reducing environmental health disparities and advancing a healthy environment for all residents."*[56]

This chapter of the EJTF report includes one measurable goal recommendation and ten model policy recommendations. Figure 6 illustrates how these recommendations are further organized into four categories that name the intended outcomes the EJTF would like to see enhanced in state government:

- Improving Government Accountability to Communities
- Incorporating EJ into Government Structures, Systems, and Policies
- Investing Equitably
- Improving Environmental Enforcement

Figure 6. Overview of EJTF Measurable Goal and Model Policy Recommendations



[56] Engrossed Substitute House Bill 1109, section 221, subsection 48.

Each of the following recommendations includes "Strategies and Considerations for Implementation" that reflect the EJTF's conversations about the complexities and nuances that accompany each recommendation. These strategies and considerations were also informed by communities, stakeholders, and agencies not represented on the EJTF. Further study is needed to implement any of these recommendations, as the strategies and considerations are not meant to be comprehensive. Rather, they call attention to many of the most urgent and crucial elements of a recommendation, provide context about the purpose and rationale of a recommendation, and in some cases, provide resources and existing examples of related work.

Overarching Strategies and Considerations for Implementation:

The following considerations apply to all measurable goals and model policy recommendations, and are listed here to avoid repetition:

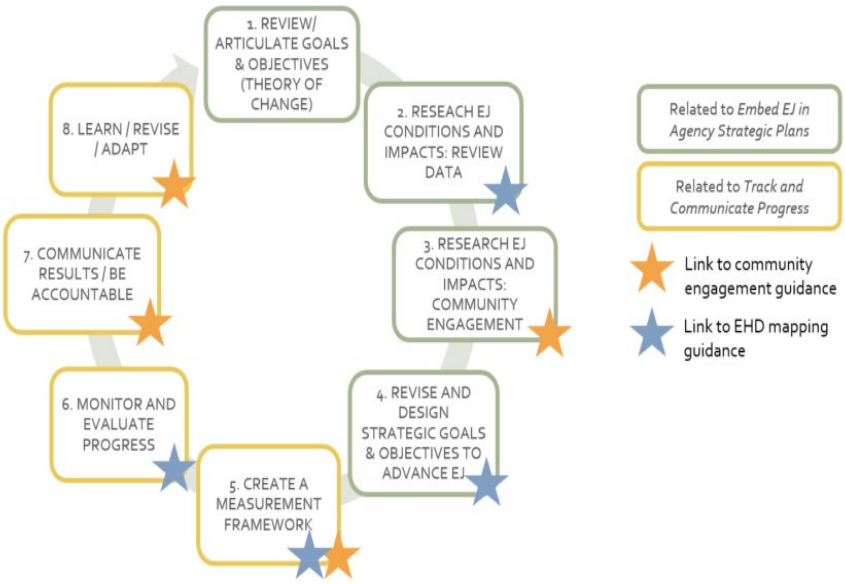
- In many instances, agencies will need additional funding, staff support, and leadership buy-in to adequately and effectively implement a recommendation.
- Select recommendations may require legislative action to support implementation. Further study is needed to determine if these same recommendations can be implemented through administrative action, legislation, or a combination of both.
- The EJTF recognizes that agency compliance with legal requirements and federal and state guidelines take precedent during recommendation implementation.
- Recommendations can be implemented in any order, although certain recommendations (e.g. "Permanent EJ Workgroup" and "Embedding EJ in Agency Strategic Plans") are meant to build a strong foundation for continued EJ work and may bolster the implementation efforts of other recommendations.
- The EJTF recognizes the need to improve coordination among state agencies to build a strong, well-maintained, and adequately funded infrastructure that will achieve EJ in Washington by addressing the needs of overburdened communities across the state. These measurable goal and model policy recommendations are focused on building this infrastructure and removing barriers so agencies can efficiently and effectively address EJ issues across Washington. Additionally, the EJTF recommends integrating the EHD map and community engagement guidance and recommendations across implementation of all measurable goals and model policy recommendations. The EHD map serves as an initial EJ analysis to assist with agency decision making, and community voices are essential to all EJ work.

Operationalizing Measurable Goals and Model Policy Recommendations: A Primer on the GARE Toolkit

Overview and Purpose

The EJTF recommendations guide state agencies on how to incorporate EJ into the core of how they do business by embedding EJ into agency strategic plans, developing systems to track, evaluate, and communicate progress in advancing equity, and EJ through agency operations and programs.

Figure 7. Embedding EJ: 8-Step Process (adapted from GARE racial equity toolkit)



Washington state agencies can learn directly from the work of the Government Alliance on Racial Equity (GARE). GARE is an organization that works with governments across the U.S. to incorporate racial equity analyses and goals into government operations. GARE has published multiple tools and resources to support governments, including their *Racial Equity Toolkit*, which can be applied at the programmatic level and can be scaled up to meet agency-wide priorities. Appendix D provides a user overview of GARE's *Racial Equity Toolkit*, with specific guidance for state agency staff seeking to apply this toolkit as a first step towards implementing EJTF recommendations #1 "Track and Communicate Progress" and #3 "Embed EJ in Strategic Plans". Figure 7 also illustrates connections between the GARE toolkit and EJTF recommendations pertaining to community engagement best practices and use of the Environmental Health Disparities (EHD) map.

Figure 8. GARE Racial Equity Toolkit is adapted to help with the implementation of two EJ Task Force recommendations.

Recommendations for Improving Government Accountability to Communities

Overview

EJTF recommendations #1 and #2 focus on improving government accountability to communities. Increasing accountability was a consistent message we heard from communities throughout the EJTF's community engagement process.

Track and Communicate Progress – Measurable Goals Recommendation

Recommendation 1: In partnership with communities, agencies should create a standard method to develop, track, evaluate, and publish environmental justice and health goals focused on pollution reduction, eliminating environmental health disparities, and improving community engagement.

Strategies and Considerations for Implementation:

- **Engage with communities throughout the goal development, tracking, and development processes:** Agencies should work with communities experiencing EJ issues, including Tribes and Indigenous communities, to identify appropriate measures and baseline indicators for tracking disparate impacts and progress towards reducing disparities. Refer to the *Community Engagement Key Recommendations* (recommendations #17-26) and *Community Engagement Plan Guidance* (Appendix C) included in this report. Consider contracting with community-led organizations and partnering with academic institutions to support goal development, tracking, and evaluation.
- **Use existing equity toolkits for goal development:** Use *GARE Framework Guidance* included in Appendix D to help with creating agency-specific and program-specific, theories of change, metrics, and indicators.
- **Create enterprise-wide and agency-specific goals:** While goals should be enterprise-wide to encourage the interagency coordination necessary to address EJ and environmental health disparities, agencies should also use statewide EJ and environmental health goals to inform agency-specific EJ and environmental health goals.
- **Create outcome and process measures:** Eliminating environmental health disparities and reducing pollution are outcome measures, whereas community engagement goals will need a set of process metrics that hold state agencies accountable for increasing meaningful engagement with communities.
- **Strive for absolute numbers:** The EHD map's relative rankings across census tracts allows the user to visualize which areas of the state are most overburdened by specific EJ issues. Relative rankings also add a layer of complexity for the user to track changes over time. In order to clearly assess progress over time, state government should strive to develop EJ and health goals that use absolute numbers.

- **Leverage Permanent EJ Workgroup to track and evaluate goals:** If stood up, the permanent EJ workgroup can assist with creating, tracking, and evaluating these goals with support from Results Washington, the Office of Financial Management, the Office of Equity, and other entities that specialize in and maintain public data dashboards. Alternatively, a third-party reviewer or agencies could review reports and track and evaluate progress toward EJ goals. Examples of existing related work in state government:
    - Results Washington can serve as a useful partner in tracking EJ outcome measures.
    - Refer to Puget Sound Partnership's Vital Signs for possible EJ measures.
    - Office of Financial Management's data dashboard could be used to track agencies-specific EJ activity (e.g. Workforce Performance Measures Dashboard).
    - WSDOT has accountability measures in its Gray Notebook.
- **Publishing progress toward goals:** Agencies should regularly report their progress and contribution toward enterprise wide EJ and environmental health goals. If stood up, the permanent EJ workgroup can be responsible for ensuring that the public is regularly updated on progress toward achieving EJ and environmental health goals.
- **Addressing data gaps:** Quantitative metrics that are standardized across regions will be limited to what is available, what can be measured, and where it is being measured. To address data gaps, collect additional local data and engage with communities for local knowledge to learn more about current and past conditions and better understand community-based solutions to EJ and environmental issues.
- **Increase access to environmental data:** Increase government transparency and accountability through improving access to environmental data by providing technical assistance and tools, such as the work supported by Environmental Data and Governance Initiative, an organization that promotes environmental data justice.
- **Community partnerships:** Developing measurable goals in partnership with communities will ensure that government is tracking the metrics communities care about.

Permanent Environmental Justice Workgroup – Model Policy Recommendation

Recommendation 2: Convene a permanent environmental justice interagency workgroup of relevant agency staff that includes members representing overburdened communities.

Strategies and Considerations for Implementation:

- **Granting authority:** The Washington state Legislature should consider convening a workgroup that can serve as a forum for collaboration and creation of accountability structures. Possible workgroup responsibility examples include: review agency-specific community engagement and strategic plans, track and publish progress toward achieving EJ goals, and advise state staff on integrating the EJTF's EJ principles into state agency actions.

- **Shared leadership and resources:** Communities and agencies share workgroup leadership responsibilities and resources. Agencies defer to community leadership as appropriate.
- **Build on previous and ongoing work:** Build on existing EJ, equity, and community engagement work in Washington state such as partnering with state boards and commissions, the Office of Equity, and the Governor's Interagency Council on Health Disparities to achieve EJ in Washington.
- **State EJ staff to serve:** Dedicated state agency EJ staff should be designated to serve on this workgroup, or staff deemed appropriate by agency leadership. Refer to recommendation #4, "Dedicated EJ Staff in State Agencies", for more information.
- **Coordinate to address existing EJ concerns:** Currently, there is no interagency mechanism in state government to address EJ-specific community concerns. EJ issues are often left unheard and inadequately addressed such as, but not limited to: environmental clean-ups across Washington, farmworkers' rights (especially in light of COVID-19), wildfire hazards, workplace hazards and exposures, addressing concerns related to existing or possible new sources of pollution in communities, and supporting community capacity building related to EJ issues.
- **Proactively advance EJ and implement existing recommendations:** Currently, there is no other interagency body working to proactively advance EJ. A permanent EJ workgroup would lead to increased interagency coordination and alignment with respect to EJ-focused investments. While there has been interagency EJ work in the past, all such groups have been temporary and have not had the authority or opportunity to implement existing EJ recommendations.
- **Create an EJ community of practice:** A permanent workgroup would lend itself to a community of practice for all agency EJ staff, and has the potential to bring in innovative ideas and solutions from commissions, boards, communities, and academic institutions.
- **Demonstrate commitment to overburdened communities:** This workgroup would prioritize communities with cumulative environmental & health burdens, and sensitive populations in its community engagement and service delivery approach.
- **Select appropriate agencies and entities to serve:** State leadership to determine which agencies or entities should serve in the permanent workgroup, for example the Governor's Executive Cabinet, the Department of Natural Resources, the Energy Facility Site Evaluation Council, the Interagency Council on Health Disparities, Ethnic Commissions, and any other agency or entity deemed appropriate by the Governor.

Recommendations for Incorporating EJ into Government Structures, Systems, and Policies

Overview

This set of recommendations focuses on enhancing state government's infrastructure to address EJ concerns in a meaningful, authentic, and strategic manner.

Embed EJ in Strategic Plans – Model Policy Recommendation

Recommendation 3: Agencies shall make achieving EJ part of their strategic plans in order to integrate EJ into agencies' protocols and processes.

Strategies and Considerations for Implementation:

- **EJ Staff to implement:** Dedicated EJ staff to assist with implementing EJ and equity components of the agency's strategic plan. Refer to recommendation #4, "Dedicated EJ Staff in State Agencies", for more information.
- **Adapted GARE Toolkit:** Agencies should use the *GARE Toolkit* adapted specifically for this recommendation to aid with strategic plan development and programmatic theories of change. See Appendix D for more detailed guidance on the *GARE Toolkit*.
- **Align with Federal EJ Executive Order (EO):** Federal EO 12898 should be considered the baseline standard for how agencies can approach their EJ work.

Dedicated EJ Staff in State Agencies – Model Policy Recommendation

Recommendation 4: Agencies will have at least one staff position dedicated to integrating environmental justice principles specifically, and equity more broadly, into agency actions.

Strategies and Considerations for Implementation:

- **Suggested EJ Staff qualifications and principle responsibilities:** Qualified EJ staff will have demonstrated experience working with communities facing EJ concerns and a deep understanding of the EJ discipline, including how to connect EJ to equity.
    - **Tribal Liaison position can serve as a model:** This position could be structured similarly to the Tribal Liaison positions within a state agency, for example: (1) Assisting the state agency in developing and implementing EJ into agency actions, processes, and protocols; (2) Serving as a contact person with overburdened communities and maintaining communication between the state agency and overburdened communities; and (3) Coordinating training of state agency employees in EJ.
    - **A potential approach to develop qualifications:** The Office of Financial Management could develop competency language for certain job classifications, with a focus on senior management. Guidelines about how to apply these

competencies for both new and existing staff, and timelines for implementation by agencies, should also be developed.

- **Leadership support and training:** Agencies ensure EJ staff are closely connected to agency executive leadership. Agency leadership will be best suited support EJ staff by participating in ongoing EJ and diversity, equity, and inclusion (DEI) trainings and professional development opportunities. Furthermore, agency staff that regularly interface with the public (e.g. community engagement coordinators) should closely collaborate with dedicated EJ staff, and also participate in EJ and DEI trainings.
- **Expand staffing over time:** Over time, the agency should support and resource lead EJ staff with other staffing support. Support staff would ideally come from different areas of the agency with the goal of infusing EJ and equity across the agency.
- **Create an EJ-Focused Community of Practice:** EJ staff could co-construct an informal[57] community of practice within their agency and among other agency staff to support agency accountability to communities, facilitate equity and EJ learning opportunities at agencies, and apply equity and EJ lens to agency work.
- **Examples of other possible EJ staff responsibilities:**
  - Designated staff to serve on the permanent EJ workgroup, if stood up.
  - Participate in informal interagency EJ community of practice.
  - Track and communicate agency progress toward EJ, perhaps in partnership with an external entity.
  - Oversee EJ-specific community engagement, including reviewing, updating, and implementing the agency's community engagement plan (see: recommendation #17).
  - Ensure EJ and equity is included in the agency's strategic plan (see: recommendation #3), and that the agency is actively working toward EJ and equity.
- State leadership should determine which agencies this recommendation should apply to, for example the Governor's Executive Cabinet, the Department of Natural Resources, the Energy Facility Site Evaluation Council, the Interagency Council on Health Disparities, and any other agency or entity deemed appropriate by the Governor.

Incorporate EJ into State Environmental Laws – Model Policy Recommendation

<u>Recommendation 5</u>: Environmental justice considerations should be incorporated into a range of state environmental laws. Further, environmental and natural resource state agencies should consider environmental justice in developing agency request legislation, analyzing bills during legislative session, and conducting rule reviews.

<u>Strategies and Considerations for Implementation:</u>

[57] Non-mandatory, and not necessarily a public meeting.

- **Prioritizing efforts to reduce inequities:** Agencies should prioritize agency request legislation and rule updates that will reduce inequity or have a positive impact on overburdened communities.
- **EJ impact review:** In analyzing bills during legislative session, the legislators, legislative staff and agencies should consider what communities will be affected and whether the bill will reduce, increase, or have no impact on EJ. Health Impact Reviews developed by the State Board of Health could serve as a model for this work.
- **Engage with stakeholders and communities to identify the best path forward:** Significant additional work is needed to identify how to best incorporate EJ into state laws.
- **Illustrative examples on how to implement this recommendation include:**
  - Modernizing the Evergreen Communities Act (SB 6529/HB 2413):
    - This update of the Evergreen Communities Act to help communities develop urban forestry plans aligning with other high priority goals, such as salmon and orca recovery, reducing environmental health disparities, and local air and water quality improvements. The bill includes a focus on EJ and ensures at least 50% of all program activities benefit overburdened communities.
  - Growth Management Act (GMA):
    - CA Senate Bill 1000 provides an example of incorporating EJ into Washington's GMA. For example, EJ could be incorporated as a new mandatory goal. This goal could require identification of overburdened communities, prioritization of improvements and programs that address the needs of overburdened communities—including addressing reduction of greenhouse gasses (GHG) that put communities at risk due to climate change, and affordable housing to combat gentrification and displacement.
  - State Environmental Protection Act (SEPA):
    - Pennsylvania Enhanced Public Participation Policy: This policy was created to ensure that EJ communities have the opportunity to participate and be involved in a meaningful manner throughout the permitting process when companies propose permitted facilities in their neighborhood, or when existing facilities expand their operations. Only those activities that may lead to significant public concern due to potential impacts on human health and the environment trigger this process. Such activities include new major sources of hazardous air pollutants, commercial incinerators, coal preparation facilities or expansion of large concentrated animal feeding operations.
    - **New Jersey** Senate Bill S232: This bill requires consideration of the potential for disproportionate cumulative health impacts on the local community when certain types of new facilities, or expanded facilities, are proposed in an overburdened neighborhood. The bill also includes explicit guidelines for meaningful public participation during public hearings in overburdened communities.

Recommendations for Investing Equitably

Overview

Applying an equity lens to the distribution of state investments is at the core of EJ work. The following recommendations focus on strategies that promote equitable investments in overburdened communities across Washington state.

Required use of EJ Analysis – Model Policy Recommendation

Recommendation 6: Agencies should adopt, and the Legislature should consider, requiring environmental justice analyses, including but not limited to the use of the Environmental Health Disparity Map, that combine the cumulative impact of environmental health indicators such as environmental exposures, environmental effects, impact on sensitive populations, and other socioeconomic factors.

Strategies and Considerations for Implementation:

- **Reference EHD map Recommendations:** Refer to the EHD map recommendations (see: recommendations #12-16) when requiring, developing, or using EJ analyses in implementing applicable environmental, natural resource, and public health programs in order to ensure appropriate use of these types of analyses. Some areas in which environmental analyses are appropriate include:
    - Community Engagement
    - Capital Investment
    - Fees and Costs of Service
    - Policy Development
    - Program Planning, Monitoring, and Evaluation
    - Grants and Loans
    - Contracting
    - Enforcement
    - Rulemaking
- **Strive for a consistent methodology through agency collaboration:** To ensure consistency of an EJ analysis application, there should be ongoing collaboration of agencies using these types of analyses. The proposed permanent EJ workgroup would be a valuable resource in this effort.
- **Illustrative examples of how aspects of this recommendation have been implemented:**
    - **The Clean Energy Transformation Act (SB 5116)** requires utilities to do an analysis based on a cumulative impacts analysis of the communities highly impacted by fossil fuel pollution and climate change in Washington for integrated resource planning.[58] Rulemaking by Commerce and the Utilities and Transportation Commission (UTC) is in process on how to implement this requirement.
    - **The CalEnviroScreen** mapping tool is used in California state government by CalEPA to aid in administering EJ grants, promote compliance with

[58] RCW 19.280.030(1)(k) https://app.leg.wa.gov/RCW/default.aspx?cite=19.280.030.

environmental laws, prioritize site-cleanup activities and identify opportunities for sustainable development.
    - **EHD Map:** A number of state agencies have utilized the EHD map in different aspects of their work, including by not limited to the Departments of Ecology, Commerce, and Transportation.
- **Train staff to conduct EJ analyses:** Training in both the development and use of the map for state staff may be needed. In addition, funding would be needed to maintain and update current analyses, like the EHD map and should also be provided to allow state agencies to work with local jurisdictions for important granular data that either could be incorporated into state tools or be considered in addition to what the state can access. Refer to EHD map recommendation #14 for more information about developing technical guidance for practitioners.
- **Engage and consult with Tribes:** Formal Tribal consultation should be offered in both the development of and proposed uses of environmental justice analyses.
- **Operationalize EJ analyses:** The California Department of Public Health and the Public Health Institute developed the Five Key Elements of Health in All Policies as a guide and filter for identifying opportunities for operationalizing this work: Promote health, equity, and sustainability; support intersectoral collaboration; benefit multiple partners; engage stakeholders; create structural or procedural change.
- **Resource:** The Social Vulnerability Index may be a resource to help measure impacts resulting from greater investments in communities.

Equitably Distribute State Environmental Investments – Model Policy Recommendation

Recommendation 7: For new and existing revenue and expenditures with an environmental nexus, the state Legislature and agencies should equitably distribute investments ensuring that resources are allocated to the most overburdened communities.

Strategies and Considerations for Implementation:

- **Identifying overburdened communities:** Overburdened communities should be identified through project- or program-specific EJ analyses. Refer to EHD map recommendation #13 for more information on how to use the EHD map as a starting point to identify overburdened communities.
- **Conduct an EJ analysis:** The EHD map is an example of an EJ analysis that can assist with equitable distribution of environmental investments. Environmental investments and programs directed toward overburdened communities should be made proportional to the health disparities that a specific community experiences.
- **Consideration of multiple factors:** An EJ analysis should serve either as the primary, or one of multiple factors, for the prioritization process.

- **Possible investment opportunities:** The intended result of this recommendation is that agencies will be directed to invest resources and programs under their control in the areas that are most disadvantaged. Additionally, funds can go toward grants, hiring, and contracting opportunities.
- **Promote transparency:** Goals and assessment metrics should be in place to in order to clearly communicate where, why, and how funds are distributed. Furthermore, efforts should be made to balance investments across the state, not just in urban areas in the Puget Sound region.
- **Illustrative examples of how aspects of this recommendation have been implemented:**
    - Model Toxics Control Act (MTCA): The Department of Ecology oversees MTCA implementation has used both the EHD map and other criteria in order to identify areas for environmental cleanup, public participation grants, remediation, and pollution prevention programs statewide.
    - New York Climate Leadership and Community Protection Act: This law sets a target for "disadvantaged communities" to receive 40% of the overall benefits from the state's climate programs, and at a minimum, "disadvantaged communities" must receive no less than 35% of those benefits.
    - California's SB 535: California state law created a program that has been periodically updated to ensure that 25% of the proceeds from the Greenhouse Gas Reduction Fund benefit projects that provide a benefit to "disadvantaged communities" as identified by the CalEnviroScreen map, which the EHD map was modeled after.
- **Possible investment priorities:** Investments should focus on eliminating health burdens and raising the standard of living.
- **Illustrative examples of ways to equitably distribute funds:**
    - Community grants to monitor pollution that would be focused on building capacity and training for community scientists. Note that adequate staff capacity would be needed to support and provide technical assistance to communities that may be new to receiving agency grant funding.
    - Education and work-readiness youth programs focused on infrastructure or utility related internships, careers, and eventually leadership.

Contracting Prioritizes High Labor Standards and Diversity – Model Policy Recommendation

Recommendation 8: Work funded by state environmental investments should increase inclusion in contracting with minority, women, and veteran-owned enterprises in alignment with the Governor's Subcabinet on Business Diversity led by OMWBE, and have high labor standard requirements that value workers' health and safety, regardless of whether a public or private entity is the beneficiary of the new spending, except where legally prohibited from doing so.

Strategies and Considerations for Implementation:

- **Examples of high labor standards include, but are not limited to**: pay equity, local hire and project labor agreements, livable wages, safe work environments, paid family and sick leave, protecting the rights of workers to organize, flexible work schedules and telework options, retirement benefits, and comprehensive health insurance.
- **Refer to WA State Disparity Study Findings:** Agencies should include the strategies and recommendations put forward by OMWBE from the 2019 WA State Disparity Study in their inclusion plans.
- **Exceptions:** Possible exceptions to this recommendation include any statutory and constitutional limitations, such as the Department of Natural Resources' Trust Mandate.

Study Opportunities for Reparations in Washington – Model Policy Recommendation

Recommendation 9: As one strategy for achieving environmental justice, Washington state government should study reparations as a mechanism to address health disparities and historical harms affecting overburdened communities. The state should focus on the unpaid debts from slavery and colonization, the legacy of redlining, treaty violations, forced exclusion, and neighborhood segregation in Washington, as well as the impact that systemic racism has had on Black, Native, Indigenous, Latinx, Asian communities and others.

Strategies and Considerations for Implementation:

- **Identify where to house this work:** As an option, the Office of Equity could develop a plan for studying reparations with the continued input and guidance from the public and the state's Ethnic Commissions. One additional strategy could be the creation of a community task force to guide this work.
- **Further explanation on reparations:** Reparations can take many forms, such as: direct payments to communities and individuals, environmental cleanups, increased investments in overburdened communities in the form of grants, programs, and projects (see: recommendation #7 "Equitably Distribute State Environmental Investments"). The process, budget, and outcomes must be community-led and co-created with government agencies.
- **Other possible areas for study:** Slavery, colonization, internment, employment discrimination, labor and land theft, and financial services discrimination.
- **California Reparations Task Force:** California state government passed legislation (AB-3121) in September 2020 to study and develop proposals for potential reparations to those affected by slavery and the direct descendants of enslaved people.

Recommendations for Improving Environmental Enforcement

Overview

The following set of recommendations focus on how to improve existing mechanisms for environmental enforcement to promote access to and benefits for overburdened communities.

Ensure Accessible Enforcement and Reporting Processes – Model Policy Recommendation

Recommendation 10: The EJTF recommends ensuring that enforcement and reporting processes are accessible to overburdened communities by elevating awareness and addressing barriers to access (such as technology, literacy, and language).

Strategies and Considerations for Implementation:

- **Increase awareness of reporting systems:** Increase public education and awareness of environmental reporting tools such as the Environmental Reporting and Tracking System (ERTS), the Environmental Crime Report Form, Clean Air Agencies' complaint forms, and other environmental reporting mechanisms.
- **Ensure accessibility:** Ensure reporting options are accessible to a diverse audience, including: multilingual formats, phone reporting, and systems navigators who can provide online, in-person, and phone support.
- **Ensure compliance with existing laws and policies:** Assessment of existing environmental reporting systems to evaluate access to services and compliance with Title VI, ADA, and non-discrimination obligations.

Support for Supplemental Environmental Projects (SEPs) – Model Policy Recommendation

Recommendation 11: Agencies with enforcement responsibilities should, to the extent practicable and appropriate, support the inclusion of "Supplemental Environmental Projects" (SEPs) in settlement agreements.

Strategies and Considerations for Implementation:

- **Further explanation of SEPs:** As part of a voluntary settlement, the responsible party may propose to undertake a project to provide tangible environmental or public health benefits to the affected community or environment. The responsible party can voluntarily choose to fund a SEP to offset part of the penalty they would otherwise be required to pay for the violation.
- **Engage affected communities:** When possible, SEPs should be developed through a partnership between the responsible party and the affected community and provide tangible environmental or public health benefits.

II. Environmental Health Disparities Map Recommendations and Guidance

Section Overview

The Task Force is responsible for providing:

> *"Guidance for using the Washington Environmental Health Disparities Map to identify communities that are highly impacted by environmental justice issues with current demographic data."*[59]

The Environmental Health Disparities map (EHD map) is a cumulative impact map that compares census tracts across Washington for environmental health disparities. It is part of the Washington Tracking Network (WTN). WTN and the EHD map are useful for exploring geographic areas in Washington to better understand communities' health as well as the social, economic, and environmental impacts influencing them. Developed jointly through community, academic, and government agency collaboration, the EHD map and data can be used by state agencies to improve accountability, engagement, and transparency towards EJ goals. The EHD map may also be used by the public, community leaders, and community organizations to improve awareness of and work towards EJ solutions. The following mapping recommendations and guidance from the EJ Task Force focus on:

- How to use the EHD map to better understand who is potentially affected by agency activities
- How to guide agency resources and decisions towards eliminating environmental and health disparities, and
- How to set goals and measure progress for the distributional equity of benefits and burdens across communities.

Refer to Appendix E for more information about the Washington Tracking Network that houses the EHD map. Appendix E also discusses how the EHD map was developed and important considerations for using the EHD map.

Considerations for EHD Map Use

The WTN and the EHD map are valuable for state agency planning and programming activities. The EHD map is a model and no model fully captures reality. The EHD map is built using the best available data to Washington state using a specific scientific model where risk is comprised of threat and vulnerability to arrive at environmental health disparity rankings.

The EHD map was developed in a robust partnership of government agencies, academia, and community-based organizations. Front & Centered, a statewide coalition that organizes and advocates for EJ, held listening sessions and community conversations to seek input into the map's development, but those sessions did not cover all communities in Washington. The EHD

[59] Engrossed Substitute House Bill 1109, section 221, subsection 48.

map is a dynamic, informative tool, but does not replace the need for thoughtful state agency engagement with impacted communities and the incorporation of additional historic disparities information into decision-making.

As a cumulative impact analysis map, there are a number of considerations that will influence how the EHD map can and should be used. The Task Force has identified the following information for agencies to be aware of when using the EHD map to inform their decisions.

Interactive

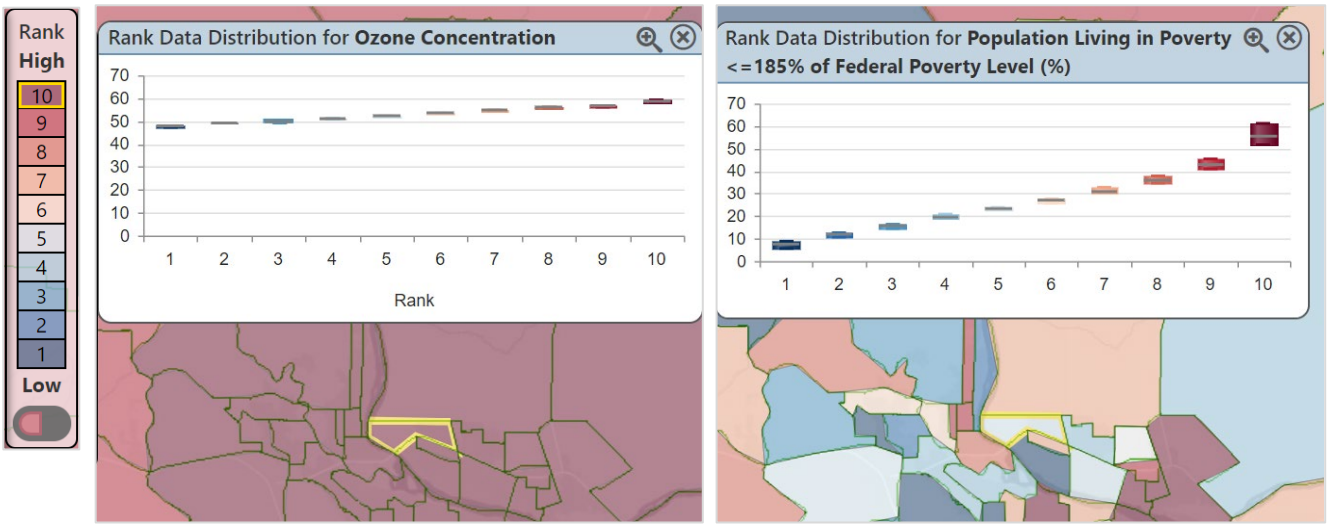
The EHD map is a robust, interactive mapping display that quickly provides a synopsis of cumulative impacts, considering environmental exposures and effects, sensitive populations, and socioeconomic factors. The resulting disparity rank is easy to understand and creates a powerful visual of where environmental health disparities exist in Washington and which measures contribute to each area's rank.

Ranking-based

The use of rankings allows disparate data sets to be displayed together, which would otherwise be difficult to display in a meaningful way. Rankings also protect sensitive health information in situations where a very limited number of individuals in an area are impacted.

The rank for each census tract indicates the order from smallest to largest value, but does not indicate how great the difference in values are for any two ranked items. This means that a user cannot draw conclusions about how large or small the disparity is between any two ranks (such as between 1 and 10, or 9 and 10). In other words, even if there is an overall reduction in environmental health disparities, relative rankings mean there will always be census tracts ranked 1 through 10. It is possible to view the data distribution (Figure 9) among the deciles in the EHD map. In this way a user can gain additional insights into the magnitude of the differences between census tracts.

Figure 9. EHD Map Rank Data Distribution Examples



Current, accessible, statewide

The EHD map includes the most current statewide data, is publicly accessible, and the data are available for download from the WTN Query Portal if additional analysis or access to absolute values are needed.

The map relies on a number of national data sources. These data may not reflect localized environmental health disparities and conditions. It also does not map the sum total of impacts. It is cumulative, but not all encompassing. State agencies should ground-truth findings from the EHD map with qualitative data and lived experiences from engaging with communities to create a fuller picture of current conditions and needs.

Relying on available data means that there are gaps in the data and in what information the EHD map reflects. It is not representative of all threats and vulnerabilities. For example, data limitations related to Tribes and Indigenous populations, statewide water quality information, rural or urban indicators, and other important considerations are not fully captured by the EHD map. In addition, Tribes were not formally consulted and business interests were not represented during the development of the EHD map.

Flexible

Overlays allow more site specific or project relevant information to be displayed, such as Tribal lands boundaries, city limits, school locations, and 100-year flood zones. Since the EHD map is built on the IBL platform, Department of Health can add new data and overlay maps.

Geographic scale

Census tracts are used because they tend to provide a stable geographic unit for presenting data. A user cannot view and analyze environmental health disparities at geographic scales that are smaller than a census tract (such as a neighborhood block) or larger areas (such as multiple tracks or zip codes). The EHD map provides rankings relative to the entire state, and does not allow for comparative rankings within other geographic boundaries (such as a county). Certain agency activities or organizations whose jurisdictions are not statewide may benefit from other maps that operate at finer or more flexible geographic scales.

Example of a Local Map: Port of Seattle's Equity Index Map

The Port of Seattle developed an Equity Index map consisting of 25 indicators using the same categories and ranking scale as the EHD map. The South King County Fund is the first project to use this Index to award $10 million between 2019 and 2023 to address noise mitigation, environmental health and sustainability in near-airport communities.

Tracking changes over time

Since the EHD map is based on relative rankings, a census tract that increases or decreases in its ranking reflects how that census tract currently compares to others. It does not mean that disparities increased or decreased in terms of the absolute value. This distinction also means

that the EHD map is useful for point-in-time comparisons, but not for tracking changes over time.

To examine changes over time, one method could be to export and analyze the underlying data. Selecting the graph icon next to the measure within the IBL will search WTN data to see the range of data used to create the rankings.

Future Direction and Funding Needs

Additional measures identified during the development of the EHD map include asthma, noise pollution, proximity to state-specific cleanup sites, and surface water quality. At the time the map was developed, these measures were not available statewide, but they are currently under development. The EHD map will be updated as statewide data for these measures become available.

Communities have expressed interest in resilience and asset-based approaches to describing their communities. Currently, the EHD map focuses on disparities. However, future map enhancements could include resilience or asset-based indicators of environmental health such as measures of civic participation or local non-profit funding. Community voice was critical throughout the development of the EHD map and should continue to play a role. Both enhancements to the usability of the EHD map and the incorporation of new data should be informed by public engagement and collaboration with overburdened communities. Resources and capacity will be needed to fully engage community in this process.

Finally, WTN was established, and continues to be mostly funded, by a Centers of Disease Control and Prevention (CDC) grant. Funding from the CDC has declined over time, and there is no dedicated funding to expand the IBL functionality or add new data to the EHD map. Department of Health staff time is critical to updating and enhancing the EHD map, such as recent WTN data updates to the American Community Survey (ACS) data (October 2019), low birth weight data (December 2019), and cardiovascular disease data (January 2020). It is anticipated that maintenance and enhancement of the EHD map will need dedicated support and funding.

Recommendations for Agency EHD Map Use

The EHD map is publicly available bringing much needed attention to environmental and human health conditions statewide and reveals disparities across Washington's communities. Identifying areas where people may face the most risk and exposure to environmental pollution is a critical step towards EJ and provides a way for state agencies to transparently and consistently integrate cumulative impact considerations into activities and decisions.

The Washington Tracking Network and the Environmental Health Disparities map have data and analyses that can support pro-equity planning in a number of agency activities. While individual agencies will determine how best to integrate WTN and the EHD map, one approach is to

prioritize the integration of the EHD map into activities that have direct impacts on communities.

In line with this, the following activities could serve as important starting points for agencies:

- Community Engagement
- Grants Programs
- Capital Investment
- Policy Development
- Rulemaking

Recommendation 12 (EHD Map): The EJTF recommends that state agencies consider four initial ways of using the WTN mapping tools and EHD data in agency activities. These suggestions are based on using the map as it currently exists, either in its online form or as exported map EHD data tables for integration with agency data.

I. **Build demographic and environmental context to guide and inform place-based activities.**
Purpose: Use the WTN, including the EHD map, to learn about the intended audience and community potentially affected by an agency activity or service.
When to implement: As policies, program changes, practice improvements, and facility management decisions are being considered.
Example: In the initial planning stages of community engagement, review the EHD map and its individual measures to learn about a population's education background, availability of affordable housing, and proximity to sources of pollution. These data can help ensure outreach is accessible and reflects community concerns.
Example: A review of WTN data will also support more comprehensive and inclusive community engagement planning. Specifically, WTN data on preferred languages for non-English speaking populations will help ensure critical information reaches diverse audiences, and that federal compliance obligations for language access are met.

II. **Conduct environmental justice review and analysis as routine practice for programs and projects.**
Purpose: Use the EHD rankings to identify highly impacted communities to assess how these areas may be positively and negatively affected by a proposed policy, program, project, or activity. If highly impacted communities will be negatively affected by a decision or activity, the agency should strive to mitigate or minimize impacts, enhance public engagement, or seek alternatives to avoid potential impacts.
When to implement: As activities, policies, program changes, practice improvements, and facility management decisions are being considered.
Example: When evaluating the potential impacts of a project on communities, the agency finds that highly impacted communities will be negatively affected by a decision

or activity. Agency staff elevate efforts to consider alternatives to avoid potential impacts.

III. **Center environmental justice as the priority intended outcome in resource allocation decision processes.**
Purpose: Direct beneficial environmental activities and investments towards areas with environmental health disparities and where the environmental health improvements will be greatest.
When to implement: When allocating resources and funding across an agency's service area.
Example: An agency includes "benefits to overburdened communities" as one element in evaluating grant proposals. Grant proposals that benefit areas with EJ or cumulative impacts considerations (such as tracts ranked 9 and 10 in the EHD map) are allocated additional points in application scoring.
Example: An agency implements a "targeted universalism" approach to allocating resources. Using a determination method that factors heavily for environmental health disparities, operational and capital dollars are prioritize to facilities or service area geographies that will most benefit (as identified by areas with high EHD rankings).

IV. **Evaluate and measure reductions in disparities through service equity improvements.**
Purpose: Evaluate the distributional equity characteristics of historic, current, and projected agency activities across the agencies service area.
When to implement: Program and activity strategic planning.
Example: An agency evaluates where past and current grants have been allocated across the state relative to EHD map ranking and geographic representation (e.g., urban/rural). The service equity analysis identifies a pattern of higher investments in urban areas with low EHD rankings. The agency addresses potential barriers to grant access, by expanding notification about the grant, adjusting the application and scoring process to support first time applicants and those with limited resources, and adjusting funding-match requirements.

Recommendation 13 (EHD Map): Use the overall EHD Map rank 9 and 10 as a starting point to identify highly impacted communities.

The EHD map is designed to identify communities who are potentially hardest hit by environmental injustices and cumulative impacts. Drawing from both federal and state experience with similar maps, the EJ Task Force recommends initially identifying highly impacted populations as census tracts ranked 9 and 10 in the overall EHD map ranking. By using rank 9 and 10 as a starting point, agencies will have a transparent and consistent approach to identifying areas with environmental health disparities. As we advance this work and refine our use of the EHD map, agencies and departments will likely tailor how they identify and prioritize highly impacted communities depending on program and project needs. This recommendation should not be construed as a definitive characterization of a place or community, or as a way to label an area as an "EJ community."

Recommendation 14 (EHD Map): Develop technical guidance for practitioners.
The EJTF acknowledges that in order to increase the use of a cumulative impact analysis to inform agency decision-making and potentially influence environmental health disparities, agency staff will need training and guidance on how to best use the EHD map and the supporting data. The Task Force recognizes that funding to maintain the EHD map and support training may be needed meet this recommendation.

DOH has developed a tutorial for beginner EHD map users interested in exploring the EHD map. The EJTF recommends additional training for practitioners that could include:

- In-depth training materials for practitioners
- Opportunities for consultation with WTN staff
- Detailed descriptions of how to utilize EHD map features and access the source data
- Guidance on EHD map limitations

Recommendation 15 (EHD Map): Adopt equity tools and analyses in agency practices.
The EJTF recommends using the EHD map in conjunction with other equity-focused tools and analyses. The development and application of equity tools and analyses are rapidly expanding both in Washington and nationally. These tools, when supported with open spatial data, help inform, guide and account for progress toward environmental health disparity reduction and elimination. These equity tools and practices take many forms, such as checklists, toolkits, impact assessments, and participatory project planning. Like the EHD map, these tools have a range benefits and limitations, and their application will depend on factors such as the type of activity, potential to affect communities, and data availability. Examples of equity tools and analyses that have been adopted by other government agencies include, the GARE Racial Equity Toolkit, City of Seattle Racial Equity Toolkit, California Governor's Office Resiliency Guidebook Equity Checklist, and City of San Antonio Budget Equity Tool.

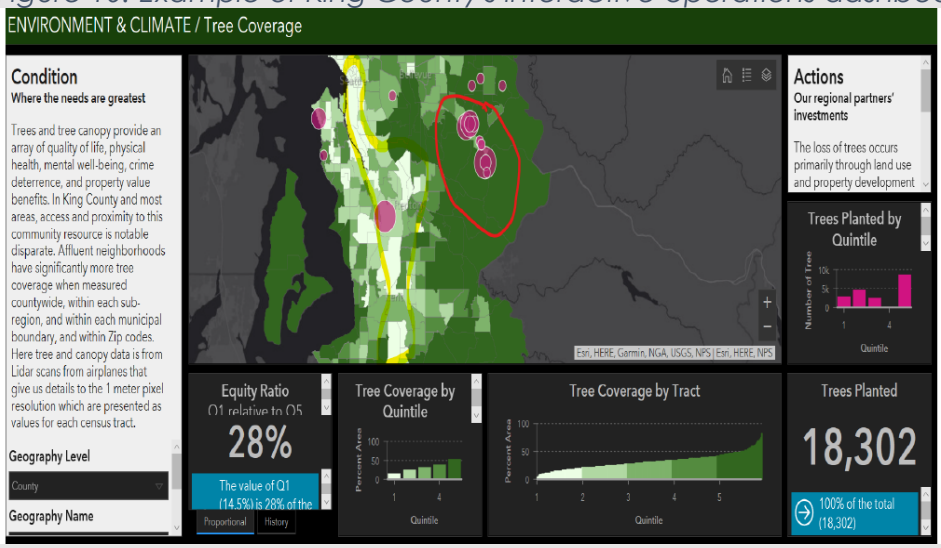
Recommendation 16 (EHD Map): Set environmental health disparity reduction goals and track progress towards those goals.
Achieving EJ and eliminating disparities must be part of an overall state effort to systematically promote and track progress towards these goals. The EJ Task Force recommends that state government entities work collaboratively to set goals, integrate accountability into current tracking systems, and regularly report on progress. Possible approaches to this work include:

- Include EHD map environmental and health disparities indicators in state performance management goals and tracking.
- Partner with the Governor's Office, Commissioner of Public Lands, Office of Equity, Office of Financial Management, and others to strengthen and expand EHD map use and capacity.

King County Uses Mapping to Track Progress toward Equity

King County tracks and measures progress toward equity as agencies implement the King County Equity and Social Justice Strategic Plan. Mapping has been a key component in this work, including an interactive operations dashboard (Figure 10) that layers program information onto community conditions over space and time. Using maps to visualize historic and current service delivery has improved program and resource planning by revealing the degree of potential effect of the county's efforts toward health disparity reduction. As a result of this work, King County is better suited to make pro-equity decisions by bringing equity actions and desired equity outcomes together in a shared measurement construct to inform learning and the ability to adaptively manage.

Figure 10. Example of King County's interactive operations dashboard



Lessons Learned for the State to Consider

King County's experience offers a several insights for other governments. Key ingredients include: action measurement standards, functioning data governance processes, and defined alignment between the agency actions and outcomes. Gaining leadership support is challenging because these tools expand transparency and accountability which may can be threatening. Champions are those willing to co-convene, co-design, and co-develop the work so that there is a high degree of trust and understanding. Setting data standards and establishing governance are key to sustainability and help guide the process of matching activities to intended outcomes over time and place. Building from pilot approaches and taking an iterative or scalable approach can help ensure efforts are effective. In addition, requiring equity analysis in budget requests and creating accountability forums can improve sustainability.

Opportunities for Community Use of the EHD Map

The Washington Tracking Network and the Environmental Health Disparities map are free publicly available resources. While state agencies are the focus for this report's recommendations, the WTN and the EHD map are valuable resources for communities and organizations across Washington state. Below are examples of how the public might use the EHD map, many of which were identified during community meetings as part of the EJTF process.

Community Information and Assessment

The public can use the EHD map to learn more about the current environmental and social conditions in their communities and workplaces. Washington is making progress toward EJ when communities and workers have access to information about the possible environmental risks they face, especially considering many dire EJ issues are not easily detectable.

Community Projects and Activism

Community organizations and the public can use the EHD map, and its underlying data to inform and leverage their advocacy work. For example: The EHD map could help build community visioning projects to inform local planning processes; EHD disparity ranks and data can enhance communication with decision makers about community EJ concerns and support requests for increased enforcement, monitoring, and environmental cleanup; and community based organizations can use the EHD map to identify areas of need.

"As a non-profit, the Communities of Color Coalition (C3) used the EJ mapping tool to assist in the distribution of monetary funds provided by a COVID-19 Rapid Development Grant. The EJ mapping tool assisted in identifying critical community needs in Yakima, Bellingham, and Seattle. Most non-profits do not have an in-house research department dedicated to collecting and interpreting environmental, health, social, and economic disparities data. Your map provided us with a vital tool and opportunity to improve our engagement efforts and review data visually to help support communities in need."

-David Ortiz, C3 Chair (May 2020)

Education

Educators can use the EHD map to inform their EJ, environmental, anti-racism, health, or any community-based curricula. The EHD map is appropriate for students of all ages to foster their own curiosity about the environment around them, and to inform their education and research in a school setting.

III. Community Engagement Recommendations and Guidance

Section Overview

The EJTF is responsible for providing:

> *"Best practices for increasing meaningful and inclusive community engagement that takes into account barriers to participation that may arise due to race, color, ethnicity, religion, income, or education level."*[60]

This section of the report has ten recommendations for increasing meaningful and inclusive community engagement, and includes supporting guidance for how to implement these recommendations.

> *"One of the key components in environmental justice is getting people to the table to speak for themselves…they need to be in the room where policy is being made."*
>
> -Dr. Robert Bullard, Father of Environmental Justice

Community Engagement and Environmental Justice

All agencies can embed EJ into their policies, practices, and processes by prioritizing and investing in meaningful community engagement, especially in areas of critical concern across Washington.[61] One of the seminal documents of the EJ movement is the *17 Principles of Environmental Justice*, which were drafted and adopted by the delegates to the First National People of Color Environmental Leadership Summit in 1991. Principle #7 explicitly states the need for community engagement to achieve environmental justice.

EJ Principle #7: "Environmental justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation."[62]

The foundation of meaningful community engagement must be an evaluation of who is negatively impacted and who is benefitted by any agency decisions meant to benefit the public as a whole. This foundation would help surpass the common practice of starting with requirements outlined in law or policy. This guidance outlines and helps agencies identify common agency activities that do not typically involve, but can significantly impact, the public.

[60] Engrossed Substitute House Bill 1109, section 221, subsection 48.
[61] As an initial step, agencies can consider prioritizing investing in community engagement in census tracts ranked nine and ten on the Environmental Health Disparities Map.
[62] "The Principles of Environmental Justice". 1991. https://www.nrdc.org/sites/default/files/ej-principles.pdf.

Why Community Engagement is Crucial

The governing structures of the United States were designed to elevate the rights and access to its resources of some people at the expense of the rights and access of others. These weighted structures led to the systemic inequity that the EJ movement responds to. They have been reaffirmed across history, often in response to efforts to move toward more equitable laws and practices, and are widely maintained today.

The *Community Engagement Plan Guidance* developed by the Task Force's Community Engagement Subcommittee in Appendix C is grounded in the position that these systems cannot change without the direct involvement of the communities who have borne the weight of systemic disparities, and that such involvement is rarely supported by Washington state's government. The EJTF and the Community Engagement Subcommittee recognize the critical value of repairing relationships and building trust with communities.

Repairing relationships and building trust between government and those members of the public harmed by environmental injustice is central to this guidance. A focus on trust-building in this context sends skills like cultural humility and emotionally intelligent communication to the forefront, and we see more ties to community organizing than to conventional communications-oriented information sharing.

Truly meaningful community engagement builds more sustainable agency programs and decisions, and it increases community understanding of agency decisions and transparency and trust in government actions. State agencies have a responsibility to create community engagement opportunities that allow all of Washington's diverse communities, "equal access to the decision-making process to have a healthy environment in which people live, learn, and work."[63] Without it, as history demonstrates,[64] entire populations are systematically left out, curbing their ability to effectively advocate for their own health and safety. Furthermore, many agencies are directed by policy and federal, state, and local laws to implement meaningful community engagement and participation.

[63] U.S. Environmental Protection Agency. "Environmental Justice". https://www.epa.gov/environmentaljustice.
[64] Maantay, Juliana, Jayajit Chakraborty, and Jean Brender. "Proximity to Environmental Hazards: Environmental Justice and Adverse Health Outcomes". (2010): https://archive.epa.gov/ncer/ej/web/pdf/brender.pdf.

Key Recommendations for Addressing Structural Barriers to Community Engagement

Figure 11. Barriers to Community Engagement

Access	Process
Apathy/Burden	Resources
Communication	Sovereignty
Potential for Influence	Trust
Representation	Types of knowledge

The third and final set of recommendations in this report address common barriers to meaningful community engagement (CE), based on barriers identified with input from EJTF members and the public (Figure 11).[65] Refer to the *Community Engagement Plan Guidance* (Appendix C) developed by the EJTF's Community Engagement Subcommittee to assist with the implementation of these CE recommendations.

Recommendation 17 (CE): Each agency develops a community engagement plan, which must include the elements outlined in our *Community Engagement Plan Guidance* (Appendix C).

Recommendation 18 (CE): Agencies evaluate new and existing services and programs for community engagement using a systematic process to determine outreach goals. These evaluations weigh the goals of the service or program, potential for its impact on the public, its importance to the community/ies being impacted, and the makeup of the impacted community. These evaluations determine:

- The agency's level of engagement for the project.
- The potential for outcomes the public can see from their engagement in the process. Agencies then communicate both determinations in their outreach process. Example evaluation tools are attached in Attachments A and B of the *Community Engagement Plan Guidance* (Appendix C).

- *Further guidance:* Section 2.01 in *Community Engagement Plan Guidance* (Appendix C).

Recommendation 19 (CE): When planning outreach activities, agencies use screening tools that integrate spatial, demographic, and health disparities data to understand the nature and needs of the people who may be impacted by agency decisions. The Task Force's recommended use of the Environmental Health Disparities map to build the demographic and environmental context to guide and inform place-based activities is a key example. This initial screening is followed by further research with local people and organizations as needed.

- *Further guidance:* Sections 2.01, 2.08, and 2.09 in *Community Engagement Plan Guidance* (Appendix C).

[65] See Attachment C in the *Community Engagement Plan Guidance* (Appendix C) for further explanations and examples on each of the Barriers to Community Engagement.

Recommendation 20 (CE): When agency decisions have potential to significantly impact a specific community (as determined by the evaluation described above in recommendation #18), agencies should work with representatives of that community to identify appropriate outreach and communication methods. Significant impact includes potential changes to critical determinants of health such as legal rights, finances, housing, and safety. It is particularly valuable to include community members in oversight, advisory, program planning, and other processes. Washington's Department of Health community health worker program serves as one model.

- *Further guidance:* Sections 2.02, 2.03, 2.04, and 2.07 in *Community Engagement Plan Guidance* (Appendix C).

Recommendation 21 (CE): When agencies ask for representation from a specific geographic or cultural community, the agencies actively support such representation in recognition of the costs of engagement borne by community members where allowable by state law and agency policy. Doing so would reduce barriers to engagement presented by trading time and/or money to learn about and engage in the agency's process, such as taking time from work, finding childcare, and arranging for transportation.

- *Further guidance: Sections 2.02 and 2.04 in Community Engagement Plan Guidance (Appendix C).*

Recommendation 22 (CE): In alignment with the Office of Financial Management's Model Diversity, Equity, and Inclusion Policy, agencies should use equity-focused hiring practices and inclusion-focused professional development to build and support an internal staff that represents the cultural and racial makeup of the population they serve.

- *Further guidance:* Sections 1.06, 2.04, and 2.06 in *Community Engagement Plan Guidance* (Appendix C).

Recommendation 23 (CE): When an agency's program or service has potential to impact Tribal and/or Indigenous people or their resources, the agency includes those groups in their community engagement work, using tailored approaches based on the needs of the Tribe. Note that community engagement is distinct from and not a substitute for formal government-to-government or cultural resource consultation.

- *Further guidance:* Sections 2.01 and 2.03 in *Community Engagement Plan Guidance* (Appendix C).

Recommendation 24 (CE): Agencies conduct compliance reviews of existing laws and policies that guide community engagement, and where gaps exist, ensure compliance for the following laws in agency service and program budgets:

- Title VI of the Civil Rights Act, prohibiting discrimination based on race, color, or national origin and requiring meaningful access to people with limited English proficiency.
- Executive Order 05-03 requiring Plain Talk when communicating with the public.

- Executive Order 13166, requiring meaningful access to agency programs and services for people with limited English proficiency.

- *Further guidance:* Sections 1.05 and 2.13 in *Community Engagement Plan Guidance* (Appendix C).

Recommendation 25 (CE): Change state laws that restrict agencies from purchasing goods and services, such as childcare and food, which support broad community participation.

- *Further guidance:*
  - Attachment C and Sections 1.07, 2.02, and 2.06 in *Community Engagement Plan Guidance* (Appendix C).
  - Common barriers to meaningful community engagement include lack of: compensation for community time and expertise, food during community meetings, transportation to meeting spaces, childcare, language access services, and internet access for virtual meetings. Additionally, the Legislature should consider providing assistance to increase access to virtual meetings, especially for rural communities that have limited broadband services. There should be as much cross-agency coordination as possible to create common "best practices" for how and when to offer these services. Forums for this coordination could be the proposed permanent EJ workgroup (see: recommendation #2) or the Office of Equity. Changes considered and developed should be done in compliance with state guidelines on ethical community engagement by the Department of Enterprise Services and the state Executive Ethics Board.
  - Significant additional work is needed to comprehensively identify the legal restrictions and develop best practices to remove these barriers. Some initial RCWs to consider amending for more effective community engagement include:
    - RCW 43.03.050: Subsistence, compensation, lodging and refreshment, and per diem allowance for officials, employees, and members of boards, commissions, councils or committees.
      - *Suggested amendments*: Compensation or reimbursement for participation on boards, commissions, councils, and committees should be allowed for those with low incomes. Providing food and services, such as daycare, to attendees of public meetings should also be allowed when adequate funds are available and deemed appropriate based on the type of engagement required.
    - RCW 39.26.040: Prohibition on payments to board, commission, council, or committee members.
      - *Suggested amendment:* Using agency discretion, allow payment for service on boards, commissions, councils, and committees for those with low incomes. Reducing barriers for community participation will allow a broader cross-section of people to share their expertise and lived experiences in shaping policies and other government processes to better reflect the needs and desires of communities that may not otherwise get a seat at the decision-making table.

Recommendation 26 (CE): In cooperation with the Governor's Subcabinet on Business Diversity led by the Office of Minority and Women's Business Enterprises (OMWBE), agencies should increase contracting diversity by proactively engaging and contracting with local organizations that are community-based, community-rooted, and community-led to improve community health outcomes and eliminate environmental injustices across Washington state**.**

- *Further guidance:*
  - Sections 1.07, 1.08, 2.02, 2.04, and 2.06 in *Community Engagement Plan Guidance* (Appendix C).
  - Agencies have tended to contract with highly paid consultants who, in turn, reach out to community organizations who are asked to provide their time and expertise without compensation. This proposal is intended to offer a more direct path for agencies to hear directly from the relevant stakeholders.
  - The EJTF recognizes that, "Those closest to the problem are closest to the solutions but furthest from resources and power."[66] Implement this recommendation in specific instances in which community expertise and understanding of community experiences is needed, such as: development of strategic plans, policy development, community engagement, or any other process that would benefit from the expertise held by local organizations and the communities they work with.
  - Agencies should consider contracting with non-profit organizations, small for-profit businesses, OMWBE-certified businesses, Tribal governments or entities in WA.
  - Agencies and the Legislature should work with the OMWBE and the Department of Enterprise Services to remove barriers to the contracting and procurement processes for community organizations, especially smaller or understaffed organizations, with the goal of including more trusted community organizations listed on the State's Qualified Master Contract List. Furthermore, contracting processes should be re-evaluated to ensure that small entities and organizations are seriously considered.
  - Agencies should work to eliminate their contracting disparities outlined in this 2019 Washington State Disparity Study and in their annual diversity fiscal reports by implementing the recommended policies, procedures, training, and implementation plans for individual agencies outlined by the Governor's Subcabinet on Business Diversity. Furthermore, agencies can prioritize the action steps outlined in their individual Inclusion Plans for increased supplier diversity.
  - Recommendations from the 2019 WA State Disparity Study are forthcoming,[67] and include policy recommendations such as: increasing access to state contracting information, lengthening solicitation times, raising the direct buy limits, and reviewing contract sizes and scopes.
  - In determining the appropriate organization to contract with, considerations must be made in understanding both how the organization being considered for a contract is

[66] Martin, Glenn E. "Those Closest to the Problem Are Closest to the Solution". The Appeal, 2017. https://theappeal.org/those-closest-to-the-problem-are-closest-to-the-solution-555e04317b79/.
[67] Expected publication date of November 2020.

representative or able to engage in outreach to a specific aspect of a diverse community, and also their ability to engage a full range of community stakeholders.

- Consider the need for a variety of knowledge and expertise types. Input is needed not just from those with government, business, or academic expertise but all community expertise and expertise from lived and intersectional experiences.
- The restrictions imposed by Initiative-200 (I-200), now in place as RCW 49.60.400, may serve as a barrier to meeting the goals of this recommendation. As such, repeal of these restrictions should be considered by the Legislature in order to update our state's policies and ensuring diversity, equity, and inclusion in government contracts, employment, and schools. In narrow circumstances, an agency may be able to tailor preferences based on race or sex.[68]

[68] "Washington State Office of the Attorney General. "Use of Race- Or Sex-Conscious Measures or Preferences To Remedy Discrimination in State Contracting". 2017. https://www.atg.wa.gov/ago-opinions/use-race-or-sex-conscious-measures-or-preferences-remedy-discrimination-state.

Areas for Further Study

Section Overview:

The EJTF discussed several ideas for how to work towards environmental justice in Washington, many of which came directly from conversations with communities across the state. The ideas that had the most promise for implementation were refined and included as formal recommendations in this report. The following two ideas need more time for thorough research and consideration. As the fight for EJ in Washington continues, further study is needed to determine if and how these two ideas will support overburdened communities.

I. **Study: Concept of "Concurrent Jurisdiction" for state agencies, which would allow state agencies to seek compliance or enforcement actions that are currently the sole responsibility of City, County & Regional agencies.**

Considerations

- Constitutional and current state law restrictions create exclusive authority for local jurisdictions.
- May create confusion on how best to report violations.

II. **Study: The expansion of "Private Rights of Action" (PRA) to allow for resident lawsuits to be filed against alleged violators of environmental laws.**

Considerations

- PRAs should not encourage lawsuits based on private interests. Rather, PRAs should focus on ameliorating environmental law regulations that negatively affect the public's health.

Conclusion

The EJTF's recommendations are focused on creating the infrastructure across the state to meaningfully and systematically work toward environmental justice. The EJTF recognizes that the fight for environmental justice is ongoing, and that the partnerships and trust between community and government are essential to achieve EJ in Washington.

Washington state government has steadily addressed EJ since the early 1990s. State government has worked with communities to examine how to embed EJ into laws, policies, programs, and processes for nearly three decades. Each major EJ-focused effort prior to the EJTF has drawn similar conclusions to the EJTF with respect to the state of EJ in Washington, and has developed comparable recommendations for how to achieve EJ. Environmental justice will not be achieved as a result of our intentions, but it can be achieved through the actions we choose to take next. ***Now is the time for Washington state government to take action and honor its commitment to environmental justice.***

Task Force Member Statements

Section Overview

All members were given the opportunity to write a member statement, about anything they felt was relevant or important to highlight, for the final report. The following statements provide insight into how the following members approached their work as EJTF members, their critiques of the EJTF process, what their hopes are for the future of EJ work in Washington, and context for why they may have made specific decisions as EJTF members.

Member: Community to Community Development, Bellingham

"We're the ones on the front line and bearing the brunt of climate change and all the injustices that happen to farmworkers. We've been trying to ring the alarm for many years."-Edgar Franks, FUJ

"It's not about the apples. It's about our people. It's about the farmworkers, it's not about the berries. It really isn't about the pears or berries. We're talking about human beings...that are interested and are fighting for a better food system...It's about the survival of farmworkers in the agricultural industry...We're not against anybody. We are for farmworkers living through this pandemic." -Rosalinda Guillen

The absence of key stakeholders in the proceedings of the Environmental Justice Taskforce is reflected in the limits of the general body recommendations put forward by the Taskforce. Being that it was an agency heavy body, most of the recommendations have to do with the minutiae of specific agencies in Washington state when it comes to considering Environmental Justice.

Though I cannot fill the silence left by all communities that were not at the decision making table, the one resounding policy recommendation that has been voiced by Black, Indigenous and Farmworker front line communities alike has been the unfulfilled need to access land in Washington State. Whether that means the abolition of treaties and the corresponding agencies to facilitate the transfer of all public lands to the areas original stewards now compartmentalized on reservations a fraction of their original territory; to allowing for reparations to black front line communities in the form of access to land, such as the current proceedings in Seattle's Central District; to providing access to farmland to farmworkers such as the current Tierra y Libertad sixty-five acre farm in Whatcom County are all the necessary first step toward moving Washington agriculture from a mere commodity export industry, towards a more sustainable and thriving localized food system.

Providing access to land to front line communities would be the first step toward moving the dial on many of these Environmental Justice policy goals.

Though I cannot speak for a large and diverse population of farmworkers in Washington State, I can provide examples of the policy recommendations for the Governor's review that have been

presented over the last seven years at the Annual Farmworker Tribunals held in Olympia that would be a step toward Environmental Justice.

Recommendations from Washington's Farm Worker Tribunals:
This body recommends that the state of Washington agencies be required to collect data on surveillance of pesticide illness and exposure, premature deaths, and workplace injuries by RCW or Rule to systematically make annual reports available to the public. (2020)

This body recommends for Community to Community Development and Familias Unidas por la Justicia to draft a Farmworker Bill of Rights for Washington, which should incorporate a comprehensive vision which includes agricultural worker protection, opportunities, and community aspirations advancing equity across generations of farmworkers and farmworker families. This bill of rights should include the systemic issues of access to fair, equitable, and environmentally sustainable, labor conditions, health, justice, education, economic development, and community infrastructure. (2020)

This body recommends that we must affirm the farmworker unions, cooperatives and collective actions for bringing real solutions into existence. We must contrast the collective good of these efforts to the industry equivalents to demonstrate that another agriculture is possible. (2019)

Member: Puget Sound Partnership

We are deeply grateful to have been a part of this important Task Force effort to advance environmental justice as an integral component of good governance and critical aim for Washington State. As the state agency leading the collective effort to restore and protect Puget Sound, we at the Puget Sound Partnership firmly believe that environmental progress cannot be achieved without first confronting environmental injustices. We are energized by the excellent start made with these Task Force recommendations and look forward to advancement of environmental justice aims across our shared work.

-- Larry Epstein, Leah Kintner, Alexandra Doty, and Beihua Page

Member: Washington State Department of Natural Resources

The Washington State Department of Natural Resources (DNR) is thankful to have participated on the statewide Environmental Justice Task Force over the last year. Our agency has learned a lot from participating and we are very encouraged by the content of the final report. As our time on the task force comes to an end, we wanted to take this opportunity to share a bit about our agency, our mission, and how we are prioritizing environmental justice.

In 1957, the Legislature created the DNR to manage state trust lands for the beneficiaries of those trusts. Under the elected leadership of the Commissioner of Public Lands and the Board of Natural Resources, DNR manages these trusts to generate revenue while stewarding the lands, waters, and habitats entrusted to its care. DNR manages over 3.2 million acres of forest,

range, agricultural, and commercial lands for more than $160 million in annual financial benefit for public schools, state institutions, and county services.

The State's Enabling Act, Constitution, and Statutes created these trusts and because of this DNR has specific management obligations. A trust is a relationship in which the trustee holds title to property that must be kept or used for the benefit of another. The relationship between the trustee and the beneficiary for these lands is a fiduciary relationship. A trust includes a grantor (the entity establishing the trust), a trustee (the entity holding the title), one or more beneficiaries (entities receiving the benefits from the assets), and trust assets (the property kept or used for the benefit of the beneficiaries). For these state trust lands, the trustee is the legislature and the beneficiaries are named public institutions of state and local governments.

The common law obligations of a trustee include to operate as a prudent person, have undivided loyalty, generate revenue, not foreclose future options and protect the corpus of the trust on behalf of the beneficiaries is commonly known as the "trust mandate". The legal construction of Washington's trust lands also creates considerable differences in how these lands are managed when compared to other public lands. For example, because the beneficiaries are public institutions, the trust obligation continues in perpetuity—that is, forever.

Despite our trust mandate, DNR is still leading the way in utilizing tools such as the Environmental Health Disparities (EHD) mapping tool to guide our decision-making. For example, we have partnered with the Department of Health and the Department of Commerce to overlay EHD mapping data over DNR-managed state lands and broadband access need data. This GIS-based map shows specific areas around the state that have the greatest need and can help drive the conversation forward about where to target investments, for example, in communication site towers. We've also been utilizing the EHD mapping tool to look at where investments in our salmon strategy work in the Snohomish Watershed will yield multiple benefits. We are working on finalizing this GIS-based tool in the coming months so that investors, legislators, and other public entities who are interested in salmon recovery efforts can also ensure that their dollars promote job creation, environmental health, and community resilience.

Additionally, the DNR Urban Forestry Program reformed its community forestry assistance grant program to include a focus on equity, including a requirement that applicants use EHD mapping tool to develop their projects in highly impacted communities. As a result, the Urban Forestry Program has awarded funding to three equity-focused urban forestry projects: one in Tacoma in 2018 and two in Spokane in 2019. In this same timeframe the program has procured roughly $800,000 in additional grant funding from the Forest Service for three urban forestry projects in the Seattle metro region where key project components include emphasis on diversity, equity, and accessibility.

And, as part of the agency's Wildfire Strategy, we used the EHD map to identify many of Washington's most vulnerable populations who live in areas with high wildland fire risk. Older

adults, young children, and those with limited English proficiency can be vulnerable during wildland fires due to potential health impacts (to the old and the young) and language barriers (those with limited English proficiency). Recent research indicates that vulnerability to wildland fire is unequal; census tracts that are majority Black, Hispanic, or Native American have a 50 percent greater vulnerability to wildland fire than other census tracts. Our use of the EHD mapping tool helped us to develop a plan to better protect non-English speaking communities during wildfire response.

Lastly, we utilized environmental justice analysis as part of the NEPA/SEPA final Environmental Impact Statement for the marbled murrelet conservation strategy. This environmental justice analysis was used to more fully understand the impacts the decision would have on various communities around the state.

We will continue to lean in on equity and environmental justice, and look forward to finding new ways to do so based on recommendations and ideas within this document and our ongoing partnerships with community organizations.

Non-Majority Opinion Statement

Section Overview

One of the strengths of the EJTF process was that EJTF members brought a diversity of perspectives, opinions, and priorities. The range of viewpoints represented on the EJTF also meant that consensus was not always possible. As such, all EJTF members were given the opportunity to include a non-majority opinion statement in instances where the member's agency, community, or organization did not align with an official EJTF decision.

Member: Association of Washington Business

The Association of Washington Business was pleased to represent our state's businesses on the Environmental Justice Task. Overall, AWB supports many of the recommendations outlined in this report. However, there are a few recommendations which we have some reservations around and believe they needed more discussion and refinement.

As a task force member, we were frustrated that new recommendations continued to be added to the report at the last three meetings. These last-minute recommendations took time away from discussing and refining the existing recommendations and made it difficult to fully explore the new additions. In addition, there are a few recommendations which we believe require a larger stakeholder discussion than was available in the task force and we are uncomfortable advancing those without having that larger discussion.

In that spirit, we have identified the following areas where we depart from the majority opinion regarding the final recommendations of this task force. These departures are not a rejection of the goal of reducing environmental justice in the state or a signal that the conversation around

this topic is completed. We believe this report represents the beginning of larger conversations about the need for reform.

However, the format of the task force was such that we were unable to fully vet the entire report before being asked to approve language or express our concerns. We would like to use this space to clarify our position.

Our first departure from the task force report is in relation to Recommendation Five (incorporate environmental justice concerns into state environmental laws). This report highlights two major state environmental laws where environmental justice should be integrated, the Growth Management Act and the State Environmental Protection Act. These are major state laws which impact multiple state agencies, counties, cities, individual Tribes, and number businesses and community organizations. Each of these stakeholders has a particular view of what changes they might like to see made in each law and we are uncomfortable recommending those changes without having a broader discussion within the stakeholder community.

In regards to Recommendation 6 (agencies should adopt and the Legislature should consider requiring EJ analysis, including the health disparity map…), we continue to have ongoing concerns related to the construction of the Cumulative Impact Mapping tool. As this tool is at the heart of several ongoing rulemakings and many of the recommendations of this report, we believe that there needs to be a higher level of confidence that the mapping tool is properly expressing health disparities on the ground.

We appreciate the emphasis on the use of this tool as one of several to identify environmental heath disparities and that it is not meant to be used for decision making but there are some methodological questions related to the generation of the scores that we think need to be better examined. While aspects of the tool have been published and received some peer review, we think a full analysis of the mapping equation by an independent group is an important step before it is used more widely at the state level and inform state policy decisions.

Finally, for Recommendation 7 (new and existing revenue expenditures with an environmental nexus….), we are concerned at the requirement for resources to be allocated according to one singular criteria. We think adding an equity consideration is a valid suggestion but it should not be the only decision that influences where and how state environmental revenues are spent.

The effort and work going into this report shows the importance of addressing the issue of environmental justice and disparate health outcomes in Washington State. The Association of Washington Business and our members share the goals of creating a more equitable environment that are expressed in this report. However, we want to ensure any of the substantive changes suggested in this report are carefully thought out and vetted within the broader stakeholder community.

"In the end, all the struggles have the same objective: the defense of life. That is the most important, no matter where we are or what the specific goal of each fight is."

-Ana Sandoval, Guatemalan Environmental Justice Activist

Appendices

- **Appendix A.** Glossary of EJ Related Terms
- **Appendix B.** Task Force, Mapping Subcommittee, and Community Engagement Subcommittee Membership
- **Appendix C.** Community Engagement Subcommittee Guidance document
    - Attachment A. Public Participation Tool
    - Attachment B. Public Participation Spectrum
    - Attachment C. Barriers to Meaningful Engagement
- **Appendix D.** Operationalizing EJ Task Force Measurable Goals and Model Policy Recommendations: A Primer on the GARE Toolkit
- **Appendix E.** Further Guidance on the Environmental Health Disparities Map
- **Appendix F.** Methodology and Analysis - Washington Tracking Network Bar Graphs on Environmental Health Disparities
- **Appendix G.** Memo: EJ and Reparations from Systemic Racism
- **Appendix H.** EJ and COVID-19 Memo from EJTF Co-Chairs

Appendix A. Glossary of EJ Related Terms

The following definitions are pulled from multiple sources that are specific to Washington state and/or environmental justice. [69,70,71,72,73,74]

Access	Creating and advancing barrier-free design, standards, systems, processes, and environments to provide all individuals, regardless of ability, background, identity or situation, an effective opportunity to take part in, use and enjoy the benefits of: employment, programs, services, activities, communication, facilities, electronic/information technology, and business opportunities.
Burden	The magnitude of poor health that exists within a community that is attributable to the risk factors that are present.
Community of Practice	A group of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.
Community Resilience	The ability of communities to withstand, recover, and learn from past disasters and to learn from past disasters to strengthen future response and recovery efforts.
Cultural Competence	An ability to interact effectively with people of all cultures and understand many cultural frameworks, values, and norms. Cultural competence comprises four components: • Awareness of one's own cultural worldview, • Attitude towards cultural differences, • Knowledge of different cultural practices and worldviews, and • Cross-cultural skills. A key component of cultural competence is respectfully engaging others with cultural dimensions and perceptions different from our own and recognizing that none is superior to another. Cultural

[69] University of Washington Department of Environmental & Occupational Health Sciences. Washington Environmental Health Disparities Map: technical report. Seattle; 2019.
[70] Washington State Office of Financial Management Diversity, Equity and Inclusion Council. Diversity, Equity and Inclusion: Glossary of Equity Related Terms. 2019.
[71] Asian Pacific Environmental Network. Mapping Resilience: A Blueprint for Thriving in the Face of Climate Disasters. Oakland; 2019.
[72] Ajmera, C., Dubytz, K., Lih, E., Rahman, S., & Six, J. University of Washington Daniel J. Evans School of Public Policy and Governance. Embedding Environmental Justice into the Washington State Department of Ecology: Promising Practices for Advancing Equity and Environmental Justice: Report. Seattle; 2020.
[73] "RFA-ES-14-010: Centers of Excellence on Environmental Health Disparities Research (P50)." National Institutes of Health. U.S. Department of Health and Human Services. https://grants.nih.gov/grants/guide/rfa-files/RFA-ES-14-010.html
[74] Powell, John, Stephen Menendian and Wendy Ake, "Targeted universalism: Policy & Practice." Haas Institute for a Fair and Inclusive Society, University of California, Berkeley, 2019. https://belonging.berkeley.edu/targeteduniversalism.

	competence is a developmental process that evolves over an extended period.
Cultural Humility	Approach to respectfully engaging others with cultural identities different from your own and recognizing that no cultural perspective is superior to another. The practice of cultural humility for white people is to: acknowledge systems of oppression and involves critical self-reflection, lifelong learning and growth, a commitment to recognizing and sharing power, and a desire to work toward institutional accountability. The practice of cultural humility for people of color is to accept that the dominant culture does exist, that institutional racism is in place, to recognize one's own response to the oppression within it, to work toward dismantling it through the balanced process of calling it out and taking care of one's self.
Cumulative Impact	The combined impact of multiple environmental health indicators on a population.
Disproportionate Impacts	In the context of EJ, this refers to when one group or population bears an environmental or health impact that is substantially higher than the average distribution. This impact is usually compounded by existing inequities due to historic discrimination against certain groups.
Distributive Justice	The equitable distribution of resources. In the context of EJ, this means reducing environmental harm in communities with disproportionately high environmental pollution, as well as increasing access to environmental benefits.
Diversity	Describes the presence of differences within a given setting, collective, or group. An individual is not diverse – a person is unique. Diversity is about a collective or a group and exists in relationship to others. A team, an organization, a family, a neighborhood, and a community can be diverse. A person can bring diversity of thought, experience, and trait, (seen and unseen) to a team — and the person is still an individual.
Environmental Effect	Adverse environmental quality generally, even when population contact with an environmental hazard is unknown or uncertain.
Environmental Equity	Environmental equity will be achieved when no single group or community faces disadvantages in dealing with the effects of the climate crisis, pollution, environmental hazards, or environmental disasters.
Environmental Exposure	Refers to how a person comes into contact with an environmental hazard. Examples of exposure include breathing air, eating food, drinking water or living near to where environmental hazards are released or are concentrated.

Environmental Hazard or Risk Factor	Refers to a specific source or concentration of pollution in the environment. Polluted air, water and soil are examples of environmental hazards.
Environmental Health Disparities	Inequities in illnesses that are mediated by disproportionate exposures associated with the physical, chemical, biological, social, natural and built environments.
Environmental Health Indicator	Refers to either a specific environmental risk factor or a specific measure of population susceptibility or vulnerability.
Environmental Justice	The fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to development, implementation, and enforcement of environmental laws, regulations and policies. This includes using an intersectional lens to address disproportionate environmental and health impacts by prioritizing highly impacted populations, equitably distributing resources and benefits, and eliminating harm.
Environmental Justice Analysis	A study that considers how current conditions or proposed actions may affect surrounding communities and populations, to include consideration of possible impacts on BIPOC communities and low-income communities who may be disproportionately exposed to environmental burdens. The USEPA provides several resources to support this type of analysis, such as this Technical Guidance for Assessing EJ in Regulatory Analysis.
Environmental Racism	Any policy, practice, or directive that differentially affects or disadvantages individuals, groups, or communities based on race or ethnicity (whether intended or unintended).
Equality	Treating everyone the same, regardless of their circumstances.
Equity	The act of developing, strengthening, and supporting procedural and outcome fairness in systems, procedures, and resource distribution mechanisms to create equitable (not equal) opportunity for all people. Equity is distinct from equality which refers to everyone having the same treatment without accounting for differing needs or circumstances. Equity has a focus on eliminating barriers that have prevented the full participation of historically and currently oppressed groups.
Ethnicity	A social construct that divides people into smaller social groups based on characteristics such as values, behavioral patterns, language, political and economic interests, history, and ancestral geographical base.
Framework	An overarching strategy or organizational structure.

Health Disparities	Refers to a higher burden of illness, injury, disability, or death experienced by one group or population relative to another.
Health Equity	Refers to everyone having the opportunity to attain their highest level of health.
Indicator	A proxy variable that aims to capture a specific trend.
Indigenous Populations	Refers to federally recognized Tribes, state recognized Tribes, and Tribes and Bands who have not been formally recognized by the federal or state governments. This includes Indigenous persons living in Tribal and U.S. territories.
Intersectionality	Intersectionality is a framework for understanding the interaction of cultures and identities held by an individual. Intersectionality explains how an individual with multiple identities that may have been marginalized can experience compounded oppression (such as racism, sexism, ageism, ableism, and classism) or how an individual can experience privilege in some areas and disadvantage in other areas. It takes into account people's overlapping identities to understand the complexity of their life outcomes and experiences.
Low-Income	Individuals and families who make less than 80 percent of the median family income for the area.
Overburdened Communities	Communities who experience disproportionate environmental harms and risks due to exposures, greater vulnerability to environmental hazards, or cumulative impacts from multiple stressors.
Race	A social construct that divides people into smaller social groups based on characteristics most typically skin color. Racial categories were socially constructed, and artificially created whiteness as one of the elements of the dominant culture. Race was created to concentrate power and advantage people who are defined as white and justify dominance over non-white people. The idea of race has become embedded in our identities, institutions, and culture, and influences life opportunities, outcomes, and experiences. Racial categories change based on the political convenience of the dominant society at a given period of time.
Racism	A way of representing or describing race that creates or reproduces structures of domination based on racial categories. In other words, racism is racial prejudice plus power. In the United States, it is grounded in the creation of a white dominant culture that reinforces the use of power to create privilege for white people while marginalizing people of color, whether intentional or not.
Risk	How likely exposure to environmental hazards will result in poor health for a population.
Sensitive Populations	Those who are at greater risk due to biological/intrinsic vulnerability.

Social Justice	A practice within a society based on principles of equality and solidarity that understands and values human rights and recognizes the dignity of every human being. Such a practice would strive to provide basic human needs and comforts to all members of the society regardless of class, race, religion or any other characteristic.
Targeted Universalism	The practice of setting universal goals and using targeted processes to achieve those goals. Within a targeted universalism framework, an organization or system sets universal goals for all groups concerned. The strategies the organization/system develops to achieve those goals are targeted to different groups—based on how different groups are situated within structures, culture, and across geographies—to obtain the universal goal.
Toolkit	A specific, prescriptive, action-oriented set of steps to integrate equity or EJ into the policy process.
Vulnerability	A person's (or population's) non-biological situation that affects their ability to cope with risk factors. Examples of vulnerability include low income, language barriers or poor access to health care.
Workforce Diversity	A collection of individual attributes that together help agencies pursue organizational objectives efficiently and effectively. These include, but are not limited to, characteristics such as national origin, language, race, color, disability, ethnicity, gender, age, religion, sexual orientation, gender identity, socioeconomic status, veteran status, political beliefs, communication styles], and family structures. The concept also encompasses differences among people about where they are from, where they have lived and their differences of thought and life experiences.

Appendix B. Task Force, Mapping Subcommittee, and Community Engagement Subcommittee Membership

Environmental Justice Task Force Member Roster

Representing	Member	Alternate Member
Interagency Council on Health Disparities (HDC)	Victor Rodriguez (Co-Chair)	
Statewide EJ Issues; Front & Centered	David Mendoza (Co-chair)	
Public Lands (Dept. of Natural Resources)	Cassie Bordelon	Stephanie Celt
Department of Commerce	Michael Furze	Sarah Vorpahl
Department of Ecology	Millie Piazza	
Puget Sound Partnership	Larry Epstein	Leah Kintner
Department of Transportation	Allison Camden	Megan White
Department of Health	Laura Johnson	
Energy Facility Site Evaluation Council (Utilities & Transportation Commission)	Sonia Bumpus	
Department of Agriculture	Ignacio Marquez	
Community-Based Organization: Community to Community Development	Tomás Madrigal	
Community-Based Organization: Tacoma Urban League of Young Professionals	Emily Pinckney	
Community-Based Organization: Asian Pacific Islander Coalition	Rowena Pineda	
Union/Organized Labor Association: UAW Local 4121	Judy Twedt	
Business Interests	Gary Chandler	Peter Godlewski
Statewide Agricultural Interests: Farm Bureau	John Stuhlmiller	
Tribal Leader	Unconfirmed	

Mapping Subcommittee Roster	
Subcommittee Co-Chair: Laura Johnson (EJTF Member)	Washington State Department of Health
Subcommittee Co-Chair: Millie Piazza (EJTF Member)	Washington State Department of Ecology
Alison Beason	Port of Seattle
Beihua Page	Puget Sound Partnership
Caroline Smith	Labor & Industries
David Mendoza (EJTF Co-Chair)	Front & Centered
Deric Gruen	Front & Centered
Edmund Seto	University of Washington
Elizabeth Lanzer	Washington State Department of Transportation
Erik Saganić	Puget Sound Clean Air Agency
Esther Min	University of Washington
Lauren Freelander	Washington State Department of Health
Paul Tabayoyon	Asian Pacific Islander Coalition of WA
Peter Godlewski (EJTF Member)	Association of Washington Business
Richard Gelb	Public Health Seattle & King County
Sarah Vorpahl (EJTF Member)	Washington State of Department of Commerce
Tomás Madrigal (EJTF Member)	Community to Community Development

Community Engagement Subcommittee Roster	
Subcommittee Co-Chair: Megan MacClellan	Washington State Department of Ecology
Subcommittee Co-Chair: Emily Pinckney (EJTF Member)	Tacoma Urban League of Young Professionals
Alexandra Doty	Puget Sound Partnership
Bill Bennion	Washington State Department of Transportation
Brett Houghton	PRR Seattle
Bridgette Valdez-Kogle	Washington State Department of Ecology
David Mendoza (EJTF Co-Chair)	Front & Centered
David Ortiz	Communities of Color Coalition
Farah Mohamed	Public Health Seattle King County
Ignacio Marquez (EJTF Member)	Washington State Department of Agriculture
Julia Havens	Washington State Department of Commerce
Micaela Araguz Razo	Latino Community Fund
Mike Chang	Makah Tribe, Cascadia Consulting Group
Myra Hernandez	Washington State Commission on Hispanic Affairs
Rowena Pineda (EJTF Member)	Asian Pacific Islander Coalition, Spokane Chapter
Shirlee Tan	Public Health - Seattle & King County
Sinang Lee	Public Health - Seattle & King County
Stephanie Celt (EJTF Member)	Department of Natural Resources
Tomás Madrigal (EJTF Member)	Community to Community Development

Appendix C. Community Engagement Plan Guidance with Corresponding Attachments

COMMUNITY ENGAGEMENT PLAN GUIDANCE

ABSTRACT

The Community Engagement Subcommittee recommends that each agency develop a Community Engagement Plan to fit agency-specific work. We have outlined elements of a plan in this document to support meaningful engagement. Our approach guides an agency to develop its own best practices, informed by successful examples, and comprising elements designed to overcome barriers to engagement that are typical of agency work.

Community Engagement Subcommittee

Washington Environmental Justice Task Force

1. Introduction

1.01 Why Community Engagement is Crucial

The governing structures of the United States were designed to elevate the rights and access to its resources of some people at the expense of the rights and access of others. These weighted structures led to the systemic inequity that the EJ movement responds to. They have been reaffirmed across history, often in response to efforts to move toward more equitable laws and practices, and are widely maintained today.

The guidance that follows is grounded in the position that these systems cannot change without the direct involvement of the communities who have borne the weight of systemic disparities, and that such involvement is rarely supported by Washington state's government. We recognize the critical value of repairing relationships and building trust with communities who have.

Repairing relationships and building trust between government and those members of the public harmed by environmental injustice is central to this guidance. A focus on trust-building in this context sends skills like cultural humility and emotionally intelligent communication to the forefront, and we see more ties to community organizing than to conventional communications-oriented information sharing.

Truly meaningful community engagement builds more sustainable agency programs and decisions, and it increases community understanding of agency decisions and transparency and trust in government actions. State agencies have a responsibility to create community engagement opportunities that allow all of Washington's diverse communities "equal access to the decision-making process to have a healthy environment in which people live, learn, and work."[75] Without it, as history demonstrates,[76] entire populations are systematically left out, curbing their ability to effectively advocate for their own health and safety. Furthermore, many agencies are directed by policy and federal, state, and local laws to implement meaningful community engagement and participation.

The Community Engagement Subcommittee recommends that **each agency develop a Community Engagement Plan to fit agency-specific work.** We have outlined elements of a plan in this document to support meaningful engagement. Our approach guides an agency to develop its own best practices, informed by successful examples, and comprising elements designed to overcome barriers to engagement that are typical of agency work.

Here, we describe pathways to a type of community engagement that empowers members of the public to collaborate with state agencies in making decisions that will have direct impacts

[75] U.S. Environmental Protection Agency. "Environmental Justice." https://www.epa.gov/environmentaljustice.
[76] Maantay, Juliana, Jayajit Chakraborty, and Jean Brender. "Proximity to Environmental Hazards: Environmental Justice and Adverse Health Outcomes". (2010): https://archive.epa.gov/ncer/ej/web/pdf/brender.pdf.

on them. However, while agencies remain responsible for communicating what decisions are made on behalf of the public, we recognize that engaging the public as partners in 100% of agency decision-making is not ideal for even the most motivated community. As a foundation of this guidance, we recommend an evaluation process to determine when that level of engagement, on one end of a spectrum, is valuable and when engagement that requires fewer resources is appropriate.

1.02 Community Engagement and Environmental Justice

All agencies can embed EJ into their missions by prioritizing and investing in meaningful community engagement, especially in areas of critical concern across Washington.[77] One of the defining documents of the EJ movement is the *17 Principles of Environmental Justice*, which were drafted and adopted by the delegates to the First National People of Color Environmental Leadership Summit in 1991. Principle #7 explicitly states the need for community engagement to achieve environmental justice.

EJ Principle #7: "Environmental justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation."[78]

The foundation of meaningful community engagement must be an evaluation of who is negatively impacted and who is benefitted by any agency decisions meant to benefit the public as a whole. This foundation stands in contrast to the common practice of starting with requirements outlined in law or policy. This guidance outlines and helps agencies identify common agency activities that do not typically involve, but can significantly impact, the public.

1.03 Acknowledging Current and Historical Harms

Building room in government decision-making for the voices of underserved and overburdened communities is one necessary component of correcting current and historical harms that communities of color, low-income communities, and other affected populations in Washington have endured. The Government Alliance on Race and Equity (GARE) names the responsibility that government has in reversing these injustices to eliminate environmental health disparities initiated and perpetuated by governmental actions, and to build community trust in government systems and institutions.

> *"From the inception of our country, government at the local, regional, state, and federal level has played a role in creating and maintaining racial inequity. A wide range of laws and policies were passed, including everything from who could vote, who could be a citizen, who could own property, who was property, where one could live, whose land was whose and more. With the Civil Rights movement, laws and policies were passed*

[77] As an initial step, agencies can consider prioritizing investing in community engagement in Census tracts ranked nine and ten on the Environmental Health Disparities Map.
[78] "The Principles of Environmental Justice". 1991. https://www.nrdc.org/sites/default/files/ej-principles.pdf.

that helped to create positive changes, including making acts of discrimination illegal. However, despite progress in addressing explicit discrimination, racial inequities continue to be deep, pervasive, and persistent across the country…Institutions and structures have continued to create and perpetuate inequities, despite the lack of explicit intention. Without intentional intervention, institutions and structures will continue to perpetuate racial inequities."[79]

1.04 Scoping Considerations

The Community Engagement Subcommittee built this guidance without the benefit of the tools and resources recommended in it. While we made every effort toward inclusion and representation, our work is inherently limited to the perspectives of those who were able to participate most. Namely, the perspectives most represented in this document are from people whose time was supported financially by their jobs and whose workload allowed time to participate. In this document, there are many instances when the Community Engagement Subcommittee speaks for people whose needs and experiences we do not fully understand, and we recognize that as a limitation to this work.

1.05 Authority

Washington state agencies are bound by several federal and state regulations that influence or rely on community engagement. Central here are:

- Title VI of the Civil Rights Act, which prohibits discrimination based on race, color, and national origin.
- Executive Order 13175, which recognizes Tribal sovereignty and requires consultation and coordination with Indian Tribal Governments.
- Title II of the Americans with Disabilities Act, which requires agencies to conduct business in a way that provides access to people with disabilities.
- Section 508 of the Rehabilitation Act, which prohibits discrimination on the basis of disability by agencies receiving federal funding.
- Executive Order 13166, requiring recipients of federal funding to accommodate people with limited English proficiency in their services and programs.

These regulations have broadly influenced state- and agency-specific policies as well. Phrases such as "meaningful engagement" proliferate. We imagine that state-level compliance with these laws and policies would amount to an equitable governmental landscape, free of the objectively disproportionate impacts of state decision-making that have led to the EJ Task Force. Agencies that may have grown accustomed to nominal compliance with laws such as

[79] Government Alliance on Race and Equity. "Racial Equity Toolkit: An Opportunity to Operationalize Equity". https://www.racialequityalliance.org/wp-content/uploads/2015/10/GARE-Racial_Equity_Toolkit.pdf

these are encouraged to re-evaluate their practices through the lens presented in this document.

Relevant Tools & Resources

- Title VI of the Civil Rights Act
- Executive Order 13166
- Results Washington's outcome measures:
    - *Efficient, Effective, and Accountable Government*
    - *Healthy and Safe Communities*

1.06 Who Washington State Agencies Serve

The central function of a public agency is to serve the public. We know that demographic data is inherently limited as it does not represent major swaths of the population, such as people who are undocumented, Indigenous peoples, and the LGBTQ community. We also know that agency leadership and staff are often not representative of the population they serve, which means decision-makers often do not have the same life experiences as the people affected by their decisions. Community engagement is, therefore, a crucial process that allows agencies to better serve the public through a greater understanding of the diversity of lived experiences and perspectives across Washington's communities.

We recommend that agency staff prepare to create a community engagement plan by asking: *Who might be affected by the agency work?* We recommend agencies name who and which communities might benefit from or be negatively impacted by agency processes, projects, or programs.

We recommend agencies create a "Who We Serve" section within the introduction of the agency community engagement plan to clearly name the communities that may be impacted in some way by internal or external agency work. In developing that section, demographic data will be a useful starting place, but direct communication with people in the impacted populations themselves will remain key to a meaningful understanding of the audience.

Agencies can ask themselves the following questions as part of developing the "Who We Serve" section of their plan:

- Who or which communities benefit or are impacted by the outcomes of an agency process, project, or program?
- Who or which communities might be impacted in some way at stages throughout an agency process?
- Are there communities or groups of people that are especially vulnerable to impacts, disproportionately affected, and underserved in some way by the process, project, or program?
- Which communities might engage and which might not in an agency process, project, or program? And why?

- Which environmental justice-related existing assets, resources, and knowledge exist within communities?

Relevant Tools & Resources

- Community Engagement Self-Assessments:
  - Office of Financial Management Diversity, Equity, Inclusion Council Resources
  - City of Seattle Inclusive Outreach and Public Engagement Guide
- The DOH Community Engagement Guide
- To Identify Stakeholders: Community Engagement: Guidelines for Excellence (pp. 126-128)

1.07 Equitable Approaches to Community Engagement

Community engagement covers a range of approaches, from outreach and consultations, to long-term collaborations, shared leadership, and supporting resident-led efforts. However, meaningful community engagement goes beyond a set of activities – it is a way of fostering trust, strengthening relationships, and honoring community knowledge. This leads to more effective and equitable solutions.

While the specific methods of engagement will differ depending on the context and the community, state agencies can find ways to center the voices of the highly impacted communities in planning and decision making.

As you work to advance EJ and equity across the state, embrace community engagement as an agency-wide plan that goes beyond the short-term needs of projects or programs. This plan should recognize communities' expertise and power to help shape solutions, as well as create planning and decision-making structures that are inclusive, accessible, flexible, and culturally appropriate.

To foster trust building, center community voices, and create equitable outcomes, use an equity lens to identify your community engagement approaches:

- Examine the power dynamics and structures within your agency that maintain inequities. These dynamics determine who you choose to engage and how, who is included and not included in decision-making, and how community members' power is valued and accounted for in your agency's work. Taking this first important step to understand and address these dynamics is critical to meaningful community engagement.
- Ensure communications and engagement efforts are carried out in a way that honors community assets and strengthens efforts to rebuild trust. Partner with community liaisons, hire staff that represent the communities you serve, and train staff on cultural competency skills.
- Align engagement efforts with clear opportunities for community to influence agency decisions – in a process that prioritize the knowledge, concerns, and ideas of the most

impacted communities. Ensure these opportunities are supported by the community's capacity to engage meaningfully. If needed, invest in building their capacity.

Relevant Tools & Resources

- Racial Equity Tools – Power Analysis
- Policy Link's Community Engagement Guide for Sustainable Communities

1.08 Community Engagement Planning Process and Considerations

Equitable community engagement begins before the project starts. Staff need time to plan for determining how community engagement fits into efforts as a whole using the considerations below. These considerations allow time for staff to identify and engage the appropriate stakeholders and community members in meaningful ways. Engagement planning steps, timing, and considerations are often concurrent, and multiple engagement activities may be required within a project. To ensure communities are engaged in a way that produces optimal outcomes for all parties involved, we recommend that state agencies require that all project plans include community engagement and outreach scope, goals, and estimated funding needs.

Key timeline and planning considerations for developing a community engagement plan:

1. **Build relationships:** Key contacts or community champions provide critical access to hard-to-reach populations. Plan to take the time to solicit local and regional viewpoints, regardless of knowledge or existing connection in the community. Recognize that positive encounters with community contacts are valuable, especially outside of project-focused transactions.
2. **Project scope:** Within the project scope, a community engagement plan should identify what regulatory, systemic, and environmental impacts and outcomes the program, project or policy will have—intended and unintended—on underserved, under-supported, historically marginalized, and overlooked communities or populations.
3. **Community impacts:** Identify how communities and populations may be disproportionately impacted and what guidance is needed and what input could be gathered?
4. **Types of community engagement:** Use a comprehensive approach to implement the types of engagement that are meaningful to the specific audience(s).
5. **Equitable engagement:** Outline an approach to determine who should be engaged and how. Use the Environmental Health Disparities Map and/or EPA's EJSCREEN tool to identify additional areas of need. Include considerations for community groups and jurisdictions that are already active on this topic.
6. **Budget for engagement activity:** Consider partnering with other agencies or entities to maximize time and funding. This may take time, so provide for this in the timeline.
7. **Media and promotion:** Plan time to research what media platforms are most used and most available to best reach your audiences. Consider a variety.

8. **Include timeline for application or request for funding (RFA/RFQ):** There are established timelines within procurement guidelines as outlined in RCW 39.26. You can make access to funds more equitable with flexibility for expanded timelines or by providing technical assistance to support communities with less capacity to be competitive.
9. **Evaluate existing programs and projects**: Evaluate existing engagement to assess where community engagement is inadequate or is missing altogether and begin to plan and incorporate it into ongoing efforts. For example, programs like the Department of Ecology's Model Toxics Control Act are currently going through rule revision and evaluating places where public engagement should be incorporated since it is an opportune time to incorporate community engagement into regular requirements of program action.

Relevant Tools & Resources

- Strategic Prevention Framework

2. Elements of Your Agency-Specific Community Engagement Plan

2.01 Determining Obligation

In the early stages of developing or revising any agency service or program, we recommend that each agency determines the level of community engagement needed, based on the program's impact on the public. This accommodates both the reality that it is not appropriate for all agency work to be moderated by a public voice, and the fact that the voice of those significantly impacted by agency decisions is a critical component of equitable, effective, and sustainable programs.

Because the intent of this guidance is to integrate systemically underrepresented voices more wholly into government decision-making, this process applies to all agency activities. The steps outlined below are as relevant to an agency's grant-making program as to a proposal to make changes to a neighborhood's infrastructure. They guide agencies to a more rigorous level of community engagement when the impact of their decision is greater and a more streamlined approach for low-impact decisions.

Using demographic data is a key element of the screening process when determining who lives in an area that could be affected by agency decisions. We support the EJ Task Force's recommendation of conducting area assessments using Washington's Environmental Health Disparities Map as an initial screening process to find information about population, race, language, and income. This screening can inform follow up outreach with local organizations, schools, public health agents, and community leaders to learn information that demographic data cannot provide, such as preferred communication pathways, presence of languages of lesser diffusion, or the presence of underrepresented communities not defined in census data.

These evaluations can be conducted with a structured tool (see the Racial Equity Toolkit, linked below, and examples provided in Attachment A and B), and can be simple screenings or complex processes, depending on the nature of the program being evaluated.

Core Elements of Determining Obligation

These include a series of steps to understand the relevance of the program to the public:

- Understanding the intentional and unintentional burdens and benefits of the program
- Identifying who and how many people are burdened/benefit (see Demographics below)
- Identifying social relevance of the program
- Outlining the potential for the program to impact someone's legal, financial, physical, or social health
- Confirming legal notification and outreach requirements.

These steps are followed using a systematic tool such as the International Association for Public Participation P2 Spectrum to align the level of public relevance with the suitable level of community engagement.

Relevant Tools & Resources

- Community Engagement Evaluation Tool (Attachment A)
- International Association for Public Participation P2 Spectrum (Attachment B)
- Racial Equity Toolkit, Government Alliance on Race and Equity
- If agencies receive EPA funding, consider the following resources that describe EJ and community engagement expectations associated with that funding (note that other federal funding agencies may have similar guidance):
    - EJ Interagency Working Group Framework for Collaboration
    - EPA's procedural safeguards checklist for funding recipients

2.02 Funding

Providing adequate funds and resources for community engagement is the backbone to implementing best practices for meaningfully reaching diverse communities across Washington. We argue that poorly funded community engagement delivers poor results, which feeds into the perception that community engagement is not a valuable process. Case studies across the country illustrate cost-savings over time when investments are made in the decision-making process. Well-resourced community engagement lowers the risk of an agency being out of compliance with federal and state requirements and leads to greater agency efficiency. Investing in community engagement is necessary to provide effective customer service for Washington's residents. Therefore, think critically about how to prioritize funds and resources for community engagement, which includes incorporating a funding element to an agency-specific community engagement plan.

Key elements of your agency's community engagement plan identify available funds and resources to systematically and intentionally:

- Hire or contract expert[80] community engagement coordinators, possibly through community organizations, to provide agency leadership on engagement planning and staff training.
- Communicate with communities in a culturally and linguistically relevant way, including following your agency's federally-mandated language access plan, translating documents, and providing interpretation for all interactions and verbal presentations.
- Compensate community members and organizations for their time and expertise and streamline the reimbursement process for community engagement-related expenses.
- Provide funding for multiple community engagement formats (e.g. public meetings, focus groups, surveys, community festivals, community beautification projects or artwork, etc.).
- Make transportation, culturally appropriate food, and childcare available for all events that include members of the public.
- Support staff travel to different parts of the state to engage with diverse communities.

[80] See section 2.09 for a discussion of expertise.

While we stand by the recommendation that community members be compensated when they invest significant time and labor into an agency's decision-making process, we recognize significant barriers exist in Washington state law that make such financial compensation challenging or impossible. Grant-making programs such as the Department of Ecology's Public Participation Grants are one option for investing in community feedback.

Relevant Tools & Resources

- The Valuing Engagement Toolkit can help agencies identify and articulate the costs and benefits of engagement, and assist with making the business case for community engagement.
- The Independent Sector values volunteer time at $25.43 per hour, on average, across the U.S.
- Government example: The National Park Service & U.S. Forest Service valued its volunteers' time at $179 million in 2018.
- The International Association for Public Participation's Core Values Awards, showcasing exceptional community engagement work.

2.03 Engagement and Consultation with Tribal and Indigenous Peoples

Tribal and Indigenous peoples have existed and prospered in what is now Washington state since time immemorial. Tribal and Indigenous peoples in Washington state are not homogenous – there are 29 federally-recognized Tribes, many non-recognized Tribes, Tribal and Indigenous peoples that come from other parts of what is now the U.S., Alaskan Natives, Native Hawaiians, and Indigenous peoples from all across the world. Therefore, using a tailored approach to engage with Tribal and Indigenous communities is not only necessary, but also acknowledges the diversity of Tribal and Indigenous peoples in Washington. Tribal and Indigenous engagement is a part of any project or policy that might affect these communities (which is almost all the time) and applies to governmental and non-governmental entities. Tribal and Indigenous engagement is *not* a substitute for Tribal consultation, which is a specific process of early, often, and meaningful communication and coordination between Tribal governments and state or federal governments. Many agencies have developed plans for formal Tribal consultation to facilitate compliance with Chapter 43.376 RCW and the Washington State Centennial Accord of 1989, such as Washington's Department of Health.

Key considerations when engaging with Tribal and Indigenous peoples:

- **European colonization has disrupted virtually all aspects of Tribal and Indigenous cultures**. This has led to a variety of disparate and disproportionate environmental, social, and economic outcomes for Indigenous peoples in Washington state.
- **Acknowledge and cede space to local Tribal and Indigenous leaders and sovereignty.** Tribal sovereignty should always be centered, and space should be ceded to the Tribal leaders and elders. Each Tribe and Indigenous community have their own leaders, cultural norms, and values. Tribal leadership, both in communities and in government,

can take forms that are less common in white culture. These leadership structures, like the role elders can play, are important to recognize. Consistency between an agency's engagement intentions and agency policies are an integral part of honoring and respecting sovereignty.

- **Building trust and relationships is integral to have positive outcomes.** Many Tribal and Indigenous communities and peoples are protective of who is allowed to hold influence and community platforms – even with external engagement events. It is necessary to build trust and relationships with these communities, which means showing up and listening without pre-intended outcomes of what you want from them. This might mean giving something without expectation of reciprocity. One-off engagement events often do not build the trust and relationships needed for successful outcomes and is likely to lead to more long-lasting harm.
- **Pay for time and space.** If you want to do real engagement, you need to support the local community. That could mean renting local venues, hiring Native caterers and families, and compensating people for their time. In many communities, it is customary to bring gifts for key individuals to express gratitude for their presence and contributions.
- **Respect local norms and protocols.** There are often many formal and informal cultural and local norms and protocols. Oftentimes, relationships must be built before these norms and protocols become evident. Some general norms include, but are not limited to, respecting when elders and leaders speak, scheduling meetings around fishing and hunting seasons, and scheduling meetings around key community events (e.g., high school football games, Tribal holidays, etc.).
- **Engagement outcomes are dependent on the investments into engagement with Tribal and Indigenous communities.** People within and between Tribal communities are part of a wide and communal network. Conducting poor engagement within a community is likely to result in poor communication and dissemination of information within the social networks of a community. Additionally, conducting poor or no engagement is likely to create a bad reputation across the Tribal and Indigenous networks in the state, which may lead to additional barriers in the future when trying to engage those communities.
- **Tribal and Indigenous engagement does NOT substitute for Tribal consultation.** Each Tribe is likely to have their own consultation procedures, which supersede agency policies. Consultation needs to happen early, often, and meaningfully. Chapter 43.376 RCW and the Washington State Centennial Accord of 1989 provide background on formal government to government consultation.

Relevant Tools & Resources

- In an effort to more fully recognize Tribal sovereignty, the 2019 Tribal Consent and Consultation policy requires the Washington State Attorney General's Office to obtain free, prior and informed consent before initiating a program or project that directly and tangibly affects Tribes, Tribal rights, Tribal lands and sacred sites. This policy makes significant steps toward meeting the intent of the United Nations Declaration on the

Rights of Indigenous Peoples and it is the first of its kind in Washington State. It will be proposed for legislation during the 2020 session.

2.04 Choosing Services and Service Providers

Trust is critical to effective community engagement and a currency that many agencies lack in public perception. In our analysis of barriers to community engagement, some of the key factors impacting trust included:

- Geographic, racial, and cultural representation in agency staff.
- Linguistic or cultural relevance of communication materials.
- History and established relationships with community.
- Two-way information sharing when community information is incorporated into agency priorities.

When engaging the community, the ability to listen and understand issues through their perspective is important. A community engagement practitioner is responsible for providing a safe space and conducive environment, where community members can freely express their experiences, stories, and frustrations with government entities without fear of negative consequences. While professional training can be very beneficial, traits like emotional intelligence, humility, curiosity, adaptability, planning skills, and leadership outrank formal academic formal academic credentials or certifications when assessing the aptitude of community engagement practitioners.

While there is obvious overlap in skill sets, the skills and knowledge of successful communications staff and successful community engagement staff can differ in important ways. The primary goal of community outreach is to build trust with varying groups and elicit honest, engaged feedback to inform agency decisions and promote a two-way flow of information during decision-making. This differs from communications, which typically prioritizes providing a one-way flow of information through traditional media channels.

Key issues on this topic to include in an agency-specific community engagement plan:

- Develop community engagement services that are not static but rather determined in response to several factors, which are further developed in Determining Obligation, above:
    - Relevance of the issue to the impacted population(s).
    - Specific linguistic and cultural needs of the impacted population(s).
- Design services to impact the primary outcomes of the program or efforts.
- Establish standards of skills, experience, and knowledge for community engagement practitioners that value anti-racism and equity training, community outreach or organizing experience, cultural humility, and understanding of the specific cultures and communities at hand. Note that none of these skills are strictly tied to formal academic accomplishments or certifications.

- Develop engagement approaches that integrate community leaders and community members as partners in engagement.
- Consider whether your agency supports community engagement staff who represent the ethnic and cultural makeup of the population you serve. If not, work with your agency's recruitment and retention specialists on a plan to include such staff.

2.05 Identifying a Responsible Coordinator and Alliance with Agency Leadership

Identify an agency-wide contact person or coordinator in your agency-specific community engagement plan. To be effective, this coordinator will have the authority, or a clear path to it, to make agency-wide decisions about community engagement standards and strategies. They will be able to strategize the agency's diverse engagement needs, introduce and disseminate best practices across the agency, and ensure that the standards identified by the agency are being met.

More specifically, responsible coordinators are especially important during EJ emergencies. To be most effective, coordinators will be on the frontlines with highly impacted communities and sensitive populations to plan for and respond to emergencies such as hazardous substance releases and oil spills in order to assess the impact, monitor the situation, provide technical assistance, and evaluate the effectiveness of the response efforts.

Relevant Tools & Resources

- EPA's On-Scene Coordinators

2.06 Representation and Access

One of the most critical components of conducting meaningful community engagement is valuing the representation from community members who are most impacted by agency decisions. This takes hard work, and often means "swimming upstream" to question agency norms or the status quo of how an agency conducts community engagement.

At the core of representation and access is:

- A deep understanding of an agency's audience, which cannot be achieved without valuing cultural humility, and building relationships and community trust.
- Culturally and linguistically appropriate communication, such as plain talk, translation and interpretation, informational animations and graphics, and various formats and opportunities for communities to engage with an agency.
- Acknowledging and addressing internal biases and hiring and other staffing practices that may unintentionally "screen out" individuals from highly impacted communities.

2.07 Effective Communication

Much of the information agencies need to engage community members about is highly technical and contextual. Agency-specific community engagement plans address the common barriers each agency encounters when they deliver highly technical, discipline-specific information to the public and how to share information and ask questions in ways that facilitate understanding among the public, especially individuals with little or no technical background.

Key issues on this topic to include in an agency-specific community engagement plan:

- Plain talk, including defining what it means for the agency and when and how to use it. This will include writing for people with varying levels of literacy, writing for translation, and speaking for interpretation.
- The use of visuals to support written copy.
- The value of education when an agency is going to engage communities with little technical or policy understanding, including educational tools. This will include ideas for partnering with community-based organizations who already educate community members on similar topics.
- Culturally appropriate communication, including how and when to assess for cultural appropriateness and what to do when you misstep.
- Opportunities to partner with agency communications departments.

2.08 Ethical Data Collection

Given our increasingly diverse population, it is crucial that agencies think critically about the way data are gathered and why certain populations routinely are not counted or accurately represented. To get a more holistic understanding of the communities an agency serves, the agency must collect both quantitative and qualitative data. An agency's community engagement plan guides how the agency intends to address data gaps and prioritize ethical data collection policies and practices. We recommend that agencies especially prioritize data collection to evaluate the effectiveness of community engagement work to determine whether the community is actually being served by the agency's efforts.

Quantitative Data

A common way to gather quantitative data is through surveys, like the Census. Disaggregating demographic data allows state agencies to begin to identify how various segments of the population may be impacted by different policies, programs, or projects. We must also acknowledge that the way we currently collect demographic information has limitations and cannot capture the full identify of an individual.

When collecting quantitative data, ask:

- What will these data be used for?
- Who is left out? How are they left out?
- How can we frame our approaches and questions in a culturally relevant manner?

- When surveying people who speak languages other than English, does the survey reflect the logic and nuance of each language?
- How will we protect the privacy and security of community members? And how will we convey this protection to community members? How will we honestly communicate risks?
- How will we share data with the broader community in a culturally humble manner that leverages community assets to address existing community concerns (e.g. the process to provide feedback on data interpretations, how data are represented in a recommendation or final report, etc.)?

Qualitative Data

Community engagement is one important way to gather qualitative data. Agencies need to understand the nuances of a community's lived experiences to contextualize quantitative data and make holistically informed decisions. Building relationships and conversing with community members and trusted community leaders provides insight beyond demographic data. When engaging communities, it is important to recognize and value the community as a partner in the process, including sharing findings with communities for their feedback before finalizing a decision that may affect their lives.

Questions to consider when collecting qualitative data include:

- How do we get informed consent? What does this mean for online spaces?
- How do we maintain anonymity if that is requested/desired? How does this happen when state agencies given the required protocols for certain public meetings?
- How do we collect and share data from marginalized or sensitive populations without further creating trauma or jeopardizing their safety?

2.09 Language Access

All state agencies that receive federal funding are bound by a 2004 executive order and pursuant guidance from federal agencies to ensure their services and programs are equally accessible to people with limited English proficiency. Extensive guidance has been developed to support those legal requirements, see *Relevant Tools and Resources* below for details.

In addition to agency-wide systems that help staff decide when and how provide multi-lingual communication, cultural appropriateness of the communication and delivery method are critical considerations.

Translation and interpretation needs are often determined using a threshold described in federal language access plan guidance: if 5% or 1,000 individuals in a population prefer a specific non-English language, translation or interpretation is likely appropriate. However, when agency decisions can have meaningful, direct impacts on the public, it is important to pay attention to smaller linguistic groups even if a language does not meet that threshold. Special attention must be paid to providing accurate services in languages that are often overlooked.

For example, Indigenous Mexican languages, languages that have no or short histories of being written, and dramatically distinct "dialects."

Lastly, American Sign Language, while a key element of each agency's ADA accommodations, is a language and belongs in language access planning.

Relevant Tools and Resources

- National standards for culturally and linguistically appropriate services
- Federal guidance for developing language access plans and providing language services
- Guidance from the U.S. Environmental Protection Agency on developing and fulfilling language access plans

COVID Case Study

In early 2020, as Washington state was in the early stages of responding to the COVID-19 pandemic, the State established a Community Engagement Task Force's (CETF) through its Department of Health. This task force focused on making vital public health information related to COVID-19 accessible to communities with limited English proficiency, in accordance with Governor Inslee's Language Access Plan During COVID-19 Memo. This type of language access, a task that has challenged agencies across the state, was organized and delivered in a surprisingly short time, modeling how state resources and power can be leveraged quickly to implement meaningful, pro-equity work alongside communities.

The task force includes health educators, policy experts, and language access specialists who have dedicated their careers to health equity. The group's key guidance is a Language Access Plan. The CETF also contracted directly with over 20 "community-rooted, community-led, and community-based" organizations across Washington to provide critical health and safety information to communities disproportionately impacted by COVID-19, especially among culturally and linguistically diverse groups.

2.10 Online Engagement and Internet Access

When Washington state joined the rest of the country in responding to the novel coronavirus, formerly in-person group activities like schooling and public meetings suddenly moved online. That transition made the impact of long-standing gaps in internet access across the state bracingly clear. Census data from 2018 show that over 1,235,000 people in Washington lack internet connections aside from cellphone data, with about 735,000 of those people lacking a data connection completely. Most of this gap is due to lacking financial resources, but many Washingtonians live in areas where broadband simply is not part of the infrastructure.

We can look to community organizers and outreach practitioners who have historically worked with populations who have limited internet access for tools to bridge these gaps. Three potential approaches are:

- Prioritizing community-directed outreach. Building relationships with representatives of the relevant community and following their guidance on best outreach methods.
- Text message campaigns that introduce the issue and connect people with next steps.

- Replacing or supplementing public meetings with websites and online tools designed for interactive learning and engagement.
- Recording and sharing videos of online public meetings that are accessible in off-peak hours.
- Providing opportunity to comment or take part in discussion about a decision outside of online public meetings.

2.11 Training

Developing an agency-wide community engagement plan sets policy for your agency and communicates to staff and customers about engagement expectations and opportunities. A training program can assist with implementation by promoting awareness of the plan and teaching staff strategies and best practices for engagement. In addition to training agency staff about how to communicate the key functions of an agency with community, Diversity, Equity, and Inclusion (DEI), environmental justice, and cultural humility trainings are important core competencies for community engagement.

When deciding who will provide the training, it is appropriate to look for opportunities to hire individuals or smaller firms local to the communities the agency works with. These groups know the needs and nuances of their communities, and working with such groups can be a tool for relationship building.

The training topics listed above require skill, experience, and sensitivity to present effectively. Particularly for topics with structural oppression at their roots, poorly run trainings can cause deep and lasting organizational and personal harm. To avoid this, look for training providers with demonstrated track records.

Relevant Tools & Resources

Reach out to peer agencies. They are often happy to share their plans, practices, experiences, and training practices. They may even have a program you can use as-is. Do online research into community engagement plans and training programs.

2.12 Policy and Legislative Development

This section focuses on building internal policy and working with the legislature in a manner that considers the experience of and integrates input from members of the public who may be impacted by these decisions.

All agency policies impact communities and populations differently, and can have unintended consequences unless impacted communities have an opportunity to contribute to policy development. It is important to apply the elements of your agency's community engagement plan when developing new or amending existing agency policies. This can lead to better policies as well as more positive public receptivity to proposals. In particular, developing agency request

legislation and navigating input and amendments during legislative session can require specific planning to support community engagement.

Key issues on this topic that should be in an agency-specific community engagement plan:

- **Clarification of objectives regarding environmental justice.** To support work that prioritizes equitable outcomes and recognizes the need for community engagement, the agency should review primary objectives for proposed policies, and referring to and applying the agency's EJ strategy if one is in place. These objectives should be clearly articulated.
- **A clear consultation and communication process in advance of legislative session:**
    - *Roles and responsibilities*. Clarify who are the primary contacts and how to communicate with them.
    - *Content.* Agency staff should have clear guidelines about what aspects of a draft policy should be shared and with whom.
    - *Timeline.* Ensure a clear timeline is provided that allows sufficient time for policies to be communicated about, understood, and for feedback to be provided (especially for smaller organizations with more limited resources and capacity).
    - *Review and responsiveness.* Agencies should have systems in place to record input, clarifying that main points have been understood. Suggestions should be thoroughly reviewed and considered. Agencies should plan to implement suggested changes where possible (this may at times require new ways of thinking or flexibility on the part of the agency) or propose alternatives when needed. Either way, follow up with stakeholders and articulate how the agency will respond to their input.
- **Consider offering compensation** for the time community partners put into policy review.
- **A clear plan for engagement during legislative session**
    - *Key policy details*. It should be clear what parts of a proposed policy would need further engagement and review if amendments are proposed.
    - *Agreed points of contact during session*. Agencies should agree with community partners who is willing and able to review proposed amendments and respond in a timeline manner during legislative session.
    - **Refer to objectives for quick turnaround decisions.** If agencies need to make immediate decisions during legislative session, they can refer back to the articulated objectives to ensure final policy details further these goals.

2.13 Agency Accountability and Responsibility

It is the responsibility of agencies to meet the needs of the public they serve, not to selectively choose whose needs are recognized. Secondarily, agencies are responsible for complying with, evaluating, and holding themselves accountable to these community engagement recommendations. Presently, there are three statewide external resources that may help hold agencies accountable to community engagement, Results Washington, the Office of Financial Management's interactive data dashboard, and the Office of Equity. The agency may also be

accountable to ensure community engagement in achieving federal expectations, through funding or other relationships between state and federal entities. To build trust and ensure accountability with communities, agencies will maintain transparency and communication. For this part of the community engagement plan, we recommend the agency identifies mechanisms for evaluating community engagement work and reporting back to communities. Measurable Goal 1, described in the Environmental Justice Task Force's final report, goes into further detail on tools for building internal accountability, such as existing equity toolkits, internal audits, community partnerships, and communication and evaluation strategies.

To center accountability as agencies write a community engagement plan, we recommend agencies evaluate its community engagement work and consider the following:

- How are highly subjective words like "meaningful" and "effective" used in the context of community engagement? Will it provide clarity for the agency to define these words within the community engagement plan?
- How will the agency know when the agency achieved "meaningful" or "effective" community engagement?
- Where are there pre-existing opportunities within an agency's purview to expand community engagement to support the agency's current work and obligations?
- Where is agency funding is coming from, and are there specific requirements for community engagement associated with that funding?
- How are agencies demonstrating the process by which they are incorporating and engaging communities in their decision-making processes?

Relevant Tools & Resources

- Racial Equity Toolkit (pp. 9-10)
- Existing toolkits and example evaluations of government community engagement work (p. 4)
- WA Office of the Attorney General: Government Accountability
- Results Washington
- The Community Engagement Continuum: Outreach, Mobilization, Organizing and Accountability to Address Violence against Women in Asian and Pacific Islander Communities

Community Engagement Plan Guidance Attachment A, Public Participation Evaluation Tool

Site Information

Date:
Cleanup Process Stage:
Site Name:
Site Manager:
Public Involvement Lead:
Stakeholders:

Note:
This is a slightly modified example of a community engagement evaluation tool that is in use. This example is specific to one discipline (environmental cleanup) but could be developed into something more broad or tailored to fit agency-specific projects.

Best Practices and Assumptions

- We assess at a higher level of public participation in the absence of technical information and experience in the community.
- If it goes "bad," what will we wish we had done at first?
- We will reassess at key decision points.
- This evaluation tool includes the defined cleanup site and the affected community (perceived or actual).
- We are assuming that all of our sites are difficult to communicate and may be complicated to cleanup.

Scoring System - Adapted from IAP2 Evaluating Public Participation

1-2 Very Low to Low – recommendation: at least inform.

2-3 Low to Moderate – recommendation: at least consult (public comment periods are consult).

3-4 Moderate to High – recommendation: probably involve.

4-5 High to Very High – recommendation: minimum Involve, consider opportunities for Collaborate or Empower if feasible

Assessment Question	Very Low	Low	Med	High	Very High
1. How much do major stakeholders (i.e. Tribes, local government, local organizations, general public) care about the cleanup and the decision to be made?					
2. Proximity to other big or controversial projects.					
3. What degree of participation does the public appear to want?					
4. Impact of cleanup or investigation to people's daily life?					
5. What is the value of the site or the associated resources for the community? (aesthetics, economic, etc.)					
6. What degree is the risk or perceived risk of exposure off site?					
7. What is the level of EJ concerns? (linguistically isolated communities, EJ Index, demographics, workers?)					
8. What is the potential for public outrage?					
9. What is the legally optimal (MTCA, RCRA, Dangerous Waste Regulations) level of public participation?					
10. Level of complexity that requires agency-wide policy or regulatory analysis (i.e. vapor intrusion, water quality standards, other regulations).					
11. To what extent do internal staff believe that the public could help improve the outcome?					
12. What is the potential for the public to influence the decision-making process?					
13. What level of media interest do you anticipate?					
14. What is the anticipated potential for political controversy?					
15. What is the capacity and level of resources that the community or organizations currently have to address this site?					
Count number of checks in each column.					
Multiply number of checks by the weight.	X1	X2	X3	X4	X5
Enter column score.					
Add total of all five column scores.					
Divide total score by the number of questions.					
Average score					

Community Engagement Plan Guidance Attachment B, Public Participation Spectrum

INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision. We will seek your feedback on drafts and proposals.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will work together with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

Community Engagement Plan Guidance Attachment C, Barriers to Meaningful Engagement

Community Engagement Subcommittee, EJ Task Force (2019/2020)

This list was developed with input from members of the Community Engagement Subcommittee, members of the EJ Task Force during its 1/14/2020 meeting, and members of the public attending the same Task Force meeting. These points are largely unedited transcriptions from contributors. This list is not intended to be static or definitive. Categories help organize a large list, and we recognize that many/most items in the list are connected and related to each other in complex ways.

Systems of oppression

Agency culture and structures inherently reference, rely on, and reflect systems of oppression such as:

- White supremacy
- Settler colonialism
- Capitalist hegemony
- Patriarchy
- Christian hegemony

Access to information

When printed materials are the central mode of communication, many people are excluded.

- Print materials that are unreadable
- Print materials unreadable for people who are older or sight-impaired
- The lack of large print, braille, interpreters
- Text-heavy documents/materials (not in plain English)
- Use visuals as much as possible to convey the message (instead of relying on heavy text, even if the text gets translated into other languages).
- Translated print materials (while important) does not guarantee information access because some folks may not be literate in their native tongue or the translation vendor does literal translation (that does not accurately express the true meaning) or uses formal or complicated terms (versus colloquial word choices).
- Best practice in terms of translating text materials into other languages is to use “transcreation” instead of direct translation services. Transcreation is the process of adapting a message from one language to another, while maintaining its intent, style, tone, and context.
- Printed information sometimes becomes obsolete or outdated – hard to get up to date information.

Focus on English excludes people who speak other languages.

- Limited proficiencies (with English for example)
- Low quality translation/interpretation and English-only speaking staff who can't assist
- When preparing translations or hiring interpreters, agencies can overlook Indigenous languages like Purépecha or Mixtec languages, assuming Latinx people all speak Spanish. This extends into language variants, Indigenous languages, and other linguistic nuances worldwide.
- Some populations (e.g., Farm Workers injured on the job) need both translation/interpretation and ADA access to information.

Access to meetings

Arrangements to get to the meeting can cost more than the meeting is worth.

- Traveling to meetings that are geographically distant from the people impacted by the topic of the meeting
- Cost of travel
- Meetings not accessible for those living in rural areas
- Meetings not accessible for those without reliable cell service or internet connection
- Temporally and spatially accessible meeting spaces
- [Lack of] Childcare
- Inaccessible meetings: no food, no childcare, lacking transportation, lacking language interpretation
- Business/industry members and expertise in the room can be intimidating
- Legal status and fear of retaliation from a person in power (e.g., an employer). Meeting attendees/public comment respondents may not be safe speaking up.

The environment at the meeting can be unwelcoming or exclusive.

- People aren't sure if they are invited or welcome to the meeting
- Shame for not knowing what is going on
- For ethnically diverse communities, a conventional mainstream public meeting format may not be culturally sensitive or appropriate.
- English-speaking presenters at meetings with LEP communities may not have the training or knowledge on how to present while accounting for interpretation (they speak too fast, with jargon, etc.).
- There may not be upfront work to help build knowledge capacity of the community around a specific technical topic before bringing them into a meeting (particularly an advisory committee type meeting where they will provide recommendations/inputs). Thus, community members may not feel comfortable sharing ideas if they do not have the foundational background info first.
- The physical room arrangement can have some participants in more powerful seats than others. For example, "galleries" in meetings might discourage participation.

Apathy/burden

Note that apathy can be claimed as a reason not to provide meaningful public engagement, when often the appearance of apathy is a result of systemic issues like distrust, choosing to use limited resources in systems that are more effective based on previous experience with community engagement processes, etc.

- People don't feel responsible for what's happening in their neighborhoods.
- Participation burnout – community members have already commented on an issue multiple times and do not see any improvements/response/actions
- [People] Feel like their voices don't matter or that the government doesn't care about them
- Difficulties prioritizing what to care about and invest time in
- People have more pressing issues in their lives
- Multiple agencies are trying to work in the same communities but are not coordinating among themselves to provide a more integrated engagement approach (Where it makes sense) that reduces redundancy.
- Energy needed to engage is overwhelming compared to other needs in individual's lives – need to make it easier to understand the issues and participate

Communication

Effectively communicating the issue and supporting information in a way that's understandable to a broad variety of people isn't prioritized.

- Difficulties prioritizing what to care about and invest time in: How can people find out what is meaningful for them?
- Effectively communicating why this work matters and how it affects Washington residents' daily lives, while keeping in mind that everyone is busy and has competing priorities
- The bureaucratization of communicating the message
- Technical language and jargon isn't understandable to the layperson
- Defined limitations of what is possible for the government to do are not clear so it is difficult to know how to make recommendations that are possible (e.g., what is the role of the government, what can they do within their legal limits?)

The engagement process and opportunities aren't effectively communicated.

- Can't figure out how or where to give comment(s)
- Be transparent early and throughout the program planning process the boundaries for the program that is set
- Meeting content requires better introduction for community member(s) to feel informed enough to participate (better educational materials in multiple languages and

relevant to community perspective are needed as is an allotment of time needed for community engagement)

Potential for influence

While agency process may include community engagement, it does not support external influence on the decision-making process.

- Inflexibility, unwillingness to change
- Government fear of losing power or control can shut down the public process
- State government norms – keeping up with the status quo
- Lack of follow up from the government
- Communities questioning whether or not they actually have power and if engaging with the government is a good use of their time as a result
- Waiting to work with communities until decisions have been made – informing communities about decisions, rather than involving communities early and often.
- Legislature provides predetermined decisions but expects community engagement to inform outcomes
- Norm that the technical experts know best, and community comments aren't "informed by science"
- Devaluing Indigenous knowledge and traditional ecological knowledge (TEK) that may come in the form of public comment compared to western science to inform processes and decisions; not creating space and time for incorporating TEK and Indigenous knowledge early in the process
- For Tribes – the misconstrued notion that participating in a government's public engagement process can serve as a replacement for government-to-government consultation and Tribal engagement.
- Pressure/power of conflicting interests from business/industry can be intimidating and seem aligned with government.
- Funds and time not set aside by government for community engagement on an issue puts the burden on communities to know the issue and when/how to engage and puts out message that it is community's problem and input is not desired.

Representation

- Government agencies working with a small group of communities, so their work is not actually representative of the community
- Agency staff don't represent community members, limiting trust and cultural/communication skills
- Nonprofit staff may not truly represent the communities they serve (are they actually from the community?) or community leaders may not represent all diverse voices within a community.

- Same folks who have easy access to participating in government's community engagement activities may show up multiple times in different events – so the same voice is continually being heard. Such folks have a voice to hear, but the government is not doing extensive outreach to engage a more diverse set of community members.
- Who can represent certain groups?
    - For example, some Tribal Nations may have specific procedures on who is able to represent them publicly (e.g. elected Tribal leader, departmental staff, etc.). Having a Tribal member present may not sufficiently meet the definition of engagement or representation for some or many Tribes.
- We [agencies] hear from a small group of very vocal people who may not be representative.

Process

- The fundamental goal is often to comply with the law or regulation, not to effectively engage communities.
- Evaluation of effectiveness isn't often prioritized. Agencies can perceive success as long as they aren't being sued or issued a formal complaint.
- The goal of the engagement isn't defined clearly to establish appropriate expectations for the community.
- The goal of the engagement isn't defined clearly to establish appropriate goals and tasks for agency staff.
- The decision-making process – how do we decolonize the decision-making process? How do we support power-sharing and community self-empowerment?
- Government staff with less authority not having the power to listen and make significant changes even if they would like to.
- Lack of working early and often with folks impacted the most
- [Lack of] Investing in black and brown communities
- Government not recognizing intersectionality [intersectionality of agency programs, how different agencies influence each other]
- Jurisdictional and sector/department silos
- Process of mutual learning and dialogue that builds relationship versus one-time listening session - Create or participate in opportunities for mutual learning between community and agency staff
- Determining funding and staff time needed for community engagement is not part of decision-making process
- The solution to the problem isn't the solution for everyone and may put some people at risk. For example, high nitrates in the drinking water well in a home for people who may risk getting evicted if they report it back.

Novel processes/results of engagement aren't accommodated in agency plans

- Lack of creativity or thinking outside of the box in terms of community engagement
- Identify creative avenues to help address key community recommendations that may fall out of your agency's program scope or authority.
- "Do meetings the black way" [Agencies expect all cultures to adapt to their culture, rather than meeting people where they are]
- How do we do more of something we're not used to?

Agency timelines do not accommodate change or the amount of time meaningful engagement and relationship building takes.

- Artificial deadlines – lack of understanding within government processes that deadlines are often more adjustable than they seem.
- Lack of empowerment of government employees to ask "what is actually driving this deadline? Where and how can we create more space to be responsive to/engaging of communities?"
- The government rushing the decision-making process, perception that the timeline is immovable.
- Sometimes the timeline is immovable – for legislative deadlines, budgeting, etc.
- Conducting an engagement as an afterthought or later in the process vs building it into the process from the very beginning and have it evolve throughout the process.
- Ensure that there is a continuous loopback mechanism in sharing back with the communities how their input informed decisions, plans and tools.
- Agencies don't value the expertise of skilled community engagement staff (e.g., include them in scoping, budgeting, defining process needs).

Resources

Accurate amounts of time and money for meaningful engagement are not allocated when budgeting projects.

- Lack of budget or resources for community engagement efforts. For example, if people are being asked to travel or contribute significantly, there is often no compensation for their time, cost burden, or expertise.
- Government resources not allocated properly.
- Hire staff that reflect diverse lived experiences from communities that the agency/organization wants to serve
- Provide technical assistance to community grantees (especially small CBOs) to build their capacity in managing your agency's grant funding and reporting (but also identify areas of improvement in the contracting process within your agency to ensure that it is not overburdening the CBOs).

- Staff time not allocated for community engagement.
- The legislature doesn't respond well to asks for increased engagement funding.
- Resources means not just hiring a community engagement coordinator but investing in community leadership and civic engagement (e.g., community leadership boards)
- Barriers in state law can prevent funded/compensated participation in decision-making processes that cost money.
- The process and budget for projects that require/use community engagement is rarely developed with someone who has expertise in community engagement.

Sovereignty

- Sovereign Tribes may see government processes at a different level than what their sovereign status warrants. For example, most state-Tribal relations happen at a formal government-to-government process or through formal consultation processes. If these processes are not elevated to the status of a Tribe's sovereignty, many Tribes will choose not to engage for fear of engaging being used against them.

Trust

- Community context – the historical relationship of the public with government agencies and how that leads to the current level of trust
- Lack of listening skills among agency representatives
- Be present in the community and support their community-led work, not just come into the community when you need something
- As a government staff not from the community, learn about and be sensitive the historical and current trauma that communities of color have faced
- Agencies are only responsible for bringing offenders to compliance rather than preventing injury.
- The public participation process often doesn't result in a different outcome.
- Agency staff from outside of a particular community can become pedantic in that community, describing "what it's really like" when they don't have direct experience and don't appear to listen to those who do, especially when agency staff come from a bigger city to regulate a smaller town.
- Agency decision-makers often don't have direct experience with the system they're working in (e.g., bus systems and public transportation). "Rules without relation lead to rebellion."

Types of knowledge

- Many agencies don't believe the public can provide meaningful input, and have the colonial mindset that only academically-oriented individuals can be the experts.
- A balance needs to be established to provide the relevant technical information so that relevant input can be received – defining the goals, limitations, etc. is important
- Don't value community engagement to invest resources to do it the right way or do it at all
- Real or perceived sense of what you need to be "competent" enough to participate
- Prioritizing quantitative or science-based data over qualitative data
- Evaluate the weight of public comments
- Which comments hold more weight?
- Are public comments actually valued?
- Perception that "we have the right people at the table" already and the lack of ability to see the gaps in participation/involvement
- Recognize and honor the expertise that each person brings to the table – either from the government or community – and that we are here to learn from each other.
- Indigenous knowledge systems are often multi-generational and are constructed and validated by different norms than Western Science.
    - Also, considerations over the ethics of sharing culturally sensitive Indigenous knowledge, how it is being recorded publicly, and how it is being used.

Appendix D: Operationalizing EJ Task Force Measurable Goals and Model Policy Recommendations; A Primer on the GARE Toolkit

Overview and Purpose

The EJTF recommendations guide state agencies on how to incorporate EJ into the core of how they do business by embedding EJ into agency strategic plans, developing systems to track, evaluate, and communicate progress in advancing equity, and EJ through agency operations and programs.

Washington state agencies can learn directly from the work of the Government Alliance on Racial Equity (GARE). GARE is an organization that works with governments across the U.S. to incorporate racial equity analyses and goals into government operations. GARE has published multiple tools and resources to support governments, including their *Racial Equity Toolkit*, which can be applied at the programmatic level and can be scaled up to meet agency-wide priorities. This primer provides a user overview of GARE's Racial Equity Toolkit, with specific guidance for state agency staff seeking to apply this toolkit as a first step towards implementing Task Force recommendations #1 "Track and Communicate Progress" and #3 "Embed EJ in Strategic Plans" (Figure 1). Figure 2 also illustrates connections between the GARE toolkit and EJTF recommendations pertaining to community engagement best practices and use of the Environmental Health Disparities (EHD) map.

Figure 1. GARE Racial Equity Toolkit is adapted to help with the implementation of two EJ Task Force recommendations.

Figure 2. Embedding EJ and Equity: 8-Step Process (adapted from GARE racial equity toolkit)

STEPS 1-4: Embed EJ into your agency's strategic plan

The following steps, adapted from the GARE Racial Equity Toolkit, can be used by agency leadership and staff to begin the process of reviewing an agency-wide or program-level strategic plan, defining the EJ and equity context within which the agency or program operates (problem identification), and ultimately identifying opportunities to adjust or reform agency priorities and programmatic design to align agency goals with EJ and equity outcomes. These steps can be applied to an existing agency-wide strategic plan, an existing program-level plan, or in cases where no strategic plan currently exists, be used to develop an EJ and equity plan.

Terms and Definitions

Results – end conditions we are aiming to impact (at the community level)

Outcomes – desired effects at the jurisdiction, agency, department, or program level

Outputs – numerical counts of a program's actions or products that were created or delivered, the number of people served, and the activities or services provided.

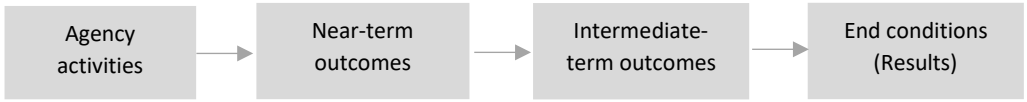
Output and outcome measures – the means by which to monitor successful implementation and effects of actions that have a reasonable chance of influenced desired results. They measure:

- Quantity – how much did we do?
- Quality – how well did we do it?
- Effects – Is anyone better off?

1. REVIEW/ARTICULATE GOALS AND OBJECTIVES (THEORY OF CHANGE)

In order to identify strategic opportunities for advancing EJ through planned agency work, a logical place to start is to articulate why your agency or program does what it does, in what social, economic, or environmental realms does it makes a difference, and how (i.e. your theory of change). Clarifying your realm of influence and your assumptions and beliefs about how your agency or program is effecting change within that realm, is an essential step in discovering the ways in which your agency's approach, investments, and activities may be missing an opportunity to, or in some cases unintentionally exacerbating, environmental inequities.

A complete theory of change is comprised of the ultimate results (end conditions) you are seeking to effect in the world, the key activities your agency or program performs to deliver those results, and the near and long-term outcomes of those activities that are assumed to influence those ultimate results. A very simple theory-of-change template is as follows:



Guiding questions for crafting your theory of change:

1. **Results:** What change does your agency or program strive to bring about? What results (changes in community conditions) are you seeking to deliver?
2. **Agency activities:** What are the key areas of work, groups of activities, or investments what your agency or program delivers?
3. **Near and intermediate-term outcomes:** What are the immediate outcomes generated by your agency or program activities? How do these outcomes lead to changes in the community?
4. **Realms of influence:** In addition to the primary intended results of your agency/program, what additional social, economic, or environmental realms does your agency/program have the potential to influence?

2. RESEARCH EJ CONDITIONS AND IMPACTS: REVIEW DATA

Step 2 involves reviewing available data (both community-level data on socioeconomic or environmental conditions, and/or program-level performance data) and considering how your agency operations or program, as designed, might contribute to eliminating or exacerbating inequities.

★ ***Consider using the EHD Map to support this step.***

Guiding questions for assessing environmental injustice conditions and impacts:

<u>Build demographic and environment context to guide and inform place-based activities:</u>

- Identify potential impacts in geographic areas & communities.
- Learn about the racial, ethnic, economic demographics.
- What are the existing racial, ethnic, and economic inequities in your program or agency's service area?

<u>Conduct EJ review and analysis as routine practice from programs and projects:</u>

Use performance level data to learn about:

- Where program activities have primarily occurred.
- Who program activities have primarily served to date & how that compares with area characteristics.

The next step is to consider information collected through community engagement efforts. If your agency has not yet directly engaged communities disproportionately impacted by environmental health inequities or has not yet done so adequately, consider immediate opportunities to begin or expand engagement. Look at information collected through community engagement efforts to consider how your program, as designed, might contribute to eliminating or exacerbating inequity.

★ ***Refer to community engagement guidance during this step.***

Guiding questions to answer through community engagement:

1. Who are the most affected community members who are concerned with or have experience related to this program? How have you involved these community members in the development of this program?
2. What has your engagement process told you about the burdens or benefits for different groups?
3. What has your engagement process told you about the factors that produce or perpetuate racial inequity related to this program?

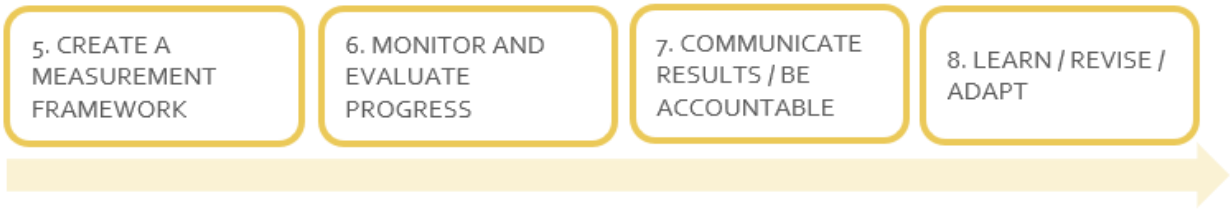
Based on information collected in Steps 2 and 3, revise your theory of change to include equity-explicit results, and determine adjustments to your agency activities (e.g. adjust existing activities, create new activities, eliminate harmful activities) to achieve those results.

★ ***Consider using the EHD Map to support this step.***

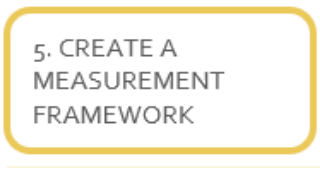
Guiding questions to support the revision process:

1. Based on your review of data and community engagement results, how does your program alleviate or exacerbate inequity?
2. Who benefits from or is burdened by your program or agency operations, as currently designed and executed?
3. What are the potential unintended consequences of not adjusting your agency or program approach?
4. How do you presume your proposed adjustments to result in pro-equity outcomes and results?

STEPS 5-8: Track and Communicate Progress



The following steps expand on the GARE Toolkit and provide guidance to agencies seeking to implement the EJTF's recommendation to: track and communicate progress of measurable goals. Establishing a system to monitor and evaluate progress, through use of performance measures and community indicators, can only be completed once a revised, pro-equity theory of change (near-term and intermediate-term outcomes and end results) is articulated. A measurement framework is also the basis for accountability and transparency in communicating progress in advancing equity and EJ goals. Finally, the results of a measurement framework should be fed directly into the process of revisiting your theory-of-change and program or agency effectiveness, on a periodic basis.



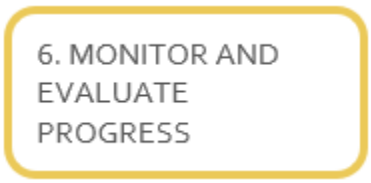
Create a draft measurement framework, including performance measures (that directly measure implementation of actions) and community indicators (that measure changes in community conditions that your actions aim to influence). It is an important to include both, as performance measures are directly responsive to your agency's work and provide timely feedback about whether you are on track to generate meaningful change in community conditions. Community indicators are slower to respond but provide essential feedback about whether your agency or program is making a positive impact in advancing equity and environmental justice.

★ ***Consider using the EHD Map as a potential source of ideas for outcome measures.***

★ ***Refer to community engagement guidance during this step. A measurement framework should be developed with direct input from the communities you are seeking to benefit.***

Guidance on establishing output and outcome measures to track implementation of pro-equity activities:

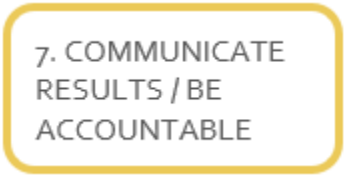
- Consider existing output measures (e.g. number of workshops per quarter, number of people served, number of contracts, miles of utility lines installed) and outcome measures (e.g. graduation rate, increase in jobs, change in air and water quality, change in recidivism rate) at your agency. Can existing agency-wide or program-level measures be disaggregated by race, income, geography, etc., to tell a story about the distribution of your agency activities and associated benefits/effects?
- Consider new performance measures that generate feedback about whether your new/revised activities are achieving near-term outcomes in your theory-of-change. What new program or activity level data can be collected to determine that those new/revised activities are being implemented as intended? What existing community-level datasets can be leveraged to track changes in community conditions (and distribution of positive changes across communities) over time?
- Determine the directionality or desired target for your output and outcomes measures, to use as a guidepost during your monitoring and evaluation efforts.



Monitor output and outcomes measures and establish a regular frequency for conducting periodic evaluations of progress. Monitoring allows for ongoing tracking and course correction and provides agency leaders and staff a 'signal' when something is not making the progress you expect. Evaluation allows for more in-depth analysis of measure data to understand how and why progress is or isn't being made. Communities should be continuously engaged throughout the monitoring and evaluation process, to ground truth the measures data and provide insight into why and how changes are or are not occurring, and what should be done about it.

Guiding evaluation questions:

- How much did we do?
- How well did we do it?
- Is anyone better off?

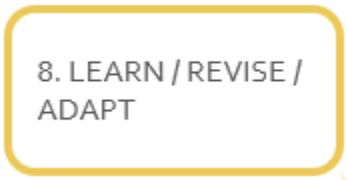


Use a communications tool, such as the Center for Social Inclusion's Talking About Race Right Toolkit to develop messages and a communications strategy and share out the results of your efforts to monitor and evaluate your progress in advancing equity and environmental justice.

★ ***Refer to community engagement guidance during this step. Determine approach outreach and communication strategies to reach communities in a meaningful way and stay accountable.***

Guiding questions:

1. How will impacts be documented and evaluated? Are you achieving the anticipated outcomes? Are you having impact in the community?
2. What are your messages and communication strategies that are will help advance racial equity?
3. How will you continue to partner and deepen relationships with communities to make sure your work to advance equity is working and sustainable for the long haul?



Finally, agencies should adaptively manage agency or program-level strategic plans, by learning from results of monitoring and evaluation processes and establishing a culture of evidence-based decision-making. Evidence should include not only findings generated from monitoring and evaluation efforts, but from *ongoing community engagement.*

★ ***Refer to community engagement guidance during this step. Communities should be directly engaged to ground truth insights and lessons you have derived from monitoring and evaluation efforts.***

Appendix E. Further Guidance on the Environmental Health Disparities Map

Washington Tracking Network

The Washington Tracking Network (WTN) is a suite of tools maintained by the Washington State Department of Health focused on making up-to-date public health data more accessible. There are over 300 measures on WTN, and data are available for download and exploration. The following tools are relevant for the proposed mapping uses and recommendations in this report:

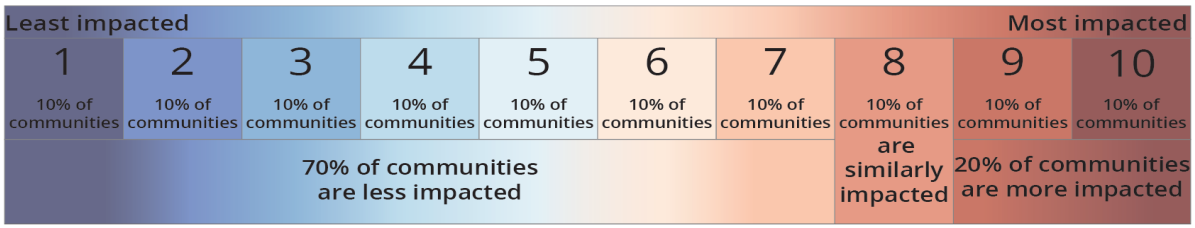
- **Query Portal** allows users to select data according to their interest by time period and geography (county, census tract, state). Data are available as tables, charts, or maps, and available for download. The query portal allows you to select and view multiple measures at the same time.
- **Information by Location (IBL)** is an interactive map that compares census tracts in Washington across a variety of public health and environmental measures. IBL ranks census tracts between 1 (least impacted) and 10 (most impacted). The EHD map is included in IBL.

Environmental Health Disparities Map Measures and Rankings

The Environmental Health Disparities (EHD) map compares census tracts across our state for environmental health disparities. Like all IBL maps, the EHD map uses rankings to create a common scale to compare different issues at the census tract level. Rankings allow the map to display health information while protecting confidentiality in census tracts with small populations. The rankings help to compare health and social factors that may contribute to disparities in a community. The rankings should not be interpreted as absolute values or be used to diagnose a community health issue or to label a community.

The rankings show that there is a difference between tracts, but not how great the difference is between tracts. The rankings were created using deciles (1 decile = 10%). Each decile represents about 10% of the values in the data set. Because the final composite scores are ranked by deciles, the resulting rankings shown on the map range from 1 (least impacted) to 10 (most impacted). For example, if a census tract has an EHD rank of 8, it means there are about

Figure 1. Visual of IBL ranking system.



10% of other census tracts with a similar level of disparities, 20% have a higher level, and 70% have a lower level (Figure 1).

It is possible to explore the data that inform the overall ranking as well. Each IBL map is made up of themes and measures. The EHD map includes 19 measures organized into four themes (Table 1):

Table 1. Themes and Measures included in the Environmental Health Disparities Map

Themes	**Measures**
Environmental Exposures Levels of pollutants that populations come into contact with.	NOx-diesel Emissions Ozone Concentration $PM_{2.5}$ Concentration Populations near Heavy Traffic Roadways Toxic Release from Facilities
Environmental Effects Measures that account for adverse environmental quality generally, even when population contact with an environmental hazard is unknown or uncertain.	Lead Risk from Housing Proximity to Hazardous Waste Treatment, Storage, and Disposal Facilities Proximity to National Priorities List Sites (Superfund Sites) Proximity to Risk Management Plan Facilities Wastewater Discharge
Socioeconomic Factors Measure population characteristics that modify the pollution burden itself.	Limited English No High School Diploma Poverty Race - People of Color Transportation Expense Unaffordable Housing Unemployed
Sensitive Populations Those who are at greater risk due to intrinsic biological vulnerability to environmental stressors.	Death from Cardiovascular Disease Low Birth Weight

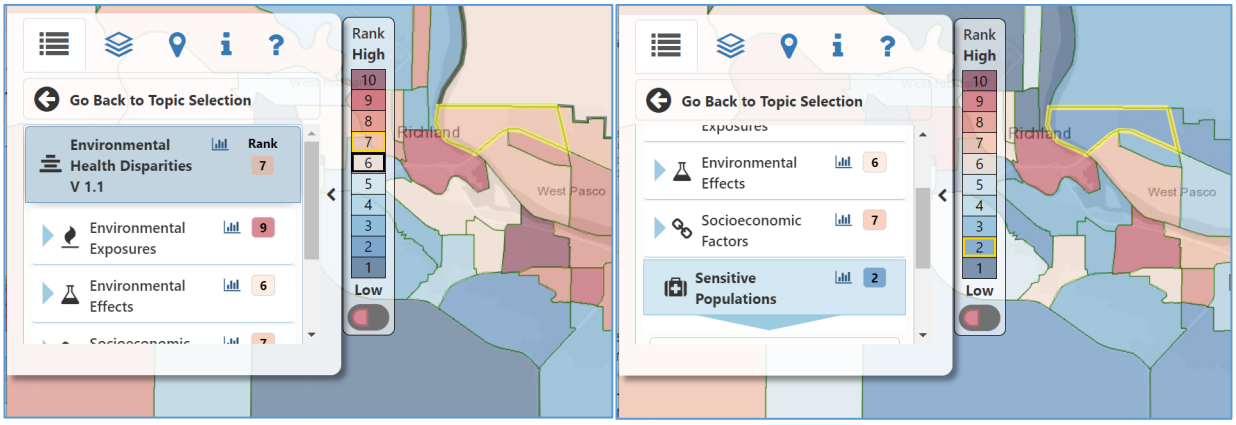
Each census tract has an overall EHD rank, but also a rank for each of the four themes and individual measures. For example, a census tract may have an overall EHD rank of 7, an Environmental Exposures (theme) rank of 9, and a NOx-Diesel Emissions (measure) rank of 6. In

this scenario, a user would then understand that while this area has some of the highest impacts for environmental exposures, NOx is probably only part of the exposures in this tract.

By exploring the individual measures in the EHD ranking for a census tract, a user can gain insights into how the measures influence the overall ranking. A tract can be highly impacted in some themes or measures and less impacted in others. In the highlighted tract below, the Environmental Exposures theme has a rank of 9, while the Sensitive Populations theme has a rank of 2 (Figure 2). A user would then understand that for this census tract the environmental exposures theme is an area of greater concern for this census tract compared to the sensitive populations theme.

Each tract is uniquely impacted by the measures. Exploring the themes and measures will give a more robust picture of how a given census tract is impacted by specific environmental health disparity measures.

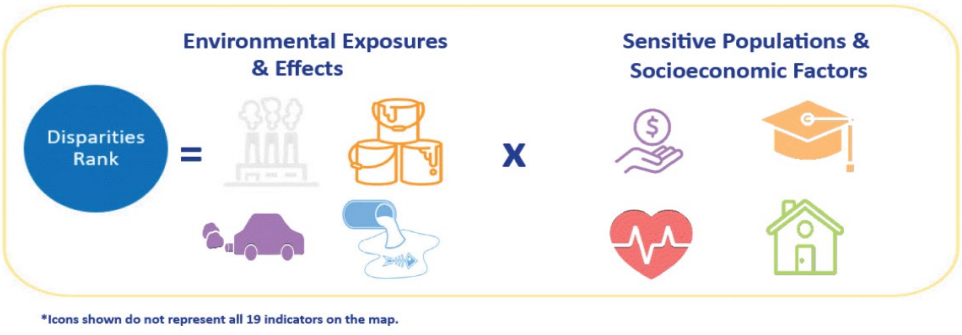
Figure 2. Example of how specific measures can change a tract's rank.



EHD Model Development

The EHD map model was adapted from CalEnviroScreen—a cumulative environmental impacts assessment map developed by CalEPA and used in California to inform implementation of various state policies. It estimates a cumulative environmental health impact score for each census tract reflecting pollutant exposures and factors that affect people's vulnerability to environmental pollution. The model is based on a conceptual formula of *Risk = Threat X Vulnerability*, where threat and vulnerability are based on several indicators (Figure 3).

Figure 3. Visualization of how the disparities rank is calculated.



The Environmental Effects and Environmental Exposures themes comprise the threat portion of the conceptual formula and account for the pollution burden. Since there are uncertainties in the extent to which proximity to hazardous sites and pollutant sources reflects exposures to individuals in the community Environmental Exposures have a lower contribution (.5) to the overall EHD rank following a similar methodology used by CalEnviroScreen.

The Sensitive Populations and Socioeconomic Factors themes comprise the vulnerability portion of the conceptual formula. These measures are proxy metrics for population characteristics. In the model, threat is multiplied by vulnerability in order to reflect the scientific literature that indicates population characteristics often modify and amplify the impact of pollution exposures on certain vulnerable populations.

The EHD map and CalEnviroScreen modelling differs from the US Environmental Protection Agency's EJSCREEN. Both CalEnviroScreen and the EHD map are cumulative environmental risk assessment maps. EJSCREEN is not a cumulative impacts model, but rather shows each environmental and demographic indicator, one at a time, and 11 EJ Indexes that combine a single environmental factor with demographic factors (low-income and minority residents).

Sensitivity Analysis

Two different sensitivity analyses, Spearman's correlation coefficients and principal component analysis, were conducted to assess and reduce bias due to data availability. The only highly correlated measure was linguistic isolation with race/ethnicity. Although highly correlated, these indicators are not duplicative because they describe different vulnerabilities. Both linguistic isolation and race/ethnicity add important new information. The Principal Component Analysis (PCA) was used to understand how the indicators within a theme influenced the topic, or overall, ranking. The PCA revealed that five principal components account for 66.26% of the variance. The components corresponded approximately to (1) pollution related to urbanized areas, (2) socioeconomic factors, (3) traffic−related pollution, (4) hazardous waste, and (5) peri−urban related pollution. PCA results indicate that there may be more focused priorities for different regions. For example, diesel emissions may be the most relevant for urbanized areas, while low socioeconomic status may be most relevant for rural areas.[81]

[81] Min, E., et al., (2019) "The Washington State Environmental Health Disparities Map: Development of a Community-Responsive Cumulative Impacts Assessment Tool". Int. J. Environ. Res. Public Health, 16(22), 4470. doi:10.3390/ijerph16224470.

Appendix F. Methodology and Analysis: Washington Tracking Network Bar Graphs on Environmental Health Disparities

Created By: Rad Cunningham, Senior Epidemiologist for the Washington State Department of Health, rad.cunningham@doh.wa.gov

Figure 1. Race and Ethnicity by Environmental Health Disparity Rank

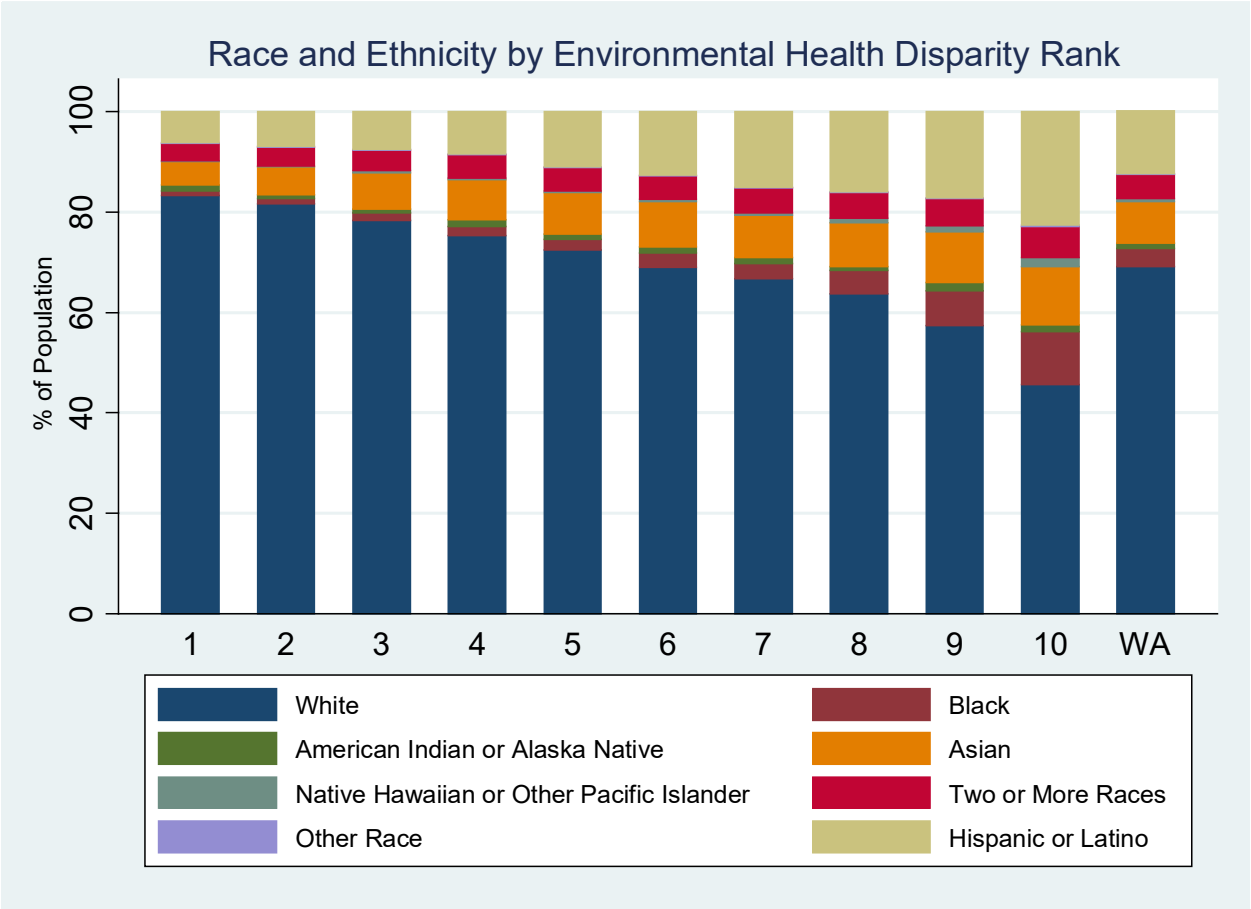


Table 1. Race and Ethnicity by Environmental Health Disparities (EHD) Rank

EHD Rank	White	Black	American Indian or Alaska Native	Asian	Native Hawaiian or Other Pacific Islander	Two or More Races	Other Race	Hispanic or Latino
1	83.2	0.9	1.3	4.6	0.2	3.5	0.1	6.2
2	81.5	1.1	0.7	5.7	0.2	3.7	0.1	7.0
3	78.2	1.6	0.7	7.3	0.4	4.1	0.1	7.5
4	75.3	1.8	1.3	8.0	0.3	4.7	0.2	8.5
5	72.5	2.0	1.0	8.3	0.4	4.7	0.1	11.0
6	69.0	2.8	1.2	9.1	0.4	4.6	0.2	12.7
7	66.8	3.0	1.1	8.4	0.6	4.9	0.2	15.0
8	63.7	4.6	0.8	8.7	1.0	5.0	0.2	16.0
9	57.4	7.0	1.6	10.1	1.2	5.4	0.2	17.1
10	45.6	10.5	1.4	11.7	1.8	6.2	0.3	22.7
WA Avg.	69.1	3.6	1.1	8.3	0.6	4.7	0.2	12.5

Methods

This graph and table of race and ethnicity by Environmental Health Disparities (EHD) rank was created using environmental health disparities ranking, whose methods are described in Min et al. 2019[82], and race and ethnicity data from table DP05 from the U.S. Census's 2018 American Community Survey[83]. The data were matched by census tract to create a dataset that could be used to assess race and ethnicity differences by EHD rank. The data combines race and ethnicity using methods developed for the Environmental Protection Agencies (EPA) EJSCREEN tool.[84] The analysis follows methods developed by Min 2020[85].

Results

We find a linear association between increasing EHD rank and the percentage of the population that was non-white or persons of color. In other words, minority, non-white Washington residents were more likely to live in census tracts identified as high risk by the EHD map. White people made up 81.5% of the population of the lowest risk census tract and 45.6% of the highest risk census tracts. Black Washingtonians were ten times more likely to live in a census tract ranked a ten (highest risk) than a census tract ranked a one (lowest risk). Native Hawaiian

[82] Min, Esther, et al. "The Washington state environmental health disparities map: development of a community-responsive cumulative impacts assessment tool." *International journal of environmental research and public health* 16.22 (2019): 4470.

[83] Data are available on the Census website: https://www.census.gov/acs/www/data/data-tables-and-tools/american-factfinder/

[84] 2019 Environmental Protection Agency, Office of Policy. EJSCREEN Environmental Justice Mapping and Screening Tool: EJSCREEN Technical Documentation. Accessed at: https://www.epa.gov/sites/production/files/2017-09/documents/2017_ejscreen_technical_document.pdf

[85] Min 2020, A tale of Two Community Engaged Research Studies; Addressing Environmental Health Disparities in Washington State. [Doctoral Dissertation, University of Washington] ResearchWorks Archive.

or other Pacific Islanders were nine times more likely to live in a tract ranked ten vs one. More Hispanic and Latino residents live in census tracts ranked a nine or a ten than live in census tracts ranked one through five combined. There is a similar trend for Asian residents. The trend is visible but less pronounced for Washington residents identifying as either Other Race or Two or More Races.

Limitations

The environmental health disparities map is comprised of four themes made up of nineteen measures. One of the measures is People of Color (POC), a measure of the percent of a census tracts population that is non-white. Each of the four themes has a 25% weight in the final ranking. People of Color is under the socioeconomic factors theme along with six other measures. Therefore, its rank in the final map is (1/7)*0.25= 0.036 or 3.6% of the weight of the ranking. A preferred method would have been to remove the POC measure and recalculate the EHD rankings before running the analysis above. Due to staff activations to the COVID-19 response we were not able to use this method for this report but plan to for future reports and to update the results of this report at that time using the preferred method. However, given the clear trends seen in the data and the relatively small weight of the POC measure in the overall ranking we do not expect meaningful changes in the outcome of the analysis. This limitation applies equally to the poverty chart and table below.

Figure 2. Difference in Live Expectancy Compared to the State Average

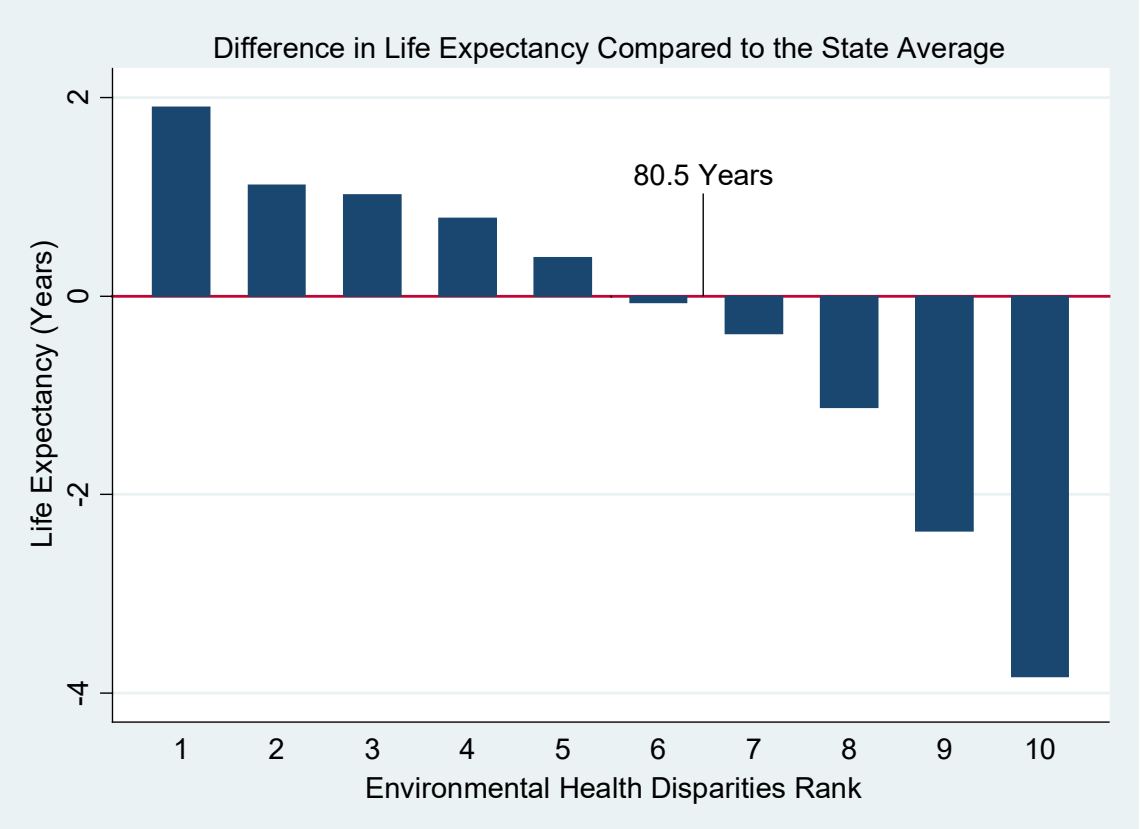


Table 2: Life Expectancy by Environmental Health Disparity Rank

EHD Rank	Life Expectancy at Birth	WA Average Life Expectancy	Difference from State Average
1	82.4	80.5	1.9
2	81.7		1.1
3	81.6		1.0
4	81.3		0.8
5	80.9		0.4
6	80.5		-0.1
7	80.2		-0.4
8	79.4		-1.1
9	78.2		-2.4
10	76.7		-3.8

Methods

The Center for Health Stastics at the Washington State Department of Health estimates life expectancy using data from death certificates following methodologies developed by the World Health Organization[86]. The life expectancy data was combined with the environmental health disparities ranks to produce the chart and table above.

Results

We find that in addition to the linear trend between people of color and EHD rank there is also a linear association between EHD rank and life expectancy. There is a 5.7 year difference in life expectancy between the lowest and highest EHD rank.

Limitations

Our methodology was to average life expectancy across census tracts by EHD rank. One limitation of this method is that census tracts have different popultaions. A census tract with a smaller population would have the same weight as a census tract with a larger population. Census tracts are standardized by the U.S. Census to have an average population of 4,000 people with a minimum of 1,200 and a maximum of 8,000[87]. This standardization limits the extent of this limitation. In an unadjusted regression, life expectancy increased by 0.28 years per additional 1,000 population. The r-squared statistic in the regression suggested that population explains 2.8% of the variation in life expectancy.

[86] Chiang CL. Life table and mortality analysis. Geneva: World Health Organization, 1977.
[87] U.S. Census, Geographic Products Branch: https://www2.census.gov/geo/pdfs/education/CensusTracts.pdf

Figure 3. Poverty by Environmental Health Disparity Ranking

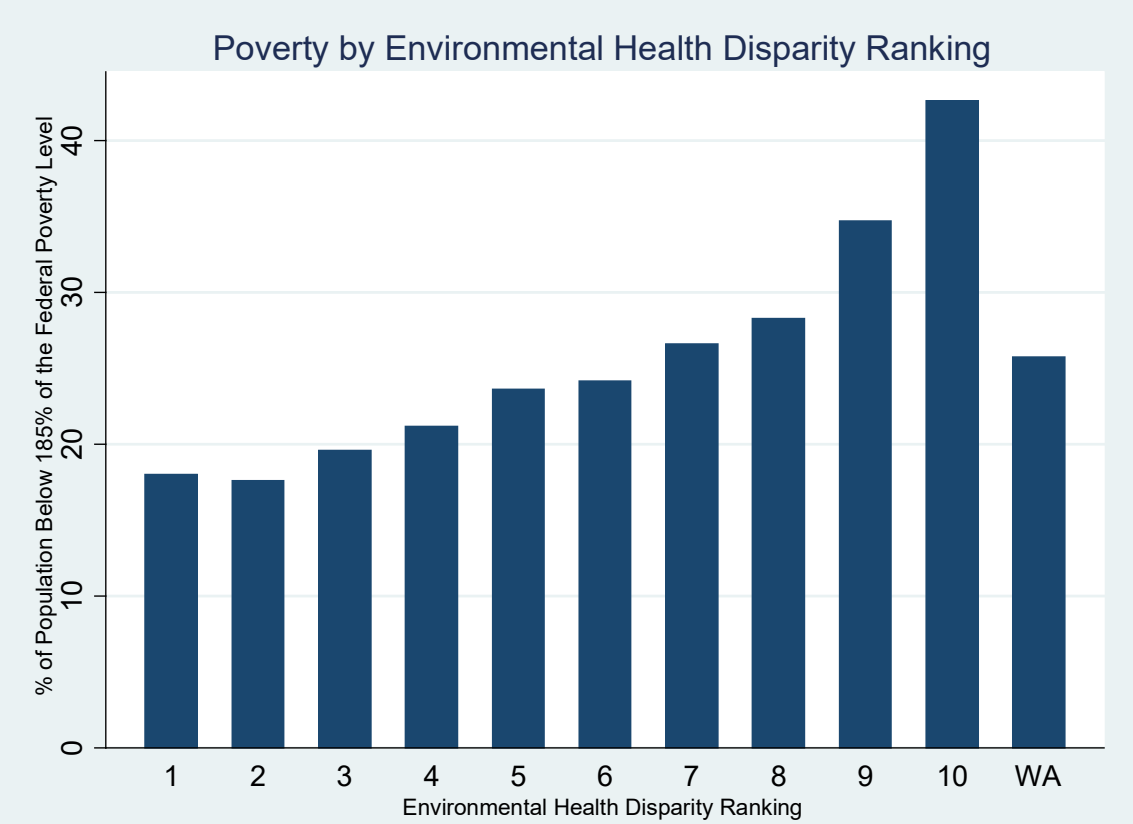


Table 3: Poverty by Environmental Health Disparity Rank

EHD Rank	Total Population	Population Under 185% of FPL	Percent under 185% of FPL
1	583304	104927	18.0
2	701525	123562	17.6
3	714922	139970	19.6
4	720213	152462	21.2
5	703700	166292	23.6
6	725651	175160	24.1
7	735128	195393	26.6
8	746588	210981	28.3
9	704190	244429	34.7
10	702192	299041	42.6
WA	7037413	1812217	25.8

Methods

We created the dataset used to populate the table and graph depicting the relationship between EHD rank and poverty, defined as 185% of the federal poverty level,[88] by combining poverty data from the U.S. Census Bureau's 5-Year American Community Survey table S1701 with EHD ranks on a census tract level.

Results

We find that, as with race and ethnicity and life expectancy, that there is a linear association between EHD rank and poverty. The poverty rate in the highest EHD rank is more than double that of the lowest EHD rank.

Limitations

The limitations for this section are described above on page 130.

[88] Data are available on the Census website: https://www.census.gov/acs/www/data/data-tables-and-tools/american-factfinder/

Appendix G. Memo: EJ and Reparations from Systemic Racism

Environmental Justice and Reparations from Systemic Racism

A memo for the Washington State Environmental Justice Task Force

Written by task force members representing community organizations:

Emily Pinckney, Tacoma League of Young Professionals

Rowena Pineda, Asian Pacific Islander Coalition

Judy Twedt, UAW Local 4121

September 2020

_____

It is a historic fact that racial disparities in health are rooted in legacies of slavery and colonialism. Washington State's Environmental Health Disparities map outlines the current land-based relationships between human health, income, race, and pollution. This tool, developed through community-based participatory research, documents present inequities and shows the links between social vulnerabilities and exposure to pollution.

But today's geographic and racial health disparities did not arise by complacency or individual acts. Racial discrimination in New Deal housing and transportation policy, indigenous land theft, broken treaties, and other forms of institutional (and often unconstitutional) harms shaped these current multigenerational inequalities.

In support of the Washington State Environmental Justice Task Force, this memo does two things:

1. Draws links between historical discrimination and contemporary health and environmental disparities specific to Washington State.
2. Provides an (incomplete) list of resources, writings and reports to support the development of reparations proposals to redress historic and current harms.

I. Multigenerational Environmental Health Disparities

To heal was to be familiar with what was destroyed

-Ray Young Bear, Meskwaki poet[89]

Racial segregation across the country was shaped in the Jim Crow era by the exclusionary zoning of The Federal Housing Administration's redlining maps which banks used to determine who received federal mortgage loans for homeownership. Redlining maps of Seattle, Tacoma, and Spokane are available through the University of Richmond's *Mapping Inequality* project.

The 1936 of commercial map of the greater Seattle area outlined 6 security areas, graded 'A' through 'E'. This was supervised by deputy state appraiser, E.G. Wendland and the chief valuator of the Federal Housing Administration. Here are few of the descriptions of neighborhoods and their resulting grades:

- "A" rating: a waterfront area in the Seward Park neighborhood, described as "*a new area sparsely settled but protected by building and racial restrictions.*"
- "B" rating: the Ballard neighborhood, "*the locality is populated by working men, skilled mechanics, and white-collar workers. This is the 'Scandinavian" section of Seattle.*"
- "B" rating: The Capitol Hill Neighborhood surrounding Volunteer Park, because "*Notwithstanding the age of the district, the locality has no racial problems, nor has it a problem of the influx of people of a lower earning standard*."
- "C" rating: a neighborhood described by its proximity to *"a gas plant which is causing a smoke and odor nuisance."*
- "D" rating: A neighborhood in the Central District, described in one short sentence: *"This is the Negro area of Seattle."*

In addition to redlining, racist property deeds and covenants barred the sale to or occupancy by African Americans across the country and in Seattle. Richard Rothstein[90] describes how, between 1935 and 1944 W.E. Boeing, founder of Boeing Company, developed suburbs north of Seattle. During this period and after WWII, more suburbs were constructed with other developers which all wrote racially restrictive language and covenants into their property deeds. The result was a city whose African American population was encircled by all-white suburbs and restricted to purchasing houses in urban areas closest to polluting industries. Boeing property deeds stated, for example, "No property in said addition shall at any time be sold, conveyed, rented, or leased in whole or in part to any person or persons not of the white or Caucasian race."

[89] As quoted in *An American Sunrise* by Muskogee Creek poet Joy Harjo

[90] "The Color of Law: A Forgotten History of How our Government segregated America" 2017, Liveright Publishers

Similar racial covenants and housing policy also segregated cities in eastern Washington, including Spokane.

The federal interstate highway system also segregated neighborhoods in many cities. In Spokane, residents describe how I-90 cut through the east central neighborhoods and affected communities, just as in other major US cities including Los Angeles and Atlanta. This led to intergenerational inequality in health and wealth.

Together, the policies of redlining, racial covenants, and infrastructure placement created intergenerational wealth gaps that persist and contribute to environmental health disparities to this day: Research on extreme heat suggests that these policies created heat burdens as low-income neighborhoods that have less tree canopy. This causes a greater heat exposure on residents, and is rising with global warming.

Research published in the Proceedings of the National Academy of Sciences shows that racialized wealth gaps and segregation have a two-pronged effect on health outcomes: on average white Americans create more pollution through their consumption than Black and Hispanic Americans, but don't breathe the full costs of this consumption:

> *"In the United States, PM2.5 exposure is disproportionately caused by consumption of goods and services mainly by the non-Hispanic white majority, but disproportionately inhaled by Black and Hispanic minorities. On average, non-Hispanic whites experience a "pollution advantage": They experience ~17% less air pollution exposure than is caused by their consumption. Blacks and Hispanics on average bear a "pollution burden" of 56% and 63% excess exposure, respectively, relative to the exposure caused by their consumption."*

These findings are not new. Fifteen years previously, the Congressional Black Caucus Foundation released their report *African Americans and Climate Change: Unequal Burden*, noting that "policies intended to mitigate climate change can generate large health and economic benefits or costs for African Americans, depending on how they are structured."

I. Further Resources

Reparations

1. Movement 4 Black Lives: Reparations Platform, accessed September 3, 2020
2. Resource Generation: Land Reparations and Indigenous Solidarity Toolkit Accessed September 4, 2020
3. Catherine Millas Kaiman: Environmental Justice and Community Based Reparations Seattle University Law Review
4. William "Sandy" Darity and Kristen Mullen: Black Reparations and the Racial Wealth Gap June 15, 2020 Brookings Institution Report
5. Ta-Nehisi Coates: The Case for Reparations June 2014, The Atlantic

6. Yearby, Lewis, Gilbert, and Banks: Racism is a Public Health Crisis Data for Progress, September 2020
7. Maanvi Singh: Native American 'Land Taxes': A step on the roadmap for reparations The Guardian, December 31, 2019
8. Daniel R. Wildcat: Why Native Americans Don't Want Reparations Washington Post, June 10, 2014
9. Ereshnee Naidu-Silverman: What South Africa can Teach the US About Reparations Washington Post, June 25, 2019
10. Irvine Molotsky: Senate Votes to Compensate Japanese American Internees New York Times, April 21, 1988
11. John Tateishi: Redress: The Inside Story of the successful Campaign for Japanese American Reparations Heyday Books, 2020
12. Maki, Kitano, and Berthold: Achieving the Impossible Dream: How Japanese Americans Obtained Redress, University of Illinois Press 1999

Racism and environmental health inequities

13. Beverly Wright and Robert Bullard: The Wrong Complexion for Protection: how the Government Response to Disaster Endangers African American Communities, NYU Press 2012
14. Meg Anderson: Racist Housing Practices from the 1930's Linked to Hotter Neighborhoods Today Spokane Public Radio, January 14, 2020
15. US Cities Spending millions on trees to fight heat -- but are their plans equitable? The Guardian, August 26, 2020
16. Matthew Fleischer: Want to tear down insidious monuments to racism? Bulldoze LA Freeways LA Times, June 24, 2020
17. Hannah Weinberger: UW Research shows racism and redlining hurt local wildlife too August 20,2020 Crosscut
    a. Supporting research: Schell et al.: The ecological and evolutionary consequences of systemic racism in urban environments Science August 13, 2020
18. Brad Plummer and Nadja Popovich: Decades of Racism Housing Policy Left Neighborhoods Sweltering New York Times, August 24, 2020
19. Supporting research: Hoffman, Shandas, and Pendleton: The effects of historic housing policies on residents exposure to intra-urban heat Climate, January 13, 2020
20. Tessum et al.: Inequities in consumption of goods and services adds to racial-ethnic disparities in air pollution exposure Proceedings in the National Academy of Sciences, March 11, 2019
21. Maldonado, Shearer, Bronen, Peterson, Lazarus: Impact of Climate Change on Tribal Communities in the U.S.: Displacement, Relocation, and Human Rights Climate Change, April 9, 2013

22. Bailey, Kreiger, Agénor, Graves, Linos, and Basset: Structural racism and health inequities in the USA: evidence and interventions The Lancet, April 8, 2017
Red Lining and Segregation
23. Shawn Vestal: Whites-Only covenants still exist in many mid-century Spokane neighborhoods. Spokesman Review, December 24, 2016
24. Seattle Civil Rights and Labor History Project: Segregated Seattle
25. Richard Rothstein: The Color of Law: A Forgotten History of How Our Government Segregated America Liveright Publishing, 2017
26. Seattle's history of redlining November 20, 2018 KCTS9
27. Mapping Inequality: Tacoma Redlining Map
28. Mapping Inequality: Seattle Redlining Map and descriptions in Seattle's classification key

Appendix H. EJ and COVID-19 Memo from EJTF Co-Chairs

MEMORANDUM

TO: GOVERNOR INSLEE, COMMISSIONER FRANZ, SPEAKER JINKINS, MAJORITY LEADER BILLIG, SECRETARY WIESMAN, AND MEMBERS OF SAFE START ADVISORY GROUPS

FROM: VICTOR RODRIGUEZ AND DAVID MENDOZA - CO-CHAIRS, WA STATE ENVIRONMENTAL JUSTICE TASKFORCE

SUBJECT: USE THE ENVIRONMENTAL HEALTH DISPARITY MAP TO INFORM COVID-19 RELIEF AND RECOVERY

DATE: AUGUST 21, 2020

Summary & Recommendation

The COVID-19 pandemic has both illuminated and exacerbated the long-standing inequities in our country, and in our state. As such, COVID-19 relief and recovery funds and strategies must be equitably distributed to ensure that the state reaches communities that are experiencing the most dire health and economic repercussions. If equity is not front and centered by considering the underlying vulnerabilities and disparities among communities, ongoing response and recovery efforts could exacerbate the current inequities and increase disparities for Black, Indigenous, and People of Color. During an extreme statewide budget shortfall, our investments must be strategic and focused on yielding the greatest returns on our investments, which ultimately means investing in communities facing the most severe inequities to improve health and resiliency for future emergencies in Washington.

The Environmental Justice Task Force Co-Chairs recommend that the Governor, the Commissioner of Public Lands, the Legislature, and the Safe Start advisory groups use the Environmental Health Disparity Map to inform the state's COVID-19 relief and recovery work. A national study showed a disproportionate impact of COVID-19 on communities with high levels of pollution while federal data show that there have been racial disparities in coronavirus infections and deaths nationwide. Referencing an environmental health analysis will help to ensure that the state prioritizes investments in communities in areas with high levels of disparities and prevent a disproportionate impact related to potential forthcoming budget cuts.

This is especially important during the current wildfire season, which could increase the number of people who contract COVID-19 and make the symptoms more severe in those who do get sick, according to public health officials.

Using Environmental Health Disparity Mapping in COVID-19 Relief and Recovery

The Environmental Health Disparities Map is an interactive mapping tool that compares communities across our state. The map incorporates environmental exposures and effects, socioeconomic factors, and information on sensitive populations to rank environmental health disparities by census tract. The map can be used to aid decision-makers on where to invest resources, which communities to prioritize for funding, where to focus employment opportunities, and where to focus recovery efforts. In addition, since the response to COVID-19 is likely to be long with periods of illness resurgence, the Environmental Health Disparities map may help identify areas with likely resurgence or areas needing greater resources—testing, cultural and linguistically appropriate materials, guidance on safe workplaces, etc.

We recommend the following ways in which to integrate the use of mapping:

- ***Area Assessment*** - Learn about the intended audience or potentially impacted community.
- ***Equity Impact Analysis*** - Analyze whether Highly Impacted Communities will be affected by a proposed policy, program, or activity
- ***Project Prioritization*** - Direct activities and investments towards the most burdened communities.
- ***Service Equity Evaluation*** - Evaluate the equitable distribution of agency activities across the state (or service area).

Disparate Impacts of Pollution and COVID-19 on Communities of Color

Our health is interconnected with the environment. Polluted water, food, air, and land makes us sick and more susceptible to diseases like COVID-19. Recent scientific publications suggest that air pollutant exposure worsens COVID-19 symptoms and outcomes. A Harvard study concluded that "a small increase in long-term exposure to PM2.5 leads to a large increase in COVID-19 death rate." Considering environmental health factors in COVID-19 relief and recovery efforts may help save lives.

It has been well documented that Black, Indigenous, and People of Color are more likely to live in areas with more pollution. The Environmental Health Disparity Map details the cumulative impacts of environmental hazards and exposures overlaid with numerous social factors that provides a comprehensive understanding of the range of impacts facing communities across Washington State. Adding this information into planning and distribution of COVID-19 relief and recovery efforts could greatly improve our ability to identify the areas in our state who need the most help and attention.

Black, Indigenous, and People of Color are being disproportionately impacted by COVID-19. According the WA State Department of Health:

- Case rates over the pandemic for Hispanic people and Native Hawaiian or Other Pacific Islander people are nine times higher than those of White people.
- Confirmed cases statewide show 44% of all cases attributed to Latinos who only represent 13% of the total population. The percentage of COVID-19 patients who are

Black is also above that population's overall percentage. At this point in data collection, White COVID-19 cases make up 35% of those sickened by the virus, while the White population makes up 68% of the state population.

- Hospitalization rates are seven times higher for Hispanics and ten times higher for Native Hawaiians or Other Pacific Islanders than those of White people. Case and hospitalization rates for Black people and American Indian or Alaska Native people are three times higher than those of White people.
- Compared to White people, death rates are over three times higher among Hispanic people and Native Hawaiian or Other Pacific Islander people, twice as high among American Indian or Alaska Native people, and over 50 percent higher among Black and Asian people.

If recovery planning does not consider the distributive injustices or geographic inequities detailed in the Environmental Health Disparity Map, these injustices are bound to exacerbate the disparities related to COVID-19. For too long, Black, Indigenous, and People of Color and poor communities have borne disproportionate harm from pollution, a result of discriminatory systems that perpetuate inequities within WA State. The impact of COVID-19 is just the latest and most dramatic evidence of this inequity. Embracing our recommended approach in planning for recover/relief programs can be a first step in beginning to address these longstanding inequities.

Thank you for your consideration of this recommendation. The Co-Chairs and staff of the EJ Taskforce are ready and willing to assist any of you or your staff with addressing any questions or concerns you may have about implementing this recommendation.

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White House Environmental Justice Advisory Council
Environmental Protection Agency [Mail Code 2201A]
1200 Pennsylvania Avenue, NW
Washington DC 20460

Memorandum

TO: White House Environmental Justice Advisory Council (WHEJAC)

FROM: Emma Kurnat-Thoma, PhD, MS, RN, FAAN; EPA-HQ-AO-2022-0050-75

DATE: February 24, 2022

SUBJECT: WHEJAC Scorecard and Performance Measurement Precision in Environmental Justice (EJ) Outcome Evaluation

SUMMARY

This memorandum provides strategic recommendations for the development of a complex construct for whole-of-government implementation, *Environmental Justice* (EJ).

This summary highlights the following:

- ***Need 1: Accurate Definition of EJ***
  - There is a need for a singular, clear, succinct, and holistic definition of the EJ construct for use in the whole-of-government approach.
- ***Need 2: Holistic Conceptual Model or Framework of EJ***
  - There is a need for a conceptual model or framework that unites the Administration's EJ activities for a whole of government response that can be easily communicated to local communities.
- ***Need 3: Clearly Defined Performance Measures and Contexts that Include Population Health***
  - There is a need for EJ construct operationalization that includes use of valid, reliable performance scorecard metrics which include population health outcomes. The presence of military, economic realities and priorities in the EJ conceptual framework should not exclude or minimize the presence of population health constructs and measurement outcome truths indicating the presence of grave harms.
- ***Need 4: Recognizing the Unseen Cultural Values and Time Periods***
  - There needs to be a conceptual EJ element and scorecard measure that is temporal/historical, culturally-based, and emphasizes correction of severe inter-generational environmental injustices for communities and locations that were/are gravely impacted by having cultural values that are separate from standardized financial/economic/income, racial, health, employment metrics (i.e. native languages and cultural displacements, traditional food supply, historical legacies of ancestors, religious resources).

BACKGROUND

Environmental Justice

EJ is complex construct and has multiple definitions, meaning, and applications. In reviewing Justice40 and EJ Scorecard documentation, it was challenging to appreciate the unifying construct that the whole of US Government approach would use to achieve and deliver EJ.

For example, EJ as defined in various regulatory contexts which may or may not include addressing harm eliminations, reparations and the direct involvement of impacted marginalized groups that fully accounts for their cultural priorities. Specific examples include:

- "The fair treatment and meaningful involvement of all people regardless of race, color, culture, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies to ensure that each person enjoys— the same degree of protection from environmental and health hazards; and equal access to any Federal agency action on environmental justice issues in order to have a healthy environment in which to live, learn, work, and recreate", (116th Congress, 2020; Environmental Protection Agency, 2022).
- "A tool to ensuring that the needs of underserved communities are met. Underserved communities are those which have not participated in, or have not received, limited benefits from USDA programs which may improve their quality of life and/or environment", (USDA, 2022).
- "Environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no population bears a disproportionate share of negative environmental consequences resulting from industrial, municipal, and commercial operations or from the execution of federal, state, and local laws; regulations; and policies. Meaningful involvement requires effective access to decision makers for all, and the ability in all communities to make informed decisions and take positive actions to produce environmental justice for themselves", (Department of Energy, 2022).
- "The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income in the development, implementation, and enforcement of environmental laws, regulations, and policies", (Department of Health and Human Services, 2022).
- "The fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. Environmental justice includes addressing disproportionate environmental and health impacts in all laws, rules, and policies with environmental impacts by prioritizing vulnerable populations and overburdened communities, the equitable distribution of resources and benefits, and eliminating harm." (Washington State, 2020).

These definitions emphasize state and federal agency regulatory and policy applications and they also represent key progress and laudable advancement of EJ interests. However, it is noted there are a wide variety of socio-political and academic definitions, paradigms, theories of EJ (i.e. temporal aspects, human-species relations aspects, varying justice term constructions) which provide richer context and can inform broader dimensions of fundamental human rights for actualization.

We must be mindful of the level of systematic institutionalization and potential analytical weaknesses for which current EJ definitions were developed and implemented up to this point. While we may not be able

to fully answer or resolve them, we must acknowledge the following questions in order to perform due diligence in seeking improved moral, social, and political EJ:

- "Is our definition of EJ a result of a sufficiently holistic analysis of the situation"?;
- "Is this the best definition of EJ that will meet the broad needs of those impacted at such different scales and by such different stakeholders, actors and interests across time and generations (i.e. tribal agreements since 1800's; Trinity site; to present day corporate and military harms)"?
- "Is there anything we can add to the definition (EJ) from a social, moral and political perspective that will continue to evolve and improve this contested concept to truly benefit those most in need?".

It is appreciated that understanding the cause-effect of environmental harms and empowering those that have been harmed involves painful realities of political conflict and controversy (Mohai et al, 2009). In the interests of mitigating and leaning into that very controversy, Banzhaf et al's (2019) review states that the selection and use of an EJ definition ***is a critical step to characterizing the nature of injustice(s) involved and is a necessary prerequisite to generating effective policy solutions***.

Examples include:

- Justice and environmental ethics each have multiple forms, definitions and contributing theoretical sub-components and concepts that can be 'mapped', (Stanford Encyclopedia of Philosophy, 2021a; 2021b).
- "The inequitable exposure of communities of color, and communities in poverty, to environmental risks due primarily to their lack of recognition and political power", (Agyeman, Schlosberg, Craven & Matthews, 2016).
    - Global environmental racism, deforestation, immigrant rights, military testing, free trade agreements, human trafficking, etc.
- "A field of study and a social movement that seeks to address the unequal distribution of environmental benefits and harms and asks whether procedures and impacts of environmental decision-making are fair to the people they affect", (Bryant and Callewaert, 2003; Ecological Society of America, 2022).
- EJ as both human-human relationships compared to human-natural world relationships in our common home (the full spectrum of interrelated and interconnected ecological diversity) because it is recognized that injuries done to the non-human world have a close relationship to the injustices in the human world. For example "an interaction and relationship of human beings with each other as a social concept"….versus "our relationship as species—human beings—to the rest of the natural world" (p. 6, Ashgar, 2001).
    - Cautioning against EJ views of distributive justice ***only***; if EJ is solely defined as a *maldistribution* of and *access* to resources (i.e. wealth and power) then EJ becomes defined by the conflicts required to achieve this aim and thus becomes resigned to a consumptive path of unacceptable levels of power politics in the absence of shared community empowerment (i.e., a path of continual reporting, complaints, lawsuits), (p. 8, Ashgar, 2001).
    - Keystone natural resources as a form of capital *that is not interchangeable with other forms of capital* and that are distinctive and defining features of a place and culture (p. 10, Ashgar, 2001).
    - Balancing the need for accurate standardized measurement of scarce keystone resources so as not to inadvertently further limit and exploit these resources over further generations by issuing a poorly conceived reductionist-value term ("this is it's only defined prescribed value"), (p. 11-12, Ashgar).

- Poverty as a self-perpetuating consumptive short-term bargaining cycle in restrictive social milieus such that any successful EJ must seek to uplift those in poverty (p. 13, Ashgar, 2001).
- EJ as a failure to properly regulate the activities of major corporations "who target minority communities for high technology, incinerators and waste", while many middle-class Americans show little concern (p. 14, Ashgar, 2001).
- While it is an important component, emphasis on only race is overly restrictive, for example: "women, children, and the poor", (p. 15, Ashgar, 2001).
- Bullard (1994) stipulated 5 principles that define the construct of EJ (p. 15, Ashgar, 2001):
    - Guaranteeing the right to environmental protection;
    - Preventing the harm before it occurs;
    - Shifting the burden of proof of contamination to polluters and not the residents;
    - Obviating proof of intent to discriminate; and
    - Redressing existing iniquities.
- Unintended contributions of additional poisons in the form of improperly stewarded EJ policies that were intended to correct them (p. 16, Ashgar, 2001).
- Principles of justice as a whole (separate of EJ) are linked with intra- and intergenerational realities and mechanisms and cannot be separated from international relationships (p. 19, Ashgar, 2001).
- Justice as a desirable social virtue and cannot be realized without "the establishment of appropriate political institutions and giving consideration to a shared public ethics that results in a social order that is acceptable and enjoyed by the majority if not all" (p. 19, Ashgar, 2001).
- Justice is linked to central features of the political philosophies and traditions, including liberalism, conservativism, socialism, etc., (p. 19, Ashgar, 2001).
- An entitlement and the monopolistic acquisition creep over time that worsens the positions of others by preventing them from acquiring the same to the point where it shows no concern for vital and basic human needs of others, is fundamentally unjust and unethical (p. 25, Ashgar, 2001).
- There will always be incentives for abuse of EJ rights unless there are clearly defined mechanisms that protect against exploitation in matters of economical polarization (p. 26, Ashgar, 2001).
- Leverage in EJ negotiations depend on the exact definition and nature of 'justice' used which is based on how that justice is perceived (p. 27, Ashgar, 2001).
- The construct of EJ needs to acknowledge the impacts of displacement when attempting to create conditions conducive to appropriating accountability and responsibility for stakeholder actions. For example, avoiding the mechanisms that can make progress to solving EJ harms such that threats are not solved, just merely shifted and displaced elsewhere:
    - *Spacial displacement*: shifting of toxic materials from one site to another;
    - *Medium displacement*: dumping toxics in the sea instead of the land (or from one state to another);
    - *Temporal displacement*: problem is delayed and displaced "into the future", such as the long-term effects of nuclear testing, (p. 37, Ashgar, 2001).
- How should our definition of EJ better account for the vulnerable, weak and impoverished that are most impacted and incapable of serving as their own agents. These individuals are suffering from 'unequal exchanges' in their interconnected relationships with those wielding power over them. As such, they

> lack the true knowledge of the fundamental scale of the resource iniquity determining their 'freedoms' to equally have their say and consensually exercise their rights (p. 39, Ashgar, 2001).

Conceptual Mapping, Maps and Conceptual Frameworks Are Needed

The nature, intensity, and duration of protracted financial, land, economic, social-political conflicts and disputes associated with EJ are severe and costly for all involved—the rich and the poor. There is a need for a conceptual model or framework to define, clarify, and map the desired aims and achievements for which EJ will be operationalized, measured, and actualized. For example, philosophical roots of EJ have both 1) justice philosophy and 2) environmental ethics components. These sub-components can contribute to a more holistic analysis and operationalization of EJ for which to align the Administration's EJ definition, framework model, and appropriate selection of scorecard metrics that will be successful in working with local communities.

- *Justice*: one of the cardinal 'virtues' and occupies centre stage in ethics, legal, and political philosophy in terms of 'what we owe each other' in living out our relationships with one another, and how these relate to economic efficiency and environmental value (Stanford Encyclopedia of Philosophy, 2021a). It involves stipulating terms of 'enforcement obligations', impartiality, corrective vs distributive aims, human vs non-human relationships, and extent to which egalitarianism, equality is present in either relationship (i.e. an employee) or outcomes (i.e. health exposure, poverty-housing measure, etc.).
- *Environmental Ethics:* "discipline in philosophy that studies the moral relationship of human beings to, and also the value and moral status of, the environment and its non-human contents", (Stanford Encyclopedia of Philosophy, 2021b). It involves the challenge presented by the delicate balancing of our environmental surroundings with our human self-centeredness, social priorities including poverty and politically disadvantaged groups of persons such as women (i.e. in advocating for local communities versus military or a federal agency), the role of the relationship of wilderness protection and poverty versus built environments for economic gain, and the ethics of sustainability and climate change.

Example of the Catholic Church and the Laudato Si Movement

Related to environmental justice is the "integral ecology" philosophy as outlined by Pope Francis in the 2015 papal encyclical *Laudato Si (LS)*, for which drives the operationalization, action platform, and evaluation metrics of the Catholic Church in responding to the climate crisis (Pope Francis, 2015). LS defines integral ecology as an interconnected relationship between human beings and our common home, such that combined environmental and social justice philosophy can be integrated to overcome rigid socio-economic systems by strategically focusing climate crises policy response(s) on the weakest and most vulnerable members of our human family (Sorondo & Ramanathan, 2016; Sorondo, Frumkin, & Ramanathan, 2018). LS action platform components emphasize holistic, cultural, community-based resilience and empowerment mechanisms including but not limited to: ecological sustainability and biodiversity protection, worker dignity, just agricultural practices, access to education, just finance structures, sustainable lifestyles, and defense of all forms and stages of human life with special attention given to the most vulnerable groups throughout social, administrative systems and social service programs (LS Platform Goals, 2022). Although still an important aspect, notice how this is not merely reduced to just a regulatory legal-technical definition of 'regulatory or policy code' because it uses a theological and philosophical foundation that is rooted in the Gospel. It thus offers a valuable teaching lesson for varying scales of application and alignment (individual, local, regional, national, international

moral priorities). Thus LS offers an example of creating a holistic and humane 'vision' of technical, legal, regulatory definition components and implementation aspects.

Standardized Performance Metrics for EJ Scorecard

Use of strategic plans and conceptual model frameworks are standard components to operationalizing formal performance metrics for transparent accountability via benchmarking and scoring in public health applications (Smith et al, 2008; Stoto, 2015). EJ *has a strong public health component*, thus we must be cautious in conceiving, applying, and implementing EJ (financial, -economic, carbon science, military and homeland security, etc.) without sufficient inclusion, recognition of, or inter-agency collaboration for public/population health considerations.

Many of the core aspects of EJ impact or feature severely health-related outcomes for marginalized and vulnerable populations. The challenge of prioritization, selection and use of EJ performance measurement outcomes is ensuring validity, reliability, and utility for which to evaluate and identify equity gaps for populations that traditionally are not empowered participants for which redress inequities. If not properly selected and used, they may contribute to additional harms and oppression intra-generationally and inter-generationally.

In terms of selection of reliable and valid performance measures, use of well-established metrics at the national and international levels while also developing feedback mechanisms that account for, and meaningfully respond to, the needs of local applications will be key. For example, the WHO defines a climate resilient health system as one that is able to "anticipate, respond to, cope with, recover from and adapt to climate-related shocks and stress, so as to bring sustained improvements (and system future capacity) in population health". Final selected EJ measures related to public and population health should be able to accurately examine and reasonably indicate performance such that sustained progress and true achievements can be accomplished. If not wisely selected, progress will not be accurately measured and true improvement (justice) will not occur.

Previous experience in the health insurance industry policy arena (i.e.: health sector accreditation) offers valuable collaboration lessons in capturing meaningful metrics that business interests will tolerate, support, collaborate with and contribute to when monitoring population health system processes and outcomes (Smith et al, 2008; Stoto, 2015). For example: those involving the most amount of automated precision, granularity, insights, but the least amount of technical burden for data capture for which to be aligned across as many organizations, levels, stakeholders when generating useful insights. It's not each stakeholder stipulating their own preferred metrics—it's a collaborative integrated approach that aligns multiple stakeholder interests for a strategic aim. Resources for health system performance measurement stakeholders for which to optimize use and selection of population health standardized metrics, portfolios to monitor EJ-related health impacts include, but are not limited to:

- Centers for Medicare and Medicaid Services (CMS)
- Agency for Healthcare Research and Quality (AHRQ)
- National Quality Forum (NQF) Quality Positioning System
- Institute for Health Metrics and Evaluation (IHME) at the University of Washington
- The Joint Commission
- The National Committee for Quality Assurance

RECOMMENDATIONS

The following recommendations are made to facilitate clarification of the Administration's definition, framework, and measurement of EJ for scorecard goals and implementation aims:

- ***Need 1: Accurate Definition of EJ***
    - There is a need for a singular, clear, succinct, holistic definition of the EJ construct for use in the whole-of-government approach so as to facilitate coordinated integration that is effective throughout all U.S. federal agencies in achieving EJ.
- ***Need 2: Holistic Conceptual Model or Framework of EJ***
    - There is a need for a conceptual model or framework that unites the Administration's EJ activities for a whole of government response. This framework should be a visual figure that can easily communicate EJ's meaning and strategic roadmap for the U.S.' whole-of-government approach to achieving and delivering EJ. It should include the required content areas stipulated in EO 12898 (i.e. Justice 40 and any additional Administration and Task Force priorities) that are to be evaluated and monitored with Scorecard Metrics. Related similarities in terms of designating a visual map and aligned performance indicators include the United Nations Sustainable Development Goals program. This figure can be easily communicated to local communities to facilitate improved communication about EJ.
- ***Need 3: Clearly Defined Performance Measures and Contexts that Adequately Includes Population Health***
    - There is a need for construct operationalization and designating performance scorecard metrics which include population health interests to be rooted in the context of the overall EJ conceptual model or framework. EJ performance metrics should be valid, reliable and aligned across agencies with pre-emptive resolution of conflicting accountabilities as much as possible to encourage broad multi-sectorial participation. The presence of military-security, economic realities and priorities in the EJ conceptual framework should not exclude or minimize the presence of population health constructs and measurement outcome truths indicating the presence of grave harms.
- ***Need 4: Recognizing the Unseen Cultural Values and Time Periods***
    - Despite the whole-of-government approach and the inclusion of military branches of U.S. government in EJ leadership, there needs to be a conceptual EJ element that is temporal/historical, culturally-based and emphasizes correction of severe inter-generational historical environmental injustices (i.e. military atrocities from decades ago leading up to current contexts of continued harm). This must provide for and honor EJ in non-traditional ways that are culturally meaningful to the communities and locales most severely affected because it harmed that which was most valuable and is not easily defined by standardized financial/economic/income, racial, health, employment metrics (i.e. native languages, cultural displacements, traditional food supply, historical legacies of ancestors, religious resources).

CLOSING

I am grateful for the opportunity to submit these written comments. Thank you for the thoughtful consideration of these issues. I applaud the WHEJAC and the Biden/Harris Administration's commitment to these important matters in the service of all humanity.

Respectfully Yours in the Service of the Common Good,

Emma Kurnat-Thoma, PhD, MS, RN, FAAN

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ENCYCLICAL LETTER

LAUDATO SI'

OF THE HOLY FATHER

FRANCIS

ON CARE FOR OUR COMMON HOME

1. "LAUDATO SI', mi' Signore" – "Praise be to you, my Lord". In the words of this beautiful canticle, Saint Francis of Assisi reminds us that our common home is like a sister with whom we share our life and a beautiful mother who opens her arms to embrace us. "Praise be to you, my Lord, through our Sister, Mother Earth, who sustains and governs us, and who produces various fruit with coloured flowers and herbs".[1]

2. This sister now cries out to us because of the harm we have inflicted on her by our irresponsible use and abuse of the goods with which God has endowed her. We have come to see ourselves as her lords and masters, entitled to plunder her at will. The violence present in our hearts, wounded by sin, is also reflected in the symptoms of sickness evident in the soil, in the water, in the air and in all forms of life. This is why the earth herself, burdened and laid waste, is among the most abandoned and maltreated of our poor; she "groans in travail" (*Rom* 8:22). We have forgotten that we ourselves are dust of the earth (cf. *Gen* 2:7); our very bodies are made up

[1] *Canticle of the Creatures*, in *Francis of Assisi: Early Documents*, vol. 1, New York-London-Manila, 1999, 113-114.

of her elements, we breathe her air and we receive life and refreshment from her waters.

Nothing in this world is indifferent to us

3. More than fifty years ago, with the world teetering on the brink of nuclear crisis, Pope Saint John XXIII wrote an Encyclical which not only rejected war but offered a proposal for peace. He addressed his message *Pacem in Terris* to the entire "Catholic world" and indeed "to all men and women of good will". Now, faced as we are with global environmental deterioration, I wish to address every person living on this planet. In my Apostolic Exhortation *Evangelii Gaudium*, I wrote to all the members of the Church with the aim of encouraging ongoing missionary renewal. In this Encyclical, I would like to enter into dialogue with all people about our common home.

4. In 1971, eight years after *Pacem in Terris*, Blessed Pope Paul VI referred to the ecological concern as "a tragic consequence" of unchecked human activity: "Due to an ill-considered exploitation of nature, humanity runs the risk of destroying it and becoming in turn a victim of this degradation".[2] He spoke in similar terms to the Food and Agriculture Organization of the United Nations about the potential for an "ecological catastrophe under the effective explosion of industrial civilization", and stressed "the urgent need for a radical change

[2] Apostolic Letter *Octogesima Adveniens* (14 May 1971), 21: *AAS* 63 (1971), 416-417.

in the conduct of humanity", inasmuch as "the most extraordinary scientific advances, the most amazing technical abilities, the most astonishing economic growth, unless they are accompanied by authentic social and moral progress, will definitively turn against man".[3]

5. Saint John Paul II became increasingly concerned about this issue. In his first Encyclical he warned that human beings frequently seem "to see no other meaning in their natural environment than what serves for immediate use and consumption".[4] Subsequently, he would call for a global ecological *conversion*.[5] At the same time, he noted that little effort had been made to "safeguard the moral conditions for an authentic *human ecology*".[6] The destruction of the human environment is extremely serious, not only because God has entrusted the world to us men and women, but because human life is itself a gift which must be defended from various forms of debasement. Every effort to protect and improve our world entails profound changes in "lifestyles, models of production and consumption, and the established structures of power which today govern

[3] *Address to FAO on the 25th Anniversary of its Institution* (16 November 1970), 4: *AAS* 62 (1970), 833.

[4] Encyclical Letter *Redemptor Hominis* (4 March 1979), 15: *AAS* 71 (1979), 287.

[5] Cf. *Catechesis* (17 January 2001), 4: *Insegnamenti* 41/1 (2001), 179.

[6] Encyclical Letter *Centesimus Annus* (1 May 1991), 38: *AAS* 83 (1991), 841.

societies".[7] Authentic human development has a moral character. It presumes full respect for the human person, but it must also be concerned for the world around us and "take into account the nature of each being and of its mutual connection in an ordered system".[8] Accordingly, our human ability to transform reality must proceed in line with God's original gift of all that is.[9]

6. My predecessor Benedict XVI likewise proposed "eliminating the structural causes of the dysfunctions of the world economy and correcting models of growth which have proved incapable of ensuring respect for the environment".[10] He observed that the world cannot be analyzed by isolating only one of its aspects, since "the book of nature is one and indivisible", and includes the environment, life, sexuality, the family, social relations, and so forth. It follows that "the deterioration of nature is closely connected to the culture which shapes human coexistence".[11] Pope Benedict asked us to recognize that the natural environment has been gravely damaged by our irresponsible behaviour. The social environment has also suffered damage. Both are ulti-

[7] *Ibid.*, 58: *AAS* 83 (1991), p. 863.

[8] John Paul II, Encyclical Letter *Sollicitudo Rei Socialis* (30 December 1987), 34: *AAS* 80 (1988), 559.

[9] Cf. Id., Encyclical Letter *Centesimus Annus* (1 May 1991), 37: *AAS* 83 (1991), 840.

[10] *Address to the Diplomatic Corps Accredited to the Holy See* (8 January 2007): *AAS* 99 (2007), 73.

[11] Encyclical Letter *Caritas in Veritate* (29 June 2009), 51: *AAS* 101 (2009), 687.

mately due to the same evil: the notion that there are no indisputable truths to guide our lives, and hence human freedom is limitless. We have forgotten that "man is not only a freedom which he creates for himself. Man does not create himself. He is spirit and will, but also nature".[12] With paternal concern, Benedict urged us to realize that creation is harmed "where we ourselves have the final word, where everything is simply our property and we use it for ourselves alone. The misuse of creation begins when we no longer recognize any higher instance than ourselves, when we see nothing else but ourselves".[13]

United by the same concern

7. These statements of the Popes echo the reflections of numerous scientists, philosophers, theologians and civic groups, all of which have enriched the Church's thinking on these questions. Outside the Catholic Church, other Churches and Christian communities – and other religions as well – have expressed deep concern and offered valuable reflections on issues which all of us find disturbing. To give just one striking example, I would mention the statements made by the beloved Ecumenical Patriarch Bartholomew, with whom we share the hope of full ecclesial communion.

[12] *Address to the Bundestag*, Berlin (22 September 2011): *AAS* 103 (2011), 664.

[13] *Address to the Clergy of the Diocese of Bolzano-Bressanone* (6 August 2008): *AAS* 100 (2008), 634.

8. Patriarch Bartholomew has spoken in particular of the need for each of us to repent of the ways we have harmed the planet, for "inasmuch as we all generate small ecological damage", we are called to acknowledge "our contribution, smaller or greater, to the disfigurement and destruction of creation".[14] He has repeatedly stated this firmly and persuasively, challenging us to acknowledge our sins against creation: "For human beings… to destroy the biological diversity of God's creation; for human beings to degrade the integrity of the earth by causing changes in its climate, by stripping the earth of its natural forests or destroying its wetlands; for human beings to contaminate the earth's waters, its land, its air, and its life – these are sins".[15] For "to commit a crime against the natural world is a sin against ourselves and a sin against God".[16]

9. At the same time, Bartholomew has drawn attention to the ethical and spiritual roots of environmental problems, which require that we look for solutions not only in technology but in a change of humanity; otherwise we would be dealing merely with symptoms. He asks us to replace consumption with sacrifice, greed with generosity, wastefulness with a spirit of sharing,

[14] *Message for the Day of Prayer for the Protection of Creation* (1 September 2012).

[15] *Address in Santa Barbara, California* (8 November 1997); cf. John Chryssavgis, *On Earth as in Heaven: Ecological Vision and Initiatives of Ecumenical Patriarch Bartholomew*, Bronx, New York, 2012.

[16] *Ibid.*

an asceticism which "entails learning to give, and not simply to give up. It is a way of loving, of moving gradually away from what I want to what God's world needs. It is liberation from fear, greed and compulsion".[17] As Christians, we are also called "to accept the world as a sacrament of communion, as a way of sharing with God and our neighbours on a global scale. It is our humble conviction that the divine and the human meet in the slightest detail in the seamless garment of God's creation, in the last speck of dust of our planet".[18]

Saint Francis of Assisi

10. I do not want to write this Encyclical without turning to that attractive and compelling figure, whose name I took as my guide and inspiration when I was elected Bishop of Rome. I believe that Saint Francis is the example par excellence of care for the vulnerable and of an integral ecology lived out joyfully and authentically. He is the patron saint of all who study and work in the area of ecology, and he is also much loved by non-Christians. He was particularly concerned for God's creation and for the poor and outcast. He loved, and was deeply loved for his joy, his generous self-giving, his openheartedness. He was a mystic and a pilgrim who lived in

[17] *Lecture at the Monastery of Utstein*, Norway (23 June 2003).

[18] "Global Responsibility and Ecological Sustainability", Closing Remarks, Halki Summit I, Istanbul (20 June 2012).

simplicity and in wonderful harmony with God, with others, with nature and with himself. He shows us just how inseparable the bond is between concern for nature, justice for the poor, commitment to society, and interior peace.

11. Francis helps us to see that an integral ecology calls for openness to categories which transcend the language of mathematics and biology, and take us to the heart of what it is to be human. Just as happens when we fall in love with someone, whenever he would gaze at the sun, the moon or the smallest of animals, he burst into song, drawing all other creatures into his praise. He communed with all creation, even preaching to the flowers, inviting them "to praise the Lord, just as if they were endowed with reason".[19] His response to the world around him was so much more than intellectual appreciation or economic calculus, for to him each and every creature was a sister united to him by bonds of affection. That is why he felt called to care for all that exists. His disciple Saint Bonaventure tells us that, "from a reflection on the primary source of all things, filled with even more abundant piety, he would call creatures, no matter how small, by the name of 'brother' or 'sister'".[20] Such a conviction

[19] Thomas of Celano, *The Life of Saint Francis*, I, 29, 81: in *Francis of Assisi: Early Documents*, vol. 1, New York-London-Manila, 1999, 251.

[20] *The Major Legend of Saint Francis*, VIII, 6, in *Francis of Assisi: Early Documents*, vol. 2, New York-London-Manila, 2000, 590.

cannot be written off as naive romanticism, for it affects the choices which determine our behaviour. If we approach nature and the environment without this openness to awe and wonder, if we no longer speak the language of fraternity and beauty in our relationship with the world, our attitude will be that of masters, consumers, ruthless exploiters, unable to set limits on their immediate needs. By contrast, if we feel intimately united with all that exists, then sobriety and care will well up spontaneously. The poverty and austerity of Saint Francis were no mere veneer of asceticism, but something much more radical: a refusal to turn reality into an object simply to be used and controlled.

12. What is more, Saint Francis, faithful to Scripture, invites us to see nature as a magnificent book in which God speaks to us and grants us a glimpse of his infinite beauty and goodness. "Through the greatness and the beauty of creatures one comes to know by analogy their maker" (*Wis* 13:5); indeed, "his eternal power and divinity have been made known through his works since the creation of the world" (*Rom* 1:20). For this reason, Francis asked that part of the friary garden always be left untouched, so that wild flowers and herbs could grow there, and those who saw them could raise their minds to God, the Creator of such beauty.[21] Rather than a prob-

[21] Cf. Thomas of Celano, *The Remembrance of the Desire of a Soul*, II, 124, 165, in *Francis of Assisi: Early Documents*, vol. 2, New York-London-Manila, 2000, 354.

lem to be solved, the world is a joyful mystery to be contemplated with gladness and praise.

My appeal

13. The urgent challenge to protect our common home includes a concern to bring the whole human family together to seek a sustainable and integral development, for we know that things can change. The Creator does not abandon us; he never forsakes his loving plan or repents of having created us. Humanity still has the ability to work together in building our common home. Here I want to recognize, encourage and thank all those striving in countless ways to guarantee the protection of the home which we share. Particular appreciation is owed to those who tirelessly seek to resolve the tragic effects of environmental degradation on the lives of the world's poorest. Young people demand change. They wonder how anyone can claim to be building a better future without thinking of the environmental crisis and the sufferings of the excluded.

14. I urgently appeal, then, for a new dialogue about how we are shaping the future of our planet. We need a conversation which includes everyone, since the environmental challenge we are undergoing, and its human roots, concern and affect us all. The worldwide ecological movement has already made considerable progress and led to the establishment of numerous organizations committed to raising awareness of these challenges. Regrettably, many efforts to

seek concrete solutions to the environmental crisis have proved ineffective, not only because of powerful opposition but also because of a more general lack of interest. Obstructionist attitudes, even on the part of believers, can range from denial of the problem to indifference, nonchalant resignation or blind confidence in technical solutions. We require a new and universal solidarity. As the bishops of Southern Africa have stated: "Everyone's talents and involvement are needed to redress the damage caused by human abuse of God's creation". [22] All of us can cooperate as instruments of God for the care of creation, each according to his or her own culture, experience, involvements and talents.

15. It is my hope that this Encyclical Letter, which is now added to the body of the Church's social teaching, can help us to acknowledge the appeal, immensity and urgency of the challenge we face. I will begin by briefly reviewing several aspects of the present ecological crisis, with the aim of drawing on the results of the best scientific research available today, letting them touch us deeply and provide a concrete foundation for the ethical and spiritual itinerary that follows. I will then consider some principles drawn from the Judaeo-Christian tradition which can render our commitment to the environment more coherent. I will then attempt to get to the roots of the pres-

[22] Southern African Catholic Bishops' Conference, *Pastoral Statement on the Environmental Crisis* (5 September 1999).

ent situation, so as to consider not only its symptoms but also its deepest causes. This will help to provide an approach to ecology which respects our unique place as human beings in this world and our relationship to our surroundings. In light of this reflection, I will advance some broader proposals for dialogue and action which would involve each of us as individuals, and also affect international policy. Finally, convinced as I am that change is impossible without motivation and a process of education, I will offer some inspired guidelines for human development to be found in the treasure of Christian spiritual experience.

16. Although each chapter will have its own subject and specific approach, it will also take up and re-examine important questions previously dealt with. This is particularly the case with a number of themes which will reappear as the Encyclical unfolds. As examples, I will point to the intimate relationship between the poor and the fragility of the planet, the conviction that everything in the world is connected, the critique of new paradigms and forms of power derived from technology, the call to seek other ways of understanding the economy and progress, the value proper to each creature, the human meaning of ecology, the need for forthright and honest debate, the serious responsibility of international and local policy, the throwaway culture and the proposal of a new lifestyle. These questions will not be dealt with once and for all, but reframed and enriched again and again.

CHAPTER ONE

WHAT IS HAPPENING TO OUR COMMON HOME

17. Theological and philosophical reflections on the situation of humanity and the world can sound tiresome and abstract, unless they are grounded in a fresh analysis of our present situation, which is in many ways unprecedented in the history of humanity. So, before considering how faith brings new incentives and requirements with regard to the world of which we are a part, I will briefly turn to what is happening to our common home.

18. The continued acceleration of changes affecting humanity and the planet is coupled today with a more intensified pace of life and work which might be called "rapidification". Although change is part of the working of complex systems, the speed with which human activity has developed contrasts with the naturally slow pace of biological evolution. Moreover, the goals of this rapid and constant change are not necessarily geared to the common good or to integral and sustainable human development. Change is something desirable, yet it becomes a source of anxiety when it causes harm to the world and to the quality of life of much of humanity.

19. Following a period of irrational confidence in progress and human abilities, some sectors of society are now adopting a more critical approach. We see increasing sensitivity to the environment and the need to protect nature, along with a growing concern, both genuine and distressing, for what is happening to our planet. Let us review, however cursorily, those questions which are troubling us today and which we can no longer sweep under the carpet. Our goal is not to amass information or to satisfy curiosity, but rather to become painfully aware, to dare to turn what is happening to the world into our own personal suffering and thus to discover what each of us can do about it.

I. Pollution and climate change

Pollution, waste and the throwaway culture

20. Some forms of pollution are part of people's daily experience. Exposure to atmospheric pollutants produces a broad spectrum of health hazards, especially for the poor, and causes millions of premature deaths. People take sick, for example, from breathing high levels of smoke from fuels used in cooking or heating. There is also pollution that affects everyone, caused by transport, industrial fumes, substances which contribute to the acidification of soil and water, fertilizers, insecticides, fungicides, herbicides and agrotoxins in general. Technology, which, linked to business interests, is presented as the only way

of solving these problems, in fact proves incapable of seeing the mysterious network of relations between things and so sometimes solves one problem only to create others.

21. Account must also be taken of the pollution produced by residue, including dangerous waste present in different areas. Each year hundreds of millions of tons of waste are generated, much of it non-biodegradable, highly toxic and radioactive, from homes and businesses, from construction and demolition sites, from clinical, electronic and industrial sources. The earth, our home, is beginning to look more and more like an immense pile of filth. In many parts of the planet, the elderly lament that once beautiful landscapes are now covered with rubbish. Industrial waste and chemical products utilized in cities and agricultural areas can lead to bioaccumulation in the organisms of the local population, even when levels of toxins in those places are low. Frequently no measures are taken until after people's health has been irreversibly affected.

22. These problems are closely linked to a throwaway culture which affects the excluded just as it quickly reduces things to rubbish. To cite one example, most of the paper we produce is thrown away and not recycled. It is hard for us to accept that the way natural ecosystems work is exemplary: plants synthesize nutrients which feed herbivores; these in turn become food for carnivores, which produce significant quantities

of organic waste which give rise to new generations of plants. But our industrial system, at the end of its cycle of production and consumption, has not developed the capacity to absorb and reuse waste and by-products. We have not yet managed to adopt a circular model of production capable of preserving resources for present and future generations, while limiting as much as possible the use of non-renewable resources, moderating their consumption, maximizing their efficient use, reusing and recycling them. A serious consideration of this issue would be one way of counteracting the throwaway culture which affects the entire planet, but it must be said that only limited progress has been made in this regard.

Climate as a common good

23. The climate is a common good, belonging to all and meant for all. At the global level, it is a complex system linked to many of the essential conditions for human life. A very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climatic system. In recent decades this warming has been accompanied by a constant rise in the sea level and, it would appear, by an increase of extreme weather events, even if a scientifically determinable cause cannot be assigned to each particular phenomenon. Humanity is called to recognize the need for changes of lifestyle, production and consumption, in order to combat this warming or at

least the human causes which produce or aggravate it. It is true that there are other factors (such as volcanic activity, variations in the earth's orbit and axis, the solar cycle), yet a number of scientific studies indicate that most global warming in recent decades is due to the great concentration of greenhouse gases (carbon dioxide, methane, nitrogen oxides and others) released mainly as a result of human activity. As these gases build up in the atmosphere, they hamper the escape of heat produced by sunlight at the earth's surface. The problem is aggravated by a model of development based on the intensive use of fossil fuels, which is at the heart of the worldwide energy system. Another determining factor has been an increase in changed uses of the soil, principally deforestation for agricultural purposes.

24. Warming has effects on the carbon cycle. It creates a vicious circle which aggravates the situation even more, affecting the availability of essential resources like drinking water, energy and agricultural production in warmer regions, and leading to the extinction of part of the planet's biodiversity. The melting in the polar ice caps and in high altitude plains can lead to the dangerous release of methane gas, while the decomposition of frozen organic material can further increase the emission of carbon dioxide. Things are made worse by the loss of tropical forests which would otherwise help to mitigate climate

change. Carbon dioxide pollution increases the acidification of the oceans and compromises the marine food chain. If present trends continue, this century may well witness extraordinary climate change and an unprecedented destruction of ecosystems, with serious consequences for all of us. A rise in the sea level, for example, can create extremely serious situations, if we consider that a quarter of the world's population lives on the coast or nearby, and that the majority of our megacities are situated in coastal areas.

25. Climate change is a global problem with grave implications: environmental, social, economic, political and for the distribution of goods. It represents one of the principal challenges facing humanity in our day. Its worst impact will probably be felt by developing countries in coming decades. Many of the poor live in areas particularly affected by phenomena related to warming, and their means of subsistence are largely dependent on natural reserves and ecosystemic services such as agriculture, fishing and forestry. They have no other financial activities or resources which can enable them to adapt to climate change or to face natural disasters, and their access to social services and protection is very limited. For example, changes in climate, to which animals and plants cannot adapt, lead them to migrate; this in turn affects the livelihood of the poor, who are then forced to leave their homes, with great uncertainty for their fu-

ture and that of their children. There has been a tragic rise in the number of migrants seeking to flee from the growing poverty caused by environmental degradation. They are not recognized by international conventions as refugees; they bear the loss of the lives they have left behind, without enjoying any legal protection whatsoever. Sadly, there is widespread indifference to such suffering, which is even now taking place throughout our world. Our lack of response to these tragedies involving our brothers and sisters points to the loss of that sense of responsibility for our fellow men and women upon which all civil society is founded.

26. Many of those who possess more resources and economic or political power seem mostly to be concerned with masking the problems or concealing their symptoms, simply making efforts to reduce some of the negative impacts of climate change. However, many of these symptoms indicate that such effects will continue to worsen if we continue with current models of production and consumption. There is an urgent need to develop policies so that, in the next few years, the emission of carbon dioxide and other highly polluting gases can be drastically reduced, for example, substituting for fossil fuels and developing sources of renewable energy. Worldwide there is minimal access to clean and renewable energy. There is still a need to develop adequate storage technologies. Some countries have made consid-

erable progress, although it is far from constituting a significant proportion. Investments have also been made in means of production and transportation which consume less energy and require fewer raw materials, as well as in methods of construction and renovating buildings which improve their energy efficiency. But these good practices are still far from widespread.

II. The issue of water

27. Other indicators of the present situation have to do with the depletion of natural resources. We all know that it is not possible to sustain the present level of consumption in developed countries and wealthier sectors of society, where the habit of wasting and discarding has reached unprecedented levels. The exploitation of the planet has already exceeded acceptable limits and we still have not solved the problem of poverty.

28. Fresh drinking water is an issue of primary importance, since it is indispensable for human life and for supporting terrestrial and aquatic ecosystems. Sources of fresh water are necessary for health care, agriculture and industry. Water supplies used to be relatively constant, but now in many places demand exceeds the sustainable supply, with dramatic consequences in the short and long term. Large cities dependent on significant supplies of water have experienced periods of shortage, and at critical moments these have not always been administered with sufficient

oversight and impartiality. Water poverty especially affects Africa where large sectors of the population have no access to safe drinking water or experience droughts which impede agricultural production. Some countries have areas rich in water while others endure drastic scarcity.

29. One particularly serious problem is the quality of water available to the poor. Every day, unsafe water results in many deaths and the spread of water-related diseases, including those caused by microorganisms and chemical substances. Dysentery and cholera, linked to inadequate hygiene and water supplies, are a significant cause of suffering and of infant mortality. Underground water sources in many places are threatened by the pollution produced in certain mining, farming and industrial activities, especially in countries lacking adequate regulation or controls. It is not only a question of industrial waste. Detergents and chemical products, commonly used in many places of the world, continue to pour into our rivers, lakes and seas.

30. Even as the quality of available water is constantly diminishing, in some places there is a growing tendency, despite its scarcity, to privatize this resource, turning it into a commodity subject to the laws of the market. Yet *access to safe drinkable water is a basic and universal human right, since it is essential to human survival and, as such, is a condition for the exercise of other human rights*. Our world has a grave social debt towards the poor who lack

access to drinking water, because *they are denied the right to a life consistent with their inalienable dignity*. This debt can be paid partly by an increase in funding to provide clean water and sanitary services among the poor. But water continues to be wasted, not only in the developed world but also in developing countries which possess it in abundance. This shows that the problem of water is partly an educational and cultural issue, since there is little awareness of the seriousness of such behaviour within a context of great inequality.

31. Greater scarcity of water will lead to an increase in the cost of food and the various products which depend on its use. Some studies warn that an acute water shortage may occur within a few decades unless urgent action is taken. The environmental repercussions could affect billions of people; it is also conceivable that the control of water by large multinational businesses may become a major source of conflict in this century.[23]

III. Loss of biodiversity

32. The earth's resources are also being plundered because of short-sighted approaches to the economy, commerce and production. The loss of forests and woodlands entails the loss of

[23] Cf. *Greeting to the Staff of FAO* (20 November 2014): *AAS* 106 (2014), 985.

species which may constitute extremely important resources in the future, not only for food but also for curing disease and other uses. Different species contain genes which could be key resources in years ahead for meeting human needs and regulating environmental problems.

33. It is not enough, however, to think of different species merely as potential "resources" to be exploited, while overlooking the fact that they have value in themselves. Each year sees the disappearance of thousands of plant and animal species which we will never know, which our children will never see, because they have been lost for ever. The great majority become extinct for reasons related to human activity. Because of us, thousands of species will no longer give glory to God by their very existence, nor convey their message to us. We have no such right.

34. It may well disturb us to learn of the extinction of mammals or birds, since they are more visible. But the good functioning of ecosystems also requires fungi, algae, worms, insects, reptiles and an innumerable variety of microorganisms. Some less numerous species, although generally unseen, nonetheless play a critical role in maintaining the equilibrium of a particular place. Human beings must intervene when a geosystem reaches a critical state. But nowadays, such intervention in nature has become more and more frequent. As a consequence, serious problems arise, leading to further interventions; human activity

becomes ubiquitous, with all the risks which this entails. Often a vicious circle results, as human intervention to resolve a problem further aggravates the situation. For example, many birds and insects which disappear due to synthetic agrotoxins are helpful for agriculture: their disappearance will have to be compensated for by yet other techniques which may well prove harmful. We must be grateful for the praiseworthy efforts being made by scientists and engineers dedicated to finding solutions to man-made problems. But a sober look at our world shows that the degree of human intervention, often in the service of business interests and consumerism, is actually making our earth less rich and beautiful, ever more limited and grey, even as technological advances and consumer goods continue to abound limitlessly. We seem to think that we can substitute an irreplaceable and irretrievable beauty with something which we have created ourselves.

35. In assessing the environmental impact of any project, concern is usually shown for its effects on soil, water and air, yet few careful studies are made of its impact on biodiversity, as if the loss of species or animals and plant groups were of little importance. Highways, new plantations, the fencing-off of certain areas, the damming of water sources, and similar developments, crowd out natural habitats and, at times, break them up in such a way that animal populations can no longer migrate or roam freely. As a re-

sult, some species face extinction. Alternatives exist which at least lessen the impact of these projects, like the creation of biological corridors, but few countries demonstrate such concern and foresight. Frequently, when certain species are exploited commercially, little attention is paid to studying their reproductive patterns in order to prevent their depletion and the consequent imbalance of the ecosystem.

36. Caring for ecosystems demands far-sightedness, since no one looking for quick and easy profit is truly interested in their preservation. But the cost of the damage caused by such selfish lack of concern is much greater than the economic benefits to be obtained. Where certain species are destroyed or seriously harmed, the values involved are incalculable. We can be silent witnesses to terrible injustices if we think that we can obtain significant benefits by making the rest of humanity, present and future, pay the extremely high costs of environmental deterioration.

37. Some countries have made significant progress in establishing sanctuaries on land and in the oceans where any human intervention is prohibited which might modify their features or alter their original structures. In the protection of biodiversity, specialists insist on the need for particular attention to be shown to areas richer both in the number of species and in endemic, rare or less protected species. Certain places need

greater protection because of their immense importance for the global ecosystem, or because they represent important water reserves and thus safeguard other forms of life.

38. Let us mention, for example, those richly biodiverse lungs of our planet which are the Amazon and the Congo basins, or the great aquifers and glaciers. We know how important these are for the entire earth and for the future of humanity. The ecosystems of tropical forests possess an enormously complex biodiversity which is almost impossible to appreciate fully, yet when these forests are burned down or levelled for purposes of cultivation, within the space of a few years countless species are lost and the areas frequently become arid wastelands. A delicate balance has to be maintained when speaking about these places, for we cannot overlook the huge global economic interests which, under the guise of protecting them, can undermine the sovereignty of individual nations. In fact, there are "proposals to internationalize the Amazon, which only serve the economic interests of transnational corporations".[24] We cannot fail to praise the commitment of international agencies and civil society organizations which draw public attention to these issues and offer critical cooperation, employing legitimate means of pressure,

[24] Fifth General Conference of the Latin American and Caribbean Bishops, *Aparecida Document* (29 June 2007), 86.

to ensure that each government carries out its proper and inalienable responsibility to preserve its country's environment and natural resources, without capitulating to spurious local or international interests.

39. The replacement of virgin forest with plantations of trees, usually monocultures, is rarely adequately analyzed. Yet this can seriously compromise a biodiversity which the new species being introduced does not accommodate. Similarly, wetlands converted into cultivated land lose the enormous biodiversity which they formerly hosted. In some coastal areas the disappearance of ecosystems sustained by mangrove swamps is a source of serious concern.

40. Oceans not only contain the bulk of our planet's water supply, but also most of the immense variety of living creatures, many of them still unknown to us and threatened for various reasons. What is more, marine life in rivers, lakes, seas and oceans, which feeds a great part of the world's population, is affected by uncontrolled fishing, leading to a drastic depletion of certain species. Selective forms of fishing which discard much of what they collect continue unabated. Particularly threatened are marine organisms which we tend to overlook, like some forms of plankton; they represent a significant element in the ocean food chain, and species used for our food ultimately depend on them.

41. In tropical and subtropical seas, we find coral reefs comparable to the great forests on dry land, for they shelter approximately a million species, including fish, crabs, molluscs, sponges and algae. Many of the world's coral reefs are already barren or in a state of constant decline. "Who turned the wonderworld of the seas into underwater cemeteries bereft of colour and life?"[25] This phenomenon is due largely to pollution which reaches the sea as the result of deforestation, agricultural monocultures, industrial waste and destructive fishing methods, especially those using cyanide and dynamite. It is aggravated by the rise in temperature of the oceans. All of this helps us to see that every intervention in nature can have consequences which are not immediately evident, and that certain ways of exploiting resources prove costly in terms of degradation which ultimately reaches the ocean bed itself.

42. Greater investment needs to be made in research aimed at understanding more fully the functioning of ecosystems and adequately analyzing the different variables associated with any significant modification of the environment. Because all creatures are connected, each must be cherished with love and respect, for all of us as living creatures are dependent on one another. Each area is responsible for the care of this fam-

[25] Catholic Bishops' Conference of the Philippines, Pastoral Letter *What is Happening to our Beautiful Land?* (29 January 1988).

ily. This will require undertaking a careful inventory of the species which it hosts, with a view to developing programmes and strategies of protection with particular care for safeguarding species heading towards extinction.

IV. Decline in the quality of human life and the breakdown of society

43. Human beings too are creatures of this world, enjoying a right to life and happiness, and endowed with unique dignity. So we cannot fail to consider the effects on people's lives of environmental deterioration, current models of development and the throwaway culture.

44. Nowadays, for example, we are conscious of the disproportionate and unruly growth of many cities, which have become unhealthy to live in, not only because of pollution caused by toxic emissions but also as a result of urban chaos, poor transportation, and visual pollution and noise. Many cities are huge, inefficient structures, excessively wasteful of energy and water. Neighbourhoods, even those recently built, are congested, chaotic and lacking in sufficient green space. We were not meant to be inundated by cement, asphalt, glass and metal, and deprived of physical contact with nature.

45. In some places, rural and urban alike, the privatization of certain spaces has restricted people's access to places of particular beauty. In

others, "ecological" neighbourhoods have been created which are closed to outsiders in order to ensure an artificial tranquillity. Frequently, we find beautiful and carefully manicured green spaces in so-called "safer" areas of cities, but not in the more hidden areas where the disposable of society live.

46. The social dimensions of global change include the effects of technological innovations on employment, social exclusion, an inequitable distribution and consumption of energy and other services, social breakdown, increased violence and a rise in new forms of social aggression, drug trafficking, growing drug use by young people, and the loss of identity. These are signs that the growth of the past two centuries has not always led to an integral development and an improvement in the quality of life. Some of these signs are also symptomatic of real social decline, the silent rupture of the bonds of integration and social cohesion.

47. Furthermore, when media and the digital world become omnipresent, their influence can stop people from learning how to live wisely, to think deeply and to love generously. In this context, the great sages of the past run the risk of going unheard amid the noise and distractions of an information overload. Efforts need to be made to help these media become sources of new cultural progress for humanity and not a

threat to our deepest riches. True wisdom, as the fruit of self-examination, dialogue and generous encounter between persons, is not acquired by a mere accumulation of data which eventually leads to overload and confusion, a sort of mental pollution. Real relationships with others, with all the challenges they entail, now tend to be replaced by a type of internet communication which enables us to choose or eliminate relationships at whim, thus giving rise to a new type of contrived emotion which has more to do with devices and displays than with other people and with nature. Today's media do enable us to communicate and to share our knowledge and affections. Yet at times they also shield us from direct contact with the pain, the fears and the joys of others and the complexity of their personal experiences. For this reason, we should be concerned that, alongside the exciting possibilities offered by these media, a deep and melancholic dissatisfaction with interpersonal relations, or a harmful sense of isolation, can also arise.

V. Global inequality

48. The human environment and the natural environment deteriorate together; we cannot adequately combat environmental degradation unless we attend to causes related to human and social degradation. In fact, the deterioration of the environment and of society affects the most vulnerable people on the planet: "Both everyday

experience and scientific research show that the gravest effects of all attacks on the environment are suffered by the poorest".[26] For example, the depletion of fishing reserves especially hurts small fishing communities without the means to replace those resources; water pollution particularly affects the poor who cannot buy bottled water; and rises in the sea level mainly affect impoverished coastal populations who have nowhere else to go. The impact of present imbalances is also seen in the premature death of many of the poor, in conflicts sparked by the shortage of resources, and in any number of other problems which are insufficiently represented on global agendas.[27]

49. It needs to be said that, generally speaking, there is little in the way of clear awareness of problems which especially affect the excluded. Yet they are the majority of the planet's population, billions of people. These days, they are mentioned in international political and economic discussions, but one often has the impression that their problems are brought up as an afterthought, a question which gets added almost out of duty or in a tangential way, if not treat-

[26] Bolivian Bishops' Conference, Pastoral Letter on the Environment and Human Development in Bolivia *El universo, don de Dios para la vida* (23 March 2012), 17.

[27] Cf. German Bishops' Conference, Commission for Social Issues, *Der Klimawandel: Brennpunkt globaler, intergenerationeller und ökologischer Gerechtigkeit* (September 2006), 28-30.

ed merely as collateral damage. Indeed, when all is said and done, they frequently remain at the bottom of the pile. This is due partly to the fact that many professionals, opinion makers, communications media and centres of power, being located in affluent urban areas, are far removed from the poor, with little direct contact with their problems. They live and reason from the comfortable position of a high level of development and a quality of life well beyond the reach of the majority of the world's population. This lack of physical contact and encounter, encouraged at times by the disintegration of our cities, can lead to a numbing of conscience and to tendentious analyses which neglect parts of reality. At times this attitude exists side by side with a "green" rhetoric. Today, however, we have to realize that a true ecological approach *always* becomes a social approach; it must integrate questions of justice in debates on the environment, so as to hear *both the cry of the earth and the cry of the poor*.

50. Instead of resolving the problems of the poor and thinking of how the world can be different, some can only propose a reduction in the birth rate. At times, developing countries face forms of international pressure which make economic assistance contingent on certain policies of "reproductive health". Yet "while it is true that an unequal distribution of the population and of available resources creates obstacles to development and a sustainable use of the envi-

ronment, it must nonetheless be recognized that demographic growth is fully compatible with an integral and shared development".[28] To blame population growth instead of extreme and selective consumerism on the part of some, is one way of refusing to face the issues. It is an attempt to legitimize the present model of distribution, where a minority believes that it has the right to consume in a way which can never be universalized, since the planet could not even contain the waste products of such consumption. Besides, we know that approximately a third of all food produced is discarded, and "whenever food is thrown out it is as if it were stolen from the table of the poor".[29] Still, attention needs to be paid to imbalances in population density, on both national and global levels, since a rise in consumption would lead to complex regional situations, as a result of the interplay between problems linked to environmental pollution, transport, waste treatment, loss of resources and quality of life.

51. Inequity affects not only individuals but entire countries; it compels us to consider an ethics of international relations. A true "ecological debt" exists, particularly between the global north and south, connected to commercial im-

[28] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, 483.

[29] *Catechesis* (5 June 2013): *Insegnamenti* 1/1 (2013), 280.

balances with effects on the environment, and the disproportionate use of natural resources by certain countries over long periods of time. The export of raw materials to satisfy markets in the industrialized north has caused harm locally, as for example in mercury pollution in gold mining or sulphur dioxide pollution in copper mining. There is a pressing need to calculate the use of environmental space throughout the world for depositing gas residues which have been accumulating for two centuries and have created a situation which currently affects all the countries of the world. The warming caused by huge consumption on the part of some rich countries has repercussions on the poorest areas of the world, especially Africa, where a rise in temperature, together with drought, has proved devastating for farming. There is also the damage caused by the export of solid waste and toxic liquids to developing countries, and by the pollution produced by companies which operate in less developed countries in ways they could never do at home, in the countries in which they raise their capital: "We note that often the businesses which operate this way are multinationals. They do here what they would never do in developed countries or the so-called first world. Generally, after ceasing their activity and withdrawing, they leave behind great human and environmental liabilities such as unemployment, abandoned towns, the depletion of natural reserves, deforestation, the impoverishment of agriculture and local

stock breeding, open pits, riven hills, polluted rivers and a handful of social works which are no longer sustainable".[30]

52. The foreign debt of poor countries has become a way of controlling them, yet this is not the case where ecological debt is concerned. In different ways, developing countries, where the most important reserves of the biosphere are found, continue to fuel the development of richer countries at the cost of their own present and future. The land of the southern poor is rich and mostly unpolluted, yet access to ownership of goods and resources for meeting vital needs is inhibited by a system of commercial relations and ownership which is structurally perverse. The developed countries ought to help pay this debt by significantly limiting their consumption of non-renewable energy and by assisting poorer countries to support policies and programmes of sustainable development. The poorest areas and countries are less capable of adopting new models for reducing environmental impact because they lack the wherewithal to develop the necessary processes and to cover their costs. We must continue to be aware that, regarding climate change, there are *differentiated responsibilities*. As the United States bishops have said, greater attention must be given to "the needs of the

[30] Bishops of the Patagonia-Comahue Region (Argentina), *Christmas Message* (December 2009), 2.

poor, the weak and the vulnerable, in a debate often dominated by more powerful interests".[31] We need to strengthen the conviction that we are one single human family. There are no frontiers or barriers, political or social, behind which we can hide, still less is there room for the globalization of indifference.

VI. Weak responses

53. These situations have caused sister earth, along with all the abandoned of our world, to cry out, pleading that we take another course. Never have we so hurt and mistreated our common home as we have in the last two hundred years. Yet we are called to be instruments of God our Father, so that our planet might be what he desired when he created it and correspond with his plan for peace, beauty and fullness. The problem is that we still lack the culture needed to confront this crisis. We lack leadership capable of striking out on new paths and meeting the needs of the present with concern for all and without prejudice towards coming generations. The establishment of a legal framework which can set clear boundaries and ensure the protection of ecosystems has become indispensable, otherwise the new power structures based on the techno-economic paradigm may overwhelm not only our politics but also freedom and justice.

[31] United States Conference of Catholic Bishops, *Global Climate Change: A Plea for Dialogue, Prudence and the Common Good* (15 June 2001).

54. It is remarkable how weak international political responses have been. The failure of global summits on the environment make it plain that our politics are subject to technology and finance. There are too many special interests, and economic interests easily end up trumping the common good and manipulating information so that their own plans will not be affected. The *Aparecida Document* urges that "the interests of economic groups which irrationally demolish sources of life should not prevail in dealing with natural resources".[32] The alliance between the economy and technology ends up sidelining anything unrelated to its immediate interests. Consequently the most one can expect is superficial rhetoric, sporadic acts of philanthropy and perfunctory expressions of concern for the environment, whereas any genuine attempt by groups within society to introduce change is viewed as a nuisance based on romantic illusions or an obstacle to be circumvented.

55. Some countries are gradually making significant progress, developing more effective controls and working to combat corruption. People may well have a growing ecological sensitivity but it has not succeeded in changing their harmful habits of consumption which, rather than decreasing, appear to be growing all the more. A simple example is the increasing use and power

[32] Fifth General Conference of the Latin American and Caribbean Bishops, *Aparecida Document* (29 June 2007), 471.

of air-conditioning. The markets, which immediately benefit from sales, stimulate ever greater demand. An outsider looking at our world would be amazed at such behaviour, which at times appears self-destructive.

56. In the meantime, economic powers continue to justify the current global system where priority tends to be given to speculation and the pursuit of financial gain, which fail to take the context into account, let alone the effects on human dignity and the natural environment. Here we see how environmental deterioration and human and ethical degradation are closely linked. Many people will deny doing anything wrong because distractions constantly dull our consciousness of just how limited and finite our world really is. As a result, "whatever is fragile, like the environment, is defenceless before the interests of a deified market, which become the only rule".[33]

57. It is foreseeable that, once certain resources have been depleted, the scene will be set for new wars, albeit under the guise of noble claims. War always does grave harm to the environment and to the cultural riches of peoples, risks which are magnified when one considers nuclear arms and biological weapons. "Despite the international agreements which prohibit chemical, bacterio-

[33] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 56: *AAS* 105 (2013), 1043.

logical and biological warfare, the fact is that laboratory research continues to develop new offensive weapons capable of altering the balance of nature".[34] Politics must pay greater attention to foreseeing new conflicts and addressing the causes which can lead to them. But powerful financial interests prove most resistant to this effort, and political planning tends to lack breadth of vision. What would induce anyone, at this stage, to hold on to power only to be remembered for their inability to take action when it was urgent and necessary to do so?

58. In some countries, there are positive examples of environmental improvement: rivers, polluted for decades, have been cleaned up; native woodlands have been restored; landscapes have been beautified thanks to environmental renewal projects; beautiful buildings have been erected; advances have been made in the production of non-polluting energy and in the improvement of public transportation. These achievements do not solve global problems, but they do show that men and women are still capable of intervening positively. For all our limitations, gestures of generosity, solidarity and care cannot but well up within us, since we were made for love.

59. At the same time we can note the rise of a false or superficial ecology which bolsters com-

[34] John Paul II, *Message for the 1990 World Day of Peace*, 12: *AAS* 82 (1990), 154.

placency and a cheerful recklessness. As often occurs in periods of deep crisis which require bold decisions, we are tempted to think that what is happening is not entirely clear. Superficially, apart from a few obvious signs of pollution and deterioration, things do not look that serious, and the planet could continue as it is for some time. Such evasiveness serves as a licence to carrying on with our present lifestyles and models of production and consumption. This is the way human beings contrive to feed their self-destructive vices: trying not to see them, trying not to acknowledge them, delaying the important decisions and pretending that nothing will happen.

VII. A variety of opinions

60. Finally, we need to acknowledge that different approaches and lines of thought have emerged regarding this situation and its possible solutions. At one extreme, we find those who doggedly uphold the myth of progress and tell us that ecological problems will solve themselves simply with the application of new technology and without any need for ethical considerations or deep change. At the other extreme are those who view men and women and all their interventions as no more than a threat, jeopardizing the global ecosystem, and consequently the presence of human beings on the planet should be reduced and all forms of intervention prohibited. Viable future scenarios will have to be generated between these extremes, since there is no

one path to a solution. This makes a variety of proposals possible, all capable of entering into dialogue with a view to developing comprehensive solutions.

61. On many concrete questions, the Church has no reason to offer a definitive opinion; she knows that honest debate must be encouraged among experts, while respecting divergent views. But we need only take a frank look at the facts to see that our common home is falling into serious disrepair. Hope would have us recognize that there is always a way out, that we can always redirect our steps, that we can always do something to solve our problems. Still, we can see signs that things are now reaching a breaking point, due to the rapid pace of change and degradation; these are evident in large-scale natural disasters as well as social and even financial crises, for the world's problems cannot be analyzed or explained in isolation. There are regions now at high risk and, aside from all doomsday predictions, the present world system is certainly unsustainable from a number of points of view, for we have stopped thinking about the goals of human activity. "If we scan the regions of our planet, we immediately see that humanity has disappointed God's expectations".[35]

[35] Id., *Catechesis* (17 January 2001), 3: *Insegnamenti* 24/1 (2001), 178.

CHAPTER TWO

THE GOSPEL OF CREATION

62. Why should this document, addressed to all people of good will, include a chapter dealing with the convictions of believers? I am well aware that in the areas of politics and philosophy there are those who firmly reject the idea of a Creator, or consider it irrelevant, and consequently dismiss as irrational the rich contribution which religions can make towards an integral ecology and the full development of humanity. Others view religions simply as a subculture to be tolerated. Nonetheless, science and religion, with their distinctive approaches to understanding reality, can enter into an intense dialogue fruitful for both.

I. The light offered by faith

63. Given the complexity of the ecological crisis and its multiple causes, we need to realize that the solutions will not emerge from just one way of interpreting and transforming reality. Respect must also be shown for the various cultural riches of different peoples, their art and poetry, their interior life and spirituality. If we are truly concerned to develop an ecology capable of remedying the damage we have done, no branch of the sciences and no form of wisdom

can be left out, and that includes religion and the language particular to it. The Catholic Church is open to dialogue with philosophical thought; this has enabled her to produce various syntheses between faith and reason. The development of the Church's social teaching represents such a synthesis with regard to social issues; this teaching is called to be enriched by taking up new challenges.

64. Furthermore, although this Encyclical welcomes dialogue with everyone so that together we can seek paths of liberation, I would like from the outset to show how faith convictions can offer Christians, and some other believers as well, ample motivation to care for nature and for the most vulnerable of their brothers and sisters. If the simple fact of being human moves people to care for the environment of which they are a part, Christians in their turn "realize that their responsibility within creation, and their duty towards nature and the Creator, are an essential part of their faith".[36] It is good for humanity and the world at large when we believers better recognize the ecological commitments which stem from our convictions.

II. The wisdom of the biblical accounts

65. Without repeating the entire theology of creation, we can ask what the great biblical nar-

[36] John Paul II, *Message for the 1990 World Day of Peace*, 15: *AAS* 82 (1990), 156.

ratives say about the relationship of human beings with the world. In the first creation account in the Book of Genesis, God's plan includes creating humanity. After the creation of man and woman, "God saw everything that he had made, and behold it was *very good*" (*Gen* 1:31). The Bible teaches that every man and woman is created out of love and made in God's image and likeness (cf. *Gen* 1:26). This shows us the immense dignity of each person, "who is not just something, but someone. He is capable of self-knowledge, of self-possession and of freely giving himself and entering into communion with other persons".[37] Saint John Paul II stated that the special love of the Creator for each human being "confers upon him or her an infinite dignity".[38] Those who are committed to defending human dignity can find in the Christian faith the deepest reasons for this commitment. How wonderful is the certainty that each human life is not adrift in the midst of hopeless chaos, in a world ruled by pure chance or endlessly recurring cycles! The Creator can say to each one of us: "Before I formed you in the womb, I knew you" (*Jer* 1:5). We were conceived in the heart of God, and for this reason "each of us is the result of a thought of God. Each of us is willed, each of us is loved, each of us is necessary".[39]

[37] *Catechism of the Catholic Church*, 357.

[38] *Angelus* in Osnabrück (Germany) with the disabled, 16 November 1980: *Insegnamenti* 3/2 (1980), 1232.

[39] Benedict XVI, *Homily for the Solemn Inauguration of the Petrine Ministry* (24 April 2005): *AAS* 97 (2005), 711.

66. The creation accounts in the book of Genesis contain, in their own symbolic and narrative language, profound teachings about human existence and its historical reality. They suggest that human life is grounded in three fundamental and closely intertwined relationships: with God, with our neighbour and with the earth itself. According to the Bible, these three vital relationships have been broken, both outwardly and within us. This rupture is sin. The harmony between the Creator, humanity and creation as a whole was disrupted by our presuming to take the place of God and refusing to acknowledge our creaturely limitations. This in turn distorted our mandate to "have dominion" over the earth (cf. *Gen* 1:28), to "till it and keep it" (*Gen* 2:15). As a result, the originally harmonious relationship between human beings and nature became conflictual (cf. *Gen* 3:17-19). It is significant that the harmony which Saint Francis of Assisi experienced with all creatures was seen as a healing of that rupture. Saint Bonaventure held that, through universal reconciliation with every creature, Saint Francis in some way returned to the state of original innocence.[40] This is a far cry from our situation today, where sin is manifest in all its destructive power in wars, the various forms of violence and abuse, the abandonment of the most vulnerable, and attacks on nature.

[40] Cf. Bonaventure, *The Major Legend of Saint Francis*, VIII, 1, in *Francis of Assisi: Early Documents*, vol. 2, New York-London-Manila, 2000, 586.

67. We are not God. The earth was here before us and it has been given to us. This allows us to respond to the charge that Judaeo-Christian thinking, on the basis of the Genesis account which grants man "dominion" over the earth (cf. *Gen* 1:28), has encouraged the unbridled exploitation of nature by painting him as domineering and destructive by nature. This is not a correct interpretation of the Bible as understood by the Church. Although it is true that we Christians have at times incorrectly interpreted the Scriptures, nowadays we must forcefully reject the notion that our being created in God's image and given dominion over the earth justifies absolute domination over other creatures. The biblical texts are to be read in their context, with an appropriate hermeneutic, recognizing that they tell us to "till and keep" the garden of the world (cf. *Gen* 2:15). "Tilling" refers to cultivating, ploughing or working, while "keeping" means caring, protecting, overseeing and preserving. This implies a relationship of mutual responsibility between human beings and nature. Each community can take from the bounty of the earth whatever it needs for subsistence, but it also has the duty to protect the earth and to ensure its fruitfulness for coming generations. "The earth is the Lord's" (*Ps* 24:1); to him belongs "the earth with all that is within it" (*Dt* 10:14). Thus God rejects every claim to absolute ownership: "The land shall not be sold in perpetuity, for the land is mine; for you are strangers and sojourners with me" (*Lev* 25:23).

68. This responsibility for God's earth means that human beings, endowed with intelligence, must respect the laws of nature and the delicate equilibria existing between the creatures of this world, for "he commanded and they were created; and he established them for ever and ever; he fixed their bounds and he set a law which cannot pass away" (*Ps* 148:5b-6). The laws found in the Bible dwell on relationships, not only among individuals but also with other living beings. "You shall not see your brother's donkey or his ox fallen down by the way and withhold your help… If you chance to come upon a bird's nest in any tree or on the ground, with young ones or eggs and the mother sitting upon the young or upon the eggs; you shall not take the mother with the young" (*Dt* 22:4, 6). Along these same lines, rest on the seventh day is meant not only for human beings, but also so "that your ox and your donkey may have rest" (*Ex* 23:12). Clearly, the Bible has no place for a tyrannical anthropocentrism unconcerned for other creatures.

69. Together with our obligation to use the earth's goods responsibly, we are called to recognize that other living beings have a value of their own in God's eyes: "by their mere existence they bless him and give him glory",[41] and indeed, "the Lord rejoices in all his works" (*Ps* 104:31). By virtue of our unique dignity and our gift of intelli-

[41] *Catechism of the Catholic Church*, 2416.

gence, we are called to respect creation and its inherent laws, for "the Lord by wisdom founded the earth" (*Prov* 3:19). In our time, the Church does not simply state that other creatures are completely subordinated to the good of human beings, as if they have no worth in themselves and can be treated as we wish. The German bishops have taught that, where other creatures are concerned, "we can speak of the priority of *being* over that of *being useful*".[42] The Catechism clearly and forcefully criticizes a distorted anthropocentrism: "Each creature possesses its own particular goodness and perfection… Each of the various creatures, willed in its own being, reflects in its own way a ray of God's infinite wisdom and goodness. Man must therefore respect the particular goodness of every creature, to avoid any disordered use of things".[43]

70. In the story of Cain and Abel, we see how envy led Cain to commit the ultimate injustice against his brother, which in turn ruptured the relationship between Cain and God, and between Cain and the earth from which he was banished. This is seen clearly in the dramatic exchange between God and Cain. God asks: "Where is Abel your brother?" Cain answers that he does not know, and God persists: "What have you done?

[42] German Bishops' Conference, *Zukunft der Schöpfung – Zukunft der Menschheit. Einklärung der Deutschen Bischofskonferenz zu Fragen der Umwelt und der Energieversorgung*, (1980), II, 2.

[43] *Catechism of the Catholic Church*, 339.

The voice of your brother's blood is crying to me from the ground. And now you are cursed from the ground" (*Gen* 4:9-11). Disregard for the duty to cultivate and maintain a proper relationship with my neighbour, for whose care and custody I am responsible, ruins my relationship with my own self, with others, with God and with the earth. When all these relationships are neglected, when justice no longer dwells in the land, the Bible tells us that life itself is endangered. We see this in the story of Noah, where God threatens to do away with humanity because of its constant failure to fulfil the requirements of justice and peace: "I have determined to make an end of all flesh; for the earth is filled with violence through them" (*Gen* 6:13). These ancient stories, full of symbolism, bear witness to a conviction which we today share, that everything is interconnected, and that genuine care for our own lives and our relationships with nature is inseparable from fraternity, justice and faithfulness to others.

71. Although "the wickedness of man was great in the earth" (*Gen* 6:5) and the Lord "was sorry that he had made man on the earth" (*Gen* 6:6), nonetheless, through Noah, who remained innocent and just, God decided to open a path of salvation. In this way he gave humanity the chance of a new beginning. All it takes is one good person to restore hope! The biblical tradition clearly shows that this renewal entails recovering and respecting the rhythms inscribed in nature by the

hand of the Creator. We see this, for example, in the law of the Sabbath. On the seventh day, God rested from all his work. He commanded Israel to set aside each seventh day as a day of rest, a *Sabbath*, (cf. *Gen* 2:2-3; *Ex* 16:23; 20:10). Similarly, every seven years, a sabbatical year was set aside for Israel, a complete rest for the land (cf. *Lev* 25:1-4), when sowing was forbidden and one reaped only what was necessary to live on and to feed one's household (cf. *Lev* 25:4-6). Finally, after seven weeks of years, which is to say forty-nine years, the Jubilee was celebrated as a year of general forgiveness and "liberty throughout the land for all its inhabitants" (cf. *Lev* 25:10). This law came about as an attempt to ensure balance and fairness in their relationships with others and with the land on which they lived and worked. At the same time, it was an acknowledgment that the gift of the earth with its fruits belongs to everyone. Those who tilled and kept the land were obliged to share its fruits, especially with the poor, with widows, orphans and foreigners in their midst: "When you reap the harvest of your land, you shall not reap your field to its very border, neither shall you gather the gleanings after the harvest. And you shall not strip your vineyard bare, neither shall you gather the fallen grapes of your vineyard; you shall leave them for the poor and for the sojourner" (*Lev* 19:9-10).

72. The Psalms frequently exhort us to praise God the Creator, "who spread out the earth on

the waters, for his steadfast love endures for ever" (*Ps* 136:6). They also invite other creatures to join us in this praise: "Praise him, sun and moon, praise him, all you shining stars! Praise him, you highest heavens, and you waters above the heavens! Let them praise the name of the Lord, for he commanded and they were created" (*Ps* 148:3-5). We do not only exist by God's mighty power; we also live with him and beside him. This is why we adore him.

73. The writings of the prophets invite us to find renewed strength in times of trial by contemplating the all-powerful God who created the universe. Yet God's infinite power does not lead us to flee his fatherly tenderness, because in him affection and strength are joined. Indeed, all sound spirituality entails both welcoming divine love and adoration, confident in the Lord because of his infinite power. In the Bible, the God who liberates and saves is the same God who created the universe, and these two divine ways of acting are intimately and inseparably connected: "Ah Lord God! It is you who made the heavens and the earth by your great power and by your outstretched arm! Nothing is too hard for you… You brought your people Israel out of the land of Egypt with signs and wonders" (*Jer* 32:17, 21). "The Lord is the everlasting God, the Creator of the ends of the earth. He does not faint or grow weary; his understanding is unsearchable. He gives power to the faint, and strengthens the powerless" (*Is* 40:28b-29).

74. The experience of the Babylonian captivity provoked a spiritual crisis which led to deeper faith in God. Now his creative omnipotence was given pride of place in order to exhort the people to regain their hope in the midst of their wretched predicament. Centuries later, in another age of trial and persecution, when the Roman Empire was seeking to impose absolute dominion, the faithful would once again find consolation and hope in a growing trust in the all-powerful God: "Great and wonderful are your deeds, O Lord God the Almighty! Just and true are your ways!" (*Rev* 15:3). The God who created the universe out of nothing can also intervene in this world and overcome every form of evil. Injustice is not invincible.

75. A spirituality which forgets God as all-powerful and Creator is not acceptable. That is how we end up worshipping earthly powers, or ourselves usurping the place of God, even to the point of claiming an unlimited right to trample his creation underfoot. The best way to restore men and women to their rightful place, putting an end to their claim to absolute dominion over the earth, is to speak once more of the figure of a Father who creates and who alone owns the world. Otherwise, human beings will always try to impose their own laws and interests on reality.

III. The mystery of the universe

76. In the Judaeo-Christian tradition, the word "creation" has a broader meaning than "nature",

for it has to do with God's loving plan in which every creature has its own value and significance. Nature is usually seen as a system which can be studied, understood and controlled, whereas creation can only be understood as a gift from the outstretched hand of the Father of all, and as a reality illuminated by the love which calls us together into universal communion.

77. "By the word of the Lord the heavens were made" (*Ps* 33:6). This tells us that the world came about as the result of a decision, not from chaos or chance, and this exalts it all the more. The creating word expresses a free choice. The universe did not emerge as the result of arbitrary omnipotence, a show of force or a desire for self-assertion. Creation is of the order of love. God's love is the fundamental moving force in all created things: "For you love all things that exist, and detest none of the things that you have made; for you would not have made anything if you had hated it" (*Wis* 11:24). Every creature is thus the object of the Father's tenderness, who gives it its place in the world. Even the fleeting life of the least of beings is the object of his love, and in its few seconds of existence, God enfolds it with his affection. Saint Basil the Great described the Creator as "goodness without measure",[44] while Dante Alighieri spoke of "the love which moves

[44] *Hom. in Hexaemeron,* I, 2, 10: PG 29, 9.

the sun and the stars".[45] Consequently, we can ascend from created things "to the greatness of God and to his loving mercy".[46]

78. At the same time, Judaeo-Christian thought demythologized nature. While continuing to admire its grandeur and immensity, it no longer saw nature as divine. In doing so, it emphasizes all the more our human responsibility for nature. This rediscovery of nature can never be at the cost of the freedom and responsibility of human beings who, as part of the world, have the duty to cultivate their abilities in order to protect it and develop its potential. If we acknowledge the value and the fragility of nature and, at the same time, our God-given abilities, we can finally leave behind the modern myth of unlimited material progress. A fragile world, entrusted by God to human care, challenges us to devise intelligent ways of directing, developing and limiting our power.

79. In this universe, shaped by open and intercommunicating systems, we can discern countless forms of relationship and participation. This leads us to think of the whole as open to God's transcendence, within which it develops. Faith allows us to interpret the meaning and the mysterious beauty of what is unfolding. We are free

[45] *The Divine Comedy, Paradiso*, Canto XXXIII, 145.

[46] Benedict XVI, *Catechesis* (9 November 2005), 3: *Insegnamenti* 1 (2005), 768.

to apply our intelligence towards things evolving positively, or towards adding new ills, new causes of suffering and real setbacks. This is what makes for the excitement and drama of human history, in which freedom, growth, salvation and love can blossom, or lead towards decadence and mutual destruction. The work of the Church seeks not only to remind everyone of the duty to care for nature, but at the same time "she must above all protect mankind from self-destruction".[47]

80. Yet God, who wishes to work with us and who counts on our cooperation, can also bring good out of the evil we have done. "The Holy Spirit can be said to possess an infinite creativity, proper to the divine mind, which knows how to loosen the knots of human affairs, including the most complex and inscrutable".[48] Creating a world in need of development, God in some way sought to limit himself in such a way that many of the things we think of as evils, dangers or sources of suffering, are in reality part of the pains of childbirth which he uses to draw us into the act of cooperation with the Creator.[49]

[47] Id., Encyclical Letter *Caritas in Veritate* (29 June 2009), 51: *AAS* 101 (2009), 687.

[48] John Paul II, *Catechesis* (24 April 1991), 6: *Insegnamenti* 14 (1991), 856.

[49] The Catechism explains that God wished to create a world which is "journeying towards its ultimate perfection", and that this implies the presence of imperfection and physical evil; cf. *Catechism of the Catholic Church*, 310.

God is intimately present to each being, without impinging on the autonomy of his creature, and this gives rise to the rightful autonomy of earthly affairs.[50] His divine presence, which ensures the subsistence and growth of each being, "continues the work of creation".[51] The Spirit of God has filled the universe with possibilities and therefore, from the very heart of things, something new can always emerge: "Nature is nothing other than a certain kind of art, namely God's art, impressed upon things, whereby those things are moved to a determinate end. It is as if a shipbuilder were able to give timbers the wherewithal to move themselves to take the form of a ship".[52]

81. Human beings, even if we postulate a process of evolution, also possess a uniqueness which cannot be fully explained by the evolution of other open systems. Each of us has his or her own personal identity and is capable of entering into dialogue with others and with God himself. Our capacity to reason, to develop arguments, to be inventive, to interpret reality and to create art, along with other not yet discovered capacities, are signs of a uniqueness which transcends the

[50] Cf. Second Vatican Ecumenical Council, Pastoral Constitution on the Church in the Modern World *Gaudium et Spes*, 36.

[51] Thomas Aquinas, *Summa Theologiae*, I, q. 104, art. 1 ad 4.

[52] Id., *In octo libros Physicorum Aristotelis expositio*, Lib. II, lectio 14.

spheres of physics and biology. The sheer novelty involved in the emergence of a personal being within a material universe presupposes a direct action of God and a particular call to life and to relationship on the part of a "Thou" who addresses himself to another "thou". The biblical accounts of creation invite us to see each human being as a subject who can never be reduced to the status of an object.

82. Yet it would also be mistaken to view other living beings as mere objects subjected to arbitrary human domination. When nature is viewed solely as a source of profit and gain, this has serious consequences for society. This vision of "might is right" has engendered immense inequality, injustice and acts of violence against the majority of humanity, since resources end up in the hands of the first comer or the most powerful: the winner takes all. Completely at odds with this model are the ideals of harmony, justice, fraternity and peace as proposed by Jesus. As he said of the powers of his own age: "You know that the rulers of the Gentiles lord it over them, and their great men exercise authority over them. It shall not be so among you; but whoever would be great among you must be your servant" (*Mt* 20:25-26).

83. The ultimate destiny of the universe is in the fullness of God, which has already been attained by the risen Christ, the measure of the

maturity of all things.[53] Here we can add yet another argument for rejecting every tyrannical and irresponsible domination of human beings over other creatures. The ultimate purpose of other creatures is not to be found in us. Rather, all creatures are moving forward with us and through us towards a common point of arrival, which is God, in that transcendent fullness where the risen Christ embraces and illumines all things. Human beings, endowed with intelligence and love, and drawn by the fullness of Christ, are called to lead all creatures back to their Creator.

IV. The message of each creature in the harmony of creation

84. Our insistence that each human being is an image of God should not make us overlook the fact that each creature has its own purpose. None is superfluous. The entire material universe speaks of God's love, his boundless affection for us. Soil, water, mountains: everything is, as it were, a caress of God. The history of our friendship with God is always linked to particular places which take on an intensely personal meaning; we all remember places, and revisiting those

[53] Against this horizon we can set the contribution of Fr Teilhard de Chardin; cf. Paul VI, *Address in a Chemical and Pharmaceutical Plant* (24 February 1966): *Insegnamenti* 4 (1966), 992-993; John Paul II, *Letter to the Reverend George Coyne* (1 June 1988): *Insegnamenti* 11/2 (1988), 1715; Benedict XVI, *Homily for the Celebration of Vespers in Aosta* (24 July 2009): *Insegnamenti* 5/2 (2009), 60.

memories does us much good. Anyone who has grown up in the hills or used to sit by the spring to drink, or played outdoors in the neighbourhood square; going back to these places is a chance to recover something of their true selves.

85. God has written a precious book, "whose letters are the multitude of created things present in the universe".[54] The Canadian bishops rightly pointed out that no creature is excluded from this manifestation of God: "From panoramic vistas to the tiniest living form, nature is a constant source of wonder and awe. It is also a continuing revelation of the divine".[55] The bishops of Japan, for their part, made a thought-provoking observation: "To sense each creature singing the hymn of its existence is to live joyfully in God's love and hope".[56] This contemplation of creation allows us to discover in each thing a teaching which God wishes to hand on to us, since "for the believer, to contemplate creation is to hear a message, to listen to a paradoxical and silent voice".[57] We can say that "alongside revelation properly so-called, contained in sa-

[54] John Paul II, *Catechesis* (30 January 2002),6: *Insegnamenti* 25/1 (2002), 140.

[55] Canadian Conference of Catholic Bishops, Social Affairs Commission, Pastoral Letter *You Love All that Exists… All Things are Yours, God, Lover of Life"* (4 October 2003), 1.

[56] Catholic Bishops' Conference of Japan, *Reverence for Life. A Message for the Twenty-First Century* (1 January 2000), 89.

[57] John Paul II, *Catechesis* (26 January 2000), 5: *Insegnamenti* 23/1 (2000), 123.

cred Scripture, there is a divine manifestation in the blaze of the sun and the fall of night".[58] Paying attention to this manifestation, we learn to see ourselves in relation to all other creatures: "I express myself in expressing the world; in my effort to decipher the sacredness of the world, I explore my own".[59]

86. The universe as a whole, in all its manifold relationships, shows forth the inexhaustible riches of God. Saint Thomas Aquinas wisely noted that multiplicity and variety "come from the intention of the first agent" who willed that "what was wanting to one in the representation of the divine goodness might be supplied by another",[60] inasmuch as God's goodness "could not be represented fittingly by any one creature".[61] Hence we need to grasp the variety of things in their multiple relationships.[62] We understand better the importance and meaning of each creature if we contemplate it within the entirety of God's plan. As the Catechism teaches: "God wills the interdependence of creatures. The sun and the moon, the cedar and the little flower, the eagle and the sparrow: the spectacle of their countless diversities and inequalities tells us that no crea-

[58] Id., *Catechesis* (2 August 2000), 3: *Insegnamenti* 23/2 (2000), 112.

[59] Paul Ricoeur, *Philosophie de la Volonté, t. II: Finitude et Culpabilité*, Paris, 2009, 216.

[60] *Summa Theologiae*, I, q. 47, art. 1.

[61] *Ibid.*

[62] Cf. *Ibid.*, art. 2, ad 1; art. 3.

ture is self-sufficient. Creatures exist only in dependence on each other, to complete each other, in the service of each other".[63]

87. When we can see God reflected in all that exists, our hearts are moved to praise the Lord for all his creatures and to worship him in union with them. This sentiment finds magnificent expression in the hymn of Saint Francis of Assisi:

> Praised be you, my Lord, with all your creatures,
> especially Sir Brother Sun,
> who is the day
> and through whom you give us light.
> And he is beautiful and radiant
> with great splendour;
> and bears a likeness of you, Most High.
> Praised be you, my Lord,
> through Sister Moon and the stars,
> in heaven you formed them clear
> and precious and beautiful.
> Praised be you, my Lord,
> through Brother Wind,
> and through the air, cloudy and serene,
> and every kind of weather
> through whom you give sustenance
> to your creatures.
> Praised be you, my Lord, through Sister Water,
> who is very useful and humble
> and precious and chaste.
> Praised be you, my Lord, through Brother Fire,
> through whom you light the night,

[63] *Catechism of the Catholic Church*, 340.

and he is beautiful and playful
and robust and strong".[64]

88. The bishops of Brazil have pointed out that nature as a whole not only manifests God but is also a locus of his presence. The Spirit of life dwells in every living creature and calls us to enter into relationship with him.[65] Discovering this presence leads us to cultivate the "ecological virtues".[66] This is not to forget that there is an infinite distance between God and the things of this world, which do not possess his fullness. Otherwise, we would not be doing the creatures themselves any good either, for we would be failing to acknowledge their right and proper place. We would end up unduly demanding of them something which they, in their smallness, cannot give us.

V. A universal communion

89. The created things of this world are not free of ownership: "For they are yours, O Lord, who love the living" (*Wis* 11:26). This is the basis of our conviction that, as part of the universe, called into being by one Father, all of us are linked by unseen bonds and together form a kind

[64] *Canticle of the Creatures*, in *Francis of Assisi: Early Documents*, New York-London-Manila, 1999, 113-114.

[65] Cf. National Conference of the Bishops of Brazil, *A Igreja e a Questão Ecológica,* 1992, 53-54.

[66] *Ibid.*, 61.

of universal family, a sublime communion which fills us with a sacred, affectionate and humble respect. Here I would reiterate that "God has joined us so closely to the world around us that we can feel the desertification of the soil almost as a physical ailment, and the extinction of a species as a painful disfigurement".[67]

90. This is not to put all living beings on the same level nor to deprive human beings of their unique worth and the tremendous responsibility it entails. Nor does it imply a divinization of the earth which would prevent us from working on it and protecting it in its fragility. Such notions would end up creating new imbalances which would deflect us from the reality which challenges us.[68] At times we see an obsession with denying any pre-eminence to the human person; more zeal is shown in protecting other species than in defending the dignity which all human beings share in equal measure. Certainly, we should be concerned lest other living beings be treated irresponsibly. But we should be particularly indignant at the enormous inequalities in our midst, whereby we continue to tolerate some considering themselves more worthy than others. We fail to see that some are mired in desperate and degrading poverty, with no way out,

[67] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 215: *AAS* 105 (2013), 1109.

[68] Cf. Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009), 14: *AAS* 101 (2009), 650.

while others have not the faintest idea of what to do with their possessions, vainly showing off their supposed superiority and leaving behind them so much waste which, if it were the case everywhere, would destroy the planet. In practice, we continue to tolerate that some consider themselves more human than others, as if they had been born with greater rights.

91. A sense of deep communion with the rest of nature cannot be real if our hearts lack tenderness, compassion and concern for our fellow human beings. It is clearly inconsistent to combat trafficking in endangered species while remaining completely indifferent to human trafficking, unconcerned about the poor, or undertaking to destroy another human being deemed unwanted. This compromises the very meaning of our struggle for the sake of the environment. It is no coincidence that, in the canticle in which Saint Francis praises God for his creatures, he goes on to say: "Praised be you my Lord, through those who give pardon for your love". Everything is connected. Concern for the environment thus needs to be joined to a sincere love for our fellow human beings and an unwavering commitment to resolving the problems of society.

92. Moreover, when our hearts are authentically open to universal communion, this sense of fraternity excludes nothing and no one. It follows that our indifference or cruelty towards fellow

creatures of this world sooner or later affects the treatment we mete out to other human beings. We have only one heart, and the same wretchedness which leads us to mistreat an animal will not be long in showing itself in our relationships with other people. Every act of cruelty towards any creature is "contrary to human dignity".[69] We can hardly consider ourselves to be fully loving if we disregard any aspect of reality: "Peace, justice and the preservation of creation are three absolutely interconnected themes, which cannot be separated and treated individually without once again falling into reductionism".[70] Everything is related, and we human beings are united as brothers and sisters on a wonderful pilgrimage, woven together by the love God has for each of his creatures and which also unites us in fond affection with brother sun, sister moon, brother river and mother earth.

VI. The common destination of goods

93. Whether believers or not, we are agreed today that the earth is essentially a shared inheritance, whose fruits are meant to benefit everyone. For believers, this becomes a question of fidelity to the Creator, since God created the world for everyone. Hence every ecological approach needs to incorporate a social perspective

[69] *Catechism of the Catholic Church*, 2418.

[70] Conference of Dominican Bishops, Pastoral Letter *Sobre la relación del hombre con la naturaleza* (21 January 1987).

which takes into account the fundamental rights of the poor and the underprivileged. The principle of the subordination of private property to the universal destination of goods, and thus the right of everyone to their use, is a golden rule of social conduct and "the first principle of the whole ethical and social order".[71] The Christian tradition has never recognized the right to private property as absolute or inviolable, and has stressed the social purpose of all forms of private property. Saint John Paul II forcefully reaffirmed this teaching, stating that "God gave the earth to the whole human race for the sustenance of all its members, *without excluding or favouring anyone*".[72] These are strong words. He noted that "a type of development which did not respect and promote human rights – personal and social, economic and political, including the rights of nations and of peoples – would not be really worthy of man".[73] He clearly explained that "the Church does indeed defend the legitimate right to private property, but she also teaches no less clearly that there is always a social mortgage on all private property, in order that goods may serve the general purpose that God gave them".[74]

[71] John Paul II, Encyclical Letter *Laborem Exercens* (14 September 1981), 19: *AAS* 73 (1981), 626.

[72] Encyclical Letter *Centesimus Annus* (1 May 1991), 31: *AAS* 83 (1991), 831.

[73] Encyclical Letter *Sollicitudo Rei Socialis* (30 December 1987), 33: *AAS* 80 (1988), 557.

[74] *Address to Indigenous and Rural People,* Cuilapán, Mexico (29 January 1979), 6: *AAS* 71 (1979), 209.

Consequently, he maintained, "it is not in accord with God's plan that this gift be used in such a way that its benefits favour only a few".[75] This calls into serious question the unjust habits of a part of humanity.[76]

94. The rich and the poor have equal dignity, for "the Lord is the maker of them all" (*Prov* 22:2). "He himself made both small and great" (*Wis* 6:7), and "he makes his sun rise on the evil and on the good" (*Mt* 5:45). This has practical consequences, such as those pointed out by the bishops of Paraguay: "Every *campesino* has a natural right to possess a reasonable allotment of land where he can establish his home, work for subsistence of his family and a secure life. This right must be guaranteed so that its exercise is not illusory but real. That means that apart from the ownership of property, rural people must have access to means of technical education, credit, insurance, and markets".[77]

95. The natural environment is a collective good, the patrimony of all humanity and the responsibility of everyone. If we make something our own, it is only to administer it for the good

[75] *Homily at Mass for Farmers,* Recife, Brazil (7 July 1980): *AAS* 72 (1980): *AAS* 72 (1980), 926.

[76] Cf. *Message for the 1990 World Day of Peace*, 8: *AAS* 82 (1990), 152.

[77] Paraguayan Bishops' Conference, Pastoral Letter *El campesino paraguayo y la tierra* (12 June 1983), 2, 4, d.

of all. If we do not, we burden our consciences with the weight of having denied the existence of others. That is why the New Zealand bishops asked what the commandment "Thou shalt not kill" means when "twenty percent of the world's population consumes resources at a rate that robs the poor nations and future generations of what they need to survive".[78]

VII. The gaze of Jesus

96. Jesus took up the biblical faith in God the Creator, emphasizing a fundamental truth: God is Father (cf. *Mt* 11:25). In talking with his disciples, Jesus would invite them to recognize the paternal relationship God has with all his creatures. With moving tenderness he would remind them that each one of them is important in God's eyes: "Are not five sparrows sold for two pennies? And not one of them is forgotten before God" (*Lk* 12:6). "Look at the birds of the air: they neither sow nor reap nor gather into barns, and yet your heavenly Father feeds them" (*Mt* 6:26).

97. The Lord was able to invite others to be attentive to the beauty that there is in the world because he himself was in constant touch with nature, lending it an attention full of fondness and wonder. As he made his way throughout the

[78] New Zealand Catholic Bishops Conference, *Statement on Environmental Issues* (1 September 2006).

land, he often stopped to contemplate the beauty sown by his Father, and invited his disciples to perceive a divine message in things: "Lift up your eyes, and see how the fields are already white for harvest" (*Jn* 4:35). "The kingdom of God is like a grain of mustard seed which a man took and sowed in his field; it is the smallest of all seeds, but once it has grown, it is the greatest of plants" (*Mt* 13:31-32).

98. Jesus lived in full harmony with creation, and others were amazed: "What sort of man is this, that even the winds and the sea obey him?" (*Mt* 8:27). His appearance was not that of an ascetic set apart from the world, nor of an enemy to the pleasant things of life. Of himself he said: "The Son of Man came eating and drinking and they say, 'Look, a glutton and a drunkard!'" (*Mt* 11:19). He was far removed from philosophies which despised the body, matter and the things of the world. Such unhealthy dualisms, nonetheless, left a mark on certain Christian thinkers in the course of history and disfigured the Gospel. Jesus worked with his hands, in daily contact with the matter created by God, to which he gave form by his craftsmanship. It is striking that most of his life was dedicated to this task in a simple life which awakened no admiration at all: "Is not this the carpenter, the son of Mary?" (*Mk* 6:3). In this way he sanctified human labour and endowed it with a special significance for our development. As Saint John Paul II taught, "by enduring the toil

of work in union with Christ crucified for us, man in a way collaborates with the Son of God for the redemption of humanity".[79]

99. In the Christian understanding of the world, the destiny of all creation is bound up with the mystery of Christ, present from the beginning: "All things have been created though him and for him" (*Col* 1:16).[80] The prologue of the Gospel of John (1:1-18) reveals Christ's creative work as the Divine Word (*Logos*). But then, unexpectedly, the prologue goes on to say that this same Word "became flesh" (*Jn* 1:14). One Person of the Trinity entered into the created cosmos, throwing in his lot with it, even to the cross. From the beginning of the world, but particularly through the incarnation, the mystery of Christ is at work in a hidden manner in the natural world as a whole, without thereby impinging on its autonomy.

100. The New Testament does not only tell us of the earthly Jesus and his tangible and loving relationship with the world. It also shows him risen and glorious, present throughout creation by his universal Lordship: "For in him all the fullness of God was pleased to dwell, and through him to reconcile to himself all things, whether on earth or in heaven, making peace by the blood of

[79] Encyclical Letter *Laborem Exercens* (14 September 1981), 27: *AAS* 73 (1981), 645.

[80] Hence Saint Justin could speak of "seeds of the Word" in the world; cf. *II Apologia* 8, 1-2; 13, 3-6: PG 6, 457-458, 467.

his cross" (*Col* 1:19-20). This leads us to direct our gaze to the end of time, when the Son will deliver all things to the Father, so that "God may be everything to every one" (*1 Cor* 15:28). Thus, the creatures of this world no longer appear to us under merely natural guise because the risen One is mysteriously holding them to himself and directing them towards fullness as their end. The very flowers of the field and the birds which his human eyes contemplated and admired are now imbued with his radiant presence.

CHAPTER THREE

THE HUMAN ROOTS OF THE ECOLOGICAL CRISIS

101. It would hardly be helpful to describe symptoms without acknowledging the human origins of the ecological crisis. A certain way of understanding human life and activity has gone awry, to the serious detriment of the world around us. Should we not pause and consider this? At this stage, I propose that we focus on the dominant technocratic paradigm and the place of human beings and of human action in the world.

I. Technology: creativity and power

102. Humanity has entered a new era in which our technical prowess has brought us to a crossroads. We are the beneficiaries of two centuries of enormous waves of change: steam engines, railways, the telegraph, electricity, automobiles, aeroplanes, chemical industries, modern medicine, information technology and, more recently, the digital revolution, robotics, biotechnologies and nanotechnologies. It is right to rejoice in these advances and to be excited by the immense possibilities which they continue to open up before us, for "science and technology are wonder-

ful products of a God-given human creativity".[81] The modification of nature for useful purposes has distinguished the human family from the beginning; technology itself "expresses the inner tension that impels man gradually to overcome material limitations".[82] Technology has remedied countless evils which used to harm and limit human beings. How can we not feel gratitude and appreciation for this progress, especially in the fields of medicine, engineering and communications? How could we not acknowledge the work of many scientists and engineers who have provided alternatives to make development sustainable?

103. Technoscience, when well directed, can produce important means of improving the quality of human life, from useful domestic appliances to great transportation systems, bridges, buildings and public spaces. It can also produce art and enable men and women immersed in the material world to "leap" into the world of beauty. Who can deny the beauty of an aircraft or a skyscraper? Valuable works of art and music now make use of new technologies. So, in the beauty intended by the one who uses new technical instruments and in the contemplation of

[81] John Paul II, *Address to Scientists and Representatives of the United Nations University,* Hiroshima (25 February 1981), 3: *AAS* 73 (1981), 422.

[82] Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009), 69: *AAS* 101 (2009), 702.

such beauty, a quantum leap occurs, resulting in a fulfilment which is uniquely human.

104. Yet it must also be recognized that nuclear energy, biotechnology, information technology, knowledge of our DNA, and many other abilities which we have acquired, have given us tremendous power. More precisely, they have given those with the knowledge, and especially the economic resources to use them, an impressive dominance over the whole of humanity and the entire world. Never has humanity had such power over itself, yet nothing ensures that it will be used wisely, particularly when we consider how it is currently being used. We need but think of the nuclear bombs dropped in the middle of the twentieth century, or the array of technology which Nazism, Communism and other totalitarian regimes have employed to kill millions of people, to say nothing of the increasingly deadly arsenal of weapons available for modern warfare. In whose hands does all this power lie, or will it eventually end up? It is extremely risky for a small part of humanity to have it.

105. There is a tendency to believe that every increase in power means "an increase of 'progress' itself", an advance in "security, usefulness, welfare and vigour; …an assimilation of new values into the stream of culture",[83] as if reality,

[83] Romano Guardini, *Das Ende der Neuzeit*, 9th ed., Würzburg, 1965, 87 (English: *The End of the Modern World*, Wilmington, 1998, 82).

goodness and truth automatically flow from technological and economic power as such. The fact is that "contemporary man has not been trained to use power well",[84] because our immense technological development has not been accompanied by a development in human responsibility, values and conscience. Each age tends to have only a meagre awareness of its own limitations. It is possible that we do not grasp the gravity of the challenges now before us. "The risk is growing day by day that man will not use his power as he should"; in effect, "power is never considered in terms of the responsibility of choice which is inherent in freedom" since its "only norms are taken from alleged necessity, from either utility or security".[85] But human beings are not completely autonomous. Our freedom fades when it is handed over to the blind forces of the unconscious, of immediate needs, of self-interest, and of violence. In this sense, we stand naked and exposed in the face of our ever-increasing power, lacking the wherewithal to control it. We have certain superficial mechanisms, but we cannot claim to have a sound ethics, a culture and spirituality genuinely capable of setting limits and teaching clear-minded self-restraint.

II. The globalization of the technocratic paradigm

106. The basic problem goes even deeper: it is the way that humanity has taken up technology

[84] *Ibid.*
[85] *Ibid.*, 87-88 (*The End of the Modern World,* 83).

and its development *according to an undifferentiated and one-dimensional paradigm*. This paradigm exalts the concept of a subject who, using logical and rational procedures, progressively approaches and gains control over an external object. This subject makes every effort to establish the scientific and experimental method, which in itself is already a technique of possession, mastery and transformation. It is as if the subject were to find itself in the presence of something formless, completely open to manipulation. Men and women have constantly intervened in nature, but for a long time this meant being in tune with and respecting the possibilities offered by the things themselves. It was a matter of receiving what nature itself allowed, as if from its own hand. Now, by contrast, we are the ones to lay our hands on things, attempting to extract everything possible from them while frequently ignoring or forgetting the reality in front of us. Human beings and material objects no longer extend a friendly hand to one another; the relationship has become confrontational. This has made it easy to accept the idea of infinite or unlimited growth, which proves so attractive to economists, financiers and experts in technology. It is based on the lie that there is an infinite supply of the earth's goods, and this leads to the planet being squeezed dry beyond every limit. It is the false notion that "an infinite quantity of energy and resources are available, that it is possible to renew them quickly, and that the negative effects of the ex-

ploitation of the natural order can be easily absorbed".[86]

107. It can be said that many problems of today's world stem from the tendency, at times unconscious, to make the method and aims of science and technology an epistemological paradigm which shapes the lives of individuals and the workings of society. The effects of imposing this model on reality as a whole, human and social, are seen in the deterioration of the environment, but this is just one sign of a reductionism which affects every aspect of human and social life. We have to accept that technological products are not neutral, for they create a framework which ends up conditioning lifestyles and shaping social possibilities along the lines dictated by the interests of certain powerful groups. Decisions which may seem purely instrumental are in reality decisions about the kind of society we want to build.

108. The idea of promoting a different cultural paradigm and employing technology as a mere instrument is nowadays inconceivable. The technological paradigm has become so dominant that it would be difficult to do without its resources and even more difficult to utilize them without being dominated by their internal logic. It has become countercultural to choose a lifestyle whose

[86] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, 462.

goals are even partly independent of technology, of its costs and its power to globalize and make us all the same. Technology tends to absorb everything into its ironclad logic, and those who are surrounded with technology "know full well that it moves forward in the final analysis neither for profit nor for the well-being of the human race", that "in the most radical sense of the term power is its motive – a lordship over all".[87] As a result, "man seizes hold of the naked elements of both nature and human nature".[88] Our capacity for making decisions, a more genuine freedom and the space for each one's alternative creativity are diminished.

109. The technocratic paradigm also tends to dominate economic and political life. The economy accepts every advance in technology with a view to profit, without concern for its potentially negative impact on human beings. Finance overwhelms the real economy. The lessons of the global financial crisis have not been assimilated, and we are learning all too slowly the lessons of environmental deterioration. Some circles maintain that current economics and technology will solve all environmental problems, and argue, in popular and non-technical terms, that the problems of global hunger and poverty will be resolved simply by market growth. They are

[87] Romano Guardini, *Das Ende der Neuzeit*, 63-64 (*The End of the Modern World*, 56).

[88] *Ibid.*, 64 (*The End of the Modern World*, 56).

less concerned with certain economic theories which today scarcely anybody dares defend, than with their actual operation in the functioning of the economy. They may not affirm such theories with words, but nonetheless support them with their deeds by showing no interest in more balanced levels of production, a better distribution of wealth, concern for the environment and the rights of future generations. Their behaviour shows that for them maximizing profits is enough. Yet by itself the market cannot guarantee integral human development and social inclusion.[89] At the same time, we have "a sort of 'superdevelopment' of a wasteful and consumerist kind which forms an unacceptable contrast with the ongoing situations of dehumanizing deprivation",[90] while we are all too slow in developing economic institutions and social initiatives which can give the poor regular access to basic resources. We fail to see the deepest roots of our present failures, which have to do with the direction, goals, meaning and social implications of technological and economic growth.

110. The specialization which belongs to technology makes it difficult to see the larger picture. The fragmentation of knowledge proves helpful for concrete applications, and yet it often leads

[89] Cf. Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009), 35: *AAS* 101 (2009), 671.

[90] *Ibid.*, 22: p. 657.

to a loss of appreciation for the whole, for the relationships between things, and for the broader horizon, which then becomes irrelevant. This very fact makes it hard to find adequate ways of solving the more complex problems of today's world, particularly those regarding the environment and the poor; these problems cannot be dealt with from a single perspective or from a single set of interests. A science which would offer solutions to the great issues would necessarily have to take into account the data generated by other fields of knowledge, including philosophy and social ethics; but this is a difficult habit to acquire today. Nor are there genuine ethical horizons to which one can appeal. Life gradually becomes a surrender to situations conditioned by technology, itself viewed as the principal key to the meaning of existence. In the concrete situation confronting us, there are a number of symptoms which point to what is wrong, such as environmental degradation, anxiety, a loss of the purpose of life and of community living. Once more we see that "realities are more important than ideas".[91]

111. Ecological culture cannot be reduced to a series of urgent and partial responses to the immediate problems of pollution, environmental decay and the depletion of natural resources.

[91] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 231: *AAS* 105 (2013), 1114.

There needs to be a distinctive way of looking at things, a way of thinking, policies, an educational programme, a lifestyle and a spirituality which together generate resistance to the assault of the technocratic paradigm. Otherwise, even the best ecological initiatives can find themselves caught up in the same globalized logic. To seek only a technical remedy to each environmental problem which comes up is to separate what is in reality interconnected and to mask the true and deepest problems of the global system.

112. Yet we can once more broaden our vision. We have the freedom needed to limit and direct technology; we can put it at the service of another type of progress, one which is healthier, more human, more social, more integral. Liberation from the dominant technocratic paradigm does in fact happen sometimes, for example, when cooperatives of small producers adopt less polluting means of production, and opt for a non-consumerist model of life, recreation and community. Or when technology is directed primarily to resolving people's concrete problems, truly helping them live with more dignity and less suffering. Or indeed when the desire to create and contemplate beauty manages to overcome reductionism through a kind of salvation which occurs in beauty and in those who behold it. An authentic humanity, calling for a new synthesis, seems to dwell in the midst of our technological culture, almost unnoticed, like a mist seeping

gently beneath a closed door. Will the promise last, in spite of everything, with all that is authentic rising up in stubborn resistance?

113. There is also the fact that people no longer seem to believe in a happy future; they no longer have blind trust in a better tomorrow based on the present state of the world and our technical abilities. There is a growing awareness that scientific and technological progress cannot be equated with the progress of humanity and history, a growing sense that the way to a better future lies elsewhere. This is not to reject the possibilities which technology continues to offer us. But humanity has changed profoundly, and the accumulation of constant novelties exalts a superficiality which pulls us in one direction. It becomes difficult to pause and recover depth in life. If architecture reflects the spirit of an age, our megastructures and drab apartment blocks express the spirit of globalized technology, where a constant flood of new products coexists with a tedious monotony. Let us refuse to resign ourselves to this, and continue to wonder about the purpose and meaning of everything. Otherwise we would simply legitimate the present situation and need new forms of escapism to help us endure the emptiness.

114. All of this shows the urgent need for us to move forward in a bold cultural revolution. Science and technology are not neutral; from the beginning to the end of a process, various inten-

tions and possibilities are in play and can take on distinct shapes. Nobody is suggesting a return to the Stone Age, but we do need to slow down and look at reality in a different way, to appropriate the positive and sustainable progress which has been made, but also to recover the values and the great goals swept away by our unrestrained delusions of grandeur.

III. The crisis and effects of modern anthropocentrism

115. Modern anthropocentrism has paradoxically ended up prizing technical thought over reality, since "the technological mind sees nature as an insensate order, as a cold body of facts, as a mere 'given', as an object of utility, as raw material to be hammered into useful shape; it views the cosmos similarly as a mere 'space' into which objects can be thrown with complete indifference".[92] The intrinsic dignity of the world is thus compromised. When human beings fail to find their true place in this world, they misunderstand themselves and end up acting against themselves: "Not only has God given the earth to man, who must use it with respect for the original good purpose for which it was given, but, man too is God's gift to man. He must therefore respect the natural and moral structure with which he has been endowed".[93]

[92] Romano Guardini, *Das Ende der Neuzeit*, 63 (*The End of the Modern World*, 55).

[93] John Paul II, Encyclical Letter *Centesimus Annus* (1 May 1991), 38: *AAS* 83 (1991), 841.

116. Modernity has been marked by an excessive anthropocentrism which today, under another guise, continues to stand in the way of shared understanding and of any effort to strengthen social bonds. The time has come to pay renewed attention to reality and the limits it imposes; this in turn is the condition for a more sound and fruitful development of individuals and society. An inadequate presentation of Christian anthropology gave rise to a wrong understanding of the relationship between human beings and the world. Often, what was handed on was a Promethean vision of mastery over the world, which gave the impression that the protection of nature was something that only the faint-hearted cared about. Instead, our "dominion" over the universe should be understood more properly in the sense of responsible stewardship.[94]

117. Neglecting to monitor the harm done to nature and the environmental impact of our decisions is only the most striking sign of a disregard for the message contained in the structures of nature itself. When we fail to acknowledge as part of reality the worth of a poor person, a human embryo, a person with disabilities – to offer just a few examples – it becomes difficult to hear the cry of nature itself; everything is connected. Once the human being declares independence

[94] Cf. *Love for Creation. An Asian Response to the Ecological Crisis*, Declaration of the Colloquium sponsored by the Federation of Asian Bishops' Conferences (Tagatay, 31 January-5 February 1993), 3.3.2.

from reality and behaves with absolute dominion, the very foundations of our life begin to crumble, for "instead of carrying out his role as a cooperator with God in the work of creation, man sets himself up in place of God and thus ends up provoking a rebellion on the part of nature".[95]

118. This situation has led to a constant schizophrenia, wherein a technocracy which sees no intrinsic value in lesser beings coexists with the other extreme, which sees no special value in human beings. But one cannot prescind from humanity. There can be no renewal of our relationship with nature without a renewal of humanity itself. There can be no ecology without an adequate anthropology. When the human person is considered as simply one being among others, the product of chance or physical determinism, then "our overall sense of responsibility wanes".[96] A misguided anthropocentrism need not necessarily yield to "biocentrism", for that would entail adding yet another imbalance, failing to solve present problems and adding new ones. Human beings cannot be expected to feel responsibility for the world unless, at the same time, their unique capacities of knowledge, will, freedom and responsibility are recognized and valued.

[95] John Paul II, Encyclical Letter *Centesimus Annus* (1 May 1991), 37: *AAS* 83 (1991), 840.

[96] Benedict XVI, *Message for the 2010 World Day of Peace*, 2: *AAS* 102 (2010), 41.

119. Nor must the critique of a misguided anthropocentrism underestimate the importance of interpersonal relations. If the present ecological crisis is one small sign of the ethical, cultural and spiritual crisis of modernity, we cannot presume to heal our relationship with nature and the environment without healing all fundamental human relationships. Christian thought sees human beings as possessing a particular dignity above other creatures; it thus inculcates esteem for each person and respect for others. Our openness to others, each of whom is a "thou" capable of knowing, loving and entering into dialogue, remains the source of our nobility as human persons. A correct relationship with the created world demands that we not weaken this social dimension of openness to others, much less the transcendent dimension of our openness to the "Thou" of God. Our relationship with the environment can never be isolated from our relationship with others and with God. Otherwise, it would be nothing more than romantic individualism dressed up in ecological garb, locking us into a stifling immanence.

120. Since everything is interrelated, concern for the protection of nature is also incompatible with the justification of abortion. How can we genuinely teach the importance of concern for other vulnerable beings, however troublesome or inconvenient they may be, if we fail to protect a human embryo, even when its presence is un-

comfortable and creates difficulties? "If personal and social sensitivity towards the acceptance of the new life is lost, then other forms of acceptance that are valuable for society also wither away".[97]

121. We need to develop a new synthesis capable of overcoming the false arguments of recent centuries. Christianity, in fidelity to its own identity and the rich deposit of truth which it has received from Jesus Christ, continues to reflect on these issues in fruitful dialogue with changing historical situations. In doing so, it reveals its eternal newness.[98]

Practical relativism

122. A misguided anthropocentrism leads to a misguided lifestyle. In the Apostolic Exhortation *Evangelii Gaudium,* I noted that the practical relativism typical of our age is "even more dangerous than doctrinal relativism".[99] When human beings place themselves at the centre, they give absolute priority to immediate convenience and all else becomes relative. Hence we should not be surprised to find, in conjunction with the omnipresent technocratic paradigm and the cult

[97] Id., Encyclical Letter *Caritas in Veritate* (29 June 2009), 28: *AAS* 101 (2009), 663.

[98] Cf. Vincent of Lerins, *Commonitorium Primum*, ch. 23: PL 50, 688: "Ut annis scilicet consolidetur, dilatetur tempore, sublimetur aetate".

[99] No. 80: *AAS* 105 (2013), 1053.

of unlimited human power, the rise of a relativism which sees everything as irrelevant unless it serves one's own immediate interests. There is a logic in all this whereby different attitudes can feed on one another, leading to environmental degradation and social decay.

123. The culture of relativism is the same disorder which drives one person to take advantage of another, to treat others as mere objects, imposing forced labour on them or enslaving them to pay their debts. The same kind of thinking leads to the sexual exploitation of children and abandonment of the elderly who no longer serve our interests. It is also the mindset of those who say: Let us allow the invisible forces of the market to regulate the economy, and consider their impact on society and nature as collateral damage. In the absence of objective truths or sound principles other than the satisfaction of our own desires and immediate needs, what limits can be placed on human trafficking, organized crime, the drug trade, commerce in blood diamonds and the fur of endangered species? Is it not the same relativistic logic which justifies buying the organs of the poor for resale or use in experimentation, or eliminating children because they are not what their parents wanted? This same "use and throw away" logic generates so much waste, because of the disordered desire to consume more than what is really necessary. We should not think that political efforts or the force of law will be suffi-

cient to prevent actions which affect the environment because, when the culture itself is corrupt and objective truth and universally valid principles are no longer upheld, then laws can only be seen as arbitrary impositions or obstacles to be avoided.

The need to protect employment

124. Any approach to an integral ecology, which by definition does not exclude human beings, needs to take account of the value of labour, as Saint John Paul II wisely noted in his Encyclical *Laborem Exercens*. According to the biblical account of creation, God placed man and woman in the garden he had created (cf. *Gen* 2:15) not only to preserve it ("keep") but also to make it fruitful ("till"). Labourers and craftsmen thus "maintain the fabric of the world" (*Sir* 38:34). Developing the created world in a prudent way is the best way of caring for it, as this means that we ourselves become the instrument used by God to bring out the potential which he himself inscribed in things: "The Lord created medicines out of the earth, and a sensible man will not despise them" (*Sir* 38:4).

125. If we reflect on the proper relationship between human beings and the world around us, we see the need for a correct understanding of work; if we talk about the relationship between human beings and things, the question arises as to the meaning and purpose of all human activity. This has to do not only with manual or agri-

cultural labour but with any activity involving a modification of existing reality, from producing a social report to the design of a technological development. Underlying every form of work is a concept of the relationship which we can and must have with what is other than ourselves. Together with the awe-filled contemplation of creation which we find in Saint Francis of Assisi, the Christian spiritual tradition has also developed a rich and balanced understanding of the meaning of work, as, for example, in the life of Blessed Charles de Foucauld and his followers.

126. We can also look to the great tradition of monasticism. Originally, it was a kind of flight from the world, an escape from the decadence of the cities. The monks sought the desert, convinced that it was the best place for encountering the presence of God. Later, Saint Benedict of Norcia proposed that his monks live in community, combining prayer and spiritual reading with manual labour (*ora et labora*). Seeing manual labour as spiritually meaningful proved revolutionary. Personal growth and sanctification came to be sought in the interplay of recollection and work. This way of experiencing work makes us more protective and respectful of the environment; it imbues our relationship to the world with a healthy sobriety.

127. We are convinced that "man is the source, the focus and the aim of all economic and social

life".[100] Nonetheless, once our human capacity for contemplation and reverence is impaired, it becomes easy for the meaning of work to be misunderstood.[101] We need to remember that men and women have "the capacity to improve their lot, to further their moral growth and to develop their spiritual endowments".[102] Work should be the setting for this rich personal growth, where many aspects of life enter into play: creativity, planning for the future, developing our talents, living out our values, relating to others, giving glory to God. It follows that, in the reality of today's global society, it is essential that "we continue to prioritize the goal of access to steady employment for everyone",[103] no matter the limited interests of business and dubious economic reasoning.

128. We were created with a vocation to work. The goal should not be that technological progress increasingly replace human work, for this would be detrimental to humanity. Work is a necessity, part of the meaning of life on this earth, a path to growth, human development and per-

[100] Second Vatican Ecumenical Council, Pastoral Constitution on the Church in the Modern World *Gaudium et Spes*, 63.

[101] Cf. John Paul II, Encyclical Letter *Centesimus Annus* (1 May 1991), 37: *AAS* 83 (1991), 840.

[102] Paul VI, Encyclical Letter *Populorum Progressio* (26 March 1967), 34: *AAS* 59 (1967), 274.

[103] Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009), 32: *AAS* 101 (2009), 666.

sonal fulfilment. Helping the poor financially must always be a provisional solution in the face of pressing needs. The broader objective should always be to allow them a dignified life through work. Yet the orientation of the economy has favoured a kind of technological progress in which the costs of production are reduced by laying off workers and replacing them with machines. This is yet another way in which we can end up working against ourselves. The loss of jobs also has a negative impact on the economy "through the progressive erosion of social capital: the network of relationships of trust, dependability, and respect for rules, all of which are indispensable for any form of civil coexistence".[104] In other words, "human costs always include economic costs, and economic dysfunctions always involve human costs".[105] To stop investing in people, in order to gain greater short-term financial gain, is bad business for society.

129. In order to continue providing employment, it is imperative to promote an economy which favours productive diversity and business creativity. For example, there is a great variety of small-scale food production systems which feed the greater part of the world's peoples, using a modest amount of land and producing less waste, be it in small agricultural parcels, in orchards and gardens, hunting and wild harvesting

[104] *Ibid.*
[105] *Ibid.*

or local fishing. Economies of scale, especially in the agricultural sector, end up forcing smallholders to sell their land or to abandon their traditional crops. Their attempts to move to other, more diversified, means of production prove fruitless because of the difficulty of linkage with regional and global markets, or because the infrastructure for sales and transport is geared to larger businesses. Civil authorities have the right and duty to adopt clear and firm measures in support of small producers and differentiated production. To ensure economic freedom from which all can effectively benefit, restraints occasionally have to be imposed on those possessing greater resources and financial power. To claim economic freedom while real conditions bar many people from actual access to it, and while possibilities for employment continue to shrink, is to practise a doublespeak which brings politics into disrepute. Business is a noble vocation, directed to producing wealth and improving our world. It can be a fruitful source of prosperity for the areas in which it operates, especially if it sees the creation of jobs as an essential part of its service to the common good.

New biological technologies

130. In the philosophical and theological vision of the human being and of creation which I have presented, it is clear that the human person, endowed with reason and knowledge, is not an external factor to be excluded. While human

intervention on plants and animals is permissible when it pertains to the necessities of human life, the *Catechism of the Catholic Church* teaches that experimentation on animals is morally acceptable only "if it remains within reasonable limits [and] contributes to caring for or saving human lives".[106] The *Catechism* firmly states that human power has limits and that "it is contrary to human dignity to cause animals to suffer or die needlessly".[107] All such use and experimentation "requires a religious respect for the integrity of creation".[108]

131. Here I would recall the balanced position of Saint John Paul II, who stressed the benefits of scientific and technological progress as evidence of "the nobility of the human vocation to participate responsibly in God's creative action", while also noting that "we cannot interfere in one area of the ecosystem without paying due attention to the consequences of such interference in other areas".[109] He made it clear that the Church values the benefits which result "from the study and applications of molecular biology, supplemented by other disciplines such as genetics, and its technological application in agriculture and industry".[110] But he also point-

[106] *Catechism of the Catholic Church*, 2417.

[107] *Ibid.*, 2418.

[108] *Ibid.*, 2415.

[109] *Message for the 1990 World Day of Peace*, 6: *AAS* 82 (1990), 150.

[110] *Address to the Pontifical Academy of Sciences* (3 October 1981), 3: *Insegnamenti* 4/2 (1981), 333.

ed out that this should not lead to "indiscriminate genetic manipulation"[111] which ignores the negative effects of such interventions. Human creativity cannot be suppressed. If an artist cannot be stopped from using his or her creativity, neither should those who possess particular gifts for the advancement of science and technology be prevented from using their God-given talents for the service of others. We need constantly to rethink the goals, effects, overall context and ethical limits of this human activity, which is a form of power involving considerable risks.

132. This, then, is the correct framework for any reflection concerning human intervention on plants and animals, which at present includes genetic manipulation by biotechnology for the sake of exploiting the potential present in material reality. The respect owed by faith to reason calls for close attention to what the biological sciences, through research uninfluenced by economic interests, can teach us about biological structures, their possibilities and their mutations. Any legitimate intervention will act on nature only in order "to favour its development in its own line, that of creation, as intended by God".[112]

133. It is difficult to make a general judgement about genetic modification (GM), whether veg-

[111] *Message for the 1990 World Day of Peace*, 7: *AAS* 82 (1990), 151.

[112] John Paul II, *Address to the 35th General Assembly of the World Medical Association* (29 October 1983), 6: *AAS* 76 (1984), 394.

etable or animal, medical or agricultural, since these vary greatly among themselves and call for specific considerations. The risks involved are not always due to the techniques used, but rather to their improper or excessive application. Genetic mutations, in fact, have often been, and continue to be, caused by nature itself. Nor are mutations caused by human intervention a modern phenomenon. The domestication of animals, the crossbreeding of species and other older and universally accepted practices can be mentioned as examples. We need but recall that scientific developments in GM cereals began with the observation of natural bacteria which spontaneously modified plant genomes. In nature, however, this process is slow and cannot be compared to the fast pace induced by contemporary technological advances, even when the latter build upon several centuries of scientific progress.

134. Although no conclusive proof exists that GM cereals may be harmful to human beings, and in some regions their use has brought about economic growth which has helped to resolve problems, there remain a number of significant difficulties which should not be underestimated. In many places, following the introduction of these crops, productive land is concentrated in the hands of a few owners due to "the progressive disappearance of small producers, who, as a consequence of the loss of the exploited lands, are

obliged to withdraw from direct production".[113] The most vulnerable of these become temporary labourers, and many rural workers end up moving to poverty-stricken urban areas. The expansion of these crops has the effect of destroying the complex network of ecosystems, diminishing the diversity of production and affecting regional economies, now and in the future. In various countries, we see an expansion of oligopolies for the production of cereals and other products needed for their cultivation. This dependency would be aggravated were the production of infertile seeds to be considered; the effect would be to force farmers to purchase them from larger producers.

135. Certainly, these issues require constant attention and a concern for their ethical implications. A broad, responsible scientific and social debate needs to take place, one capable of considering all the available information and of calling things by their name. It sometimes happens that complete information is not put on the table; a selection is made on the basis of particular interests, be they politico-economic or ideological. This makes it difficult to reach a balanced and prudent judgement on different questions, one which takes into account all the pertinent variables. Discussions are needed in which all those directly or indirectly affected (farmers, consum-

[113] Episcopal Commission for Pastoral Concerns in Argentina, *Una tierra para todos* (June 2005), 19.

ers, civil authorities, scientists, seed producers, people living near fumigated fields, and others) can make known their problems and concerns, and have access to adequate and reliable information in order to make decisions for the common good, present and future. This is a complex environmental issue; it calls for a comprehensive approach which would require, at the very least, greater efforts to finance various lines of independent, interdisciplinary research capable of shedding new light on the problem.

136. On the other hand, it is troubling that, when some ecological movements defend the integrity of the environment, rightly demanding that certain limits be imposed on scientific research, they sometimes fail to apply those same principles to human life. There is a tendency to justify transgressing all boundaries when experimentation is carried out on living human embryos. We forget that the inalienable worth of a human being transcends his or her degree of development. In the same way, when technology disregards the great ethical principles, it ends up considering any practice whatsoever as licit. As we have seen in this chapter, a technology severed from ethics will not easily be able to limit its own power.

CHAPTER FOUR

INTEGRAL ECOLOGY

137. Since everything is closely interrelated, and today's problems call for a vision capable of taking into account every aspect of the global crisis, I suggest that we now consider some elements of an *integral ecology*, one which clearly respects its human and social dimensions.

I. Environmental, economic and social ecology

138. Ecology studies the relationship between living organisms and the environment in which they develop. This necessarily entails reflection and debate about the conditions required for the life and survival of society, and the honesty needed to question certain models of development, production and consumption. It cannot be emphasized enough how everything is interconnected. Time and space are not independent of one another, and not even atoms or subatomic particles can be considered in isolation. Just as the different aspects of the planet – physical, chemical and biological – are interrelated, so too living species are part of a network which we will never fully explore and understand. A good part of our genetic code is shared by many living be-

ings. It follows that the fragmentation of knowledge and the isolation of bits of information can actually become a form of ignorance, unless they are integrated into a broader vision of reality.

139. When we speak of the "environment", what we really mean is a relationship existing between nature and the society which lives in it. Nature cannot be regarded as something separate from ourselves or as a mere setting in which we live. We are part of nature, included in it and thus in constant interaction with it. Recognizing the reasons why a given area is polluted requires a study of the workings of society, its economy, its behaviour patterns, and the ways it grasps reality. Given the scale of change, it is no longer possible to find a specific, discrete answer for each part of the problem. It is essential to seek comprehensive solutions which consider the interactions within natural systems themselves and with social systems. We are faced not with two separate crises, one environmental and the other social, but rather with one complex crisis which is both social and environmental. Strategies for a solution demand an integrated approach to combating poverty, restoring dignity to the excluded, and at the same time protecting nature.

140. Due to the number and variety of factors to be taken into account when determining the environmental impact of a concrete undertaking, it is essential to give researchers their due role, to

facilitate their interaction, and to ensure broad academic freedom. Ongoing research should also give us a better understanding of how different creatures relate to one another in making up the larger units which today we term "ecosystems". We take these systems into account not only to determine how best to use them, but also because they have an intrinsic value independent of their usefulness. Each organism, as a creature of God, is good and admirable in itself; the same is true of the harmonious ensemble of organisms existing in a defined space and functioning as a system. Although we are often not aware of it, we depend on these larger systems for our own existence. We need only recall how ecosystems interact in dispersing carbon dioxide, purifying water, controlling illnesses and epidemics, forming soil, breaking down waste, and in many other ways which we overlook or simply ignore. Once they become conscious of this, many people realize that we live and act on the basis of a reality which has previously been given to us, which precedes our existence and our abilities. So, when we speak of "sustainable use", consideration must always be given to each ecosystem's regenerative ability in its different areas and aspects.

141. Economic growth, for its part, tends to produce predictable reactions and a certain standardization with the aim of simplifying procedures and reducing costs. This suggests the

need for an "economic ecology" capable of appealing to a broader vision of reality. The protection of the environment is in fact "an integral part of the development process and cannot be considered in isolation from it".[114] We urgently need a humanism capable of bringing together the different fields of knowledge, including economics, in the service of a more integral and integrating vision. Today, the analysis of environmental problems cannot be separated from the analysis of human, family, work-related and urban contexts, nor from how individuals relate to themselves, which leads in turn to how they relate to others and to the environment. There is an interrelation between ecosystems and between the various spheres of social interaction, demonstrating yet again that "the whole is greater than the part".[115]

142. If everything is related, then the health of a society's institutions has consequences for the environment and the quality of human life. "Every violation of solidarity and civic friendship harms the environment".[116] In this sense, social ecology is necessarily institutional, and gradually extends to the whole of society, from the primary social group, the family, to the wider local, national and

[114] *Rio Declaration on Environment and Development* (14 June 1992), Principle 4.

[115] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 237: *AAS* 105 (2013), 1116.

[116] Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009), 51: *AAS* 101 (2009), 687.

international communities. Within each social stratum, and between them, institutions develop to regulate human relationships. Anything which weakens those institutions has negative consequences, such as injustice, violence and loss of freedom. A number of countries have a relatively low level of institutional effectiveness, which results in greater problems for their people while benefiting those who profit from this situation. Whether in the administration of the state, the various levels of civil society, or relationships between individuals themselves, lack of respect for the law is becoming more common. Laws may be well framed yet remain a dead letter. Can we hope, then, that in such cases, legislation and regulations dealing with the environment will really prove effective? We know, for example, that countries which have clear legislation about the protection of forests continue to keep silent as they watch laws repeatedly being broken. Moreover, what takes place in any one area can have a direct or indirect influence on other areas. Thus, for example, drug use in affluent societies creates a continual and growing demand for products imported from poorer regions, where behaviour is corrupted, lives are destroyed, and the environment continues to deteriorate.

II. Cultural ecology

143. Together with the patrimony of nature, there is also an historic, artistic and cultural pat-

rimony which is likewise under threat. This patrimony is a part of the shared identity of each place and a foundation upon which to build a habitable city. It is not a matter of tearing down and building new cities, supposedly more respectful of the environment yet not always more attractive to live in. Rather, there is a need to incorporate the history, culture and architecture of each place, thus preserving its original identity. Ecology, then, also involves protecting the cultural treasures of humanity in the broadest sense. More specifically, it calls for greater attention to local cultures when studying environmental problems, favouring a dialogue between scientific-technical language and the language of the people. Culture is more than what we have inherited from the past; it is also, and above all, a living, dynamic and participatory present reality, which cannot be excluded as we rethink the relationship between human beings and the environment.

144. A consumerist vision of human beings, encouraged by the mechanisms of today's globalized economy, has a levelling effect on cultures, diminishing the immense variety which is the heritage of all humanity. Attempts to resolve all problems through uniform regulations or technical interventions can lead to overlooking the complexities of local problems which demand the active participation of all members of the community. New processes taking shape cannot always fit into frameworks imported

from outside; they need to be based in the local culture itself. As life and the world are dynamic realities, so our care for the world must also be flexible and dynamic. Merely technical solutions run the risk of addressing symptoms and not the more serious underlying problems. There is a need to respect the rights of peoples and cultures, and to appreciate that the development of a social group presupposes an historical process which takes place within a cultural context and demands the constant and active involvement of local people *from within their proper culture*. Nor can the notion of the quality of life be imposed from without, for quality of life must be understood within the world of symbols and customs proper to each human group.

145. Many intensive forms of environmental exploitation and degradation not only exhaust the resources which provide local communities with their livelihood, but also undo the social structures which, for a long time, shaped cultural identity and their sense of the meaning of life and community. The disappearance of a culture can be just as serious, or even more serious, than the disappearance of a species of plant or animal. The imposition of a dominant lifestyle linked to a single form of production can be just as harmful as the altering of ecosystems.

146. In this sense, it is essential to show special care for indigenous communities and their

cultural traditions. They are not merely one minority among others, but should be the principal dialogue partners, especially when large projects affecting their land are proposed. For them, land is not a commodity but rather a gift from God and from their ancestors who rest there, a sacred space with which they need to interact if they are to maintain their identity and values. When they remain on their land, they themselves care for it best. Nevertheless, in various parts of the world, pressure is being put on them to abandon their homelands to make room for agricultural or mining projects which are undertaken without regard for the degradation of nature and culture.

III. Ecology of daily life

147. Authentic development includes efforts to bring about an integral improvement in the quality of human life, and this entails considering the setting in which people live their lives. These settings influence the way we think, feel and act. In our rooms, our homes, our workplaces and neighbourhoods, we use our environment as a way of expressing our identity. We make every effort to adapt to our environment, but when it is disorderly, chaotic or saturated with noise and ugliness, such overstimulation makes it difficult to find ourselves integrated and happy.

148. An admirable creativity and generosity is shown by persons and groups who respond to

environmental limitations by alleviating the adverse effects of their surroundings and learning to live their lives amid disorder and uncertainty. For example, in some places, where the façades of buildings are derelict, people show great care for the interior of their homes, or find contentment in the kindness and friendliness of others. A wholesome social life can light up a seemingly undesirable environment. At times a commendable human ecology is practised by the poor despite numerous hardships. The feeling of asphyxiation brought on by densely populated residential areas is countered if close and warm relationships develop, if communities are created, if the limitations of the environment are compensated for in the interior of each person who feels held within a network of solidarity and belonging. In this way, any place can turn from being a hell on earth into the setting for a dignified life.

149. The extreme poverty experienced in areas lacking harmony, open spaces or potential for integration, can lead to incidents of brutality and to exploitation by criminal organizations. In the unstable neighbourhoods of mega-cities, the daily experience of overcrowding and social anonymity can create a sense of uprootedness which spawns antisocial behaviour and violence. Nonetheless, I wish to insist that love always proves more powerful. Many people in these conditions are able to weave bonds of belonging and togetherness which convert overcrowding into an

experience of community in which the walls of the ego are torn down and the barriers of selfishness overcome. This experience of a communitarian salvation often generates creative ideas for the improvement of a building or a neighbourhood.[117]

150. Given the interrelationship between living space and human behaviour, those who design buildings, neighbourhoods, public spaces and cities, ought to draw on the various disciplines which help us to understand people's thought processes, symbolic language and ways of acting. It is not enough to seek the beauty of design. More precious still is the service we offer to another kind of beauty: people's quality of life, their adaptation to the environment, encounter and mutual assistance. Here too, we see how important it is that urban planning always take into consideration the views of those who will live in these areas.

151. There is also a need to protect those common areas, visual landmarks and urban landscapes which increase our sense of belonging, of rootedness, of "feeling at home" within a city which includes us and brings us together.

[117] Some authors have emphasized the values frequently found, for example, in the *villas*, *chabolas* or *favelas* of Latin America: cf. Juan Carlos Scannone, S.J., "La irrupción del pobre y la lógica de la gratuidad", in Juan Carlos Scannone and Marcelo Perine (eds.), *Irrupción del pobre y quehacer filosófico. Hacia una nueva racionalidad,* Buenos Aires, 1993, 225-230.

It is important that the different parts of a city be well integrated and that those who live there have a sense of the whole, rather than being confined to one neighbourhood and failing to see the larger city as space which they share with others. Interventions which affect the urban or rural landscape should take into account how various elements combine to form a whole which is perceived by its inhabitants as a coherent and meaningful framework for their lives. Others will then no longer be seen as strangers, but as part of a "we" which all of us are working to create. For this same reason, in both urban and rural settings, it is helpful to set aside some places which can be preserved and protected from constant changes brought by human intervention.

152. Lack of housing is a grave problem in many parts of the world, both in rural areas and in large cities, since state budgets usually cover only a small portion of the demand. Not only the poor, but many other members of society as well, find it difficult to own a home. Having a home has much to do with a sense of personal dignity and the growth of families. This is a major issue for human ecology. In some places, where makeshift shanty towns have sprung up, this will mean developing those neighbourhoods rather than razing or displacing them. When the poor live in unsanitary slums or in dangerous tenements, "in cases where it is necessary to relocate them, in order not to heap suffering upon

suffering, adequate information needs to be given beforehand, with choices of decent housing offered, and the people directly involved must be part of the process".[118] At the same time, creativity should be shown in integrating rundown neighbourhoods into a welcoming city: "How beautiful those cities which overcome paralyzing mistrust, integrate those who are different and make this very integration a new factor of development! How attractive are those cities which, even in their architectural design, are full of spaces which connect, relate and favour the recognition of others!"[119]

153. The quality of life in cities has much to do with systems of transport, which are often a source of much suffering for those who use them. Many cars, used by one or more people, circulate in cities, causing traffic congestion, raising the level of pollution, and consuming enormous quantities of non-renewable energy. This makes it necessary to build more roads and parking areas which spoil the urban landscape. Many specialists agree on the need to give priority to public transportation. Yet some measures needed will not prove easily acceptable to society unless substantial improvements are made in the systems themselves, which in many cities force

[118] Pontifical Council For Justice And Peace, *Compendium of the Social Doctrine of the Church*, 482.

[119] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 210: *AAS* 105 (2013), 1107.

people to put up with undignified conditions due to crowding, inconvenience, infrequent service and lack of safety.

154. Respect for our dignity as human beings often jars with the chaotic realities that people have to endure in city life. Yet this should not make us overlook the abandonment and neglect also experienced by some rural populations which lack access to essential services and where some workers are reduced to conditions of servitude, without rights or even the hope of a more dignified life.

155. Human ecology also implies another profound reality: the relationship between human life and the moral law, which is inscribed in our nature and is necessary for the creation of a more dignified environment. Pope Benedict XVI spoke of an "ecology of man", based on the fact that "man too has a nature that he must respect and that he cannot manipulate at will".[120] It is enough to recognize that our body itself establishes us in a direct relationship with the environment and with other living beings. The acceptance of our bodies as God's gift is vital for welcoming and accepting the entire world as a gift from the Father and our common home, whereas thinking that we enjoy absolute power over our own bod-

[120] *Address to the German Bundestag*, Berlin (22 September 2011): *AAS* 103 (2011), 668.

ies turns, often subtly, into thinking that we enjoy absolute power over creation. Learning to accept our body, to care for it and to respect its fullest meaning, is an essential element of any genuine human ecology. Also, valuing one's own body in its femininity or masculinity is necessary if I am going to be able to recognize myself in an encounter with someone who is different. In this way we can joyfully accept the specific gifts of another man or woman, the work of God the Creator, and find mutual enrichment. It is not a healthy attitude which would seek "to cancel out sexual difference because it no longer knows how to confront it".[121]

IV. The principle of the common good

156. An integral ecology is inseparable from the notion of the common good, a central and unifying principle of social ethics. The common good is "the sum of those conditions of social life which allow social groups and their individual members relatively thorough and ready access to their own fulfilment".[122]

157. Underlying the principle of the common good is respect for the human person as such, endowed with basic and inalienable rights or-

[121] *Catechesis* (15 April 2015): *L'Osservatore Romano*, 16 April 2015, p. 8.

[122] Second Vatican Ecumenical Council, Pastoral Constitution on the Church in the Modern World *Gaudium et Spes*, 26.

dered to his or her integral development. It has also to do with the overall welfare of society and the development of a variety of intermediate groups, applying the principle of subsidiarity. Outstanding among those groups is the family, as the basic cell of society. Finally, the common good calls for social peace, the stability and security provided by a certain order which cannot be achieved without particular concern for distributive justice; whenever this is violated, violence always ensues. Society as a whole, and the state in particular, are obliged to defend and promote the common good.

158. In the present condition of global society, where injustices abound and growing numbers of people are deprived of basic human rights and considered expendable, the principle of the common good immediately becomes, logically and inevitably, a summons to solidarity and a preferential option for the poorest of our brothers and sisters. This option entails recognizing the implications of the universal destination of the world's goods, but, as I mentioned in the Apostolic Exhortation *Evangelii Gaudium*,[123] it demands before all else an appreciation of the immense dignity of the poor in the light of our deepest convictions as believers. We need only look around us to see that, today, this option is in fact an ethical imperative essential for effectively attaining the common good.

[123] Cf. Nos. 186-201: *AAS* 105 (2013), 1098-1105.

V. Justice between the generations

159. The notion of the common good also extends to future generations. The global economic crises have made painfully obvious the detrimental effects of disregarding our common destiny, which cannot exclude those who come after us. We can no longer speak of sustainable development apart from intergenerational solidarity. Once we start to think about the kind of world we are leaving to future generations, we look at things differently; we realize that the world is a gift which we have freely received and must share with others. Since the world has been given to us, we can no longer view reality in a purely utilitarian way, in which efficiency and productivity are entirely geared to our individual benefit. Intergenerational solidarity is not optional, but rather a basic question of justice, since the world we have received also belongs to those who will follow us. The Portuguese bishops have called upon us to acknowledge this obligation of justice: "The environment is part of a logic of receptivity. It is on loan to each generation, which must then hand it on to the next".[124] An integral ecology is marked by this broader vision.

160. What kind of world do we want to leave to those who come after us, to children who are now growing up? This question not only concerns

[124] Portuguese Bishops' Conference, Pastoral Letter *Responsabilidade Solidária pelo Bem Comum* (15 September 2003), 20.

the environment in isolation; the issue cannot be approached piecemeal. When we ask ourselves what kind of world we want to leave behind, we think in the first place of its general direction, its meaning and its values. Unless we struggle with these deeper issues, I do not believe that our concern for ecology will produce significant results. But if those issues are courageously faced, we are led inexorably to ask other pointed questions: What is the purpose of our life in this world? Why are we here? What is the goal of our work and all our efforts? What need does the earth have of us? It is no longer enough, then, simply to state that we should be concerned for future generations. We need to see that what is at stake is our own dignity. Leaving an inhabitable planet to future generations is, first and foremost, up to us. The issue is one which dramatically affects us, for it has to do with the ultimate meaning of our earthly sojourn.

161. Doomsday predictions can no longer be met with irony or disdain. We may well be leaving to coming generations debris, desolation and filth. The pace of consumption, waste and environmental change has so stretched the planet's capacity that our contemporary lifestyle, unsustainable as it is, can only precipitate catastrophes, such as those which even now periodically occur in different areas of the world. The effects of the present imbalance can only be reduced by our decisive action, here and now. We need to reflect

on our accountability before those who will have to endure the dire consequences.

162. Our difficulty in taking up this challenge seriously has much to do with an ethical and cultural decline which has accompanied the deterioration of the environment. Men and women of our postmodern world run the risk of rampant individualism, and many problems of society are connected with today's self-centred culture of instant gratification. We see this in the crisis of family and social ties and the difficulties of recognizing the other. Parents can be prone to impulsive and wasteful consumption, which then affects their children who find it increasingly difficult to acquire a home of their own and build a family. Furthermore, our inability to think seriously about future generations is linked to our inability to broaden the scope of our present interests and to give consideration to those who remain excluded from development. Let us not only keep the poor of the future in mind, but also today's poor, whose life on this earth is brief and who cannot keep on waiting. Hence, "in addition to a fairer sense of intergenerational solidarity there is also an urgent moral need for a renewed sense of intragenerational solidarity".[125]

[125] Benedict XVI, *Message for the 2010 World Day of Peace*, 8: *AAS* 102 (2010), 45.

CHAPTER FIVE

LINES OF APPROACH AND ACTION

163. So far I have attempted to take stock of our present situation, pointing to the cracks in the planet that we inhabit as well as to the profoundly human causes of environmental degradation. Although the contemplation of this reality in itself has already shown the need for a change of direction and other courses of action, now we shall try to outline the major paths of dialogue which can help us escape the spiral of self-destruction which currently engulfs us.

I. Dialogue on the environment in the international community

164. Beginning in the middle of the last century and overcoming many difficulties, there has been a growing conviction that our planet is a homeland and that humanity is one people living in a common home. An interdependent world not only makes us more conscious of the negative effects of certain lifestyles and models of production and consumption which affect us all; more importantly, it motivates us to ensure that solutions are proposed from a global perspective, and not simply to defend the interests of a few

countries. Interdependence obliges us to think of *one world with a common plan*. Yet the same ingenuity which has brought about enormous technological progress has so far proved incapable of finding effective ways of dealing with grave environmental and social problems worldwide. A global consensus is essential for confronting the deeper problems, which cannot be resolved by unilateral actions on the part of individual countries. Such a consensus could lead, for example, to planning a sustainable and diversified agriculture, developing renewable and less polluting forms of energy, encouraging a more efficient use of energy, promoting a better management of marine and forest resources, and ensuring universal access to drinking water.

165. We know that technology based on the use of highly polluting fossil fuels – especially coal, but also oil and, to a lesser degree, gas – needs to be progressively replaced without delay. Until greater progress is made in developing widely accessible sources of renewable energy, it is legitimate to choose the less harmful alternative or to find short-term solutions. But the international community has still not reached adequate agreements about the responsibility for paying the costs of this energy transition. In recent decades, environmental issues have given rise to considerable public debate and have elicited a variety of committed and generous civic responses. Politics and business have been slow to react in a way

commensurate with the urgency of the challenges facing our world. Although the post-industrial period may well be remembered as one of the most irresponsible in history, nonetheless there is reason to hope that humanity at the dawn of the twenty-first century will be remembered for having generously shouldered its grave responsibilities.

166. Worldwide, the ecological movement has made significant advances, thanks also to the efforts of many organizations of civil society. It is impossible here to mention them all, or to review the history of their contributions. But thanks to their efforts, environmental questions have increasingly found a place on public agendas and encouraged more far-sighted approaches. This notwithstanding, recent World Summits on the environment have not lived up to expectations because, due to lack of political will, they were unable to reach truly meaningful and effective global agreements on the environment.

167. The 1992 Earth Summit in Rio de Janeiro is worth mentioning. It proclaimed that "human beings are at the centre of concerns for sustainable development".[126] Echoing the 1972 Stockholm Declaration, it enshrined international cooperation to care for the ecosystem of the entire earth, the obligation of those who cause pollu-

[126] *Rio Declaration on Environment and Development* (14 June 1992), Principle 1.

tion to assume its costs, and the duty to assess the environmental impact of given projects and works. It set the goal of limiting greenhouse gas concentration in the atmosphere, in an effort to reverse the trend of global warming. It also drew up an agenda with an action plan and a convention on biodiversity, and stated principles regarding forests. Although the summit was a real step forward, and prophetic for its time, its accords have been poorly implemented, due to the lack of suitable mechanisms for oversight, periodic review and penalties in cases of non-compliance. The principles which it proclaimed still await an efficient and flexible means of practical implementation.

168. Among positive experiences in this regard, we might mention, for example, the Basel Convention on hazardous wastes, with its system of reporting, standards and controls. There is also the binding Convention on international trade in endangered species of wild fauna and flora, which includes on-site visits for verifying effective compliance. Thanks to the Vienna Convention for the protection of the ozone layer and its implementation through the Montreal Protocol and amendments, the problem of the layer's thinning seems to have entered a phase of resolution.

169. As far as the protection of biodiversity and issues related to desertification are concerned, progress has been far less significant. With regard to climate change, the advances have been

regrettably few. Reducing greenhouse gases requires honesty, courage and responsibility, above all on the part of those countries which are more powerful and pollute the most. The Conference of the United Nations on Sustainable Development, "Rio+20" (Rio de Janeiro 2012), issued a wide-ranging but ineffectual outcome document. International negotiations cannot make significant progress due to positions taken by countries which place their national interests above the global common good. Those who will have to suffer the consequences of what we are trying to hide will not forget this failure of conscience and responsibility. Even as this Encyclical was being prepared, the debate was intensifying. We believers cannot fail to ask God for a positive outcome to the present discussions, so that future generations will not have to suffer the effects of our ill-advised delays.

170. Some strategies for lowering pollutant gas emissions call for the internationalization of environmental costs, which would risk imposing on countries with fewer resources burdensome commitments to reducing emissions comparable to those of the more industrialized countries. Imposing such measures penalizes those countries most in need of development. A further injustice is perpetrated under the guise of protecting the environment. Here also, the poor end up paying the price. Furthermore, since the effects of climate change will be felt for a long time to

come, even if stringent measures are taken now, some countries with scarce resources will require assistance in adapting to the effects already being produced, which affect their economies. In this context, there is a need for common and differentiated responsibilities. As the bishops of Bolivia have stated, "the countries which have benefited from a high degree of industrialization, at the cost of enormous emissions of greenhouse gases, have a greater responsibility for providing a solution to the problems they have caused".[127]

171. The strategy of buying and selling "carbon credits" can lead to a new form of speculation which would not help reduce the emission of polluting gases worldwide. This system seems to provide a quick and easy solution under the guise of a certain commitment to the environment, but in no way does it allow for the radical change which present circumstances require. Rather, it may simply become a ploy which permits maintaining the excessive consumption of some countries and sectors.

172. For poor countries, the priorities must be to eliminate extreme poverty and to promote the social development of their people. At the same time, they need to acknowledge the scandalous level of consumption in some privileged sectors

[127] Bolivian Bishops' Conference, Pastoral Letter on the Environment and Human Development in Bolivia *El universo, don de Dios para la vida* (March 2012), 86.

of their population and to combat corruption more effectively. They are likewise bound to develop less polluting forms of energy production, but to do so they require the help of countries which have experienced great growth at the cost of the ongoing pollution of the planet. Taking advantage of abundant solar energy will require the establishment of mechanisms and subsidies which allow developing countries access to technology transfer, technical assistance and financial resources, but in a way which respects their concrete situations, since "the compatibility of [infrastructures] with the context for which they have been designed is not always adequately assessed".[128] The costs of this would be low, compared to the risks of climate change. In any event, these are primarily ethical decisions, rooted in solidarity between all peoples.

173. Enforceable international agreements are urgently needed, since local authorities are not always capable of effective intervention. Relations between states must be respectful of each other's sovereignty, but must also lay down mutually agreed means of averting regional disasters which would eventually affect everyone. Global regulatory norms are needed to impose obligations and prevent unacceptable actions, for example, when powerful companies or countries

[128] Pontifical Council for Justice and Peace, *Energy, Justice and Peace,* IV, 1, Vatican City (2014), 53.

dump contaminated waste or offshore polluting industries in other countries.

174. Let us also mention the system of governance of the oceans. International and regional conventions do exist, but fragmentation and the lack of strict mechanisms of regulation, control and penalization end up undermining these efforts. The growing problem of marine waste and the protection of the open seas represent particular challenges. What is needed, in effect, is an agreement on systems of governance for the whole range of so-called "global commons".

175. The same mindset which stands in the way of making radical decisions to reverse the trend of global warming also stands in the way of achieving the goal of eliminating poverty. A more responsible overall approach is needed to deal with both problems: the reduction of pollution and the development of poorer countries and regions. The twenty-first century, while maintaining systems of governance inherited from the past, is witnessing a weakening of the power of nation states, chiefly because the economic and financial sectors, being transnational, tends to prevail over the political. Given this situation, it is essential to devise stronger and more efficiently organized international institutions, with functionaries who are appointed fairly by agreement among national governments, and empowered to impose sanctions. As Benedict XVI has affirmed in continuity with the social

teaching of the Church: "To manage the global economy; to revive economies hit by the crisis; to avoid any deterioration of the present crisis and the greater imbalances that would result; to bring about integral and timely disarmament, food security and peace; to guarantee the protection of the environment and to regulate migration: for all this, there is urgent need of a true world political authority, as my predecessor Blessed John XXIII indicated some years ago".[129] Diplomacy also takes on new importance in the work of developing international strategies which can anticipate serious problems affecting us all.

II. Dialogue for new national and local policies

176. There are not just winners and losers among countries, but within poorer countries themselves. Hence different responsibilities need to be identified. Questions related to the environment and economic development can no longer be approached only from the standpoint of differences between countries; they also call for greater attention to policies on the national and local levels.

177. Given the real potential for a misuse of human abilities, individual states can no longer ignore their responsibility for planning, coordi-

[129] Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009), 67: *AAS* 101 (2009).

nation, oversight and enforcement within their respective borders. How can a society plan and protect its future amid constantly developing technological innovations? One authoritative source of oversight and coordination is the law, which lays down rules for admissible conduct in the light of the common good. The limits which a healthy, mature and sovereign society must impose are those related to foresight and security, regulatory norms, timely enforcement, the elimination of corruption, effective responses to undesired side-effects of production processes, and appropriate intervention where potential or uncertain risks are involved. There is a growing jurisprudence dealing with the reduction of pollution by business activities. But political and institutional frameworks do not exist simply to avoid bad practice, but also to promote best practice, to stimulate creativity in seeking new solutions and to encourage individual or group initiatives.

178. A politics concerned with immediate results, supported by consumerist sectors of the population, is driven to produce short-term growth. In response to electoral interests, governments are reluctant to upset the public with measures which could affect the level of consumption or create risks for foreign investment. The myopia of power politics delays the inclusion of a far-sighted environmental agenda within the overall agenda of governments. Thus we

forget that "time is greater than space",[130] that we are always more effective when we generate processes rather than holding on to positions of power. True statecraft is manifest when, in difficult times, we uphold high principles and think of the long-term common good. Political powers do not find it easy to assume this duty in the work of nation-building.

179. In some places, cooperatives are being developed to exploit renewable sources of energy which ensure local self-sufficiency and even the sale of surplus energy. This simple example shows that, while the existing world order proves powerless to assume its responsibilities, local individuals and groups can make a real difference. They are able to instil a greater sense of responsibility, a strong sense of community, a readiness to protect others, a spirit of creativity and a deep love for the land. They are also concerned about what they will eventually leave to their children and grandchildren. These values are deeply rooted in indigenous peoples. Because the enforcement of laws is at times inadequate due to corruption, public pressure has to be exerted in order to bring about decisive political action. Society, through non-governmental organizations and intermediate groups, must put pressure on governments to develop more rigorous regulations, procedures and controls. Unless citizens

[130] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 222: *AAS* 105 (2013), 1111.

control political power – national, regional and municipal – it will not be possible to control damage to the environment. Local legislation can be more effective, too, if agreements exist between neighbouring communities to support the same environmental policies.

180. There are no uniform recipes, because each country or region has its own problems and limitations. It is also true that political realism may call for transitional measures and technologies, so long as these are accompanied by the gradual framing and acceptance of binding commitments. At the same time, on the national and local levels, much still needs to be done, such as promoting ways of conserving energy. These would include favouring forms of industrial production with maximum energy efficiency and diminished use of raw materials, removing from the market products which are less energy efficient or more polluting, improving transport systems, and encouraging the construction and repair of buildings aimed at reducing their energy consumption and levels of pollution. Political activity on the local level could also be directed to modifying consumption, developing an economy of waste disposal and recycling, protecting certain species and planning a diversified agriculture and the rotation of crops. Agriculture in poorer regions can be improved through investment in rural infrastructures, a better organization of local or national markets, systems of irrigation,

and the development of techniques of sustainable agriculture. New forms of cooperation and community organization can be encouraged in order to defend the interests of small producers and preserve local ecosystems from destruction. Truly, much can be done!

181. Here, continuity is essential, because policies related to climate change and environmental protection cannot be altered with every change of government. Results take time and demand immediate outlays which may not produce tangible effects within any one government's term. That is why, in the absence of pressure from the public and from civic institutions, political authorities will always be reluctant to intervene, all the more when urgent needs must be met. To take up these responsibilities and the costs they entail, politicians will inevitably clash with the mindset of short-term gain and results which dominates present-day economics and politics. But if they are courageous, they will attest to their God-given dignity and leave behind a testimony of selfless responsibility. A healthy politics is sorely needed, capable of reforming and coordinating institutions, promoting best practices and overcoming undue pressure and bureaucratic inertia. It should be added, though, that even the best mechanisms can break down when there are no worthy goals and values, or a genuine and profound humanism to serve as the basis of a noble and generous society.

III. Dialogue and transparency in decision-making

182. An assessment of the environmental impact of business ventures and projects demands transparent political processes involving a free exchange of views. On the other hand, the forms of corruption which conceal the actual environmental impact of a given project, in exchange for favours, usually produce specious agreements which fail to inform adequately and to allow for full debate.

183. Environmental impact assessment should not come after the drawing up of a business proposition or the proposal of a particular policy, plan or programme. It should be part of the process from the beginning, and be carried out in a way which is interdisciplinary, transparent and free of all economic or political pressure. It should be linked to a study of working conditions and possible effects on people's physical and mental health, on the local economy and on public safety. Economic returns can thus be forecast more realistically, taking into account potential scenarios and the eventual need for further investment to correct possible undesired effects. A consensus should always be reached between the different stakeholders, who can offer a variety of approaches, solutions and alternatives. The local population should have a special place at the table; they are concerned about their own future and that of their children, and can consider

goals transcending immediate economic interest. We need to stop thinking in terms of "interventions" to save the environment in favour of policies developed and debated by all interested parties. The participation of the latter also entails being fully informed about such projects and their different risks and possibilities; this includes not just preliminary decisions but also various follow-up activities and continued monitoring. Honesty and truth are needed in scientific and political discussions; these should not be limited to the issue of whether or not a particular project is permitted by law.

184. In the face of possible risks to the environment which may affect the common good now and in the future, decisions must be made "based on a comparison of the risks and benefits foreseen for the various possible alternatives".[131] This is especially the case when a project may lead to a greater use of natural resources, higher levels of emission or discharge, an increase of refuse, or significant changes to the landscape, the habitats of protected species or public spaces. Some projects, if insufficiently studied, can profoundly affect the quality of life of an area due to very different factors such as unforeseen noise pollution, the shrinking of visual horizons, the loss of cultural values, or the effects of nuclear energy use. The culture of consumerism,

[131] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, 469.

which prioritizes short-term gain and private interest, can make it easy to rubber-stamp authorizations or to conceal information.

185. In any discussion about a proposed venture, a number of questions need to be asked in order to discern whether or not it will contribute to genuine integral development. What will it accomplish? Why? Where? When? How? For whom? What are the risks? What are the costs? Who will pay those costs and how? In this discernment, some questions must have higher priority. For example, we know that water is a scarce and indispensable resource and a fundamental right which conditions the exercise of other human rights. This indisputable fact overrides any other assessment of environmental impact on a region.

186. The Rio Declaration of 1992 states that "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a pretext for postponing cost-effective measures"[132] which prevent environmental degradation. This precautionary principle makes it possible to protect those who are most vulnerable and whose ability to defend their interests and to assemble incontrovertible evidence is limited. If objective information suggests that serious and irreversible damage may result, a project

[132] *Rio Declaration on the Environment and Development* (14 June 1992), Principle 15.

should be halted or modified, even in the absence of indisputable proof. Here the burden of proof is effectively reversed, since in such cases objective and conclusive demonstrations will have to be brought forward to demonstrate that the proposed activity will not cause serious harm to the environment or to those who inhabit it.

187. This does not mean being opposed to any technological innovations which can bring about an improvement in the quality of life. But it does mean that profit cannot be the sole criterion to be taken into account, and that, when significant new information comes to light, a reassessment should be made, with the involvement of all interested parties. The outcome may be a decision not to proceed with a given project, to modify it or to consider alternative proposals.

188. There are certain environmental issues where it is not easy to achieve a broad consensus. Here I would state once more that the Church does not presume to settle scientific questions or to replace politics. But I am concerned to encourage an honest and open debate so that particular interests or ideologies will not prejudice the common good.

IV. Politics and economy in dialogue for human fulfilment

189. Politics must not be subject to the economy, nor should the economy be subject to the

dictates of an efficiency-driven paradigm of technocracy. Today, in view of the common good, there is urgent need for politics and economics to enter into a frank dialogue in the service of life, especially human life. Saving banks at any cost, making the public pay the price, foregoing a firm commitment to reviewing and reforming the entire system, only reaffirms the absolute power of a financial system, a power which has no future and will only give rise to new crises after a slow, costly and only apparent recovery. The financial crisis of 2007-08 provided an opportunity to develop a new economy, more attentive to ethical principles, and new ways of regulating speculative financial practices and virtual wealth. But the response to the crisis did not include rethinking the outdated criteria which continue to rule the world. Production is not always rational, and is usually tied to economic variables which assign to products a value that does not necessarily correspond to their real worth. This frequently leads to an overproduction of some commodities, with unnecessary impact on the environment and with negative results on regional economies.[133] The financial bubble also tends to be a productive bubble. The problem of the real economy is not confronted with vigour, yet it is the real economy which makes diversification and improvement in production possible,

[133] Cf. Mexican Bishops' Conference, Episcopal Commission for Pastoral and Social Concerns, *Jesucristo, vida y esperanza de los indígenas e campesinos* (14 January 2008).

helps companies to function well, and enables small and medium businesses to develop and create employment.

190. Here too, it should always be kept in mind that "environmental protection cannot be assured solely on the basis of financial calculations of costs and benefits. The environment is one of those goods that cannot be adequately safeguarded or promoted by market forces".[134] Once more, we need to reject a magical conception of the market, which would suggest that problems can be solved simply by an increase in the profits of companies or individuals. Is it realistic to hope that those who are obsessed with maximizing profits will stop to reflect on the environmental damage which they will leave behind for future generations? Where profits alone count, there can be no thinking about the rhythms of nature, its phases of decay and regeneration, or the complexity of ecosystems which may be gravely upset by human intervention. Moreover, biodiversity is considered at most a deposit of economic resources available for exploitation, with no serious thought for the real value of things, their significance for persons and cultures, or the concerns and needs of the poor.

191. Whenever these questions are raised, some react by accusing others of irrationally at-

[134] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, 470.

tempting to stand in the way of progress and human development. But we need to grow in the conviction that a decrease in the pace of production and consumption can at times give rise to another form of progress and development. Efforts to promote a sustainable use of natural resources are not a waste of money, but rather an investment capable of providing other economic benefits in the medium term. If we look at the larger picture, we can see that more diversified and innovative forms of production which impact less on the environment can prove very profitable. It is a matter of openness to different possibilities which do not involve stifling human creativity and its ideals of progress, but rather directing that energy along new channels.

192. For example, a path of productive development, which is more creative and better directed, could correct the present disparity between excessive technological investment in consumption and insufficient investment in resolving urgent problems facing the human family. It could generate sensible and profitable ways of reusing, revamping and recycling, and it could also improve the energy efficiency of cities. Productive diversification offers the fullest possibilities to human ingenuity to create and innovate, while at the same time protecting the environment and creating more sources of employment. Such creativity would be a worthy expression of our most noble human qualities, for we would be striving

intelligently, boldly and responsibly to promote a sustainable and equitable development within the context of a broader concept of quality of life. On the other hand, to find ever new ways of despoiling nature, purely for the sake of new consumer items and quick profit, would be, in human terms, less worthy and creative, and more superficial.

193. In any event, if in some cases sustainable development were to involve new forms of growth, in other cases, given the insatiable and irresponsible growth produced over many decades, we need also to think of containing growth by setting some reasonable limits and even retracing our steps before it is too late. We know how unsustainable is the behaviour of those who constantly consume and destroy, while others are not yet able to live in a way worthy of their human dignity. That is why the time has come to accept decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth. Benedict XVI has said that "technologically advanced societies must be prepared to encourage more sober lifestyles, while reducing their energy consumption and improving its efficiency".[135]

194. For new models of progress to arise, there is a need to change "models of global develop-

[135] *Message for the 2010 World Day of Peace*, 9: *AAS* 102 (2010), 46.

ment";[136] this will entail a responsible reflection on "the meaning of the economy and its goals with an eye to correcting its malfunctions and misapplications".[137] It is not enough to balance, in the medium term, the protection of nature with financial gain, or the preservation of the environment with progress. Halfway measures simply delay the inevitable disaster. Put simply, it is a matter of redefining our notion of progress. A technological and economic development which does not leave in its wake a better world and an integrally higher quality of life cannot be considered progress. Frequently, in fact, people's quality of life actually diminishes – by the deterioration of the environment, the low quality of food or the depletion of resources – in the midst of economic growth. In this context, talk of sustainable growth usually becomes a way of distracting attention and offering excuses. It absorbs the language and values of ecology into the categories of finance and technocracy, and the social and environmental responsibility of businesses often gets reduced to a series of marketing and image-enhancing measures.

195. The principle of the maximization of profits, frequently isolated from other considerations, reflects a misunderstanding of the very concept of the economy. As long as production

[136] *Ibid.*
[137] *Ibid.*, 5: p. 43.

is increased, little concern is given to whether it is at the cost of future resources or the health of the environment; as long as the clearing of a forest increases production, no one calculates the losses entailed in the desertification of the land, the harm done to biodiversity or the increased pollution. In a word, businesses profit by calculating and paying only a fraction of the costs involved. Yet only when "the economic and social costs of using up shared environmental resources are recognized with transparency and fully borne by those who incur them, not by other peoples or future generations",[138] can those actions be considered ethical. An instrumental way of reasoning, which provides a purely static analysis of realities in the service of present needs, is at work whether resources are allocated by the market or by state central planning.

196. What happens with politics? Let us keep in mind the principle of subsidiarity, which grants freedom to develop the capabilities present at every level of society, while also demanding a greater sense of responsibility for the common good from those who wield greater power. Today, it is the case that some economic sectors exercise more power than states themselves. But economics without politics cannot be justified, since this would make it impossible to favour

[138] Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009), 50: *AAS* 101 (2009), 686.

other ways of handling the various aspects of the present crisis. The mindset which leaves no room for sincere concern for the environment is the same mindset which lacks concern for the inclusion of the most vulnerable members of society. For "the current model, with its emphasis on success and self-reliance, does not appear to favour an investment in efforts to help the slow, the weak or the less talented to find opportunities in life".[139]

197. What is needed is a politics which is farsighted and capable of a new, integral and interdisciplinary approach to handling the different aspects of the crisis. Often, politics itself is responsible for the disrepute in which it is held, on account of corruption and the failure to enact sound public policies. If in a given region the state does not carry out its responsibilities, some business groups can come forward in the guise of benefactors, wield real power, and consider themselves exempt from certain rules, to the point of tolerating different forms of organized crime, human trafficking, the drug trade and violence, all of which become very difficult to eradicate. If politics shows itself incapable of breaking such a perverse logic, and remains caught up in inconsequential discussions, we will continue to avoid facing the major problems of humani-

[139] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 209: *AAS* 105 (2013), 1107.

ty. A strategy for real change calls for rethinking processes in their entirety, for it is not enough to include a few superficial ecological considerations while failing to question the logic which underlies present-day culture. A healthy politics needs to be able to take up this challenge.

198. Politics and the economy tend to blame each other when it comes to poverty and environmental degradation. It is to be hoped that they can acknowledge their own mistakes and find forms of interaction directed to the common good. While some are concerned only with financial gain, and others with holding on to or increasing their power, what we are left with are conflicts or spurious agreements where the last thing either party is concerned about is caring for the environment and protecting those who are most vulnerable. Here too, we see how true it is that "unity is greater than conflict".[140]

V. Religions in dialogue with science

199. It cannot be maintained that empirical science provides a complete explanation of life, the interplay of all creatures and the whole of reality. This would be to breach the limits imposed by its own methodology. If we reason only within the confines of the latter, little room would be left for aesthetic sensibility, poetry, or even rea-

[140] *Ibid.*, 228: *AAS* 105 (2013), 1113.

son's ability to grasp the ultimate meaning and purpose of things.[141] I would add that "religious classics can prove meaningful in every age; they have an enduring power to open new horizons… Is it reasonable and enlightened to dismiss certain writings simply because they arose in the context of religious belief?"[142] It would be quite simplistic to think that ethical principles present themselves purely in the abstract, detached from any context. Nor does the fact that they may be couched in religious language detract from their value in public debate. The ethical principles capable of being apprehended by reason can always reappear in different guise and find expression in a variety of languages, including religious language.

200. Any technical solution which science claims to offer will be powerless to solve the se-

[141] Cf. Encyclical Letter *Lumen Fidei* (29 June 2013), 34: *AAS* 105 (2013), 577: "Nor is the light of faith, joined to the truth of love, extraneous to the material world, for love is always lived out in body and spirit; the light of faith is an incarnate light radiating from the luminous life of Jesus. It also illumines the material world, trusts its inherent order, and knows that it calls us to an ever widening path of harmony and understanding. The gaze of science thus benefits from faith: faith encourages the scientist to remain constantly open to reality in all its inexhaustible richness. Faith awakens the critical sense by preventing research from being satisfied with its own formulae and helps it to realize that nature is always greater. By stimulating wonder before the profound mystery of creation, faith broadens the horizons of reason to shed greater light on the world which discloses itself to scientific investigation".

[142] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 256: *AAS* 105 (2013), 1123.

rious problems of our world if humanity loses its compass, if we lose sight of the great motivations which make it possible for us to live in harmony, to make sacrifices and to treat others well. Believers themselves must constantly feel challenged to live in a way consonant with their faith and not to contradict it by their actions. They need to be encouraged to be ever open to God's grace and to draw constantly from their deepest convictions about love, justice and peace. If a mistaken understanding of our own principles has at times led us to justify mistreating nature, to exercise tyranny over creation, to engage in war, injustice and acts of violence, we believers should acknowledge that by so doing we were not faithful to the treasures of wisdom which we have been called to protect and preserve. Cultural limitations in different eras often affected the perception of these ethical and spiritual treasures, yet by constantly returning to their sources, religions will be better equipped to respond to today's needs.

201. The majority of people living on our planet profess to be believers. This should spur religions to dialogue among themselves for the sake of protecting nature, defending the poor, and building networks of respect and fraternity. Dialogue among the various sciences is likewise needed, since each can tend to become enclosed in its own language, while specialization leads to a certain isolation and the absolutization of its own

field of knowledge. This prevents us from confronting environmental problems effectively. An open and respectful dialogue is also needed between the various ecological movements, among which ideological conflicts are not infrequently encountered. The gravity of the ecological crisis demands that we all look to the common good, embarking on a path of dialogue which requires patience, self-discipline and generosity, always keeping in mind that "realities are greater than ideas".[143]

[143] *Ibid.*, 231: p. 1114.

CHAPTER SIX

ECOLOGICAL EDUCATION AND SPIRITUALITY

202. Many things have to change course, but it is we human beings above all who need to change. We lack an awareness of our common origin, of our mutual belonging, and of a future to be shared with everyone. This basic awareness would enable the development of new convictions, attitudes and forms of life. A great cultural, spiritual and educational challenge stands before us, and it will demand that we set out on the long path of renewal.

I. Towards a new lifestyle

203. Since the market tends to promote extreme consumerism in an effort to sell its products, people can easily get caught up in a whirlwind of needless buying and spending. Compulsive consumerism is one example of how the techno-economic paradigm affects individuals. Romano Guardini had already foreseen this: "The gadgets and technics forced upon him by the patterns of machine production and of abstract planning mass man accepts quite simply; they are the forms of life itself. To either a greater or lesser degree mass man is convinced that

his conformity is both reasonable and just".[144] This paradigm leads people to believe that they are free as long as they have the supposed freedom to consume. But those really free are the minority who wield economic and financial power. Amid this confusion, postmodern humanity has not yet achieved a new self-awareness capable of offering guidance and direction, and this lack of identity is a source of anxiety. We have too many means and only a few insubstantial ends.

204. The current global situation engenders a feeling of instability and uncertainty, which in turn becomes "a seedbed for collective selfishness".[145] When people become self-centred and self-enclosed, their greed increases. The emptier a person's heart is, the more he or she needs things to buy, own and consume. It becomes almost impossible to accept the limits imposed by reality. In this horizon, a genuine sense of the common good also disappears. As these attitudes become more widespread, social norms are respected only to the extent that they do not clash with personal needs. So our concern cannot be limited merely to the threat of extreme weather events, but must also extend to the catastrophic consequences of social unrest. Obsession with a

[144] Romano Guardini, *Das Ende der Neuzeit*, 9th edition, Würzburg, 1965, 66-67 (English: *The End of the Modern World*, Wilmington, 1998, 60).

[145] John Paul II, *Message for the 1990 World Day of Peace,* 1: *AAS* 82 (1990), 147.

consumerist lifestyle, above all when few people are capable of maintaining it, can only lead to violence and mutual destruction.

205. Yet all is not lost. Human beings, while capable of the worst, are also capable of rising above themselves, choosing again what is good, and making a new start, despite their mental and social conditioning. We are able to take an honest look at ourselves, to acknowledge our deep dissatisfaction, and to embark on new paths to authentic freedom. No system can completely suppress our openness to what is good, true and beautiful, or our God-given ability to respond to his grace at work deep in our hearts. I appeal to everyone throughout the world not to forget this dignity which is ours. No one has the right to take it from us.

206. A change in lifestyle could bring healthy pressure to bear on those who wield political, economic and social power. This is what consumer movements accomplish by boycotting certain products. They prove successful in changing the way businesses operate, forcing them to consider their environmental footprint and their patterns of production. When social pressure affects their earnings, businesses clearly have to find ways to produce differently. This shows us the great need for a sense of social responsibility on the part of consumers. "Purchasing is always a moral –

and not simply economic – act".[146] Today, in a word, "the issue of environmental degradation challenges us to examine our lifestyle".[147]

207. The Earth Charter asked us to leave behind a period of self-destruction and make a new start, but we have not as yet developed a universal awareness needed to achieve this. Here, I would echo that courageous challenge: "As never before in history, common destiny beckons us to seek a new beginning… Let ours be a time remembered for the awakening of a new reverence for life, the firm resolve to achieve sustainability, the quickening of the struggle for justice and peace, and the joyful celebration of life".[148]

208. We are always capable of going out of ourselves towards the other. Unless we do this, other creatures will not be recognized for their true worth; we are unconcerned about caring for things for the sake of others; we fail to set limits on ourselves in order to avoid the suffering of others or the deterioration of our surroundings. Disinterested concern for others, and the rejection of every form of self-centeredness and self-absorption, are essential if we truly wish to care for our brothers and sisters and for the nat-

[146] Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009), 66*: AAS* 101 (2009), 699.

[147] Id., *Message for the 2010 World Day of Peace*, 11*: AAS* 102 (2010), 48.

[148] *Earth Charter*, The Hague (29 June 2000).

ural environment. These attitudes also attune us to the moral imperative of assessing the impact of our every action and personal decision on the world around us. If we can overcome individualism, we will truly be able to develop a different lifestyle and bring about significant changes in society.

II. Educating for the covenant between humanity and the environment

209. An awareness of the gravity of today's cultural and ecological crisis must be translated into new habits. Many people know that our current progress and the mere amassing of things and pleasures are not enough to give meaning and joy to the human heart, yet they feel unable to give up what the market sets before them. In those countries which should be making the greatest changes in consumer habits, young people have a new ecological sensitivity and a generous spirit, and some of them are making admirable efforts to protect the environment. At the same time, they have grown up in a milieu of extreme consumerism and affluence which makes it difficult to develop other habits. We are faced with an educational challenge.

210. Environmental education has broadened its goals. Whereas in the beginning it was mainly centred on scientific information, consciousness-raising and the prevention of environmental risks, it tends now to include a critique of the

"myths" of a modernity grounded in a utilitarian mindset (individualism, unlimited progress, competition, consumerism, the unregulated market). It seeks also to restore the various levels of ecological equilibrium, establishing harmony within ourselves, with others, with nature and other living creatures, and with God. Environmental education should facilitate making the leap towards the transcendent which gives ecological ethics its deepest meaning. It needs educators capable of developing an ethics of ecology, and helping people, through effective pedagogy, to grow in solidarity, responsibility and compassionate care.

211. Yet this education, aimed at creating an "ecological citizenship", is at times limited to providing information, and fails to instil good habits. The existence of laws and regulations is insufficient in the long run to curb bad conduct, even when effective means of enforcement are present. If the laws are to bring about significant, long-lasting effects, the majority of the members of society must be adequately motivated to accept them, and personally transformed to respond. Only by cultivating sound virtues will people be able to make a selfless ecological commitment. A person who could afford to spend and consume more but regularly uses less heating and wears warmer clothes, shows the kind of convictions and attitudes which help to protect the environment. There is a nobility in the duty to care for creation through little daily actions, and it is won-

derful how education can bring about real changes in lifestyle. Education in environmental responsibility can encourage ways of acting which directly and significantly affect the world around us, such as avoiding the use of plastic and paper, reducing water consumption, separating refuse, cooking only what can reasonably be consumed, showing care for other living beings, using public transport or car-pooling, planting trees, turning off unnecessary lights, or any number of other practices. All of these reflect a generous and worthy creativity which brings out the best in human beings. Reusing something instead of immediately discarding it, when done for the right reasons, can be an act of love which expresses our own dignity.

212. We must not think that these efforts are not going to change the world. They benefit society, often unbeknown to us, for they call forth a goodness which, albeit unseen, inevitably tends to spread. Furthermore, such actions can restore our sense of self-esteem; they can enable us to live more fully and to feel that life on earth is worthwhile.

213. Ecological education can take place in a variety of settings: at school, in families, in the media, in catechesis and elsewhere. Good education plants seeds when we are young, and these continue to bear fruit throughout life. Here, though, I would stress the great importance of the family, which is "the place in which life – the

gift of God – can be properly welcomed and protected against the many attacks to which it is exposed, and can develop in accordance with what constitutes authentic human growth. In the face of the so-called culture of death, the family is the heart of the culture of life".[149] In the family we first learn how to show love and respect for life; we are taught the proper use of things, order and cleanliness, respect for the local ecosystem and care for all creatures. In the family we receive an integral education, which enables us to grow harmoniously in personal maturity. In the family we learn to ask without demanding, to say "thank you" as an expression of genuine gratitude for what we have been given, to control our aggressivity and greed, and to ask forgiveness when we have caused harm. These simple gestures of heartfelt courtesy help to create a culture of shared life and respect for our surroundings.

214. Political institutions and various other social groups are also entrusted with helping to raise people's awareness. So too is the Church. All Christian communities have an important role to play in ecological education. It is my hope that our seminaries and houses of formation will provide an education in responsible simplicity of life, in grateful contemplation of God's world, and in concern for the needs of the poor and the protection of the environment. Because the

[149] John Paul II, Encyclical Letter *Centesimus Annus* (1 May 1991), 39: *AAS* 83 (1991), 842.

stakes are so high, we need institutions empowered to impose penalties for damage inflicted on the environment. But we also need the personal qualities of self-control and willingness to learn from one another.

215. In this regard, "the relationship between a good aesthetic education and the maintenance of a healthy environment cannot be overlooked".[150] By learning to see and appreciate beauty, we learn to reject self-interested pragmatism. If someone has not learned to stop and admire something beautiful, we should not be surprised if he or she treats everything as an object to be used and abused without scruple. If we want to bring about deep change, we need to realize that certain mindsets really do influence our behaviour. Our efforts at education will be inadequate and ineffectual unless we strive to promote a new way of thinking about human beings, life, society and our relationship with nature. Otherwise, the paradigm of consumerism will continue to advance, with the help of the media and the highly effective workings of the market.

III. Ecological conversion

216. The rich heritage of Christian spirituality, the fruit of twenty centuries of personal and communal experience, has a precious contribu-

[150] Id., *Message for the 1990 World Day of Peace*, 14: *AAS* 82 (1990), 155.

tion to make to the renewal of humanity. Here, I would like to offer Christians a few suggestions for an ecological spirituality grounded in the convictions of our faith, since the teachings of the Gospel have direct consequences for our way of thinking, feeling and living. More than in ideas or concepts as such, I am interested in how such a spirituality can motivate us to a more passionate concern for the protection of our world. A commitment this lofty cannot be sustained by doctrine alone, without a spirituality capable of inspiring us, without an "interior impulse which encourages, motivates, nourishes and gives meaning to our individual and communal activity".[151] Admittedly, Christians have not always appropriated and developed the spiritual treasures bestowed by God upon the Church, where the life of the spirit is not dissociated from the body or from nature or from worldly realities, but lived in and with them, in communion with all that surrounds us.

217. "The external deserts in the world are growing, because the internal deserts have become so vast".[152] For this reason, the ecological crisis is also a summons to profound interior conversion. It must be said that some committed and prayerful Christians, with the excuse of real-

[151] Apostolic Exhortation *Evangelii Gaudium* (24 Nov 2013), 261: *AAS* 105 (2013), 1124.

[152] Benedict XVI, *Homily for the Solemn Inauguration of the Petrine Ministry* (24 April 2005): *AAS* 97 (2005), 710.

ism and pragmatism, tend to ridicule expressions of concern for the environment. Others are passive; they choose not to change their habits and thus become inconsistent. So what they all need is an "ecological conversion", whereby the effects of their encounter with Jesus Christ become evident in their relationship with the world around them. Living our vocation to be protectors of God's handiwork is essential to a life of virtue; it is not an optional or a secondary aspect of our Christian experience.

218. In calling to mind the figure of Saint Francis of Assisi, we come to realize that a healthy relationship with creation is one dimension of overall personal conversion, which entails the recognition of our errors, sins, faults and failures, and leads to heartfelt repentance and desire to change. The Australian bishops spoke of the importance of such conversion for achieving reconciliation with creation: "To achieve such reconciliation, we must examine our lives and acknowledge the ways in which we have harmed God's creation through our actions and our failure to act. We need to experience a conversion, or change of heart".[153]

219. Nevertheless, self-improvement on the part of individuals will not by itself remedy the extremely complex situation facing our world to-

[153] Australian Catholic Bishops' Conference, *A New Earth – The Environmental Challenge* (2002).

day. Isolated individuals can lose their ability and freedom to escape the utilitarian mindset, and end up prey to an unethical consumerism bereft of social or ecological awareness. Social problems must be addressed by community networks and not simply by the sum of individual good deeds. This task "will make such tremendous demands of man that he could never achieve it by individual initiative or even by the united effort of men bred in an individualistic way. The work of dominating the world calls for a union of skills and a unity of achievement that can only grow from quite a different attitude".[154] The ecological conversion needed to bring about lasting change is also a community conversion.

220. This conversion calls for a number of attitudes which together foster a spirit of generous care, full of tenderness. First, it entails gratitude and gratuitousness, a recognition that the world is God's loving gift, and that we are called quietly to imitate his generosity in self-sacrifice and good works: "Do not let your left hand know what your right hand is doing… and your Father who sees in secret will reward you" (*Mt* 6:3-4). It also entails a loving awareness that we are not disconnected from the rest of creatures, but joined in a splendid universal communion. As believers, we do not look at the world from without but from within, conscious of the bonds with

[154] Romano Guardini, *Das Ende der Neuzeit*, 72 (*The End of the Modern World*, 65-66).

which the Father has linked us to all beings. By developing our individual, God-given capacities, an ecological conversion can inspire us to greater creativity and enthusiasm in resolving the world's problems and in offering ourselves to God "as a living sacrifice, holy and acceptable" (*Rom* 12:1). We do not understand our superiority as a reason for personal glory or irresponsible dominion, but rather as a different capacity which, in its turn, entails a serious responsibility stemming from our faith.

221. Various convictions of our faith, developed at the beginning of this Encyclical can help us to enrich the meaning of this conversion. These include the awareness that each creature reflects something of God and has a message to convey to us, and the security that Christ has taken unto himself this material world and now, risen, is intimately present to each being, surrounding it with his affection and penetrating it with his light. Then too, there is the recognition that God created the world, writing into it an order and a dynamism that human beings have no right to ignore. We read in the Gospel that Jesus says of the birds of the air that "not one of them is forgotten before God" (*Lk* 12:6). How then can we possibly mistreat them or cause them harm? I ask all Christians to recognize and to live fully this dimension of their conversion. May the power and the light of the grace we have received also be evident in our relationship to other creatures and to the world

around us. In this way, we will help nurture that sublime fraternity with all creation which Saint Francis of Assisi so radiantly embodied.

IV. Joy and peace

222. Christian spirituality proposes an alternative understanding of the quality of life, and encourages a prophetic and contemplative lifestyle, one capable of deep enjoyment free of the obsession with consumption. We need to take up an ancient lesson, found in different religious traditions and also in the Bible. It is the conviction that "less is more". A constant flood of new consumer goods can baffle the heart and prevent us from cherishing each thing and each moment. To be serenely present to each reality, however small it may be, opens us to much greater horizons of understanding and personal fulfilment. Christian spirituality proposes a growth marked by moderation and the capacity to be happy with little. It is a return to that simplicity which allows us to stop and appreciate the small things, to be grateful for the opportunities which life affords us, to be spiritually detached from what we possess, and not to succumb to sadness for what we lack. This implies avoiding the dynamic of dominion and the mere accumulation of pleasures.

223. Such sobriety, when lived freely and consciously, is liberating. It is not a lesser life or one lived with less intensity. On the contrary, it is a way of living life to the full. In reality, those

who enjoy more and live better each moment are those who have given up dipping here and there, always on the look-out for what they do not have. They experience what it means to appreciate each person and each thing, learning familiarity with the simplest things and how to enjoy them. So they are able to shed unsatisfied needs, reducing their obsessiveness and weariness. Even living on little, they can live a lot, above all when they cultivate other pleasures and find satisfaction in fraternal encounters, in service, in developing their gifts, in music and art, in contact with nature, in prayer. Happiness means knowing how to limit some needs which only diminish us, and being open to the many different possibilities which life can offer.

224. Sobriety and humility were not favourably regarded in the last century. And yet, when there is a general breakdown in the exercise of a certain virtue in personal and social life, it ends up causing a number of imbalances, including environmental ones. That is why it is no longer enough to speak only of the integrity of ecosystems. We have to dare to speak of the integrity of human life, of the need to promote and unify all the great values. Once we lose our humility, and become enthralled with the possibility of limitless mastery over everything, we inevitably end up harming society and the environment. It is not easy to promote this kind of healthy humility or happy sobriety when we consider our-

selves autonomous, when we exclude God from our lives or replace him with our own ego, and think that our subjective feelings can define what is right and what is wrong.

225. On the other hand, no one can cultivate a sober and satisfying life without being at peace with him or herself. An adequate understanding of spirituality consists in filling out what we mean by peace, which is much more than the absence of war. Inner peace is closely related to care for ecology and for the common good because, lived out authentically, it is reflected in a balanced lifestyle together with a capacity for wonder which takes us to a deeper understanding of life. Nature is filled with words of love, but how can we listen to them amid constant noise, interminable and nerve-wracking distractions, or the cult of appearances? Many people today sense a profound imbalance which drives them to frenetic activity and makes them feel busy, in a constant hurry which in turn leads them to ride rough-shod over everything around them. This too affects how they treat the environment. An integral ecology includes taking time to recover a serene harmony with creation, reflecting on our lifestyle and our ideals, and contemplating the Creator who lives among us and surrounds us, whose presence "must not be contrived but found, uncovered".[155]

[155] Apostolic Exhortation *Evangelii Gaudium* (24 November 2013), 71: *AAS* 105 (2013), 1050.

226. We are speaking of an attitude of the heart, one which approaches life with serene attentiveness, which is capable of being fully present to someone without thinking of what comes next, which accepts each moment as a gift from God to be lived to the full. Jesus taught us this attitude when he invited us to contemplate the lilies of the field and the birds of the air, or when seeing the rich young man and knowing his restlessness, "he looked at him with love" (*Mk* 10:21). He was completely present to everyone and to everything, and in this way he showed us the way to overcome that unhealthy anxiety which makes us superficial, aggressive and compulsive consumers.

227. One expression of this attitude is when we stop and give thanks to God before and after meals. I ask all believers to return to this beautiful and meaningful custom. That moment of blessing, however brief, reminds us of our dependence on God for life; it strengthens our feeling of gratitude for the gifts of creation; it acknowledges those who by their labours provide us with these goods; and it reaffirms our solidarity with those in greatest need.

V. Civic and political love

228. Care for nature is part of a lifestyle which includes the capacity for living together and communion. Jesus reminded us that we have God as our common Father and that this makes

us brothers and sisters. Fraternal love can only be gratuitous; it can never be a means of repaying others for what they have done or will do for us. That is why it is possible to love our enemies. This same gratuitousness inspires us to love and accept the wind, the sun and the clouds, even though we cannot control them. In this sense, we can speak of a "universal fraternity".

229. We must regain the conviction that we need one another, that we have a shared responsibility for others and the world, and that being good and decent are worth it. We have had enough of immorality and the mockery of ethics, goodness, faith and honesty. It is time to acknowledge that light-hearted superficiality has done us no good. When the foundations of social life are corroded, what ensues are battles over conflicting interests, new forms of violence and brutality, and obstacles to the growth of a genuine culture of care for the environment.

230. Saint Therese of Lisieux invites us to practise the little way of love, not to miss out on a kind word, a smile or any small gesture which sows peace and friendship. An integral ecology is also made up of simple daily gestures which break with the logic of violence, exploitation and selfishness. In the end, a world of exacerbated consumption is at the same time a world which mistreats life in all its forms.

231. Love, overflowing with small gestures of mutual care, is also civic and political, and

it makes itself felt in every action that seeks to build a better world. Love for society and commitment to the common good are outstanding expressions of a charity which affects not only relationships between individuals but also "macro-relationships, social, economic and political ones".[156] That is why the Church set before the world the ideal of a "civilization of love".[157] Social love is the key to authentic development: "In order to make society more human, more worthy of the human person, love in social life – political, economic and cultural – must be given renewed value, becoming the constant and highest norm for all activity".[158] In this framework, along with the importance of little everyday gestures, social love moves us to devise larger strategies to halt environmental degradation and to encourage a "culture of care" which permeates all of society. When we feel that God is calling us to intervene with others in these social dynamics, we should realize that this too is part of our spirituality, which is an exercise of charity and, as such, matures and sanctifies us.

232. Not everyone is called to engage directly in political life. Society is also enriched by a countless array of organizations which work to

[156] Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009) 2: *AAS* 101 (2009), 642.

[157] Paul VI, *Message for the 1977 World Day of Peace*: *AAS* 68 (1976), 709.

[158] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, 582.

promote the common good and to defend the environment, whether natural or urban. Some, for example, show concern for a public place (a building, a fountain, an abandoned monument, a landscape, a square), and strive to protect, restore, improve or beautify it as something belonging to everyone. Around these community actions, relationships develop or are recovered and a new social fabric emerges. Thus, a community can break out of the indifference induced by consumerism. These actions cultivate a shared identity, with a story which can be remembered and handed on. In this way, the world, and the quality of life of the poorest, are cared for, with a sense of solidarity which is at the same time aware that we live in a common home which God has entrusted to us. These community actions, when they express self-giving love, can also become intense spiritual experiences.

VI. Sacramental signs and the celebration of rest

233. The universe unfolds in God, who fills it completely. Hence, there is a mystical meaning to be found in a leaf, in a mountain trail, in a dewdrop, in a poor person's face.[159] The ideal is

[159] The spiritual writer Ali al-Khawas stresses from his own experience the need not to put too much distance between the creatures of the world and the interior experience of God. As he puts it: "Prejudice should not have us criticize those who seek ecstasy in music or poetry. There is a subtle mystery in

not only to pass from the exterior to the interior to discover the action of God in the soul, but also to discover God in all things. Saint Bonaventure teaches us that "contemplation deepens the more we feel the working of God's grace within our hearts, and the better we learn to encounter God in creatures outside ourselves".[160]

234. Saint John of the Cross taught that all the goodness present in the realities and experiences of this world "is present in God eminently and infinitely, or more properly, in each of these sublime realities is God".[161] This is not because the finite things of this world are really divine, but because the mystic experiences the intimate connection between God and all beings, and thus feels that "all things are God".[162] Standing awestruck before a mountain, he or she cannot separate this experience from God, and perceives that the interior awe being lived has to be entrusted to the Lord: "Mountains have heights and they are plentiful, vast, beautiful, graceful, bright and fragrant. These mountains are what my Beloved is to me. Lonely valleys are quiet, pleasant, cool,

each of the movements and sounds of this world. The initiate will capture what is being said when the wind blows, the trees sway, water flows, flies buzz, doors creak, birds sing, or in the sound of strings or flutes, the sighs of the sick, the groans of the afflicted..." (Eva De Vitray-Meyerovitch [ed.], *Anthologie du soufisme,* Paris 1978, 200).

[160] *In II Sent.*, 23, 2, 3.

[161] *Cántico Espiritual*, XIV, 5.

[162] *Ibid.*

shady and flowing with fresh water; in the variety of their groves and in the sweet song of the birds, they afford abundant recreation and delight to the senses, and in their solitude and silence, they refresh us and give rest. These valleys are what my Beloved is to me".[163]

235. The Sacraments are a privileged way in which nature is taken up by God to become a means of mediating supernatural life. Through our worship of God, we are invited to embrace the world on a different plane. Water, oil, fire and colours are taken up in all their symbolic power and incorporated in our act of praise. The hand that blesses is an instrument of God's love and a reflection of the closeness of Jesus Christ, who came to accompany us on the journey of life. Water poured over the body of a child in Baptism is a sign of new life. Encountering God does not mean fleeing from this world or turning our back on nature. This is especially clear in the spirituality of the Christian East. "Beauty, which in the East is one of the best loved names expressing the divine harmony and the model of humanity transfigured, appears everywhere: in the shape of a church, in the sounds, in the colours, in the lights, in the scents".[164] For Christians, all the creatures of the material universe find their

[163] *Ibid.*, XIV, 6-7.

[164] John Paul II, Apostolic Letter *Orientale Lumen* (2 May 1995), 11: *AAS* 87 (1995), 757.

true meaning in the incarnate Word, for the Son of God has incorporated in his person part of the material world, planting in it a seed of definitive transformation. "Christianity does not reject matter. Rather, bodiliness is considered in all its value in the liturgical act, whereby the human body is disclosed in its inner nature as a temple of the Holy Spirit and is united with the Lord Jesus, who himself took a body for the world's salvation".[165]

236. It is in the Eucharist that all that has been created finds its greatest exaltation. Grace, which tends to manifest itself tangibly, found unsurpassable expression when God himself became man and gave himself as food for his creatures. The Lord, in the culmination of the mystery of the Incarnation, chose to reach our intimate depths through a fragment of matter. He comes not from above, but from within, he comes that we might find him in this world of ours. In the Eucharist, fullness is already achieved; it is the living centre of the universe, the overflowing core of love and of inexhaustible life. Joined to the incarnate Son, present in the Eucharist, the whole cosmos gives thanks to God. Indeed the Eucharist is itself an act of cosmic love: "Yes, cosmic! Because even when it is celebrated on the humble altar of a country church, the Eucharist is always in some way celebrated on the al-

[165] *Ibid.*

tar of the world".[166] The Eucharist joins heaven and earth; it embraces and penetrates all creation. The world which came forth from God's hands returns to him in blessed and undivided adoration: in the bread of the Eucharist, "creation is projected towards divinization, towards the holy wedding feast, towards unification with the Creator himself".[167] Thus, the Eucharist is also a source of light and motivation for our concerns for the environment, directing us to be stewards of all creation.

237. On Sunday, our participation in the Eucharist has special importance. Sunday, like the Jewish Sabbath, is meant to be a day which heals our relationships with God, with ourselves, with others and with the world. Sunday is the day of the Resurrection, the "first day" of the new creation, whose first fruits are the Lord's risen humanity, the pledge of the final transfiguration of all created reality. It also proclaims "man's eternal rest in God".[168] In this way, Christian spirituality incorporates the value of relaxation and festivity. We tend to demean contemplative rest as something unproductive and unnecessary, but this is to do away with the very thing which is most important about work: its meaning. We

[166] Id., Encyclical Letter *Ecclesia de Eucharistia* (17 April 2003), 8: *AAS* 95 (2003), 438.

[167] Benedict XVI, *Homily for the Mass of Corpus Domini* (15 June 2006): *AAS* 98 (2006), 513.

[168] *Catechism of the Catholic Church*, 2175.

are called to include in our work a dimension of receptivity and gratuity, which is quite different from mere inactivity. Rather, it is another way of working, which forms part of our very essence. It protects human action from becoming empty activism; it also prevents that unfettered greed and sense of isolation which make us seek personal gain to the detriment of all else. The law of weekly rest forbade work on the seventh day, "so that your ox and your donkey may have rest, and the son of your maidservant, and the stranger, may be refreshed" (*Ex* 23:12). Rest opens our eyes to the larger picture and gives us renewed sensitivity to the rights of others. And so the day of rest, centred on the Eucharist, sheds it light on the whole week, and motivates us to greater concern for nature and the poor.

VII. The Trinity and the relationship between creatures

238. The Father is the ultimate source of everything, the loving and self-communicating foundation of all that exists. The Son, his reflection, through whom all things were created, united himself to this earth when he was formed in the womb of Mary. The Spirit, infinite bond of love, is intimately present at the very heart of the universe, inspiring and bringing new pathways. The world was created by the three Persons acting as a single divine principle, but each one of them performed this common work in accord-

ance with his own personal property. Consequently, "when we contemplate with wonder the universe in all its grandeur and beauty, we must praise the whole Trinity".[169]

239. For Christians, believing in one God who is trinitarian communion suggests that the Trinity has left its mark on all creation. Saint Bonaventure went so far as to say that human beings, before sin, were able to see how each creature "testifies that God is three". The reflection of the Trinity was there to be recognized in nature "when that book was open to man and our eyes had not yet become darkened".[170] The Franciscan saint teaches us that *each creature bears in itself a specifically Trinitarian structure*, so real that it could be readily contemplated if only the human gaze were not so partial, dark and fragile. In this way, he points out to us the challenge of trying to read reality in a Trinitarian key.

240. The divine Persons are subsistent relations, and the world, created according to the divine model, is a web of relationships. Creatures tend towards God, and in turn it is proper to every living being to tend towards other things, so that throughout the universe we can find any number of constant and secretly interwoven re-

[169] John Paul II, *Catechesis* (2 August 2000), 4: *Insegnamenti* 23/2 (2000), 112.

[170] *Quaest. Disp. de Myst. Trinitatis*, 1, 2 concl.

lationships.[171] This leads us not only to marvel at the manifold connections existing among creatures, but also to discover a key to our own fulfilment. The human person grows more, matures more and is sanctified more to the extent that he or she enters into relationships, going out from themselves to live in communion with God, with others and with all creatures. In this way, they make their own that trinitarian dynamism which God imprinted in them when they were created. Everything is interconnected, and this invites us to develop a spirituality of that global solidarity which flows from the mystery of the Trinity.

VIII. Queen of all creation

241. Mary, the Mother who cared for Jesus, now cares with maternal affection and pain for this wounded world. Just as her pierced heart mourned the death of Jesus, so now she grieves for the sufferings of the crucified poor and for the creatures of this world laid waste by human power. Completely transfigured, she now lives with Jesus, and all creatures sing of her fairness. She is the Woman, "clothed in the sun, with the moon under her feet, and on her head a crown of twelve stars" (*Rev* 12:1). Carried up into heaven, she is the Mother and Queen of all creation. In her glorified body, together with the Risen Christ, part of creation has reached the fullness of its beauty. She

[171] Cf. Thomas Aquinas, *Summa Theologiae,* I, q. 11, art. 3; q. 21, art. 1, ad 3; q. 47, art. 3.

treasures the entire life of Jesus in her heart (cf. *Lk* 2:19,51), and now understands the meaning of all things. Hence, we can ask her to enable us to look at this world with eyes of wisdom.

242. At her side in the Holy Family of Nazareth, stands the figure of Saint Joseph. Through his work and generous presence, he cared for and defended Mary and Jesus, delivering them from the violence of the unjust by bringing them to Egypt. The Gospel presents Joseph as a just man, hard-working and strong. But he also shows great tenderness, which is not a mark of the weak but of those who are genuinely strong, fully aware of reality and ready to love and serve in humility. That is why he was proclaimed custodian of the universal Church. He too can teach us how to show care; he can inspire us to work with generosity and tenderness in protecting this world which God has entrusted to us.

IX. Beyond the sun

243. At the end, we will find ourselves face to face with the infinite beauty of God (cf. *1 Cor* 13:12), and be able to read with admiration and happiness the mystery of the universe, which with us will share in unending plenitude. Even now we are journeying towards the sabbath of eternity, the new Jerusalem, towards our common home in heaven. Jesus says: "I make all things new" (*Rev* 21:5). Eternal life will be a shared experience of

awe, in which each creature, resplendently transfigured, will take its rightful place and have something to give those poor men and women who will have been liberated once and for all.

244. In the meantime, we come together to take charge of this home which has been entrusted to us, knowing that all the good which exists here will be taken up into the heavenly feast. In union with all creatures, we journey through this land seeking God, for "if the world has a beginning and if it has been created, we must enquire who gave it this beginning, and who was its Creator".[172] Let us sing as we go. May our struggles and our concern for this planet never take away the joy of our hope.

245. God, who calls us to generous commitment and to give him our all, offers us the light and the strength needed to continue on our way. In the heart of this world, the Lord of life, who loves us so much, is always present. He does not abandon us, he does not leave us alone, for he has united himself definitively to our earth, and his love constantly impels us to find new ways forward. *Praise be to him*!

* * *

246. At the conclusion of this lengthy reflection which has been both joyful and troubling, I pro-

[172] Basil the Great, *Hom. in Hexaemeron*, I, 2, 6: PG 29, 8.

pose that we offer two prayers. The first we can share with all who believe in a God who is the all-powerful Creator, while in the other we Christians ask for inspiration to take up the commitment to creation set before us by the Gospel of Jesus.

A prayer for our earth

All-powerful God,
you are present in the whole universe
and in the smallest of your creatures.
You embrace with your tenderness all that exists.
Pour out upon us the power of your love,
that we may protect life and beauty.
Fill us with peace, that we may live
as brothers and sisters, harming no one.
O God of the poor,
help us to rescue the abandoned
and forgotten of this earth,
so precious in your eyes.
Bring healing to our lives,
that we may protect the world and not prey on it,
that we may sow beauty,
not pollution and destruction.
Touch the hearts
of those who look only for gain
at the expense of the poor and the earth.
Teach us to discover the worth of each thing,
to be filled with awe and contemplation,
to recognize that we are profoundly united
with every creature
as we journey towards your infinite light.
We thank you for being with us each day.

Encourage us, we pray, in our struggle
for justice, love and peace.

A Christian prayer in union with creation

Father, we praise you with all your creatures.
They came forth from your all-powerful hand;
they are yours, filled with your presence and your tender love.
Praise be to you!

Son of God, Jesus,
through you all things were made.
You were formed in the womb of Mary our Mother,
you became part of this earth,
and you gazed upon this world with human eyes.
Today you are alive in every creature
in your risen glory.
Praise be to you!

Holy Spirit, by your light
you guide this world towards the Father's love
and accompany creation as it groans in travail.
You also dwell in our hearts
and you inspire us to do what is good.
Praise be to you!

Triune Lord,
wondrous community of infinite love,
teach us to contemplate you
in the beauty of the universe,
for all things speak of you.
Awaken our praise and thankfulness

for every being that you have made.
Give us the grace to feel profoundly joined
to everything that is.

God of love, show us our place in this world
as channels of your love
for all the creatures of this earth,
for not one of them is forgotten in your sight.
Enlighten those who possess power and money
that they may avoid the sin of indifference,
that they may love the common good,
advance the weak,
and care for this world in which we live.
The poor and the earth are crying out.
O Lord, seize us with your power and light,
help us to protect all life,
to prepare for a better future,
for the coming of your Kingdom
of justice, peace, love and beauty.
Praise be to you!
Amen.

Given in Rome at Saint Peter's on 24 May, the Solemnity of Pentecost, in the year 2015, the third of my Pontificate.

Franciscus

TABLE OF CONTENTS

Chapter six

ECOLOGICAL EDUCATION AND SPIRITUALITY [202-246]

VATICAN PRESS

Pentagon relies on antiquated, dangerous methods for hazardous waste disposal

Gulf Coast Environmental Defense is a grassroots environmental organization that has advocated for the health of the Florida Panhandle community for more than 30 years.

It's a shocking case of arrested development. In a nation that prides itself on high technology, our federal government is burning and detonating hazardous waste in the open air, using stone age disposal methods long ago outlawed for private companies.

How did this happen? In the 1980s, when our federal hazardous waste rules were written, a special exemption was created for waste military explosives. This loophole has a catch: it was only for waste explosives "which cannot be safely disposed of through other modes of treatment."

After decades of technological progress, safer alternative technology is available and has been endorsed by the Department of Defense Explosives Safety Board and the National Academy of Sciences.

Why isn't the Department of Defense using it?

The Pentagon, known for its technologically sophisticated weaponry and communication systems, is relying on the most antiquated methods for ridding itself of waste munitions: open burning and open detonation (OB/OD). This isn't only backward; it's dangerous.

Currently, at more than 60 sites across the United States, millions of pounds of unneeded explosives such as bombs, artillery shells, propellants, tactical missiles, rockets, pyrotechnics, igniters, cartridges, rounds, incendiaries such as napalm, land mines, flares and smoke canisters are burned and exploded in the open air.

OB/OD spews heavy metals, including extremely fine particles of easily breathable lead, depleted uranium and other heavy metals; energetic compounds and perchlorate; dioxins and other organic compounds, often spreading far beyond the point of release, washing into creeks, rivers and bays and leaching into groundwater, exposing service members and

nearby communities. These contaminants can cause cancer, birth defects, cardiac and immune system deterioration, and severe brain damage.

Eglin Air Force Base in Okaloosa County, Florida, is the OB/OD disposal site for waste explosives and munitions generated at Hurlburt Field, Tyndall Air Force Base, Pensacola Naval Air Station, and Navy Support Activity Panama City, as well as Eglin itself. A Florida Department of Environmental Protection (FDEP) permit allows nearly 9 million pounds of these wastes to go up in smoke and come down in air and water pollution.

Although open burning (OB) at Eglin has been authorized for decades, a new FDEP draft permit omits OB. This appears to be a significant improvement, but it continues open detonation (OD) unabated.

Three important information gaps suggest that Eglin's OB/OD may have even greater negative effects on nearby military and civilian communities.

First, it is assumed that Eglin groundwater can be sacrificed to munitions disposal. Already there is enormous pressure on Florida's potable water supplies from rapid development and saltwater intrusion; it is likely that Eglin groundwater and surface water will eventually be needed for drinking water use. Protecting it should be a priority.

Over the years, FDEP records show rapidly increasing levels of poisoned groundwater at Eglin. Levels above the state's excess cancer risk have been recorded since 2006 and continue to rise, doubling between in concentration between 2017 and 2018 at one location. But even this data may understate the danger, since FDEP acknowledges that Eglin's groundwater monitoring has been inadequate to measure the actual threat to onsite workers and residents.

Second, there is no monitoring of Eglin's air emissions. Since OB/OD contamination travels through air, as well as soil, to reach groundwater in these high concentrations, the air pathway must be measured in real time.

Third, both poisoned irrigation water and air deposition may also be exposing local populations through contaminants in garden produce and seafood.

While sites in other states are prohibited from OB/OD of certain wastes such as depleted uranium, dioxins, PCBs, napalm, pesticides, red phosphorus, nerve agents, nuclear devices, riot control gear, asbestos, chemical warfare materiel, and biological agents, there are no such prohibitions at Eglin. And transport of hazardous waste from the other four facilities shares the roads civilian and commercial interests use daily to travel throughout Northwest Florida, risking accidental release that could affect thousands of people along and near by the Interstate10 /Highway 98 corridor between Pensacola and Panama City.

GCED has worked with the Pensacola Bay Area and the Okaloosa and Walton chapters of the League of Women Voters and joined in urging that FDEP require Eglin to begin phasing out OB/OD immediately. Northwest Florida families, military and civilian, should not be subjected to the unnecessary risk of cancer, birth defects, cardiac and immune system deterioration, and severe brain damage so that Eglin can continue its antiquated ways. It's time to move into the 21st century.

Enid Sisskin, PhD, is a director of Gulf Coast Environmental Defense
esisskin@gmail.com

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

JUL 1 3 2010

Arnold P. Wendroff, Ph.D.
544 Eighth Street
Brooklyn, New York 11215-4201

Dear Dr. Wendroff:

Thank you for your correspondence of May 27, 2010 regarding ritualistic mercury use. As always, we appreciate your continuous interest, concern and involvement to raise awareness on issues concerning the ritualistic use of mercury. As was stated in previous communications with you, the EPA has worked well with others to raise awareness on the issue and take action within the current legal framework of our authorities. We will continue to do so in the future. EPA has an ongoing concern about potential mercury (Hg) exposure associated with its use in ritualistic practices. Conceivably, such exposures can even extend to non-users through a scenario where ritualistic Hg practices by previous occupants of residential dwellings have contaminated the living space of the current unsuspecting residents. EPA Region 2 is exploring ways to characterize this potential exposure scenario.

As part of our efforts to find a way to study potential mercury exposure associated with its use in ritualistic practices, we are pursuing the Regional Applied Research Effort (RARE) Program. The RARE Program is one approach EPA takes to promote collaboration between the Regions and EPA's Office of Research and Development (ORD). The goals of the program are to:

1) Provide the Regions with near-term research on high-priority, region-specific science needs,
2) Improve collaboration between Regions and ORD laboratories, and
3) Build a foundation for future scientific interaction.

ORD provides $200,000 per year to each Region to develop a research topic, which is then submitted to a specific ORD laboratory or center as an extramural research proposal. Once approved, the research is conducted as a joint effort with ORD researchers and regional staff working together to meet region-specific needs.

RARE grants are competitively awarded so it's critically important to insure as sound and scientifically rigorous a proposal as possible. Due to the competitive nature of the RARE Program process, there is no guarantee that

any given proposal will be selected. Ultimately, the fate of a RARE proposal is governed by the rigor and regional importance of the study as judged by the members of the Regional Science Council and EPA's Senior Management Team. RARE grants follow a regimented time line - the deadline for the current submission is July 31, 2010. Region 2 is also in active discussion with our colleagues in Region 1 to identify ways in which we can work collaboratively on issues surrounding ritualistic use of mercury. We have discussed with them our draft RARE grant proposals (see below) and are exploring the possibility of a joint proposal.

Studying the prevalence of ritualistic Hg use and its potential for contaminating residential dwellings poses logistic challenges, both legal and cultural. Access agreements would be needed to gain entry into residential dwellings. EPA has explored accessing vacant NYC Housing Authority apartments as a way to obviate this requirement. Another approach would be to expand on a ritualistic Hg study that NJDEP performed in Union City, N.J., where building common spaces (hallways, vestibules, etc.) rather than apartments were sampled. However, getting to an apartment entrance and not beyond does limit the usefulness of the sampling data. Perhaps most promising is an ongoing children's health study being conducted at the Columbia University School of Public Health. The study, which has a sizable Dominican cohort, is primarily focused on asthma triggers and pesticides. Access agreements are already in place; thus, it may be possible to incorporate residential Hg vapor sampling into the study design, although there may be cultural sensitivity associated with sampling to identify ritualistic practices. Issues such as this need to be considered as part of a robust research proposal.

Thank you for your continued interest in public health intervention strategies related to ritualistic Hg use. For any follow-up queries on this issue, please contact Mark Maddaloni of my staff. Mark can be reached at (212) 637-3590 (maddaloni.mark@epa.gov).

Sincerely,

Judith A. Enck

Judith A. Enck
Regional Administrator

U.S. EPA / Region 2/Office of Research and Development
FY11 Regional Applied Research Effort Proposal

PROJECT TITLE AND REGIONAL CONTACT: **Mercury Vapor Sampling in Targeted Housing: Investigation of Ritualistic Mercury Use.** Mark Maddaloni - Office of Strategic Programs, Office of the Regional Administrator (212) 637-3590

DIRECTOR'S NAME: Pat Evangelista - Director, Office of Strategic Programs (212) 637-4447

ORD CONTACT:
Matt Lobber - National Center for Environmental Assessment. (202) 564-3243 lorber.matt@epa.gov

PROJECT DESCRIPTION:

Science and Environmental Issues: Elemental mercury plays a role in several related Afro-Caribbean religions including Santeria (NJDEP, 2003). Such practices include the sprinkling of mercury in residential dwellings. Air monitoring data in the hallways of buildings in areas with a large Afro-Caribbean population in NJ have provided strong evidence that at least 2% of apartments in these areas have an ongoing or historic presence of mercury, consistent with such cultural use, that exceeds the background in non Afro-Caribbean areas (NJDEP, 2003; NJDEP, 2007). Such uses potentially pose a health hazard, not only to those who engage in these practices, but to subsequent occupants of these dwellings.

Research Objectives and Expected Outcomes: Despite knowledge of the existence of ritualistic practices involving mercury, no data exist on levels of in-dwelling exposure. A study conducted previously by NJDEP relied on indirect indicators outside apartments of conditions inside apartments and could not provide an estimate of the airborne concentration of mercury inside the apartments. **Measurement of mercury vapor inside a dwelling, at the point of exposure, is the best environmental indicator of potential hazard. This pilot level study of targeted housing will inform the potential extent and magnitude of mercury vapor contamination secondary to ritualistic practices by directly measuring mercury vapor concentration in targeted housing units.**

Approach: EPA Region 2 and the Office of Research and Development will collaborate with the NJDEP-Office of Science, the Hudson Regional Health Commission (HRHC), the NJ Dept. of Health and Senior Services (NJDHSS), the NJ Dept. of Community Affairs (NJDCA) and UMDNJ (Dr. Michael Gochfeld, M.D., Ph.D.). The study tasks are as follows:

Sampling Design – EPA,NJDEP, NJDCA and HRHC will coordinate to construct a sampling schedule for Union City/West New York, NJ that will coincide with NJDCA's regular inspection of apartment buildings in those areas. Control apartments will be identified from inspections in non Afro-Caribbean communities.

Sampling – HRHC will accompany NJDCA inspectors to apartments where real-time readings for mercury vapor will be conducted using a Lumex portable sampling device. NJDEP owns such a device, and HRHC has extensive experience with its use from the previously-referenced studies.

Response Plan – EPA. NJDHSS, NJDEP and UMDNJ will review the scientific medical literature to derive a graded response plan to be used in the event that above-background levels of mercury vapor are detected in an apartment.

Medical Follow-Up – In the event that a significant exposure is discovered in an occupied apartment, UMDNJ (Dr. Gochfeld) will conduct an initial medical evaluation to determine the need for medical follow-up.

Data Analysis/Report Preparation - In coordination with EPA, NJDEP will take the lead in conducting statistical analysis of the data and in preparation of a draft and final report. All collaborators will review and comment on the draft report.

Estimated Budget and Timetable: Expenses for this study are limited to the following areas:

Partial salaries for HRHC, UMDNJ personnel

Transportation for HRHC

Preparation/printing of educational materials

Possible incentives for occupants

Approximate budget for the study is $40,000-50,000.

Study Duration

Given the estimate from the previously-referenced studies that approximately 2% of apartments in the target communities may have current or historical contamination from cultural uses of mercury, we anticipate the need to sample in 250-300 apartments in order to get a representative sample of mercury vapor exposure levels in impacted apartments.

The rate of inspection of apartments in this study is constrained by NJDCA's inspection schedule (as feasible, we will work with NJDCA to temporarily give precedence to inspections in Union City/West New York). Given these two considerations, we anticipate that the field portion of this study will extend over two years.

References

NJDEP (2003). Cultural Uses of Mercury in New Jersey – Research Project Summary (http://www.state.nj.us/dep/dsr/research/mercury-cultural.pdf).

NJDEP (2007). Cultural Uses of Mercury in New Jersey – Year 2 Mercury Vapor in Residential Buildings – Comparison of Communities That Use Mercury for Cultural Purposes with a Reference Community (http://www.state.nj.us/dep/dsr/research/mercury-cultural-yr2.pdf).

FERNANDO FERRER
BOROUGH PRESIDENT

OFFICE OF THE BRONX BOROUGH PRESIDENT
The Bronx County Building
851 Grand Concourse
Bronx, New York 10451
590-3500

All-America City

April 7, 2000

Antonia Novello, M.D.
Commissioner
New York State Department of Health
Corning Tower
Empire State Plaza
Albany, NY 12237

Dear Commissioner Novello:

It has been brought to my attention that the sale of unlabeled elemental mercury continues to take place in New York City, despite previous publicity of this problem. People who purchase mercury, a legal substance that is sometimes improperly labeled, often use the substance in ways that put their health at risk.

In light of the known health-related dangers of mercury, I urge the State to conduct a public outreach and education campaign on the toxic effects of elemental mercury and to enforce the sale of improperly labeled mercury.

The Department of Health's primary mission is the prevention of illnesses. I ask that you incorporate the issue of mercury poisoning into carrying out your missions.

Sincerely,

FERNANDO FERRER

BPB9191
FF/mn

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FERNANDO FERRER
BOROUGH PRESIDENT

July 23, 1997

Benjamin Mojica, MD, MPH
Acting Commissioner of Health
New York City Department of Health
125 Worth Street
New York, NY 10013

Dear Commissioner Mojica:

It has recently been brought to my attention that the sale of unlabeled elemental mercury is still ongoing in New York City. I understand that in the past the New York City Department of Health (NYCDOH) has taken steps to raise public awareness on this issue and to educate communities across the City about the dangers associated with this hazardous chemical.

In light of the recent warnings issued by the Agency for Toxic Substances and Disease Registry (ATSDR) and the Environmental Protection Agency (EPA), I urge the NYCDOH to once again conduct a public outreach and education campaign on the toxic effects of elemental mercury, particularly for pregnant women and children. As reported last year in the American Journal of Public Health, it is quite easy to purchase mercury in New York City. Purchasers, however, should be made aware of the risks involved and your role in raising public awareness is important.

I also understand that you will be meeting with the EPA and the NewYork State Department of Health to further discuss this issue. I would appreciate being kept informed of your continued efforts in this area.

Sincerely,

FERNANDO FERRER

BHHSDC #7116

Fluoridation Policy:

An Annotated Bibliography of Published Science

A sampling of the scientific studies and reports relevant to water fluoridation published since the HHS 2015 recommendation to lower the fluoridation target to 0.7 ppm is listed below.

I suggest these items provide compelling evidence that 0.7 ppm is neither optimal nor safe and that any claims to the contrary are ill-founded. Moreover, protests that more study is required before banning fluoridation is a tacit endorsement of human experimentation without individual consent which is medical assault - *Karen F. Spencer*

2021

BENCHMARK DOSE ANALYSIS: Using fluoride studies from MIREC and ELEMENT projects as input, the results of which are consistent with other studies, authors identify 0.2 mg/L as having an adverse impact on neurodevelopment. “The prospective studies offer strong evidence of prenatal neurotoxicity, and the benchmark results should inspire a revision of water-fluoride recommendations aimed at protecting pregnant women and young children.” https://pubmed.ncbi.nlm.nih.gov/34101876/

- Grandjean P, Hu H, Till C, Green R, Bashash M, Flora D, Tellez-Rojo MM, Song P, Lanphear B, Budtz-Jørgensen E. A Benchmark Dose Analysis for Maternal Pregnancy Urine-Fluoride and IQ in Children. Risk Analysis. 8 June 2021.

LIFETIME EXPOSURE: Fluoridation is the primary source of fluoride exposure for 1,629 Canadians between 3 and 79 that finds substantially higher lifetime fluoride exposure in fluoridated communities using CHMS data, increasing with age. Vulnerable subpopulations to adverse effects of fluoride noted as the young, those who are iodine deficient, and post-menopausal women. https://www.mdpi.com/1660-4601/18/12/6203/htm

- Julia K. Riddell, Ashley J. Malin, Hugh McCague, David B. Flora, and Christine Till. Urinary Fluoride Levels among Canadians with and without Community Water Fluoridation. Int. J. Environ. Res. Public Health 2021, 18(12), 6203.

KIDNEYS: This study of 1,070 adults found every 1 mg/L increment in the urinary fluoride concentrations was associated with significant increases of 22.8% in the risk of kidney function injury after adjusting for potential confounding factors. Authors conclude that long-term fluoride exposure is associated with compromised kidney function in adults, and that urinary NAG is a sensitive and robust marker of kidney dysfunction caused by fluoride exposure. https://pubmed.ncbi.nlm.nih.gov/34478979/

- Wu L, Fan C, Zhang Z, Zhang X, et al. Association between fluoride exposure and kidney function in adults: A cross-sectional study based on endemic fluorosis area in China. Ecotoxicol Environ Saf. 2021 Aug 31;225:112735.

BEHAVIORAL CHANGES: Children in Cincinnati Childhood Allergy and Air Pollution Study (CCAAPS) assessed at age 12. Boys in particular did not experience significant anxiety or depression, yet had somatic behaviors based on their childhood urinary fluoride (CUF) concentrations, “seven times more likely to exhibit ‘at-risk’ internalizing symptomology.” https://pubmed.ncbi.nlm.nih.gov/34755609/

- Adkins EA, Yolton K, Strawn JR, Lippert F, Ryan PH, Brunst KJ. Fluoride exposure during early adolescence and its association with internalizing symptoms. Environ Res. 2021 Oct 29:112296.

CRITICAL WINDOWS: Using urine samples and test scores from 596 mother-child Canadian pairs in the MIREC prospective cohort, researchers found evidence that developmental neurological damage was based on timing of fluoride exposure and gender, "Associations between fluoride exposure and PIQ (performance IQ) differed based on timing of exposure. The prenatal window may be critical for boys, whereas infancy may be a critical window for girls." https://pubmed.ncbi.nlm.nih.gov/34051202/

- Farmus L, Till C, Green R, Hornung R, Martinez-Mier EA, Ayotte P, Muckle G, Lanphear B, Flora D. Critical Windows of Fluoride Neurotoxicity in Canadian Children. Environ Res. 2021 May 26:111315.

GENES: Several genes make individuals more vulnerable to the neurotoxic impact with gender differences, also affecting mitochondria and suggesting vulnerability to dementia. Chinese study of 952 school children between 7 and 13 using water, urinary, hair and nail fluoride identified multiple neurodevelopmental metabolic pathways that result in adverse effects from low fluoride exposures. https://www.sciencedirect.com/science/article/pii/S0160412021003068

- Yu X, Xia L, Zhang S, et al. Fluoride exposure and children's intelligence: Gene-environment interaction based on SNP-set, gene and pathway analysis, using a case-control design based on a cross-sectional study. Environ Int. 2021 Jun 4;155:106681.

GENETIC VULNERABILITY: Dopamine relative genes affect the susceptibility of individuals to fluoride toxicity even in safe water concentrations which result in lowered IQ so that "low-moderate fluoride exposure is inversely related to children's IQ." https://pubmed.ncbi.nlm.nih.gov/33360592/

- Zhao L, Yu C, Lv J, et al. Fluoride exposure, dopamine relative gene polymorphism and intelligence: A cross-sectional study in China. Ecotoxicology and Environmental Safety. 2021 Feb;209:111826.

BRITTLE BONES: "In this cohort of postmenopausal women, the risk of fractures was increased in association with two separate indicators of fluoride exposure. Our findings are consistent with RCTs and suggest that high consumption of drinking water with a fluoride concentration of ~1 mg/L may increase both BMD (bone mineral density) and skeletal fragility in older women." https://pubmed.ncbi.nlm.nih.gov/33822648/

- Helte E, Donat Vargas C, Kippler M, Wolk A, Michaëlsson K, Åkesson A. Fluoride in Drinking Water, Diet, and Urine in Relation to Bone Mineral Density and Fracture Incidence in Postmenopausal Women. Environ Health Perspect. 2021 Apr;129(4):47005.

OSTEOARTHRITIS: Identifies fluoride as an environmental chemical that has adverse effects on articular cartilage and osteoarthritis (OA) risk. "In full sample analysis, a 1 mg/L increase in UF (urinary fluoride) level was associated with a 27% higher risk of OA." https://link.springer.com/article/10.1007/s12011-021-02937-2

- Sowanou, A., Meng, X., Zhong, N. et al. Association Between Osteoarthritis and Water Fluoride Among Tongyu Residents, China, 2019: a Case–Control of Population-Based Study. Biol Trace Elem Res (2021).

NO BENEFIT FOR PRESCHOOLERS: Polish study finds 'optimal' fluoride concentrations in water provide no dental benefit. Dental caries experience depended on oral hygiene and diet. https://www.sciencedirect.com/science/article/abs/pii/S0946672X2100016X

- Opydo-Szymaczek J, et al. Fluoride exposure and factors affecting dental caries in preschool children living in two areas with different natural levels of fluorides. Journal of Trace Elements in Medicine and Biology. Volume 65. 2021.

ALTERNATIVE: This systematic review and meta-analysis concludes that biomimetic hydroxyapatite-containing, fluoride-free oral care products are effective in reducing dental decay, especially in children without the risk of dental fluorosis and neurotoxicity inherent in topical use of fluoridated products. https://files.cdha.ca/profession/journal/2752.pdf

- Hardy Limeback, BSc, PhD, DDS; Joachim Enax, Dr; Frederic Meyer, Dr. Biomimetic hydroxyapatite and caries prevention: a systematic review and meta-analysis. | Can J Dent Hyg 2021;55(3): 148-159.

AMERICAN KIDNEYS: Using U.S. NHANES data from two recent cycles, finds 'optimal' amounts of fluoridated water results in high incidence of uric acid in adolescents suggesting higher risk of kidney disease and other illnesses. Identifies dose-response trend in plasma fluoride of teens.
https://www.sciencedirect.com/science/article/pii/S0147651320315074

- Yudan Wei, Jianmin Zhu, Sara Ann Wetzstein. Plasma and water fluoride levels and hyperuricemia among adolescents: A cross-sectional study of a nationally representative sample of the United States for 2013–2016. Ecotoxicology and Environmental Safety. Volume 208. 15 January 2021.

TODDLERS: The Programming Research in Obesity, Growth, Environment and Social Stressors (PROGRESS) cohort included 948 mother-child pairs from Mexico City. Blinded testing of children between one and 24 months to examine associations between maternal fluoride intake from food and beverages during pregnancy and offspring neurodevelopment in this prospective and longitudinal study found, "higher exposure to fluoride from food and beverage consumption in pregnancy was associated with reduced cognitive outcome, but not with language and motor outcome in male offspring over the first two years of life."
https://fluoridealert.org/wp-content/uploads/cantoral-2021.final_.pdf

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NO SAFE DOSE: Study of Mexican children and their mothers using measurements of urinary fluoride and water concentrations associated dental fluorosis and lowered IQ with fluoride dose consistent with findings of larger studies in other countries. Authors declare WHO fluoride guidelines are unsafe and hypothesize that 0.045 F^- mg/day is a protective exposure
https://www.mdpi.com/1660-4601/18/21/11490/htm

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INFLAMED GUTS: Exposure to fluoridated water at both doses (10 mg/L & 50 mg/L) inflame guts in rats and alters the gut microbiome as compared to control (0 mg/L).
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SAFETY: Evidence of dental fluorosis and other adverse effects to bodies and brains from supposed safe concentrations is alarming. "The safety of public health approach of drinking water fluoridation for global dental caries reduction are urgently needed further research."
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SKELETAL FLUOROSIS: This Chinese study of the pathogenetic progression of skeletal fluorosis, details how local signaling pathways, hormones, promoter DNA hypermethylation, RNA expression etc. are affected by fluoride exposure leading to pain and disability. https://www.mdpi.com/1422-0067/22/21/11932/htm

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BLOOD: Canadian Health Measures Survey (CHMS) collects extensive biomonitoring data used to assess the exposure of Canadians to environmental chemicals finds higher fluoride in urine associated with significantly higher blood lead, urinary lead, etc. Also finds urinary selenium is significantly lower in fluoridated Canadian communities, “this is the first study where biomonitoring data from multiple cycles of CHMS were combined in order to generate robust estimates for subsets of the Canadian population. Such assessments can contribute to a regional-level prioritization of control measures to reduce the exposure of Canadians to chemicals in their environment.”
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IODINE: Identifies and discusses the biochemical and hormonal impact of fluoride and fluoridation policy on iodine metabolism with consideration of related neurodevelopmental and pathological disorders. https://www.mdpi.com/1660-4601/16/6/1086

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NUTRITION: The f-ion is a poison but the bioavailability of CaF is different than NaF as calcium is the antidote to fluoride poisoning. In addition to being in water and dental products, 20% of pharma and 40% of agrichemicals have a fluoride base. Consequently, people are exposed to excessive amounts of fluoride which contributes to chronic disease.
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THYROID: 18% of people drinking 'optimally' fluoridated water in Canadian communities have a heightened risk of low thyroid function because fluoride interferes with iodine metabolism. Many of them will be sub-clinical and not know they are mildly hypothyroid, which nevertheless increases their risk for diabetes, high cholesterol, and other problems. Study excluded those already diagnosed with thyroid disease. (CHMS)
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THYROID: Even 0.5 ppm fluoride in water has an adverse impact on thyroid hormones. Water is currently fluoridated to 0.7 ppm, a reduction from up to 1.2 ppm in 2015.
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OVERDOSED BABIES: Over one third of babies (37%) in fluoridated American communities consume amounts of fluoride in excess of the upper limits of fluoride considered safe per government regulations. Even 4% of babies in non-fluoridated communities are overdosed on fluoride due to consumption of products made with fluoridated water. At the very least, this puts these children at high risk for developing dental fluorosis. Dental fluorosis is associated with increased incidence of learning disabilities, broken bones and kidney disease.
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GOVERNMENT BIAS: A National Toxicology Program animal experiment studying the impact of fluoride consumption used the wrong rats, the wrong dose, and the wrong study design in order to manufacture a finding of no prenatal or postnatal effect.
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PREGNANT WOMEN: Pregnant Canadian women drinking 'optimally' fluoridated water had twice the fluoride exposure per individual testing as compared to pregnant women in non-fluoridated Canadian communities - and consistent with the range in the Mexican women in the ELEMENT cohort whose children had up to 6 points lowered IQ based on prenatal exposure to fluoride (from salt). The Canadian study excluded those with health conditions such as kidney disease as well as considered confounding factors such as tea consumption.
https://ehp.niehs.nih.gov/doi/pdf/10.1289/EHP3546

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LEARNING DISABILITIES: Over 200 children were individually tested. Study found attention deficit disorder apparently caused by their prenatal exposure to fluoride specific to dose. This is the 3rd report out of the NIH sponsored 12 year ELEMENT project that has confirmed low dose prenatal exposure to fluoride consistent with exposure in 'optimally' fluoridated communities causes subtle but permanent brain damage for many consumers. Excluded those with history of mental illness or conditions such as diabetes and renal disease.
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- Verena Romero, Frances J. Norris, Juvenal A. Ríos, Isel Cortés, Andrea González, Leonardo Gaete, Andrei N. Tchernitchin. The impact of tap water fluoridation on human health. Rev. méd. Chile vol.145 no.2 Santiago Feb. 2017.

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2018 Open Letter: http://www.multibriefs.com/briefs/icim/nutrition.pdf
2019 Children's Health Defense Statement: https://childrenshealthdefense.org/news/u-s-water-fluoridation-a-forced-experiment-that-needs-to-end/
2020 Expert Opinion: https://www.ehn.org/fluoride-and-childrens-health-2648120286.html

"…fluoride is presumed to be a cognitive neurodevelopmental hazard to humans…"
- Draft Monograph from National Toxicology Program, "Systematic Review of Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects" (Sept 6, 2019)

Fluoridation policy poses a hazard to an unsuspecting public

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DEFINITIONS:

- **Endorsement**: An endorsement is an authoritative statement reflecting a point of view for the purpose of exerting influence. An endorsement is ***not*** an expert opinion.
  - **Authoritative statement:** An opinion that interprets a rule, law or policy for the purpose of guiding, influencing, or mandating action. Authoritative statements are not inherently trustworthy or reliable, but they are inherently manipulative. "Testimonial propaganda" utilizes authoritative statements in marketing and in politics. The slogan "question authority" was intended to encourage critical thinking in order to combat the blind acceptance of biased authoritative statements that endorse policy and/or sanctioned narratives. (*Logical Fallacies: Appeal to Authority*)
- **Expert Opinion**: An expert opinion is dependent on evidence and the due diligence of someone with substantial study in a field. The Daubert Standard is a legal process that validates the trustworthiness of experts offering opinion in a court of law.

EXAMPLES:

ENDORSEMENT: The April 2015 HHS statement recommending 0.7 ppm fluoride concentration in drinking water for 'safe & effective' prevention of tooth decay promoted the long standing fluoridation policy of the agency.
vs.
EXPERT OPINION: The June 2015 Cochrane report finds no reliable evidence of dental benefit to adults or low income children, but documents substantially higher rates of dental fluorosis, some of which will likely result in costly cosmetic dentistry.
The 2019 National Toxicology Program systematic review offered an expert opinion based on the evidence that fluoride is a presumed hazard to human health specific to neurotoxic impact when exposure is pre- or post-natal.

Water Fluoridation and Environmental Justice

a report submitted to the

Environmental Justice Interagency Working Group

from

The Fluoride Action Network
http://fluoridealert.org/

September 25, 2015

Do you want them drinking a neurotoxic chemical ?

STOP
Artificial Water Fluoridation

FluorideAlert.org

Water Fluoridation and Environmental Justice

This report was prepared by Neil Carmen, Ellen Connett and Paul Connett, with contributions from other members of the Fluoride Action Network, including David Kennedy, Chris Neurath, John Graham, Tara Blank, and Dan Stockin**.**

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Fluoride Action Network
http://fluoridealert.org/

September 25, 2015

To the Environmental Justice Interagency Working Group

Re: Water Fluoridation and Environmental Justice

We are submitting these comments to the EJ Interagency Working Group in support of the formation and agenda goals of this group. We believe that the attached report (Water Fluoridation and Environmental Justice) gives a clear example of how such an interagency group working cooperatively together can right a bad policy for poor families and communities of color.

Hitherto, water fluoridation has fallen through the cracks as far as regulation by federal agencies has been concerned. The Food and Drug Administration has never regulated fluoridation nor have they ever tested the safety of fluoride. Their position is that fluoride is an "unapproved drug." The Environmental Protection Agency's Office of Water, since 1985, has had no jurisdiction over any chemical ADDED to water, only contaminants. The Department of Health and Human Services promotes fluoridation through the Division of Oral Health at the Centers for Disease Control and Prevention.

Here is the nub of the problem that needs correcting by interagency action. The CDC's Oral Health Division has become a "rogue elephant" as far as this practice is concerned. Their mission is to promote fluoridation – and they do so effectively and aggressively – but the problem is that they have a conflict of interest when it comes to monitoring or even questioning the safety of this practice. That has led them into performing with gross negligence in regards to the adverse effects of fluoridation on the poor and communities of color for several decades. Moreover, the expertise in this department is largely dental. Few if any of their personnel have training in other areas of medicine, toxicology or health risk assessment.

Since 1950, when fluoridation was approved, the role of federal agencies has been only to support the policy and in so doing they have had to dismiss and discredit anyone or any of the thousands of studies that reveal the inherent risks in this anti-science experiment.
For over 60 years-American citizens have been treated to Public Relations and propaganda rather than a dispassionate and objective analysis of either the effectiveness or safety of this practice.

Now that serious health effects have been documented – particularly fluoride's neurotoxic effects - it is time to end this practice. Very seldom can the simple turning off a tap (i.e. the spigot at the public water works) do so much good for so many.

We urge you to continue on the trajectory you have started. Working together you may be able to right many wrongs and in so doing regain the respect and trust of the American people.

Neil Carman, Ellen and Paul Connett
and other members of the Fluoride Action Network

"Federal agencies must identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations."
(Presidential Executive Order 12898
of February 11, 1994)

TABLE OF CONTENTS

WATER FLUORIDATION and ENVIRONMENTAL JUSTICE

Executive Summary

Evidence is presented that artificial water fluoridation as promoted by federal agencies has been ineffective in fighting tooth decay and in addition causes "*disproportionately high and adverse human health…effects…on minority populations and low-income* populations," in violation of Presidential Executive Order 12898 of February 11, 1994. This problem has been seriously compounded by the failure of these same agencies to warn communities of color of their special vulnerabilities to fluoride exposure in general and the water fluoridation program in particular. The agencies' actions are fueling calls by civil rights and environmental leaders for investigative hearings by Congress.

The way the EPA Office of Water is approaching its requirement to establish a safe level of fluoride in drinking water is not scientifically defendable, is politically compromised and makes absolutely no attempt to address numerous environmental justice issues that arise from water fluoridation.

There are more positive, effective, and comprehensive ways of fighting tooth decay, which also prevent disproportionate harm to poor families and communities of color and do not violate their civil rights.

Those who promote fluoridation correctly claim that most of tooth decay is concentrated in low-income families and those from communities of color. That is why it is tragic that 80% of dentists in the U.S. refuse to treat children on Medicaid. The poor need special and focused attention. Putting a toxic substance into everyone's drinking water is a very poor substitute. Water fluoridation has not evened-up the playing field as evidenced by the numerous reports of the dental crises being reported among low-income and communities of color in large U.S. cities that have been fluoridated for over 20 years. Far from helping low-income families and communities of color fluoridation causes them disproportionate harm.

Officials in the US Public Health Service knew as early as 1962 that African-Americans had a higher prevalence of dental fluorosis than whites. Dental researchers have continued to report this over many decades. In 2005 the CDC reported that both Blacks and Hispanic children had higher rates of dental fluorosis particularly in its most disfiguring categories (moderate and severe). However, in all this time neither the CDC nor any other federal agency that promotes water fluoridation has sought to warn communities of color of their particular vulnerability with respect to this permanent visually objectionable injury from systemic exposure to fluoride. Nor have they indicated what this means: their children have been over-exposed to fluoride before their permanent teeth have erupted and this over-exposure might indicate they have been damaged in other ways. This failure to warn communities of color of this problem is a clear example of environmental *injustice*.

When the US Public Health Service endorsed fluoridation in 1950 (before any trial had been completed or any meaningful health study had been published) it quickly fossilized into a policy that was considered beyond debate. Although the FDA has never *approved* any fluoride containing substance intended to be ingested for the purpose of reducing tooth decay it has *rejected* fluoride-containing vitamins stating that, "there is no substantial evidence of drug

effectiveness as prescribed, recommended, or suggested in its labeling." Drug therapy 1975.

Water fluoridation has never been subjected to an individual-based random control trial (RCT) for either effectiveness or safety. Very few basic health studies have been conducted in fluoridated countries and only in recent years have some of the studies of serious toxic and health effects of fluoride (e.g. lowered IQ) been published, and mainly in non-fluoridated countries.

Fluoride is not an essential nutrient. There is no need to swallow it: fluoride's beneficial action can be achieved with direct application of fluoridated toothpaste onto the tooth surface. Tooth decay in children from low-income families is not caused by too little fluoride but poor nutrition, including far too much sugar.

The EJ issue goes beyond just dental fluorosis and the failure of the government agencies to warn communities of color about their vulnerability. Fluoridation penalizes families of low-income in the following ways.

1) They cannot afford to avoid fluoridated water if they want to do so because both removal equipment and bottled water (for drinking and cooking) is very expensive.
2) They cannot afford the expensive treatments to conceal the effects of dental fluorosis (a discoloration and mottling of the enamel).
3) Dental fluorosis rates are higher in fluoridated communities especially in Black and Hispanic populations than White.
4) Fluoride's toxicity is made worse by poor nutrition.
5) Lactose intolerance is more frequent among Blacks and other ethnic groups than white, and less consumption of dairy products means lower exposure to calcium, which helps to protect against absorption of fluoride from the gut.
6) Low-income families from communities of color are less likely to breast-feed their children. Low fluoride ready-to-feed formula is more expensive as is distilled water therefore when baby formula is made up with fluoridated water, the baby gets over 100 times more fluoride than a breast-fed child.
7) Fluoride has been associated with lowered IQ in children in 45 studies (as of Sept 2015).
8) Children living in the inner cities are more likely to be exposed to lead from flaking old paint, air pollution, etc. leading to cognitive damage. Exposure to fluoride adds to this toxic burden. Research from the University of North Carolina demonstrated that the chemicals used in fluoridation increase the leaching of lead from brass plumbing fixtures into drinking water.
9) Communities of color have a greater incidence of kidney disease. Because poor kidney function makes it more difficult for the body to get rid of fluoride kidney patients must avoid as much exposure to fluoride as possible.
10) Communities of color have a greater incidence of diabetes, which can lead to increased consumption of water, which in turns leads to a greater consumption of fluoride.

Two strategic goals in the Interagency Working Group on environmental justice (EJ IWG) action agenda for fiscal years 2016- 2018, create a very positive framework within which we can move forward on this issue. These strategic goals are:

I. Enhance communication and coordination to improve the health, quality-of-life, and economic opportunities in overburdened communities;
II. Enhance multi-agency support of holistic community-based solutions to solve environmental justice issues;

These goals challenge us to find a plan not just to fight tooth decay in children but also to improve their "health, quality of life and economic opportunities" and to do so with "community-based solutions," which will involve "multi-agency support."

We have taken up this challenge in our 5-step alternative plan to water fluoridation.

Our positive, creative and holistic plan aims to fight tooth decay in low-income children but also find ways to improve their health, their fitness, their quality of life, their intellectual development and possibly even their employment within the community. We would like to go further. Our plan also works on other aspects of community development, including its food supply, its discarded resources, its local employment and business opportunities and the need to lower its carbon footprint.

In our 5-step program we are proposing that we start with ending water fluoridation in step 1 and then use the money saved on chemicals, equipment and promotion to finance step 2. This second step involves an educational program for young children modeled after programs in Scotland and Denmark. One aim of this is to reduce sugar consumption. If that is done well it will also help to fight obesity and that over the long-term will produce huge savings in health costs. This should encourage the HHS to provide additional funding needed for step 2 and some of the funding for steps 3 and 4. Here is a summary of the 5 steps:

1) **End water fluoridation.** The EPA's Office of Water could do this swiftly if they were instructed to determine a safe level of fluoride to protect all children from lowered IQ. This would not only remove a threat to children's intellectual development and future economic potential, but it would also end a number of extra and unnecessary health threats for communities of color, especially for people with poor kidney function; borderline iodine deficiency and diabetes. Never has turning off a tap promised so much.
2) **Establish the equivalent of both Scotland's very successful Childsmile program and the Danish program for pre-schoolers**, in all pre-school programs, kindergarten and primary schools (and possibly churches) and WIC programs in low-income areas.
3) **Set up dental clinics either in schools or stand-alone facilities** in the inner city and other low-income areas. In these we should use trained dental nurses to restore decay-damaged teeth and to remove infected ones.
4) **Expand these dental clinics into community centers** aimed at improving the child's overall health**.** They could support better nutrition, physical fitness and cultural activities. Ideally these community centers would be linked to local community gardens and farms close to the city.

5) **Further expand these community centers** into job-creating operations and a foundation for local business opportunities. One concrete way of doing this is to integrate a ”reuse and repair” operation into the Zero Waste approach for handling discarded materials.

More than anything else a scientifically balanced approach allows the transition from the politics of “no” to the politics of “yes.” Once we get off the shortsighted notion that we can battle tooth decay by putting a neurotoxic chemical into the public drinking water, we can unleash not only the full potential of the children from low-income communities, but also of the communities themselves. The three key words are education, nutrition and justice. We need education (not fluoridation) to fight tooth decay and obesity. We need better nutrition to keep our children and ourselves as healthy as possible and we need Environmental Justice for all.

1. Abstract

Evidence is presented that artificial water fluoridation as promoted by federal agencies has been ineffective at helping fight tooth decay in the inner cities and in addition causes "*disproportionately high and adverse human health…effects…on minority populations and low-income populations,"* in violation of Presidential Executive Order 12898 of February 11, 1994. This problem has been seriously compounded by the failure of these same agencies to warn minority populations of their special vulnerabilities to fluoride exposure in general and the water fluoridation program in particular. The current *ongoing* determination by the Environmental Protection Agency's (EPA) Office of Water of a new Maximum Contaminant Level Goal (MCLG) and the Maximum Contaminant Level (MCL) for fluoride as reported in 2011 is scientifically flawed and betrays an insensitivity to Environmental Justice issues. There are more positive and creative ways of fighting tooth decay in the inner city, which also address other EJ issues in a holistic fashion.

2. Introduction

Water fluoridation is the deliberate addition of a fluoride-containing compound to the water supply to produce a concentration of free fluoride ions at about 1 ppm (i.e. 1.0 milligram of fluoride per liter). As of April, 2015 the new recommended level by the U.S. Department of Health and Human Services (HHS) is 0.7 ppm. The stated purpose of this practice is to help fight tooth decay.

Fluoridation began in the U.S. and Canada in 1945 (see timeline below). This is a very unusual practice as it is the only time that the public water supply has been used as a vehicle to deliver medical or human treatment. All the other chemicals added to water are added to make the water safe or palatable to drink.

While fluoridation is widely practiced in the USA **most countries do not fluoridate their water.** 97% of the European population does not drink fluoridated water (a few countries fluoridate their salt, which allows the consumer the choice of whether to buy it or not). Yet according to World Health Organization (WHO) data (available online) there is little difference in tooth decay in 12-year-olds between fluoridated and non-fluoridated countries today.

In 1999 the CDC published a figure (see Figure 1) that suggests that dental caries was being reduced in 12-year-olds from the 1960's to the 1990's as the percentage of the US population drinking fluoridated water had increased.

Figure 1

FIGURE 1. Percentage of population residing in areas with fluoridated community water systems and mean number of decayed, missing (because of caries), or filled permanent teeth (DMFT) among children aged 12 years — United States, 1967–1992

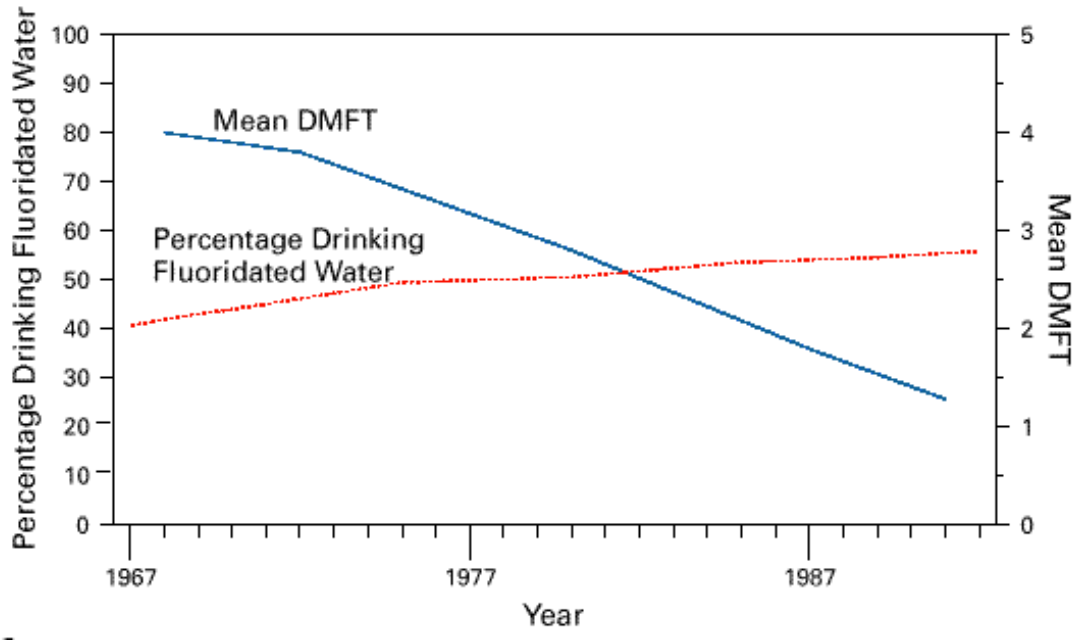


Figure 1: A copy of Figure 1 in the CDC review, TITLE CDC (1999).

However, in Figure 2, World Health Organization (WHO) data is plotted for tooth decay in 12-year-olds for both fluoridated and non-fluoridated countries, and it can seen that the decay rates have been coming down as fast, if not faster, in the non-fluoridated countries as the fluoridated countries. It is surprising therefore the CDC should conclude that the declines in the US have been caused by fluoridation.

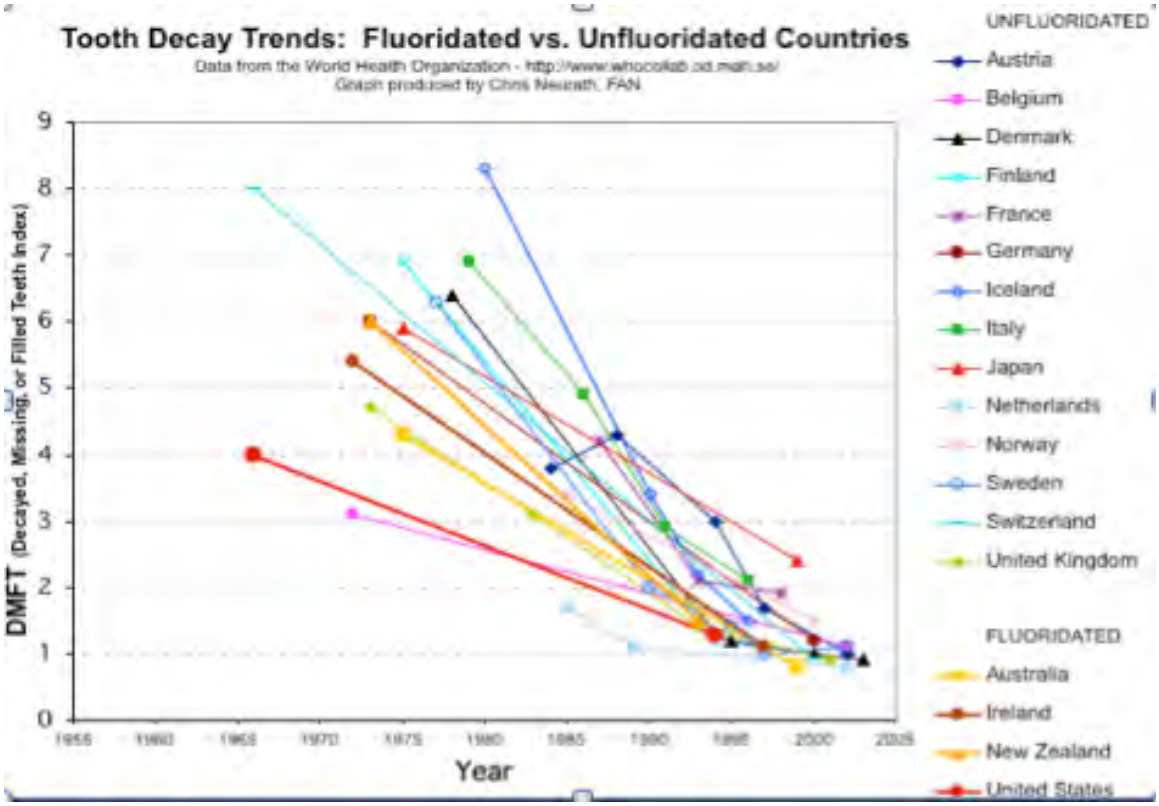


Figure 2: WHO data on tooth decay in 12-year-olds for 18 countries, 4 Fluoridated, 13 non-fluoridated and 1 (UK) partially fluoridated, plotted from the 1960s to 2000's (Graph by Chris Neurath; see FAN, 2012a).

We would do well to study the ways that European countries have achieved reduction of tooth decay in low-income families without forcing their citizens to swallow fluoride. Of particular interest are the Childsmile program in Scotland and the Nexø Program in Denmark.

3. Why are some people opposed to the practice of Water fluoridation?

The arguments given by many citizens and scientists opposed to fluoridation include the following.

1) Once added to the water there is no way that the dose each individual receives can be controlled.

2) Nor can we control who receives the treatment – it goes to everyone regardless of age, health or nutritional status.

3) It violates the individual's right to informed consent to human treatment.

4) It is difficult and expensive to avoid, as cheap filters don't remove the fluoride. This makes this doubly unethical for low-income families who don't want this treatment.

5) No doctors are overseeing the treatment or monitoring side-effects.

6) The Food and Drug Administration (FDA) has never regulated fluoride for ingestion. According to the FDA fluoride is an "unapproved drug".

7) Incredibly, after 70 years there has not been one single individually-based randomized control trial (RCT) to demonstrate safety or effectiveness

8) Fluoride is not an essential nutrient. No one has ever shown that if an animal is starved of fluoride in its diet that it develops a disease. An individual can have perfectly good teeth without fluoride. Tooth decay is not caused by too little fluoride but by poor dental hygiene and a poor diet, including too much sugar.

9) There is not one biological process in the body that needs fluoride to function properly but many that are harmed by it. Fluoride inhibits enzymes and interferes with G-proteins, which carry important messages across cell membranes. See Barbier et al. (2010) for a review of the biochemical mechanisms of fluoride's toxic action.

10) Nature in her wisdom has kept fluoride away from the baby. The level in mothers' milk is very low (0.004 ppm, NRC, 2006; 0.004 to 0.008, Sener, 2007) Thus the breast-fed baby is protected from fluoride, but that protection is removed by water fluoridation. A bottle-fed baby where the formula is made up with fluoridated tap water (at the new recommended guideline of 0.7 ppm fluoride) gets over 100 times more fluoride than a breast-fed baby.

11) Even promoters of fluoridation now admit the predominant mechanism of fluoride's beneficial action on the teeth is *topical* not *systemic* (CDC, 1999). In other words one does not need to swallow this toxic substance to get the purported benefit. Brushing the teeth with fluoridated toothpaste is a more rational delivery system, which minimizes exposure to other tissues and does not force it on people who don't want it.

12) Fluoridation promoters have wildly exaggerated the benefits of swallowing fluoride. A recent Cochrane review (the gold standard for evidence-based medicine) concluded that the scientific studies that have purported to demonstrate effectiveness have been of a very poor quality (Iheozor-Ejiofor et al., 2015) .

13) Fluoridation poses many health risks.

14) Of particular concern is the large number of animal and human studies that indicate that fluoride is neurotoxic (i.e. it can enter and interfere with brain chemistry) including 45 (out of 51) studies that have associated fairly modest exposure to fluoride and lowered IQ in children.

15) The last children in the USA that need their IQ lowered are children from low-income families, who are precisely those who have been targeted by those promoting this practice.

16) There are many other health concerns. These include lowered thyroid function (Peckham et al., 2015); accumulation in the human pineal gland (Luke 1997, 2001); ADHD (Malin and Till, 2015); accumulation in the bone (arthritis, NRC, 2006, increased hip fractures in the elderly, Li et al, 2001) and an increased risk of osteosarcoma in young boys when exposed in their 6^{th} -8^{th} years (Bassin et al, 2006).

17) U.S. children are being hugely over-exposed to fluoride from all sources as evidenced by the prevalence of dental fluorosis, which now impacts 41% of 12-15 year olds (Beltrán-Aguilar et al., 2010). The rates are higher for Black and Hispanics (Beltrán-Aguilar et al., 2005).

18) Now that it has become clear that low-income and minority communities are more

vulnerable to dental fluorosis and probably fluoride's other toxic effects fluoridation has become a major Environmental Justice issue and needs to be re-assessed from that perspective.

4. Fluoridation and Environmental Justice.

Those who promote fluoridation often do so based upon equity considerations. They correctly claim that most of tooth decay is concentrated in low-income families and especially in communities of color. In the United States, according to Kaste at al. (1996), 25 percent of children and adolescents experience 80 percent of all dental decay occurring in permanent teeth. However, the evidence suggests that promoters were being overly optimistic when they thought that forcing everyone to swallow fluoride would even-up the playing field when it comes to these dental inequalities.

As we explain below fluoridation far from helping low-income families is actually hurting them. In fact fluoridation is a rather graphic example of environmental *injustice*.

Fluoridation penalizes families of low-income, especially communities of color in the following ways.

1) Low-income families cannot afford to avoid fluoridated water if they want to do so because both removal equipment and bottled water (for drinking and cooking) is very expensive.

2) Low-income families cannot afford the expensive treatments to conceal the damage that fluoride can cause to the enamel (dental fluorosis).

3) Dental fluorosis rates are higher in Black and Hispanic communities than White communities especially in the more severe forms that require treatment (Beltrán-Aguilar et al., 2005).

4) Fluoride is more toxic when exposure is accompanied by poor nutrition. Poor nutrition is more likely to occur in low-income families than those with higher incomes. This is what was said about this issue in a 1952 article that appeared in the Journal of the American Dental Association:

> "The data from this and other investigations suggest that malnourished infants and children, especially if deficient in calcium intake, may suffer from the effects of water containing fluorine while healthy children would remain unaffected…Thus low levels of fluoride ingestion which are generally considered to be safe for the general population may not be safe for malnourished infants and children. Therefore, the nutritional status must be carefully assessed and guarded in areas with endemic fluorosis. Nutritional studies should be included in any comprehensive program of fluoridation of water with special attention to chronically ailing infants and children." (Massler & Schour 1952).

5) Lactose intolerance is more frequent among Blacks and other ethnic groups than white, and less consumption of dairy products typically means lower exposure to calcium. Calcium in the diet helps to a certain extent to protect against absorption of fluoride from the gut.

6) Minority families are less likely to breast-feed their children. When baby formula is made up with fluoridated water it leads to over 100 times more exposure to fluoride than breast-feeding.

7) Fluoride is neurotoxic and in 45 studies it has been associated with lowered IQ in children. The last children that need their IQ lowered are children from low-income families.

8) Low-income and minority groups living in the inner city are likely to have a greater exposure to lead. Fluoride appears to enhance the toxicity of lead. Lead increases the risk of dental fluorosis. Both lead and fluoride are neurotoxic.

9) Children from low-income families are more likely to get mercury amalgam fillings than families with higher income. Mercury is neurotoxic. The combined impact of mercury and fluoride on a child's mental development may be greater than either acting alone.

10) Minority communities have a greater incidence of kidney disease. Poor kidney function increases fluoride's uptake into the bone, which is likely to increase the rates of arthritis and hip fractures (over a lifetime).

11) Minority communities have a greater incidence of diabetes, some forms of which lead to an increased consumption of water, which in turns leads to a greater consumption of fluoride.

Many of these issues are discussed in more detail and documented in the text below.

5. The history of the water fluoridation program with a special emphasis on dental fluorosis and environmental justice issues

A timeline from the early 1900's to 2015

In the early 1900's a handful of dentists, particularly Frederick McKay (1916, 1928) and G.V. Black & McKay (1916) were interested in what was causing a condition (which was prominent in both Texas and Colorado), which led to discoloration and marking of the teeth. The condition was called "dental mottling." McKay described dental mottling as "the most poorly constructed enamel of which there is any record in the history of dentistry."

1925

Norman Ainsworth in a study of 4000 children in Essex County in England reported a lowered prevalence of dental caries in Maldon and Heybridge, which were areas endemic for "dental mottling" (now known as areas with high natural levels of fluoride in the water) – (see Mullen, 2005).

1928

Frederick Mckay (1928) noted that while the discoloration and marking of the teeth in cases of "dental mottling" looked very bad it did not appear to increase the child's susceptibility to tooth

decay, in fact there appeared to be less tooth decay among children with dental mottling than those without.

1931

In 1931 three separate research teams (Smith et al., 1931; Churchill et al, 1931 and Vehu, 1931) identified the cause of this condition as fluoride in the drinking water and the name was changed to "dental fluorosis," which literally means "poisoning of the teeth by fluoride." It was quickly recognized that dental fluorosis was a "systemic" not a "topical" effect. It can only be contracted *before* the permanent teeth have erupted. It is occasionally seen in the primary teeth (Warren et al., 1999) but it is most frequently observed in the secondary teeth.

1930 and 40's

Under the leadership of H. Trendley Dean the US Public Health Service (PHS) studied the occurrence of this condition throughout the USA. In addition to this mapping exercise Dean subsequently published his famous classification of the different levels of severity of this condition: very mild, mild, moderate and severe. According to Dean et al. (1934, 1935):

> ***Very mild*** ranged from white patches on the cusp of the teeth to up to 25% of the enamel impacted.
> ***Mild*** impacted between 25 and 50% of the enamel.
> ***Moderate*** impacted 100% of the enamel.
> ***Severe*** impacted 100% of enamel with pitting and chipping.

Pictures illustrating these four levels of dental fluorosis are given in Figure 3

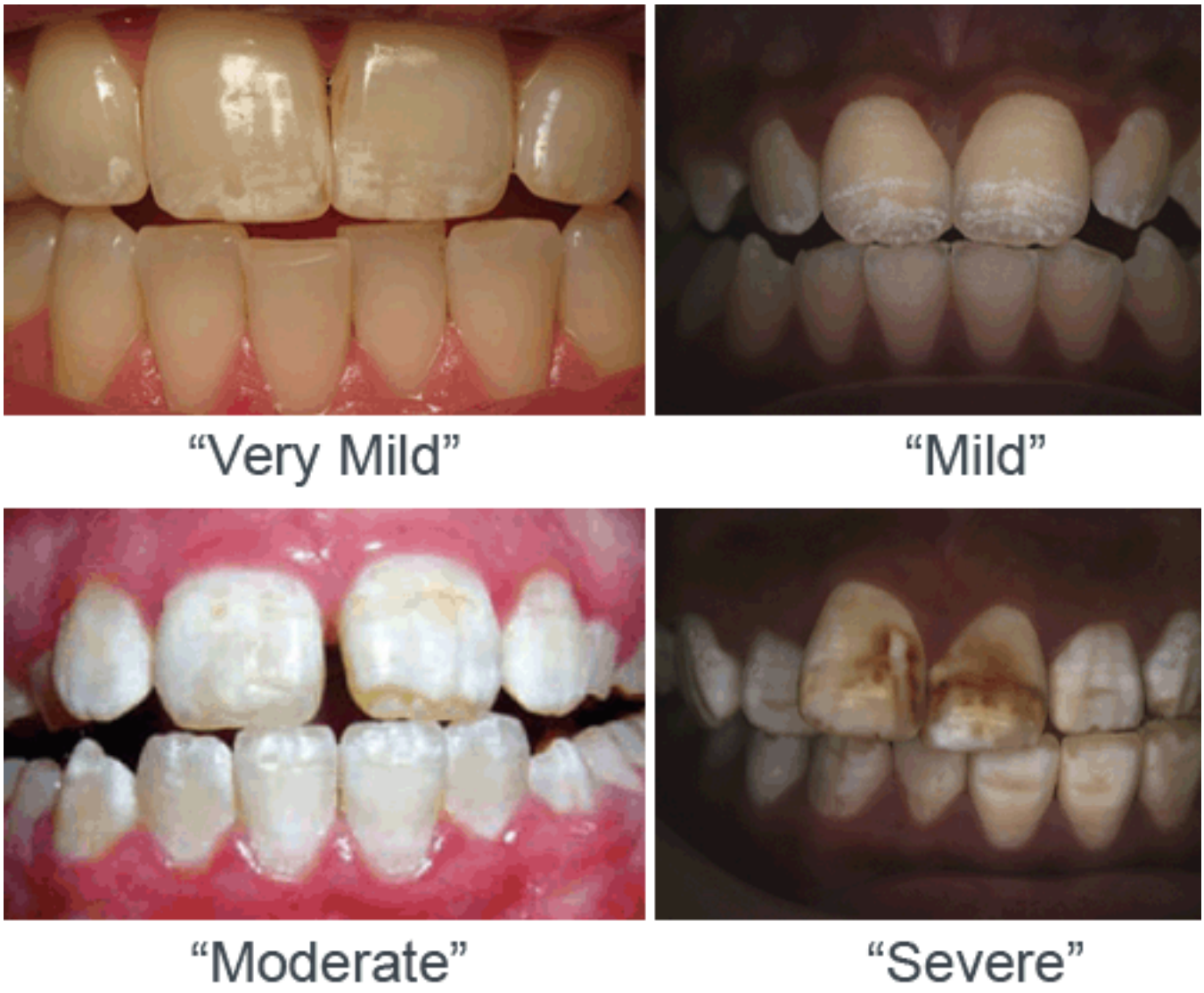


Figure 3. Pictures of the four levels of dental fluorosis. (Photographs by Dr. Hardy Limeback and Dr. Iain Pretty, et al. - see more photos)

1942.

In 1941-1942, Dean and his colleagues published his famous 21-city study which purported to show that as the fluoride level in the water went from about 0.1 to 2.6 ppm tooth decay fell. Most of reduction occurred between 0.1 and 0.9 ppm, with only a modest further decrease occurring between 0.9 and 2.6 ppm. He further noted that there was little noticeable dental fluorosis occurring below 1 ppm. Thus was born the notion that the "optimal level" for reducing tooth decay while minimizing the risk of dental fluorosis was 1 ppm. Dean later indicated that at 1 ppm only about 10% of children would have dental fluorosis and only in the *very mild* category. Dean later testified in the US Congress that *mild* dental fluorosis would not be an acceptable trade off for lowered tooth decay. This is what he said to the Delaney Committee in 1952:

> "We don't want any 'mild' [fluorosis] when we are talking about fluoridation. We don't want to go that high…I don't want to recommend any fluoridation where you get any 'mild'". (Connett et al., 2010, page 110).

All the children in Dean's 21-City study were white: there were no Blacks or Hispanics in the 7,257 children studied.

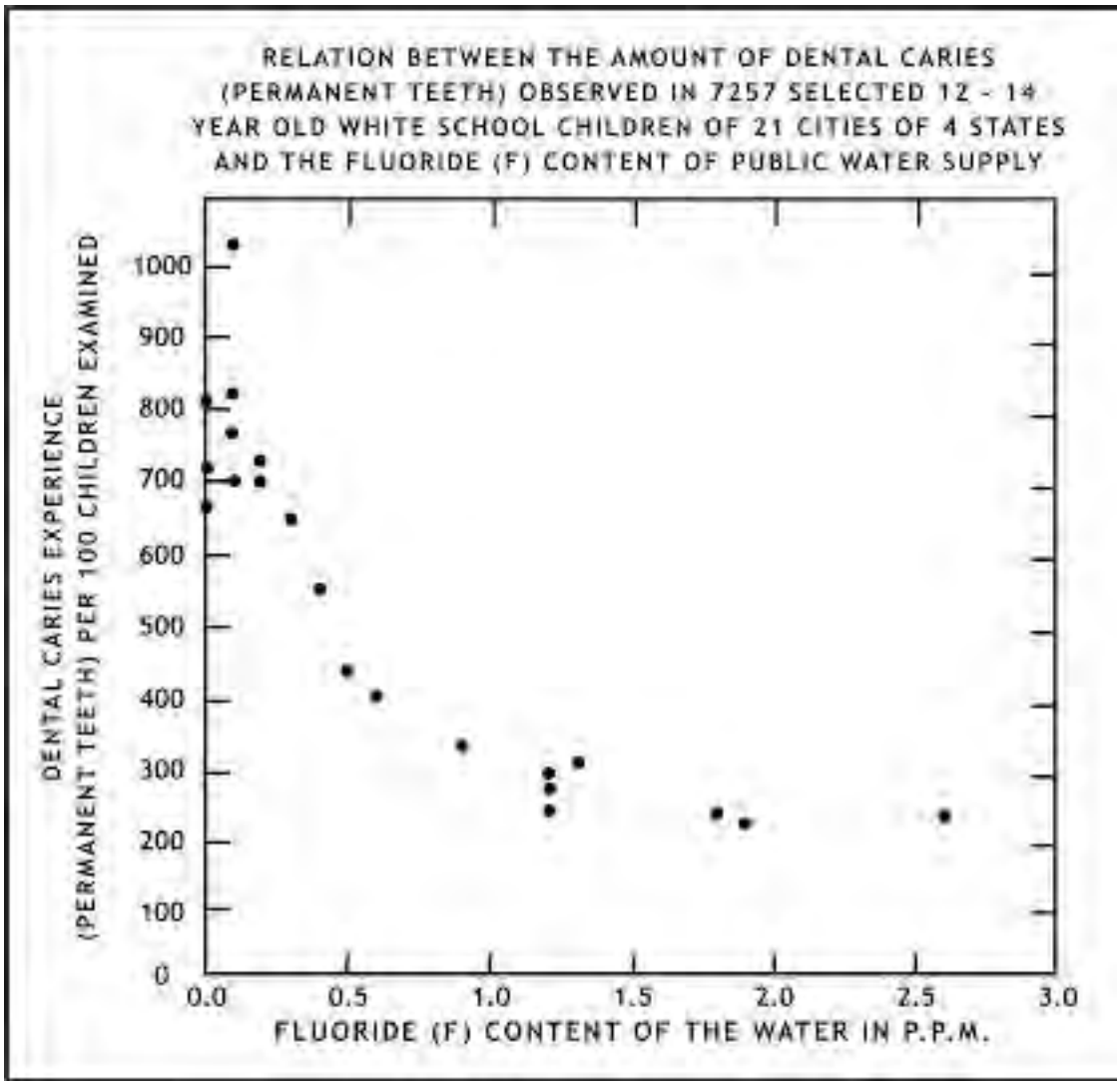


Figure 4: Dean's famous 21-city plot of Dental caries experience in each community versus the concentration of fluoride in the community's water supply in ppm (Dean et al., 1941, 1942)

1945

By 1945 Dean and others were convinced that natural levels of fluoride in the water lowered tooth decay and there were no side effects other than dental fluorosis. The question became: could one deliberately add a fluoride-containing compound to the public water supply and achieve the same result? The PHS decided to run a series of experiments to check this out. Instead of these experiments being conducted in the form of randomized control trials on

individual volunteers they were launched on whole cities. In their discussions the early promoters did not want to use the word experiment because as they said, "people don't like to be experimented upon!" They also saw them more as demonstrations – demonstrating that what they had seen with natural fluoride could be reproduced with artificial fluoride. These fluoridation experimental trials began in 1945 in Grand Rapids, MI; Newburgh, NY and Brantford, Ontario, Canada using sodium fluoride at 1 ppm (1 mg fluoride/liter of water). Most now agree that the methodology used in these experiments would not be acceptable by modern epidemiological standards but nevertheless they provided the foundation for the widely accepted belief in this practice for many decades. Dr. Philip Sutton wrote two monographs and a whole book on the inadequacies of these experimental trials, and his arguments have never been successfully rebutted by proponents (Sutton, 1959, 1960, 1996).

1950

The trials were meant to last for 10 years, but before any of them had been completed the PHS endorsed fluoridation in 1950 and over the next two years with little science on the table it was endorsed by nearly every dental, public health and medical body in the country. Despite their lack of science these endorsements have been used heavily by promoters ever since.

1956

In 1956, Schlesinger et al. published the health findings for the Newburgh, NY (control city Kingston, NY) experiment. They reported that young men in fluoridated Newburgh had a significantly greater number of cortical bone defects than non-fluoridated Kingston (about 2 to 1). There was no follow-up on this finding, which is surprising because the cortical bone is the outside layer of the bone and protects against fracture. However, Dr. Caffey who examined the X-rays said in 1955 that the age, sex and anatomical distribution of these defects were remarkably similar to osteosarcoma. 20 years later this comment prompted the National Academy of Science (NAS) in 1977 to recommend that researchers check to see if there was an increase in osteosarcoma in young men under 30 in fluoridated communities (NAS, 1977). The other finding by Schlesinger was that young girls were menstruating on average 5 months earlier in the fluoridated community than in the non-fluoridated one. This observation was not considered important at the time but today it is intriguing in the context of Luke's findings, a) that fluoride accumulates in the human pineal gland (Luke, 2001) and b) lowers melatonin production in animals and shortens the time to puberty (Luke, 1997).

1962

A January 10, 1962 internal memorandum, from a top PHS official, F.J. Maier, in connection with the first fluoridation trial, revealed that, "negroes in Grand Rapids had twice as much [dental] fluorosis than others." Based on this, Maier asked, "In a community with a larger number of negroes (say in Dekalb County, Georgia) **would this tend to change our optimum fluoride levels?"**(Maier, 1962).

1983

In 1983 the U.S. Surgeon General convened a panel to review the literature as part of the process of determining a safe drinking water standard for fluoride (the MCL, or Maximum

Contaminant level). One member of the panel on reviewing pictures of dental fluorosis stated that, "You would have to have rocks in your head to allow your child much more than two parts per million (Grossman, 1990 – see Appendix A)…" Over-exposure to fluoride damages teeth as the photos of the various stages of dental fluorosis above, also known as enamel fluorosis, clearly show**.**

1985

When the EPA published its rationale for both a MCL and MCLG (goal) at the very high level of 4 ppm they did not include dental fluorosis as an *adverse health effect* but as a "cosmetic effect" (for which they produced a non-enforceable secondary standard of 2 ppm). Instead of dental fluorosis the EPA used skeletal fluorosis as the health effect of concern – even so, they did not use the first signs of skeletal fluorosis (which are identical to arthritis) but the terminal stages in which the patient is crippled, i.e. crippling skeletal fluorosis. Choosing the gross end point of the problem conflicts with the normal way that the EPA comes up with protective standards. Normally they determine the Lowest Observable Adverse Effect Level (LOAEL) and then apply safety factors to that. Note also that U.S. standard of 4 ppm is about three times the WHO guideline of 1.5 ppm, which is the standard adopted by Canada, Mexico and most of the rest of the world.

Professionals at the EPA who witnessed this process have stated that the level of 4 ppm was chosen for political not scientific reasons. It was chosen to accommodate concerns of states like South Carolina which did not want to spend a lot of money removing high natural fluoride levels from drinking water if a lower level were chosen (Grossman, 1990 in Appendix A; and FAN, 2007).

1985

In a Texas survey, published in 1985, Butler et al. reported that the prevalence of dental fluorosis among African-American children was greater than for Hispanic and non-Hispanic white children. The reported Odds Ratio was 2.3.

1986-7

The National Institute of Dental Research (NIDR) conducted one of the largest surveys of tooth decay and dental fluorosis ever carried out in the USA. They looked at the teeth of approximately 39,000 children in 84 communities. The *dental caries* results were reported in 1990 by Brunelle and Carlos but the *dental fluorosis* data was not reported until 1997 by Heller et al. The latter reported 29.9% of the children living in communities with fluoride levels between 0.7 and 1.2 ppm had some form of dental fluorosis. Of these 22.5 % had very mild, 5.8% had mild, 1.3% had moderate and none were in the severe category.

As far as dental caries was concerned Brunelle & Carlos found that for children aged 5-17, who had lived all their lives in a fluoridated versus a non-fluoridated community, the *average* saving in tooth decay was 0.6 of one tooth surface (see their Table 6). There are 4 and 5 surfaces for the "cutting" and "chewing" teeth respectively, and by the time all the child's teeth have erupted there are a total of 128 tooth surfaces. Even this very modest saving of 0.6 of one tooth

surface was not shown by the authors to be statistically significant, but this did not stop them declaring:

> "The results show that water fluoridation has played a dominant role in the decline of caries and must continue to be a major prevention methodology."

Brunellle and Carlos also noted that, "Contrary to some earlier observations, however, white children had lower mean DMFS scores than non-whites (blacks and all others) at most ages (Fig. 7)."

1988

In 1988, Bette Hileman, in an important review in *Chemical and Engineering News* reported disagreements among dental researchers as to whether dental fluorosis rates were increasing among children in the U.S.:

> "Dennis Leverett, chairman of the department of community dentistry at the Eastman Dental Center in Rochester, N.Y., claims that the prevalence of dental fluorosis today in communities with fluoridated water is twice the level that H. Trendley Dean, a dental surgeon in the Public Health Service, reported in 1942 … In contrast, William S. Driscoll, acting chief of the disease prevention and health promotion branch at the National Institute of Dental Research (NIDR), and his coworkers report that surveys in 1980 "suggest that no important changes in the prevalence and severity of fluorosis have taken place" since **Dean's studies.** However, Driscoll did find eight children with either moderate or severe fluorosis in a community with a fluoride level of 1 ppm…" (Hileman, 1988)

1990

In 1990, Williams and Zwemer in a study from Georgia, reported that dental fluorosis was more severe among African-American children than white children. As the following table shows, 16.7% of black children in Augusta, Georgia had moderate/severe fluorosis versus 9.1% of white children. In Richmond County, the respective rates were 3.3% vs 0% (see Table 1)

Table 1. **Dental Fluorosis Rates in Augusta & Richmond County, Georgia**

Residence/Race	**No Fluorosis** (TSIF Score = 0)	**Very Mild/Mild Fluorosis** (TSIF Score = 1 - 3)	**Moderate/Severe Fluorosis** (TSIF Score = 4 - 7)
City/**Black**	19.6%	63.7%	**16.7%**
City/White	18.2%	72.7%	9.1%
County/**Black**	47.8%	48.9%	**3.3%**
County/White	44.9%	55.1%	0%

SOURCE: Williams JE, Zwemer JD. (1990).

In 1990 the long-awaited animal cancer study (requested by Congress) was published by the National Toxicology Program (NTP, 1990). This report caused great consternation because the authors reported a statistically significant increase in a bone cancer (osteosarcoma) in the male rats, which was "equivocal" evidence that fluoride was carcinogenic.

1991

Soon after the 1990 NTP study was published a cover story was published in the *Journal of the American Dental Association* speculating that fluoridation may actually be *protective* against cancer (McGuire et al., 1991). It was clear from the comments in this article that the authors were more worried that a finding that fluoride caused cancer would end water fluoridation, than it might be killing a few young men each year. They wrote:

> "An incorrect inference implicating fluoride carcinogenicity and its removal from our water systems would be detrimental to the oral health of most Americans…a disruption in the delivery of fluoride through municipal water systems would increase decay rates over time…Linking of fluoride ingestion and cancer initiation could result in a large-scale defluoridation of municipal water systems under the Delaney clause." (Connett et al., 2010, p. 187)

One of the authors of this report was Professor Chester Douglass, chairman of the Harvard dental department. In 1994 he received a large grant from the National Institute of Environmental Health Sciences to investigate the possible connection between fluoridation and osteosarcoma. This raises serious questions about why an investigation that had the potential to end fluoridation was given a) to a dental school and b) to a dental professor who was known to be pro-fluoridation and was simultaneously a consultant for Colgate (FAN, 2006).

Despite these doubts in 2001, Douglass's graduate student, Elise Bassin, as part of her doctoral thesis, discovered in a carefully matched case control study that young boys exposed to fluoridated water in their 6^{th}, 7^{th} or 8^{th} years had a 5-7-fold increased risk of succumbing to osteosarcoma by the age of 20. Over the next three years, Douglass – given several opportunities - hid this finding from his peers, his funders and the National Research Council of the National Academies (NRC) review panel. Bassin's thesis (2001) was not "found" until 2004. For the rest of this intriguing story see the Harvard/Bone Cancer files (FAN, 2006); Harvard Crimson, 2006; Connett et al., 2010, chapter 18**.**

1997

Heller et al. (1997) paper published (see above)

1997 also saw the publication of **a controversial report from the Institute of Medicine** (IOM). The title of the report included fluoride in a list of well-known nutrients needed for healthy bone growth: calcium, magnesium, phosphate and vitamin D (IOM, 1997). In response to a letter from a number of scientists complaining about this false classification of fluoride as a nutrient, Dr. Bruce Alberts, President of the National Academies, and Dr. Kenneth Shine, President of the IOM, wrote:

> First, let us reassure you with regard to one concern. Nowhere in the report is it stated that fluoride is an essential nutrient. If any speaker or panel member at the September 23rd workshop referred to fluoride as such, they misspoke. As was stated in *Recommended Dietary Allowances 10th Edition,* which we published in 1989: "These contradictory results do not justify a classification of fluoride as an essential element, according to accepted standards. Nonetheless, because of its valuable effects on dental health, fluoride is a beneficial element for humans." (Alberts and Shine, 1998).

We return to this story in section 26 where we challenge the EPA Office of Water for using the IOM report to support their false claim that fluoride is a nutrient in a 2010 report (EPA, 2010b, page 39).

1999 - 2000

Kumar et al. (1999) reported that "African-American children studied [in Newburgh and Kingston, NY] in 1995 were at higher risk for dental fluorosis than children of other racial groups. . . . The higher risk for dental fluorosis observed among African-American children is consistent with several other studies."

In 2000 Kumar et al. noted, "The results support our earlier findings that African-American children were at **higher risk for dental fluorosis** in the fluoridated area. Even in the nonfluoridated area, there was a suggestion that African-American children were at higher risk. Whether this higher risk for African-American children is the result of their lower threshold for fluoride or due to other unknown sources of fluoride is not known. It has been reported that African-American children in the United States drink more water and less milk compared to white children. In Newburgh, this difference in the fluid consumption may have resulted in a higher prevalence of fluorosis in African-American children. . . . Because a race fluorosis association could have important policy implications, a large-scale study in a representative sample should be conducted to test specifically the hypothesis that African-American children are at higher risk for fluorosis."

2003 -2006

The US EPA Office of Water asked the National Research Council of the National Academies to review their safe water standards for fluoride. A 12-membered panel (unusually for official reviews on fluoride, the panel was balanced with 3 pro-fluoridation, 3 anti-fluoridation and 6 undeclared) was appointed by the National Research Council of the National Academies to do this. The panel reported back in 2006 with a landmark 500-page review (NRC, 2006).

The NRC panel concluded that the safe drinking water goal and standard for fluoride in water (MCLG and MCL) of 4 ppm was not protective of health and a new risk assessment needed to be performed to determine a new MCLG (maximum contaminant level goal).

The panel had this to say on dental fluorosis:

> "Severe enamel fluorosis is characterized by dark yellow to brown staining and discrete and confluent pitting, which constitutes enamel loss... Severe enamel fluorosis compromises that health-protective function by causing structural damage to the tooth.

> The damage to teeth caused by severe enamel fluorosis is a toxic effect that is consistent with prevailing risk assessment definitions of adverse health effects...
>
> "Severe enamel fluorosis occurs at an appreciable frequency, approximately 10% on average, among children in U.S. communities with water fluoride concentrations at or near the current MCLG [maximum contaminant level goal] of 4 mg/L. Thus, the MCLG is not adequately protective against this condition...
>
> "The committee finds that it is reasonable to assume that some individuals will find *moderate* enamel fluorosis on front teeth to be detrimental to their appearance and that it could affect their overall sense of well-being. However, the available data are not adequate to categorize moderate enamel fluorosis as an adverse health effect on the basis of structural or psychological effects.
>
> "Since 1993, there have been no new studies of enamel fluorosis in U.S. communities with fluoride at 2 mg/L in drinking water. Earlier studies indicated that the prevalence of moderate enamel fluorosis at that concentration could be as high as 15%..." (NRC, 2006)

However, even though the NRC panel concluded that ***severe*** dental fluorosis constituted an adverse health effect no federal or state agency has gone to any lengths to inform the public that this is the case. Nor have they warned the African-American and Mexican American communities with a total population of 101 million people (Colby & Ortman, U.S. Census, Table 2, 2015) that they are particularly vulnerable to this condition,

2005

In 2005, the Centers for Disease Control and Prevention (Beltrán-Aguilar et al. See Table 2 below) acknowledged for the first time publicly that the black community has higher rates of dental fluorosis than the white community. It took a Freedom of Information Act request, however, to learn the full extent of this disparity. **58% of black children** were diagnosed with dental fluorosis in CDC's 1999-2004 national survey, versus 36% of white children. (Gracia, 2011; see also Stockin, 2015).

Table 2: A copy of Table 23. Enamel fluorosis* among persons aged 6- 39 years, by selected characteristics United States, National Health and Nutrition Examination Survey, 1999- 2002. Source: Beltrán-Aguilar et al., 2005 (CDC, 2005)
http://fluoridealert.org/content/table-23-enamel-fluorosis-among-persons-aged-6-39-mmwr-2005/

Characteristic	Unaffected		Questionable		Very mild		Mild		Moderate/Severe	
	%†	SE§	%	SE	%	SE	%	SE	%	SE
Age group (yrs)										
6–11	59.81	4.07	11.80	2.50	19.85	2.12	5.83	0.73	2.71	0.59
12–15	51.46	3.51	11.96	1.84	25.33	1.98	7.68	0.93	3.56	0.59
16–19	58.92	3.90	10.21	1.70	20.79	1.78	6.65	0.67	4.03	0.77
20–39	74.86	2.28	8.83	1.23	11.15	1.22	3.34	0.58	1.81	0.39
Sex										
Male	67.65	2.69	9.99	1.45	15.65	1.52	4.58	0.54	2.12	0.39
Female	66.97	2.84	9.83	1.34	15.58	1.36	4.84	0.61	2.78	0.49
Race/Ethnicity¶										
White, non-Hispanic	69.69	3.13	10.43	1.62	14.89	1.56	3.87	0.60	1.92	0.48
Black, non-Hispanic	56.72	3.30	10.40	2.16	21.21	2.16	8.24	0.82	3.43	0.54
Mexican-American	65.25	3.89	8.95	1.29	15.93	2.24	5.05	0.72	4.82**	1.81
Poverty status††										
<100% FPL	68.02	3.21	10.67	1.64	14.29	1.73	4.07	0.69	2.97	0.66
100%–199% FPL	66.92	2.91	9.11	1.79	16.11	1.46	5.21	0.78	2.65	0.56
≥200% FPL	66.88	2.75	10.73	1.93	15.56	1.56	4.83	0.50	2.00	0.37
Total	**67.40**	**2.65**	**9.91**	**1.35**	**15.55**	**1.37**	**4.69**	**0.49**	**2.45**	**0.40**

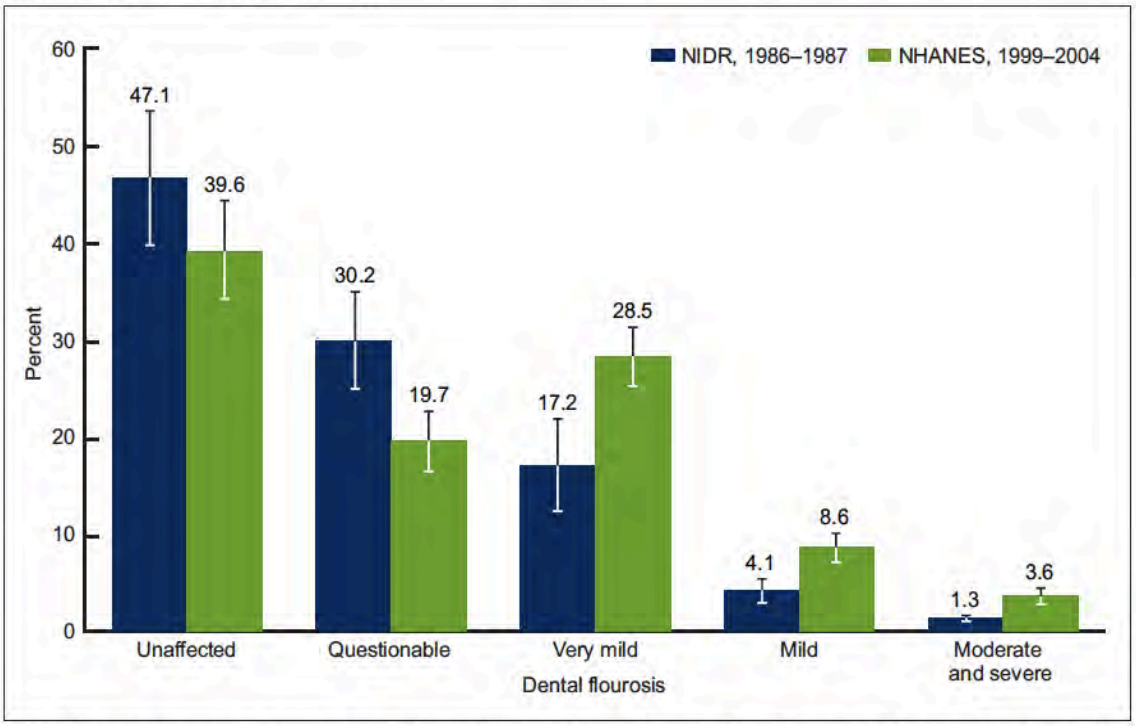
* Using Dean's index. All estimates are adjusted by age (single years) and sex to the U.S. 2000 standard population, except sex, which is adjusted only by age.
† Weighted prevalence estimates.
§ Standard error.
¶ Calculated using "other race/ethnicity" and "other Hispanic" in the denominator.
** Unreliable estimate: the standard error is 30% the value of the point estimate, or greater.
†† Percentage of the Federal Poverty Level (FPL), which varies by income and number of persons living in the household.

According to attorney Michael Connett and Special Projects Director for the Fluoride Action Network (FAN): "The epidemic of fluorosis now seen in the black community is the visible legacy of the government's failure to act on what it knew. They knew in 1962 that '**negroes in Grand Rapids had twice as much [dental] fluorosis than others'** (Maier, 1962)."

2010

In 2010 another report from the CDC revealed that **41% of U.S. children** between the ages of 12 and 15 had some form of dental fluorosis. This total included children from both fluoridated and non-fluoridated communities. No breakdown was given for race and ethnicity. A breakdown of the 41% total showed that **28.5 % has very mild, 8.6% had mild, and 3.6 % had either moderate or severe dental fluorosis** (Beltrán-Aguilar et al., 2010).

Figure 3. Change in dental fluorosis prevalence among children aged 12–15 participating in two national surveys: United States, 1986–1987 and 1999–2004



NOTES: Dental fluorosis is defined as having very mild, mild, moderate, or severe forms and is based on Dean's Fluorosis Index. Percentages do not sum to 100 due to rounding. Error bars represent 95% confidence intervals.

SOURCES: CDC/NCHS, National Health and Nutrition Examination Survey, 1999–2004 and National Institute of Dental Research, National Survey of Oral Health in U.S. School Children, 1986–1987.

Figure 6: Change in dental fluorosis prevalence among children aged 12-15 participating in two national surveys: United States, 1986-1987 and 1999-2004, 3 from Beltrán -Aguilar et al. (2010).

2011

On January 7 the U.S. Department for Health and Human Services and EPA held a joint press conference in Washington, DC (HHS, 2011a). The HHS announced its proposal to lower its recommended fluoride level in water to fight tooth decay from a range of 0.7 – 1.2 ppm to 0.7 ppm, largely because of the escalating prevalence of dental fluorosis among US children.

At this same press conference EPA's Office of Water announced that it had begun its determination of a new safe drinking water standard for fluoride (recommended by the NRC panel in March of 2006). While stating that they wanted to find a safe level for fluoride in drinking water (their federal responsibility), they also stated that they were interested in protecting children's teeth (*not* their federal responsibility). According to EPA Assistant Administrator for the Office of Water Peter Silva.

> ""EPA's new analysis **will help us make sure that people benefit from tooth decay prevention** while at the same time avoiding the unwanted health effects from too much fluoride (HHS, 2011a)." (our emphasis)

EPA at this juncture threw away its objectivity in the setting of a "safe" Maximum Contaminant Level goal (MCLG) for fluoride in drinking water. In other words they were indicating that they were going to select the safe level for fluoride as a contaminant that would not conflict with the HHS recommended level for fluoride in the fluoridation program. Clearly that is a political judgment. However, from a legal point of view no consideration of any perceived benefit of a contaminant should be allowed to interfere with the EPA's obligation to determine a **safe** Maximum Contaminant Level Goal (MCLG). According to the Safe Drinking Water Act the MCLG should be determined based on a known or reasonably anticipated harmful effect, with appropriate safety factors applied to protect everyone in society, including vulnerable subsets. **Such calculations should be scientifically determined and should not be compromised by accommodating some perceived benefit.**

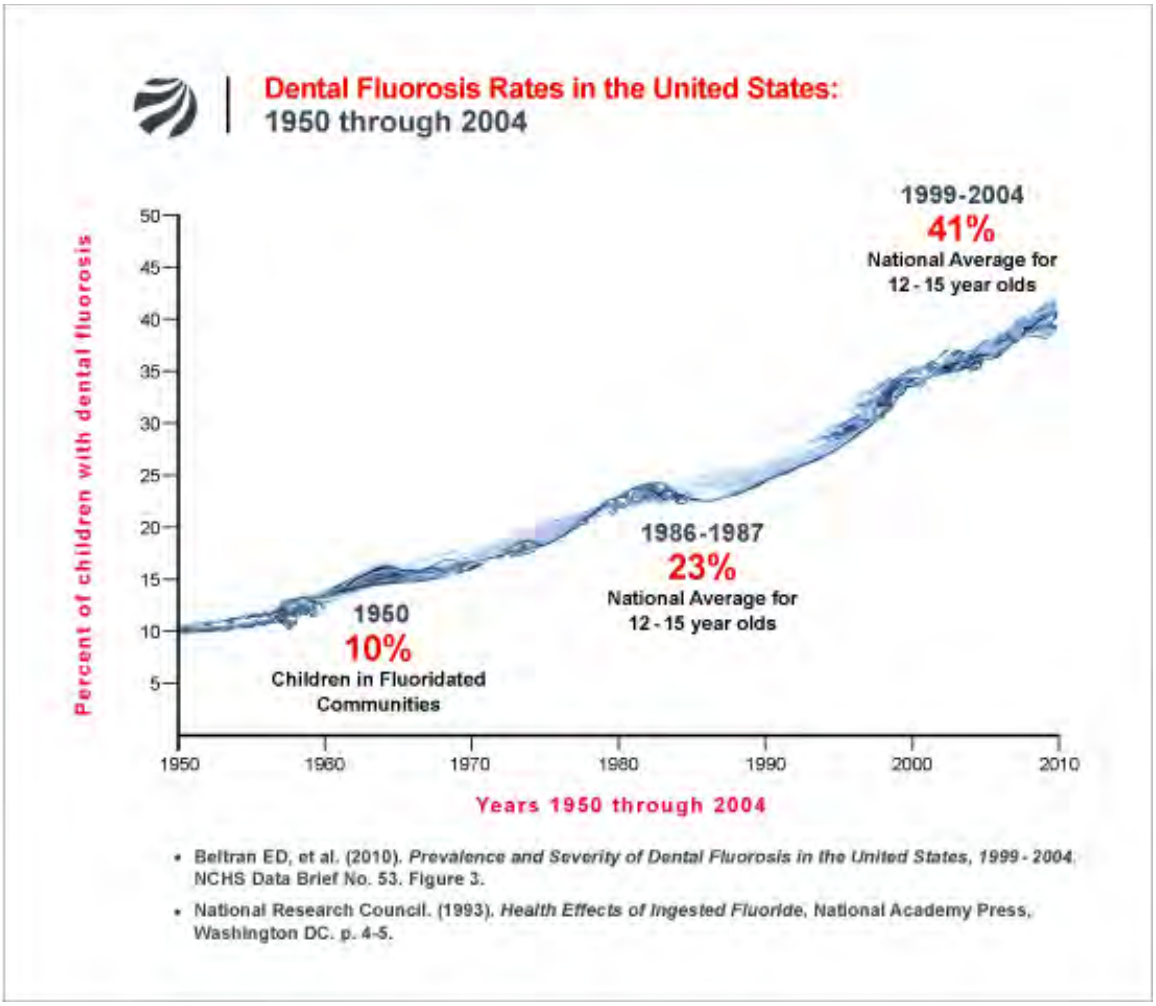
2015

The HHS formally announced its new recommended level of 0.7 ppm fluoride in water claiming that it would lower tooth decay, while minimizing the prevalence of the more objectionable stages of dental fluorosis (HHS, 2015). In so doing they continued their 60-year plus denial of any other potential health effect other than dental fluorosis at the doses experienced by any American, including the most vulnerable, drinking fluoridated water and getting fluoride from other common sources such as dental products (see section 25 for our response to this).

SUMMARY: DENTAL FLUOROSIS IN THE U.S. 1945-2015

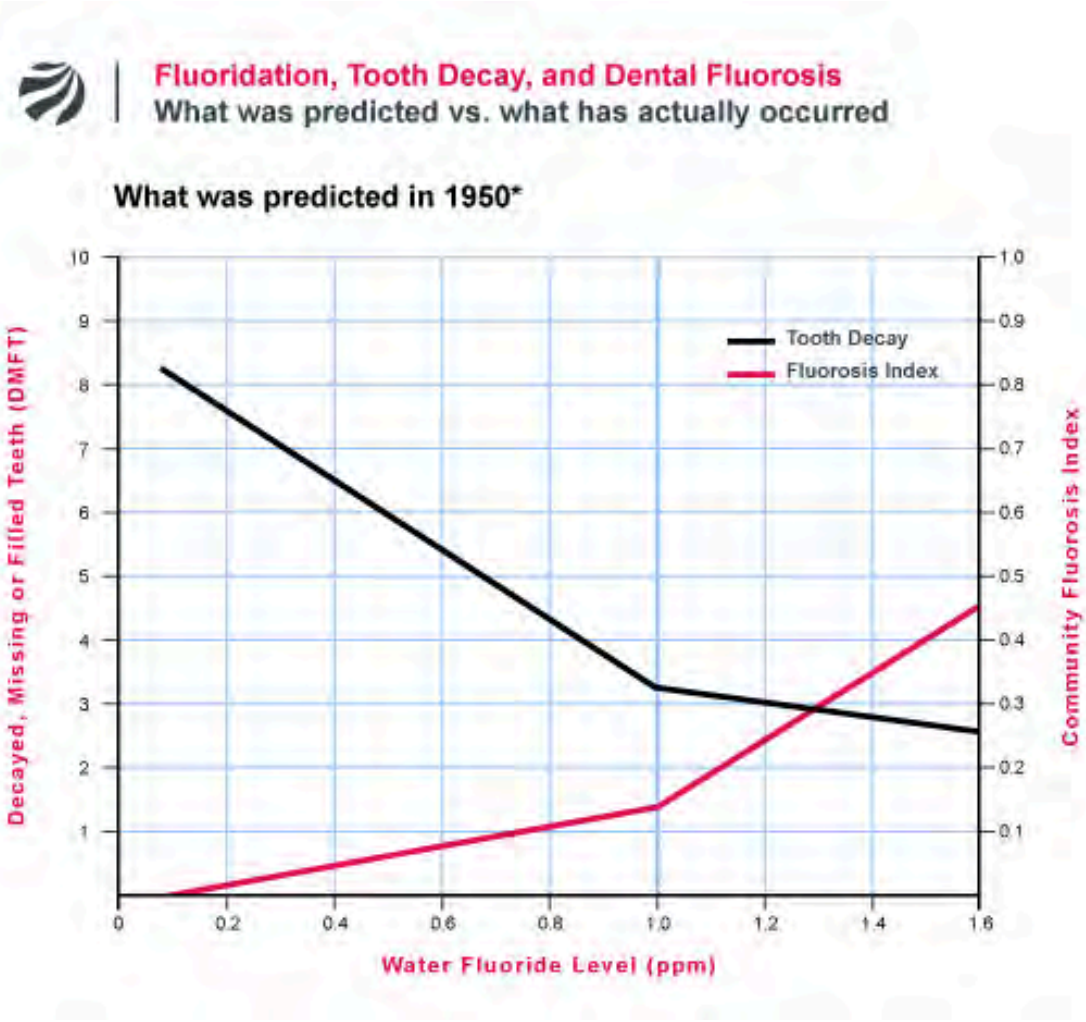
In 1945 Dean estimated that about 10% of children would develop dental fluorosis in communities fluoridated at 1 ppm. Since then children are being exposed to fluoride not only in fluoridated water but also from all the beverages and processed foods made with fluoridated water, and from many other sources including dental products, and pesticide residues on food, including EPA permitted fluoride residues – from the fumigant sulfuryl fluoride – of 900 ppm fluoride in powdered eggs, 130 ppm fluoride in wheat flour, and 70 ppm fluoride in 99.99% of all processed food (FAN, 2005). As a result the rates of dental fluorosis are getting significantly worse across the U.S. However, the CDC's Division of Oral Health continues to promote artificial water fluoridation despite its disproportionate impact on communities of color and low-income groups. Studies sponsored by this CDC division in 2005 and 2007 confirm the growing epidemic of dental fluorosis in minority populations. It is an open question as to whether reducing the fluoride levels from a range of 0.7 to 1.2 ppm across the country to a single value of 0.7 ppm, will have a major effect on decreasing the prevalence of this condition in general or in minority communities in particular. A larger question is whether the level of 0.7 ppm will cause other health problems, but for the CDC's Division of Oral Health that is a mute question since they adamantly deny that any other tissue is harmed by water fluoridation or from all sources combined.

Meanwhile, at no time have federal government officials ever taken steps to warn black communities of their heightened fluorosis risk.



(Graph by Fluoride Action Network)

Figure 7: Dental fluorosis rates in the United States: 1950 through 2004 (FAN).


Fluoridation, Tooth Decay, and Dental Fluorosis
What was predicted vs. what has actually occurred
What was predicted in 1950*
Tooth Decay
Fluorosis Index
Decayed, Missing or Filled Teeth (DMFT)
Community Fluorosis Index
Water Fluoride Level (ppm)
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1
2
3
4
5
6
7
8
9
10
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

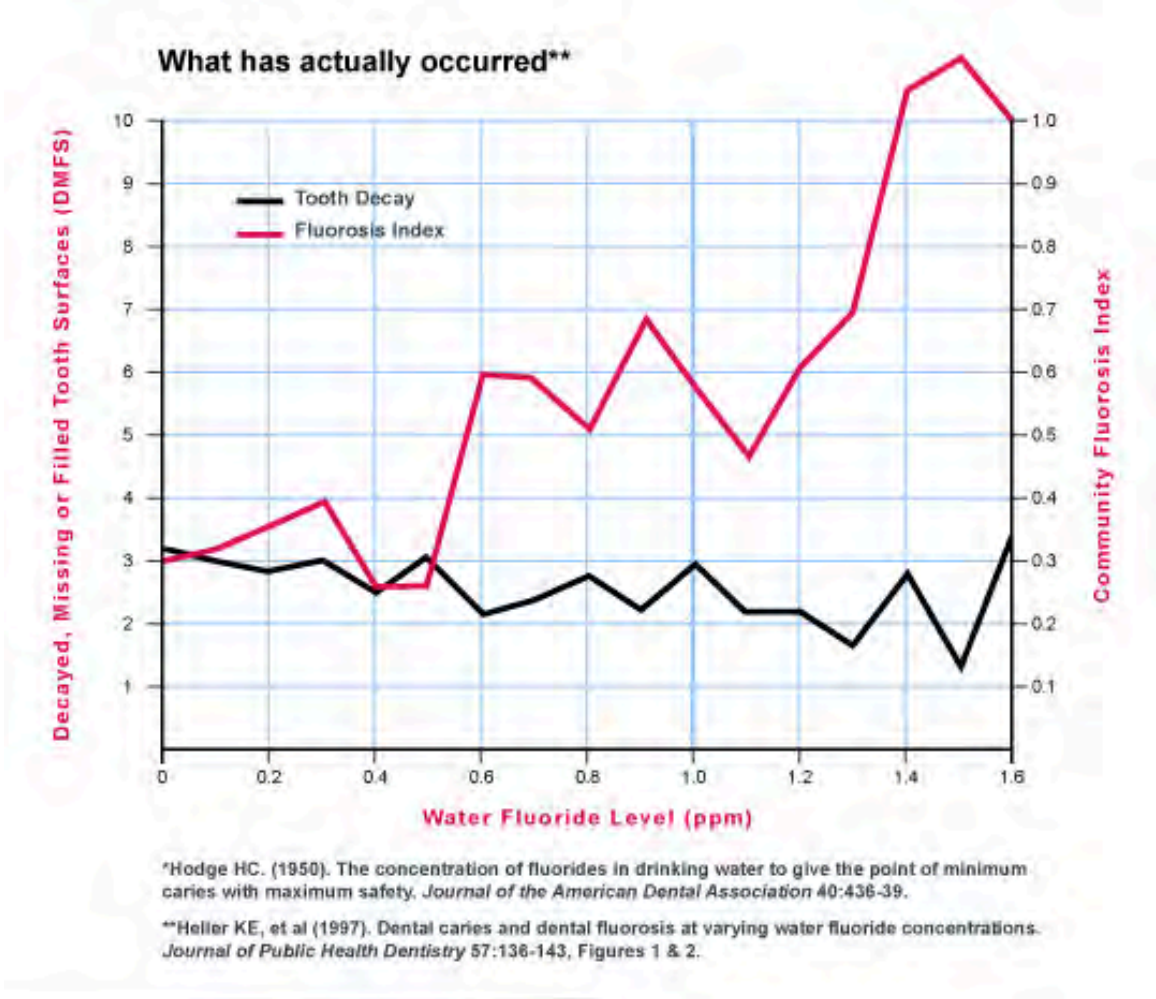


Figure 8: What was predicted in 1950 (top graph) vs. What has actually occurred (bottom graph). Legend: Black line is tooth decay measured as DMFT. Red Line is the Community Fluorosis Index. (FAN).

6. Has fluoridation helped reduce tooth decay in the Inner City?

While it is clear that the fluoridation program has failed to limit the prevalence of dental fluorosis to levels anticipated in 1945, what about the other half of the program? Has it reduced tooth decay? And in the context of this discussion has it reduced tooth decay in low-income families and minority communities especially in the inner city?

Despite the laudable aim to reduce the inequalities in dental care, putting fluoride in everyone's water to reduce tooth decay among inner city children has not been the magic bullet it was expected to be. Story after story in the media of major fluoridated cities in the US tell the same story: we still have a dental crisis among America's inner city children especially among poor and minority families. In Table 3 we summarize these reports from New Haven CT; Washington DC; Detroit MI; Boston MA; Concord NH; Manhattan and the Bronx in NY; Cincinnati OH; Pittsburgh PA; and San Antonio TX.

TABLE 3: Communities with water fluoridation and high dental decay	
Fluoridation Status	**Detail**
CONNECTICUT Mandatory Fluoridation since 1965 for water systems servicing a population of 20,000 or more 90.3% of the population receive fluoridated water as of 2012	… Peters [director of New Haven Public Schools school health centers] said this past June New Haven Public schools screened 484 Troup students, from kindergarten on up to grade 8, and found that 35 percent had moderate to severe dental needs. "The need for dental care is very clear in Connecticut and New Haven," Peters said at Troup Wednesday. "Tooth decay is the most common childhood disease. It is five times more common than asthma and its the leading reason for missed school across the state." … 2015. Markeshia Ricks M. The dentist comes to Troup. New Haven Independent. September 11.
CONNECTICUT See above	"Dental decay remains the most common chronic disease among Connecticut's children. Poor oral health causes Connecticut children to lose hundreds of thousands of school days each year. One in four Connecticut children is on Medicaid, but two of three Connecticut children receive no dental care. And DSS continues to exploit the seriously stretched public health providers and the few remaining private providers. There is an oral health crisis in Connecticut." 2005. Slate R. State must fund plan to provide oral health care for the poor. New Haven Register. May 5.
DISTRICT OF COLUMBIA Fluoridated since 1952	Washington DC has "one of the highest decay rates in children in the country." The "typical new patient, age 6, has five or six teeth with cavities — a 'staggering" number'" at the Children's National Medical Center. 2002. Morse S. Bottled Water: Just add Fluoride. Washington Post. March 5.
DISTRICT OF COLUMBIA Fluoridated since 1952	• Low-income Children in Washington, DC are at High Risk for Poor Oral Health and Consequently Inadequate School Readiness • a large proportion (44 percent) of the 144 students examined had a history of dental caries, • Examined students are primarily from some of the most impoverished Wards (5, 6, 7, & 8) and exhibit high caries incidence 2007. Issue Brief: Oral Health is Critical to the School Readiness of Children in Washington, DC. By Altarum Institute.
ILLINOIS	Thousands of low-income children and adults in Illinois suffer from untreated dental disease. They can't eat or sleep properly, do their best at

Fluoridation is mandatory 98.5% of the state's population receive fluoridated water (as of 2012)	school or work or smile and are at risk for other serious health problems… … Illinois has among the lowest rates in the nation for government funded dental care. As a result we face an oral health care crisis… Illinois currently has just one clinic per 8,400 children who rely on government insurance… 2009. Support Bill HB 388 for dental care. By Lauri Frichtl, Executive Director, Illinois Head Start. Pioneer Press.
INDIANA 94.8% of the state's population receive fluoridated water (as of 2012)	Results from the 2006 BRFSS also indicated that 47 percent of Hoosiers ages 18 and older have had permanent teeth extracted—a percentage that was significantly higher than the national median of 44 percent (see Figure 2). Groups with the highest prevalence of tooth extractions **included blacks; individuals with an annual household income of less than $35,000; and individuals with lower educational attainment.** Prevalence of extractions was highly associated with age – as age increased so did the percentage of Hoosiers who reported having had any permanent teeth extracted. … The elderly, minorities, and low income citizens often face the unfortunate need to have some or all of their teeth extracted. 2009. Oral Health Needs in Indiana: Developing an Effective and Diverse Workforce. Center for Health Policy. May.
MICHIGAN **Detroit** Fluoridated since 1967	**Excerpt from abstract:** To describe the epidemiology of dental caries among low-income African American children 5 years old and younger in the City of Detroit. **Conclusion: Dental Caries in primary teeth in children 5 years of age and younger in Detroit is a major dental public health problem.** 2006. Severity of Dental Caries Among African American Children in Detroit. By Ismail AI, Tellez M, Sohn W. Presented at the 35th Annual Meeting & Exhibition of the American Assoc. for Dental Research in Orlando, Florida. March.
MICHIGAN **Detroit** Fluoridated since 1967	From abstract: The aim of this study was to examine the relationship between dietary patterns and caries experience in a representative group of low-income African-American adults. Participants were residents of Detroit, Michigan, with household incomes below 250% of the federally-established poverty level (n = 1,021)… This population had severe caries, poor oral hygiene, and diets that are high in sugars and fats and low in fruits and vegetables. Apart from tap water, the most frequently consumed food item by adults of all ages was soft drinks; 19% of all energy from sugar came from soft drinks alone. 2006: Dietary Patterns Related to Caries in a Low-income Adult Population. By Burt BA, Kolker JL, Sandretto AM, et al. Caries Research 40(6):473–80.

MASSACHUSETTS 70.4% of the state residents receive fluoridated water	Children from low-income families and children from certain racial/ethnic groups not only have a much higher prevalence of oral disease but are also less likely to have had their dental caries treated. (Page 4) Significant racial, ethnic and socioeconomic disparities exist within all oral health indicators, at each grade level, and among the state's 14 counties. (page 5) Kindergarten • 39.4% of non-Hispanic Black kindergarten children have been affected by dental caries, 1.7 times higher than non-Hispanic white kindergarten children; • 40.9% of Hispanic kindergarten children have been affected by dental caries, 1.8 times higher than non-Hispanic white kindergarten children; and • 41.5% of kindergarten children from low-income families have been affected by dental caries, 1.9 times higher than kindergarten children from families with higher incomes. 2008. The Oral Health of Massachusetts' Children. By White BA, Monopoli MP, Souza BS. Catalyst Institute. January.
MASSACHUSETTS 70.4% of the state residents receive fluoridated water	…"Children are going to school with cavities, gum infections, rotting teeth. I don't think people know how serious a problem it is," said Ms. Cepeda, who has served as coordinator of the volunteer committee. The problem is one that a special state legislative commission last year called an oral health crisis in Massachusetts: Not enough dentists are available for people on MassHealth, the state's health plan that includes Medicaid and the Children's Health Insurance Program… 2001. Fluoridated Water Not Preventing Rampant Decay Among Southbridge's Poor. Telegram & Gazette (Massachusetts). October 14.
NEW HAMPSHIRE **Concord** Fluoridated since 1978	"It's overwhelming," said Deb Bergschneider, dental clinic coordinator at the Concord center. "Because we serve the uninsured, we see the lower level of the community and the need is just astronomical. … By the time they get to us, their mouths are bombed out. They are all emergency situations. It's a severe, severe, problem. It's sad." 2005. Gerth U. Nothing to smile about. Fosters Daily Democrat, May 22.
NEW YORK **Manhattan** Fluoridated since 1965	The level of untreated decay, %d/ dft, was 91%, significantly higher than the US national population which is 76% overall, and 76% for African Americans and Mexican Americans within the US national population. **CONCLUSIONS:** The children in this population have higher caries prevalence and a higher level of untreated caries than the national means as reported in NHANES III. The high level of untreated decay found in this particularly disadvantaged community suggests that enhanced dental services targeting the very young are needed in these communities.

	2002. Dental caries among disadvantaged 3- to 4-year old children in northern Manhattan. By Albert DA, Park K, Findley S, et al. Pediatric Dentistry, May;24(3):229-33. http://fluoridealert.org/studytracker/19188/
NEW YORK **Bronx** Fluoridated since 1965	"Bleeding gums, impacted teeth and rotting teeth are routine matters for the children I have interviewed in the South Bronx. Children get used to feeling constant pain. They go to sleep with it. They go to school with it. Sometimes their teachers are alarmed and try to get them to a clinic. But it's all so slow and heavily encumbered with red tape and waiting lists and missing, lost or canceled welfare cards, that dental care is often long delayed. Children live for months with pain that grown-ups would find unendurable. The gradual attrition of accepted pain erodes their energy and aspiration. I have seen children in New York with teeth that look like brownish, broken sticks. I have also seen teen-agers who were missing half their teeth. But, to me, most shocking is to see a child with an abscess that has been inflamed for weeks and that he has simply lived with and accepts as part of the routine of life. Many teachers in the urban schools have seen this. It is almost commonplace." 1991. Kozol J. Savage Inequalities. Harper Perennial.
OHIO **Cincinnati** Fluoridated since 1969-1970	"We cannot meet the demand," says Dr. Larry Hill, Cincinnati Health Department dental director. "It's absolutely heartbreaking and a travesty. We have kids in this community with severe untreated dental infections. We have kids with self-esteem problems, and we have kids in severe pain and we have no place to send them in Cincinnati. People would be shocked to learn how bad the problem has become." … An estimated 43 percent of the city's 8-year-olds living in low-income homes have significant teeth decay. The rate of infection stood at 37 percent in 1996. 2002. Solvig E. Special Report: Cincinnati's Dental Crisis. The Enquirer (Cincinnati, Ohio). October 6.
PENNSYLVANIA **Pittsburgh** Fluoridated since 1952	"Nearly half of children in Pittsburgh between 6 and 8 have had cavities, according to a 2002 state Department of Health report. More than 70 percent of 15-year-olds in the city have had cavities, the highest percentage in the state. Close to 30 percent of the city's children have untreated cavities. That's more than double the state average of 14 percent." 2005. Law V. Sink your teeth into health care. *Pittsburgh Tribune-Review* February 13.
TEXAS **San Antonio**	"After 9 years and $3 million of adding fluoride, research shows tooth decay hasn't dropped among the poorest of Bexar County's children it has only increased—up 13 percent this year. One out of two children in the Head

Fluoridated since 2002	Start program who were checked for cavities had some last year." 2011. Conger J. Added to our drinking water: A chemical more toxic than lead? KENS 5. November 11.

So despite being fluoride-overdosed, it's not working for poor families and communities of color in the U.S. as they still suffer from higher rates of tooth decay in fluoridated communities (see Table 3 and also FAN, 2013a). Many poor and minority communities suffer from what health officials have called a "silent epidemic" of untreated tooth decay.

According to Kaste et al. (1996), national data indicate that 80% of tooth decay in children is concentrated in 25% of the child population, with low-income children and racial/ethnic minority groups having more untreated decay on average than the U.S. population as a whole.

Little has changed since 1996. According to Dye et al. (2015): "Untreated tooth decay was higher for Hispanic (36%) and non-Hispanic black (42%) adults compared with non-Hispanic white (22%) and non-Hispanic Asian (17%) adults aged 20–64."

This is not just the opinion of handful of dental researchers it is also the view of the number one promoter of fluoridation in the country: the CDC's Division of Oral Health. In 2012, according to the CDC, the total population on fluoridated drinking water systems was 210,655,401 Americans or 67.1% of the population (CDC, 2012). Even with this astounding number, dental health disparities continue to thrive for communities of color and society's poorest – the very groups that fluoridation was meant to serve. In the words of the CDC (2015):

> • **Oral health disparities are profound** in the United States. Despite major improvements in oral health for the population as a whole, oral health disparities exist for many racial and ethnic groups, by socioeconomic status, gender, age and geographic location.
>
> • **Overall**. Non-Hispanic blacks, Hispanics, and American Indians and Alaska Natives generally have the poorest oral health of any racial and ethnic groups in the United States.
>
> • **Children and Tooth Decay**. The greatest racial and ethnic disparity among children aged 2–4 years and aged 6–8 years is seen in Mexican American and black, non-Hispanic children.
>
> • **Adults and Untreated Tooth Decay**. Blacks, non-Hispanics, and Mexican Americans aged 35–44 years experience untreated tooth decay nearly twice as much as white, non-Hispanics.

So fluoridation is not working for poor families and communities of color in the U.S.

Why is this the case? The simple truth is that tooth decay is not caused by not enough ingested fluoride but by poor diet and too much sugar as well as too little intervention from dental professionals. This is what the Senate Subcommittee on Primary Health and Aging said about

the lack of access to dental care in 2012. Millions of Americans are "unable to get even the basic dental care they need."(Sanders, 2012)

Poor nutrition and lack of access to professional dental care goes hand in hand with poverty. ***Sadly 80% of dentists in the US will not treat children on Medicaid because the financial returns are so low*** *(FAN, 2013b).*

Some of the children that need the most care get the least.

Fluoridation simply cannot compensate for poor diet, lack of early professional interventions and poor practices like baby's sucking on bottles of sugared water, juice, milk and even fizzy drinks for hours on end leading to baby bottle tooth decay (BBTD) which ravages the infant's first teeth. Such abuse of the primary teeth cannot be prevented with fluoridation but the prevalence can be reduced with better education.

Even though fluoridation promoters know that BBTD cannot be prevented by fluoridation – or should know –that doesn't stop them using pictures of BBTD as a scare tactic to persuade communities to start or to continue fluoridation. In Figure 9, a Medical Office of Health from Canada holds up a picture of BBTD falsely implying that fluoridation will address this problem. It won't. Such propaganda exercises are bad enough in the hands of rabid fluoridation promoters; they are even worse when practiced by civil servants whose salaries are paid for by the taxpayer.

Figure 9: In Canada, Medical Officer of Health Dr. Hazel Lynn holds up a picture of Baby Bottle Tooth decay (BBTD). Lynn claimed in Owen Sound's Sun Times (Jan 31, 2014) that water fluoridation prevents tooth decay and is a safe practice. The implication is

fluoridation will mitigate against BBTD. It won't! Photo: James Masters/QMI Agency (Langlois, 2014)

7. Why are African Americans more sensitive to fluoride's toxicity?

As discussed above African Americans and Hispanics have been shown to be at an increased risk of developing dental fluorosis, and have a higher risk of suffering from the more severe forms of this condition (Russell, 1962; Butler et al., 1985; Williams & Zwemer, 1990; Beltrán-Aguilar et al., 2005, 2010; Martinez-Mier & Soto-Rojas, 2010).

It is not yet known why blacks suffer higher rates of dental fluorosis. According to the CDC, it may be a result of "biologic susceptibility or greater fluoride intake." (Beltrán-Aguilar et al., 2005). Whatever the explanation, it is clear that the black community is being disproportionately harmed by current fluoride policies in the United States.

Here are a few possible explanations:

1) African Americans consume significantly more total fluids and plain water, and thus receive more fluoride from drinking water, than white children (Sohn et al., 2009).

2) According to CDC, African Americans are less likely to breastfeed than most other racial groups: "non-Hispanic blacks had a lower prevalence of breastfeeding initiation than non-Hispanic whites in all but two states…"-(CDC, 2010). As human milk contains very low levels of fluoride (Ekstrand et al., 1981, 1984; Sener et al., 2007), babies fed formula made with fluoridated water at 0.7 -1.2 mg/L will receive 100 to 200 times more fluoride than a human-fed baby simply through consumption of the water. If the parent reduces the amount of formula in a fluoridated community to save money as many poor parents do (Stein 2008; Egemen et al., 2002; Parraga et al., 1988), and adds more water than recommended, these children will receive even higher levels of fluoride.

3) Another possible explanation was suggested by a study by Leite et al. (2011). The authors found that rats treated with both lead and fluoride had worse dental fluorosis than rats treated with fluoride alone. Thus it is possible that children with lead exposure will be more susceptible to developing dental fluorosis. African-Americans in the inner-city have had more exposure to lead than white children. In 1995 Stevens reported, "Of impoverished black children aged three to five living in American inner cities, 90% have elevated blood-lead levels." CDC in 2003 stated, "Of the children reported with confirmed elevated [blood lead levels] between 1997 and 2001, approximately 17% were non-Hispanic whites, 60% were non-Hispanic blacks, 16% were Hispanic, and 7% were of other races or ethnicities. As reported by the MMWR in 2013:

> This report summarizes the results of that analysis, which indicated that the percentage of children aged 1–5 years with BLLs at or above the upper reference interval value of 5 μg/dL calculated using the 2007–2010 NHANES cycle was 2.6%. Thus, an estimated 535,000 U.S. children aged 1–5 years had BLLs ≥5 μg/dL based on the U.S. Census Bureau 2010 count of the number of children in this age group. (MMWR, 2013)

No federal agency has investigated or published studies on the interaction of neurotoxicants such as lead and fluoride on children in fluoridated inner-cities or anywhere else.

4) Fluoride's toxicity is exacerbated by inadequate nutrition, including lower intakes of iodine and calcium (see studies at FAN, 2012).

5) Certain racial groups are more likely to be lactose intolerant than others. Included among these are Central and East Asians (80-100% lactose intolerant; de Vrese et al., 2001), Native Americans (80-100% lactose intolerant; National Institute of Child Health and Human Development, 2006), African Americans (**75% lactose intolerant**), and Southern Indians (70% lactose intolerant; de Vrese et al., 2001). The elevated incidence of lactose intolerance may indicate lower rates of milk consumption, and higher consumption rates of water or other beverages, than Whites (21% lactose intolerant; Scrimshaw, 1988). Thus these groups may be more heavily exposed to fluoride in water and other beverages than are Caucasian Americans, and their calcium intakes may be compromised. Calcium in the diet is partially protective of fluoride because it lowers uptake of fluoride from the gut.

8. Reckless assumptions underpin fluoridation promotion

Dental fluorosis is a clear indicator that the child has been over-exposed to fluoride before their permanent teeth have erupted. This can be compared to the purple-blue line on the gums of those who have been over-exposed to lead. Both markers tell a story. But not all fluoride exposure outcomes are so easily recognizable as dental fluorosis.

One of the most reckless assumptions made by those who endorsed fluoridation in 1950 was the notion that while fluoride was interfering with some biochemical mechanism in the growing tooth cells causing the damage to the enamel which we call dental fluorosis, that it was not causing damage to any other developing tissue in a baby's body.

It was also reckless to ignore the fact that nature provides only a miniscule amount of fluoride in mothers' milk.

It was also reckless to ignore the fact that there is not one biochemical process in the body that needs fluoride to function properly.

It is even more reckless to ignore the fact that fluoride is highly toxic to many fundamental biological processes, see Barbier et al., 2010, The Biochemical Mechanisms of Fluoride's Toxicity.

If fluoride limits its toxic effects to the cells laying down the enamel in our teeth (Den Besten & Li, 2011), we have been extremely lucky and undeservedly so considering the recklessness of exposing a huge population to this toxic substance every day of their lives for a whole lifetime with every glass of water they drink.

9. Pro-fluoridation governments have undertaken very few studies to seriously investigate fluoride's potential to cause both short-term health effects in children or long-term health effects in adults.

The consequences of the reckless assumptions discussed in section 8 above have been largely hidden form the public and media because of an atrocious lack of basic research on fluoride's health effects until fairly recent years.

Once the Public Health Service had endorsed fluoridation in 1950 the U.S. government showed little interest in funding studies to investigate the health of fluoridated communities. The same has been true in other (largely English speaking) fluoridated countries.

Based on what has been reported in the scientific literature one would have expected a responsible government that has endorsed the experiment of fluoridation to have carefully investigated a possible association of the following conditions with an increased exposure to fluoride:

a) Arthritis rates
b) Decreased thyroid function
c) Lowered IQ in children
d) Increased ADHD rates in children.
e) Reduced time to puberty
f) Reproductive health
g) Alzheimer's disease

A responsible government would have also:

> Attempted to put the anecdotal reports of people claiming to be sensitive to fluoride on a scientific level using double-blind studies;
>
> Further investigated Bassin et al.'s (2006) suggested age window of vulnerability to osteosarcoma in young boys;
>
> Attempted to reproduce Jennifer Luke's findings of fluoride's accumulation in the human pineal gland and lowered melatonin production in fluoride-treated animals (Luke, 1997, 2001), and
>
> Made a comprehensive effort to monitor fluoride levels in urine, blood and bone to establish a baseline for future research. One simple strategy would have been to have collected the hip-bone of patients undergoing hip replacement (of which there are many thousands each year) and monitored them for fluoride. This was done in one small Canadian study and it was found that the levels were considerably higher in the bones collected in fluoridated Toronto compared to unfluoridated Montreal (Chachra et al., 2010). We need more studies like this.
>
> Used dental fluorosis as a biomarker for exposure to probe any possible correlation with bone fractures, osteosarcoma, age of puberty, even IQ scores.

Most of this research should have started 70 years ago before this reckless fluoridation experiment was begun. But Instead of basic scientific research like this the public has been treated to over 60 years of promotion, propaganda and PR. The central plank of which is the

foolish notion that "the absence of study is the same as the absence of harm." According to Paul Connett, PhD, retired chemistry professor, "**When policy is king, science becomes a slave."**

Another way that the pro-fluoridation health establishment in the U.S. has kept western scientists in the dark about fluoride's toxicity is the exclusion of the journal *Fluoride* from Pub Med, the largest online search engine for biomedical papers and maintained by the National Institutes of Health (NIH). Pub Med refuses to index the only scientific journal dedicated to all aspects of fluoride research. It is published by the International Society for Fluoride Research (ISFR) four times a year, and all issues are available online for free at http://www.fluorideresearch.org/backissues.pdf (see section 15 below).

Despite its exclusion from PubMed many studies published in *Fluoride* have been widely cited by scientists in the field — including U.S. government researchers. A review of the references in the landmark report on the toxicology of fluoride by the National Research Council of the National Academies in 2006 reveals an important story: the journal *Fluoride* had the highest number of references -see table 4 for the top 10 journals referenced by the NRC

Table 4: The top ten journals cited in the NRC (2006) review

Name of Journal	# of Citations
Fluoride	56
Journal of Dental Research	34
Community Dentistry and Oral Epidemiology	31
Journal of Public Health Dentistry	31
Journal of the American Dental Association	23
Journal of Bone and Mineral Research	21
Calcified Tissue Research	19
Caries Research	18
Bone	13
Pediatric Dentistry	12

The feeble excuses offered by the NIH for keeping *Fluoride* out of Pub Med is that the ISFR is anti-fluoridation (and therefore biased). But a) the ISFR has never taken a formal position against fluoridation and b) there is far more to fluoride research than the issue of water fluoridation so why deprive scientists access to that other research? It is true that the editors of *Fluoride* over many years have been anti-fluoridation, but if that is the reason for exclusion from Pub Med the NIH has exercised a glaring double standard here because the editors of every major dental journal are pro-fluoridation but that hasn't kept their journals out of Pub Med.

10. Non-fluoridated countries lead research effort on fluoride's toxicity

The understanding of fluoride's dangers and the potential risks posed by water fluoridation by independent scientists (outside government agencies) in the western world is changing because of research efforts in countries like India, China, Iran, and Mexico. These countries have high natural levels of fluoride in regions of their countries and are genuinely interested in finding out

what level of fluoride in water is safe to drink. Moreover, they do not have a fluoridation program to protect and their researchers are not worried about offending those who promote this practice. (There are also areas in the U.S. where drinking water contains high fluoride levels (FAN, 2007).

A great deal of this research effort was revealed to the Western world by the landmark review of fluoride's toxicity by the U.S. National Research Council of the National Academies report in 2006.

11. National Research Council of the National Academies review of 2006

It is hard to overstate the significance of this review titled, ***Fluoride in Drinking Water: A Scientific Review of EPA's Standards*** (NRC, 2006).

First and foremost the panel put together by the NRC was truly balanced which was most unusual for official reviews of fluoride's toxicity. In the 12-membered panel three were known to be pro-fluoridation, three anti-fluoridation and six undeclared.

Second, the panel was expected to take about one year to complete their review but they ended up spending three and half years on this task.

Third, the panel did not limit themselves to human epidemiological studies, they looked at animal studies, biochemical studies, clinical trials, case studies, epidemiological studies and even theoretical modeling in the case of fluoride's impact on the bone.

In short, they looked at everything that pertained to understanding fluoride's toxicity. Nor did they shun the use of the huge database provided by the journal *Fluoride*, which has published research papers on fluoride since 1968.

As a result the NRC's final report, which is 507 pages long, with over 1100 references, is a veritable textbook on the toxicology on fluoride. What they did not do was to review the practice or the purported benefits of water fluoridation, which they were asked not to do by the EPA. They described their mission as follows,

> The committee was charged to review toxicologic, epidemiologic, and clinical data on fluoride—particularly data published since the NRC's previous (1993) report—and exposure data on orally ingested fluoride from drinking water and other sources.
>
> On the basis of its review, the committee was asked to evaluate independently the scientific basis of EPA's MCLG of 4 mg/L and SMCL (secondary maximum contaminant level—a concentration intended to avoid cosmetic damage) of 2 mg/L in drinking water, and the adequacy of those guidelines to protect children and others from adverse health effects. The committee was asked to consider the relative contribution of various fluoride sources (e.g., drinking water, food, dental-hygiene products) to total exposure. The committee was also asked to identify data gaps and to make recommendations for future research relevant to setting the MCLG and SMCL for fluoride. *Addressing questions of artificial fluoridation, economics, risk-benefit assessment, and water-treatment technology was not part of the committee's charge* [emphasis added] (see

also Donahue, 2003).

The enormous breadth covered by this panel is revealed by the chapter titles:

1. Introduction

2. Measures of Exposures to Fluoride in the United States

3.Pharmakinetics of Fluoride

4. Effects of Fluoride on Teeth

5. Musculoskeletal effects

6. Reproductive and Development Effects of Fluoride

7. Neurotoxicity and Neurobehavioral Effects

8. Effects on the Endocrine System

9. Effects of the Gastrointestinal, Renal, Hepatic and Immune Systems

10. Genotoxicity and Carcinogenicity

11. Drinking Water Standards for Fluoride

This important publication can be searched online without charge at http://www.nap.edu/catalog/11571/fluoride-in-drinking-water-a-scientific-review-of-epas-standards

Based on this massive review the NRC panel concluded that the current MCLG (the maximum contaminant level goal) and MCL (maximum contaminant level) for fluoride (4 ppm) was not protective of health and recommended that the EPA's Office of Water (that commissioned the review) conduct a new risk assessment for fluoride to determine a new (and safer) MCLG.

The MCLG is supposed to be the safe level based upon the best science available on harmful effects with the application of appropriate safety factors to protect everyone including vulnerable subsets of the population from "known and reasonably anticipated" harm. The MCLG is an ideal goal. Once the MCLG has been identified the MCL (a federally enforceable standard) is determined and takes into account the economic costs of reaching this standard in a situation where there are high natural levels in the water, either naturally or from industrial pollution.

The NRC recommendation was made in March 2006, but as of September 2015 the determination of the MCLG (and hence the MCL) has still has not been completed by the EPA Office of Water (OW) and the U.S. continues to operate with an unsafe standard nearly three times higher than the WHO recommended safe level of 1.5 ppm, which has been adopted by nearly every other country in the world.

While not discounting any of the other health concerns revealed in the eleven chapters of the report, the authors singled out three clinical conditions that they believed triggered the need for

a new health risk assessment:

1. Clinical stage II skeletal fluorosis: "The committee judges that stage II is also an adverse health effect, as it is associated with chronic joint pain, arthritic symptoms, slight calcification of ligaments, and osteosclerosis of cancellous [porous] bones."

2. Bone fractures: "The majority of the committee concluded that the MCLG is not likely to be protective against bone fractures."

3. Severe dental fluorosis: "After reviewing the collective evidence, including studies conducted since the early 1990s, the committee concluded unanimously that the present MCLG of 4 mg/L for fluoride should be lowered. Exposure at the MCLG clearly puts children at risk of developing severe enamel fluorosis."

In addition to these end points the NRC panel pointed to many gaps in the literature and recommended numerous research questions that needed to be addressed. An independent observer should wonder why after over 60 years of fluoridation (as of 2006) there should be so many gaps in the literature. We have attempted to answer that question in section 9 above. This is what the chairman of the NRC panel had to say about this in a *Scientific American* article in January 2008:

> "What the committee found is that we've gone with the status quo regarding fluoride for many years—for too long really—and now we need to take a fresh look . . . In the scientific community people tend to think this is settled. I mean, when the U.S. surgeon general comes out and says this is one of the top 10 greatest achievements of the 20th century, that's a hard hurdle to get over. But when we looked at the studies that have been done, we found that many of these questions are unsettled and we have much less information than we should, considering how long this (fluoridation) has been going on." (Fagin, 2008)

On the day that the NRC (2006) was published the American Dental Association (ADA) rushed in to deny its relevance to fluoridation and six days later the CDC's Division of Oral Health did the same. This was an extraordinary position to take because in chapter 2 the NRC panel provided an exposure analysis, which clearly demonstrates that certain subsets of the population are exceeding the EPA's safe reference dose for fluoride (0.06 mg/kg/day) drinking fluoridated water. These subsets included high water drinkers, people with poor kidney function, people with borderline iodine deficiency and bottle-fed babies. The latter case is illustrated by figure 2.8 that appears on page 85 of the report.

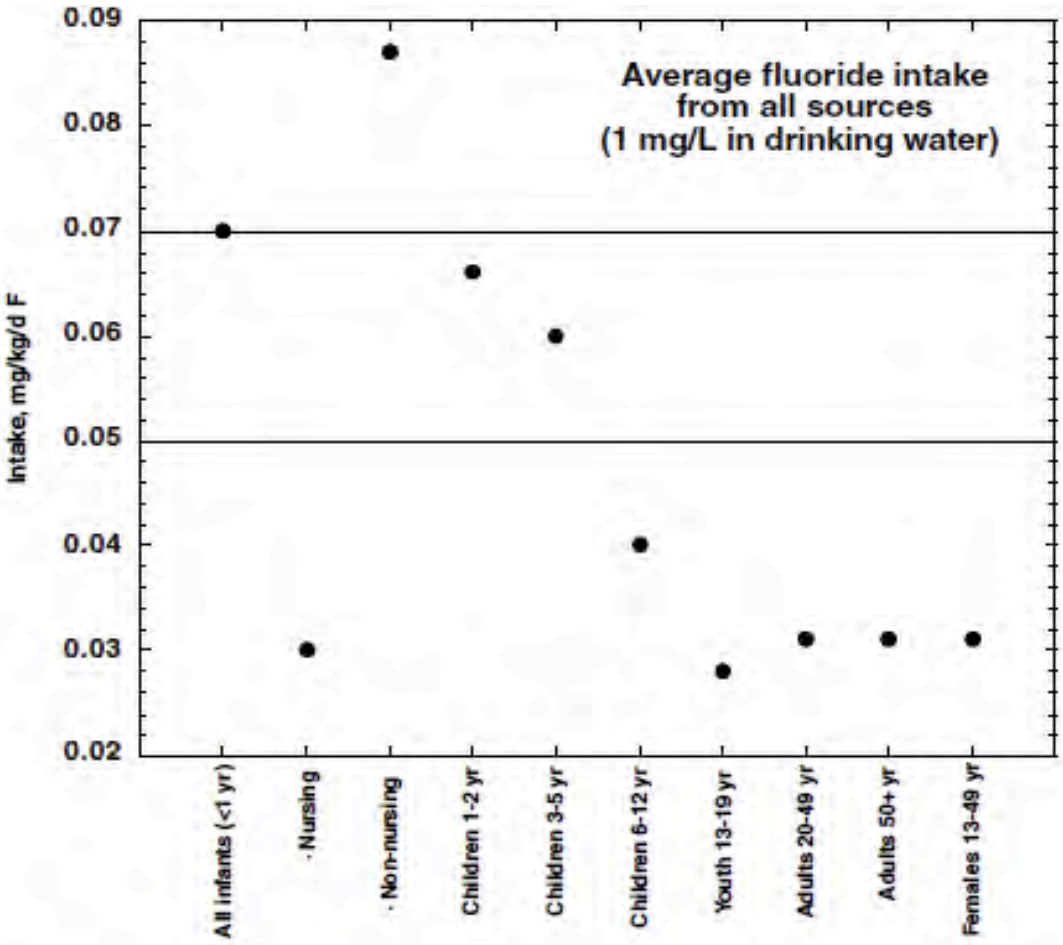


FIGURE 2-8 Estimated average intake of fluoride from all sources, at 1 mg/L in drinking water (based on Table 2-11). Horizontal lines indicate an intake of 0.05-0.07 mg/kg/day.

Figure 10: Copy of Figure 2-8 in NRC (2006), p.85.

More studies since 2006

Because of the huge delay in the EPA Office of Water completing the recommended risk assessment – its now been 9 years - more studies have been published since 2006, which further underline the need and urgency for a new more protective MCLG. These include many more studies on neurotoxicity, a key study on thyroid function, another on ADHD and an important study on osteosarcoma. Had these been available at the time of the NRC review it is more than likely that these would have been added to the list of endpoints cited above by the panel that should be considered in a new risk assessment.

The EPA's Office of Water in 2011 claimed that the end point of severe dental fluorosis will also protect against arthritic symptoms, bone fractures and harm to any other tissue.

Here we will start with some of the findings in the NRC review and update them with more recent studies.

12. NRC and Endocrine Disruption

The NRC panel labeled fluoride an endocrine disruptor. The authors state:

> "The chief endocrine effects of fluoride exposures in experimental animals and in humans include decreased thyroid function, increased calcitonin activity, increased parathyroid hormone activity, secondary hyperparathyroidism, impaired glucose intolerance, and possible effects on the timing of sexual maturity. Some of these effects are associated with fluoride intake that is achievable at fluoride concentrations in drinking water of 4 mg/L or less, especially for young children or for individuals with high water intake. (p. 8, NRC 2006)
>
> "In summary, evidence of several types indicates that fluoride affects normal endocrine function or response; the effects of the fluoride-induced changes vary in degree and kind in different individuals. Fluoride is therefore an endocrine disruptor in the broad sense of altering normal endocrine function or response, although probably not in the sense of mimicking a normal hormone." (p. 266, NRC 2006)

The 2006 NRC report notes that six prior major reviews (1991, 1993, 1999, 2000, 2002, 2003) of the health effects of fluoride did not consider the endocrine system in detail apart from the reproductive system.

13. NRC on Thyroid Function

On thyroid function, the NRC panel reported: "Fluoride exposure in humans is associated with elevated TSH concentrations, increased goiter prevalence, and altered T4 and T3 concentrations; similar effects in T4 and T3 are reported in experimental animals, but TSH has not been measured in most studies." (p. 262)

The panel also indicated that affects on the thyroid have been observed at very low levels. They state that, "In humans, effects on thyroid function were associated with fluoride exposures of 0.05-0.13 mg/kg/day when iodine intake was adequate and 0.01-0.03 mg/kg/day when iodine intake was inadequate (Table 8-2)." (p. 263, NRC 2006).

To reach these dosages (which depend on bodyweight) it takes remarkably little fluoride. For those with borderline iodine deficiency it would only take the consumption of 0.1 to 0.3 mg of fluoride per day for a 10 kg infant and 0.7 to 2.1 mg/day for a 70 kg adult. These are easily exceeded in a fluoridated community. For someone whose iodine levels are adequate for a 10 kg infant it would take between 0.5 and 1.3 mg /day and for a 70 kg adult it would take 3.5 mg to 9.1 mg/day. The lower end of these ranges would be reached by some people in a fluoridated community.

These statements have been recently buttressed by new research conducted in the UK and published in 2015.

14. Hypothyroid and fluoride study from UK

This study by Peckham et al., 2015 used the records of over 98% of the General practices in England on the numbers of patients treated for hypothyroidism and examined the prevalence of this condition as a function of the fluoride levels in the local drinking water supplies. The authors noted that:

> **"**Approximately, six million people (10%) in England live in areas where drinking water contains natural fluoride or which has been artificially fluoridated at a target concentration of 1 ppm (1 mg/L). Using prevalence data from the UK QOF, an analysis was undertaken to determine whether prevalence was affected by practice populations being situated in fluoridated areas at >0.7 mg/L and areas with lower levels of fluoride. While there are other sources of fluoride in people's diet (e.g., tea), drinking water is the most significant source of ingested fluorides in the UK." (Peckham et al, 2015)

The UK research team found that higher levels of fluoride in drinking water was a useful predictor of the prevalence of hypothyroidism. They found that general medical practices located in the West Midlands (a wholly fluoridated area) are nearly twice as likely to report high hypothyroidism prevalence in comparison to Greater Manchester (non-fluoridated area). (Peckham et al, 2015)

They concluded:

> "In many areas of the world, hypothyroidism is a major health concern and in addition to other factors—such as iodine deficiency— fluoride exposure should be considered as a contributing factor. The findings of the study raise particular concerns about the validity of community fluoridation as a safe public health measure." (Peckham et al, 2015)

It is hard to overstate the significance of these findings.

First, Peckham's findings are not totally unexpected. Scientific and medical research stretching back to the 1920s has shown that fluoride can affect the thyroid. In fact from the 1930s to the 1950s doctors in Argentina, France and Germany used fluoride to lower thyroid function in hyperactive thyroid patients. The levels of fluoride used overlap with the levels of exposure known to occur in some people drinking artificially fluoridated water today (Galletti & Joyet, 1958).

Second, hypothyroidism is a very common disorder in the US. In fact, one of the most prescribed drugs in the USA is synthroid, which is used to treat hypothyroidism. It can have serious adverse health effects. For a further discussion of the extent and concern about hypothyroidism in the USA see Appendix B.

Third, race may be a factor in sensitivity to certain thyroid diseases, which may make communities of color more vulnerable to fluoride's impacts on thyroid function (see Appendix C).

Fourth, reduced thyroid function in pregnant women is linked to reduced IQ in their children and there is accumulating evidence that fluoride, at levels within the range to which fluoridated populations are exposed, is associated with lowered IQ. Fluoride's effect on thyroid function

might be the mechanism by which it lowers IQ.

15. Fluoride and brain function

Whether or not the mechanism for fluoride's ability to lower IQ is caused by fluoride's interference with thyroid function in pregnant women or not, there is a huge body of evidence from animal, fetal and human studies that fluoride is a potent developmental neurotoxin (see http://fluoridealert.org/issues/health/brain/). The NRC examined some of that evidence in 2006 but much more has been published (or translated) since then. For example, in 2006 the NRC panel reviewed 5 IQ studies, there have been – as of Sept 2015 - 45 studies (out of 52 studies) that have found an association between lowered IQ and exposure to fairly modest levels of fluoride.

27 of these IQ studies were subjected to a meta-analysis by a team from Harvard University, which included Philippe Grandjean (Choi et al., 2012). While they noted that many of the studies had weaknesses (particularly control of a number of conflicting variables) they also noted that the results were remarkably consistent considering the investigations had been conducted in different countries (China and Iran) in widely different geographical areas, at different times and by different research teams. 26 out of the 27 studies found a lowered IQ in the "high-fluoride" village compared with the low-fluoride village. The average lowering was 7 IQ points. Such a downward shift in a large population would have huge ramifications. It would halve the number of geniuses and double the number of mentally handicapped. This in turn would have enormous social and economic consequences.

In a press release from Harvard University that accompanied the Choi et al., 2012 meta-analysis, co-author Philippe Grandjean was quoted as saying that, "Fluoride seems to fit in with lead, mercury, and other poisons that cause chemical brain drain."

When one considers the pains that our society has taken to either eliminate or drastically reduce the use of lead and mercury (e.g. banning lead in paint, solder, and gasoline and the phasing out the use of mercury in industrial switches, thermometers and other medical equipment, as a fungicide in paint, use in alkaline batteries, limiting emissions from coal-fired power stations and incinerators, fish advisories and in some countries the use in dental fillings) all in the name of protecting children and pregnant women from known neurotoxins, it is absolutely bizarre that we should continue to knowingly add this neurotoxin (i.e. fluoride) every day to the drinking water of over 200 million people.

In a radio debate with Dr. Howard Pollick, a well-known promoter of fluoridation, Grandjean was more succinct when he said:

> "Because I've worked in this field long enough to know that with time, we have always found that lead, mercury and pesticides were more toxic than we originally thought. I am not willing to sit here and say, OK, let's expose the next generation's brains and just hope for the best." (WBUR, 2015)

Fluoridation promoters have done their best to dismiss the Choi et al. 2012 findings claiming

that the fluoride concentrations in the High-Fluoride villages made the findings irrelevant to artificial water fluoridation programs. It is true that in two of the studies the fluoride concentrations ranged as high as 11 and 11.5 ppm, but this was the exception not the rule. Table 5 gives the fluoride concentrations in the 20 studies where the fluoride exposure was from water not coal and for which the concentrations was given.

Table 5: A listing of the Fluoride concentrations in the "high-fluoride" villages in 20 of the 27 studies subjected to a meta-analysis by Choi et al., 2012. The data was compiled by Paul Connett from Table 1 in the Choi paper.

Author/year	ppm in High F village
Chen 1991	4.55
Lin 1991	0.88
An 1992	2.1 – 7.6 (mean = 4.9)
Xu 1994	1.8
Yang 1994	2.97
Li 1995	1.81 – 2.69 (mean = 2.25)
Yao 1996	2 – 11 (mean = 6.5)
Zhao 1996	4.12
Yao 1997	2
Lu 2000	3.15
Hang 2001	2.90
Wang 2001	2.97
Xiang 2003	0.57 – 4.5 (mean = 2.54)
Seraj 2006	2.5
Wang 2006	5.44 +/- 3.88 (1.52 – 9.32)
Fan 2007	1.14 - 6.09 (mean = 3.62)
Wang 2007	3.8 – 11.5 (mean = 7.65)
Li 2010	2.47 +/- 0.75 (1.72 – 3.22)
Poureslami 2011	2.38
Wang 1996	>1- 8.6 (mean = 4.8)

Mean of 20 results (using means) = 70.49 / 20 = 3.52

Taken from Choi et al, 2012 – Table 1, pp 24-26.

From Table 5 it can be seen that many of the studies had fluoride concentrations less than 3 ppm and that the mean for all the studies combined was 3.52 ppm, which is lower than the current safe drinking water standard in the USA (4 ppm). Such levels offer **no adequate margin of safety** to protect all children in a large population drinking fluoridated water (and getting fluoride from other sources) sufficient to protect against this serious harmful effect.

Such a conclusion becomes even more obvious when we look at the details of one particularly well-conducted study (Xiang et al. 2003a,b.).

Xiang controlled for iodine intake (Xiang et al, 2003a) and lead exposure (Xiang 2003,b) and retrospectively for arsenic. The average level of fluoride in the well water for the Low-fluoride village was 0.36 ppm (range 0.18 -0.76 ppm) and the average level in the High Fluoride was 2.5

ppm (range 0.57- 4.5 ppm). The average drop in IQ was 5-10 IQ points across the whole age range. Xiang et al also sub-divided the High- Fluoride village into 5 sub-groups (A,B,C,D and E) with mean fluoride concentrations of 0.75, 1.53, 2.46, 3.28 and 4.16 ppm. As can be seen from his Table 8 (reproduced below as our Table 6) as the fluoride concentration increases in these 5 sub-groups the mean IQ decreases in an apparent linear fashion (see the results plotted graphically in Figure 11.

Table 6: A reproduction of Table 8 in Xiang et al., 2003a

Table 8. Level of fluoride in drinking water and children's IQs

Village	F in drinking water (mg/L)				IQ and rate of retardation	
	Group	No. samples	Water F level (Mean±SD)	No. children	IQ (Mean±SD)	Rate of IQ<80 (%)
Xinhuai	F	290	0.36±0.15	290	100.41±13.21	6.55
Wamiao	A	9	0.75±0.14	9	99.56±14.13	0.00
	B	42	1.53±0.27	42	95.21±12.22*	9.52
	C	111	2.46±0.30	111	92.19±12.98†	14.41*
	D	52	3.28±0.25	52	89.88±11.98†	21.15†
	E	8	4.16±0.22	8	78.38±12.68†	37.50†

*$p<0.05$. †$p<0.01$ compared with group F.

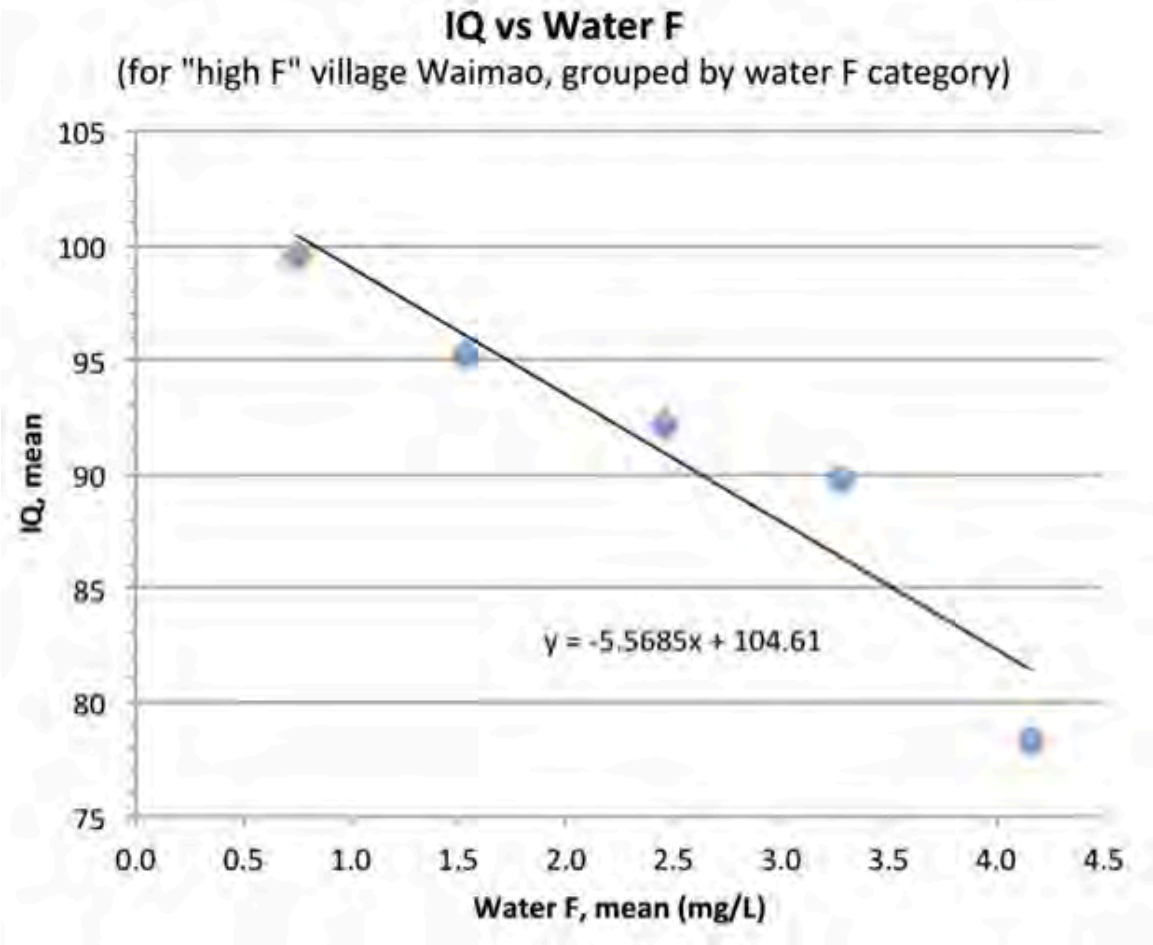


Figure 11: A plot of the mean IQ versus the mean IQ in the 5 sub-groups (A- E) in the high fluoride village, data taken from Table 8 in Xiang et al, 2003a.

From this plot one can see that IQ was lowered at a concentration somewhere between 0.75 and 1.5 ppm. This overlaps the range at which communities are fluoridated in the U.S. (0.7 to 1.2 ppm). This finding offers NO margin of safety to protect all children drinking fluoridated water from this serious end point. To make matters worse still according to the authors the children in these rural Chinese villages are unlikely to be using fluoridated toothpaste nor are they likely to be bottle-fed. Thus if we take into account these two sources many American children will be getting more fluoride *from all sources combined* than these Chinese children whose IQ was lowered.

Xiang also found that as the fluoride concentration went up in the 5 sub-groups the percentage of children with an IQ less than 80 (note that an IQ 70 -80 is borderline mentally handicapped and below 70 is outright mentally handicapped) increases dramatically from 0% (at 0.75 ppm) to 37.5% at 4.16 ppm (see Xiang's Table 8 reproduced above in Table 6).

By sub-dividing the children in the high-fluoride village Xiang eliminated any confounding factors that may have existed between the low and high-fluoride villages.

Other studies demonstrating fluoride's neurotoxicity

The evidence that fluoride is neurotoxic does not rest entirely on the 45 IQ studies. These findings are consistent with many animal studies that show that fluoride can enter the brain and alter brain chemistry in several ways. Of particular relevance are the 31 (out of 33) studies that show that when animals are placed in mazes they learn and memorize simple tasks less well when exposed to fluoride (see http://fluoridealert.org/issues/health/brain/).

There are also other human studies that have been conducted on very young children (too young to undertake IQ tests). One of these techniques tests the child's ability to copy and reproduce from memory drawings with a multiple of simple features. These have also shown that child's cognitive function is impaired by fluoride exposure. One example of this was a well-designed study from Mexico by Rocha Amador et al. (2009). They used the Rey-Osterrieth Complex Test (see Figure 12 below). They found that approximately **9 out of 10 children exposed to fluoride** were unable to copy the ROCF as expected for their age. For Immediate Recall, almost **6 out of 10 children** were unable to draw the figure as expected for their age.

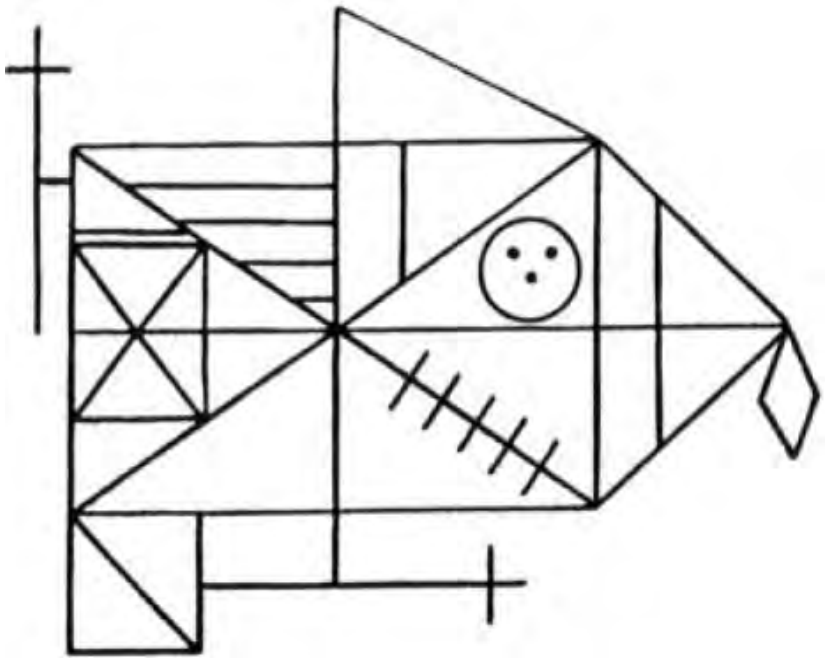


Figure 12: The Rey-Osterrieth Complex Figure Test used in the Rocha Amador et al. (2009) study.

There have also been four studies of aborted fetuses form China, which show that those from endemic fluorosis areas have impaired brain structures compared to non-fluorosis areas (Yu, 1996; Dong, 1989; Du, 1992; He, 1989).

The last children that need their IQ lowered in the US are children from low-income and minority families

16. Fluoridation and ADHD.

Attention Deficit Hyperactivity Disorder (ADHD) has become one of the most commonly diagnosed childhood behavioral disorders. Its basic characteristics are inattention, hyperactivity and impulsivity. "ADHD often continues into adolescence and adulthood, which can lead to medication dependency and a lifetime of treatment (Maddox, 2003)."

In early 2015 a study was published that examined the relationship between exposure to fluoridated water and ADHD prevalence among children and adolescents, ages 4-17, in the United States. The authors found that, "[s]tate prevalence of artificial water fluoridation in 1992 significantly positively predicted state prevalence of ADHD in 2003, 2007 and 2011, even after controlling for socioeconomic status. A multivariate regression analysis showed that after socioeconomic status was controlled each 1% increase in artificial fluoridation prevalence in 1992 was associated with approximately 67,000 to 131,000 additional ADHD diagnoses from 2003 to 2011. Overall state water fluoridation prevalence (not distinguishing between fluoridation types) was also significantly positively correlated with state prevalence of ADHD for all but one year examined." (Malin & Till, 2015). See figure 13 below

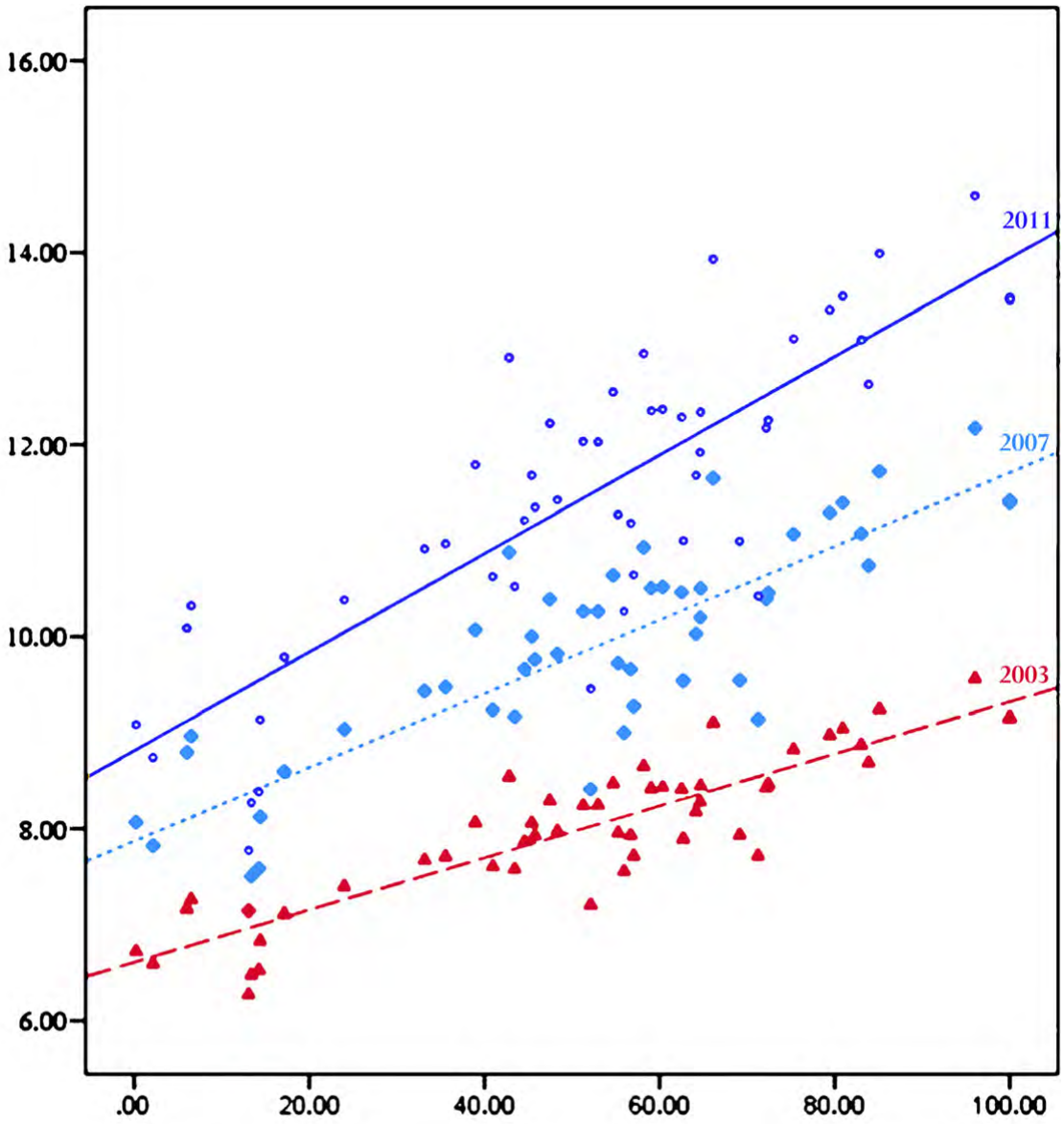


Figure 13: Percent of children with ADHD (by U.S. state) for 2003, 2007 and 2011 plotted against the % of population in each state fluoridated in 1992 (Malin & Till, 2015)

17. African Americans suffer greater exposure to other neurotoxins (lead and mercury)

LEAD

Lead exposure and lead poisoning have been concerns for decades in African American communities. The Huffington Post cites a CDC report that says that lead poisoning is a disease that primarily impacts African-Americans. According to the CDC (Jones et al.), children of color whose families are poor and who live in housing built before 1950 have the highest lead poisoning risk:

> On average, between 1999 and 2004, **black children were 1.6 times** more likely to test positive for lead in their blood than white children. And among children who tested positive for extremely high lead levels (≥10 micrograms per deciliter), the disparity was even more stark. Black children were nearly three times more likely than white children to have highly elevated blood-lead levels, the type of lead poisoning where the most damaging health outcomes occur. (Jones et al., 2009).

Combined Lead and fluoride exposure

As far we know, no federal agency has published anything on the synergistic effects of exposure to fluoride and lead. The Agency for Toxic Substances and Disease Registry (ATSDR, 2004) produced an "interaction profile" to exposures of the mixture containing uranium, fluoride, cyanide and nitrate. However, no information was available on any interaction.

There are some experiments that have exposed animals to a combination of lead and fluoride. These have reported the following:

•• Liu et al. (2008) reported that co-exposing rat pups to lead and fluoride resulted in "alterations in testis morphology and sperm quality, including low viability and high abnormality, thereby suggesting that disturbance of energy metabolism may be one of the mechanisms by which F or Pb affects the male reproductive system."

•• In the animal study cited above by Leite et al. (2011), rats treated with both lead and fluoride had worse dental fluorosis than rats treated with fluoride alone.

•• Niu et al. (2009) rat study: "Results showed that the learning abilities and hippocampus glutamate levels were significantly decreased by F and Pb individually and the combined interaction of F and Pb. The activities of AST and ALT (markers of lead toxicity) in treatment groups were significantly inhibited, while the activities of GAD were increased, especially in rats exposed to both F and Pb together. These findings suggested that alteration of hippocampus glutamate by F and/or Pb may in part reduce learning ability in rats."

•• Niu et al. (2008) study with adult rats: "From results of the Y-maze test, we can see a significant decrease in learning ability of animals in the HiF+HiPb (High fluoride with high lead) group."

•• Panov et al. (2015) reported the following from a study where rats were exposed to both fluoride and lead:

> * Comparison of the values obtained for the groups of separate and combined exposure shows that, for the majority of the toxicodynamic indices, the combined effect is more marked than the effect of fluoride alone or lead alone.
>
> * With a combined exposure of lead and fluoride (but not alone) significant reduction in the thyrotropin level was observed. Thyrotropin is a hormone secreted by the pituitary gland that regulates the production of thyroid hormones.

> * Neither fluoride nor lead produced a reduction in triiodothyronine level, but it was reduced under the combined effect (i.e. overt synergism took place). On the contrary, at exposure to lead alone or in combination with fluoride the level of thyroxine was raised.

In addition to the interaction between lead and fluoride is the additional problem that the chemicals used to fluoridate water appear to interact with chloramine (a common disinfection agent) to increase the dissolution of lead from brass fittings (see Appendix D).

MERCURY

According to Kaste et al. (1996), national data indicate that 80% of tooth decay in children is concentrated in 25% of the child population, with low-income children and racial/ethnic minority groups having more untreated decay on average than the U.S. population as a whole. This means that they also have greater exposure to mercury via mercury amalgam fillings.

According to the Food & Drug Administration,

> Dental amalgam is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. **Approximately 50% of dental amalgam is elemental mercury by weight.** The chemical properties of elemental mercury allow it to react with and bind together the silver/copper/tin alloy particles to form an amalgam.
>
> Dental amalgam fillings are also known as “silver fillings” because of their silver-like appearance. Despite the name, "silver fillings" do contain elemental mercury (FDA, 2015).

According to Counter & Buchanan (2011), “Children are particularly vulnerable to Hg intoxication, which may lead to impairment of the developing central nervous system, as well as pulmonary and nephrotic damage...” Exposures from dental amalgams “release Hg vapors, and Hg2+ in tissues… [and] fetal/neonatal Hg exposure from maternal dental amalgam fillings.” The authors state:

> It has been known for sometime that dental amalgam is a major source of Hg^0 (elementary mercury) exposure in humans because Hg is the principal metal in most dental fillings (approximately 50% Hg by weight) (Nadarajah et al., 1996). The health effects of dental amalgam Hg have been a subject of considerable debate for years, with no scientific consensus on an association between amalgam Hg exposure and adverse health consequences, either in adults or children (Clarkson, 2002; Ratcliffe et al., 1996). However, questions have been raised regarding a possible association between maternal Hg dental fillings and the health of the developing fetus, neonate, and infant. Significant levels of Hg have been measured in oral vapor, blood, and in organs of animals and humans with Hg containing dental amalgam restorations (Abraham et al., 1984; Snapp et al., 1989; Vimy et al., 1990, 1997). In the oral cavity, Hg0 vapor is rapidly oxidized to inorganic divalent Hg (Hg2+) in vivo after release from dental amalgam and absorbed through inhalation.

18. Association of pre-term births in upstate New York with community water fluoridation

According to the CDC:

> In 2012, preterm birth affected more than 450,000 babies—that's 1 of every 9 infants born in the United States. Preterm birth is the birth of an infant before 37 weeks of pregnancy. Preterm-related causes of death together accounted for 35% of all infant deaths in 2010, more than any other single cause. Preterm birth is also a leading cause of long-term neurological disabilities in children. Preterm birth costs the U.S. health care system more than $26 billion in 2005.
> http://www.cdc.gov/reproductivehealth/MaternalInfantHealth/PretermBirth.htm

In November 2009, Hart et al. presented an abstract at the American Public Health Association on the "Relationship between municipal water fluoridation and preterm birth in Upstate New York." In part, the authors stated:

> **"**The annual incidence of preterm birth (PTB) (<37 weeks gestation) in the United States is approximately 10% and is associated with considerable morbidity and mortality. Current literature suggests an association between periodontal disease and PTB. Domestic water fluoridation is thought to have lessened the burden of dental disease. Theoretically, one would expect water fluoridation to be protective against PTB. The aim of our study was to examine the relationship between municipal water fluoridation and PTB.
> **Domestic water fluoridation was associated with an increased risk of PTB (9545 (6.34%) PTB among women exposed to domestic water fluoridation versus 25278 (5.52%) PTB among those unexposed, p < 0.0001)). This relationship was most pronounced among women in the lowest SES groups (>10% poverty) and those of non-white racial origin.** Domestic water fluoridation was independently associated with an increased risk of PTB in logistic regression, after controlling for age, race/ethnicity, neighborhood poverty level, hypertension, and diabetes (Hart et al., 2009).

In 2013, the Henry J. Kaiser Family Foundation reported that non-Hispanic blacks had the highest rate for "*Preterm Births as a Percent of All Births by Race/Ethnicity."*
16.3% - Non-Hispanic Black
11.3% - Hispanic
10.2% - Non-Hispanic White
http://kff.org/other/state-indicator/preterm-births-by-raceethnicity/

19. State Oral Health Reports have provided little or no information on dental fluorosis and no warnings to communities of color on their extra vulnerabilities

While the federal government has been grossly negligent about warning communities of color about their findings that they are more vulnerable to dental fluorosis, at least they have provided important dental fluorosis data on the national level which allows interested parties to find out what is going on if they had the time and inclination to do so (Beltrán-Aguilar, 2005, 2010).

However, this has not happened to any significant extent at the state level. Most of the state reports on oral health (many funded by the CDC's Division of Oral Health) have provided no dental fluorosis rates and no racial breakdowns to the public. As a result practically no warnings have emerged at the state level. In Appendix E we have presented what we were able to find on these matters from reviewing **119 state reports published between 2000 and 2015.** Incredibly, 109 of these reports contained not one mention of dental (or enamel) fluorosis. Of the remaining 10 reports only two presented statistics on dental fluorosis. Two reports gave statistics for "white spot lesions" in Head Start children. While no definition of "white spot lesion" was given in the reports, it could include fluorosis as it is seen in the primary teeth (Warren et al., 1999; Hong et al 2006a) but most frequently observed in the secondary teeth.

> • The 2011 Washington state report gives the rate for White Spot Lesions in Head Start/ECEAP Preschoolers at 20.5%, with African American children having the highest percent.
>
> • The 2007 Georgia report notes: "20% of 2 to 5 year old Georgia Head Start children surveyed have white spot lesions."

A small non-profit called the Fluoride Action Network, not paid for, or funded by, any federal or state agency working on infant health, childhood health, or oral health, succeeded in getting New Hampshire to become the first state to require notification that infants under 6-months of age should not be routinely fed infant formula mixed with fluoridated water. The law passed in August 4, 2012, *against the opposition of nearly every health and oral-health group in the state (see list below)*, is a proactive approach to reduce fluorosis rates by notifying parents about the risk posed to their infants by fluoridated water so they can take action to prevent a further increase in overexposure to fluoride.

It was passed by the New Hampshire House, 253-23, unanimously by the Senate, and signed by the Governor, the legislation (HB-1416) read:

> "*If a public water supply is fluoridated, the following notice shall be posted in the water system's consumer confidence report: 'Your public water supply is fluoridated. According to the Centers for Disease Control and Prevention, if your child under the age of 6 months is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance of dental fluorosis. Consult your child's health care provider for more information.*'"

The law requires the above notice on all annual water consumer confidence reports in fluoridated communities, which must be mailed to all water consumers, be posted on water department websites, and available at city halls.

The legislation was initially introduced in 2011, but was killed in the House Health and Human Services committee, which at the time was chaired by a retired dentist and proponent of fluoridation. In 2012 the bill was sent to a different committee, the House Municipal and Public Works committee, **where it was approved by a 13-2 vote despite the same opposition it had met a year earlier by more than a dozen groups, including the**

New Hampshire Dental Association
New Hampshire Oral Health Coalition
Delta Dental
American Water Works Association
Municipal Association
Oral Health Advocacy Taskforce
Dental Hygienists' Association
Partners for a Healthier Community
Health Law Advocates
PEW Charitable Trusts
Granite State Children's Alliance (PEW Grantee)
New Hampshire Department of Health and Human Services

The simplest explanation for this negligence is that those who specialize in oral health are far more interested in promoting water fluoridation, than revealing its downside. However, whatever the explanation, minority communities have every reason to feel let down by those who are paid to protect their health.

In Appendix F we also examine the oral health reports prepared by private entities like the Pew Foundation. Again we find little or no discussion of dental fluorosis or the different prevalence for different races. Clearly their interest is in promoting fluoridation with little desire in undermining their message that fluoridation is "safe and effective" and certainly no desire to draw attention to the disproportionate harm this practice is causing poor and minority communities.

20. **Civil Rights Leaders mobilize to fight fluoridation because of the increased risks to minority communities.**

Beginning in March 2011 Civil Rights leaders began to speak out publicly about the lack of warning from the CDC and other health agencies about the higher rates of dental fluorosis and extra vulnerability of minority communities to fluoride's toxic effects. Below we provide excerpts of the statements from prominent leaders on this issue. Links to the full text of each statement listed below is in Appendix G.

We present them in chronological order starting with Rev. Durley's letter of March 9, 2011, presented in full.

1) March 9, 2011. Letter from Dr. Gerald L. Durley, Pastor, Providence Baptist Church, to Senator Chip Rogers, Senate Majority Leader, Georgia State Capital, Atlanta. **Re: Repeal of Georgia's Mandatory Fluoridation Law**.

> Dear Senator Rogers,
>
> As a citizen, a minister, and a community leader, I am writing to state my opposition to the practice of water fluoridation, and to ask that the current Georgia law mandating water fluoridation throughout our state be repealed.

First and foremost, water fluoridation takes away people's choice. We have a God-given right to not have fluoride forced into our bodies or the bodies of our children. Fluoridation supporters attempt to say that people are not forced to drink fluoridated water, but that is a disingenuous statement that ignores reality. Many families do not have funds to buy an expensive home water fluoride removal system, or to buy unfluoridated bottled water for making their babies' milk formula, so in truth they are forced to drink fluoride in their water simply because of their economic status or household income.

Second, fluoridation disproportionately harms members of the black community. The Centers for Disease Control's own information acknowledges that blacks have significantly more "dental fluorosis" teeth staining than whites. For many, the stains are not simply "barely visible" or "faint" in color, or "just a cosmetic issue" as fluoridation promoters call it. Common sense tells us that if fluorides affect the teeth, which are the hardest surfaces of the body to cause permanent staining, certainly other soft tissue organs in the body are affected. Also, the National Research Council of the National Academy of Science, has designated kidney patients, diabetics, seniors, and babies as "susceptible subpopulations" that are especially vulnerable to harm from ingested fluorides. Black citizens are disproportionately affected by kidney disease and diabetes, and are therefore more impacted by fluorides.

Third, we cannot control the dose of fluoride people ingest if we put fluoride in drinking water. Layered on top of this, we do not know what each person's medical history or nutritional status is. Therefore, the "one size fits all" approach to fluoridation makes no sense at all.

We need to focus on helping people get access to dentists. Lack of fluoride does not cause cavities. Too many sugars on the teeth, lack of access to dental care, and lack of dental health education –these cause cavities.

We also need to know why the full story about harm from fluorides is only just now coming out. I support the holding of Fluoridegate hearings at the state and national level so we can learn why we haven't been openly told that fluorides build up in the body over time, why are government agencies haven't told the black community openly that fluorides disproportionately harm black Americans, and why we've been told that decades of extensive research show fluoridation to be safe, when the National Research Council in 2006 listed volumes of basic research that has never been done. This is a serious issue for all Americans, of every race and in every location.

2) March 29, 2011. Letter from **Ambassador Andrew Young** to Chip Rogers, Senate Majority Leader, Georgia State Capitol, Atlanta, GA.

I am writing to convey my interest in seeing that Georgia's law mandating water fluoridation for Georgia communities be repealed…

I am most deeply concerned for poor families who have babies: if they cannot afford unfluoridated water for their babies milk formula, do their babies not count? Of course

> they do. This is an issue of fairness, civil rights, and compassion. We must find better ways to prevent cavities, such as helping those most at risk for cavities obtain access to the services of a dentist

3) April 6, 2011. Letter from **Matt Young, DDS**, President, International Academy of Oral Medicine and Toxicology, to Thomas Frieden, MD, MPH, Director, Centers for Disease Control and Prevention, Atlanta, GA. RE: Disproportionate Harm From Water Fluoridation to Babies, Kidney Patients, and African Americans.

> As President of the International Academy of Oral Medicine and Toxicology, I am writing to communicate our organization's concern that the CDC-supported practice of water fluoridation disproportionately harms certain subsets of the population: such as babies, kidney patients, and African Americans.
>
> There is much science we could cite here, but the purpose of this letter is to succinctly summarize the basis for our conclusion that fluoridation must end.

4) June 2011. **Alveda King**, nationally known minister and niece of civil rights leader Martin Luther King Jr.:

> ”This is a civil rights issue … No one should be subjected to drinking fluoride in their water, especially sensitive groups like kidney patients and diabetics, babies in their milk formula, or poor families that cannot afford to purchase unfluoridated water. Black and Latino families are being disproportionately harmed.”

5) July 1, 2011. A Resolution on fluoridation was passed by the **League of United Latin American Citizens (LULAC)** titled, Civil Rights Violation Regarding Forced Medication.

> WHEREAS, minority communities are more highly impacted by fluorides as they historically experience more diabetes and kidney disease; and…
>
> WHEREAS, minorities are disproportionately harmed by fluorides as documented by increased rates of dental fluorosis (disfiguration and discoloration of the teeth); and…
>
> WHEREAS, the CDC now recommends that non-fluoridated water be used for infant formula (if parents want to avoid dental fluorosis – a permanent mottling and staining of teeth), which creates an economic hardship for large numbers of families, minority and otherwise…

6) April 2013. **Portland chapter of the NAACP** voted to oppose the fluoridation of the public water supply.

> … Clifford Walker, chair of the branch veteran’s committee, says he believes the vote was unanimous. They had been **debating the issue vigorously** for several months,” Walker says. “People with **diabetes** would be [affected] by adding fluoride to the water. African-Americans have a higher rate of diabetes.” The decision, he says, is “in the best interest of our constituents.”

> A key narrative of this spring's fluoridation campaign has been that **fluoride supporters had gathered a coalition of 80 groups representing low-income and minority Portlanders**, while the anti-fluoride campaign had none.
> *WW* reported this morning that the pro-fluoridation campaign, Healthy Kids Healthy Portland, has **rewarded that support with cash payments totaling more than $119,000**. Groups like the Urban League, the Native American Youth and Family Center and the Latino Network are using that money for "outreach," according to Evyn Mitchell, the campaign manager for Healthy Kids. (Mesh, 2013)

7) November 11, 2014. A Resolution was passed by the **Santa Rosa-Sonoma County NAACP** Opposing Fluoridation of Our Public Water Supply.

> Whereas: Studies have found that in fluoridated communities, African-American and Latino children are at greater risk for dental fluorosis (discolored teeth from damaged tooth enamel caused by fluoride exposure) and,
>
> Whereas: Former Ambassador Andrew Young, one of many civil rights leaders opposed to fluoride, has pointed out that: "we...have a cavity epidemic today in our inner cities that have been fluoridated for decades"

8) May 11, 2015: Letter from **Rev. William (Bill) Owens, President of the Coalition of African American Pastors** to Rep. Barry Loudermilk, Chairman, House Subcommittee on Oversight / Science, Space, & Technology Committee, Washington DC:

> African Americans should have been told that we are disproportionately harmed by "dental fluorosis," the disfigurement of teeth caused by overexposure to fluorides as a young child. And who among us was told that kidney patients, diabetics, seniors, and children are susceptible subgroups that are especially vulnerable to harm from fluorides? There are more patients with kidney disease and diabetes in the black community, and this is all the more reason federal officials should have told us that kidney patients and diabetics are especially vulnerable to harm. Additionally, low-income families often times lack the resources to purchase unfluoridated water or a filtration system to remove fluoride from drinking water.

21. The emergency "fluoridation-defense" meeting held at Morehouse College

After the statements from civil rights leaders became public (Lillie Center, 2011; FAN, 2011c), Ambassador Young and Rev Gerald Durley were invited to a hastily organized semi-confidential meeting held at Morehouse College on June 1, 2011.

Freedom of Information documents reveal the enormous concern that the pro-fluoridation lobby (both inside and outside government) had about the traction the statements by the Civil Rights leaders were receiving both in the media and on the internet. An extraordinary number of important and influential governmental and professional representatives were brought together for this meeting.

This "army of officials" was a magnified version of the "shock and awe" tactics used to intimidate decision makers should they ever have the temerity to question the wisdom of the fluoridation program. Council chambers are flooded by dentists, dental students, local and state dental and health spokespersons claiming that if they should end fluoridation they would be threatening the future health and well-being of their children.

Those at the Morehouse meeting included the following (FAN, 2015a):

- Dr. David Satcher (former US Surgeon General)
- Dr. John Maupin, Morehouse School of Medicine
- Gwen Keyes Fleming, EPA, Administrator Region IV
- Dr. Ursula Bauer, Director, National Center for Chronic Disease Prevention and Health promotion
- Dr. Scott Presson, CDC program services
- Dr. Gina Thornton-Evans – CDC oral health epidemiologist
- Dr. Desmond Williams, Lead, Chronic Kidney Disease Initiative

Department of Health and Human Services/Office of Minority Health

- Dr. Garth Graham –Deputy Assistant Director for Minority Health
- Dr. Rochelle Rollins, Director, Division of Policy and Data
- Dr. Arlene Lester, Regional Minority Health Consultant, Georgia State

National Dental Association
(The NDA represents over 6,000 Black dentists, and 30 million Black Americans)

- Dr. Elizabeth Lense, State Dental Director, NDA
- Dr. Sheila Brown, President, NDA
- Dr. Roy Irons, DDS
- Dr. Kim Perry, Chairman of the Board, NDA
- Mr. Robert Johns, ED

American Dental Association (ADA)

- Dr. Bill Cainon, Pres-Elect, ADA
- Dr. Leon Stanislav, former Chairman NFAC
- Judy Sherman, Washington DC office, ADA

This was a lot of muscle to use against the two Civil Rights leaders who attended this meeting. It is a pity that a fraction of that muscle power has not gone into informing minority communities about the special risks posed to them by fluoride and water fluoridation. Some people might be impressed that so much effort is going into protecting children's teeth, for others it is disheartening that the rest of their bodies cause so little concern.

22. A better way of tackling tooth decay in the inner city and address other EJ issues

Here we offer a creative and positive holistic approach to address dental decay and other aspects of Environmental Justice in the Inner City. Our suggestions are in line with items I and II

of the "Action agenda on three collective and strategic goals for fiscal years 2016- 2018" of the Inter Agency Working Group on Environment Justice (EJ IWG), namely:

I. Enhance communication and coordination to improve the health, quality-of-life, and economic opportunities in overburdened communities;
II. Enhance multi-agency support of holistic community-based solutions to solve environmental justice issues

Our 5-step alternative plan to water fluoridation for low-income areas and the inner city.

1) **End water fluoridation.** This could be accomplished swiftly by the US EPA Office of Water (OW). If OW were to determine the safe dose of fluoride that would protect all our children from lowered IQ it would force an immediate end to fluoridation. Such protection against fluoride's neurotoxic effects would improve the "health, quality-of-life, and economic opportunities" for children and young people in many ways, especially from low-income families.

2) **Establish the equivalent of Scotland's very successful Childsmile program** in all kindergarten and primary schools (and possibly churches and WIC programs) in low-income areas. In this program involving both teachers and parents, children are taught to brush their teeth properly; are provided more nutritious snacks and beverages and encouraged to reduce sugar consumption. The program also provides annual dental check-ups and treatment if required. This could be combined with a program along the lines of the Danish program for pre-school toddlers – see Appendix I.

3) Set up dental clinics either in schools or stand-alone facilities in the inner city and other low-income areas. Recruit dentists, dental hygienists and nutritionists to provide part-time pro bono services to these clinics and support the educational services in step 2.

4) Expand these dental clinics into community centers aimed at improving the child's overall health, nutrition and physical fitness as well as stimulating other health supporting activities. Such a center, depending on local interest and skills could include keep-fit equipment and classes, community gardens, community composting, cooking, nutritional and canning advice. Depending upon demand It might also be linked to local farms..

5) **Expand these communities still further into job creating operations.** One example we know that works well is a "reuse and repair" operation to handle discarded appliances, furniture and other reuseable items from the local and nearby communities. Reuse and repair can also involve job training, skill-sharing, tool sharing, a community workbench and value added enterprises. Such an operation can be linked to a Zero Waste strategy involving source separation, composting, recycling and other waste reduction and prevention initiatives. This strategy not only fights the pollution generated by landfills and incinerators (which are often sited in low-income areas), it also provides many jobs and local business opportunities. One of the authors of this report has lectured and written extensively in this area, see *The Zero Waste Solution: Untrashing the Planet One Community at a Time* by Paul Connett (Chelsea Green, 2013). There are many other creative schemes including

community gardens, a community culinary school that teaches new chefs how to make food that is inexpensive, tasty and nutritious, and many many more.

6) It is not difficult to see how many federal and local agencies could be involved with such an ambitious scheme. These could include the HHS as well as the departments of Education and Agriculture and the waste management folks at the EPA. Step 5 could be integrated with the ongoing efforts along these lines in many municipalities. This is one of many ideas that with a little creativity a community can embrace.

More than anything else a holistic approach allows the transition from the politics of "no" to the politics of "yes." Once we get off the shortsighted notion that we can battle tooth decay by putting a neurotoxic chemical into the public drinking water, we can unleash not only the full potential of the child, but also of our communities and maybe even our civil and professional services. The three key words are education, nutrition and justice. We need education not fluoridation to fight tooth decay and obesity. We need healthy soil, to produce healthy food to produce healthy people to produce a healthy economy and ultimately a healthy planet and we need Environmental Justice for all. A great deal can be achieved with creativity and vision. A threatened community is a strengthened community when people work together to solve their problems in a creative and positive way..

23. FAN responds to HHS Jan 7, 2011 announcement proposing to lower recommended level of fluoride in water to fight tooth decay

In a joint press release issued January 7, 2011, the Department of Health and Human Services and the Environmental Protection Agency's Office of Water (OW) announced a recommendation to lower the level of fluoride in community water fluoridation schemes to 0.7 mg/L (down from the level set in 1962: 0.7 to 1.2 mg/L) (HHS, 2011). In this announcement Assistant Secretary for Health Howard K. Koh said: "**One of water fluoridation's biggest advantages is that it benefits all residents of a community…"** Simultaneous with this announcement the public was encouraged to submit **comments** on this new recommendation. On April 19, 2011, the Fluoride Action Network (FAN) responded with two submissions (a,b) and documented the issue of Environmental Justice as it pertains to fluoridation and African Americans (FAN, 2011a).

On April 19,2011 FAN sent a letter to the then director of HHS Kathleen Sebelius. Subsequently approximately 18,000 people sent in emails in support of this letter. A full copy of the letter can be found in Appendix H. Below is a shortened version.

Fluoride Action Network
February 4, 2011

To HHS and Honorable Secretary Sebelius

In response to your request for comments on the recent change in your recommended level of fluoride added to community drinking water, I respectfully submit the following points

supporting the stance that a reduction in fluoride levels is not sufficient, and that the United States should follow the approach of western Europe and end water fluoridation completely:

- Fluoride is not a nutrient, nor is it essential for healthy teeth…
- Using the water supply to mass medicate the population is unethical…
- The benefit and safety of ingested fluoride has never been proved by accepted medical standards…
- Any benefits of fluoride are primarily topical, not systemic…
- Americans will still be over-exposed to fluoride at 0.7 ppm.,.
- African-American children and low-income children will not be protected…
- HHS has failed to consider fluoride's impact on the brain…
- HHS has failed to consider fluoride as an endocrine disruptor…
- HHS has failed to consider or investigate current rates of skeletal fluorosis in the U.S. …
- HHS has failed to consider fluoride as a potential carcinogen…
- HHS has failed to confirm the safety of silicofluorides…

Most of the arguments listed above are covered in far more detail in the recently published book "The Case Against Fluoride" by Connett, Beck and Micklem (Chelsea Green, 2010). We urge director Sebelius to appoint a group of experts from HHS, who have not been involved in promoting fluoridation, to provide a fully documented scientific response to the arguments and evidence presented in this book. Were director Sebelius to do this we strongly believe that neither she nor these experts will want to see the practice of water fluoridation continue. The practice is unnecessary, unethical and hitherto the benefits have been wildly exaggerated and the risks minimized. A scientific response to this book from a HHS team would allow the public to judge the cases both for and against fluoridation on their scientific and ethical merits.

24. FAN's critique of the EPA's initial steps to determine a new MCLG for fluoride

In the timeline above (see section 5) it has already been explained how inappropriate it was for the EPA Office of Water (OW) at the HHS/EPA joint press conference on Jan 7, 2011 to indicate that it was going to take into account the benefits of the water fluoridation program while determining a new MCLG (safe drinking water standard goal) for fluoride in water (HHS, 2011a). Here we will address concerns about the way they have gone about determining the MCLG and indicate a) that it is based upon poor scientific assumptions and b) how it is insensitive to EJ issues.

In determining a new MCLG for fluoride the EPA announced that they were going to use **severe**

dental fluorosis as the most sensitive health effect for fluoride. They argued that if they found a safe level (safe reference dose or RfD) that protected against severe dental fluorosis it would protect against impacts on all other tissues including bones in adults. In so doing they completely ignored all the scientific evidence sent to them by Fluoride Action Network (FAN, 2011a,b; Thiessen 2011, 2015) and others that fluoride is a neurotoxin that has been associated with lowered IQ in children – a far more serious end point as far as protecting the population is concerned.

In order to support its hypothesis that severe dental fluorosis was the most sensitive outcome to fluoride's toxicity the EPA would have to show that in all the studies where IQ has been lowered (45 studies as of September 2015 at http://fluoridealert.org/studies/brain01/) *all the children with lowered IQ* had ***severe*** dental fluorosis. If any had moderate, mild or very mild dental fluorosis their hypothesis collapses. The EPA has not shown this; instead they have simply ignored all the evidence presented to them on IQ studies. In a delegation to the EPA's OW on Sept 8 2014 FAN provided evidence that children with moderate, mild and even very mild dental fluorosis had a lowered IQ. This evidence came from Xiang's important IQ study from 2003. Xiang was part of the delegation. EPA OW continues to remain silent on this evidence.

Figure 14: A photo taken of the FAN delegation (from left to right: Quanyong Xiang, Paul Connett, Chris Neurath and Bill Hirzy) outside the EPA's Headquarters after they had met with two top officials at the EPA Office of Water on Sept 8, 2014

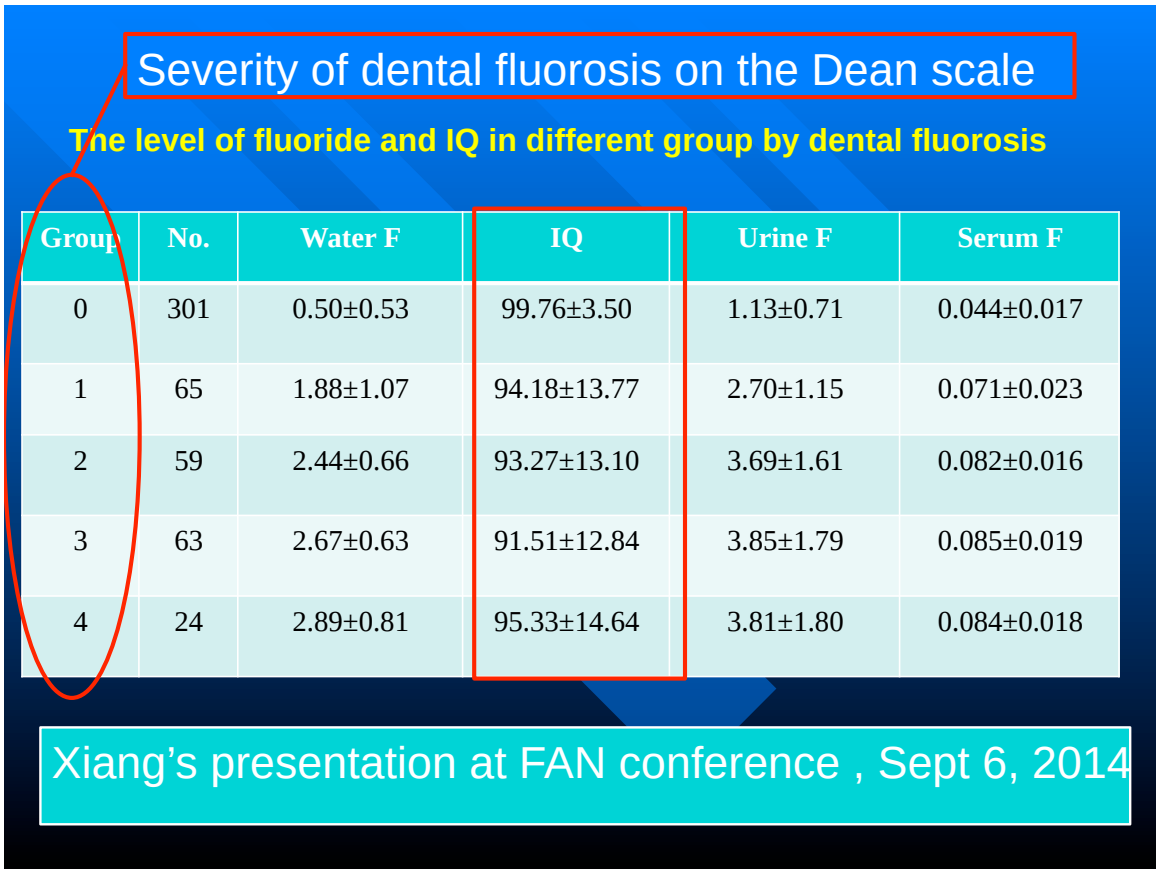


Figure 15: A copy of a slide in Dr. Quanyong Xiang's presentation at the FAN conference in Crystal City, Sept 6, 2014. The left hand column (0,1,2,3,4) corresponds to Dean's classification of the different levels of dental fluorosis (0 = none, 1 = very mild, 2 = mild, 3 = moderate and 4 = severe. Note by comparing with column 4 that children had lowered IQ who had very mild, mild and moderate dental fluorosis. This refutes the claim by the OW that *severe* dental fluorosis is the most sensitive health effect of fluoride exposure. Lowered IQ is a more sensitive end point.

The EPA further indicated in the calculations made available simultaneously in the Federal Register (HHS, 2011b) that they were going to use Dean's studies from the 1940's to estimate the threshold level where **severe** dental fluorosis would occur. Having estimated that level they then applied an "uncertainty factor of 1" to protect all the members of society – including the most vulnerable – from this effect.

Normally a factor of 10 is used to extrapolate from the study group to protect a large population to account for the very wide range of sensitivity expected in any large population (this is sometimes referred to as the intra-species variation factor). An uncertainty factor of 1 means 100% certainty that Dean's study in the 1940s was so large and so inclusive that it covered the full range of sensitivity of the total US population of children in the 21st century. This is extraordinarily cavalier. In his early studies (from the 1930s) Dean did look at age, sex and color and even mentioned in a 1933 paper, the case of a negro girl with mottled teeth in the bicuspids who used the fluoride water for just three years. However, in his 21-city study from 1942 he focused only on white children. Dean states, "The Study embraced 7,257 ***white*** urban school

children, aged 12 to 14 years of 21 cities…" (our emphasis).

Thus the only children who featured in Dean's 21-city study were white – so it wasn't even inclusive of the US population in 1942, let alone in the twenty-first century.

By using studies that did not include low-income families and communities of color clearly makes the EPA's calculations inappropriate for estimating a level which would protect every child from severe dental fluorosis – **without a safety factor applied to it** - especially in the light of the discussion above that indicates that both Blacks and Hispanics are more sensitive to dental fluorosis than Whites. Choosing an uncertainty factor of one is scientifically indefensible on the one hand, and betrays an insensitivity to EJ issues on the other.

If the EPA is serious about eliminating environmental injustice from its policy decisions this is a classic case to address. In determining a safe reference dose for fluoride and a new MCLG the EPA OW has to do two things:

> 1) They need to provide evidence that severe dental fluorosis is a more sensitive end point than lowered IQ. The last children in the U.S. who need their IQ lowered are children from low-income families.
>
> 2) Even if they use severe dental fluorosis as the end point they need to use a more appropriate database and uncertainty factors to produce a safe reference dose to protect all individuals in society including the most vulnerable.

If they don't do either of these things it will make a mockery of the Presidential Executive Order of 1994: ***"Federal agencies must identify and address, as appropriate, "disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations."*** (Presidential Executive Order 12898 of February 11, 1994)

The above discussion updates our concerns to those we submitted in two formal responses to the OW's reports, which appeared in the Federal Register at the same time as their press conference of Jan 7, 2011.

FAN's two formal responses submitted to the EPA's Office of Water in April 2011 can be accessed online at:
http://www.fluoridealert.org/wp-content/uploads/epa-2010.dose_.pdf
and
http://www.fluoridealert.org/wp-content/uploads/fan.exposure.revised.4-22-11.pdf

Below we have given a skeletal summary of our responses so that readers will have a quick access to the many criticisms we had of OW's assumptions and calculations in both documents.

A) A summary of FAN's Responses to EPA OW's report, Fluoride: Dose-Response Analysis For Non-cancer Effects**.**

We identified 16 flaws *in the methodology and rationale behind OW's proposed RfD (safe reference dose)*

We argued that

1) Consideration of the adverse effects of fluoride should take precedence over any presumed benefits in OW's determination of an RfD and MCLG

2) OW has failed to offer convincing evidence that severe dental fluorosis should be considered the critical effect associated with exposure to fluoride.

3) failed to consider potential variation in responses to the different types of fluoride in drinking water.

4) failed to apply appropriate safety factors.

5) unnecessarily delayed consideration of the potential carcinogenicity of fluoride.

6) failed to consider fluoride's effects on the brain.

7) failed to consider fluoride as an endocrine disruptor.

failed to consider the disproportionate impact on a number of susceptible populations in its analysis.

8) disregarded pregnant women and embryos/fetuses in its analysis.

9) completely ignored infants 0-6 months of age in its analysis, and has failed to consider the disproportionate burden placed on bottle-fed infants.

10) failed to consider the disproportionate impact on above-average water consumers, which account for at least 10% of the population.

11) failed to consider the disproportionate impact on minority Americans.

12) failed to consider the disproportionate burden placed on low-income families.

13) failed to consider the disproportionate harm to people with inadequate nutrition.

14) failed to consider those with impaired kidney function.

15) failed to consider those co-exposed to lead, arsenic, or aluminum.

16) failed to consider those with an increased sensitivity to fluoride.

B) A summary of FAN's Comments on the EPA OW's Report Fluoride: Exposure and Relative Source Contribution Analysis

*The policies used to calculate fluoride exposures are flawed, especially when no margin of safety is applied**. FAN identified 12 flaws in their analysis***

> *1) OW's policy of using the 90th percentile for water consumption ignores 10% of the U.S. population —nearly 31 million people*
>
> *2) OW's policy of using the mean drinking water fluoride concentration ignores as much as half of the population whose drinking water has higher fluoride levels.*
>
> *3) OW's policy of using the average body weight of the population of interest ignores as much as half of the population in the lower 50th percentile for weight.*
>
> *4) OW has failed to consider studies of urinary fluoride excretion as an estimate of total fluoride intake.*

5) OW has failed to consider fluoride exposures for several of the most sensitive groups — pregnant women, embryos/fetuses, and infants 0-6 months

6) failed to adequately consider racial, ethnic, regional, and socioeconomic differences in food and beverage consumption patterns

OW has ignored several sources of fluoride as contributors to total intake. OW has

> *8) ignored fluoride exposures from several dental products, including professionally applied topical fluorides, mouthwashes, and various dental devices.*
>
> *9) failed to consider fluoride exposure from dietary fluoride supplements in its analysis.*
>
> *10) failed to consider pharmaceuticals and anesthetics that metabolize to the fluoride anion in its exposure analysis.*
>
> *11) failed to consider ambient air as a source of fluoride in its exposure analysis.*
>
> *12) does not adequately consider exposure from cigarettes in its analysis.*

25. The EPA's false characterization of fluoride as a nutrient.

In addition to all the other flaws discussed above there is another major misrepresentation that the EPA made in both the documents discussed in section 24 above to which we would like to draw special attention because it is a false claim that is often made by promoters of fluoridation. This is the claim that fluoride is a nutrient. In the case of OW they should not have made this claim in 2011 because twice they were informed in 2003 that the source they were using had rejected the claim. Here are the details.

The EPA states that the source for this claim is the Institute of Medicine (IOM). Here are the exact quotes.

In their report, "Fluoride: Exposure and Relative Source Contribution Analysis" on page 39 EPA's Office of Water states:

> However, it should be recognized that **fluoride is a nutrient** and reconstitution of infant formulas with water containing lower levels of fluoride may result in infants not consuming the Adequate Intake for fluoride (0.5 mg/day) established by the Institute of Medicine (1997).

And in their report, Fluoride: Dose-Response Analysis For Non-cancer Effects, on page 95 they state:

> The dietary guidelines for fluoride were revised by the Institute of Medicine (IOM) in 1997. The 1997 revisions (see Table 5-1) considered **fluoride as a nutrient** based on its presence and function in bones and tooth enamel. (p. 95)

To appreciate the blatancy of this falsehood a little history is needed. In 1997 the Food and Nutrition Board of the IOM caused considerable consternation among scientists who have taken an interest in the fluoride debate. The IOM produced a report entitled, *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride* (IOM, 1997) and held a public meeting in Washington DC, Sept 23, 1997, to discuss a draft of the report. William Hirzy PhD (then with the EPA) and Paul Connett PhD attended this day-long meeting and several times questioned the inclusion of fluoride among a list of well-known nutrients, when there is no scientific study justifying such a characterization for fluoride.

To demonstrate that a substance is an essential nutrient one has to remove the proposed nutrient from an animal's diet and demonstrate that some disease occurs as result. This has never been done for fluoride. Moreover, no one has ever shown that there is any biochemical process in the body that needs fluoride to function properly or any molecule (fat, amino acid, protein, nucleic acid or metabolite) that contains fluoride.

Despite the intervention of Hirzy and Connett the IOM went ahead and finalized its draft retaining fluoride among a list of known nutrients needed for healthy bone growth. About a dozen scientists wrote to the heads of both the Institute of Medicine (Dr. Kenneth Shine) and the National Academies (Dr. Bruce Albert) complaining of this false implication. Alberts and Shine (1998) replied as follows:

> First, let us reassure you with regard to one concern. Nowhere in the report is it stated that fluoride is an essential nutrient. If any speaker or panel member at the September 23rd workshop referred to fluoride as such, they misspoke. As was stated in *Recommended Dietary Allowances 10th Edition,* which we published in 1989: "These contradictory results do not justify a classification of fluoride as an essential element, according to accepted standards. Nonetheless, because of its valuable effects on dental health, fluoride is a beneficial element for humans."

Run the clock forward to April 2003 when Paul Connett had a semi-debate at the EPA headquarters in Washington DC as part of their annual science fair. Ed Ohanian of the EPA's Office of Water was present. He didn't formally debate Connett but he did summarize some of

the EPA's activities on fluoride. In these comments he cited the IOM (1997) as characterizing fluoride as a nutrient. Connett corrected him citing the Shine-Alberts letter (1998).

Then in October 2003 before Connett testified before the NRC panel, which was reviewing fluoride's toxicity discussed above (section 11), Joyce Donahue (2003), also of EPA's Office of Water, presented the parameters of the review they wanted from the panel. She also referred to fluoride as a nutrient and used the IOM report to justify that claim. Connett corrected her from the floor again citing the Alberts-Shine letter (1998).

it is extraordinary that the EPA 's Office of Water should try to get away with this false characterization yet again.

26. Fluoride has no known role in nutrition or biochemistry (a summary)

Here is what FAN submitted to the EPA in April 2011 on this point.

> Fluoride is not considered by knowledgeable experts to be an essential nutrient for humans, and it has no known, beneficial role in human biochemistry (Nielsen, 1996; Hunt & Stoecker, 1996; NRC, 1989).
>
> The U.S. authority for recommended dietary intakes concluded in 1989 that contradictory studies in rats and mice in the 1970s "do not justify a classification of fluorine [as fluoride] as an essential element, according to accepted standards" (NRC, 1989). (Because animal diets can be more stringently depleted in fluoride than human diets, studies in short-lived rats and mice are considered the best way to discover the possible essentiality of minerals in mammals.)
>
> In its most recent publication on recommended dietary intakes, the same U.S. authority makes no mention of fluoride essentiality in the diets of humans or animals (IOM, 1997).
>
> Human milk is extraordinarily low in fluoride, ranging from 0.007 parts per million (ppm) to 0.011 ppm (IOM, 1997)—100 times less than in fluoridated water in the U.S. (0.7 to 1.0 ppm).
>
> Human milk also has about 3 times less fluoride than the blood of the mothers producing it (Sener et al., 2007).
>
> Thus it seems clear that nature has evolved active mechanisms to limit the transfer of fluoride in humans—both from ingested food and water to blood, and from blood to breast milk.
>
> Thus either by accident or intent mothers' milk protects the baby from more than minimal exposure to fluoride. Water fluoridation removes that protection for bottle-fed babies.
>
> It is well-established that fluoride's toxicity may be exacerbated by poor nutrition. By not accounting for this fluoridation promoters are contributing to the disproportionate

harm fluoride exposure and water fluoridation may be causing both low-income and minority families, who are more likely to suffer from poor nutrition.

However, nutritional factors may enhance fluoride's toxicity. These include deficiencies in iodine, calcium, magnesium, and vitamin C (ATSDR, 1993, p.112), selenium, and vitamin D (e.g. ATSDR, 1993, p.112; NRC, 2006).

Poor nutrition has been found to increase the incidence and severity of dental fluorosis (Pandit et al., 1940; Murray et al., 1948; Littleton et al., 1999) and skeletal fluorosis (Pandit at al., 1940; Marier et al., 1963; Fisher et al., 1989; Teotia et al., 1984; Littleton et al., 1999).

The dose of fluoride at which disturbed endocrine function occurs is reduced in situations of iodine deficiency (NRC, 2006). Lin et al. (1991), in a UNICEF - sponsored study, found that even modest levels of fluoride in the water (0.88 mg/L vs. 0.34 mg/L) resulted in reduced IQ (and increased frequency of hypothyroidism) when combined with low iodine, even more so than with iodine deficiency alone.

The increasing dietary intake of fats in the U.S. may have negative repercussions in terms of fluoride metabolism, as "Diets high in fat have been reported to increase deposition of fluoride in bone and, thus, to enhance toxicity" (HHS, 1991).

As we have not received a response to our April, 2011 submission (as of Sept 2015), we have yet to hear whether the EPA OW has retracted their claim that fluoride is a nutrient or whether they are going to try to convince the world that it is.

27. Final HHS ruling in 2015 uses sleight of hand to dismiss FAN's input on fluoride's neurotoxicity

In April 2015 the HHS released its opinion in support of its recommended level of 0.7 mg/L level for water fluoridation programs in the US (DHHS, 2015). ***In this HHS document there is no mention of the Environmental Justice issue and thus no discussion of the adverse potential this recommended level bodes for the children of low-income and minority families.***

The HHS statement was accompanied by a statement from the director of the CDC's Division of Oral Health on the "evidence supporting the safety and effectiveness of fluoridation". In this statement the terms "minority" and "racial" were each used once; the term "poor" was used twice, and all with the same reference to the Surgeon General's report of 2000 (Weno, 2015; Surgeon General's reference) discussed above.

The CDC also rejected our concerns about Fluoride's neurotoxicity. Here is the short section that deals with this:

IQ and other neurological effects

.

The standard letters and approximately 100 unique responses expressed

concern about fluoride's impact on the brain, specifically citing lower IQ in children. Several Chinese studies considered in detail by the NRC review reported lower IQ among children exposed to fluoride in drinking water at mean concentrations of 2.5–4.1 mg/L—several times higher than concentrations recommended for community water fluoridation.

The NRC found that "the significance of these Chinese studies is uncertain" because important procedural details were omitted, but also stated that findings warranted additional research on the effects of fluoride on intelligence.

Based on animal studies, the NRC committee speculated about potential mechanisms for nervous system changes and called for more research "to clarify the effect of fluoride on brain chemistry and function."

These recommendations should be considered in the context of the NRC review, which limited its conclusions regarding adverse effects to water fluoride concentrations of 2–4 mg/L and did "not address the lower exposures commonly experienced by most U.S. citizens."

A recent meta-analysis of studies conducted in rural China, including those considered by the NRC report, identified an association between high fluoride exposure (i.e., drinking water concentrations ranging up to 11.5 mg/L) and lower IQ scores; study authors noted the low quality of included studies and the inability to rule out other explanations.

A subsequent review cited this meta-analysis to support its identification of "raised fluoride concentrations" in drinking water as a developmental neurotoxicant.

A review by SCHER also considered the neurotoxicity of fluoride in water and determined that there was not enough evidence from well-controlled studies to conclude if fluoride in drinking water at concentrations used for community fluoridation might impair the IQ of children. The review also noted that "a biological plausibility for the link between fluoridated water and IQ has not been established."

Findings of a recent prospective study of a birth cohort in New Zealand did not support an association between fluoride exposure, including residence in an area with fluoridated water during early childhood, and IQ measured repeatedly during childhood and at age 38 years. (CDC, 2015) **(our emphasis).**

Please note the highlighted section in this excerpt. This statement is referring to the Harvard meta-analysis by Choi et al., 2012 discussed in section above. We have already noted that fluoridation promoters have tried to dismiss the relevance of this review with respect to artificial water fluoridation by referring to the "high concentrations" in the "high–fluoride villages." However, we saw in table xx that for the 20 studies where the source of fluoride was water and not coal and for which fluoride concentrations were given, the mean value in the "high-fluoride" villages was 3.52 ppm, which is lower than the current safe drinking water standard of 4 ppm. We also noted that a number of studies were lower than 3 ppm, and when we looked at one study (Xiang et al. 2003 a,b) in more detail some of the children had their IQ

lowered at 1.5 ppm, and extrapolating from a linear fit of the data, could possibly have occurred between 0.75 and 1.5 ppm.

To see the "sleight of hand" operating here note the way the CDC authors qualify "high fluoride exposure" as " **drinking water concentrations ranging up to 11.5 mg/L.**"

When we look at the study in question (Wang, 2007) we find that the 11.5 ppm is one end of a range "3.5 to 11.5 ppm." Thus this value of 11.5 ppm was not experienced by all the children in this particular study, nor was it typical for all 20 studies, where the mean value was 3.52 ppm, so singling it out is highly misleading. (See Table 5, section 15)

Moreover, as any regulatory toxicologist should know when looking at a table of results like this it is not the *highest* value, which is of concern but the *lowest*. It is the lowest value (i.e. the lowest observable adverse effect level, or LOAEL), which is the starting point for determining the safe reference dose (RfD) needed to protect all the individuals in a large population that may be exposed to this toxic. The RfD is the stepping stone in determining the MCLG in water.

So once again we see the CDC Oral Health Division presenting the data in a way to minimize concerns about the practice they vigorously promote. This is not science but a public relations exercise in the name of protecting its long-standing policy. Once again we see an example of where, "**When policy is king, science becomes a slave."**

28. Summary

Water fluoridation is a very poor and unethical practice, which infringes on the right of every individual to informed consent to human treatment.

It throws an extra burden on poor families and communities of color. These range from an increased risk to dental fluorosis (the first telltale sign that the body has been over-exposed to this toxic substance) to a lowered IQ. The last children in the U.S. who need their IQ lowered are children from poor families and communities of color because their intellectual development is more likely to have have compromised by exposure to other neurotoxins like lead and mercury and because fluoride's toxicity is made worse by poor nutrition.

While the Oral Health Division of the Centers for Disease Control and Prevention lauds the fluoridation experiment as "One of the top public health achievements of the Twentieth Century" it is probably our greatest public health mistake and needs to be ended as soon as possible.

We believe that it is not enough to say "no" to this program but to say "yes" to a viable and better alternative. We have done this using the challenge of the agenda goals of the EJ IWG for 2016 – 2018 and have a proposed a 5-step plan which addresses these goals (see section 21)

29. Recommendations

The Environmental Justice Interagency Working Group (EJ IWG)

We urge all the agencies involved in the EJ IWG to see how they can become involved in our

proposed 5-step plan. We believe there is a role for every single agency.

The CDC.

If the CDC's Division of Oral Health resists our 5 step plan, and is going to continue to spend millions of taxpayers' dollars on fluoridation promotion then it should not be spent on propaganda. That should be left to private organizations like the ADA and Pew. The CDC's Division of Oral Health should provide balanced information. As well as providing information on benefits they need to do a better job of providing information on side effects. Such a task should be given over to a different section of the CDC, not the Oral Health Division, whose personnel have little or no training in specialized areas of medicine other than the teeth and no expertise in toxicology and risk assessment.

Meanwhile, the CDC should be warning, those particularly vulnerable to fluoride's toxic actions of their vulnerabilities. These citizens include low-income families and Black and Hispanic Americans.

The EPA

1) As we have made clear above the EPA Office of Water could end fluoridation tomorrow if it used the best science to determine a safe reference dose (RfD) for fluoride that would protect all our children from lowered IQ. If they use standard procedures and appropriate safety factors the RfD would be so low that an MCLG would have to be set at zero, as is the case for both lead and arsenic. Needless to say, as with arsenic and lead, an MCL (the federally enforceable standard) would have to be chosen, which took into account the costs of removing naturally-occurring fluoride down to some compromise that didn't make removal too cost-prohibitive. The key for the EPA under the Safe Water Drinking Act is to produce a scientifically defensible MCLG for fluoride.

2) The EPA should live up to its self-proclaimed interest in making sure that their decisions take into account EJ issues. In 2011 the EPA stated that:

> Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

An excellent place to start making these noble words into a reality would be for the EPA OW to take them into account in their ongoing determination of a safe MCLG for fluoride in water. As of Jan 7 2011 the initial steps they have taken in this determination conflicts with these goals in two fundamental ways:

A) They have ignored all the evidence that fluoride is neurotoxic falsely claiming that severe dental fluorosis is the most sensitive end point of fluoride's toxicity. If this is uncorrected it will further hurt the interest of children of low-income and communities of color: they are the last children that need their IQ lowered or have their mental development impacted in any way.

B) Even if severe dental fluorosis is erroneously accepted as the most sensitive end point it is ridiculous for them to use data from the 1930s and 1940s in which the vast majority of the

children were white. This foolishness was compounded by their applying to this outdated and incomplete data an uncertainty factor of one, instead of the normal default value of 10, when extrapolating from a small study that has found harm to produce a reference dose to protect all the individuals in a large population from that harm. The normal safety factor of 10 is used to protect for the full range of sensitivity to any toxic substance expected in a large population (i.e. intra-species variation). This variation in sensitivity is caused by many differences in a large population, including genetics, race, ethnicity, income levels, social circumstances, diet and health status. The fact that one of the factors which influences the prevalence of dental fluorosis – especially in its more severe forms - is race underlines the enormous insensitivity being shown to EJ issues by the EPA in their selection of this uncertainty factor and needs urgent and immediate correction.

3. The EPA should acknowledge that fluoride is not a nutrient unless they can produce science to substantiate this claim.

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APPENDICES

APPENDIX A: Article by Daniel Grossman, *Fluoride's Revenge: Has this cure, too, become a disease?* Published in the Progressive, December 1990.

APPENDIX B: Hypothyroidism in the USA

APPENDIX C: Certain Thyroid-Related Diseases May Vary by Race: Study looked at Graves', Hashimoto's thyroiditis among U.S. military personnel.

APPENDIX D: Fluoride chemical species & Lead: No mention by EPA of lead-fluoride-chlorine interactions

APPENDIX E: 119 State Reports on Oral Health

APPENDIX F: Pro-Fluoridation groups have also downplayed or ignored dental fluorosis

APPENDIX G: Civil Rights Leaders have begun to mobilize to end fluoridation's threat to minority communities

APPENDIX H: On April 19,2011 (check date) FAN sent a letter to the then director of HHS Kathleen Sebelius. Subsequently approximately 18,000 people sent in emails in support of this letter

APPENDIX I: The Nexø Method from Dermark

APPENDIX A

Fluoride's Revenge: Has this cure, too, become a disease?
The Progressive | December 1990 | By Daniel Grossman
(See Photocopy of this article)

Daniel Grossman is a free-lance science writer specializing in environmental and health issues. Research for this article was supported by a grant from the Fund for Investigative Journalism.

Terry Rich, a Colorado Spring dentist, recently treated Molly, a teenage patient, for an ugly brown stain on her front teeth. "She was dissatisfied with her teeth," he recalls, noting that dark, brown horizontal lines marred an otherwise straight smile. Though his acid-etching treatment failed to remove the stain, Rich hopes to try again with a different formula. Molly is Rich's own child. Like other people across the nation, she suffers from dental fluorosis, an ailment caused by excessive levels of the chemical fluoride in naturally mineral-rich water.

Moderate/Severe Dental Fluorosis (Photograph by BMC Oral Health)

An investigation of the health effects of fluoride, including two Freedom of Information Act requests that pried loose more than 10,000 pages of documentation, shows that a Government regulation intended to prevent fluorosis was derailed by a decades-old controversy between two agencies over a legally unrelated Government policy.

Officials at the Public Health Service, the Federal Government's all-purpose health agency, stopped the Environmental Protection Agency from issuing a standard to prevent dental fluorosis because they feared the rule would disrupt their own plans to protect dental health. As a result, what might have been an open public debate became an obscure internecine battle between two bureaucracies, each with its own idea of what makes good public policy. Though dental fluorosis is hardly a life-threatening ailment, this

story demonstrates how a powerful agency, intent upon enforcing its own view of the public good, can suppress anyone who gets in its way.

On October 31, 1985, employees of the EPA were circulating a memo written by Paul Price, a staff member in the regulatory agency's drinking water program. It was a spoof of an official press release issued that day to announce a new regulation.

"The Office of Drinking Water," it began, "proudly presents their new improved FLUORIDE REGULATION, or 'How We Stopped Worrying and Learned to Love Funky Teeth."' The takeoff reflected the frustration felt by staff members who had invested years in developing the protective regulation only to see it diluted because of pressure from another agency.

Though fluoride is best known as the chemical added to drinking water and toothpaste to prevent dental decay, it can also cause a variety of harmful ailments, including one that puts brown stains on teeth and may make them brittle and crumbly. The amount of fluoride added to drinking water to prevent tooth decay is about the same as the amount that can cause moderate staining.

Such staining, known as dental fluorosis, was discovered even before the beneficial effects of fluoride were recognized. The convoluted history of fluoride -- perhaps one of America's most bizarre encounters with a chemical contaminant -- holds the secret to why two agencies, each ostensibly concerned about the effects of fluoride on teeth, should clash.

Dental fluorosis was first noted in Colorado Springs at the turn of the century by a young dentist who became obsessed with discovering the cause of the disease, then known as "Colorado Stain." When minute amounts of fluoride dissolved in drinking water were identified as the culprit in 1931, the Public Health Service dispatched H. Trendly Dean, a talented epidemiologist, to determine the concentration at which the disease occurs.

"In moderate cases, all enamel surfaces of the teeth are altered," Dean wrote. "Brown stain is frequently a disfiguring feature." In severe cases, he added, "brown stains are widespread and teeth often present a corroded-like appearance." The disease, researchers later discovered, is caused in children up to the age of eight during the formation of their teeth.

Fluoride would probably be treated today with the same degree of concern as any other contaminant that affects human health, were it not for the fact that Dean also confirmed an observation that changed the course of preventative health care. He showed that people with dental fluorosis had fewer cavities--then considered a public-health scourge. This discovery was greeted with enthusiasm by activists in the dental community, especially in Wisconsin, a stronghold of the Progressive movement, where a small group of energetic dentists campaigned vigorously to add fluoride to drinking water.

Dean and his agency were more circumspect, as were the American Dental Association and the American Medical Association, which preferred to await the results of investigations of the benefits of fluoride. But by the mid-1940s, a few communities began experimenting with fluoridation - as the process of adding fluoride came to be known. By 1950, the Public Health Service, under increasing pressure from advocates, endorsed the process.

As a full-blown campaign to fluoridate the entire country - nourished by the once-skeptical Public Health Service - began to build, grass-roots opposition appeared as well. Some critics questioned the safety and efficacy of fluoridation, and others raised ethical, moral, and philosophical objections to the injection of a potent chemical into a public resource. There were crackpots, too, who countered advocates of fluoridation with McCarthy-era anticommunist and anti-Semitic rhetoric. One activist who gained

notoriety in California claimed that fluoridation would produce "moronic atheistic slaves." It would "weaken the minds of the people," she said, and make them prey to communists. Another called fluoridation a Jewish attempt to "weaken the Aryan race mentally and spiritually."

When the strategy of challenging fluoridation in local referendums began to threaten the nationwide endeavor, proponents responded by tarring all opponents - indeed the very idea of opposition - with this "quack" brush. According to fluoridation advocate G.F. Lull, for example, "We will find in the antifluoridation camp the antivaccinationists, the antivivisectionists, the cultists and quacks of all descriptions: In short, everyone who has a grudge against legitimate scientific progress."

The controversy over fluoridation is no longer as visible as it was in the 1950s, but it continues. The Public Health Service is still trying to make fluoridation universally available, and opponents are still at work with roadblocks and sandbags. Today, proponents note with alarm that fluoridation was actually rejected in about 100 of the more than 150 referendums on the measure in the past decade. With only two-thirds of the public water supplies served by what dentists consider the optimal level of fluoride today, the longstanding Public Health Service goal of 95 per cent by 1990 was recently lowered to 75 per cent by the year 2000.

Though many beneficial chemicals are dangerous when consumed at excessive levels, fluoride is unique because the amount that dentists recommend to prevent cavities is about the same as the amount that causes dental fluorosis. The Public Health Service recommends that about one part of fluoride be added for every million parts of water to prevent tooth decay -- the amount depends on the climate -- while the Environmental Protection Agency says water with as little as 0.7 parts per million of fluoride can cause moderate dental fluorosis in a small percentage of the people who drink it.

Today, according to the EPA, there are 1,300 communities -- mostly rural towns -- serving nearly two million people with water naturally enriched with fluoride in concentrations greater than two parts per million (ppm). And there are 200 communities serving more than a quarter-million people with water exceeding four ppm. At two ppm, according to agency studies, 10 per cent of all children will contract either moderate or severe fluorosis. At four ppm, nearly half the children will be afflicted. The Public Health Service estimates that nearly half a million American schoolchildren suffer from mild or severe dental fluorosis.

The EPA issued a regulation to protect the public from dental fluorosis in 1977, under authority of the then newly enacted Safe Drinking Water Act. The rule prohibited public water suppliers from distributing water with more than two ppm of fluoride, though the deadline for compliance extended until 1984. As the deadline neared, however, none of the offending suppliers moved to comply, since defluoridation equipment costs hundreds of thousands of dollars. Instead, EPA came under increasing pressure to reexamine the rule. The regulation was a temporary standard, promulgated hastily with the expectation that the agency would later issue a permanent rule based on further deliberations.

EPA staff scientists were convinced of the need to prevent fluorosis. "This was the only contaminant up to this time that we knew had a human health effect," recalls David Schnare, an EPA drinking water analyst. Other drinking-water contaminants, he explains, were recognized by the results of animal studies only.

Nevertheless, EPA was besieged by petitions from state governors and dental officials to weaken the standard or, better yet, replace the legally binding regulation with a less burdensome, voluntary standard. But voluntary standards are typically ignored.

Dental and other public-health officials opposed the binding rule because they feared EPA would encourage the antifluoridation camp and hinder the ongoing effort to fluoridate the entire country. EPA's

plans to regulate fluoride, said John Daniel, a dental official in South Carolina, "served only to stimulate ardent antifluoridationists in their fanatic quest to associate fluoride with every disease and unpleasantness known to mankind."

But many members of the medical community are cautiously beginning to question forty years of doctrinaire advocacy of fluoridation. Even Public Health Service officials are noting today that fluoride may not be as effective as they once claimed. "Perhaps we have been too much the crusaders," says Canadian dental official Alan Gray in calling on his colleagues to reconsider the benefits of fluoridation.

State governments opposed the binding regulation for another reason: because defluoridation is expensive and therefore politically unpalatable. According to EPA estimates, for instance, a typical family in a community that installed defluoridation equipment could expect an increase in its water bill of between $20 and $100 annually.

Though the Public Health Service has long been the chief Federal advocate of fluoridation -- and therefore a less-than-neutral judge -- EPA in 1981 asked Surgeon General C. Everett Koop, a Public Health Service leader, to convene a panel to advise the agency on the relationship between fluoride in drinking water and dental fluorosis. It was an unusual step; according to Joseph Cotruvo, the EPA official directly responsible for drinking-water standards, EPA had never before asked the Surgeon General to conduct such a review of a chemical, nor has it since.

Koop's office assembled a committee of dental researchers in various branches of the Service. Completed in 1982, their report concluded that dental fluorosis, though "cosmetically objectionable," is not a health hazard. Summarizing the report, Koop wrote to EPA: "No sound evidence exists which shows that drinking water...in the U.S. has an adverse effect on dental health."

Public Health Service documents verify that the wording of Koop's letter was intended to hinder EPA plans to set a binding fluoride standard. Unless EPA demonstrates that a contaminant has a "health effect," the agency cannot legally set a binding standard.

"If we send this letter," Koop explained in a memo to Edward Brandt, his superior in the Public Health Service, "it means that [EPA] would not be able to publish [binding] drinking-water regulations." Then he advised, "I think we should go with this letter, in spite of the fact that EPA will not like our response."

Still eager to demonstrate the need to regulate fluoride, the EPA asked the Surgeon General to assemble another panel in 1983, this time to consider the nondental effects of fluoride. A transcript of the panel's two-day meeting shows that, despite its nondental mandate, the panel was especially disturbed by what it learned about dental fluorosis. "You would have to have rocks in your head to allow your child much more than two parts per million," said Stanley Wallach, then medical-service chief of the Veterans Administration Medical Center in Albany, New York.

In the final draft of its report, panel chair Jay Shapiro concluded, "There was a consensus that... dental fluorosis per se constitutes an adverse health effect that should be prevented." Shapiro wrote a memo warning that "because the report deals with sensitive political issues which may or may not be acceptable to the PHS, it runs the risk of being modified at a higher level or returned for modification." He attached the memo to his draft and sent them on to John Small, a Public Health Service official. Small, in turn, forwarded the draft to Koop.

The final report, which Koop sent the EPA a month later, included none of the Shapiro draft's conclusions about dental fluorosis. Instead, it concluded that it was "inadvisable" for children to drink water

containing high levels of fluoride to prevent the "uncosmetic effect" of dental fluorosis. Koop had again foiled EPA by repeating his conclusion that dental fluorosis is not an "adverse health effect."

When contacted recently, members of the panel assembled by the Public Health Service expressed surprise at their report's conclusions; they never received copies of the final--altered--version. EPA scientist Edward Ohanian, who observed the panel's deliberations, recalled being "baffled" when the agency received its report. But, he added, "it's what they give us in writing that counts."

But William Ruckelshaus, then the administrator of EPA, wanted to set a binding standard to prevent dental fluorosis, so EPA tried one more time. In 1984, Ruckelshaus asked the National Institute of Mental Health to assemble a panel to examine the psychological effects of dental fluorosis. This time the request was submitted directly to NIMH rather than through the office of the Surgeon General.

Although there was no body of research on the psychological effects of dental fluorosis per se, the panel was guided by numerous studies of facial attractiveness and the behavioral impacts of other dental impairments, such as cleft lip and palate. Panel members were also impressed by photographs they were shown of the teeth of people suffering from severe dental fluorosis. They concluded that people with moderate or severe cases risked "psychological and behavioral problems or difficulties."

EPA staff members were pleased with the results of this study. "The staff response was: Here is our silver bullet," says Paul Price, then an analyst working on the standard. He recalls that the staff was vacillating between recommending a standard of one ppm or two ppm, to prevent the psychological effects of dental fluorosis.

Ruckelshaus was shown a set of pictures of dental fluorosis at a high-level meeting in July 1984, recalls drinking-water analyst Schnare. Ruckelshaus's comment: "That's an adverse health effect." But he stepped down as EPA administrator in January 1985 and was replaced by Lee Thomas, a man less sympathetic to staff concerns about dental fluorosis.

Recent interviews confirm that the staff was preparing at the time to recommend that Thomas issue a one-ppm standard. "It is legally and scientifically indefensible to set the [standard] at a level other than optimum (e.g., 1 ppm)," reads the draft of a memo prepared for Thomas's approval.

A handwritten note scribbled on this draft, however, says a higher-level office, controlled not by staff scientists but by political appointees, preferred a binding standard of four ppm, justified by the threat of skeletal fluorosis, another effect of fluoride, but a much less common one. The note added, "And they have the final say!"

The final draft, completed a few weeks later, concluded that dental fluorosis is merely a "cosmetic effect" and recommends a binding standard of four ppm, and a voluntary one of two ppm When issued six months later, the standard followed this recommendation.

One drinking water official believes Thomas succumbed to pressure. A native of South Carolina, a state abundantly endowed with fluoride-rich water, Thomas listened not to his staff but to Republican Senator Strom Thurmond, a relentless opponent of the fluoride standard. Edward Groth of the Consumers Union, who wrote a doctoral dissertation on the fluoridation controversy, surmises that Thomas took "the path of least resistance" in following the lead of the Surgeon General.

The technical staff was "devastated" at the decision to go with a standard of four ppm instead of one, according to Paul Price, who managed the writing of the standard and its official justification issued by the EPA. But, he says, once the decision was made, "there were arguments that could be made to justify it."

Price calls the struggle over fluoride regulation "a clash of two different cultures." The Public Health Service, he says, was guided by a 1950s-era attitude that health problems are solved with medication and that doctors know best; anyone questioning this is a crackpot. The Environmental Protection Agency, in contrast, works on the principle -- and is staffed with scientists who believe -- that nothing should be allowed in drinking water unless its safety can be proven. This conviction dictates stringent regulations justified by conservative analyses with ample margins of safety. In the case of fluoride, these two philosophies collide.

In Colorado Springs, where dental fluorosis was first studied almost a century ago, fluoride levels today reach nearly four ppm Dentist Terry Rich thinks this level is too high, though he concedes the city couldn't afford a treatment plant even if regulators required it.

And he views the high level of fluoride in his city's water as an opportunity for business. "It could be a money-making thing in my practice," he says, musing about treatment for people suffering from dental fluorosis - "if only I could figure out a way to do it."

APPENDIX B

Hypothyroidism in the USA

The following is from the **American Thyroid Association**
http://www.thyroid.org/media-main/about-hypothyroidism/

Prevalence and Impact of Thyroid Disease
More than 12 percent of the U.S. population will develop a thyroid condition during their lifetime.

- An estimated 20 million Americans have some form of thyroid disease.
- Up to 60 percent of those with thyroid disease are unaware of their condition.
- Women are five to eight times more likely than men to have thyroid problems.
- One woman in eight will develop a thyroid disorder during her lifetime.
- Most thyroid cancers respond to treatment, although a small percentage can be very aggressive.
- The causes of thyroid problems are largely unknown.
- Undiagnosed thyroid disease may put patients at risk for certain serious conditions, such as cardiovascular diseases, osteoporosis and infertility.
- Pregnant women with undiagnosed or inadequately treated hypothyroidism have an increased risk of miscarriage, preterm delivery, and severe developmental problems in their children.
- Most thyroid diseases are life-long conditions that can be managed with medical attention.

Facts about the Thyroid Gland and Thyroid Disease
The thyroid is a hormone-producing gland that regulates the body's metabolism—the rate at which the body produces energy from nutrients and oxygen—and affects critical body functions, such as energy level and heart rate.

- The thyroid gland is located in the middle of the lower neck.
- Although the thyroid gland is relatively small, it produces a hormone that influences every cell, tissue and organ in the body.
- Hypothyroidism is a condition where the thyroid gland does not produce enough thyroid hormone. Symptoms include extreme fatigue, depression, forgetfulness, and some weight gain.
- Hyperthyroidism, another form of thyroid disease, is a condition causing the gland to produce too much thyroid hormone. Symptoms include irritability, nervousness, muscle weakness, unexplained weight loss, sleep disturbances, vision problems and eye irritation.
- Graves' disease is a type of hyperthyroidism; it is an autoimmune disorder that is genetic and estimated to affect one percent of the population.

APPENDIX C

Certain Thyroid-Related Diseases May Vary by Race:
Study looked at Graves', Hashimoto's thyroiditis among U.S. military personnel.
http://www.webmd.com/women/news/20140415/certain-thyroid-related-diseases-may-vary-by-race

Race appears to be a factor in determining a person's risk of developing autoimmune thyroid conditions such as Graves' disease or Hashimoto's thyroiditis, a new study in the *Journal of the American Medical Association* (JAMA) says. African Americans and Asians are much more likely to develop Graves' disease than whites are, according to the study published in the April 16, 2014 issue of *JAMA*. On the other hand, whites have an increased risk of Hashimoto's thyroiditis when compared to other ethnic groups, the researchers found.

The findings are based on analysis of medical records from all United States active duty military personnel aged 20 to 54 from 1997 through 2011. "These stark race differences in the incidence of autoimmune thyroid disease raise the important question of why?" said lead author Donald McLeod, an endocrinologist and researcher at the QIMR Berghofer Medical Research Institute in Queensland, Australia. "If we can work this out, we may unlock the mechanisms of autoimmune thyroid disease, and potentially yield insights into other autoimmune disorders."

The thyroid gland plays a crucial role in regulating the body's metabolism, influencing how quickly a person burns calories, how fast their heart beats, and how alert they feel. Graves' disease occurs when the immune system begins producing an antibody that tricks the thyroid into producing too much hormone. It's the most common cause of hyperthyroidism, and affects about one in every 200 people, according to the U.S. National Institutes of Health (NIH).

Hashimoto's thyroiditis happens when the immune system attacks the thyroid gland itself, causing hormone production to fall and causing hypothyroidism. Hashimoto's affects as many as 5 percent of adults, according to the NIH.

The analysis found that, compared to whites, black women are about twice as likely and black men are about two and a half times more likely to have Graves' disease.

Asian/Pacific Islander women had a 78 percent increased risk of Graves' disease compared to whites, while Asian/Pacific Islander men had a more than threefold increased risk, the study noted. But the risk of Hashimoto's in both blacks and Asian/Pacific Islanders was much lower than the risk among whites, ranging from 67 percent to 78 percent less, the findings showed.

"The findings are striking, that there are so many more African Americans and Asian individuals who are coded as having Graves'," said Dr. James Hennessey, director of clinical endocrinology at Beth Israel Deaconess Medical Center in Boston. He was not involved with the new research.

Study author McLeod demurred when asked about how a person's race could influence their thyroid function. "Our current study can't answer whether racial differences in autoimmune thyroid disease incidence are due to genetics, environmental exposures or a combination of both," McLeod said. "Further work needs to be performed to find the underlying mechanisms of thyroid autoimmunity."

In the paper, the researchers rule out one potential environmental influence -- smoking. Smoking is associated with an increased risk for Graves' and a decreased risk for Hashimoto's. But whites have the highest smoking rates in the U.S. military, which runs counter to their increased risk for Hashimoto's and lower risk for Graves', the study authors added.

APPENDIX D

Fluoride chemical species & Lead: No mention by EPA of lead-fluoride-chlorine interactions

Lead poses a health concern in two ways with the addition of fluoride chemicals to public drinking water, and EPA needs to address the lead-fluoride **interactions** and the lead-fluoride-chlorine **interactions**.

1. First, lead is a known toxic contaminant in the industrial fluoride waste byproduct added to water at levels that may exceed the EPA's 15 ppb maximum level and contributes to lead poisoning.

2. Second, fluoride leaches lead salts from any lead-based plumbing systems in older homes common in poor urban areas heavily populated by low income, minority groups. There is a failure by public health officials to adequately monitor for toxic lead that is being leached from the water piping system and plumbing systems in fluoridated cities over decades, since hexafluorosilicic acid (likely the produced intact silicic acid) causes lead to escape from common materials (brass) used in the water supply system (reported as elevated blood lead levels in children that have been linked to fluoride in water (NRC 2006, Coplan et al. 2007).

Research by Masters and Coplan (1999) and Westendorf (1975) provide evidence that fluoride in drinking water increases blood lead levels and lead is a metal that interferes with acetylcholine esterase activity. Acetylcholine esterase is a key enzyme playing a vital role in neurotransmission throughout the human nervous system and one of the most fundamental enzymes in the body. Masters and Coplan (1999) stated referring to the silicofluorides as "Sifts":

> Unfortunately, and as surprising as it may seem, neither of these commercial-grade Sifts have been properly (or officially) tested for safety in fluoridating drinking water. Indeed, their use in water fluoridation has even been called an "ideal solution to a longstanding problem"11 as a way to dispose of a highly toxic by-product that is otherwise an enormous health hazard to the local environment. Meanwhile, our own research has revealed12 and recently confirmed13 a statistically significant association between silicofluoride-treated water and elevated blood lead levels, which, in turn, have disturbing implications in relation to their very unwelcome neurological and sociological consequences.

A recent study in rats found a synergistic effect of significantly higher concentrations of lead in both the blood and calcified tissues of animals that were exposed to both silicofluorides and lead (Sawan et al. 2010).

Masters and Coplan (2001) raised further concerns about silicofluorides interference effects on vital biological enzymes such as acetylcholinesterase.

> As pointed out in a recent comprehensive review,10 among the many different enzymes that initiate, control, and terminate various chemical changes in the body, acetylcholinesterase is one of the most fundamental. Therefore, in view of the extensive use of SiFs for water fluoridation (estimated to be 200,000 tons per year in the United States), Westendorf's seminal findings take on added importance in that they reveal that fluorosilicates are more potent in interfering with acetylcholinesterase activity than uncomplexed fluoride. These SiFs are industrial grade materials derived from HF and SiF4 emissions that are collected in water as toxic by-products in the manufacture of phosphate fertilizers from fluoride-bearing rock phosphate. During that step concentrated aqueous solutions of fluosilicic acid, H2SiF6, are formed containing residual HF and SiF4, together with variable low concentrations of contaminants like lead, arsenic, cadmium, beryllium, and heavy-metal radionuclides.

Recent analysis in Thunder Bay, Ontario, Canada (see below) shows that all 3 fluoride chemicals (H2SiF6 – hexafluorosilicic acid, NaF – sodium fluoride, and Na2SiF6 – sodium silicofluoride) used in artificial water fluoridation, increase the lead content in drinking water when lead pipes are used.

Fluoridation Impacts on Water Chemistry P3-4, Report No. 2009.123, (Thunder Bay, Ontario, 2009):

> "The drinking water produced from the Bare Point Water Treatment Plant is taken from Lake Superior and then treated. Water quality testing results of this source water have continually shown that the Lake Superior water is of high quality, is soft, and of low alkalinity. Testing has also demonstrated that the water is very low in dissolved major ions and metals. These characteristics mean that the water is of excellent quality and as a result has little buffering capacity – the ability to resist changes in the water chemistry.
>
> The effects on the water chemistry of three fluoridating agents, hydrofluorosilicic acid, sodium silicofluoride and sodium fluoride, were all tested on Bare Point drinking water in a laboratory controlled setting. The impact the water chemistry with fluoride addition was tested to determine whether the addition of fluoride would have a potential to increase the number occurrences of elevated lead levels in the community.
>
> The results of this preliminary study show that all fluoridating agents, when added to the drinking water at a concentration of 0.7 ppm (the optimal fluoride concentration rate as recommended by an expert panel convened by Health Canada in 2007), increased lead leaching from the lead pipe."

Research by Maas et al. 2007 in the journal *Neurotoxicology* demonstrate that lead in solder and brass metal in the water pipes, connections and other materials is also leached and released by all fluoride chemicals used in urban artificial water fluoridation. Their synergistic effects with chlorine and/or chloramine were demonstrated to increase the lead levels even further and yet the EPA has no discussion of this lead leaching concern. Maas et al. (2007) found levels of lead leaching from brass when coming in contact with fluorosilicic acid and chloramine:

CHLORAMINE, FLUOROSILICIC ACID & LEAD LEACHING FROM BRASS MATERIALS

Chemicals	**Median Lead level**
Chlorine	145.9 µg/DL (1.5mg/L)
Chloramine *	23.3 orami (0.23mg/L) or 233 ppb
Chlorine & sodium fluoride	185.3 µg/DL (1.85mg/L)
Chloramine* & sodium fluoride	28.1 µg/DL (0.28mg/L)
Chlorine and fluorosilicic acid	362.8 µg/DL (3.63mg/L) doubled
Chloramine* & fluorosilicic acid	42.6 µg/DL (0.43mg/L) doubled
Chloramine** & fluorosilicic acid	83.1 µg/DL (0.83mg/L) quadrupled

* with 100% extra ammonia added, to neutralize effect; note difference of one sample of chloramine without this extra ammonia (at **)
** without extra ammonia.

APPENDIX E

119 State Reports on Oral Health

109 of these reports have no mention of dental or enamel fluorosis
10 reports include a mention of dental fluorosis:

2 reports give limited fluorosis statistics: 2009 California and 2014 Idaho

2 reports cite fluorosis only in a reference citation

The Alabama 2010 report presents the most information on fluorosis, albeit very briefly

Out of the 119 reports, five mention "White Spots" which could be dental fluorosis.

- The 2007 Georgia report notes: "20% of 2 to 5 year old Georgia Head Start children surveyed have white spot lesions."
- The 2011 Washington state report gives the rate for White Spot Lesions in Head Start/ECEAP Preschoolers at 20.5%, with African American children having the highest percent.

State	Oral Health Report
Alabama	2007. **Dental Screenings by % W/Decay. In order by Dental District and % W/Decay. 2006-2007.** http://fluoridealert.org/wp-content/uploads/al-2007.pdf **Note:** 7,643 students were screened at 103 schools. **No mention of dental fluorosis.**
Alabama	2012. **The Oral Health of Alabama's Children, 2010-2012**. http://fluoridealert.org/wp-content/uploads/al-2012.pdf **No mention of dental fluorosis.**
Alabama	2013. **The Oral Health of Alabama's Kindergarten and Third Grade Children Compared to the General U.S. Population and Healthy People 2020 Targets**. Alabama Department of Public Health Data Brief February. http://fluoridealert.org/wp-content/uploads/al-2013.pdf **No mention of dental fluorosis.**
Alaska	Undated**. 13. Oral Health. Healthy Alaskans 2010 – Volume I.** http://www.fluoridealert.org/wp-content/uploads/ak.report.pdf **A 2 paragraph description of dental fluorosis is given.**
Alaska	2007. **Alaska Oral Health Plan: 2008-2012.** By BJ Whistler. Women's, Children's and Family Health, Division of Public Health, Alaska Department of Health and Social Services. Funding for the State Oral Health Plan was provided by the U.S. Centers for Disease Control and Prevention through the Chronic Disease Prevention and Health Promotion Programs Cooperative Agreement (U58/CCU022905). http://www.fluoridealert.org/wp-content/uploads/ak.2007.pdf **No mention of dental fluorosis.** **‹ "White Spot Lesions" is mentioned on page 12:** "Develop or identify education materials for parental/caregiver recognition of early enamel caries, 'white spot lesions', in relation to early childhood caries and prevention efforts."
Alaska	2012. **Alaska Oral Health Plan 2012-2016**. Alaska Department of Health and Social Services. July. Funding for the State Oral Health Plan was provided by the U.S. Centers for Disease Control and Prevention through the Chronic Disease Prevention and Health Promotion Programs Cooperative Agreement (U58/CCU022905). http://fluoridealert.org/wp-content/uploads/ak-2012.pdf **No mention of dental fluorosis.**

	‹ "White Spot Lesions" is mentioned on page 35 using the same language as above.
Alaska	2013. **Alaska Oral Health Surveillance System**. Oral Health Program, Department of Health and Social Services. November 1. Supported by a cooperative agreement with the U.S. Centers for Disease Control and Prevention. http://fluoridealert.org/wp-content/uploads/ak-2013.pdf *** Dental fluorosis mentioned once on page 12:** "Rates of dental fluorosis, a cosmetic condition in tooth enamel, may increase if fluoride levels in the drinking water are chronically in excess of optimal fluoride levels."
Arizona	2005. **The Oral Health of Arizona's Children. Current status, trends, and disparities**. Arizona Department of Health Services - Office of Oral Health. November. http://fluoridealert.org/wp-content/uploads/az.2005.pdf *** Dental fluorosis mentioned once on page 18: "Consistent with recommendations developed by the National Institute of Dental and Craniofacial Research, each tooth surface was scored for decay, restorations, sealants, fluorosis, trauma, premature loss, and eruption status. Additional information was gathered to determine treatment urgency and referral needs."** **However, no statistics were given on dental fluorosis** even though "More than 13,000 children received dental screenings." and "each tooth surface was scored for decay, restorations, sealants, fluorosis, trauma, premature loss, and eruption status…"
Arkansas	2002. **Too Few Visits to the Dentist? The Impact on Children's Health**. A Special Report from Arkansas Advocates for Children & Families. February. http://www.fluoridealert.org/wp-content/uploads/ar-2002.pdf **No mention of dental fluorosis.**
Arkansas	Undated. **Alaska Oral Health Assessment. Summary Report 2004-2005**. By the State of Alaska, Department of Health and Social Services, Division of Public Health, Oral Health Program. http://fluoridealert.org/wp-content/uploads/ak-2004-2005.pdf **No mention of dental fluorosis.**
Arkansas	2007. **Oral Health in Arkansas**. By Mouden LD, Phillips MM, Sledge R, Evans V. Office of Oral Health. August. http://fluoridealert.org/wp-content/uploads/ar-2007.pdf **No mention of dental fluorosis.**
Arkansas	2012. **Arkansas Oral Health Plan 2012-2015**. Arkansas Department of Health, Office of Oral Health. "Recommendation 2.8. Provide funding for public health clinic start up and maintenance grants and other safety net programs including community health centers and not-for-profit volunteer programs. Strategy: 1. On an ongoing basis, pursue funding for community health center dental expansion and volunteer community programs through the **Tobacco Master Settlement Agreement** and other funding mechanisms." http://fluoridealert.org/wp-content/uploads/ar-2012.pdf **No mention of dental fluorosis.**
Arkansas	2013. Office of Oral Health Surveillance Plan. Prepared by Abby Holt and Brian Whitaker. Arkansas Department of Health. "**Community water fluoridation (CWF) is promoted through a CDC cooperative agreement**. Activities include presentations on the benefits and costs of CWF internally within the ADH and externally to various governing bodies, community leaders and lay citizens through the distribution of informational packets and campaigns to include

	print and broadcast media. Internal partners include the ADH Section of Engineering and the Office of Communications and Marketing among others." http://fluoridealert.org/wp-content/uploads/ar-2013.pdf **No mention of dental fluorosis.**
California	2006. **"Mommy, it hurts to chew." The California Smile Survey. An Oral Health Assessment of California's Kindergarten and 3rd Grade Children.** Dental Health Foundation. February. http://fluoridealert.org/wp-content/uploads/ca-2006.pdf "During the 2004-2005 school year we surveyed over 21,000 California children in kindergarten or third grade, in nearly 200 randomly-selected schools spread across the State…" **No mention of dental fluorosis.**
California	2009. **Research and public policy: dental caries and fluoridation**. UCSF Dental Public Health Seminar: Part 1. By Howard Pollick. October 6. http://www.fluoridealert.org/wp-content/uploads/pollick-2009.pdf * This is not a report published by the state. However, there is a discussion on dental fluorosis and rates are given for "High Schools" 1993-94. It's difficult to read the small chart in the report for the percent of severity of dental fluorosis. **Percent of dental fluorosis given for 10th graders teeth 1993-94:** **Fluoridated Urban: 9.0%** **Other Urban: 16.1%** **Rural 7.9%** **All Regions (lifetime residents): 11.5%**
California	2009. **Dental Health Fact Sheet 2009 [for Santa Clara].** By the **Santa Clara** Public Health Department. http://fluoridealert.org/wp-content/uploads/ca-2009.santa-clara.pdf **No mention of dental fluorosis.**
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	Services. http://www.fluoridealert.org/wp-content/uploads/dc-2007.pdf **No mention of dental fluorosis.**
Florida	2013. **Florida Oral Health Metrics**. A Florida Public Health Institute Report. Report prepared by the Urban Health Solutions Research and Writing Team (Bello L, Dye M, Garces A, Rovira I, McCabe B). This report was made possible with generous support from the DentaQuest Foundation. http://fluoridealert.org/wp-content/uploads/fl-2013.pdf **No mention of dental fluorosis.**
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	Island volcanic smog (VOG) is a major issue. Off-gassing chemicals of greatest concern include hyrdrogen fluoride, a source for exposure for children to dental fluorosis.
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	Fluoride supplements (page 34): "It is recommended that the risk of tooth decay should be weighted before issuing a prescription for these supplements in children younger than 6 years of age because these supplements also increase the risk of enamel fluorosis." Fluoride mouth rinse (page 34)"Children under 6 years old are not recommended to use it without the prescription of a dentist because of the risk of enamel fluorosis as they tend to swallow it more often than adults." Fluoride gel and foam (page 34): "These are usually applied in dental offices and pose less of a threat for fluorosis in children younger than six because of the big intervals in between the applications... Fluoride varnish has a fluoride concentration of 22,600 ppm…"
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Vermont	2014. **Vermont Oral Health Plan 2014**. By the Vermont Department of Health. http://fluoridealert.org/wp-content/uploads/vt-2014.pdf **No mention of dental fluorosis.**
Virginia	2011. **Oral Health in Northern Virginia.** A report commissioned by the Northern Virginia Health Foundation. September 2011. http://fluoridealert.org/wp-content/uploads/va-2011.northern-va.pdf **No mention of dental fluorosis.**
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Washington	2011. **Smile Survey 2010. The Oral Health of Washington's Children**. By the Washington State Department of Health; Delta Dental Washington Dental Service Foundation; Washington State Department of Early Learning. March. http://fluoridealert.org/wp-content/uploads/wa-2011.pdf **No mention of dental fluorosis.** **‹ WHITE SPOT Lesions mentioned in Tables 7,8,9,10.** **WHITE SPOT LESIONS in Head Start/ECEAP Preschoolers is 20.5%** WHITE SPOT: Head Start/ECEAP Preschoolers by race: 25.3%, African-American 20.7%, Minority 20.6%, White, Non-Hispanic 17.5%, Hispanic

West Virginia	2010. **West Virginia Oral Health Plan 2010-2015**. By the West Virginia Department of Health & Human Resources. March 2010. http://fluoridealert.org/wp-content/uploads/wv-2010.pdf **No mention of dental fluorosis.**
Wisconsin	2012. **The Health of Dane County. The Oral Health Crisis**. Produced by the Public Health Madison & Dane County and the Oral Health Coalition of Dane County. May. http://fluoridealert.org/wp-content/uploads/wi-2012.dane-county.pdf **No mention of dental fluorosis.**
Wisconsin	2013 - **Healthy Smiles / Healthy Growth. Wisconsin's Third Grade Students**. By Olson M, Chaffin J, Chudy N, Yang A. The publication was made possible in part by funding from two grants from the Centers for Disease Control and Prevention. The Division of Oral Health, Cooperative Agreement DP08-802 and the Division of Nutrition, Physical Activity and Obesity Cooperative Agreement 5U58DP001494-05. http://fluoridealert.org/wp-content/uploads/wi-2013.pdf **No mention of dental fluorosis.**
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APPENDIX F

Pro-Fluoridation groups have also ignored dental fluorosis

The Pew foundation has probably been the most active foundation in promoting community water fluoridation since 2008 by setting up health care coalitions across the country to vigorously support fluoridation. According to Pew's main fluoridation campaigner, Matt Jacob (2012), Pew's outreach to states for community water fluoridation (CWF) included the following:

• Arkansas: "Funded a poll and offered other assistance to pass a state mandate in 2011."
• California: "Provided assistance to a successful campaign to secure CWF in San Jose."
• Kansas: "Assisted oral health advocates in Wichita pass a fluoridation policy."
• Mississippi: "Provided message training for oral health field staff."
• Montana: "Assisted successful effort to preserve CWF in the city of Bozeman."
• New Hampshire: "Helped defeat a statewide ban on CWF."
• Oregon: "Offering funds and research for a campaign [referendum] in Portland."
• Wisconsin: "Provided research and technical assistance to preserve CWF in Milwaukee."

• In May 2011, **The Pew Center on the States**, a major funder of pro-fluoridation groups, published **The State of Children's Health: Making Coverage Matter** (Pew, 2011, http://fluoridealert.org/wp-content/uploads/pew-2011.pdf). There is no discussion of dental fluorosis in this report.

• In July 2015, a report titled, **Fluoridation Advocacy: Pew's Contributions and Lessons that Emerge** (http://fluoridealert.org/wp-content/uploads/pew.july-2015.pdf) contained one citation on fluorosis (page 3) that came from the CDC's "FAQs for Dental Fluorosis." The Pew Charitable Trusts commissioned the **Children's Dental Health Project** (CDHP) to prepare this report. CDHP funders include the CDC, DHHS, Colgate-Palmolive and the W.K. Kellogg Foundation. An individual from the American Dental Association is on its board. There was one citation to African-Americans (page 15): "To build this consensus [for working on a referendum for fluoridation], Upstream formed a diverse coalition of Portland organizations called Healthy Kids, Healthy Portland (HKHP). The coalition included the **African Women's Coalition**, the Asian Pacific American Network of Oregon, Familias en Acción, Kaiser Permanente Northwest, Lutheran Community Services and the Oregon Business Association. (See below, *Portland, Oregon: Money given to minority groups to support fluoridation)*

• On the **Children's Dental Health Project (CDHP)** website (https://www.cdhp.org/) a search for "fluorosis" had two hits:

- April 27, 2015: "… The updated level for fluoride is expected to help reduce enamel fluorosis. Fluorosis is a change in the appearance of tooth enamel that does *not* affect the health or function of the teeth.*[In 2006 the NRC-2006 report stated that severe dental fluorosis was an adverse health effect.]* Typically, fluorosis in the U.S. is a mild, cosmetic condition that leaves faint, white spots or streaks on the surface of teeth. The effect is subtle, which is why many people with fluorosis don't even notice it; it often takes a dental professional to recognize it…" https://www.cdhp.org/blog/316-hhs-updates-fluoride-level
-

- January 10, 2011: Quote from Burton Edelstein, President of CDHP, "In no way does this adjustment mean that public health authorities are backing off of their commitment to fluoridating water" said Edelstein. "In fact, capping water levels at the newly recommended level (0.7 parts per million) is the best way to meet children's needs while also reducing the chance that a child will develop fluorosis. Edelstein added that "Parents can take steps to limit the chance of fluorosis from toothpaste by supervising tooth brushing." https://www.cdhp.org/resources/219-public-health-officials-reconfirm-value-of-water-fluoridation-while-adjusting-recommended-levels

• On Pew's website (http://www.pewtrusts.org/en/projects/childrens-dental-policy) **Children's Dental Policy,** a search for fluorosis gets 2 hits:

-- **Quote from Bill Maas, Advisor, Pew Children's Dental Campaign (and former Director of the Division of Oral Health at the CDC):** "Opponents have also raised concerns about community water fluoridation leading to severe cases of dental fluorosis. Fluorosis is a change in appearance of the tooth's enamel. Nearly all fluorosis in the U.S. is not harmful and results in white streaks on the teeth that are barely noticeable. Severe fluorosis can cause enamel damage and brown spots, but that problem is rare in our country, afflicting only people on private well water." - http://www.pewtrusts.org/en/research-and-analysis/q-and-a/2011/12/08/bill-maas-water-fluoridation

-- **FAQ's:** Q. What is dental fluorosis? Dental fluorosis is a change in the appearance of tooth enamel that occurs when someone is exposed to too much fluoride. In the U.S., fluorosis is typically a minor discoloration of teeth that is usually visible only to a dentist. It does not cause pain, and it does not affect the health or function of the teeth. The new HHS recommendation reflects the fact that Americans today receive fluoride from more sources (toothpaste, mouth rinses, and other products) than they were getting several decades ago. In 2006, the National Research Council examined water sources with a range of naturally occurring fluoride levels and found that severe fluorosis virtually never occurs in levels below 2 parts per million. Public water systems fluoridate at a concentration that's well below that level. - http://www.pewtrusts.org/en/research-and-analysis/q-and-a/2011/11/11/water-fluoridation-frequently-asked-questions

• In the Pew sponsored **Campaign for Dental Health** website http://ilikemyteeth.org/ , there were two "hits" for African Americans:

- A 2012 citation to a $9 million grant to the UCLA School of dentistry to give access to the city's Latino and African American children (birth to 5 years). - http://ilikemyteeth.org/million-dollar-grant-aims-increase-dental-care-access-las-youngest/
-

-- Another 2012 citation noting, "U.S. National Health Interview Surveys from 1964 to 2010 showed that the once blatant racial gap in kid's dental care has been eliminated… African-American kids still have higher rates of cavities, and

there are still children of all races who do not have access to dental care." - http://ilikemyteeth.org/children-race-dentist/

There is no mention on the websites of the **Children's Dental Health Project,** the **Children's Dental Policy** or Pew's **Campaign for Dental Health** of another neurotoxin that children are exposed to: **mercury in dental amalgams**. The FDA defines them as, "is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. Approximately 50% of dental amalgam is elemental mercury by weight." - http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DentalProducts/DentalAmalgam/ucm171094.htm

APPENDIX G

Civil Rights Leaders have begun to mobilize to end fluoridation's threat to minority communities

This section contains the following:

May 21, 2015. **Letter from William Owens, Coalition of African American Pastors,** to Rep. Barry Loudermilk, Chairman, House Subcommittee on Oversight / Science, Space, & Technology Committee, Washington, DC.
http://fluoridealert.org/wp-content/uploads/owens-may.11.2015.pdf

November 11, 2014. Resolution of the Santa Rosa-Sonoma County NAACP Opposing Fluoridation of Our Public Water Supply.
http://fluoridealert.org/wp-content/uploads/sonoma.calif_.naacp_.nov-2014.pdf

April 17, 2013. Portland NAACP Opposes fluoridation.
http://fluoridealert.org/news/portland-naacp-opposes-fluoridation/

July 1, 2011. **Civil Rights Violation Regarding Forced Medication.** Resolution of the League of United Latin American Citizens.
http://lulac.org/advocacy/resolutions/2011/resolution_Civil_Rights_Violation_Regarding_Forced_Medication/

June 22, 2011. **Another King family member speaks out as Fluoridegate scandal builds in Atlanta.**
http://fluoridealert.org/news/another-king-family-member-speaks-out-as-fluoridegate-scandal-builds-in-atlanta/

April 6, 2011. Letter from Matt Young, DDS, President, International Academy of Oral Medicine and Toxicology, to Thomas Frieden, MD, MPH, Director, Centers for Disease Control and Prevention, Atlanta, GA.
http://fluoridealert.org/wp-content/uploads/iaomt-letter-to-cdc-april.6.2011.pdf

March 29, 2011. Letter from Andrew Young to Chip Rogers, Senate Majority Leader, Georgia State Capitol, Atlanta, GA.
http://fluoridealert.org/wp-content/uploads/young-andrew.letter-march.29.2011.pdf

March 9, 2011. Letter from Dr. Gerald L. Durley, Pastor, Providence Baptist Church, to Senator Chip Rogers, Senate Majority Leader, Georgia State Capital, Atlanta. **Re: Repeal of Georgia's Mandatory Fluoridation Law**.
http://fluoridealert.org/wp-content/uploads/durley_2011.pdf

APPENDIX H

On January 7, 2011, the U.S. Department of Health and Human Services (HHS) announced its recommendation to reduce the level of fluoride added to drinking water based on national survey data showing that 41% of American adolescents (ages 12-15) now have dental fluorosis *(a tooth defect caused by excess fluoride consumption during childhood). On January 13, 2011, the HHS published a* Federal Register notice *proposing to reduce the recommended fluoride level from the existing range of 0.7 to 1.2 parts per million (ppm) to 0.7 ppm. HHS solicited public comments on their recommendation. The Fluoride Action Network's submission to HHS is reproduced in full below. Over 18,000 emails were sent to HHS in support of FAN's submission.*

Fluoride Action Network
February 4, 2011

To HHS and Honorable Secretary Sebelius

In response to your request for comments on the recent change in your recommended level of fluoride added to community drinking water, I respectfully submit the following points supporting the stance that a reduction in fluoride levels is not sufficient, and that the United States should follow the approach of western Europe and end water fluoridation completely:

- **Fluoride is not a nutrient, nor is it essential for healthy teeth.** No study has ever revealed a diseased state resulting from lack of fluoride, including dental caries. (1,2) No American is, or ever was, "fluoride deficient."

- **Using the water supply to mass medicate the population is unethical.** The public water supply should not be used as a drug-delivery system without regard for an individual's age, weight, health status, or knowledge of how fluoride will interact with other drugs they are taking. No informed consent is requested or given, and no medical follow-up is offered.

- **The benefit and safety of ingested fluoride has never been proved by accepted medical standards.** The HHS has failed to inform the public that there is not a single randomized controlled trial (the gold standard of medical research) that demonstrates the effectiveness of water fluoridation. (3) HHS has also failed to inform the public that the Food and Drug Administration has never studied, or approved, the safety of fluoride supplements and continues to classify all fluoride supplements as "unapproved new drugs." (4, 5) Lastly, HHS has failed to inform the public that tooth decay rates have declined at the same general rate in all western, industrialized countries, irrespective of water fluoridation status. (6)

- **Any benefits of fluoride are primarily topical, not systemic**. The CDC has acknowledged this for over a decade (7). The Iowa Fluoride Study, funded by HHS, has reported little, if any, relationship between individual fluoride intake and caries experience. According to the study (the largest of its kind): "achieving a caries-free status may have relatively little to do with fluoride *intake*, while fluorosis is clearly more dependent on fluoride intake." (8)

- **Americans will still be over-exposed to fluoride at 0.7 ppm.** According to EPA's recent documents "it is likely that most children, even those that live in fluoridated communities, can be over-exposed to fluoride at least occasionally. (9) At present, nearly 41% of American adolescents aged 12-15 have some form of dental fluorosis (10), an outwardly visible sign of fluoride toxicity. Reducing the fluoride levels to 0.7 ppm will *not* remedy this problem as national statistics clearly show that dental fluorosis remains significantly elevated at 0.7 ppm. (11)

Drinking water is just one source of ingested fluoride; others include foods, beverages, dental products and supplements, pesticides and pharmaceuticals. For communities that practice artificial water fluoridation, this is the easiest source of fluoride to remove.

- **Infants will not be protected**. Infants fed formula made with fluoridated tap water—at the reduced level of 0.7 ppm—will still receive up to 175 times more fluoride than a breast-fed infant. In their supporting documents, EPA has not calculated the risks to the bottle-fed infant. In fact, infants from birth to six months of age were completely excluded from any consideration by EPA, despite HHS's own admission that "The period of possible risk for fluorosis in the permanent teeth…extends from about birth through 8 years of age." (12) As the most susceptible subpopulation, the potential for long-term, irreparable damage to developing infants must be seriously considered, and should extend beyond just their teeth.

- **African-American children and low-income children will not be protected.** HHS's reference (p. 2386) to the study by Sohn et al. (13) failed to mention that African-American and low-income children were found to consume significantly more total fluids and plain water, and thus receive more fluoride from drinking water, than white or higher-income children. African-Americans have been shown to have an increased risk of developing dental fluorosis, and are at higher risk for suffering from the more severe forms of this condition. (14) Despite receiving high intakes of fluoride, low-income and minority children living in fluoridated communities continue to suffer from rampant and severe dental decay (15-18)—undermining the common premise that fluoridation will prevent these problems. Additionally, low-income children have a greater risk for suffering from all forms of fluoride toxicity, as poor diet exacerbates the detrimental effects of fluoride. This is clearly, therefore, an environmental justice issue.

- **HHS has failed to consider fluoride's impact on the brain.** Over 100 animal studies have observed fluoride-induced brain damage (19), 24 human studies have reported lowered IQ in children exposed to various levels of fluoride (20), and at least 6 other studies have found non-IQ neurological effects such as impaired visuo-spatial organization. (21-26) One study of 500 children in China observed reduced IQ at a water fluoride level of 1.9 ppm (27, 28) and another reported a reduction in IQ at even lower (mean=1.3 ppm) water fluoride levels. (29) HHS's new recommendation of 0.7 ppm offers no adequate margin of safety to protect all of our children, including those with iodine deficiencies (30-32), from experiencing similar neurological damage.

- **HHS has failed to consider fluoride as an endocrine disruptor.** The 2006 NRC report (33) states that fluoride is an endocrine disruptor, and even at low levels can be detrimental to the thyroid gland. Pre- and post-natal babies, people with kidney disease, and above-average water drinkers (including diabetics and lactating women) are especially susceptible to the endocrine disrupting effects of fluoride in drinking water.

- **HHS has failed to consider or investigate current rates of skeletal fluorosis in the U.S.** According to EPA's supporting document (34), there is a general lack of information on the prevalence of stage II skeletal fluorosis in the U.S. Yet, many of the symptoms of stage II skeletal fluorosis (e.g. sporadic pain, stiffness of the joints) are identical to arthritis (35-40), which affects at least 46 million Americans. People with renal insufficiency are known to be at an elevated risk for developing skeletal fluorosis (33), as crippling stage III skeletal fluorosis with renal deficiency has been documented in the U.S. at water fluoride levels as low as 1.7 ppm. (41) Since skeletal fluorosis in kidney patients has been detected in small case studies, it is likely that systematic studies would detect skeletal fluorosis at even lower fluoride levels.

- **HHS has failed to consider fluoride as a potential carcinogen**. Bassin et al. (42) reported a significantly elevated risk of osteosarcoma in boys living in fluoridated communities, and thus

fluoride may be a carcinogen. Chester Douglass, who has serious conflicts-of-interest concerning fluoride research, has stated that a subsequent study will refute these findings (43), but no publication has appeared in the five years since he made this claim. As EPA has still not completed carcinogenicity testing for fluoride, HHS should not support the addition of a potential carcinogen to our drinking water.

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- **HHS has failed to confirm the safety of silicofluorides**. Despite being used in more than 90% of artificial water fluoridation schemes, no chronic toxicity testing of silicofluorides has ever been completed: "No short-term or subchronic exposure, chronic exposure, cytotoxicity, reproductive toxicity, teratology, carcinogenicity, or initiation/promotion studies were available" for the toxicological summary for silicofluorides, as prepared for the National Institute of Environmental Health Sciences. (44) However, recent epidemiological research has found an association between the use of silicofluoride-treated community water and increased blood lead concentrations in children (45) – a link that is consistent with recent laboratory findings. (46) HHS has failed to inform the American public that the fluoridating agent used in drinking water is a hazardous waste product from the phosphate fertilizer industry, and can be laced with arsenic and radionuclides, (47, 48) which are known carcinogens. HHS should not support the addition of a non-tested substance to our drinking water.

Most of the arguments listed above are covered in far more detail in the recently published book "The Case Against Fluoride" by Connett, Beck and Micklem (Chelsea Green, 2010). We urge director Sebelius to appoint a group of experts from HHS, who have not been involved in promoting fluoridation, to provide a fully documented scientific response to the arguments and evidence presented in this book. Were director Sebelius to do this we strongly believe that neither she nor these experts will want to see the practice of water fluoridation continue. The practice is unnecessary, unethical and hitherto the benefits have been wildly exaggerated and the risks minimized. A scientific response to this book from a HHS team would allow the public to judge the cases both for and against fluoridation on their scientific and ethical merits.

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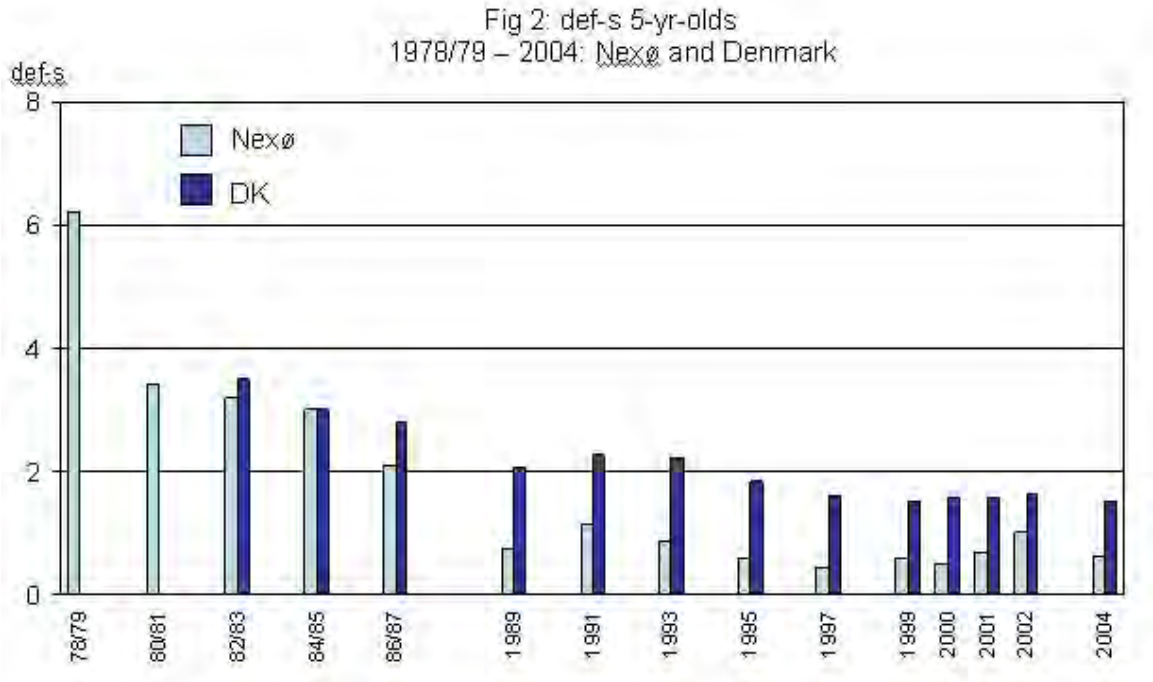
APPENDIX I

The Nexø Method

Some information from:
http://www.nexodent.com

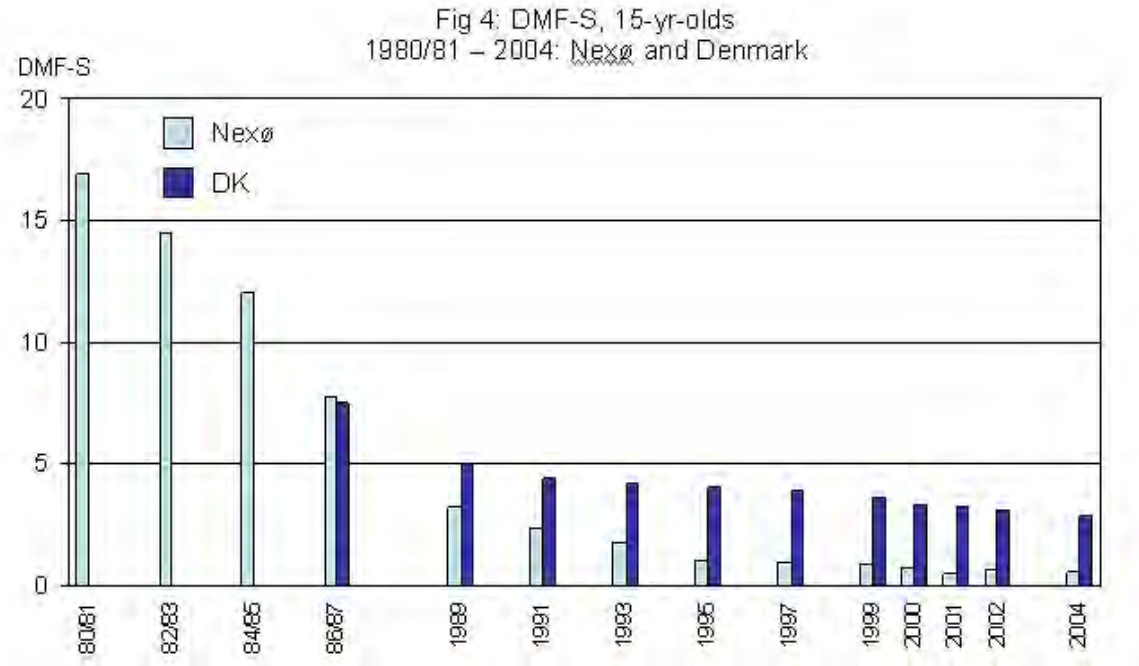
This public health dental program is based on similar principles as the ChildSmile system in Scotland, but is more comprehensive. It was developed in Denmark, with the initial trial in a community named Nexø. The results were so dramatic in rapidly lowering caries rates that the method has been extended to other communities in Denmark and other countries. Today, Denmark has the lowest childhood caries rates in the developed world according to WHO data [WHO 2015], and Denmark has never been fluoridated.

The caries rates over time in Nexø compared to those in the rest of Denmark which was not using Nexø Method, are shown in the graphs below. The first period 1978-1979 was the baseline period before the Nexø program began. The first graph is for primary teeth, dmfs:



http://www.nexodent.com/2a.jpg

For permanent teeth in 15 year olds, DMFS:



http://www.nexodent.com/4.jpg

When compared to the primary teeth, the permanent teeth took several years before the reduction in caries caught up to the Denmark level. Nexø started out as a high caries area, because it had relatively low SES compared to the rest of Denmark. The slower rate of improvement is likely because the children were already almost 15 years old when the program started. However, by 1995, by which time the 15 year olds had continuous exposure to the method since infancy, the benefit was already very dramatic. The DMFS rate was only 1.03 in Nexø compared to 4.01 in Denmark, for a 400% lowering. The largest difference ever claimed by water fluoridation has been about 70%, and today the claim is typically a 25% lowering of DMFS rates. By 2004 the rate in Nexø was just 0.56 compared to 2.85 in the rest of Denmark, a 500% reduction. These rates are all measures of decay by tooth surface ("S" for surfaces), not "T" for entire tooth, so they are higher than a tooth score.

The success of the Nexø Method has been documented in peer-reviewed scientific papers, both in Denmark and in other countries where it has been tried [Ekstrand 2005].

Here is the brief summary of the Nexø method itself:

> A dental health care program based on individualized non-operative caries treatment of children and adolescents aged 0-18. The aim of the program is to maintain sound teeth using the fewest resources possible.
>
> The treatment program is based on 3 principles - dosed at individually assessed recalls according to diagnosis and risk assessment:

1. Education of parents, children and adolescents in understanding Dental caries as a localized disease.
2. Intensive training in home-based plaque control.
3. Early professional non-operative intervention.

All parents and children in a community are given free oral hygiene training starting at 8 months age and continuing frequently through age 18. Parents and children are shown how to do proper oral hygiene and are checked to see how they are doing at each visit. If oral hygiene is not adequate or any caries starts developing, the next visit is scheduled sooner. Topical fluoride is given only if oral hygiene is not adequate or caries starts developing. Systemic fluorides are never considered. Even sealants are avoided because they are considered less effective than proper oral hygiene.

If any fillings or dental work is required, they are provided in a timely manner.

The program gets parents and children receiving frequent oral health visits throughout childhood. Dental auxiliaries perform most of the work rather than dentists to save expense.

The economics of the Nexø Method have also been examined using careful scientific and economic analyses [Ekstrand 2005, Vermaire 2013]. They found that the dramatic reduction in caries requiring treatment outweighs any additional cost for more frequent prevention visits. This net economic long-term benefit was found even in the context of an area like Denmark that has relatively low caries rate. For areas with high caries rates, due to low socio-economic status for example, the economic benefit would likely be higher.

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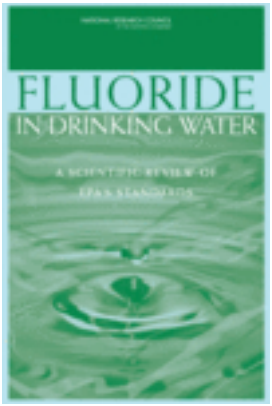
Free Executive Summary



Fluoride in Drinking Water: A Scientific Review of EPA's Standards

Committee on Fluoride in Drinking Water, National Research Council

ISBN: 978-0-309-10128-8, 530 pages, 6 x 9, paperback (2006)

Most people associate fluoride with the practice of intentionally adding fluoride to public drinking-water supplies for the prevention of tooth decay. However, fluoride can also enter public water systems from natural sources, including runoff from weathering of fluoride-containing rocks and soils and leaching from soil into groundwater. Fluoride pollution from various industrial emissions can also contaminate water supplies. In a few areas of the United States, fluoride concentrations in water are much higher than normal, mostly from natural sources. Because it can occur at toxic levels, fluoride is one of the drinking water contaminants regulated by the U.S. Environmental Protection Agency (EPA). In 1986, EPA established a maximum allowable concentration for fluoride in drinking water of 4 milligrams per liter (mg/L), a guideline designed to prevent the public from being exposed to harmful levels of fluoride. After reviewing research on various health effects from exposure to fluoride, including studies conducted in the last 10 years, this report concludes that EPA's drinking water standard for fluoride does not protect against adverse health effects. Just over 200,000 Americans live in communities where fluoride levels in drinking water are 4 mg/L or higher. Children in those communities are at risk of developing severe tooth enamel fluorosis, a condition that can cause tooth enamel loss and pitting. A majority of the report's authoring committee also concluded that people who drink water containing 4 mg/L or more of fluoride over a lifetime are likely at increased risk for bone fractures.

Summary

Under the Safe Drinking Water Act, the U.S. Environmental Protection Agency (EPA) is required to establish exposure standards for contaminants in public drinking-water systems that might cause any adverse effects on human health. These standards include the maximum contaminant level goal (MCLG), the maximum contaminant level (MCL), and the secondary maximum contaminant level (SMCL). The MCLG is a health goal set at a concentration at which no adverse health effects are expected to occur and the margins of safety are judged "adequate." The MCL is the enforceable standard that is set as close to the MCLG as possible, taking into consideration other factors, such as treatment technology and costs. For some contaminants, EPA also establishes an SMCL, which is a guideline for managing drinking water for aesthetic, cosmetic, or technical effects.

Fluoride is one of the drinking-water contaminants regulated by EPA. In 1986, EPA established an MCLG and MCL for fluoride at a concentration of 4 milligrams per liter (mg/L) and an SMCL of 2 mg/L. These guidelines are restrictions on the total amount of fluoride allowed in drinking water. Because fluoride is well known for its use in the prevention of dental caries, it is important to make the distinction here that EPA's drinking-water guidelines are not recommendations about adding fluoride to drinking water to protect the public from dental caries. Guidelines for that purpose (0.7 to 1.2 mg/L) were established by the U.S. Public Health Service more than 40 years ago. Instead, EPA's guidelines are maximum allowable concentrations in drinking water intended to prevent toxic or other adverse effects that could result from exposure to fluoride.

In the early 1990s at the request of EPA, the National Research Council

(NRC) independently reviewed the health effects of ingested fluoride and the scientific basis for EPA's MCL. It concluded that the MCL was an appropriate interim standard but that further research was needed to fill data gaps on total exposure to fluoride and its toxicity. Because new research on fluoride is now available and because the Safe Drinking Water Act requires periodic reassessment of regulations for drinking-water contaminants, EPA requested that the NRC again evaluate the adequacy of its MCLG and SMCL for fluoride to protect public health.

COMMITTEE'S TASK

In response to EPA's request, the NRC convened the Committee on Fluoride in Drinking Water, which prepared this report. The committee was charged to review toxicologic, epidemiologic, and clinical data on fluoride—particularly data published since the NRC's previous (1993) report—and exposure data on orally ingested fluoride from drinking water and other sources. On the basis of its review, the committee was asked to evaluate independently the scientific basis of EPA's MCLG of 4 mg/L and SMCL of 2 mg/L in drinking water and the adequacy of those guidelines to protect children and others from adverse health effects. The committee was asked to consider the relative contribution of various fluoride sources (e.g., drinking water, food, dental-hygiene products) to total exposure. The committee was also asked to identify data gaps and to make recommendations for future research relevant to setting the MCLG and SMCL for fluoride. Addressing questions of artificial fluoridation, economics, risk-benefit assessment, and water-treatment technology was not part of the committee's charge.

THE COMMITTEE'S EVALUATION

To accomplish its task, the committee reviewed a large body of research on fluoride, focusing primarily on studies generated since the early 1990s, including information on exposure; pharmacokinetics; adverse effects on various organ systems; and genotoxic and carcinogenic potential. The collective evidence from in vitro assays, animal research, human studies, and mechanistic information was used to assess whether multiple lines of evidence indicate human health risks. The committee only considered adverse effects that might result from exposure to fluoride; it did not evaluate health risk from lack of exposure to fluoride or fluoride's efficacy in preventing dental caries.

After reviewing the collective evidence, including studies conducted since the early 1990s, the committee concluded unanimously that the present MCLG of 4 mg/L for fluoride should be lowered. Exposure at the MCLG clearly puts children at risk of developing severe enamel fluorosis,

a condition that is associated with enamel loss and pitting. In addition, the majority of the committee concluded that the MCLG is not likely to be protective against bone fractures. The basis for these conclusions is expanded upon below.

Exposure to Fluoride

The major sources of exposure to fluoride are drinking water, food, dental products, and pesticides. The biggest contributor to exposure for most people in the United States is drinking water. Estimates from 1992 indicate that approximately 1.4 million people in the United States had drinking water with natural fluoride concentrations of 2.0-3.9 mg/L, and just over 200,000 people had concentrations equal to or exceeding 4 mg/L (the presented MCL). In 2000, it was estimated that approximately 162 million people had artificially fluoridated water (0.7-1.2 mg/L).

Food sources contain various concentrations of fluoride and are the second largest contributor to exposure. Beverages contribute most to estimated fluoride intake, even when excluding contributions from local tap water. The greatest source of nondietary fluoride is dental products, primarily toothpastes. The public is also exposed to fluoride from background air and from certain pesticide residues. Other sources include certain pharmaceuticals and consumer products.

Highly exposed subpopulations include individuals who have high concentrations of fluoride in drinking water, who drink unusually large volumes of water, or who are exposed to other important sources of fluoride. Some subpopulations consume much greater quantities of water than the 2 L per day that EPA assumes for adults, including outdoor workers, athletes, and people with certain medical conditions, such as diabetes insipidus. On a per-body-weight basis, infants and young children have approximately three to four times greater exposure than do adults. Dental-care products are also a special consideration for children, because many tend to use more toothpaste than is advised, their swallowing control is not as well developed as that of adults, and many children under the care of a dentist undergo fluoride treatments.

Overall, the committee found that the contribution to total fluoride exposure from fluoride in drinking water in the average person, depending on age, is 57% to 90% at 2 mg/L and 72% to 94% at 4 mg/L. For high-water-intake individuals, the drinking-water contribution is 86% to 96% at 2 mg/L and 92% to 98% at 4 mg/L. Among individuals with an average water-intake rate, infants and children have the greatest total exposure to fluoride, ranging from 0.079 to 0.258 mg/kg/day at 4 mg/L and 0.046 to 0.144 mg/kg/day at 2 mg/L in drinking water. For high-water-intake individuals exposed to fluoride at 4 mg/L, total exposure ranges from 0.294

mg/kg/day for adults to 0.634 mg/kg/day for children. The corresponding intake range at 2 mg/L is 0.154 to 0.334 mg/kg/day for adults and children, respectively.

Dental Effects

Enamel fluorosis is a dose-related mottling of enamel that can range from mild discoloration of the tooth surface to severe staining and pitting. The condition is permanent after it develops in children during tooth formation, a period ranging from birth until about the age of 8. Whether to consider enamel fluorosis, particularly the moderate to severe forms, to be an adverse health effect or a cosmetic effect has been the subject of debate for decades. In previous assessments, all forms of enamel fluorosis, including the severest form, have been judged to be aesthetically displeasing but not adverse to health. This view has been based largely on the absence of direct evidence that severe enamel fluorosis results in tooth loss; loss of tooth function; or psychological, behavioral, or social problems.

Severe enamel fluorosis is characterized by dark yellow to brown staining and discrete and confluent pitting, which constitutes enamel loss. The committee finds the rationale for considering severe enamel fluorosis only a cosmetic effect to be much weaker for discrete and confluent pitting than for staining. One of the functions of tooth enamel is to protect the dentin and, ultimately, the pulp from decay and infection. Severe enamel fluorosis compromises that health-protective function by causing structural damage to the tooth. The damage to teeth caused by severe enamel fluorosis is a toxic effect that is consistent with prevailing risk assessment definitions of adverse health effects. This view is supported by the clinical practice of filling enamel pits in patients with severe enamel fluorosis and restoring the affected teeth. Moreover, the plausible hypothesis concerning elevated frequency of caries in persons with severe enamel fluorosis has been accepted by some authorities, and the available evidence is mixed but generally supportive.

Severe enamel fluorosis occurs at an appreciable frequency, approximately 10% on average, among children in U.S. communities with water fluoride concentrations at or near the current MCLG of 4 mg/L. Thus, the MCLG is not adequately protective against this condition.

Two of the 12 members of the committee did not agree that severe enamel fluorosis should now be considered an adverse health effect. They agreed that it is an adverse dental effect but found that no new evidence has emerged to suggest a link between severe enamel fluorosis, as experienced in the United States, and a person's ability to function. They judged that demonstration of enamel defects alone from fluorosis is not sufficient to change the prevailing opinion that severe enamel fluorosis is an adverse cosmetic effect. Despite their disagreement on characterization of the condition, these

two members concurred with the committee's conclusion that the MCLG should prevent the occurrence of this unwanted condition.

Enamel fluorosis is also of concern from an aesthetic standpoint because it discolors or results in staining of teeth. No data indicate that staining alone affects tooth function or susceptibility to caries, but a few studies have shown that tooth mottling affects aesthetic perception of facial attractiveness. It is difficult to draw conclusions from these studies, largely because perception of the condition and facial attractiveness are subjective and culturally influenced. The committee finds that it is reasonable to assume that some individuals will find *moderate* enamel fluorosis on front teeth to be detrimental to their appearance and that it could affect their overall sense of well-being. However, the available data are not adequate to categorize moderate enamel fluorosis as an adverse health effect on the basis of structural or psychological effects.

Since 1993, there have been no new studies of enamel fluorosis in U.S. communities with fluoride at 2 mg/L in drinking water. Earlier studies indicated that the prevalence of moderate enamel fluorosis at that concentration could be as high as 15%. Because enamel fluorosis has different distribution patterns among teeth, depending on when exposure occurred during tooth development and on enamel thickness, and because current indexes for categorizing enamel fluorosis do not differentiate between mottling of anterior and posterior teeth, the committee was not able to determine what percentage of moderate cases might be of cosmetic concern.

Musculoskeletal Effects

Concerns about fluoride's effects on the musculoskeletal system historically have been and continue to be focused on skeletal fluorosis and bone fracture. Fluoride is readily incorporated into the crystalline structure of bone and will accumulate over time. Since the previous 1993 NRC review of fluoride, two pharmacokinetic models were developed to predict bone concentrations from chronic exposure to fluoride. Predictions based on these models were used in the committee's assessments below.

Skeletal Fluorosis

Skeletal fluorosis is a bone and joint condition associated with prolonged exposure to high concentrations of fluoride. Fluoride increases bone density and appears to exacerbate the growth of osteophytes present in the bone and joints, resulting in joint stiffness and pain. The condition is categorized into one of four stages: a preclinical stage and three clinical stages that increase in severity. The most severe stage (clinical stage III) historically has been referred to as the "crippling" stage. At stage II, mobility is not significantly

affected, but it is characterized by chronic joint pain, arthritic symptoms, slight calcification of ligaments, and osteosclerosis of the cancellous bones. Whether EPA's MCLG of 4 mg/L protects against these precursors to more serious mobility problems is unclear.

Few clinical cases of skeletal fluorosis in healthy U.S. populations have been reported in recent decades, and the committee did not find any recent studies to evaluate the prevalence of the condition in populations exposed to fluoride at the MCLG. Thus, to answer the question of whether EPA's MCLG protects the general public from stage II and stage III skeletal fluorosis, the committee compared pharmacokinetic model predictions of bone fluoride concentrations and historical data on iliac-crest bone fluoride concentrations associated with the different stages of skeletal fluorosis. The models estimated that bone fluoride concentrations resulting from lifetime exposure to fluoride in drinking water at 2 mg/L (4,000 to 5,000 mg/kg ash) or 4 mg/L (10,000 to 12,000 mg/kg ash) fall within or exceed the ranges historically associated with stage II and stage III skeletal fluorosis (4,300 to 9,200 mg/kg ash and 4,200 to 12,700 mg/kg ash, respectively). However, this comparison alone is insufficient for determining whether stage II or III skeletal fluorosis is a risk for populations exposed to fluoride at 4 mg/L, because bone fluoride concentrations and the levels at which skeletal fluorosis occurs vary widely. On the basis of the existing epidemiologic literature, stage III skeletal fluorosis appears to be a rare condition in the United Sates; furthermore, the committee could not determine whether stage II skeletal fluorosis is occurring in U.S. residents who drink water with fluoride at 4 mg/L. Thus, more research is needed to clarify the relationship between fluoride ingestion, fluoride concentrations in bone, and stage of skeletal fluorosis before any conclusions can be drawn.

Bone Fractures

Several epidemiologic studies of fluoride and bone fractures have been published since the 1993 NRC review. The committee focused its review on observational studies of populations exposed to drinking water containing fluoride at 2 to 4 mg/L or greater and on clinical trials of fluoride (20-34 mg/day) as a treatment for osteoporosis. Several strong observational studies indicated an increased risk of bone fracture in populations exposed to fluoride at 4 mg/L, and the results of other studies were qualitatively consistent with that finding. The one study using serum fluoride concentrations found no appreciable relationship to fractures. Because serum fluoride concentrations may not be a good measure of bone fluoride concentrations or long-term exposure, the ability to show an association might have been diminished in that study. A meta-analysis of randomized clinical trials reported an elevated risk of new nonvertebral fractures and a slightly decreased risk of vertebral

fractures after 4 years of fluoride treatment. An increased risk of bone fracture was found among a subset of the trials that the committee found most informative for assessing long-term exposure. Although the duration and concentrations of exposure to fluoride differed between the observational studies and the clinical trials, bone fluoride content was similar (6,200 to more than 11,000 mg/kg ash in observational studies and 5,400 to 12,000 mg/kg ash in clinical trials).

Fracture risk and bone strength have been studied in animal models. The weight of evidence indicates that, although fluoride might increase bone volume, there is less strength per unit volume. Studies of rats indicate that bone strength begins to decline when fluoride in bone ash reaches 6,000 to 7,000 mg/kg. However, more research is needed to address uncertainties associated with extrapolating data on bone strength and fractures from animals to humans. Important species differences in fluoride uptake, bone remodeling, and growth must be considered. Biochemical and physiological data indicate a biologically plausible mechanism by which fluoride could weaken bone. In this case, the physiological effect of fluoride on bone quality and risk of fracture observed in animal studies is consistent with the human evidence.

Overall, there was consensus among the committee that there is scientific evidence that under certain conditions fluoride can weaken bone and increase the risk of fractures. The majority of the committee concluded that lifetime exposure to fluoride at drinking-water concentrations of 4 mg/L or higher is likely to increase fracture rates in the population, compared with exposure to 1 mg/L, particularly in some demographic subgroups that are prone to accumulate fluoride into their bones (e.g., people with renal disease). However, 3 of the 12 members judged that the evidence only supports a conclusion that the MCLG *might not* be protective against bone fracture. Those members judged that more evidence is needed to conclude that bone fractures occur at an appreciable frequency in human populations exposed to fluoride at 4 mg/L and that the MCLG is not *likely* to be protective.

There were few studies to assess fracture risk in populations exposed to fluoride at 2 mg/L in drinking water. The best available study, from Finland, suggested an increased rate of hip fracture in populations exposed to fluoride at concentrations above 1.5 mg/L. However, this study alone is not sufficient to judge fracture risk for people exposed to fluoride at 2 mg/L. Thus, no conclusions could be drawn about fracture risk or safety at 2 mg/L.

Reproductive and Developmental Effects

A large number of reproductive and developmental studies in animals have been conducted and published since the 1993 NRC report, and the

overall quality of that database has improved significantly. Those studies indicated that adverse reproductive and developmental outcomes occur only at very high concentrations that are unlikely to be encountered by U.S. populations. A few human studies suggested that high concentrations of fluoride exposure might be associated with alterations in reproductive hormones, effects on fertility, and developmental outcomes, but design limitations make those studies insufficient for risk evaluation.

Neurotoxicity and Neurobehavioral Effects

Animal and human studies of fluoride have been published reporting adverse cognitive and behavioral effects. A few epidemiologic studies of Chinese populations have reported IQ deficits in children exposed to fluoride at 2.5 to 4 mg/L in drinking water. Although the studies lacked sufficient detail for the committee to fully assess their quality and relevance to U.S. populations, the consistency of the results appears significant enough to warrant additional research on the effects of fluoride on intelligence.

A few animal studies have reported alterations in the behavior of rodents after treatment with fluoride, but the committee did not find the changes to be substantial in magnitude. More compelling were studies on molecular, cellular, and anatomical changes in the nervous system found after fluoride exposure, suggesting that functional changes could occur. These changes might be subtle or seen only under certain physiological or environmental conditions. More research is needed to clarify the effect of fluoride on brain chemistry and function.

Endocrine Effects

The chief endocrine effects of fluoride exposures in experimental animals and in humans include decreased thyroid function, increased calcitonin activity, increased parathyroid hormone activity, secondary hyperparathyroidism, impaired glucose tolerance, and possible effects on timing of sexual maturity. Some of these effects are associated with fluoride intake that is achievable at fluoride concentrations in drinking water of 4 mg/L or less, especially for young children or for individuals with high water intake. Many of the effects could be considered subclinical effects, meaning that they are not adverse health effects. However, recent work on borderline hormonal imbalances and endocrine-disrupting chemicals indicated that adverse health effects, or increased risks for developing adverse effects, might be associated with seemingly mild imbalances or perturbations in hormone concentrations. Further research is needed to explore these possibilities.

Effects on Other Organ Systems

The committee also considered effects on the gastrointestinal system, kidneys, liver, and immune system. There were no human studies on drinking water containing fluoride at 4 mg/L in which gastrointestinal, renal, hepatic, or immune effects were carefully documented. Case reports and in vitro and animal studies indicated that exposure to fluoride at concentrations greater than 4 mg/L can be irritating to the gastrointestinal system, affect renal tissues and function, and alter hepatic and immunologic parameters. Such effects are unlikely to be a risk for the average individual exposed to fluoride at 4 mg/L in drinking water. However, a potentially susceptible subpopulation comprises individuals with renal impairments who retain more fluoride than healthy people do.

Genotoxicity and Carcinogenicity

Many assays have been performed to assess the genotoxicity of fluoride. Since the 1993 NRC review, the most significant additions to the database are in vivo assays in human populations and, to a lesser extent, in vitro assays with human cell lines and in vivo experiments with rodents. The results of the in vivo human studies are mixed. The results of in vitro tests are also conflicting and do not contribute significantly to the interpretation of the existing database. Evidence on the cytogenetic effects of fluoride at environmental concentrations is contradictory.

Whether fluoride might be associated with bone cancer has been a subject of debate. Bone is the most plausible site for cancer associated with fluoride because of its deposition into bone and its mitogenic effects on bone cells in culture. In a 1990 cancer bioassay, the overall incidence of osteosarcoma in male rats exposed to different amounts of fluoride in drinking water showed a positive dose-response trend. In a 1992 study, no increase in osteosarcoma was reported in male rats, but most of the committee judged the study to have insufficient power to counter the evidence for the trend found in the 1990 bioassay.

Several epidemiologic investigations of the relation between fluoride and cancer have been performed since the 1993 evaluation, including both individual-based and ecologic studies. Several studies had significant methodological limitations that made it difficult to draw conclusions. Overall, the results are mixed, with some studies reporting a positive association and others no association.

On the basis of the committee's collective consideration of data from humans, genotoxicity assays, and studies of mechanisms of action in cell systems (e.g., bone cells in vitro), the evidence on the potential of fluoride to initiate or promote cancers, particularly of the bone, is tentative and

mixed. Assessing whether fluoride constitutes a risk factor for osteosarcoma is complicated by the rarity of the disease and the difficulty of characterizing biologic dose because of the ubiquity of population exposure to fluoride and the difficulty of acquiring bone samples in nonaffected individuals.

A relatively large hospital-based case-control study of osteosarcoma and fluoride exposure is under way at the Harvard School of Dental Medicine and is expected to be published in 2006. That study will be an important addition to the fluoride database, because it will have exposure information on residence histories, water consumption, and assays of bone and toenails. The results of that study should help to identify what future research will be most useful in elucidating fluoride's carcinogenic potential.

DRINKING-WATER STANDARDS

Maximum-Contaminant-Level Goal

In light of the collective evidence on various health end points and total exposure to fluoride, the committee concludes that EPA's MCLG of 4 mg/L should be lowered. Lowering the MCLG will prevent children from developing severe enamel fluorosis and will reduce the lifetime accumulation of fluoride into bone that the majority of the committee concludes is likely to put individuals at increased risk of bone fracture and possibly skeletal fluorosis, which are particular concerns for subpopulations that are prone to accumulating fluoride in their bones.

To develop an MCLG that is protective against severe enamel fluorosis, clinical stage II skeletal fluorosis, and bone fractures, EPA should update the risk assessment of fluoride to include new data on health risks and better estimates of total exposure (relative source contribution) for individuals. EPA should use current approaches for quantifying risk, considering susceptible subpopulations, and characterizing uncertainties and variability.

Secondary Maximum Contaminant Level

The prevalence of severe enamel fluorosis is very low (near zero) at fluoride concentrations below 2 mg/L. From a cosmetic standpoint, the SMCL does not completely prevent the occurrence of moderate enamel fluorosis. EPA has indicated that the SMCL was intended to reduce the severity and occurrence of the condition to 15% or less of the exposed population. The available data indicate that fewer than 15% of children will experience moderate enamel fluorosis of aesthetic concern (discoloration of the front teeth) at that concentration. However, the degree to which moderate enamel fluorosis might go beyond a cosmetic effect to create an adverse psychological effect or an adverse effect on social functioning is not known.

OTHER PUBLIC HEALTH ISSUES

The committee's conclusions regarding the potential for adverse effects from fluoride at 2 to 4 mg/L in drinking water do not address the lower exposures commonly experienced by most U.S. citizens. Fluoridation is widely practiced in the United States to protect against the development of dental caries; fluoride is added to public water supplies at 0.7 to 1.2 mg/L. The charge to the committee did not include an examination of the benefits and risks that might occur at these lower concentrations of fluoride in drinking water.

RESEARCH NEEDS

As noted above, gaps in the information on fluoride prevented the committee from making some judgments about the safety or the risks of fluoride at concentrations of 2 to 4 mg/L. The following research will be useful for filling those gaps and guiding revisions to the MCLG and SMCL for fluoride.

- Exposure assessment

— Improved assessment of exposure to fluoride from all sources is needed for a variety of populations (e.g., different socioeconomic conditions). To the extent possible, exposures should be characterized for individuals rather than communities, and epidemiologic studies should group individuals by exposure level rather than by source of exposure, location of residence, or fluoride concentration in drinking water. Intakes or exposures should be characterized with and without normalization for body weight. Fluoride should be included in nationwide biomonitoring surveys and nutritional studies; in particular, analysis of fluoride in blood and urine samples taken in these surveys would be valuable.

- Pharmacokinetic studies

— The concentrations of fluoride in human bone as a function of exposure concentration, exposure duration, age, sex, and health status should be studied. Such studies would be greatly aided by noninvasive means of measuring bone fluoride. Information is particularly needed on fluoride plasma and bone concentrations in people with small-to-moderate changes in renal function as well as in those with serious renal deficiency.

— Improved and readily available pharmacokinetic models should be developed. Additional cross-species pharmacokinetic comparisons would help to validate such models.

- Studies of enamel fluorosis

— Additional studies, including longitudinal studies, should be done in U.S. communities with water fluoride concentrations greater than 1 mg/L.

These studies should focus on moderate and severe enamel fluorosis in relation to caries and in relation to psychological, behavioral, and social effects among affected children, their parents, and affected children after they become adults.

— Methods should be developed and validated to objectively assess enamel fluorosis. Consideration should be given to distinguishing between staining or mottling of the anterior teeth and of the posterior teeth so that aesthetic consequences can be more easily assessed.

— More research is needed on the relation between fluoride exposure and dentin fluorosis and delayed tooth eruption patterns.

- Bone studies

— A systematic study of clinical stage II and stage III skeletal fluorosis should be conducted to clarify the relationship between fluoride ingestion, fluoride concentration in bone, and clinical symptoms.

— More studies of communities with drinking water containing fluoride at 2 mg/L or more are needed to assess potential bone fracture risk at these higher concentrations. Quantitative measures of fracture, such as radiologic assessment of vertebral body collapse, should be used instead of self-reported fractures or hospital records. Moreover, if possible, bone fluoride concentrations should be measured in long-term residents.

- Other health effects

— Carefully conducted studies of exposure to fluoride and emerging health parameters of interest (e.g., endocrine effects and brain function) should be performed in populations in the United States exposed to various concentrations of fluoride. It is important that exposures be appropriately documented.

FLUORIDE IN DRINKING WATER

A SCIENTIFIC REVIEW OF EPA'S STANDARDS

Committee on Fluoride in Drinking Water

Board on Environmental Studies and Toxicology

Division on Earth and Life Studies

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Preface

In 1986, the U.S. Environmental Protection Agency (EPA) established a maximum-contaminant-level goal (MCLG) of 4 milligrams per liter (mg/L) and a secondary maximum contaminant level (SMCL) of 2 mg/L for fluoride in drinking water. These exposure values are not recommendations for the artificial fluoridation of drinking water, but are guidelines for areas in the United States that are contaminated or have high concentrations of naturally occurring fluoride. The goal of the MCLG is to establish an exposure guideline to prevent adverse health effects in the general population, and the goal of the SMCL is to reduce the occurrence of adverse cosmetic consequences from exposure to fluoride. Both the MCLG and the SMCL are nonenforceable guidelines.

The regulatory standard for drinking water is the maximum contaminant level (MCL), which is set as close to the MCLG as possible, with the use of the best technology available. For fluoride, the MCL is the same as the MCLG of 4 mg/L. In 1993, a previous committee of the National Research Council (NRC) reviewed the health effects of ingested fluoride and EPA's MCL. It concluded that the MCL was an appropriate interim standard, but that further research was needed to fill data gaps on total exposures to fluoride and its toxicity. Because new research on fluoride is now available and because the Safe Drinking Water Act requires periodic reassessment of regulations for drinking water contaminants, EPA requested that the NRC evaluate the adequacy of its MCLG and SMCL for fluoride to protect public health. In response to EPA's request, the NRC convened the Committee on Fluoride in Drinking Water, which prepared this report. The committee was charged to review toxicologic, epidemiologic, and clinical data on fluoride,

particularly data published since 1993, and exposure data on orally ingested fluoride from drinking water and other sources. Biographical information on the committee members is provided in Appendix A.

This report presents the committee's review of the scientific basis of EPA's MCLG and SMCL for fluoride, and their adequacy for protecting children and others from adverse health effects. The committee considers the relative contribution of various sources of fluoride (e.g., drinking water, food, dental hygiene products) to total exposure, and identifies data gaps and makes recommendations for future research relevant to setting the MCLG and SMCL for fluoride. Addressing questions of economics, risk-benefit assessment, or water-treatment technology was not part of the committee's charge.

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the NRC's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report: Kenneth Cantor, National Cancer Institute; Caswell Evans, Jr., University of Illinois at Chicago; Michael Gallo, University of Medicine and Dentistry of New Jersey; Mari Golub, California Environmental Protection Agency; Philippe Grandjean, University of Southern Denmark; David Hoel, Medical University of South Carolina; James Lamb, The Weinberg Group Inc.; Betty Olson, University of California at Irvine; Elizabeth Platz, Johns Hopkins Bloomberg School of Public Health; George Stookey, Indiana University School of Dentistry; Charles Turner, University of Indiana; Robert Utiger, Harvard Institute of Medicine; Gary Whitford, Medical College of Georgia; and Gerald Wogan, Massachusetts Institute of Technology.

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. The review of this report was overseen by John C. Bailar, University of Chicago, and Gilbert S. Omenn, University of Michigan Medical School. Appointed by the NRC, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

The committee gratefully acknowledges the individuals who made presentations to the committee at its public meetings. They include Paul Con-

nett, St. Lawrence University; Joyce Donohue, EPA; Steve Levy, University of Iowa; William Maas, Centers for Disease Control and Prevention; Edward Ohanian, EPA; Charles Turner, Indiana University; and Gary Whitford, University of Georgia. The committee also wishes to thank Thomas Burke, Johns Hopkins University; Michael Morris, University of Michigan; Bernard Wagner, Wagner and Associates; and Lauren Zeise, California Environmental Protection Agency, who served as consultants to the committee.

The committee is grateful for the assistance of the NRC staff in preparing the report. It particularly wishes to acknowledge the outstanding staff support from project director Susan Martel. We are grateful for her persistence and patience in keeping us focused and moving ahead on the task and her expertise and skill in reconciling the differing viewpoints of committee members. Other staff members who contributed to this effort are James Reisa, director of the Board on Environmental Studies and Toxicology; Kulbir Bakshi, program director for the Committee on Toxicology; Cay Butler, editor; Mirsada Karalic-Loncarevic, research associate; Jennifer Saunders, research associate; and Tamara Dawson, senior project assistant.

Finally, I would like to thank all the members of the committee for their efforts throughout the development of this report.

John Doull, M.D., Ph.D., *Chair*
Committee on Fluoride in Drinking Water

Contents

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Exposure to fluoridated water and attention deficit hyperactivity disorder prevalence among children and adolescents in the United States: an ecological association

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Exposure to fluoridated water and attention deficit hyperactivity disorder prevalence among children and adolescents in the United States: an ecological association

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Abstract

Background

Epidemiological and animal-based studies have suggested that prenatal and postnatal fluoride exposure has adverse effects on neurodevelopment. The aim of this study was to examine the relationship between exposure to fluoridated water and Attention-Deficit Hyperactivity Disorder (ADHD) prevalence among children and adolescents in the United States.

Methods

Data on ADHD prevalence among 4-17 year olds collected in 2003, 2007 and 2011 as part of the National Survey of Children's Health, and state water fluoridation prevalence from the Centers for Disease Control and Prevention (CDC) collected between 1992 and 2008 were utilized.

Results

State prevalence of artificial water fluoridation in 1992 significantly positively predicted state prevalence of ADHD in 2003, 2007 and 2011, even after controlling for socioeconomic status. A multivariate regression analysis showed that after socioeconomic status was controlled each 1% increase in artificial fluoridation prevalence in 1992 was associated with approximately 67,000 to 131,000 additional ADHD diagnoses from 2003 to 2011. Overall state water fluoridation prevalence (not distinguishing between fluoridation types) was also significantly positively correlated with state prevalence of ADHD for all but one year examined.

Conclusions

Parents reported higher rates of medically-diagnosed ADHD in their children in states in which a greater proportion of people receive fluoridated water from public water supplies. The relationship between fluoride exposure and ADHD warrants future study.

Keywords

ADHD, Water fluoridation, Neurotoxicity, Environmental factors

Background

Attention-Deficit Hyperactivity Disorder (ADHD) is the most common neurodevelopmental disorder of childhood [1]. It is characterized by symptoms of inattention, impulsivity/hyperactivity or both that are present in childhood and can persist into adulthood [2]. As of 2011, 11% of 4-17 year olds in the United States (U.S.) had received a diagnosis at some point in their lives [3]. The high prevalence of ADHD is a growing public health concern because the behavioural symptoms of the disorder can seriously affect learning and academic achievement, as well as social functioning.

ADHD is considered to develop from an interaction between genetic and environmental factors [4-6], with numerous developmental neurotoxicants significantly increasing the risk for a diagnosis of ADHD. Environmental factors include prenatal and neonatal exposure to manganese [7], poly-chlorinated biphenyls (PCBs) [8,9], nicotine [10] and mercury [11,12], as well as childhood exposure to arsenic [13,14], food additives and food colouring [15], pesticides [16] and lead [17]. Fluoride however, despite being a widespread environmental developmental neurotoxin [18,19], has received virtually no attention in the ADHD literature. Nevertheless, there is a burgeoning body of human and animal research indirectly suggesting that it may contribute to the disorder's onset.

Water fluoridation and ADHD

The U.S. is one of the most widely fluoridated countries in the world, with approximately 74.6% of the population receiving fluoridated water for the prevention of dental caries [20]. The vast majority of those on fluoridated public water systems receive fluoride via the addition of fluoridation chemicals, while a small minority receives naturally occurring fluoride. Fluoridation chemicals include: hydrofluorosicilic acid, sodium fluorosilicate and sodium fluoride [21]. Until September 2010, the CDC's Department of Health and Human Services (DHHS) recommended that U.S. public water systems be fluoridated at 0.7 – 1.2 mg/L [22]; however, they have found that children and adults living in communities fluoridated at this range actually tend to receive 0.9 – 3.6 mg/L and 0.6 – 6.6 mg/L of fluoride per day respectively from all sources, including: water, food and dental products [23]. Consistently, the 2010 U.S. National Health and Nutrition Survey found that approximately 41% of 12-15 year olds suffer from dental fluorosis, a consequence of fluoride overexposure [24]. The DHHS has since announced a proposal to change the recommended fluoride concentration to 0.7 mg/L, but this has yet to be widely adopted [22,25].

Rats exposed to fluoridation chemicals have been shown to exhibit ADHD-like symptoms. Male rats whose mothers were injected with 0.13 mg/L of sodium fluoride two to three times per day during gestation days 14-18 or 17-19 had symptoms of hyperactivity at nine weeks of age. Juvenile and adult rats who drank water fluoridated at 100 mg/L for six weeks and 125 mg/L for 11 weeks, respectively, exhibited hypoactivity and impaired attention [26]. Although postnatal fluoride concentrations were high, blood plasma levels ranged from 0.059 - 0.640 mg/L, and these are comparable to plasma levels in humans who ingested 5 – 10 mg/L of fluoride [26,27]. Moreover, impaired learning and memory have also been found

among rats that drank 5 mg/L of sodium fluoride treated water for six months or 20 mg/L for three months [28,29].

Rats with fluorosis also tend to have significant decreases in neural nicotinic acetylcholine receptors (nACHRs) and inhibited cholinesterase expression [30-33], both of which could interfere with attentional processes [34]. Moreover, they have significant decreases in protein expression of α4 and α7 nAChR subunit genes [28,31,35], and abnormalities at the α4 nAChR subunit in particular have been implicated in all ADHD subtypes [36,37]. Furthermore, nicotinic receptor agonists that ameliorate ADHD symptoms do so in rats by acting on the $\alpha_4\beta_2$ and, in some cases, α_7 subunits [38-41].

Fluoride can readily cross the placenta, accumulate in the infant brain and easily exert neurotoxic effects, such as decreasing norepinephrine in the parietal and occipital lobes, decreasing serotonin in the parietal lobe and increasing serotonin in the frontal and occipital lobes [42-45]. Such changes can adversely affect arousal and attention, pain tolerance, and learning and memory respectively [42,43]. Expectedly, prenatal fluoride exposure has been associated with impaired infant neurobehavioural development. For example, infants whose mothers lived in areas with water fluoridated at 1.7 to 6 mg/L while pregnant had delayed orientation reactions when compared to those whose mothers were exposed to 0.5 to 1.0 mg/L [46].

Exposure to fluoridated water during childhood has also been associated with impaired attention and cognitive and intellectual functioning. Importantly, among children who were exposed environmentally to water fluoridated at 1.2 - 3 mg/L (slightly above the U.S. recommended level), increased urinary fluoride concentrations were associated with slower reaction time and poorer visuospatial organization that could interfere with attention, and reading and writing respectively [47]. Additionally, urinary fluoride of 5.6 ± 1.7 mg/L was inversely related to performance on a measure of visual memory and visuospatial organization, as well as attention (the Rey-Osterrieth Complex Figure Test) [48]. A recent meta-analysis, which included a number of epidemiological studies, also found that children living in 'high fluoride' areas had IQs that averaged 7 points lower than those living in 'low fluoride' areas [49]. Seven of the 'high fluoride' areas had fluoride concentrations slightly above the U.S recommended range (1.8 - 3 mg/L) [50-56], while one had a concentration within the recommended range (0.88 mg/L) [57]. Moreover, a dose–response relationship between exposure to water fluoridated at relatively low concentrations (0.24 - 2.84 mg/L) and reduced IQ among children has also been established [58]. The association between fluoride exposure and lowered IQ in children provides support for a neurotoxic developmental effect. While ADHD was not measured in these epidemiological studies, it is plausible that fluoride is also contributing to attention-related symptoms given its association with lower IQ.

Using an ecological design, the current study examined whether higher water fluoridation prevalence is associated with higher rates of ADHD diagnoses in the U.S.. Given the research linking exposure to fluoridated water to adverse neurodevelopmental and cognitive effects, it was hypothesized that states with more widespread water fluoridation would tend to have higher ADHD prevalence.

Methods

ADHD sample

State-based ADHD prevalence data was obtained from the Centers for Disease Control and Prevention (CDC) website. The CDC collected this information via the National Survey of Children's Health (NSCH). The NSCH is a cross-sectional random-digit survey, conducted in 2003, 2007 and 2011, in which parents were contacted via telephone and asked about the emotional and physical well-being of a randomly selected child from their household. To determine ADHD prevalence, each responding parent or guardian was asked whether "a doctor or other health care provider ever told you that [child] had attention deficit disorder or attention-deficit/hyperactivity disorder, that is, ADD or ADHD". In the 2007 and 2011 NSCH, if the parent answered yes, he or she was asked whether the child was currently diagnosed with ADHD and, if so, how severe it is. In 2011, the responding parent was also asked the age of diagnosis [59]. Lifetime parent-reported health care provider-diagnosed ADHD (whether a parent or guardian had ever been told by a health care provider that his or her child had ADD or ADHD) was the measure of ADHD prevalence used in this study.

Extracted from the original sample of children aged 0-17, three subsamples of children aged 4-17 living in the U.S. were used to assess ADHD prevalence per state in 2003 (n = 79,264), 2007 (n = 73,123), and 2011 (n = 76,015). The lifetime prevalence of ADHD increased over time and was 7.8% in 2003, 9.5% in 2007, and 11% in 2011. ADHD prevalence was also higher for males, children of lower socioeconomic status (SES), older children, and for children whose parents had a high school education as compared to those whose parents either did not graduate high school or attained postsecondary education [3].

Water fluoridation prevalence data

Data on the number of people receiving fluoridated water from public water supplies in each of the 51 United States in 1992 (n = 144,217,476), 2000 (n = 161,924,080), 2002 (n = 172, 209,735), 2004 (n = 180,632,481), 2006 (n = 184,028,038), and 2008 (n = 195,545,109) was also obtained from the CDC website [20]. To determine state-based fluoridation prevalence, the CDC obtained and analyzed data from the Water Fluoridation Reporting System (WFRS), an online tool monitoring the percentage of the U.S. population on public water systems that receives optimally fluoridated drinking water [20]. For the years 1992, 2006 and 2008 the CDC distinguished between the number of people in the U.S. receiving fluoridation chemicals versus naturally occurring fluoride. Additionally, for 1992 only, the CDC distinguished between the prevalence of artificially versus naturally fluoridated water per state. In 1992, approximately 93.4% of people on public water systems received optimally fluoridated water via the addition of fluoridation chemicals, while 6.6% exclusively received naturally occurring fluoride. In both 2006 and 2008, approximately 95.5% received fluoridation chemicals and 4.5% received natural fluoride.

To calculate the percentage of each state receiving optimally fluoridated (i.e. according to the DHHS recommendations) water from public water systems (i.e. encompassing either naturally or artificially fluoridated water) state population estimates were obtained from the United States Census website [60,61]. The number of people receiving optimally fluoridated water in each state was divided by the number of people in each state for a given year and multiplied by 100. For 1992, the number of people receiving artificially fluoridated water and

the number receiving naturally fluoridated water in each state were also divided by the state population estimate and multiplied by 100 to determine the respective state based prevalence.

Statistical analysis

Descriptive statistics were calculated for U.S. water fluoridation prevalence for all years examined. Statistical comparisons of ADHD prevalence and water fluoridation prevalence between geographic regions were determined using one-way ANOVA followed by Bonferroni post hoc test in all cases except for regional fluoridation prevalence comparisons in 2000 and 2002. In those cases Games-Howell's test was used due to heterogeneous variances. Pearson correlations were used to examine relationships between state water fluoridation prevalence and state ADHD prevalence. These were not corrected for family wise error given the exploratory nature of this study. Hierarchical and multivariate regression analyses were conducted to examine the relationship between artificial water fluoridation prevalence and ADHD prevalence after controlling for natural water fluoridation prevalence and SES, and SES respectively. A one-tailed alpha level of 0.05 was the criterion for statistical significance for all analyses. A Bonferroni correction was applied to the univariate analysis of the multivariate regression however, making the criterion for significance for that analysis an alpha of 0.017.

Results

State water fluoridation

Median percentages and interquartile ranges of the U.S. population receiving optimally fluoridated water from public water systems in 1992, 2000, 2002, 2004, 2006 and 2008 are presented in Table 1. Median water fluoridation prevalence ranged from 58.16 - 66.33% from 1992-2008, increasing over time. Interquartile ranges ranged from 26.99 - 31.83%, indicating that fluoridation prevalence between states was highly variable.

Table 1 Percentage of each state receiving fluoridated water per year

Year	Median	Interquartile Range
1992	58.16	30.33
2000	58.62	31.83
2002	63.93	29.61
2004	66.24	26.99
2006	65.75	30.52
2008	66.33	30.39

ADHD and water fluoridation prevalence according to geographic region

ADHD and water fluoridation prevalence were organized in Tables 2 and 3 respectively according to the United States Census Bureau's classification of geographic regions [62] (See Additional file 1). Differences in ADHD prevalence between geographic regions were statistically significant in 2003 ($F(3, 47) = 21.84$, $p = .000$), 2007 ($F(3, 47) = 12.07$, $p = .000$), and 2011($F(3, 47) = 13.35$, $p = .000$). In 2003, ADHD prevalence was significantly lower in the West ($M = 6.41$, $SD = 0.8$) than in all other regions, and in both 2003 and 2007 significantly higher in the South ($M = 9.41$, $SD = 1.05$ and $M = 11.74$, $SD = 2.28$, respectively), than in all other regions. In 2007 and 2011, ADHD prevalence was lower in the

West (M = 7.73, SD = 1.3 and M = 8.75, SD = 1.67, respectively) than in all other regions, but not significantly lower than the North East (M = 9.46, SD = 0.97 and M = 10.96, SD = 1.72, respectively). In 2011, ADHD prevalence was highest in the South (M = 13.51, SD = 2.49), but not significantly higher than the Midwest (M = 11.93, SD = 2.03).

Table 2 Prevalence of ADHD as a function of geographic region

Region	2003		2007		2011	
	Mean	% SD	Mean	% SD	Mean	% SD
Northeast	7.92	1.13	9.46	0.97	10.96	1.72
Midwest	7.87	1.05	9.82	2.03	11.93	2.03
South	9.41	1.05	11.74	2.28	13.51	2.49
West	6.41	0.80	7.73	1.28	8.75	1.67

Note. Mean percentage of children or adolescents ages 4–17 ever diagnosed with ADHD as of that year; SD, standard deviation. Northeast, n = 9, Midwest, n = 12,
South, n = 17, West, n = 13.

Table 3 Prevalence of water fluoridation as a function of geographic region

	1992		2000		2002		2004		2006		2008	
Region	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Northeast	39.6	22.36	49.39	22.60	50.79	22.0	49.78	19.25	50.30	19.43	50.13	21.39
Midwest	69.1	11.84	69.62	9.32	72.51	10.77	73.25	10.69	72.87	10.78	70.17	13.11
South	69.0	15.11	67.80	16.17	71.68	14.74	74.82	15.11	74.37	15.85	73.37	17.51
West	31.7	22.78	34.13	20.70	37.26	20.86	39.90	19.5	41.16	19.35	43.65	19.78

Note. M, mean percentage of population receiving fluoridated water from public water systems in that year. SD, standard deviation. Northeast, n = 9, Midwest, n = 12, South, n = 17, West, n = 13.

Differences in water fluoridation prevalence between regions were also statistically significant in 1992 ($F(3, 47) = 15.05$, $p = .000$), 2000 ($F(3, 47) = 12.21$, $p = .000$), 2002 ($F(3, 47) = 13.20$, $p = .000$), 2004 ($F(3, 47) = 15.07$, $p = .000$), 2006 ($F(3, 47) = 13.28$, $p = .000$), and 2008 ($F(3, 47) = 8.88$, $p = .000$). Similar to ADHD prevalence, water fluoridation prevalence in all years examined was lower in the West than in all other regions, but not significantly lower than the North East. In 2004, 2006 and 2008 water fluoridation prevalence was also higher in the South than in all regions, but not significantly higher than the Mid-West.

The relationship between ADHD prevalence and water fluoridation prevalence

Since artificial and natural water fluoridation prevalence per state was only distinguished in 1992, the relationship between each and ADHD prevalence was of primary focus and examined separately. States with higher artificial fluoridation prevalence had significantly higher ADHD prevalence in 2003 ($r(49) = .46$, $p = .000$), 2007 ($r(49) = .42$, $p = .001$), and 2011 ($r(49) = .48$, $p = .000$). Natural fluoridation prevalence in 1992 however, was not significantly related to ADHD prevalence in 2007 or 2011, $r(49) = -.19$, $p = .09$, and $r(49) = -.22$, $p = .06$ respectively, but was significantly negatively associated with ADHD prevalence in 2003, $r(49) = -.29$, $p = 0.02$.

The relationship between overall state water fluoridation prevalence (not differentiating between artificial and natural fluoridation) and state ADHD prevalence in later years was also examined. Positive associations were found between the two for all years examined, except between water fluoridation prevalence in 2008 and ADHD prevalence in 2007 ($p = .07$).

These correlations were numerically smaller however, than between artificial water fluoridation prevalence and ADHD prevalence (see Table 4).

Table 4 Pearson correlations among water fluoridation prevalence and ADHD prevalence

Variables	2	3	4	5	6	7	8	9
1.) ADHD2003	.67	.65	.32*	.37**	.38**	.39**	.39**	.32*
2) ADHD2007	—	.71	.35**	.30*	.30*	.31*	.28*	.21
3.) ADHD2011	—	—	.39**	.34**	.32*	.34**	.33**	.25*
4.) FPrev_1992	—	—	—	.82	.80	.81	.80	.75
5.) FPrev_2000	—	—	—	—	.96	.91	.91	.89
6.) FPrev_2002	—	—	—	—	—	.96	.97	.93
7.) FPrev_2004	—	—	—	—	—	—	.99	.95
8.) FPrev_2006	—	—	—	—	—	—	—	.96
9.) FPrev_2008	—	—	—	—	—	—	—	—

Note. ADHD, parent-reported health care provider-diagnosed lifetime prevalence of ADHD in that year. FPrev_, percentage of the population receiving fluoridated water from public water systems in that year. *p < .05, **p < .01. When not corrected for family-wise error, simple Pearson r > .25 is significant at p = .05, r > .33 is significant at p = .01.

ADHD prevalence, SES and artificial water fluoridation prevalence

Those of lower SES are often targets of public artificial water fluoridation programs [63,64] and also tend to have higher ADHD prevalence [3]. Therefore, data on median household income per state in 1992 was obtained from the U.S. Census website [65] to examine whether SES could be mediating the relationship between artificial water fluoridation prevalence and ADHD prevalence. States with lower median household income in 1992 had significantly higher artificial water fluoridation prevalence in 1992 ($r(49) = -.27$, $p = 0.03$) and consistent with the NSCH findings, significantly higher ADHD prevalence in 2003 ($r(49) = -.35$, $p = .006$), 2007 ($r(49) = -.37$, $p = .007$) and 2011 ($r(49) = -.44$, $p = 0.001$). Therefore, a hierarchical regression analysis was conducted to examine whether higher artificial water fluoridation prevalence in 1992 predicted higher prevalence of ADHD in 2003 after controlling for natural water fluoridation prevalence and median household income in 1992. These results are presented in Table 5.

Table 5 Hierarchical regression predicting 2003 ADHD prevalence with 1992 artificial and natural fluoridation prevalence

Variables	Total R^2	ΔR^2	F change	df	B
Step 1	.21	.21	13.11**	1, 49	
ArtF_1992					.027**
Step 2	.24	.03	1.75	1, 48	
ArtF_1992					.024**
NatF_1992					-.043
Step 3					
ArtF_1992	.34	.10	6.87*	1, 47	.017*
NatF_1992					-.071*
SES_1992					-.010**

Note. ArtF, prevalence of artificial water fluoridation. NatF, Prevalence of natural water fluoridation. SES, median household income. B, unstandardized coefficient.
* p < .05, ** p ≤ .01.

The final model was significant, $F(3, 47) = 7.91$, $p = 0.000$, and accounted for 33.5% of the variance in 2003 parent-reported health care provider-diagnosed ADHD. In the final model,

artificial water fluoridation prevalence significantly and independently positively predicted 2003 ADHD prevalence, B = 0.017, t (47) = 2.16, p = 0.036, while natural water fluoridation prevalence and median household income in 1992 (measured in hundreds of dollars) significantly negatively predicted it, B = −0.071, t (47) = −2.21, p = 0.032 and B = − 0.010, t (47) = 2.62, p = 0.012 respectively. Therefore, while higher artificial fluoridation prevalence in 1992 was associated with higher parent-reported health care provider-diagnosed ADHD prevalence in 2003, higher natural fluoridation prevalence and median household income in 1992 were each associated with lower 2003 ADHD prevalence.

A multivariate hierarchical regression analysis was also conducted to examine the unique relationships between artificial fluoridation prevalence and ADHD in all three years of interest after median household income in 1992 was controlled (see Table 6). Natural water fluoridation prevalence in 1992 was not included in this model because it was not significantly correlated with ADHD prevalence in 2007 or 2011, and was already controlled for in the previous regression predicting 2003 ADHD prevalence.

Table 6 Multivariate regression predicting ADHD prevalence with 1992 artificial fluoridation prevalence and 1992 median household income

Variables	B	SE	t	p value	[95% CI]
ADHD 2003					
ArtF_1992	.023	.008	3.05	.004	.008, .038
SES_1992	-.007	.004	−1.92	.061	-.015, .000
ADHD 2007					
ArtF_1992	.031	.012	2.64	.011	.007, .055
SES_1992	-.013	.006	−2.17	.035	-.025, −.001
ADHD 2011					
ArtF_1992	.042	.013	3.20	.002	.015, .068
SES_1992	-.018	.007	−2.77	.008	-.031, −.005

Note. ArtF, prevalence of artificial water fluoridation. SES, median household income. ADHD. Parent-reported health care provider-diagnosed lifetime prevalence of ADHD, in the given year. B, unstandardized coefficient. Bonferroni corrected criterion for statistical significance, $p < 0.017$.

The overall model was significant when predicting ADHD prevalence in 2003 (F (2, 48) = 8.71, p = 0.001), 2007 (F (2, 48) = 7.94, p = 0.001) and 2011 (F (2, 48) = 12.21, p = 0.000), accounting for 24%, 22% and 31% of the variance in ADHD prevalence respectively. In the final model, artificial fluoridation prevalence in 1992 significantly and independently predicted parent-reported health care provider-diagnosed ADHD in all three years examined, Wilks λ = .81, F (3, 46) = 3.64, p = 0.02, while the predictive relationship between median household income in 1992 and ADHD prevalence in all three years was reduced to that of a trend, Wilks λ = .86, F (3, 46) = 2.48, p = 0.07. After applying a Bonferroni correction, artificial fluoridation prevalence in 1992 significantly predicted ADHD prevalence in 2003, (B = 0.023, t (48) = 3.05, p = 0.004), 2007 (B = 0.031, t (48) = 2.64, p = 0.011), and 2011 (B = 0.042, t (48) = 3.20, p = 0.002). Thus, after adjusting for socioeconomic status, a 1% increase in artificial water fluoridation prevalence in 1992 was associated with a 0.023% increase in ADHD prevalence in 2003 (corresponding to approximately 67,000 additional diagnoses), a 0.031% increase in ADHD prevalence in 2007 (corresponding to approximately 93,000 additional diagnoses) and a 0.043% increase in ADHD prevalence in 2011 (corresponding to approximately 131,000 additional diagnoses). Median household income in 1992 (measured in hundreds of dollars) did not meet the threshold for significance in predicting ADHD prevalence in 2003 (p = 0.061) or 2007 (p = 0.035), but did so in 2011 (B = −.018, t = − 2.77, p = 0.008) (see Figure 1).

Figure 1 Artificial fluoridation prevalence predicting ADHD prevalence after adjusting for 1992 median household income. The line with large dashes and triangles represent predicted values of ADHD prevalence in 2003. The line with small dashes and diamonds represent predicted values of ADHD prevalence in 2007. The solid line and circles represent predicted values of ADHD prevalence in 2011.

Discussion

Fluoride is a developmental neurotoxin [18,19] associated with impaired cognitive functioning in infants and children. This is the first study to examine the relationship between exposure to fluoridated water and ADHD prevalence, and did so using population-based data collected by the CDC. It is also unique in that it examined ADHD prevalence within the U.S., decreasing the likelihood that differences in ADHD prevalence between states reflect differing diagnostic criteria (DSM criteria is most commonly applied in the U.S. to diagnose ADHD). Furthermore, ADHD state prevalence was determined using identical methodology, eliminating the common problem of differing methodologies when comparing ADHD prevalence between countries [1].

As hypothesized, water fluoridation prevalence was positively associated with parent-reported health care provider-diagnosed ADHD prevalence. Geographic regions and states in which a greater proportion of people received fluoridated water from public water systems tended to have a greater proportion of children and adolescents diagnosed with ADHD. This suggests that living in an "optimally" fluoridated community increases a child or adolescent's risk of developing the disorder. Moreover, results did not appear to be confounded by socioeconomic status because they remained consistent after controlling for this variable. Our findings are consistent with prior epidemiological studies that have associated high and low fluoride concentration exposure [49,58] with neurodevelopmental effects in children.

Artificial water fluoridation prevalence was significantly positively associated with ADHD prevalence, while natural water fluoridation prevalence was either negatively or not significantly associated with it. Although this could imply that the relationship between exposure to fluoridated water and increased ADHD prevalence is specific to fluoridation chemicals, the high variability in naturally occurring fluoride concentrations (0.1 mg/L - 15.9 mg/L) [21] within states prevents this conclusion from being made. Specifically, natural fluoride concentration could potentially be confounding the relationship between natural fluoridation prevalence and ADHD prevalence leading to a misleading result. For example, counties with low natural fluoridation prevalence could have high concentrations of naturally occurring fluoride that pose a greater neurodevelopmental risk than high prevalence of low concentrations of naturally occurring fluoride. This could contribute to increased ADHD prevalence within states that have low natural fluoridation prevalence. Thus, future research controlling for the high variability in natural fluoride concentration is necessary to more validly examine this relationship. Additionally, unlike artificially fluoridated water, U.S. citizens can be exposed to naturally fluoridated water from sources other than public water systems (e.g. wells and springs). Therefore, the state prevalence of natural fluoridation from public water systems may not reflect the true state-based proportion of people exposed to naturally fluoridated water.

Since states of lower SES tended to have higher artificial water fluoridation prevalence and ADHD prevalence, another important area of investigation was whether artificial water

fluoridation prevalence in 1992 still predicted ADHD prevalence after SES was considered. That is, did children and adolescents in states with higher artificial water fluoridation prevalence merely have higher rates of ADHD because they tended to be of lower socioeconomic status and therefore more likely to have additional ADHD risk factors? Results showed that this was not the case and prevalence of artificial water fluoridation in 1992 did indeed predict ADHD prevalence independent of SES. Moreover, artificial water fluoridation prevalence even appeared to be the more robust predictor.

Although more research is needed to investigate the relationship between exposure to fluoridated water and increased ADHD prevalence, there are two main pathways by which exposure to fluoridated water could theoretically contribute to the disorder. First, silicofluoride-treated water has been shown to corrode lead-bearing plumbing, increasing the leaching of lead in the water [66]. Silicofluorides appear to react synergistically with lead, which in turn, increases its uptake into the body [27]. Consequently, children living in communities with silicofluoride-treated water tend to have increased lead venus blood levels (VBLs) (above 5 μg/dL), and those with additional risk factors for lead exposure (e.g. living in a house built before 1939 or living in poverty during the ages of 0-5) appear most vulnerable [67-70]. Lead VBLs equal to and lower than those more commonly found among children living in silicofluoride-treated communities have repeatedly been associated with a significantly increased risk of developing ADHD [15,71]. In fact, it has been suggested that 25.4% (598 000) of ADHD cases among 8-15 year olds in the U.S. could be attributed to lead exposure greater than 1.3 μg/dL [72].

Second, exposure to fluoridated water may contribute to ADHD via suppression of the thyroid gland. Fluoride reduces thyroid gland activity [73-75] and thyroid hormones are particularly important for cholinergic activity in the basal forebrain and hippocampus [76]. Moreover, hypothyroxemia has been associated with ADHD and is considered a potential cause of the disorder [77]. In fact, thyroid gland suppression is the mechanism by which PCB exposure contributes to it [78]. Additional studies are necessary to investigate the interaction among fluoride exposure, thyroid function and ADHD symptoms and to clarify whether exposure to fluoridated water contributes to ADHD via suppression of the thyroid gland.

Even though current findings indicate a relationship between ADHD prevalence and fluoride exposure that occurs through the optimal fluoridation of public water systems, there are several study design limitations that should be considered. First, this study is an ecological design that broadly categorized fluoride exposure as exposed versus non-exposed rather than collecting information related to concentration of fluoride and patterns and frequency of exposure or outcome at the individual level. Future research could explore the relationship between exposure to fluoridated water and the occurrence of ADHD at the individual level. Further clarification of a potential dose–response relationship between fluoride exposure and ADHD symptoms would also be important for determining causality. Second, given that fluoridation prevalence in neighboring years was highly correlated from 2000 onward and unavailable for the mid to late 90s, it could not be determined whether exposure to fluoridated water at a particular period of development was most associated with increased ADHD prevalence. Nevertheless, given that other research has demonstrated the developing brain's particular sensitivity to the neurotoxic effects of fluoride, it is likely that prenatal and early postnatal development presents a window of vulnerability. Third, fluoridation prevalence data was analyzed with ADHD prevalence data from different years, and therefore, it cannot be confirmed that those surveyed in a given year were living in the same region as when the fluoridation data were derived. Fourth, we were unable to obtain reliable

population-based data on blood lead levels among 4-17 year old children and adolescents, and therefore could not determine whether lead was mediating the relationship between exposure to fluoridated water and ADHD. Lastly, parent-reported health-care provider-diagnosed ADHD prevalence was used in this study which is not as precise a measure as others (e.g. conducting formal ADHD assessments) or may be subject to potential parent biases regarding seeking or accepting an ADHD diagnosis for their child. Therefore, the survey method used in the current study may not completely capture 'true' ADHD prevalence. Despite these limitations, an association between exposure to fluoridated water and ADHD prevalence was still found, even after considering the increased tendency for children in low SES states to receive an ADHD diagnosis.

Conclusions

In summary, this study has empirically demonstrated an association between more widespread exposure to fluoridated water and increased ADHD prevalence in U.S. children and adolescents, even after controlling for SES. The findings suggest that fluoridated water may be an environmental risk factor for ADHD. Population studies designed to examine possible mechanisms, patterns and levels of exposure, covariates and moderators of this relationship are warranted.

Competing interests

The authors declare they have no competing interests.

Authors' contributions

AM conceived of the study and hypothesis, acquired the data and contributed to the study design, data analysis, interpretation of results and manuscript preparation. CT contributed to the study design, supervision of data analysis, interpretation of results and manuscript preparation. Both authors read and approved the final manuscript.

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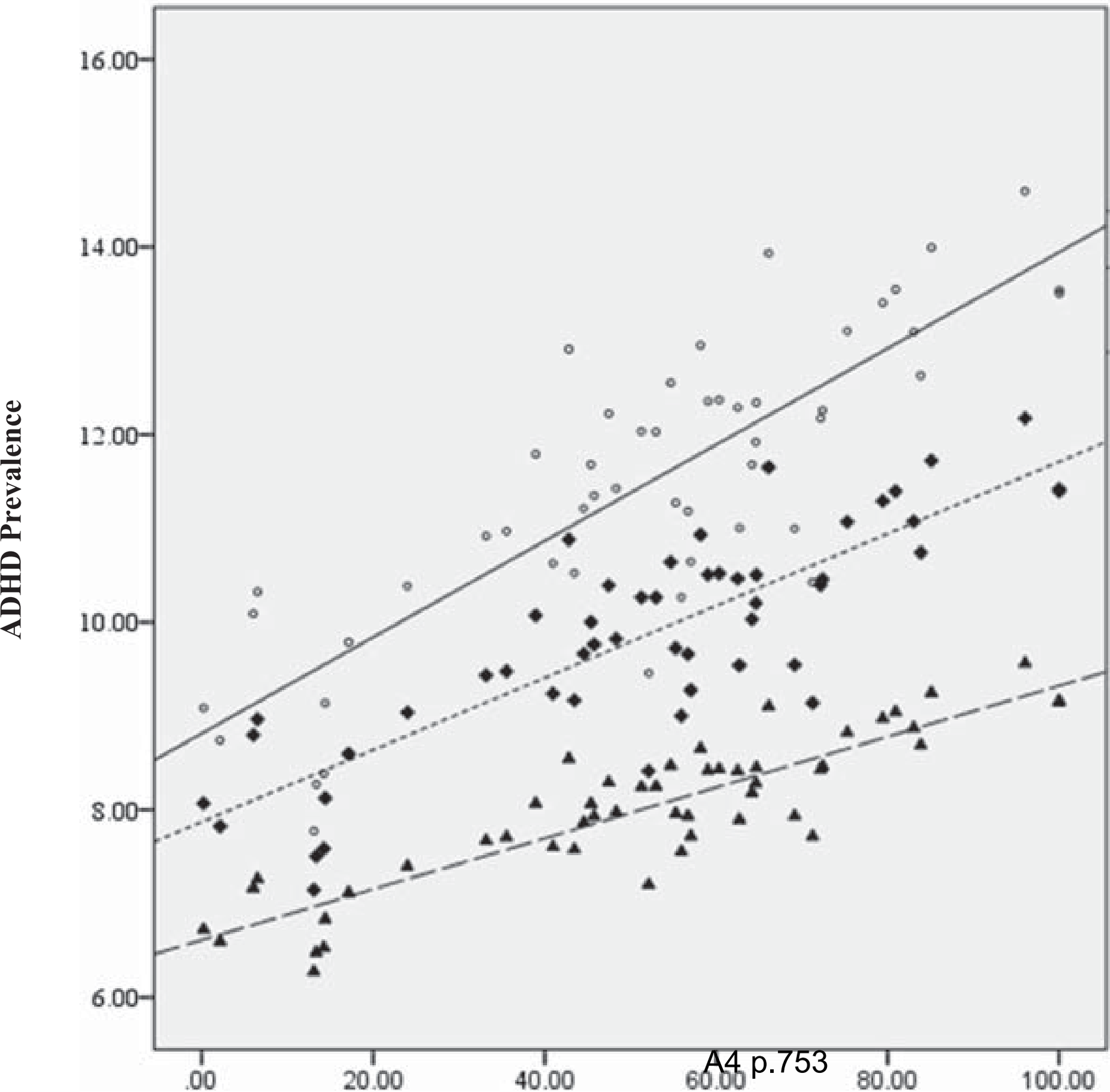
ADHD Prevalence
16.00
14.00
12.00
10.00
8.00
6.00
.00
20.00
40.00
60.00
80.00
100.00
Artificial Water Fluoridation Prevalence in 1992

Additional files provided with this submission:

Additional file 1. US Census Regions and Divisions. Census regions and divisions of the United States. This file includes a map of the U.S. census regions and divisions as well as a list of the states in each region and division (1094k)
http://www.ehjournal.net/content/supplementary/s12940-015-0003-1-s1.pdf

Comparison of Indoor Mercury Vapor in Common Areas of Residential Buildings with Outdoor Levels in a Community Where Mercury Is Used for Cultural Purposes

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Elemental mercury has been imbued with magical properties for millennia, and various cultures use elemental mercury in a variety of superstitious and cultural practices, raising health concerns for users and residents in buildings where it is used. As a first step in assessing this phenomenon, we compared mercury vapor concentration in common areas of residential buildings versus outdoor air, in two New Jersey cities where mercury is available and is used in cultural practices. We measured mercury using a portable atomic absorption spectrometer capable of quantitative measurement from 2 ng/m^3 mercury vapor. We evaluated the interior hallways in 34 multifamily buildings and the vestibule in an additional 33 buildings. Outdoor mercury vapor averaged 5 ng/m^3; indoor mercury was significantly higher (mean 25 ng/m^3; $p < 0.001$); 21% of buildings had mean mercury vapor concentration in hallways that exceeded the 95th percentile of outdoor mercury vapor concentration (17 ng/m^3), whereas 35% of buildings had a maximum mercury vapor concentration that exceeded the 95th percentile of outdoor mercury concentration. The highest indoor average mercury vapor concentration was 299 ng/m^3, and the maximum point concentration was 2,022 ng/m^3. In some instances, we were able to locate the source, but we could not specifically attribute the elevated levels of mercury vapor to cultural use or other specific mercury releases. However, these findings provide sufficient evidence of indoor mercury source(s) to warrant further investigation. *Key words:* **cultural use of mercury, elemental mercury, indoor air quality, mercury, mercury exposure, mercury vapor, Santeria, voodoo.** *Environ Health Perspect* **114:59–62 (2006). doi:10.1289/ehp.8410 available via *http://dx.doi.org/* [Online 20 September 2005]**

Mercury is one of two elements that are liquid at ambient temperature. It is 13 times heavier than water, and its unique properties have led to a wide variety of uses in industry and elsewhere. Elemental mercury is still widely used in dentistry and a variety of hospital applications (Haas et al. 2003). It is also found in a number of technologic applications such as thermometers, barometers, thermostats, switches, gas meters, and especially fluorescent lights that may be found in residential buildings. In the past, organic mercury compounds were widely used as preservatives in household paints, and mercury antiseptics are still in use.

The unique properties of elemental mercury or quicksilver have led people to attribute magical and spiritual powers to it through the ages. Mercury was viewed as an essential component of the alchemical triad of mercury, sulfur, and air and has been associated with the Hindu god Shiva (Little 1997). Mercury amalgam religious icons remain available today (Garetano G, unpublished data). Elemental mercury is also used in the spiritual practices associated with Santeria, voodoo, Espiritismo, Palo Mayumbo, and other Afro-Caribbean syncretic religions [Riley et al. 2001; U.S. Environmental Protection Agency (EPA) 2002]. Additional uses of elemental mercury in a superstitious manner have been reported (Wendroff 1990). These practices include sprinkling elemental mercury in the home, in cars, or around babies and carrying capsules of mercury as amulets to bring good luck or love (Johnson 1999; U.S. EPA 2002). These activities do not appear to be components of ceremonial use associated with spiritual traditions, nor are they condoned or recommended by serious practitioners of those traditions (Stern et al. 2003). We label these uses of mercury, separate from the ceremonial use in spiritual traditions, as cultural uses. In communities where cultural uses of mercury are believed to be prevalent, the availability of mercury in specialty shops called botanicas has been well documented (Riley et al. 2001; Wendroff 1990; Zayas and Ozuah 1996).

Both the technologic applications and cultural uses of mercury provide the opportunity for it to be an indoor air pollutant in residential settings. Elemental mercury evaporates at a rate of 7 μg/cm^2/hr at 20°C (Andren and Nriagu 1979). Up to 80% of inhaled mercury is absorbed and readily crosses the blood–brain barrier (Cherian et al. 1978; Clarkson 2002). The primary health concern associated with inhaled mercury vapor is its neurotoxicity, and infants are considered particularly vulnerable. The Agency for Toxic Substances and Disease Registry (ATSDR) and the U.S. EPA, respectively, have established a minimal risk level (MRL) of 300 ng/m^3 and a reference concentration (RfC) of 200 ng/m^3 for elemental mercury vapor in residential quarters (ATSDR 1999; U.S. EPA 1995). The release of elemental mercury in a household may pose some health risk for those who are exposed. For example, broken clinical thermometers typically contain only 600–675 mg elemental mercury but can generate mercury vapor concentrations an order of magnitude above both the U.S. EPA RfC and the ATSDR MRL (Carpi and Chen 2001; Muhlendahl 1990; Riley et al. 2001; Smart 1986). Health effects in children have been documented from such exposures (Moreno-Ramírez et al. 2004).

By comparison, elemental mercury for cultural use is commonly distributed in gelatin capsules containing approximately 9 g elemental mercury (Riley et al. 2001; Wendroff 1990), which, when released, can result in high concentrations of vapor (Riley et al. 2001; U.S. EPA 1993). At least one case of significant human exposure to elemental mercury requiring medical intervention as a result of cultural practices has been reported (Forman et al. 2000).

Once spilled, sprinkled, or left in an open container, elemental mercury may release vapor for prolonged periods. Significant levels of mercury vapor have been found in buildings decades after spillage, resulting in the significant exposure of subsequent building

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occupants without their knowledge (Centers for Disease Control and Prevention 1996; Orloff et al. 1997).

Other than those investigations conducted in response to known spills, data regarding mercury vapor concentration in residential buildings are scant. Carpi and Chen (2001) surveyed 12 residential and commercial sites in the New York metropolitan area without prior knowledge of mercury contamination. Eleven of these locations were found to have mercury vapor concentrations significantly elevated over outdoor concentrations. Prior breakage of clinical fever thermometers was subsequently identified as the probable mercury source in two of the locations.

Given the lack of documentation of mercury vapor in residential buildings in general or of a disproportionate elevation of mercury vapor in buildings in communities where it is used culturally, we chose to conduct a survey of residential dwellings in a community in which elemental mercury is readily available to assess the prevalence of mercury use or spillage.

We hypothesized that elevated levels of mercury vapor would be found in residential buildings in communities that engage in cultural uses of mercury. We further hypothesized that these elevated levels can serve as a signal of significant cultural use in addition to unintentional breakage and spillage from other sources. In this article we address the first hypothesis. We address the second hypothesis in a subsequent study to be published separately.

Materials and Methods

Rationale for this study design. Riley et al. (2001) described a high level of apprehension and distrust of authorities or any outsider from a different culture. As a result of these cultural barriers, direct investigation of the residences of persons possibly using mercury for cultural purposes without first establishing a cause for concern was deemed inappropriate. Therefore, as a first step in characterizing the extent of this phenomenon, we chose to monitor mercury vapor within interior hallways of residential buildings, rather than directly measuring mercury vapor in residences, under the assumption that intentional and unintentional releases of mercury within the building would be reflected in elevated concentrations in common areas compared with the respective outdoor concentrations. Measurement of mercury vapor in common areas does not provide a direct estimate of exposure, but by comparing these measurements with respective outdoor levels and by comparing measurements across buildings, we can assess the prevalence of elevated indoor mercury concentrations. This information can inform decisions about appropriate public health strategies and can guide future surveys.

Site selection. The information on cultural uses of mercury suggests that such uses are most common among certain Latino-Caribbean populations. The geographic area selected for inquiry was based on our prior knowledge of both the predominant Latino population and the presence of botanicas that typically sell mercury (Riley et al. 2001; Stern et al. 2003). The study was conducted in the New Jersey municipalities of Union City and West New York, comprising a total area of approximately 2.4 mi^2 (6.2 km^2), with 82.3 and 78.7% Latino population, respectively. Multifamily buildings were chosen for accessibility of common areas as well as for the potential for efficient screening. A primary criterion was that the buildings surveyed be within 0.5 miles (0.8 km) of a botanica. On the initial sampling date, a building meeting this criterion was selected on referral from a local health official, and all accessible buildings for approximately a two-block radius were evaluated. On subsequent sampling dates the same procedure was followed in other areas of the community meeting the same criteria. Additionally, three botanicas and one former botanica encountered during the residential building surveys were also visited.

Mercury vapor monitoring. We measured real-time mercury vapor concentration in air using an atomic absorption spectrometer (model 915+; Ohio Lumex Co. Inc., Twinsburg, OH). The instrument has a sensitivity of 2 ng/m^3 of mercury in air and has been successfully used for measuring mercury in ambient air (Ohio Lumex 2000; Zdravko and Mashyanov 2000). In previous studies, residential structures identified as having elevated mercury concentration with such direct reading instruments were also found to have elevated mercury vapor concentration with 8-hr sampling and subsequent laboratory analysis (Singhvi et al. 2001).

The instrument was factory calibrated according to the manufacturer's specification and was within its factory calibration schedule. The spectrometer warmup, operation, and calibration followed the manufacturer's instructions. Internal calibration uses a built-in mercury cell and was performed in the field before and on completion of sampling in typical field conditions. During internal calibration, measured mercury concentration varied from the predicted concentration by < 10% on each date. We validated precision by evaluating the relative deviation of triplicate measurements at each sampling location. The overall relative deviation for the 286 triplicate sample sets that were equal to or exceeding the manufacturers' stated detection limit of 2 ng/m^3 mercury vapor was 7.9%. Once the instrument was warmed up and calibrated, it was operated continuously. All measurements were recorded at a height of approximately 1 m above the floor unless otherwise indicated. Each data point is the average of three discrete 10-sec measurements at a given sampling location. The instrument also displayed mercury concentration continuously in a real-time sampling mode. This allowed evaluation of spatial variation and trends in mercury vapor concentration. Potential sources were localized where possible.

Site visits were conducted on 6 days in June and August 2002. Although only one visit was planned for each site, repeat visits were made to two buildings because of the high mercury vapor concentration encountered. Mercury vapor was monitored in the vestibule and the interior hallways on each floor of the buildings. These interior hallways contain the entrances to residential apartments. About half the buildings surveyed had open access to both locations. A total of 227 locations in 67 buildings were surveyed. On average, five hallway locations were assessed in those buildings that were fully accessible. All buildings were visited once except the two buildings with the highest readings. Mercury vapor measurements were recorded in 37 outdoor locations in proximity to the buildings evaluated. Outdoor readings near neighboring buildings showed low variation. Within the three botanicas and one former botanica, mercury vapor was monitored in the retail portion of the store.

Additional data. In addition to mercury vapor measurements, the following data were also collected for each building: number of residential units, number of floors, presence of a central heating ventilation and air conditioning system (HVAC), and the presence of open windows.

Data analysis. We calculated the mean mercury vapor concentration for each floor of a building by averaging all data points for that floor. We computed the average mercury concentration for a building by averaging the mean concentration for each floor. The maximum mercury vapor concentration reported for a building is the maximum data point from any hallway location within the building. Statistical analysis was conducted using SPSS software (SPSS Inc., Chicago, IL). Specific tests are indicated in the results section as applicable.

Results

Site access and characteristics. Sixty-seven buildings were visited, of which approximately half were fully accessible. Only vestibules were accessible in the remainder. All buildings in which the interior halls were was accessed (n = 34) were multistory (mean, 4 floors) with a total of 497 residential units

(mean, 14 units). Buildings in which only the vestibule was accessible tended to be slightly smaller (mean, 12 units), although this difference was not significant ($p = 0.18$). Based on familiarity with the area, including community history, overall appearance, and census characteristics, all buildings are believed to be > 50 years old, although records were not uniformly available. None of the buildings had HVAC systems that influenced the areas evaluated. Ventilation within the hallways was primarily influenced by windows and doors to residential apartments; 12 of 34 (35%) buildings had open hallway windows during the time of the visit.

Mercury vapor concentration. The data were log-normally distributed; thus, arithmetic and geometric mean values, as well as percentiles, are reported. Because of relatively limited sample size and non-normal distributions, we compared mercury values using the Mann-Whitney *U*-test as well as by *t*-test on log-transformed data, unless otherwise indicated.

Outdoor mercury vapor concentrations had a mean value of 5 ng/m^3 with an 80th percentile of 12 ng/m^3 and a 95th percentile of 17 ng/m^3. Our findings are consistent with outdoor levels measured elsewhere ranging from several nanograms per cubic meter to 20 ng/m^3, with higher concentrations associated with urban/industrial areas and ambient mercury outside a mercury storage facility in Hillsborough, New Jersey, ranging from 2 to 8 ng/m^3 (ATSDR 1999; Gochfeld M, unpublished data; New Jersey Department of Environmental Protection 2001).

The geometric and arithmetic mean mercury concentrations in building hallways were 10 ng/m^3 and 25 ng/m^3, respectively. In building vestibules, the geometric and arithmetic means were 7 ng/m^3 and 11 ng/m^3, respectively. The mercury vapor concentration in interior hallways was significantly greater than that found outdoors ($p < 0.001$) and in building vestibules ($p < 0.05$). Mercury vapor in vestibules was also greater than that found outdoors ($p < 0.001$). All three locations were found to differ significantly ($p < 0.001$) when compared simultaneously using the Kruskal-Wallis nonparametric one-way analysis of variance test. Indoor and outdoor mercury vapor concentrations are summarized in Tables 1 and 2.

We found that 7 of 34 (21%) buildings had a mean mercury vapor concentration in hallways that exceeded the upper 95th percentile of outdoor mercury vapor concentration (17 ng/m^3), and that 35% of buildings (12 of 34) had maximum mercury vapor concentration in hallways that exceeded the upper 95th percentile of outdoor mercury vapor concentration.

No significant difference was noted in the mean and maximum mercury vapor concentration in buildings that had open windows compared with those that had either no windows or closed windows ($p < 0.8$ and $p < 0.4$, respectively). No difference was noted between mercury vapor concentration by measurement date using Kruskal-Wallis Test ($p > 0.6$) nor among the floors of the building on which the maximum concentration of mercury was detected ($p > 0.7$).

Within the three botanicas surveyed, average mercury concentration ranged from 40 ng/m^3 to 482 ng/m^3 (mean, 220 ng/m^3), whereas a former botanica averaged 72 ng/m^3. Mercury concentration within the botanicas was significantly greater than that within the residential buildings ($p < 0.01$).

Spatial variability. We were able to localize potential sources of mercury contamination in seven buildings as evidenced by increasing mercury concentration as the "source area" was approached. At two sites, the probable source of mercury vapor emission was tracked to areas on the floor surface, one near a building entrance, the second on a stairway to a roof exit. In the remaining five buildings, mercury vapor concentration increased as certain individual or groups of apartment entrances were approached. No visible contamination was noted in any of the cases, and the actual source of vapor remained unknown.

We noted order of magnitude differences in mercury concentration between locations in buildings with high mercury concentration. For example, mercury vapor concentration ranged from 35 ng/m^3 to 2,022 ng/m^3 in the building with the highest concentration. Similar findings were noted elsewhere. The difference between mercury concentration on the building level (floor) on which the maximal value was noted and the remainder of the building was significantly higher in four of the buildings ($p < 0.04$).

Temporal variability. Although our intent was to survey buildings once, two buildings had maximum hallway mercury vapor concentrations of 2,022 ng/m^3 and 774 ng/m^3, which exceeded both the ATSDR MRL (300 ng/m^3) and U.S. EPA RfC (200 ng/m^3). Local public health officials were notified, and repeat visits were made to each building. The building with the highest concentration was visited on five dates. Both the average and maximum mercury vapor concentrations of the building were significantly different on repeat visits (Kruskal-Wallis test, $p < 0.04$). Outdoor temperature ranged from 17 to 31°C, and hallway windows were open, providing passive ventilation, on all dates. The building hallways were not cooled, and indoor temperature was similar to that outdoors. Unexpectedly, mercury vapor concentration did not vary as a result of temperature changes ($p > 0.7$), and contrary to expectation, higher mercury vapor concentrations were noted on cooler days. By the final visit, maximum mercury vapor concentrations in each building (109 and 19 ng/m^3, respectively) were significantly reduced ($p < 0.01$) compared with the initial visit. In both buildings, mean and maximum mercury concentrations fell below MRL and RfC. Despite the reduction in vapor concentration, the area of maximum concentration remained consistent.

Discussion

Our findings provide a valuable first look at the differences between indoor mercury concentrations and those outdoors in an area with known cultural use of mercury. Although our data are not intended as estimates of residential exposure to mercury vapor, they do indicate that, compared with outdoor levels, such exposures are likely in a significant proportion of multifamily residential buildings in an area with known cultural uses of mercury. This study did not include comparison with indoor mercury concentrations in a comparable area that can serve as a control for cultural use of mercury. Therefore, these data cannot distinguish between those elevations in mercury concentration resulting from cultural uses and those resulting from unintentional releases of mercury (e.g., broken thermometers or fluorescent lightbulbs, spilled gas meter seals). We are currently engaged in a follow-up study to investigate these questions.

Table 1. Comparison of mercury vapor concentration (ng/m^3) within building hallways and outdoors.

Location	No.	Arithmetic mean ± SD	Geometric mean (SD)
Outdoors	37	5 ± 5	4 (2)
Building vestibule	57	11 ± 12	7 (2)
Mean in building hallways	34	25 ± 53	10 (4)
Maximum in building hallways	34	102 ± 364	17 (4)

Mann-Whitney *U*-test, $p < 0.001$.

Table 2. Distribution of mercury vapor concentration (ng/m^3) within building hallways and outdoors.

	Percentile				
Location	25th	50th	75th	90th	95th
Outdoors	3	4	6	12	17
Building vestibules	4	7	13	22	36
Mean of building hallways	6	11	16	66	155
Maximum within hallways	9	14	25	106	1,086

There are relatively few reports of "background" mercury concentration in indoor air in residential buildings or "noncontaminated" environments to which our results can be compared. Our finding of mercury vapor in greater concentrations indoors compared with outdoors is consistent with the findings of Carpi and Chen (2001), who investigated mercury in residences without prior knowledge of mercury use or release.

Carpi and Chen (2001), using a direct reading instrument, were able to identify specific points inside several of the apartments they investigated that appeared to be the source of mercury emissions. Likewise, we were able to localize potential mercury sources in several buildings with elevated mercury concentrations. We clearly observed an increasing gradient in mercury vapor concentration as a potential source was approached. Although the exact source was not identified, the potential source of mercury vapor seemed to be residential apartments in five of the buildings with elevated mercury vapor concentration. Our finding that > 20% of buildings we studied had average and 35% had maximum mercury vapor concentrations that exceed the 95th percentile of outdoor concentrations is significant and leads to the conclusion that sources of contamination are present and prevalent indoors in this community. These findings are consistent with the hypothesis of cultural use of mercury, but not definitive. The elevated mercury vapor concentration found in botanicas is also consistent with its availability for cultural use.

These measurements were not made in areas that directly reflect exposure, nor, for the most part, do they measure concentration at the emission source. Therefore, these measurements could underestimate mercury concentration at the point of long-term exposure. Our surveys were subject to the variability in environmental conditions that occurs in occupied residential buildings and possibly the variability in patterns and methods of cultural mercury use. In most buildings surveyed, including those with the highest mercury vapor concentration, windows were open. This may partially explain the variability in mercury concentration and the lack of association with temperature we found in the sites with repeated visits. Although spot measurements of mercury vapor concentration in buildings may not reflect long-term average mercury concentration, we believe that the signals of elevated mercury concentration provided by spot measurements are relevant as a screening tool in identifying the presence of mercury release regardless of its source. For this approach to be more effective as a tool for screening for exposures of concern, models need to be developed that can reasonably predict the transit of mercury vapor from a source "behind closed doors" to other rooms or areas of a building under conditions that simulate occupancy.

Whether exposure to elevated mercury vapor arises from intentional cultural uses or from unintentional breakage and spillage of mercury-containing equipment, these exposures pose the potential for adverse health effects and should be addressed. However, the nature and scope of the public health problem will be significantly different for each of these cases. Each will require a different public health outreach and intervention strategy. It is therefore essential that future investigations clarify the relative contribution of each cause. We are currently continuing research to this end.

Given the findings of Carpi and Chen (2001) and this investigation, we feel some broader evaluations to establish reference ranges of mercury concentrations in the indoor residential environment are warranted. Such a reference range would include mercury contamination resulting from historical accidental breakage of mercury-containing equipment. Such contamination may be widespread and would likely be independent of cultural factors. Based on reports on the manner in which mercury may be used for cultural purposes, and our present findings, we also recommend expanded screenings in areas where mercury may be used for cultural purposes with the inclusion of suitable control locations. Although cultural obstacles may be present that may impede a direct approach to assessing human exposure to mercury vapor as a result of cultural practices and its relevance to public health, we believe further evaluations in the field will ultimately shed light on this elusive issue.

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AN EVALUATION OF POTENTIAL EXPOSURE TO MERCURY IN A COMMUNITY [Union City & West New York, NJ] WHERE MERCURY IS USED FOR CULTURAL PURPOSES

Doctoral Dissertation, School of Public Health, University of Medicine and Dentistry of New Jersey

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ii

ABSTRACT OF THE DISSERTATION

Elemental mercury is used in a variety of superstitious and cultural practices. These practices involve **intentional dispersal of mercury within residential buildings** by individuals who believe this will provide some benefit or ward off harm but may represent **an insidious source of mercury exposure.**

iii

We determined that cultural mercury use is a likely source of exposure for a small but noteworthy percentage of individuals in communities where there is such use.

6

Chapter 1

Comparison of Outdoor Mercury Vapor Levels to Levels in Common Areas of Residential Buildings in a Community where Mercury is used for Cultural Purposes

10

We hypothesize that elevated levels of mercury vapor are present in residential buildings in communities that engage in cultural use of mercury compared with outdoors. We further hypothesize that elevated levels can serve as a signal of significant cultural use in addition to unintentional breakage and spillage from other sources.

14

Windows and doors to residential apartments primarily influenced ventilation within the hallways. **12 of 34 (35%) buildings had open hallway windows during the time of the visit.**

16

Mercury concentration within the botanicas was significantly higher than that within the residential buildings ($P<0.01$).

In the remaining five buildings, mercury vapor concentration increased as certain individual or groups of apartment entrances were approached. No visible contamination was noted in any of the cases and the actual source of vapor remained unknown.

18

Although our data are not intended as estimates of residential exposure to mercury vapor they do indicate that, compared with outdoor levels, such exposures are likely in a significant proportion of multifamily residential buildings in an area with known cultural uses of mercury.

19
Though the exact source was not identified, **the potential source of mercury vapor seemed to be residential apartments** in five of the buildings with elevated mercury vapor concentration. … Our… findings are consistent with the hypothesis of cultural uses of mercury, but not definitive. The **elevated mercury vapor concentration found in botanicas is also consistent with its availability for cultural use.**

These measurements were not made in areas that directly reflect exposure, nor, for the most part, do they measure concentration at the emission source. Therefore, **these measurements could underestimate mercury concentration at the point of long-term exposure.** … In most buildings surveyed, including those with the highest mercury vapor concentration, windows were open.

20
Whether exposure to elevated mercury vapor arises from intentional cultural uses or from unintentional breakage and spillage of mercury-containing equipment, **these exposures pose the potential for adverse health effects and should be addressed.**

Based on reports on the manner in which mercury may be used for cultural purposes, and our present findings, **we also recommend expanded screenings in areas where mercury may be used for cultural purposes** with the inclusion of suitable control locations.

26-27
Chapter 2

Comparison of Mercury Vapor in Residential Communities that use Mercury for Cultural Purposes with a Reference Community

After controlling for a number of factors that might influence Hg^0 vapor levels, **the most plausible explanation for greater Hg^0 vapor levels in the study area is cultural use of mercury.**

31
Extensive detail exists elsewhere on the prevalence, manner of use and availability of Hg^0 for cultural purposes (Johnson 1999; Johnson 2004; Ozuah et al. 2003; Riley et al. 2001; Stern et al. 2003; Wendroff 1990; Zayas and Ozuah 1996). Though mercury is available in communities where it is culturally, due to apprehension, a distrust of authorities and those outside the culture, it's sale or distribution to these "outsiders" is limited (Riley et al. 2001; Stern et al. 2003). This is not the case outside the U.S. where we readily purchased several grams of Hg^0 and other select liquids and received verbal instructions on the most auspicious days to spread them on the floor in the home with the recommendation to do so twice-weekly (see figure 1).

32
Although the magnitude of exposure to Hg^0 vapor from cultural use is unknown, **the hazard of Hg^0 vapor is well established and it is detectable years after small spills** from objects such as a fever thermometer (Carpi and Chen 2001; von Muhlendahl 1990). With larger spills, significant concentrations of Hg^0 vapor may persist for decades (Sasso et al. 1996). **This presents the specter of exposure to Hg^0 in residences from either unintentional or intentional Hg^0 releases without knowledge of such**

exposure. Wendroff (2005) contends cultural mercury use has created such a problem. Based on the described manner and frequency of mercury use by some individuals this contention is not without basis.

49
We cannot attribute the greater prevalence of elevated mercury vapor levels in this area or in the primary study community to cultural use with absolute certainty, but **we have no alternate explanation.**

49-50
Our method relies upon sensitive instrumentation to detect a signal of mercury release though the source may be distant. Thus, Hg^0 vapor exposure near the source in apartments is likely to be significantly greater than we detected in common areas, unless as we noted on occasion, the source was in the common area.

50
When we examine these data in context with the prior literature, previous and ongoing biomonitoring programs, **there is no choice other than to acknowledge some percentage of individuals are needlessly and possibly unknowingly exposed to Hg^0 vapor because of the cultural or folk use of mercury. This includes residents of apartments where mercury was used culturally by prior residents.**

59
Chapter 3

Evaluation of Urinary Mercury as a Biomarker of Exposure for Individuals Exposed to Mercury Vapor in a Non-occupational Setting

62-63
While noting sub-clinical neurological findings from low-level Hg^0 vapor exposure, Heyer et al. (2004) put forth the supposition, ***"It is possible that elemental mercury may follow the history of lead, eventually being considered a neurotoxin at extremely low levels."***

83
We have demonstrated that the utilization of the value, 20μg/L, as the upper limit of normal urine mercury fails to identify significant exposure. All individuals in the lowest Hg^0 vapor exposure category were exposed to Hg^0 vapor at a level of magnitude above the U.S. EPA RfC (U.S. EPA 1995) and the ATSDR MRL (ATSDR 1999), yet two-thirds had urine Hg less than 20μg/L. If individuals in this group were the first to seek urine mercury screening, significant exposure might have been undetected. Thus, for this reason and those stated in the text, **we feel strongly that the value, 20μg/L, and the word "normal" should only appear together in a historical context.**

96
Chapter 4

Conclusions and Recommendations

97
The detection of elevated Hg^0 vapor levels in residential buildings and botanicas supports the contention that mercury is available and released in residential buildings by cultural use.

98
However, the selection of reference buildings controlled factors likely to contribute to elevated Hg^0 vapor levels leaving **cultural mercury use as the plausible explanation** for the difference in Hg^0 vapor levels between the control and reference communities.

99-100
In summary we conclude:

1. **Hg^0 vapor levels in the common areas of residential buildings in communities that use mercury for cultural purposes are significantly greater than those outdoors.**

2. **Hg^0 vapor levels are significantly greater in the common areas of residential buildings in communities that use mercury for cultural purposes compared to those in communities where the use of Hg^0 is unlikely.**

3. **Hg^0 vapor exposure from cultural mercury use is likely in a small but noteworthy percentage of households in the study area.**

4. Biomonitoring of urine mercury is [a] reasonable tool to assess intermediate and chronic duration non-occupational exposure to Hg^0 vapor, including that from cultural use, though at present, its sensitivity to detect exposure at less than $3\mu g/m^3$ Hg^0 is unclear.

100
Recommendations for Public Health Action

The prevalence of cultural mercury use and the likelihood of exposure to Hg^0 vapor at levels of public health concern warrant specific actions to address this use in communities where this practice exists. Though the extent of public health action might vary based on the prevalence of cultural use and associated Hg^0 exposure, the following recommendations are relevant to the study communities surveyed in this research.

1. Culturally appropriate educational outreach activities, using written materials or other media that addresses sources of mercury, its health hazards, and resources for individuals who may be exposed are required. Educational materials must be accessible to individuals without deliberate action to seek information regarding mercury.

2. **Health care providers should be provided with educational materials and guidance regarding biomonitoring.**

3. **Public health clinics and appropriate community-based clinics should provide urine mercury screening to those individuals that reasonably believe they are exposed, regardless of their ability to pay for this analysis.**

4. **Local public health officials should have the capability, individually or regionally, to conduct mercury vapor monitoring with sensitive instruments. Monitoring in residences should be offered to all individuals with urine mercury above population norms. Public health officials should consider monitoring in all residences that request it.**

101
5. Recommendations 1 through 4 should be designed and implemented in a manner that allows

evaluation of their efficacy and relevance to other communities.

6. **A strategy should be developed by state and local public health and environmental officials, in consultation with federal officials, to guide response actions if residences with mercury vapor at levels of concern are identified.**

Recommendations for Additional Research

Research needs in addition to those that might accompany the recommended public health actions are also present.

1. **In other communities where there is cultural mercury use, air-monitoring surveys similar to that in Chapter 2 may be useful where deliberate public health action is deferred due to a lack of information regarding the prevalence of these practices.**

2. Studies to establish baseline levels of mercury vapor in residential buildings are warranted both to evaluate the contribution of indoor mercury vapor to total mercury exposure and to provide a basis of comparison for public health investigations involving indoor mercury vapor exposure.

3. The existing literature should be evaluated with consideration of the contribution of dental amalgam to urine mercury, to better describe the "normal" ranges of urine mercury in non-occupationally exposed populations.

102

4. The effect of adjustment on urine mercury should be further evaluated in an attempt to aid interpretation of results and to foster consistency in reporting so that inter-study and inter-individual comparisons may be more relevant.

103

Appendix A

Determination of the Number of Households in the Study Area that Might Contain Elemental Mercury in Sufficient Quantity to Generate a Signal of Mercury in Common Areas of the Residence

105

By extrapolation, 1.74% of households (95% CI: 1.05%, 2.43%) or 689 (CI: 416, 962) of the 39,591 **within the study area may contain mercury at a level sufficient to result in a Hg^0 vapor signal of greater than 25 ng/m^3 in building common areas.** On average, there are 2.8 persons per household in this community.

Conclusion

The majority of households in the study area are not likely to contain Hg^0 in sufficient quantity to generate Hg^0 vapor signals of greater than 25 ng/m^3 in common areas. Despite this, **the number of individuals in households where Hg^0 is present at this level is of concern.**

106

Curriculum Vita

[The author is currently Assistant Director of the Environmental Health and Public Health Emergency Preparedness Programs of the Hudson Regional Health Commission, 595 County Avenue, Building 1, Secaucus, NJ 07094. Telephone (201) 223-1133 ggaretano@hudsonregionalhealth.org]

Verbatim excerpts and selective **boldface** by:

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TO: White House Environmental Justice Advisory Committee
FR: Grand Canyon Trust
RE: WHEJAC's Assessment on Annual Performance Scorecard/Docket ID No. EPA-HQ-OA-2022-0050
DATE: March 10, 2022

Dear White House Environmental Justice Advisory Committee,

This letter in response to the annual performance scorecard Docket ID No. EPA-HQ-OA-2022-0050. It is understood that the scorecards provide a method for evaluation and accountability to assess the agencies' progress for addressing historic environmental justice. WHEJAC's efforts to addressing these issues consist of strategic, scientific, technological, regulatory, community engagement and economic issues related to environmental justice[1]. This letter provides a brief background with prioritized actions and recommendations to address both current and historic environmental injustices within the Black Mesa region of Northern Arizona.

Background

The Colorado Plateau is a region with enriched cultural and natural resources, home to generations of Native American communities expanding across the plateau. These communities are at the frontlines of the climate crisis and the transition away from a fossil-fueled dependent based economy.

Extensive coal mining operations on Black Mesa occurred within the Navajo and Hopi reservation for several decades from the 1950's to 2019 consisting of the Black Mesa Mine and the Kayenta Mine. The mining and combustion of Black Mesa coal created jobs and revenue for the Navajo Nation and the Hopi Tribe. The shuttered-closure of the Navajo Generating Station (NGS) and its primary coal supplier Kayenta Mine (2019), left behind lingering environmental, social and cultural impacts.

The Navajo Nation government and Hopi Tribe did not have an appropriate time-frame nor the capacity to prepare an ample response. The unplanned closure of NGS bolstered significant economic impacts, reinforced by Navajo Nation losing 20% of its annual revenue and 80% of the Hopi Tribe's annual revenue. Approximately 85% of the employees of NGS and Kayenta Mine were Navajo citizens. The closure projected to sever 1,500 direct and indirect jobs and benefits for the Navajo Nation[2].

[1] https://www.epa.gov/environmentaljustice/white-house-environmental-justice-advisory-council
[2] Yulin Hong et al, April 2020, Just and Equitable Transition for Navajo Nation.

It is important for the advisory committee to take into consideration the impacts that communities have faced for several generations in the Black Mesa region. The social and environmental impacts are interconnected with historical federal actions such as the 1974 Navajo Hopi Land Settlement Act. This event displaced many Hopi and Navajo families across the region and was enacted in support of developing the coal reserves in the area[3]. To enforce artificial boundaries, additional federal action resulted in a 40 year moratorium on building and infrastructure development in the region as well as a livestock reduction program. Taken together, the region of Black Mesa has endured economic degradation and systemic exploitation of land, resources, and people including destruction of water resources, lack of basic infrastructure, inadequate reclamation, culturally sensitive impacts, and proven health disparities.

The ancestral lands of the Indigenous communities in the region have tremendous cultural and natural value that are intertwined with economic value through the spiritual and traditional practices and knowledge of the people. A just and equitable transition requires creative and ambitious thought that respects this dynamic relationship. Environmental reclamation is required for the people who are the ancestral stewards of this land to develop long term economic solutions that honor traditional lifeways and provide the stability that is needed for long-term restoration.

The people of the Navajo Nation and the Hopi Tribe continue to face social and economic impacts from the lack of accountability from operators, stakeholders and federal government agencies. Outlining components of a transition on the Black Mesa include first reclamation and remediation followed by sustainable economic development.

Implementation of Black Mesa Region Hydrological Study

We recommend the Administration consider immediate action to fund a hydrological study that will provide technical-scientific expertise within the Black Mesa region. A study to conduct hydrological subsurface and groundwater study is a paramount to achieve a just and equitable transition. The Navajo Aquifer (N-Aquifer) is one of the largest aquifers located in the region. The N-Aquifer is the main water resource available to the Tribe's local communities members and other non-tribal members.

Peabody Western Coal Company, primary operator of Kayenta Mine, extracted more than coal resources. The coal-mine used millions of gallons a day for it's mining operations drawing water from the N-Aquifer. There is a need to conduct an extensive

[3] https://hardrock.navajochapters.org/navajo-hopi-partition-land-information/

hydrological study for the region for the planning of sustainable economic development. There are many benefits that a hydrological study could provide:

- Future planning of regional economic development.
- Development of regional climate adaptation and mitigation plans within Northern Arizona or the Four Corners region.
- Environmental sustainability plans and water conservation guidelines for underserved communities in Navajo County.
- Ecological vulnerability assessment for agricultural and food production projects.
- Guidelines to enhance and protect culturally sensitive plant and animal species that are dependent on water resources within the region.
- Comprehensive understanding of the interface between large-scale industrial development and water resource availability.
- Aid in the development of supporting guidelines, toolkits, roadmaps, etc. for a just and equitable transition.

The initiation of a hydrological study is highly recommended, it is a key action that could preserve and sustain the Black Mesa region economically, environmentally, and socially.

Oversight of Coal Mine Reclamation on Black Mesa

The reclamation of coal mines is required by the Surface Mining, Reclamation and Control Act (SMCRA) to be conducted during and following mine operations[4]. The Office of Surface Mining, Reclamation and Enforcement (OSMRE) is responsible for overseeing the reclamation of Black Mesa. For nearly two decades, community members of Black Mesa have been witness to poor oversight and little progress regarding reclamation at the Black Mesa mine and as a result have very little confidence in the OSMRE to act according to the standards laid out by the Administration's environmental justice policy with regards to the Kayenta Mine.

A just and equitable transition starts with adequate oversight and prioritization of reclamation by the Department of the Interior. Reclamation of the land and resources committed to developing access to quality water are critical elements to existing efforts by community led organizations seeking to provide solutions that will create generational economic stability, food security and restoration of the social and physical health of the people of the Black Mesa region. The initial action required for adequate reclamation is for the OSMRE to initiate a “significant mine permit review” for the Kayenta Mine which will allow for the Navajo Nation and Hopi Tribe to participate in the oversight process.

[4] https://www.osmre.gov/laws-and-regulations

Providing Just Transition Assistance

A just and equitable transition in the Southwestern region of the United States requires immediate funding aimed at assisting coal impacted communities to achieve economic diversification, job creation, and economic justice. While in operation the Black Mesa coal mine, the Kayenta coal mine, and the NGS electric generating facility provided the region short-lived economic opportunities. In the Southwestern United States, the legacy of these investments is substantial growth and a comfortable and affordable living for urban populations. The other side of this legacy is the economic and environmental degradation of a rural area of the country that in this time of transition requires direct and specific investments but also lacks the capacity to attract significant funding. We recommend the committee to provide funding specific to rural underserved communities in this specific region that have experienced on-going environmental and social impacts.

Conclusion

An all-of-government approach to a just transition should be carried forth with the inclusion of reclaiming lands, restoring tribal and local economies. There are many uncertainties with regards to the extent of the environmental and ecological damages that have occured pending the closure. It is important to recognize the injustices that still exist and that governmental intervention is urged. A unified action of the federal government would set a precedent for the future Four Corners region that includes the states of New Mexico, Arizona, Utah and Colorado.

For several decades the community members organized and created local non-profit organizations to ensure that justice is fulfilled for the people and land . A few of the organizations that were created in the region include Black Mesa United, Tó Nizhóní Áni, Black Mesa Trust, and Black Mesa Water Coalition. These organizations are community-led established by members of the Black Mesa region that have devoted their work to assist, support and elevate voices of the multi-generational members of the community of Black Mesa.

The Grand Canyon Trust acknowledges the social, economic, and environmental injustices that communities of the Black Mesa region have and continue to experience. Therefore, we are providing support and assistance to these communities through various programs and initiatives.

We thank you for taking into account our recommendations.

Jessica Stago
Program Director
Native America Economic Initiatives, Grand Canyon Trust

Wilda Anagal
Legislative Community Coordinator
Native America Economic Initiatives, Grand Canyon Trust

February 10, 2022

White House Environmental Justice Advisory Council
c/o Karen L. Martin, WHEJAC Designated Federal Officer
Washington, DC

Dear Councilmembers:

Thank you for the opportunity to comment on the WHEJAC January 26 and 27, 2022 public meetings. We are a group of students at the University of Kansas[1] enrolled in an Environmental Injustice course this term. With encouragement from our instructor (not as an assignment), the undersigned students were able to attend parts of the public meeting. It was an interesting "behind the scenes" experience to watch and learn about all the initiatives across the federal agencies in the area of environmental justice. After viewing the very informative presentations from government officials, commentary from the WHEJAC membership and the public, we are submitting this comment letter because we noticed some projects discussed during the meeting to be similar to ones found in the Kansas City metropolitan area in Kansas and Missouri.

ABOUT CAN

CleanAirNow (CAN) is a nonprofit, grassroots environmental organization located in Kansas City that helps promote clean air for communities of color and low income and spreads awareness of the disproportionate burdens from air pollution in these neighborhoods that may constitute environmental racism. CAN has helped to establish air monitors in the Armourdale[2] and Rosedale[3] communities in the Kansas City metropolitan area. Historically, these communities have been disproportionately impacted by air pollution. The people in these neighborhoods are suffering negative health consequences.

These low-income communities of color are suffering the effects of chemical pollutants in their air at a much higher rate than their white high-income counterparts. These communities are exposed to a plethora of chemicals and air pollutants that cause cardiovascular and respiratory damage. The generational disadvantages caused by improper redlining and zoning have caused additional financial and physical damages to these communities by devaluing their homes and

[1] *Disclaimer.* This comment was not funded or guided by the University of Kansas or its departments and agencies, nor funded or guided by any local, county, state or the federal government.
[2] In 2010, Armourdale had a population of 5,488. The overwhelming majority of the region's inhabitants (76%) identify as people of color. With respect to the type of residence, there are 1,623 homes in the region. On the contrary, there are 1,915 housing units in the region. Further, the median household income for this neighborhood is $31,600. See *Environmental Justice Recommendations: Comments on the Armourdale General Plan*, May 2021
[3] In the 19th century, Mexican workers established communities in neighborhoods such as Rosedale and Armourdale. These communities' nearness to the Kansas City railyard and interior port has exposed their residents to dangerous levels of fine particulate matter (PM2.5) for generations. See B. Lugo-Martinez, *Environmental Racism in the Heartland, Fighting for Equity and Health in Kansas City*, November 2021, Union of Concerned Scientists and CleanAirNow, https://doi.org/10.47923/2021.14322

creating lifelong health problems that last for generations. The Kansas City area has air pollution monitors currently, but not enough and not in the right places. These communities would best benefit from having fence line monitors and community chosen monitors closer to schools, senior housing, parks, and residential areas. CAN is already working on this but needs the help of the EPA, federal, local, and state governments to help create new regulations on these chemical producing companies, railways, and diesel truck routes to reduce the environmental risk to these communities and ensure that new residences or community spaces are not built within close proximity to these plants and air-polluting industrial groups.

In addition, CAN has worked with "las promotoras de salud" (health promotors in English) and "El Centro" in the Argentine community,[4] which is predominantly Latino, located in Wyandotte County, Kansas City, Kansas. CAN and the health promotors provide information on how the air they breathe correlates to the negative health impacts they suffer. They provided air monitors which allowed community members to access real-time quality index at the fence line of polluting industries in this community. These monitors and real-time communications are important to people who generally, lack access to such information.

CAN is concerned about the negative and cumulative effects of environmental racism in these neighborhoods. By establishing their own air quality monitoring, they have shown that the Clean Air Act (CAA) alone is insufficient to mitigate the compounding impact of air pollution in these areas from multiple industries, some of which have been in violation of the CAA. To begin addressing these injustices, CAN has proposed several recommendations including developing ways to measure the cumulative impact of air pollution to at risk communities and making sure the buildings serving the most vulnerable populations (schools, senior centers, daycares, community centers) are fitted with filters designed to take out the most harmful chemicals being emitted by the nearby industries.

Many of the undersigned students do not reside in the Argentine, Armourdale, or Rosedale neighborhoods. However, from our initial studies this term we have become aware of the environmental injustices around the greater Kansas City metropolitan area. We are aware of the damages to local communities from air pollution. For example, a path one of us used to walk regularly is now desolate as the once luscious path struggles to grow anything anymore, which seems to be related to nearby stationary sources of air pollution in Douglas County, Kansas, where Kansas University is located. With Kansas and Missouri being the quintessential "flyover states" (less attention from Washington DC), having significant open land, and often ambient air quality is in attainment, many companies have sited factories in "areas of least

[4] The Argentine neighborhood was named after the silver smelter that operated for more than a century on 20 acres next to the Kansas River beginning in 1880. It released lead and other heavy metals into the surrounding soil and water and was later designated an EPA Superfund site. See B. Lugo-Martinez, *Environmental Racism in the Heartland, Fighting for Equity and Health in Kansas City*, November 2021, Union of Concerned Scientists and CleanAirNow, https://doi.org/10.47923/2021.14322

resistance" that over the years have caused air pollution problems at the fence-line for adjacent communities.

As students, we recognize the challenge is how best the United States can move forward knowing that aspects of prevention under the CAA and other environmental laws and regulations have failed to protect the most vulnerable. We recognize that addressing environmental racism has never been a component of the mission of the Environmental Protection Agency. We are now left with the challenge of reversing the harm caused and redefining this serious call to action, and with that we provide the following recommendations to the WHEJAC:

RECOMMENDATIONS

- It is critical going forward to promulgate a national environmental justice policy and law that requires more transparency by polluters including direct communications with local, affected communities as well as other fundamental principles of environmental justice including fair treatment.

- Organizations like CAN immediately need more funding and resources to better understand the damage from legacy pollution and ongoing sources, particularly, regarding air emissions. With resources, CAN and other grassroots organizations can help identify damages and recommend relief and restoration for their disadvantaged communities and better represent these communities. We ask the WHEJAC to recommend the federal government establish specific "set asides" in the federal budget for financial resources to be earmarked for grassroots, non-profit organizations, such as CAN, that are utilizing citizen science to help hold companies accountable for their impacts on disadvantaged neighborhoods. For example, see the Indian set aside under the Clean Water Act. Such a set aside could be used as a template in various components of the federal budget to specifically fund grassroots EJ grant programs.

- The working class and those without an income need access to environmental information. They need information to come from sources they can trust. As a group of diverse students, it is our hope that more people whom look like the people in these disadvantaged communities will join the EJ movement to help those who do not understand the urgency of environmental crisis that is ahead of us all. We request the WHJAC encourage the whole federal government to hire and retain more minorities and ethnically diverse employees.

- We are well aware of the unfair treatment of minorities and those of lower socioeconomic status in terms of the environment, but who's helping? We ask the WHEJAC to recommend the federal government provide more concrete ways and initiatives for local communities to receive the help they deserve, the information they

need, the consideration of their way of life in decision making that affects these communities. And, we ask the WHEJAC to make recommendations for concrete ways to support people volunteering to assist disadvantaged communities.

- The federal and state governments need to strictly enforce existing federal environmental and civil rights laws.

- The federal government needs a government-wide policy to address the cumulative effects of climate change on the most sensitive people in the United States, especially in overburdened, underserved, or disadvantaged communities.

SUMMARY

Communities in the Kansas City metropolitan area are in desperate need of assistance. One example is the Argentine neighborhood, a largely Hispanic neighborhood located near a massive railyard that is known to heavily pollute the area known to cause respiratory problems, cancer, and a decreased lifespan. An organization called CleanAirNow is working to collect more data and share what it finds to help protect this neighborhood and others like it in the Kansas City area. To provide environmental justice for overburdened, underserved and disadvantaged communities, the federal government needs to support grassroots organizations like CAN and others. We, the undersigned students request the WHEJAC consider and take action on the comments and recommendations above.

Thank you for the opportunity to comment.

Sincerely,

Hailey N. Williams, Emporia, Kansas

Sydney Drinkwater, Lawrence, Kansas

Marcela Paiva Veliz, Lawrence, Kansas

Magali Rojas, Kansas City, Missouri

Devin Grace Araujo, Shawnee, Kansas

Holly Marie Howe, St. Joseph, Michigan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 30 1983

OFFICE OF
WATER

Leslie A. Russell, D.M.D.
363 Walnut Street
Newtonville, Mass. 02160

Dear Dr. Russell:

Thank you for your letter of March 9, 1983, in regard to the fluoridation of drinking water.

The information available to the Environmental Protection Agency is that fluoridation is a safe and effective means for reducing the occurrence of dental caries. The fluoridation process has been endorsed by several Presidents of the United States and by several Surgeons General, including the current Surgeon General, Dr. C. Everett Koop. A copy of Dr. Koop's statement on fluoridation is enclosed.

Water treatment chemicals, including fluosilicic acid, have been evaluated for their potential for contributing to the contamination of drinking water. The Water Treatment Chemicals Codex, published by the National Academy of Sciences, prescribes the purity requirements for fluosilicic acid and other fluoridation chemicals.

In regard to the use of fluosilicic acid as a source of fluoride for fluoridation, this Agency regards such use as an ideal environmental solution to a long-standing problem. By recovering by-product fluosilicic acid from fertilizer manufacturing, water and air pollution are minimized, and water utilities have a low-cost source of fluoride available to them. I hope this information adequately responds to your concern.

Sincerely yours,

Rebecca Hanmer

Rebecca Hanmer
Deputy Assistant Administrator
for Water

Enclosure

CERTIFIED TO NSF / ANSI 60

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Trade Name:	Hydrofluosilicic Acid
Chemical Name:	Silicate(2-), hexafluoro-,dihydrogen
CAS Number:	16961-83-4
Chemical Family:	Inorganic Fluorides
Synonyms:	Fluorosilicic Acid, Fluosilicic Acid, Hexafluosilicic Acid, HFS, FSA
Primary Use:	Industrial Chemical, Water treatment
Company Information:	THE MOSAIC COMPANY 3033 Campus Drive Plymouth, MN 55441 www.mosaicco.com (800) 918-8270 or (763) 577-2700 8 AM to 5 PM Central Time US
Emergency Phone:	24 Hour Emergency Telephone Number: **For Chemical Emergencies:** Spill, Leak, Fire or Accident Call CHEMTREC North America: (800) 424-9300 CCN 201871 Others: (703) 527-3887 (collect)

Distributed by:
SAL Chemical
3036 Birch Drive,
Weirton, WV 26062
304.748.8200 - Phone
304.797.8751 - Fax

SECTION 2 HAZARD IDENTIFICATION

GHS Classification

Acute Tox Category 4 (Oral)	Hazard Statement H302
Skin Corrosion/Irritation: Category 1B	Hazard Statement H314
Serious Eye Damage/Eye Irritation: Category 1	Hazard Statement H318

Signal Word: DANGER

Hazard Statement(s)

H302 Harmful if swallowed
H314 Causes severe skin burns and eye damage
H318 Causes serious eye damage

Label Elements: Precautionary Statements

Prevention:

P260 Do not breath fumes/gas/mist/vapors/spray
P264 Wash skin thoroughly after handling
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/protective clothing / Wear eye protection/face protection
P284 In case of inadequate ventilation/ wear respiratory protection

Response:	P301+ P312	IF SWALLOWED: Call a Poison Center/Doctor if you feel unwell.
	P301+P330+P331	IF SWALLOWED: Rinse mouth, Do NOT induce vomiting.
	P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes; Remove contact lenses, if present and easy to do. Continue rinsing.
	P303+P361+P353	IF ON SKIN: Take off immediately all contaminated clothing. Rinse skin with water.
	P304+P340	IFINHALED: Remove person to fresh air and keep comfortable for breathing
	P310	Immediately call a doctor
	P363	Wash contaminated clothing before reuse.
	P390	Absorb Spillage to prevent material damage.
Storage:	P405	Store locked up
Disposal:	P501	Disposal of content/containers to be in accordance with local/regional/national regulations.

SECTION 3 COMPOSITION INFORMATION ON INGREDIENTS

Formula: H_2SiF_6

	Hazardous Component	CAS Number	Percentage
Composition:	Hydrofluosilicic Acid	16961-83-4	23-25%

SECTION 4 FIRST AID MEASURES

First Aid Procedures:

Eyes: Immediately flush with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin: If on skin, promptly wash the contaminated area with soap and plenty of water. Immediately flush with plenty of water. Discard clothes if contaminated. Get medical attention if irritation occurs

Inhalation: Move to fresh air. Administer oxygen. Treat symptomatically. Get medical attention promptly. Observe for possible delayed reaction.

Ingestion: Do Not induce vomiting. Give large quantities of milk or water to patient if conscious. Seek medical attention promptly.

Most important symptoms and effects, both acute and delayed: Refer to Section 11 – Toxicological Information

Note to Physician: None

SECTION 5 FIRE FIGHTING MEASURES

Extinguishing Media: Suitable extinguishing media:

Small fires: Use water spray, dry chemical or carbon dioxide (CO_2).

Large fires: Use water spray, foam, dry chemical or carbon dioxide (CO_2).

Move containers from fire area if you can do it without risk. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media: None known

Unusual Fire and Explosion Hazards	Flash Point:	Not Applicable
	Flammable Properties	OSHA Flammability Class: Not applicable
		LEL/UEL: Not Applicable
	Auto-Ignition Temperature:	Not Applicable.
Protection of Fire-fighters	Wear self-contained breathing apparatus with full protective clothing.	
	Fluorosilicic Acid is a non-combustible; substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.	

SECTION 6 ACCIDENTAL RELEASE MEASURES

Advice for non-emergency personnel:	Prevent further leakage or spillage if safe to do so. Keep away from incompatible materials.
Advice for emergency responders:	Wear suitable protective clothing, gloves and eye/face protection. Use recommended respiratory protection. Stop leak if you can do it without risk. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Ventilate area.
Environmental Precautions:	Prevent further leakage or spillage if safe to do so. Do not let product get into drains; do not flush into surface water or sanitary sewer system.
Response Techniques:	Pick up mechanically. Use neutralizing agent. Absorb with liquid-binding material (dry earth, sand, vermiculite, acid binders). Ensure adequate ventilation. Dispose spilled/contaminated material as described in Section 13 “Disposal Considerations”.

SECTION 7 HANDLING AND STORAGE

Handling:	Use only in well-ventilated areas. Use only equipment and materials which are compatible with the product. Preferably transfer by pump or gravity. Keep away from incompatible products. For precautions see Section 2.
Storage:	Do not use packing made of metal. Store only in the original container. Do not store together with strong bases or very alkaline substances. Do not store together with substances which can be oxidized. Do not store together with flammable substances/solutions. Do not store near sources of heat or ignition, or reactive materials. Must be stored in a room with spill collection facilities. Keep containers tightly closed in a cool, well-ventilated place and away from heat. Keep in a contained area. Keep away from Incompatible products.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:	Assure that ventilation is adequate to control airborne levels.	
Personal Protective Equipment (PPE):	Eye/Face:	Splash proof goggles and full-face shield should be worn at all times.
	Skin:	Acid proof gloves, headgear, protective shoes and clothing should be worn to prevent contact.
	Respiratory:	Wear NIOSH approved respiratory protective equipment when vapor or mists may exceed applicable concentration limits.
	Other:	Facilities utilizing or storing this material should be equipped with an eyewash station and a safety shower.
General Hygiene Considerations:	Avoid breathing fumes. Avoid ingestion. Wash thoroughly after handling. Avoid contact with eyes or skin Use with adequate ventilation	

Exposure Guidelines:	OSHA Permissible Exposure Limits (PEL):	2.5 mg/m^3 as Fluoride
	ACGIH Threshold Limit Value (TLV):	2.5 mg/m^3 as Fluoride

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values in this section are determined at 20°C (68°F) and 760 mm Hg (1 atm).

Material Description

Appearance/Description:	Colorless to amber liquid with a pungent odor
Color:	Colorless to amber
Physical State:	Liquid
Odor:	Pungent
Odor Threshold:	Not data available.

General Properties

Boiling Point:	105°C (221°F) @ 23%-25%
Freezing/Melting Point:	-18° to -20°C (-1° to -4°F)
Thermal Decomposition:	>105°C (>221°F) @ 23%-25%
pH (1 % Solution):	1.2
Specific Gravity:	1.2. Water = 1
Bulk Density:	10.2 lb./gallon
Solubility in water:	100% soluble in water
Viscosity:	6.5 cps
Molecular Weight of Pure Material:	144.11 g/mol

Volatility

Volatility:	No data available.
Vapor Pressure (mm Hg):	22.5 @ 25°C (77°F)
Vapor Density (air = 1):	No data available.
Evaporation Rate:	No data available.

Flammability

Flash Point:	Not applicable.
Flammability/Explosive Limits (%):	Not applicable.
Auto-ignition Temperature:	Not applicable.

Environmental

Octanol/Water Partition Coefficient	No data available.

SECTION 10 STABILITY AND REACTIVITY

Reactivity	No data available
Chemical Stability:	Stable under recommended conditions of storage, handling and proper use.
Possibility of Hazardous Reactions	Corrosive in contact with metals, It may give off hydrogen gas by reaction with metals.
Conditions to Avoid:	Avoid thermal decomposition, do not overheat.
Incompatible Materials:	Bases, acids, strong oxidizing agents, metals, stoneware and glass.
Hazardous Decomposition Products:	Extreme temperatures such as a fire cause formation of highly toxic and corrosive fumes of fluorides such as SiF_4 and HF.
Hazardous Polymerization:	Will not occur.
Corrosiveness:	Attacks silica bearing materials, metals, and stoneware

SECTION 11 TOXICOLOGICAL INFORMATION

GHS Properties	**Classification**	
Acute Toxicity:	Oral 4: ATEmx (oral) = 1,720 mg/Kg	Oral : LD_{50} (oral, rat) 430 mg/kg
	Inhalation: No data available.	
	Dermal: No data available	
Aspiration Hazard	No data available.	
Carcinogenicity:	No data available.	
Germ Cell Mutagenesis	No data available.	
Skin Corrosion Irritation	Causes severe skin burns and eye irritation. Acid with extreme pH ≤ 2.	
Serious eye damage/irritation	Causes serious eye damage. Acid with extreme pH ≤ 2.	
Skin sensitization	No data available.	
Specific Target Organ Toxicity - Single Exposure:	No data available.	
Specific Target Organ Toxicity - Repeated Exposure	No data available.	
Reproductive Toxicity	No data available.	
Respiratory Sensitization	No data available.	
Additional information:	The Registry of Toxic Effects of Chemical Substances (RTECS) VV8225000	

Potential Health Effects

Eye	Acute (immediate): Causes serious eye damage. Chronic (Delayed): Repeated or prolonged exposure to corrosive materials may cause conjunctivitis.
Skin	Acute (immediate): Causes severe skin burns and eye damage. Chronic (Delayed): Repeated or prolonged exposure to corrosive materials will cause dermatitis.
Inhalation	Acute (immediate): May cause corrosive burns Chronic (Delayed): Repeated or prolonged exposure to corrosive fume may cause bronchial irritation with chronic cough.
Ingestion	Acute (immediate): Harmful if swallowed. Chronic (Delayed): Repeated or prolonged exposure to corrosive materials or fumes may cause gastrointestinal disturbances.

SECTION 12 ECOLOGICAL INFORMATION

Toxicity	No data available.		
Persistence and degradability	Not relevant. (Inorganic substance).		
Bio accumulative potential	Log Pow: Not applicable	Log Kow: Not applicable	Bio accumulative potential low
Mobility in soil	No data available.		
Results of PBT and vPvB assessment	PBT /vPvB assessment not available as chemical safety assessment not required/not conducted.		
Other adverse effects	No data available.		

SECTION 13 DISPOSAL CONSIDERATIONS

Recover or recycle if possible. Keep material in a closed DOT- approved container pending disposal in accordance with all applicable regulations.

Disposal should be in accordance with applicable, regional, national, and local laws and regulations.

It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste disposal and disposal methods in accordance with applicable regulations.

SECTION 14 TRANSPORT INFO

Regulatory Status:	USDOT	Canada TDG	IATA	IMO/IMDG
Proper Shipping Name:	Fluorosilicic Acid	Fluorosilicic Acid	Fluorosilicic Acid	Fluorosilicic Acid
Hazard Class:	Class 8 (Corrosive)	8	8	8
Packing Group	II	II	II	II
Identification Number:	UN 1778	UN 1778	UN 1778	UN 1778
Emergency Guide No.	154	154	8L	EMS-No: F-A, S-B
US DOT	Poison Inhalation Hazard: No	Marine Pollutant: No		Reportable Quantity: No

CERTIFIED TO NSF / ANSI 60

SECTION 15 REGULATORY INFORMATION

CERCLA:	Not Regulated. Product is not listed with an RQ (Reportable Quantity)
RCRA 261.33:	Not Regulated
SARA TITLE III:	Section 302/304: Not Regulated Reportable Quantity: No TPQ: No
	Section 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No Reactivity: No
	Section 313: Not Regulated
TSCA:	Listed on TSCA Inventory
Canada	DSL: Yes NDSL: No
WHMIS 1988:	Fluorosilicic Acid is listed as Class E (Corrosive) and D1B (Toxic material). This SDS has been prepared according to the hazard criteria of the Controlled Product Regulations (CPR) and the SDS contains all of the information required by the CPR.
CA Proposition 65:	(Health & Safety Code Section 25249.5) Not listed

SECTION 16 OTHER INFORMATION

NFPA	Health: 3	Flammability: 0	Instability: 1	Special Hazard: None
HMIS	Health: 3	Flammability: 0	Physical Hazard: 0	PPE: Determined by user. See Section 8

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Preparation:	The preparation of this SDS was in accordance with ANSI Z400.1-2010.
Revision Date:	July 13, 2015
Sections Revised:	All
SDS Number:	MOS 200011.01
References:	Globally Harmonized System of Classification and Labelling of Chemicals (GHS) – 4th Edition 2011 OSHA Hazard Communication Standard, 2012

Good afternoon and thank you for this opportunity. I'm John Mueller, in Tulsa, Oklahoma. My college degree is in Geophysical Engineering, and I am now retired from 25 years as a licensed civil engineer working mainly for public water and wastewater utilities. I have been studying the history and science of water fluoridation for almost 13 years. My community voice today, speaks in behalf of a very large Environmental Justice community; that is the community of citizens who are disproportionately harmed by exposure to fluoride, especially Blacks and other vulnerable subgroups, and particularly all pregnant women and their prenatal and infant offspring, all being at risk of harm according to currently available science. The additional supporting materials I will be submitting includes an annotated listing of over 90 relevant studies and documents produced just within the last five to six years alone. And I must point out that the fluorine atom in the harmful "forever chemicals", PFAS, is the same highly reactive fluorine atom that is in its ionic form in fluoridated tap water, even though their chemical behaviors and harmful properties can differ widely due to different chemical bonding.

Fluoride has been the most protected environmental pollutant ever since the Public Health Service approved it in 1950 and recommended its addition to tap water to help prevent childhood tooth decay. Lead, for comparison, was protected for decades before EPA finally acted responsibly in *its* regulation. But fluoride's protected status, for more than 70 years, has created a very hard and dense wall. On one side of that wall is world class science showing fluoride is a developmental neurotoxicant; and on the other side is the powers-that-be who are bent on maintaining fluoride's protected status. That wall must now come down as required by implementation of President Biden's Executive Orders. I am hopeful and reasonably optimistic that I, and others, are giving you the knowledge and understanding to issue the strongest recommendation to remove that wall for the greater good. The most available tool for its removal is, conveniently, the current lawsuit in which EPA is being sued under

provisions of Section 21 of the Toxic Substances Control Act (TSCA), to ban the addition of fluoridation chemicals to public drinking water. A new, amended petition is anticipated for EPA's consideration in this lawsuit, to accommodate more recent studies conducted since the original petition was first filed in November 2016. Today, my request is for WHEJAC to do all in its power to have EPA and Administrator Regan approve the upcoming amended petition that will be filed with the Federal court later this year in that TSCA lawsuit.

Thank you so much for this unique opportunity.

John F. Mueller, Jr., PE (Ret)
5255 S. Irvington Pl
Tulsa, OK 74135
918-237-5296

Good afternoon. I'm John Mueller, in Tulsa, Oklahoma, and I represent, albeit ostensibly, the community of citizens who depend on artificially fluoridated water for their daily needs. Unfortunately, water fluoridation has, for far too long, been falsely claimed by the CDC and other proponents to be "safe and effective." But with highest integrity, the current science has revealed that fluoridation is not safe; it has far-reaching harmful effects, similar to those from arsenic, lead and mercury, and physically painful effects on those with chemical sensitivities and their caregivers. Its efficacy for preventing childhood tooth decay becomes irrelevant when mental health risks of permanent brain damage are at stake. Furthermore, the CDC has the data confirming fluoridation disproportionately affects Blacks and other vulnerable subgroups. But CDC appears to want to ignore the current science which has been revealed in studies funded by the National Institutes of Health. Based on that science and relevant Executive Orders, including EOs 14008 and 13985, a regulatory ban on fluoridation is obligatory. Accordingly, a scorecard for assessing progress in addressing this injustice must necessarily include water utilities' compliance with such a regulatory ban. The CDC has the identities of those fluoridating utilities, and a scorecard dataset could be as simple as having a column for either a Yes or No to document if the utility has in fact discontinued adding fluoridating chemicals.

Fortunately, President Biden's Environmental Justice agenda has paved the way to ensure that a nationwide ban on water fluoridation is in fact imminent. I am confident that President Biden and Vice President Harris have the political will to "walk the talk" about scientific integrity and environmental justice, and that the White House Council on Environmental Quality and the Interagency Council will do their part to ensure all affected agencies follow suit under a "whole of government" and "whole of EPA" approach.

I want to briefly point out how the American Dental Association (ADA) is attempting to influence the National Toxicology Program's (NTP)

forthcoming report on fluoride's neurotoxicity, a draft of which I have noted in previous WHEJAC meetings, and attached to my Feb 10 email to this group. The ADA, in a letter dated February 7, 2022, has pleaded with the NTP director, Dr. Rick Woychik, to exclude from that report "any neurotoxin claims" relating fluoridation to potential developmental neurotoxic effects. This unethical approach by the ADA, in concert with any support from the CDC, clearly flies in the face of scientific integrity and transparency, as will be shown in the additional materials I will be emailing to the WHEJAC.

Thank you for your commitment to properly address urgent and compelling matters such as this.

WHEJAC February 2022 Meeting
Oral Public Comments - Kathy Yuknavage, Our Common Wealth 670, Treasurer:

Our Common Wealth 670 is a grassroots non-profit organization based on the island of Saipan in the Commonwealth of the Northern Mariana Islands (CNMI).

Our primary concern is the substandard EIS review process conducted by the Department of Defense (DoD) that allows increasing US military expansion and environmental harm in the region, and DoD's often flippant responses to Commonwealth concerns.

Five reviews have been conducted from late 1990 to present. DoD's stated **purpose is meeting military training requirements in the Western Pacific**. Their ***need was using the CNMI as the sole location for this purpose***. This purported ***need*** precludes consideration of other alternative sites with existing installations on larger land masses elsewhere in the Pacific that can share this training responsibility and are less susceptible to impacts as our small island archipelago of less than 184 sq land miles.

WWII and current exercises have left military debris, unexploded ordnance (UXO), and contamination on our land and surrounding waters. DoD is now proposing new leases on our islands despite the acknowledgement within the CNMI Covenant with the US that no additional lands would be leased for such purposes. This disregards Indigenous sovereignty.

Allowing Live-fire training on leased lands that will be returned even more polluted than after WWII, is problematic from both a socio-economic and environmental justice perspective. DoD has made clear that removing UXO and contaminants on leased lands is not a requirement or a priority.

Suggested EJ scorecard metrics:

- DoD should be required to complete baseline studies of water, sediment and biota contamination to demonstrate past and current levels to ensure accountability for remediation and restoration of leased lands.
- Activities should support cultural norms, incorporate best practices to meet *local* environmental requirements, and abide by local laws and regulations. DoD has forgone obtaining Coastal Management Permits. Although allowed legally, it does not offset socio-economic impacts to our underserved and indigenous population when DoD's proposed actions are inconsistent with marine and terrestrial resource protection.
- All pertinent research must be considered not just those studies that Federal Agencies have funded or that support their preferred activities, and not allow other peer reviewed research cited by local agencies that does not support their activities be disregarded.
- Public hearings should have knowledgeable panels capable of answering substantive questions posed by participants. Should a panel not be able to answer most questions, then this should not be considered a Public Hearing or engaged public discourse for comment.
- DoD continues to offer higher salaries to entice experienced local professionals that used to review EISs on behalf of the CNMI, to now make assessments for them. Federal agencies should provide proportionate funding to local governments to hire experienced experts and make necessary purchases to enable thorough reviews for a just assessment of environmental concerns.
- Federal resources should be provided to garner broad participation in Public Hearings including social media, radio, TV, and not just a newspaper ad. Provide pertinent information of plans in an accessible and timely manner, and in Agency responses to comments. There should be translation services, and indigenous people should be given time to express themselves, consistent with and respectful of local culture. Consent should always be a primary goal before consultation.

LEAGUE of UNITED LATIN AMERICAN CITIZENS

Civil Rights Violation Regarding Forced Medication

WHEREAS, the League of United Latin American Citizens is this nation's oldest and largest Latino organization, founded in Corpus Christi, Texas on February 17, 1929; and

WHEREAS, LULAC throughout its history has committed itself to the principles that Latinos have equal access to opportunities in employment, education, housing and healthcare; and

WHEREAS, LULAC advocates for the well-being of, but not exclusively of, Hispanics throughout our country; and

WHEREAS, safe drinking water is a necessity for life; and

WHEREAS, the purpose of a public water supply is to supply water to the entire community which is composed of people with varying health conditions, in varying stages of life, and of varying economic status; not to forcibly mass medicate the population which is a civil rights violation; and

WHEREAS, fluoridation is mass medication of the public through the public water supply; and

WHEREAS, current science shows that fluoridation chemicals pose increased risk to sensitive subpopulations, including infants, the elderly, diabetics, kidney patients, and people with poor nutritional status; and

WHEREAS, minority communities are more highly impacted by fluorides as they historically experience more diabetes and kidney disease; and

WHEREAS, minorities are disproportionately harmed by fluorides as documented by increased rates of dental fluorosis (disfiguration and discoloration of the teeth); and

WHEREAS, the National Research Council in 2006 established that there are large gaps in the research on fluoride's effects on the whole body; a fact that contradicts previous assurances made by public health officials and by elected officials, that fluorides and fluoridation have been exhaustively researched; and

WHEREAS, a growing number of cities and health professionals have rejected fluoridation based on current science and the recognition of a person's right to choose what goes into his/her body; and

WHEREAS, the CDC now recommends that non-fluoridated water be used for infant formula (if parents want to avoid dental fluorosis – a permanent mottling and staining of teeth), which creates an economic hardship for large numbers of families, minority and otherwise; and

WHEREAS, the League of United Latin American Citizens (LULAC), founded in 1929, has historically been a champion of the disenfranchised and a leader in the fight for social and environmental justice; and

WHEREAS, City Council Districts I-6 of San Antonio (predominantly minority districts) voted overwhelmingly that the public water supply should not be contaminated with fluoridation chemicals; and

WHEREAS, the election to fluoridate the water, essentially disenfranchised the right of these minority Districts to safe drinking water for all; and

WHEREAS, the U.S. Health and Human Services and the EPA (January 2011) have recently affirmed the NRC Study results that citizens may be ingesting too much fluoride and that the exposure is primarily from drinking water; and

WHEREAS, the proponents of fluoridation promised a safe and effective dental health additive, but the San Antonio Water System's (SAWS) contract for fluoridation chemicals proves a "bait and switch"; as SAWS is adding the toxic waste by-product of the phosphate fertilizer industry, that has no warranty for its safety and effectiveness for any purpose from the supplier (PENCCO, Inc.) or the source (Mosaic Chemical); and

THEREFORE, BE IT RESOLVED, that LULAC commends efforts by organizations that oppose forced mass medication of the public drinking supplies using fluorides that are industrial grade, toxic waste by-products which contain contaminants (arsenic, lead, mercury) which further endanger life; and

BE IT FURTHER RESOLVED, that LULAC supports efforts by all citizens working to stop forced medication through the public water system because it violates civil rights; and

BE IT FURTHER RESOLVED, that LULAC opposes the public policy of fluoridation because it fails to meet legislative intent; and

BE IT FURTHER RESOLVED, that LULAC demands to know why government agencies entrusted with protecting the public health are more protective of the policy of fluoridation than they are of public health.

Approved this 1st day of July 2011.

Margaret Moran
LULAC National President

Lynne Bonnett
675 Townsend Avenue, unit 169
New Haven CT 06512

Public Comment for WHEJAC. February 27, 2022.

Tweed New Haven Authority seeks to expand in a small residential community.
They are in the midst of performing an Environmental Assessment using the Federal Aviation Agency's guidelines for evaluating how this expansion will affect our community.

The airport is in a flood plain, surrounded by residential homes and very close to Long Island Sound. In order to expand they need to extend the runway. I am a resident representative for the Project Advisory Committee that has met only one time since January 13, 2022. Residents report difficulty getting information from Tweed leadership and routinely file FOIA requests. I, myself, have tried to get information about stormwater drainage from their property but have not been able to get that information from them or from the local wastewater treatment plant. I have heard that the runoff from deicing is sent to the wastewater treatment plant but have not been able to confirm that.

The consultants hired by Tweed New Haven Authority to conduct the EA fall back on antiquated rules and regulations used by the FAA that limits air pollution measures to computer modeling and 24 hr averages, (no real time measurements using monitors) as well as noise complaints from jets flying over sensitive residential areas such as schools and homes. These episodic noise and vibrations are 85 decibels in neighbor's yards.

People report tasting jet fuel, being unable to carry on conversations, having sleep interrupted by the loud noise, homes vibrating from the jets, cracks in the walls, plaster falling off of walls and a myriad of other complaints.

We think that true environmental assessment takes acute exposures in to account, not just 24 hr averages that dilute the true effect of these episodic exposures. Ozone, for example, is measured in 8-hour segments in the State of CT (I believe also in the EPA). It is toxic, burns airways, stunts lung growth in children and causes heart disease, respiratory disease and cancer. It is highest during daytimes when children and residents are outside. 24 hr averages will not describe the true toxicity of these exposures.

Please ask/require that the EPA upgrade the rules and regulations for the FAA's Environmental Assessment to be more in line with current scientific information about how to measure the impact of air pollutants and noise on the populations affected.

Thank you.

Sincerely,

/Lynne Bonnett/

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Acrodynia and Hypertension in a Young Girl Secondary to Elemental Mercury Toxicity Acquired in the Home

Jessica J. Mercer, M.D., Lionel Bercovitch, M.D., and Jennie J. Muglia, M.D.

Department of Dermatology, Warren Alpert Medical School, Brown University, Providence, Rhode Island

Abstract: **Acrodynia, also known as pink disease, erythredema polyneuropathy, Feer syndrome, and raw-beef hands and feet, is thought to be a toxic reaction to elemental mercury and less commonly to organic and inorganic forms. Occurring commonly in the early 20th century, acrodynia is now a seemingly extinct disease in the modern world because of regulations to eliminate mercury from personal care products, household items, medications, and vaccinations. We present a case of a 3-year-old girl with acrodynia secondary to toxic exposure to elemental mercury in the home environment.**

CASE PRESENTATION

A 3-year-old girl was admitted with a 3-day history of redness, pain and swelling of both hands, profuse sweats, irritability, chills, poor oral intake, and severe periumbilical pain. Within the 2 weeks before admission, she had been evaluated in the emergency department on two separate occasions for abdominal pain, which was diagnosed as constipation and viral gastroenteritis. Examination at admission revealed redness and edema of the hands and feet, desquamation of the fingertips and toes, and mild webspace maceration (Figs. 1 and 2). Lymphadenopathy, conjunctival injection, and mucous membrane involvement were absent. Blood pressure was 158/100. Differential diagnoses of her hypertension and systemic symptoms included pheochromocytoma, neuroblastoma, coarctation of the aorta, and vasculitis. Cutaneous differential diagnoses initially included atypical Kawasaki syndrome, postviral acral desquamation, erythromelalgia, and juvenile plantar dermatosis in the setting of preexisting atopy. Total metanephrine level was high at 475 pg/mL (normal ≤205 pg/mL), but was nondiagnostic of a catecholamine-secreting tumor, which typically is greater than four times the reference range. Magnetic resonance imaging, angiography, and echocardiogram excluded internal masses, aortic coarctation, and other cardiovascular abnormalities. Thereafter, mercury toxicity was suspected, and later confirmed by a 24-hour urine mercury level of 178 μg/24 hours (normal 0–20 μg/24 hours). Hypertension was managed with amlodipine and labetalol. Chelation therapy with succimer was initiated. A compounded topical preparation containing mexiletine 2%, a lidocaine analog, and ketamine 2% applied to her hands and feet provided transient pain control. There was no history of excess fish intake or exposure to mercury, broken thermometers, batteries, or fluorescent bulbs. Environmental survey of the home, where the

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Figure 1. Desquamation of the fingers.

Figure 2. Desquamation of the toes.

family had lived for 2 months, revealed mercury levels in the carpet of 40,000 $\mu g/m^3$ (normal < 100 $\mu g/m^3$). After 5 weeks of chelation therapy, all signs and symptoms had resolved.

DISCUSSION

Acrodynia, also known as pink disease, erythredema polyneuropathy, Feer syndrome, and raw-beef hands and feet, is a syndrome related to elemental mercury and, less commonly, inorganic mercury salt intoxication primarily in children (1,2). Chardon first described it in the French literature in 1830, and Crawford later recognized it in the American literature in 1932 (3,4), but it was not until 1948 that Warkany and Hubbard (5) established a connection between acrodynia and mercury toxicity. It presents with the triad of edematous, painful, pink to red, desquamating fingers and toes; neurologic symptoms (irritability, photophobia, weakness, paresthesias); and hypertension (6). Elemental mercury exists as a liquid that can evaporate at room temperature. It is thought that elemental mercury toxicity affects children more often than adults because their nostrils are nearer the floor and because mercury vapor, which is heavier than air, settles near the floor because of the effect of gravity (6,7). In addition, children have higher minute volume respiration per unit of weight and therefore inhale more air per unit of body weight than do adults (7).

The diagnosis of acrodynia may be easily overlooked because of its current rarity in North America and Europe. As noted in the literature, there is substantial clinical overlap between acrodynia and Kawasaki disease (7). One author previously suggested mercury as the causative agent of Kawasaki disease (8). This led to a study evaluating mercury levels in six patients with a clinical diagnosis of Kawasaki disease; all were found to have high urinary mercury excretion, although later reports failed to confirm this association (9). Acrodynia should also be considered in the differential diagnosis for patients with presumed Kawasaki disease who are afebrile or have atypical presentations.

Another cardinal feature of acrodynia is hypertension. Mercury causes high blood pressure by inhibiting catecholamine-*O*-methyltransferase, the critical enzyme involved in catabolism of catecholamines, through direct inactivation of its coenzyme *S*-adenosylmethionine. Inhibition of catecholamine-*O*-methyltransferase by mercury results in accumulation of dopamine, epinephrine, and norepinephrine (10), which probably explains the high catecholamine levels seen in our patient. In addition to following mercury levels in response to treatment, catecholamine levels may also be tracked as a surrogate marker of therapeutic response (2).

Although it was determined that the patient in our case was exposed to elemental mercury in the carpeting of her new home, its source could only be speculated. Common residential sources include spillage from mercury-containing devices such as thermometers and contact with latex paint containing mercury added to prolong shelf life. In addition, some religions in Afro-Caribbean cultures, including Santeria, voodoo, and Palo, ritually sprinkle elemental mercury about the home to ensure health, wealth, and happiness (11,12). The concern with elemental mercury in flooring and upholstery is that it can persist for weeks to months, resulting in chronic exposure to mercury vapor (13). This may increase the risk of toxicity, because it has been shown that urine mercury levels correlate positively with duration of

residency in a contaminated building and total amount of time spent in the building (14). Vacuuming worsens mercury exposure by further dispersing the vapor, and clearance should not be attempted without guidance from the local health department (13).

One must have a high index of suspicion to recognize mercury toxicity. If suspected, laboratory testing of blood, urine, or hair samples can be performed for confirmation. Whole blood should be examined as opposed to serum, because mercury concentrates in erythrocytes, urine should be collected over a 24-hour period rather than spot checking, and the longest of hair strands should be evaluated (7). Because mercury has a short half-life in the blood but a long half-life in other tissues, blood samples are more useful for diagnosing acute poisoning, whereas urine and hair samples are better for diagnosis of chronic intoxication (7). Although reference levels are not well established for children, the threshold for toxicity is probably lower than in adults, and clinical correlation is recommended.

Treatment entails removal of the source of mercury exposure in the patient's environment with the aid of trained personnel and elimination from the body largely through chelation therapy. The Food and Drug Administration has not approved any therapy for mercury toxicity in children, but DMSA succimer is approved for the treatment of lead poisoning in children and has been adopted as the most commonly used chelating agent for mercury in the pediatric population (15). Other agents less commonly used are D-penicillamine, 2,3-dimercaptopropanol (British anti-lewisite, dimercaprol), and 2,3-dimercapto-l-propane sulfonic acid. Transient elevation in plasma mercury levels may occur with use of these agents because of oxidation within red blood cells (7). Repeat blood or urine mercury levels should be performed after chelation therapy to ensure that the level has decreased appropriately.

Although acrodynia is now relatively rare, cases such as ours may still be encountered. Awareness and recognition of the characteristic cutaneous findings of red, desquamating, and edematous hands and feet coupled with high blood pressure and neurologic symptoms will prevent the diagnosis from being overlooked. Prompt diagnosis and treatment of this disorder may help prevent long-term neurological sequelae.

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Mercury Hazard Widespread *in* Magico-Religious Practices *in* U.S.

People of Hispanic and Caribbean ethnicity use metallic mercury to ward off evil spirits by ingesting it, applying it to the skin, and wearing it in an amulet

BY MICHAEL I. GREENBERG, MD, MPH

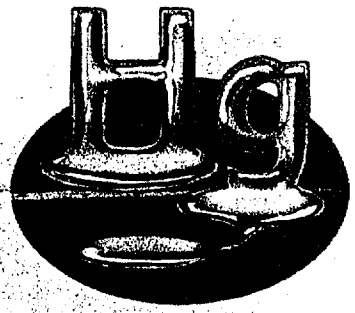
I recently attended an extremely interesting scientific conference organized by the Southern States Mercury Task Force. This group of environmentalists, toxicologists, and scientists meet annually primarily to discuss the mercury hazard in many bodies of fresh water in the United States.

The conference was absolutely fascinating on this subject, and covered many aspects of potential health hazards for humans posed by mercury in marine animals and marine food sources. While the conference concentrated on this aspect of environmental science, I became sidetracked by an engrossing lecture delivered by Arnold P. Wendroff, PhD, a research associate at Brooklyn College in Brooklyn, NY.

Dr. Wendroff is a social scientist who was a career elementary school teacher in the New York City school system, working in a facility primarily attended by Hispanic students. Dr. Wendroff said one day during a lesson about the periodic table, one young Hispanic student indicated that he was familiar with the symbol for mercury.

Dr. Wendroff asked the student if he knew mercury was used for, fully expecting him to say that mercury was used in thermometers. The student responded that his mother used mercury to ward off evil spirits. This simple answer thrust Dr. Wendroff into the strange and unusual world of magico-religious practices and ceremonies and their associated potentially hazardous exposures.

Because the student's answer baffled Dr. Wendroff, he asked the child to bring him some of the mercury, and the child complied. Dr. Wendroff began a local investigation that led to a most fascinating and important public health/toxicology discovery that I will describe in this special report.



For Sale in 'Yerberias'

Elemental mercury — "azogue" as it is known in the Hispanic community or "vi dajan" in the Haitian community — is commonly found for sale over-the-counter in stores known as "botanicas" or "yerberias." These botanicas and yerberias are small, privately owned specialty shops, located primarily in Latino and U.S.-Carribbean communities, that stock and sell popular religious items as well as many items that are thought to provide healing/medicinal benefits. Within the Latino and Caribbean communities, some people practice ethno-religious rituals that are part of what is known as Santeria, Espiritismo, or Voodoo. Azogue, or mercury, often plays a very important role in these religious and ethno-medical rituals.

In the practice of Santeria, azogue is believed to give "resguardo" or protection or even provide "cantazo" or a "strike against the person." Espiritismo, also known as the "work of the dead," is part of a traditional healing ritual in which people maintain relationships with the "angel guardian" (guardian angel) and "gufas" (spirit guides). Mercury is integral in the ceremonial practice of these belief systems, and is apparently widely used in this

Elemental mercury is commonly found for sale over-the-counter in stores known as 'botanicas' or 'yerberias'

Magico-Religious Use of Metallic Mercury

- Used as a floor wash or cast directly onto floors to provide protection against evil spirits

- Sprinkled into automobile interiors for protection

- Ingested directly

- Applied to the skin or used in spiritual cleansing baths

-Placed in oil lamps or candles illuminated for protection

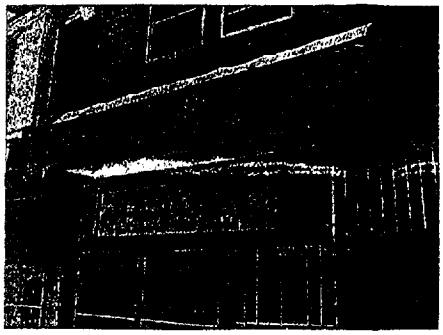
-Kept inside vials and worn as charms or amulets

-Used to provide love spells

Source: Michael I. Greenberg, MD, MPH

regard. The metallic mercury used by practitioners of these healing faiths is used in many different ways as listed in the table.

The uses of mercury in these magico-religious rituals are legion and appear to be widespread. In fact, a recent survey revealed that most U.S. cites with large Hispanic populations had functioning botanicas, and that the vast majority of these stores sold mercury over-the-counter. These sales are unregulated by local or state governments, and the product is unaccompanied by any significant cautionary information regarding the health hazards of mercury. In fact, many of the botanicas actually advocate the use of mercury in the most dangerous ways, usually resulting in aerosolization and creation of an inhalation hazard.



Elemental mercury — "azogue" as it is known in the Hispanic community or "vi dajan" in the Haitian community — is commonly found for sale over-the-counter in stores known as "botanicas" or "yerberias," such as the one shown here.

Total Mercury Sales

A 1996 report discovered that 35 botanicas in the Bronx, NY, had collectively sold more than 150 nine-gram units of mercury per day. This would represent total mercury sales of more than 420 kilograms for these stores alone. Extrapolating this to the potential for environmental catastrophe and human health hazard, these numbers suggest that it is possible that more than 13,000 Bronx dwellings will have a mean weight of nine grams of mercury dispersed in them per year. Of course, the possibility does exist that fewer dwelling are contaminated but with even higher mercury burdens than reported.

One Internet site advertises the unrestricted sale of mercury via mail for only $18 per pound

In 1997, a report by the Chicago Department of Health revealed that 15 of 79 Hispanic adults interviewed in Chicago admitted to using mercury regularly for magico-religious purposes. In a non-published study, Dr. Clyde Johnson of the City University of New York discovered that 44 percent of adults of Caribbean descent and 27 percent of Hispanic ethnicity (n=203) indicated that they used mercury in their homes or carried it in their cars or on their person.

Shockingly, more than half of those interviewed indicated that they routinely disposed of mercury in their household garbage. One case of special interest involved a woman of Dominican descent who had been adding mercury to her cologne and applying the cologne to her skin daily. As a result of this practice, grossly elevated levels of mercury were reportedly found in her breast milk, thus posing a compound hazard to mother and child.

The magico-religious uses of mercury really tell a story of toxic potential rather than a story of specific and predictable toxicity. The fact is that the total potential that these sources of mercury pose is impossible to calculate or even estimate accurately. There are many important variables, and each locale where these practices occur may have specific threats germane to them.

It is clear, however, that the uncontrolled use of ceremonial mercury is widespread, not currently being evaluated effectively, and is certainly not well appreciated. In fact, a recent search of the Internet revealed numerous "cyber-botanicas," all of which were advertising the sale of mercury. One Internet site advertised the unrestricted sale of azogue via mail for only $18 per pound.

Medical Hazards

The medical hazards of aerosolized and inhaled mercury are well recognized and have been well described in the scientific literature. In fact, accidental mercury intoxication by entire families following inadvertent vacuuming of small amounts of spilled mercury is well known. What is not well known is the potential biological impact that large amounts of mercury dispersed within homes, cars, and directly onto individuals will pose.

If individuals live in a particular apartment and engage in such practices, the apartment or dwelling certainly will become contaminated with mercury. Subsequent inhabitants of these dwellings will never know they are facing the potential of continuing, potentially serious exposure to mercury.

Knowledge of the fact that mercury is being widely used by specific populations is critical information for emergency physicians. Specifically, chronic elemental mercury intoxication often presents clinically with rather vague and non-specific findings such as fatigue and lethargy. In addition, tremor, visual difficulties, tachycardia, dermographism, and gingivitis may also be seen.

A typical triad of symptoms of chronic elemental mercury intoxication includes excitability, tremor, and gingivitis. As in many environmental toxic exposures, the key to successful treatment, and, in fact, the first step in that treatment, involves identification of the source of exposure and its prompt removal.

The sorts of mercury exposures discussed in this report compel emergency physicians to be diligent and vigilant. The specific populations identified often present to inner city emergency departments. Practitioners in these areas are urged to explore the possibility that occult or overt mercury exposure may have occurred. Taking a careful history will require careful questioning, and in many cases will require careful language translation and interpretation.

If individuals engage in using mercury to ward off evil, their dwelling certainly will become contaminated with mercury

Sensitivity to the fact that the exposures may be part and parcel of religious ceremonies will be essential. That these ceremonies are of special importance to the patient yet foreign to the physician may challenge the physician's history-taking skills. In any case, emergency physicians in any practice setting should be prepared to recognize the possible manifestations of chronic elemental mercury exposure in ethno-religious ceremonies. In addition, emergency physicians may find themselves taking the lead in reporting environmental contaminations and exposures to local and state public health officials, and providing necessary educational information to patients who may be using mercury in this way. ■

A 1997 report by the Chicago DOH revealed that 15 of 79 Hispanic adults interviewed in Chicago admitted to using mercury regularly

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December 17, 2014

Colonel Paul Owen
Commander, New York District
U.S. Army Corps of Engineers
26 Federal Plaza, Room 2113
New York, New York 10278

Dear Colonel Owen:

I am writing on behalf of many North Rockland County (New York) constituents, including the elected officials of the Towns of Haverstraw and Stony Point, who have contacted me regarding the proposal by Transmission Developers, Inc. (TDI) to construct the Champlain Hudson Power Express transmission line (CHPE). I understand the Section 404 Clean Water Act permit (404 permit) application for this project is still pending approval by the Army Corps of Engineers (ACOE). I request that the 404 permit not be issued until ACOE has done a hard-look review of the proposed dredging.

There are still significant concerns regarding this proposed project, ranging from maritime requirements to dredging of the Hudson River. Several agencies, including the U.S. Coast Guard, the Maritime Association of the Port of New York/New Jersey Tug & Barge Committee, and the American Waterways Operators, submitted letters and comments to ACOE, expressing their concerns regarding CHPE's disregard of the industry standard of 15-foot burial depth. These letters convey the strong recommendations that CHPE be buried to a depth of at least 15 feet, not 7 feet as proposed by CHPE, in order avoid fouling an anchor on the cable or the articulated mattresses, which are used to cover the powerline in places it cannot be buried deep enough. The Hudson River has a long history as a vital component of our nation's Marine Transportation System, and has a strong current. Vessels need to be able to anchor during the sudden onset of fog or other inclement weather, and a cable buried less than 15 feet deep would present a significant risk that the anchor could be damaged or become entangled in the cable or articulated mattresses.

Additionally, the Final Environmental Impact Statement (FEIS) does not adequately evaluate the health, safety, and environmental impacts of the various levels of dredging required to construct CHPE. The FEIS incorporates a sediment analysis with data from 2009, but does not explore the effects of dredging this sediment for 102.5 miles through the Hudson River.

Furthermore, the Iona Marsh, a nationally registered habitat for the bald eagle, has not been evaluated for environmental impacts, as the DEIS states that the proposed CHPE Project route would not cross them. However, one of the four trajectories provided by TDI shows CHPE passing through the northern section of Iona Island. Neither the impacts to the bald eagle's habitat nor the potential consequences of constructing CHPE through Iona Island, which was used by the U.S. Navy as a naval ammunition depot from 1900 through 1947, have been evaluated.

Therefore, I ask that you give full consideration to the concerns raised by my constituents regarding this project, and withhold the 404 permit until these concerns have been adequately addressed.

Sincerely,

Nita M. Lowey
Member of Congress

NML:sl

cc: Brian Mills, NEPA Document Manager, Department of Energy

Jodi McDonald, Chief, Regulatory Branch, Army Corps of Engineers

HIDDEN DANGER: *Environmental Health Threats in the Latino Community*

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Natural Resources Defense Council
October [20] 2004

[Available on the NRDC web site at **www.nrdc/org/health/effects/latino/english/contents.asp**]

EXECUTIVE SUMMARY

p. x
MERCURY EXPOSURE
The harmful effects of mercury pose another health threat to Latinos. The major ways in which Latinos are exposed to mercury are by eating mercury-contaminated fish and by using mercury in religious ceremonies, cosmetics, and folk remedies.

p. xi
Certain religious and cultural practices provide another route of exposure to mercury, which is sprinkled indoors by practitioners of *Espiritismo* and *Santeria* (religious traditions found most commonly among people of Puerto Rican and Cuban origin, respectively), and in the *Voodoo* and *Palo* traditions. Surveys in Massachusetts, New York, and Chicago found that between 19 and 44 percent of Hispanic respondents reported using mercury for magic or religious purposes. Researchers estimate that 47,000 capsules of mercury are sold per year in *botanicas* (stores that sell remedies and religious items) in [the borough of the Bronx] New York City, and these capsules are likely to cause long-term contamination of more than 13,000 homes or apartment buildings each year. Use of mercury in an apartment building has been shown to cause elevated levels of mercury vapor in the hallways and entryway, and probably also in other apartments where mercury is not used. Toxic vapors can linger for months or even years, leading to neurological and respiratory symptoms in apartment residents.

p. 54
Chapter 6

MERCURY

Another substance posing a significant health threat to Latinos is mercury. Once known best as the silvery liquid in thermometers, mercury is better known today as a poison that damages the brain and kidneys. Despite the health risks associated with the chemical, the public largely does not appreciate the seriousness of the threat and the presence of its sources. This is especially true in the Latino community, where public education efforts in Spanish have so far been limited. The most serious ways in which Latinos may be exposed to dangerous amounts of mercury are eating mercury-contaminated fish and using mercury in religious ceremonies, cosmetics, and folk remedies.
p. 55

MERCURY LEVELS IN THE BLOOD AND HAIR OF LATINOS

Nationwide, more than one in 12 women of reproductive age has mercury in her blood that exceeds the level set as safe by the Environmental Protection Agency (EPA).[4] A large study done by the Centers for Disease Control and Prevention (CDC) tested for mercury in the blood and hair of more than 2,500 women and children around the United States. On average, Mexican-American children had higher levels of mercury in their bodies compared with non-Hispanic white children.[5] In addition, three people tested in that study had mercury levels that were 100 to 1,000 times as high as the average for the other people tested. All of these people were Mexican-Americans, including a 37-year-old woman and two children ages 1 and 3. These people had both methyl mercury and inorganic mercury in their bodies, suggesting that they may have been exposed to this toxic chemical both from eating fish and from direct exposure such as from folk remedies or religious uses.

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p. 57

FOLK REMEDIES AND COSMETICS

Mercury, known as *azogue* in some Latino communities, is sometimes used as a folk remedy for *empacho* (indigestion or gastroenteritis). This practice is most common among Mexican-Americans, and surveys have found that one out of 12 Latinos in New Mexico mention *azogue* as a cure for *empacho*.[15] Doctors have [p. 58] documented individual cases of children becoming ill, even requiring hospitalization, from the use of mercury for *empacho*.[16] Not surprisingly, children are more likely than adults to be harmed by ingesting *azogue*.[17] Diagnosis is complicated by the similarity between the symptoms from consuming *azogue* and the symptoms of the illness it is used to treat. People who use *azogue* for the treatment of illness do not realize that it is harmful, just as most Americans did not realize until recently the potential hazards of mercury-containing disinfectants (such as Merthiolate or Mercurochrome) for treating cuts and scrapes in children.

p. 58

RELIGIOUS CEREMONIES

Another source of mercury exposure that goes largely unnoticed is its use in the religious practices of some Latin American and Afro-Caribbean communities. Practitioners of *Espiritismo* and *Santeria* (religious traditions most commonly found among people of Puerto Rican and Cuban origin, respectively), *Voodoo*, and *Palo* use mercury. It is sometimes carried in capsules, burned in candles or oil lamps, sprinkled around the home, or added to perfumes. In these religious traditions, *azogue* helps summon spirits for magical spells and serves as an amulet that keeps evil spirits at bay and brings good luck.[20]

Initial studies indicate that the use of *azogue* is relatively common in the Latino and Caribbean community. A 2003 study of 898 Latino respondents in [Lawrence] Massachusetts found that 38 percent have used or know someone who has used *azogue* for religious, spiritual, or health purposes.[21] Similarly, a study of 203 adults in New York City revealed that 44 percent of Caribbean respondents and 27 percent of those from Latin America reported using mercury as a part of their cultural practices.[22] In a Chicago survey, 19 percent of Hispanics reported using mercury for magic or religious purposes.[23] And in another survey, 12 percent of practitioners reported sprinkling mercury around a child's crib or bed.[24]

p. 59

Mercury is sold in most *botanicas*, stores that sell remedies and religious items. Studies show that more than 85 percent of *botanicas* around the country sell *azogue* and that in some areas the percentage is even higher.[25] A canvass of 35 *botanicas* in the Bronx found that they collectively sold more than 420 kilograms (924 pounds) of mercury yearly.[26] Based on this survey, researchers estimated that 47,000 capsules of mercury are sold per year in [the Bronx,] New York City, and these capsules would be likely to cause long-term contamination of more than 13,000 homes or apartment buildings each year.[27]

Even if a family does not use mercury themselves, there can be a danger of exposure because mercury lingers in cracks in the floor or in carpets for months or years, slowly giving off mercury vapor that

can be inhaled by people living in the building. For example, use of mercury in an apartment building has been shown to cause elevated levels of mercury vapor in the hallways and entryway, and probably in other apartments where mercury was not used. Moving into a house or apartment where mercury was used in the past can expose new occupants to mercury hazards. Children have been reported to become seriously ill from living in a room where a mercury thermometer was broken eight months previously, and the amounts of mercury used in these rituals can be significantly more than the amount in a thermometer.[28] In certain areas of New Jersey with large populations of Caribbean-Americans, indoor mercury levels have often been found to be five times the outdoor level.[29] When mercury is in vapor form it can cause neurological problems and is also associated with respiratory symptoms such as shortness of breath, pneumonia, and lung disaease.[30]

In 2001, the New York State Senate adopted a resolution calling on state and federal agencies to investigate the residential use of mercury in New York. The Senate was especially concerned about the risks to women and children and about the risks to people who move into apartments unaware that the previous tenant scattered mercury that could make them sick.[31] In 1994, the U.S. Environmental Agency warned state and local health officials of a mercury threat to Hispanics related to the use of mercury in many Hispanic communities.[32]

Studies have shown elevated levels of mercury in people's bodies related to inadvertent exposure to mercury used in rituals. A survey of 100 Hispanic and Caribbean children from a Bronx, New York, community with known access to mercury for religious rituals revealed that 5 percent had elevated levels of the toxic metal in their urine.[33] The mercury levels were as high as those shown to cause subtle cognitive defects, abnormalities in motor function, and mood changes in adults. Recently, health officials investigating a mercury spill in a school found that Latinos who used mercury in their homes had higher mercury levels than individuals exposed at the school.[34]

Mercury disposal is also cause for concern. A 1999 study showed that 64 percent of users of *azogue* reported throwing mercury into the garbage, and 27 percent reported flushing it down the toilet.[35] New York's Bureau of Wastewater Treatment has been unable to identify the source of about 68 pounds per year of mercury entering one of its plants from a region that contains the city's largest Latino population.[36] When mercury is disposed of in garbage or wastewater, it eventually is transformed into methyl mercury and contaminates the fish we eat.

p. 60

Conversations with *azogue* users indicate that some realize that touching or eating mercury may be harmful, but they are generally unaware that mercury is highly volatile and that inhalation is a very dangerous route of mercury exposure.[37] A culturally sensitive education campaign that involves *Santeros* (*Santeria* priests), local groups, and local government officials could address this problem. Significantly, various studies show that *botanica* owners are already wary of outsiders and are trying to conduct sales in an inconspicuous manner. Any action that drives this business further underground will only hinder efforts at education. Therefore, an approach that allows practitioners to make well-informed decisions will help to protect children in these communities.

RECOMMENDATIONS

…

- Local departments of health in cities with significant Latino populations should provide bilingual materials at public health clinics and in schools to inform Latinos about the risks of mercury use in folk remedies, cosmetics, and religious ceremonies.

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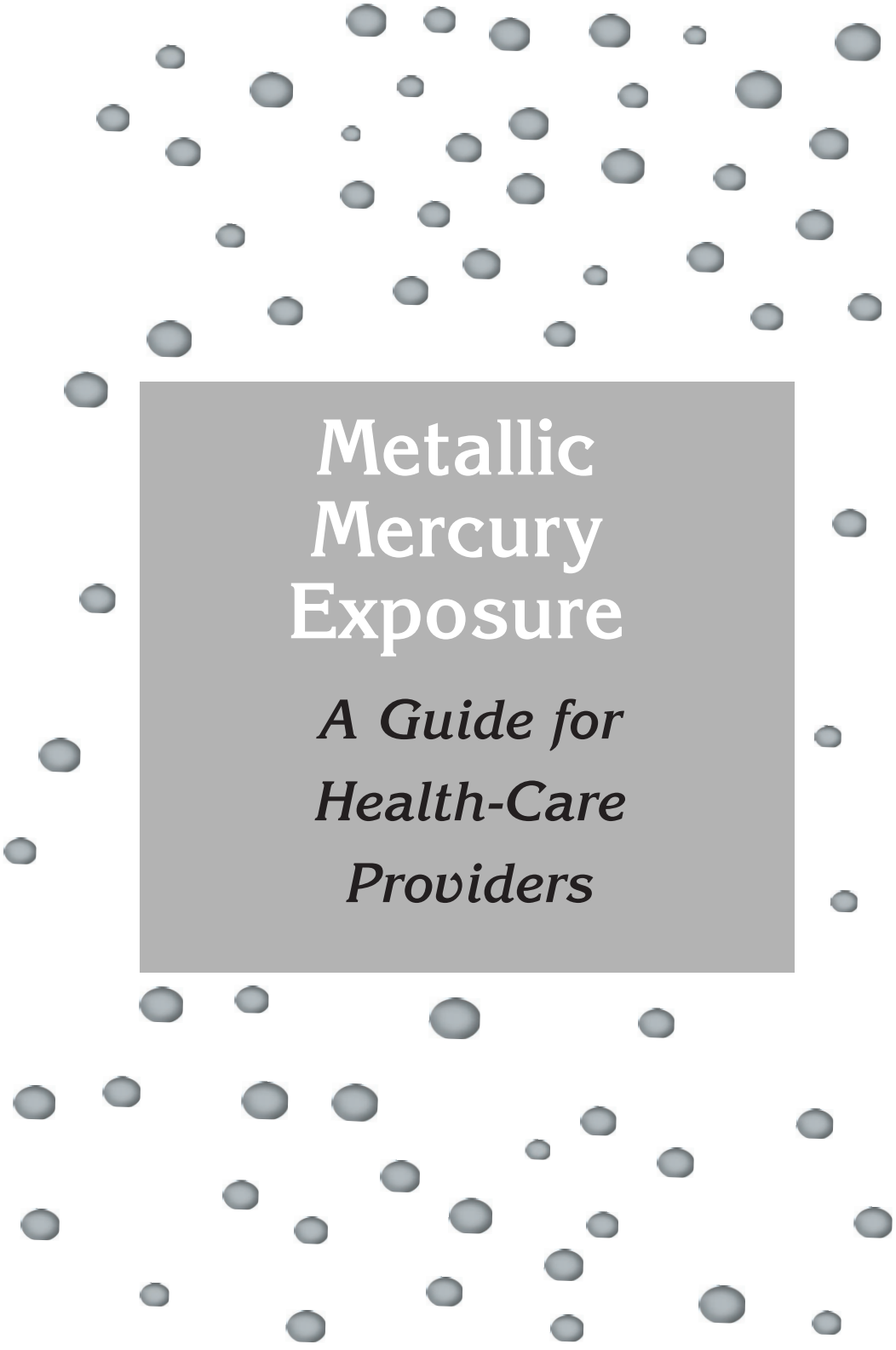

Metallic Mercury Exposure

A Guide for Health-Care Providers

TABLE OF CONTENTS

METALLIC MERCURY EXPOSURE

A Guide for Health-Care Providers

Some people in Latin American and Caribbean communities, especially those who practice Santería, Espiritismo, or Voodoo, may use metallic mercury (known as azogue or vidajan) in religious and ethnomedical rituals that could adversely affect their health. Some people may use metallic mercury in folk treatments as a substitute for, or as a supplement to, conventional medical treatment.

This brochure has been developed to inform health-care professionals and providers that their patients who use metallic mercury may be at risk for mercury poisoning. It addresses the most common questions and concerns about metallic mercury:

❶ What is Azogue / Vidajan? ❷ Reasons and Means of Use ❸ Routes of Exposure ❹ Health Effects ❺ Testing for Exposure and Absorption ❻ Removal and Disposal of Metallic Mercury ❼ Legal Issues ❽ Addressing Patient Concerns ❾ Additional Resources

❶ WHAT IS AZOGUE / VIDAJAN?

Azogue / Vidajan is metallic mercury.
In the English and Spanish languages, quicksilver and azogue are popular names for metallic mercury. In Haitian Creole, metallic mercury is called vidajan. *Azogue / vidajan* may be commonly found in *botánicas* and religious stores that sell popular religious and non-conventional medicinal products located in Latino and Caribbean communities.

Metallic mercury can be easily identified by its shiny, silver-gray appearance. This heavy and slippery liquid metal easily breaks up into many small beads, which can join again with equal ease. When dispersed in a room, it may not be easily seen and can remain for months or years.

Metallic mercury:

- ♦ does not dissolve in water or alcohol
- ♦ is odorless but has a metallic taste
- ♦ is a liquid and a vapor at room temperature
- ♦ evaporates slowly into indoor air (and evaporates more quickly as the temperature increases)
- ♦ is invisible in vapor form

There are other types of mercury besides the metallic form. Some people confuse the **silvery** metallic mercury with the **red** mercury called mercuric sulfide (Spanish *mercurio*). Mercuric sulfide (also called cinnabar) is used as pigments in paints and tattoos. Metallic mercury is refined to its elemental form from mercuric sulfide.

Metallic mercury is sold in *botánica*s in capsules or glass vials in amounts ranging from a few grams to 3 to 5 ounces for spiritual "works" (*trabajos*). It can also be found in thermometers, electrical switches, and thermostats in the home.

Azogue / Vidajan capsules can have up to10 times (3 to 5 ounces) more metallic mercury than one thermometer.

Mercury Vapors

Metallic mercury begins evaporating as soon as it contacts air. Higher temperatures increase the rate and amount of evaporation. Since *azogue / vidajan* capsules are not sealed, there is always a risk of evaporation from the container. The vapor particles will stick to almost anything: jewelry, carpets, draperies, clothing, furniture and cracks in floors.

Metallic mercury vapors are invisible and may persist throughout the room for many months or years. Because mercury vapors can remain within indoor environments for extended periods of time, people who live in or regularly visit these households may be at risk for exposure to harmful levels of mercury vapor. The risk of exposure may be greater during cold seasons, when people heat their homes and close their windows, trapping heat (and mercury vapors) inside. Changes in temperature can cause fluctuations in the concentration of indoor mercury levels.

Mercury vapor is denser than air and settles near the floor. **Children are at a greater risk of exposure because they spend more time on the floor.** Younger children in particular can be exposed to more of the invisible vapors because they often crawl or play on the floor, and generally have higher respiration rates.

❷ REASONS AND MEANS OF USE

Industrial Uses

In the past, metallic mercury was a common ingredient in pharmaceutical products, was used in industry to coat mirrors, and could be found in some paints (prior to 1991). Today, this liquid metal is found in electrical equipment (e.g., batteries), weather instruments (e.g., thermometers, barometers, manometers, switches), and dental amalgams. It is also used in factories to produce chlorine gas and in "informal" gold extraction as well as the industrial gold mining process.

Spiritual Uses

The use of *azogue* can vary widely among individuals. *Azogue* has particular significance in *Santería* or *Lucumí* religion. The metal "works" for *Elegguá*, an African Yoruba god and one of the *Siete Potencias Africanas* (The Seven African Powers), called upon by believers to open paths and remove obstacles. *Azogue* is also one of the seven basic metals of *Santería*. It is believed that the metal azogue can give either *resguardo* (protection) or *cantazo* (a strike against a person, bringing harm and illness).

Espiritismo, also called "the work of the spirits," is a traditional healing practice in which people maintain relationships with the "*protecciones*"—the *angél guardian* (guardian angel) and *guías* (spirit guides).

Adherents believe that *azogue* has spiritual powers similar to its characteristics as a metal. Just as *azogue* moves quickly, likewise it "speeds" the "works" of *Santeros* and *Espiritistas*.

Practitioners of *Santería*, *Espiritismo*, or *Voodoo* may periodically use *azogue* or *vidajan* in practices to seek spiritual aid from the gods or spirits. It is used in a variety of ways for various reasons.
It may be:

- placed in floor washes or sprinkled directly onto the floor to cleanse or protect the home
- ingested to cure stomach ailments
- applied to the skin or used in baths for spiritual cleansing
- placed in oil lamps or candles for protection and to increase good fortune
- kept inside a vial or charm bag for protections or as amulets
- offered as petitions to the Yoruba gods
- used for love spells

❸ ROUTES OF EXPOSURE

It is hazardous to use metallic mercury and breathe its vapors. There is always a risk of mercury intake whenever it is used.

Inhaling Mercury Vapors

Metallic mercury is harmful when ingested, but even **more dangerous** when inhaled. The vapors rapidly diffuse through the lungs and enter the bloodstream. The mercury is converted to different physical and chemical states, and distributed to tissues throughout the body. Almost 80% of inhaled metallic mercury vapor is absorbed by the body. The mercury accumulates in the kidneys and brain. Some of the inhaled mercury is exhaled, or released through urine or excrement.

Ingesting Mercury

Ingested metallic mercury is usually converted to a non-diffusible form that prevents it from easily entering the bloodstream. Most of it goes through the gastrointestinal tract and is expelled from the body through excrement. Less than 1% of ingested metallic mercury is absorbed by the body. About half of the mercury ingested will be excreted after 35 to 90 days. While in adults, ingesting small quantities of metallic mercury may not immediately result in noticeable health effects, the same amount of mercury can make a child sick due to their smaller body size and because the developing organs are very sensitive.

Applying Mercury to the Skin

Metallic mercury that is rubbed on the skin or used in spiritual baths may evaporate and be inhaled. Smaller amounts may also enter the bloodstream directly through abraded skin and accumulate in the kidneys and the central nervous system.

❹ HEALTH EFFECTS

Metallic mercury may cause permanent damage to the brain and kidneys, and may even cause death.

The type of damage to the body caused by this form of mercury is determined by how much and for how long the person is exposed to it. Vapors may be fatal if inhaled in large amounts for even a brief period of time.

Metallic mercury can persist in the body for months; mostly in the kidneys and brain. The most affected part of the body is the nervous system.

The half-life of metallic mercury in humans is approximately 30-40 days in blood and about 60 days in urine. Mercury vapor is lipid-soluble and readily crosses the blood-brain barrier and the placenta. Mercury can be detected in the brain for many years after an exposure.

Depending on the level of exposure, the appearance of signs and symptoms may vary. Health effects can occur within hours (acute) or over weeks, months or even years (chronic). Acute poisoning symptoms would be expected to occur only after exposure to very high concentrations.

Signs and Symptoms of Short-Term (Acute) Exposure:

- cough
- difficulty breathing
- chest pain
- nausea, vomiting
- diarrhea
- fever
- metallic taste in the mouth
- renal failure (shock and acute renal dysfunction)

Signs and Symptoms of Long-Term (Chronic) Exposure:

- stomatitis, gingivitis
- tremors
- erethism (strange irritability and marked shyness)
- memory loss
- headache
- fatigue, insomnia
- depression
- loss of appetite and weight loss
- behavioral and cognitive difficulties
- decreased lung vital capacity
- renal failure
- burning eyes and conjunctivitis
- rashes and peeling skin on palms of hands and soles of feet

The use of mercury in ethnomedical or religious practices typically involves small quantities administered over time. Thus, affected individuals would likely exhibit chronic symptoms.

Symptoms associated with metallic mercury exposure may be general in nature (fatigue, nausea, headaches), and often can be mistaken for symptoms of other conditions or illnesses. For this reason, mercury poisoning may be difficult to diagnose.

Mercury and Children

Metallic mercury has the greatest effect on the fetus and small children, and their developing central nervous systems.

Metallic mercury **will** reach the fetus of a pregnant woman.

It is important to protect pregnant women and small children from metallic mercury. It will enter the fetal bloodstream through the placenta and may produce permanent damage to the child's developing organs, especially the brain, kidneys, lungs and liver. Nursing mothers who inhale the vapors can also affect infants through breast milk.

Toddlers who crawl on floors contaminated with mercury can inhale or ingest it. The amount and frequency of mercury exposure determines the impact on a child's development. However, the younger the child, the greater the risk of long-term neurological and developmental effects.

Children are more susceptible to mercury toxicity because their organs exhibit higher absorption and retention rates of mercury, and their nervous systems are highly sensitive to the metal.

Some children exposed to metallic mercury can develop a condition called acrodynia or "pink disease."

Signs and Symptoms of Acrodynia in Children:

- severe leg cramps
- irritability
- numbness, prickling or tingling
- painful pink fingers
- peeling hands, feet and nose
- rash
- heavy sweating
- sensitivity to light

❺ TESTING FOR EXPOSURE AND ABSORPTION

Since users of metallic mercury may not be aware of its harmful effects, they may not mention it to their health-care providers. *It is important to ask patients if they use non-conventional or folk / traditional treatments for ailments and if any of those remedies contain mercury (*azogue *or* vidajan*).*

Environmental Testing

Metallic mercury vapors are invisible and odorless. A mercury vapor analyzer, a small machine that measures the level of mercury in the air, can be used to detect mercury within indoor environments. This measurement takes only a few minutes and the results are immediate.

Medical Testing

Several laboratory tests measure the levels of all forms of mercury in the body. Blood or urine samples can be tested for metallic mercury levels. Hair samples can be tested for long-term exposure to methylmercury (the form of mercury found in some fish), if careful testing methods are used. But **a urine test is the recommended way to measure metallic mercury levels in the body.**

The New York State Heavy Metals Registry has established reportable levels for elevated mercury. The reportable levels are concentrations at or above 5 ng/ml in blood, and at or above 20 ng/ml in urine. The mercury level in blood reflects exposure to all forms of mercury, and may therefore be influenced by dietary intake (i.e. fish).

Ideally, in order to determine elevated mercury levels, urine samples should be collected over 24 hours, but spot urine samples can be used instead, if corrected for creatinine levels. If patients report using metallic mercury, or a spot urine sample has elevated results, then a 24-hour urine collection, corrected for creatinine, should be analyzed.

For blood or urine sample analysis call the **New York State Clinical Laboratory Evaluation Program at (518) 485-5378** to find the nearest laboratory certified to conduct mercury analyses.

Treatment

Determining and eliminating exposure is the most important step in the treatment process.

There are several ways to enhance elimination of mercury from the body. Duration of use, symptoms of exposure, and mercury levels determine when and how to treat a patient exposed to mercury.

Chelators, specific agents that bind to mercury to form a nonpoisonous compound that can be excreted from the body, can reduce the body burden of mercury. Chelation should be reserved for individuals who have evidence of very high mercury absorption and significant symptoms. The appropriate chelator to use depends on the form of mercury to which a person has been exposed and the health status of the individual.

Some types of chelators are contraindicated for elemental and organic mercury compounds because of the possibility of increased neurotoxicity, so expert consultation should be sought prior to treatment.

To receive more information about testing or treatment procedures, call the **Mount Sinai Occupational Health Clinic at (212) 987-6043 or Bellevue Occupational Health Clinic at (212) 562-4572.** Both clinics are part of the New York State Network of Occupational Health Clinics and have experience in evaluating mercury exposure.

❻ REMOVAL AND DISPOSAL OF METALLIC MERCURY

Common household appliances should not be used to collect spilled metallic mercury. Brooms and mops will only spread the contamination. Vacuum cleaners will disperse the mercury into droplets, and the heat they generate can increase vaporization. Mercury should never be discarded into sinks, bathtubs or toilets, as it may become trapped, evaporate and re-enter the home.

When cleaning up a mercury spill, care needs to be taken to avoid contaminating clothing, shoes, and

jewelry. Metallic mercury readily binds to gold and can permanently damage jewelry.

Small amounts of metallic mercury (like the amount found in fever thermometers) can be cleaned up from hard surfaces such as tile, wood, or linoleum floors. But, if it has been spilled or placed on carpets, upholstery or porous surfaces they **should be discarded** or specially cleaned with mercury spill kits and detergents.

Mercury spill kits are sold by safety equipment distributors, industrial safety supply outlets and laboratory safety services. Check under *environmental and ecological products and services* or *laboratory safety services* in phone books.

If patients need information on how to clean up small mercury spills they can call:

NYC DEPARTMENT OF HEALTH
Bureau of Environmental andOccupational Disease Prevention
(212) 788-4290 (Business Hours)

Poison Control Center
(212) 764-7667 (24 hours a day)

If a large amount of mercury has been spilled in a home or business, people should call:

NYC DEPARTMENT OF HEALTH
Poison Control Center
(212) 764-7667 (24 hours a day)

NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION
(718) DEP-HELP (24 hours a day)

If a person has a large amount of mercury in their home or business and wants to dispose of it, the NYC Department of Environmental Protection can recycle the mercury.

For more information about recycling mercury, call the NYC Department of Environmental Protection during business hours at (718) 595-4784.

❼ LEGAL ISSUES

It is not illegal to use or sell mercury. However, Federal and New York City law requires that mercury containers be properly labeled alerting people to the hazards associated with mercury.

❽ ADDRESSING PATIENT CONCERNS

In order to improve the well-being of your patients and their families, they should be aware of the potential dangers of mercury use. Children are at particular risk for harmful effects. As a physician, you can respect your patients' religious beliefs and still provide effective health care. Patients should be asked about their use of traditional/folk treatments and educated about the dangers of metallic mercury (*azogue /vidajan*). They should be aware of how to find out about alternatives that will allow them to continue practicing their religious or cultural beliefs, using safer substances.

Information about these alternatives can be found in the books sold in *botánicas*. Patients can also be encouraged to ask their *espiritista, santero,* or *doktè fey* to suggest other things that may be used in place of *azogue* or *vidajan*.

A patient education brochure is available from the New York City Department of Health. The brochure discusses the health effects associated with using *azogue / vidajan* (metallic mercury) and includes steps for cleaning up small amounts of *azogue / vidajan* in homes. For copies, call (212) 788-4290.

⑨ ADDITIONAL RESOURCES

NEW YORK CITY DEPARTMENT OF HEALTH
Bureau of Environmental and Occupational Disease Prevention
125 Worth St., CN-34C
New York, NY 10013
(212) 788-4290 (Business Hours)

{For information on indoor air testing, medical and environmental levels of concern, potential assessments, patient brochures and metyhods for clean up of small amounts of mercury.}

NEW YORK CITY DEPARTMENT OF HEALTH
New York City Poison Control Center
455 First Ave. CN-81
New York, NY 10016
(212) 764-7667 (24 hours)

{For help in acute poisoning situations and for clinical and treatment information}

NEW YORK STATE CLINICAL LABORATORY EVALUATION PROGRAM
(518) 485-5378

NEW YORK STATE NETWORK OF OCCUPATIONAL HEALTH CLINICS
New York City:

Bellevue Occupational Health Clinic
First Ave. at 27th St. Rm CD349
New York, NY 10016
(212) 562-4572

Mt. Sinai- Irving J. Selikoff Center for Occupational and Environmental Medicine
One Gustave L. Levy Place, Box 1058
New York, NY 10029
(212) 987-6043

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Toxic Substances Assessment
1-800-458-1158 (toll free within NY State)

{Information on indoor air testing and the Environmental Laboratory Approval Program}

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION

(718) DEP-HELP(24 hours a day. To report a large mercury spill.)

(718) 595-4784 (Business hours. For information on mercury recycling).

ACKNOWLEDGMENTS

We would like to acknowledge the excellent brochures on this topic developed by the Hispanic Health Council of Hartford, Connecticut and the Environmental Epidemiology and Occupational Health section of the State of Connecticut Department of Public Health and Addiction Services. Their brochures served as the basis for our educational materials. We would also like to thank the many reviewers who so generously provided comments on this brochure.

This brochure was developed and edited by Natasha Dwamena, Nancy Jeffery and Lori Stevenson of the New York City Department of Health's Bureau of Environmental and Occupational Disease Prevention.

THE CITY OF NEW YORK
DEPARTMENT OF HEALTH

Michael R. Bloomberg
Mayor

Thomas R. Frieden, MD, MPH
Commissioner

nyc.gov/health

Azogue Vidajan Metallic Mercury Poisoning

THE CITY OF NEW YORK
DEPARTMENT OF HEALTH

Rudolph W. Giuliani
Mayor

Neal L. Cohen, M.D.
Commissioner

Web Site: www.ci.nyc.ny.us/health

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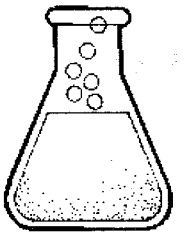
What is *Azogue*/Vidajan?

Azogue is Spanish and
Vidajan is Haitian Creole
for metallic mercury
also known as *quicksilver* in English.

Metallic mercury is a very toxic, silver-gray liquid metal.

- It does not dissolve in water or alcohol.
- It has no smell but has a metallic taste.
- It can be a liquid or a vapor at room temperature.
- It can remain where spilled for several months.
- It evaporates in air.
- Its vapors cannot be seen.



ALL TYPES OF MERCURY ARE TOXIC.

Azogue/Vidajan is found in thermometers used to measure body temperature, some paints (made before 1991), electrical switches, thermostats and batteries. It is also sold in botánicas in capsules in amounts ranging from a few grams to 3-5 ounces for spiritual "works" (*trabajos*).

An *azogue/vidajan* capsule can contain up to10 times more mercury than one thermometer.

The mercury vapor from these capsules is heavier than air, so the vapor tends to settle near the floor. **Children may be at a greater risk** of breathing in the vapor, because they may crawl and play on floors.

WHAT IS *AZOGUE/VIDAJAN* USED FOR?

Some people use *azogue/vidajan* in traditional medicine or for spiritual/religious purposes, such as:

- to cleanse or protect the home
- to cure stomach ailments
- for spiritual cleansing
- for protection and to increase good fortune
- to offer petitions to the Yoruba gods
- for love spells

When used for spiritual/religious purposes, *azogue/vidajan* has been:

- placed in floor washes or sprinkled onto the floor
- applied to the skin or used in baths
- swallowed
- placed in oil lamps or candles
- kept inside vials or charm bags as amulets

IS THERE A SAFE WAY TO USE *AZOGUE/VIDAJAN?*

NO! There is always a risk of breathing *azogue* vapors when it is used in any way.

→ *Azogue/Vidajan* is dangerous when inhaled. It can also be harmful when swallowed or applied to the skin.

→ *Azogue/Vidajan* gets into carpets, draperies, furniture, and cracks in the floors when spilled. It can stay in a room for months or years.

→ You won't know how often you are breathing *azogue/vidajan* vapor because you cannot see or smell it.

HOW CAN *AZOGUE/VIDAJAN* AFFECT YOUR HEALTH?

➔ *Azogue/Vidajan* can stay in your kidneys and brain for months. The most affected part of the body is the nervous system.

➔ *Azogue/Vidajan* can cause permanent damage to the brain and kidneys. It can harm the developing baby, and may even cause death.

➔ The health effects depend on how much and for how long a person has had contact with *azogue/vidajan*.

Signs and Symptoms of *Azogue/Vidajan* (Metallic Mercury) Poisoning :

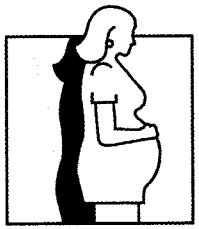
- tremors
- irritability and shyness
- redness and swelling of the mouth and gums
- memory loss
- headache
- tiredness and difficulty sleeping
- depression
- loss of appetite and weight loss
- eye and skin irritation
- respiratory failure and death (after very high exposures)

➔ It may take a long time for signs and symptoms to develop. For this reason, poisoning may be difficult to diagnose.

➔ Tell your doctor if you experience any of these signs and symptoms. Also let your doctor know if you use *azogue/vidajan* (metallic mercury).

Health Effects on Children

***Azogue/Vidajan* is most dangerous to the unborn child and small children.**



Vapors breathed in by pregnant women can enter the developing baby. *Azogue/vidajan* can also be passed to an infant through the mother's breast milk.

Toddlers who crawl on floors where *azogue/vidajan* has been spread may breathe it in or may swallow it. This exposure can cause brain damage that may lead to behavioral and learning problems.

The younger the child, the greater the risk of long-term effects.

Children are more affected by mercury than adults. Some children exposed to *azogue/vidajan* can develop a condition called acrodynia or *pink disease.*

Signs and Symptoms of Acrodynia in Children:

- severe leg cramps
- irritability
- numbness, prickling or tingling
- painful pink fingers
- peeling hands, feet and nose
- rash
- heavy sweating
- sensitivity to light

WHAT CAN BE USED INSTEAD OF *AZOGUE/VIDAJAN?*

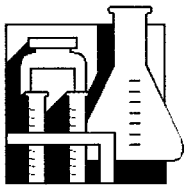
Botánicas have substitutes for *azogue/vidajan.*

Alternatives to *azogue/vidajan* can be found in books sold in botánicas. You can also ask an *espiritista, santero or doktè fey* to suggest other things that may be used in place of *azogue/vidajan.*

HOW TO MEASURE THE AMOUNT OF *AZOGUE/VIDAJAN* IN THE BODY OR HOME

The only way to know if there are *azogue/vidajan* vapors in the home is to test for it with special equipment, such as a mercury detector (mercury vapor analyzer) that measures the level of *azogue/vidajan* in the air in the home. For more information about mercury air testing, call the New York City Department of Health.

There are laboratory tests that measure the level of *azogue/vidajan* in urine and blood. A urine test is the best way to measure for exposure to



azogue/vidajan (metallic mercury). If you think you have been exposed and need testing, call your doctor or the New York City Department of Health.

HOW TO CLEAN UP *AZOGUE/VIDAJAN*

When *azogue/vidajan* is spilled, it breaks apart into tiny silver beads that roll around and stick to surfaces and get in cracks.

Do not use a vacuum cleaner, broom, or mop to collect spilled *azogue/vidajan*. Brooms and mops will spread the *azogue/vidajan* beads and a vacuum will heat the *azogue/vidajan*, causing it to give off DANGEROUS vapors.

Do not throw *azogue/vidajan* down sinks, toilets or bathtub drains.The *azogue/vidajan* may become trapped, then evaporate and re-enter the home.

Small amounts of *azogue/vidajan* (like the amount found in thermometers—about 4.5 grams)

can be cleaned up from surfaces like tile, wood, or linoleum floors. If *azogue/vidajan* has been spilled or placed on carpets, upholstery or other porous surfaces, throw them away if possible, or clean them using mercury spill kits and detergents.

Do not attempt to clean-up large amounts of mercury (more than the amount found in a fever thermometor) yourself.

Method for Clean-up of SMALL (less than 5 grams) amounts of spilled *azogue/vidajan* (metallic mercury).

➔ Keep children and pets away from the area before and during clean-up.

➔ Remove gold jewelry.Mercury can damage gold items.

1. Have ready 4-5 sealable plastic bags (preferably ziplock), a trash bag, rubber or latex gloves, paper towels, cardboard or squeegee, an eyedropper, wide tape and a flashlight.

2. Put on rubber or latex gloves.

3. Carefully pick up any pieces of broken glass (from a thermometer or vial). Place them on a paper towel and put the towel in a zip lock bag to be thrown away.

4. Use stiff cardboard or a rubber squeegee to collect the silver beads in one place. (Use a flashlight to help you look for *azogue/vidajan* beads). Remember to look all around the area because the beads can stick to surfaces and get into cracks in the floor!

5. Use an eye dropper to carefully draw up the *azogue/vidajan* beads. Slowly squeeze the beads onto a damp paper towel. Put the towel in a zip lock bag to be sealed and thrown away.

6. Use the sticky side of wide tape to pick up any remaining glass and *azogue/vidajan* beads. When done, place the tape containing glass and *azogue/vidajan* into a zip lock bag.

7. When all visible pieces have been picked up and clean-up is done, place the cardboard or squeegee into a zip lock bag for disposal.

8. Carefully remove rubber gloves and place them in a zip lock bag.

9. Put the sealed zip locked bags in a sealed garbage bag amd dispose with regular household trash.

➔ If possible, open a window for 24 to 48 hours in the room where the *azogue/vidajan* was spilled to ventilate the area *after* the clean-up has been completed.

➔ Do not vacuum area until 2-3 days after the clean-up.Make sure there are no beads of *azogue/vidajan* left before vacuuming! After this you may vacuum the area as needed.

It can be very difficult to completely remove *azogue/vidajan* beads that have made their way into cracked surfaces, such as wood, linoleum, ceramic or parquet floor tiles.

Mercury spill kits can be used to clean up spills. These kits are sold by safety equipment distributors, industrial safety supplies outlets, or laboratory safety services (check under *environmental and ecological products and services* or *laboratory safety services* in phone books).

If there is a large amount of mercury (more than the amount found in a fever thermometer) in your home or business and you want to dispose of it, the New York City Department of Environmental Protection (DEP) can recycle the mercury. Please call the Department of Environmental Protection during normal business hours (Monday through Friday, 9 AM to 5 PM) at 718-595-4784 to find out more about recycling mercury.

If a large amount of mercury has been spilled in your home or business, please call the New York City Department of Health Poison Control Center or the New York City Department of Environmental Protection.

NYC Department of Health
Poison Control Center:
212-764-7667 (24 hours a day)

NYC Department Environmental Protection
718-DEP-HELP (24 hours a day)

FOR MORE INFORMATION

If you have any questions about possible health effects from *azogue/vidajan* or how to clean up *azogue/vidajan* from your home, please call the New York City Department of Health.

If you have questions about the disposal of large amounts of mercury (more than the amount found in a fever thermometer), please call the New York City Department of Environmental Protection.

You can also talk to your doctor about *azogue/vidajan* and ask your *santero* or *espiritista* or *doktè fey* to suggest substitutes for *azogue/vidajan*.

NEW YORK CITY DEPARTMENT OF HEALTH
Bureau of Environmental and Occupational Disease Prevention
Information on Health Effects and Clean-up of Mercury
125 Worth St., CN-34Cs
New York, NY 10013
(212) 788-4290 (Monday–Friday, 9 AM –5 PM)

NEW YORK CITY DEPARTMENT OF HEALTH
Poison Control Center
Information on Health Effects and Clean-up of Mercury
455 First Ave. CN-81
New York, NY 10016
(212) 764-7667 (24 hours a day)

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
Department of Emergency Response and Technical Assessment
Information on Mercury Recycling
(718) 595-4784 (Monday–Friday, 9 AM –5 PM)

To report a large mercury spill
(718) DEP-HELP (24 hours a day)

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

July 20, 2021

M-21-28

MEMORANDUM FOR THE HEADS OF DEPARTMENTS AND AGENCIES

FROM: Shalanda D. Young, Acting Director, Office of Management and Budget
Brenda Mallory, Chair of the Council on Environmental Quality
Gina McCarthy, National Climate Advisor

SUBJECT: Interim Implementation Guidance for the Justice40 Initiative

President Biden is committed to securing environmental justice and spurring economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment in housing, transportation, water and wastewater infrastructure, and health care. In Executive Order 14008,[1] the President directed the Director of the Office of Management and Budget (OMB), the Chair of the Council on Environmental Quality (CEQ), and the National Climate Advisor, in consultation with the White House Environmental Justice Advisory Council (WHEJAC), to jointly publish guidance on how certain Federal investments might be made toward a goal that 40 percent of the overall benefits of such investments flow to disadvantaged communities – the Justice40 Initiative. The Justice40 Initiative is a critical part of the Administration's whole-of-government approach to advancing environmental justice.

The following Interim Implementation Guidance for the Justice40 Initiative ("guidance" or "interim guidance") provides the initial recommendations pursuant to section 223 of Executive Order 14008,[2] and supports the Administration's comprehensive approach to advancing equity for all in line with Executive Order 13985.[3] The Executive branch should implement this guidance in accordance with existing authorities in order achieve the 40-percent goal.

Summary of Interim Implementation Guidance for the Justice40 Initiative

This interim guidance includes a set of actions required of agencies that manage covered Justice40 programs. These actions include identifying the benefits of covered programs, determining how covered programs distribute benefits, and calculating and reporting on reaching the 40-percent goal of the Justice40 Initiative. This interim guidance provides implementation direction to an initial set of covered programs under the Justice40 Initiative. Additional guidance is forthcoming. The interim guidance applies to all entities with covered programs, including those agencies with potential covered programs listed in Appendix B.

[1] *Tackling the Climate Crisis at Home and Abroad*, 86 Fed. Reg., 7619 (Feb. 1, 2021).
[2] *Supra* note 1, at 7632.
[3] *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, 86 Fed. Reg., 7009 (Jan. 25, 2021).

Interim Agency Justice40 Implementation

I. Interim Definition of Disadvantaged Communities

Further guidance to agencies on how to define disadvantaged communities for the purposes of the Justice40 Initiative[4] will be released later this year, concurrent with the establishment of a geospatial Climate and Economic Justice Screening Tool being developed by CEQ, in partnership with the United States Digital Service (USDS). This new tool will include interactive maps with indicators to assist agencies in defining and identifying disadvantaged communities.

Until such time when further guidance is provided, agencies should consider using, as appropriate, the following indicators of disadvantaged communities to implement the goals of the Justice40 Initiative utilizing existing data sources and indices that are currently used by programs serving low income, vulnerable, and underserved communities:

- **Community** – Agencies should define community as "either a group of individuals living in geographic proximity to one another, or a geographically dispersed set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions."[5]

- **Disadvantaged** – Agencies should consider appropriate data, indices, and screening tools to determine whether a specific community is disadvantaged based on a combination of variables that may include, but are not limited to, the following:

    - Low income, high and/or persistent poverty
    - High unemployment and underemployment
    - Racial and ethnic residential segregation, particularly where the segregation stems from discrimination by government entities
    - Linguistic isolation
    - High housing cost burden and substandard housing

[4] Executive Order 14008 uses the phrase "disadvantaged communities," and this term has been used in existing Federal and state programs to prioritize funding for environmental justice. Some community members and advocates prefer alternative terminology, and specifically the use of "overburdened and underserved communities." Until subsequent guidance can address the question of the most appropriate terminology, this memorandum relies on the language used in Executive Order 14008.
[5] CEQ, *Environmental Justice: Guidance under the National Environmental Policy Act* (Dec. 10, 1997), available at https://ceq.doe.gov/docs/ceq-regulations-and-guidance/regs/ej/justice.pdf.

- Distressed neighborhoods
- High transportation cost burden and/or low transportation access
- Disproportionate environmental stressor burden and high cumulative impacts
- Limited water and sanitation access and affordability
- Disproportionate impacts from climate change
- High energy cost burden and low energy access
- Jobs lost through the energy transition
- Access to healthcare

In determining which variables to consider, agencies should consider the statutory authority for covered programs. In addition to the above definition of disadvantaged communities, geographic areas within Tribal jurisdictions should be included.

II. Covered Programs

Agencies should work with OMB, as outlined in section IV, to review and determine whether Federal programs fall within the scope of the Justice40 Initiative. Agencies should contact their OMB Resource Management Office or email EJ@omb.eop.gov to consult on the determination of covered programs.

A. **Covered Program**. A "covered program" is a Federal Government program that makes covered investment benefits in one or more of the following seven areas:

i. Climate change
ii. Clean energy and energy efficiency
iii. Clean transportation
iv. Affordable and sustainable housing
v. Training and workforce development (related to climate, natural disasters, environment, clean energy, clean transportation, housing, water and wastewater infrastructure, and legacy pollution reduction, including in energy communities[6])
vi. Remediation and reduction of legacy pollution
vii. Critical clean water and waste infrastructure

B. **Covered Investments**. A "covered investment" is a Federal investment in one or more of the following categories:

i. Federal financial assistance as defined at 2 CFR 200,[7] including both Federal grants as well as other types of financial assistance (including loans, credit, guarantees, or direct spending/benefits);
ii. Direct payments or benefits to individuals;
iii. Federal procurement benefits (acquisition of goods and services for the Federal government's own use);

[6] Energy communities, as discussed in Executive Order 14008, include coal, oil, and gas and power plant communities.
[7] 2 CFR 200 Subpart A §200.1 (Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards) defines Federal financial assistance.

iv. Programmatic Federal staffing costs (e.g. federal pay for staff that provide technical assistance); and
v. Additional federal investments under covered programs as determined by OMB.

When appropriate and within existing statutory authorities, eligible investments of covered programs include: FY 2021 enacted appropriations, supplemental appropriations, prior year carryover from unobligated balances, and (when they become available) future fiscal year appropriations.

III. **Examples of Benefits of Covered Programs**

Benefits include direct and indirect investments (and program outcomes) that positively impact disadvantaged communities.

Table 1 provides a summary of additional examples of benefits of covered investments identified by the WHEJAC and the White House Environmental Justice Interagency Council (IAC) to be considered by agencies when determining the benefits of covered program.

Table 1

Category	Example Benefits When Applied for (or within) Disadvantaged Communities

Climate Change	• Reduction of greenhouse gas (GHG) emissions and local air pollutants[8]
	• Creation of community resilience plans that specifically include addressing needs of disadvantaged communities
	• Increased technical assistance and community engagement of disadvantaged communities
	• Increased flood mitigation Benefits
	  • Hectares of floodplain restored
	  • Hectares of wetlands restored
	  • Green stormwater infrastructure
	  • Urban flood risk mapping addressing the distribution of socially vulnerable communities and risks

[8] For example, program expenditures to reduce air pollution generated by one state or locality that benefit "down wind" disadvantaged communities or in, such as, installing a control device on an incinerator that reduces exposure to harmful pollutants in a disadvantaged community in a neighboring state.

	• Increased urban heat island effect mitigation benefits
	  • Increased acres of greenspace restored
	  • Increased tree and vegetation cover and sustainable shade coverage
	• Increased access to and advancement of public health warnings (weather and preparedness messages) translated into multiple languages

Clean Energy and Energy Efficiency	• Increased energy efficiency programs and resources • Deployment of clean energy, including renewable community energy projects • Establishment of community microgrids • Reduction of energy burden (e.g. the share of household income spent on home energy costs)
Clean Transportation	• Improvement in public transportation accessibility, reliability, and options • Reduction of exposure to harmful transportation-related emissions • Access to clean, high-frequency transportation • Access to affordable electric vehicles, charging stations, and purchase programs • Increased bicycle and walking paths
Affordable and Sustainable Housing	• Availability and access to affordable green housing • Reduction in displacement • Improved indoor air quality • Improved housing quality and safety and enhanced public health • Reduction in abandoned or vacant homes • Reduced housing cost burden

Training and Workforce Development	• Increased participation in clean energy good job training and subsequent good job placement/hiring, including providing the free and fair chance to join a union and collectively bargain. • Increased participation in good job training programs that target participation from disadvantaged communities, including formerly incarcerated individuals and youth transitioning out of foster care • Increased climate-smart training, including training to identify waste, efficiencies, and GHG inventories. • Increased percentage of good job training programs within energy communities, such as those that include paid employment and that measure and report participant outcomes.
Remediation and Reduction of Legacy Pollution	• Reduction of criteria air pollutant and toxic air pollutant exposure • Reduction in farmworker exposure to pesticides • Brownfield redevelopment • Remediation of Superfund sites • Community engagement training; capacity support for reduction strategies • Reclamation of abandoned mine lands and capping of orphan oil and gas wells
Development of Critical Clean Water Infrastructure	• Replacement of lead service lines • Increased access to safe drinking water and sanitary sewer services • Reduction in waterborne and respiratory illnesses • Reduction in the quantity of raw sewage discharged • Increase in the number of community water systems that meet applicable health-based standards

Building on program metrics and engagement with state and community partners, the WHEJAC, and the IAC, and other groups including the Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization, OMB will work with CEQ and USDS to develop and publish a common set of metrics to measure select benefits across agencies, e.g., improvements in air quality.

IV. **Calculating Benefits**

Executive Order 14008 states that "40 percent of the overall benefits" of federal investments from covered programs should flow to disadvantaged communities. To respond to that directive, each agency should establish a methodology for calculating the benefits that a) flow from each applicable covered program and b) accrue in disadvantaged communities from each covered program.

A. **Benefits Methodology**. The determination of what constitutes a "benefit" will vary by covered program. Accordingly, each agency is directed to:

i. Within 60 days of the issuance of this guidance, to deliver to OMB:
   a. An assessment of agency programs (referencing the list of programs in Appendix B) that are covered programs in accordance with section II.A and II.B of this guidance; and
   b. A description of the types of benefits that result from the identified covered programs.

ii. Within 150 days of the issuance of this guidance deliver to OMB a methodology for calculating the covered program benefits accruing to disadvantaged communities. This methodology should also include a description of the metrics that the agency is developing to measure covered program benefits.[9]

B. **Stakeholder Consultation**. When determining the benefits of a covered program, as specified in section IV(A), agencies should consult with stakeholders, including state, local, and Tribal governments, as well as Native communities, to ensure public participation and that community stakeholders are meaningfully involved in what constitutes the "benefits" of a program. In addition, if the calculation of a benefit to a disadvantaged community includes investments outside of that community, the disadvantaged community should be consulted. In engaging with stakeholders, agencies should consider their obligation under Title VI of the Civil Rights Act of 1964 to ensure meaningful access for individuals with limited English proficiency (LEP), as well as their

[9] It may not be possible to accurately measure the allocation of covered program benefits based solely on the geography where the program expenditures occur. Accordingly, agencies should actively consider the purpose of the covered program when determining whether covered program benefits have accrued to disadvantaged communities. For example, an energy efficiency program that provides weatherization assistance to individual households may need to analyze the allocation of program benefits by tracking the characteristics of recipient households, rather than relying on geographic indicators. Programs that distribute grants to states and territories that then distribute funds to households may need to work with such states and territories to obtain additional information about the ultimate distribution of federal funding and benefits.

obligation pursuant to Section 504 of the Rehabilitation Act to take appropriate steps to ensure effective communication for individuals with disabilities. Where applicable, agencies should also comply with, the Paperwork Reduction Act, Federal Advisory Committee Act, or other relevant law, regulation, or guidance. Agencies should also review and incorporate, where appropriate, recommendations from the WHEJAC and the IAC when developing metrics. (Examples of Stakeholder Engagement Plans will be available to agencies on the MAX Justice40 page.)

V. **Reporting**

Agency heads are responsible for calculating the accrual of covered program benefits to disadvantaged communities. Agencies should consult with OMB when determining whether their program is a covered program. Consistent with section IV, agencies shall report the following information to OMB for each covered program within 60 days and 150 days of the issuance of this guidance, as specified, and annually thereafter.

A. Within 60 days of the issuance of this guidance agencies shall report:

i. Agency
ii. Program
iii. Program ID (for financial assistance programs, this should be the assistance listing as defined in 2 C.F.R. § 200.203[10])
iv. Amount Appropriated
v. Amount Obligated[11]
vi. Developed Stakeholder Engagement Plan (y/n)

B. Within 150 days of the issuance of this guidance agencies shall report:

vii. Benefit Methodology Submitted (y/n)
viii. Benefit Methodology Submitted (date)
ix. Target Benefits of Program (qualitative list of types of targeted benefits)
x. Percent of Benefits Directed to Disadvantaged Communities (e.g., percent new waste water systems installed in disadvantaged communities of total waste systems installed)
xi. Percent of Benefits Not Directed to Disadvantaged Communities (e.g., percent new waste water systems not installed in disadvantaged communities)
xii. Percent of Benefits with Unknown Direction (e.g., a percentage of waste water systems with unknown installation location), including a brief explanation of why the percent of benefits to disadvantaged communities cannot be determined
xiii. Line Item Data for the Geographic Distribution of Benefits and Program Funding (e.g., a table of data with rows for the census block groups served

[10] Assistance listings refers to the publicly available listing of Federal assistance programs managed and administered by the General Services Administration. Assistance listings are detailed public descriptions of federal programs that provide grants, loans, scholarships, insurance, and other types of assistance awards.
[11] As obligation amounts change over time, agencies should update this reported amount semi-annually.

by each waste water system installation and the locations that received funding for that installation)[12]

a. For programs that do not target benefits geographically, the data provided should reflect the common characteristics of communities receiving benefits at the narrowest level that does not raise privacy concerns

xiv. Amount of Program Funding Received in Disadvantaged Communities (e.g. the dollars of funding received by a grant or loan recipient in a disadvantaged community)

Forthcoming guidance will provide additional information on the tool agencies should use to report the above information discussed in sections IV and V, and specific instructions for submitting the data into that tool.

The Administration's overall progress towards the Justice40 Initiative's goal will be tracked by the categories of covered project (climate change, clean energy and energy efficiency, clean transportation, affordable and sustainable housing, training and workforce development, the remediation and reduction of legacy pollution, and the development of critical clean water infrastructure).

VI. Pilot to Maximize Benefits to Disadvantaged Communities

In addition to the previously mentioned covered programs, Appendix A lists 21 programs that will undertake an initial implementation of the Justice40 Interim Implementation Guidance to maximize the benefits that are directed to disadvantaged communities. These programs were selected by reviewing WHEJAC recommendations, consulting with the IAC, and reviewing agency responses to information requests about current federal investments in disadvantaged communities.

The agencies with covered programs listed in Appendix A should identify applicable program funding mechanisms, policies, and procedures based on this guidance and consider program-specific guidance that provides recommendations for maximizing the benefits of the program that accrue in disadvantaged communities, as appropriate and consistent with applicable law. Specifically, the agencies with covered programs listed in Appendix A are directed to:

A. **Develop a Stakeholder Engagement Plan.** Within 30 days of issuance of this guidance, develop a plan to engage stakeholders relevant to the covered agency program. Plans should include a timeline for engaging relevant stakeholders, to include grantees and recipients, and a list of key issues relating to implementation of the Justice40 Initiative with respect to the covered program for stakeholder input. Plans should account for other stakeholder engagement efforts, including, but not limited to public involvement activities conducted pursuant to the National Environmental Policy Act and nation-to-nation consultations with

[12] Although this request includes the submission of detailed data, the calculation of several items listed already requires such data to exist, and this requirement asks the agency to also report the raw data used to make those calculations. Since disadvantaged communities in the CEJST will be defined at a very narrow geographic level, agencies need to prepare benefits and place of performance data at a narrow geographic level to perform these calculations. Agencies should report at the narrowest geographic unit possible.

Tribes. In addition, if the calculation of a benefit to a disadvantaged community includes investments outside of that community, the disadvantaged community should be consulted.

B. Justice40 Implementation Plan to Maximize Benefits. Within 60 days of issuance of this guidance, develop a draft implementation plan describing a) the agency's plan to maximize benefits of the covered program in disadvantaged communities; b) any significant barriers or constraints to maximizing benefits to disadvantaged communities; c) opportunities and/or resource needs that may address the identified barriers or constraints; and, d) timelines for achieving the milestones identified in the agency's plan.

C. Consider the Following Program Modifications to Maximize Benefits. When developing a Justice40 implementation plan to maximize benefits, that agency should consider the following guidelines, to the **extent consistent with statutory and constitutional requirements**, for modifying programs:

i. Foster well-paying job creation and job training, including a free and fair chance to join a union and collectively bargain.
ii. Coordinate investments and leverage funds where possible to provide multiple benefits and to maximize benefits.
iii. Avoid potential burdens to disadvantaged communities.
iv. Ensure transparency and accountability through full compliance with OMB requirements at 2 C.F.R. part 200 for financial assistance programs and provide public access to program information including through high quality data in compliance with Federal Funding Accountability and Transparency Act reporting (2 C.F.R. § 200.212).
v. Conduct outreach, and support technical assistance and capacity building to help potential applicants' access, manage, and report on results of funding.
vi. Hold competitive solicitations that prioritize or award extra points to projects that meet the criteria for benefiting disadvantaged communities and includes community engagement, planning, and feedback.
vii. When developing eligibility requirements in program guidelines and solicitation materials, establish targets or minimum thresholds for a specific benefit. For example, an agency could identify a certain percentage of total jobs for a project to be held by residents of a disadvantaged community in order to receive a higher priority for funding.
viii. Require applicants to apply cost savings from project implementation to benefit disadvantaged communities (e.g., energy cost savings reinvested in the local community to promote workforce development and community health).
ix. To the extent modifications are restricted by statute or regulation, describe what, if any, legislative changes would be required to advance the goals of Justice40 Initiative with respect to such covered program.

D. Calculating Benefits and Reporting. Within 60 days of issuance of this guidance, in line with section IV. A and V (but on the timeline specified in section VI.), provide a methodology for calculating, the covered program benefits

accruing generally and to disadvantaged communities. This methodology should also include a description of any additional metrics that the agency is developing to measure covered program benefits.

E. **Other Reporting.** The pilot programs listed in Appendix A should also plan to report the information outlined in section V.

Pilot programs should submit the requested information to EJ@omb.eop.gov by the stated deadlines. Agencies may also use EJ@omb.eop.gov to pose any questions regarding this guidance.

Appendix A. Justice40 Covered Program Pilot to Maximize Benefits to Disadvantaged Communities

Agency	Program
ARC	Partnerships for Opportunity and Workforce and Economic Revitalization (POWER)
DHS	Flood Mitigation Assistance Program
DHS	Building Resilient Infrastructure and Communities Program (BRIC)
DOE	Weatherization Assistance Program
DOE	Solar Energy Technologies Office (National Community Solar Partnership)
DOE	Vehicles Technologies Office (Clean Cities)
DOE	Environmental Management, Los Alamos
DOE	Advance Manufacturing Office (Industrial Assessment Centers)
DOI	Abandoned Mine Land Economic Revitalization (AMLER) Program
DOT	Bus and Bus Facilities Infrastructure Investment Program
DOT	Low or No Emissions Vehicle Program
EPA	Drinking Water State Revolving Fund
EPA	Clean Water State Revolving Fund
EPA	Brownfields Program
EPA	Superfund Remedial Program
EPA	Diesel Emissions Reductions Act Program (DERA)
EPA	Reducing Lead in Drinking Water
HHS	National Institute of Environmental Health Science (NIEHS) Environmental Career Worker Training Program
HHS	Low Income Home Energy Assistance Program (LIHEAP)
HUD	Lead Hazard Reduction and Healthy Homes Grants
USDA	Rural Energy for America Program

Appendix B. Internal Guidance for Agencies

A. Covered Program List

OMB has begun compiling a list of potential "covered programs" at https://go.max.gov/justice40. The programs listed have potential existing authorities that could be used to benefit disadvantaged communities. Agencies with covered programs are directed to begin examining (and consider modifications to) policies, practices, and procedures to implement the Administration's Justice40 goals. If an agency would like to request to add or remove a program from this list, please contact EJ@omb.eop.gov.

B. Agencies with Potential Covered Programs

Appalachian Regional Commission
Corporation for National and Community Service
Corps of Engineers--Civil Works
Delta Regional Authority
Denali Commission
Department of Agriculture
Department of Commerce
Department of Energy
Department of Health and Human Services
Department of Homeland Security
Department of Housing and Urban Development
Department of Justice
Department of Labor
Department of State
Department of the Interior
Department of Transportation
Department of Veterans Affairs
Environmental Protection Agency
National Aeronautics and Space Administration
National Science Foundation

Mercury Exposure in an Urban Pediatric Population

Philip O. Ozuah, MD, MSEd; Michael S. Lesser, MD; James S. Woods, PhD; Hyunok Choi, MPH; Morri Markowitz, MD

Objective.—To determine the prevalence of elevated urinary mercury (Hg), as a marker of exposure, in a population of children drawn from an inner-city community with documented access to elemental mercury.

Methods.—A prospective consecutive patient series was conducted from November 1998 to January 1999 at an inner-city clinic in New York. Anonymous urine specimens from subjects (aged 1–18 years) were collected in mercury-free containers, split, acidified with 1:100 hydrochloric acid, and frozen. Cold-vapor atomic absorption spectrofluorometric assays were conducted simultaneously at laboratories at the University of Washington and the New York City Department of Health.

Results.—We enrolled 100 children (mean age 9.4 years; 62% male; 55% Hispanic; and 43% African American). Assay results from both laboratories were strongly correlated ($r = 0.8$, $P < .0001$). Mean urinary Hg was 1.08 ± 1.82 μg/L. The 95th percentile for urinary Hg was 2.8 μg/L (range 0.2 to 11.7 μg/L). Five subjects had Hg levels above 5 μg/L.

Conclusion.—We found that 5% of subjects had unsuspected elevated urinary Hg levels. This finding, in a group of inner-city minority children, strongly supports the need for further investigation of the sources of mercury exposure in this population.

KEY WORDS: mercury; toxin exposure; urban health

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Childhood exposure to mercury is a growing concern among health care providers and public health officials. Some published reports suggest that a substantial proportion of inner-city minority populations may be engaged in ritualistic uses of elemental mercury.[1–6] These practices include sprinkling and burning elemental mercury in the home. The volatilization of elemental mercury may present a serious danger to home occupants, particularly children, because absorption of mercury vapor through the lung is nearly complete. Mercury, a potent neurotoxicant, has disproportionate effects on the developing organisms' central nervous system, and for the same dose of elemental mercury exposure, children are affected much more severely than adults.[7–9]

In a previous report, we found that elemental mercury was readily available at folk pharmacies in a community located in an inner-city section of New York.[1] However, the full extent of elemental mercury exposure in children from this community has not been investigated. Thus, the aim of this study was to determine the prevalence of elevated urinary mercury (Hg), as a marker of exposure, in a population of children drawn from an inner-city community with documented easy access to elemental mercury.

From the Albert Einstein College of Medicine/Children's Hospital at Montefiore (Dr Ozuah and Dr Markowitz), Bronx, NY; the New York City Department of Mental Health (Dr Lesser), New York, NY; the Department of Environmental Health (Dr Woods), University of Washington, Seattle, Wash; and the Albert Einstein College of Medicine/Department of Family Medicine (Mr Choi), Bronx, NY.

This paper was presented in part at the Annual Meetings of the Pediatric Academic Societies, Boston, Mass, May 2000.

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METHODS

Subjects and Setting

We conducted a prospective consecutive patient series from November 1998 to January 1999 at an ambulatory clinic in the South Bronx of New York City. The study site was located in the same community where we had earlier demonstrated widespread sales of elemental mercury.[1] Nearly all the children treated at this site reside in the same community. Of all children treated at this site, 69% are Hispanic, 30% are African American, and 99% are Medicaid eligible, below the federal poverty level, or working poor.

Inclusion criteria were as follows: 1) clinic visits for routine health maintenance or follow up, 2) routine urinalysis ordered by the physician, 3) no suspicion of urinary tract infection, and 4) age between 1 and 18 years. All children meeting the inclusion criteria were enrolled. All specimens were collected anonymously.

This study was approved by the Institutional Review Board at Montefiore Medical Center, Bronx, New York. Informed consent was waived because of the anonymous use of urine specimens originally collected for non-research purposes.

Laboratory Methods

Urine from each subject was placed in a polyethylene screw-cap container, acidified with 1:100 hydrochloric

acid, split into pairs, and immediately refrigerated at 4° or lower. Samples from each pair were packed in a Coleman cooler with frozen cold packs and shipped by overnight express delivery service to Dr Woods' laboratory at the University of Washington in Seattle and to the New York City Department of Health Bureau of Laboratories for analyses.

Analysis of mercury in urine samples was performed using a state-of-the-art PSA Merlin Mercury Analysis System. This system employs continuous-flow, cold-vapor spectrofluorometry for mercury detection, has rapid and random-access automatic sampling capabilities (40 samples in less than 1 hour), and affords the highest possible resolution of Hg concentrations in biological media (20 ppt [ng/L] practical detection limit). Data were stored and analyzed using a computerized Touchstone software program. Each urine sample was analyzed in duplicate, and the mean of the 2 analyses was computed as the Hg concentration of that sample. A complete series of quality-control test samples derived from standard reference materials inorganic Hg solutions, including both water and spiked urine samples containing total Hg concentrations in the range of 0 to 100 μg/L, was run with each set of analyses.

To determine the prevalence of elevated urinary Hg, we considered urinary Hg levels above 5 μg/L to be elevated. Although there are no firmly established background levels for urinary Hg in children, published data indicate that the vast majority of unexposed children should have urinary Hg levels below 5 μg/L.[9–11]

Data Analysis

The degree of correlation between urinary Hg measurements from both laboratories was examined by Pearson Correlation. Descriptive statistics were used to determine the distribution of mercury measurements.

RESULTS

A total of 100 children participated. There were no refusals. The mean age was 9.4 years. Sixty-two percent of subjects were boys, 55% were Hispanic, and 43% were African American.

Urinary Hg measurements from both laboratories were strongly correlated ($r = 0.8$, $P < .0001$). For all participants, the mean value of urinary Hg measurements was 1.08 μg/L (standard deviation ± 1.82). The 5th, 10th, 25th, 50th, 75th, and 95th percentiles for urinary Hg levels were 0.25, 0.25, 0.38, 0.64, 1.12, and 4.7 μg/L, respectively. The range was 0.2 to 11.7 μg/L.

Five subjects had urinary Hg levels greater than 5 μg/L, and 3 subjects had levels above 10 μg/L.

DISCUSSION

We found that 5% of children in this study had unsuspected elevated urinary Hg levels. These findings, in a group of inner-city minority children, have some ramifications. Published reports[12] indicate that dental personnel with urinary Hg measurements below 4 μg/L have subtle preclinical deficits in cognition, motor function, and mood. A substantial number of children in our study had urinary Hg levels above 4 μg/L. This is potentially significant because neurodevelopmental deficits have been shown to be more prevalent among inner-city minority children.[13] Thus, if present in the local environment, elemental mercury may be a contributing factor to the deficits observed in inner-city, low-income minority children.

We note several limitations of our study. As a result of the anonymous approach that was employed, we did not evaluate the children for recent dental work, number of dental amalgam surfaces, or dietary intake of fish. All of these factors have been associated with increased mercury burden.[14,15] Therefore, we were unable to directly link the measured urinary Hg levels with ritualistic practices. In addition, we were unable to link the urinary Hg measurements to individual demographic data. However, regardless of the source of exposure, elevated urinary Hg is deserving of concern, especially in children. Also, we were unable to assess any relationship between urinary Hg levels and neurobehavioral function in these children, although other studies have documented preclinical toxicity in adults with low levels of exposure.[12]

The findings of this pilot study indicate that mercury exposure is ongoing in this population of children. Comparable populations are extant in cities throughout the United States. Prior work identified ritualistic use of elemental mercury as a possible source of environmental mercury exposure in this community. However, the full scope of sources and ramifications of mercury exposure among these children require more extensive study.

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Hazardous rituals: mercury pollution in the Bronx

By Ozzie Ramos, The Bronx Journal, 10 June 2005. English Language.

For years, elemental mercury or *azogue*, has been used in the Afro-Caribbean communities for ritualistic purposes. Families practicing *Vodun*, *Santeria*, *Espiritismo*, and other underground religions often use the substance to cleanse their homes of spirits, to put spells on loved ones, even to improve the skin or cure intestinal disorders. "As a girl, I used to watch my aunt cleanse her home with mercury," said Evelyn Cordero of the Bronx, as she left La Division Botanica on Fordham Road. "I remember wondering what made the water glitter as she mopped."

In March, the Rockland County Department of Health added an article to its health code that prohibited keeping mercury in an uncovered container in homes. It also required that all mercury sold in stores must be correctly labeled in English, French and Spanish, and must contain warnings about its danger. In addition, vendors are required to inform buyers of the dire consequences of mercury spills and exposure.

"This was specifically done because of the knowledge that people in the Afro-Caribbean neighborhoods of Rockland were using mercury for ritualistic purposes," said Dr. Arnold Wendroff, the environmentalist and director of the Mercury Poisoning Project, who has been monitoring mercury use in these communities for more than ten years.

Is this a wake-up call for the Bronx?

Given the Bronx's much larger Haitian and Latino community, why has New York City's Department of Health not enacted similar laws banning the use of uncontained elemental mercury? "There is published hard data on mercury sales in the Bronx, and on the influx of mercury into the sewage treatment plants like Ward's Island," said Wendroff. "But no one wants to rock the boat because they know there's a major mercury problem in the Bronx."

Even Rockland County is careful about rocking the boat. Which is why, said Wendroff, the Rockland County Health Code sets its own level for the evacuation of buildings, using a measurement of mercury levels that is 100 times higher than those currently used in the rest of the country. (the national standard for evacuation in mercury spills is 1 microgram per cubic meter of air. For Rockland, it is 100 micrograms.). "And the reason why it's so high," he adds, "is apparently because the Rockland County Department of Health believes there is a problem, but they have no place to put people who would be displaced from their homes during an evacuation."

Carmen Santiago sells religious items at the Guadeloupe Botanica on the Grand Concourse and 183rd Street. "Mercury wards off evil spirits in the home, and has been used for that purpose for quite a while," she said. "I know mercury is bad for you and that the cops will close you down if you

sell it. I also know that you can still buy in some botanicas if you know someone. But I don't see it."

Neither does the owner of La Division Botanica, a man who calls himself "Professor" Eliseo, but refuses to reveal his given name. Eliseo, 52, who has owned his botanica for nine years and also teaches Espiritismo for $150 a session, said, "I have been men pour mercury from the jar into gelatin capsules to sell it for a couple of dollars. And I used mercury a couple of times myself by placing it in candles." Eliseo said he stopped after hearing about someone who drank mercury to cure his intestinal problems, but damaged his kidneys in the process. "I can tell you that mercury is being sold and used today. But I do not either sell it or use it," he adds. Instead, he employs herbal preparations in the rituals he practices.

Eliseo points out that since 9/11, paranoia has spread throughout the botanica circuit. "I've heard rumors that if you sell mercury, you can be arrested because the government would think you might be making bombs," he said.

There is no truth to the notion that mercury is an ingredient for bombs. It is also not illegal, as long as it is properly contained and labeled. What is true, however, is that mercury is a menace. Sprinkled on floorboards, it evaporates and seeps into the floors and walls for up to 15 years.

Inhabitants of an apartment inhale the invisible and undetectable vapors, which can damage the brain, heart, lungs, and liver. Children and fetuses are especially vulnerable to mercury's effects, which can include insomnia, bronchitis, emotional instability, neurological problems, gingivitis and developmental problems.

"What users don't know is how toxic mercury is long after they've used it," said Wendroff, "and how compromised developmentally they may become if they have been contaminated." Unlike lead or asbestos, he points out, mercury breaks up. "It's a liquid and a gas at the same time. The little droplets on the floor are continuously evaporating. And the vapor is what's toxic. It is inhaled and absorbed into the blood. The exposure is continuous and lasts for years." Which means that families who move into apartments where practitioners once sprinkled mercury are also at risk, although they may not suspect it.

To measure the extent of mercury use in the Bronx, doctors at Montefiore Medical Center conducted a study in 1995 in which an Espiritismo practitioner went to Bronx botanicas to see if she could buy mercury at each. She was able to buy unlabeled mercury at 38 of the 41 botanicas she visited. Thirty-five shops reported sales averaging 930 pounds a year. In addition, more than 29 percent of botanica workers and customers indicated that the primary way they used mercury was to sprinkle it on floors.

Since 1995, said Wendroff, "Somewhere between 8,000 and 50,000 homes per year are being contaminated with enough mercury to warrant evacuation."

Local environmentalists like Marian Feinberg, the environmental health coordinator of the organization "For a Better Bronx," believe that these statistics are alarmist and that putting the blame solely on the Hispanic community is racist. "If mercury is so dangerous, why are dentists still putting it in our mouths?" she said. "most of the mercury in the environment that we're exposed to comes from power plants. The tuna fish that you eat today is more dangerous. It's full of mercury."

Wendroff, who has a Ph.D in medical sociology with a specialty in the traditional medicine and witchcraft of the southeast African country of Malawi, where he served in the Peace Corps, first became aware of the mercury problem in 1991 while teaching science at a Brooklyn junior high school. Pointing to the symbol for mercury, he asked if anyone knew what it was used for, thinking that kids would reply, "Thermometers." However, one boy volunteered that his mother sprinkled mercury on the floor to ward off what is known in Santeria as brujo, or evil spirits. "It suddenly rang a bell," said Wendroff, who also noticed that the child was exhibiting signs of mercury exposure such as anorexia, irritability and forgetfulness.

Wendroff claims that not only are individual homes tainted by mercury use, so is the city's water supply. It becomes compromised when excess mercury is either flushed down toilets or poured down drains after Santeria rituals are completed.

However, mercury in the community has become a taboo subject. Few want to talk about it, and even fewer want to own up to the fact that it is a problem. The New York City Department of Environmental Protection tested New York City's waste water in late 2003 and early 2004 and discovered that there was an enormous excess of levels of mercury in the Ward's Island plant, which serves Washington Heights and the South Bronx.

Most politicians, like Congresswoman Nydia Velasquez, Senator Bill Bradley, former Mayor David Dinkins, and former Bronx Borough President, Fernando Ferrer, have paid lip service to the problem, but little more. Wendroff claims to have written to almost every local politician and said that they have either ignored him or voiced their concern with no follow-up. When The Bronx Journal contacted Bronx Borough President Alfonso Carrión and Ferrer for this article, they both refused to comment.

Mercury is a political hot potato, said Wendroff, in part because politicians fear alienating the Hispanic community by placing the blame on ritualistic mercury use, and in part because any real solution is expensive. "Cleaning up mercury spills can cost up to $50,000 per apartment," he explains. "It can be cleaned up. But first you have to find it, which is also expensive. And embarrassing. Because all these political people know. And so does the media. They're treating it as a 'potential health threat' and not doing the research themselves." In the end, he believes, the government, because of its past negligence, will be directly responsible for the cleanup.

What both Wendroff and Feinberg agree on is that public health education is crucial. "I don't think it's about politicians," said Feinberg. "It's about health education. The most affecting change will come when people will start to be more educated in general about the problem."

Still, Wendroff remains skeptical. He points out that in 2000 the New York City Department of Health created two pamphlets, one for laypersons in English, Spanish, and Creole, and another for health care workers. "But they never adequately distributed them to the public," he said. "They did a cover-your-ass operation. And that was it. The city is at a fabulous, fabulous legal liability. After all, our officials failed to seriously assess the problem. And they never communicated their concern to the people."

For now, the Bronx—and the New York City Department of Health—needs to take inspiration from Rockland. As Dr. Joan Facelle, Rockland's health commissioner, said bluntly, "We don't know the extent of the problem."

back to top

SATCON2

Community Engagement Working Group Report

SATCON2 Community Engagement Working Group

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Table of Contents

1. Summary and Overview

This report is part of a collection of Working Group Reports from the SATCON2 Conference.

1.1. Charge

The SATCON2 Community Engagement Working Group aimed to engage a broad and diverse swath of stakeholders in dark skies and near-Earth space who are impacted by large mega-constellations of tens of thousands of low-Earth orbit (LEO) satellites, beyond professional astronomy alone. The working group consisted of 22 members across 23 time zones including professional and amateur astronomers, members of sovereign Indigenous/First Nations communities, dark-sky advocates, planetarium professionals, and environmental/ecological non-governmental organizations. We set out to work together towards a new and effective conceptual, ethical, legal, and regulatory framework for the protection and sustainability of space and the night sky as a global cultural, natural and scientific commons. Community Engagement Working Group members invested thousands of volunteer hours in working group meetings, listening sessions with impacted constituencies, numerous conversations, developing, conducting and analyzing surveys, and finalizing our results and recommendations.

1.2. Constituencies

For SATCON2, the Community Engagement Working Group focused on five specific constituencies that had not previously been explicitly included in SATCON1 or other policy discussions about satellite constellations, including some groups traditionally excluded from political and economic power**:**

1. Astrophotography and Astro-Tourism
2. Amateur Astronomy
3. Indigenous Communities and Perspectives
4. Planetariums
5. Environmental and Ecological Concerns

They shared their feedback, needs and recommendations during listening sessions and conversations before the workshop and during dedicated sessions at the workshop.

We acknowledge that there remain many constituencies and perspectives not included in the Community Engagement Working Group that may prove important players in future negotiation and policy-making, such as telecommunication companies, space contractors, economic development groups, ground-based internet equipment suppliers, and Internet service providers.

The largest group not included explicitly in the Community Engagement Working Group is the population of humans world-wide who admire, cherish, view, connect with, seek solace from, practice traditional religion and culture with, navigate by, are inspired by, and need the stars, the Milky Way, and unpolluted night skies. Our principles and recommendations include them implicitly, and we call for explicit consideration of the rights of humanity to see the stars in all future space activities including satellite constellations.

We emphasize that these reports represent the needs and perspectives of individuals, specific communities, and those who were able to offer feedback and participate. Our compiled report does not speak for all members of any constituency, or all examples of a group, e.g., all Native American tribal communities or all environmental groups.

Last, we honor all the voices and communities who offered their time and feedback for the months leading up to the SATCON2 workshop and this report. This included many who have been historically marginalized and are overloaded by disproportionate fallout from climate change and the pandemic. We are grateful for their uncompensated labor in a time of loss, crisis fatigue, and global pain, in which we are quickly approaching our and our planet's ability to cope — much like overcrowded low-Earth orbits.

1.3. Background and Context

In early 2020 much of work and life as we knew it ground to a halt with the arrival of the COVID-19 pandemic on the global stage. But one activity continued unceasingly at pre-pandemic levels: the relentless launch of satellite constellations by private operators, while the world was roiled by climate change, economic collapse, racial injustice and of course, the still ongoing pandemic.

The 18 months leading up to SATCON2 revealed widening inequalities among all these factors, including the dire need for affordable accessible broadband for all as education, work and much of daily life went online. Globally available cheap broadband is the main promise and potential from companies such as Starlink, OneWeb and others. It remains to be seen whether this promise is fulfilled, but in the process we stand to clutter LEO orbits with hazardous space debris, blind our ground-based telescopes to the cosmos, imperil life and well-being with falling rocket bodies and increasing greenhouse gas emissions — and lose dark skies for all of humanity and all flora and fauna over the next few years. The impacts will likely affect a broad swath of constituencies across humanity, beyond professional astronomy alone. By invoking the democratization of space, the commons of space itself — as enshrined in the Outer Space Treaty of 1967 (OST) — continues to be claimed piecemeal by corporations in a longstanding pattern of unchallenged, unregulated "progress" on our collective behalf. We are reminded of this through regular headlines on space billboards and space tourism; the SATCON2 workshop week in mid-July was itself bracketed by the brief space adventures of Richard Branson, Jeff Bezos and their crews. Some working

group members contrasted that billionaire space race with the two-week Red Road to DC[1], which began during the SATCON2 workshop week, and involved the journey of a 25-foot Native American totem pole through sacred Indigenous lands from Washington state to Washington DC, highlighting historical and continuing exclusion and erasure of marginalized communities and culture.

We view this report as the beginning, rather than the end, of a conversation that is long overdue. We urge active ongoing engagement among federal agencies, private and state actors in space, professional societies and especially organizations and communities representing the diversity of stakeholders in our shared skies, so we can co-create a new, ethical, sustainable approach to space exploration rather than the current regulatory maze of siloed concerns enabling business as usual.

1.4. Common Themes and Principles

We identified common themes that recurred and resonated across the Community Engagement Working Group's five subgroups. Collectively, the Community Engagement Working Group offers the following observations and principles:

1. The skies and space belong to everyone. Space is a global commons.
2. All people are impacted by changes in the sky. Nearly all consulted for SATCON2 had already noticed a dramatic rise in satellite constellation sightings in the past two years, and were worried.
3. Many communities see the unchecked actions of space actors as colonization expanded to a cosmic scale during a time of global crisis.
4. The sky must be considered part of the environment and the current National Environmental Policy Act (NEPA) exemption for the satellite constellation industry must end.
5. Ecosystems depend on the night sky and on each other.

1.5. Recommendations

The Community Engagement Working Group offers the following nine recommendations to decision-makers, regulators, the satellite industry, researchers, and all communities affected by satellite constellations.

1. Duty to consult

Satellite operators must first consult all impacted groups, including the sovereign American Indian / Alaska Native nations and global Indigenous communities, before launching satellites. Industry must fully consider the concerns of Indigenous nations, including sovereignty, transparency, written agreements, and jurisdiction of treaties in space. Space belongs to us all and we need to listen to all constituencies impacted by satellite constellations. The OST establishes space as a global commons, and the American Astronomical Society (AAS) mission statement emphasizes inclusivity, sustainability, and the importance of humanity's understanding of the Universe.

1 https://redroadtodc.org/

2. Need for more information and communication

Communities want more information and dialogue. Astronomers and other parties concerned about the impacts of LEO satellite constellations need to engage, listen, share, and act with affected constituencies, government agencies, and cultural, grassroots, and political leaders. Decision-makers and private satellite operators must intentionally invite the voices and groups that have historically been excluded from the power structure and decision-making regarding space activity. Involving youth is a key aspect to co-creating solutions together to protect the Earth and skies that they will inherit.

3. Engage with industry

Astronomers and other interested and affected groups need to continue to engage with the satellite industry to build relationships and find common ground. The Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference proposed by the International Astronomical Union (IAU) is one possible venue for such engagement.

4. Recognize and rebalance power structures

Decision-makers and advocates for the regulation of LEO satellites should recognize the economic, legal, and political structures that continually affect technology choices. The regulatory process must take those power structures into account to optimize societal and environmental benefit with equity — power over a global commons comes with responsibilities to the global good. The social systems of economic and technological opportunities that enable satellite constellations focus on technological solutions; but there is only so much back-correcting that software can do to remove satellite streaks in images, or that engaging affected communities in dialogue, reports, and conferences can do to make amends once irreparable damage is done to the sky and to communities — just as removing plastics from the ocean is proving an impossible task. We urge the broad inclusion of all affected communities in meaningful dialogue from the start.

At the same time, there has been an enormous amount of volunteer labor from mainstream astronomy, communities and institutions devoted to addressing the challenges posed by satellite constellations. Funding for training and FTEs from agencies and industry is needed for continued efforts in the future.

5. Learn from the past

History offers valuable lessons on many issues of concern with satellite constellations, including environmental concerns, loss of millenia-old practices, and the painful legacies of colonization. The past century in particular offers ample examples of disruptive technologies that have been developed first and regulated only later, with varying degrees of cost, benefit, risk, and impact, e.g., telephones, trains/planes/cars, fossil fuels, and the Internet itself. Examples of global challenges requiring international collaboration include damage to the ozone layer, for which corrective action has been largely successful, and climate change, for which a global course of corrective action has remained elusive. We must learn from those examples as we grapple with the satellite constellation challenge.

6. "Science vs. Internet" is a false choice

Affordable broadband is crucial to almost all aspects of 21st century work and life, and some communities welcome satellite broadband. However, we must not assume that LEO satellite constellations are the only option, or that sacrificing the night sky is an acceptable trade-off. Industry and government agencies must develop a meaningful assessment of viable alternatives to satellite broadband, including ground-based fiber, from the aspects of cost, infrastructure and environmental impact. Satellite operator business models may not accurately assess the profitability of satellite constellation broadband Internet and its affordability for low-income users; in Mexico, Starlink currently charges roughly four times more than ground-based broadband, and one recent study found only a small overlap between global populations that need broadband and those that can afford to pay market rates for it. Costs of satellite constellations that are put on society — such as coping with space debris after satellite collisions or bankruptcies and environmental costs from launches, operations, and deorbiting — should be fully considered in the true cost of satellite constellations, rather than left as externalities.

7. Better international regulation and globally coordinated oversight/enforcement

We need coordinated international regulation of the satellite constellation industry with oversight and enforcement, in contrast to the current regulatory maze of siloed issues enabling business as usual. Most of the constituencies polled by the Community Engagement Working Group want industry to slow down until meaningful solutions can be developed in consensus, involving youth and communities. The fallout from unregulated unchecked satellite constellation launches includes dramatic predicted increases in all of the following: space debris, radio frequency interference, orbital traffic and collisions, environmental fallout in the upper atmosphere or oceans after satellite decommissioning, and global sky brightness (not just individual satellite streaks) washing out fainter stars or meteors, and undermining dedicated dark sky parks and preserves.

8. Slow or stop satellite constellation launches until problems are resolved

We strongly urge that the pace of launches be slowed or stopped until the issues can be much more fully understood and meaningful solutions to proven and likely problems can be developed in consensus. All the constituencies we polled and consulted are already noticing a dramatic rise in the number of satellites seen, when the number of satellites in orbit is currently only 5–10% of what is planned to be launched in the next decade. We need to plan for and mitigate both the known impacts of satellite constellations and a broad array of unintended consequences from them for many human endeavors.

9. Continued active engagement and conversation

The Community Engagement Working Group views the SATCON2 workshop as the beginning, rather than the end, of a long overdue conversation that was prompted by satellite constellations, but that extends

to far broader issues of preserving space and the night sky as a scientific, environmental and cultural commons for humanity. The Community Engagement Working Group urges active engagement and long-term relationship-building among industry, leadership, all space actors and communities representing the diversity of stakeholders in our shared skies so we can co-create an inclusive, ethical, and sustainable approach to space.

1.6. Subgroup reports

The reports from our five constituencies follow this overview. We emphasize that these reports represent the needs and perspectives of individuals, specific communities, and those who were able to offer feedback and participate. Our compiled report does not speak for all members of any constituency, or all examples of a group, e.g., all Native American tribal communities or all environmental groups. We acknowledge that we ran out of time and resources to include many perspectives at the workshop and in this report and that they still need to be honored, including the role of aesthetics, culture, heritage, art, storytelling, and humanity in our connection to the skies. There are other issues that we could do only peripheral justice to, including rural economic development, an assessment of alternatives to satellite broadband, the digital divide etc. Rather than being a comprehensive or conclusive document, this report shares early findings as we begin a long-term process of building relationships and listening to communities' needs and perspectives on the impact of LEO satellite mega-constellations, co-creating new ways for how we collectively approach space in the coming years.

4. Perspectives from Indigenous Communities

The primary authors of this section and subgroup members are, in alphabetical order of last name:

Fernando Avila Castro (Mestizo / Universidad Nacional Autónoma de México)
David Begay (Diné, Indigenous Education Institute and U. of New Mexico)
Juan-Carlos Chavez (Yaqui/Sonora, affiliate at the Blue Marble Space Institute of Science)
Alvin Harvey (Diné, MIT)
Kaʻiu Kimura (Native Hawaiian, ʻImiloa Astronomy Center of Hawaiʻi)
Annette Lee (Ojibwe and D(L)akota, St. Cloud State University)
James Lowenthal (Smith College)
Nancy Maryboy (Diné/Cherokee, Indigenous Education Institute and U. of Washington)
Hilding Neilson (Mi'kmaw, University of Toronto)
Doug Simons (Canada France Hawaiʻi Telescope and U. of Hawaiʻi)
Aparna Venkatesan (U. of San Francisco)

International perspectives on this report's topics were offered by Hilding Neilson, Fernando Avila Castro and Michele Bannister (non-Indigenous (Pākehā), University of Canterbury, New Zealand).

This report shares a summary of perspectives and needs as directly stated by our Indigenous colleagues and conference participants at SATCON2, primarily through the Community Engagement Working Group. We emphasize that these speakers and participants speak for themselves and their own experiences only, not their whole community or all Indigenous peoples or tribal nations.

We also respectfully draw the reader's attention to the References and Further Reading section at the end, which includes a brief (incomplete) compilation of articles co-authored by this subgroup's members and others on Indigenous perspectives in space and related report topics, as well as recent articles featuring subgroup members that draw attention to the ongoing role of satellite constellations in "astro-colonialism" and space as an environmental commons.

Opening the workshop, Dr. Chavez began by drawing attention to our relationship with Mother Earth and Father Sky, asking that we honor their gifts and take responsibility for our actions and choices as we

began this conversation. He invited all those working on these issues to bring our best intentions to this journey, and to seek ways to heal and learn from the past so we can do better and be better as beloved communities. He ended by seeking permission to continue in a good way so that our desire to progress does not come at the cost of elders or with ideals of empire, but so we can proceed in ways that honor our interconnectedness.

4.1. Key Themes

Some key themes that emerged from the morning talks and the afternoon Town Hall and breakout room on Indigeous and international perspectives are described below.

Indigenous peoples are part of sovereign nations — they are not special interest groups. Satellite constellations that are visible by the unaided eye on Earth will impact Indigenous peoples. The SATCON1 report noted in passing that the satellites might affect wayfinding practiced by different Indigenous peoples. It is commendable that the SATCON2 working groups included greater discussion about how Indigenous peoples might be harmed by or benefit from these satellites, including the voices of some Indigenous peoples. However, Indigenous peoples were included in the discussion as a special interest group along with amateur astronomers, astrophotographers, and others. This is inappropriate because Indigenous peoples in Canada and the United States are groups of sovereign nations with rights highlighted by treaties and the United Nations Declaration of the Rights of Indigenous Peoples. Consulting and including Indigenous peoples in a working group is a positive step from the SATCON1 report, but more work is needed for that discussion to be nation-to-nation and not colonizer-to-Indigenous peoples.

Altered relationship with the cosmos. Indigenous workshop speakers shared that "*satellites literally interrupt our relationship with the stars and ceremonial ways of connecting with them*", "*Stars are our ancestors and erasing them is erasing our tellings and scientific-cultural traditions*", and "*Land, sky and oceans are relationships, a verb*". Speakers emphasized the need for a relational ethical approach to space built on consensus and consultation. There is also a profound shift in our view of the stars as a fixed sphere, as we introduce more human-made moving objects into this realm.

A new form of colonization. The perspectives of Indigenous peoples with respect to outer space and the expected rapid growth of satellite constellations are important and necessary. Indigenous peoples from around the globe have observed the night sky since time immemorial and have a sophisticated and complex relationship with the visible night sky. As sovereign peoples and cultures, the rapid growth of these satellite constellations can have a significant and negative impact on this relationship. Many Indigenous stories are written in the stars. Light pollution has acted to erase Indigenous stories and identities — again — disconnecting these peoples from the night sky, mirroring the painful history of colonization in which Indigenous peoples lost their land and water. Speakers viewed light pollution as erasing their stories and satellites as rewriting them. They shared successful collectives to honor and preserve ancestral knowledge about Indigenous star stories and sky traditions, including Pai Pai star stories[29] from the bilingual 68 Voices project[30] based in Mexico, and the highly successful nonprofit Native

29 https://68voces.mx/pai-pai-el-origen-de-los-celos
30 https://68voces.mx/

Skywatchers[31] founded by astronomer-artist Dr. Annette Lee. Speakers also raised the disproportionate impact of colonization, climate change and COVID19 on Indigenous communities.

Duty to consult. Indigenous peoples and nations must be consulted and their decisions should be respected. Many nations might view these satellites as inappropriate and as another form of pollution or colonization, but many nations might view the benefits of the satellites, such as access to broadband internet, as being valuable to their communities. However, it is not the purview of the workshop report authors, or academia and industry, to dictate the impact of these LEO satellites on Indigenous peoples. As such, the discussion would be better served as a nation-to-nation dialogue that includes consultation and consent.

Urgent need for cultural competency in space agencies and space actors. The accelerating situation with satellite constellations and the use of near-Earth space reveals an urgent need for space policy and scientific programs rooted in cultural competency and sensitivity to cultural traditions. NASA could lead the way by having an Office of Tribal Affairs or an Office of Cultural Protocol. Such an office could address ongoing practices around sensitive issues (e.g., what is heritage and who gets to define it; the thriving export business of human remains and ashes to near-Earth space). Several participants also suggested that NASA is missing an opportunity for due diligence on a major international issue: engaging sovereign nations in space exploration. NASA has much to learn from Indigenous ways of knowing and integrative scientific-cultural practices such as wayfinding, which have reflected for millennia the relatively new NASA values of Inclusion and Mission Success. Participants shared that a talking circle with NASA leadership is needed — something that has been very rich when allowed to happen — rather than the current approach of being sent in circles when Indigenous scientists and communities wish to be heard.

We can also learn from inclusive or creative approaches in other countries, e.g., in New Zealand, a small yet highly active spacefaring nation. Recent major national shifts in cultural competency include the official declaration[32] of the heliacal rising of Matariki (The Pleiades) as a national holiday honoring Māori calendrical and cultural traditions. In addition, national initiatives in New Zealand are required to protect and enact Māori principles and incorporate Māori in economic and cultural development, as per Te Tiriti o Waitangi | the Treaty of Waitangi. The New Zealand government has to consider how any policy affects Māori empowerment and communities, including for instance in science implementation and funding.[33] New Zealand has five dark-sky reserves at present, for culture, astrotourism, and science; iwi-owned astrotourism in the largest reserve contributes to rural economic development, and the increased visibility of satellites there has been noted.

Legal and policy issues in space in the context of treaties with Sovereign Indigenous Nations. A growing number of issues need legal clarification and explicit addressing[34]. These include: how do we define the environment of the Earth, where does Earth end and space begin, and what is the legal jurisdiction of Earth's laws? What are the legal obligations for state and private actors in space given existing treaties with sovereign Indigenous nations? We need written agreements between industry,

31 https://www.nativeskywatchers.com/
32 https://www.mbie.govt.nz/business-and-employment/employment-and-skills/employment-legislation-reviews/matariki/matariki-public-holiday/
33 http://www.maramatanga.co.nz/sites/default/files/Rauika%20Ma%CC%84ngai_A%20Guide%20to%20Vision%20Ma%CC%84tauranga_FINAL.pdf
34 E.g., https://www.nature.com/articles/d41586-021-01954-4

spacefaring countries and Indigenous nations that respect these treaties and these communities' sovereignty. Such agreements must be transparent and include cost analysis so that agreements are not dependent on a new generation of leaders and people. Looking at New Zealand's approach once more, Aotearoa (the Maori name for New Zealand) is a new Artemis Accords signatory with public statements[35] emphasizing Māori principles of sustainability and stewardship of natural resources, as applied to outer space, which is termed an environment. Legal scholars are yet to answer the broader legal question of whether night skies are implicit in the multiple existing agreements and treaties between state actors and Indigenous peoples.

Systematic studies are needed on the viability of satellite broadband and outcomes for economic development. Two of our subgroup members drew attention to the unfolding situation as regards satellite broadband in their countries.

In Mexico, as an example, Dr. Avila Castro shared that as of July 2021, according to official data[36] 31% of the working population earns 3700 pesos a month or less, or approximately a third of the population earns $185 USD or less a month at current exchange rates of $1 USD = 20 pesos. Only 2% of the working force earns 18,700 pesos ($925 USD) a month. The announced price of Starlink in Mexico is the same as in the USA: An initial $500 USD (10,000 pesos) and a monthly fee of $99 USD (2,000 pesos). With this information we can easily see that Starlink is completely out of reach of the vast majority of the population. On the other hand, Mexico has 84 million internet users which is around 70% of the overall population. In urban areas, internet coverage is acceptable and affordable through cellular (3G, 4G), and ground-based internet (DSL, cable, optic fiber). As with other services, rural areas are the ones left behind so it could be argued that Starlink could fill those gaps in coverage. However, rural areas have the lowest incomes meaning that satellite internet is completely unaffordable for them. Even if resources are pooled to share a satellite link for the whole community, infrastructure has to be acquired, installed, and maintained (routers, cables, WiFi antennas, etc) and at that point it makes more sense to solve the last mile problem through conventional internet access. But let's expand the scenario even further, e.g., that Starlink is installed and operating through a community effort. What is going to happen if the Starlink project doesn't pan out and has to shut down the service? Now the community has invested a lot of money, only to be left with some proprietary antennas that are no longer useful. This is what technological colonization means in a developing country. You no longer own the infrastructure or services — they are owned instead by a private company in a foreign country[37]. So for the developing world, satellite internet in this form does not have a real market to expand, nor does it have a long term benefit for the people. However, people in these countries will suffer the increase in light pollution, and the loss of their traditional tales and stories in the skies. Any short-term benefits from satellite broadband may therefore be eclipsed by long-term economic and other impacts, with no clear path of recovery.

35 https://www.beehive.govt.nz/release/space-exploration-soars-artemis-accords

36 Data come from the National Institute of Statistics, Geographical Information (INEGI), and the Federal Institute of Telecommunications (IFT).

37 More broadly, fiber optic cables can serve multiple data-carrying functions in multiple formats for multiple providers and users from individuals to corporations to governments for multiple decades. In contrast, satellite dishes to access satellite broadband internet are fixed to one household account with one private provider corporation using one format of data transmission, and are prone to rapid obsolescence.

In the case of the nation of Canada, Dr. Neilson shared that access to broadband internet has been promised by governments for years[38]. To that end the Canadian government has committed support to the satellite company Telesat[39] which currently has a constellation of about 300 LEO satellites in space to provide broadband internet access to almost two million Canadians who lack affordable access. Most of this access will impact large areas of Canada with small population densities who are disproportionately Indigenous. At the time of writing, it is unclear whether and how many communities have been consulted about this.

Nuanced approaches without appropriation are required. Indigenous peoples have their own governance, rights and needs. Both academia and industry should avoid statements emphasizing preferred narratives around satellite constellations. We must avoid such appropriations of Indigenous perspectives and needs, or misinterpreting them for pre-determined uses — this is a real issue now that astronomers are at the receiving end of colonization. Nuanced approaches that engage in long-term relationships and listening with communities are needed, recognising that consensus building happens differently in each community and culture. This is not a single issue across all Indigenous peoples (e.g., cultural sky traditions); rather, this is a complex tradeoff between broadband access, economic development, cultural heritage, and survival (many Indigenous peoples do not have access to clean water or other basic necessities).

We end by sharing that the co-Chairs of the Community Engagement Working Group were invited into extended dialogue with a circle of Oceania wayfinders ranging from Hawai‘i to Aotearoa and many Pacific communities, starting in the week of the SATCON2 workshop. It would be inappropriate to attempt to summarize these conversations this early in the process, but we honor the wayfinders’ gracious invitation into dialogue as we collectively move forward to preserve the health and integrity of the ocean above us as well as the ocean between our lands.

We express gratitude and support for these Indigenous perspectives offered at SATCON2. We hope that we can listen, consult, learn from the past and co-create an ethical sustainable future in space that honors our interconnection and does not come at the expense of things that belong to us all.

38 https://crtc.gc.ca/eng/internet/internet.htm
39 https://www.telesat.com/about-us/

6. Environmental and Ecological Impacts of Satellite Constellations

The primary authors of this section and subgroup members are:

James Lowenthal (Smith College)
Diana Umpierre (Sierra Club)
Erika Nesvold (JustSpace Alliance)
Sally Carttar (National Park Service)

The Environmental Impacts subgroup of the SATCON2 Community Engagement Working Group researched and discussed numerous aspects of environmental and ecological impacts of satellite mega-constellations, held a virtual listening session with the Sierra Club, held dedicated presentation and discussion sessions during the SATCON2 workshop, and reached out to numerous individuals with expertise in environmental conservation and related concerns. Here we report the main issues and themes that surfaced from those inquiries and discussions.

We offer three main recommendations, summarized here and expanded below:

1. Earth-orbiting space should be considered part of Earth's environment, legally and otherwise.
2. Satellite constellations should not be exempt from NEPA review.
3. Sovereignty should be respected with regard to space and the night sky.

6.1. Historical, political, and environmental context

Just as the SATCON2 conference got underway to grapple with the challenges posed by Elon Musk's SpaceX Starlink and other mega-constellations of LEO satellites, news headlines around the world highlighted the race to space by two other billionaires, Jeff Bezos of Blue Origin and Richard Branson of Virgin Galactic. At the same time, much of the American and Canadian west was suffering from record-breaking heat waves and wildfires, as was Greece, while other areas, including parts of Germany and Belgium, saw massive and fatal flooding following unprecedented torrential rainfall, all exacerbated by anthropogenic climate change. Several members of the Community Engagement Working Group and people interviewed pointed out the ironic contrast between the dire material needs of the vast

majority of the Earth's population and the indulgences of some of the richest men in the world, as if the wealthy were literally escaping a planet on fire by means unavailable to most people. Others drew parallels between the current space race, including the development of satellite constellations, and the long history of colonial imperialism over the last millennium: the new natural resource up for grabs is space itself, to be exploited and capitalized by the highest bidders and the quickest and largest private corporations.

International legal and philosophical conception of the need to protect space for all humanity was enshrined, soon after the advent of the Space Age, in the OST. The OST lays the foundation for peaceful international cooperation and universal access to space, but it contains no explicit reference to the need for environmental protection against harm from human activities in space. More than 50 years later, facing the prospect of a rapid and manifold expansion and commercialization of activity in space, the United Nations Office of Outer Space Affairs (UNOOSA) issued the first Guidelines for the Long-Term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space (UN COPUOS 2021). Guideline A.2 reads in part:

> *In developing, revising or amending, as necessary, national regulatory frame- works, States and international intergovernmental organizations should...:*
>
> > *b: Implement space debris mitigation measures, such as the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, through applicable mechanisms;*
> > *c: Address, to the extent practicable, risks to people, property, public health and the environment associated with the launch, in-orbit operation and re-entry of space objects;*

Gilbert & Vidaurri (2021) study existing national and international case law and conclude that consideration of the NEPA should be applied to space activities — contrary to the practice of the US Federal Communications Commission (FCC), which is to disregard environmental impacts when considering applications by satellite operators for licenses to launch and operate satellite constellations. Sutherland (2021) describes the process by which NASA applies NEPA, in contrast to the FCC. Cirkovic (2021a,b) argues for a new "cosmolegal" conception of space and space law that recognizes the limitations of traditional terrestrial legal frameworks and the potential risks from overcrowding of orbits, space debris, and possible contamination of other planets by human activity in space. Comparisons between the problems of space debris, satellite constellations, and climate change become even more concrete given the prediction that increasing levels of atmospheric CO_2 will reduce drag on LEO satellites, making them stay in orbit longer (O'Callaghan, 2021).

Thus there is growing concern about the environmental impacts of satellite constellations, and precedent for implementing regulation and national and international law to control, mitigate, minimize, or eliminate those impacts.

6.2. Environmental harm from satellite constellations

Environmental harm from satellite constellations occurs during all three phases of satellite constellation lifetimes. Below we summarize the major impacts we found in the literature and from our discussions.

I. Impacts to the natural and human environment identified or predicted from launching satellite constellations include**:**

   a. Large quantities of CO_2, NOx, water vapor, and other greenhouse gases and toxic substances are produced by combustion of liquid and/or solid fuel during rocket launches (see Dallas et al., 2020 for a comprehensive review). Depending on the type of fuel used and the size of the launching rocket, up to 300 tons of CO_2 can be produced per launch. The breakdown of water vapor released in the stratosphere leads to depletion of the ozone layer (Marais, 2021).
   b. Combustion of kerosene fuel produces black carbon, and combustion of solid rocket fuel produces soot and alumina, both of which can affect the albedo (reflectivity) of Earth's atmosphere to sunlight (Lawler & Boley, 2021).
   c. Pollution associated with rocket launches, including over sensitive habitats such as the Gulf Coast in Texas and Cape Canaveral in Florida, negatively impacts humans and wildlife alike. Rocket launching facilities that are placed in environmentally delicate areas and/or near low-income or marginalized people raise questions about environmental justice and equity, e.g., the SpaceX spaceport near Boca Chica, TX (Sandoval & Webner, 2021).
   d. Falling debris and explosions associated with failed rocket launches have raised concerns and protest among neighbors of proposed launching sites, e.g., Little Cumberland Island, Georgia, where Camden County plans a new spaceport (Marvar, 2021).

II. Impacts on the natural and human environment identified or predicted from operating LEO satellites at orbit-raising and final station altitude include**:**

   a. Possible disruption of various species' ability to navigate using the stars. A wide range of species are suspected or known to use the stars and even the Milky Way to navigate (e.g., Foster et al., 2018; Sokol, 2021; Fritts 2021), from dung beetles (Foster et al., 2021) to bats (Stone, Harris & Jones, 2015), harbor seals (Mauck et al., 2008), and migratory songbirds (Emlen, 1967; Wiltschko et al., 1987; Pakhomov, Anashina & Chernetsov, 2017). The possibility that the proliferation of bright artificial LEO satellites could lead to the disruption of migration by many millions or billions of individual animals (Lintott & Lintott, 2020) is still new enough just two years after the first launch of Starlink satellites that no peer-reviewed studies have been published yet reporting confirmed impacts of satellite constellations on animals; however, numerous members of the working group felt that there was sufficient reason to be concerned about such possible effects on animals that the precautionary principle should apply, and that launches should be halted unless and until the effects are demonstrated to be negligible.
   b. Interference with the timeless and profound human experience of regarding the starry sky. The night sky is a fundamental part of nature, and one that provides us with solace, inspiration, and connection with countless generations before us and, one hopes, yet to come. The human right to see the naturally dark, unpolluted, starry night sky has been articulated in the Declaration in Defense of the Night Sky and the Right to Starlight (Starlight Foundation, 2007), and Resolution B5 in Defence of the Night Sky and the Right to Starlight (International Astronomical Union, 2009), and by the US National Park Service, which operates an extraordinarily popular Night Skies program whose motto is "Half the Park is After Dark" and whose philosophy is that naturally dark skies are, like clean air and clean

water, a natural resource to which every human has a right (National Park Service, 2021). Satellite constellations have the potential to dramatically and irrevocably alter the naked-eye appearance of the night sky (e.g., Lawler, Boley & Rein, 2021; Lawler and Boley, 2021; Skibba, 2021).

c. Earth-orbiting satellites know no national boundaries, and several Community Engagement Working Group members pointed out the need to respect the sovereignty of other nations, including Native American and other Indigenous peoples, who may regard outer space and the night sky as part of the environment, even if the FCC does not.
d. The rise in overall night-sky brightness due to the combined light from many thousands of satellites, even if individually invisible to the naked eye, may already be a significant new form of light pollution; Kocifaj et al. (2021) calculate that the night sky may already be as much as 10% brighter than natural as a result of the integrated reflected light from all artificial objects currently in orbit, including fewer than 2000 Starlink satellites out of more than 10,000 planned; that contribution to overall sky brightness will inevitably grow as more satellite constellations are put in orbit. Reasonable estimates based on planned satellite constellations just in the 2020's imply that the night sky could be artificially brightened by as much as 250%, erasing the view of the Milky Way and more than half of naked-eye visible stars (see the Astrophotography subgroup report of the Community Engagement Working Group). The circadian rhythms of humans and animals are generally thought to be controlled by the perception of integrated and diffuse light such as from the sky (Brown, 2016), rather than from individual light sources, and many species are sensitive to extremely low levels of light, well below 1 lux (e.g., Walbeek et al., 2021). Therefore an overall elevation of night sky brightness by satellite constellations may have profound and negative effects on many or most species of flora and fauna on Earth. Again, the field is too new for there to be published empirical studies yet, but Community Engagement Working Group members argued that the precautionary principle should apply.
e. Some interviewees indicated that any potential impacts on the integrity and continuance of Earth Observation (EO) satellites from orbital debris collisions and especially a potential debris cascade (the Kessler syndrome) due to overcrowding of orbits would be points of major concern to the environmental and ecological justice community, from scientists and activists to policy makers. Many of those EO satellites operate in LEO. For decades, EO satellites have provided data that have helped humanity understand, appreciate and protect the planet's atmosphere and ecosystems. They have exposed the vulnerability of our planet and the limits of our natural resources. They provided evidence and now the means to monitor our progress, or lack thereof, in tackling the climate and biodiversity crises. Whether directly or indirectly, whether knowingly or not, these constituents have benefited from EO observations in their work on ecosystems, natural resources, wildlife biodiversity, agriculture, food security, transportation, weather, water and air quality, light pollution, wildfires, disaster response, smart growth, climate adaptation, energy transition, social justice, and much more.

   Unfortunately, because the focus on identifying and communicating impacts and mitigations related to satellite mega-constellations has been primarily on astronomy, most of the communities working on environmental, ecological and social justice issues (including

non-profit organizations) are largely unaware of the challenges that thousands of new LEO satellites, and associated space debris, could pose to current and future EO satellites.

While intentional and meaningful outreach to these communities has only recently started, questions from them so far have included:

- Who is bearing the burden of costs associated with tracking these many objects, mitigating potential issues, and the loss or reduction of public benefits, if the operations of EO satellites are compromised?
- Will future launches of EO satellites be affected or reduced by more congested LEOs?
- How will cascading collision events, especially with untracked debris, affect the EO satellites we have come to depend on in respect of issues of great environmental importance, such as monitoring pollution and land cover changes affecting people and wildlife?
- What sustainability and carrying capacity studies are being carried out, if any, to ensure the safety and health of the planet's atmosphere and the equitable access to near-Earth orbits, especially among marginalized communities?

f. Community Engagement Working Group members pointed out that even with sophisticated decommissioning plans in place, individual satellite operators can go, and already have gone, bankrupt, potentially leaving thousands of satellites stranded in orbit, perhaps for thousands of years. This is perhaps analogous to leaving wrecked cars by the side of the highway indefinitely, a practice no modern society accepts.

III. Impacts on the natural and human environment identified or predicted from decommissioning LEO satellites include:

a. Aluminum and rare-earth metals deposited mostly in the atmosphere and the oceans but also on land during re-entry of satellites, either planned or accidental. Boley & Byers (2021) estimate that from the eventual re-entry of the fewer than 2000 Starlink satellites already in orbit as of this writing, the deposition of aluminum into the atmosphere will exceed that from all natural causes, primarily the steady rain of small asteroids and micrometeoroids (roughly 50 tons per day), that Earth collects (e.g., Rojas et al., 2021).

b. The greatly increased likelihood, given the numbers of satellites planned in LEO, of unplanned or uncontrolled re-entries resulting in the direct impact of satellites or satellite fragments with the ground, possibly causing direct injury or loss of life to humans or animals. Residents of the Pacific Northwest got a dramatic demonstration of such a scenario when a SpaceX Falcon 9 made an uncontrolled re-entry into the atmosphere, producing a spectacular fireball witnessed by thousands (Ives, 2021).

The Community Engagement Working Group makes the following recommendations regarding the proven or plausible impacts on the human and natural environment of launching, operating, and decommissioning LEO satellite constellations:

1. **Earth-orbiting space should be considered part of Earth's environment, legally and otherwise**. There was a strong consensus that the region of space occupied by Earth-orbiting satellites and the night sky should be considered an integral part of the environment and of the human experience of the natural world. To limit the concept of the environment to the surface of Earth and its atmosphere but to exclude the starry night sky or even objects passing through the atmosphere en route to or returning from LEO is to make an arbitrary distinction that defies common sense and universal experience.
2. **Satellite constellations should not be exempt from NEPA**. There was strong consensus that NEPA, which the FCC has so far declined to invoke in considering licence applications by potential operators of satellite constellations, should in fact be applied, and that environmental impact studies should be required components of such license applications.
3. **Sovereignty should be respected with regard to space and the night sky.** Even if the FCC does not consider space to be part of the environment or subject to NEPA review, other nations can and do consider space, the starry sky, the Milky Way, the planets and the Moon to be part of the environment, nature, cosmology, cultural and spiritual heritage and practice. Introducing satellite constellations to the night sky, especially if bright enough to be seen naked eye, thus threatens the autonomy and wellbeing of people of other sovereign nations including Indigenous and First Nations people, and undermines the concept of space as a commons as enshrined in the OST.

WHO European Ministerial Conference on Health Systems: "Health systems, health and wealth"
Tallinn, Estonia, 25–27 June 2008

BACKGROUND DOCUMENT

Performance measurement for health system improvement: experiences, challenges and prospects

Peter C. Smith, Elias Mossialos and Irene Papanicolas

WORLD HEALTH ORGANIZATION
EUROPE

Performance measurement for health system improvement: experiences, challenges and prospects

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Contents

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Key messages

- Performance measurement offers policy-makers a major opportunity for securing health system improvement and accountability.
- Performance measurement aims to improve the quality of decisions made by all actors within the health system.
- Securing improved performance measurement often requires the active leadership of government.
- Major improvements are still needed in data collection, analytical methodologies, policy development and implementation of health system performance measurement.
- Definitions of performance indicators should be clear, consistent and fit into a clear conceptual framework.
- Policy-makers should pay particular attention to the political and organizational context within which performance data are collected and disseminated.
- Considerable progress has been made in developing performance indicators for acute hospital care, primary care and population health, but for mental health, financial protection and health system responsiveness research is at a much earlier stage of development.
- The development of individual performance indicators requires concerted expert and political attention, and these indicators should: aim to provide information that is relevant to the needs of specific actors; attempt to measure performance that is directly attributable to an organization or actor; aim to be statistically sound, easy to interpret and unambiguous; and be presented with full acknowledgement of any data limitations.
- The presentation of performance measurement data and how this influences its interpretation by patients, providers and practitioners and the public require more attention.
- Public reporting has many benefits, but can lead to adverse outcomes; mechanisms should be put in place to monitor and counteract these adverse outcomes.
- An important use of performance measurement is to provide feedback to clinical practitioners on their actions and how these compare to those of their peers.
- Performance measurement systems should be monitored frequently to ensure alignment with other health system mechanisms and to identify areas for improvement.
- Experiments under way to examine how performance measurement can be used in conjunction with explicit financial incentives to reward provider performance are a promising area for policy and a priority for further research.
- A better evidence base on which to underpin performance measurement policy is needed, and new initiatives should be subject to rigorous evaluation.

Executive summary

Performance measurement offers policy-makers a major opportunity to secure health system improvement and accountability. Its role is to improve the quality of decisions made by all actors within the health system, including patients, practitioners, managers, governments at all levels, insurers and other payers, politicians, and citizens as financial supporters.

Recent major advances in information technology and increasing demands for health system accountability and patient choice have driven rapid advances in health system performance measurement. Health systems, however, are still in the relatively early stages of performance measurement, and major improvements are still needed in data collection, analytical methodologies, and policy development and implementation.

Health system performance has a number of aspects – including population health, health outcomes from treatment, clinical quality and the appropriateness of care, responsiveness, equity and productivity – and progress is varied in the development of performance measures and data collection techniques for these different aspects. Considerable progress has been made in such areas as acute hospital care, primary care and population health, but in such areas as mental health, financial protection and health system responsiveness, research is at a much earlier stage of development.

The first requirement of any performance measurement system is to formulate a robust conceptual framework within which performance measures can be developed. Definitions of performance indicators should then fit into the framework and satisfy a number of criteria, such as face validity, reproducibility, acceptability, feasibility, reliability, sensitivity and predictive validity. Besides paying attention to these technical considerations, policy-makers should pay careful attention to the political and organizational context within which performance data are to be collected and disseminated.

Numerous technical questions arise when analysing and interpreting performance measures. Among the most important are: what has caused the observed performance and to what practitioners, organizations or agencies should variations in performance be attributed? In some areas, advanced analytical methods of risk adjustment have been developed to help answer the question about attribution.

In some aspects of health care, patient safety is a major concern, and methods of statistical surveillance have been developed to help detect anomalous performance rapidly and confidently. An example of anomalous, though not necessarily unsafe, performance is the overuse of a particular intervention, and the need to find out whether it means something unsafe for patients would then follow the initial finding of an *anomaly*.

More attention should be paid to the presentation of performance-measurement data and how patients, providers, practitioners and the public interpret it and are influenced by it. For example, a particularly contentious issue is the use of *composite* measures of performance, which seek to combine several performance indicators into a single measure of organizational or system performance. These are superficially attractive, as they can help summarize levels of attainment in an accessible fashion, but they can also lead to faulty inferences and should be used with caution.

Policy-makers can use performance measurement in a number of ways to promote system improvement. It can be used in *public reporting of performance*, sometimes in the form of organizational *report cards*. This has been found to have an important beneficial effect, particularly on provider organizations. However, it has so far had little direct effect on patients and can also lead to adverse outcomes, such as avoidance of patients with complex health problems. Mechanisms should be put in place to monitor and counteract such tendencies.

Experiments are under way to examine how performance measurement can be used with *explicit financial incentive*s to reward health care provider performance. This is a promising policy area. However, such schemes raise a number of important questions about design, such as which aspects of performance to target, how to measure attainment, how to set targets, whether to offer incentives at the individual or group level, how strong to make the link between achievement and reward, and how much money to attach to an incentive. So far, there is little convincing research evidence of the effectiveness of such incentives, and this is a priority for further research.

Targets, a quantitative expression of an objective to be met in the future, are a particular form of incentive mechanism. They have been particularly prevalent in the area of public health. Their effectiveness in securing major system improvements, however, has been questioned, and it is unlikely that they will secure such improvements unless aligned with other policy levers, such as strong democratic accountability, market mechanisms or direct financial incentives.

Performance measurement can also be used to provide *feedback to clinical practitioners* on their performance relative to their peers. These feedback systems can secure widespread improvements in performance. However, to be successful, they need to be owned by

the practitioners and usually require careful statistical risk adjustment to control for confounding patient characteristics. Also, the need to provide feedback that does not immediately threaten the reputation or livelihood of clinicians and other professionals can at times conflict with the demand for public reporting.

Securing improved performance measurement is an important stewardship task of government, as many of the benefits of performance measurement cannot be realized without the active leadership of government, whether through law, regulation, coordination or persuasion. Stewardship responsibilities associated with performance measurement can be summarized under the following headings:

1. *development of a clear conceptual framework and a clear vision of the purpose of the performance measurement system:*

- alignment with accountability relationships;
- alignment with other health system mechanisms, such as finance, market structure and information technology;

2. *design of data collection mechanisms:*

- detailed specification of individual indicators;
- alignment with international best practice;

3. *information governance:*

- data audit and quality control;
- ensuring public trust in information;
- ensuring well-informed public debate;

4. *development of analytical devices and capacity to help understand the data:*

- ensuring analysis is undertaken efficiently and effectively;
- ensuring local decision-makers understand the analysis;
- commissioning appropriate research on, for example, risk adjustment, uncertainty and data feedback mechanisms;

5. *development of appropriate data aggregation and presentational methods:*

- ensuring information has appropriate effect on all parties;
- mandating public release of summary comparative information;
- ensuring comparability and consistency;

6. *design of incentives to act on performance measures:*

- monitoring effect of performance information on behaviour;
- acting to enhance beneficial outcomes and negate any adverse consequences;

7. *proper evaluation of performance-measurement instruments:*

- ensuring money is spent cost-effectively on information resources;

8. *managing the political process:*

- developing and monitoring policy options;
- encouraging healthy political debate;
- ensuring that specific interest groups do not capture the performance information system.

None of these roles need be undertaken by government itself, but it must be ensured that they all function effectively.

Performance measurement for health system improvement: experiences, challenges and prospects

Policy issue

Information plays a central role in the ability of a health system to secure improved health effectively and efficiently for its population. It can be used in many diverse ways, such as tracking public health, monitoring health care safety, determining appropriate treatment paths for patients, promoting professional improvement, ensuring managerial control and promoting the accountability of the health system to the public. Underlying all of these efforts is the role performance measurement plays in guiding the decisions that various stakeholders – such as patients, clinicians, managers, governments and the public – make in steering the health system towards better outcomes.

Records of performance-measurement efforts in health systems can be traced back at least 250 years *(1,2)*. More formal arguments for the collection and publication of information on performance were developed more than 100 years ago, when such pioneers in the field as Florence Nightingale and Ernest Codman campaigned for its widespread use in health care. Until recently, professional, practical, and political barriers have prevented these principles from becoming a reality *(3)*. For example, Nightingale's and Codman's efforts were frustrated by professional resistance and, until recently, information systems have failed to deliver their promised benefits, in the form of timely, accurate and comprehensive information.

Over the past 25 years, however, health system performance measurement and reporting have grown substantially, thus helping to secure health system improvement. Many factors have contributed to this growth. On the demand side, health systems have come under intense pressure to contain costs; also, patients now expect to make more informed decisions about their treatment, and strong demands have been made for increased audit and accountability of the health professions and health service institutions *(4,5)*. On the supply side, the great advances in information technology have made it much cheaper and easier to collect, process and disseminate data.

In many respects, the policy agenda is moving away from discussions of whether performance measurement should be undertaken and what data to collect and is moving towards determining the best ways in which to summarize and present such data and how to integrate it successfully into effective structures for governance. Yet, despite the proliferation of performance-measurement initiatives, there remain a large number of unresolved questions about the collection and deployment of such information. Health systems are still experimenting with the concept of performance measurement, and much still needs to be done to realize its full potential.

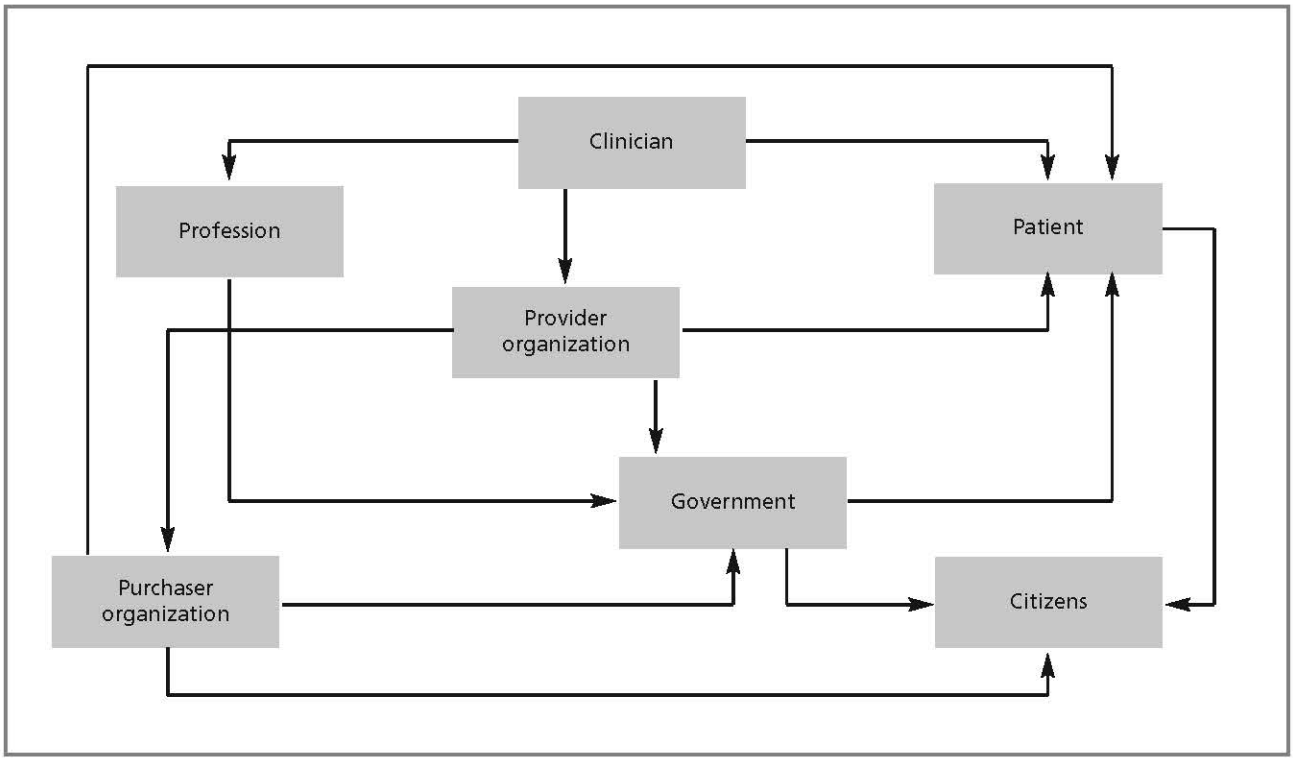
This document reviews some of the main issues emerging in the debate about performance measurement and draws on a detailed collection of essays by leading experts in the field. These essays were prepared for the WHO Ministerial Conference on Health Systems, in Tallinn, Estonia, and are due to be published after the conference by Cambridge University Press *(6)*. The document first examines the purpose of performance measurement and the different areas for which data are collected. It then examines the different ways in which performance measurement has been presented and used for health system improvement internationally. Finally, it discusses the major challenges found in presenting and using performance measures and concludes by presenting key lessons and future priorities for policy-makers.

Purpose of performance measurement

Health systems are complex entities with many different stakeholders, including patients, clinicians, health care providers, purchaser organizations, regulators, the government and the broader public. These stakeholders are linked by a series of accountability relationships (Fig. 1). Accountability has two broad elements: the rendering of an account (providing information) and the consequent holding to account (sanctions or rewards for the accountable party). Whatever the precise design of the health system, the fundamental role of performance measurement is to help hold its various agents to account, by enabling stakeholders to make informed decisions. It is therefore noteworthy that, if the accountability relationships are to function properly, no system of performance information should be viewed in isolation from the broader system design within which the measurement is embedded.

Each of the relationships described in Fig. 1 has different information needs in terms of the nature of the information, its detail and timeliness, and the level of aggregation required. For example, in choosing which provider to use, a patient may need detailed comparative data on health outcomes. In contrast, in holding a government to account and in deciding for whom to vote, a citizen may need highly aggregated summaries and trends. Many intermediate needs also arise. In deciding whether providers are performing adequately, a purchaser (such as a social insurer) may need both broad, more aggregated information and detailed assurance of safety aspects. A fundamental challenge for performance measurement is to design information systems that serve these diverse needs. Table 1 examines this issue in more detail.

Fig. 1. A map of some important accountability relationships in the health system



In practice, the development of performance measurement has rarely been pursued with a clear picture of who the information users are or what their information needs might be. Instead performance-measurement systems have usually sought to inform a variety of users, typically presenting a wide range of data in the hope that some of the information collected will be useful to different parties. Yet, given the diverse information needs of the different stakeholders in health systems, it is unlikely that a single method of reporting performance will be useful for everybody. Instead, data sources should be designed and exploited to satisfy the demands of different users. This may often involve using data from the same sources in different forms. A major challenge for health systems is, therefore, to develop more nuances in the collection and presentation of performance measures for the different stakeholders without imposing a huge burden of new data collection and analysis.

Defining and measuring performance

In general, performance measurement seeks to monitor, evaluate and communicate the extent to which various aspects of the health system meet their key objectives. Usually, those objectives can be summarized under a limited number of headings – for example, health conferred on people by the health system, its responsiveness to public preferences, the financial protection it offers and its productivity. *Health* relates both to the health outcomes secured after treatment and to the broader health status of the population. *Responsiveness* captures aspects of health system behaviour not directly related to health outcomes, such as dignity, communication, autonomy, prompt service, access to social support during care, quality of basic services and choice of provider. *Productivity* refers to the extent to which the resources used by the health system are used efficiently in the pursuit of effectiveness. Besides a concern for the overall attainment in each of these areas, *The world health report 2000 (7)* highlighted the importance of distributional (or equity) issues, expressed in terms of inequity in health outcomes, responsiveness and payment. Table 2 summarizes these largely universal aspects of health performance measures.

Various degrees of progress have been made in the development of performance measures and data collection techniques for the different aspects of health performance. In some areas, such as population health, there are well-established indicators – for example, infant mortality and life expectancy (sometimes adjusted for disability). Even here, however, important further work is needed. A particular difficulty with population health measures is estimating the specific contribution of the health system to health. To address this, researchers are developing new instruments, such as the concept of *avoidable mortality (8,9).*

Table 1. Information requirements for stakeholders in health care systems

Stakeholder	Examples of needs	Data requirements
Government	Monitoring the health of the nation Setting health policy Ensuring that regulatory procedures are working properly Ensuring that government finances are used as intended Ensuring that appropriate information and research functions are undertaken Monitoring regulatory effectiveness and efficiency	Information on performance at national and international levels Information on access and equity of care Information on utilization of service and waiting times Population health data
Regulators	Protecting patient's safety and welfare Ensuring broader consumer protection Ensuring the market is functioning efficiently	Timely, reliable and continuous information on patient safety and welfare Information on probity and efficiency of financial flows
Payers (taxpayers and members of insurance funds)	Ensuring money is being spent effectively, efficiently and in line with expectations	Aggregate, comparative performance measures Information on productivity and cost–effectiveness Information on access to (and equity of) care
Purchaser organizations	Ensuring that contracts offered to their patients are in line with the objectives the patients expect	Information on patient experiences and patient satisfaction Information on provider performance Information on the cost–effectiveness of treatments
Provider organizations	Monitoring and improving existing services Assessing local needs	Aggregated clinical performance data Information on patient experiences and patient satisfaction Information on access and equity of care Information on utilization of service and waiting times
Physicians	Staying up to date with current practice Being able to improve performance	Information on current practice and best practice Performance information benchmarks
Patients	Being able to make a choice of provider when in need Information on alternative treatments	Information on location and quality of nearby emergency health services Information on quality of options for elective care
The public	Being reassured that appropriate services will be available if needed in the future Holding government and other elected officials to account	Broad trends in and comparisons of system performance at national and local level Efficiency information Safety information

The contribution of the health system to health care can be more reliably captured in terms of clinical outcomes for patients. Traditionally, this contribution has been examined using post-treatment mortality, which is a blunt instrument. However, increasing interest is focusing on more general measures of improvements in patient health status, often in the form of patient-reported outcome measures. These measures are derived from simple surveys of subjective health status administered directly to patients, often before and after treatment. Numerous instruments have been developed, often in the context of clinical trials. These take the form of detailed condition-specific questionnaires or broad-brush generic measures *(10)*.

Table 2. Aspects of health performance measures

Measurement area	Description of measures	Examples of indicators
Population health	Measures of aggregated data on the health of the population	Life expectancy Years of life lost Avoidable mortality Disability-adjusted life-years
Individual health outcomes	Measures of individual's health status, which can be relative to the whole population or among groups Indicators that also apply utility rankings to different health states	Generic measures: • Short form 36 (SF-36)[a] • EQ-5D[b] Disease-specific measures: • arthritis impact measurement scale • Parkinson's disease questionnaire (PDQ-39)
Clinical quality and appropriateness of care	Measures of the services and care patients receive to achieve desired outcomes Measures used to determine if best practice takes place and whether these actions are carried out in a technologically sound manner	Outcome measures: • health status • specific post-operative readmission and mortality rates Process measures: • frequency of blood pressure measurement
Responsiveness of health system	Measures of the way individuals are treated and the environment in which they are treated during health system interactions Measures concerned with issues of patient dignity, autonomy, confidentiality, communication, prompt attention, social support and quality of basic amenities	Patient experience measures Patient satisfaction measures
Equity	Measures of the extent to which there is equity in health, access to health care, responsiveness and financing	Utilization measures Rates of access Use–needs ratios Spending thresholds Disaggregated health outcome measures
Productivity	Measures of the productivity of the health care system, health care organizations and individual practitioners	Labour productivity Cost–effectiveness measures (for interventions) Technical efficiency (measures of output/input) Allocative efficiency (measured by willingness to pay)

a SF-36 is a multipurpose, short-form health survey with only 36 questions.

b EQ-5D is a standardized instrument for measuring the outcome of a wide range of health conditions and treatments. It provides a simple descriptive profile and a single index value for health status that can be used in the clinical and economic evaluation of health care and in population health surveys.

Source: Smith et al. *(6)*.

To measure performance when monitoring outcomes from health care interventions over time and between providers, the policy challenge is to identify the most appropriate choice of instrument. In England, for example, the government has recently mandated the use of the generic patient-reported outcome measure instrument EQ-5D for use for all National Health Service patients undergoing four common procedures. This experiment will assess the costs of such routine use and will test whether the resistance of some health professionals to patient-reported outcome measures is sustained. Also, while the relevance of patient-reported outcome measures to acute care is clear, their application to such areas as chronic disease and mental illness remain less well developed.

Although clinical outcome measures are the gold standard for measuring effectiveness in health care, their use can be problematic – for example, if the outcomes cannot realistically be assessed in a timely or feasible

Table 3. Usefulness of structural outcome and process indicators

Type of indicator	Advantages	Disadvantages	Most useful areas
Outcome	Often more meaningful to stakeholders Attention directed to (and health goals focused on) the patient Encourages long-term health-promotion strategies Not easily manipulated	May be ambiguous and difficult to interpret, as they are the result of many factors that are difficult to disentangle Takes time to collect Requires a large sample size to detect statistically significant effects Can be difficult to measure – for example, wound infection	To measure quality of homogeneous procedures To measure quality of homogeneous diagnosis with strong links between interventions and outcomes To measure quality of interventions made to heterogeneous populations that suffer from a common condition
Process	Easily measured without major bias or error More sensitive to quality of care Easier to interpret Require a smaller sample size to detect statistically significant effects Can often be observed unobtrusively Provide clear pathways for action Capture aspects of care valued by patients (aside from outcomes)	Often too specific, focusing on a particular intervention or condition May quickly become dated as models of care and technology develop May have little value to patients unless they understand how they relate to outcomes May be easily manipulated	To measure quality of care, especially for treatments where technical skill is relatively unimportant To measure quality of care of the homogeneous conditions in different settings

Source: Adapted from Davies *(13)* and Mant *(14)*.

fashion. This is particularly important for chronic diseases. Measures of the process then become important signals of future success *(11)*. Process measures are based on actions or structures known to be associated with health system outcomes, in either health or responsiveness. An example of an action might be appropriate prescribing, which is known from research evidence to contribute to good outcomes *(12)*. Also, the concept of *effective coverage* is an important population health process measure. Table 3 summarizes the basic advantages and disadvantages of using outcome and process indicators and the areas of performance measurement where they are most useful.

Work in the area of responsiveness is inherently challenging, as in principle it requires general surveys of both users and non-users of health services. Also, aggregating diverse areas into usable summary indicators of responsiveness is problematic. The World Health Survey of households in over 70 countries contained a *responsiveness* module that offers some potential for proposing operational solutions to the routine measurement of health system responsiveness *(15)*.

Financial protection from the catastrophic expenditure associated with ill health is a fundamental health system concern. Many high-income countries have introduced universal insurance coverage to address this issue, but even then there are quite large variations in measures of financial protection between countries and over time. The issue, however, is even more acute in many lower-income countries, where there are massive variations in the extent to which households (especially the poor) are protected from catastrophic expenditure. There is therefore increasing interest in WHO and the World Bank developing reliable and comparable indicators of financial protection *(16)*. A major challenge is to move beyond the immediate expenditure on health care, to trace the longer-term implications for household wealth and savings.

Finally, productivity (and efficiency) is perhaps the most challenging measurement area of all, as it seeks to offer a comprehensive framework that links the resources used to the measures of effectiveness described above. The need to develop reliable measures of productivity is obvious, given the policy problems of trying to decide where limited health system financial resources are best spent and of trying to identify inefficient providers. The experience of *The world health report 2000 (7)*, however, illustrates how difficult this task is at the macro

Box 1. Hospital benchmarking in Finland

Background

In Finland, in 1997, the National Research and Development Centre for Welfare and Health launched a research and development project (Hospital Benchmarking) to produce benchmarking information on hospital performance and productivity *(18)*. The main aims of the project were:

- to develop a new measure to describe the output of hospitals that was better than traditional measures, such as admissions or outpatient visits; and
- to provide the management of hospitals with benchmarking data for improving and directing activities at hospitals.

Data collection

The project was expanded to cover nearly all publicly delivered specialized health care in Finland and, in 2006, data from the project was integrated into the production of national statistics. Data for the Hospital Benchmarking project are collected annually from hospitals, and they include both inpatient and outpatient care, along with information on diagnoses and procedures. The project produces a wide range of hospital and regional (hospital-, district- and municipality-based) indicators on hospital productivity and costs – by specialty, inpatient wards and diagnosis-related groups. By using uniform personal identity codes, the different episodes of care of the same patient can be linked together.

Uses of data

The data allow regional measurement of productivity and costs, which indicate, for example, how much the costs of a hospital district or a municipality deviate from the national average and how much of this deviation depends on the inefficient delivery of services and the use of services per person.

Hospital Benchmarking data have been used increasingly for appraising and directing hospital activities. Results from the Hospital Benchmarking project indicate that productivity of hospitals decreased somewhat during the years 2001–2005 and that there are significant differences in productivity between hospitals *(19)*.

level. And the accounting challenges of identifying resources consumed become progressively more acute as one moves to finer levels of detail, such as the meso level (provider organizations, for example), the clinical department, the practitioner, or – most challenging of all – the individual patient or person *(17)*. Box 1 gives details of the Finnish experience with producing benchmarking data to use for productivity improvement.

Methodological issues about performance measurement

The diverse uses of health system performance measures necessitate a wide variety of measurement methods, indicators, analytical techniques and approaches to presentation. Also, different methods of data collection – such as national surveys, patient surveys, administrative databases and routinely collected clinical information – are needed to assemble these diverse

Box 2. OECD Health Care Quality Indicators Project

Background

Since its beginning, in 2001, the OECD Health Care Quality Indicators Project has aimed to track the quality of health care in a number of countries, to assess the quality of international health care. This is done by developing a set of indicators based on comparable data that can be used to investigate quality differences in health care among countries.

Indicators

The five areas in which indicators are being collected are:

1. patient safety
2. quality of mental health care
3. quality of health promotion, illness prevention and primary care
4. quality of diabetes care
5. quality of cardiac care.

The collection of indicators follows a twofold process. Initially, data will be gathered from a limited set of new indicators prepared by teams of internationally renowned experts in each of the five areas. Then country experts in all five areas will conduct work that will provide the basis for improving quality data systems across countries.

Source: Health Care Quality Indicators Project *(20)*.

types of information. The area of performance under scrutiny will determine the most appropriate data collection technique. For example, when measuring responsiveness, household or individual surveys are likely to be the best sources of patient experiences and perspectives, whereas when looking at specific clinical outcomes, clinical registries may be a more informative and cost-effective source of information. In practice, although performance measurement efforts have progressed over recent years, many health systems still rely on readily available data as a basis for performance measurement.

The first requirement in any performance measurement system is to develop a robust conceptual framework within which performance measures can be developed. This should ensure that all major areas of health system performance are covered by the measurement system, that priorities for new developments can be identified and that collection and analysis efforts are not misdirected or duplicated. In short, the eventual requirement is to develop an optimal portfolio of performance-measurement instruments. An example of such a framework is the Organisation for Economic Co-operation and Development (OECD) Health Care Quality Indicators Project, which seeks to assemble a suite of performance indicators that are common to a large number of national performance measurement schemes (Box 2).

Detailed issues about methodology arise when

Table 4. Characteristics of good performance indicators

Stages	Characteristics of indicators
Development of indicators	*Face/content validity*: the extent to which the indicator accurately measures what it purports to measure
	Reproducibility: the extent to which the indicator would be the same if the method by which it was produced was repeated
Application of indicators	*Acceptability*: the extent to which the indicator is acceptable to those being assessed and those undertaking the assessment
	Feasibility: the extent to which valid, reliable and consistent data are available for collection
	Reliability: the extent to which there is minimal measurement error or the extent to which findings are reproducible should they be collected again by another organization
	Sensitivity to change: the extent to which the indicator has the ability to detect changes in the unit of measurement
	Predictive validity: the extent to which the indicator has the ability to accurately predict

Source: Adapted from Campbell et al. *(21)*.

considering the design of individual indicators. An important consideration is the level at which to present performance data. Possibilities include the macro level (such as national life expectancy), the meso level (such as post-operative mortality rates in hospitals) and the micro level (such as health outcomes achieved by individual practitioners). Table 4 summarizes some of the characteristics of good indicators. The intention is to develop performance measures that exhibit the characteristics of acceptability, feasibility, reliability, sensitivity to change and validity.

The following sections look more closely at the methodological considerations that need to be taken into account when selecting which indicators to use and how to use and interpret them.

Attribution and causality

Fundamental questions that arise when seeking to interpret many performance data are: what has caused the observed performance and to which practitioners, organizations or agencies should variations in performance be attributed? Hauck, Rice & Smith *(22)* show that there are immense differences in the extent to which the health system influences performance measures, ranging from a very large effect on responsiveness measures (such as waiting time) to a small effect on population mortality, which is heavily influenced by factors outside the health system. Such variations should be considered when holding providers and other stakeholders to account. To guide policy, improve service delivery and ensure accountability, it is critical that the causality of observed measures is attributed to the correct source(s). When using statistical methods to evaluate causal relationships and guide policy, researchers and policy-makers should be careful to control properly for measurement and attribution bias *(23)*. Box 3 gives key considerations that users of performance measures need to take into account when addressing causality and attribution bias.

Risk adjustment is an approach widely used to address the problem of attribution. It adjusts outcome data according to differences in resources, case mix and environmental factors, thereby seeking to enhance comparability (Box 4). In health care, in particular, variations in patient outcomes will have much to do

Box 3. Key considerations when addressing causality and attribution bias

Users of performance measures should consider the following recommendations when addressing causality and attribution bias.

Reports of research that investigates a possible causal and attributable link between the agents being assessed and the quality outcome proposed should be evaluated with particular attention to:

- the study methodology;
- its controls for confounding variables; and
- the generalizability of the study sample.

Prospective analyses to identify critical pathways involved in the achievement of desired and undesired processes and outcomes of care should be undertaken. These analyses should try to:

- identify possible confounders; and
- identify the extent to which agents under assessment are or can be clustered into homogeneous groupings.

In new performance measurement initiatives, sources of random and systematic error in measurement and sampling should be carefully considered when developing the design. Procedures of data collection that maximize the reliability and accuracy of data (both primary and secondary) used for quality assessment should be institutionalized.

Risk-adjustment techniques should be employed when evaluating the relationship between agents under assessment and the quality indicators. Hierarchical models should be used to account for the clustering of data within different levels of the health system under analysis. The use of statistical methods, such as propensity scores or instrumental variables, should be considered.

Causality and attribution bias cannot be completely eliminated, even when utilizing the best available statistical methods. Unintended effects from biases in assessment of performance should be monitored carefully, especially when reimbursement or other incentives are linked to the measures.

Source: Adapted from Terris & Aron *(23)*.

Box 4. Statistical considerations when performing risk adjustment

Risk adjustment often involves using statistical modelling applied to large databases with information from many providers. The techniques produce weighting schemes for assessing patient risk. The statistical models can then be used to estimate the *expected* outcome for a provider, given its mix of patients or populations. Its actual outcome is then compared with this benchmark. The following should be considered when performing risk adjustment.

- Optimal risk-adjustment models result from a multidisciplinary effort that involves the interaction of clinicians with statisticians, as well as with experts in information systems and data production.
- Different practice patterns, patient characteristics and data specifications may limit the transferability of models across different countries. Before applying a model developed in another setting, clinicians and methodologists should examine its clinical validity and statistical performance.
- Decision-makers should be wary when drawing conclusions about the performance of risk-adjustment models from statistical summary measures (such as coefficient of determination, R^2, values), as these measures may not capture the model's predictive ability for different patient subgroups.
- In cases where it is believed that patient characteristics may also influence differences in the treatment patients receive, it may be more appropriate to apply risk stratification instead of (or alongside) risk adjustment.

Source: Adapted from Iezzoni *(24)*.

with variations in patient attributes, such as age or socioeconomic class, and any co-morbidities. Similar considerations apply when comparing measures of population health. In such cases, it is essential to employ methods of risk adjustment when using indicators and comparing agents. A key question then is: for what is the agent under scrutiny accountable? In the short run, for example, a health system has to deal with the epidemiological patterns and risky behaviour it inherits. This implies a major need for risk adjustment when comparing it with other health systems. In the longer run, one might expect the health system to be accountable for improving epidemiological patterns and health-related behaviour. The need for risk adjustment then becomes less critical, as the health system is responsible for many of the underlying causes of the measured outcomes.

Since early efforts with diagnosis-related groups in the United States, the methods of risk adjustment have been steadily refined over a period of 40 years, particularly in adjusting for outcomes for specific diseases or health care treatments. A key issue remains the quality (especially the completeness) of the data on which risk adjustment is undertaken, especially the presence of co-morbidities or other complications. Recording these data depends (ultimately) on the practitioners whose performance is being assessed, so there is an ever-present threat to the integrity of the data if the incentives associated with performance comparison are too stark. Also, most risk-adjustment efforts are still works in progress, and there is often a need for careful qualitative clinical commentary on any risk-adjusted data, as there are often technical limitations to any scheme. Risk adjustment, however, is almost always essential if performance measurement is to secure credibility with practitioners, so it is important that efforts to improve on current methodologies are sustained.

A specific issue in the interpretation of many performance data is random variation, which by definition emerges with no systematic pattern and is always present in quantitative data. Statistical methods become central to determining whether an observed variation in performance has arisen by chance, rather than from variations in the performance of agents within the health system. As a matter of routine, confidence intervals should be presented alongside performance indicators. In the health care area, a challenge for such methods is to identify genuine outliers in a consistent and timely fashion, without signalling an excessive number of *false positives*. This is crucial when undertaking surveillance of individual practitioners or teams. In dealing with this situation, one must ask: when does a deviation from expected outcomes become a cause for concern and when should a regulator intervene? Statistical methods of squeezing maximum information from time series of data are now reaching an advanced stage of refinement and offer great scope for more focused intervention *(25)*.

Composite measures

Health systems are complex entities with multiple aspects, making performance very difficult to summarize, especially through a single measure. Yet, when separate performance measures are provided for the many different aspects of the health system under observation – such as efficiency, equity, responsiveness, quality, outcomes and access – the amount of information provided can be overwhelming. Such information overload makes it difficult for the users of performance information to make any sense of the data. In response to these problems, the use of composite indicators has become increasingly popular. Composite indicators combine separate performance indicators into a single index or measure and are often used to rank or compare the performance of different practitioners, organizations or systems, by providing a bigger picture and offering a more rounded view of performance *(26)*.

However, if composite indicators are not carefully designed, they may be misleading and could lead to serious failings if used for health system policy-making or planning *(27)*. One of the main challenges in creating composite indicators is deciding which measures to

Table 5. Advantages and disadvantages of composite indicators

Advantages	Disadvantages
Offer a broad assessment of system performance	May disguise failings in specific parts of the health care system
Place system performance at the centre of the policy arena	Make it difficult to determine where poor performance is occurring and, consequently, may make policy and planning more difficult and less effective
Enable judgement and cross-national comparison of health system efficiency	Often can lead to double counting, because of high positive correlation
Offer policy-makers at all levels the freedom to concentrate on areas where improvements are most readily secured, in contrast to piecemeal performance indicators	May use feeble data when seeking to cover many areas, which may make the methodological soundness of the entire indicator questionable
Clearly indicate which systems represent the best overall performance and improvement efforts	May make individual measures used contentious and hidden, due to aggregation of the data
Can stimulate better data collection and analytic efforts across health systems and nations	May ignore aspects of performance that are difficult to measure, leading to adverse behavioural effects
	May only reflect certain preferences when inadequately developed methods for applying weights to composite indicators are used

Source: Adapted from Smith *(27)*.

include in the indicator and with what weights. As composite indicators aim to offer a comprehensive performance assessment, they should include all important aspects of performance, even if they are difficult to measure. In practice, however, there is often little choice of data, and questionable sources may be used for some components of the indicator. Considerable ingenuity may therefore be needed to develop adequate proxy indicators *(26, 27)*.

Fundamental to composite indicators is the choice of weights (or importance) to be attached to the component measures. All the evidence suggests that there exist great variations in the importance different people attach to different aspects of performance, so the specification of a single set of weights is fundamentally a political action. This indicates that the choice of weights requires political legitimacy on the part of the decision-maker. Analysis can therefore inform, but should not determine, the choice of weights. There exists a body of economic methodology for inferring weights, which includes methods for calculating willingness to pay, for eliciting patient's preferences from rankings of alternative scenarios, and for directing making choices in experiments. These economic methods, however, have not been widely applied to the construction of composite indicators of health system performance *(27)*.

Besides capturing effectiveness, a primary benefit of composite indicators is that they allow the construction of measures of the overall productivity (or cost–effectiveness) of a health system. In particular, a composite measure of health system attainment can be assessed alongside expenditure without the need to assign an expenditure to specific health system activities. This was a principle underlying *The world health report 2000 (7)*. However, the response to that report emphasized that many aspects of constructing composite attainment and productivity indicators are disputable. Table 5 takes a closer look at the advantages and disadvantages of using composite indicators for health performance assessment.

Using performance measurement: key policy levers

Rapid advances in technology and analytical methodology, coupled with changing public and professional attitudes, have made the use of large-scale information systems for performance assessment and improvement increasingly feasible *(4)*. Experiences with realizing the potential of new data resources to improve system performance, however, have so far shown inconsistent results, and no consensus exists yet on the best way to proceed. This section looks at some of the experiences in using data for performance improvement and at the lessons learned to date.

Information systems

Many of the earliest efforts to use performance data concentrated on collecting and organizing existing administrative information and disseminating it for management applications. These early efforts focused mainly on cost containment and resource allocation. Examples include the development of diagnosis-related

Box 5. The Nordic collaboration

Background

A Nordic Council of Ministers working group, consisting of 3–4 representatives from each of the Nordic countries (Denmark, Finland, Greenland, Iceland, Norway and Sweden), was established in 2000. Its overall aim is to facilitate collaboration between the Nordic countries through the development of quality indicators and the creation of a foundation for evaluations that should benefit the public, health care professionals and health managers.

Indicators

Six subgroups work on selecting generic and disease-specific indicators and indicators within the areas of patient safety, psychiatry, primary health care, acute somatic care, public health and preventive health care, and patient-experienced health care. So far, the joint quality indicators selected for the Nordic countries fall under the following categories:

1. general and disease-specific indicators (mortality and survival rates for common illnesses);
2. health promotion and ill health prevention;
3. mental health;
4. primary care;
5. patient safety; and
6. the patient experience.

Source: National Board of Health and Welfare *(30)*.

groups to compare hospital costs in the United States and the release of a suite of performance indicators in England to help managers understand how their local health systems compared with the rest of the country. Although (from a managerial perspective) such methods are valuable in better exploiting existing data sources, little attention was given to the use of this information for evaluating external accountability or clinical treatment *(28)*.

Later developments, such as the establishment of the Canadian Institute for Health Information in 1994 and the Nordic collaboration in 2000 (Box 5), used large databases of performance measurement in more creative ways to assist with evidence-based decision-making in health planning and with accountability. Initially, performance data were used mostly by federal and provincial institutions. Reports and summary statistics, however, have increasingly been made available to the public – for example, in the form of the Statistics Canada annual reports. The Canadian Institute for Health Information also focused on analysing the data collected to produce reliable summary indicators, to better understand why trends or patterns emerge and, thus, to best guide policy *(29)*.

Recent technological developments have increased the ability to store a greater volume of information with a greater level of detail, distribute it more widely and flexibly, and update it more quickly. In the future, the development of the electronic health record – containing all the information on a patient's health history – offers vast potential for capturing performance in many areas. Many challenges, however, need to be addressed if this potential is to be transformed into reality. First, due to the sheer amount of data and the speed at which it can be processed, auditing its accuracy is becoming increasingly important and challenging; the possibility of error carries with it severe implications, if increasing reliance is to be placed on performance data. Second, the constant development of technology calls for continual investment in (and maintenance of) the information infrastructure and entails the need to ensure that the increasing number of information systems are mutually compatible, if their full value is to be exploited. Third, coordination is crucial to ensuring that the information collected is comparable across institutions and settings. Finally, the storage and use of so much information raises ethical concerns about patient privacy *(31)*.

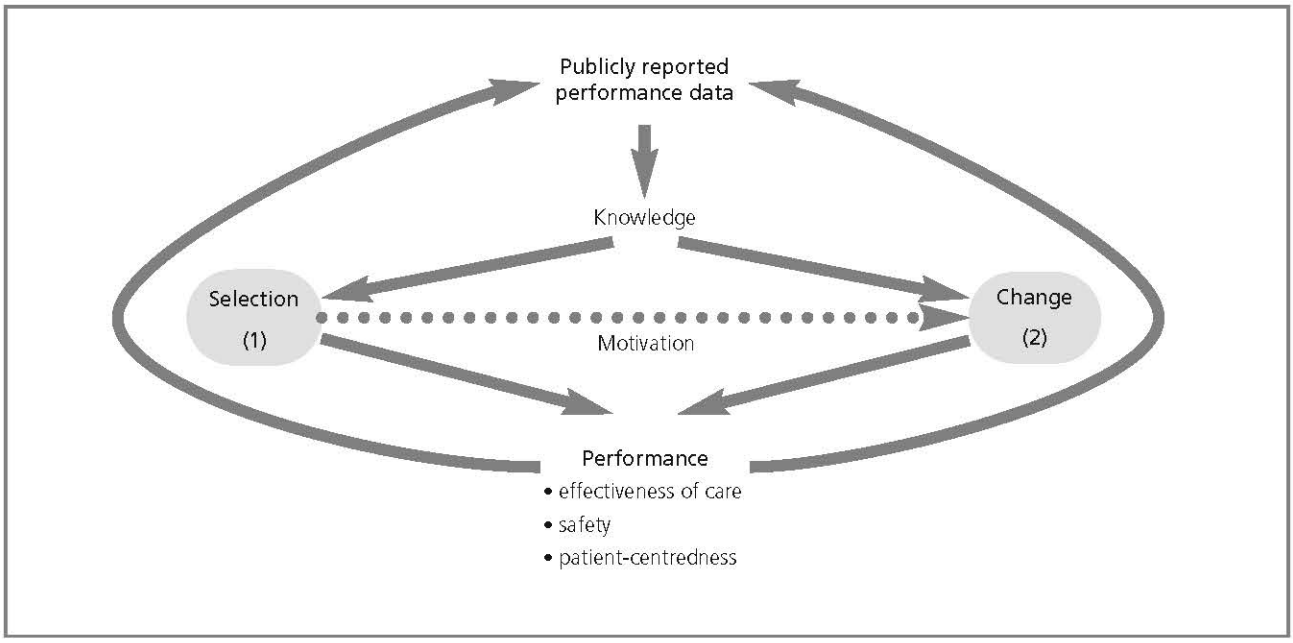
Public reporting

The placement of information in the public domain, to inform the public and other stakeholders about purchaser and provider performance, is growing. This information often takes the form of *report cards* or *provider profiles* that summarizes measures, such as waiting times, patient satisfaction ratings and mortality rates, across providers. Two broad objectives lie behind the public disclosure of information: first, to stimulate quality improvement and, second, to enhance the more general accountability of health system organizations and practitioners to the public who fund and use them. Public reporting can improve quality through two pathways, as illustrated in Fig. 2: (1) a selection pathway, whereby consumers become better informed and select providers of higher quality; (2) a change pathway, whereby information helps providers to identify the areas of underperformance, thus acting as a stimulus for improvement *(32)*.

Both the United Kingdom and the United States have experimented extensively with the use of public disclosure of performance information. The United States has issued report cards for more than 20 years, with its first significant effort led by the federal government agency that administers the Medicare insurance programme. This initiative sought to inform consumer choice and stimulate provider improvement. Following complaints about the validity of the rankings, it was rapidly withdrawn. However, it has since prompted the development of many other performance reports produced by state and federal governments, employers, consumer advocate groups, the media, private enterprise and business purchasers.

There is considerable evidence that publication of provider performance measures leads to improved

Fig. 2. Pathways for improving performance through publicly reported data



Source: Adapted from Berwick, James & Coye *(32)*.

performance *(33)*. Although the immediate purpose of publishing provider performance measures has often been to facilitate and inform patient choice, there is little evidence that patients make direct use of report cards. However, through their effect on the reputation of providers, report cards do appear to promote performance improvements in providers. Apart from their effect on performance, there are growing public demands to make important outcome information public and, in this respect, report cards can assist regulation and enhance accountability.

Starting in 1992, in the United States, two states (New York and Pennsylvania) have experimented with public reporting of post-operative mortality rates for coronary artery bypass graft surgery. These rates are risk adjusted and published at the level of both the hospital and the individual surgeon. The associated confidence intervals are also reported, and a number of empirical analyses have examined the effects of these celebrated report-card initiatives. There is no doubt that the schemes have been associated with a marked improvement in risk-adjusted mortality in the two states *(34)*. However, there is a debate about whether these results necessarily imply that the schemes have been beneficial, and a number of adverse outcomes have also been reported, as follows *(35,36)*.

- The coronary artery bypass graft surgery report cards led to increased selection by New York and Pennsylvania providers, who were more inclined to avoid sicker patients (who might benefit from treatment) and to treat increased numbers of healthier patients (for whom the benefits of treatment are more contested).
- The initiative has led to increased Medicare expenditures with only a small improvement in population health.
- Practitioners were concerned about the absence of quality indicators other than mortality, about inadequate risk adjustment and about the unreliability of data.

In England, all National Health Service health care organizations are issued an annual performance rating – a report-card rating them from zero to three stars, based on about 40 performance indicators. These ratings were strongly promoted by the national government and received much media and public attention. Poor performance has put executives' jobs at risk, and the initiative has had a strong effect on reported aspects of health care, such as waiting times. However, it has also induced some unintended behavioural consequences, such as a lack of attention to some aspects of clinical quality, which have not been reported. In contrast to the English case, Scotland published a range of important clinical outcome data in the 1990s without any associated publicity. Many governors, clinicians and managers were unaware of the initiative and few incentives were attached to the reports. As a result these indicators had very little impact on the behaviour of practitioners or organizations *(37)*. This experience highlights the need to associate an incentive (which might be financial or reputation- or market-based) with a public-reporting scheme.

Box 6. National quality indicators in Norway

Background

Norway started to use national quality indicators for specialized health care services in 2003. By 2006, data for 21 indicators were registered (11 for somatic care and 10 for psychiatric care) and, in addition to the indicators, patient-experience surveys were also included. Data reporting is compulsory, and data is published on the Free Hospital Choice Norway web site *(38)*, along with other initiatives and information on the waiting times for different treatments. Data are presented at the hospital level along with data on national averages and developments over time.

Aims

Some important aims of data collection are:

1. to create a base level of quality and generate incentives for health care personnel to improve quality;
2. to identify a base level of quality for management;
3. to support prioritization of health care services by political and administrative entities;
4. to provide the public with information and create transparency in health care services; and
5. to provide users with information to make decisions.

Norway offers another example of public disclosure of performance information. Box 6 discusses the use of national quality indicators in Norway.

Publicly reported information has had a limited direct effect so far on patients and professionals, probably because it is necessarily aggregated and because the indicators reported are limited and inconsistent *(39)*. However, there is increasing evidence that health care organizations do take notice of these data, which have an important effect on their reputations, and that publication of performance information has led to concrete performance improvements *(34,40)*. Notwithstanding doubts about its effectiveness in promoting system improvement, the publication of performance information also serves an important accountability role. There is therefore no doubt that increased public reporting of outcomes of care is an irreversible trend in most health systems. However, it can lead to adverse outcomes, if not implemented and monitored with care.

Experience to date suggests the following points should be taken into account when implementing public disclosure of data.

- Careful consideration should be given to the purpose of the disclosure and to the type of information the different health system stakeholders want and are able to use.
- Careful consideration should be given to the effect that public disclosure of information may have on quality of care. Where appropriate, public disclosure of information should be integrated with other quality improvement strategies *(41)*.
- To enhance their credibility and usefulness, public performance reports should be created in collaboration with physicians and other legitimate interest groups *(35, 41)*.
- When reporting data, careful risk adjustment should be implemented to offer accurate comparisons between providers and to ensure that the legitimacy of the comparisons is accepted by professionals *(24, 41)*. Detailed information on the risk-adjustment strategies used should be made available alongside the reported information for public scrutiny.

Incentives

There is no doubt that clinicians and other actors in the health system generally respond as expected to financial incentives *(42)*. The incorporation of performance measurement into financial-incentive regimes therefore potentially offers a promising avenue for future policy, and a number of experiments that attach financial rewards to reported performance are now under way.

Historically, the use of indirect financial incentives in health care has been proffered through systems of accreditation that offer rewards in the form of access to markets or extra payments, once specified structures of care are put in place. Germany has an accreditation system of this sort at the regional level, where specific quality indicators are used for accreditation *(43)*. Accreditation is, however, a very blunt incentive instrument. Policy is now shifting towards much more direct and focused incentives. In particular, the United States has been experimenting with financial incentives in different contexts, such as the *rewarding results* experiment, which uses incentives to improve quality *(44)*. However, these have so far been small-scale experiments, and the results have been difficult to assess with any confidence.

Many issues need to be considered when designing performance-incentive schemes, including which aspects of performance to target, how to measure attainment, how to set targets, whether to offer incentives at the individual or group level, how strong to make the link between achievement and reward, and how much money to attach to an incentive. Also, evaluating such schemes is essential, but challenging. In most instances, a controlled experiment is not feasible, as it is often not feasible to establish a convincing *do-nothing* baseline with which to compare the policy under scrutiny. Moreover, constant monitoring is needed to ensure that unintended responses to incentives (such as cream-skimming or other unwanted behavioural responses) are not occurring, that the incentive scheme does not jeopardize the reliability of the performance data on

Box 7. The contract for general practitioners, United Kingdom

Framework

In April 2004, a new general-practitioner contract took effect in the United Kingdom National Health Service. This new contract more closely linked general practitioners with quality targets for both clinical and organizational activities through the Quality and Outcomes Framework programme. The programme rewards general practitioners for meeting targets in targeted areas, measured by about 150 indicators. Each indicator has a number of points allocated to it, varying according to the amount and difficulty of work required to successfully meet these criteria. A maximum of 1050 points can be earned, and up to 20% of general practitioner income is at risk under the scheme.

Targeted areas

Indicators upon which points are allocated are measured for the following main categories (some smaller categories are omitted):

- clinical areas (76 indicators (focused on medical records, diagnosis, and initial and ongoing clinical management) and 550 points): such as coronary heart disease, stroke and transient ischaemic attack, hypertension, hyperthyroidism, diabetes, mental health, chronic obstructive pulmonary disease, asthma, epilepsy and cancer;
- organizational areas (56 indicators and 184 points): such as records and information about patients, communication with patients, education and training, practice management and medicine management;
- patient experience (4 indicators and 50 points): such as appointment length and consulting with patients about other issues; and
- additional services (10 indicators and 36 points): such as cervical screening, child health surveillance, maternity services and contraceptive services.

No risk adjustment is undertaken. Instead, practices may exclude certain patients from performance measurement, if the required intervention is clinically inappropriate or if the patient refuses to comply.

Findings to date

- In preparation for the 2004 programme, general practitioners in the United Kingdom employed more nurses and administrative staff, established chronic-disease clinics and increased the use of electronic medical records *(46)*. Also, general practitioners are increasingly delegating tasks to other members of clinical staff. For example a nurse may be asked to specialize in diabetes care *(47)*.
- Although the Quality and Outcomes Framework programme was voluntary, in its first year of implementation almost all United Kingdom practices chose the programme, with the median practice scoring 95.5% of the possible points available. In the clinical areas, the median score was 96.7% *(46)*. The achievements of years two and three of the contract have been similarly high *(48)*.
- Interviews with general practitioners suggested they were concerned about the programme's focus on biomedical targets, which may lead to a reduced focus on other important aspects of care and may interfere with their ability to treat the patient as a whole person *(47)*.
- There is little evidence of manipulation of the prevalence data on which performance is based. However, some practices do appear to be making excessive use of exception reporting *(49)*.
- Although there is some evidence that the Quality and Outcomes Framework programme has improved patient care, quality was already improving rapidly in primary care and the specific effect of the programme seems to have been small *(50, 51)*.

Source: Adapted from Lester & Roland *(52)*.

which it relies, and that it does not compromise unrewarded aspects of performance.

The United Kingdom is experimenting with an ambitious financial-reward system for general practitioners, introduced in April 2004, under which about 20% of earnings are directly related to their performance across about 150 quality indicators *(45)* (Box 7). So far, it has not been possible to attribute any major improvements in general-practitioner performance, or other system improvements, to this bold (and very expensive) experiment. More generally, while performance-based incentive schemes do appear to offer immense potential for system improvement, there is a clear need for more careful research to identify the best mechanisms for harnessing their potential.

Targets

Health system targets are a specific type of performance measurement and incentive scheme and are a quantitative expression of an objective to be met in the future. Targets have been brought to health policy from the field of business, the main idea being that when goals are explicitly defined as targets, more organized and efficient efforts will be made to meet them. Targets are expected to be SMART: specific, measurable, accurate, realistic and time bound *(53)*. If well designed, targets can help organizations and practitioners focus on a manageable number of achievable goals, which thereby lead to system improvements. The governments of many countries – including European Region Member States (most notably, the United Kingdom), Australia,

New Zealand and the United States – have experimented with targets in health care.

However, evidence on the success of using health system targets is limited *(54)*. They have traditionally been used extensively in public health, but reports of measurable success are rare. The English experience with the 1992 Health of the Nation strategy is typical. The strategy was based on the WHO health for all initiative and set a series of ambitious public health targets. However, a careful independent evaluation in 1998 concluded that its "impact on policy documents peaked as early as 1993; and, by 1997, its impact on local policy-making was negligible" *(55)*. Hunter summarized its failings under six broad headings *(56)*.

1. There appeared to be a lack of leadership in the national government.
2. The policy failed to address the underlying social and structural determinants of health.
3. The targets were not always credible and were not formulated at a local level.
4. The strategy was poorly communicated beyond the health system.
5. The strategy was not sustained.
6. Partnerships between agencies were not encouraged.

In the past decade, targets have been an especially strong feature of English health care policy. Starting in 1998, the Treasury issued strategic targets, called Public Service Agreements, to all government departments, including the health ministry *(57)*. Public Service Agreements were focused primarily on outcomes, such as the improvement of mortality rates, reductions in smoking and obesity, and reductions in waiting times. The health ministry used the star rating report cards, described above, as a key instrument to achieve these objectives. In contrast to most national target systems, this proved notably effective in securing some of the targeted objectives in health care *(58)*. This success can be attributed to the following.

- The targets were precise, short-term objectives, rather than long-term and general.
- Targets were based at the local level, rather than the national level.
- Professionals were engaged in the design and implementation of some of the targets. While this ran the risk of leading to so-called capture by professional interests, it also served to increase the awareness of objectives.
- Organizations were given increased financing, information and managerial capacity to respond to challenging targets.
- Concrete incentives were attached to the targets.

Box 8. Risks associated with increased reliance on targets

- Untargeted aspects of the health system may be neglected.
- Managers and practitioners may concentrate on short-term targets directly in their control at the expense of targets that address long-term or less controllable objectives.
- The complexity of the target system requires a large implementation capacity and may be influenced by professional interests.
- Excessively aggressive targets may undermine the reliability of the data on which they are based.
- Excessively aggressive targets may induce undesirable behavioural responses.
- Targets may encourage a narrow, mercenary attitude, rather than encouraging altruistic professionalism.

Source: Smith *(59)*.

However, this success in health care was not replicated in the area of public health, almost certainly because managers felt health care targets were much more amenable to health system intervention.

While targets provide a straightforward way of highlighting key objectives and can be very successful if designed and implemented correctly, there are notable risks associated with their use *(59)*. Box 8 identifies some of the risks associated with increased reliance on targets. The conclusions from this experience are that, while performance targets offer some latitude for focusing system attention on specific areas of endeavour, they are unlikely to secure performance improvements, unless implemented carefully alongside other improvement initiatives, such as more general inspection and regulation.

Professional improvement

Most of the uses of performance measurement described above have been concerned with providing some means of external assessment and scrutiny of the health system, as a mechanism for prompting improved performance. Yet, another important use of performance measurement can be to provide feedback for clinicians on their performance relative to their peers. Databases that serve this purpose exist in many countries. For example, in Sweden they take the form of *quality registers*, where individual-based data on patient characteristics, diagnoses, treatments, experiences and outcomes are all collected voluntarily on the part of the health care providers and shared with other members of the register. The explicit aim of the quality registers is to facilitate the improvement of quality in clinical work through continuous learning and development *(60)* (Box 9). Indeed there is a strong argument that performance measurement should become an inherent part of a clinician's lifelong learning. This suggests the need for a

Box 9. Sweden's quality registers

The development of national quality registers in Sweden has been a major effort in promoting performance improvement. Sweden has about 50 active quality registers, with the first one dating back to 1979.

The aim of a national quality register is to encourage good medical practice through the comparison and evaluation of outcome and quality information over time and between providers.

A variety of organizational patterns are used, but each is clinically led and typically maintained by a group (usually located in one of the Swedish university hospitals) that collects, assembles, analyses and distributes the data to its members. Several meetings might be organized each year to discuss this material. The participation of clinicians in a registry group is voluntary, and in most cases registers develop gradually.

When a register is developed, the quality indicators and reporting tools are established on the basis of consensus within the medical specialty and are often refined from year to year. Information on departments is anonymous. However, most well-established registers do present department data publicly. The quality registers provide clinicians with essential information with which to compare performance and facilitate discussion on improvement. Increasingly, data from quality registers have also been used to support decision-making.

Source: Rehnqvist *(60)*.

prominent role for performance measurement principles in early clinical training.

Whether information for professional improvement should be kept anonymous or be made available to the public is widely debated. Evidence suggests that, to be effective, such performance measurement schemes need to be designed and owned by the professionals who use them *(61)*. It is argued that the most constructive systems are those that encourage positive and cooperative behaviour among clinicians and avoid public threats to their professional or commercial standing, which may encourage defensive behaviour that could lead to cream skimming or other unwanted behavioural responses. Indicators used for professional improvement should therefore:

- reflect meaningful aspects of clinical practice with a strong scientific underpinning;
- ensure risk adjustment of indicators;
- allow exclusion of certain patients, such as those who refuse to comply with treatment;
- facilitate interpretability;
- represent services under a provider's control;
- ensure high accuracy; and
- minimize cost and burden.

Also, as well as measuring the outcomes of care, it is important to seek to measure the extent of inappropriate care (overuse or underuse of treatments).

The requirements of a successful professional-improvement performance-measurement system may therefore come into conflict with the requirements of information systems designed to promote accountability and patient choice. This is not to say that the tension between these different needs and demands cannot be resolved. Experiences from Sweden and elsewhere, such as Denmark and the Netherlands, suggest that public and professional needs can be reconciled – for example, some quality registers do publish outcomes on individual practitioners *(62)*. In any case, patients will in all likelihood increasingly demand that more performance data be made available. The challenge for the professions is to ensure that this trend is harnessed to good results, rather than leading to defensive professional behaviour. One solution lies in the careful development of acceptable, statistical, risk-adjustment schemes and in careful presentation of statistical data, so that the public and media are better equipped to understand and interpret the information that is made available to them.

Summary and conclusions

The ultimate goal of any performance-measurement instrument is to promote the achievement of health system objectives. Thus, its effectiveness should be evaluated not in relation to statistical properties, such as accuracy and validity, but should be evaluated more broadly in relation to the extent to which it promotes or compromises these objectives. Effective performance measurement alone is not enough to ensure effective performance management. The functions of analysis and interpretation of performance data are also crucial. Also, performance measurement is only one (albeit very important) instrument for securing system improvement. To maximize its effect, performance measurement needs to be aligned with other aspects of system design, such as financing, market structure, accountability arrangements and regulation. Finally, a great deal of attention needs to be paid to the political context within which any performance-measurement scheme is implemented. Without careful attention to these broader health system considerations, the best performance-measurement system will be ineffective.

Governments have a major stewardship role to play in harnessing the full potential of performance measurement for improving the health system. *The world health report 2000 (7)* defined stewardship as "defining the vision and direction of health policy, exerting influence through regulation and advocacy, and collecting and using information". The present document has sought to outline how performance measurement can help governments fulfil each of these roles. It has argued that performance measurement offers health systems major opportunities to secure performance improvement and that no health system

can be adequately steered without good performance information and intelligence. The overarching role of performance measurement is to enhance the decisions made by actors throughout the health system.

Performance information can help governments directly in formulating and evaluating policy and in undertaking regulation. The broader stewardship role of governments is, however, to ensure that the necessary flow of information is available, functioning properly and aligned with the design of the health system. Performance measurement is a public good that will not occur naturally. Governments therefore have a fundamental role to ensure that the maximum benefit is secured from performance measurement, whether through law, regulation, coordination or persuasion. Implementation then requires sustained political and professional leadership at the highest level and also assurance that the necessary analytical capacity is available throughout the health system.

Some of the stewardship responsibilities of government in the area of performance measurement are summarized in Box 10.

Given the increasing demand for performance measurement and given the large set of actors and responsibilities, it is important that policy-makers consider what makes performance indicators effective in improving system performance and accountability. Although there is no conclusive answer to this question, experience has suggested that any policy development should embrace the following.

1. A clear conceptual framework and a clear vision of the purpose of the performance-measurement system should be developed and should be aligned with the accountability relationships inherent in the health system.
2. Performance indicators should attempt to measure performance that is directly attributable to an organization or actor, and not to environmental factors (such as patient attributes or socioeconomic factors).
3. Definitions of performance indicators should be clear and consistent and should fit into the conceptual framework chosen.
4. Indicators should aim to measure concepts that are relevant to the needs of specific actors and should not focus merely on measuring what is available or easy to measure.
5. Indicators should aim to be statistically sound and should be presented in a way that is straightforward to interpret, thus reducing the likelihood of manipulation or misinterpretation.
6. Indicators should be presented with full acknowledgement of any data limitations, including uncertainty estimates and lack of timeliness. Further exploration of improved processes for handling measurement errors is needed, as such errors may confound true performance differences.
7. More attention should be paid to the presentation of performance data and how this influences their

Box 10. Stewardship responsibilities associated with performance measurement

Stewardship responsibilities associated with performance measurement can be summarized under the headings that follow. None of these roles need be undertaken by government itself, but it must be ensured that they all function effectively:

1. **development of a clear conceptual framework and a clear vision of the purpose of the performance measurement system:**
   - alignment with accountability relationships;
   - alignment with other health system mechanisms, such as finance, market structure and information technology;
2. **design of data collection mechanisms:**
   - detailed specification of individual indicators;
   - alignment with international best practice;
3. **information governance:**
   - data audit and quality control;
   - ensuring public trust in information;
   - ensuring well-informed public debate;
4. **development of analytical devices and capacity to help understand the data:**
   - ensuring analysis is undertaken efficiently and effectively;
   - ensuring local decision-makers understand the analysis;
   - commissioning appropriate research on, for example, risk adjustment, uncertainty and data feedback mechanisms;
5. **development of appropriate data aggregation and presentational methods:**
   - ensuring information has appropriate effect on all parties;
   - mandating public release of summary comparative information;
   - ensuring comparability and consistency;
6. **design of incentives to act on performance measures:**
   - monitoring effect of performance information on behaviour;
   - acting to enhance beneficial outcomes and negate any adverse consequences;
7. **proper evaluation of performance-measurement instruments:**
   - ensuring money is spent cost-effectively on information resources;
8. **managing the political process:**
   - developing and monitoring policy options;
   - encouraging healthy political debate;
   - ensuring that specific interest groups do not capture the performance information system.

interpretation by patients, providers and provider organizations.

8. Attention should be given to enhancing the capacity to understand and use information among managers and clinicians. Use of performance data should become an intrinsic part of clinical education and lifelong professional development.
9. Incentives that act on performance measures should be carefully designed. The impact of performance information on behaviour should be carefully monitored, and actions should be taken to enhance beneficial outcomes and to negate any adverse consequences.
10. Policy-makers should pay particular attention to the broader health system, to ensure that performance measurement is aligned with the design of mechanisms, such as finance and market structures, and to recognize the organizational context within which performance data are collected and disseminated.
11. Performance measurement systems should be monitored frequently and evaluated to identify opportunities for improvement and any unintended side-effects.
12. The political aspects of performance measurement should be managed effectively. Among other things, this involves ensuring that specific interest groups do not capture the performance information system and also involves encouraging healthy political debate.

Health systems are still in an early stage of performance measurement, and major steps can still be taken to improve the effectiveness of their measurement systems. Performance measurement, however, offers opportunities for major health system improvements. Advances in technology are likely to increase this potential still further, and the increasing public demands for accountability and information will reinforce current trends. There is therefore a policy-making imperative to consider carefully the role of performance measurement in the health system, to implement initiatives of proven effectiveness, to undertake careful trials of less established mechanisms and to monitor and update performance measurement systems as new knowledge and capacity emerge.

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WHO European Ministerial Conference on Health Systems:
"Health systems, health and wealth"
Tallinn, Estonia, 25–27 June 2008

This report is one of three background documents prepared for the WHO European Ministerial Conference on Health Systems: "Health Systems, Health and Wealth", held on 25–27 June 2008 in Tallinn, Estonia. Together, these reports demonstrate that:

- ill health is a substantial burden economically and in terms of societal well-being;
- well-run health systems can improve health and well-being, and contribute to wealthier societies, and
- strategies are available to improve health systems' performance.

These are the key themes of the Conference. These detailed syntheses highlight important research findings and their implications, and underline the challenges that they pose for policy-makers. They support the Conference position that cost-effective and appropriate spending on health systems is a good investment that can benefit health, wealth and well-being in their widest senses.

These three background documents together provide the theoretical foundations around which the aims, arguments and rationale for the Conference are oriented. Document 1 gives the background evidence on the cost of ill health and is supported by twin volumes on health as a vital investment in eastern and western Europe. Documents 2 and 3 represent concise synopses of the two comprehensive Conference volumes being coordinated by the European Observatory on Health Systems and Policies. These volumes on health systems, health and wealth and performance involve a range of leading experts and will be made available to delegates in draft for comment. They will be revised in light of feedback before publication at the end of 2008.

Background document #2
Performance measurement for health system improvement: experiences, challenges and prospects

This summary makes the case for performance measurement as key tool for policy-makers endeavouring to improve health systems in the European Region. It highlights the various elements required of a comprehensive health system performance measurement framework; pinpoints how performance measurement can be used in practice; and stresses the role of government stewardship in securing improved performance. It reviews existing evidence and provides examples of the empirical application of performance measures, demonstrating that if governments invest in health they can expect those resources to be used well.

Sodium Fluorosilicate

Sodium Fluorosilicate

Material Safety Data Sheet

Chemical: Sodium Fluorosilicate

NFPA: H=3 F=0 I= 0 S=None
HMIS: H=3 F=0 R=0 PPE= Supplied by user; dependent on conditions

MSDS Number: NaSiF6-1103
Effective Date: 11 October 2003
Issued by: Solvay Chemicals, Inc. Regulatory Affairs Department

Not valid three years after effective date or after issuance of superseding MSDS, whichever is earlier. French or Spanish translations of this MSDS may be available. Check www.solvaychemicals.us or call Solvay Fluorides, LLC to verify the latest version or translation availability.

Material Safety Data Sheets contain country specific regulatory information; therefore, the MSDS's provided are for use only by customers of Solvay Fluorides, LLC in North America. If you are located in a country other than the United States, please contact the Solvay Group company in your country for MSDS information applicable to your location.

1. Company and Product Identification

1.1 Product Name: Sodium Fluorosilicate

Chemical Name: Sodium Silicofluoride

Synonyms: Sodium Fluosilicate, Sodium Fluorosilicate, Sodium Silica Fluoride, Disodium Hexafluoro- Silicate(2-)

Chemical Formula: Na_2SiF_6

Molecular Weight: 188.1

CAS Number: 16893-85-9

EINECS Number: 240-934-8

Grade/Trade Names: N/A

1.2 Recommended Uses: Fluoride source for water

1.3 Supplier:
Solvay Fluorides, LLC
PO BOX 27328 Houston, TX 77227-7328
3333 Richmond Ave. Houston, Texas 77098

1.4 Emergency Telephone Numbers
General: 1-877-765-8292 (Solvay Fluorides, LLC)
Emergencies (USA): 1-800-424-9300 (CHEMTREC®)
Transportation Emergencies (INTERNATIONAL/MARITIME): 1-703-527-3887 (CHEMTREC®)
Transportation Emergencies (CANADA): 1-613-996-6666 (CANUTEC)
Transportation Emergencies (MEXICO-SETIQ): 91-800-00-214-00 (MEX. REPUBLIC)
-0-11-525-559-1588 (elsewhere)

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MSDS No. NaSiF6-1103 Revised 10-11-03

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Solvay Fluorides
A Subsidiary of Solvay Chemicals, Inc.

SOLVAY

Sodium Fluorosilicate

Material Safety Data Sheet

2. Composition/Information on Ingredients

INGREDIENTS	FORMULA	WT. PERCENT	CAS #
Sodium Silicofluoride	Na_2SiF_6	≥ 98.0%	16893-85-9
Water	H_2O	≤ 0.5%	7732-18-5
Insoluble Matter		≤ 0.5%	

3. Hazards Identification

Emergency Overview:

- Hazardous product for the human health and the aquatic environment.
- Presents hazards from its ionizing fluorine.
- In case of decomposition, releases hydrogen fluoride.

3.1 Route of Entry: Inhalation: Yes Skin: Yes Ingestion: Yes

3.2 Potential Effects of exposure:

- Irritating to mucous membranes, eyes and skin.
- Risk of cardiac and nervous disorders.
- Chronic exposure to the product can cause bone fluorosis.

Inhalation:

- Nose and throat irritation.
- Spasmodic cough and difficulty in breathing.
- At high concentrations, risk of hypocalcemia (possible life-threatening lowering of serum calcium) with nervous problems (tetany) and cardiac arrhythmia (heart irregularity).
- In case of repeated or prolonged exposure; risk of sore throat, nose bleeds, chronic bronchitis.

Eyes: Severe eye irritation, watering, and redness.

Skin contact:

- Irritation, redness and swelling of the skin.
- In case of prolonged contact: risk of burns.

Ingestion:

- Severe irritations, burns, perforation of the gastrointestinal tract accompanied by shock.
- Nausea, vomiting (bloody), abdominal cramps and diarrhea (bloody).
- Risk of hypocalcemia (possible life-threatening lowering of serum calcium) with nervous problems (tetany) and cardiac rhythm disorders.
- Risk of convulsions, loss of consciousness, deep coma and cardiopulmonary arrest.
- Risk of general symptoms having a severe prognosis.

Carcinogenicity: See section 11.3

4. First-Aid Measures

4.1 General Recommendations: Strict hygiene during and at the end of working shifts

Inhalation:
- Remove the subject from dusty environment.
- Oxygen or cardiopulmonary resuscitation if necessary.
- Consult with a physician in case of respiratory symptoms

Eyes:
- Consult with an ophthalmologist immediately in all cases.
- Take to hospital immediately.
- Flush eyes with running water for 15 minutes, while keeping the eyelids wide open.

Skin:
- Remove contaminated shoes, socks and clothing; while washing the affected skin with soap and water for 15 minutes. Double bag all contaminated clothing for disposal.
- Cover with an anti-bacterial cream.
- Provide clean clothing.
- Consult with a physician in cases of persistent pain or redness.

Ingestion:
- Contact a physician for immediately in all cases.
- Take to hospital.

If the subject is completely conscious:
- Rinse mouth with fresh water.
- Give to drink 3-4 glasses of milk or a 1% aqueous calcium gluconate solution.
- If the subject presents nervous, respiratory or cardiovascular disorders: administer oxygen.

If the subject is unconscious:
- NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSIOUS PERSON
- Classical resuscitation measures.

4.2 Medical Treatment/Notes to Physician: Exposed person should be observed for 48-72 hours for delayed onset of edema.

Inhalation: Pre-existing respiratory diseases may be aggravated including asthma and emphysema.

5. Fire-Fighting Measures

5.1 Flash point: Non flammable

5.2 Auto-ignition Temperature: Not applicable

5.3 Flammability Limits: Not applicable

5.4 Unusual Fire and Explosion Hazards: Formation of dangerous gas/vapors in case of decomposition (see section 10)

5.5 Extinguishing Methods

Common:

- In case of fire in close proximity, all means of extinguishing are acceptable.
- Use extinguishing media appropriate for surrounding fire.

Inappropriate extinguishing means: No restriction.

5.6 Fire Fighting Procedures:

Specific hazards: Non-combustible

Protective measures in case of intervention:

- Wear self contained breathing apparatus when in close proximity or in confined spaces.
- When intervening in close proximity wear acid resistant over-suit.
- After intervention, proceed to clean the equipment (take a shower, remove clothing carefully, clean and check).

Other precautions: Control the use of water due to environmental risk (see section 6).

6. Accidental Release Measures

6.1 Precautions:

- Follow the protective measures given in section 8.
- Avoid dispersing the dust into a cloud.

6.2 Cleanup methods:

- Collect the product with suitable means avoiding dust formation.
- Place everything into a closed, labeled container compatible with the product.
- For disposal methods, refer to section 13.

6.3 Precautions for protection of the environment:

- Immediately notify the appropriate authorities in case of significant discharge.
- Do not discharge into the environment (sewers, rivers, soils, ...).

7. Handling and Storage

7.1 Handling:

- Use only equipment and materials which are compatible with the product.
- Keep away from heat sources.
- Keep away from reactive products (see section 10)

7.2 Storage:

- Keep in original packaging, and tightly closed.
- Keep away from reactive products (see section 10).

7.3 Specific Uses: See Section 1.2

7.4 Other precautions:

- Warn people about the hazards of the Sodium Silicofluoride.
- Avoid dust and formation of dust clouds.
- Follow the protective measures given in section 8.

7.5 Packaging: Paper lined with PE.

8. Exposure Controls/Personal Protection

8.1 Exposure Limit Values: Sodium Fluorosilicate

Authorized limit Values	TLV® ACGIH®-USA (2002)	OSHA PEL	NIOSH REL (1994)
Fluorides	2.5 mg/m³ (as F)	2.5 mg/m³ (as F)	None

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8.2 Exposure Controls:

- Follow the protective measures given in section 7.
- Maintain employee exposures to levels below the applicable exposure limits.

8.2.1 Occupational Exposure Controls:

8.2.1.1 Ventilation: Provide local ventilation suitable for the dust risk.

8.2.1.2 Respiratory protection:

- Self/contained breathing apparatus in medium confinement/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.
- Use only respiratory protection that conforms to international/national standards.
- Use only NIOSH approved respirators.
- Comply with OSHA respiratory protection requirements.

8.2.1.3 Hand protection:

- Protective gloves - chemical resistant:
- Recommended materials: PVC, neoprene, and rubber.

8.2.1.4 Eye protection: Dust proof goggles.

8.2.1.5 Skin protection:

- Overalls.
- Apron/boots of PVC, neoprene, rubber in case of dusts.

8.3 Other precautions:

- Do not smoke, eat and drink in the working area.
- Take off contaminated clothing immediately after work.
- Shower and eye wash stations.
- Consult the industrial hygienist or the safety manager for the selection of personal protective equipment suitable for the working conditions.

Sodium Fluorosilicate

Material Safety Data Sheet

9. Physical and Chemical Properties

9.1 **Appearance:** Free-flowing crystals
Odor: White
Color: Odorless

9.2 **Important Health, Safety and Environmental information:**
pH: Not applicable

Change of state:
Melting point: Decomposes @ 500°C (932°F)
Boiling point: Not applicable
Decomposition Temperature: 500°C (932°F)

Flash Point: Not applicable

Flammability: Non Flammable
(solid, gas)

Explosive Properties: Not available

Oxidizing Properties: Not available

Vapor Pressure: Not available

Relative Density:
Specific gravity (H_2O=1): 1
Bulk Density: 10.8 grams/ml (90 lbs/ft^3)

Solubility: 40 mg/l at 20°C (68°F) Remark: Atmospheric pressure

Partition coefficient: Not applicable

Viscosity: Not applicable

Vapor Density (air=1): Not available

Evaporation Rate: No data

9.3 **Other Information:** No data

Surface Tension: No data

10. Stability and Reactivity

Stability: Stable under certain conditions (see below).

10.1 Conditions to avoid: Temperatures above decomposition temperature see section 9.

10.2 Materials and substances to avoid:

- Strong acids-reacts
- Strong alkalis-reacts
- Oxidizing agents-reacts
- Metals-reacts

10.3 Hazardous decomposition products:

- Hydrofluoric Acid
- Fluorine

10.4 Hazardous Polymerization: Not applicable

10.5 Other information: None

11. Toxicological Information

11.1 Acute toxicity:
Inhalation: No data available.

Oral: LD_{50}, rat, 125mg/kg (Sodium hexafluorosilicate)

Dermal: No data available.

Irritation: No data available.

Sensitization: No data available.

Comments: No data available.

11.2 Chronic toxicity: No data available.

11.3 Carcinogenic Designation: None

12. Ecological Information

12.1 Acute ecotoxicity: No data available.

12.2 Chronic ecotoxicity: No data available.

12.3 Mobility: No data available.

12.4 Degradation
Abiotic: No data available.

Biotic: No data available.

12.5 Potential for bioaccumulation: No data available.

Sodium Fluorosilicate

Material Safety Data Sheet

13. Disposal Considerations

13.1 Waste treatment: Consult current federal, state and local regulations regarding the proper disposal of this material.

13.2 Packaging treatment: Consult current federal, state and local regulations regarding the proper disposal of emptied containers.

13.3 RCRA Hazardous Waste: Not listed.

14. Transport Information

Mode	DOT	IMDG	IATA
UN Number	UN 2674	UN 2674	UN 2674
Class	6.1	6.1	6.1
Proper Shipping Name	Sodium Fluorosilicate	Sodium Fluorosilicate	Sodium Fluorosilicate
Hazard label	Toxic	Toxic	Toxic
Subsidiary	Not a marine pollutant	Not a marine pollutant	Not a marine pollutant
Placard	Toxic	Toxic	Toxic
Packing Group	III	III	III
MFAG			
Emergency Info	ERG: 154	EmS: 6.1-04	ERG Code: 6L

15. Regulatory Information

National Regulations (US)

TSCA Inventory 8(b): Yes

SARA Title III Sec. 302/303 Extremely Hazardous Substances (40 CFR355): No

SARA Title III Sec. 311/312 (40 CFR 370):
Hazard Category: None

SARA Title III Sec. 313 Toxic Chemical Emissions Reporting (40 CFR 372): No

CERCLA Hazardous Substance (40CFR Part 302):
Listed: No
Unlisted Substance: No

State Component Listing: No Data.

National Regulations (Canada) Canadian DSL Registration: DSL

WHMIS Classification: D2B - Material causing other toxic effect

This product has been classified in accordance with the hazard criteria of the ***Controlled Products Regulations*** and the MSDS contains all the information required by the ***Controlled Products Regulations.***

MSDS No. NaSiF6-1103 Revised 10-11-03

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Labeling according to Directive 1999/45/EC.

Category	ID	Phrase
Symbols	T	Toxic
Phrases R	23/24/25	Toxic by inhalation, in contact with skin and if swallowed.
Phrases S	1/2	Keep locked up and out of reach of children.
	26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16. Other Information

16.1 Ratings:

NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)

Health = 3 Flammability = 0 Instability = 0 Special = None

HMIS (HAZARDOUS MATERIAL INFORMATION SYSTEM)

Health = 3 Fire = 0 Reactivity = 0 PPE = Supplied by User; dependent on local conditions

16.2 Other Information:

The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations of mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

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16.3 Reason for revision:

Supersedes edition: Sodium Fluorides Inc. MSDS dated 3/4/97.
Purpose of revision: Change Company name and MSDS format

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International prevalence of chemical sensitivity, co-prevalences with asthma and autism, and effects from fragranced consumer products

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Abstract

Chemical sensitivity is a medical condition characterized by adverse health effects from exposure to common chemical pollutants and products. This study investigated the prevalence of chemical sensitivity in four countries—the United States (US), Australia (AU), Sweden (SE), and the United Kingdom (UK). In addition, it investigated the co-prevalence of chemical sensitivity with medically diagnosed multiple chemical sensitivities (MCS), fragrance sensitivity (health problems from fragranced products), asthma/asthma-like conditions, and autism/autism spectrum disorders (ASDs). Using nationally representative population samples in each country, data were collected in June 2016 and June 2017 through on-line cross-sectional surveys of adults ($n = 4435$). Results found that, across the four countries, 19.9% of the population report chemical sensitivity, 7.4% report medically diagnosed MCS, 21.2% report either or both, and 32.2% report fragrance sensitivity. In addition, 26.0% of the population report asthma/asthma-like conditions, of which 42.6% report chemical sensitivity and 57.8% fragrance sensitivity. Also, 4.5% of the population report autism/ASDs, of which 60.6% report chemical sensitivity and 75.8% fragrance sensitivity. Among individuals with chemical sensitivity, 55.4% also report asthma/asthma-like conditions, 13.5% autism/ASDs, and 82.0% fragrance sensitivity. Although the prevalence of chemical sensitivity across the countries is statistically different, its co-prevalences with other conditions are statistically similar. Results also found that, for 44.1% of individuals with chemical sensitivity, the severity of health effects from fragranced products can be potentially disabling. Further, 28.6% of those with chemical sensitivity have lost workdays or a job, in the past year, due to exposure to fragranced products in the workplace. Results indicate that chemical sensitivity is widespread across the four countries, affecting over 61 million people, that vulnerable individuals such as those with asthma and autism are especially affected, and that fragranced consumer products can contribute to the adverse health, economic, and societal effects.

Keywords Chemical sensitivity · Multiple chemical sensitivities · MCS · Fragrance · Asthma · Autism

Introduction

Chemical pollutants have been associated with deleterious effects on the environment and human health. A constellation of adverse health effects have been associated with chemical sensitivity, a medical condition that is typically initiated and triggered by exposure to common petrochemical products and pollutants, such as pesticides, building materials, solvents, new carpet and paint, and consumer products (Ashford and Miller 1998; Caress and Steinemann 2003; Steinemann 2018c). Health effects associated with these chemical exposures include headaches, dizziness, seizures, heart arrhythmia, gastrointestinal problems, mucosal symptoms, breathing difficulties, and asthma attacks (Steinemann 2018c, d, f, 2019; Ashford and Miller 1998). Notably, these volatile chemical products that are associated with adverse health effects are also primary sources of indoor and outdoor air pollutants (McDonald et al. 2018; Ott et al. 2007).

Among these sources of exposure, fragranced consumer products can be a primary trigger of health problems.

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Fragranced consumer products (or fragranced products)—chemically formulated products with the addition of a fragrance or a scent (Steinemann 2015)—include a range of items such as air fresheners, laundry products, cleaning supplies, personal care products, colognes, and household items. An individual "fragrance" in a product is typically a complex mixture of several dozen to several hundred compounds, many derived from petrochemicals (Sell 2006). Fragranced products have been associated with adverse health and societal effects in the general population (Caress and Steinemann 2009b; Steinemann 2016, 2017, 2018a, b), and especially vulnerable sub-populations such as those with asthma (Weinberg et al. 2017, Steinemann et al. 2018, Steinemann 2018g), autism (Steinemann 2018e), and chemical sensitivity (Caress and Steinemann 2005, 2009a, b; Steinemann 2018c, d, f, 2019).

Relatively little is known about the prevalence of chemical sensitivity at the national or international levels, or its co-prevalence with other health conditions. One challenge is the lack of an internationally consistent definition and diagnostic criteria (e.g., Lacour et al. 2005; MCS 1999; De Luca et al. 2011; Genuis 2010). Another challenge is that different studies often use different terms and criteria for assessment. While chemical sensitivity is a common and general term, other terms include chemical intolerance (Palmquist et al. 2014; Miller 2001), toxicant-induced loss of tolerance (Miller 1997), and multiple chemical sensitivities (Ashford and Miller 1998). Further, chemically sensitive individuals may manifest the condition even though they lack a specific diagnosis. Nevertheless, prior studies have operationalized characteristics of chemical sensitivity in order to investigate the condition.

Prior national prevalence studies of chemical sensitivity in the general population include the following. In the US, two surveys, conducted 2002–2003 ($n = 1057$) and 2005–2006 ($n = 1058$), found respectively a prevalence of 11.1% and 11.6% self-reported chemical sensitivity, and 2.5% and 3.9% medically diagnosed MCS (Caress and Steinemann 2005, 2009a). Chemical sensitivity was assessed as being "allergic or unusually sensitive to everyday chemicals like those in household cleaning products, paints, perfumes, detergents, insect spray, and things like that." In Japan, a survey in 2012 ($n = 7245$) estimated a prevalence of 7.5% of chemical intolerance (Azuma et al. 2015). In Denmark, a survey in 2010 ($n = 2000$) found a prevalence of 8.2% of chemical intolerance (Skovbjerg et al. 2012). Chemical intolerance was assessed in these two studies using the Quick Environmental Exposure and Sensitivity Inventory (QEESI) criteria (Miller and Prihoda 1999). Also in Denmark, a survey in 2006 ($n = 6000$) found a prevalence of 27% reporting symptoms related to inhalation of airborne chemicals such as perfume, motor vehicle exhaust, and cleaning agents (Berg et al. 2008).

This present study investigates the prevalence of chemical sensitivity across four countries, and its co-prevalences with medically diagnosed MCS, fragrance sensitivity, asthma/asthma-like conditions, and autism/ASDs. This study also examines the types of health effects associated with exposures to fragranced consumer products, and societal effects such as access to public places, lost workdays and lost jobs, and preferences for fragrance-free environments. It provides a meta-analysis and synthesis of the individual studies in each country (Steinemann 2018c, d, f, 2019), together with new statistics on the co-prevalences among the conditions, offering greater depth and breadth of findings into the pervasiveness and effects of chemical sensitivity in the general population and in vulnerable sub-populations.

Methods

Four national cross-sectional surveys, using the same instrument implemented in each country's native language, were conducted of adults in the United States (US), Australia (AU), United Kingdom (UK), and Sweden (SE). Sample populations were representative of the general populations according to age, gender, and region ($n = 1137$, 1098, 1100, 1100; respectively; confidence limit = 95%, margin of error = 3% for all studies). Using randomized participant recruitment (SSI 2016), the surveys drew upon large web-based panels (with over 5,000,000; 200,000; 900,000; 60,000 people, respectively) held by Survey Sampling International. The survey instrument was developed and tested over a two-year period before full implementation in June 2016 (US, AU, UK) and June 2017 (SE). The survey response rate was 94%, 93%, 97%, and 92% (respectively), and all responses were anonymous. The research study received ethics approval from the University of Melbourne. Survey methods are detailed in the Electronic supplementary material (ESM-Methods).

Descriptive statistics and cross-tabulations determined percentages according to each response and sub-population; see Electronic supplementary material (ESM-Data).

Prevalence odds ratios (PORs) measured the strength of associations to determine whether one sub-population is proportionally more affected than another. Chi-squared analyses compared proportions among countries to determine whether a statistically significant difference exists. All POR and Chi-squared analyses were performed using a 95% confidence interval (CI) or a 95% confidence level, respectively.

To promote comparability, the survey replicated questions from previous studies of chemical sensitivity, MCS, asthma/asthma-like conditions, autism/ASDs, and fragrance sensitivity (Steinemann 2016, 2017, 2018a, b, c, d, e, f, g, 2019; Steinemann et al. 2018; Kreutzer et al. 1999; Caress and Steinemann 2005, 2009a, b), as follows.

For chemical sensitivity, the survey asked, "Compared to other people, do you consider yourself allergic or unusually sensitive to everyday chemicals like those in household cleaning products, paints, perfumes, detergents, insect spray and things like that?" For medically diagnosed MCS, the survey asked, "Has a doctor or health care professional ever told you that you have multiple chemical sensitivities?"

For asthma/asthma-like conditions, the survey asked, "Has a doctor or health care professional ever told you that you have asthma or an asthma-like condition?" If the respondent answered yes, the survey then asked to specify whether "asthma" or an "asthma-like condition" or both.

For autism/autism spectrum disorders (ASDs), the survey asked, "Has a doctor or health care professional ever told you that you have autism or autism spectrum disorder?" The survey then asked to specify whether autism, ASD, or both.

For fragrance sensitivity, the survey asked, "Do you experience any health problems when exposed to (fragranced product or exposure context)?" If the respondent answered yes, the survey then asked about which health problems they experienced. An individual was considered to characterize fragrance sensitivity if they reported one or more types of health problems from exposure to one or more types of fragranced consumer products or exposure contexts.

Fragranced products were categorized as follows: (a) air fresheners and deodorizers (e.g., sprays, solids, oils, disks), (b) personal care products (e.g., soaps, hand sanitizer, lotions, deodorant, sunscreen, shampoos), (c) cleaning supplies (e.g., all-purpose cleaners, disinfectants, dishwashing soap), (d) laundry products (e.g., detergents, fabric softeners, dryer sheets), (e) household products (e.g., scented candles, restroom paper, trash bags, baby products), (f) fragrance (e.g., perfume, cologne, after-shave), and (g) other.

Exposure contexts included the following: air fresheners or deodorizers used within indoor environments, scented laundry products coming from a dryer vent, being in a room after it was cleaned with scented cleaning products, being near someone wearing a fragranced product, and exposure to other types of fragranced consumer products.

Health effects were categorized as follows: (a) migraine headaches, (b) asthma attacks, (c) neurological problems (e.g., dizziness, seizures, head pain, fainting, loss of coordination), (d) respiratory problems (e.g., difficulty breathing, coughing, shortness of breath), (e) skin problems (e.g., rashes, hives, red skin, tingling skin, dermatitis), (f) cognitive problems (e.g., difficulties thinking, concentrating, or remembering), (g) mucosal symptoms (e.g., watery or red eyes, nasal congestion, sneezing), (h) immune system problems (e.g., swollen lymph glands, fever, fatigue), (i) gastrointestinal problems (e.g., nausea, bloating, cramping, diarrhea), (j) cardiovascular problems (e.g., fast or irregular heartbeat, jitteriness, chest discomfort), (k) musculoskeletal problems (e.g., muscle or joint pain, cramps, weakness), and (j) other.

Societal effects included the following: ability to access restrooms, businesses, and other locations that use air fresheners or other fragranced products; loss of workdays or lost jobs due to illness from fragranced product exposure in the workplace; disabling health effects from exposure to fragranced products; and preferences for fragrance-free workplaces, healthcare facilities, and healthcare professionals.

Results

Results are presented herein for individual countries (US, AU, UK, SE, respectively) and as summaries across all four countries. Tables 1, 2, 3, 4, and 5 provide the main findings. Full results, including data and statistics for each individual country and summaries, according to questionnaire responses and sub-populations, are provided as Electronic supplementary material (ESM-Data).

Prevalence of chemical sensitivity and diagnosed MCS

Across the four countries ($n = 4435$), 19.9% of the general population report chemical sensitivity (25.9%, 18.9%, 16.3%, 18.5%), 7.4% report medically diagnosed MCS (12.8%, 6.5%, 6.6%, 3.6%), and 21.2% report either or both chemical sensitivity/MCS (27.5%, 19.9%, 18.0%, 19.5%) (Table 1).

Among those with chemical sensitivity, 29.2% report diagnosed MCS (42.9%, 29.0%, 30.2%, 14.7%). Among those with diagnosed MCS, 80.1% report chemical sensitivity (86.9%, 84.5%, 74.0%, 75.0%). For those with either or both conditions, 93.7% report chemical sensitivity (93.9%, 95.0%, 90.4%, 95.3%) and 33.6% report diagnosed MCS (46.3%, 32.6%, 36.9%, 18.7%) (Table 1).

For chemical sensitivity, the proportions among the four countries are statistically different ($p < 0.001$, Chi-square test), and for diagnosed MCS, the proportions are statistically different ($p < 0.001$, Chi-square test). Also, among those with chemical sensitivity who also report diagnosed MCS, the proportions are statistically different ($p < 0.001$). However, among those with diagnosed MCS who also report chemical sensitivity, the proportions are statistically similar ($p = 0.687$).

Chemical sensitivity and fragrance sensitivity

Across the countries, 32.2% of the general population report fragrance sensitivity (34.7%, 33.0%, 27.8%, 33.1%). Further, 82.0% of individuals with chemical sensitivity also report fragrance sensitivity (81.0%, 82.6%, 77.7%, 86.8%). Thus, individuals with chemical sensitivity are more likely to be fragrance sensitive than the general population (Table 1). For fragrance sensitivity, the

Table 1 Prevalences and co-prevalences of chemical sensitivity, diagnosed MCS, fragrance sensitivity, asthma/asthma-like conditions, and autism/ASDs

	US	AU	UK	SE	Average
Chemical sensitivity	25.9%	18.9%	16.3%	18.5%	19.9%
MCS	42.9%	29.0%	30.2%	14.7%	29.2%
Fragrance sensitivity	81.0%	82.6%	77.7%	86.8%	82.0%
Asthma	35.0%	32.9%	39.7%	31.4%	34.8%
Asthma/asthma-like conditions	59.2%	56.5%	57.0%	49.0%	55.4%
Autism	8.2%	8.2%	10.1%	5.4%	8.0%
Autism/ASDs	13.3%	13.0%	16.2%	11.3%	13.5%
MCS	12.8%	6.5%	6.6%	3.6%	7.4%
Chemical sensitivity	86.9%	84.5%	74.0%	75.0%	80.1%
Fragrance sensitivity	86.2%	91.5%	89.0%	90.0%	89.2%
Asthma	40.0%	40.8%	49.3%	42.5%	43.2%
Asthma/asthma-like conditions	71.0%	74.6%	74.0%	62.5%	70.5%
Autism	15.2%	28.2%	21.9%	22.5%	22.0%
Autism/ASDs	23.4%	39.4%	37.0%	32.5%	33.1%
Chemical sensitivity/MCS	27.5%	19.9%	18.0%	19.5%	21.2%
Chemical sensitivity	93.9%	95.0%	90.4%	95.3%	93.7%
MCS	46.3%	32.6%	36.9%	18.7%	33.6%
Fragrance sensitivity	78.9%	82.1%	77.3%	86.9%	81.3%
Asthma	33.5%	32.1%	39.9%	30.4%	34.0%
Asthma/asthma-like conditions	57.2%	56.4%	57.1%	47.7%	54.6%
Autism	7.7%	9.2%	9.6%	6.5%	8.3%
Autism/ASDs	12.8%	14.7%	16.7%	12.1%	14.1%
Fragrance sensitivity	34.7%	33.0%	27.8%	33.1%	32.2%
Chemical sensitivity	60.4%	47.2%	45.4%	48.6%	50.4%
MCS	31.7%	18.0%	21.2%	9.9%	20.2%
Chemical sensitivity/MCS	62.7%	49.4%	50.0%	51.1%	53.3%
Asthma	35.0%	32.9%	39.7%	31.4%	34.8%
Asthma/asthma-like conditions	59.2%	56.5%	57.0%	49.0%	55.4%
Autism	8.2%	8.2%	10.1%	5.4%	8.0%
Autism/ASDs	13.3%	13.0%	16.2%	11.3%	13.5%
Asthma/asthma-like conditions	26.8%	28.5%	25.3%	23.2%	26.0%
Chemical sensitivity	57.0%	37.4%	36.7%	39.2%	42.6%
MCS	33.8%	16.9%	19.4%	9.8%	20.0%
Chemical sensitivity/MCS	58.7%	39.3%	40.6%	40.0%	44.7%
Fragrance sensitivity	64.3%	55.6%	54.0%	57.3%	57.8%
Autism/ASDs	13.1%	10.2%	11.9%	10.2%	11.4%
Autism/ASDs	4.3%	3.7%	4.7%	5.1%	4.5%
Chemical sensitivity	79.6%	65.9%	55.8%	41.1%	60.6%
MCS	69.4%	68.3%	51.9%	23.2%	53.2%
Chemical sensitivity/MCS	81.6%	78.0%	63.5%	46.4%	67.4%
Fragrance sensitivity	83.7%	82.9%	84.6%	51.8%	75.8%
Asthma/asthma-like conditions	81.6%	78.0%	71.2%	42.9%	68.4%

Table interpretation: for each condition (in italics), the first row indicates the prevalence in the general population, and rows below that indicate the co-prevalances. For instance, for chemical sensitivity for the US, the prevalence among the general population is 25.9% and, among these individuals, 42.9% also report diagnosed MCS

Table 2 Exposures to fragranced consumer products and associated health problems

	Gen pop	ChemSens	MCS	ChemSens/MCS
Fragrance sensitive	32.2%	82.0%	89.2%	81.3%
Health problems from exposure to:				
Air fresheners or deodorizers	17.4%	54.8%	65.9%	53.5%
Scented laundry products from a dryer vent	7.6%	26.4%	49.6%	26.5%
Room cleaned with scented products	15.7%	53.8%	65.9%	52.4%
Someone wearing a fragranced product	20.1%	56.5%	66.1%	55.3%
Other type of fragranced consumer product	18.6%	58.9%	68.0%	57.1%

Gen pop general population, *ChemSens* chemical sensitivity, *MCS* diagnosed MCS, *ChemSens/MCS* chemical sensitivity/diagnosed MCS

proportions among the four countries are statistically different ($p < 0.03$, Chi-square test). However, among those with chemical sensitivity who also report fragrance sensitivity, the proportions are statistically similar ($p = 0.795$).

Chemical sensitivity, asthma, and fragrance sensitivity

Across the countries, 26.0% of the general population report diagnosed asthma/asthma-like conditions (26.8%, 28.5%, 25.3%, 23.2%). In addition, 55.4% of individuals with chemical sensitivity also report asthma/asthma-like conditions (59.2%, 56.5%, 57.0%, 49.0%), and 42.6% of individuals with asthma/asthma-like conditions also report chemical sensitivity (57.0%, 37.4%, 36.7%, 39.2%). Further, 57.8% of individuals with asthma/asthma-like conditions are also fragrance sensitive (64.3%, 55.6%, 54.0%, 57.3%). Thus, individuals with chemical sensitivity are more likely to report asthma/asthma-like conditions, and individuals with asthma/asthma-like conditions are more likely to be chemically sensitive and fragrance sensitive, than the general population (Table 1). Among those with chemical sensitivity who also report asthma/asthma-like conditions, the proportions among the four countries are statistically similar ($p = 0.496$).

Chemical sensitivity, autism, and fragrance sensitivity

Across the countries, 4.5% of the general population report diagnosed autism/ASDs (4.3%, 3.7%, 4.7%, 5.1%). In addition, 13.5% of individuals with chemical sensitivity also report autism/ASDs (13.3%, 13.0%, 16.2%, 11.3%), and 60.6% of individuals with autism/ASDs also report chemical sensitivity (79.6%, 65.9%, 55.8%, 41.1%). Further, 75.8% of individuals with autism/ASDs are also fragrance sensitive (83.7%, 82.9%, 84.6%, 51.8%). Thus, individuals with chemical sensitivity are more likely to report autism/ASDs, and individuals with autism/ASDs are more likely to be chemically sensitive

Table 3 Health problems (frequency and type) reported from exposure to fragranced consumer products

	Gen Pop	ChemSens	MCS	ChemSens/MCS
Fragrance sensitive	32.2%	82.0%	89.2%	81.3%
Type of health problem:				
Migraine headaches	12.6%	36.9%	41.7%	36.4%
Asthma attacks	7.0%	25.2%	33.2%	24.6%
Neurological problems (e.g., dizziness, seizures, head pain, fainting, loss of coordination)	5.1%	17.7%	22.9%	17.2%
Respiratory problems (e.g., difficulty breathing, coughing, shortness of breath)	16.7%	50.2%	50.4%	48.5%
Skin problems (e.g., rashes, hives, red skin, tingling skin, dermatitis)	9.1%	29.9%	44.2%	29.7%
Cognitive problems (e.g., difficulties thinking, concentrating, or remembering)	4.3%	15.5%	28.0%	15.5%
Mucosal symptoms (e.g., watery or red eyes, nasal congestion, sneezing)	13.2%	39.4%	43.9%	38.2%
Immune system problems (e.g., swollen lymph glands, fever, fatigue)	2.7%	9.8%	21.9%	9.7%
Gastrointestinal problems (e.g., nausea, bloating, cramping, diarrhea)	3.8%	12.9%	22.2%	12.8%
Cardiovascular problems (e.g., fast or irregular heartbeat, jitteriness, chest discomfort)	3.2%	11.0%	21.7%	11.3%
Musculoskeletal problems (e.g., muscle or joint pain, cramps, weakness)	2.5%	9.0%	21.0%	9.2%
Other	2.0%	3.2%	2.6%	3.1%

Table 4 Societal effects of fragranced consumer products

	Gen pop	ChemSens	MCS	ChemSens/MCS
Fragrance sensitive	32.2%	82.0%	89.2%	81.3%
Disabling health effects from fragranced consumer products	29.1%	44.1%	61.7%	43.4%
Unable or reluctant to use restrooms in public place because of air freshener, deodorizer, or scented product	13.3%	37.4%	54.6%	37.3%
Unable or reluctant to wash hands in public place because of fragranced soap	10.4%	32.1%	53.0%	32.5%
Want to leave a business quickly because of fragranced product	17.0%	51.0%	56.8%	49.4%
Prevented from going someplace because of fragranced product that would cause sickness	16.0%	46.5%	65.0%	46.2%
Lost workdays or job in past year due to sickness from fragranced product exposure in workplace	9.0%	28.6%	45.0%	28.0%
Supportive of fragrance-free policy in the workplace				
Yes	47.8%	70.2%	69.9%	69.5%
No	20.4%	10.9%	19.7%	11.7%
Prefer fragrance-free healthcare facilities and professionals				
Yes	51.4%	75.4%	76.5%	74.4%
No	22.1%	11.9%	15.3%	12.8%

and fragrance sensitive than the general population (Table 1). Among those with chemical sensitivity who also report autism/ASDs, the proportions among the four countries are statistically similar ($p = 0.624$).

Chemical sensitivity and effects from fragranced products

Fragranced products pose particular problems for the chemically sensitive. Results are summarized in this section and in Tables 2, 3, and 4. Full results for each country, according to the general population and sub-populations of those with chemical sensitivity, diagnosed MCS, and chemical sensitivity/MCS, are provided as Electronic supplementary material (ESM-Data).

Among chemically sensitive individuals, 82% are fragrance sensitive, reporting adverse health effects from fragranced consumer products. Fragranced products and exposure contexts that are associated with health problems include but are not limited to the following: air fresheners and deodorizers (54.8%), scented laundry products coming from a dryer vent (26.4%), being in a room recently cleaned with

Table 5 Demographic information

	Gen pop	ChemSens	MCS	ChemSens/MCS
Total (*N*)	4435	884	329	943
(% relative to general population)	100.0%	19.9%	7.4%	21.2%
Male/female				
All males	49.1%	40.1%	56.2%	41.6%
All females	51.0%	59.9%	43.8%	58.4%
Gender and age				
Male 18–24	6.5%	5.4%	11.1%	6.4%
Male 25–34	10.2%	11.7%	19.6%	12.2%
Male 35–44	11.2%	9.7%	14.8%	10.1%
Male 45–54	10.9%	7.7%	5.4%	7.5%
Male 55–65	10.3%	5.6%	5.3%	5.5%
Female 18–24	7.1%	8.1%	6.1%	8.0%
Female 25–34	11.5%	12.8%	10.9%	12.4%
Female 35–44	12.2%	14.7%	8.5%	14.2%
Female 45–54	11.3%	13.6%	11.7%	13.4%
Female 55–65	9.0%	10.7%	6.7%	10.4%

scented products (53.8%), being near someone wearing a fragranced product (56.5%), and other types of fragranced consumer products (58.9%) (Table 2).

Types of adverse health effects associated with these fragranced product exposures, for chemically sensitive individuals, include respiratory problems (50.2%), mucosal symptoms (39.4%), migraine headaches (36.9%), skin problems (29.9%), asthma attacks (25.2%), and neurological problems (17.7%), among others (Table 3).

Disabling health problems can result from fragranced product exposures. The severity of health problems associated with fragranced products was investigated, using criteria from each country's disability legislation (ADAAA 2008, DDA 1992, EA 2010, DA 2008). Among those adversely affected by fragranced products, for 29.1% of the general population, 44.1% of individuals with chemical sensitivity, and 61.7% of individuals with diagnosed MCS, the health effects from fragranced product exposures are reported as potentially disabling (Table 4, and ESM-Data Table 20).

Societal access can be restricted by fragranced products. For individuals with chemical sensitivity, 37.4% are unable or reluctant to use public restrooms that have an air freshener, deodorizer, or scented product; 32.1% are unable or reluctant to wash hands in a public place if the soap is fragranced; 51.0% enter a business but then leave as quickly as possible due to a fragranced product; and 46.5% have been prevented from going someplace because a fragranced product would make them sick (Table 4).

Lost workdays and lost jobs are associated with exposure to fragranced products: 9% of the general population, 28.6% of individuals with chemical sensitivity, and 45.0% of individuals with diagnosed MCS, have lost workdays or lost a job, in the past year, due to illness from fragranced product exposure in the workplace. For individuals with chemical sensitivity, this loss represents more than 23 million people in the four countries (Table 4 and ESM-Data Table 29; USCB 2018, ABS 2018, ONS 2018, SCB 2018).

Fragrance-free policies receive strong support. Among those with chemical sensitivity, 70.2% would be supportive of a fragrance-free policy in the workplace (compared to 10.9% that would not). Also, 75.4% would prefer that healthcare facilities and healthcare professionals be fragrance-free (compared to 11.9% that would not). Thus, more than six times as many individuals with chemical sensitivity would prefer that workplaces, healthcare facilities, and healthcare professionals were fragrance-free than not (Table 4).

Among the general population, 47.8% would be supportive of a fragrance-free policy in the workplace (compared to 20.4% that would not). Also, 51.4% would prefer that healthcare facilities and healthcare professionals be fragrance-free (compared to 22.1% that would not). Thus, more than twice as many individuals in the general population would prefer that workplaces, healthcare facilities, and healthcare professionals were fragrance-free than not (Table 4).

Demographic proportions of chemical sensitivity are 40.1% male and 59.9% female, and diagnosed MCS are 56.2% male and 43.8% female, compared with the general population proportions of 49.1% male and 51.0% female. Thus, chemical sensitivity has a female bias (+ 8.9%), and diagnosed MCS has a male bias (+ 7.1%). Relative to gender and age, the highest bias for chemical sensitivity is female 35–44 (+ 2.5%) and for diagnosed MCS is male 25–34 (+ 9.4%) (Table 5).

Discussion and conclusion

Chemical sensitivity is pervasive across the four countries, affecting an estimated 61 million adults (USCB 2018, ABS 2018, ONS 2018, SCB 2018). Individuals with chemical sensitivity, asthma/asthma-like conditions, and autism/ASDs all have a higher prevalence of fragrance sensitivity than those without these conditions.

Chemically sensitive individuals are proportionally more likely to report asthma/asthma-like conditions (POR 5.54; 95% CI 4.74–6.49), autism/ASDs (POR 6.68; 95% CI 4.98–8.97), and fragrance sensitivity (POR 18.54; 95% CI 15.32–22.43) than non-chemically sensitive individuals.

Also, individuals with asthma/asthma-like conditions are proportionally more likely to report chemical sensitivity (POR 5.54; 95% CI 2.23–3.99) and fragrance sensitivity (POR 4.54; 95% CI 3.93–5.23) than individuals without asthma/asthma-like conditions. In addition, individuals with autism/ASDs are proportionally more likely to report chemical sensitivity (POR 7.55; 95% CI 5.57–10.24) and fragrance sensitivity (POR 7.25; 95% CI 5.21–10.10) than individuals without autism/ASDs.

Even though the prevalences of each chemical sensitivity, diagnosed MCS, and fragrance sensitivity among the four countries are statistically different, the co-prevalences of conditions are statistically similar for chemical sensitivity with fragrance sensitivity, chemical sensitivity with asthma/asthma-like conditions, and chemical sensitivity with autism/ASDs.

Further, the proportion of individuals with diagnosed MCS who also report chemical sensitivity is statistically similar across the countries. However, the proportion of individuals with chemical sensitivity who also report diagnosed MCS is statistically different across the countries.

Study strengths include the following: (a) sample populations are statistically representative of the general populations according to age, gender, and region in each country; (b) survey respondents were randomly recruited from large web-based panels that reflect population characteristics; and (c)

the survey replicated questions from previous national population studies for consistency and comparability. Study limitations include the following: (a) only adults ages 18–65 were surveyed, which excludes data from other age groups; (b) the survey relied on self-reported data, although self-report is a standard and widely accepted approach for epidemiological research; and (c) the cross-sectional design of the survey obtains data from one point in time, although the survey can be repeated.

In conclusion, the study indicates that chemical sensitivity is an international public health problem. Further, individuals with chemical sensitivity report a higher co-prevalence of fragrance sensitivity, asthma/asthma-like conditions, and autism/ASDs than individuals without chemical sensitivity. Exposure to fragranced consumer products can exacerbate the adverse health and societal effects, especially for these vulnerable subpopulations with chemical sensitivity, asthma/asthma-like conditions, and autism/ASDs. Reducing exposure to fragranced products, such as through fragrance-free policies, can reduce adverse effects for not only vulnerable individuals but also the general population.

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Compliance with ethical standards

The research study received ethics approval from the University of Melbourne.

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Requesting Presidential Intervention
Regarding Red Hill Bulk Fuel Storage Facilities
& Ongoing Matters of Ecocide against the Hawaiian Kingdom

From: Bronson Azama, Hawaiian Kingdom Subject

To White House Environmental Justice Advisory Council or to whom it may concern:

My name is Bronson Azama, I am of Kānaka Maoli ancestry. My family has lived in the islands of Hawai‘i for over two thousand years. I am a subject of the Hawaiian Kingdom and am a citizen of the United States under duress. I write to you today to bring attention to the ecocide happening on the island of O‘ahu due to the ongoing leakage of the Red Hill Bulk Fuel Storage Facilities utilized by the United States Navy. These leakages have poisoned our Sole Source Aquifer which is impacting the capital of both our nation [Hawaiian Kingdom] and now the illegitimate State of Hawai‘i.

There have been several leaks since 2014, which have now resulted in the poisoning of our aquifer. However, anecdotal evidence from interviews with individuals who have worked at these facilities indicates that the deteriorated and aged facilities leak daily. This groundwater threatens not only the people living on the island currently but also our future generations.

Our ancestors have taught us the importance of being accountable to future generations, this issue goes beyond the law, beyond a judge, but a simple morale issue of being accountable to our children‘s, children‘s, children, and beyond. What is happening on our islands is ecocide, there is a long list of grievances from Kānaka Maoli caused by the United States since the illegal overthrow of 1893 with aid from United States Marines, followed by the illegal annexation via a joint resolution, not a treaty. And now as there are further investigations and questions into the legalities of the illegal military occupation of our homeland, we are faced with a water crisis!

These lands that are illegally occupied which we have title to, are suffer from further decapacitization by the United States military via the Red Hill crisis among many other issues. Whether doing so intentionally or otherwise is not up for debate, my point is this issue of our

Aquifer being poisoned is an extension of the illegal occupation of our islands and is essentially an ecocide of our people.

We need to bring our people environmental and social justice, this can be done by first the closure of the Red Hill Bulk Fuel Storage facilities and implementation of Post-Closure requirements to purify the poisoned water, bedrock, and surrounding environment. As well as the compensation to residents affected. Following these steps, the White House needs to revisit the issue surrounding the illegal occupation of the Hawaiian Islands, and address the restoration of a nation-to-nation relationship between the United States and the Hawaiian Kingdom.

This has no animosity toward the United States, we are simply asking your powerful nation and its leaders to do the right thing. Do the Earth and the people who call it home not deserve such healing? You who are reading are included as people of the Earth. When we all heal, and when we heal others, we find our collective resurgence that supports all.

It is never too late to right a wrong!

Ke aloha nui,
Bronson Azama

Contact info : Karen L. Martin at whejac@epa.gov or by phone 202-564-0203

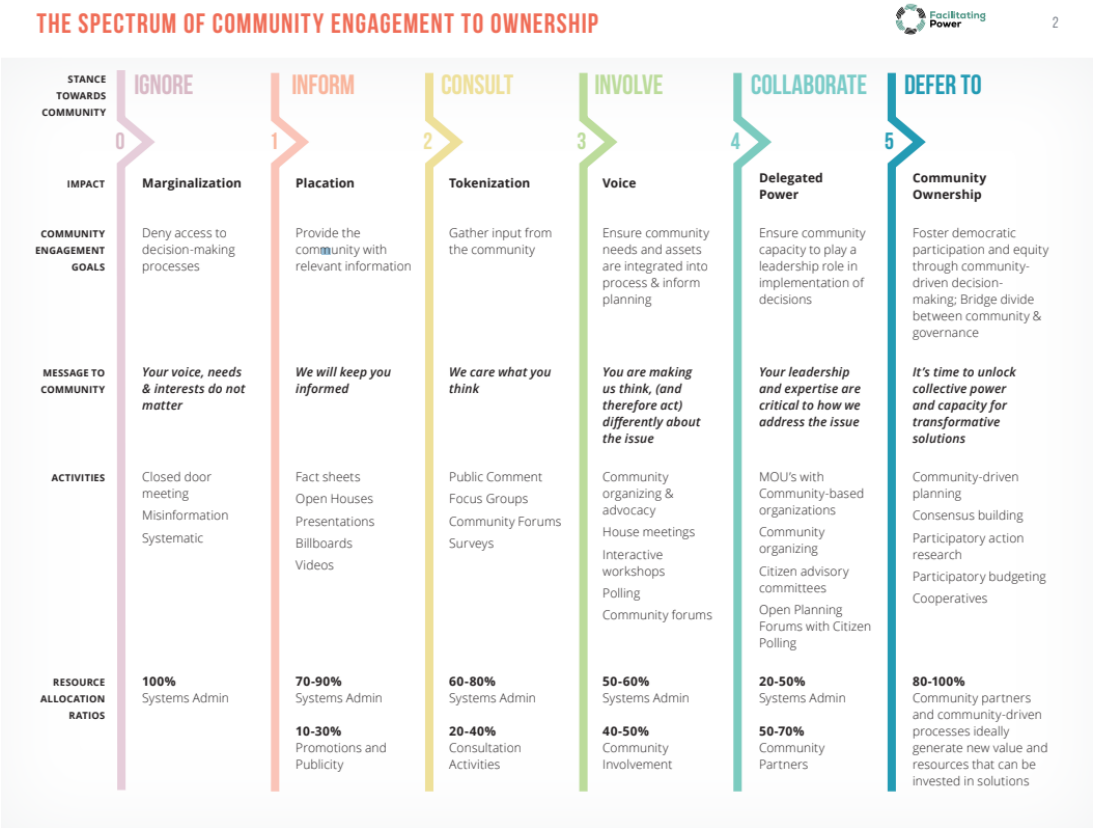
Objective: Provide comments relevant to the performance scorecard that is being developed by the White House Environmental Justice Advisory Council to **assess the progress of federal agencies in addressing current and historic environmental injustice.**

On behalf of The Chisholm Legacy Project, we offer the following recommendations to the White House Environmental Justice Advisory Council and the Council on Environmental Quality regarding development of the Justice40 Scorecard:

We agree with White House Environmental Justice Advisory Council's (WHEJAC) concerns around use of the term "disadvantaged community." Terms that might be more appropriate to consider include overburdened, underinvested in, or historically disenfranchised/marginalized. We advocate for language that assigns a level of culpability to government actors for historical and ongoing neglect and outright abuse. We also advocate for framings that acknowledge that while these communities may be overburdened and historically marginalized, they do not lack agency. Interventions must first and foremost recognize a community's right to self-determinism. For the sake of this written comment, we will be using the phrases "frontline and fenceline communities" and "EJ communities." In addition, we will be referencing the WHEJAC Recommendations and EO 12898 Revisions Report, dated May 21, 2021, hereafter called the May 2021 Report.

In the development of a Justice40 scorecard, input throughout the entire process must be driven primarily by stakeholder representatives, such as BIPOC communities, Black femmes from frontline and fenceline communities, those living in public housing, communities that were excluded from the REAP Program, etc. In the process of data collection in EJ communities, research entities should engage in just models of collaborative relationship and mutually beneficial partnership led by affected communities. The Chisholm Legacy Project will be publishing a guiding document for this relationship in the coming months. Additionally, when seeking collaborations, partnerships, and mentorship opportunities, nontraditional indicators of success and leadership must be considered to meaningfully incorporate the lived experiences of BIPOC/Black femme voices in frontline and fenceline communities.

Frontline and fenceline communities are often distrustful of government engagement. In order to rebuild trust, government actors must authentically transfer power to communities rather than simply consulting after decisions have been made. To this end, we find the following graphic from Facilitating Power useful. True, meaningful, and transformative change happens when communities own the changes to their own circumstances. It is imperative that the Justice40 Scorecard create requirements for agencies to defer to community decision-making.



WHEJAC must more clearly expound on its commitment to "do no harm." Immediate direct effects of any action or lack of action are not the only effects that should be considered. Medium- and long-term outcomes, especially in continued or emerging disparities, should be monitored. In addition, consideration should be given to "loss and damage" in frontline and fenceline communities in the form of reparations (e.g., payments to BIPOC who developed health conditions as a result of living in HUD financed homes that were built on toxic sites). Pollution and toxins in the air, water, and soil are among the most immediate threats to these communities and must be addressed in a holistic, intersectional manner to alleviate the disproportionate burden that is experienced. For instance, coal ash is a major threat to public health. The recommendation and metric guidelines outlined in the May 2021 Report for clean up in the Tennessee Valley Authority region should include the monitoring and evaluation of key performance indicators with mechanisms of measurement developed through community-led, democratic decision-making processes. These guidelines and metrics should also be applied to all toxic coal ash regions, including those outside of TVA territory, and should include equitable compensation for victims.

Additionally, because Black and other communities of color are disproportionately exposed to PM2.5 and other air pollutants in vehicle exhaust, we recommend direct funding towards the installation of green barriers between EJ communities and transportation

corridors, with air monitors that can measure improvement in air quality installed in all metropolitan and suburban areas. These communities should be the first considered for accelerated transition to electric public transportation, with the requirement that the electricity is not derived from dirty energy sources.

In addition to WHEJAC's goal of replacing lead water pipes, we should be ensuring that everyone in the United States has reliable access to safe and clean drinking water. Citizen science opportunities can help ensure progress. While expanding criteria to the Drinking Water State Revolving Fund (DWSRF), WHEJAC should also incentivize states to include unincorporated townships, specifically freedmen's settlements such as Sandbranch, Texas. The Sandbranch community and many other freedmen's settlements like it, currently have no running water or wastewater infrastructure.

There is an immense amount of energy democracy work already occurring at the community level. We recommend WHEJAC catalog action taken to localize energy and uplift energy democracy and justice in marginalized communities through mechanisms such as microgrids, solar coops, etc. WHEJAC should also measure the degree of interdisciplinary, intersectional solutions by monitoring engagement of diverse community members to ensure climate action does not lead to further subsequent inequities. Additionally, the Department of Energy needs to take a more active stance in making clean energy resources accessible to communities by partnering with community members in the expansion of renewable energy. Application processes for grant programs require time and technical expertise to participate. The burden should not be on the most affected and least resourced communities.

Divestment and investment must be utilized to equitably transition to a living economy away from dirty energy. Therefore, WHEJAC must more clearly define the threshold of divestment from fossil fuels, plastics, dangerous chemicals, and nuclear energy by 2030 that is addressed in the May 2021 report. Updated language from most recent IPCC report about divesting from so-called "clean" solutions that are neither clean nor in the best interest of frontline communities must be adopted by WHEJAC. Furthermore, there must be more clearly outlined mechanisms and oversight in place to make sure banks are investing 40+% in frontline and fenceline communities. These may require a separate team to track and analyze the monitoring and enforcements. This should include requirements and metrics for community ownership, asset ownership, and overall lending and investing practices being non-extractive. Additionally, with regards to green bank financing, we recommend including "no interest" loans to increase community participation and mitigate the risk of default.

Finally, we have significant concerns regarding gaps in data acquisition and coverage in the Climate Economic Justice Screening tool. These gaps will lead to too many communities falling through the cracks, which points to an incomplete commitment to Justice40, and therefore they must be addressed while the screening tool is still in beta. These concerns are (but are not limited to) the following:

Clean energy and energy efficiency:
Affordable and sustainable housing:
-Urban Heat Island is not accounted for
-Ignores community planning
-Ignores Radon

Clean transit:
-Ozone (O3) not accounted for
-Focus seems to be on pass through vehicles not community access to multimodal transit
-Percentage of roads improved with bicycle lanes
-Percentage of roads improved with sidewalks
-Number of bus routes
-Number of bus shelters

Reduction and remediation of legacy pollution:
-Leaking underground storage tanks are more than likely going to be missed
-RMP facilities cover a lot but facilities can also have TRI and NPDES but not be RMP facilities

Health Burdens:
-Access to medical facilities
-Food deserts

Additionally, datasets used for the scorecard and the mapping are not well designed to address wealth gaps. Income and household value are both accounted for, but with so many people - especially in EJ communities – renting or living in public housing or living with little to no income, not including non-housing assets as another economic indicator can misrepresent the economic situation of many communities (including high net wealth communities as well).

We look forward to continuing to engage with WHEJAC and CEQ and hope that our recommendations on behalf of the equity of frontline and fenceline communities will be integrated into the development of the Justice40 Scorecard. Thank you.

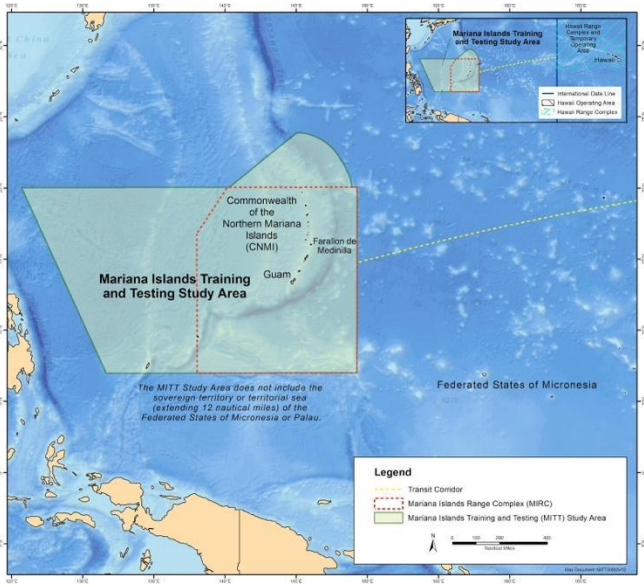
February 24, 2022

re: WHEJAC February 2022 Meeting Public Comments

Dear White House Environmental Justice Advisory Council:

Un dångkulo na si Yu'us ma'åse, Olomwaay and thank you very much for allowing us, Our Common Wealth 670 (OCW 670) to take part in this discussion of Environmental Justice. We the undersigned are a grassroots non-profit organization of community advocates, scholars, environmental activists, specialists, and policy makers from the Commonwealth of the Northern Mariana Islands (CNMI), continental US, and the Indo Pacific Region.

Our primary concerns are with ever increasing US military expansion in personnel, vehicles, and with the frequency of exercises on our lands, and within the surrounding waters of the Oceanic region. The current and proposed levels of military training and testing simply cannot be supported by our small population, limited island land mass, scarce environmental resources, and fragile island ecosystems. Past war activities have already done great harm and left a myriad of military debris, unexploded ordnance (UXO), and pollution on our land and in our ocean. Further long-term irreparable damage will be inevitable not only to our environment, but also to our cultural traditions, and ways of life. The Department of Defense (DoD) continues to insist that our islands (*less than 184 square land miles*) are the only place on earth to house the proposed Commonwealth Joint Military Training (CJMT) and provide for the enormously impactful Mariana Training and Testing (MITT) Study Area of nearly *one million square nautical miles* that surrounds our islands, seas and skies.



Burdening our archipelago with the responsibility of housing this many personnel and allowing an increased frequency in bombing of the Northern Island of Farallon de Medinilla (FDM) is unjust, not to mention sonar and in-water explosions in the MITT, and live-fire ranges on Pagan and Tinian. This is especially incongruent with our ways of life given our ancient fishing traditions and ancestral connections to these lands, waters and skies.

There is a glaring lack of oversight and meaningful engagement by the DoD with the Indigenous peoples of the Marianas at their hosted public meetings. DoD has fallen well short of providing pertinent information to our community in their draft Environmental Impact Statements (EIS) in an accessible and timely manner, and in their responses to public comments. There are extremely limited translation services, most questions go unanswered, and our people, especially our elders or "man'amko" are given limited time to express themselves, which is inconsistent with, and disrespectful of local cultural norms. This has been exacerbated now that DoD is relying solely on the CNMI Bureau of Military Affairs to communicate plans with our regulatory agencies, and leaders for pertinent discourse. Time and again the Bureau does not include communication with our House of Representatives, and to date, not with the general public either. Indeed, the Bureau's states that their mission is:

> *"To improve communication, coordination and response of the CNMI government to the United States military, facilitate the military's integration into the community, and to ensure the relationship between the military and the CNMI is one based on mutual respect and benefit."*

However, nothing is stated concerning sharing of pertinent planning information with the general public for discourse and comment nor is consent. In no way does this contribute to an engaged EIS process as required by the Clean Water Act (CWA).

As to the Bureaus' mission to, "*facilitate the military's integration into the community*", this statement leads us to believe that integration is a primary goal rather than outcome of proper consent and consultation of military planning. Our community of little over 55,000 people, has an ROTC in every single high school. This rampant recruitment process pulls young people away from our local workforce to serve the military abroad. In addition, DoD has continually competed with our own regulatory agencies to recruit experts to complete the EIS process. DoD can, and do offer higher salaries, so experienced local professionals that used to review EISs on behalf of the CNMI have left our local workforce and are now making assessments on behalf of the DoD's desired outcomes. This is a process that leads to data bias and does not adequately allow for a just assessment of our environmental concerns.

As to the Bureaus' mission to, "…*ensure the relationship between the military and the CNMI is one based on mutual respect and benefit,"* the DoD has failed to complete baseline studies of water, sediment and biota since the late 1990's at the persistent request of the CNMI environmental agencies. These studies are needed so they may demonstrate the impact to the environment over time and to ensure accountability for remediation and restoration. To date, no baseline levels have ever been completed to our knowledge, much less shared with the CNMI regulatory community. This shows the general disrespect displayed by the DoD and the one sidedness of the benefits.

In addition, the CWA requires all CNMI public and private agencies to abide by local regulations for the protection of our scarce natural resources and our water quality. However, the DoD has forgone obtaining the same local Coastal Management Permits that we must adhere to locally. This is allowed legally even when their proposed actions are inconsistent with CNMI local laws and policies that aim to protect our marine and terrestrial resources. DoD continually conducts the bare minimum of environmental assessments and suggests using substandard management efforts, yet claim their plans and exercises meet all environmental compliance standards. Many times, DoD cites the studies they have funded that ultimately support their preferred activities, and dismiss others cited by CNMI agencies and the public that do not.

As another example, the proposed ruling by the National Marine Fisheries Services and the National Oceanic and Atmospheric Association seeks to exempt the DoD from abiding by regulations set forth in the designation of several critical coral habitats in Marianas waters (See https://www.federalregister.gov/documents/2020/11/27/2020-21226/endangered-and-threatened-species-critical-habitat-for-the-threatened-indo-pacific-corals).

Inexplicably, the DoD is proposing a new land lease on the islands of Tinian and Pagan for the CJMT despite the longstanding acknowledgement within the CNMI Covenant that no additional lands would be leased for such purposes. This is a breach of public trust and an egregious overreach of power that disregards Indigenous sovereignty in both the legal and socio-cultural sense. Allowing Live-fire training on leased lands that will be returned to the Commonwealth, even more polluted than after WWII, is problematic from both a socio-economic and environmental justice perspective. DoD has made it clear that cleaning up the existing UXO on FDM and on the leased military lands of Tinian is not a requirement or a priority.

In closing, DoD activities do not sufficiently support local stewardship, cultural norms or practices, reflect best practices to meet *local* requirements, and do not offset socio-economic impacts to our underserved and indigenous population.

Respectfully,

Theresa Arriola, Chair — 02/24/2022 Date

Sophia E. Perez, Vice Chair — 02/24/2022 Date

Sheila J. Babauta, Secretary — 02/24/2022 Date

Kathy L. Yuknavage, Treasurer — 02/24/2022 Date

Our Common Wealth 670
Saipan, CNMI
www.ocw670.com
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November 29, 2020

To Whom It May Concern:

I am writing on behalf of the Towboat and Harbor Carriers Association to strongly request that the Champlain Hudson Power Express (CHPE) cable route application as proposed in the Hudson River be denied.

"the Applicants recognize that there is significant waterborne commerce on the Hudson River, with the majority of the cargo originating from the Ports of New York and New Jersey."[1]

The Maritime Industry strongly feels that vessel safety has been dismissed in this process and that safe navigation will be compromised in the Hudson River by this or any cable seeking to run parallel in navigable waters. The first and hopefully last cable to run parallel A vast and powerful river, the Hudson has long been a vital piece in our nations Maritime Transportation System (MTS) serving New York State and our Nation connecting cities/ports world-wide with numerous ports along the Hudson including the State Capital Port Albany/.

"The Port Industry of New York and New Jersey accounted for nearly $12 billion in tax revenue, supported over 500,000 jobs, and was responsible for $36.1 billion in personal and $99.5 billion in business income in the region in 2019, according to a new economic impact study released today by the New York Shipping Association"[2].

"In addition to the indisputable statistics through 2019, the pandemic has highlighted for the nation what we have always known - our supply chain is the lifeline of the economy and we must keep it working efficiently," [3]

[1] HDR Letter October 18, 2010, Sean Murphy
[2] New York Shipping Association, 2020 Economic Report
[3] IBID

STATE POLICY 3

"Th e installation and operation of the transmission cables may affect navigation or future dredging activities which may, in turn, affect the operation of port facilities in New York City and Albany. However, the applicant has consulted with appropriate port facility operators and agreed to site the project in a manner that would not hamper or interfere with port activities."[4]

The mission of Harbor Safety, Navigation and Operations Committee of the Port of New York and New Jersey is: "To *develop non-regulatory solutions to operational challenges in the Port of New York and New Jersey."* The Energy Sub-Committee has worked closely with numerous Alternative/Conventional Energy proposals to develop workable sensible proposals and met with the CHPE consultants' numerous times to discuss cable routing. At each meeting the Energy Sub-Committee raised several concerns regarding the proposed cable route and installation. At first the consultant informed the Energy Sub-Committee that they were negotiating with the New York State Department of Conservation (DEC) to route the cable outside the channel in shallow water and that the route would not be the same as presented however, the CHPE route is very similar though not identical to the first proposal but still does not meet navigation safety concerns and therefore the Applicant has met but NOT consulted with the appropriate port facility operators.

STATE POLICY 2

"Should the bi-pole occupy any federally maintained navigation channels it will be buried at least 15 feet below the authorized depth in a single trench within those channels. In this matter, the siting of the cable at these depths will minimize conflicts with water based navigation by substantially avoiding anchor strikes and potential future navigational improvements."[5]

All waters are navigable whether maintained or not and therefore the cable must be buried at least 15-feet when sited in navigable waters. Varying in size and use, anchors have long been a staple of the shipping industry performing many functions including anchoring, docking, and emergencies. While docks and anchorages are predictable,

[4] NYSDOS Letter June 8, 2011, Signed by Daniel E. Shapiro, First Deputy Secretary of State
[5] IBID

emergencies are not. The Hudson River varies in channel width and depths is primarily rock and can narrow to 400 feet in width. The primary tool to mitigate non-controllable factors is the anchor. Non- controllable external factors include diminishing visibility (fog, snow, and thunderstorms), Ice, or other vessels or internal casualty factors (loss of engines or steering). As non-controllable factors can occur anytime and anywhere in any navigable waters where anchors are the primary tool for crew and cargo safety.[6]

Risk of fouling an anchor on a cable has many impacts to include but not limited to loss of assets, supply chain schedules, asset/human casualties, and/or environmental damage. Vessels transiting the River trade in various liquid products including Albany exports of ethanol.

The Energy Sub Committee and the Towboat and Harbor Carriers Association have serious concerns with the proposed cable routing and burial depths for this project and strongly object to burial depths as proposed. Burial depths should be analyzed, verified, and certified by the applicant and MUST be for ALL navigational waters maintained or not maintained. Two experts Malcom Sharples P.E, Offshore Electrical Cable Burial for Wind Farms: State of the Art, Standards and Guidance & Acceptable Burial Depths, Separation Distances and Sand Wave Effect and Dr. Charles Aubeny testimony in Trans Bay Cable LLC vs. M/V Ocean Life calculate anchor penetration significantly deeper than the deepest burial depth proposed for the CHPE. The anchor is an important ship-handling tool and often the only tool available in an emergency. Commercial vessels often times have to anchor unexpectedly in an emergency situation due to diminishing weather and visibility, to avoid collision or running aground. Mariners also rely on the anchor for ship-handling maneuvers such as turning a vessel with the following tide or to keep the vessel under control when approaching a berth or anchorage. The anchor is very effective but not a precision instrument. Routing underwater infrastructure (cable, pipelines, etc.) parallel to the navigable waters is very likely to complicate anchoring restricting vessel safety for crew and cargo. An effort to avoid the cable or the anchor snagging the cable could result in a serious marine incident at a significant environmental and economic cost.[7]

Navigation Safety must be preserved in all navigable waters of the Hudson River as stated by the CAPT Black, United States Coast Guard, Chief of Prevention by direction of the District Commander in a letter dated July 19, 2017 to Stephen Ryba, Chief Regulatory Branch, U.S. Army Corps of Engineers. During Superstorm Sandy, over 60

[6] TRANS BAY CABLE LLC, Plaintiff, v. M/V OCEAN LIFE, et al., Defendants.
[7] TRANS BAY CABLE LLC, Plaintiff, v. M/V OCEAN LIFE, et al., Defendants.

commercial U.S Flagged vessels sheltered at anchored in the Hudson River until storm waters receded and terminals opened. Protected United States mariners and vital cargoes will be at risk without the ability to anchor.

The OSPARS Commission cable routing recommendations includes as follows:[8]

- protected areas, environmentally sensitive and/or valuable areas with e.g., habitats and species sensitive to physical disturbance or damage where the cable laying activity or operation would result in adverse effects should be avoided;
    - Running the cable parallel to navigable waters make it impossible to avoid adverse effects to navigation safety and marine environment
- **shortest possible length**;
    - The CHPE proposal is the Longest proposed length
- bundling with existing cables and pipelines, where it is safe to do so;
    - No other cable or pipeline runs parallel to navigable waters. One cable running parallel is unfit for rendering this proposal for perpendicular crossings.
- **minimal number of crossings** with other cables or pipelines to reduce the number of crossing structures.
    - The CHPE cable intends to cross numerous cables and pipelines

"Another condition requires that the applicant verify the transmission cables' burial depth on a periodic basis so that they do not become a hazard to navigation or marine resources."[9]OSPAR Commission Environmental Impacts are listed as follows:[10]

[8] Guidelines on Best Environmental Practice (BEP) in Cable Laying and Operation

[9] IBID

[10] Guidelines on Best Environmental Practice (BEP) in Cable Laying and Operation

- **“Contamination Impacts”** – “Release of harmful substances or nutrients may take place while the cable is laid due to displacement and resuspension of contaminated sediment (see disturbance) or because of damage to cables with subsequent release of insulation fluids. Contamination may also occur due to accidents and technical faults during construction”. TDI funded report details projected impacts “CHPE Navigation Risk Assessment”

    - **“Contamination Impacts”** will occur during sheer and jet plow applications and again each and every time the cable is found to not be buried and/or shifted and required to be relocated. It should also be noted that the cable is slated to be abandoned on our nation’s waterway during the end of its life cycle. Duty to Give Adequate Notice of the Obstruction In addition to installing a submerged structure in accordance with the permit issued by the Army Corps of Engineers, the owner of the submerged structure must properly mark it. A party owning and maintaining a submerged structure above the mud line has a duty to warn of the potential obstruction to navigation. Notice of the submerged structure must be adequate to apprise mariners of its location and characteristics. The signage must be visible from passing vessels and located close to the obstruction. Duty to Inspect the Obstruction Once a submerged obstruction is installed, the party owning it has a duty to adequately inspect it and correct all failures.
    - **Dielectric fluid Impacts** - Pressure blow of dielectric fluid leak in the Hudson River cost $10 million to clean up plus civil penalties. A similar blow in Long Island Sound cost $30 million n a matter of first impression, the U.S. Court of Appeals for the Second Circuit has ruled that an oil-filled submerged electrical transmission cable is a "facility" under the Oil Pollution Act of 1990 (OPA). *Power Authority of the State of New York v. M/V Ellen S. Bouchard, et. al.*, No. 19-1140-cv, 2020 WL 4355268 (2d Cir. July 30, 2020). The Second Circuit's decision turned on interpreting the OPA definition of "facility," and marked the first time this statutory term has been construed by an appellate court. The court held unanimously that the cable in question is an OPA "facility," and thus falls within the purview of the OPA liability scheme.

- **"Electro-magnetic impacts"** – "Magnetic fields generated by cables may impair the orientation of fish and marine mammals and affect migratory behavior". A TDI funded report details projected impacts at various burial depths.

    - **"Electro-magnetic impacts"** - In a report written for HDR/DTA (Consultants for TDI dated March 3, 2011) to calculate DC magnetic fields all studies were done at either 6 or 8 foot burial depths. It is understood that TDI plans to not bury the cable in significant portions of the Hudson River, therefore this report is **inconclusive** to the impacts to marine resources. What is known is that even at 6 or 8 foot proposed burial depths magnetic compasses for vessel navigation will be compromised. The Magnetic Compass is the cornerstone of all Navigation and required by law to be carried aboard vessel. Unknown/sporadic deviation of the Magnetic Compass by magnetic fields emitted by cables would severely impact navigation safety in the event of Electronic Navigation Failure caused internally or externally (Lightning Strike, Cyber Attack). Erroneous deviation of the magnetic compass due to the impact of cabling lying parallel to the navigable channel may exacerbate the situation of trying to navigate in reduced visibility, thus adding an unnecessary level of additional risk to the mariner

- **"Reef Effect Impacts"** – "The submarine cables themselves, if not buried, will also provide a solid substrate for a variety of species. This 'reef effect' has been extensively discussed in literature (see OSPAR 2009) and may lead to the introduction of non-local fauna and thus to an alteration of the natural benthic community."

    - **"Reef Effect Impacts"** - When cost to bury exceed company profits the utilization of non-purpose Levee mattress will be laid over the cable to save cost on major waterbodies including the Hudson River. The use of Levee Mattresses (designed to hold back Levees in the Western Rivers increase reef effect impacts. The impacts of Reef Effects have not been discussed and therefore **inconclusive.**

- **"Thermal Impacts"** – "When electric energy is transported, a certain amount gets lost as heat, leading to an increased temperature of the cable surface and subsequent warming of the surrounding environment".

    - **"Thermal Impacts"** are a factor of transmission cables however not identified was the Thermal Impacts in shallow burial depths or on the river bed where the cable is proposed to be sited for a great majority of its route and therefore **inconclusive** to the impacts to the marine environment including shortnose sturgeon and its marine environment.

New York is our home. Over 31,000 New York City residents earn their livelihood in the maritime industry. New York is now the second largest port in the United States and soon to be the LARGEST. Because we recognize the importance of balancing the working waterfront activities, we support environmental stewardship balanced with economic growth and welcome the opportunity to partner with DEC, FERC, and USACE to create a sensible to approach to cable routes. While these utility projects are important, the risks are too great to dedicate the bottoms of our navigable waterways to subsurface infrastructure. These projects should not be permitted in navigable waters unless they are perpendicular to the navigable channel and buried safely to avoid any chance of anchor strike or snag.

I wish to thank you in advance for your considerations to our needs and if you have any questions or concerns please feel free to email me at dirctor@TBHC.com

Sincerely,

CAPT Eric Johansson, Executive Director
Towboat and Harbor Carriers Association
Port of New York/New Jersey

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UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
AT SAN FRANCISCO

FOOD & WATER WATCH; AMERICAN ACADEMY OF ENVIRONMENTAL MEDICINE; FLUORIDE ACTION NETWORK; INTERNATIONAL ACADEMY OF ORAL MEDICINE & TOXICOLOGY; MOMS AGAINST FLUORIDATION; AUDREY ADAMS, individually and on behalf of KYLE ADAMS; KRISTIN LAVELLE, individually and on behalf of NEAL LAVELLE; and BRENDA STAUDENMAIER, individually and on behalf of KO STAUDENMAIER and HAYDEN STAUDENMAIER, Plaintiffs, vs. U.S. ENVIRONMENTAL PROTECTION AGENCY, an agency of the United States; SCOTT PRUIT, Administrator, U.S. Environmental Protection Agency, in his official capacity, Defendants.	Civ. No. **COMPLAINT**

1. Plaintiffs FOOD & WATER WATCH; AMERICAN ACADEMY OF ENVIRONMENTAL MEDICINE; FLUORIDE ACTION NETWORK; INTERNATIONAL ACADEMY OF ORAL MEDICINE & TOXICOLOGY; MOMS AGAINST FLUORIDATION; AUDREY ADAMS, individually and on behalf of KYLE ADAMS; KRISTIN LAVELLE, individually and on behalf of NEAL LAVELLE; and BRENDA STAUDENMAIER, individually and on behalf of KO STAUDENMAIER and HAYDEN STAUDENMAIER (collectively "Plaintiffs") bring this suit against

Defendants, the U.S. ENVIRONMENTAL PROTECTION AGENCY and SCOTT PRUITT, in his official capacity as Administrator of that Agency (collectively "EPA"), to compel the initiation of rulemaking pursuant to the Toxic Substances Control Act ("TSCA"), 15 U.S.C. § 2605(a), to prohibit the addition of fluoridation chemicals to drinking water supplies.

I. BACKGROUND

2. Industrial-grade fluoride chemicals (i.e., hydrofluorosilicic acid, sodium silicofluoride, and sodium fluoride), derived primarily from the phosphate fertilizer industry, are added to many public water supplies in the United States in an attempt to reduce tooth decay.

3. Approximately 200 million Americans live in communities with artificially fluoridated water. Even people who don't live in fluoridated areas now regularly consume fluoridated water since many processed foods and beverages are made in fluoridated areas.

4. Water fluoridation began in the 1940s based on the mistaken premise that fluoride's primary benefit to teeth comes from *ingestion*.

5. It is now universally recognized by dental researchers, including the Centers for Disease Control's (CDC) Oral Health Division, that fluoride's primary benefit comes from *topical* application. Fluoride does not need to be *swallowed*, therefore, to prevent tooth decay.

6. The National Academy of Sciences (NAS) has repeatedly stated that fluoride is not an essential nutrient. Fluoride does not need to be swallowed, therefore, to prevent *any disease* or promote *any health benefit.*

7. Water fluoridation has been rejected or discontinued by the vast majority of European countries without any demonstrated adverse effect on cavity rates.

8. Whereas fluoride's benefits to teeth come from topical contact, fluoride's health risks come from ingestion. One of the risks of fluoride ingestion is dental fluorosis, a hypomineralization of tooth enamel that produces noticeable discoloration of the teeth.

9. According to a 2011-2012 national survey by the CDC, a staggering 58% of American adolescents now have dental fluorosis, with 23% of adolescents suffering advanced forms of the condition. When present on the front teeth, dental fluorosis (even in its"mild" forms) is an aesthetically objectionable condition that can cause children significant social anxiety and embarrassment.

10. The rate of dental fluorosis among U.S. children is far higher today than was the case when fluoridation first began in the 1940s, and is several times higher than the rate documented in the 1980s. The continued increase in fluorosis over the past 60 years highlights the fact that American children are being exposed to unprecedentedly high doses of fluoride, primarily but not exclusively through water fluoridation.

11. The prevalence and severity of dental fluorosis is significantly greater in areas with fluoridated water than in areas without. This is because children in fluoridated areas receive larger cumulative doses of fluoride than children in non-fluoridated areas.

12. A primary concern with fluoride's impact on human health today is its deleterious effect on the brain.

13. In 2006, the National Research Council (NRC) concluded that "it is apparent that fluorides have the ability to interfere with the functions of the brain."

14. Over 300 published, peer-reviewed studies have reported that fluoride interferes with the brain. This includes over 50 studies linking fluoride exposure to cognitive impairments in human populations. The majority of these studies have been published within the past 10 years.

15. In 2014, fluoride was added to the list of chemicals "*known* to cause developmental neurotoxicity in *human* beings" in a review published by *Lancet Neurology*. Fluoride is one of only 12 chemicals that are on this list, alongside lead, mercury, and PCBs.

16. Many of the studies investigating fluoride's impact on the brain have found adverse neurotoxic effects at doses ingested by a large number of Americans living in fluoridated communities.

17. EPA's safety standards for fluoride dosing remain focused on preventing severe dental fluorosis and/or crippling skeletal fluorosis, and do not account for fluoride's effects on the brain. Yet, studies in humans and animals show that fluoride causes adverse neurotoxic effects at doses that are *lower* than those which produce severe dental and skeletal fluorosis. Safety standards solely designed to protect against severe dental and skeletal fluorosis will thus not protect against fluoride's neurological effects.

18. EPA has promulgated *Guidelines for Neurotoxicity Risk Assessment* (hereafter, *Guidelines*), which set forth the principles, concepts, and procedures that EPA has stated it "will follow" when "evaluating data on potential neurotoxicity associated with exposure to environmental toxicants."

19. Despite the voluminous peer-reviewed scientific literature on fluoride neurotoxicity in humans, animals, and cell cultures, EPA has never applied its own *Guidelines* to fluoride.

20. Application of EPA's *Guidelines* to the human, animal, and in vitro research on fluoride neurotoxicity would show that (1) neurotoxicity is a hazard of fluoride exposure, and (2) the risk of this hazard exists at doses that are now ingested by millions of Americans living in fluoridated communities.

21. Neurodevelopmental disabilities, including learning disabilities and attention deficit hyperactivity disorder, are now widespread in the United States. Data from the CDC shows that 1 in 6 U.S. children now suffer from a neurodevelopmental disability.

22. In a nation besieged by neurological disorders of poorly understood etiology, both in young children and the elderly, minimizing exposures to known neurotoxic substances must be a public health priority.

II. JURISDICTION AND VENUE

24. On November 22, 2016, a group of organizations and individuals, including Plaintiffs, petitioned EPA to exercise its authority under Section 6 of TSCA, 15 U.S.C. § 2605, to prohibit the addition of "fluoridation chemicals" to drinking water supplies based on the voluminous peer-reviewed research linking fluoride exposure to neurotoxicity. (The one and only chemical use of "*fluoridation* chemicals" is to fluoridate drinking water.)

25. By letter dated February 17, 2017, EPA denied the Petition.

26. Plaintiffs have a right to bring this action pursuant to TSCA, 15 U.S.C. § 2620(b)(4), which authorizes petitioners to commence a civil action in a district court of the United States to compel the EPA Administrator to initiate a rulemaking proceeding as requested in the petition.

27. This Court has jurisdiction pursuant to 15 U.S.C. § 2620(b)(4)(A) and 28 U.S.C. § 1331.

28. Venue is properly vested in this Court under 28 U.S.C. § 1391(e) as Plaintiff KRISTIN LAVELLE resides in Berkeley California, and Plaintiff FOOD & WATER WATCH has a regional office in Oakland, California.

III. PARTIES

29. Plaintiff FOOD & WATER WATCH ("FWW") is a national, non-profit, public interest consumer advocacy organization with its headquarters in Washington, D.C. and a regional office in Oakland, California.

30. FWW's mission includes educating consumers about the health and safety of our food and water systems and as such FWW advocates on behalf of the public for policies promoting environmental protection and the long-term well-being of individuals and communities.

31. FWW's members live in fluoridated communities across the United States, and as with virtually all Americans, regularly purchase processed foods and beverages that are contaminated with fluoridated water. Since the labels on processed foods and beverages do not identify whether the products are made

with fluoridated water, it is often not possible for consumers to know which particular food or beverage is contaminated. There is therefore a credible threat that FWW's members will be exposed to fluoridated water and the health risks associated therewith, even if they purchase home water filtration systems to remove the fluoride out of the tap water entering their homes.

32. Jessica Trader is an FWW member and a San Francisco business owner. San Francisco adds industrial fluoride chemicals to its water. Jessica has moderate-to-severe dental fluorosis from over-exposure to fluoride as a child. As a result of her fluorosis, Jessica's teeth have noticeable white and brown stains, which have caused her social anxiety and embarrassment. Jessica is concerned about the impact that her prior and ongoing exposures to fluoridation chemicals could have on her health and has spent significant money in order to limit her exposure to this toxicant, including through the purchase and installation of a professional water filtration system that removes fluoride.

33. Dayna Stephens is a FWW member and professional saxophonist. Dayna currently resides in Patterson, New Jersey. Although Patterson does not fluoridate its water, Dayna's musical career requires him to spend a large percentage of his time travelling throughout the United States. Dayna suffers from Focal Segment Glumereal Sclerosis (FSGS), a cause of kidney disease in children and adolescents as well as a leading cause of kidney failure in adults. Dayna underwent dialysis for his kidney failure and underwent kidney transplant surgery. It is well established in the scientific literature that kidney disease greatly increases an individual's susceptibility to fluoride's toxicity. Dayna is aware of this research, and is very concerned about the impact fluoride ingestion could have on his health. While at home, and while travelling, Dayna spends a significant amount of time and money to avoid exposure to fluoridation chemicals from tap water, processed foods, and processed beverages.

34. Rosemary Fletcher is an FWW member and resident of Greenville, South Carolina, which adds industrial fluoride chemicals to its water. Rosemary is an African American woman on a fixed income who used to be dependent on a wheel chair due to a painful arthritic condition. After learning that her

condition could be exacerbated by fluoride exposure, Rosemary stopped drinking fluoridated water and experienced a major improvement in her symptoms. After several months of diligently eliminating fluoridated water, Rosemary was able to abandon her wheel chair, and has not needed it since. Rosemary continues to take every measure possible to avoid exposure to fluoridated water, including by purchasing bottled water for her home drinking water needs. Rosemary's reliance on bottled water has created a financial hardship for her, as she has very limited financial resources.

35. Franzi and Randy Talley are FWW members, restaurant owners, and residents of Asheville, North Carolina, which adds industrial fluoride chemicals to its water. Approximately nine years ago, Franzi was diagnosed with breast cancer, which she treated with chemotherapy. Subsequent to chemotherapy, tests revealed that Franzi had an underactive thyroid gland, as evident by low circulating thyroid hormone levels in her blood. The low thyroid function persisted for years, and was accompanied by substantial fatigue. Last year, after learning of credible medical science linking fluoride exposure to decreased thyroid function, Franzi stopped drinking the fluoridated city water. Franzi's thyroid hormone levels began to increase within months of making this switch, and are now almost back to normal. Franzi's energy level has also notably improved during this time as well. Avoiding fluoridated water is therefore a critical health priority for Franzi as she seeks to continue her recovery. Both her and her husband Randy continue to diligently do what they can to avoid fluoridated water, both for themselves and the customers they serve. They would like to install a water filtration system at their restaurants which can remove the fluoride, but they have run into technical difficulties implementing a filtration system that is capable of removing fluoride that is also compatible with their operations.

36. Karen Spencer is an FWW member and resident of Gloucester, Massachusetts which adds industrial fluoride chemicals to its water. Karen long suffered from various health problems beginning the month her city began fluoridation in 1981. Her symptoms include rashes, hives, gastrointestinal problems, arthritis, general fatigue, pain, chronic dizziness and intermittent short periods of profound,

debilitating and overwhelming fatigue. In 2014, Karen began to strictly eliminate her exposure to fluoridated water to see if it would improve her health. In 9 days, she noted a dramatic improvement in all her symptoms, including cessation her neurological symptoms. Karen has continued to strictly avoid fluoridated water and food and has made a recovery from the illnesses that caused her decades of misery.

37. Plaintiff FLUORIDE ACTION NETWORK ("FAN") is a project of the American Environmental Health Studies Project, Inc. FAN is an organization of scientists, doctors, dentists, environmental health researchers, and concerned citizens working to raise awareness about the impact of current fluoride exposures on human health. FAN's members live in fluoridated communities across the United States, and many have expended significant sums of money to avoid the fluoride added to tap water and processed foods and beverages. Many of FAN members have suffered dental fluorosis and other harm as a result of their fluoride exposures, and have credible concerns about the impact that ongoing exposures to fluoridated water will have on their health.

38. Julie Simms is a FAN member, FWW member, and resident of Seattle, Washington, which adds industrial fluoride chemicals to its water. For more than a decade, Julie experienced constant, daily headaches. She experimented with numerous therapies to cure her of the condition, but nothing worked. Then, in 2013, a friend suggested that Julie stop drinking fluoridated water. Julie was very skeptical of this suggestion as she had long been a supporter of water fluoridation, believed in its safety and efficacy. Nevertheless, at the insistence of her friend, Julie stopped drinking fluoridated water and to her great surprise, the headaches became substantially less painful within just 3 days, and were completely gone within weeks. Julie has continued to spend the necessary resources to avoid fluoridated water and consequently her daily headaches have not returned. Based on her experience, Julie's doctor has advised that she continue to refrain from fluoridated water, not just for drinking and cooking, but bathing as well.

39. Plaintiff AUDREY ADAMS, individually and on behalf of her son KYLE ADAMS, resides in Renton Washington. The Adams are served by Soos Creek Water and Sewer District, a wholesale water purveyor receiving pre-treated water from Seattle Public Utilities ("SPU"). SPU adds industrial fluoride chemicals to its water supply. Kyle has autism and has specific metabolic weaknesses that heighten his sensitivity to many chemicals, including fluoride. Kyle's doctor concurs that Kyle must refrain from exposure to fluoridated water for drinking, cooking and bathing, as he has a consistent history of suffering severe reactions when exposed to fluoridated water. These reactions include (but are not limited to) intense pain and headaches, with resulting extreme hyperactivity, accelerated heart rate and intensification of autistic symptoms. Audrey Adams continues to expend substantial time and money ensuring that Kyle is not exposed to fluoridated water, including the ongoing purchase of spring water and reverse osmosis filtered water for all drinking and cooking and special water filtration for showering. Kyle's continued ability to work, recreate, communicate, participate in community outings and even to sleep are reliant on strict avoidance of all sources of fluoridated water.

40. Plaintiff KRISTIN LAVELLE, individually and on behalf of her 12-year-old son NEAL LAVELLE, is a resident of Berkeley, California. Kristin is an occupational health therapist, and is concerned about the adverse effects that fluoride exposures could have on her and her family's health, including her son Neal. Since Berkeley adds industrial fluoride chemicals to its water, Kristin purchased a $2,000 whole house water filtration system in May of 2015. Although the filter was advertized to reduce over 80% of the fluoride, and although Kristin has dutifully followed all of the maintenance requirements, recent test results show that the filter is not removing any of the fluoride. Kristin has thus purchased a new countertop water filter, which will require ongoing replacements of the filter cartridge, and is considering purchasing a replacement filtration system. In addition to the expenses that Kristin has incurred in trying to remove the fluoride chemicals from her tap water, Kristin also spends significant time and money to minimize her and Neal's exposure to fluoridated water when away from home.

41. Plaintiff BRENDA STAUDENMAIER, individually and on behalf of her children KO STAUDENMAIER and HAYDEN STAUDENMAIER, is a resident of Green Bay, Wisconsin, which adds industrial fluoride chemicals to its water. Due to her concerns about the impact of fluoride on her and her children's health, Brenda has purchased a water filtration system to filter the fluoride out of the water. The filtration system requires that the filter cartridges be replaced approximately every six months. Each cartridge costs approximately $137.50, so Brenda has to pay approximately $275 a year to ensure access to fluoride-free water at home. Brenda is a single mother living on a low income, and $275 a year represents a substantial expense for her.

42. Plaintiff AMERICAN ACADEMY OF ENVIRONMENTAL MEDICINE was founded in 1965, and is an international association of physicians and other professionals that provides research and education in the recognition, treatment and prevention of illnesses induced by exposures to biological and chemical agents encountered in air, food and water.

43. Plaintiff INTERNATIONAL ACADEMY OF ORAL MEDICINE & TOXICOLOGY ("IAOMT") has been dedicated to its mission of protecting public health through the practice of biological dentistry since it was founded in 1984. A worldwide organization of over 800 dentists, physicians, and research professionals in more than 14 countries, IAOMT's mission is accomplished by funding and promoting relevant research, accumulating and disseminating scientific information, investigating and promoting non-invasive scientifically valid therapies, and educating medical professionals, policy makers, and the general public.

44. Plaintiff MOMS AGAINST FLUORIDATION ("MOMS") is a nonprofit organization that educates mothers, pregnant women, families, medical professionals, and all citizens about the now known health effects and ethical issues of ingesting artificial fluoridation chemicals to our water supply. MOMS takes the position that using the public's drinking water to deliver a drug in indiscriminate doses that vary widely from person to person without is a violation of the medical right to informed consent.

IV. STATUTORY FRAMEWORK

45. Section 6 of the Toxic Substances Control Act (TSCA) invests EPA with the authority and duty to take certain prescribed actions if it determines that "the manufacture, processing, distribution in commerce, use, or disposal of a chemical substance . . . presents an unreasonable risk of injury to health." 15 U.S.C. § 2605(a). In making this determination, TSCA commands that EPA consider not only risks to the general public, but to "susceptible subpopulation[s]" as well. 15 U.S.C. § 2605(b)(4)(A).

46. TSCA commands that EPA conduct its risk evaluation "without consideration of costs or other nonrisk factors." 15 U.S.C. § 2605(b)(4)(A).

47. If EPA determines that a chemical substance presents an unreasonable risk to the general public or susceptible subpopulation(s), the Agency "shall" take action "to the extent necessary to protect adequately against such risk using the least burdensome requirements." 15 U.S.C. § 2605(a). The actions that EPA may take include: (1) prohibiting the manufacture and distribution of the substance for a "particular use," and (2) prohibiting "any manner or method of commercial use" of the substance. 15 U.S.C. § 2605(a)(2) & (5).

48. EPA's authority to prohibit and regulate the use of chemical substances under TSCA encompasses drinking water additives. EPA recognized this in its June 12, 1979 Memorandum of Understanding (MOU) with the FDA, in which the Agency stated unequivocally that it has authority "to regulate direct and indirect *additives to drinking water* as chemical substances and mixtures under TSCA." As EPA explained in the MOU, "[a]lthough Section 3(2)(B) of TSCA excludes from the definition of 'chemical substance' food and additives as defined under FFDCA, the implicit repeal by the [Safe Drinking Water Act] of FDA's authority over drinking water enables EPA to regulate direct and indirect additives to drinking water as chemical substances and mixtures under TSCA."

49. In proposing and promulgating a rule under 15 U.S.C. § 2605(a), the EPA shall consider and

publish a statement addressing, inter alia, the (A) the effects of the chemical substance on human health and the exposure of human beings to it; (B) the benefits of the chemical substance; and (C) the reasonably ascertainable economic consequences of the rule. 15 U.S.C. § 2605(c)(2)(A).

V. STATEMENT OF FACTS

A. The National Research Council's 2006 Review and Subsequent Peer-Reviewed Research Demonstrates Fluoride's Ability to Harm the Brain

50. In 2003, the EPA asked the National Research Council (NRC) to review the adequacy of EPA's Maximum Contaminant Level Goal (MCLG) for fluoride, which then and now is set at 4 mg/L. In response, the NRC reviewed the existing research on fluoride toxicity and concluded, in March 2006, that the MCLG is not protective of public health and should be lowered.

51. The NRC conclusion was based on fluoride's adverse effects on bone and teeth, but the NRC also raised numerous concerns about the potential for fluoride to cause other systemic harm, particularly to the endocrine and nervous systems.

52. With respect to the endocrine system, the NRC concluded that fluoride is an "endocrine disrupter," that can alter the function of numerous endocrine glands in the body, including the thyroid gland. The NRC reviewed numerous studies linking fluoride to altered thyroid function, noting that "[i]n humans, effects on thyroid function were associated with fluoride exposures of 0.05-0.13 mg/kg/day when iodine intake was adequate and 0.01-0.03 mg/kg/day when iodine intake was inadequate." These doses are ingested by many people living in fluoridated areas. In light of the established link between thyroid function and neurological health, the NRC called for more research into fluoride's role "in the development of several diseases or mental states in the United States."

53. With respect to the nervous system, the NRC concluded: "On the basis of information largely derived from histological, chemical, and molecular studies, it is apparent that fluorides have the ability to interfere with the functions of the brain."

54. The NRC's conclusion about fluoride's interference with the brain rested primarily on its review of animal studies, because few human studies were available at the time of the NRC review. In the last decade, however, many studies have reported links between fluoride exposure and cognitive deficits in humans, providing additional foundation for concerns about fluoride's threats to the brain.

55. At the time, the NRC only had five human studies on fluoride's cognitive effects to consider in drawing its conclusions; however, there are now over 50 studies linking fluoride to cognitive deficits in humans, as reflected by reduced IQ scores, impaired performance on the Neurobehavioral Core Test Battery (NCTB) test, and impaired performance on the Rey Osterrieth Complex Figure test. In addition, at least three studies have found that the human fetal brain is damaged by elevated prenatal fluoride exposures, which may be one of the mechanisms by which fluoride lowers IQ.

56. The evidence linking fluoride to neurotoxicity in humans is far more extensive today than it was when NRC published its review in 2006, and is far more extensive than the evidence for most of the other chemicals known or suspected to be neurotoxins. Despite this fluoride continues to be used as a water additive.

57. A recent systematic review of suspected developmental neurotoxins by EPA scientists found that few chemicals have been linked to neurotoxicity in humans. The EPA scientists stated that chemicals linked to neurotoxicity in humans are "gold standard" chemicals that warrant prioritization.

58. In the case of fluoride, not only is there human data on neurotoxicity, there are so many human studies linking fluoride to neurotoxic effects that fluoride has been classified by experts as one of only 12 chemicals "*known* to cause developmental neurotoxicity in *human beings*."

59. Fluoride's ability to impair cognition in humans is consistent with animal studies showing that fluoride exposure impairs learning and/or memory capacity in rodents under carefully controlled laboratory conditions. There are now at least 45 animal studies linking fluoride to cognitive deficits in rodents.

60. Fluoride's ability to harm the brain has been further confirmed by over 100 animal studies published since the NRC review which show that fluoride exposure produces a range of adverse neuroanatomical and neurochemical alterations in the brain, including at concentrations that humans experience in fluoridated areas in the United States.

61. It has been 10 years since the NRC determined that the MCLG for fluoride be lowered based on the available data, and the data has continued to mount exponentially, but the EPA has ignored NRC's recommendations and failed to act to protect the public health.

B. Fluoride Poses Neurotoxic Risks at Doses Comparable to the Doses Ingested in Fluoridated Communities in the United States

62. A frequent claim made by those who continue to promote fluoridation is that the water fluoride concentrations associated with neurotoxicity in humans are not relevant to the water fluoride concentrations in the United States; that the drinking water concentrations linked to neurotoxicity exceed the concentration used in domestic water fluoridation programs (0.7 mg/L).

63. In support of this claim, proponents of fluoridation often point to the *highest* water fluoride concentrations that have been linked to neurotoxicity, while ignoring the *lowest* concentrations (and even the *typical* concentrations) that have been associated with harm.

64. This focus on the *highest* concentrations that cause harm as the starting point for analysis, rather than the lowest concentrations, clashes with standard tenets of risk assessment, including EPA's *Guidelines.*

65. The focus on the water fluoride *concentrations* associated with neurotoxic harm also overlooks the fact that it is the total daily *dose* of fluoride that causes toxicity (i.e., how much fluoride a person actually ingests), not simply the concentration of fluoride in the water. For example, a person consuming two liters of water containing 0.7 mg/L fluoride (the concentration used in fluoridation programs) will

consume the same waterborne dose as a person consuming water with 1.4 mg/L (a concentration that has repeatedly been linked to IQ loss). Some Americans, including athletes, manual laborers, and diabetics, consume large quantities of water, far in excess of two liters a day. Further, many of the studies which have investigated fluoride's impact on IQ have been conducted in rural China, where very few children are exposed to fluoride toothpaste and other fluoridated dental products. Since the vast majority of American children use fluoridated dental products, and since use of fluoridated dental products during the early years of life can result in substantial fluoride ingestion, an American child can receive the same daily dose of fluoride as a Chinese child despite having less fluoride in the water.

66. Contrary to the oft-repeated claim that fluoride neurotoxicity is only found at irrelevantly high water fluoride concentrations, the existing studies of fluoride-exposed human populations consistently find neurotoxic impacts within water fluoride concentrations that the EPA currently considers safe ($\leq$ 4 milligrams/liter), with many of these studies finding IQ loss at just 0.8 to 2 mg/L.

67. In total, there are 24 published studies reporting statistically significant reductions in IQ in areas with water fluoride concentrations less than the EPA's MCLG.

68. Many of the studies investigating fluoride's effect on IQ have provided individual-level data on fluoride exposure, including: (a) daily fluoride dose from all sources, (b) urine fluoride level, (c) serum fluoride level, and (d) dental fluorosis status. Each of these metrics have been found to correlate with reduced IQ.

69. The *daily fluoride dose* associated with reduced IQ in endemic fluorosis areas is exceeded by many Americans living in fluoridated areas.

70. The *urine fluoride level* associated with reduced IQ in children in endemic fluorosis areas is exceeded by many Americans living in fluoridated areas.

71. The *urine fluoride level* associated with cognitive impairment in adults in endemic fluorosis areas is exceeded by many Americans living in fluoridated areas.

72. The *serum fluoride level* associated with reduced IQ in endemic fluorosis areas is exceeded by many Americans living in fluoridated areas.

73. Studies have found that children with mild, moderate, and moderate/severe fluorosis have lower IQs than children with no fluorosis. Consistent with this, studies of rodents have repeatedly found neurotoxic effects, including learning impairments, among rats with only mild forms of fluorosis. As noted by Niu, et al, "these findings indicate that fluoride . . . can influence spontaneous behaviors and lower the learning ability of rats ***before the appearance of dental lesions***."

74. The studies linking fluorosis to cognitive deficits become extremely significant to the question of U.S. regulatory policy when considering the rate of dental fluorosis among the U.S. population.

75. CDC's 2011-2012 National Health and Nutrition Examination Survey (NHANES) found dental fluorosis in 58.3% of the surveyed adolescents, including an astonishing 21.2% with moderate fluorosis, and 2% with severe. Since there are an estimated 42-million adolescents currently living in the U.S., the NHANES data suggests that up to 24-million adolescents now have some form of dental fluorosis, with over 8 million adolescents having moderate fluorosis, and 840,000 having severe fluorosis.

76. The NHANES survey does not provide data on the respective rates of fluorosis in fluoridated vs. non-fluoridated communities, but research has repeatedly confirmed that both the prevalence and severity of dental fluorosis are greater in U.S. communities with fluoridated water than in communities without. Stopping the addition of fluoride to drinking water will thus reduce the number of children developing dental fluorosis, and the accompanying neurotoxic risks associated with the doses that produce fluorosis.

77. Recent epidemiological studies in Canada, England, and the United States provide further reason for concern about the neurotoxic dangers posed by fluoridation. In 2016, researchers from Canada found that urinary fluoride levels were significantly correlated with learning problems. In 2015, Malin and Till found a significant correlation between the prevalence of water fluoridation at the state level in the U.S. and Attention-Deficit Hyperactivity Disorder (ADHD). Another 2015 study, by Peckham et al., found

that fluoride levels greater than 0.7 mg/L significantly correlated with higher rates of hypothyroidism in the United Kingdom, even after controlling for the covariates of age, gender, and index of deprivation. The correlation between fluoridation and hypothyroidism, which is biologically plausible and consistent with prior animal and human studies, provides further mechanistic support for the capacity of fluoridated water to cause neurotoxic effects. Finally, recent epidemiological and laboratory studies strongly suggest that fluoridating water with hydrofluorosilicic acid increases the corrosion of lead (a potent neurotoxin) from brass pipes and fittings, resulting in elevated blood lead levels. This provides yet another mechanism whereby fluoridation can produce adverse neurotoxic effects at relevant use and exposure levels.

78. Studies of rodents further demonstrate the neurotoxic hazards of the fluoride doses ingested in fluoridated areas. The National Toxicology Program has estimated that over 10% of children living in fluoridated areas will receive a comparable waterborne fluoride dose as rats drinking water with 9 mg/L. This is significant because studies have repeatedly found neurotoxic effects among rats drinking water with just 1 to 9 mg/L; including oxidative stress, alterations in neurotransmitters, learning impairment, behavioral changes, and pathological changes in the synaptic structure.

79. Studies of cells have found that fluoride can damage brain cells at concentrations as low as 9 parts per *billion.* Most Americans living in fluoridated areas have more than 9 parts per billion fluoride in their blood, with some individuals having 50 to 100+ parts per billion in their blood. Since fluoride circulating in the blood has access to the brain, and since the blood brain barrier loses its efficacy with aging, many Americans will have fluoride levels in their brain that are known to harm brain cells in carefully controlled laboratory experiments.

C. Susceptible Subpopulations Are at Heightened Risk of Fluoride Neurotoxicity

80. EPA's *Guidelines* recognize that individual susceptibility to the neurotoxicity of environmental toxicants can vary by a factor of ten or more, and is influenced by factors such as nutritional status, age, genetics, co-exposure to other toxicants, and disease.

81. Each of these factors—nutritional status, age, genetics, co-exposure to other toxicants, and disease—are known to influence an individual's susceptibility to chronic fluoride toxicity.

82. Recent research has specifically demonstrated that nutrient deficiencies and genetics amplify fluoride's neurotoxicity. Zhang et al. (2015), for example, reported that certain COMT gene polymorphisms greatly influence the extent of IQ loss resulting from fluoride exposure, which is consistent with research on other neurotoxins, including methyl mercury.

83. While the full range of individual susceptibility to fluoride neurotoxicity in the U.S. cannot be precisely calculated, a number of identifiable subpopulations are clearly at elevated risk, including:

a. ***Infants:*** Although *breast fed* infants receive the lowest fluoride intake by bodyweight (<0.001 mg/kg/day) of all age-groups, this situation is flipped on its head when infants are fed *formula reconstituted with fluoridated water*, as infants consuming fluoridated formula receive the highest dosage of any age group in the population. In fact, the average daily dose received by an infant receiving fluoridated formula *exceeds* the dose that has been associated with reduced IQ in studies of Chinese children. Not only do formula-fed infants receive an unnaturally high dose, they have an impaired ability to excrete the fluoride they ingest, retaining up to 87% of the absorbed dose. As a result of this high body burden, infants exposed to fluoridated water suffer far higher rates of dental fluorosis, thus demonstrating their vulnerability to fluoride's systemic effects.

b. ***Elderly***: As noted in EPA's *Guidelines*, "[T]he aged population is considered to be at particular risk [of neurotoxicity] because of the limited ability of the nervous system to

regenerate or compensate to neurotoxic insult." This is of concern because the brain will be more exposed to fluoride in older age due to the (1) increased level of fluoride circulating in the serum as a result of age-related degenerations in kidney and bone health, and (2) increased permeability of the blood-brain barrier. Consistent with this, studies have found a very high prevalence of cognitive impairment (up to 82%) among elderly individuals in endemic fluorosis areas.

c. ***Individuals with suboptimal nutrient intake***: It has been known for over 70 years that suboptimal nutrient intake (e.g., calcium, vitamin C, vitamin D, iodine, etc) render individuals more susceptible to fluoride toxicity. This is of significant concern vis-à-vis fluoride neurotoxicity in the U.S. as suboptimal nutrient intake remains a widespread problem. For example, *86% percent* of African Americans, for example, do not get enough calcium; the *median* urine iodine concentrations for women of child-bearing age "border on insufficiency"; and 6% of Americans have a vitamin C deficiency.

d. ***Individuals with COMT gene polymorphisms***: The study by Zhang et al. (2015) suggests that children with the COMT val/val genotype suffered a five-fold larger drop in IQ than children with the COMT val/met and met/met genotypes.

e. ***Individuals with kidney disease***: The kidneys are the principal way that the human excretes fluoride. When the kidneys are damaged, the ability to excrete fluoride becomes impaired, leading to an excess accumulation of fluoride in the body. It is well established, therefore, that individuals with advanced kidney disease are at far higher risk of suffering fluoride toxicity.

f. ***African Americans***: The African American community suffers disproportionate risks from fluoride exposure, as it has a heightened prevalence of multiple risk factors for fluoride toxicity, including elevated use of infant formula, elevated exposure to lead,

depressed calcium and anti-oxidant intake, and significantly higher rates of dental fluorosis, including in its moderate and severe forms.

84. These susceptible subpopulations will suffer neurotoxic effects at doses of fluoride exposure that are lower than the general population.

D. A Reference Dose Protective Against Fluoride Neurotoxicity Is Incompatible with Water Fluoridation if Standard Risk Assessment Procedures Are Applied

85. Because of the wide range of sensitivity in the human population to neurotoxicants, EPA's Guidelines endorse the application of "uncertainty factors" (UF) when converting the "lowest observable adverse effect level" (LOAEL), "no observable adverse effect level" (NOAEL) or Benchmark Dose (BMD) level into a safe "reference dose" (RfD). Typically, the uncertainty factors are at least one order of magnitude (i.e., a factor of 10).

86. Application of a *single* uncertainty factor of 10 to the dose of fluoride associated with harm and/or the doses associated with no effect, produce RfD that is far below the levels that most Americans now receive in fluoridated areas. The dose that would protect against fluoride neurotoxicity according to EPA's Guidelines, and standard risk assessment procedures, is incompatible with the doses of fluoride ingested in fluoridated areas.

87. Application of EPA's BMD methodology to available dose-response data (Xiang et al.) indicates that ingestion of 0.7 mg fluoride per day is associated with an average loss of 2.5 IQ points when compared to a child with no fluoride exposure. This is a dose of fluoride that tens of millions of American children living in fluoridated communities now ingest.

88. A recent published quantitative risk analysis by a former Senior EPA risk assessment scientist concludes that fluoride ingestion should be kept below 0.05 mg/day if neurotoxicity is to be avoided. Virtually every person living in a fluoridated area consumes more than 0.05 mg/day from fluoridated tap water and processed foods and beverages made with fluoridated water.

89. The reduction in IQ associated with fluoride exposure is severe enough in some children to produce mental retardation, the impact of which is obvious and catastrophic. However, even the loss of a single IQ point is associated with significant economic loss. As calculated by Spadaro et al., a loss of a single IQ point causes an average drop in lifetime earnings of $18,000 in 2005 U.S. dollars, which, when adjusted for inflation, amounts to $22,250 in current dollars.

90. Since 200 million Americans now live in areas where water is fluoridated, and since virtually all Americans consume processed foods and beverages made with fluoridated water, even a small reduction in IQ from fluoridated water stands to have immense economic consequences.

E. Recent Studies Show that Fluoridation Presents Little Meaningful Benefit to Teeth

91. Fluoridation chemicals are the only chemicals added to municipal water that don't treat the water itself. The sole purpose of adding fluoridation chemicals to water for use as a drug to reduce tooth decay, a non-waterborne disease. Current research, however, demonstrates that the purported dental benefits from fluoridation are much smaller than previously believed, with many studies failing to find any measurable, clinically significant difference in tooth decay between fluoridated and non-fluoridated areas.

92. There are no randomized controlled trials on the effectiveness of fluoridation, and few of the available studies adequately account for potential confounders like socioeconomic status, sealants, and dietary habits. The evidence has thus been characterized by the Cochrane Collaboration as having "high risk of bias" and limited applicability to modern lifestyles.

93. Notwithstanding these methodological limitations, modern studies of fluoridation and tooth decay have found that the difference in cavity rates between fluoridated and non-fluoridated areas is small, inconsistent, and often non-existent, particularly in the permanent teeth.

94. Because of the meager differences in cavities now seen between fluoridated and non-fluoridated areas, sensitive measurements of tooth decay must be utilized in order to detect *any* differences in decay. But, even when sensitive measurements are utilized, the differences remain small in absolute terms, inconsistent, and greatly overshadowed by the influence of other factors known to affect decay.

95. Studies from Canada, Cuba, Finland, Germany, and the United States did not detect *any* measurable increase in decay following the termination of water fluoridation programs.

F. Fluoridation Is Unnecessary as There Are Safer, More Effective Alternatives, Including Topical Fluoride Products

96. The addition of fluoridation chemicals to drinking water began in the U.S. prior to the advent of topical fluoride products in an era when public health authorities believed fluoride's predominant benefit to teeth comes from *ingestion*. Things have changed dramatically since that time.

97. Today, over 95% of toothpastes contain fluoride, as do many other dental products, and dental researchers now universally acknowledge that fluoride's predominant benefit is topical, not systemic. As explained in the *Journal of the American Dental Association*, "fluoride incorporated during tooth development is insufficient to play a significant role in cavity protection." (Featherstone 2000) The Centers for Disease Control has confirmed the primacy of fluoride's topical mechanisms, declaring that "fluoride's predominant effect is *post*eruptive and *topical*." (CDC 2001) The NRC has confirmed this as well, stating that "the major anticaries benefit of fluoride is *topical* and *not systemic*." (NRC 2006)

98. Since fluoride's primary benefit comes from topical contact with the teeth, there is little benefit from swallowing fluoride, in water or any other product. In fact, a recent NIH-funded prospective study of the relationship between tooth decay and total daily fluoride ingestion failed to find a detectable relationship between the two. (Levy et al. 2009). Other recent studies investigating the relationship

between tooth decay and individual biomarkers of fluoride intake (e.g., toenail fluoride content and dental fluorosis) have reported similar results.

99. The widespread availability of topical fluoride products highlights the lack of necessity of adding fluoridation chemicals to water, particularly since the quality of evidence for fluoride toothpastes has been recognized as vastly superior to the quality of evidence for water fluoridation. Furthermore, it is well established that western countries that do not fluoridate their water have tooth decay rates that are just as low, and often lower, as western countries that do fluoridate their water.

100. While fluoride toothpastes and other fluoridated dental products carry their own potential hazards *when ingested*, these products—unlike drinking water—are not *designed* to be ingested. Further, unlike the addition of fluoridation chemicals to drinking water, the use of topical fluoride products does not result in the contamination of processed foods and beverages, thus making it easier to regulate the amount of fluoride ingested when topical fluoride products are the vehicle for delivering fluoride to those who want it.

VI. CAUSE OF ACTION

101. TSCA provides that a party that petitions EPA under 15 U.S.C. § 2620 is entited to a *de novo* review by a federal district court if EPA denies the petition.

102. If the petitioner demonstrates to the court by a preponderance of evidence that "the chemical substance or mixture to be subject to the proposed rule presents an unreasonable risk of injury to health or the environment, without consideration of costs or other nonrisk factors, including an unreasonable risk to a potentially exposed or susceptible subpopulation, under the conditions of use," there is reasonable, "the court shall order the Administrator to initiate the action requested by the petitioner." 15 U.S.C. § 2620(4)(B).

105. On November 22, 2016, Plaintiffs submitted a Petition to EPA, supported by over 300 attached studies, documenting each of the allegations contained in Paragraphs 2 to 23 and 50 to 100 above.

106. EPA denied Plaintiff's Petition on February 17, 2017 based on a legally erroneous, factually incorrect, and scientifically flawed assessment, wherein, *inter alia*, the EPA (A) erroneously interpreted the Frank R. Lautenberg Chemical Safety for the 21st Century Act as placing onerous new evidentiary burdens on citizen petitioners, (B) dismissed studies relied upon by Plaintiffs on demonstrably false grounds, and (C) failed to consider the research on fluoride neurotoxicity through the framework of its *Guidelines on Neurotoxicity Risk Assessment*.

107. Plaintiffs are therefore entitled to a *de novo* judicial review of the Petition.

VII. PRAYER FOR RELIEF

108. WHEREFORE, Plaintiffs respectfully request that the Court grant the following relief;

a. Declare that Plaintiffs have demonstrated by a preponderance of the evidence that artificial fluoridation of drinking water supplies presents an unreasonable risk of injury to health or the environment, without consideration of costs or other nonrisk factors, including an unreasonable risk to a potentially exposed or susceptible subpopulation, pursuant to 15 U.S.C. § 2620(b)(4)(B)(ii).

b. Order EPA to initiate the action requested by Plaintiffs in their petition pursuant to 15 U.S.C. § 2620(b)(4)(B).

c. Award Plaintiffs their costs of suit and reasonable fees for attorneys and expert witnesses in this action pursuant to 15 U.S.C. § 2620(b)(4)(C).

d. Grant Plaintiffs such further and additional relief as the Court may deem just and proper.

Respectfully submitted this 18th day of April, 2017.

By: _____
Michael Connett
Attorney for Plaintiffs

JS-CAND 44 (Rev. 07/16)

CIVIL COVER SHEET

The JS-CAND 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved in its original form by the Judicial Conference of the United States in September 1974, is required for the Clerk of Court to initiate the civil docket sheet. *(SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)*

I. (a) PLAINTIFFS

Food + Water Watch, American Academy of Environmental Medicine, Fluoride Action Network, International Academy of Oral Medicine + Toxicology, Moms Against Fluoridation, Avery Adams, Kyle Adams, Krista Laveille, Neal Laveille, Breada Studenmeier, Ko Studenmeier, Hayden Studenmeier

(b) County of Residence of First Listed Plaintiff Alameda
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys *(Firm Name, Address, and Telephone Number)*
Michael Connett
c/o Food + Water Watch Tel: 510-922-0720
1814 Franklin St, Suite 1100
Oakland CA 94612

DEFENDANTS

- Environmental Protection Agency
- Scott Pruitt (Administrator of EPA)

County of Residence of First Listed Defendant District of Columbia
(IN U.S. PLAINTIFF CASES ONLY)
NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED.
Attorneys *(If Known)*

II. BASIS OF JURISDICTION *(Place an "X" in One Box Only)*

- ☐ 1 U.S. Government Plaintiff
- ☐ 3 Federal Question *(U.S. Government Not a Party)*
- ☒ 2 U.S. Government Defendant
- ☐ 4 Diversity *(Indicate Citizenship of Parties in Item III)*

III. CITIZENSHIP OF PRINCIPAL PARTIES *(Place an "X" in One Box for Plaintiff and One Box for Defendant)*
(For Diversity Cases Only)

	PTF	DEF		PTF	DEF
Citizen of This State	☐ 1	☐ 1	Incorporated *or* Principal Place of Business In This State	☐ 4	☐ 4
Citizen of Another State	☐ 2	☐ 2	Incorporated *and* Principal Place of Business In Another State	☐ 5	☐ 5
Citizen or Subject of a Foreign Country	☐ 3	☐ 3	Foreign Nation	☐ 6	☐ 6

IV. NATURE OF SUIT *(Place an "X" in One Box Only)*

CONTRACT
- ☐ 110 Insurance
- ☐ 120 Marine
- ☐ 130 Miller Act
- ☐ 140 Negotiable Instrument
- ☐ 150 Recovery of Overpayment Of Veteran's Benefits
- ☐ 151 Medicare Act
- ☐ 152 Recovery of Defaulted Student Loans (Excludes Veterans)
- ☐ 153 Recovery of Overpayment of Veteran's Benefits
- ☐ 160 Stockholders' Suits
- ☐ 190 Other Contract
- ☐ 195 Contract Product Liability
- ☐ 196 Franchise

TORTS

PERSONAL INJURY
- ☐ 310 Airplane
- ☐ 315 Airplane Product Liability
- ☐ 320 Assault, Libel & Slander
- ☐ 330 Federal Employers' Liability
- ☐ 340 Marine
- ☐ 345 Marine Product Liability
- ☐ 350 Motor Vehicle
- ☐ 355 Motor Vehicle Product Liability
- ☐ 360 Other Personal Injury
- ☐ 362 Personal Injury - Medical Malpractice

PERSONAL INJURY
- ☐ 365 Personal Injury – Product Liability
- ☐ 367 Health Care/ Pharmaceutical Personal Injury Product Liability
- ☐ 368 Asbestos Personal Injury Product Liability

PERSONAL PROPERTY
- ☐ 370 Other Fraud
- ☐ 371 Truth in Lending
- ☐ 380 Other Personal Property Damage
- ☐ 385 Property Damage Product Liability

FORFEITURE/PENALTY
- ☐ 625 Drug Related Seizure of Property 21 USC § 881
- ☐ 690 Other

BANKRUPTCY
- ☐ 422 Appeal 28 USC § 158
- ☐ 423 Withdrawal 28 USC § 157

PROPERTY RIGHTS
- ☐ 820 Copyrights
- ☐ 830 Patent
- ☐ 840 Trademark

OTHER STATUTES
- ☐ 375 False Claims Act
- ☐ 376 Qui Tam (31 USC § 3729(a))
- ☐ 400 State Reapportionment
- ☐ 410 Antitrust
- ☐ 430 Banks and Banking
- ☐ 450 Commerce
- ☐ 460 Deportation
- ☐ 470 Racketeer Influenced and Corrupt Organizations
- ☐ 480 Consumer Credit
- ☐ 490 Cable/Sat TV
- ☐ 850 Securities/Commodities/ Exchange
- ☐ 890 Other Statutory Actions
- ☐ 891 Agricultural Acts
- ☐ 893 Environmental Matters
- ☐ 895 Freedom of Information Act
- ☐ 896 Arbitration
- ☒ 899 Administrative Procedure Act/Review or Appeal of Agency Decision
- ☐ 950 Constitutionality of State Statutes

LABOR
- ☐ 710 Fair Labor Standards Act
- ☐ 720 Labor/Management Relations
- ☐ 740 Railway Labor Act
- ☐ 751 Family and Medical Leave Act
- ☐ 790 Other Labor Litigation
- ☐ 791 Employee Retirement Income Security Act

SOCIAL SECURITY
- ☐ 861 HIA (1395ff)
- ☐ 862 Black Lung (923)
- ☐ 863 DIWC/DIWW (405(g))
- ☐ 864 SSID Title XVI
- ☐ 865 RSI (405(g))

REAL PROPERTY
- ☐ 210 Land Condemnation
- ☐ 220 Foreclosure
- ☐ 230 Rent Lease & Ejectment
- ☐ 240 Torts to Land
- ☐ 245 Tort Product Liability
- ☐ 290 All Other Real Property

CIVIL RIGHTS
- ☐ 440 Other Civil Rights
- ☐ 441 Voting
- ☐ 442 Employment
- ☐ 443 Housing/ Accommodations
- ☐ 445 Amer. w/Disabilities–Employment
- ☐ 446 Amer. w/Disabilities–Other
- ☐ 448 Education

PRISONER PETITIONS

Habeas Corpus:
- ☐ 463 Alien Detainee
- ☐ 510 Motions to Vacate Sentence
- ☐ 530 General
- ☐ 535 Death Penalty

Other:
- ☐ 540 Mandamus & Other
- ☐ 550 Civil Rights
- ☐ 555 Prison Condition
- ☐ 560 Civil Detainee–Conditions of Confinement

IMMIGRATION
- ☐ 462 Naturalization Application
- ☐ 465 Other Immigration Actions

FEDERAL TAX SUITS
- ☐ 870 Taxes (U.S. Plaintiff or Defendant)
- ☐ 871 IRS–Third Party 26 USC § 7609

V. ORIGIN *(Place an "X" in One Box Only)*

☒ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from Another District *(specify)* ☐ 6 Multidistrict Litigation–Transfer ☐ 8 Multidistrict Litigation–Direct File

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing *(Do not cite jurisdictional statutes unless diversity)*: 15 USC 2620

Brief description of cause: De Novo Review of Agency Action/Inaction

VII. REQUESTED IN COMPLAINT:

☐ CHECK IF THIS IS A CLASS ACTION UNDER RULE 23, Fed. R. Civ. P.

DEMAND $

CHECK YES only if demanded in complaint:
JURY DEMAND: ☐ Yes ☒ No

VIII. RELATED CASE(S), IF ANY *(See instructions)*: JUDGE DOCKET NUMBER

IX. DIVISIONAL ASSIGNMENT (Civil Local Rule 3-2)

(Place an "X" in One Box Only) ☒ SAN FRANCISCO/OAKLAND ☐ SAN JOSE ☐ EUREKA-MCKINLEYVILLE

DATE: April 18, 2017 **SIGNATURE OF ATTORNEY OF RECORD:** Mic Gatt

Excepts from:

Space Sustainability: Stakeholder Engagement Study Outcome Report,

May 2021, United Nations Office for Outer Space Affairs (UNOOSA)
https://www.unoosa.org/documents/pdf/studies/Space-Sustainability-Stakeholder-Engagment-Study-Outcome-Report.pdf

Executive Summary

This report captures the views of over 50 key stakeholders from the global space community exploring the subject of '*space sustainability*'... One key outcome of this study was that many felt sustainability **needs to be urgently mainstreamed** across the global space sector. **This sense of immediacy** appears to be of relevance regardless of whether the term was being applied **to an operational, policy, legal, economic, or environmental setting**.

... **now is the time to scale up our focus on space sustainability issues**. Only by putting sustainability at the heart of global space activities, we will ensure the investments being made in space today, can deliver returns for generations to come.

Context

Global space activities are booming. **In 2020 the world registered 1,260 new satellites** and other space objects with the United Nations Office for Outer Space Affairs (UNOOSA). This is **nearly 10% of all objects - ever registered** - with the UN since 1957. Over 65 countries now conducting space activities. **Satellite mega-constellations are an operational reality**. Globally, **unprecedented levels** of both up and downstream space activities are being unlocked.

Indeed, the **Earth's orbital space environment is a limited resource, the continuous creation of space debris, the increasing complexity of space operations are all example trends affecting the long-term sustainability of space activities.**

Findings

... **exponential increase of space debris and large constellations, cluttering our extremely limited usable orbits, which are Low Earth Orbit (LEO) and Medium Earth Orbit (MEO), also jeopardizing humanity's access to space**.

... carrying-capacity of the nearEarth environment

Trends were noted that sees an increasing number of satellites being launched even though similar services (i. 24/7 Earth Observation coverage with similar technical capabilities) are offered by other companies, creating a **competition on our trajectories, which can be worrisome** in the medium term, keeping in mind the **limited nature of our orbital environment**.

*"**We need to preserve the orbital environment, a bit like keeping a national park safe**. We may need 'park rangers' to monitor and clean up space."* - Christopher D. Johnson, Secure World Foundation
*"**If space becomes critically unsafe, it will not be selectively unsafe, but unsafe for everyone.**"*
- Prof. Nayef Al Rodhan, Geneva Centre for Security Policy

which are the most effective in maintaining sustainable space activities?
- Adherence to existing international space law.
- Applications of new space technologies.

- Steps to mitigate the economic cost of space sustainable practices.
- Increase transparency and information sharing practices between actors.
- Enhance platforms for multi-stakeholder dialogue.
- Increasing public awareness and interest in space sustainability issues.

.. all the six options seemed to go a long way to forming the core component of any policy response to space sustainability. However... there is no one stop solution or mitigation mechanism for the global space community when tackling space sustainability topics. In other words, not all space actors have the capacity to implement the required range of components to deliver space sustainability.

we should learn lessons from other policy areas such as the Antarctic Treaty System outside of the spatial context to find solutions to the externality problem of space debris and **to save our trajectories from the "tragedy of the global commons"**.

the need for engaging in more research and study into standardizing a common set of space sustainability indicators. Several technical operations experts... argued forcefully that there was much research to be done to develop specific metrics. One illustrative example of this lack of empirical assessment methods given is that **the actual carrying capacity of LEO and MEO orbital pathways is a relatively unknown and chronically understudied concept**... In the absence of such metrics, nobody can understand the actual impact of the objects being in the same orbit at the same time. In accordance, until sufficient metrics and definitions (i. carrying capacity or space traffic footprint) are established it was brought forward by some respondents that space sustainability measures cannot be sufficiently embedded into the regulatory and licencing processes. The interviewers did however, identify a counterargument emerging from some responders stating that sufficient metrics do exist to ensure space sustainability, the **problem is rather finding consensus on which metrics to use**.

When it comes to the role debris removal can play in space sustainability it was raised by several commentators that **only a handful of actors are leading the way in investing in existing space debris removal missions**... we must **avoid the trap of focusing too much on technological fixes to issues that have policy roots**. In other words, ... **prevention is always better than mitigation**. Technology was therefore often characterised as a "trick" for the symptoms that can sometimes lead us to forget about the underlying problem... there is sometimes so much public communication on the technology side, a **general audience might think that there is already a complete solution for our shared space sustainability challenges**.

a key element to delivering space sustainability will be a combination of industry-led best practices, and **international guidance and national level regulations**... we should not forget the user community, such as the downstream market is also able to gain access to such platforms for discussion, as well as the astronomy and science community to participate in the process. Therefore, the value of not only cross-sectoral but also multidisciplinary discussions was highlighted as a core component of the road ahead.

extending the conversation beyond the space sector to the general public could apart from it being appropriate in view of space being the "*province of all humankind*" help push the often painfully slow policymaking process forward more quickly and decisively... The arts and entertainment industry in particular has already implicated itself with the underlying issue (as demonstrated by the film *Gravity)* and could help improve conditions for policymaking on the back of heightened public understanding of the space sustainability challenge.

society's critical dependency on space applications should be directly brought to the attention of the public when addressing the issue... we need to make space actors understand the scope of their dependencies; **how sustainability issues are directly affecting them, and what would happen if they lost their space capabilities**.

it is worth demonstrating the economic benefit of space sustainability practices combined with a long term perspective when creating awareness. In that sense, **if you act responsively now**, in the short term, it is an additional cost, but **in the long term, it is a cost avoidance strategy**. In other words, responsible behaviour today means prosperity tomorrow.

we must pay close attention to the **new market trend towards miniaturization and cost efficient small and microsatellite production and launch, which does *not* seem to support the inclusion of the "space sustainability element"**.

we should be **guided by scientists and professionals on the environmental challenges and learn from our past mistakes concerning climate change on Earth**, to be able to extend our focus to the spatial element of our environment and **our irreversible dependence on it**.

most particularly UNOOSA, the United Nations' dedicated entity to outer space affairs, can help **to get ahead of the impending near Earth environmental damage curve**.

research could focus on meeting frequent questions that were being posed, such as what is the carrying capacity of LEO? **What will be the impact of mega-constellations** on collision avoidance manoeuvres?

we need to set up the prioritisation of **space sustainability as a policy challenge of global importance**... **LEO and MEO and large satellite constellations are the most pressing issues, both in terms of their impact on the potential of a space debris disaster and their interference with space observation from the Earth**. We need to concentrate on national regulation at present to ensure, as mega-constellations continue to enter the space environment, their entry and setup are as professionally managed as possible.

emphasising the huge dependency both our societies and economies have already developed on space infrastructure.

space, especially LEO, MEO and GEO, is **a finite resource**.

Conclusions

We should quickly move beyond generalities. We need to support the maturation of the policy debate on space sustainability. This can be done by breaking down the concept into core components and domains. Common interpretations and linguistics labels will help discussion on the subject both at the cross-sectional and international level, especially when considering defining the concept of space sustainability

Much of society remains unaware of their irreversible reliance on access to the global space infrastructure for their daily lives.

Communication about the global challenge of space sustainability is key. **There is a massive awareness gap to be overcome**, even in the space community, but more **especially among political decision-makers and the general public**

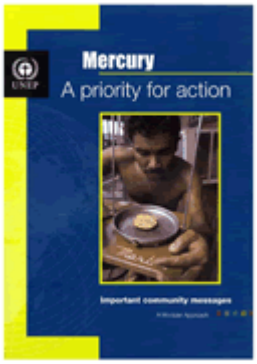
space sustainability matters more today than ever before

In summary, **space sustainability will *not* happen by itself**. Concerted, collective and committed action is required, including at the UN level. **The clock is already ticking**; the decisions we make in the next few years will define how successful we are in achieving sustainable space operations for generations to come.

http://www.unep.org/hazardoussubstances/Mercury/MercuryPublications/ReportsPublications/AwarenessRaisingPackage/tabid/4022/language/en-US/Default.aspx

United Nations Environment Programme
environment for development

Awareness Raising Package



This publication is intended to raise awareness amongst stakeholders of the effects of **mercu**
It is designed for the use of government officials, community leaders, and/or workers to provi
intended to contribute in building public support and capacity to take preventive actions.

This publication exists also in French and Spanish. [I've attached the Spanish

http://www.unep.org/hazardoussubstances/Mercury/MercuryPublications/ReportsPubli
US/Default.aspx

The document can be used in a number of ways:

- for reference,
- to train staff,
- to present or hand out as copies directly from the toolkit,
- to develop materials specific to your community.

How is it laid out?

The package begins with a **user's guide**, providing information on general awareness raising
businesses.

The package includes an **introductory booklet** which provides a general overview of the mer

There follows a set of 5 modules that describe different aspects of the mercury issue:

MODULE 1: Mercury in Products and Wastes
MODULE 2: Mercury and Industry
MODULE 3: Mercury Use in Artisanal and Small Scale Gold Mining
MODULE 4: Mercury Use in Healthcare Settings and Dentistry
MODULE 5: Cultural Uses of Mercury

The organization of the modules allows you to go directly to the topic of interest. E issue and what people need to know in order to recognize and reduce sources of e providing examples of how some mercury exposure situations have been handled.

A series of associated presentations **have been prepared for use in awareness raisin**

Introduction to the Mercury Issue
Module 1: Mercury in Products and Wastes
Module 2: Mercury and Industry
Module 3: Mercury Use in Artisanal and Small Scale Gold Mining (for Government Offic
Module 3: Mercury Use in Artisanal and Small Scale Gold Mining (for Miners)
Module 4: Mercury Use in Healthcare Settings and Dentistry (for Government Officials)
Module 4: Mercury Use in Healthcare Settings and Dentistry (for Healthcare Workers)
Module 5: Cultural Uses of Mercury

If you believe anything is missing or develop additional materials you think would email address: mercury@unep.org

==========

www.chem.unep.ch/mercury/awareness_raising.../G_01-16_BD.pdf

p. 1

Module 5

Cultural Uses of Mercury

p. 2

KEY MESSAGES

■ Mercury has been used for hundreds of years for cultural and religious reasons and has, on occasion, had mythological associations.

■ A number of practices exist today that use mercury, including: **Santería** (an Afro-Hispanic belief system), **Palo Mayombé** (Caribbean), Candomblé (Afro-Brazilian), Voodoo (Afro-Haitian), **Espiritismo** (Puerto Rican) and **Yoruba Orisha** (Afro-Hispanic). Mercury is also used in Hindu practice as a major constituent of Parad, from which religious relics are made.

■ In some cases, mercury is injected subcutaneously, intravenously or intramuscularly to improve athletic prowess or protect users from evil.

■ **Exposures resulting from cultural uses depend to a large extent on the nature of the practice:** swallowing elemental mercury capsules and **inhalation of mercury vapour** are the most common exposure routes.

WHY IS THIS IMPORTANT TO YOU?

Direct and prolonged exposure to mercury is a human health hazard **and has an impact on the downstream environment.**

People using mercury for cultural uses are often unaware of mercury's toxicity and associated risks.

Often the mercury vapour exposure from cultural use is second-hand, from magico-religious mercury use by a prior occupant of a dwelling.

The storage, transport and handling of mercury for these purposes can impose risk by introducing opportunities for spills and vapour releases.

p. 3

For the Public

Be aware of dangers of mercury and the risks of mercury use! There is no safe way to use mercury and scientists have found no safe mercury level in the human body.

Help raise awareness about mercury exposure risks with your family and in **your community**.

Dispose of mercury-containing products separately, not with other trash.

For Governments and Health Care Workers

Identify communities or cultural groups that use mercury for cultural/religious purposes and investigate the impacts.

Embark on a public awareness campaign for mercury reduction with targeted cultural groups, engaging health professionals and cultural/spiritual leaders.

Develop and distribute informative material for the public on mercury and its toxic effects.

Ask the mass media (newspapers, magazines, radio and television) to help you educate the community on the dangers of the use of mercury.

Encourage reduced mercury use through voluntary promotional initiatives or through regulation of production and sales.

Measure mercury concentrations in dwellings and commercial establishments in the affected area and use this information to communicate risks.

Take part in the UNEP Global Mercury Partnership. Go to www.chem.unep.ch/mercury/partnerships/new_partnership.htm for more information.

p. 4

What is the history of mercury use for cultural purposes?

> Mercury has been used for hundreds of years for cultural and religious reasons and has, on occasion, had mythological associations.

> Mercury was brought to the New World by Spaniards for use in extracting gold from ores. Its amalgamating properties led to a belief that mercury attracts good fortune, wealth and love.

> Other characteristics of mercury have led to a range of beliefs. Some people believe its characteristic sudden movements mean it will furnish remedies more quickly. It is also said to prevent evil or bad luck from sticking to a person because it seems slippery.

> China's first emperor, Qin Shi Huang Di (260 BC – 210 BC) took mercury pills in an attempt to achieve eternal life, but instead he died from mercury poisoning.

> In the 13th through 17th centuries, mercury was used in India in elixirs believed to confer immortality.

What are common cultural practices that use mercury?

Mercury has long been used in ethnocultural or religious practices such as Santería (an Afro-Hispanic belief system), Palo Mayombé (Caribbean), Candomblé (Afro-Brazilian), Voodoo (Afro-Haitian), Espiritismo (a spirit-focused belief system native to Puerto Rico) and Yoruba Orisha (Afro-Hispanic).

Most of these uses are associated with African roots, and many of them are related the Roman Catholic teachings of Spaniards. The use of mercury – also known as azogue (Spanish) or vidajan (Creole) for such practices – has been documented in many countries, including by minority populations in large cities. Mercury is also used in revised Wiccan (witchcraft) practices. Mercury is employed in Hindu practices as a major constituent of Parad, from which religious relics are made.

How and why is the mercury used?

Sometimes mercury is used to facilitate or to hasten desired results, such as:

> **Sprinkled on the floor** to protect occupants of a car, home etc.. This is done in children's rooms, and in cars to prevent accidents.

> Used with water and a mop for spiritual cleaning of a dwelling.

> Added to oil lamps and candles which are then burned to ward off evil spirits; bring good luck, love or money; or to hasten other spells.

> Used in various ways to cast love spells (Greenberg, 1999), heal or dispel evil influences.

Cultural and/or religious practices with mercury use include:

> Carried in amulets, ampoules, vials or pouches worn around the neck or carried on the person.

> Used to make religious statues or other objects, such as parad shivling (see Case Study 14).

p. 5

> Applied to the skin or used in bathwater, perfumes, lotions or soaps.

> Injected subcutaneously to ward off evil and protect against exposure to disease while traveling(Prasad, 2004) or intramuscularly to help athletes build muscle mass (Celli and Khan, 1976).

> Ingested for superstitious or medicinal purposes (Greenberg, 1999), including steeped in raw milk before the milk is drunk.

> Mercury and mercury compounds are also used in culturally specific medicinal compounds, such as Asian medicines (see Module 4).

Some examples of risks associated with common practices:

Mercury capsules: Mercury capsules known as Azogue, sold in religious stores, are sometimes used as a Mexican folk remedy for indigestion or gastroenteritis blockages (*empacho*). Ingestion of the heavy, mobile liquid mercury is believed by practitioners to dislodge gastrointestinal blockages, particularly in children (Geffner and Sandler, 1980). Mercury ingestion generally leads to both digestive and renal problems and neurological symptoms. Diagnosis is complicated by the similarity between the symptoms from consuming the mercury and the symptoms of the illness it is used to treat.

Mercury use in the home: **Mercury is sometimes kept in containers**, such as pots or cauldrons, in the home. These are sometimes sealed but **other times left open to "purify" the air. In the Palo belief system a significant quantity of mercury is one of the most important of many special and mystical ingredients when brewing up the cauldron which is believed to have a spirit in it.** Sometimes mercury is mixed with water, ammonia or camphor, or a magnet is placed in it. Other times it is kept in a gourd or piece of fruit. The most common use of elemental mercury in Latin American and Caribbean communities in New York City is in a container in the home. This practice is found in more than 30% of homes in Latin American communities and in about 25% of homes in Caribbean communities in New York City (Johnson, 1999).

A major problem associated with ritualistic mercury use, is the contamination of wastewater. Johnson reported that 27% of users dumped their residual, unused mercury down the drain, and more enters wastewater from the practices of putting mercury in bathwater and mopping the floor with it, when the mercury in the bottom of the bucket is inadvertently dumped out with the residual soapy water. Additionally, absorbed and ingested mercury is excreted in urine and faeces.

What are the risks?

> Exposures resulting from cultural uses depend to a large extent on the nature of the practice:

- The most common exposure pathway is through inhalation of mercury vapours. This is of particular concern especially in closed spaces. Approximately 75-85% **p. 6** of inhaled mercury vapour is absorbed and enters the bloodstream. Any mercury held in unsealed containers or spilled will result in mercury vapour.

- In particular, the practice of sprinkling mercury in a car can result in very high vapour concentrations, especially after the closed vehicle has stood in the sun
on a warm day**. Similarly, vapour concentrations in contaminated dwellings can increase in colder weather, when the room or apartment is closed and possibly heated (Johnson, 1999).**

> Special risks are involved in the storage, transport and handling of mercury which introduce opportunities for spills and exposures, both immediate and longer term.

> Unsuspecting persons can be poisoned by exposure to mercury spilled by previous residents of their dwelling. Mercury can linger in cracks in the floor, carpeting, dirt and even concrete for many years, slowly volatilizing.

What can you do?

> Be aware of the risks of mercury use and share this knowledge with your family and friends!

> Always dispose of mercury and mercury containing products as separate hazardous waste (see Module 1).

> Non-governmental organizations can initiate a public awareness campaign with governments to investigate this issue and with cultural groups in your area who are known to use mercury.

What can healthcare professionals do?

> Be aware of the symptoms of mercury poisoning and how patients might be exposed to mercury.

> Help bring together community groups and leaders and government (for example the Health Department) personnel to discuss ways to publicize the risks associated with mercury.

> Design and distribute information posters on mercury exposure, risks and symptoms in the local language for public gathering places and see that these are placed in clinics, doctors' offices and hospitals.

What can governments do?

> Measure contamination levels at locations where mercury is sold and/or used to *measure* and communicate risks.

> Meet with members of cultural groups using mercury, engaging health professionals, cultural/spiritual leaders and local distributors (e.g., botánicas owners and sanadores) in the discussion. These meetings can serve as a forum to understand the use of mercury and share ideas. They could also be useful forums to explore alternatives to mercury use.

> Develop printed informative material based on documented risks, such as leaflets or posters, on mercury exposure and toxicity in local languages.

p. 7

> Distribute or post these in targeted public places, transportation centers, government buildings, hospitals, schools and particularly stores that sell mercury.

> Encourage mercury use reduction by promoting voluntary initiatives or regulating import or sales of mercury and mercury containing products.

> Require that mercury be labeled as hazardous and that signs regarding exposure risks be posted at point-of-sale.

> Prohibition of the sale of mercury can be effective in reducing mercury use for cultural purposes and is most effective with inspection follow-ups. Prohibition can lead to a significant increase in cost of mercury capsules on the black market (see Case Study 13).

> Secure proper waste management facilities. See Module 1.

The UNEP Global Mercury Partnership is open to new partners. Joining the partnership can be an excellent opportunity to network with experts and build capacity.

What are the potential barriers in changing cultural practices?

For many ritual and cultural uses of mercury, safer substitutes are identified and readily available.

There is a general lack of awareness of the risks of mercury use as well as available alternatives amongst cultural leaders, communities, health care professionals and people who sell the products.

It is usually difficult at first for individuals to consider changing long-standing cultural or traditional practices. Furthermore, experience has shown that even if users recognize that mercury is considered toxic, they may believe that its ritualistic or supernatural nature renders it harmless or the user beyond harm.

Strong messaging including concrete examples demonstrating the risks can have an impact.

Convincing cultural leaders of mercury risks is of uppermost importance. Trusted health care leaders can play a big role in relaying the message.

p. 8

Example: The use of mercury in Santeria

Santeria is an Afro-Hispanic belief system. The use of mercury for Santeria and other spiritual practices has been reported in the Dominican Republic, Cuba and other Caribbean islands, Suriname, Belize, Trinidad, Jamaica, Peru, Ecuador, Argentina, Brazil, Colombia, Mexico, Venezuela, Guyana, France, the Netherlands and Puerto Rico (Wendroff, 1991). Santería was actively suppressed in Cuba after Fidel Castro's revolution – particularly during the 1960s. However, oppression has now largely ended, and the popularity and practice of Santería has increased in Cuba during the 1990s.

Mercury is used in a variety of ways that pose a poisoning risk to users. Some typical uses identified in Santeria are:

- Place mercury in water or in a tea bag with some coins.
- Carry a capsule of mercury in an amulet on a chain or between two coins in a wallet.
- Throw a capsule of it in bath water.
- Swallow a capsule of mercury mixed with holy water.
- Burn mercury in a candle.
- Wash the house with water containing mercury to purify it.
- Put mercury under the bed.
- Swallow a capsule of mercury, sometimes mixed with water, for stomach ailments or cancer.
- Take mercury with beer to increase virility.
- Rub a mixture of mercury and alcohol on an area affected by arthritis.
- **Put mercury in a glass near a candle so that it evaporates quickly.**
- Mix mercury with other ingredients for use in sorcery.
- Apply mercury to the skin during massages.

In communities and regions where these practices are prevalent, mercury is typically sold in capsules from "botanicas" or "yerberias," which are small, privately owned shops that sell popular religious articles, as well as a variety of products believed to have medicinal or healing properties. Mercury is sometimes sold in gelatin capsules with a capacity of more than 13.5 g, but which typically contain 8-9 g mercury (Riley et al., 2001). A capsule can contain up to 10 times more mercury than one thermometer. Small glass jars, plastic bottles or plastic bags are sometimes used as well, containing as much as 65 grams of mercury.

Most customers arrive at botánicas with a prescription received from a sanador. Besides selling products, some botánicas offer spiritual inquiry services for clients. Usually these consultations are offered in a room inside the botánicas that has been designed for that purpose. Generally, the person that offers these consultations is a spiritualist medium or santero. Some botánica owners function as counselors for their clients and offer social and emotional support.

See Case Study 13# for further information.

p. 9

Example: Hindu mercury use in Parad

Parad is an amalgamation of mercury and other metals that is used to make relics for worship of God in the Hindu tradition. Solidifying mercury is an ancient Vedic science. 'Dharnidhar Samhita' (scripture) has prescribed sixteen steps through which elemental mercury has to pass to purify it and bring out its beneficial qualities before it is alloyed (mixed with other metals) to make parad, which can be molded

into any solid form. Parad is traditionally made of silver and mercury, but it is now often made of mercury and tin, with trace amounts of other metals.

To people who practice this, the benefits of parad are said to be many and varied, and may include:

• Vaastu or Tanrik dosh nivaran (removes bad luck from the workplace or home).
• Curing a range of diseases.
• Warding off evil spirits.
• Establishing an inner spiritual balance.
• Increasing willpower.
• Stopping nightmares.
• Resolving marriage problems.

In Hindu culture, it is traditionally believed that the worship of parad shivling (an abstract image of God, an icon or statue) will destroy sins. It is said in Brahma Purana scripture that any person who worships parad idols devotedly will receive full worldly pleasures - glory, honor, high office, fame, sons, grandsons and learning - and upon death attain supreme destination (salvation). Various religious objects are made of parad and sold in markets in India. These include: beads worn around the waist or neck, amrit (a nectar or ambrosia) cup, Shivling (an abstract image or statue of God), Lakshmi (a representation of the Goddess of wealth), and a Ganesh (an idol of Lord Ganesh). India has many Shiva temples, which have parad shivlings. Sales of parad statues, jewelry and other artifacts through websites and television are widespread in India.

See Case Study 14# for further information.

p. 10

CASE STUDY 14:

PUERTO RICO: PROHIBITION OF MERCURY SALES IN BOTÁNICAS
In 1991 the Puerto Rico Department of Consumer Affairs (DACO) issued an order prohibiting the distribution and sale of mercury capsules.

The order followed a visit to a botánica by an inspector of the Department of Health. In the botánica, the inspector bought two capsules of silvery liquid. These capsules were analyzed by the Department of Health and it was confirmed that they contained mercury. The average price of a mercury gelatin capsule in botánicas at the time the research was done was $US 2.00, although some botánicas charged as much as $5.00. (The price of the mercury had increased significantly after the Department of Health prohibited its sale in botánicas. Prior to this regulation a capsule of mercury could be bought for $US 0.75.)

DACO intervened at the level of the two mercury distributors in Puerto Rico. The presidents of both companies denied having sold capsules of mercury to owners of botánicas. They agreed to impose a fine of $10,000 on people who violated this prohibition.

Despite the fact that most botánicas owners are aware of the regulation, **a significant percentage of botánicas continue to sell capsules of mercury. In a study that followed the prohibition 132 botánicas were identified in 74 towns:**

• The majority of the botánicas were located in the coastal areas. 41% of 76 botánicas visited by researchers sold mercury. Researchers found that botánica owners were reluctant to speak about mercury because of a ban on sales, and most initially denied that they had any for sale.

• In 7 cases, owners of botánicas that did not carry mercury sent the customers to others who did sell it or recommended that they obtain it from thermometers.

• About 50% of botánicas owners knew that the sale of mercury was prohibited because it can damage health, and they adhered to the restrictions. These owners do not have mercury for sale and they tell customers who ask that the sale of mercury has been prohibited because it is dangerous for health.

• Some owners of botánicas know that the sale of mercury is prohibited, but continue selling it to their clients. Some of these owners advise customers on how to utilize mercury in a way that they say is not toxic. These people very likely continue selling mercury because they are not convinced that mercury is toxic or because they have a financial interest in selling mercury that outweighs its negative health effects. Other owners of botánicas sell mercury knowing its toxic potential but believing that if it is used in a certain way the mercury will not do damage – these owners tend to advise customers on the toxic potential of mercury.

p. 11

C A S E S T U D Y 1 4

• According to owners, candles are the most frequently sold product.

Santeria spiritual leaders (sanadores), in the western part of Puerto Rico were interviewed to find out how they use mercury and whether they know of its risks. Of the 24 interviewed, all but two admitted knowing of mercury use, six knew that it was dangerous to health, and four knew that its sale was prohibited.

Botánicas are an important source of information and support system for a significant part of the Puerto Rican population. They perform important therapeutic, economic and social functions in the community. Their name evokes uses of medicines and natural substances, and their context implies traditions of healing and popular medicine. The botánicas have a great variety of products available.

While some botánica owners function like sanadores, others merely sell products for a profit whether they believe in their effectiveness or not. Some attribute the effectiveness of the products to the faith that the user places in them and confess that most of the products they sell are simply not necessarily effective.

SOURCE: This is based on a case study from a Spanish language document: Course notes Sistemas Folclóricos de Ayuda, Módulo 8: El mercurio: http://www.uprm.edu/socialsciences/sfaenlinea/id15.htm. By Mario Núñez-Molina. Universidad de Puerto Rico, Recinto Universitario de Mayagüez

CASE STUDY 15:

TOXICS LINK STUDIES MERCURY LEVELS IN PARAD

The Indian non-governmental organization Toxics Link initiated a study of Parad following the creation of a 500 kg Parad shivling at Siddha Ashram. Their objective was to identify the extent of this traditional use of mercury and the cultural significance of Parad, identify possible sources of Parad in the region,

determine the material composition of Parad, and test the leaching behavior of Parad in milk (this test was chosen because the shiv puja involves immersion and bathing of shivling by milk and drinking of that milk by the devotees). Studies revealed that the primary chemical composition of Parad by % weight is tin 74.8 %, mercury 24.9 %, and other metals at low percentages (including silver at 0.04%). Tests showed that mercury in Parad does indeed leach in milk and water, potentially exposing anyone who drinks milk that has been used to soak Parad relics or drinks from Parad cups. Toxics Link is working to raise awareness and educate the public directly on the toxicity of mercury.

Acknowledgement
This case study was provided by Toxics Link, a non-governmental organization in India. Toxics Link emerged from a need to establish a mechanism for disseminating credible information about toxics in India, and raising the level of toxics debate. Currently it has a main office in New Delhi as well as offices in Mumbai and Chennai. “The Ritual Use of Mercury,” an audio
(broadcast) segment.

p. 12

C A S E S T U D Y 1 4 & 1 5

“The Ritual Use of Mercury,” an audio (broadcast) segment.
For more information see:
Fact Sheet – National Association of County and City Health Officials.
http://www.naccho.org/topics/environmental/mercury/upload/MercuryFactsheet.pdf
The UNEP Global Mercury Partnership:
www.chem.unep.ch/mercury/partnerships/new_partnership.htm

p. 13

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Acknowledgements:

Arnold P. Wendroff, Ph.D.

Mercury Policy Project

NYDIA M. VELÁZQUEZ
12TH DISTRICT, NEW YORK

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SUBCOMMITTEE ON HOUSING AND COMMUNITY OPPORTUNITY
SUBCOMMITTEE ON GENERAL OVERSIGHT AND INVESTIGATION

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May 5, 1997

The Honorable Henry Waxman
2204 Rayburn House Office Building
Washington, D.C. 20515

Dear Representative Waxman:

I would like to bring to your attention a concern raised by a New York constituent. Dr. Arnold Wendroff, of the Mercury Poisoning Project, has sent me a packet of materials detailing a very hazardous threat to the health of many of my constituents: the long-term exposure to mercury in Latin American and Caribbean communities as a result of its domestic use for magico-religious and ethno-medical purposes.

Mercury metal is sold in unlabeled containers for such purposes by shops called *botanicas*, which recommend it be used in ways likely to contaminate dwellings with mercury, exposing all household members to toxic mercury levels. According to Dr. Wendroff, The EPA has the authority to regulate the sale and use of mercury for domestic use under the Toxic Substances Control Act, but to date has not used its authority to mitigate this disturbing hazard. Furthermore, Dr. Wendroff informs me that 90% of mercury sold for these purposes bears no label, and thus violates the Consumer Product Safety Commission's regulations mandating that all toxic substances bear identification and warning labels.

I would appreciate it if you or one of your staffers could take a look at this material and perhaps offer suggestions as to how to proceed with this matter.

Sincerely,

NYDIA M. VELAZQUEZ
Member of Congress

cc: The Honorable Charles Schumer
Dr. Arnold Wendroff

NYDIA M. VELÁZQUEZ
12TH DISTRICT, NEW YORK

COMMITTEE ON BANKING AND FINANCIAL SERVICES
SUBCOMMITTEE ON HOUSING AND COMMUNITY OPPORTUNITY
SUBCOMMITTEE ON GENERAL OVERSIGHT AND INVESTIGATION

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May 5, 1997

Dr. Arnold P. Wendroff
Mercury Poisoning Project
544 Eighth Street
Brooklyn, NY 11215

Dear Dr. Wendroff:

I appreciated hearing from you again last week. I am sending you a copy of the letter I prepared for Rep. Waxman, the Ranking Member of the House Government Reform and Oversight Committee and a leading environmentalist in the House of Representatives. I sent this letter, along with a copy of the packet you sent me, to Greg Dotson on Waxman's staff, and I will let you know when I hear something back from him. Should you have any questions in the meantime, please don't hesitate to call me.

Sincerely,

Eric Schwager

Eric Schwager
Legislative Assistant

COMMITTEE ON SMALL BUSINESS
RANKING DEMOCRATIC MEMBER

COMMITTEE ON BANKING AND FINANCIAL SERVICES
SUBCOMMITTEE ON HOUSING AND COMMUNITY OPPORTUNITY
SUBCOMMITTEE ON CAPITAL MARKETS, SECURITIES, AND GOVERNMENT SPONSORED ENTERPRISES

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Congress of the United States
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NYDIA M. VELAZQUEZ
12TH DISTRICT, NEW YORK

August 8, 2000

Dr. Arnold P. Wendroff, Ph.D.
Mercury Poisoning Project
544 Eighth Street
Brooklyn, NY 11215-4201

Dear Dr. Wendroff:

I have received a copy of the July 25, 1999 that you sent to Vice President Gore. I am aware of the advocacy that you have been doing on behalf of victims of mercury poisoning in New York City for many years. I appreciate the work that you have done to bring this issue to light.

I agree with you that the high levels of exposure to mercury in households in the Bronx create a huge danger for the communities this effects. Community education and awareness needs to be a priority in order to ensure that families know the warning signs of exposure and prevention techniques.

Also, another look must be made toward the marketing and sale of mercury. This is a dangerous and unregulated substance that can cause serious harm upon prolonged exposure. I have included some suggestions for some regulators that you might consider reaching out to in your battle to protect the children of the Bronx.

There are three Federal entities that control the availability of the elemental mercury consumer product: the Food and Drug Administration, the consumer Product Safety Commission, and the Environmental Protection Agency.

Food and Drug Administration

The FDA is responsible for ensuring that drugs for use by humans are safe and effective, that foods are safe, wholesome, and sanitary, and that regulated products are accurately, informatively, and honestly prepared. You may wish to contact the legislative liaison at the FDA at (301) 443-3793) to discuss controlling mercury as a drug, food, or food supplement.

Consumer Product Safety Commission

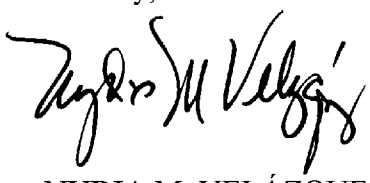
The mission of the CPSC is to protect the public against unreasonable risks of injuries and deaths associated with consumer products. If the mercury product is not considered to be marketed as a drug, food, or food supplement, control of the product may be possible under the jurisdiction of the CPSC. You may wish to contact the legislative liaison at the CPSC (301) 504-0515 to discuss controlling the mercury as a consumer product.

Environmental Protection Agency

The mission of the EPA is to protect public health and improve the natural environment. You may wish to contact the legislative liaison at the EPA (202) 260-7808 to discuss controlling the mercury product as a chemical in the environment.

Thank you again for reaching out to your legislators and representatives to spread the word about the importance of this issue. Please feel free to contact me about your concerns on this and any other issue.

Sincerely,



NYDIA M. VELÁZQUEZ
Member of Congress

Domestic mercury pollution

SIR—Mills in his recent Scientific Correspondence[1] identified a previously unsuspected source of atmospheric mercury and speculated on its toxicity. Here, I report another novel source of mercury pollution in predominantly domestic settings, where it has hitherto been thought a rarity[2]. I believe this is the first mention of widespread domestic exposure to mercury vapour.

Mercury metal is used in Latin American and Caribbean communities for occult purposes. It is sold in shops called botanicas which stock medicinal plants, magical medicines, incense, candles and perfumes[3]. These and other religious articles are dispensed to adherents of syncretistic Afro-Caribbean/Latin American religions, such as Santeria and Voodoo, as well as to the general public.

In a survey of 115 botanicas in 13 cities with large Hispanic populations in the United States and Puerto Rico, 99 were found to sell mercury. A brief survey of botanicas in Mexico, Colombia and the Dominican Republic revealed that they too dispense mercury.

Botanicas typically dispense mercury in gelatin capsules, or occasionally glass vials. Of 41 samples purchased, the median amount dispensed was 8.5 g, with a mean of 9.0 g, a range of 1.5 to 31.3 g and a modal cost of $1.00. Of 28 botanicas visited in New York City, 13 prescribed that mercury be sprinkled on the floor or mixed with soap and water used to mop the floor, to rid the house of evil influences or for other purposes. Some botanicas suggested repeated application at intervals of three days to a week, until the desired result is attained. One shopkeeper recommended placing mercury in an open container with a magnet. Any of these procedures would liberate mercury vapour directly into the room's atmosphere.

Several shopkeepers recommended that mercury should be carried on the person, kept in containers in the house, placed in bath water, or mixed with perfume, soap solutions or ammonia and camphor. Others prescribed placing mercury in devotional candles.

Mercury also presents an occupational hazard. My colleague twice observed shopkeepers spill mercury without removing or chemically neutralizing it. One proprietress said that she intentionally scattered mercury about her botanica to "bring good things", as well as adding a bit to each prescription she dispensed.

It is evident that the concentration of mercury vapour in room air will vary widely, depending on such factors as quantity dispensed, amount used, frequency of application, type of floor surface, air temperature, volume of room, height above floor level and ventilation. It is equally apparent that the proposed 1 $\mu g\ m^{-3}$ "upper limit for long-term exposure to mercury vapour in the air" cited by Mills[1] could easily be exceeded by repeated applications in a small apartment.

The most likely victims of these practices are young children, exposed to the highest levels of vapour as they sleep, crawl and play on contaminated floors[4,5]. Mercury vapour enters the fetus via the placenta, and the infant via breast milk[6]. One result of mercury vapour's neurotoxicity on penetrating the blood–brain barrier[7] is the subtle personality change called erethism. It seems likely that children are the principal victims of mercurial erethism, which is characterized by hostility, withdrawal, tendency to resent being observed, quick temper, loss of self confidence and loss of memory[5,6]. Sunderman's advice[8] of "giving careful consideration to intoxication from undetected exposure to mercury . . . in patients encountering depressions, behavioural and neurological disorders", is worth heeding, particularly in the evaluation of emotionally disturbed children.

There seems ample justification for a programme to measure mercury vapour levels and to test exposed individuals. Sociologial research is also required to develop an effective health-education programme for botanica owners and their clients.

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Magico-Religious Mercury Use in Caribbean and Latino Communities: Pollution, Persistence, and Politics

Arnold P. Wendroff

Elemental mercury is put to magico-religious uses, most problematically the sprinkling of mercury on floors of homes in Caribbean and Latino communities. Indoor mercury spills are persistent and release toxic levels of mercury vapor over long periods of time. Surveys in these communities have demonstrated widespread and large-scale mercury sales for ritualistic use, elevated mercury vapor levels in public hallways, increased amounts of mercury in wastewater, and elevated urine mercury levels in Latino children. Yet no clear connection has been drawn between ritualistic mercury use and these elevated levels, nor has any pathology been associated with such use. Social, political, and economic factors have acted to preclude advocacy for these affected communities, whose members are largely unaware of their mercury exposure (frequently secondhand) and of its adverse health effects. Without the political mandate to act, environmental agencies have not allocated the resources necessary for environmental professionals to assess and respond to this latent environmental health disaster. Steps to investigate and respond to this impending public health emergency are suggested, as presently there is no coordinated plan for assessing and remediating the tens of thousands of dwellings around the country likely to be contaminated with actionable levels of mercury vapor.

Environmental Practice 7:87–96 (2005)

In 1989, a "learning disabled," ethnically Puerto Rican ninth-grader in Brooklyn, New York, told his chemistry teacher that his mother sprinkled mercury on the floor of their apartment to keep away witches. The teacher's curiosity was aroused; he investigated, found mercury to be widely sold in the community for such uses (Wendroff, 1990), and concluded that his student exhibited symptoms of erethism arising from exposure to mercury vapor. The boy was anorexic, irritable, had short-term memory loss, and exhibited an aversion to being observed, periodically placing his head on his desk and covering it with his inverted loose-leaf notebook (Hartman, 1995). This chance observation was the starting point of much of the research described below.

Nature of the Problem

It has long been recognized that small mercury spills in homes, most commonly from broken thermometers, can produce elevated levels of mercury vapor for long periods of time (Carpi and Chen, 2001; US Environmental Protection Agency, Region 1, 2005). When such spills are reported to public health authorities, assessment and cleanup activities are regularly initiated and contaminated areas are evacuated. Such government concern about mercury toxicity is not in evidence, however, when it comes to other forms of domestic mercury contamination. In some Caribbean and Latino communities, folkloric practices and religious beliefs associated with Santeria, Espiritismo, and Voodoo attribute to mercury the power to attract good and repel evil. In these neighborhoods, elemental mercury is sold for magico-religious and ethnomedical uses by shops called *botánicas* (in the Southwest, *herboristerias* or *yerberias*) in unlabeled vials and fragile gelatin capsules containing an average weight of 10 grams of the metal. The only laws governing such sales appear to be federal and local labeling regulations, regulations that are generally flaunted, as over 90% of mercury sold by botánicas bears no labeling at all. Many, perhaps a majority, of ritualistic mercury users are ignorant of either the toxicity of mercury vapor, particularly to the developing brain (Goldman

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and Shannon, 2001), or of the persistent nature of mercury spills (US Environmental Protection Agency, 2002).

Even small, thermometer-sized mercury spills are extremely persistent and can generate problematic levels of mercury vapor for many years. A fever thermometer typically contains 0.7 grams of mercury. One study found residual mercury from a broken thermometer on a tiled bathroom floor continuing to emit substantial levels of mercury vapor after a period in excess of 15 years. The authors concluded that "mercury released from household devices can contaminate indoor residential environments for decades after the first release of this metal, . . . [and] this exposure route may raise significant concerns regarding mercury health effects in young children" (Carpi and Chen, 2001). The actual mercury vapor measured in a recent Agency for Toxic Substances and Disease Registry (ATSDR) investigation of a thermometer mercury spill found that this "small amount of elemental mercury can be readily volatilized by vacuuming and has the potential to pose a long-term human health exposure concern" (Nehls-Lowe and Morrison, 2004). Given the fact that mercury for magico-religious uses is typically sold in 10-gram units, it is reasonable to assume that spills resulting from such use are a great deal more problematic.

Several articles, reports, and conferences have addressed the putative adverse health effects of elemental mercury exposure across its spectrum of ethnomedical and magico-religious uses. The ethnomedical uses include ingestion of mercury to treat abdominal complaints, and intravenous and subcutaneous injection of mercury to boost energy and to protect against infections and evil influences (Celli and Khan, 1976; Geffner and Sandler, 1980; Hryhorczuk, 2004; Prasad, 2004; Trotter, 1985). The magico-religious uses include placing mercury in perfume and candles, mopping the floor with it, and mixing it into bathwater (Greenberg, 1999; Wendroff, 1990). The most environmentally problematic uses, and apparently some of the most common, involve placing mercury in a variety of open or unsealed containers and directly sprinkling mercury on floors and furnishings and inside motor vehicles (Riley et al., 2001). In 1990, the Surgeon General of the Public Health Service wrote: "The ritual of sprinkling mercury on the floor to ward off 'evil spirits' is practiced by selected minority groups and may pose potential hazards to those who encounter the mercury" (Novello, 1990). Fifteen years later, these rituals involving mercury are still generally considered a "potential" (versus an actual) health threat, largely because economic and political pressures have operated to retard substantive investigation of the problem.

Scale of Ritualistic Mercury Use

Although, to date, ritualistic mercury spills have not been reported to health authorities, have not been aggressively investigated by these authorities, and have not been described in first-hand case studies in the medical literature, the belief in their occurrence appears to be well founded given the conspicuous place mercury occupies in the beliefs and practices of Hispanic communities. A 1990 survey of 100 Caribbean and Latino women at a public hospital in Brooklyn, New York, found 25% familiar with esoteric uses of mercury (US Environmental Protection Agency, 2002, p. 3). A 1993 survey of ritualistic mercury use in Hartford, Connecticut, and its environs documented substantial botánica sales and use in this largely Puerto Rican community (Hispanic Health Council, 1993; US Environmental Protection Agency, 2002, p. 2). A survey of a largely Dominican community in Massachusetts found that 38% of respondents either used mercury themselves or knew someone who had used it, with 12% of respondents reporting that mercury was sprinkled around a child's crib or bed (Latowsky, 2003). A similar survey in New York City found that "[f]orty-four percent of the respondents from the Caribbean and 27 percent from Latin America stated that elemental mercury is used in their homes, cars or carried on their person in these cultural practices" (Johnson, 1999). A survey in Chicago found 16 out of 79 Latinos (mainly women) who had used mercury on several occasions (Chicago Department of Public Health, 1997). Given these statistics, it is virtually certain that spills from the ritualistic use of mercury occur with significant frequency, that they result in contaminating dwellings with high levels of mercury vapor (Greenberg, 1999), and that such contamination results in mercury absorption by the occupants of those dwellings "orders of magnitude greater than (methyl) mercury exposures from eating fish or from the leaching of mercury from amalgam fillings" (Wendroff, 1997). The Natural Resources Defense Council has estimated that in the Bronx, New York, ritualistic mercury use "would be likely to cause long-term contamination of more than 13,000 homes or apartment buildings each year" (Quintero-Somaini et al., 2004).

Community Response

The likelihood of contamination of large numbers of Caribbean and Latino homes with substantial amounts of elemental mercury presents a challenge to environmental professionals and a potentially enormous problem for federal agencies (among them the US Agency for Toxic Substances and Disease Registry, the Centers for Disease Control

and Prevention, and the US Environmental Protection Agency) and for state and local health departments. Unlike exposure to methylmercury in fish or to elemental mercury in amalgam dental fillings, exposures to magico-religious mercury spills (1) cannot be limited by changes in diet or dentistry, (2) are likely to entail enormous costs to government for their remediation (Malecki et al., 1995), and (3) have the potential to engender panic among families with pregnant women and small children living in communities where large numbers of dwellings have been contaminated by ritualistic mercury spills (Edelstein, 1988). In contrast to the relative ease of checking dwellings for the presence of lead, radon, and asbestos, assessment of mercury vapor cannot be performed by do-it-yourself lay occupants. Detecting low levels of mercury vapor necessitates inspection by environmental professionals employing sophisticated instrumentation. Unseen mercury droplets lurk in porous flooring, and micro-droplets formed when spills are vacuumed adhere to all interior surfaces.

In typical "toxic disasters," blame for widespread residential toxic exposures lies with corporate and government polluters. When such deep-pocketed polluters are identified, the wrath of the affected communities is focused on them and remediation and compensation are sought (Edelstein, 1988) and often gained. In one recent case, a corporation responsible for numerous residential mercury spills spent over 140 million dollars in cleanup costs and inspected over 200,000 homes for the presence of mercury (US Agency for Toxic Substances and Disease Registry, 2001; Williamson, 2000). This program resulted in a run on the market for portable mercury vapor analyzers, including 140 instruments leased from one manufacturer (Illinois Attorney General, 2000) and 100 purchased from another (Fenzel, 2005). A class-action lawsuit determined the defendant gas distribution company and its contractors to be liable for negligence, willful and wanton conduct, property damage, and medical expenses resulting from mercury spills from gas distribution equipment in homes (Circuit Court of Cook County, 2001).

By contrast, communities affected by ritualistic mercury contamination of dwellings cannot place the blame on corporate negligence and greed. "Any harm resulting from these practices is not only self-inflicted but also culturally sanctioned. Moreover, no readily apparent epidemic of mercury-related disease has generated the overtly 'visible victims' often necessary to bring about aggressive remedial action on the part of already overburdened public health officials. Attempts to call attention to the risks involved have regularly met [with] indifference and sometimes even outright hostility" on the part of those charged with safeguarding the public health (Foreman, 1998).

Community-based environmental justice organizations have, for the most part, not yet engaged in the issue of ritualistic mercury contamination of dwellings. Despite their acknowledgment that "community members were the only experts who could gather information on such things as angler practices [contributing to methylmercury exposure] and the home remedies used by Latinos . . ." (Corburn, 2002) and their awareness of ritualistic mercury sales by botánicas in their neighborhoods, many have refrained from addressing this issue.

As a result of this indifference, in the 15 years since the health threat posed by ritualistic mercury use has been described in both the medical literature (Greenberg, 1999; Prasad, 2004; Riley et al., 2001; Wendroff, 1990, 1991) and the mass media (Castillo, 2004; Ojito, 1997; Rauch, 1991; Vinicio, 2001), there has been essentially no advocacy on this issue from Caribbean or Latino community organizations, medical professionals, or political representatives. Packard et al. (2004) recently made the statement that "illnesses 'emerge' from the suffering of individual patients to become medically recognized problems and public health issues." As no one appears to be suffering from mercury poisoning, no one is advocating for government to substantively address the issue, aside from a few nominal and inconclusive pilot studies. The relatively straightforward research needed to demonstrate mercury contamination of dwellings and to correlate it with biomarkers of mercury absorption has not been conducted. Government knows what to do, but evidently feels that an actual demonstration of ritualistic mercury contamination, especially with attendant clinical involvement, would open a Pandora's box that it would rather leave undisturbed.

The following example illustrates governmental ambivalence on this issue. The US Agency for Toxic Substances and Disease Registry (1999) has stated, "There is an urgent need to obtain information on the levels of exposure from these [ritualistic] practices to determine if children or adults are at risk. Mercury vapor concentrations may be much higher after use during the winter months when the heat is turned on and the windows are closed, so data that reflect a variety of exposure scenarios are also needed." Yet despite this declared "urgent need," the agency in question has of yet funded no research to meet it.

Real Estate Industry Response

Although the real estate industry has moved to protect tenants from residential toxic exposures, most notably from lead in paint, landlords tend to act only when litigation-driven regulations are enacted (Cahn and Thompson, 2003). Economic constraints make it difficult for landlords, and on occasion for government agencies as well, to apply the Precautionary Principle, which states that if reasonable evidence of toxic exposures exists, then efforts to reduce or eliminate such exposures should be implemented "even in the absence of clear, scientific evidence of harm" (Raffensperger and Tickner, 1999) and that "to wait for scientific certainty (or near certainty) is to court disaster" (Wyman and Stevenson, 2001). In strictly economic terms, then, it is understandable that the applicability of the Precautionary Principle to ritualistic mercury exposure has essentially been ignored by the real estate industry, by government, and by the environmental medical profession, though it is nonetheless deplorable. This is of course hardly the first instance in which, in the collision of economic interest with the Precautionary Principle, the Precautionary Principle has had to give way.

An instance of such a failure to act prior to "scientific certainty" began with an editorial preface to an article on ritualistic mercury contamination of homes, appearing in an environmental publication serving the real estate industry. The editors wrote, "Phase I Environmental Site Inspectors should be sure to notify their lender clients about the risk of mercury contamination in certain residential neighborhoods. Frequently, lenders are unaware of the variety of risks endangering the value of their residential real estate owned. The following is just one of the many ways lenders' collateral can be jeopardized" (Wendroff and Jetter, 1999). Yet despite such editorial admonition and the wealth of circumstantial evidence of serious and widespread ritualistic mercury contamination presented in the article itself and in several subsequent studies (Garetano, 2004; Latowsky, 2003), to date there has been no apparent interest on the part of the real estate industry, or the environmental assessment profession serving it, in assessing and addressing the widespread contamination of homes with ritualistic mercury.

It seems likely that when the extent and impact of this environmental health threat are ultimately demonstrated, testing of housing stock for mercury vapor at the time of transfer will be mandated, as is currently the case with lead, radon, and asbestos. The political constraints retarding the implementation of such a program will no doubt be very great. The New York City Housing Authority (NYCHA), possibly somewhat more of an advocate for tenant protection than the private housing sector, has failed to assess its own heavily Caribbean and Latino housing developments and has declined an offer from outside to provide free surveillance of mercury vapor levels in public housing hallways, this despite its own assurance that "NYCHA is giving serious consideration to the mercury issue" (Clarke, 2002). This same communication stated that the New York City Department of Health recommended that NYCHA await the results of an investigation by the New Jersey Department of Environmental Protection. When that study demonstrated that there were elevated mercury vapor levels in Latino housing (Stern et al., 2003), NYCHA still did not assess its own buildings for elevated levels of mercury vapor. The US Department of Housing and Urban Development (HUD) has displayed the same apparent indifference to addressing this issue. A HUD official wrote to acknowledge "a potential environmental health threat caused by contamination of homes, including HUD properties, through ritualistic uses of mercury," and went on to state that HUD was awaiting results of studies from the Centers for Disease Control and the US Environmental Protection Agency (USEPA) before being able to "justify in-depth environmental assessments" (Teninga, 2002).

Government Agency Response

The Agency for Toxic Substances and Disease Registry's chronic minimal risk level for domestic mercury vapor exposure is 0.2 $\mu g/m^3$, and USEPA's domestic mercury vapor evacuation was recently lowered to 1 $\mu g/m^3$ by joint ATSDR, USEPA, and Washington, DC, Department of Health consultation over a mercury spill incident so as to be more protective in cases of fetal exposure (Blum and Fernandez, 2003; US Agency for Toxic Substances and Disease Registry, 2003). Government has no direct mandate to lower the body mercury burden of individuals with clinically elevated mercury levels resulting from fish consumption or amalgam dental fillings; however, when mercury contamination of a dwelling is suspected, government has often assumed responsibility for assessment and frequently for decontamination (Baker et al., 2005; Malecki et al., 1995). The same will likely be the case in ritualistic mercury spills, when it generally will be impossible to determine who is legally responsible for the spills and when occupants and frequently landlords will be unable to pay the cleanup costs. As experience with the assessment and cleanup of ritualistic mercury spills mounts, growing familiarity with the pattern and intensity of mercury distribution will make

the identification of ritualistic mercury contamination more assured.

Mounting evidence suggests that large numbers of homes in Caribbean and Latino communities are contaminated with actionable levels of mercury vapor. Much of this mercury contamination was likely caused by prior mercury-using occupants. This residential contamination is believed to result in significant second hand exposure (Greenberg, 1999; Johnson, 1999). Occupational exposures are likely to occur in shops that sell mercury. The New York City Department of Health inspected 20-odd botánicas, many of them known to have sold the metal. Several had elevated mercury vapor levels, and one had from 13 to 17 $\mu g/m^3$ in the store itself and from 4 to 7 $\mu g/m^3$ in stairwells and hallways leading to the three floors of apartments above (New York City Department of Health and Mental Hygiene, 2000). The New Jersey Department of Environmental Protection found substantially elevated indoor air mercury vapor levels in public vestibules and hallways of heavily Hispanic multifamily housing. It reported that although "most indoor samples were low . . . about 17% of buildings had average air levels above 20 ng/m^3, with one building average at 299 and a maximum internal reading of 2000 ng/m^3 [2.0 $\mu g/m^3$, or twice the recommended evacuation level]" (Stern et al., 2003). A recent survey found that of four apartments actually entered, the mercury levels inside were on an average 5.5 times (ranging from 3.8 to 8.8 times) higher than those detected at the doorjamb in the hallway (Puchalik, 2005). One investigator stated, "The cultural use of mercury has been identified as a potential source of mercury vapor exposure in [these] New Jersey residential settings. In this instance, elemental mercury may be intentionally dispersed within a residence. . . . We conclude that indoor mercury vapor concentrations are substantially elevated over outdoor concentration in many instances. The concentrations in some buildings approach levels of public health concern" (Garetano, 2004).

In late 2001, the US Environmental Protection Agency began a simulation to measure mercury vapor levels from ritualistic spills in a home. Mercury was sprinkled on carpeting inside a house trailer and vapor levels were monitored. A final report has yet to be released, owing to the fact that external reviewers found flaws in the simulation design, which tested only a single type of flooring and simulated neither the effects of walking on it nor of vacuuming it. More problematic still was the incongruity of the experimental results with real-world experience of domestic mercury spills requiring lengthy decontamination to reduce mercury vapor to a reoccupation level below 1 $\mu g/m^3$. The authors concluded, "Intentional ritual sprinkling of metallic mercury. . .may initially produce indoor air mercury vapor levels above the ATSDR suggested residential occupancy level, and in some cases, above the action level, but the concentration decreases over time and generally falls below the residential occupancy level" (Singhvi et al., 2004). The authors go on to state that "ATSDR has proposed a residential occupancy level of 1.0 microgram per cubic meter of air (1 $\mu g/m^3$) as the mercury level considered 'safe and acceptable' for occupancy of any structure after a spill, provided that no mercury is present" (US Agency for Toxic Substances and Disease Registry, 2001).

Contrast these simulation findings with the actual case of a thermometer containing approximately 0.7 grams of mercury that was broken on the dresser and hardwood floor of a bedroom occupied by a pregnant woman. The occupants cleaned up the visible droplets and then vacuumed the floor. Five days later, mercury vapor levels in the bedroom were over 14 $\mu g/m^3$, and the occupants were advised to evacuate the bedroom and ventilate it. Seven days after the initial spill, the bedroom had levels of 2 to 3 $\mu g/m^3$, or twice the current recommended evacuation level (Nehls-Lowe and Morrison, 2004). This scenario, involving a minute amount of mercury—probably well under 0.5 gram—should be compared with the situation in which the average 10-gram quantity of ritualistic mercury is spilled in the home, no attempt is made promptly to clean it up, it is tracked about to other rooms and to adjacent hallways and apartments, and in many cases the floors are routinely vacuumed.

Data on botánica mercury sales in the heavily Hispanic Bronx, New York, indicated a range of 25,000 to 155,000 9-gram mean-weight-units of mercury sold in one year (1995), with some 30% of those units likely to be sprinkled on floors (Zayas and Ozuah, 1996). The enormous sales and ritualistic use of elemental mercury in New York City and its environs, estimated at between 500 and 3,000 pounds per year in the Bronx alone (Baard, 2001; Zayas and Ozuah, 1996), has a significant but little appreciated environmental impact. Ritualistic mercury is placed in bathwater and in water for mopping floors, and unused mercury is dumped down drains (Johnson, 1999). Ingested and inhaled mercury is also excreted in feces and urine and, along with discarded mercury, may substantially add to the mercury burden of wastewater (New York City Department of Environmental Protection, 2004). These uses and excretory and disposal pathways allow mercury to enter the aquatic

environment. In the New York/New Jersey harbor, the median source of mercury influx has been found to be divided equally between emissions from electric power plants and emissions resulting from the religious and cultural uses of mercury, each estimated at from 200 to 600 kilograms per year (de Cerreno, Panero, and Boehme, 2002). Several analyses for metals influent to New York City's wastewater treatment plants have found excesses of mercury apparently associated with ritualistic mercury use. The New York City Department of Environmental Protection therefore sampled a small, overwhelmingly Dominican residential area and found major excesses of mercury, 10 to 100 times above the norm (albeit associated with copper, lead, and zinc). The source of this mercury seems likely to be from the contamination of drain traps when ritualistic mercury is disposed (New York City Department of Environmental Protection, 2004).

Biomarker Studies

A pilot study of pediatric urine mercury levels of Hispanic children in the Bronx found 5% with what were deemed to be clinically elevated levels of 5 to 11 μg/L (Ozuah et al., 2003). A recent Centers for Disease Control/New York City Department of Health study of urine mercury levels of over 400 Caribbean and Latino children in New York City found one with a notifiable level of 24 μg/L (Jeffery, 2004). The notifiable urine mercury level in New York State is 20 μg/L. Another mercury biomarker study is under way in New York City as part of a citywide health and nutrition examination survey. A study in Chicago found none of the 400 Latino children tested had elevated urine mercury levels (Rogers, Caldwell, and McCullough, 2004). Both blood and urine mercury levels are being measured in a representative sample of 2,000 adults in New York City, the urine mercury levels being measured because of concern over ritualistic mercury exposure (New York City Department of Health and Mental Hygiene, 2004). Unfortunately, these several urine mercury level investigations were designed without reference to recent findings that urine mercury levels resulting from exposure to low levels of mercury vapor, i.e., "below 10 μg/m^3" are "likely to be indistinguishable from background urinary mercury levels" (Tsuji et al., 2003), so their conclusions are essentially invalid. Scientists from the Centers for Disease Control and Prevention and the New York City Department of Health and Mental Hygiene have stated that their results have been released in a public forum, although no manuscripts have been published as yet (Jeffery, 2005; Rubin, 2005).

Discussion

Fear of the prospect of having to evacuate and decontaminate many thousands of homes in Caribbean and Latino communities around the country has undoubtedly acted to retard substantive environmental and clinical assessment of the ritualistic mercury problem. At the August 2004 conference of the International Society for Environmental Epidemiology, the oral session on "Urban/Ritualistic Mercury Exposure: Assessment to Intervention" demonstrated government ambivalence toward addressing the problem by its failure to mention any substantive governmental "assessment" or "intervention." The tenor of the session illustrated the issues addressed by J. H. Perkins's editorial, "Mercury: Persistence, Pollution, and Politics," which examined economic and political pressures faced by environmental scientists attempting to assess and minimize mercury emissions from coal-fired power plants (Perkins, 2004). Although smokestack emissions far exceed ritualistic mercury releases, they pose only an indirect threat to human health via bioaccumulation in the aquatic food chain, whereas if elemental mercury is sprinkled on the floors of a home, "the apartment or dwelling certainly will become contaminated with mercury [and] subsequent inhabitants will never know they are facing the potential for continuing, potentially serious exposure to mercury" (Greenberg, 1999).

The failure of government to act on this issue is traceable in part to racial, ethnic, and religious factors inherent in ritualistic mercury use and to the absence of community advocacy. Embarrassment over the self-inflicted nature of the mercury contamination accounts in some measure for such absence. This combination of fear, embarrassment, and lack of community advocacy is well illustrated in Paul's article, "Mercury Rising" (2003), which additionally shows how anthropologists, environmental scientists, and physicians have allowed political pressures to influence their professional judgment. One anthropologist interviewed suggests that because remediation of mercury-contaminated dwellings is expensive, will lead to evacuations, and so will anger both the evacuated tenants and their landlords, "you have eventually solved nothing"; further, it intimates that the status quo of domestic mercury exposure be allowed to continue. A physician quoted as stating, "We may be dealing with tons of mercury going into the air, and here we are talking about ounces going into the environment through ritualistic use," ignores the fact that a small amount of mercury in a dwelling can result in dangerously high vapor concentrations. The same erroneous correlation of gross environmental pollution with individual health threat is to

be seen in the suggestion by an environmental health advocate that "a focus on ritualistic [mercury] use is a diversion from much larger sources of contamination . . . [such as from] coal-burning power plants and medical incinerators" (Paul, 2003).

A good example of how academics and medical professionals have elided and glossed over this issue can be seen in a major edited work on Latino health. Although the editors (Aguirre-Molina, Molina, and Zambrana, 2001) and chapter authors (e.g., Zambrana and Flores, 2001) were well aware of the magico-religious uses of mercury and had been provided with extensive documentation on the subject, their section on environmental health entirely omitted mention of the contamination of dwellings from ritualistic mercury use. Their sole reference to mercury exposure in the Latino community was that "[s]hops called *botánicas* . . . sell metallic mercury (*azogue*) as an ethno medical remedy" (Wendroff, 1990), this despite the facts that the reference they cited (1) bore the title "Domestic Mercury Pollution," (2) made no mention whatsoever of mercury as an "ethno-medical remedy," (3) repeatedly emphasized the hazards of maternal-fetal and pediatric mercury vapor exposure, and (4) ended with a suggestion that clinical, environmental, and sociological research into these exposures was "required to develop an effective health-education programme for botánica owners and their clients" (Wendroff, 1990).

The president of the Latin American Foundation for Environmental Protection in Miramar, Florida, stated that he "tried to reach the politicians to get a better grant for research, [as] its [ritual mercury contamination] a very serious issue. The reason I believe politicians don't want to do anything about it is because the religious beliefs are too strong for politicians to get involved. My personal opinion is that they don't want to touch that issue" (LaPeter and De La Garza, 2004). A spokeswoman for the Miami-Dade County Health Department echoed these sentiments: "We can talk about the health issues of mercury in general. . . . But when it's something related to religion in rituals, it's not something we deal with" (Fleshler, 2004). In 1993, 31 of 78 botánicas surveyed in Puerto Rico were found to be selling mercury (Nunez-Molina, 1993). The USEPA Region 2 and the Puerto Rican Ministry of Health have repeatedly been requested to investigate the environmental health impact of ritualistic mercury use in Puerto Rico, but they have failed to do so. A government-sponsored study in French Guiana found high hair mercury levels in ethnically Haitian women and children, "likely resulting from the use of mercury for religious rituals" (Cordier et al., 1998), but no follow-up research was conducted to prove or disprove this hypothesis.

A further example of governmental ambivalence on this issue is the statement by the US Agency for Toxic Substances and Disease Registry (cited earlier) proclaiming "an urgent need" to determine levels of adult and child exposure to ritualistic mercury and recognizing that research on "a variety of exposure scenarios" is needed. Yet despite the proclaimed urgency of need, to date there has been no serious government-sponsored research to measure air mercury vapor levels inside living quarters in communities likely to be contaminated by ritualistic mercury use. At the recent USEPA-sponsored symposium, "Mercury: Medical and Public Health Issues," a senior ATSDR science advisor only briefly discussed "ethnic and folk uses of mercury" (Risher and Amler, 2004). Over the past 15 years, many government environmental health professionals have privately expressed their reservations about government's ability to substantively address this racially divisive, politically and fiscally explosive issue until there is significant demand for such intervention from the Caribbean and Latino communities themselves.

Recommendations

Sooner or later, government agencies and the environmental profession will have to respond forcefully to this looming environmental health disaster. At present, their denial that there is a serious problem has resulted in a lack of both conceptual and logistical infrastructure to deal with the need to assess very large numbers of homes for mercury contamination and even larger numbers of individuals for mercury exposure and absorption.

For the problem of ritualistic mercury contamination to be taken seriously by both the public health and the environmental health communities, botánica mercury sales must be correlated with domestic mercury contamination, with elevated body-mercury burden, and, ultimately, with pathology. There should be little technical difficulty in carrying out such research, but it is clear that without advocacy on the part of the affected communities, government will not allocate resources to gather the necessary data. Therefore, advocacy is the first requirement for conducting the necessary research. Advocacy will, in turn, come about only when the members of the Caribbean and Latino communities, especially community leaders, are, by a program of education, made fully aware of the health threat posed

to their infants, their children, and themselves by the use of ritualistic mercury in their homes.

To date, the standard biomarker of elemental mercury exposure has been the urine mercury level (Goldman and Shannon, 2001). As already noted, however, the validity of this measure for the low levels of mercury vapor likely to be the norm in contaminated dwellings ($<10\ \mu g/m^3$) has recently been called into doubt (Tsuji et al., 2003). One possible response to this is to separate screening for mercury exposure from screening for mercury absorption. Total mercury levels in unwashed hair include mercury absorbed into the blood and incorporated into the hair structure and adsorbed mercury on the surface of the hair, which is indicative of ambient mercury exposure. Automated instrumentation, requiring no wet chemistry, can analyze hair samples for mercury content accurately, rapidly, and economically (Cizdziel, Hinners, and Heithmar, 2002). Individuals with elevated hair mercury levels would then be further examined for signs and symptoms of mercury absorption and their dwellings screened for elevated levels of mercury vapor.

It is likely that a convincing demonstration that ritualistic mercury use has contaminated large numbers of homes will precipitate a demand for assessment and remediation that can only be met by government action. Accurate real-time assessment of mercury vapor levels below the $1\ \mu g/m^3$ range will require large numbers of portable atomic absorption spectrometers (Garetano, 2004). Large numbers of such instruments will be needed in a mercury emergency, along with trained operators (Illinois Attorney General, 2000). Their lack is certain to be a major constraint in both assessment and remediation efforts. Public health and environmental health agencies should be acquiring them now.

When, under a functioning government program of assessment and remediation, dwellings are found to be contaminated with mercury vapor levels above $1\ \mu g/m^3$, until remediation can be initiated it should be possible to postpone evacuation of occupants by the provision of some form of mercury-vapor filtration system. At least one manufacturer has developed such a filter for domestic use, which it claims is able to "remove mercury vapor from a $10 ft^2$ room, with carpeting in approximately 4 hours" (Siperstein, 2004). Such filters need to be further developed, tested, certified, and stockpiled. Their availability would greatly reduce the need for the evacuation of large numbers of dwellings, which in any event would likely prove impracticable, given the numbers of people involved and the difficulty bound to be encountered in finding alternative accommodations for them.

The unhappy public health consequences of past violations of the Precautionary Principle should alone be sufficient to induce government to delay no longer in confronting the substantial threat to health posed by the ritualistic use of mercury in the home. Common prudence requires that, in concert with the public health and the environmental health communities, it act now.

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"Elemental Mercury Poisoning Presenting as Hypertension in a Young Child"

by: E. Brannan, S. Su, & B. Alverson. ***Pediatric Emergency Care*****,** August, 2012

"The uncontrolled use of ceremonial mercury is widespread, not currently being evaluated effectively, and is certainly not well appreciated,"[1] The illustrative case, "Elemental Mercury Poisoning Presenting as Hypertension in a Young Child,"[2] demonstrates these points, insofar as it overlooked information that clinicians serving and Latino communities need to be aware of. The paper suggests that the source of the mercury contaminating the Puerto Rican patient's home was from ritualistic mercury use by the prior Dominican[3] occupant, but makes no mention that this is the first report reasonably associating magico-religious mercury use with mercury poisoning. In other words, this appears to be an index case of elemental mercury poisoning from inhalation exposure to mercury vapor resulting from the ritualistic use of elemental mercury in the home. It illustrates the most common scenario, second-hand exposure to mercury vapor from elemental mercury sprinkled or accidentally dropped on a floor during a ritual performed by a prior occupant, in this case, at least in part at the site of an altar on a bedroom dresser.[3,4]

When the Dominican woman's subsequent apartment was tested, after her occupancy of some 3 months, markedly elevated mercury vapor levels were found, with the highest level, 5µg/m^3, in the same locale as in her prior apartment, namely on the floor by her bedroom dresser, the site of her altar as reported by neighbors, where the mercury vapor level was 34µg/m^3.[3] The generally recommended evacuation level for mercury vapor in a home is 10µg/m^3, with a reoccupancy level of 1µg/m^3.[5] Unfortunately, neither the Dominican woman or her teen age daughter were tested for elevated urine mercury levels (UMLs), until well after the initial case of acrodynia was reported.

The mercury vapor levels in the Puerto Rican family's carpeted apartment would likely have been much higher, had their landlord not employed a contractor to clean the apartment after the Dominican occupants departure. The commercial cleaner employed a powerful truck-mounted vacuum cleaner which would have exhausted most of the mercury in the carpeting to the outside air.[6] However, enough mercury remained in the carpeting to grossly contaminate the Puerto Rican family's brand new vacuum to a level of 90µg/m^3.[7]

In cases of mercury poisoning by vapor inhalation, it is essential that all occupants of the contaminated dwelling are promptly tested for the presence of elevated UMLs, as all are exposed to mercury vapor. When this testing was somewhat belatedly performed, the patient's 8 year old sister, 10 year old brother and 32 year old mother were all found to have highly elevated UMLs, of 73, 38 and 49µg/L respectively. The notifiable UML is 20 µg/L. The two siblings were chelated with DMSA.[8,9] The father, who lacked health insurance, was not tested.[7]

It is noteworthy that all family members other than the 3 year old girl were asymptomatic, despite their exposure to high levels of mercury vapor and high UMLs, as were the prior occupants, a mother and her teen-aged daughter, who were presumably exposed to far higher levels of mercury vapor, and of a longer duration. The latter two women were never tested, despite their long residence in two mercury-contaminated dwellings, which would appear to be a lapse on the part of the RIDOH.

There could have been no clinical suspicion that any of them were at risk of intoxication, had not the 3 year old exhibited signs of acrodynia. Their exposure to toxic levels of mercury vapor would have continued were it not for their clinicians astute diagnosis of nowadays rare acrodynia. A somewhat

similar case of mercury poisoning of three siblings, with a 33 month old girl presenting with acrodynia, resulting from exposure to mercury from a broken clinical thermometer, led her physician to suggest that "Cases of chronic mercury poisoning may be missed, even today, and all paediatricians and child psychiatrists should familiarize themselves with the clinical picture."[10]

The dermatological aspects of the case described by Brannan et. al. were described in an earlier paper, whose authors also speculated that the source of the mercury was its ritualistic use.[11] They stated that "Prompt diagnosis and treatment of this disorder may help prevent long-term neurological sequelae**."** **Such prevention can only be achieved by promptly testing all members of a mercury-contaminated home**, especially pregnant women and children.

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Neurodevelopmental toxicity: still more questions than answers

Arnold P Wendroff [a]

In their Review, Grandjean and Landrigan expressed concern about the neurodevelopmental toxicity of methylmercury,[1] but did not assess the dangers of serious and widespread inhalation exposures to elemental mercury vapour (Hg^0) from its magico-religious uses in some Caribbean and Latino communities and the presumptive associated latent epidemic of developmental neurotoxicity this constitutes.

In the belief that it attracts good and repels evil, practitioners of folk magic and Caribbean religions including Espiritismo, Santería, and Voodoo, sprinkle mercury on floors and furnishings where it accumulates levels of mercury vapour, ~~about 80% of which is inhaled or absorbed.~~ **[about 80% of which inhaled is absorbed.]** The Hg^+ ion is the toxic moiety in methylmercury. Mercury vapour, like methylmercury, is lipophilic and readily crosses the placental and blood—brain barriers and enters breast milk.

The mean weight of mercury sold by botanicas for ritualistic use is about 10 g. Mercury spilt during ritualistic ceremonies that permeates flooring and furnishings can persist for decades, during which time it continually produces mercury vapour. Hence, most exposures are probably second-hand, from ritualistic spills by previous occupants of an individual's dwelling.[2, 3] Unlike methylmercury ingested in seafood, occupants of such contaminated dwellings cannot control their inhalation exposure and will be unaware of the neurotoxicity of residual mercury in flooring.

Mercury sales in The Bronx in New York (USA), where many people of Caribbean origin live, suggest that in 1995 alone,[4] between 25 500 and 155 000 homes might have been contaminated with mercury and data from similar Caribbean communities in New Jersey showed that at least 2% of apartments had mercury vapour consistent with its cultural use.[5]

Environmental health scientists, long aware of the hazards posed by ritualistic mercury use and its probable neurodevelopmental sequelae, have not put into action the “precautionary approach that emphasizes prevention and does not require absolute proof of toxicity” advocated for by the authors.[1] Despite Grandjean's previous observation that in “some ethnic groups, metallic mercury is used for magical purposes that may cause substantial exposure to mercury vapor”,[6] these exposures and their neurodevelopmental ~~affects~~ **[effects]** are not routinely assessed.

That ritualistic mercury exposure contributes to the “silent pandemic of neurodevelopmental toxicity”[1] is suggested by a case of acute magico-religious mercury poisoning in a 3-year-old Puerto Rican girl, apparently due to ritualistic mercury spills by the previous Dominican occupants of the apartment in which she lived.[2, 3]

Despite more than two decades of awareness of these ritualistic practices and a variety of research on ritualistic mercury sales, use, and reported environmental and clinical mercury levels, the authors' observation that recognition of widespread subclinical toxicity often did not occur until decades after the initial evidence of neurotoxicity is exemplified by the failure of government agencies and the environmental medical community to substantively assess these exposures.

I declare no competing interests.

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Neurodevelopmental toxicity: still more questions than answers — Authors' response

Original Text

Philippe Grandjean a b, Philip J Landrigan c

We are grateful for the comments on our review.1 Our aim was to present a balanced assessment based on our best professional judgement concerning toxicity of industrial chemicals to the developing human brain. The diversity of opinion expressed in these letters reflects the serious absence of neurotoxicity information about most chemicals, but we interpret all four letters as supportive of a call for intensified research.

Goldstein and Saltmiras echo Monsanto's oft-repeated defence that glyphosate is a safe herbicide. Still, the toxicity documentation publicly available on this widely used substance is limited. We have been unable to find documentation of any neurotoxicity testing of glyphosate considered valid by the US Environment Protection Agency. Experimental evidence lends support to the likelihood of neurotoxicity.2 On the basis of clinical reports mentioned by Goldstein and Saltmiras, we therefore believe that glyphosate should be considered a neurotoxic hazard. Monsanto's argument for safety relies on the relative absence of research results rather than on data documenting safety.

We agree with Feldman that fluoride is important for children's oral health. However, the fact that a trace element has beneficial effects at low doses in specific tissues does not negate the possibility that neurotoxicity might also be occurring, especially at increased levels of exposure. Indeed, concerns about fluoride toxicity were already raised by a National Research Council expert committee.[3] Feldman describes the recent meta-analysis[4] as selective and based on old, confounder-ridden studies. In support of her claims, she refers to two previous reports that reviewed some of the same studies, although without access to important background information. Feldman makes other serious errors—eg, by linking, without justification, a rise in population mean intelligent quotient (IQ) to the introduction of water fluoridation.

Similarly, Gelinas and Allukian dispute the validity of previous studies on fluoride exposure and neurobehavioural deficits. We do not deny the importance of a dose-response relation, which has been a unifying concept in toxicology since the time of Paracelsus. However, as we emphasised in our Review, emerging evidence on developmental neurotoxicity makes it clear that the timing of exposure is also of great importance, especially during highly vulnerable windows of brain development. Due to the growing evidence on adverse effects, US authorities now recommend that fluoridation of community water should not exceed 0·7 mg/L.[5]

We agree with Wendroff's perspective, but have been unable to identify epidemiological support for a claim of developmental neurotoxicity from exposure to mercury vapour. As elemental mercury might soon be added to the list of confirmed developmental neurotoxicants, we support the evidence-informed prevention of mercury exposures suggested by Wendroff.

In writing our Review, we have tried to steer a middle course between advocates for particular public-health actions and spokespersons for the chemical industry. We believe that sufficient evidence is already available that industrial chemicals endanger human brain development and that unrestrained production and release of such chemicals are short-sighted, dangerous, unsustainable, and fundamentally immoral. We call for a thorough revision of chemical safety policies and for the establishment of a documentation centre on developmental neurotoxicity modelled after the International Agency for Research on Cancer.
We declare no competing interests.

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A LATENT EPIDEMIC OF NEURODEVELOPMENTAL DEFICITS DUE TO EXPOSURE TO MERCURY PUT TO MAGICO-RELIGIOUS USE IN CARIBBEAN & LATINO COMMUNITIES

Initial Draft: letter to editor -- ***The Lancet Neurology*** -- in press for July 2014

Clinicians concerned about neurodevelopmental toxicity of methylmercury,[1] have neglected to assess serious and widespread inhalation exposures to elemental mercury vapor (Hg^0) emanating from its magico-religious uses in some Caribbean and Latino communities, and its presumptive associated latent epidemic of developmental neurotoxicity. The Hg^+ ion is the toxic moiety in methylmercury. Mercury vapor, like methylmercury, is lipophilic, readily crossing placental and blood-brain 'barriers', and entering breast milk.

In the belief that it attracts good and repels evil, practitioners of folk magic, Caribbean religions including Espiritismo, Santeria and Voodoo,[a] sprinkle mercury on floors and furnishings, where it evolves developmentally neurotoxic levels of mercury vapor, ~80% of which inhaled is absorbed.

The mean weight of mercury sold by botanicas for ritualistic use is ~10g.[a,b] Ritualistic spills permeate flooring and furnishings, persisting for decades, while continually evolving mercury vapor.[c] Hence, most exposures are likely at second-hand, from ritualistic spills by prior occupants.[2,3,d] Unlike methylmercury ingested in seafood, occupants of ritualistically-contaminated dwellings cannot control their inhalation exposure, are unaware of residual mercury in flooring, and of the existence and neurotoxicity of mercury vapor.

Mercury sales in the heavily Caribbean Bronx, New York, suggest that in 1995 alone, 2% to 12% of homes were ritualistically contaminated,[e] and data from similar Caribbean communities in New Jersey, found at least 2% of apartments with the presence of mercury vapor consistent with its cultural use.[f,g,h]

Environmental health scientists, long aware of hazards posed by ritualistic mercury use,[a] and likely neurodevelopmental sequelae, have failed to operationalize the "precautionary approach that emphasizes prevention and does not require absolute proof of toxicity."[1] Despite Grandjean's observation that "In ... some ethnic groups, metallic mercury is used for magical purposes that may cause substantial exposure to mercury vapor,"[4] these exposures and their neurodevelopmental impact have yet to be assessed. They have been no measurements of mercury vapor levels in occupied dwellings, and of their correlation with biomarker mercury levels and neurodevelopmental sequelae of exposed occupants.

That ritualistic mercury exposure contributes to the "silent pandemic of neurodevelopmental toxicity"[1] is suggested by a case of acute magico-religious mercury poisoning of a three year-old Puerto Rican girl, apparently due to ritualistic mercury spills by the prior Dominican occupant of her apartment.[2,3] Although neither paper mentioned it, her eight and ten year-old siblings and 32 year-old mother had highly elevated urine mercury levels of 73, 38 and 49µg/L respectively, yet were asymptomatic, albeit with no neurological assessment.[5]

Despite over two decades of awareness of these practices, and a variety of published research on ritualistic mercury sales, use, and associated environmental and clinical mercury levels,[i] the authors' observation that "recognition of widespread subclinical toxicity often did not occur until decades after the initial evidence of neurotoxicity," is exemplified by the failure of government agencies and the environmental medical community to substantively assess these exposures, due to a variety of political and economic, as opposed to medical, rationales.[j]

Documentation of the environmental health threat posed by magico-religious mercury use is accessible using the key words < **mercury Santeria** >.

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AMERICAN JOURNAL OF Public Health

Magico-Religious Mercury Use and Cultural Sensitivity

In his recent commentary, "AIDS Prevention and Cultural Sensitivity: Are They Compatible?" Bayer concluded, "Homilies about cultural sensitivity must be replaced by a forthright acknowledgement that we cannot seek radical behavioral and normative change while adhering to a dictum that serves principally to protect the status quo."[1(p897)]

Although Bayer specifically addresses acquired immunodeficiency syndrome (AIDS), his logic pertains to other complaints possessing culturally determined risk factors, including intoxication resulting from the magico-religious use of mercury in Hispanic and Caribbean homes.[2] Although the Environmental Protection Agency (EPA) has recently initiated a public awareness campaign to deal with "the burning or sprinkling of elemental mercury in homes and cars,"[3] there has been resistance on the part of numerous Hispanic "stakeholder" organizations to "regulatory action" involving the sale of illegally unlabeled mercury for magico-religious and ethnomedical use.[4]

Despite urging EPA "to begin its risk communication efforts quickly in order to show its concern for the affected population,"[4(p7)] the three national Hispanic stakeholder organizations EPA consulted felt that a more active intervention, such as enforcing the existing Federal Hazardous Substances Act labeling requirements (16 CFR §§1500–1512), "would send the message of government interference in the practicing of one's religion."[4(p8)] The stakeholder organizations agreed that "any discussion of the religious implications of [mercury use] should be omitted from the risk communication message."[4(p7)]

EPA stated that "because of the cultural aspects of this problem [of magico-religious mercury use], any regulatory action would probably be very difficult to enforce."[4(p6)] Similar sentiments have been voiced by the Consumer Product Safety Commission (CPSC), which has refused to exercise its subpoena powers to examine the sales records of distributors of illegally unlabeled or inadequately labeled mercury. Such records provide data on the amount of mercury sold for magico-religious purposes, as well as the geographical distribution of such sales, and would eliminate "many [of the] uncertainties . . . regarding the extent . . . of use of mercury in these practices."[4(p3)] Both EPA's and CPSC's actions (or inactions) illustrate Bayer's observation that "acceding to the demands of cultural sensitivity . . . not only is not a prerequisite for effective public health practice but would be inimical to the goals of . . . prevention." Both EPA and CPSC appear to have acceded to these demands by failing to enforce existing culturally neutral regulations requiring adequate labeling of mercury. They are thus maintaining the status quo at the expense of protecting the public's health. □

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Is Religion Wrecking Our Air?

By Jay Wexler Books, Culture, Science April 4, 2016

What more important natural resource could there be than the air we breathe every minute of every day? And yet, air pollution remains rampant throughout the world. The World Health Organization has estimated that air pollution causes seven million deaths per year from problems such as heart disease, respiratory ailments, and cancer. Major sources of air pollution include mobile sources like cars and trucks and stationary sources like factories and power plants. Relatively minor sources range from cigarettes and hairspray to volcanoes and cow farts.

When it comes to our air, the biggest hazard posed by religion is that religious people really like burning stuff. Whether they are burning incense or firecrackers or logs or paper or pieces of cardboard put together to resemble a small house, religious believers around the globe can't seem to get enough of using fire to celebrate their traditions.

Consider Lag B'Omer. This is a relatively minor Jewish holiday that young people celebrate all over Israel by lighting enormous bonfires to commemorate the death of a famous rabbi and the end of a plague that was killing a different rabbi's students. Even though I was raised Jewish, I had never heard of the holiday until my colleague Jack Beermann told me about it. Jack, who was nice enough to hire me when he chaired the Appointments Committee at my law school fourteen years ago, despite the fact that I misspelled his name in my cover letter, visits Israel often. "When I was there on Lag B'Omer, the whole country smelled like a bonfire that night and the next day," he said to me one day when I was explaining my book project to him. "Also, my clothes smelled like a bonfire, of course, so it must require lots of extra laundering."

According to news reports, there are so many bonfires lit on Lag B'Omer that satellite images reveal a smoky haze hovering over Israel during the holiday. Scientific research has shown that visits to emergency rooms for asthma and chronic obstructive pulmonary disease (COPD) occurrences go way up because of the smoke, which is hardly surprising since the concentration of particulate matter on the evening of the holiday can spike to as much as ten times the normal level. Government officials in Israel are well aware of the problem. A study authorized by the Knesset showed that the bonfires contribute to the problem of global warming, and that body has recommended (though not required) that people refrain from lighting them. The message has not been well received in most quarters. When an influential local mayor launched a campaign to convince residents to find alternative methods of celebrating the holiday, the people became outraged. As one journalist wrote: "In an instant, the popular mayor became the local killjoy, the Grinch who was trying to steal Lag B'Omer. The local press and town Internet forum erupted with residents blasting [the mayor] for his attempt to extinguish the flames. 'Next thing you know he'll be ordering us not to light Hanukkah candles,' one angry resident wrote." In fact, Hanukkah candles do contain hazardous substances like toluene, benzene, and formaldehyde, so it wouldn't be entirely shocking if somebody did try to ban them.

Beyond bonfires, the burning of incense is a fairly long-standing and ubiquitous religious practice found in all sorts of traditions, including Christianity, Hinduism, and Buddhism. Although incense can be sweet-smelling and pleasant, it is also really dangerous. For whatever reason (the smell, the

context, the different treatment by the media, the extreme irrationality of all human beings), people who would go miles out of their way to avoid breathing in the smoke from a single cigarette often have no problem hanging out for hours at a temple or church where the air is filled with billowing plumes of hazardous incense smoke.

When I was visiting Hong Kong, I spent an hour or so at the School of Public Health at the Chinese University of Hong Kong, talking to a research scientist named Kin-Fai Ho, whose work focuses on the effects of toxic air pollutants on human health. Professor Ho was part of a team of scientists who were granted rare access inside of two temples in Hong Kong so they could study the effects of incense burning on the air quality. The team found that during peak times, when incense was being burnt in high quantities, the air was far more polluted than during nonpeak times. At one of the temples, for instance, the peak carbon-monoxide level was three times the nonpeak level, and the average benzene concentration was almost eight times more than the government's recommendation for public places. When I asked Dr. Ho how incense smoke compares with cigarette smoke, he said the two were comparable with respect to particulate matter, carbon monoxide, and polycyclic hydrocarbons.

Temples and the people visiting them have several alternatives that can help reduce the risk from incense smoke. In their paper, Ho and his coauthors write that "visitors may decrease the number of incense sticks burned and period of stay at temples." In my travels, I did visit temples that tried to suggest limits on how many incense sticks people should burn. Some temples have tried to deal with this problem by extinguishing incense sticks after they have been burning for a while. Particularly in Hong Kong, I sometimes saw large buckets of water standing near places where large amounts of incense were being burnt, and every once in a while, a temple worker would grab a bunch of sticks and douse them in the water. There is one suggested possible solution, however, that Dr. Ho was not very optimistic about. So-called environmentally friendly incense, which is marketed in some places as a way of reducing the environmental and health impacts of incense burning, turns out, according to a new study that Ho was working on, to have slightly fewer particulate matter emissions but little effect on the amount of toxic pollutants emitted. On my way out of the interview, looking in that journalistic way for the bottom line, I asked Dr. Ho whether he thought incense-smoke inhalation was a problem. He looked at me and responded calmly, "Yeah, it's a big problem."
Another problem is fireworks. As someone who has always hated fireworks and would rather stay inside with my head under a pillow than endure a loud, smoky Fourth of July celebration with ten thousand people staring at the sky and going "ooooh" and "ahhh" over and over for half an hour, I find it hard to understand the appeal. But still, people love watching fireworks! Every celebration these days, from the biggest national holiday to the most insignificant home-run hit by a last-place baseball team down 14–0 in the bottom of the eighth inning, seems to be marked by a blast of colorful explosions. Religious celebrations are no exception. Chinese New Year celebrations, which for some take on a religious meaning (many believe the fireworks ward off evil spirits); the Muslim holiday of Eid, which marks the end of the Ramadan fasting period; the Hindu festival of lights known as Diwali; and many other religious holidays and festivals around the world are celebrated with the abundant lighting of firecrackers and fireworks.

Unfortunately, for those of us who need to breathe air in order to live, the smoke produced by fireworks can be quite dangerous. According to one academic paper that showed the effects of fireworks on air pollution during Diwali in India, "fireworks contain harmful chemicals such as potassium nitrate, carbon and sulphur apart from an array of chemicals such as strontium, barium, sodium, titanium, zirconium, magnesium alloys, copper and aluminum powder to create the colourful effects. On burning they release gases such as carbon monoxide and nitrogen dioxide." The study concluded that fireworks contributed to excessive ozone pollution spikes during the holiday, and that "high ozone levels combined with pollution due to fireworks might be critical for elderly people and

children with heart and respiratory ailments." Another Indian expert similarly concluded, "Gaseous air pollutants along with other toxic gases emitted due to burning of firecrackers aggravates the chance of attack among asthma patients. The patients with heart disease, chronic bronchitis and low immune system are also at high risk."

The realization that fireworks significantly raise air pollution levels has led officials in Beijing to call for a reduction in the use of pyrotechnics during the Chinese New Year period, and it's one reason, among others, that Abu Dhabi police have warned Eid celebrants not to use illegal fireworks in the United Arab Emirates. Even in the United States, some critics have called for the federal government to regulate fireworks, rather than exempting them from the ambit of the Clean Air Act. The EPA has refused, claiming that "Congress did not intend to require EPA to consider air-quality violations associated with such cultural traditions in regulatory determinations."

Although most people probably conjure up images of a dark and smoggy sky when they think about air pollution, in fact indoor air pollution may be nearly as dangerous as outdoor pollution, particularly in developing countries where people routinely burn coal and biomass fuel for cooking and heating their homes. **Indoor air pollution also provides the context for one of the most bizarre examples of a religious practice that has created environmental problems in the United States.**

Mercury is an element that people generally do not want to mess with. Touching it, eating it, or, most dangerously, breathing in the vapors that it releases can be extremely dangerous, potentially causing respiratory problems and damage to the nervous system. Given the perils of inhaling mercury vapors, it might be surprising to learn that some religious believers actually sprinkle the silver liquid metal inside their homes to ward off evil spirits. The practice puts not only current residents at risk but also future ones, as mercury can remain in fabrics and carpets for up to a decade, releasing dangerous vapors the entire time.

Back in 1989, a middle school chemistry teacher in Brooklyn named Arnold Wendroff was teaching his students about the periodic table. When he asked his students if they knew what mercury was used for, he fully expected someone to mention thermometers. Instead, one of his students answered that his mother, a Santeria practitioner originally from Puerto Rico, liked to sprinkle it around their apartment to fend off witches. Witches? Concerned and curious, Wendroff soon became a one-man watchdog of the ritualistic use of mercury. He learned that many practitioners of Caribbean religions like Santeria, Palo, and Voodoo believe that mercury can bring good luck and keep evil spirits at bay. In large US cities with substantial populations of these believers, practitioners purchase capsules containing a small amount of liquid mercury from so-called botanicas, which are essentially stores that sell religious paraphernalia.

The practitioners then do things like sprinkle the mercury on floors, furniture, or car interiors, or mop the floor with it, or burn it in candles, or mix it with perfume, or even swallow it. Because mercury vapors are so dangerous to inhale and because the mercury remains in the environment for so long, Wendroff concluded that the ritualistic use of mercury posed a significant health hazard that the government needed to address.

Through Wendroff's efforts, the EPA became aware of the problem in the early 1990s and started considering whether to do anything about it. The agency has several statutes that it could have used to regulate the ritual use of mercury inside homes, most importantly the Toxic Substances Control Act, or TSCA, which allows the agency to take a wide variety of regulatory actions against substances that pose an unreasonable risk to the environment or public health. To look into the issue, the EPA established a task force that conducted research and interviewed interested parties. Ultimately,

though, the agency decided against using the TSCA, opting instead to work together with states and municipalities to spread the word about the dangers of mercury through education and community outreach.

In the wake of the task force's decision, Wendroff continued to call for further efforts to address the indoor religious mercury problem, talking to the media, writing papers in scientific journals, and interacting with various governmental units. In 2005, he asked the Office of the Inspector General at EPA to "determine whether EPA had adequately investigated whether [indoor religious mercury] contamination poses an environmental health threat and, if so, had EPA substantively acted to address its dangers." Unsurprisingly, the OIG concluded that EPA had acted properly and recommended no further action. On the other hand, the office did release a report on its investigation "to further emphasize that the ritual use of mercury poses a health risk." This final conclusion does seem to be accurate. A 2011 article in the New York Times, for instance, reported on the case of a three-year-old who suffered mercury poisoning when her family moved into a Rhode Island apartment that had been the site of ritual mercury use by a former tenant many years earlier.
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Excerpted from *When God Isn't Green: A World-Wide Journey to Places Where Religious Practice and Environmentalism Collide* by Jay Wexler (Beacon Press, 2016). Reprinted with Permission from Beacon Press.

Jay Wexler
Jay Wexler is a professor at the Boston University School of Law, where he has taught environmental law and church-state law since 2001. He is the author of three previous books, including Holy Hullabaloos and The Odd Clauses.

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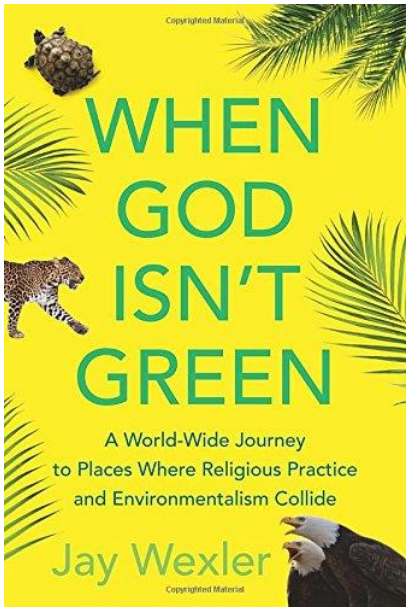

When God Isn't Green: A World-Wide Journey to Places Where Religious Practice and Environmentalism Collide Jay Wexler, Beacon Press, March 15, 2016

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Northeast -1

Maine, Massachusetts, Rhode Island, Connecticut, New Hampshire, Vermont, New York, Pennsylvania, New Jersey, Delaware, Maryland, DC

Full Name (First and Last): John Daleo
Name of Organization or Community: PlaneSense 4 Long Island
City and State: Roslyn Heights
Brief description about the concern: NextGen is ruining the suburbs. The program may work for the FAA and airline industry to increase the throughput at airports by allowing planes to fly in a closer flight path and lower for longer periods of time. FAA claims safety. I wouldn't know so much about that, but what I do know as a resident on the ground under the NextGen flight path to JFK arrivals is that there was absolutely NO consideration afforded to me as a citizen nor the other residents who have to endure this.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: I am a reasonable man. I understand I live in the NY metro area with major airports 20 miles away. I had reasonable expectations when I moved from Queens to Nassau County (suburbs) that I would get away from the noise/pollution. This has NOT been the case due to NextGen. I want WHEJAC to advise the White House Council to force the FAA review flight paths for equitable distribution. If they are able to fly over the same homes time and time again via satellite then they can be given rotated paths that share the burden. The reason they won't do this is for fear that MORE citizens will complain, but if they disperse equitably then we are all in the same boat. Airline industry must be served - agreed. But the rights of those on the ground can't be overlooked in the process. Unfortunately this is happened and allowed.

Full Name (First and Last): Tania Giacomini
Name of Organization or Community: 10,000 Hawks
City and State: New Haven, CT
Brief description about the concern: My family and I are concerned with the the noise level and frequency of noise; the amount of exhaust fumes released into the air - thus air quality and the increased automobile traffic.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: To maintain the airport as a small general aviation airport and not increase the commercial flights. Also to prohibit this becoming a freight/cargo airport.

Full Name (First and Last): Cynthia Jennings
Name of Organization or Community: Connecticut Coalition for Environmental Justice (CCEJ)
City and State: Hartford, Connecticut
Brief description about the concern: My concern is based on the impact of the COVID-19 Virus and it's variants relative to those individuals who live in Environmental Justice Communities. Obtaining statistics on the death rate in these communities is almost impossible, and we are left to estimate how many

people are dying, and why the death rate is so much higher in our communities. I would also like protocol for public health and public safety of those individuals living in EJ communities, in particular for what they should do to protect their health if they refuse the vaccine, and what the long-term effects related to cardiovascular impacts are after they have been infected with COVID. Also, I would like monies to be specifically set aside for environmental clean up of EJ communities to prevent the destruction of lung health and immune health BEFORE Covid or some other pandemic continues to kill off a substantial number of people with already compromised lungs and immune systems.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?:
I would like WHEJAC to advise the White House Council to identify every Environmental Justice Community through community mapping, with the associated risks (i.e. pulmonary, cardiac; immune systems) and I would like WHEJAC to identify specific monies to be spent on environmental cleanup and pandemic devastation prevention in these EJ communities, and I would like WHEJAC to have CRIMINAL ENFORCEMENT FOR MONIES THAT ARE STOLEN OR REPURPOSED FOR EJ COMMUNITIES, AND ARE USED FOR OTHER PURPOSES. Covid monies are critical to saving lives in EJ communities, and for these monies to be withheld from EJ communities is criminal. Monies designated for these purposes are to be STRICTLY ENFORCED for use ONLY in these communities, and there should be severe warnings on repurposing or misappropriation of these monies, as well as PROVISION OF TRAINING TO ALL EJ COMMUNITIES ON HOW TO UTILIZE THESE MONIES TO SAVE LIVES AND REDUCE RISK OF LIFE TO THOSE LIVING IN EJ COMMUNITIES.
Thank you.
Attorney Cynthia Jennings
Hartford, Connecticut

I'm the Executive Director of the Eastern PA Coalition for Abandoned Mine Reclamation (EPCAMR), and would like to provide comments following the January 26 & 27th Public Meeting. I realize that the deadline of February 9th has passed to submit the comments formally, however, I had gathered additional information following that date that is included within the body of the comments here that I would not have had in late January. I have offered some feedback after reviewing the Climate and Economic Justice Screening Tool. I've noticed a lot of coalfield communities that have abandoned mine lands and legacy abandoned mine features and water quality pollution associated with abandoned mine land issues are not even a part of this map whatsoever, here in PA, let alone Appalachia or nationally for that matter. Leaving out the coalfield communities and watersheds that are impacted by abandoned mine lands from the Justice 40 seems to go against what the Administration has been talking about all along when they were going to make it a priority to make investments in them. If these communities are left out and the criteria suggested below aren't considered, it could leave many communities out in the dark and not considered for much-needed funding opportunities from many of the agencies that are a part of the IWG, including funding from the recent Infrastructure bill funding. I have presented many of the criteria below to the PA Office of Environmental Justice for consideration and review and have had conversations with their Staff on advocating for the inclusion of many of the data listed below related to legacy abandoned mines and mine water pollution as determined under the (Title IV) Surface Mining Control & Reclamation Act of 1977, as amended. We've worked with Justin Dula, Acting Director of the PA DEP Office of Environmental Justice, and Tom McKeon, MPH, PhD Student with the Department of Geography and Urban Studies from Temple University that is currently an Environmental Justice Intern. EPCAMR would ask that you please consider the same. While these are specifically referring to PA, many of the data layers are already uniform across States in the Federal e-Abandoned Mine Land Inventory System (AMLIS) updated by the Office of Surface Mining Reclamation & Enforcement (OSMRE) in the US

Department of the Interior. • Unreclaimed AML sites (feature points) contained within P1 & P2 Problem Areas •% vegetated (a lack of vegetative cover may indicate loss of habitat, forests, and green space)• AML Sites contained within Problem Areas that are listed as "Undetermined" (No Priority)•Existing AML grayfield sites as determined by the US EPA (Earth Conservancy has these sites funded under the US EPA Region 3, for example)•If we are going to refer to the need for air quality standards, we include location of mine fires that currently have little to no capturing of any air quality monitoring data from gas emissions from the surface of the underground fires• Locations of wildcat sewers (raw or leaking sewage discharges) or combined sewer overflows [might be on 303(d) List for sewage as source of pollution]• Unemployment Rate (at what level? Municipal, City, County)• County or Municipal owned AML parcels •Subsidence Prone Areas •Abandoned Mine Drainage (AMD) water pollution discharge points (Priority 3 points within the Problem Areas)• Underserved School Districts •Communities where coal mining jobs are being actively reduced due to shutdown of coal-fired plants (I recall a few coal-fired places in SW PA) •Cancer clusters or some other health-related cluster •Excessive Radon levels (Geological boundary of the Reading Prong-similar to a Limit of Coal Measures Boundary)•Expand buffer area around current EJAs from one-mile to ten miles (or more appropriate number)•303 D impaired stream•Air quality advisory due to particulate matter• Documented private and/or public drinking water well contamination•Existing Consent Order and Agreement for pollution impacts•Dimentia clusters (associated with heavy metal contamination)•Renal failure clusters (associated with heavy metal contamination)• Hazardous Sites Cleanup and Reclamation Act sites•Past investment of funds addressing mine reclamation (water, land or fires)• Area in a Qualified Hydrologic Unit Please take a look at EPCAMR's ArcGIS PA AML Dashboard and data compilation that we've created which includes the CDC's Social Vulnerability Index (2018) and PA e-AMLIS data.
Here are two additional data layers that you may want to review and consider. We have talked with many other States throughout Appalachia with AML and AMD issues and some do have this type of information and others don't. We've even helped some States pull this type of information together through small grants over the years with our partners from Central Appalachia. As far back as 2012, EPCAMR even provided a significant amount of GIS data on abandoned mine lands and mine water pollution to researchers that were working with Geisenger, John Hopkins Education and Research Center, and the National Institute of Occupational Safety & Health. The research was from 2012. Associations of the Burden of Coal Abandoned Mine Lands with Three Dimensions of Community Context in Pennsylvania Ann Y. Liu,1 Frank C. Curriero,1,2 Thomas A. Glass,3Walter F. Stewart,4 and Brian S. Schwartz1,3,4. Legacy Pollution sites in the tool that you have presented are more related to Hazardous Waste and Superfund sites. They do not include abandoned mine sites and mine water pollution that in PA impacts over 7,000 miles of streams and an estimated 150,000 acres conservatively, of abandoned mine lands. For areas and communities where Active Mining (Title V) of the Surface Mining Control & Reclamation Act, is located, these points of interest might also want to be considered.

Presence of: Coal Mining Operations, Anthracite River Dredge, Discharge Point, Mineral Preparation Plant, NPDES Discharge Point, Refuse Disposal Facility, Surface Mine, Underground Mine, Industrial Mineral Mining Operations, Discharge Point, Mineral Preparation Plant, NPDES Discharge Point, Surface Mine, Underground Mine, I hope that these comments will possibly be considered or at least reviewed by the WHEJAC. Respectfully submitted, Bobby Hughes, Eastern PA Coalition for Abandoned Mine Reclamation (EPCAMR)

Full Name (First and Last): Gretchen Fitzgerald
Name of Organization or Community: concerned citizen
City and State: West Hurley NY

Brief description about the concern: EJ considerations for older adults - especially those who have chronic illnesses and are homebound.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: It is critical to take into consideration the special environmental justice issues specific to older adults. Adults over the age of 65 are a growing percentage of the population in the United States and are particularly vulnerable to both short-term and long-term consequences of climate change due to physical age-related changes. These health risk factors are more potent for older adults with low incomes, which is the only age group that is currently showing an increasing number of people in poverty. In addition, while many people of younger age groups may either live or work in communities more highly exposed to pollutants, older adults with chronic illnesses or disabilities are less able to leave their homes and therefore are exposed to harmful chemicals and pollutants 24 hours a day. This is especially true for residents of skilled nursing facilities and assisted living facilities. These facilities tend to be clustered in and around urban communities, which tend to have more environmental health issues compared to rural areas. Older adults can be exposed to dangerous pollutants both inside and outside the facilities, so both must be assessed and monitored frequently to avoid exacerbations of disease and subsequent hospitalizations. The White House Council on Environmental Quality must prioritize the needs of low-income older adults considering their risk of exposure and their vulnerability due to age-related changes and coexisting chronic illnesses.

Full Name (First and Last): Dr. Sacoby Wilson
Name of Organization or Community: Center for Community Engagement, Environmental Justice, and Health
City and State: College Park, Maryland
Brief description about the concern: In response to the WHEJAC public meeting on developing a scorecard for federal agencies as they try to address environmental justice issues, I, Dr. Sacoby Wilson, Director of the Center for Community Engagement, Environmental Justice, and Health (CEEJH) at the University of Maryland School of Public Health, would like to provide written recommendations. Federal agencies should be reviewed across criteria developed from the 17 Principles of Environmental Justice and CEJA's 8 Principles of Collaboration. - Agencies should be evaluated for each criteria on a scale of 0-5 points using publicly available information on the agency website, and interviews with agency representatives. The full breakdown of scoring should include the following elements:

Please see the emailed pdf.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: Pease see the emailed pdf for full list of recommendations.

Southeast -2

West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Arkansas, Louisiana, Florida

Dear WHEJAC members,

At the January 26, 2022 WHEJAC meeting, I heard Dr. Bullard highlight the need for guardrails in the spending of federal infrastructure funding and the need to organize, to mobilize, to build the justice

framework into that funding. As I waited for my turn to speak (which never came), that message resonated a lot for me: to be laser-focused, so we don't get what we are always getting: nothing; to make sure we are on this and stay on it every day, 24/7. Inspired by the call to "stay on it", I submit the following comments to ask that you consider them as you continue to provide advice and make recommendations to the White House on environmental injustices that is likely few have commented on, but that are in urgent need of "guardrails" so that federal agencies, and states receiving federal funding, like Florida where I reside, don't add more harm and marginalization in our communities. The EJ issues I present below are within the scope of the WHEJAC charter. Recommend Environmentally Just Policies to Build Back Better Nights! A few days before the WHEJAC hearing, driving back from the Everglades, my son & I made a stop to take pictures of the enormous quantity of WASTED but "energy efficient" LED lighting, at a sports field at the very edge of the Everglades, illuminating even the clouds at night. Earlier that night, we also took photos of white fog and clouds illuminated by the bright bluish white "energy-efficient" LEDs in a Florida Power & Light solar farm within one of the last remaining natural dark sky areas in the Everglades, and primary habitat for the federally endangered Florida Panther, our FL state animal. These environmental impacts are happening in many communities, but like most forms of pollution, harmful artificial light at night tends to affect our EJ communities disproportionally more. And NEPA is failing in this regard, as many federally-funded transportation projects are adding new unnecessary, inappropriate, excessive and harmful LED lighting, to the detriment of people and wildlife, as documented by plenty of peer-reviewed research. There is NO environmental justice, in energy efficiency and renewable energy, if the health & quality of the night is NOT taken into account. We need to Build Back Better Nights! To that end, I ask you to please include these in your recommendations to the Chair of the Council on Environmental Quality (CEQ) and to the White House Interagency Council on Environmental Justice (Interagency Council): (1) All federal agencies, particularly the US Dept of Transportation and US Dept of Energy, must improve their guidance and regulations, to ensure they adequately evaluate and address the potential direct, indirect and cumulative impacts of harmful light at night in our communities and our sensitive habitats. Particular attention is needed to meaningfully address the huge increase of light pollution, including agency policies that bias our federal government to install harmful blue-rich white LED lighting because they tend to consider them more energy efficient than other alternatives. This is happening in many communities, including low income communities of color where excessive bright and low-quality glaring lighting often ends up serving as yet another form of targeted policing that in addition cause detrimental impacts to the wellbeing of people and wildlife. Federally-funded infrastructure projects should in fact do the opposite: they should be opportunities to remove or replace lighting that is harmful to people, wildlife and the environment. A book by Simone Browne, titled Dark Matters: On the Surveillance of Blackness, explains the roots of this form of artificial light environmental injustice. (2) In the EPA EJ Screen Tool, include data layers that depict artificial light pollution at night. Data also exists to help tackle the inequity of access to nearby nature at night. Low income families should not have to settle for overlit urban communities, including glaring LED billboards outside bedroom windows, like many do in downtown Miami. We all deserve the benefits of healthy lighting at night, when and where needed, and affordable nearby access, without long drives to far away areas, to enjoy the wonder of stars, the sight of fireflies and the songs of wildlife at night. Recommend Policies to Prevent Harm by the Rush to Commercialize & Industrialize Space. I ask you to imagine a future in our children's lifetime without Earth observation satellites to monitor the vital signs of our planet, such weather, and without GPS satellites providing location services. Imagine our future adult children no longer able to get early

warnings for hurricanes, tornadoes, or wildfires. Imagine them not being able to know where to bring relief after natural or climate-fueled disasters, like Hurricane Maria that affected my family in the island of Puerto Rico. Imagine an enormous amount of dangerous debris, orbiting Earth's atmosphere at speeds many times faster than bullets, that no longer allows people to put any satellites in orbit, to explore space, or to even defend the only planet they will ever truly call home. That future is NOT fiction. A few months ago (October 2021), a former NASA administrator said "if we don't take action now to mitigate the debris problem.... space will no longer be accessible". This nightmare is happening because the USA government lacks comprehensive national laws and regulations to prevent commercial exploitation at or near spaceport sites, and at our very own atmosphere and near-Earth orbital environment: all to our detriment. For instance, the FCC is categorically excluding megaconstellations (swarms) of commercial satellites from companies like SpaceX. That means there are no NEPA environmental impact assessments, no analysis of alternatives, no meaningful public participation, and little to no involvement by other federal agencies, including EPA, NOAA, USGS, DOI and others that should have a say. This is further compounded by the FAA having a conflicting mandate that encourages the agency to promote expansions of and new commercial spaceports from which to launch rockets with big payloads carrying large numbers of satellites (and other objects) for private profit. This is playing out right now in places like Boca Chica, near Brownsville at the TX border, that have long experienced environmental injustices. I ask that you "Look Up" for our EJ communities being impacted by a billionaire space industry with no guardrails, threatening the future of us all. To that end, I ask that you also address this matter in your recommendations to CEQ and the Interagency Council by including the following: (3) To prevent yet another crisis, and one that will make it next to impossible to solve the social and environmental injustices already in our EJ communities, the USA federal government should pause how it is regulating space commercialization to urgently examine and improve our national policies, in a comprehensive and transparent process and in concert with other countries and the United Nations: because we all stand to lose if we don't do this right. I hope my plea to you leads to meaningful actions on these important matters. I don't want anyone to ever say "I'm grateful we tried" while saying goodbye to the wonder of starry nights, to the sight of "cucubanos" enchanting Puerto Rico nocturnal landscapes, to the songs of coquis singing at night, or to the hopes of children dreaming of becoming astronauts while looking up. For further reference, I'm attaching excerpts from a report prepared last year by the United Nations Office for Outer Space Affairs (UNOOSA), and excerpts from a report to which I contributed as part of an effort funded by the National Science Foundation to understand some of the impacts to science and society from the growing number of satellite constellations (SATCONs). Sincerely, Diana Umpierre, AICP, GISP, Pembroke Pines, Florida

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Full Name (First and Last): Enid Sisskin
Name of Organization or Community: Gulf Coast Environmental Defense
City and State: Gulf Breeze, FL
Brief description about the concern: Open burning/open detonation is an antiquated method of disposing of munitions. It hurts military families and communities located near military bases.I will be submitting longer comments by email.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: The military needs to dispose of their munitions in a safer and more responsible manner.

Full Name (First and Last): Christine Louis-Jeune
Name of Organization or Community: Stop The Burn, Go Green Campaign
City and State: Belle Glade, Florida
Brief description about the concern: The issue of pre-harvest sugarcane burning is not only a danger to the quality of our environment but to public health as well. Several studies have shown the impact of smoke pollution to our health. The main issue with sugarcane burning is that most of our resident cannot just "avoid it". During lockdown after the announcing of COVID-19, I worked at a clinic. Everyday, I saw the number individuals that would seek medical aid for this virus. I saw a number of elderly and youthful individuals pleading to be seen by a medical profession. Whether it was because air of our community directly affected their health or because they need medical treatment, they all had one thing in common. The smoke from the agricultural burning made breathing a sport. Agricultural burning is extremely detrimental to our youth and elderly. Not to mention the number of immunocompromised residents in the tri-city area who have to deal with other health issues on the daily. In 2019, the senate passed the Right to Farm Act, which protects farmers from facing the consequences that result from harmful farming practices. The health of the public should always be prioritized over a multi-billion dollar company such as US. Sugar. Pre-harvest sugarcane burning practices did not stop during the pandemic. So amidst the "black snow" and heavy smoke that is produced by this method of harvest, residents also had to compromise with the ways they had cope with being laid off, stuck at home, and an influx of bills but no active income. Even now, this is still a relevant matter in our community. We should not have to endure the frequent air pollution for the sake of farmers profit. We deserve better. Without us, there would be no need to harvest any crops. Why is it still a question to consider our health?

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?:
I need WHEJAC to advise the White House Council on Environmental Quality to assist the public in tackling the issue of historical, environmental injustice in Belle Glade, FL. The practice of pre-harvest sugarcane burning is outdated. There are healthier ways to harvest for profit without capitalizing on the health of marginalized communities. A beneficial method is already being utilized in select areas in south Florida by the same company, US Sugar, that refuses to acknowledge the 30+ year issue of air pollution caused by them.

Full Name (First and Last): Tracy Marcello
Name of Organization or Community: Stop the Burn
City and State: Tequesta, Florida
Brief description about the concern: Stop the Burn is asking U.S. Sugar and other large sugar farming operations to stop using field burning practices. These daily burns affect the marginalized communities surrounding the fields, including Belle Glade, Pahokee, and South Bay. This discriminatory practice is outdated and has been scientifically proven to diminish the air quality in these surrounding areas, causing undue harm to children and people with asthma and other medical conditions who live in these areas.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?:
Stop issuing burn permits to these sugar corporations so they are forced to begin using green farming practices (which they already use for their organic sugar production). These daily burns are outdated, discriminatory, and extremely harmful to the most vulnerable Florida populations.

My name is Theresa Coffey, my mom has lived in Louisa, VA 23093 for 60 years. We are having multiple problems with I company I have been trying to get help, but it has been difficult this all started right when COVID started so it has been struggle to get help. I have included photos and videos of the emissions, smoke, ash and dust coming from the plant. You also see how close they are to us. They are currently operating off a temporary permit and try to get a permanent permit. I apologize for the difference format. This asphalt plant is 50 ft from my mom's home is Louisa County, Virginia. We are having multiple issues with this company and it has been going on over a year now. We have been trying to get help with this issue, but due to COVID it has been a struggle trying to get assistance. My mom and I are thankful we have been connected with amazing resources. The letter below is what I sent to DEQ: I have recently learned that a permit application is pending regarding the Boxley Zion-Crossroads asphalt plant in Louisa. I would like to request a formal public notice and an opportunity for public comment on the pending permit application. Given the plant's proximity to my property and home (just 50 feet away), a public comment opportunity would allow me, my family, and neighbors to voice our concerns. Some of the harms I plan to share, experienced as a direct result of the Boxley Zion-Crossroads asphalt plant, are: • ODOR: The plant emits an odor that not only smells like tar and chemicals, but also threatens my own and my family's health. The plant's fumes have caused my mother to suffer headaches and caused me to experience a burning sensation in my nose and throat. When I sought medical advice about these ailments, my nurse informed me that the plant's emissions are hazardous, and recommended that my mother and I double mask, limit time outdoors, and change clothes after being outdoors. • NOISE: When the plant operates, it generates a loud, persistent hum, audible from inside my home. The trucks entering and exiting the plant also produce excessive noise by beeping when backing up, using air brakes, and slamming their tailgates. • DUST: The plant's operations generate a considerable about of dust that comes onto my property, caking the ground, our cars, and everything else in a layer of dust. The odor, noise, and dust created by the plant are prohibiting me and my family from able to enjoy our property. We are no longer unable to work from home and cannot host cookouts or invite family over. Thank you for your consideration. Please reply to this email so I can be sure that DEQ has received it. This a news story https://www.wric.com/news/taking-action/louisa-family-says-they-had-no-idea-their-new-neighbor-would-be-an-asphalt-plant/ I can also forward the permit, it has not been approved by DEQ, let me know if you need it. Your assistance will be greatly appreciated. Thank you, Theresa Coffey

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Full Name (First and Last): Sonia Baez-Hernandez
Name of Organization or Community: Miami Climate Alliance
City and State: Homestead, FL
Brief description about the concern: I am concerned for the lack adaptations and mitigations for frontlines communities (African American aboriginal people, Latinos and poor. According to Mallory," it is important "identify disadvantaged communities long plagued by environmental hazards, but it won't include race as a factor in deciding where to devote resources." In addition, climate change reports point out that climate change has genocidal proportions. We have the right to life and we are human too. How the WHEJAC will protect the rights of disadvantaged communities?

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: How the WHEJAC will protect the rights of disadvantaged communities? What are the solutions, adaptations and mitigations plan for frontline communities? It is any plant for "climate, clean energy and environmental improvements to communities "that have been left out and left behind for far too long"

Midwest -3

Ohio, Indiana, Michigan, Illinois, Missouri, Wisconsin, Minnesota, Iowa, Kansas, Nebraska, South Dakota, North Dakota

Full Name (First and Last): Matthew Young
Name of Organization or Community: BeechWood Inc.
City and State: Saint Paul, MN
Brief description about the concern: I hope to address meeting attendees on the invaluable role of incorporating more social work practices in the delivery of environmental justice goals across their implementation in rural and urban communities alike.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: I would encourage WHEJAC to advise the White House Council on Environmental Quality around better targeting of funding and other professional resources for social workers who desire to work with environmental justice-focused organizations.

Southwest -4

Texas, Oklahoma, New Mexico, Arizona

Full Name (First and Last): Sarah Bishop Merrill
Name of Organization or Community: SAVERGV
City and State: Harlingen, TX
Brief description about the concern: Representing the EJ communities' needs here in the Lower Rio Grande Valley, we in SAVERGV find that the monies appropriated for more of the obsolete Border Wall could be used for improving our air and water quality, and to resist, or replace 2 planned LNG projects, the Jupiter project and others with renewable energy projects, offshore wind, kinetic (wave) energy, solar arrays, etc. Methane releases are so far worse than CO2 that we must end the use of natural gas as a "transitional fuel," which it is not. The carbon footprints of these planned projects will be huge, and is already contributing to the many more 100 degree days here.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: Empower EPA and other federal agencies to take up the slack left by the Texas agencies like TCEQ (allows excessive amounts of chemicals other states long ago banned), and raise the bar for FERC approval or permitting of the LNG plants of TXLNG and RioGrandeLNG, Next Decade. Although FERC now has some new commissioners, had approved the 2 LNG export and processing projects, though we did prevail on ANNOVA to cancel their LNG plans. European banks supported us in resisting LNG near the sacred site of the Corrizo Comedcrudo tribe here, but 2 Planned LNG projects remain threatening this fragile habitat and the Bahia Grande. We want the White House to claw back the funding appropriated for a useless Border Wall, including even the lights and other disturbances of this irreplaceable eco-system and set of habitats for our several endangered and listed species, e.g., The Ocelot, the Aplomado Falcon, Piping Plover, not to mention needed Sea Grasses, Oyster beds, etc. Please stop the Wall, the

LNG, and fund our schools for ventilation projects to improve IAQ. We also have colonias here which lack standard sewers and streetlights. Septic tanks flood each time it rains, so that conditions are favorable for cholera and other illnesses among the EJ communities. We need repaired levees, not more wall segments. Ladders, and boats, planes and tunnels can easily defeat this Wall. Real diplomacy with Mexico and the northern Triangle Central American countries, such as that VP Harris has been starting, is the only authentic solution, requiring time and resources we can recoup from the huge costs of LNG and the WALL. SpaceX is also here, testing the SuperHeavy, far larger than any rocket ever launched from Earth. Debris from the planned failures necessary for engineering design has littered our lovely pristine beach at Boca Chica, and nearby public lands. The costs of establishing these Wildlife Refuges, e.g., Laguna Atascosa Nat'l Wildlife, Santa Ana, and the Bahia Grande Restoration, ... should not be ignored: we must NOT permit more Wall, nor LNG, whose Methane and possible VCE (Vapor Cloud Explosion) are hugely costly, as are all the fossil fuel emissions..., in creating extreme weather, as in Hurricanes Harvey, Alex, Dolly, etc. We must get these TX agencies working better (TCEQ is under review by the TX "Sunset Commission") so that we have full EIS, not just EAs, for LNG and SpaceX projects. Our group has delayed them, and through FAA required more analysis of significant impacts, but we need more help in regulating and preventing harm from these fossil fools! Thank you for your help. I would specifically like to ask a question about VENTILATION and both outdoor and indoor air testing. I am contacting ASHRAE but find there mainly just referrals to contractors: How can we get the state of the art equipment down here to TEST our air? I want to help my School District write grants to obtain this EPA funding for which we are getting the RFPs now that I am in touch with WHEJAC, but worry that we won't even be able to study the need and document needs quantitatively. What best practices do you recommend, and how can we have access to these? Will there be training sessions for local contractors or should we build that into our grant proposals? Most contractors are not up to speed, especially in the Rio Grand Valley, -since there is a negative attitude we are working to overcome, as Beto O'Rourke (Candidate for TX Governor) said last Friday, the attitude that "this is good enough for the Valley," --- that we somehow don't deserve state-of-the-art technologies and trained workers in these crucial fields of air and water quality testing. TCEQ is so unqualified, some of my STUDENTS at TSTC-Harlingen were working for the agency while they were still students with us, to help TCEQ crunch numbers and do testing, - TCEQ was so lacking in trained staff. This gives new meaning to the phrase "Underserved communities." We need your help soon, as construction is about to start once a FID is made for LNG. Thanks in advance!

I am herein submitting my comments for the White House Environmental Justice Advisory Council Virtual Public Meeting on February 24, 2022: As a member of the Multicultural Alliance for a Safe Environment (MASE), I am working to increase community dialogue with federal and state regulators overseeing the cleanup of toxic radioactive pollution in the historic Grants Uranium Mining District.

Background: A total of 87 uranium mines and 5 uranium mills located within the San Mateo Creek Basin have unleashed radioactive contaminants to our regional air, water and soil within the larger, more extensive Rio San Jose Basin. Around 500 abandoned uranium mines are located within the Navajo Nation. The Department of Energy has surveyed these legacy mines under its Defense-Related Uranium Mines program, but more work and funding is required to address the numerous abandoned mines and waste rock piles that continue to pose hazards to human health and the environment. Several generations living near abandoned uranium mines have already been impacted by particulate matter containing uranium and metals.

Legacy uranium mills in the Grants Uranium Mining District also left behind millions of tons of unlined tailings piles that continue to seep contaminant plumes of uranium, selenium and other constituents into our shrinking drinking water supplies. A new study notes that the Southwestern United States is experiencing its driest conditions in at least 1,200 years due to human-caused climate change.

Problem: Now the prospect of new uranium production in the same Mining District looms on the horizon of a damaged and degraded basin before long overdue mine remediation even begins. DOE has published back to back requests for Information on its proposed establishment of a new domestic uranium reserve; its proposed HALEU program; and even Consent-Based Siting for the end product of enriched uranium - spent, but highly radioactive nuclear fuel rods. How can Justice40 communities be centered in any of these DOE initiatives when we are still faced with an onslaught of legacy contamination from DOE defense-related contamination 40 years after the last uranium mine ceased operating?

Recommendations to the Council on Environmental Quality: The Multicultural Alliance for a Safe Environment has long advocated for an end to exemptions from the protections afforded by federal laws and regulations such as the Safe Drinking Water Act, the Clean Air Act, and the National Environmental Policy Act where they are most needed - in overburdened environmental justice communities. We urge federal and state regulators not to approve any new mining plans of operation in New Mexico until the complete reclamation of groundwater, soil, and air contamination in the Grants Mining District is fully achieved. Instead, investments should be made to carry out the cleanup of legacy contamination from uranium mines and mills in the Grants Mining District, which in turn, will stimulate new job creation. MASE further urges all federal and state regulatory agencies, including the DOE, to promote the right to clean, sustainable water sources and clean air for all overburdened populations within their jurisdictions as an element of Justice40. The Multicultural Alliance for a Safe Environment endorses the development of alternative energy sources that are renewable and which will sustain, rather than destroy, our multicultural landscapes and natural ecosystems. Submitted by: L. Watchempino, Pueblo of Acoma, New Mexico

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West -5

Colorado, Wyoming, Montana, Idaho, Washington, Oregon, Utah, Nevada, California, Alaska, Hawaii

Full Name (First and Last): Pamela Miller
Name of Organization or Community: Alaska Community Action on Toxics
City and State: Anchorage, AK
Brief description about the concern: Plastics and associated toxic chemicals threaten the health, well-being, and food security of Arctic Indigenous Peoples. Climate warming, toxic chemicals, and plastics are interconnected and existential threats to the health and safety of northern and Arctic Indigenous peoples. Additional comments submitted by email.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: Urgent action is needed by this Administration to curb fossil fuel, chemicals and plastics production and to prevent these threats and further harm, protect health, and human rights.

Full Name (First and Last): Pamela L. Pérez, PhD
Name of Organization or Community: California State University, Northridge
City and State: Tarzana, California
Brief description about the concern: The Tree as a Cyclical and Natural Water and Air Producing Agent Trees have two primordial functions, which benefit the health of our planet.1) Trees collect water. They produce water.2) Trees produce oxygen, while absorbing toxic gases from the air. THE WATER PRODUCING ACTION OF THE TREE: The natural simplicity of the trees' water producing function is as follows: In following with the perfection of its own natural design, the large stature of the tree allows its leaves to collect rainwater and moisture from the air in general. This water, collected by the leaves, is transported through the tree's vascular system o its trunk.. From this depository, the water reaches the ground, where it is stored in its roots. Through osmosis, the water found in the tree's roots is absorbed into the surrounding ground. This ground water, originally sourced from the tree, provides for the double terrestrial benefit, of preventing land erosion. The additional positive aspects of using trees, as a water-producing instrument, Is that their maintenance is extremely low cost, which is beneficial to low income communities. Also, in being a natural, organic element, and resource, their usage to such an end, leaves no toxic chemical residues. In order to take full advantage of the trees' water producing ability, a cultivation and planting of this natural organism must be done on a systematic, as well as on both a very extensive and intensive basis.. Planting must be done in strategic areas, such as along roadsides, where contaminants occur from the fuel of passing vehicles, as well as from the concentration of rubber particles released by the friction of the automobile tires moving on the pavement. Also, an intensive and extensive planting of trees must be realized in urban centers, with special attention devoted to their industrial nuclei. THE OXYGEN PRODUCING ACTION OF THE TREE: The tree produces oxygen much in the same mechanical way, as it produces water. Thus, it does so, through its same vascular system. The organic beauty of the divine design of the much under appreciated tree, expressed in its towering stature, and also, through its elevated and densified network of leaves and branches, allow for the process of osmosis to occur, much in the same way as the tree's alternately, as well as equally important, water producing function, However, there is a difference in the formal mechanics of these two functions. That is to say, whereas the water producing function of the tree is more static, in that, it is an accumulation of this vital liquid, which takes place at the base of the trunk, and in the surrounding ground of the same. On the other hand, in the display of the tree's critical oxygen producing function, a clearly dynamic process is observed, which involves the rhythmic, continuous, and most dynamic respiration of the tree as a most living and vibrant entity. In this sense, the essential and kinetic, inhalation and exhalation of gases, occurs principally, at the tree's upper level network of branches and leaves. The true magic of the tree's oxygen producing process manifests itself on various levels. To begin with, the tree reveals itself, and most surprisingly so, probably to many, as a true living organism, in that it breathes---inhaling and exhaling---as every other vital creation on earth, be they part of either the kingdoms of the flora, or that of the fauna. The magical beauty, of the orchestral silence of the breath of the tree, increases in crescendo, upon defining the content of its continuous suppression and release of sacred gases. This statement is made without hyperbole, upon the discovery of the nature of the gas. This gas, which is released by the tree into the environment, is identified as oxygen. By the same token, the gases inhaled by this natural purifying instrument of nature are the toxic components, which are responsible for the "Greenhouse Effect", the main culprit responsible for global warming. These gases can be defined as the freons, methanes, and carbon monoxides, which accumulate, as an aura around the earth's surface, creating an impenetrable atmospheric layer, which prevents the normal transpiration, that is, the exit and exchange of hot air within the planet's environment into outer space. These gaseous substances are currently thought to be the product of human activity, here on our planet's surface. Also, the entrance of cooler air into the earth's gaseous environment, from this same exterior space, is prevented due to the accumulation of

these same toxic gases, creators of this same “Green House” effect, on the most exterior layer of the Earth’s atmosphere. In effect, and to this end, what can be witnessed, in both the water producing function, but especially in the trees’ expression of the much needed oxygen supply in our planetary environment, is, perhaps, the most direct and complementary, relationship in the satisfaction of human needs, ever to exist between humanity, and another living organism on the earth’s surface. Yes, and undoubyably so, the most essential and purest form of the dynamic action, between the “ying” and the “yang” could not be spoken in any louder of a voice than that existing, in the present, the past, and hopefully forever more, between the social network of human beings, and the soulful natural society of trees. Why then, has this infinite and auxiliary resource found in the natural bounty of the king of the flora kingdom, the beautiful and blessed tree, never been tapped into as a solution for global warming? At this juncture, it must, also be emphasized, that the current cause of all the climatic upsets experimented by our Mother Earth, is not the cause of climate change, but instead climate change is a consequence of global warming. The increase of temperatures on the Earth’s surface, as well as in her atmosphere, is the cause of climate change, and most definitely not vice-versa. There may be various causes for this incomprehensibly neglectful phenomenon of the sacred gift presented to us by our trees . To a certain extent it may be attributed to the very important, as well as apropos adage referring to the so typical behavior of human “nature”, in that, “one finds oneself so lost in the trees, that one forgets all about the forest”. Perhaps a more inverted, side of that coin, might be represented in the saying, that, “The devil is in the detail.” Details, which we, especially, as destracted modern day inhabitants of our planet Earth, tend to overlook. However, it is inevitable not to return to the conditioning monetary factor of economic determinism. That is to say, there is no real profit factor, in both the costly extensive, as well as intensive planting of trees, which to be authentically and genuinely effective must be accomplished both simultaneously and systematically across the surface of the globe. This feat can only be accomplished, by some stretch of the imagination, by one or various extremely large multinational corporations, whose functions are strongly dictated by strong ideals of philanthropy. However, a more pragmatic vision of this extensive, and intensive, as well as simultaneous global tree-planting operation, might be done with greater success if handled at a supra-national level. That is, to be organized and institutionalized, in some form, of bio/polictical entity such as that of the United Nations, the European Union, or the World Bank,, though, with the purposeful difference of having the objective of performing a herculean, as well as macro mission of planetary agricultural gardening for humanity’s own salvation, in its sights. However, if such daunting tasks, as putting men on Mars, are being financed and explored, which arguably might be of less value to the members of the human race, who will be left behind, while others, set off to colonize that vacant, and airless red planet. Thus leaving our perfectly, and uniquely beautiful green and blue planetary home, of which, with certainty, there is no comparable other, only as a fleeting vision, in the rear view mirror, of definitively departing space ships and satellites, from our Mother Earth’s blue skies, into the infinite and blackened darkness of the foreboding outer space. Certainly then, given, what should be, a terrifying and extremely expensive alternative step into the most impractical unknown, more practical credence and care, could be placed on our already existing and most supreme planetary home, by exercising some basic housekeeping chores, in order to benefit it. For example, and for the welfare of all inhabitants on the globe, our oceans, and waterways should be properly mapped out, a task, which has already been completed with such intricacy and perfection for the empty, and to date uninhabitable surface of the planet Mars; and at such an unimaginable expense. Then, in conjunction, with the caring for our planet’s oceans, seas as well as waterways, as purposefully, yet humbly outlined in this paper, our lands must be carpeted with the magnificence of the greenery of our gifted trees, which in all their miraculous organic simplicity, serve as the best, yet most overlooked tool, truly capable of saving our planet Earth from its demise, by producing, adding to, and purifying its much deteriorated water supply. At the same time terrestrial forests, have the ability, as well as the need, in and of themselves, to absorb the emission of toxic gases,

which so greatly contaminate the Earth's atmosphere. In that same perfection of the breath of a forest, a rainbow of the purest air, may be found rising from within its living and beating heart, perpetuating the exhalation of oxygen from its most flawless system of pulmonary perfection…All to benefit so organically, and in stellar, yet strident silence the survival of humanity in the ever lasting and never ending beautiful bounty of our green and blue home…Mother Earth.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: I would urge the White House to systematically, intensively, as well as extensively, unite with other world powers, in order to plant trees at a global level. This is urgently recommended as the tree is the most viable solution to solve and correct the problem of global warming, which is currently, and so gravely affecting our planet Earth, even to its demise.

Full Name (First and Last): Paul Bernstein
Name of Organization or Community: Self
City and State: Honolulu, HI
Brief description about the concern: Between the deterioration and operational errors, fuel from the Red Hill tanks has gotten into aquifers on Oahu that supply water for about half the population on the island. The current spills have led to dislocation of a number of families, and a larger spill could mean no potable water for several hundred thousand people. These tanks must be relocated before such a disaster occurs.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: Please drain and relocate the fuel tanks at Red Hill to a location in which a spill or leak would not pollute Oahu's drinking water. Our experience with the Navy's stewardship of the bulk fuel storage facility at Red Hill is that: not only is the facility out of date and corroding literally everywhere, but the Navy has not kept up with very long-standing recommendations. You can't expect to throw money at it and expect the job to get done right. It's time for different parties to get involved, demonstrate state-of-the-art knowledge, and most likely go elsewhere. The aquifer is one of a kind and cannot be replaced.

Full Name (First and Last): Sherry Pollack
Name of Organization or Community: Ahuimanu, Oahu
City and State: Kaneohe, Hawaii
Brief description about the concern: Aloha members of the White House Environmental Justice Advisory Council (WHEJAC) I am a resident of Oahu, Hawaii. I wish to report a major environmental disaster and injustice that is being perpetrated by the Navy against the people of our island. Jet fuel from the Navy's 80-year-old Red Hill Bulk Fuel Storage facility has made its way into our drinking water on Oahu. In November 2021, the Red Hill tank system leaked jet fuel into the drinking water of more than 90,000 residents currently residing around Pearl Harbor Navy Base and Hickam Air Force base. And as I type this testimony, up to 187 million gallons of fuel continues to be stored a mere 100 feet above our primary aquifer that serves over 400,000 Hawaii residents. Despite complaints from their own military families of oily sheens in their tap water, overwhelming diesel-like fumes, and widespread health problems, Navy leaders insisted for days that the water was not contaminated. In the weeks following, the Navy's response continues to be lacking in urgency and now they are contesting the emergency order calling for the defueling of the tanks for the safety of Oahu's people and environment. In the course of all this, thousands of families have since been displaced, many were sickened, some hospitalized, and some pets had to be put down. Two lawsuits filed on February 2, 2022 by the U.S. Department of Justice on behalf of the Department of Defense and the Department of Navy challenge

the State of Hawaii's emergency order to shut down and defuel the leaking 80-year-old jet fuel tanks. I am outraged by this development and the Navy's total disregard for the health and safety of our community and for their actions that continue to threaten our drinking water aquifer. The Honolulu Board of Water Supply has had to shut down its nearby wells as a precaution and residents across the island are asked to conserve water. Water shortages are already anticipated when summer arrives. Our drinking water supply was already at risk due to the effects of climate change, including a significant decline in rainfall across all the islands. We cannot afford to let this disaster worsen or for this to happen again. The Red Hill tanks must be to defueled and decommissioned immediately. Please help us.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: Please ensure the Navy defuels and decommissions the Red Hill tanks immediately. The President is commander and chief and has the authority to order this. Mahalo.

Full Name (First and Last): Kelsey Amos
Name of Organization or Community: Oʻahu community
City and State: Honolulu, HI
Brief description about the concern: I live on Oʻahu and am concerned about the Red Hill Fuel Tank facility, which has leaked multiple times in the past and sits only 100 feet above Oʻahu's freshwater aquifer that provides water to the most densely populated part of our island chain. Most recently a leak poisoned, sickened, and disrupted the lives of dozens if not hundreds of military and civilian families that had jet fuel in their house tap water. As long as these tanks are still in operation we run the risk of harming more Hawaiʻi residents, permanently poisoning our freshwater supply on one of the most isolated islands in the world, and harming our ocean ecosystems that contaminated fresh water washes out into.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: Please advise the White House Council on Environmental Quality to do everything they can to rapidly de-fuel, decommission, and clean up / remediate the Red Hill Bulk Fuel Storage facility. As Commander-in-Chief President Biden could order the Navy to make amends and clean up their mess.

Full Name (First and Last): Danielle Espiritu
Name of Organization or Community: Oʻahu, Hawaiʻi
City and State: Aiea, Hawaiʻi
Brief description about the concern: Since 1943, over 180,000 gallons of fuel have leaked from the facility, which was built just 100 feet above the underground aquifer that serves as Oʻahu's main source of drinking water. This includes the release of 27,000 gallons in 2014 and up to 19,000 gallons in 2021. Allowing 80 year old tanks, that can hold up to 250 million gallons of jet and diesel fuel to sit just 100 feet above the aquifer that supplies the water for the majority of our island is not only wreckless, its genocide. Our Board of Health has already ordered the U.S. Navy to defuel the facility, and the Department of Defense has instead chosen to legally appeal the order, refusing to defuel. As the Red Hill facility continues to leak, which studies have already shown will happen, it poses a direct threat to the drinking water for our entire island. Several nearby public board of water supply wells have already been shut down for fear of contamination, and our board of water supply is monitoring salinity levels in our drinking water to be sure we are not overtaxing other wells that are being tapped to compensate for the wells that have been shut down. This affects our entire island.

Since many of Hawai‘i's streams are fed by springs that come from our aquifer, contaminated groundwater will likely make its way into the ocean, affecting offshore fisheries. In addition, the most recent projections show the ability of fuel that has already spilled to travel underground across valleys and into an agricultural region where I personally am working to restore lo‘i kalo, traditional taro fields.

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: I implore you to use your power to call for and allocate funds toward the defueling and permanent shut down of the U.S. Navy's bulk fuel storage facility and underground storage tanks located at Kapūkakī or “Red Hill.” In addition, I ask that you create and enforce restrictions preventing the U.S. Department of Defense from further polluting our islands. In addition, I ask for real accountability and action toward the protection of our lands and waters. This begins with defueling and permanently shutting down the U.S. Navy bulk fuel storage facility. Our urgent and collective action will determine whether or not our children and grandchildren will be able to drink water from our island and engage in these critical land-based cultural practices, which are protected by law. Mahalo nui, thank you so much for your time and attention to this urgent issue.

Full Name (First and Last): Pete DOKTOR
Name of Organization or Community: Wai Ola Alliance and community of Moanalua, West Honolulu
City and State: Honolulu, Hawai`i
Brief description about the concern: I’m a concerned veteran, parent, homeowner & community organizer in Moanalua threatened by the "imminent peril" resulting from a catastrophic leak into our sole-source aquifer by the US military, particularly the Naval Red Hill Underground Bulk Fuel Storage facility that has poisoned thousands in the last few months (December 2021). However, our family has been worried daily since a series of fuel leaks in 2014 just a mile from our home. This was not long after what happened in Flint, Michigan and we have been worried if they would harm our then newborn daughter's neurological development, given even military studies confirm will inevitably leak every year. The dominant claim by militarists is Red Hill is critical for “national security.” How can “national security” trump the public health & safety of the people, as well as our livelihoods and the livability of our community? Is the Executive Branch suggesting that protecting political and economic interests such as markets or political projection are paramount to the people for whom the military purportedly protects? As a parent and former medic & teacher, I would like to know how the Navy finds justified that we live everyday concerned for our kids that today might be the day of a catastrophic leak, and that the US military is currently our most direct, existential threat?

What do you want the WHEJAC to advise the White House Council on Environmental Quality to do?: Please do everything within your power to convince President Biden to immediately defuel and permanently decommission the Naval Red Hill fuel tanks, in a safe manner and fund that endeavor.

Letters to the Editor

Mercury Use in *Espiritismo*: A Survey of Botanicas

Despite the well-known hazards of mercury exposure,[1-5] practitioners of *espiritismo,* a spiritual belief system indigenous to Puerto Rico and other Caribbean islands,[6] have been reported to use mercury.[7-9] We surveyed New York City stores selling mercury for spiritual practice to clarify misperceptions and alert public health workers about possible mercury presence in homes in which *espiritismo* is practiced.

Mercury goes by the name of *azogue* and is sold in botanicas, stores that specialize in selling religious items used in *espiritismo,* voodoo, and Santeria, a Cuban-based religion that venerates both African deities and Catholic saints. Botanicas also sell herbs used in folk medicine and for general health promotion.

Our interviewer visited 41 botanicas in low-income New York City Hispanic communities between March and May of 1995, asking store personnel about the cost, sales, uses, and purchasers of mercury. We found that nearly 93% of botanicas sold about one to four capsules (about 9.0 g[9]) of mercury daily at an average cost of $1.50 (see Table 1). Botanica personnel estimated that Puerto Ricans, Dominicans, and "other Hispanics" make up about 90% of mercury buyers and that more than two thirds of buyers are women.

Mercury is usually recommended by family members, spiritualists, card readers, and santeros (practitioners of *Santeria*). The two primary reasons given for mercury use are for good luck and protection from evil and the envy of others. Through anecdotes, we learned that because mercury "flows smoothly," it provides good luck and, as a result of its slippery nature, prevents evil from sticking to the person. The most often recommended manner of using mercury is carrying it on one's person in a sealed pouch that should be prepared by someone with spiritual "powers." Sprinkling mercury in the home is another common form of use.

Yearly sales in Bronx 25,000 to 155,000 (median 47,000) 9 gram capsules per year. Equals 506 lbs. – 3,080 lbs/yr. Between 8,000 and 51,000 (median 13,000) homes per year contaminated in the Bronx.

Our survey shows that mercury is quite easy to purchase, and the manner of use may create situations of constant exposure to potentially high levels of mercury vapors in the immediate atmosphere. Of course, more research is needed. In particular, explorations of mercury levels in inner-city communities should include adherents of spiritualism as well as nonadherents since the latter may be exposed unwittingly to mercury poisoning by residing in apartments and homes previously inhabited by mercury-sprinkling tenants. Also, because of mercury's neurobehavioral effects, pediatricians, psychiatrists, and learning specialists should be alert to its potential presence in children.[2,4,5,10]

As providers of community health and mental health services in underserved areas, we recognize the public health threat of dispensing mercury. However, we recommend also that the dangers of mercury be sensitively separated from the social-psychological benefits of spiritualism. In inner-city Hispanic communities, *espiritismo* is an indigenous source of community socialization and support. Spiritualists frequently represent the first line of extrafamilial mental health intervention. Since botanicas also sell medicinal plants and herbal remedies, they offer some basic health care familiar to the cultures of Latin America. Therefore, public health interventions must be aimed at helping spiritualists find safe alternatives to mercury. □

Luis H. Zayas, PhD
Philip O. Ozuah, MD

TABLE 1—Reports by Botanica Personnel of Mercury Sale and Use for Spiritual Practices, New York City

Mercury Sale and Use Data	Botanicas Reporting (n = 41), No. (%)
Sale	
Sell mercury	38 (92.7)
Do not sell	3 (7.3)
Volume of daily sales[a]	
1–4 capsules	20 (48.7)
5–10 capsules	12 (29.2)
11 or more capsules	3 (7.3)
Dispensing forms	
Capsules	33 (80.5)
Larger quantities	2 (4.8)
Both forms	3 (7.3)
Source of recommendation for mercury use[b]	
Family member	16 (39.0)
Spiritualist	16 (39.0)
Friends	15 (36.5)
Card reader	14 (34.1)
Self	9 (21.9)
Santero	4 (9.7)
Books	1 (2.4)
Condition for which recommended[b]	
Luck in love, money, work, health	32 (78.0)
Protection against evil	23 (56.0)
Protection from envy	1 (2.4)
Method of use[b]	
Carried in sealed pouch	20 (48.8)
Sprinkled in home	12 (29.3)
Carried in pocket	13 (31.7)
Sprinkled in car	1 (2.4)
Consumed in small quantities	1 (2.4)

[a]Only 35 botanicas provided information on daily or weekly sales.
[b]Often, more than one source, condition, or method was reported; therefore, percentages exceed 100%.

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REPORTS BY BOTANICA PERSONNEL OF MERCURY SALE AND USE FOR SPIRITUAL PRACTICES, BRONX, NEW YORK CITY, 1995

After: Zayas & Ozuah *AJPH* 1/96:112-113

Mercury Sale and Use Data	**Botanicas Reporting (n = 41)** No.	(%)
Botanica mercury sales		
Sell mercury	38	(92.7)
Do not sell	3	(7.3)
Volume of daily mercury sales[a]		
1-4 capsules	20	(48.7)
5-10 capsules	12	(29.2)
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Mercury dispensing forms		
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Protection from envy	1	(2.4)
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Carried in pocket	13	(31.7)
Sprinkled in car	1	(2.4)
Consumed in small quantities	1	(2.4)

Based on this data, Wendroff calculated that the median number of mercury capsules/vials (mean weight 9 grams) sold in 1995 by Bronx botanicas was 47,000 or 930 pounds. Riley calculated the range of such sales at from 506 pounds to 3,080 pounds per year. This is the equivalent of from 25,500 to 155,000 (9 gram) capsules/vials per year.

[a]Only 35 botanicas provided information on daily or weekly sales.
[b]Often, more than one source, condition, or method was reported; therefore, percentages exceed 100%.

ESTIMATE OF TOTAL YEARLY MERCURY SALES, NUMBER OF DWELLINGS POLLUTED, AND NUMBER OF INDIVIDUALS EXPOSED TO MERCURY (Based on above data.)

"Volume of daily mercury sales"

# Botanicas selling mercury	Range in Table # caps/day	Midpoint of daily sales (conservative)	Calculated # capsules sold per day
20	1 - 4	2	20 x 2 = 40
12	5 - 10	7	12 x 7 = 84
3	11 - ?	11	3 x 11 = 33
Totals: 35			157

Thus, **157 capsules sold per day**, multiplied by **300 days per retail year**, equals some **47,000 capsules sold per year.** Of these, 29.3%, or **13,800 dwellings per year** will be **sprinkled with mercury**. If there are but 2 inhabitants per dwelling, there will be **27,600 individuals exposed to toxic mercury levels per year** in this area.

Appendix 5. Draft Letter to CEQ Under Discussion

WHITE HOUSE ENVIRONMENTAL JUSTICE ADVISORY COUNCIL

February 24, 2022

The Honorable Ms. Brenda Mallory, Chair
The Council on Environmental Quality
Executive Office of the President
Washington, DC 20500

Re: Resources for the White House Environmental Justice Advisory Council; Request for Timelines for Key Deliverables; Recommendation for Increase in CEQ Budget and Staff

Dear Chair Mallory:

Members of the White House Environmental Justice Advisory Council (WHEJAC) Scorecard Workgroup have been working to fulfill its mandate from the Council on Environmental Quality (CEQ) to draft recommendations on a Scorecard that will evaluate the Biden Administration's progress on implementing Justice40 and advancing environmental justice in all government policies, programs, functions, and activities.

Resources for the White House Environmental Justice Advisory Council

As the workgroup strives to meet the requested deadlines, we have reached consensus that the workgroup cannot fulfill its mandate without being assigned sufficient resource, personnel, and consultation capacities that are normally made available to federal advisory committees (FACs) to achieve expected outputs. We are referencing the Scorecard Workgroup, but this lack of sufficient support applies to all the workgroups associated with the WHEJAC.

We appreciate the dedicated work of the Designated Federal Officer and relevant staff of the Environmental Protection Agency (EPA) who work to ensure that protocols and norms are followed, assist in meeting facilitation, development of public meeting agendas, communication of FAC requests, and ensure that meeting notes are compiled and disseminated for all the FAC meetings.

However, the members are used to generating sophisticated and well documented reports, recommendations, and other outputs. The Scorecard Workgroup realizes that

a high-quality document that reflects a scorecard for each agency subject to the Executive Order requires:

- Advisors or advisory bodies from each agency;
- Experts to help develop indicators and metrics that are specific to each agency's program areas;
- Graphic designers, writers, and editors
- Personnel support for holding public meetings and for managing review and revision processes involving public comments, agency comments, and other comments.

Many WHEJAC members have served on the National Environmental Justice Advisory Council, Clean Air Federal Advisory Committee, National Children's Study and others where it is a matter of course for such expertise, resources, and personnel be provided to ensure that volunteer members have the resources and assistance to succeed and address their mandate effectively.

Request for Timelines for Key Deliverables

The WHEJAC requests CEQ to provide timelines for key outputs that are crucial to the WHEJAC's considerations. The members need to know:

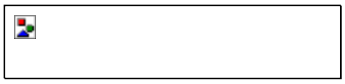
- When will the Interim Guidance on the Scorecard be finalized?
- When will the final Climate and Economic Screening Tool be released to the public?
- When will the revisions to the E.O.12898 be finalized?
- When will we receive an organization chart for both the CEQ and the White House Environmental Justice Interagency Council (IAC); a list of IAC representatives; an update on the number of IAC meetings to date; and the plan for the IAC to engage with the WHEJAC?

Recommendation for Increase in CEQ Budget and Staff

- The WHEJAC will prepare a letter to the White House to recommend an increase in CEQ's budget and staff in order for it to be effective in implementing Justice40 in all-of-government policies.

We will appreciate your expeditious consideration and action on this request.

Sincerely,



Richard Moore, WHEJAC Co-chair

Peggy M. Shepard, WHEJAC Co-chair

cc: Members of the WHEJAC
Michael S. Regan, EPA Administrator
Matthew Tejada, Director Office of Environmental Justice, EPA
Corey Solow, Deputy Director for Environmental Justice, CEQ
White House Environmental Justice Interagency Council
Karen L. Martin, Designated Federal Officer,

I, Richard Moore, Co-Chair of the White House Environmental Justice Advisory Council, certify that this is the final meeting summary for the public meeting held on February 24, 2022, and it accurately reflects the discussions and decisions of the meeting.

Richard Moore

I, Peggy Shepard, Co-Chair of the White House Environmental Justice Advisory Council, certify that this is the final meeting summary for the public meeting held on February 24, 2022, and it accurately reflects the discussions and decisions of the meeting.

Peggy Shepard