National EPA-Tribal Science Council
Summer 2024 Face-to-Face Meeting

"Rising to the Top: How Tribal Ways of Knowing Are Becoming More Valued"

Co-Hosted by the Fond du Lac Band of Lake Superior Chippewa and
U.S. Environmental Protection Agency Office of Research and Development

Fond du Lac Creek Room, Otter Creek Event Center, Black Bear Casino Resort
Carlton, Minnesota

Great Lakes Toxicology and Ecology Division Laboratory
Duluth, Minnesota

July 9–11, 2024

MEETING SUMMARY

Tuesday, July 9, 2024

Gathering and Welcome Session

Opening Blessing
Julian Kitto and Miziiweykaamikinaang *(Around the Earth) Drum Group*

Opening Remarks
Shasta Gaughen, National EPA-Tribal Science Council (TSC) Tribal Co-Chair, Pala Band of Mission Indians, and Tim Canfield, TSC Agency Co-Chair, Center for Environmental Solutions and Emergency Response, Office of Research and Development (ORD), U.S. Environmental Protection Agency (EPA)

Welcoming Remarks
Thomas Howes, Natural Resources Program Manager, Fond du Lac Band of Lake Superior Chippewa

Region 5 Opening Remarks
Debra Shore, Regional Administrator, Region 5, EPA

ORD Opening Remarks
Chris Frey, Assistant Administrator for Research and Development, ORD, EPA

Cultural Presentation

Overlap of Environmental and Historical Work

Evan Schroeder, Tribal Historic Preservation Officer (THPO), Fond du Lac Band of Lake Superior Chippewa, and Alex DuFault, Cultural Resource Management Assistant, Fond du Lac Band of Lake Superior Chippewa

Evan Schroeder read a quote from Chief Bayaaswaa, Principal Chief of the Sandy Lake Ojibwa in the 18th century, which described his homelands as the center of all good things with plentiful natural resources in all four directions. These resources encompass a "cultural corridor" that must be protected. For example, the Grand Portage Band is working to protect *manoomin* lakes through inclusion in the National Register of Historic Places. The National Environmental Policy Act (NEPA) also includes protection of cultural resources. NEPA processes and the National Register may be helpful in protecting cultural resources, but they are not solutions. The White House Council on Environmental Quality and Advisory Council on Historic Preservation recently published a handbook describing how to use NEPA and Section 106 of the National Historic Preservation Act (NHPA) alone and together to protect cultural resources, but NHPA advocates taking various steps (e.g., minimization, mitigation) when infrastructure causes adverse effects, and Tribes want to avoid—rather than mitigate—adverse effects. NEPA and NHPA are not solutions to preserve cultural resources and corridors because the letter of the law is to mitigate; these acts were not made by or for Indigenous peoples but rather to support development. An additional problem with NHPA is that the definition of a historic property includes the facet of integrity, which can be used to argue that a resource does not meet the definition. For example, culturally important land may have a road running through it, which leads to the argument that the land is no longer important to protect because it already has been compromised.

Stories told by elders should be as equally accepted as artifacts unearthed by archaeologists. Archaeology may boost traditional knowledge but must never replace it. Agencies should go directly to Tribal nations that have connections with areas of significance and allow them to lead with their knowledge and then use archaeology to help bolster the existing knowledge. Significant locations are being destroyed daily, but Tribes can be the change that saves them.

Western archaeologists must understand that sacred locations are not islands; they are interconnected and form a landscape. The Fond du Lac Band is working on its *Ganawenjigewin* cultural corridor, trying to establish boundaries that extend into the Tribe's original lands, identifying culturally significant sites, and tying them together with Indigenous narratives and oral history. In this effort, Evan is not looking through historical records; instead, he is starting with the knowledge of Tribal elders and citizens. The Fond du Lac Band has its own national register of historic properties and is working to compel the Federal government to recognize and protect these properties. The U.S. government must recognize Tribal historical registers because Tribes are sovereign nations; they should not have to list their properties on another government's registers to be protected.

Western science should not extract IK. Scientists must ask communities what the community members want to know because research goals must come from within the community. Co-created research must

be Indigenous-led, guided by traditional knowledge and answer research questions important to Tribal people.

Alex DuFault explained that he works with the Tribe's Cultural Resource Program and performs Tribal cultural research surveys that incorporate the Ojibwe perspective. These surveys differ from archaeology but use some archaeological tools. The Fond du Lac Band is fortunate to have as a resource the 1993 textbook, *Plants Used by the Great Lakes Ojibwa*. The textbook helps "legitimize" cultural plants and allows the Tribe to self-determine which plants are significant. The surveys indicated an inventory of 94 species in 75 genera, which is approximately one-third of the culturally significant species according to the textbook. Five out of six land tracts had linear prevalence of culturally significant species (PCSS), but only two tracts had greater than 50 percent PCSS. Use of PCSS has become a method to quantify disturbance resulting from utility lines. Alex noted that Tribes can use this method to quantify disturbance and indicate areas that must be protected.

Evan stressed that the survey effort is important so that during project assessments, the Tribe can declare whether cultural resources are going to be affected. Future research will focus on whether important locations show a difference in culturally significant plant species. Also, trees are living artifacts and warrant protection. Definitions may need to be broadened to include more than human changes (e.g., lightning strikes on trees). The Fond du Lac Band currently is examining tree rings in relation to cultural burning.

Shasta asked whether Evan and Alex work solely on Fond du Lac trust land or off-reservation as well. Evan responded that all of the work has been performed within the boundaries of the reservation, but he would like to expand into the original cultural landscape that the Tribe is trying to establish. In response to a follow-up question from Shasta, Evan explained that the reservation encompasses 101,000 acres.

Shasta asked Evan to explain the effects on Tribal human and environmental health when a cultural resource is destroyed. Evan replied that the effects are immense. For example, the State of Minnesota did not engage in full consultation about bulldozing a Fond du Lac cemetery in 2017, and Tribal members are still grieving and trying to heal from the trauma. It is very detrimental for cultural resources to be destroyed. The entirety of the Fond du Lac ancestral homelands is one cultural resource, and any bit that is destroyed is damaging to the community's well-being. Alex added that native plants that the Ojibwe need access to for their physical and mental health being are destroyed by invasive species, and this is also harmful.

Debra noted that industry must be made to understand that the response to a catastrophic event can be just as damaging as the event itself. Tribes need to be able to protect cultural resources from being damaged during a response to a catastrophe.

Janette Marsh asked what resources the Tribe uses to staff and support Evan's office. Evan responded that the primary grant is through the National Park Service (NPS). Evan and Alex constitute the entire office and are constantly searching for grant funding to be able to properly perform their jobs. Because they are underfunded, many cultural resources are being destroyed, and they are unable to prevent it. Shasta added that not every Tribe has a THPO because the NPS has a long and arduous application and certification process. The total funding amount for THPOs is small, and each year, as the number of THPOs increases, the amount of funding does not. EPA should become involved in this area because environmental effects cause cultural effects. EPA could help support THPOs and Tribes through ORD research about these negative effects; the Agency also could convene more meetings with cultural staff and include more cultural staff in existing meetings.

Rory O'Rourke asked Evan about his perspective on inclusion of IK in Federal decision-making when Federal agencies have a limited ability to protect IK. Evan explained that the Fond du Lac Band has an institutional review board (IRB) process and is very selective on how and why the Tribe shares IK. If sharing will not serve to advocate for or protect the community, the IK probably will not be shared. He suggested that Federal staff who are concerned about bridging this gap should reach out to THPOs and move forward from there.

Caucus Sessions

The Tribal and EPA Caucuses met separately. The Tribal Caucus discussed internal Caucus business, and the EPA Caucus received training on the five stages of relationship building with Tribes.

Tribal Science Session

Climate Adaptation in the 1854 Ceded Territory
Tyler Kaspar, Environmental Biologist, 1854 Treaty Authority, and Steve Shier, Climate Specialist, 1854 Treaty Authority

Tyler Kaspar explained that the 1854 Treaty Authority is an inter-Tribal organization that protects and preserves the off-reservation rights of the Bois Forte Band of Chippewa and Grand Portage Band within the ceded territory that was created by the second Treaty of La Pointe in 1854. The Authority is governed by a board of directors from the Boise Forte and Grand Portage Bands. The 1854 Treaty Authority Resource Management Division manages fisheries, wildlife, climate change and invasive species; other functions include enforcement, cultural preservation, and education and outreach.

The 1854 ceded territory has experienced climate change in the form of increased average annual temperatures, increased annual precipitation, changed phenology (i.e., timing of seasonal events), and more common extreme events (e.g., mega-rain events). These changes threaten many culturally important beings that the Ojibwe rely on for spiritual, ceremonial, medicinal, subsistence and economic needs. Many Ojibwe Tribes retained treaty rights to hunt, fish and gather off-reservation, and these rights are directly threatened. Increased air and water temperatures will stress many animal beings (e.g., moose, common loon, tullibee) and plant beings (e.g., paper birch, sugar maple); the southern end of many of these species' ranges is located in the ceded territories.

The 1854 Treaty Authority completed its *Climate Change Vulnerability and Assessment Plan* in 2016 with partners and currently is working with the same partners to update it. The plan identifies key resources, describes how they may be vulnerable, and outlines strategies for managing resources and adapting to climate change. The Authority is implementing the plan across its programs. The University of Minnesota Climate Adaptation Partnership (MCAP) has updated the climate projection section, and the 1854 Treaty Authority Education and Outreach Coordinator is leading Tribal community engagement interviews. The next step is to update the vulnerability assessments.

Steve Shier explained that walleye is a focus species for the Authority, and this species faces increased stress from warming water, reduced dissolved oxygen and increased dead zones that result from changes in timing and duration of lake stratification. Since 2015, the authority has been monitoring the temperatures in 20 lakes—including Lake Vermillion, an important lake to the Bois Forte Band—and monitoring ice thickness in 10 lakes during the winter and wild rice in three lakes. In addition to direct environmental measurements—including seasonal snowpack throughout the moose range and spring arrival of waterfowl and amphibians—cameras and acoustic recorders track seasonal changes. Trout stream monitoring will begin this year. Steve highlighted a new interactive climate data tool for Minnesota's future climate, Minnesota CliMAT.

A workshop held on April 5 with 32 attendees compared the 1854 Treaty Authority's and GLIFWC's vulnerability assessments. Wild rice, walleye, black ash, sugar maple, wild ginger and Labrador tea were evaluated because results for these six species had the biggest differences between the two vulnerability assessments. Following input from Tribal staff and community members and new data and observations, the 1854 Treaty Authority proposes an increase in the vulnerability rankings for these species and the inclusion of four additional species (red osier dogwood, turkey, waterfowl, elk). Steve displayed the revised vulnerability assessment.

In December 2023, the 1854 Treaty Authority, assisted by MAPC, began to reach out to Indigenous community members for their thoughts on climate change and perceived needs for climate mitigation. Interviewees included men, women and youth from the Grand Portage and Bois Forte Bands who are harvesters or professionals. The GLIFWC questionnaire was used to guide the interviews, but conversation was allowed to digress to create room for dynamic discussion.

Janette asked how the Tribes uses the 1854 Treaty Authority's work in their own efforts. Tyler explained that the Authority examined solutions that could be implemented by multiple Tribes, although some are reservation-specific. The Authority built on the efforts of the Grand Portage, Bois Forte and Fond du Lac Bands. Nancy Schuldt added that the Fond du Lac Band actively uses the plan.

Shasta asked what Tyler and Steve would find helpful from ORD to inform their planning. Tyler explained that the Authority is lucky to have a partnership with MCAP and works with this program to obtain data. All Tribes in the Great Lakes Region, not just those located near a coast, need to be considered in coastal resilience strategies. Nancy added that it is important to protect high-functioning ecosystems because these will help protect against future climate change effects.

Melanie Nowin asked how the Authority protects IK. Steve explained that IRB processes are in place. None of the interviewees' knowledge was shared with MCAP or publicly. Interviewees will be provided the opportunity to review the summary report before it is released.

Sulfate-Impacted Wild Rice Populations: Decline and Recovery in Response to Experimental Sulfate in Mesocosms

Nathan Johnson, Professor and Director of Graduate Studies, Civil Engineering Department, Swenson College of Science and Engineering, University of Minnesota Duluth

Nathan Johnson explained that research in the 1940s and 1950s indicated that no large wild rice stands existed in waters exceeding 10 parts per million (ppm) of sulfate, and wild rice was largely absent in waters exceeding 50 ppm. In the 2010s, Tribes and the State of Minnesota initiated several studies to understand the mechanism causing this phenomenon and whether the surface water standard of 10 milligrams per liter (mg/L), which is based on the historical research and the Fond du Lac and Grand Portage Bands' water quality standards, is protective. Industrial point sources have elevated the sulfate levels in water bodies from less than 1 ppm to hundreds of ppm.

As an annual plant, wild rice must complete its entire life cycle within 1 year. Research was initiated to determine whether sulfate in surface water harms wild rice and how sulfide in sediment affects the wild rice life cycle. Past experiments have indicated that biomass and overall growth are not affected by sulfate, but seed mass is reduced. Lower seed mass affects reproduction, so the effects of sulfate may manifest in populations across a longer time frame. Self-perpetuating populations—mesocosms—were used to isolate the effects of sulfate from other stressors. Results unambiguously showed that sulfate converted to sulfide in sediment, which harms wild rice reproduction by inhibiting nitrogen uptake and, therefore, seed growth. Results also show that sulfate inhibits two stages of the life cycle—seed production and early seedlings.

Follow-up research investigated whether wild rice can recover after sulfate has driven populations to extinction and how quickly chemical conditions in sediment will shift to reflect new surface water boundary conditions. During the sulfate-loading phase of the experiment, it took 5 to 8 years for the decline of germination, survival, biomass, seed mass and filled seeds in mesocosm conditions. After sulfate loading was terminated, these elements recovered in 2 to 3 years in mesocosm conditions. Sediment chemistry also recovered within this time frame, and no sulfide was found in the porewater.

Nathan summarized that sulfate from surface water transforms to sulfide in porewater, harming specific portions of the wild rice life cycle. Wild rice in mesocosms grows back quickly after sulfate is removed from surface water. Accounting for mass in different phases is important: Sulfide in porewater is present in small but relevant amounts, and sulfide amounts in sediments are large but less mobile and reactive. Future research should focus on whether wild rice will recover or become extinct more or less quickly in different conditions (e.g., natural hydrology, different water, different sediment) and whether kinetic or thermodynamic constraints control the rate of sulfide release from sediment. Nathan concluded by explaining that Minnesota is grappling with how to implement its own permits after EPA compelled the State to add more than 30 wild rice lakes to its impaired waters list.

Shasta asked whether those who consume the wild rice might be affected by sulfate. Nathan responded that the amount of sulfate in the seeds is not significant and does not bioaccumulate in the plants. Sulfate, however, may affect how the plant processes mercury, which might then bioaccumulate.

Shasta asked what observations led to this research. Nancy responded that the Fond du Lac Band knew that mining had effects on other natural resources and requested that specific research be performed on the effects of sulfate on *manoomin*. Nathan agreed that the project was Tribally driven, noting that the study posed interesting academic questions about sulfur and plant morphology as well.

Arianna Northbird asked about the detriments to site-specific sulfate standards. Nathan responded that the 10 mg/L standard has been on the books for some time. The Minnesota Pollution Control Agency (MPCA) has been reactionary about implementing the current standard across the State and is waiting for industry to ask for site-specific standards for specific water bodies. Some companies have concerns about a restrictive discharge limit, but no robust data have been submitted to MPCA to suggest that the current sulfate concentrations in water are not harmful to wild rice. Nathan has provided advice to MPCA about the development of a sufficient set of measurements (evidence) to demonstrate that wild rice is healthy in a water body with a concentration of sulfate greater than 10 mg/L. Nancy reiterated that this topic is the essence of the webinar that the Fond du Lac Band is co-hosting with EPA on August 1; local Tribes have been invited to attend.

Fond du Lac Band of Lake Superior Chippewa Food Sovereignty Initiative
Campbell Fischer, Food Sovereignty Outreach Manager, Fond du Lac Band of Lake Superior Chippewa, and Delilah Savage, Aandanjigewin *Food Projects Supervisor, Fond du Lac Band of Lake Superior Chippewa*

Campbell Fischer and Delilah Savage showed a 12-minute video, “Gitigaaning: The Place of the Gardens,” that tells the story of the Fond du Lac Band’s food sovereignty efforts by highlighting several projects, community gatherings, and educational classes that support and empower community members to return to their traditional food systems.

Campbell explained that *Na’enimonigamig* (where things are stored away) and *Gitigaaning* (the place of the gardens) were created to help combat the epidemic of diet-related illnesses in the community, as well as to increase agricultural knowledge and allow the community to reclaim a sovereign food system

rooted in Anishinaabe values, with the ultimate goal to empower a thriving, resilient community. The program began in 1995 as a grassroots effort in which the community members gathered to support one another. Strategic planning began in 2015, and the *Food Sovereignty Initiative Strategic Plan* was developed and implemented in 2017. The first growing season at *Gitigaaning* commenced in 2019, and the *Bimiginogaan* (grow dome) to extend the growing season was completed in 2020. The Tribe's Agricultural Division was established in 2022.

One of the main goals of the initiative is to perform educational outreach. The *Gitigaan* Class Series offers educational garden classes from March through May, the 13 Moons Program hosts monthly workshops and seasonal education events around traditional natural resources and cultural activities, and the Fond du Lac Tribal and Community College Environmental Institute manages the *Bimaaji'idiwan* Producer Training Program and organizes the annual *Gitigaan Wikkondiwag* Fall Festival. Also, the initiative has diverted 2,250 pounds of fish waste from landfills through composting; the finished compost will be available for community use.

Delilah explained that the program is working on a food box distribution for July 25 under the U.S. Department of Agriculture's Local Foods Purchasing Assistance Program. Local fresh foods are sourced from Fond du Lac lands and distributed to the community.

Janette asked about the source of the fish waste. Campbell responded that some comes from the abattoir (butcher facility) that the community uses and some is brought by community members.

Jessica Daniel asked about expansion plans for the garden. Campbell explained that 8 acres are fenced off for future use. An orchard is being established, and the program would like to expand into small-scale livestock farming.

Protecting Tribal Waters for Future Generations
Nancy Schuldt, Water Projects Coordinator, Fond du Lac Band of Lake Superior Chippewa

Nancy showed a series of maps highlighting the water-rich environment and the ceded territories; the Fond du Lac reservation has 44,000 acres of wetlands. Ojibwe Tribes ceded vast areas of land to the U.S. government but retained their hunting, fishing and wild rice harvesting rights in perpetuity. All Ojibwe Tribes have a strong relationship with the watershed. The Fond du Lac Office of Water Protection has Treatment-as-a-State status under Sections 106, 303(c), 319 and 401 of the Clean Water Act to monitor, manage, restore and protect on-reservation waters according to Fond du Lac water quality standards. The Tribe works in the ceded territories with Federal agencies under their trust responsibilities.

The Fond du Lac Band is on the frontlines of many high-profile environmental issues in Minnesota, including *manoomin* and wetland protection and restoration, reduction of mercury in fish, and Superfund cleanup. Because use of data is not enough, the Tribe employs newer economic, social science and analytical tools to effectively communicate Tribal concerns and priorities. The Fond du Lac Band was the first Tribe within the Great Lakes Basin to have its water quality standards approved by EPA; these standards are much more restrictive than Minnesota's to better protect Tribal and environmental health in the context of a traditional subsistence lifestyle.

Nancy showed a series of photographs highlighting the high-quality conditions on the reservation, noting that monitoring is the heart of the program. Monitoring data are used for a wide variety of applications, including ensuring that all new and revised standards are scientifically defensible. The last triennial review was in 2020, and although the most recent review has been delayed, the program is currently preparing for it. The program's recent move from narrative to numeric nutrient criteria has been approved; the Tribe is engaging in additional research to demonstrate the protectiveness of the

10 mg/L standard. Narrative criteria have been added to protect the habitat and hydrology necessary to sustain healthy *manoomin*, and new wetland water quality standards and an aquatic life use-specific conductance criterion have been implemented to protect fish and sensitive benthic invertebrate species from upstream pollutant sources. The Fond du Lac Band is restoring lake sturgeon, a culturally significant, formerly abundant and highly sensitive species that was nearly eliminated by overfishing, mining and logging practices and habitat loss.

Nancy displayed a series of maps detailing on- and off-reservation mining effects. The Fond du Lac Band used 20 years of data to demonstrate that specific conductance is a mining fingerprint. EPA validated the data and approved a specific conductance standard to protect sensitive aquatic life despite mining industry objections. The Tribe recognizes and celebrates the beneficial connections between humans and the environment and that humans are part of a system. Performing science with awe and humility is a powerful act of reciprocity for all nonhuman relations.

Region 7 Cumulative and Health Impact Assessment (CHIA) Tool
Eliodora Chamberlain, Regional Science Liaison, Region 7, EPA, and Amanda Berry, Environmental Protection Specialist, Region 7, EPA

Eliodora Chamberlain explained that Region 7's goal was to develop a cumulative impact assessment and health impact assessment protocol to be used by the region's Resource Conservation and Recovery Act (RCRA) program for Iowa's RCRA permits. The protocol was required to include a desktop review, allow for determinations early in the process (at least 6 months early), and take less than 50 hours to complete. The resulting CHIA tool uses the same six stages as a health impact assessment: screening, scoping, assessment, recommendations, reporting and monitoring. The CHIA process is conducted by three individuals—the RCRA project manager, environmental justice coordinator and risk assessor—who each have specific roles and responsibilities.

Amanda Berry described the first three stages of the CHIA process, which are undertaken by all three individuals. The screening stage includes information on facilities and permits, as well as which community members could be affected. The scoping phase coordinates with RCRA community engagement, which begins 6 months prior to permit application or renewal. The purpose of the assessment stage is to screen the risk of potential receptors to chemical and nonchemical stressors; this stage includes several tools and processes (e.g., EJScreen, NEPAssist, preliminary cumulative risk assessment). During the interpretation step of the assessment stage, the team decides the "who, what and how" of collecting more data if needed. Stages four through six are performed solely by the RCRA project manager.

Eliodora displayed the RCRA CHIA Tool summary of the process used in Iowa and noted that the information is used to determine what programs will need additional discussion. In this instance, 60 questions were generated to prompt robust discussion and cross-program coordination. Stoplight colors are used in the summary to denote level of concern and assist the permit writer in understanding community impacts. Region 7 has conducted CHIA on three different types of permits, with a fourth about to begin. The generated results corroborated with permit decisioning. The actual time each CHIA process took, including team meetings and quality control procedures, was 12.5 to 26 hours. Risk assessors spent the most time, up to 10 hours.

Eliodora noted that Region 4 has used the tool, with approximately 50 hours spent on the process. CHIA helped the region identify a data gap, and more data are being gathered.

Caucus Sessions

The Tribal and EPA Caucuses met separately. The Tribal Caucus continued its discussions, and the EPA Caucus received training on combining IK with EPA risk calculations. The meeting was recessed at the end of each Caucus session.

Wednesday, July 10, 2024

Field Trip: Fond du Lac Lands

The TSC members and guests visited a Fond du Lac *manoomin* lake and learned about the restoration and stewardship of wild rice waters; the time and effort involved with harvesting and processing *manoomin* means that when it is given as a gift, it is very meaningful. The attendees learned about food sovereignty efforts and the *Aandanjigewin* food distribution program at the Tribe's *Gitigaaning* farm while touring the *Bimiginogaan*, commercial kitchen, root cellar, abattoir and garden lands. Finally, the participants heard about and viewed the St. Louis River area of concern at Jay Cooke State Park and Chambers Grove Park.

Field Trip: Great Lakes Toxicology and Ecology Division (GLTED) Laboratory

The TSC members and guests visited ORD's GLTED Laboratory in Duluth and received an overview presentation from Dale Hoff, Director of GLTED. The attendees toured the On-Site Freshwater Organisms Culture Unit, PFAS Exposure Research Laboratories, Freshwater Health Research Laboratory, Stable Isotope Mass Spectrometry Laboratory, and Benthic Taxonomy Laboratory. The TSC members and guests also viewed a poster on social science and environmental justice research in the Great Lakes region. The poster session was led by Ecosystems Services Branch Chief, Joel Hoffman, along with ORD social scientists Kathleen Williams, Jules Witts and Kathleen Torso.

Thursday, July 11, 2024

Day 3 Opening Session

Days 1 and 2 Recap
Shasta Gaughen and Tim Canfield

Before Shasta and Tim began their recap, Nancy presented each TSC member and guest with a gift of *manoomin* harvested from Fond du Lac waters.

Shasta is grateful that each TSC face-to-face meeting provides the opportunity to learn about different Tribes and the capabilities of different EPA facilities. It has been a privilege to be welcomed on the Fond du Lac lands so warmly, and she hopes that the TSC members are able to reciprocate and bring their knowledge to their hosts. The TSC provides the opportunity to share with EPA unique perspectives, such as the perspective of caring for all nonhumans as relatives. The opportunity exists to mold young scientists to apply these perspectives to their work.

Tim noted that the TSC received many beneficial presentations during the course of the meeting at the cost of some Caucus time. He thought that the value gained from the presentations during the first day and on the field trip outweighed this loss. The training presented by Marie Schaefer, Matt Small and Rory set the foundation of what Tim has learned during his time on the TSC. Marie described some of the training, noting that the core aspect of Indigenous research methodologies is reciprocal relationship building. During its sessions, the EPA Caucus discussed the five stages of relationship building and then broke into smaller groups to discuss the barriers and opportunities of each stage. A list of priorities will be created to help move forward to remove barriers and engage in best practices.

Collaboration/Co-Creation Opportunity: Approaches and Tools to Describe the Benefits Provided by Nature Associated With the Cleanup of Superfund and Other Contaminated Sites
Leah Sharpe, Decision Scientist, Center for Environmental Measurement and Modeling, ORD, EPA

Leah Sharpe explained that it is important to improve decision processes rather than try to determine the "right" answer. EPA has developed tools that could be useful in Tribal decision-making, but the framing of "ecosystem services" is incompatible with Indigenous perspectives and values and does not address the reciprocity between humans and the environment. She would like to collaborate with the TSC to bridge these gaps.

Leah displayed a diagram of the six steps of the generic decision-making process and identified some of EPA's tools used for Superfund cleanup that correspond with each step (e.g., Final Ecosystem Goods and Services Tool and the steps of clarify decision context, define objectives, and evaluate trade-offs and select solutions; EnviroAtlas and the estimate consequences step). Identifying the connections between the environment and human communities could allow Superfund managers to consider the full suite of potential benefits that can be derived from remediation and redevelopment, but Superfund cleanup is a prescribed, regulated process that does not allow managers to require responsible parties to do more than is legally required. Also, Superfund managers often do not have the capacity to incorporate new concepts and tools into their work.

To bridge these gaps, collaborative efforts with the Superfund program began in 2021 to help ensure that incorporating new tools was a reasonable endeavor. A series of ongoing workshops has allowed shared understanding of the tools and their concepts and management processes, provided concrete next steps and proposals, offered the crosswalk of tools and management processes, and expanded understanding of tool potential and the amount of effort needed for implementation. In 2023, coordinated case studies were developed that provide interested managers with specific, realistic examples and Superfund-specific guidelines for applying the tools within existing processes. Additionally, EPA's Ecosystem Services Tool Selection Portal helps users select the best tools for their unique scenarios.

Leah displayed a diagram of the four steps of the ecological risk assessment process and identified some of EPA's tools that correspond with each step (e.g., Eco-Health Relationship Browser and the planning and scoping step; Causal Analysis/Diagnosis Decision Information System, or CADDIS, and the steps of problem formulation, analysis and risk characterization). Leah asked the TSC to consider whether there would be value in a collaborative effort similar to the Superfund effort to meet Tribal needs related to ecological risk assessment. Such a collaboration could explore the intersection between Western science and IK and how Tribes can use these tools in the Tribal contexts to collaborate in the cleanup of contaminated sites on or near their lands. The ultimate goals would be to develop a shared vision for how these tools could be useful and identify specific steps to support their use.

Shasta stated that she and Misha Mazurkewycz had discussed this the day before. She dislikes the term ecosystem services because it views nature in a very capitalistic manner. She thinks that such a collaboration would be very useful to broaden efforts and look beyond ecosystem services. An index of Federal and State agency tools that are beneficial to Tribes could be created, and this collaboration could serve as a model for other Federal and State agencies to emulate.

Nancy explained that the concept of ecosystem services has been a "hard sell" to Fond du Lac leadership, but the Tribe has used it to address issues stemming from the poorly regulated mining industry. It is critical to account for what nature does for humans, not just what it could do, or the assessment is useless.

Caucus Sessions

The Tribal and EPA Caucuses met separately to continue their discussions.

TSC Business Session

Caucus Report Outs
Shasta Gaughen and Tim Canfield

Shasta reported that the Tribal Caucus had discussed what the Tribal Representatives will include in their letter to the American Indian Environmental Office regarding the proposal to reorganize the National Tribal Caucus under the Federal Advisory Committee Act. The Caucus also discussed the lack of participation by the Region 10 Tribal Representatives and absence of a Region 10–Alaska Native Representative; Shasta would like to work with Monica Rodia to stress to Region 10 the importance of selecting representatives who will participate. The Tribal Representatives would like to ensure that the updated TSC website is useful for Tribes and acts as a comprehensive portal for Tribal science information and tools. Although EPA has asked that the Tribal Caucus assign a representative to the EPA Transcriptomic Assessment Product Panel, none of the Tribal Representatives have the expertise to meaningfully serve; therefore, the Caucus instead recommends that the National Tribal Toxics Council, which has the expertise, provide a representative. Finally, the Tribal Representatives would like to discuss with the full TSC a proposal to hold only one TSC face-to-face meeting per year because of the full schedules, heavy workloads and limited capacity of Tribal staff. One annual meeting also allows the budget to include the TSC Alternate Representatives.

Tim reported on the training that the EPA Caucus engaged in about the five stages of relationship building with Tribes. The EPA Representatives will continue to explore this in depth during the next year. Marie added that the training has been derived from her work, and after the EPA Caucus has done its homework and identified all of the opportunities and benefits, the EPA Representatives will approach the Tribal Caucus about how to move forward by removing the barriers so that it is possible to take advantage of the opportunities. The EPA Caucus also talked about how to Indigenize the TSC meetings to obtain the most benefits. Tim displayed a slide from Matt's training presentation that highlights the differences and commonalities between Western science and IK; *Braiding Sweetgrass* has taught Tim that significantly more commonalities exist. For the next 6 months, he would like the TSC to explore these commonalities. It is important to find common space where Tribes and EPA can engage with each other on common goals.

Open Discussion
TSC Members

Closing Blessing and Adjournment
Bryan Printup provided a traditional Haudenosaunee closing blessing, and Tim and Shasta adjourned the meeting at 12:31 p.m.

National EPA-Tribal Science Council
Summer 2024 Face-to-Face Meeting Participants

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TSC Tribal Co-Chair
Pala Band of Mission Indians (Region 9)

Tim Canfield
TSC Agency Co-Chair
U.S. Environmental Protection Agency
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Dana Adkins
Chickahominy Indian Tribe (Region 3)

Amanda Berry
U.S. Environmental Protection Agency
Region 7

Eliodora Chamberlain
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Jessica Daniel
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Alex DuFault
Fond du Lac Band of Lake Superior Chippewa

Kelsy Federico
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