EPA Progress Report 2009

Pacific Southwest Region

U.S. Environmental Protection Agency
Pacific Southwest/Region 9
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From the Regional Administrator

Dear Readers,

As we enjoy a renewed commitment to environmental protection as expressed by President Obama and Administrator Jackson, we can all be reenergized to work together to tackle our environmental challenges.

In carrying out EPA's mission, we have always sought creative ways to protect public health and the environment in the Pacific Southwest. As we meet the challenges before us, we will continue to show how improvements in environmental infrastructure, technology and policy can help strengthen our economy and lead to a healthier, more sustainable future.

The American Recovery and Reinvestment Act recently signed into law by President Obama provides a major cash infusion to upgrade wastewater and drinking water infrastructure, spur cleanup and redevelopment of brownfields, remediate toxic Superfund sites and leaking underground tanks, and reduce harmful diesel emissions. This funding will bring real environmental improvements and create jobs in the process. (Learn more at www.epa.gov/recovery.)

The environmental challenges we face have always cut across geographic and government boundaries, and every one of us plays a role. We all make a difference—whether through individual action or in partnership through agencies, organizations and communities. EPA's partnerships with Pacific island and tribal governments are particularly crucial, since they have historically lacked the funding, expertise and infrastructure available elsewhere.

Our work with the Navajo Nation to assess and address hazards at more than 500 abandoned uranium mine sites is a good example. It reminds us that as we look to the future, we still must attend to the toxic legacies of the past. In doing so, we must also answer calls for environmental justice from communities at risk, ensuring that everyone has a healthy environment.

Vigorous enforcement of our nation's environmental laws is essential to meeting that goal. In fiscal 2008, our enforcement actions secured more than $2 billion toward improved wastewater systems, toxic cleanups and other environmental improvements in the Pacific Southwest.

Beyond our shores, our involvement in international partnerships has been instrumental in improving hazardous waste regulation in China. Our shared border with Mexico is another setting where international cooperation is leading to healthier communities and ecosystems. (Learn more about this progress at www.epa.gov/border2012.)

The most daunting challenge of all—global climate change—requires unprecedented cooperation and innovation. As we help map new national strategies, we're finding many opportunities here in the Pacific Southwest. Wastewater treatment plants, heavy-duty diesel equipment and military bases, for example, can all reduce their greenhouse gas emissions significantly, as you'll read here.

Each of us bears a responsibility to change—have you calculated your carbon footprint lately? (Try it by clicking on 'What You Can Do' at www.epa.gov/climatechange.)

Guided by scientific research and a spirit of innovation—and powered by a diverse, talented and dedicated workforce—we're working to carry out our mission in ways that make sense for the future in the Pacific Southwest.

To all those who have worked with us, thank you—and we look forward to continuing our efforts together.

Laura Yoshii

Laura Yoshii

Acting Regional Administrator

EPA Pacific Southwest Region

Cover: A view of Red Rock Canyon, near Las Vegas, Nevada.

Opposite: Rainbow Falls, on the Big Island of Hawaii.

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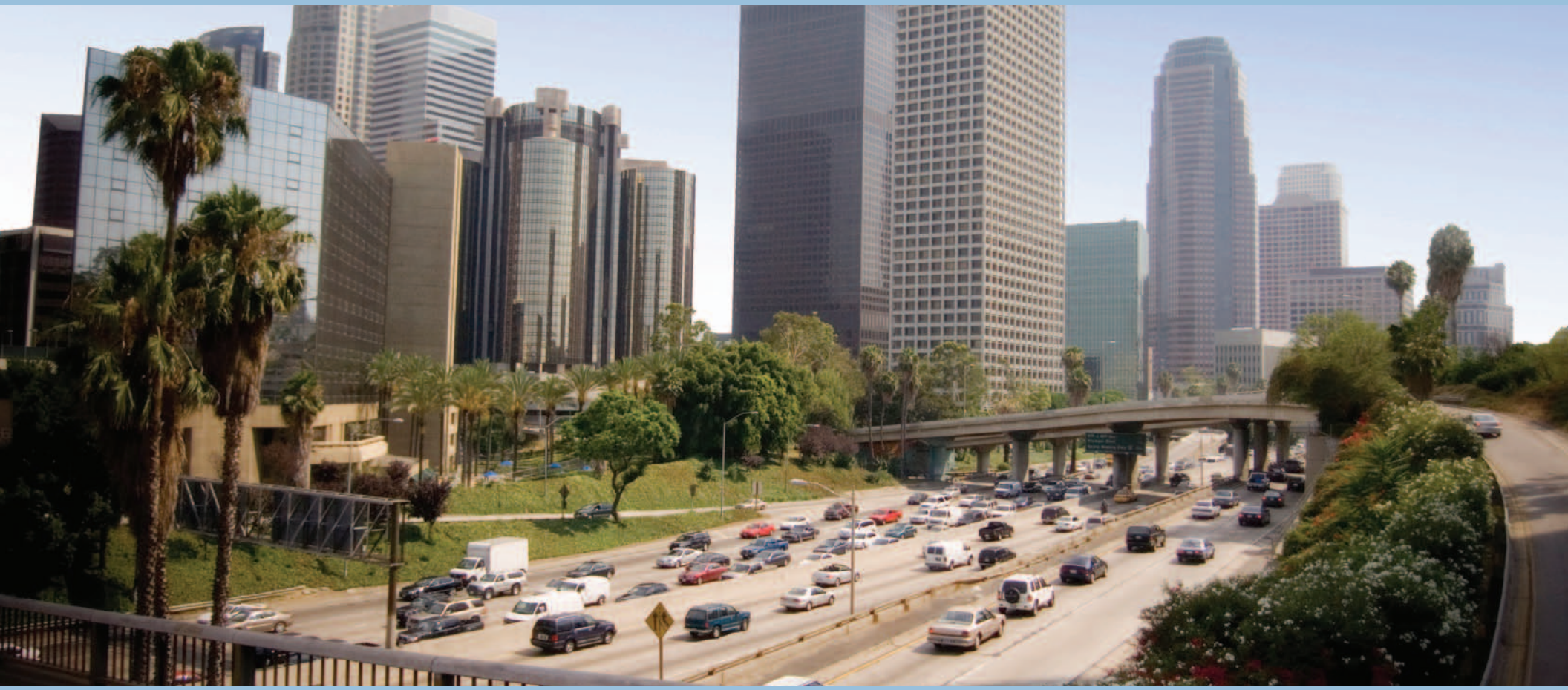
Clean Air



The Clean Air Acts of 1970, 1977 and 1990 gave EPA and state governments the authority to reduce the presence of six air pollutants to meet national health standards: lead, sulfur dioxide, carbon monoxide, nitrogen oxides, ozone (smog) and particulates.

These standards are updated periodically to keep up with the latest scientific research on the health effects of these pollutants. EPA recently tightened the standards on ozone, fine particulates and lead and is working with state partners and others to further reduce emissions.

Foreign-flagged ships steam into California ports, creating a major source of air pollution. To control this, EPA and other federal agencies have been working to implement MARPOL Annex VI—an international treaty to reduce maritime pollution.

At the local end of the spectrum, EPA has been working with community groups in neighborhoods and small cities to encourage involvement in local decisions that can have an impact on residents' exposure to pollution.

However, not all pollution is man-made. In California and Hawaii, wildfires and volcanic eruptions emit massive quantities of particulates and sulfur dioxide that are beyond human control. EPA has been working with state and local governments to better warn residents when conditions are hazardous in order to minimize health risks.

Trends

Tighter Standards Bring Healthier Air

After thorough reviews of the latest scientific research on the health effects of air pollutants, EPA tightened national air quality standards on fine particulate pollution in December 2006, ozone in March 2008, and lead in October 2008.

Adoption of the new standards has triggered a series of planning processes involving EPA, states, tribes and local air districts that will extend the progress toward healthier air seen in most areas since the 1970s.

Trends in Particulate Pollution

In 1997, EPA set standards for fine particulates, or $PM_{2.5}$ (particulate matter of 2.5 microns or smaller), when scientific evidence showed them to be an even greater health threat than larger particles.

EPA has been tracking levels of fine particulate matter since 1999 and has seen improvement nationwide. In the Pacific Southwest, two areas did not meet the 1997 standards: California's San Joaquin Valley and South Coast. The state has since provided EPA with detailed plans on how these two areas would meet the standards by the required Clean Air Act deadline.

In December 2006, EPA tightened the 24-hour $PM_{2.5}$ standard from 65 to 35 micrograms per cubic meter. As a result, EPA in December 2008 designated areas that met or failed to attain the new standard (see map). In the Pacific Southwest, these nonattainment areas were located in California and Arizona. Both states are on track to provide EPA with implementation plans for attaining the new PM standard.

A federal appeals court has asked EPA to re-evaluate the annual $PM_{2.5}$ standard (for longer-term exposure), which the agency had left unchanged at 15 micrograms per cubic meter.

Since December 2006, EPA has tightened national air quality standards on fine particulate pollution, ozone and lead.

Refining the Ozone Standard

After scientific studies showed that the earlier standard for ozone was insufficient to protect public health, EPA in 1997 tightened the standard to 0.08 parts per million (effectively 0.084 ppm with rounding). The agency again revised the ozone standard in March 2008, tightening it to 0.075 ppm with no rounding.

State and tribal recommendations identifying areas that meet or fail to meet the new ozone standard were due to the agency by March 12, 2009. EPA expects to finalize designations in March 2010, after which states must submit plans showing how they will meet the new standard by the Clean Air Act deadline.

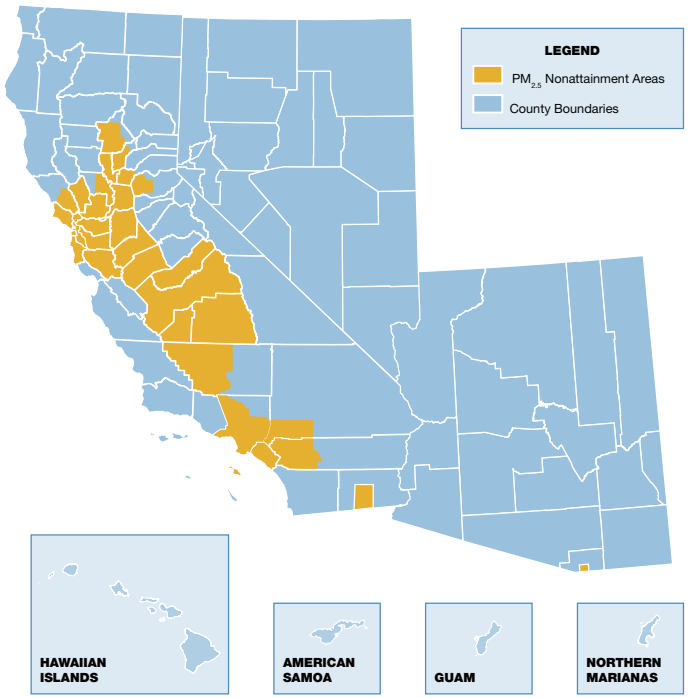
Tightening Limits on Lead

Scientific evidence about the health effects of lead (Pb) has grown dramatically since EPA set the initial standard in 1978. Studies have shown that exposure to very low lead levels can be harmful, especially to young children.

In October 2008, EPA tightened the standard from 1.5 down to 0.15 micrograms per cubic meter. Currently, EPA is improving the existing lead monitoring network by requiring monitors both in areas with industries that emit more than a ton of lead per year, as well as in urban areas with more than 500,000 people.

More on air quality:
www.epa.gov/air

$PM_{2.5}$ Nonattainment Areas



In December 2008, EPA designated areas that fail to meet the new $PM_{2.5}$ standard.

Primer

Community Involvement Helps Solve Local Problems

Traditionally, environmental protection has been a government-driven process. For example, to improve air quality, EPA adopts national health standards; states and regional air districts adopt plans and pollution control measures needed to attain the standards. Increasingly, another approach is also getting results—community involvement in government decision-making.

Decisions about planning, zoning and permits are made by all levels of government. These decisions often have an impact on local air, water and land quality. EPA is collaborating with local groups in some highly impacted communities to assist them in engaging on local environmental issues. The agency provides local groups grant resources and technical assistance to expand their opportunities to address environmental concerns.

Building Capacity and Reducing Exposures in the San Joaquin Valley

The small city of Arvin, at the southern end of California's San Joaquin Valley, has multiple environmental challenges. First is unhealthy air—Arvin is downwind of most of the valley's air pollution sources. Every four days, on average, the ozone (smog) levels exceed the national health standard.

Environmental hazards in Arvin include air pollution, a Superfund site, contaminated drinking water, and pesticide use.

According to the San Joaquin Valley Unified Air District's plan for attaining the federal health standard for ozone, it will take Arvin longer to attain than just about anywhere else in the valley. Valley-wide decisions about planning, zoning, and permits can speed up the process or slow it down.

Other environmental hazards in Arvin include a Superfund site, other waste sites, arsenic-contaminated drinking water, and exposure to pesticides drifting from surrounding farms. Arvin is 88% Hispanic, has a 25% unemployment rate, and a median household income of only $23,000.

EPA is collaborating with the local Committee for a Better Arvin to build capacity, engage regulatory partners, and protect public health. Last year, the committee co-hosted two workshops with EPA, California's Cal/EPA, and others. These workshops informed nearly fifty participants about EPA programs, grant opportunities, and tools for the community to better understand toxic hazards. The committee secured a $20,000 EPA grant for environmental education and capacity building.

EPA is also helping the community address its other challenges. The agency's drinking water program conducted inspections and took enforcement actions for arsenic violations in five valley communities, including the Arvin Community Services District, which serves 16,000 people. The district is now installing additional water treatment facilities and, until they are built, notifying the public of unhealthful levels of arsenic in the water supply. The program also organized a community meeting to understand residents' concerns and inform them about how to spot future violations.

EPA's Superfund program held public meetings with Arvin city officials, the Committee for a Better Arvin, and the Arvin Community Services District to update everyone about groundwater cleanup work underway at the Brown and Bryant Superfund site. In addition, EPA inspected aboveground fuel storage tanks in response to community concerns, and informed the committee about how to identify violations and call in complaints.

EPA staff and local residents at a community meeting to discuss environmental hazards in Arvin, Calif.

Above: Perimeter of the Brown & Bryant Superfund site in Arvin, where groundwater cleanup is underway.

Reducing Impacts of Goods Movement in Southern California

The Ports of Long Beach and Los Angeles are the entry point of 40% of all imports to the U.S. and the source of 20% of diesel particulate emissions in Southern California. Air pollution associated with goods movement—including ships, diesel trucks and trains—causes an estimated 1,200 premature deaths in the South Coast Air Basin annually, with one-tenth of that attributed to the ports alone. Los Angeles County has a population of 10 million, with minorities making up nearly 70%.

The ports are the source of 20% of diesel particulate emissions in Southern California.

Last year, EPA collaborated with minority and low-income communities in Southern California to focus enforcement efforts and to influence port expansion plans. First, to educate its staff, EPA hosted national Environmental Justice Goods Movement Workgroup member Prof. Andrea Hricko and Prof. Ed Avol, an air pollution health effects expert who serves on multiple port and goods movement committees. The two University of Southern California professors took part in a presentation and six staff meetings on health research, emission reduction strategies, and ways to improve both EPA and public participation.

As an outgrowth of that visit, EPA and the West Coast Diesel Collaborative cosponsored an environmental justice workshop in Southern California to publicize grant funding opportunities. Representatives of 20 local groups attended the workshop. Riverside's Center for Community Action and Environmental Justice secured an EPA grant to educate and organize residents to get involved in local decision-making to reduce particulate air pollution. Riverside County has millions of square feet of distribution centers that serve the Ports of L.A. and Long Beach.

EPA's enforcement programs prioritized inspections at industrial sites in Wilmington that posed potential environmental and public health threats. The agency also organized two Community Tools and Resources workshops, one in Riverside County and another in the ports area.

In commenting on five environmental impact statements for port-related projects, EPA recommended additional mitigation measures to offset significant and unavoidable impacts to neighboring communities. The agency also recommended a community health impact assessment, which would estimate the health effects of the air pollution and other potential health stressors added by the projects and would help identify appropriate mitigations.

In addition, EPA grants helped to replace more than 900 old, polluting trucks operating in and around the ports with new, clean-burning natural gas trucks, bringing cleaner air to neighboring communities (see related story, p. 8).

About 40% of all U.S. imported goods come ashore at the ports of Long Beach and Los Angeles and are moved inland by diesel trucks and trains.

Places

Protecting People from Natural Hazards: California's Wildfires, Hawaii's "Vog"

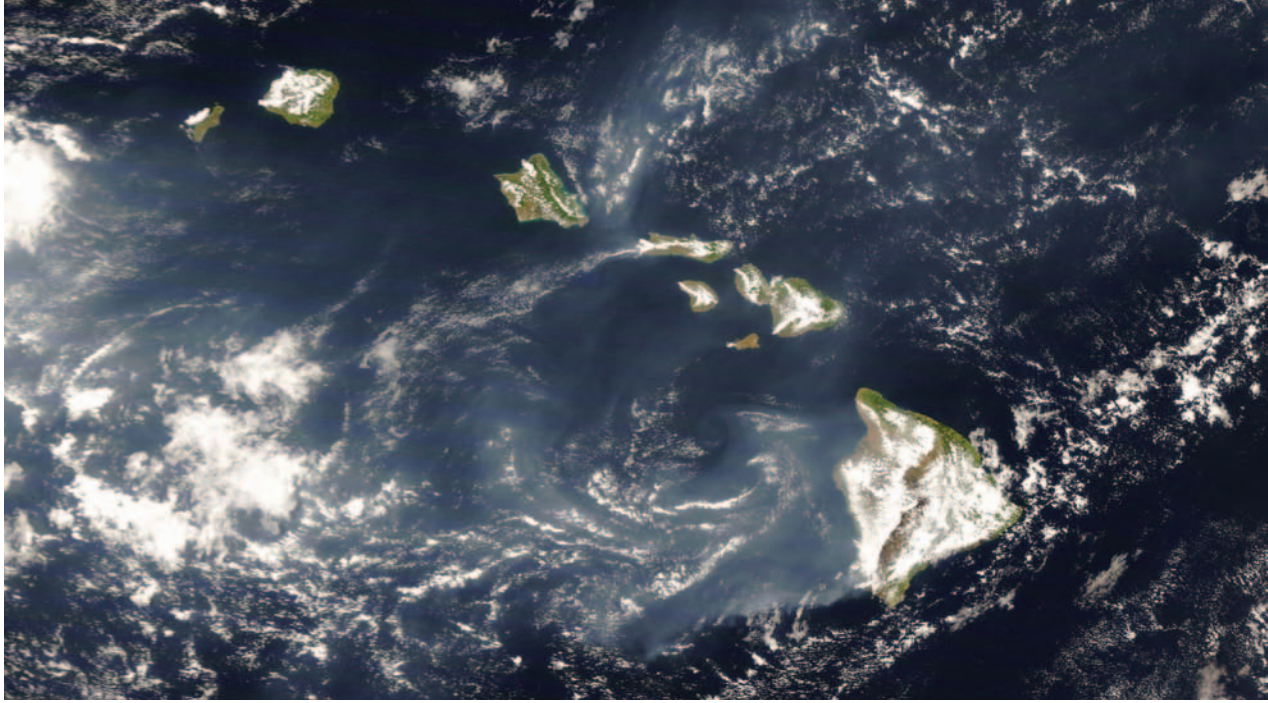
Not all air pollution is man-made. In Northern California in June 2008, lightning ignited more than 2,000 wildfires. While most were extinguished within a few days, some of the largest continued for weeks, creating a pall of smoke that covered much of the state.

On the Big Island of Hawaii, residents contend with "vog," or volcanic smog: the sulfur dioxide (SO_2) and sulfate particles from Kilauea Volcano. While these events are beyond human control, EPA works with state and local governments to reduce people's exposure to air pollution.

Tribal Request for Assistance in Fire Areas

In California, the stubbornest fires burned in rural Humboldt, Trinity and Siskiyou counties, including the lands of the Hoopa, Yurok and Karok Tribes. The three tribes requested assistance with air monitoring from state and federal agencies, including the California Air Resources Board (CARB) and EPA.

When the tribes also requested help with health messaging and issuing advisories to residents, EPA's Tim Wilhite worked with the Indian Health Service and the Hoopa Tribe on communications. But urban areas hundreds of miles away from the fires, like Sacramento, Fresno and the San Francisco Bay Area, were also affected by the smoke. Local officials and residents could see and smell the smoke for weeks, and wondered if breathing the air was hazardous.



In response, EPA was able to share air quality data, along with links to public health information on how to minimize smoke exposure, via the AIRNow Web site. The AIRNow site also proved its value later in the year when the predictable spate of late-dry-season wildfires hit in Southern California—and continues to offer useful advice about minimizing exposure to air pollution.

Hawaii "Vog" Threatened Residents, Visitors

On March 19, 2008, there was an explosion at Halemaumau crater in Hawaii Volcanoes National Park—the first since 1924. Later, two more explosions opened vents that emitted up to 7,000 tons per day of SO_2, more than quadruple the normal "background" level recorded in previous years. To protect nearby residents and park visitors, the state and county requested EPA assistance with air monitoring and forecasting unhealthy air conditions.

EPA's Janet Yocum helped state and county officials with air monitoring and data analysis during their initial emergency response. Catherine Brown, Susan Stone and Scott Jackson worked with the Hawaii Department of Health (DOH) to create a more permanent system for alerting the public to vog's health impacts. They helped DOH initiate real-time reporting for SO_2 via the Hawaii DOH Web site and helped add reporting of fine particulates to EPA's AIRNow Web site. EPA is working with DOH and other agencies to develop next-day online forecasting as well.

The monitoring showed that people living near the park were sometimes exposed to unhealthy levels of SO_2 and particulates. Data were translated into real-time air quality alerts (posted on the Hawaii DOH and AIRNow Web sites) showing where vog and fine particulate pollution reached unhealthy levels.

Real-time air quality information:
www.airnow.gov

More on natural hazards:
www.epa.gov/naturalevents

More on vog:
www.hawaii.gov/gov/vog

Above: Satellite photo of the Hawaiian Islands showing cloud cover (bright white areas) and volcanic smog, or "vog" (misty gray areas).

People

Maggie Waldon: A Tenacious Approach to Air Enforcement

Having English Bulldogs has taught Maggie Waldon a thing or two when it comes to working in the Pacific Southwest Air Division's Enforcement Office. "Bulldogs never give up and neither do I," she says.

At five feet tall, Maggie doesn't appear threatening—but what she lacks in height she makes up for in determination. Since joining the Enforcement Office in 2001, Maggie has specialized in developing cases that require the stubbornness of a bulldog.

At first, it was easy enough focusing on companies that were illegally emitting hazardous air pollutants in their solvent degreasing operations and getting them to use non-toxic alternatives or air pollution controls. Then Maggie's focus began to turn to emissions of both hazardous air pollutants and volatile organic compounds, especially those being emitted by aerospace companies, refineries and manufacturers of polystyrene foam.

These companies were emitting volatile organic compounds (VOCs), air pollutants that were difficult to quantify because there were no proven measurement systems and existing analytical methods fell short. "The problem with VOCs is that they are invisible," says Maggie. "Once the polluting activity has ceased, it's hard to go back and prove that there were excess emissions." VOCs threaten public health because, in the presence of sunlight, they react with other pollutants to form the photochemical oxidant known as ozone (or smog).

"When we started doing inspections of polystyrene manufacturers five or six years ago, the industry was 'under the radar' of regulators," Maggie says. The facilities aren't large, but there are lots of them. They make the foam that's embedded in walls of new buildings for insulation, laid beneath newly-paved roads and runways (it's less brittle than cement), and the familiar packing "peanuts" and cheap foam coolers for picnics.

Estimating emissions from these facilities is more complicated than just putting an emissions monitor on a smokestack. VOCs can leak out of equipment, pipes and connections anywhere between the foam manufacturing process and the control device. At one facility, Maggie found that the VOCs weren't going to a control device at all. The facility's permit required the gases to go to a boiler, but instead they were being piped through a hole in the wall, directly into the air.

Cases against 10 polystyrene manufacturers have a major impact.

After Maggie initiated several enforcement actions against polystyrene manufacturers in the Pacific Southwest Region, other EPA regional offices began inspecting polystyrene manufacturers in their regions. Then the industry's trade association held a national meeting to discuss how to respond. Ultimately, Maggie initiated civil enforcement cases against 10 manufacturers. Some of these are already concluded, with facilities paying penalties ranging from $150,000 to $400,000 and installing state of the art control devices. Some are still in negotiations between EPA, the Department of Justice, and the manufacturers.

As part of a national enforcement team looking at oil refineries, Maggie helped negotiate a settlement with ConocoPhillips in which ConocoPhillips agreed to pay a penalty of $4.5 million and spend an additional $10 million on environmentally beneficial projects to reduce emissions further and to support activities in the communities where it operates. ConocoPhillips operates refineries in the Los Angeles area, San Luis Obispo, and the San Francisco Bay Area.

Maggie also supports regional emergency response operations as a member of the Response Support Corps and the Radiation Emergency Response Team.

Innovations

New Clean Air Technologies Emerge

As usual, California is at the center of the action in the quest for cleaner technologies.

On July 9, 2008, at the California Emerging Clean Air Technology Forum in Merced, federal, state and local agencies joined forces to develop and implement technologies needed for California to meet federal air quality standards, to reduce people's exposure to air toxics, and to reduce greenhouse gas emissions. This year, the forum is continuing as an ongoing collaborative effort between EPA, the California Air Resources Board (CARB), the South Coast and San Joaquin Valley air districts, Cal/EPA, and the California Energy Commission.

These agencies signed a commitment to develop, test and deploy new sustainable technologies to accelerate progress in meeting national air quality standards. Experts from across the nation presented the latest research on hydraulic and plug-in hybrids, electric vehicles, fuel cells, air monitoring and remote sensing, agricultural water pump efficiency, and diesel mobile source controls, among others.

The Merced event focused on new and emerging technologies to reduce air pollution from both mobile and industrial sources. This group will determine which technologies to move forward and implement the research projects to help meet California's unique air quality challenges.

On January 5, 2009, EPA, CARB and the South Coast Air Quality Management District sponsored an event at the Puente Hills Landfill to showcase cleaner burning tractors, bulldozers and other earth moving equipment that is ahead of schedule in meeting the state's new, stringent diesel emissions standards. The new regulation requires the installation of diesel soot filters on off-road diesel engines and encourages the replacement of older, dirtier engines with newer emission-controlled models.

The largest grant recipient for diesel emission reduction activities, nonprofit Cascade Sierra Solutions, received $1.13 million from EPA in September 2008 in a first of-its-kind grant to help lower the fuel costs of truckers and reduce greenhouse gas emissions and diesel pollution. An additional $17.1 million will be leveraged by the Cascade Sierra Solutions partners to provide below-market interest rate loans to truckers, allowing them to install idle reduction technologies on more than 1,700 trucks.

Under the program, truckers will save approximately $10 million in fuel costs per year, or over 2.5 million gallons of diesel fuel per year—and at the same time reduce 28,000 tons of carbon dioxide, 32 tons of particulate matter, and 630 tons of nitrogen oxides per year.

Inset: Announcement for interagency forum held in Merced, Calif., in July 2008.

Above right: Former EPA Regional Administrator Wayne Nastri shows difference in exhaust emissions between old diesel earth-movers and new ones that meet California's new emissions standards.

Learn more:
www.epa.gov/region9/air/cecat-forum
www.westcoastcollaborative.org

The Diesel Emissions Reduction Act

Since 2004, EPA has issued grants for projects throughout the West Coast that save fuel while reducing diesel emissions. The Diesel Emissions Reduction Act of 2005 (DERA) provided additional funding to cut emissions from diesel engines nationwide. Since 2004, EPA issued grants totaling $32 million for 115 projects in the Pacific Southwest, affecting more than 7,463 on- and off-road engines.

Diesel engines emit nitrogen oxides, CO_2 and soot, which are linked to thousands of premature deaths, hundreds of thousands of asthma attacks and millions of lost work days. These grant projects will have immediate and significant benefits for public health, and will help to advance new technologies and approaches for the future.

The American Recovery and Reinvestment Act of 2009 will provide more than $33 million to states and other eligible entities in the Pacific Southwest to support the implementation of diesel emission reduction technologies through DERA. Under this program, funding will be used to achieve significant reductions in diesel emissions while maximizing job preservation and creation.

Crossing Borders

MARPOL Annex VI Treaty to Require Cleaner Ships

EPA has been instrumental in carrying out a newly-ratified treaty to prevent air pollution from ships: the MARPOL Annex VI Treaty.

This treaty sets up an international maritime program that consists of two sets of standards to control ships' emissions. The first sets a cap on the sulfur content of fuel, while the second limits nitrogen oxides emissions from ships' engines. The U.S. ratified the treaty in 2008.

Diesel engines on oceangoing vessels such as container ships, tankers, bulk carriers, and cruise ships are significant contributors to air pollution in many of our nation's cities and ports, especially ports in the Pacific Southwest Region, such as Los Angeles, Long Beach and Oakland. Controlling these emissions not just here but throughout the world will provide important air quality benefits to many millions of coastal and inland residents.

Most ships that come to the U.S. are flagged in other countries, but they're subject to international standards. State and local air quality regulators have long been frustrated by air pollution from ocean-going ships, since states and local governments for the most part can't regulate them under the Clean Air Act. As land-based emissions have come under tighter and tighter limits, especially in Southern California's South Coast Air Quality Management District, ship emissions from fast-growing port traffic has accounted for a growing portion of the smog and particulate pollution.

On October 9, 2008, the 168 member states of the United Nations' International Maritime Organization (IMO) adopted stringent new standards to control harmful exhaust emissions from the engines that power oceangoing vessels. This is a critical first step that may eventually help millions of Americans and many more people around the world to breathe cleaner air. To fully realize the significant benefits of this program, countries that have ratified the treaty can seek an emission control area (ECA) designation from the IMO.

Since the U.S. ratified the treaty, EPA (the lead U.S. federal agency) has been working with the U.S. State Department, U.S. Coast Guard, and the Government of Canada to develop a comprehensive approach to establishing ECAs along all U.S. and Canadian coasts. EPA expects to submit the U.S./Canadian application for ECAs to the IMO in late March in preparation for consideration at its next regularly scheduled meetings in July 2009. Approval of the application could then take place as early as the IMO's March 2010 meeting.

More on oceangoing vessels:
www.epa.gov/oms/oceanvessels.htm

The U.N. International Maritime Organization set new, stringent standards limiting ships' emissions of smog-forming nitrogen oxides.

Clean Water

Here in the Pacific Southwest, public awareness of water issues peaks during droughts, floods, major oil spills, and sewage spills. Keeping our waters clean requires routine but essential work every day of the year by EPA and state, regional and local agencies.

Much of the work involves infrastructure—building, maintaining, and improving facilities that treat clean water to make it drinkable, and other facilities to treat wastewater for discharge without harming aquatic life or people. (It's a particular challenge on remote tribal lands and Pacific islands—see story, p. 25.)

These facilities are built and operated by local governments, but EPA and state governments provide funding and issue permits that specify how clean the discharged water must be to protect designated uses such as fishing and swimming.

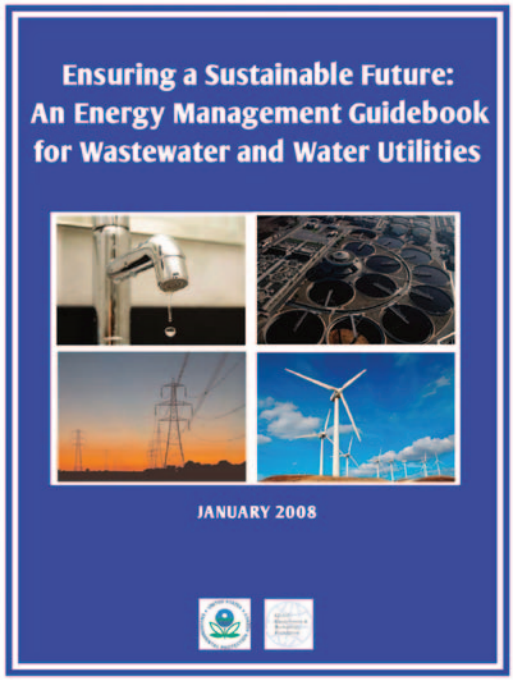
A changing climate, growing population and rising energy costs all add to the challenge of maintaining adequate infrastructure. In addition to funding, EPA provides technical support and other resources to help utilities operate more sustainably.

Wastewater treatment can't do the whole job of protecting watersheds. EPA also works to prevent stormwater runoff from polluting waterways by controlling pollutants at their source. Restoration of degraded streams and estuaries is another essential element in the protection of watersheds and the wildlife and people they support.

Trends

Meeting the Challenge of Sustainable Water Infrastructure

EPA's Sustainable Water Infrastructure and Climate Change initiative promotes energy and water efficiency at wastewater and drinking water utilities in the Pacific Southwest. Such management practices conserve water, reduce greenhouse gas emissions, and save money, freeing up funding for training and capital improvement projects.



EPA's Pacific Southwest Water Division has launched a Sustainable Water Infrastructure Web site, which provides agencies and operators with information about a comprehensive four-step energy management process, case studies, efficient and renewable energy technologies, and funding opportunities—including the State Revolving Fund loan programs, which have been bolstered by the American Recovery and Reinvestment Act of 2009 (see box).

To promote energy and water efficiency, EPA has also begun a series of energy management workshops and ENERGY STAR benchmarking classes in the Pacific Southwest. The first workshop drew an audience of more than 100 utility operators and managers.

Improving energy efficiency at drinking water and wastewater facilities reduces greenhouse gas emissions and operating costs.

Water and wastewater facilities are among the largest and most energy-intensive systems owned and operated by local governments, accounting for approximately 30-50% of municipal energy use. U.S. drinking water and wastewater facilities annually spend about $4 billion on energy, representing about 53 million metric tons of annual carbon dioxide emissions.

Additionally, the costs of adapting water infrastructure to climate change impacts—like drought, increasing storm severity, sea level rise, saltwater intrusion, and reduced snow pack—will be substantial.

More on sustainable infrastructure tools:
www.epa.gov/region9/waterinfrastructure

More on the Recovery Act in the Pacific Southwest:
www.epa.gov/region9/eparecovery

What you can do to conserve water:
www.epa.gov/watersense

The American Recovery and Reinvestment Act

On February 17, President Obama signed the American Recovery and Reinvestment Act of 2009 (ARRA). The act, part of a concerted effort to create jobs and stimulate the U.S. economy, provides $288 billion in economic recovery tax relief and $499 billion in targeted priority investments with unprecedented accountability measures built in.

Of the $6 billion in ARRA funding allocated for water infrastructure projects through the State Revolving Fund (SRF) loan programs, approximately $650 million will go to projects in the Pacific Southwest Region. In addition, 20% of the funding is designated to be used for environmentally innovative projects that address energy efficiency, water efficiency and innovative stormwater management.

EPA estimates that it will cost approximately $500 billion over the next 20 years to meet America's drinking water and wastewater infrastructure needs. Since 1970, EPA's Construction Grant and SRF programs have provided over $140 billion for drinking water and wastewater infrastructure, and EPA continues to provide annual SRF program capitalization grants.

Inset: EPA provides sustainability guidance to utilities.

Primer

Strengthening Discharge Permits for Coastal Cities

As every major city in the United States discharges treated wastewater into nearby waterways, EPA places a high priority on establishing and enforcing stringent state and federal discharge permits to protect public health and the environment.

In December 2008 and January 2009, EPA took action affecting municipalities in California, Hawaii, Guam and American Samoa, and how thoroughly they treat their water before discharge. These actions will help protect recreational users of ocean waters such as anglers and surfers, as well as marine life.

The Basics of Wastewater Discharge

To comply with the Clean Water Act of 1972, most municipal wastewater treatment plants use both primary and secondary treatment. Primary treatment involves screening out large floating objects, such as rags and sticks, removing grit, such as sand and small stones, and allowing wastewater to settle, followed by the removal of collected solids. In secondary treatment, primary-treated wastewater flows into another facility where bacteria consume most of the organic matter in the wastewater before it is discharged.

Amendments to the law in 1977 allow for variances from secondary treatment for certain ocean discharges, provided the plant meets specified criteria. One important requirement is that the discharge must meet water quality standards adopted by the state to protect marine life and recreational activities such as swimming, surfing and fishing.

Many coastal cities that once sought variances from secondary treatment have chosen to upgrade their treatment plants to meet Clean Water Act requirements without variances. This is especially true in areas with heavy recreational beach use. Also, as water supplies become more valuable, an increasing number of municipalities are adding advanced treatment technologies to their secondary treatment plants to clean the wastewater to the point it can be used safely for landscape irrigation and other uses.

Upgrading Treatment Plants in California

In January, EPA announced an agreement with the San Francisco Bay Regional Water Quality Control Board and the East Bay Municipal Utility District (EBMUD) that requires the district to address wet weather discharges of partially-treated stormwater, which includes some sewage, into the bay.

Terms of the agreement, contained in a revised discharge permit, require EBMUD to identify areas with the highest wet weather sewage flows for sewer repair and flow reduction. In addition, EBMUD must develop a program requiring repair of leaking private sewer pipes that extend from homes and businesses to city sewer mains, spend at least $2 million annually in incentives to accelerate repair of private sewer pipes, and improve maintenance and repair of sewers.

Also in January 2009, EPA approved a permit incorporating a variance for the Morro Bay/Cayucos wastewater treatment plant in Morro Bay, Calif. The permit will enable the facility to continue operating while work is underway to complete a secondary sewage treatment facility within five years. In addition, after working with EPA, the Central Coast Regional Water Quality Control Board, and other state and local authorities, the discharger has decided to go beyond Clean Water Act requirements and implement tertiary treatment and water recycling. Tertiary treated water can be used for farm and landscape irrigation.

EPA has also proposed to approve San Diego's request for a similar variance, as the city

A clarifier at the Honouliuli treatment facility in Honolulu.

Above: The East Bay Municipal Utility District has agreed to improve its infrastructure to reduce wet-weather discharges into San Francisco Bay.

recently upgraded its Point Loma Metropolitan Wastewater Treatment Plant to disinfect treated wastewater. Point Loma's discharge point is 4.5 miles offshore, about 300 feet deep. EPA will make a final decision in mid-2009 after considering comments from the public.

Recent EPA actions will require municipalities to more thoroughly clean up their wastewater.

Upgrading Treatment Plants in Hawaii and the Pacific Islands

In January, EPA denied Honolulu's request for continuation of two variances allowing the city to discharge wastewater from two treatment plants without secondary treatment. EPA had reviewed the city's applications for the variances, including water quality data from the last several years, and carefully considered and responded to public comments. EPA concluded that the discharges from the Sand Island and Honouliuli treatment facilities do not meet Clean Water Act requirements, including standards designed to protect recreational use and marine life in the vicinity of the offshore ocean outfalls. The Honolulu treatment plants will be required to upgrade to full secondary treatment, pending the outcome of a recent appeal.

"We will work with Honolulu to upgrade its two largest wastewater plants, and make other improvements to its wastewater systems," said Alexis Strauss, director of EPA's Water Division in the Pacific Southwest Region.

In January, EPA proposed to deny variances for the Agana and Northern District wastewater treatment plants in Guam and the Tafuna and Utulei wastewater treatment plants in American Samoa. EPA's tentative decisions include findings that the discharges do not meet the criteria for protecting recreation and marine life. EPA is accepting comments from the public on the proposed denials and will consider the comments received before making final decisions.

Taken together, the recent actions by EPA will result in substantial improvements to water quality in the coastal waters of the Pacific Southwest.

In 2006, a sewage spill into Honolulu's Ala Wai Canal caused a week-long closure of a portion of Waikiki Beach.

Places

Restoring Coastal Watersheds in California

California's coastal streams and estuaries, from the Tijuana Estuary on the U.S.-Mexico border to the Smith River near the Oregon border, are critical habitats for endangered fish and wildlife, as well as water sources for people.

Endangered species like the Coho Salmon, Southern Steelhead Trout, and Red-Legged Frog still live in coastal streams as far south as Malibu, but they struggle to survive in waterways degraded by water diversions and drought, soil erosion, pollution, dams, gravel mining, and channelization.

Recognizing these threats, EPA partners with state and local agencies and nonprofits to provide funding and oversight for critical watershed protection efforts through a broad range of programs. EPA is part of the West Coast Governors' Agreement on Ocean Health, joining together the efforts of Washington, Oregon and California with federal agencies to focus on the Pacific Ocean.

The San Francisco Estuary Project received a nearly $5 million EPA grant in December 2008 to fund projects run by more than a dozen local organizations to help protect the Bay's fragile ecosystem. Examples include reducing urban storm runoff, removing mercury from upstream watersheds, and improving habitat for native fish. In addition, every year EPA funds non-point source pollution prevention projects along coastal streams.

A wide-ranging new effort is the West Coast Estuaries Initiative for the California Coast, part of EPA's Targeted Watershed Grant Program. These grants advance partnerships that conserve, restore and protect the water quality, habitat and environment of coastal waters, estuaries, bays and nearshore waters. Congress appropriated a total of $7.5 million in 2007 and 2008. Nine projects, now underway, were chosen in a competitive process (see below); state and local matching funds leveraged $11 million more.

A recent EPA enforcement settlement against housing developers for stormwater violations at construction sites included a $608,000 project to prevent sediment runoff into Mendocino County's Garcia River. Specifics include fixing roads, decommissioning unused roads, and restoring the tree canopy and native vegetation in two Garcia River tributaries.

More on watershed priorities:
www.epa.gov/region9/water/watershed

West Coast Estuaries Initiative for the California Coast: 2007 and 2008 Grants

Restoration of Waukell Creek Wetland/Stream Habitats, Klamath River (Yurok Tribal Fisheries Program) $547,832 (Federal: $493,000) *North Coast*

Mattole River Estuary (Mattole Salmon Group) $2,325,242 (Federal: $958,435) *Humboldt/Mendocino Counties*

Green Infill—Clean Stormwater (Association of Bay Area Governments/SFEP) $3,461,995 (Federal: $996,495) *San Francisco Bay*

Lower Carmel River Floodplain Restoration Project (Big Sur Land Trust) $2,992,000 (Federal: $992,000) *Carmel Bay/Monterey County*

San Gregorio Creek Watershed: Filling Critical Flow Needs (American Rivers) $589,646 (Federal: $441,146) *Coastal San Mateo County*

Transforming Inflows to Elkhorn Estuary: Lower Carneros Creek Wetlands (Ag. & Land-Based Training Assoc.) $1,459,962 (Federal: $999,962) *Monterey Bay*

Moro Cojo Slough Restoration and Management Plan (Moss Landing Marine Labs, San Jose State Univ.) $360,847 (Federal: $267,347) *Monterey Bay*

South San Diego Bay Coastal Wetland Restoration/ Enhancement (San Diego Unified Port Dist.) $2,229,043 (Federal: $1,000,000) *South San Diego County*

Tijuana River Watershed: Water Quality & Community Outreach (SW Wetlands Interpretive Assoc.) $1,799,297 (Federal: $990,898) *Border/South San Diego County*

People

Amy Miller: Reducing Stormwater Impacts

Amy Miller is team leader of the Pacific Southwest Water Division's Stormwater and Wetlands Enforcement Team. She supervises the group, but still gets out into the field for inspections and case development.

"With wetlands cases, it's like *CSI* on TV—you look at the damage and try to find out what it was like originally, what happened, and who did it," she says. In a recent Arizona case, a developer bulldozed more than three square miles of land, destroying an ancient mesquite forest, and damming, rerouting and channelizing the Santa Cruz River.

"I hiked all over the property, and it was like a moonscape," Amy recalled. During the next heavy rainfall, downstream flooding resulted. The developer paid penalties of $1.25 million—one of the nation's largest penalties for a wetlands violation.

Industrial stormwater cases are different. Inspectors look for potential pollution sources at open sites like ports, mines and construction sites. Port facilities are subject to stormwater requirements. Due to ports' close proximity to waterways, trash and contaminants on the ground during rainstorms are often washed directly into the water.

In 2007, Amy's team and the Los Angeles Regional Water Quality Control Board conducted 55 inspections of tenants at the ports of Long Beach and Los Angeles, resulting in 20 compliance orders. In 2008, EPA and the Central Valley Regional Board conducted a similar audit at the Port of Stockton. The agencies also conducted on-site audits on the ports' own stormwater compliance programs.

Beverage manufacturers are another potential source of stormwater pollution. In one case, she says, "There was oil and grease on the ground, and the stench of spoiled soft drinks on hot asphalt was terrible."

The beverages contain nutrients and are acidic, which can harm sensitive stream ecosystems. The spoiled liquids should have been disposed of in the sanitary sewer system—where the effluent is treated—not in the stormwater system, which drains to creeks and beaches.

"You go out into the field and work with people to solve problems. Each case has an endpoint, where you can see the environmental results."

In a recent case against two California soft drink facilities, the legal settlement required the company to pay about $1 million in penalties and hire an environmental director to ensure that best management practices are followed. Amy says the next time she inspected the facilities, "They were so clean. It was very rewarding to see the entire staff change their ethic."

When Amy was at Golden Gate University Law School in San Francisco in the mid-1990s, she was planning a career in foreign service with the U.S. State Department. Then she took an internship at EPA, and it changed everything.

"I fell in love with enforcement," she says. It's really not as strange as it sounds. "You go out into the field and work with people to solve problems. Each case has an endpoint, where you can see the environmental results."

Opposite page, top: State and federal water quality officials visit the Tijuana Estuary, where excess sediment and trash threaten a highly valued aquatic ecosystem.

Clean Land

Toxic sites on land can harm people three ways: By direct contact, polluting water, or concentrating pollutants in the food chain. This chapter illustrates how EPA is working to clean up toxics and block all three pathways of exposure.

In rural Arizona mining towns, smokestack emissions from smelters long ago deposited toxic metals like arsenic and lead. Today, EPA is working with landowners and smelting companies to investigate and clean up contaminated soil in local yards and parks while assessing air quality impacts.

Toxic dumping from decades ago pollutes groundwater urgently needed for drinking and other uses in urban areas. EPA is overseeing dozens of sites where groundwater treatment is restoring this vital resource.

Offshore from Palos Verdes, DDT dumped long ago has moved up the food chain into fish. EPA has partnered with local governments to keep these fish off the dinner table through outreach and a ban on selling them.

In Las Vegas, a closed landfill threatens to pollute the city's water supply. EPA won a court ruling that makes responsible parties pay for a long-term solution.

And a small group of EPA employees is making a big difference in China by putting the agency's experience and expertise to use in helping China deal with pressing toxics issues.

Trends

Cleaning Up Toxic Legacy of Smelters in Arizona Towns

Since the inception of EPA's Superfund program in 1981, most cleanups have focused on the toxic legacies of earlier industries. In the Pacific Southwest, EPA has been involved in cleanups of mining sites since the early 1980s. A recent focus has been investigating and cleaning up smelters—where the ore extracted from mines is heated in a furnace until it liquefies, and the pure metal separates from the unusable molten slag.

Historically, smelters were a dirty business. Before the 1970s, they emitted stack smoke high in toxic metals such as lead, copper and arsenic as well as sulfur dioxide from burning sulfur. Mining towns were built around the smelters, and homes and yards were covered with toxic dust day after day, year after year.

Today, stack smoke at smelters has been controlled and only a few smelters are still operating, but people living in the rural smelter towns are at risk from the toxics deposited in their yards decades ago.

At the ASARCO Hayden Plant site in Arizona, which still produces copper from a smelter, EPA's Superfund program is overseeing the removal of contaminated soil from up to 300 yards in residential areas under an Administrative Agreement and Order on Consent signed by ASARCO and EPA in 2008. Through this agreement, which utilizes the Superfund Alternative approach, EPA and the responsible party, ASARCO, are implementing the Superfund cleanup process—from public involvement to Record of Decision and cleanup—even though the site is not added to EPA's Superfund National Priorities List.

ASARCO filed for bankruptcy in 2005, but under the agreement the company set aside $15 million that can only be used for the cleanup and that will be available even if the Hayden Smelter shuts down. At several other smelter sites in Arizona, mining and smelting companies have recognized their responsibility and are doing their own remedial investigations and cleanup. These include smelter sites in Superior, Douglas and Ajo, Ariz.

EPA is overseeing removal of contaminated soil from yards of up to 300 homes in Hayden, Arizona.

In the case of the Humboldt Smelter in Dewey-Humboldt, Ariz., however, the smelting company went bankrupt and the smelter shut down decades ago. There are no surviving entities to pay for cleanup, but several hundred people still live there. EPA added this site to the Superfund National Priorities List in 2008. Initial soil sampling found several "hot spots" of contamination in the yards of several homes. Here, the top two feet of soil has been removed and the bulldozed yards have been re-covered with a two-foot layer of clean soil.

In early 2009, EPA set up air monitors around Dewey-Humboldt to measure the particulates (dust) in the air, and the metal content of the dust. Results will be used to evaluate cleanup options.

In Hayden, population 800, the town park's top two feet of soil has been removed and replaced with clean soil, making it safer for children to play there. The aging plant at Hayden has complied with smokestack air pollution regulations, but air monitoring in town has shown levels of arsenic, lead and chromium still exceeding public health standards, probably due to toxic fumes escaping from leaks in the plant outside the smokestack.

As the exact source of air contamination in Hayden is discovered and controlled, the town's residents can look forward to breathing easier.

The smokestack of a copper smelter rises above Hayden, Ariz.

Primer

Reclaiming Groundwater in the Arid West

With years-long droughts underway in Arizona, Nevada and California, surface water is in short supply. It's more important than ever to restore contaminated groundwater, making it safe for use as drinking water. Since the early 1980s, EPA's Superfund program has been doing just that at dozens of sites throughout the arid West.

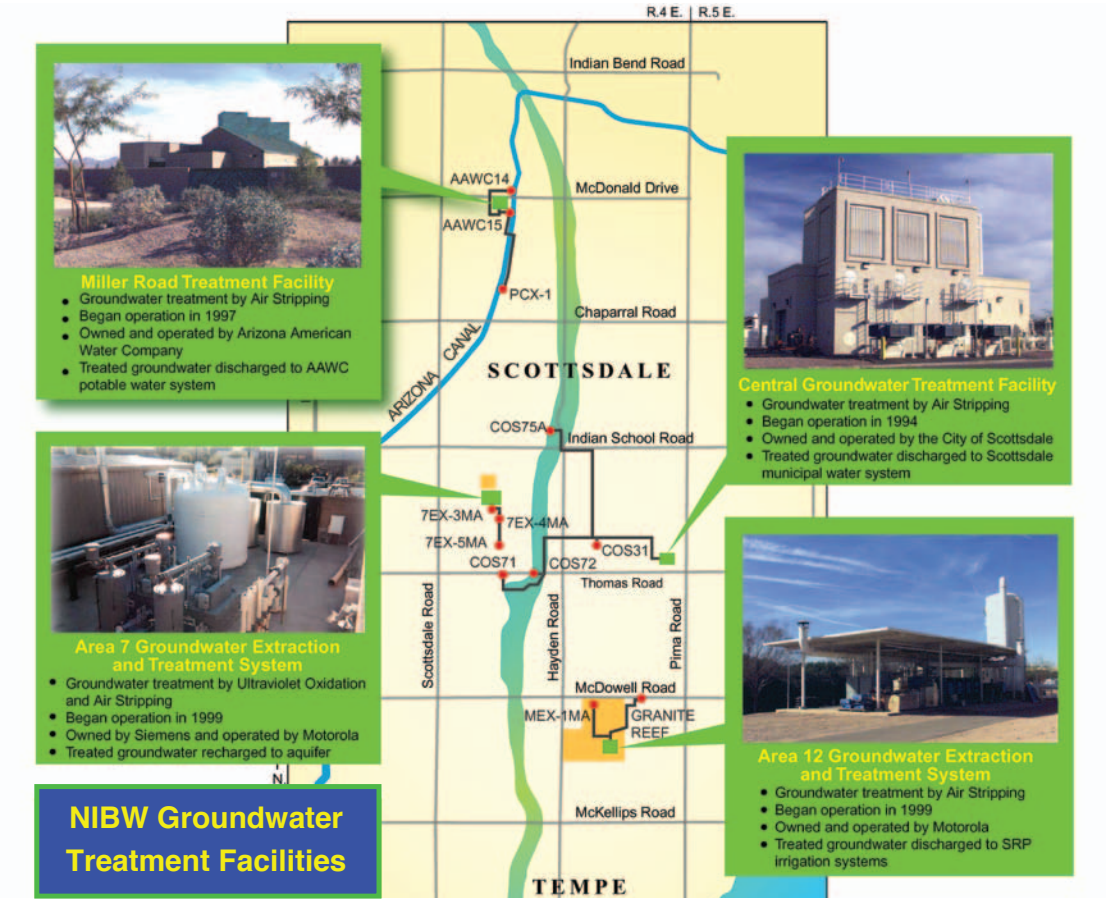
In the early 1900s, groundwater went straight to the tap, because it was assumed to be pure. But since the 1930s, liquid fuels and hazardous wastes dumped on the ground in some areas have seeped into the groundwater, making it unfit for human consumption. In some cases, "plumes" of chemically contaminated groundwater have spread vertically into deeper groundwater aquifers and laterally for miles across property boundaries and city limits.

At more than 60 of these sites, EPA Superfund staff have been working with responsible parties and contractors to get groundwater cleanup and containment systems (such as pump-and-treat) up and running. These groundwater treatment facilities, scattered throughout the West's major urban areas, are quietly churning out millions of gallons of clean water each day. In many cases, the treated water is being returned to groundwater basins or supplied directly to municipal water providers.

Some pump-and-treat facilities have been operating for more than a decade now, and the groundwater beneath them is approaching drinking water standards. At these older sites, EPA is conducting five-year reviews to ensure that the treatment systems are still functioning as intended. In a few cases, however, contaminated groundwater has just recently been discovered and mapped, and cleanup is still in the planning stages.

The old saying, "An ounce of prevention is worth a pound of cure," goes double for groundwater. It's much cheaper to prevent contamination than to clean it up. Since the early 1980s, EPA and states, territories and tribes have enforced strict regulations on underground fuel tanks, aboveground oil facilities, and hazardous waste generators and handlers to prevent new spills and leaks. Still, much work remains to clean up the toxic legacy of the past.

- At the San Fernando Valley Superfund sites in Los Angeles County, cleanup of chlorinated solvents (such as TCE and PCE) in groundwater has been underway for more than a decade, and the three pump-and-treat systems there have produced more than 60 billion gallons of clean drinking



Left: Map and photos of groundwater treatment facilities at the North Indian Bend Wash Superfund site in Scottsdale, Ariz.

water while removing more than 200,000 pounds of solvents from the groundwater.

In recent years, hexavalent chromium contamination has emerged as a growing problem that has affected some of these systems and forced a reduction in pumping rates in order to continue meeting performance standards. EPA has attacked this problem on two fronts, working with state agencies to identify, investigate and clean up the sources of contamination while also working with the city of Glendale and responsible parties (who are on the hook to finance cleanup) to design and build two chromium treatment demonstration projects in Glendale.

- Drinking water wells in the Los Angeles Department of Water and Power's (LADWP) Tujunga well field in the San Fernando Valley have recently been discovered to be contaminated with the chemicals TCE and PCE. EPA is working with LADWP and the state Department of Toxic Substances Control to identify possible sources for these chemical contaminants.

- Construction of groundwater treatment systems is expected to be completed this year at the San Gabriel Valley El Monte site in Los Angeles County. Once complete, these systems will generate over 1.9 millions gallons of treated groundwater per day, which will be used to meet the potable water supply needs of local businesses and more than 7,600 homes.
- For the past several years, the San Gabriel Valley Superfund sites in South El Monte, Whittier and Baldwin Park have collectively treated and distributed almost 57,000 acre feet of drinking water per year (over 18.5 billion gallons), enough water to supply several million households in Los Angeles County.
- At the Visalia Pole Yard, in Visalia in the San Joaquin Valley, responsible party Southern California Edison used an innovative steam injection-vapor extraction system to remove more than 400,000 pounds of contaminants in soil and groundwater. Two years of monitoring data indicate that the groundwater cleanup goals have been met.
- In the Phoenix area, several NPL sites (Indian Bend Wash North and South, Phoenix Goodyear Airport North and South, and Motorola 52nd Street) have extensive PCE and TCE contamination in groundwater that stretches for several miles. Multiple treatment systems are operating throughout the three sites. During 2008, more than 6.3 billion gallons of water were treated with these systems, and more than 6,300 pounds of TCE were removed from the groundwater at these sites. Thousands of people in the Phoenix area are served drinking water that has been treated by one of these systems.
- The Tucson International Airport Area Superfund site is in the southeastern part of Tucson. The groundwater in the area has multiple TCE plumes, as well as a 1,4-Dioxane plume, associated with this site. There are five groundwater treatment systems with a combined pumping rate of 6,000 gallons per minute. Over the last 22 years, almost 50 billion gallons have been treated, removing 200,000 pounds of solvents. Water from one of the treatment systems comprises 9% of Tucson's water supply and serves 50,000 Tucson residences.

More on Superfund in the Pacific Southwest:
www.epa.gov/region9/superfund

Above: Aerial view of groundwater treatment facility at the Tucson International Airport Area Superfund site.

Left: Air stripping trays remove contaminants from groundwater.

Places

Containing Sunrise Landfill to Protect Las Vegas Drinking Water

In August 2008, EPA settled an enforcement action against the company responsible for the 440-acre Sunrise Mountain Landfill in Clark County, Nev. The agreement, which requires the company to build and operate a comprehensive remedy for the site that will prevent waste from washing downstream into Las Vegas Wash and Lake Mead during rainstorms, caps a decade of effort by a small group of EPA staff.

The landfill's cover was breached by a heavy rainstorm in 1998, discharging waste into the wash, which in turn flows into Lake Mead, the main source of drinking water for the Las Vegas area, the Phoenix area and parts of Southern California. In response EPA issued administrative orders under the Resource Conservation and Recovery Act and the Clean Water Act. The operators did short-term repairs, but resisted developing a comprehensive closure.

Overcoming the operators' myriad technical and legal objections required patient, persistent effort by EPA staff. Unwilling to leave any aspect of the closure plans to chance, they systematically negotiated an exhaustively detailed design for a lasting landfill cover and stormwater controls.

The company, Republic Services of Southern Nevada, has paid a $1 million civil fine to resolve alleged violations of the Clean Water Act, and will pay an estimated $36 million to implement a comprehensive closure. In addition to stormwater controls, the plan includes an armored engineered cover, methane gas collection, groundwater monitoring, and long-term operation and maintenance.

The settlement will ensure effective long-term control of the landfill, which contains over 49 million cubic yards of waste. The remedy is expected to take roughly two years to build. Upon completion, it is estimated to prevent the release of over 14 million pounds of contaminants annually, including stormwater pollutants, methane gas and landfill leachate.

For 40 years prior to 1993, the Sunrise Mountain Landfill received most of the Las Vegas area's waste, including municipal solid waste, medical waste, sewage sludge, hydrocarbon-contaminated soils, asbestos, and construction waste.

For 40 years, Sunrise Mountain Landfill received most of the Las Vegas area's waste.

The landfill was operated on behalf of Clark County by entities related to Republic Services of Southern Nevada from the 1950s through 1993, when the landfill stopped accepting more waste. Following the landfill cover failure in 1998, EPA ordered Republic Dumpco, a related company, and the Clark County Public Works Department to correct violations of the federal clean water laws and immediately stabilize the site.

The technical advances in developing the unique surface armoring of the landfill serve as a precedent for other desert landfill sites requiring comparable protections from erosion and infiltration. When construction is complete in two years, the Sunrise Landfill should be able to successfully weather a 200-year storm event.

More on Sunrise Landfill:
www.epa.gov/region9/waste/sunrise

Aerial view of the Sunrise Landfill near Las Vegas, Nev.

People

Luis Garcia-Bakarich: Reaching Out on Cleanups

Luis Garcia-Bakarich has been a Superfund community involvement coordinator for just three years, and he's already been nominated for a national EPA award for exceptional public service.

At the Brown and Bryant Superfund site in California's San Joaquin Valley, he earned the trust of a community where people feel plagued with environmental problems—the Superfund site, poor groundwater quality, and some of the nation's worst air pollution. When the community criticized EPA's proposed cleanup plan, Luis began meeting with concerned residents, initiating a dialogue between the community and EPA's technical staff. By the time EPA finalized the plan, the community group sent EPA a "thank you" letter for the work he led.

Luis is also the Pacific Southwest Region's coordinator for the Technical Assistance Services for Communities (TASC) contract, which provides technical and educational services to communities affected by hazardous waste sites. Through his efforts, seven communities have received TASC services, including four completed projects and three underway.

But his most significant contribution has been his vital role in the Navajo Abandoned Uranium Mine Project (see story, p. 26). In 2008, the project included assessment and cleanup of potentially contaminated radioactive homes and structures, testing of water sources, and informing nearby residents.

With an emphasis on partnership, Luis collaborated with the Navajo Nation EPA to conduct effective outreach and provide information so residents can be more informed about the risks associated with abandoned uranium mines. The abandoned mines are in remote areas, near isolated homes and communities. Luis worked with the Navajo Nation EPA to describe the work to be done on each resident's property. He helps coordinate outreach efforts and materials for both the communities and the tribal agencies.

Early on, he helped organize a stakeholder workshop in Gallup, New Mexico, to discuss the project's five-year cleanup plan. Approximately 150 people attended, including representatives from 13 federal agencies, the Navajo Nation, the Hopi Tribe, the states of New Mexico and Arizona, two universities, nonprofits, and private citizens.

Effective outreach helps protect Navajo residents from uranium contamination.

Later, Luis worked collaboratively with EPA and Navajo Nation staff on outreach, including the development of a communications strategy that he presented to Navajo Division of Health and Indian Health Service personnel, to ensure that Navajo families don't drink contaminated water. He developed signs that are now permanently displayed at livestock wells that are unfit to use for drinking water due to uranium contamination. In addition, Luis created a half-page ad in the Navajo Times warning residents about the locations of the contaminated wells and prepared illustrated reports for members of Congress.

Working in concert with colleagues in EPA's Pacific Southwest Tribal Program, Luis has contributed significantly to EPA's strong relationship with the Navajo Nation.

Partnership

Reducing Public Health Impacts of Contamination on Palos Verdes Shelf

While the shimmering waters off the coast of Los Angeles appear blue and clear, a large deposit of toxic DDT and PCB-contaminated sediment on an expanse of ocean floor known as the Palos Verdes (PV) Shelf has created a health risk to consumers of local fish.

The most contaminated species of fish, white croaker, is readily caught by subsistence fishers from local piers and can be bought in local markets. Local residents who eat these fish, including children and pregnant women, are exposed to dangerous levels of DDT and PCBs.

EPA banned use of the pesticide DDT in 1972, and PCBs (polychlorinated biphenyls) a few years later, but the toxic legacy continues. An estimated 110 tons of DDT and 11 tons of PCBs flushed down the sewers by local industries in the 1940s to the 1970s lies on the PV Shelf.

Over the past seven years, however, EPA's Sharon Lin, Jackie Lane and Lori Lewis have collaborated with local partners to create a highly successful stakeholder-driven public outreach and education program to teach at-risk populations about safer fish consumption practices: the Palos Verdes Shelf Institutional Controls (ICs) program. They have worked closely with federal, state and local health agencies, community-based organizations and environmental groups to reach vulnerable populations and reduce their health risk.

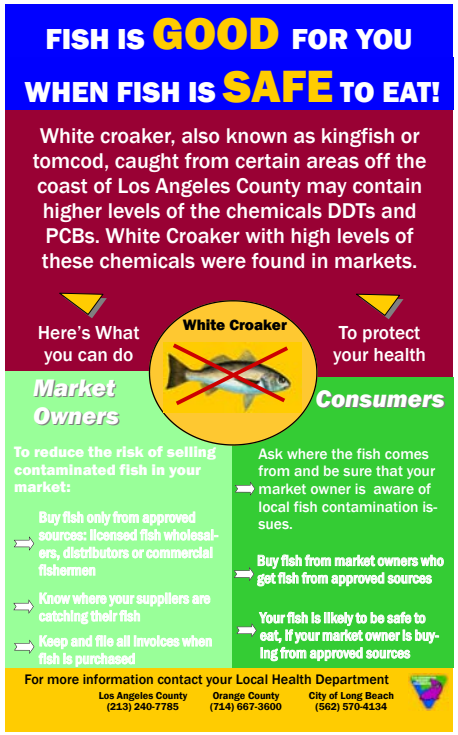
Sharon has been working with the Fish Contamination and Education Collaborative (FCEC), a partnership of state agencies and local groups, to educate local community members on the dangers of eating bottom-feeding fish from the area. To further involve the partners, Sharon negotiated four Cooperative Agreements in 2007-2008 to provide funding and create alliances with local and state agencies: the City of Long Beach, the Orange County and Los Angeles County Departments of Public Health, and the California Department of Fish and Game. These agencies are providing enforcement and outreach support to supplement the community and angler outreach and education efforts.

The FCEC partners have reached more than 100,000 community members in more than ten languages. After training through the ICs program, public health nurses from L.A. County, Orange County and Long Beach have been working closely with a number of community-based organizations serving different ethnic groups. In the past year, outreach was done through L.A. County Department of Public Health programs, reaching thousands more people, including more than 360 obstetricians and 1,200 pediatricians.

The angler outreach program, carried out by Heal the Bay and the Cabrillo Marine Aquarium, reaches anglers at piers, shorelines and bait shops. Pier outreach occurs at 10 piers and eight shoreline locations on a year-round, weekly basis.

Evaluation and measurement of behavior modifications based on the ICs program has shown that the message "Know your fish, reduce the risk" has effectively reached thousands of anglers, fish markets and consumers. Community members are modifying their fishing and consumption behaviors to reduce their health risks.

The collaborative effort has been so successful that the community partners of the FCEC were recognized with a 2009 EPA National Citizen Excellence in Community Involvement Award.



Outreach poster warns coastal residents to avoid eating white croaker due to DDT and PCB contamination.

Above: Training session for Palos Verdes Shelf outreach workers.

Learn more:
www.pvsfish.org
www.epa.gov/region9/superfund/pvshelf

Crossing Borders

Assisting China's Efforts to Protect Land, Waters and People

In April 2006, top EPA officials traveled to China for the official signing of the Hazardous and Solid Waste Annex and Strategy, formalizing EPA's partnership with China on these issues.

Since then, EPA's Pacific Southwest Regional Office has been leading the implementation of this strategy—by maintaining contact with China's Ministry of Environmental Protection (MEP), helping China strengthen its hazardous waste regulations and clean up contaminated sites, and improving its emergency response capacities through workshops and study tours both in the U.S. and China.

EPA's point person in this partnership, and in many ways its architect, is Lida Tan of the Pacific Southwest Superfund Division. A native of China, she came to the U.S. at the age of 18 in 1983, and has been with EPA for the past 20 years. The Hazardous and Solid Waste Annex began as her idea in 2005. EPA's Office of International Affairs approved, seeing it as an opportunity to open up a whole new area of cooperation with China. Lida drafted and negotiated both the annex and strategy. When discussions stalled, she simply picked up the phone.

For the past three years, Lida has worked with EPA colleagues in offices throughout the nation, plus California's Department of Toxic Substances Control, to carry out the strategy. They organized more than 10 workshops in China, and hosted dozens of study tours in the U.S. for MEP officials.

Highlights include:

- **PCB Cleanup:** China's first Superfund-like cleanup involves more than 47 PCB sites and permitting an incinerator to destroy the PCB waste. This project will serve as a model for PCB cleanups in other provinces. EPA organized four workshops for China on PCB investigation, sampling, incineration and permitting.
- **Waste Management and Pollution Prevention:** China has a waste law, but has sought EPA's help on its implementation and enforcement. Lida organized five workshops on the U.S. waste program, including permits, inspections, and enforcement. She has also coordinated within EPA in advising MEP on recycling, medical waste, and extended product responsibility.
- **Hazardous Waste Regulation:** In 2008, MEP noted EPA's contribution when it adopted hazardous waste manifest regulations and emergency response preparedness requirements for hazardous waste treatment facilities.
- **Emergency Response:** After a major benzene spill into the Songhua River in 2005 fouled the drinking water of Harbin and flowed into Russia, emergency response became a top priority for China. EPA led four study tours in the U.S., and organized two workshops on chemical safety and emergency planning/response in China.
- **Contaminated Soil:** EPA is providing technical support to MEP as it drafts regulations to address soil contamination.

EPA's Lida Tan, Ben Machol and Amy Zimpfer (sitting, near center) with delegation of environmental officials from China, January 8, 2009.

Communities and Ecosystems

Much of EPA's work in the Pacific Southwest cuts across boundaries. Addressing the environmental needs of the region's Indian tribes and Pacific island territories, for example, involves many of EPA's programs—as does addressing environmental justice concerns in communities across the region.

Tribal and Pacific island communities share the need to provide safe drinking water to all of their inhabitants and clean up contaminated sites. Working as partners with EPA, they've made great strides toward that goal in recent years.

On the Navajo Nation, safe drinking water is just one goal of an ambitious five-year plan, now underway, to address the most hazardous uranium mining sites. EPA is working with the Navajo Nation EPA to assess environmental hazards at more than 500 of these sites.

Johnston Atoll in the Pacific is a wildlife refuge where chemical weapons were destroyed at a specially-designed incineration facility in the 1990s. EPA recently worked with the U.S. Army to ensure that no toxic hazards remain.

In the urban community of South Phoenix, Arizona, a three-year effort to reduce toxics used at industrial sites in a residential neighborhood has garnered positive results for both businesses and residents.

Trends

Safe Drinking Water Coming to Islands, Tribes

The Pacific island territories and the tribal lands of the Pacific Southwest Region face significant challenges to providing safe drinking water. In some places infrastructure is inadequate or nonexistent, and limited funding, challenging local economic conditions and remote locations often make it difficult to upgrade or install systems.

The result is a striking disparity: 27% of the people in the Pacific island territories and 13% of the homes in Indian Country lack access to safe drinking water, compared to 0.6% of all U.S. homes.

The island and tribal governments, working with EPA, have made significant progress toward the goal of safe drinking water for everyone in the past five years. For instance, the proportion of people with access to safe drinking water in the U.S. Pacific islands—Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (CNMI)—has climbed from 39% in 2003 to 73% in 2008.

But more financial assistance will be necessary to reach 100%. "We have plenty of shovel-ready projects, but lack adequate funding," says EPA's John McCarroll, supervisor of the Pacific Islands Office of the Pacific Southwest Region. Some of these projects will be funded with approximately $4 million provided under the American Recovery and Reinvestment Act (ARRA).

Saipan, in CNMI, is the only municipality of its size in the U.S. without 24/7 drinking water service. In parts of Saipan, at certain hours of the day, people turn on their taps and get nothing. In 2008, with the help of a $3.2 million EPA grant, CNMI completed the Kanat Tabla water storage tank, which brought 24/7 drinking water to more of Saipan. The proportion of residents with continuous drinking water service jumped from just 25% in 2005 to 65% in 2008.

In Saipan, the proportion of homes with 24/7 drinking water service jumped from 25% in 2005 to 65% in 2008.

In Guam, improvements have resulted from a $105 million bond issuance by the government of Guam and the implementation of a court order (sought by EPA) to the island government mandating drinking water and wastewater improvements. Both are necessary for safe drinking water, because leaky sewage systems can pollute drinking water with disease pathogens. When such contamination has occurred, the Guam government has issued "Boil Water" notices to residents—that is, people must boil their tap water before drinking it.

An aging water tank on Saipan that collapsed.

In 2008, however, Guam enjoyed its fourth year in a row without Boil Water notices, and had no health-based violations of safe drinking water regulations. And Guam's court order provided a model for a similar order EPA negotiated to improve CNMI's water system. The order is anticipated to take effect in 2009.

On tribal lands in the Pacific Southwest, EPA-funded projects in 2008 brought safe drinking water to 3,000 additional homes in Indian Country. Meanwhile, on the Navajo Nation in the Four Corners region of Arizona, Utah, and New Mexico, EPA worked with the Navajo Nation EPA to protect residents after sampling in isolated desert locales revealed 22 wells with unhealthy levels of radionuclides such as uranium (see story, page 26).

In February 2009, the White Mountain Apache Tribe celebrated groundbreaking of a drinking water treatment plant that will treat up to 2 million gallons per day of river water to serve 10,000 residents. The facility will replace a dwindling groundwater supply unable to meet the demands of the reservation.

The project, which features an innovative, award-winning green building design, will be partially funded by the ARRA, which will provide a total of about $8 million to the Pacific Southwest Region for tribal drinking water projects.

Above: EPA provided $3 million in funding to construct the new million-gallon Kanat Tabla water tank to improve access to drinking water for Saipan residents.

Primer

EPA, Navajo Nation Address Uranium Contamination

From 1944 to 1986, nearly four million tons of uranium ore were extracted from Navajo lands under leases with the Navajo Nation. Today the mines are closed, but a legacy of uranium contamination remains, including more than 500 abandoned uranium mines (AUMs) as well as homes and drinking water sources with elevated levels of radiation.

The U.S. House of Representatives Oversight and Government Reform Committee directed five federal agencies—EPA, the Bureau of Indian Affairs, Department of Energy, Indian Health Service, and Nuclear Regulatory Commission—to work together to attack the problem. Over the last two years, a team of 30 staff and managers from EPA's Pacific Southwest Regional Office organized five federal agencies and developed a coordinated five-year plan to address contaminated homes, wells, mine sites, mills and dumps. This landmark plan outlines a cleanup strategy and details the cleanup process for the Navajo Nation over five years—work that is now underway.

The team of federal and Navajo Nation agencies has assessed more than 100 Navajo homes, 240 wells and 80 abandoned mines to determine threats to residents. Working in partnership with the Navajo Nation EPA, the team has removed 27 contaminated homes.

EPA and the Navajo Nation are addressing the most urgent risks first—uranium-contaminated water sources and structures.

The lands of the Navajo Nation include 27,000 square miles within the boundaries of Arizona, Utah, and New Mexico in the Four Corners area. The unique geology of these lands makes them rich in uranium, a radioactive element in high demand for the development of nuclear weapons and power plants from the closing months of World War II in the mid-1940s to the present.

Many Navajo people worked the mines, often living and raising families in close proximity to the mines, mills, and dusty piles of processed ore. Potential health effects include lung cancer from inhalation of radioactive particles, as well as bone cancer and impaired kidney function from exposure to radionuclides in drinking water.

In 2005, the Navajo Nation asked EPA's Superfund program to take the lead on the Northeast Church Rock Mine site, located adjacent to the United Nuclear Corporation (UNC) Superfund site. In 2006, EPA issued an administrative order to UNC to conduct a removal investigation at 14 separate areas. The Superfund program later cleaned up four residential yards and one home to the north of the Northeast Church Rock Mine site. EPA is working with the Navajo Nation EPA and UNC to arrive at a final remedy for the entire site.

In 2007, EPA released the Navajo AUM Assessment Report and Geospatial Data Atlas. A collaborative effort with the U.S. Army Corps of Engineers, the Navajo Abandoned Mine Land Reclamation Program and the Navajo Nation EPA, it is an exhaustive assessment and analysis of all known uranium mines on the Navajo Nation. It ranked the Northeast Church Rock Mine site as the highest priority. EPA has distributed copies of the report to the Navajo

Windmill pumps groundwater into a storage tank on the Navajo Nation.

Above: Portable geiger counter and GIS equipment map radiation readings.

Nation and is using it to analyze and prioritize AUM sites, and to identify all the sites in need of further investigation using the site screening process.

In 2008, EPA and the tribe focused on the urgent issue of uranium-contaminated water sources and structures. Approximately 30% of the Navajo population does not have access to a public drinking water system and may be using unregulated water sources with uranium contamination. EPA and the U.S. Centers for Disease Control tested 249 unregulated water sources, and found that 22 exceeded drinking water standards for radioactive contaminants.

EPA and the Navajo Nation EPA have launched an aggressive outreach campaign to inform residents of the dangers of drinking contaminated water (see story, p. 21). The two agencies are also working with the Indian Health Service to develop alternative drinking water supplies.

During the next four years, EPA will focus on the problems posed by abandoned mines, completing a tiered assessment of more than 500 uranium mines and taking actions to address the highest priority sites. As mines that pose risks are discovered, EPA will identify those sites with potentially responsible parties for possible enforcement action. At those sites on Navajo Trust lands without such responsible parties, EPA will conduct removal actions as funding is available. EPA will coordinate with government agencies regarding sites that are on state and federal lands.

Although the legacy of uranium mining is widespread and will take many years to address completely, the collaborative efforts of EPA, other federal agencies and the Navajo Nation will bring an unprecedented level of support to the people at risk from these sites. Much work remains to be done, and EPA is committed to working with the Navajo Nation to remove the most immediate contamination risks and to find permanent solutions to the remaining contamination on Navajo lands.

For more information:
www.epa.gov/region9/superfund/navajo-nation

Above: Workers demolish and remove a contaminated home.

Right: A natural rock arch on the Navajo Nation.

Places

Johnston Island: Achieving Clean Closure

For decades Johnston Island, a remote atoll more than 700 miles southwest of Honolulu, was the repository for some of the world's most deadly hazardous waste: more than 400,000 bombs and artillery shells filled with four million pounds of a nerve agent so potent that a drop of it on your skin can be fatal. All of the nerve agent was incinerated in the 1990s in a factory-like complex on the island.

Today, the island is part of a wildlife refuge providing the only nesting habitat for birds in thousands of square miles of the Pacific Ocean. EPA recently oversaw a final round of confirmatory sampling to demonstrate clean closure.

The U.S. Army designed and built JACADS (Johnston Atoll Chemical Agent Disposal System) as a prototype for similar plants now built and operating on the U.S. mainland to dispose of chemical munitions. EPA worked with the Army from design of the incinerator facility to clean closure, a period of about 30 years, to ensure that human health and the environment were protected every step of the way.

When the facility was operational, the island was inhabited by thousands of military and civilian operators who would have been at risk from any leaks of nerve agent. EPA issued the Army's permit with numerous conditions to prevent any release, including constant air monitoring. The agency periodically sent inspectors to look for any flaws in the operation and constantly reviewed the Army's reports.

By November 2000, the last of the chemical agent was destroyed. In 2002-2003, the Army dismantled JACADS, removed all buildings, cleaned up the site, and completed closure verification sampling. EPA's review of the sampling methods and results, however, found deficiencies in some of the quality control analyses and spatial data coverage. As a result, the agency could not certify clean closure.

So EPA assigned a multidisciplinary team of staff and managers to work collaboratively with the Army to resolve these issues. Team members had expertise in sampling design and management, analytical chemistry, and other relevant specialties. They met with the Army's experts and contractors to review over 400,000 data points and decide which were technically valid. EPA concluded that while most of the data were valid, 100 locations on the island would require re-sampling.

Today, Johnston Island and its nesting seabirds are part of a wildlife refuge.

Because the island's infrastructure was gone and the airstrip unusable, the Army hired a private research vessel and had it fitted with all necessary equipment. The re-sampling crew spent five days traveling each way to and from Honolulu, and seven days working on the island, with nights spent on the boat. EPA's JACADS project manager, John Beach, was a member of the re-sampling effort and oversaw the Army's work.

"We worked in an atmosphere of mutual respect with the Army," says EPA Pacific Southwest Waste Division Associate Director Arlene Kabei. "But we had to request that the Army return to the island for some re-do. It was a testament to the scientifically-credible work by both the Army's and EPA's teams that the Army also accepted the need for more validation data to assure clean closure."

Since the cleanup, Johnston Atoll, a coral reef ecosystem that is home to hundreds of thousands of seabirds, was given complete protection as part of the recently established Pacific Remote Islands National Monument.

Johnston Island is home to hundreds of thousands of nesting seabirds.

People

Karen Henry: Working with Communities for Environmental Justice

Karen Henry is uniquely qualified to be in the Pacific Southwest Region's Environmental Justice (EJ) program. She grew up in a Richmond, Calif., neighborhood across the street from railroad tracks used by diesel locomotives. Just beyond that lay the sprawling Chevron refinery.

One day the playground in the middle of her apartment complex was fenced off because it was found to be contaminated with lead. She recalls wondering, "Why did the government let us play there for years?" She also had asthma when she lived there, but it disappeared when she moved to a different neighborhood.

Because of her experiences, Karen knows how residents in communities with disproportionate impacts feel. She also knows how agency scientists and engineers think, since she holds degrees in biochemistry as well as civil and environmental engineering.

Karen has been a member of the EJ program since its inception. In the late 1990s, Karen helped EPA pilot a new collaborative problem solving (CPS) process to replace the earlier top-down standard procedure of government agencies, known as "DAD": Decide, Announce, Defend. She worked with Barrio Logan, a Latino neighborhood in San Diego—one of 15 pilot projects across the nation. People there were concerned about air pollution from a metal plating shop. Karen brought together a CPS group that involved EPA and community members as co-leads, state and local agencies, and industry.

"When people work together on an ongoing basis, it builds relationships," she says. "Agency people relate to the community as people they know. Industries usually want to be good neighbors." With different agencies present, if one said it didn't have jurisdiction to do what the community was asking, another could step in, Karen says. In this case, state air regulators set up air monitoring stations around the plating shop—and found that it was emitting chromium into the air.

With CARE grants and collaborative problem solving, communities are in a leadership position.

Ultimately the local government denied the plating shop its operating permit, and it closed. EPA offered compliance assistance training to other businesses in the neighborhood. When the two-year pilot was over, EPA adopted CPS nationwide. More than a decade later, the Barrio Logan collaborative is still going, working on reducing air pollution from the port. The collaborative has also reached 6,500 people in auto-related businesses, and two-thirds have adopted pollution reduction practices.

Today, the CPS model is duplicated at the state level, and with EPA's newer Community Action for a Renewed Environment (CARE) grant program. In every case, Karen says, "The communities are in a leadership position." She's currently working with groups in West Oakland, Pacoima (in Los Angeles), and Bayview/Hunters Point (San Francisco).

In Hunters Point, residents are concerned about developers bulldozing serpentine rock and kicking up asbestos dust. Recently, the developer has started watering down the area to keep the dust down, and the local air district and the community are doing air monitoring.

"EPA doesn't have authority here, but we try to mediate solutions," Karen says. "People do disagree, but I'm usually able to help residents and agencies listen to one another so they can solve problems together."

Partnership

Reducing Toxics, Resource Use in Arizona

In South Phoenix, Arizona, industries that use toxic chemicals share a low-income neighborhood with thousands of residents. In 2005, following community meetings, 21 South Phoenix businesses joined a partnership to reduce their air emissions. Meanwhile, a $225,000 EPA grant helped the state's Department of Environmental Quality launch a statewide effort to improve environmental performance. Both programs report positive results.

South Phoenix Partnership

For several years, South Phoenix residents expressed concerns about air pollution from industry and diesel trucks. From 1992 to 2001, seven major chemical fires occurred, sickening many people who sought medical help at hospitals. To address these concerns, EPA established a pollution prevention partnership with the key stakeholders—community residents, 21 companies, and several state and local agencies.

The goals of the South Phoenix Industry Challenge/Good Neighbor Partnership were to reduce toxic exposures from industrial emissions, to reduce diesel emissions from city garbage trucks and street sweepers, and to prevent accidental chemical releases. In three years, 21 facilities reduced air emissions by a total of 85,000 pounds.

Participants also reduced a total of 60 million kWh of electricity, 373,000 pounds of hazardous waste, and 827,000 gallons of water, measured per unit of production. One partner, the City of Phoenix, retrofitted 64 diesel vehicle engines that operate in South Phoenix to reduce particulate emissions. The partnership has now become a model for community toxics reduction projects across the nation.

"No longer will South Phoenix be known as a heavy polluter, and we are grateful to the South Phoenix companies who stepped forward to clean up the air," commented Maricopa County Supervisor Mary Rose Wilcox.

Arizona Partnership Program

With the aid of a $225,000 Innovation Grant from EPA, the Arizona Department of Environmental Quality expanded Arizona Performance Track. The program recognizes business and government facilities that are good environmental stewards, and who go above and beyond the minimum requirements set by regulations.

Four of eight members have completed one reporting cycle and show the following results:

- Ping Inc., a golf equipment manufacturer, reduced its energy use by 24% in three years, the equivalent of 5,000 metric tons of CO_2. Ping also cut its annual use of smog-forming mineral spirits by 44%.
- Intel Ocotillo avoided 4,000 pounds of excess air emissions that could have resulted from its increasing production. The facility also saved 244 million gallons of water by improving on an already highly efficient water management system.
- The City of Scottsdale recently conserved 615 acres of wildlife habitat. Past efforts by Scottsdale bring their total to more than 14,416 acres added to the McDowell-Sonoran Preserve. The city has also recharged more than 4 billion gallons of water to its underground aquifer since 2004.
- Xanterra South Rim LLC reduced its greenhouse gas emissions by 6%, equal to 855 metric tons of CO_2, and cut water use by 2.7 million gallons, on a per-visitor basis. Earlier, Xanterra reduced 14 million gallons per year from its 2002 baseline.

More on the South Phoenix partnership:
www.phoenixindustrychallenge.com

More on Arizona Performance Track:
www.azdeq.gov/function/about/track.html

EPA's Leif Magnuson (far left) with participants in the South Phoenix Industry Challenge/Good Neighbor Partnership.

Partnership

Internship Program Brings Students West

In the summer of 2008, EPA's regional Civil Rights Office hosted four students from Historically Black Colleges and Universities (HBCUs) for summer internships. The students got a chance to experience the work EPA staff does in the field, in the regional lab, and at the office in downtown San Francisco.

The effort began with the establishment of the regional office's first HBCU Memorandum of Understanding (MOU) as part of its commitment to pursue stronger relationships with HBCUs to support educational and employment opportunities for African Americans, and to attract a workforce as diverse as the public EPA serves. Xavier University in New Orleans was selected as the first school as it offered the opportunity to directly support the revitalization of communities impacted by Hurricane Katrina, of keen interest to many regional EPA staff who personally volunteered to secure safe drinking water and clean up oil spills and hazardous waste in affected areas.

The recruitment effort at Xavier included a presentation by Dr. Patrick Wilson, a toxicologist at EPA's Pacific Southwest Office. His talk inspired several students to apply for internships, including Luther St. James of Daytona Beach, Fla., and Antoinette Lane of Oakland, Calif., both biology students interested in medical school. The regional office later recruited students from other HBCUs with which EPA has MOUs: Simone Combs, from Spelman College in Atlanta, and Cynthia Williams, from Howard University in Washington D.C.

Arriving in June 2008, the interns were assigned a variety of tasks and field trips. Luther spent his first week on the Navajo Nation in northeast Arizona with Luis Garcia-Bakarich (see story, p. 21) of EPA's Superfund Community Involvement Office. They traveled many miles meeting with residents of the Navajo Nation, informing them about dangerous radiation levels in their homes. According to Luther, "it was a humbling experience" to witness first hand the direct effects of pollution on their lives.

Each intern kept a weekly work diary. Simone wrote: "At the Region 9 lab in Richmond, we saw what kinds of work are done at the lab and even got to help out by plugging a bunch of fish for mercury analysis. The following day we drove up to the Leviathan Mine Superfund site in the Lake Tahoe area, to help Peter Husby test the creek water. . . . [V]isiting the mines was one of the experiences that impressed me the most. We wrapped up our week by helping facilitate the CYCLE program in which middle and high school kids spent a day at the lab."

More than two dozen EPA staff and managers worked with the interns during the summer, serving as educators, mentors, field trip guides, and even serving home cooked dinners. All agreed that watching the students learn and grow from their many experiences was personally rewarding, and that they look forward to seeing these young people become our nation's next generation of environmental leaders.

Above: Interns plug fish tissue for mercury analysis at EPA's laboratory in Richmond, Calif.

Left: Xavier University intern Luther St. James on an EPA work trip to the Navajo Nation, June 2008.

Compliance and Stewardship

One of EPA's essential functions is to ensure compliance with environmental laws—making sure they mean as much on the ground as they do on paper. Here we look at some of the past year's most successful enforcement cases in the Pacific Southwest—and the EPA staff who make them happen.

This chapter's other focus, stewardship, looks at EPA's work on sustainable solutions to long-term environmental challenges big and small, from local redevelopment to global climate change.

EPA's Brownfields Program spurs redevelopment where former industrial sites are lying unused due to suspected contamination. In Nevada City, California, the sites are legacies of historic gold mining. On the other side of the Sierra, at the Reno-Sparks Indian Colony, redevelopment is already bringing economic benefits.

In Hawaii, EPA research grants are funding ground-breaking scientific studies of the impact of rising carbon dioxide levels on coral reefs. Early results suggest that if the oceans absorb too much CO_2, acidification may doom reef-building organisms.

Meanwhile, in a desert valley near Las Vegas, Nellis Air Force Base points the way to a sustainable future. Nellis installed the nation's biggest solar photovoltaic generating system, and the base is conserving water and energy while reducing toxic waste.

Trends

Enforcement Actions Secure $2 Billion for Environmental Improvements

In fiscal 2008, EPA enforcement actions in the Pacific Southwest resulted in commitments of more than $2 billion for toxic cleanups and other environmental improvements—a record amount for the region.

The largest cleanup commitment, $876 million, resulted from a Clean Water Act case against the City of San Diego for sewage leaks and spills over several years. The city is scheduled to spend the funds to upgrade and maintain its sewage collection system through 2012. Honolulu, in a similar case, is committed to spend $300 million on sewage system upgrades to prevent spills like the one that closed Waikiki beaches for a week in 2006.

One settlement will result in a nearly 40% reduction in emissions from a Southern California cement plant.

Federal agencies made commitments totaling $810 million to clean up contaminated soil and groundwater at five federal facility Superfund sites in California. Based on enforceable agreements with the Department of Defense and the Department of Energy, these federal agencies will implement cleanups at Camp Pendleton, El Toro Marine Corps Air Station, Edwards Air Force Base, Fort Ord and Lawrence Livermore National Laboratory. Contaminants at the sites range from unexploded ordnance to toxic chemicals to radioactive materials.

In other major cases, owners of a landfill near Las Vegas will take action to prevent waste from contaminating waterways at an estimated cost of $36 million (see Sunrise Landfill, p. 20) and ExxonMobil paid a $2.64 million penalty for PCB leaks from an offshore oil platform (see Chris Rollins, p. 38).

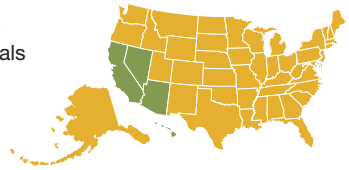
Cleaning Up Cement Kilns

EPA's Pacific Southwest Office took part in a national enforcement initiative against fossil-fuel-burning cement kilns that spew excessive air pollution.

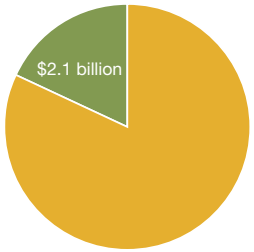
The case against Cemex California Cement's plant in Victorville in San Bernardino County, California—the state's largest source of smog-forming nitrogen oxides (NOx)—was one such action. A March 2009 settlement set new limits for air pollutants, including sulfur dioxide (SO_2), carbon monoxide (CO) and NOx, reducing emissions at the Cemex plant by 3.8 million pounds per year—nearly 40%. Cemex also must pay a $2 million penalty.

EPA also settled a case involving emissions of NOx, particulate matter, and other pollutants against another cement plant, Riverside Cement's Oro Grande facility near Victorville, Calif. As part of the settlement, the company shut down seven 50-year-old kilns before starting up a new, cleaner kiln to replace them. Shutting down the old kilns cut NOx emissions by 3 million pounds per year compared to the new kiln. The company also paid $394,000 in penalties.

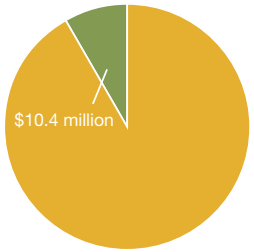
Enforcement Results in FY 08
Pacific Southwest vs. National Totals



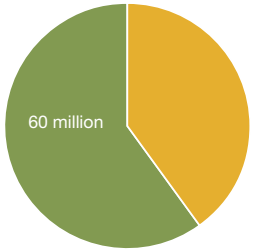
Commitments to Pollution Control and Cleanup
National: $11.8 billion



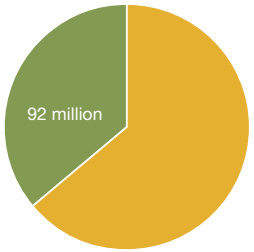
Penalties Assessed
National: $127 million



Contaminated Soil to Be Cleaned
National: 100 million cubic yards



Contaminated Water to Be Cleaned
National: 255 million cubic yards



Targeting Neighborhood Plating Shops

EPA and state regulators make routine inspections of industrial facilities, but the list of regulated locations is a long one. So inspections are often prioritized to target issues or geographic areas of particular concern.

In Los Angeles, EPA hazardous waste inspectors in 2008 targeted metal plating shops in the Pacoima/Sun Valley area and the Compton/Gardena area. In 26 inspections in these low-income neighborhoods, EPA found significant violations at eight facilities. Enforcement actions are now underway.

Above: Enforcement results for the Pacific Southwest Region, one of 10 EPA Regions.

Primer

Returning Brownfields to Productive Use

Disused industrial sites, rail yards, and underground fuel tank sites are often candidates for redevelopment, but can lay unused for decades because developers don't want to get stuck with unknown cleanup costs.

EPA's Brownfields program provides grants and technical expertise to assist cleaning up and redeveloping contaminated lands, making it easier for such lands to become vital, functioning parts of their communities. In the past two years, for example, EPA's Brownfields program has spurred redevelopment in Nevada City and Newark, California, and at the Reno-Sparks Indian Colony in Nevada.

Golden Opportunity for Abandoned Mines in Nevada City

Nevada City, in Northern California's Gold Country, is working with federal and local partners to assess abandoned gold mine sites. The city is using EPA Brownfields assessment funds to find out whether these sites are safe as future recreation areas. Funds are used to assess properties, prioritize sites for cleanup, and analyze cleanup options. The project also strengthens local partnerships through community outreach activities.

The city (population 3,000) has a 160-year history of gold mining operations, with 16 major mines in the area. After gold was discovered, Nevada City rapidly became the largest and wealthiest mining town in California, with 10,000 residents. Hydraulic mining in the late 1800s changed the landscape drastically. Miners aimed high-pressure hydraulic monitors, like large water cannons, at the hillsides, washing away millions of tons of earth and rock.

The gold-bearing muck washed downstream in trenches "charged" with mercury, a toxic liquid metal which has the unusual property of dissolving gold. The mercury was then collected and evaporated in furnaces, leaving behind pure gold. The mercury vapor was condensed back into liquid and used again, but at every step, some mercury was lost. Today, recreational gold miners are finding as much mercury as gold in local creekbeds.

Nevada City and its partners are assessing five major mine tailings areas that are close to residential neighborhoods and elementary schools. Historical research and initial assessments indicate that these sites are probably contaminated with mercury and arsenic. This affects numerous downstream communities, potentially contaminating drinking water and making fish unsafe to eat. Deer Creek was once an important fishing resource, but now there's a fishing ban in effect.

Nevada City's primary partner is the local nonprofit Friends of Deer Creek (FODC). Their aim is to further community understanding and stewardship of the Deer Creek watershed. When the nonprofit was ready to begin assessment, EPA provided a comprehensive sampling plan. When FODC wanted to analyze samples at low cost, EPA evaluated the proposed laboratory methods and showed how to do it while adhering to the agency's sampling protocols.

Four areas have already been sampled. After assessment and cleanup, the sites will be open to the public for recreation, learning about local history, and ecological restoration. Nevada City plans an interpretive "Tribute Trail" linking the sites.

Nevada City and the FODC are collaborating to find where there's mercury in the Deer Creek watershed, better understand how it moves, and reduce or eliminate downstream mercury transport. The project will help protect local residents and downstream communities from the toxic legacies of mining—mercury and arsenic.

A Green College Campus in Newark, Calif.

In the southeastern San Francisco Bay Area, EPA in 2004 awarded a $200,000 Brownfields grant to the Ohlone Community College District to clean up hazardous substances contamination on an 82-acre property on Cherry Street in Newark that had been used for agriculture. To-

Hirschman's Pond, near Nevada City, Calif., where hydraulic gold mining has left contamination.

More on Brownfields:
www.epa.gov/region9/waste/brown

Watch videos:
www.epa.gov/region9/waste/features/nevada-city
www.epa.gov/region9/waste/features/RenoSparks

day, the site is a new community college campus that provides training, education, and other services.

In addition to hosting an environmental studies program, it's the first community college to be LEED (Leadership in Energy and Environmental Design) Platinum-certified—the highest rating for an energy and resource-saving development. Solar panels generate up to half of the electricity needed by its Newark Center building, and school furniture is made from at least 65% recycled materials.

The district serves Newark, Fremont and a portion of Union City, with a combined population of about 250,000. Of the district's 7,974 full-time equivalent students, approximately 84% are Asian, Pacific Islander, and Hispanic. Minority populations account for nearly half of Newark's residents. The new campus provides job training in a variety of health sciences and technology fields, as well as jobs for instructors and campus employees.

Boosting Economic Development at Reno-Sparks Indian Colony

At the Reno-Sparks Indian Colony in Nevada, EPA helped transform idle contaminated property into economic development that benefits the tribe's 1,000 members, as well as other Native Americans in the region and the City of Reno.

Several years ago, EPA's $2 million grant to the State of Nevada created a revolving loan fund for brownfields cleanup. The state loaned about $1 million to the tribe—the first brownfields loan to an Indian community in the western U.S. The tribe used it to find and remove 1,000 tons of soil contaminated with lead and petroleum from former industrial operations.

The 22-acre property is being redeveloped into a commercial site, including a Wal-Mart Super Center. The site will produce up to $6 million in tax revenues annually, which will be used to repay the bonds that financed a new Tribal Health Center, as well as ongoing local government services such as public safety and schools.

Brownfields redevelopment helped finance the new Tribal Health Center at the Reno-Sparks Indian Colony, near Reno, Nev.

Places

Studying Climate Impacts on Hawaii's Coral Reefs

In 2006, EPA awarded a $747,000 Science to Achieve Results (STAR) grant to Paul Jokiel of the University of Hawaii, and others, for research on the effects of climate change on Hawaiian coral reefs. His recent findings suggest that ocean acidification due to human activities could cause significant change to coral reef communities in shallow warm oceans.

Coral reefs are sensitive to higher temperatures and ocean acidification, which are influenced by rising levels of carbon dioxide (CO_2) in the atmosphere associated with climate change. Acidification interferes with the ability of reef organisms to make calcium carbonate skeletons and therefore threatens the physical structure of reefs.

Dr. Jokiel built a mesocosm (controlled environment) facility at the Hawaii Institute of Marine Biology to test the impact of increased CO_2 on common calcifying reef organisms. The mesocosms simulated a doubling of today's CO_2 to levels expected later in this century.

A Hawaiian coral reef provides food and habitat for fish and other marine life.

In long-term experiments, corals in the mesocosms exposed to elevated CO_2 had a 15-20% reduction in calcification rate, but no changes in reproduction or recruitment of corals were detected. However, CCA cover was reduced 86%, and one form of CCA, rhodoliths, actually shrank within the mesocosms with elevated CO_2. This is alarming, since CCA hold a reef together by cementing carbonate fragments into massive reef structures, and they provide chemical cues to attract settling larvae of reef-building corals.

Scientists find that future climate changes will likely harm coral reefs.

These findings provide evidence that future climate changes are likely to have significant adverse impacts on coral reef ecosystems throughout the world. Calcifying organisms like corals and CCA are essential to the growth, recruitment and stabilization of reefs. Their massive wave-resistant reef structures protect tropical shorelines, and provide habitat for a myriad of fish and other organisms that support coastal human populations.

The question remains as to whether coral reefs can adapt to the relatively rapid environmental changes that are now occurring. In a *Limnology and Oceanography* paper (2008), Jokiel and others present a modeling tool to evaluate coral reef responses to changes in ocean temperature and chemistry. The model can help managers assess the interactions of stressors in ways specific to local conditions and populations, and can aid in evaluating relative risk.

A 2007 EPA report by Dr. Jordan West, *Climate Change and Interacting Stressors: Implications for Coral Reef Management in American Samoa*, provides specific recommendations for minimizing impacts of climate change for reefs in American Samoa.

Protecting Coral Reefs

EPA has taken a strong role in protecting coral reefs in Hawaii and other U.S. islands in the Pacific through research, grant funding, technical assistance, program development, and enforcement. Recent activities are addressing threats to coral reefs from climate change and land-based pollution. In the past two years, EPA has provided technical assistance and more than $5 million to American Samoa, Guam, and the Northern Mariana Islands for coral reef protection.

Wendy Wiltse, a Honolulu-based EPA biologist, reviews proposed harbor improvements, beach sand replenishment, aquaculture, and other projects that have direct impacts to coral reefs in Hawaii and the Pacific islands. Through the Army Corps of Engineers permit process, she helps minimize impacts to reefs and assists in designing effective mitigation. Dr. Wiltse is also very active in Hawaii's efforts to reduce land-based pollution, such as silt-laden runoff, which threatens the health of Hawaii's reefs.

More on coral reefs:
www.epa.gov/region9/water/oce/coralreefs.html

Innovation

Nellis AFB Accelerates Environmental Performance

Over the past year, reporters have been beating a track to Southern Nevada's Nellis Air Force Base, to see Nellis' sparkling new 140-acre photovoltaic electric power generating facility—the nation's largest photovoltaic array.

There, 72,000 solar panels track the desert sun each day to generate up to 14 megawatts of power—enough to provide 20-30% of the facility's electric power. The solar panels avoid the annual generation of 18,000 metric tons of carbon dioxide (CO_2). The array is sited, in part, over a closed, historic landfill, thereby making creative use of an area with limited development potential.

This $100 million system was built through the coordinated efforts of the Air Force, MMA Renewable Ventures LLC, and Nevada Power.

The huge 14-megawatt solar array gets attention, but Nellis also reduced energy use, water use, and hazardous waste.

MMA Renewable Ventures financed and operates the solar power plant, selling electricity to Nellis Air Force Base at a guaranteed fixed rate for the next 20 years. Nevada Power supported the project by purchasing Renewable Energy Credits generated by the solar array.

Nellis has already achieved a 16% reduction in energy use from lighting retrofits, improved air conditioning equipment and "cool roofs"—white ceramic paint on rooftops to reduce heat absorption, which cuts air conditioning power use. And they've gotten a 50% (20-ton) reduction in hazardous waste from a variety of projects, including recycling fuel from spill pads and encouraging the reuse of hazardous materials.

But Nellis' environmental performance doesn't stop there. Guided by its Environmental Management System (EMS), Nellis is setting additional goals to reduce its impacts. Base managers aim to reduce water use by 11%, or 100 million gallons of water annually, as a result of a $2.8 million xeriscaping project. They're replacing thirsty lawns and landscaping with plants adapted to desert environments, which need little water. Given the continuing drought in the Southwest, water conservation is a high priority throughout the region.

The base's jet plane maintenance activities and building maintenance have routinely generated waste paint—a hazardous waste—and wastewater contaminated by zinc. The base has set a goal to cut both of the waste streams, reducing paint waste by 2,600 pounds and reducing zinc discharges to water by 120 pounds a year.

Nellis' successful implementation of its EMS has provided the foundation for its environmental accomplishments to date and its future goals. An EMS is a set of policies, processes and practices that enable a facility to reduce its environmental impacts and increase its operating efficiency. Nellis' EMS is notable because of the size of the facility and its success in gaining the involvement and cooperation of Air Force personnel as well as civilian staff and contractors.

Nellis Air Force Base now has the nation's largest solar photovoltaic generating system.

People

Chris Rollins: Tracking Down PCBs and Hazardous Waste Violations

On January 29, 2009, EPA levied fines totaling $518,500 on two Maryland-based companies that allegedly exported a PCB-laden ship from San Francisco, even though the ship—the retired passenger liner Oceanic—had already left U.S. waters when EPA took action. The message was clear: You can run, but you can't hide from EPA's law enforcers.

In this case, the key enforcer was Chris Rollins, a long-time San Franciscan and UC Berkeley graduate with a degree in physical sciences. Neither Chris nor any other U.S. officer, including the Coast Guard, was able to board the ship after it left port, since it avoided U.S. jurisdiction en route to the Persian Gulf. But Chris and the regional enforcement team examined thousands of pages of records subpoenaed from companies that owned or worked on the vessel to establish the violations.

Chris first came to EPA's Pacific Southwest Regional Office as a part-time student intern in early 1998, when he started work in the Pesticides Program. After graduation in December of that year, he gained full-time status and became a pesticide inspector, making the rounds of stores that sell pesticides, checking for violations of pesticide labeling and registration regulations.

Highly toxic PCBs, including "invisible" uses on obsolete ships, cannot legally be exported from the U.S.

For the past year and a half, he's been in the Waste Division, where he conducts inspections and develops cases involving violations of regulations governing hazardous waste and PCBs—polychlorinated biphenyls. EPA banned the production of PCBs in 1978, after tests showed that they cause cancer in animals and harm the nervous, immune, and endocrine systems in humans.

PCBs' most widespread use was in electrical transformers and capacitors—familiar to most people as the canisters sitting atop powerline poles. Most of the liquid PCBs formerly inside these canisters have been replaced with less toxic chemicals, but all such equipment made before 1979 is assumed to have some residual PCBs. This is legal, but yellow warning labels are required for PCB concentrations of 500 ppm or more.

Ships built before 1979, such as the Oceanic, may contain PCBs in cable insulation, gaskets and watertight seals, and paint. PCBs, including these "invisible" uses on ships, cannot legally be exported from the U.S. The primary means of legal disposal are high-temperature incineration for liquid PCBs and special hazardous waste landfills for PCBs in solids.

In another major case Chris worked on recently, ExxonMobil paid $2.64 million to settle allegations that the oil giant illegally disposed of at least 389 gallons of PCBs that leaked from transformers on an offshore oil platform in Southern California's Santa Barbara Channel over a two-year period. No release to ocean waters was ever documented. Some of the PCBs ended up in an oil pipeline to tanks onshore, where it was diluted into large quantities of oil, and some went to the wrong type of landfill.

Watch Chris in EPA's video about PCBs:
www.epa.gov/region9/pcb-ship

People

Donna "Kahi" Kahakui: Enforcing the Law in Hawaii

Go ahead. Think of the long-running TV show, *Hawaii Five-0*. Now, instead of Dano (as in "Book 'im, Dano"), think Donna. That would be Donna Kahiwaokawailani Kahakui, one of two EPA Special Agents based in Honolulu, working for the Criminal Investigations Division (CID). In Hawaii's law enforcement community, she's known as Kahi.

Before coming to EPA in 2002, Kahi was already known as an environmental activist and athlete. She founded Kai Makana, a volunteer-run nonprofit that educates and mobilizes people to understand and preserve marine life and the ocean environment through youth mentorship and community-based programs. One of their projects involves stewardship of Mokauea Island, an islet off Honolulu where ancient Hawaiian lifeways are recreated.

Kahi is also a champion outrigger canoe paddler. In April 1999, she completed the first recorded solo outrigger canoe paddle from the Big Island to Oahu—a 140-mile marathon in 58 hours that her CID colleague Gary Guerra calls "superhuman." That's just one item on a long list of paddling records (Molokai to Oahu, 32 miles in 5 hours, 11 minutes) and accomplishments, both solo and as a member of outrigger crews.

Unlike on *Hawaii Five-0*, most of the CID's work is carried out quietly. This cadre of EPA agents investigates environmental crimes—not unknowing violations, which carry financial penalties, but willful lawbreaking that earns jail time.

Kahi covers the State of Hawaii, while Gary primarily covers American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and some of Hawaii.

They collaborate closely with other law enforcement agencies that can provide backup. Several years ago, they initiated quarterly Hawaii Environmental Enforcement Task Force meetings, where federal, state and local law enforcement authorities gather to plan cooperative efforts.

Like detectives, they often work odd hours, conducting interviews with whistleblowers outside the workplace. In one recent instance, Kahi worked with the U.S. Coast Guard to successfully prosecute a couple of sailors who routinely dumped oil off their vessel.

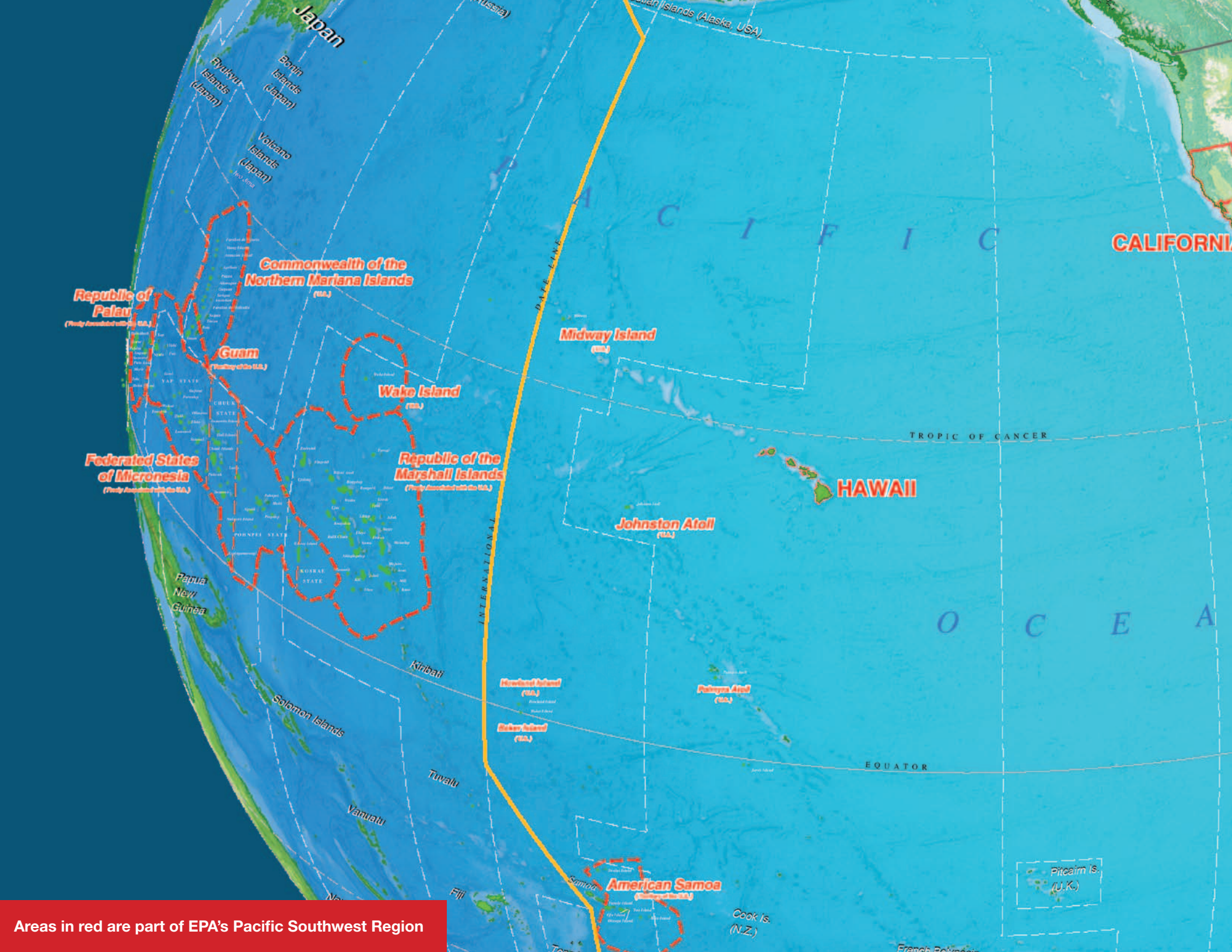
EPA investigators initiated quarterly Hawaii Environmental Task Force meetings to plan cooperative efforts.

In 2008, Kahi went in with plenty of backup to an illegal hazardous waste dump in Leeward (western) Oahu, shut it down, and called in an EPA Emergency Response Team to safely clean up and remove drums of oil and chemicals. The soil was contaminated with lead, arsenic, and chromium. EPA ordered the owner to clean up the site. Two men associated with the dump were later charged and convicted for firearm violations.

With EPA and other federal and state agencies putting the spotlight on the Waianae Coast, the evironmental violators have been put on alert and now realize that they are being watched and will be held accountable for their actions, says Gary.

The United States Attorney for the District of Hawaii, Ed Kubo, has sent an equally clear message to those who do not adhere to the environmental laws and do not care to protect and preserve the Hawaiian Islands. Kahi, Gary and EPA-CID are committed to doing just that.

Kahi Kahakui (right) and Nahina Leeloy together paddled outrigger canoes almost 180 miles from Oahu to Kauai to Ni'ihau, to raise awareness of the need to take care of the ocean.



Areas in red are part of EPA's Pacific Southwest Region

The activities EPA conducts to carry out its mission have their own environmental impacts—energy use, material use, waste generation and air emissions, for example. The Pacific Southwest Regional Office is decreasing these impacts by continuously improving the sustainability of its practices through its ISO 14001-certified Environmental Management System (EMS). Recent results include a 48% reduction in paper use since 2003 and diversion of 25 tons of waste from landfill through composting.

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