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EPA Progress Report 2007

Pacific Southwest Region



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From the Regional Administrator

Dear Readers,

This last year we faced many challenges and achieved several significant accomplishments in EPA's Pacific Southwest Region. Together with our state, local and tribal government partners, we have been able to better protect our air, water and land. We do it through our daily actions, such as issuing permits and grants; ongoing compliance assistance and strong enforcement; and through our innovative, creative voluntary efforts.

In this report, we are pleased to focus on the results achieved in collaboration with our partners, stakeholders, colleagues, and the public. The challenges we face are daunting. We have the nation's fastest-growing major urban areas — Las Vegas and Phoenix. We have more than 1,300 water bodies impaired by pollution. We have 125 toxic sites on EPA's Superfund National Priorities List. California's heavily populated South Coast and San Joaquin Valley have the nation's worst air quality. Our region has a U.S.-Mexico border area with more than 8 million people, 146 federally recognized tribes, and far-flung territories in the Pacific, where many communities still lack basic safe drinking water and wastewater facilities.

The land and people of our region are diverse, and it is that diversity that gives us our strength. We are fortunate to have a workforce that reflects the diversity of our region and community partners that are fully committed to protecting public health and the environment.

Air quality has always been one of our highest priorities. Last year, the San Joaquin Valley finally met the health standard for coarse particulate pollution — an agent of asthma and respiratory disease — after exceeding it for more than 15 years. Through the West Coast Collaborative, we made great strides reducing diesel emissions, especially in the ports of Long Beach and Los Angeles. We concluded legal cases against four major oil companies, requiring them to reduce emissions from seven California refineries.

Two of our foremost goals for clean water are to ensure that everyone has access to safe drinking water and to restore impaired waters. We have worked to meet water and wastewater infrastructure needs on tribal lands and in Mexican border and Pacific island communities. We have reached agreements through our enforcement actions with urban areas to make major improvements to prevent sewage spills. EPA grants are supporting work by state and tribal governments on permits, pollutant limits, inspections, enforcement and preventing polluted runoff.

Our work to restore land involves many tools. In 2006 we started the Route 66 Partnership, to help small communities in northern Arizona clean up abandoned fuel tanks and gas stations. Our Superfund program cleans up the most difficult toxic sites, such as Arizona's Indian Bend Wash, where we completed construction of groundwater cleanup facilities. We launched EPEAT, to prevent e-waste and save energy by making it easy for purchasers to buy greener computers. We are leading the nation in cleaning up underground tanks and illegal dumps on tribal lands. We collaborated with Mexico to collect 36 tons of waste pesticides along the border. Emergency Response is also a priority, with homeland security threats now included in EPA's disaster preparedness work.

By leveraging a diverse array of resources, actively engaging in innovative partnerships, and utilizing the full breadth of our capabilities, we have accomplished far more than would otherwise be possible.

I invite you to keep working with us to conserve, protect and restore the air we breathe, the water we drink, and the unique urban and natural environments of our vast Pacific Southwest Region. There's a lot more that we can — and must — accomplish in the coming years.



Wayne Nastri
Regional Administrator
EPA Pacific Southwest Region





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Inside Back Cover

Clean Air



EPA's Pacific Southwest Region has many of the nation's most dramatic mountain landscapes. But in some places, they can be obscured by air pollution. Los Angeles had lung-searing smog days as early as 1943. Phoenix, Las Vegas, and California's San Joaquin Valley have also suffered from unhealthy levels of particulate pollution.

A combination of factors has made the quest for clean air in these areas an uphill battle. In addition to topography and weather, rapid urban growth plays a major role, generating more smog ingredients from vehicles, and more dust (coarse particulates) from construction sites. For the past two decades, Las Vegas and Phoenix have been the nation's fastest-growing major urban areas.

Yet despite these considerable challenges, pollution control measures have gotten results. Peak smog lev-

els in the Los Angeles area are less than half what they were in the 1970s. Las Vegas is on the verge of attaining the national health standards for ozone and coarse particulates, while Phoenix has attained the standards for ozone and carbon monoxide — even as it continues its visible struggle with coarse particulate pollution.

Clean air is not an easy goal. But through traditional planning, new technologies, and innovative partnerships, real progress is being made.

Trends

Air Quality Trends Positive — But Key Areas Still Lag

EVEN AS POPULATION AND economic activity have boomed over the past few decades, the trend in air quality in the Pacific Southwest has been a positive one. However, millions of people live in areas that are still a long way from meeting health standards.

As shown in Figure 1, the biggest long-term success for clean air in the Pacific Southwest is also the biggest remaining problem: Ozone (smog) levels in the South Coast air basin — the greater Los Angeles area — are far better than they were in the 1970s, but still the unhealthiest in the nation. Ozone levels there have failed to meet the national health standard on more than 100 days per year in some recent years.

In other areas of the Pacific Southwest, progress has been slow, but consistently trending toward meeting the health standard for ozone.

The data in Figure 2, showing levels of fine particulate pollution, or PM_{2.5}, only go back to 1999, but the trends are also positive: All but

two areas have consistently met the national health standard of 15 micrograms per cubic meter of air. The exceptions, California's South Coast and San Joaquin Valley, are making gradual progress. (With EPA's recent tightening of one of its PM_{2.5} standards due to better understanding of health impacts, additional areas will also need to improve.)

"Rapid growth makes it difficult to achieve the health standards, because emission reductions from pollution control measures can be erased by growth in the number of sources," says Dave Jesson, EPA's senior expert on air quality in the Pacific Southwest.

"We've made big strides through measures requiring cleaner vehicles, low-emission products, and better controls on industrial sources," says Jesson. "Extending progress will require increasingly creative and aggressive combinations of policymaking, planning and new technologies."

**Key Air Pollution Areas
in the Pacific Southwest**



Fig. 1. Ozone (O₃) Concentrations

National 8-hour Standard
Average of 4th Highest Days over Three Years

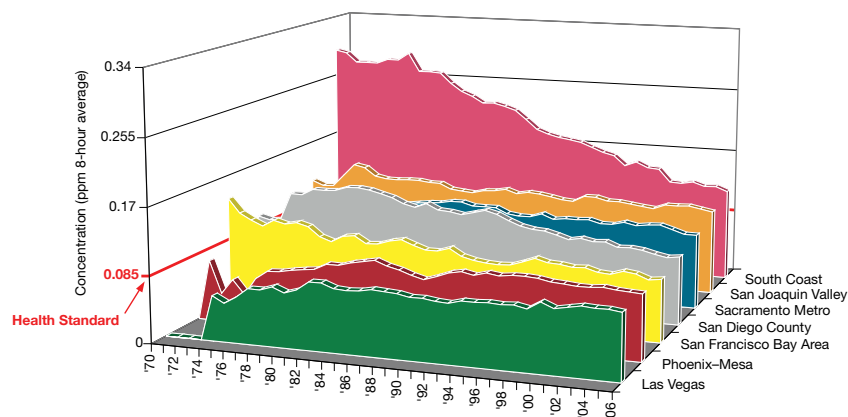
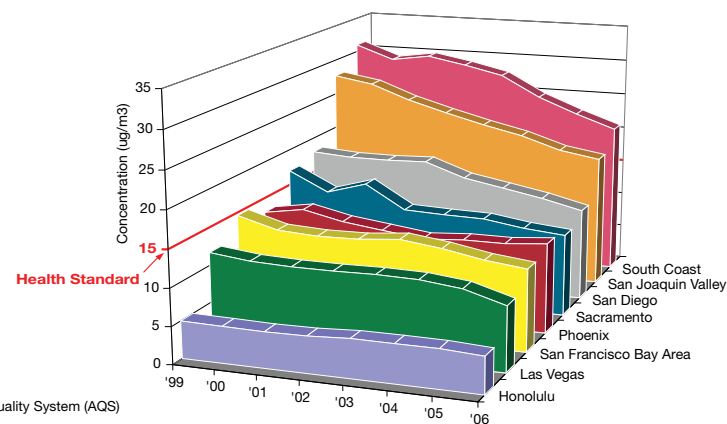


Fig. 2. Particulate Matter — PM_{2.5} Concentrations

Mean Concentrations — Highest Site in Each Area



Source: US EPA's Air Quality System (AQS)

Primer

Goods Movement: Working with Ports to Reduce Air Pollution

IN THE VAST TRANSPORTATION network of ships, trucks and trains that move every conceivable type of goods from place to place, few locations can match the intense activity of a port.

The adjacent ports of Long Beach and Los Angeles, taken together, handle 40% of the nation's containerized cargo traffic — more than 14 million 20-foot containers annually, carrying more than \$260 billion worth of goods. As big as they are, these figures may double by 2020. The combined ports are an economic powerhouse for the Los Angeles area, and, by some estimates, are responsible for more than 300,000 jobs in the five-county region.

However, with the economic benefits come environmental challenges. Air pollution from these seaports is a major ingredient in the area's in-

famous smog, still the nation's worst despite decades of hard-won gains in air quality. The area's airborne particulate pollution also still reaches unhealthy levels.

Not only do the ships add air pollutants from their smokestacks, but vast armies of diesel equipment work to support port activities, from the tugs that help move the ships safely, to the equipment that moves containers from place to place on the docks, to the trucks and trains that bring the containers to their final destinations. Each type of equipment contributes to the air quality challenges of the LA area. All of the parties now recognize that in order for the area to attain the health-based standards for fine particles and ozone, it is essential that all of this equipment operate cleaner than it does now.

State and local agencies are deeply involved in ambitious plans to reduce emissions from the ports. One of the most innovative and far reaching plans is the San Pedro Bay Ports Clean Air Action Plan, drafted by both ports with the involvement of key regulatory agencies, including EPA. The plan, unveiled in 2006, proposes hundreds of millions of dollars in investments by the ports, government agencies, and port-related industries to reduce the ports' air pollution by an ambitious 50% in the next five years, cutting diesel particulates by 1,200 tons and nitrogen oxides by 12,000 tons annually.

In 2007, port tenants, railroads, and trucking companies at the ports are expected to sign on to participate in the plan, which includes commitments to:



- Eliminate dirty diesel trucks from the ports by helping finance a new generation of clean or retrofitted vehicles.
- Develop shore-side electricity at ship berths, so docked ships will no longer need to generate power by running their main, smoke-producing engines.
- Require ships to reduce speeds when entering or leaving the harbor region, use low-sulfur fuels, and employ other emission-reduction technologies.

Recognizing the importance of goods movement and ports in particular to environmental issues nationwide, EPA in September 2006 convened a meeting of regional administrators, national EPA officials, and other key stakeholders to discuss solutions for port-related pollution in all U.S. coastal states. These efforts, together with EPA's core role in setting national emissions standards, will continue to ensure progress in improving public health.

Clean Diesel and the West Coast Collaborative

On September 1, 2006, California required service stations to sell diesel with 97% less sulfur, greatly reducing particulates in diesel emissions. Under an EPA regulation, the rest of the nation followed suit on October 15. The move is predicted to benefit public health even more than the phase-out of leaded gasoline in the 1970s and 1980s.

EPA has funded 51 diesel emissions reduction projects in the West since 2004, together with more than 30 government agencies and private partners that form the West Coast Collaborative. EPA grants totaling \$7.5 million for the projects have leveraged tens of millions from other sources.



Above: EPA awarded a \$300,000 grant to the Port of Long Beach to develop a hybrid-powered cargo-handling vehicle. Left to right: EPA Deputy Administrator Marcus Peacock, port director Richard Steinke, cargo terminal VP Anthony Otto, Harbor Commission President James Hankla, EPA Regional Administrator Wayne Nastro, port planner Robert Kanter.

Below: The Port of Los Angeles' shore facilities stretch over several square miles. All cargo is containerized for easy transfer to trucks and trains. (Photo: Matt Haber)



Places

San Joaquin Valley Strives for Healthier Air

THE TOPOGRAPHY OF CALIFORNIA'S San Joaquin Valley provides an almost perfect trap for air pollution: It is long, low, and surrounded by mountains except at its northern extension, the Sacramento Valley.

The San Joaquin has been California's most productive agricultural area for more than a century, and in recent years it has experienced rapid urban growth and an influx of large dairies. All three contribute to some of the nation's most challenging air quality problems, which affect the health and livelihood of the valley's 3.3 million residents and 27,000 farms.

In the valley's hot, dry summers, emissions from cars, trucks, trains, livestock waste, prescribed burning, oil and gas production, recreational boats, and pesticides combine to create unhealthy ozone levels. During the cooler fall and winter, particulates are the greater health problem. Particulate sources include dust from vehicles on both paved and unpaved roads, smoke from home fireplaces and burning of agricultural waste, and diesel exhaust from the

region's trucks, buses, tractors, locomotives, and irrigation pumps.

Thanks to efforts led by the San Joaquin Valley Unified Air Pollution Control District, the valley for the first time met the national health standard for coarse particulate matter such as dust and soot (known as PM_{10}) for the 2003-2005 period. The agency's 2003 PM_{10} reduction plan put a variety of measures in place that have added up to cleaner air, including restrictions on fireplaces, and on burning dead trees and branches from orchards and other agricultural materials. There were state-funded financial incentives for replacing dirty diesel engines with cleaner ones.

"A lot of people put a lot of effort into improving the valley's air quality," says Kerry Drake, associate director of EPA's regional Air Division. "But there is still much more to do."

EPA has long been a partner in San Joaquin's efforts to reduce air pollution. The agency has worked with agriculture to build a flexible, menu-driven program for reducing agricultural dust, developed standards for engine emissions and fuels — which over time will have a particular impact on non-road sources such as diesel pumps and tractors — and has funded key research on emissions inventories, monitoring, and modeling. The agency has also brought together a diverse group of stakeholders to advance innovative emission reduction projects through the West Coast Collaborative.

The valley has a long way to go to meet the national health standards for ozone and small

particulates, $PM_{2.5}$. These small particles, which are even more harmful than PM_{10} because they go deeper into people's lungs, come from some of the same sources: Farming, road dust, and managed burning account for nearly half the valley's $PM_{2.5}$. Other major sources include stationary sources (irrigation pump engines and smokestacks) and burning of residential fuels such as propane and natural gas.

To help the valley meet a number of challenges, including air quality, Governor Arnold Schwarzenegger formed the California Partnership for the San Joaquin Valley in September 2005. EPA and the air district were part of the partnership's Air Quality Workgroup, which submitted an action plan to the governor in late 2006, focusing on collaboration between federal, state, and local agencies to accelerate adoption of emissions reduction technologies such as replacing diesel engines with cleaner alternatives.

The air district's most recent efforts include requiring wineries and dairies to reduce their volatile organic compound (VOC) emissions. Also starting in 2007, housing and commercial developers must mitigate the added air pollution their developments will create, or pay into a mitigation fund. In addition, the district is due to submit a plan in mid-2007 to meet the new health standard for ozone.

Exactly when the valley will meet all air quality health standards is difficult to predict. But one thing is certain: Everyone's effort will be needed.

Orange groves and cultivated fields stretch across the east side of California's San Joaquin Valley.



Science

Research Supports Mission, Spurs Innovation

WORKING BEHIND THE SCENES on many environmental challenges in the Pacific Southwest is EPA's Regional Science Council, which strives to strengthen EPA's scientific skills and knowledge. Its membership includes staff and managers from across EPA's programs and from the Management and Technical Services Division, which provides regional science support.

The council regularly hosts seminars on cutting-edge science developments and emerging issues. It also plays a leadership role in deploying support resources from EPA's national Office of Research and Development. In 2006, the council assembled EPA's first regional science plan, which examines the critical science needs and activities driving broader priorities in the Pacific Southwest.

Studying Air Pollution from Airports

One of EPA's top regional priorities is reducing air pollution in urban areas. EPA funded a study conducted by the UCLA School of Public Health to identify ambient levels of the complex particulate and toxic emissions at Los Angeles International Airport (LAX), both at the blast fence and in the community downwind of the LAX runways.

This project was proposed and designed as part of the LAX Environmental Impact Statement (EIS) review process because EPA had identified a lack of information on jet engine emissions as a deficiency in the 2000 EIS for LAX. The results of the first phase of that study, which was focused on the blast fence area, are expected in early spring of this year.

This research has laid the groundwork for further projects at LAX, as well as airports in Boston and Rhode Island. This year, a larger year-long air quality and emission source apportionment study is planned. Results are expected to help assess community exposure to air pollution from aircraft and airports worldwide.

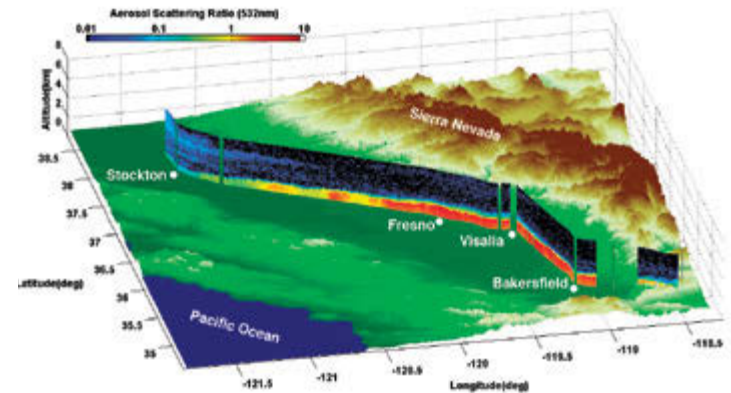
Air Quality Research Centers in California

Two California research centers have each received \$8 million in EPA funding for innovative work on air quality and health. The first of the two grants is funding five years of research at the San Joaquin Valley Aerosol Health Effects Center at the University of California, Davis. Focused on the San Joaquin Valley, researchers here are evaluating exposures to airborne particulate matter and trying to figure out which components and sources lead to observed health effects.

The second is being put to use by the Southern California Particle Center, a consortium of universities including the University of Southern California, UC Irvine and UCLA. Researchers are investigating the underlying mechanisms that produce the health effects associated with exposure to particulate matter. They are also looking at how the health effects vary depending on the source, chemical composition and physical characteristics of the particulates.

Advanced Monitoring Initiative and GEOSS

The U.S. is part of an international effort to better understand the Earth's natural processes and environmental conditions — the Global Earth



Observation System of Systems (GEOSS). EPA is supporting GEOSS by funding short research projects through the agency's Advanced Monitoring Initiative (AMI).

EPA has two AMI-funded projects underway in the Pacific Southwest. One will evaluate whether data from satellites, ground sensors, and balloons can be combined to better understand ozone (smog) formation, severity, and movement in the U.S.-Mexico border area. Partners include NASA-Ames, Jet Propulsion Laboratory, Southwest Consortium for Environmental Research and Policy, UC Berkeley, and the Pan American Health Organization.

The other project is using satellite and overflight data to study the distribution of fine airborne particulates ($PM_{2.5}$) in the San Joaquin Valley. This data will also enable researchers to test the reliability of the valley's ground-based measurement network and the need for future ground-based studies. Partners include NASA, NOAA, the San Joaquin Valley Air Pollution Control District, and the California Air Resources Board.

This High Spectral Resolution Lidar (HSRL) image is the result of data collected by a NASA aircraft flying over the eastern San Joaquin Valley on February 15, 2007. It shows that aerosols (fine particulates) were mostly confined to the southern part of the valley, and below 1,500 meters altitude. (Image courtesy of NASA Langley Research Center)



Senior science policy adviser Jan Baxter and Waste Division environmental scientist Mary Blevins co-chair the Regional Science Council.

Advances

Biofuels: Grease Is the Word

THANKS TO AN INCREASING awareness of global climate change and the risks of dependence on foreign oil, there's been a resurgence of interest in cleaner, domestic energy such as biofuels — renewable fuels from plant and animal sources, such as methane from cow manure, ethanol from corn or switchgrass, and biodiesel from restaurant grease or soybeans.

In addition to an array of programs to increase energy efficiency (see p. 35 for examples), EPA has helped promote the use of biofuels and other alternative energy sources. In the Pacific Southwest, more than a dozen dairies are already converting manure into methane and using it to generate electricity. In the region's cities, a growing number of restaurants and cafeterias

are redirecting tons of used cooking oil and grease to the production of biodiesel.

In San Francisco, oils used to fry food in restaurants are fueling the city's vehicle fleet. In 2005, the city's transit system fueled a single bus with B20 — a mixture of 20% biodiesel and 80% regular diesel. More B20 buses are now operating, and Mayor Gavin Newsom announced that by 2008 all of the city's vehicles will use B20, creating a demand for over 2 million gallons of pure biodiesel annually. In March 2007, EPA Regional Administrator Wayne Nastri awarded a \$200,000 grant to the City College of San Francisco to start training mechanics to work on vehicles using B20 or 100% biodiesel.

In Southern Nevada, recycled grease from Las Vegas casino restaurants fuels more than 1,300 Clark County School District buses, which use B20. At the University of Nevada, Reno, an EPA grant helped chemical engineering Professor Hatice Gecol develop a low-cost, continuous production process to make biodiesel from the student cafeteria's waste cooking oils. The scaled-up production facility will soon make 800,000 gallons of biodiesel per year.

In Santa Cruz, California, a \$75,000 EPA grant to Ecology Action proved the local market potential of biodiesel. This led to the construction of a biodiesel production plant in the nearby Salinas Valley that uses both agricultural and restaurant waste as feedstock. On the Hawaiian Island of Maui and at Los Angeles International Airport, you can rent "Bio-Beetle" cars that run on biodiesel.

Biodiesel from restaurant grease burns cleaner and takes far less energy to manufacture and distribute than petroleum-based diesel.

According to Olof Hansen, EPA's regional biodiesel expert, biodiesel from restaurant grease has great advantages over conventional diesel. First, it's cleaner-burning (60% less particulate emissions, and nearly 80% less greenhouse gases). Second, it takes far less energy to manufacture and distribute, especially if it's made and used locally. Third, it diverts restaurant grease that can clog sewer pipes and thereby prevents sewage overflows to surface waters (see story, p. 12).

And finally, it enables restaurants, institutional kitchens, and biodiesel producers to turn a waste into a valuable product. In California, there's even a trade association, CalFOG (FOG = "Fat, Oils, Grease") that unites restaurants, waste haulers, and wastewater treatment plant managers. Ironically, the diesel engine's inventor, Germany's Dr. Rudolph Diesel, originally built the engine in 1894 to run on peanut oil, which was cheaper than petroleum fuels. Biodiesel, like recycling, has come full circle.

For more information, go to www.epa.gov/region9/waste/biodiesel

Biodiesel-powered vehicles like this "Bio-Beetle" are turning heads in Hawaii and other locations.



People

Bob Baker: Preventing Air Pollution Through Precise Permitting

NEXT TIME YOU'RE IN A PLANE flying over an urban area, look around. Can you see any smokestacks belching smoke? Probably not, thanks to people like Bob Baker. He reviews air emission permits issued by states and tribes for new electric power plants, to make sure they minimize air pollution. Baker has been very busy in recent years, as the energy crisis of 2000-2001 sparked an upsurge in plans for new power plants.

These permits are crucial to clean air, because they limit the allowable emissions from all major “stationary sources” — mostly industrial facilities, as opposed to “mobile sources,” such as vehicles and construction equipment.

Under the federal Clean Air Act, EPA oversees the issuance of permits for new stationary sources. To prevent delays in the already lengthy permit process, Baker works with his counterparts at state or tribal air pollution control agencies to find out what’s being proposed early on. He’ll take a close look at the plans, and tell them what the project needs to do to minimize air pollution. The state regulators then write these conditions into the permit.

For example, one important requirement is known as “BACT” — Best Available Control Technology. This requires new stationary sources to use state-of-the-art pollution control equipment. Another is the offset requirement that applies in areas like California’s South Coast air district, where the air fails to meet national health standards. Here, applicants wanting to build a new facility are required to find and

reduce existing pollution sources, so there’s no net increase in air pollution. This has also helped drive technical innovations, since it’s a strong incentive to minimize emissions from the new facility.

Another crucial requirement in every permit is the modeling protocol. This specifies how air emissions from the facility will be accurately measured, recorded, and submitted to the regulatory agency. The data enables the agency to take enforcement action if the facility puts out more pollution than its permit allows.

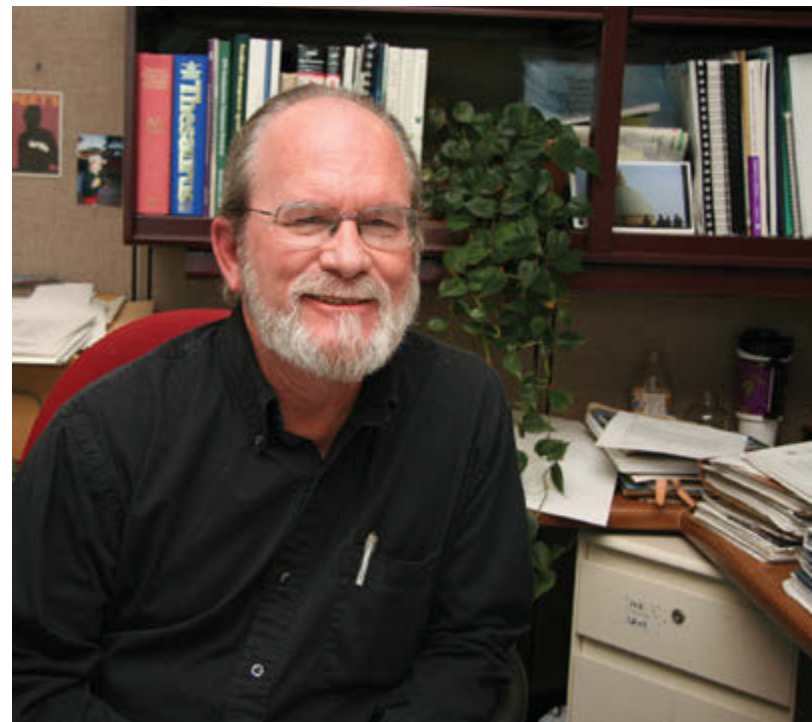
Baker is an expert on combustion processes, the emissions they generate, and ways to reduce them. During his career in EPA’s regional Air Division, new technology has allowed new power plants to become far more efficient, and far less polluting. The latest emission controls on natural gas-fired power plants have reduced nitrogen oxide emissions (an ingredient in smog) from 150 parts per million (ppm) down to 2.5 ppm or less.

A UC Davis-trained civil engineer, Baker was born at Letterman Hospital in the Presidio of San Francisco, and grew up in Vallejo. After college, he served three years in the U.S. Army, including one in Vietnam as a tank commander, before coming to EPA in 1972. At EPA, he worked first as a lab technician, then in 1980 started doing technical analysis of proposed new stationary sources. He’s been doing similar work ever since. After more than 35 years at EPA, Baker is planning to retire this year.



Above: Bob Baker in the early '70s at EPA's lab in Alameda, California.

Below: Baker today.



Clean Water



Clean water is essential for life — not just for people, but for plants, wildlife, livestock, fish, and other aquatic life. That's obvious in arid areas of the Pacific Southwest, such as Arizona, Nevada, and Southern California. Here, small sources of pollution can do major damage to wet lands and rivers.

Clean water is just as essential in wetter areas like Hawaii. In the tropical Pacific, soil erosion can wash silt into nearshore waters, killing coral and all the other organisms that depend on it.

Everywhere, polluted runoff from careless logging or agricultural practices can dump silt, manure, or toxics into waterways. Sewage overflows and cesspools can spread disease pathogens. To prevent these and other water pollution problems, EPA assists state and tribal agencies by enforcing the federal Clean Water

Act, funding infrastructure improvements, and providing other key types of support.

For human consumption, tap water must meet strict federal standards. Drinking water is routinely tested for dozens of potential bacterial and chemical contaminants. With more than 10,000 agencies and companies providing drinking water in the Pacific Southwest, making sure they all do it right is a big job. EPA works closely with state and tribal agencies to support and oversee these local compliance efforts.

Trends

How's the water? Surprises in California, Arizona's Monitoring Results

THE CLEAN WATER ACT OF 1972 requires states to identify waters that are “impaired” by pollutants. That’s why state water monitoring efforts have usually focused on the most polluted waters. Over the last several years, however, EPA’s Environmental Monitoring and Assessment Program (EMAP) has funded the first truly statewide surface water monitoring in western states. In 2006, Arizona and California published their first EMAP results.

These “big picture” studies provide important context to the Pacific Southwest Region’s official state lists of impaired waters, which now total about 1,300. A water body can be a section of river or stream, a lake, a bay, or a coastal area. Some waters are impaired by more than one pollutant.

Some of the results were surprising: For instance, 98% of California’s coastal bays and estuaries had sufficient dissolved oxygen — an indicator of clean water — to support fish and other aquatic life.

In assessing streams, Arizona and California monitored water chemistry, habitat, and biological integrity. Both states developed a macroinvertebrate index — a biological indicator of stream health — rather than just analyzing the water. Using this index, California found 78% of its streams “non-impaired” (where invertebrates indicating clean water were found). Arizona, however, categorized 57% of its stream areas as “most disturbed” — lacking aquatic invertebrates that indicate clean water (see Figure 1).

Arizona’s outlook was not as good as had been expected. One possible explanation is that Arizona’s streams, especially in the desert landscapes that cover most of the state, have less water than California’s, making Arizona’s

aquatic life more vulnerable to pollutants and other stressors.

Janet Hashimoto, a water monitoring expert in EPA’s Pacific Southwest Office, says the EMAP-type probabilistic monitoring approach provides baselines to track water quality trends. California took samples at 130 random sites, including San Francisco Bay. Arizona took samples at 47 perennial stream sites.

In 2007, Arizona, California, Nevada, the Navajo Nation, and the Pyramid Lake Paiute Tribe are participating in a nationwide lakes survey. EPA is also planning to assess the nation’s large, non-wadeable rivers using the EMAP-type survey design in the near future.

Work has been underway since the 1980s to reduce pollutants in impaired waters, under EPA and the states’ TMDL — Total Maximum Daily Loads — programs. TMDL studies identify the sources and amounts of a pollutant in a water body, and specify the reductions needed to restore the water body’s designated beneficial uses — a first step toward actual pollution reductions. By late 2006, Pacific Southwest

Fig. 1. Statewide Assessments of Wadeable Perennial Streams
Macroinvertebrate Index of Biotic Integrity

California (stream miles)	
impaired	22%
non-impaired	78%
Arizona (stream miles)	
most disturbed	57% (±12%)
intermediate	29% (±13%)
least disturbed	14% (±9%)

states and territories had completed more than 940 TMDLs (see Figure 2).

TMDL targets are often met by limiting discharges allowed by permits issued to facilities like factories and wastewater treatment plants. TMDLs also help EPA and states prioritize projects to reduce polluted runoff, or “nonpoint sources.” EPA has issued grants to states and tribes for hundreds of nonpoint source projects in recent years.

No single solution can clean up the nation’s thousands of impaired water bodies. But with the Clean Water Act and continued large-scale monitoring, EPA and states are taking a comprehensive approach to assessing our waterways and restoring them to ecological health.

Fig. 2. Number of TMDLs Completed in the Pacific Southwest Region

	AZ	CA	HI	NV	Outer Pacific	All
1990 & prior	5	9	87	3	0	104
1991-1995	2	5	1	24	0	32
1996-2000	36	53	1	0	0	90
2001-2005	42	469	16	35	0	562
2006-present	2	150	0	0	3	155
TOTAL	87	686	105	62	3	943

Primer

Beneath the Cities: Reducing Sewage Spills

UNDER THE STREETS IN every urban area, there's a potential health hazard: sewage collection pipes connecting to every home and building. When sewage flow is blocked below ground, it promptly rises to street level, and flows through street gutters and storm drains, exposing people to disease pathogens and polluting streams and beaches. Major sewage pipe breaks in Honolulu and Manhattan Beach, California, last year made headlines and forced the closure of nearby beaches.

While the big beach spills got the most publicity, more numerous sewage overflows into city streets are also a serious health hazard. In the 1990s, hundreds of these stinking overflows plagued Southern California every year. But today, there's good news: Los Angeles reports a 70% reduction, and San Diego claims a 77% reduction in the number of sewage spills in the past five years.

The pollutants in sewage include bacteria and viruses, nutrients, industrial wastes, and some-

times toxics. Many overflows occur during wet weather, when more water can enter the sewage pipes. During these maximum flows, sewers are most vulnerable to constrictions caused by insufficient pipe capacity, poor operation and maintenance, vandalism, and obstructions like grease from restaurants.

EPA provided nearly \$70 million in Clean Water State Revolving Fund capitalization grants in fiscal 2006 to fund local wastewater treatment and other water quality protection projects in the Pacific Southwest. EPA's most recent effort to reduce sewage spills in the region began in 2000, with a regionwide inventory of state spill records to find out where the biggest problems were. EPA staff worked with state agencies to collect data on the 214 major municipal systems, 33 minor systems, and 16 federal facilities in the Pacific Southwest that have water discharge permits.

Unfortunately, sewage spills are quite common. With several hundred spills occurring each year, it made sense for EPA to focus on the large spills and the cities and towns with recurring spill problems. EPA worked with sewer system managers to find the root causes of the spills. Urban growth, pipe failures, pump station breakdowns and deterioration of old sewer pipes are typical causes of overflows. The next step involved training and technical assistance on approaches for improving sewer system management and maintenance and to promote renewal of aging infrastructure.

After that, EPA and the state agencies initiated enforcement actions. Four Southern California

Urban growth, pump station breakdowns, and the deterioration of old sewer pipes can all cause overflows.

coastal cities were ordered to reduce spills and develop infrastructure renewal plans. To resolve the Los Angeles and San Diego actions, EPA and the state's regional water boards required these cities to improve operation and maintenance, as well as rebuild some of their infrastructure. Los Angeles alone is in the midst of a \$2 billion project to rebuild 488 miles of sewer, annually clean more than 40% of its 6,500-mile sewer system, better control restaurant grease discharges, and plan for future urban expansion.

California in 2006 adopted a Statewide Permit for publicly owned systems requiring them to develop management plans requiring maintenance, inspections, infrastructure rehabilitation, capacity assessment, rapid response to spills and public notification.

Over the next few years, EPA expects other communities in the Pacific Southwest to follow the lead of Los Angeles and San Diego. In 2007, the agency is continuing to collect comprehensive data on spills, and to negotiate spill-reducing agreements with more municipalities. The urban wastewater agencies are a crucial line of defense against epidemic diseases. Without them, urban life would be impossible.

Large cities must maintain hundreds of miles of sewer pipes to prevent spills from endangering public health.



Places

The Hanalei Watershed, Kauai, Hawaii

THE STATE OF HAWAII has always been known for its inviting beaches, but with a growing population of about 1.3 million people — and more than 7 million visitors a year — preventing pollution of coastal waters from sewage and polluted runoff is a bigger job than ever.

Even Kauai, with a far smaller population than the islands of Oahu, Maui, or Hawaii, has had its share of problems. But with the support of an EPA grant, the community near Kauai's Hanalei River and Hanalei Bay has taken a model approach to addressing these problems.

In 2003, the Hanalei Watershed Hui received the first EPA Targeted Watershed Initiative Grant in the Pacific Southwest Region. Funds were used for a wide range of tasks, from coral reef preservation to improved water quality monitoring and assessing the watershed's biological resources. The hui (Hawaiian for "group") also used the grant to control polluted runoff by installing check dams to trap sediments flowing out of taro fields, and constructing fences to exclude cattle from sensitive riparian areas.

The hui has also focused on improving wastewater management, which is relevant to water quality challenges facing the entire state. Across the state of Hawaii, raw, untreated sewage is often discharged directly into the ground via cesspools. This method of waste disposal can contaminate streams, groundwater, and coastal waters with disease-causing pathogens and oxygen-depleting nitrates.

In 2005, a nationwide regulation took effect banning the use of Large Capacity Cesspools,

which are defined as cesspools used by multiple residential dwellings or commercial establishments serving 20 or more persons on any day. Under the federal ban, Large Capacity Cesspool owners are installing safer septic systems or connecting to sewers served by wastewater treatment plants. In Hawaii, the state Department of Health plays an important role by ensuring that wastewater systems used to replace cesspools are properly designed. EPA has negotiated legally-binding agreements with private owners as well as state and local agencies to close and replace large cesspools. In 2006, the Hawaii Department of Education, the Hawaii County Department of Environmental Management, and Costco's Kailua-Kona store signed such commitments with EPA.

In the Hanalei Watershed, the hui has prioritized and coordinated efforts to replace cesspools

along the Hanalei River, Waipa Stream, and close to Hanalei Bay. Large cesspools are believed to be significant contributors to elevated nutrient and bacteria levels in these waterways. Kauai County is addressing several cesspools adjacent to Hanalei Beach. Four of these have been replaced as a result of a legal agreement with EPA. Another four in the Hanalei watershed have been upgraded to septic systems by the hui, using EPA grant money. Plus, the county is making improvements to a septic system at a restroom at the beach.

Beyond these short-term improvements, the hui is looking at a broader, long-term solution by exploring the feasibility of a centralized wastewater collection and treatment system for the town of Hanalei. This could be a model for other communities across the state of Hawaii.

Watershed protection activities on lands surrounding Hanalei Bay on the island of Kauai help keep the bay's waters clean. (Photo: Jim Jacobi, U.S. Geological Survey)



Innovation

Turning Biosolids into Energy

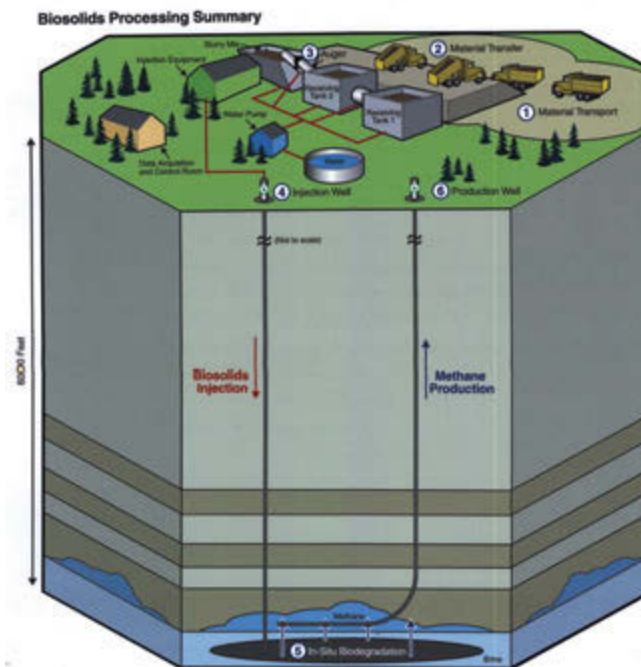
AS THE WEST COAST'S LARGEST CITY, Los Angeles does things on a bigger scale than anywhere else in the Pacific Southwest. The city's environmental challenges are bigger too, from the city's smog to its sewage spills and overflows (see story, p. 12). While the city's massive wastewater treatment facilities prevent sanitary wastes from polluting beaches and waterways, these pungent wastes — known as biosolids, or sludge — have to go somewhere.

In recent years, the city has been trucking 500 tons of the nutrient-rich biosolids each day to Kern County, where they're applied as fertilizer to farms growing non-food crops. But the trucks add to traffic and air pollution in the Los Angeles area, so the city is researching environmentally-friendly, low-cost alternatives to the practice.

The city's planners came up with an innovative solution that not only gets rid of the waste without harming the environment, it may also gener-

ate a cash crop of clean fuel. The city intends to pump the sludge about a mile deep below the Terminal Island wastewater treatment plant in San Pedro Harbor, into a porous sandstone formation where high temperatures and pressure will break down the organic matter into its primary constituents, methane and carbon dioxide. Since both of these primary gases would have normally been released into the atmosphere, the sandstone provides a containment benefit.

After several years of technical and regulatory review, EPA, with the regional water board's endorsement, authorized the City of Los Angeles to proceed on an experimental basis. One goal of the project is to ensure that the carbon dioxide and other components remain sequestered in the deep formation, while tracking the sub-surface movement and collection of methane gas — natural gas — that can be tapped as a source of clean, renewable energy.



The five-year experimental underground injection permit will allow the city to curb its current practice of trucking the biosolids hundreds of miles daily to Kern County — which generates diesel emissions from the trucks that carry it. When factoring both the trucking and land application, reductions of atmospheric emissions of carbon dioxide, methane, carbon monoxide and nitrous oxide will be realized. Given the many potential benefits of this project, the Los Angeles Times reported that it "could be an environmental trifecta" — good for clean air, clean water, and clean land.

Above: Diagram shows how biosolids from Los Angeles' sewage treatment plants will be injected into deep underground formations for conversion into methane and CO₂, in a process patented by Terralog Technologies under a contract with the City of Los Angeles. The methane (natural gas) will be extracted and used as a clean fuel, while the CO₂ will be permanently sequestered.

Left: Terminal Island, in the upper left of this photo, will be the site of an innovative project to dispose of biosolids from wastewater treatment plants by deep underground injection (see diagram, above).



People

Marvin Young and Jon Merkle: Keeping Tap Water Safe To Drink

JON MERKLE WAS A YOUNG lawyer from Chicago when he came to work at EPA's Pacific Southwest Regional Office in San Francisco in March 1977. Marvin Young joined the agency in June 1980, after growing up in Honolulu, getting degrees from the University of Hawaii, and working for the Indian Health Service on the Navajo Nation.

Merkle spent the early years of his EPA career working on enforcement actions against suspected violators of the Clean Water Act, including industries that dumped toxic polychlorinated biphenyls (PCBs) into evaporation ponds in Henderson, Nevada, and sugar mills that dumped sugar cane waste into the ocean off the Big Island of Hawaii. Young spent several years of his early career cleaning up toxic sites on the Pacific islands of Guam and American Samoa.

Then they discovered their true calling: clean drinking water. This year, both men are retiring after working more than 20 years in EPA's regional Drinking Water Compliance and Enforcement section. At different times, Merkle and Young each served several years as supervisor of this group of about a dozen people, whose job is to ensure that drinking water is safe to drink throughout the Pacific Southwest. To do this, EPA works with the region's state, tribal, and territorial governments to oversee their use of EPA grant money to monitor the compliance of thousands of local water purveyors with the federal Safe Drinking Water Act.

EPA can also take enforcement action directly. In the mid-1990s, water purveyors were required to start testing their water for lead and copper contamination. About two thousand in the Pacific Southwest ignored the new regulation, so Young and his section prepared and sent out more than 2,000 legal Notices of Violation. It was the regional Water Division's biggest enforcement effort in 20 years.

EPA Action Targeted Unsafe Canal Water

In 1991, EPA learned that in Imperial County, on the U.S.-Mexico Border, a local irrigation district's canals were the source of untreated tap water for about 10,000 people in the county. Tests showed the canal water was contaminated with bacteria.

Merkle drew up an EPA order to the district to comply with the Safe Drinking Water Act. While the district appealed, the county stopped issuing building permits, and some of the local residents blamed EPA. About 800 people showed up at a public meeting with EPA staff, and 49 of them spoke — all but one opposed to EPA's action.

The district appealed EPA's order in court, and won. Four years later, however, Congress changed the law. Once it took effect, the states of California and Arizona issued compliance orders to irrigation districts serving a total of 14,000 people. The districts finally complied by providing bottled water to their canal-tapping customers.

Getting Past Airport Security To Test Water on Planes

More recently, EPA needed data on whether water on airliners is safe to drink. Merkle and other EPA staff had to drag coolers filled with ice and sample jars through airports, wait at security checkpoints, and rush onto planes during the short time the planes were empty between flights — dozens of times.

Nationwide, samples showed that airplane tap water was often contaminated with bacteria. In 2005, EPA ordered U.S. airlines to comply with federal law by routinely testing their water, and notifying passengers any time contamination is found. Thanks to Merkle and other EPA staff, water on U.S. airliners will be held to the same strict health standards as tap water on the ground.



Marvin Young (left) and Jon Merkle

Clean Land



EPA's Pacific Southwest Region is truly a landscape of contrasts, from pristine watersheds in the Sierra Nevada, to irrigated agricultural lands of California's Central Valley, to sprawling urban and industrial areas in habited by millions from coast to desert.

Protecting these varied landscapes, and the health of the people who live in them, presents different challenges in each area. In the arid West, mining has brought toxic elements like arsenic and uranium to the surface, and work is needed at some sites to prevent these poisons from polluting the air or water.

In the Pacific Southwest, cleanups usually focus on preventing toxics at old industrial and waste disposal sites from contaminating water supplies and preventing ex

posure to contaminated soils. In the Pacific Islands, EPA has been cleaning up old munitions, chemicals, and fuel tanks left from when the islands were staging areas for military operations during World War II, the Korean Conflict, and the Vietnam War.

Throughout the Pacific Southwest, EPA works with state, local, and tribal governments to clean up former industrial and tank sites, paving the way for redevelopment that revitalizes communities.

Trends

Superfund Cleanups Reach Milestone

IN THE 1970s, AMERICANS learned that toxic waste dumping had despoiled hundreds of sites across the nation, contaminating land and waters both above and below ground. To deal with the problem, Congress passed laws regulating toxic waste disposal, and in late 1980 a law to clean up the worst toxic waste sites, the Comprehensive Environmental Response, Compensation, and Liability Act. It's known as the Superfund law, since it created a fund to pay for cleanups when no viable responsible parties could be found.

EPA works closely with communities, potentially responsible parties, scientists, researchers, contractors, and state, local, tribal, and federal authorities on site cleanup. Together with these groups, EPA's Superfund program identifies hazardous waste sites, conducts investigations to determine the extent of contamination, develops cleanup plans, and cleans up the sites.

Today, construction of cleanup facilities has been completed at over 1,000 sites across the nation. In late 2006, the Pacific Southwest Region reached an important milestone by achiev-

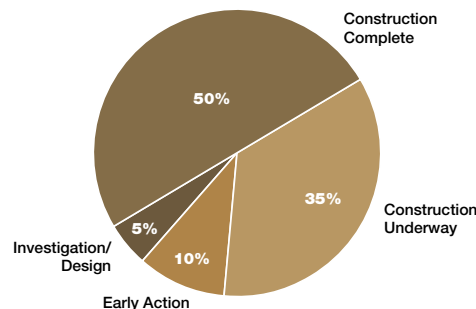
ing "construction complete" status at the Indian Bend Wash site in Arizona. The agency has now finished work on cleanup facilities at 50% of the 125 Superfund National Priorities List (NPL) sites in the region.

In addition to making progress in cleaning up NPL sites, EPA has a Superfund Emergency Response program, which mitigates immediate risks at sites that pose an imminent threat to public health or the environment, such as oil and chemical spills. Superfund's Brownfields program, added in the late 1990s, helps communities assess, clean up and redevelop sites where potential contamination hinders redevelopment — such as the hundreds of abandoned gas stations along a once-great highway, Route 66 (see p. 20).

For more information about Superfund, visit www.epa.gov/region9/waste/sfund

Site Cleanup – Superfund Program in the Pacific Southwest

Total of 125 NPL Sites



Today, construction of cleanup facilities has been completed at over 1,000 sites across the nation.

Cleanup workers taking samples at a leaking storage tank site. The first step in cleaning up sites like this is to assess what contaminants are present.



Primer

Mine Cleanup: A Priority in the West

THE GOLD RUSH OF 1848-1849 touched off a mining boom throughout the western states that lasted more than a century, and mining is still a big part of the economy in some areas. But mining also left a legacy of more than 50,000 abandoned mine sites. The vast majority of these pose little or no threat to the environment, but some of them pollute surface waters and groundwater with acid or toxic dissolved metals.

EPA's Pacific Southwest Regional Office is working with the Pacific Northwest and Rocky Mountains offices on a national EPA initiative to address these sites — the Great American West Mining Priority. Cleanups or environmental assessments are already underway at many

of the sites. Cleanup activities at some, such as the Iron Mountain Mine and Sulphur Bank Mine in northern California, have been underway for years. Now these actions are picking up momentum across the West. State and tribal agencies have been working with EPA to investigate and prioritize the abandoned mine sites that pose the greatest environmental risks.

In the Pacific Southwest, EPA has stepped up activities at abandoned mercury mines in California, copper mines in Nevada and Arizona, and uranium and copper mines on tribal lands of the Navajo and Tohono O'odham Nations. While long-term cleanup actions are underway at sites on EPA's Superfund National Priorities List, immediate threats to human health and

the environment have been addressed by EPA's Superfund Emergency Response program.

Mining and Mercury

Mercury is a highly toxic liquid metal formerly used in gold and silver mining and explosives manufacturing. Mercury itself was mined almost exclusively in the coastal ranges of California, from Lake, Sonoma, and Napa Counties in the north to San Luis Obispo County in the south.

EPA cleanup operations have been underway for more than a decade at Lake County's abandoned Sulphur Bank Mine, on the shore of Clear Lake. In 2006, EPA temporarily relocated 64 residents of the Elem Tribal Community, adjacent to the mine site, to remove arsenic- and mercury-contaminated mine tailings beneath houses, streets, and yards. Five houses had to be demolished, removed, and rebuilt.

On Cache Creek, downstream from Clear Lake, El Paso Natural Gas Corp. began stabilizing slopes to prevent erosion of mercury-contaminated soil and rock at two former mercury mine sites, under an EPA cleanup order. EPA had earlier identified the company as a former owner/operator.

At the Abbot/Turkey Run Mercury Mine site in Lake County, EPA demolished mercury-contaminated smelter structures and cleaned up shining beads and puddles of pure mercury found in and around the buildings. EPA also removed mercury-contaminated materials from the Buena Vista/Klau Mercury Mine site in San Luis Obispo County. Mercury contamination has

Abandoned open pit mines can pollute downstream waters with toxic dissolved metals unless the waste rock is recontoured to prevent erosion, as shown here at the Buena Vista/Klau Mercury Mine in California.



been found in fish in a reservoir downstream. This mine site has been added to EPA's Superfund National Priorities List, and further assessment of cleanup needs is underway.

Today, gold mining is still a source of mercury pollution. Naturally occurring mercury in gold-bearing ore in Nevada is vaporized and released into the air in the thermal processes used to extract the gold. Over the last five years, EPA and the Nevada Department of Environmental Protection (NDEP) have been working with gold mining operations to reduce these emissions. In 2005-2006, NDEP developed the nation's first regulations to control air emissions of mercury from mining. Since 2001, Nevada gold mines have reduced mercury emissions by more than 75%.

Copper Mines

Cleanup is also underway at the sprawling, abandoned Anaconda Mine near Yerington, Nevada. In 2006, EPA removed electric transformers filled with toxic PCBs, and took action to prevent dispersion of arsenic-contaminated dust and water from evaporation ponds on the site. EPA also provided funding to the Yerington Paiute Tribe, whose lands adjoin the mine site, to test air and water samples for contaminants, and assess potential impacts on tribal lands and residents.

At the Cyprus Tohono Mine, operated by Phelps Dodge on Tohono O'odham land south of Tucson, Arizona, EPA issued an administrative order requiring the company to clean up

tailings containing toxic salt and uranium. This site leached uranium into the groundwater and fouled a tribal community's drinking water well. The well was relocated to an area untouched by the contamination. Removal of the salts and tailings is now underway. These wastes are being piled on a plastic pad, which will then be capped so that no water can get in to move the toxics. The work will cost an estimated \$18 million.

At the Ironite/Iron King Mine and smelter near Prescott, Arizona, EPA removed arsenic-laden soils from a residential area. At the ASARCO copper mine near Hayden, Arizona, an EPA assessment showed elevated levels of arsenic in some residential areas. EPA is now using funds from ASARCO, under a national agreement with the company, to conduct a remedial investigation and feasibility study of cleanup options.

Uranium Mines

EPA and the Navajo Nation have identified more than 500 former uranium mine sites on Navajo lands. High on the priority list for further investigation and cleanup is the North East Churchrock Mine. In 2006, EPA issued an administrative order to a responsible party, General Electric/United Nuclear Corp., requiring the company to test soil from 11 areas on the site that may be contaminated with radiation, heavy metals, and spilled fuel. This work is now underway.

For more information on mine cleanups in the Pacific Southwest, visit www.epa.gov/region9/waste/sfund/superfundsites.html

EPA's cleanup work at the Sulphur Bank Mercury Mine Superfund site in Lake County, California, aims to protect nearby residents, as well as fish and wildlife, from highly toxic mercury.





Places

The Route 66 Partnership: Revitalizing the Mother Road

ROUTE 66, STRETCHING FROM CHICAGO to Santa Monica, was once such a busy highway that it was known as “America’s Main Street.” Between the early 1920s and the late 1960s, millions of Americans migrated to California on it. In the 1960s there was even a television drama series about people traveling on Route 66.

But then a freeway was built that bypassed the old two-lane highway and the many towns it passed through, leaving bankrupt gas stations and slowly deteriorating commercial strips. Unseen beneath the old gas pumps lay rusting fuel storage tanks, many of them leaking toxic hydrocarbons into the soil and groundwater. Today, these sites are known as brownfields, because potential contamination hinders redevelopment, particularly in small rural towns with scant financial resources.

The Arizona Department of Environmental Quality (ADEQ) launched the Route 66 Initiative in 2004 to help these small and economically challenged communities address problems at former gas stations and other sites with underground storage tanks (USTs). Through the initiative, ADEQ has coordinated with UST owners and operators, property owners, and local governments to identify and remove abandoned USTs, and speed up cleanups and investigations. By early 2007, more than two dozen site cleanups had been completed.

In late 2005, EPA staff began working with ADEQ to promote the Route 66 Initiative and take the effort to the next level, helping Route 66 communities explore ways to redevelop sites that had been cleaned up or investigated.

The initial project area included Winslow, Joseph City, and Holbrook, Arizona.

Less than a year after ADEQ and EPA joined forces to look into redevelopment opportunities in this area, the agencies recruited partners from 20 local, state, and federal agencies and organizations, including the National Park Service, Small Business Administration, the state Departments of Transportation and Commerce, the Route 66 Association of Arizona, and others.

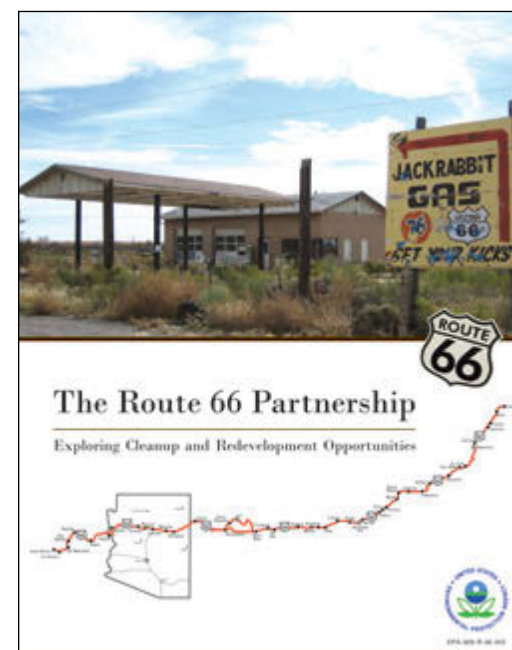
Organizations in the Route 66 Partnership are offering millions of dollars in funding to help communities transform these sites. In January 2006, the partnership held a two-day kickoff meeting to share information and discuss the challenges, options, and possible next steps. Over 60 people attended, creating a network of stakeholders that included government agencies, local news media, businesses, bankers, community members, and UST site owners. EPA followed up by co-sponsoring a Brownfields Grant Workshop in Holbrook in October 2006 and a Community Development Workshop in Flagstaff in March 2007.

Through these efforts by ADEQ and EPA, residents of these communities could see that others, including state and federal agencies, were ready to help them find solutions after decades of struggling with environmental and economic challenges.

Holbrook secured a grant from the Arizona Department of Commerce to conduct a business inventory along the old highway. Winslow received a \$96,000 grant from ADEQ for an en-

vironmental cleanup at a monument dedicated to the well-known line “Standin’ on a corner in Winslow, Arizona,” from a 1970s song by the Eagles. Flagstaff received an EPA brownfields grant to address petroleum-contaminated sites along Route 66 in that city.

Building on these early successes, three other EPA regional offices, covering states from New Mexico to Missouri, have initiated similar projects focused on abandoned gas station sites on other portions of Route 66. Other state governments have also joined these efforts. For more information, including tools and resources for cleanup, redevelopment, and historic preservation, visit www.epa.gov/region9/waste/brown/66



Left: In early 2006, people from EPA, the Arizona Department of Environmental Quality, local governments, businesses and other stakeholders along the path of Route 66 met to kick off their partnership.

Advances

Indian Bend Wash — Construction Complete

IN DECEMBER 2006, EPA and the Arizona Department of Environmental Quality announced that construction of all cleanup facilities at one of the nation's largest groundwater contamination sites has been completed. The 13-square mile Indian Bend Wash (IBW) Superfund site is located in two areas that cover portions of Scottsdale and Tempe.

The two areas, North Indian Bend Wash and South Indian Bend Wash, are separated by the Salt River channel. The two areas have separate, underground plumes of contaminated water. At North Indian Bend Wash, four groundwater pump-and-treat systems have been built to remove the contamination. At South Indian Bend Wash, where the groundwater's contaminant levels are lower, EPA is monitoring 80 groundwater wells. Results show that the contaminants are gradually diminishing naturally, and are expected to reach safe drinking water levels within 15 years.

Across the entire site, contaminated soil close to the surface at four locations has been treated by soil vapor extraction. This process is still underway at two other locations. Construction work on the last of these soil vapor extraction

facilities at South Indian Bend Wash was completed in 2006.

Groundwater pump-and-treat facilities at the north site have already cleaned more than 61 billion gallons of contaminated groundwater, enough to meet the household needs of more than 400,000 average-sized homes for a year.

Keith Takata, EPA's Superfund Division director for the Pacific Southwest Region, hailed the culmination of "cooperative effort between EPA, the state, the cities of Scottsdale and Tempe, and numerous companies to ensure that the drinking water is safe for residents."

Work at the site spanned almost the entire history of EPA's Superfund program, which began in 1981. At the time, no one predicted just how complex, costly, and lengthy the effort to clean up the nation's most toxic sites would be. Indian Bend Wash provides a good example of the challenges involved.

In 1981, the City of Scottsdale discovered that its drinking water wells were contaminated with volatile organic compounds (VOCs) trichloroethylene (TCE) and perchloroethylene (PCE). In 1983, EPA listed the site on its Superfund National Priorities List. The area includes developed land with residential, commercial and industrial uses.

To define the extent of VOC contamination for all of IBW, more than 240 groundwater monitoring wells were drilled, ranging from 140 to 1400 feet below ground surface. Results showed that the area is underlain by three aquifer units layered on top of each other with varying groundwater flow and direction, each with varying degrees of

VOC contamination. The contamination resulted from numerous industries in the Scottsdale and Tempe areas disposing of VOCs directly into the ground or dry wells (which drain into the soil) in the 1970s and earlier.

Scottsdale and Tempe rely on groundwater as one of their sources of drinking water.

The treatment facilities remove VOCs from the groundwater. The clean, treated groundwater is then blended into drinking water supply systems, discharged to irrigation canals, or re-injected back into the underground aquifer. By 2006, the North IBW system was continuously treating enough water to supply over 50,000 average-sized homes.

The groundwater treatment plants will operate for many years into the future. In most cases, the work has been paid for by the industrial facilities that caused the contamination. However, additional activities have been paid for by federal Superfund money when other funding sources were not available. EPA enforcement staff and attorneys spent years tracking down responsible parties, and securing legally binding commitments from them to pay their fair share for the cleanup, as required by the federal Superfund law. In some cases, litigation was necessary. But the decades-long effort has paid off by restoring clean, safe drinking water sources to Scottsdale and Tempe.

For more information, visit www.epa.gov/region9/waste/sfund/indianbend

New groundwater treatment facility at the Indian Bend Wash Superfund site is the fourth and final one to be completed.



People

**Steve Calanog:
Strengthening Emergency Response**

STEVE CALANOG MAY NOT WEAR A UNIFORM, but he carries a commanding title. He is one of four EPA Pacific Southwest staff trained to become EPA's incident commander when a disaster strikes.

After Hurricanes Katrina and Rita hit the Gulf Coast, Calanog served four 21-day tours of duty as EPA's Deputy Incident Commander in Louisiana. There, he coordinated the work of 200 to 300 EPA employees from all over the U.S. as they took on a variety of tasks, from rescuing stranded residents to testing drinking water systems in an area as large as West Virginia. Post-disaster reports cited EPA for a job well done.

Calanog came to EPA in 1992 after a stint with the Peace Corps in rural Paraguay, where he worked on improving basic sanitation, learning the local Indian language, and educating the people on how to prevent sewage-borne diseases. Like the locals, he swam in piranha-infested rivers, and emerged unscathed. "They rarely bite," he says, dismissing their fierce reputation as a Hollywood myth.

For the past eight years, Calanog has been one of 17 On-Scene Coordinators in EPA's regional office who respond to oil and chemical spills, as well as floods, earthquakes, and terrorism incidents that could release oil, toxics, radiation, or biological warfare agents. Three years ago, Calanog trained for his incident commander role at the U.S. Forest Service's National Wildland Fire Coordinating Group and the Coast Guard's maritime emergency training center at Yorktown, Virginia. Since then, he has headed

an Incident Management Team of ten EPA staff who can be ready to go on a moment's notice when disasters occur anywhere in the U.S. The regional office has three of these teams.

These teams are part of the National Incident Management System (NIMS), which coordinates federal agencies responding to terrorism and other emergencies. Calanog participates on an EPA national workgroup that is developing the agency's incident management procedures for major emergencies as well as more routine work. Under NIMS, EPA's Pacific Southwest Regional Office and the U.S. Coast Guard co-lead two geographic response teams that include 15 federal agencies, the states of California, Nevada, Arizona, and Hawaii; and U.S. Pacific Island territories.

Last year, the U.S. State Department called EPA for help in responding to a mercury spill in the Philippine Islands. Some students at a school near Manila had found a vial of mercury in their chemistry lab, played with it, and spread it around the school, poisoning themselves. Three were hospitalized. Calanog headed a four-person EPA team sent in to clean up the school. While there, he briefed top Philippine officials on disaster preparedness, and recommended that mercury be removed from all schools. By the time he left, a bill to do this had been introduced in the national legislature.

"We were treated like celebrities by officials and the news media," says Calanog, whose father came to the U.S. from the Philippines. "But we were just doing our job."



Communities and Ecosystems



EPA's Pacific Southwest Region stretches across a vast area of roughly 400,000 square miles on the U.S. mainland, plus the lands and waters of Hawaii and Pacific islands more than 6,000 miles from California.

Its habitats range from Sonoran deserts to lush rain forests and coral reefs, providing habitat for thousands of unique species of wildlife, fish, and plants. Its residents reflect the world's diversity, from indigenous peoples to immigrants from around the globe.

Not surprisingly, the environmental players vary from place to place. On the U.S.-Mexico Border, EPA collaborates with U.S. states, the Mexican environmental agency SEMARNAT, Mexican state governments, and border tribes.

In the Pacific, EPA cooperates with the State of Hawaii, the Territories of American Samoa and Guam, and the Commonwealth of the Northern Mariana Islands. On the mainland, EPA works with each of the region's states—California, Arizona, Nevada and Hawaii—146 federally-recognized tribes, and in some cases partners directly with local community groups.

These partnerships and commitment to healthy habitats and communities form the foundation of EPA's work across the region, the nation, and the planet.

Trends

Pacific Islands: Public Health Improves

WHEN IMAGINING LIFE ON A FARAWAY Pacific island, many of us envision an idyllic existence under swaying palms. But it's not quite that simple.

People in the U.S. Pacific island territories of Guam and American Samoa and the Commonwealth of the Northern Mariana Islands (CNMI) — where average incomes are low and water and sanitary conditions are below U.S. mainland standards — have struggled for decades to improve conditions. In 2006, the ongoing collaborative efforts of EPA and these islands' environmental agencies paid off with improvements benefiting more than 100,000 residents.

Guam: Sewage Spills Down, Drinking Water Safety Up

Bacterial contamination of drinking water has been a long-standing problem on Guam due to sewage overflows that infiltrated drinking water wells. Before 2003, residents were notified several times a year that they should boil their water before drinking it — in one instance, the boil-water warning lasted 70 days. But as a result of recent improvements, Guam has had safer drinking water without boil-water notices for the past two years.



Infrastructure investments, such as installing emergency back-up generators at sewage pump stations and upgrading its drinking water chlorination system, have made a big difference. The Guam Waterworks Authority has improved operations and infrastructure, in compliance with a 2003 EPA order, and has raised \$100 million in capital from a bond issued in 2006.

Sewage overflows have decreased by an amazing 99.9%, from 500 million gallons between 1999 and 2002 to 100,000 gallons in 2006.

WWII-Era Fuel Tanks Removed in Saipan

Tanapag Village in Saipan, CNMI, faced a lingering hazard from World War II: massive fuel tanks abandoned by the U.S. military. Over the last 50 years, the tanks leaked and corroded, putting Tanapag residents at risk from petroleum contamination and physical collapse of the tanks.

In 2006, EPA removed six collapsed tanks and cleaned up the remaining oil sludge and underlying contaminated soil and groundwater. The removals — many in people's backyards or next to their outdoor kitchens — changed people's lives for the better.

The project was also a capacity-building opportunity for the local CNMI Division of Environmental Quality (DEQ). After undergoing a 40-hour health and safety training, DEQ staff worked with the EPA on-scene coordinator and various contractors in all aspects of assessing and cleaning up the sites.



Health Risks Reduced in American Samoa

Pigs in American Samoa were polluting fresh water streams, exposing residents to leptospirosis, a disease carried in pigs' guts. Nearly 1,000 small-scale piggeries house a total of 8,244 pigs on the main island, Tutuila. These are commonly makeshift operations, with open-sided buildings on concrete or packed earth. Wastes were typically discharged into unlined cesspools or directly into streams or wetlands. In 2004, pig waste contaminated waters in 31 of American Samoa's 41 watersheds.

In 2005, American Samoa's government initiated prevention efforts with water monitoring, education, inspections, and enforcement on Afuelo Stream, and island-wide. The first priorities were to educate the public about basic sanitation, to locate and map pig facilities and their discharge points, and begin water quality monitoring. Enforcement followed. The Afuelo Stream actions included moving 100 pigs away from the stream and installing waste treatment systems.

These measures have reduced *E. coli* bacteria in the stream by 90%, and cut nitrogen and phosphorus pollution by 58% (2,649 pounds) and 43% (2,088 pounds) annually. Similar benefits are expected island-wide.

At Tanapag Village in Saipan, EPA removed six corroding military fuel tanks left from the 1940s, and cleaned up underlying soil.

In 2004, pig waste contaminated waters in 31 of American Samoa's 41 watersheds.

Primer

The U.S.-Mexico Environment – Challenges and Opportunities

THE U.S.-MEXICO BORDER, stretching 2,000 miles from the Gulf of Mexico to the Pacific Ocean, is a diverse area, encompassing deserts, mountain ranges, wetlands, estuaries and aquifers. The border region is currently home to more than 12 million people — by 2020, the binational population along the border is expected to double to more than 24 million people.

The environmental challenges of this rapid population growth include unplanned development; greater demand for land and energy; increased traffic congestion, air pollution and waste generation; overburdened or unavailable wastewater treatment; and increased frequency of chemical emergencies.

Kicked off in 2002, the U.S.-Mexico Border Environmental Program (Border 2012) is a powerful partnership between EPA, the Mexican environmental agency SEMARNAT, 10 border

states, 26 U.S. tribes, and numerous binational institutions and communities. It is a 10-year, binational, results-oriented environmental program for the U.S.-Mexico border area that aims to sustainably protect the environment and public health.

Border 2012 emphasizes measurable results, public participation, transparency, and timely access to environmental information. The partners work together to set priorities through Regional Workgroups, and the associated Task Forces provide a public forum and implement the on-the-ground border projects.

Accomplishments include major improvements to drinking water and wastewater infrastructure that benefit more than 7.8 million people, establishment of emission inventories and a binational air monitoring network to assist in identifying effective emission reduction strategies, road



paving projects to significantly reduce particulate pollution, and the conduct of sister city drills to improve binational emergency preparedness coordination and readiness. In fact, many of the emergency responders who participated in the joint drills were trained at the Border 2012-supported Baja California Emergency Management Institute, an unprecedented public/private partnership that offers a full range of certified training for emergency responders.

Indigenous Communities and Tribal Nations Collaborate for Results

Indigenous communities in Sonora and Baja California are among the poorest and most isolated populations of this arid region, with little to no water or wastewater infrastructure. Until recently, the only source of drinking water for children and residents of the Quitovac O'dham community in Sonora, Mexico, were shallow, hand-dug wells contaminated with coliform bacteria and high levels of lead, arsenic, uranium, and chromium were. The usual source of drinking water for most indigenous communities in Baja California has been untreated surface water from springs, shallow wells or creeks. Many of those sources are contaminated by livestock, wildlife, or dead animals.





In 2006, the communities of Quitovac (Sonora, Mexico) and San Antonio de Necua (Baja California, Mexico) completed construction of their water systems. The new system at Quitovac serves a boarding school for 100 O'odham children. The Mexican government is now extending electricity to the community and has committed to upgrade homes to provide indoor plumbing, and the Pan American Health Organization is providing a health clinic.

In partnership with a nonprofit organization, the Pala Band of Mission Indians is helping to provide training on the maintenance of water infrastructure systems to the indigenous communi-

ties of San Jose de la Zorra and San Antonio de Necua in Baja California, Mexico.

Among the program's biggest successes last year was the permanent removal and safe disposal of 1.8 million abandoned scrap tires in Baja California that posed significant public health risks (most of the tires were sent to cement kilns and used as tire-derived fuel).

In addition, the border and pesticides programs sponsored the cleanup of obsolete, but still highly toxic, agricultural pesticides along the Arizona-Sonora border. Many of these pesticides, which included toxaphene and DDT (illegal to use in the U.S.), methyl parathion, and azinphos methyl, were improperly stored in corroding — in some cases leaking — containers. In at least one instance, children were found playing on a pile of sacks of dry pesticide. The cleanup will protect children from further exposure. The waste collection events gathered 72,000 pounds of dry pesticides and 500 gallons of liquid pesticides from the San Luis, Sonora, and Yuma, Arizona, areas.

Each year, diesel trucks make nearly 5 million crossings from Mexico into the U.S. Emissions from diesel engines, especially the microscopic soot known as "particulate matter" (PM), create serious health problems for adults and have extremely harmful effects on children and the elderly. Health issues from diesel emissions in-



clude (but are not limited to) chronic bronchitis, asthma, premature death, and cancer.

In order to better understand the costs and effectiveness of diesel retrofit technologies on Mexican heavy-duty diesel vehicles operating in the San Diego-Tijuana border region, EPA worked with the San Diego Air Pollution Control District to fund the retrofit of 60 heavy-duty diesel trucks from Baja California. This project reduced the particulate matter (PM₁₀) emitted by these vehicles by 25-40%; additional retrofits are planned for the Arizona/Sonora and California/Baja California border regions.

For more information on Border 2012, visit www.epa.gov/border2012

Above: These sacks of methyl parathion represent just a portion of the 36 tons of waste pesticides collected by EPA and the Mexican government for proper disposal.



Top left: San Antonio de Necua — a new water well constructed with funding from the Border 2012 programs.

Left: Cleanup of the INNOR tire pile in Mexicali, Mexico.

Places

Gila River Indian Community's Environmental Program Excels

A FEW YEARS AGO, the Gila River Indian Community, located south of Phoenix, Arizona, had a host of environmental problems on their land, from a tire fire involving more than 3 million used tires, to unauthorized trash dumping. Today, the tribe has not only cleaned up these sites, it has an ongoing program to protect air, land, and water that is a model for other tribes.

The tribe regulates approximately 50 privately-owned businesses and industries on their land by adopting specific ordinances to regulate waste and emissions. These businesses encompass a variety of industries including an explosives manufacturer, several sand and gravel mining operations, agricultural chemical supply companies, and cotton gins. The tribe's Department of Environmental Quality (DEQ) has also adopted general regulations covering visible emissions, storage and handling of volatile

organic compounds, degreasing and metal cleaning, and fugitive dust.

In 2006, Gila River DEQ became the first tribal agency in the U.S. to develop a comprehensive Air Quality Management Plan to protect air quality. This includes an air monitoring program that's already up and running, an inventory of total air emissions on the tribe's land, and air quality standards that are the same as EPA's national standards. Also part of the plan is an air permitting program which allows DEQ to set and enforce emissions limits for industries operating on tribal land. And the tribe has hired a team of environmental professionals, most of them Native Americans, to administer the plan.

Each year, DEQ sponsors Earth Day volunteer trash cleanups, and a household hazardous waste collection event which has brought in more than 6,000 pounds of used batteries, oil, paint, antifreeze, and other hazardous materials. In addition, the DEQ supports other district, community and school clean-ups throughout the year. The DEQ also collaborates with surrounding jurisdictions to combat illegal dumping and other environmental issues that impact the Community.

The DEQ Pesticide Control Program has worked with farmers on tribal land to greatly reduce both the amounts and toxicity of pesticides sprayed, as well as training farm workers and pesticide handlers on safety. The DEQ Water Quality Program routinely monitors and analyzes water from many sources on tribal land, including



rivers, canals, stormwater, groundwater, and wells. The data collected gives the Gila River Indian Community the ability to detect changes in water quality and contamination and provide guidance for cleanup and remediation.

The Gila River Indian Community is one of two tribes in the U.S. to be chosen as a Brownfields Showcase Community. With more than \$700,000 in EPA brownfields grant money, the tribe has been able to leverage \$8.3 million more from other sources to clean up and reuse abandoned industrial sites. A new facility, the Diabetes Education and Research Center, has been constructed on one of the sites.

Gila River Indian Community DEQ and its director, Margaret Cook, have been recognized by both the State of Arizona and EPA for their outstanding accomplishments and leadership. In 2004, EPA awarded DEQ staff the Conner Byestewa Jr. Award for environmental excellence, which is given annually to three of the more than 146 tribes in the Pacific Southwest Region.

Gila River DEQ Director Margaret Cook (front center), ADEQ Director Steve Owens (rear, middle) and EPA regional Air Division Director Deborah Jordan (front, holding document) celebrate the Gila River Indian Community's completion of a comprehensive plan for improving air quality on more than 600 square miles of tribal land within central Arizona.



Collaboration

Building the Willits Bypass — and Saving Wetlands

THE TOWN OF WILLITS in Northern California's Mendocino County sits on the edge of the Little Lake Valley, so named because winter rains flood the valley each year, creating a unique seasonal pond that can grow to hundreds of acres, depending on the rainfall. Coho and Chinook salmon, as well as steelhead trout, migrate through the valley's creeks each winter to reach their spawning grounds.

Because of this seasonal wetland, the land has remained open space up to now, with patches of riparian forest, and deer and cattle grazing its grasses in the dry season. However, the state transportation agency, Caltrans, planned to reroute a portion of Highway 101 through the valley, which could have affected 130 acres of wetlands. EPA worked with Caltrans, natural resource agencies like the state Department of Fish and Game and the U.S. Fish and Wildlife Service, and other stakeholders to develop a plan to build the bypass with no net loss of wetlands.

This collaborative approach has been standard for EPA since the agency adopted a "Memorandum of Understanding for Surface Transportation Projects" in 1994 that lays out a framework for cooperation in resolving wetlands issues under the Clean Water Act's Section 404 and the National Environmental Policy Act (NEPA). Section 404 protects wetlands, while NEPA requires EPA to review and comment on Environmental Impact Statements drafted by federal agencies regarding their proposed actions. "One of EPA's primary goals is to avoid and minimize environmental impacts through early engagement with

our partners," says Nancy Levin of the regional Environmental Review Office.

Due to the potential impacts on wetlands, the originally proposed alignment of the roadway could not have been permitted under Section 404, according to Mike Monroe of EPA's regional Wetlands Regulatory Office. Monroe and Levin worked with Caltrans and more than a dozen other stakeholders to map, measure, and analyze the wetlands impacts of several alternative routes.

Other stakeholders included Willits and Mendocino County elected officials, the nonprofit Willits Environmental Center, the North Coast Regional Water Quality Control Board, the U.S. Army Corps of Engineers, the National Oceanographic and Atmospheric Administration's (NOAA) Fisheries Office, and the Federal Highway Administration.

After a series of negotiations, the stakeholders agreed on a route that will save 75 acres of wetlands and creeks that would have been destroyed by the original proposal. Under Section 404, a proposed project can be permitted if unavoidable wetlands impacts are mitigated — offset by the creation, enhancement, preservation, or restoration of wetlands elsewhere. For the Willits Bypass, Caltrans has agreed to create or otherwise preserve at least 1.5 acres of wetlands in the Little Lake Valley for every one acre lost.

All parties worked together to understand each others' interests — for example, the local interest in preserving a business park and playing fields. EPA contributed leadership in negotiating the final agreement. Construction of the bypass is tentatively scheduled to begin in 2010.



EPA worked with Caltrans to preserve most of the seasonal wetlands in the Little Lake Valley near Willits, while allowing construction of the Willits Bypass on Highway 101. (Photo courtesy of Caltrans)

Partnership

The West Oakland Toxic Reduction Collaborative

WEST OAKLAND, A PART of Oakland, California, is surrounded by freeways and next to the nation's fourth-busiest container cargo port. The port alone generates up to 10,000 trips per day through the community by heavy diesel trucks. In this mostly African-American and Hispanic community, asthma levels are among the state's highest, and income levels are low.

Residents knew there was something wrong with this picture, so in 2000 they formed the Environmental Indicators Project (EIP), which tracked 17 indicators of local environmental health. The project's 2002 report, "Neighborhood Knowledge for Change," set the community's agenda for environmental improvements.

The report caught the attention of EPA's regional Air Division. EPA's Mike Bandrowski, Richard Grow, Karen Henry, and John Brock met with EIP members to discuss how the agency could support the group's efforts to reduce diesel pollution in the community. They got to know EIP leaders, and formed a partnership to organize the West Oakland Toxic Reduction Collaborative, a multi-stakeholder effort to mobilize community residents and groups, government agencies, non-profits, and businesses to improve air quality and community health.

EPA and EIP are the co-leads of the collaborative. EPA also provides some of EIP's and the collaborative's funding, through grants. The participants are divided into eight work groups, each working on voluntary efforts to reduce residents' exposure to diesel and toxic pollutants.

The community of West Oakland is subject to a disproportionate amount of air pollution because it is adjacent to the Port of Oakland, which generates up to 10,000 heavy diesel truck trips through the community each day.

EPA's ENVIRONMENTAL JUSTICE PROGRAM is working to reduce disproportionate environmental impacts to low-income areas and communities of color. In 2006, this included projects in:

North Richmond, CA	Bayview-Hunters Point, San Francisco, CA
Pacoima (NW Los Angeles)	Tucson, AZ
West Oakland and downtown Oakland, CA	South Phoenix, AZ
Canal District, San Rafael, CA	Anahola, Kauai, HI

The Alternative Fuels group, which includes utility giant Pacific Gas and Electric Co., is working with several companies to replace dirty diesel truck engines with clean-burning liquefied natural gas engines. The Healthy Homes Work Group has trained 10 local residents to go to door-to-door with an indoor air pollution checklist to identify asthma triggers.

A Land Use Work Group is consulting with city planners to find ways to relocate trucking businesses out of residential areas and into the former Oakland Army Base, now owned by the Port of Oakland and the City of Oakland. A Brownfields Group is working with the state Department of Toxic Substances Control to address cleanup and redevelopment of abandoned industrial sites on an area-wide basis.

Another group's focus is to ensure that as the port expands to handle an anticipated tripling of container traffic by 2020, there is a substantial decrease in air pollution and risk to residents. This group will be working with the Bay Area Air Quality Management District to meet the state's even more ambitious goal: To lower residents' health risks from diesel emissions by 85%.

"It's been gratifying to work with community leaders like EIP's Margaret Gordon and Brian Beveridge," says Richard Grow, EPA project lead. "Everyone is focused on common goals."

People

EPA's Agriculture Team: Making a Difference in the Central Valley

FOR MORE THAN 10 YEARS, the Agriculture Team in EPA's regional Communities and Ecosystems Division has coordinated with colleagues in an array of environmental programs to address issues related to agriculture in the Pacific Southwest.

Cindy Wire, James Liebman, Don Hodge, and Karen Heisler make up the staff team that works with Kathy Taylor, Agriculture Advisor to the Regional Administrator, to promote voluntary partnerships with the agricultural community and its allies. Both the Air and Water Divisions have designated associate directors dedicated to agricultural issues — Kerry Drake and Jovita Pajarillo — who work closely with the team to optimize cross-program coordination.

The majority of the team's work is focused on California's Central Valley, due to the disproportionate environmental and health impacts associated with agriculture in this vast area. The team strives to engage agricultural producers across the valley to employ strategies that make their operations more sustainable. Together, they're finding ways to improve environmental performance while supporting the economic bottom line and the well-being of valley communities.

It's not easy, considering that Central Valley agriculture must compete in an increasingly global marketplace, with great variations in environmental and labor practices. But this is all the more reason to champion frameworks for environmental performance that leverage the marketplace to support producers who do the right thing.

EPA's Ag Team has long supported agricultural innovation and partnerships, including third-party certification of practices that yield environmental improvement such as reductions in pesticide loading. The team recognizes that a direct return in the marketplace is critical to engaging the industry's commitment around environmental protection.

Success requires producer participation, several years of demonstration projects and data development, and ultimately market recognition. Over time, EPA's regional Ag Team has developed important relationships with other agencies and organizations that have proven to be key partners in achieving these steps.

For example, Jamie Liebman's leadership with the Dairy Manure Collaborative leveraged \$16 million in grants and in-kind resources to advance manure management through demonstration projects and technology assessment, taking into account air emissions, nitrogen, salts, and clean energy production. Jamie's technical fluency and leadership skills have helped a diverse group of stakeholders work together on finding ways to address the impacts of dairies.

Cindy Wire's hands-on management of Food Quality Protection Act grants has yielded proven reductions in pesticide impacts in the Central Valley. Much of Cindy's time is spent in the field with growers and their allies — university researchers, nonprofits, and commodity organizations — encouraging their commitments to developing and demonstrating more sustainable cropping systems.

Don Hodge is championing EPA's perspective on Environmental Management Systems in agriculture, specifically the necessity for data-driven programs and third-party certification. Don is the most recent addition to the team, and has brought an extensive knowledge of environmental measures and indicators of improvement, as well as personal dedication to sustainability.

Karen Heisler has for many years been a guiding force on the team. Her networking in the agriculture community enables EPA to anticipate events that demand the agency's attention, such as concerns about *E. coli* contamination, or adoption of emerging technologies that could affect agricultural sustainability.

In short, the Ag Team focuses on environmental results through innovation, coordination across programs, and well-articulated goals. Their successes, in partnership with Central Valley producers, are benefiting the agricultural community, consumers, valley residents, and the environment.

Don Hodge, Jamie Liebman, Kerry Drake, Jovita Pajarillo, Karen Heisler, Cindy Wire, and Kathy Taylor (not pictured) work with the agricultural community in the Pacific Southwest.



Compliance and Stewardship



Compliance is about playing by the rules — laws and regulations governing activities that affect human health and the environment. One of EPA's overriding priorities is to ensure environmental compliance by assisting regulated facilities, supporting state and local monitoring and enforcement activities, and taking direct federal action.

Stewardship is a responsibility we all share to care for our environment — at home, at work, and on the go. Everyone can recycle paper, use energy-efficient appliances, and make marketplace decisions that support a clean environment. Industries and institutions can contribute by conserving energy and resources on a larger scale. EPA has a number of voluntary partnerships that encourage government, industrial, and other facilities to achieve environmental results that go far beyond compliance with regulations.

For example, six facilities in the Pacific Southwest, including Motorola in Chandler, Arizona, and the NASA Ames Research Center in California, completed three-year commitments under EPA's Performance Track program in 2006. Collectively, they made substantial reductions in their generation of hazardous waste (140 tons), solid waste (64 tons), energy use (7 trillion BTUs), and water use (52 million gallons). They also increased their use of recycled materials by 187 tons. Performance Track now has 55 member facilities in the region.

Trends

Expanding Enforcement Tools To Increase Environmental Results

ENFORCING THE NATION'S ENVIRONMENTAL LAWS is central to EPA's mission, and the agency has a number of tools at its disposal to ensure compliance.

In cases of serious environmental violations which might involve egregious negligence or conduct involving intentional, willful or knowing disregard for the law, EPA's Criminal Investigation Division pursues criminal penalties and remediation from violators.

Effectively communicating enforcement activities to the public and the regulated community sends a clear message that failure to comply has consequences.

The agency uses civil enforcement tools to return violators to compliance and deter misconduct in others, eliminate or prevent environmental harm, and preserve a level playing field for responsible companies that abide by the laws. In judicial cases, EPA brings suit in federal court to have a judge order a remedy. In administrative cases, the agency issues orders directly to the violator.

In fiscal 2006, EPA's Pacific Southwest Region concluded 295 enforcement cases, garnering over \$468 million in funding to clean up and prevent pollution caused by violations. Collection of \$7.8 million in penalties helped ensure that polluters gained no advantage over those who invest in compliance.

Using Expedited Settlements to Speed Environmental Outcomes

One of the most efficient ways to address minor violations and obtain environmental benefits is through the use of expedited administrative penalty orders. These tools offer relatively "real time" enforcement where violations are corrected and a penalty is obtained in a short amount of time, generally a few months from EPA's discovery of the violation.

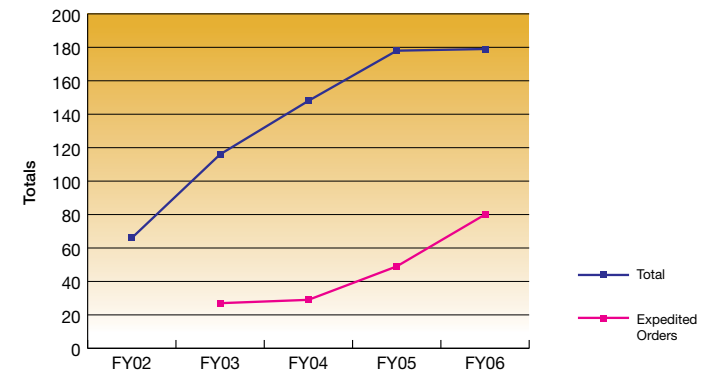
As Figure 1 shows, EPA has steadily increased its use of these enforcement tools in the Pacific Southwest, increasing the percentage of expedited orders out of all administrative penalty orders from 24% in fiscal 2003 to 45% in fiscal 2006.

Reducing Air Pollution Through the National Refinery Initiative

The Pacific Southwest Region played an active role in a national initiative to address the most significant Clean Air Act compliance concerns affecting the petroleum refining industry. Through this initiative, EPA has reached more than a dozen comprehensive agreements with petroleum refiners to significantly reduce harmful air emissions of nitrogen oxide, sulfur dioxide, carbon monoxide, benzene, volatile organic compounds, and particulates.

In fiscal 2006, three more settlements became effective, with a combined projected reduction in sulfur dioxide and nitrogen oxide emissions of more than 5,300 and 300 tons per year, respectively, from seven California refineries: ExxonMobil's Torrance refinery; Tesoro's Martinez refinery; Valero's Benicia and Wilmington refineries; and ConocoPhillips' Carson/Wilmington, Rodeo, and Santa Maria refineries.

Fig. 1. Pacific Southwest Region
Final Administrative Penalty Orders



In addition to these reductions, the Pacific Southwest portion of these settlements include nearly \$2 million in penalties and \$650,000 in supplemental environmental projects.

Publicizing Enforcement to Improve Compliance

Effectively communicating enforcement activities to the public and the regulated community both improves awareness of compliance requirements and sends a clear message that failure to comply has consequences.

One recent example of the impact of targeted enforcement and outreach involved asbestos violations at charter schools in Arizona. After receiving a tip, EPA determined that five of the larger charter schools in Phoenix had failed to conduct inspections for asbestos-containing building materials and develop asbestos management plans. EPA issued enforcement actions and later publicized settlement of the cases. As a result, EPA was contacted for compliance assistance by other charter schools, consultants hired to do inspections and develop plans for more than 40 schools, and the Arizona State Board for Charter Schools, which posted compliance information on their Web site.

Primer

Conserving Resources, Minimizing Waste

THERE'S A SIMPLE WORD for the unwise or inefficient use of resources: Waste.

To have a healthy planet and a sustainable economy, we must reduce wasted energy and materials.

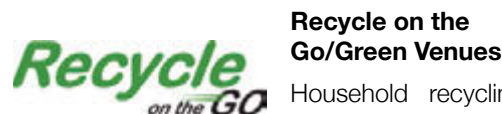
Reducing the Waste Stream to a Trickle

As the pie chart on this page shows, our waste stream is made up of a wide range of materials, from coal combustion ash to toxic wastes to everyday trash. While some sectors, such as municipal solid waste, have become more and more efficiently managed, others have seen less progress.

EPA is partnering with citizens, environmental groups, academia, industry and all levels of government to speed progress in every sector. A number of new initiatives are part of the Resource Conservation Challenge, a national effort to conserve natural resources and energy

by managing materials more efficiently. They are helping reach EPA's near-term goal of a 35% recycling rate nationwide, while conserving energy and greenhouse gas emissions associated with processing raw materials, reducing the need for new landfills and incinerators, and stimulating development of green technologies.

Increasing the nation's recycling rate just 1% will cut greenhouse gas emissions by the equivalent of taking more than 1.3 million cars off the road — that's more than all the cars registered in the state of Utah.



Recycle on the Go/Green Venues

Household recycling has been a success story, but in our fast-moving society, that's not nearly enough. These programs encourage recycling at concerts, sporting events, shopping centers, parks, hotels, airports, and other locations, by working with partners to encourage people to recycle wherever they go by making it easy and convenient.

An example of an early success is professional football's Pro Bowl. In January 2007, for the second year in a row, EPA, the National Football League, Boys and Girls Clubs of Hawaii, Honolulu Recovery Systems and Aloha Stadium participated in collecting and recycling thousands of bottles and cans in the parking lot during the event. In addition, Community Energy, a green energy marketer and developer, donated renewable energy credits to offset greenhouse gas emissions from the Pro Bowl

and the NFL Pro Bowl Tailgate Party. The NFL also sponsored tree-planting projects at several local schools.

In the hospitality industry, one large Hilton Hotel in San Francisco hosted a four-day EPA conference in 2006 where the agency worked together with attendees toward a goal of Zero Waste. No disposable food service ware was used, recycling and composting bins were placed throughout the event, and the food waste and even the paper towels were collected for composting. In 2007, the hotel put its Zero Waste program into effect all the time, and EPA's regional office will adopt a new Green Meetings Policy.

For more information, visit www.epa.gov/recycleonthego

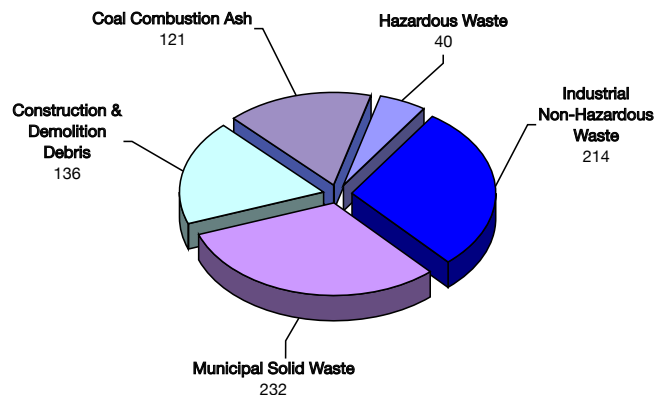
Industrial Materials Recycling

Each year, the U.S. generates 123 million tons of coal combustion products, the byproducts from coal-burning power plants. When this coal fly ash is added to concrete as a cement replacement, the naturally cementitious byproduct makes concrete stronger and more durable. This practice reduces greenhouse gas emissions as well; for every ton of fly ash that goes into concrete, one ton of carbon dioxide emissions is avoided.

In November 2006, EPA's Pacific Southwest Regional Office hosted the Byproducts Beneficial Use Summit, attended by 200 people from 35 states, the District of Columbia and Guam. At the event, EPA honored three organizations

Today's Waste Stream

Millions of Tons of Waste Generated per Year in U.S.



for their pioneering use of fly ash: The Los Angeles Community College District incorporated high-volume fly ash concrete into designs of 44 new buildings; Caltrans developed high-performance concrete mixes using coal ash and other recycled materials, which are being used in building the eastern span of the San Francisco-Oakland Bay Bridge (see photo, opposite); and Dutra Farms is using 45,000 tons of ash annually in floors for cow sheds on dairy farms.

For more on recycling industrial materials, go to www.epa.gov/epaoswer/osw/conserve/priorities/bene-use.htm

Lifecycle Building Challenge

Another big piece of the waste stream is construction and demolition debris. In 2007, EPA, the American Institute of Architects, the Building Materials Reuse Association and West Coast Green are sponsoring a nationwide competition for students and professionals to spur innovative building and building components designs as well as management practices that anticipate future use — facilitating a building's eventual disassembly or adaptation (instead of demolition) to minimize waste and maximize materials recovery. For details, visit www.lifecyclebuilding.org

Scaling Back on Energy Use

Reducing our use of energy has become a higher priority than ever as we take steps to address climate change. EPA's energy conservation programs partner with industry, government and individuals to make reducing energy

use a simple proposition. These and other major efforts in the Pacific Southwest have been paying off: Nevada ranks 23rd, Arizona 33rd, Hawaii 47th, and California 50th — best in the nation — in per-capita electricity use.

Change a Light, Change the World

On October 4, 2006, EPA's Pacific Southwest Regional Office teamed with the Arizona Public Service Co. (APS), the Housing Authority of Maricopa County, and the state Energy Office to kick off the agency's newest energy-saving initiative, the Change a Light, Change the World campaign. Electric utility APS sent workers to swap out incandescent bulbs for compact fluorescent lights at Paradise Homes in Sunrise, Arizona, a complex that provides subsidized housing for the elderly and disabled.

Compact fluorescents use up to 75% less energy than standard light bulbs, generate 70% less heat, and last up to 10 times as long. So a single light change can save up to \$25 in energy costs, reduce air conditioning costs (because they emit less heat), and require nine fewer trips up a ladder to change a light bulb. The fuel burned to generate the electricity used by a single compact fluorescent will emit 450 pounds less carbon dioxide than a regular bulb.

"If every American household changed a single light bulb to a high efficiency light, it would provide enough power to light more than 2.5 million homes — or every home in Arizona," said EPA Regional Administrator Wayne Nastri at the Arizona event.



EPA's Energy Star: Conserving Energy Since 1992

The Change a Light campaign is the newest facet of EPA's Energy Star program, launched by the agency in 1992 as a voluntary, market-based partnership to reduce air pollution through increased energy efficiency. With assistance from the U.S. Department of Energy, Energy Star offers businesses and consumers energy-efficient solutions to save energy and money while protecting the environment for future generations. More than 7,000 organizations have become Energy Star partners.

Hundreds of electrical appliances now on the market, from washing machines to light fixtures, now carry the Energy Star label, which tells buyers that they're getting a product that will save them energy and money compared with other models.

Commercial buildings carefully designed to minimize energy use can also be certified with an Energy Star. California now leads the nation with 779 Energy Star buildings, saving their owners and occupants \$149 million and preventing emissions of more than 1.5 billion pounds of carbon dioxide emissions annually.

For information on Energy Star programs and partners, go to www.energystar.gov

Caltrans will use over 30 different concrete mix designs in the new SF/Oakland Bay Bridge, including mixes containing over 50% fly ash cement replacement. (Photo: John Huseby, courtesy of Caltrans)

Places

Removing Arsenic from Drinking Water in Fallon, Nevada

FALLON IS A DESERT COMMUNITY east of Reno, Nevada, best known for its Naval Air Station, home base of top guns like the “Fighting Saints” and the “Desert Outlaws.” But until recently, the small city faced an insidious enemy these warriors were powerless to defeat: toxic dissolved arsenic in its drinking water.

Like many cities in the arid Southwest, Fallon gets its drinking water by pumping groundwater from deep wells. Deep underground, the basalt rock formations that hold Fallon’s water also contain the naturally-occurring, but toxic metal arsenic. In the 1980s, Fallon’s drinking water was found to contain up to 100 parts per billion (ppb) arsenic, twice the federal drinking water standard at the time and the highest level in the nation for a city its size or larger.

Arsenic is a proven carcinogen. Though it has not been proven to cause the form of cancer known as leukemia, many Fallon residents suspected arsenic was at least partially responsible for the geographic cluster of 17 Fallon children stricken by leukemia in 1997-2004. Three died of the disease.

In 2000, EPA ordered Fallon and the Naval Air Station to meet the 50 ppb standard. But that drinking water standard was already being challenged as too lax to protect public health. After years of reviewing scientific studies on the health effects of arsenic, EPA lowered the standard to 10 ppb, effective starting in 2006.

City officials faced a daunting challenge. They had to build a treatment plant that would meet the new standard, but the \$17.5 million cost was unaffordable to the city’s 2,500 house-

holds. Fortunately, the city received a \$6 million grant from Congress that was administered by EPA. The Navy also contributed \$6 million, the State of Nevada \$4.5 million, and Fallon \$1 million. Fallon water customers would also pay the \$1.6 million annual cost of operating the plant.

The treatment plant, designed by consultant Shepherd Miller Inc., was designed to treat 4.5 million gallons per day, with a potential for expansion to treat double that amount. The system works by continuously adding dissolved iron to the water, which reacts with the arsenic to form particles that are then filtered out. The resulting iron-arsenic sludge is not hazardous, and is trucked to the city’s trash landfill.

The plant started operating in April 2004, and quickly met the then-standard of 50 ppb arsenic. After that, plant operators carefully adjusted the water’s acidity and iron content to make it even more effective. The plant met the new 10 ppb standard before it took effect in 2006.

Fallon water ratepayers each pay a surcharge of \$20.44 per month on their water bills to keep the treatment plant operating. But it’s far cheaper than buying bottled water. And it’s safe, since tap water must be routinely tested for dozens of contaminants and meet strict standards. Fallon’s treatment plant is the largest ever built to remove arsenic. Now, it’s a model for other communities across the nation which fail to meet the new arsenic standard.

This drinking water treatment plant removes naturally-occurring but toxic arsenic from the water supply in Fallon, Nevada. The city’s water, pumped from wells and treated here, now meets the new national safe drinking water standard for arsenic.



People

Kaoru Morimoto: Inspecting Hazwaste Facilities

WHEN EPA'S SUPERFUND PROGRAM began in 1981, abandoned hazardous waste dumps were being discovered on a daily basis, and it has taken decades to clean them up. But you rarely hear about such discoveries today, thanks to strict state and federal laws regulating hazardous waste storage, treatment and disposal, and the efforts of state, tribal, and EPA inspectors like Kaoru Morimoto, who ensure compliance.

Morimoto is a UC Davis-trained mechanical engineer who came to EPA from the U.S. Navy Public Works Center in Oakland in 1995. Then, he was part of a team responsible for hazardous waste compliance at the Oakland Naval Supply Center and the Alameda Naval Air Station. As part of the regulated community, he never knew when EPA inspectors would show up to inspect his facilities. Now, he's the regulator, but he understands what it's like to be one of the regulated.

Morimoto and his ten colleagues in EPA's Pacific Southwest Waste Management Division enforcement office are responsible for inspecting facilities that generate, store, transport, or dispose of hazardous waste. Dozens more inspectors work for the region's states, tribes, territorial and local governments. It's their job to make surprise inspection visits to hazardous waste facilities all across the region.

Inspections of small facilities like plating shops can be fairly simple, Morimoto says. "Just follow the chemical process from beginning to end, see where the waste is going, and check to see that the records match the process."

But inspecting large facilities is more challenging. At one large solvent recycling operation Morimoto inspected in Arizona, there were 2,500 valves, flanges, and pumps that the facility was required by law to identify and monitor for leaks and emissions. The required record-keeping can run to thousands of pages. But Morimoto takes the same approach as with small facilities: Follow the chemicals, see where they end up, and check whether the records match the reality.

At the Arizona facility, workers showed him how the solvent distillation process worked, and how the emission control system soaked up toxic solvent vapors. Morimoto scrutinized the schematic diagrams in the device's operations manual, compared them to the actual piping, and found that the vapors were actually venting into the atmosphere — a serious violation. Not only that, they had made "improvements" to the emissions control system that had rendered it

ineffective. And the required records were not being kept — more violations.

It wasn't easy, but the facility tracked down the flaws in its system, and brought it into compliance. Under the terms of a legal settlement with EPA, the company also paid a \$67,000 penalty and spent \$100,000 to buy emergency equipment to help the local fire department deal with chemical fires and spills.

"The violations I've found as an inspector aren't always intentional," Morimoto notes. "They're usually just a result of ignorance." Thanks to inspectors like Morimoto, hazardous waste is carefully tracked so it no longer ends up in someone's drinking water supply or the air we breathe.



EPA inspectors make surprise visits to facilities like this one to track down leaks and other emissions.



Advances

Greening Computers with EPEAT

FROM E-MAIL TO E-WASTE, computer equipment is everywhere now, and it's having major impacts on the environment.

All those computers use huge amounts of energy, and they become obsolete quickly, creating mountains of trash containing toxic metals such as lead, mercury, and cadmium, as well as valuable materials that could be reused. For three years, a team of three EPA employees worked on a solution to these problems, and in 2006 they rolled out an unparalleled success: The Electronic Product Environmental Assessment Tool (EPEAT).

The EPEAT Team included John Katz of EPA's Pacific Southwest Regional Office in San Francisco, Vicky Salazar of the Pacific Northwest Office in Seattle, and Holly Elwood of EPA Headquarters in Washington, D.C. Building on national and regional dialogues on electronics and the environment, the team set a clear goal: harnessing the power of purchasers to drive greener electronics design.

The team knew purchasers wanted to buy greener electronic products but were unsure how to accurately compare their environmental impacts. They knew manufacturers were willing to provide greener products but needed to ensure they would sell. They knew public advocacy organizations wanted strict measures that could be verified and trusted.

So they assembled a diverse group of stakeholders from all camps, and came up with a solution: EPEAT, a registry of electronic products that meet stringent environmental performance standards. EPEAT makes it easy for purchasers to select desktop computers, laptops, and monitors based on environmental performance.

Launched in July 2006, EPEAT now lists more than 300 products from thirteen manufacturers. These products save energy and reduce hazardous waste when they're junked. Meanwhile, government and private purchasers have committed \$40 billion to purchasing these greener electronics.

The environmental results are huge: EPEAT-registered products are expected, over the next five years, to prevent the use of 13 million pounds of hazardous materials and 3 million pounds of non-hazardous materials, and save nearly 600,000 megawatt-hours of electricity — enough to supply about 60,000 homes for a year.

Ultimately, the benefits could be many times larger, since EPEAT drives environmental improvements in the design of electronics.

But developing the EPEAT program and making it a success was no simple task. It involved working with the stakeholders to achieve con-

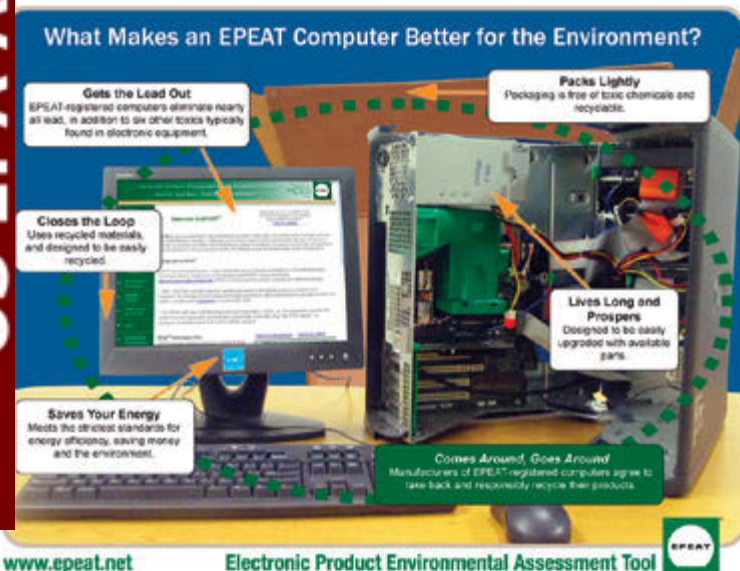
sensus about both the environmental standards for computer equipment, and the process for verifying that the standards are met. The criteria covered eight performance categories:

- Reduction/Elimination of Environmentally Sensitive Materials
- Material Selection
- Design for End of Life
- Product Longevity/Life Cycle Extension
- Energy Conservation
- End of Life Management
- Corporate Performance
- Packaging

The team then shepherded these ratings through a standard setting process accredited by the American National Standards Institute (ANSI). The next step was to select an organization to run the nascent system. After an innovative competitive process, EPA awarded seed funding to the Green Electronics Council to launch the system. The team worked with them on every aspect of the launch, culminating in July 2006, when the EPEAT Web site went live at www.epeat.net

Even before the launch, the team successfully recruited eight federal agencies, two states, several cities, and two large health care organizations to use EPEAT in their purchasing decisions.

EPEAT has made pollution prevention a simple and easy choice for purchasers of laptops, monitors and desktop computers.



Access

Engaging the Public in Environmental Work

As part of its mission to protect public health and the environment, EPA provides a wide range of services and programs that strengthen the ability of both the agency and the American people to take environmental action.

Information: Online and In Person

Information is one of the most powerful tools we have for understanding and acting upon environmental and public health issues. EPA's Web site at www.epa.gov provides a vast trove of useful information for consumers, students, businesses, state and local governments, researchers, and everyone in between.

Whether via the Web, phone or in-person visit, EPA's Environmental Information Center and Library in San Francisco are ready to assist concerned citizens and environmental professionals alike in locating EPA documents, researching environmental issues, and playing a role in environmental decisions. The EIC/Library features an Assistive Technology Center for patrons with disabilities and is open Monday through Thursday, 9 a.m. to noon and 1 to 4 p.m.



Another way to play a role in EPA's work is to report environmental violations or emergencies when they are witnessed or suspected.

Look for the icons on EPA's Pacific Southwest Web site at www.epa.gov/region9, or call (800) 424-8802 if an environmental emergency is in progress.

The Street Where You Live

While most EPA staff in the Pacific Southwest work out of the regional office in San Francisco, key personnel are based throughout the region. Some work in EPA field and outreach offices in Los Angeles, San Diego and Honolulu. Others live and work in high-priority areas such as Arizona, California's north coast, and the Sierra Nevada, where they can be closer to the issues and the people they work with.

In addition, members of the Superfund program's Community Involvement Office work across the region with residents of communities dealing with Superfund toxic cleanup sites, acting as advocates for early and meaningful community participation in cleanups.

Wise Investments

In the Pacific Southwest, EPA distributed more than \$450 million in financial assistance grants in fiscal 2006 to state and local agencies, educational and research institutions, and other organizations to advance protection of public health and the environment.

From major funding for municipal wastewater facilities to small grants supporting community education efforts, EPA's grant programs closely

Water specialist Everett Pringle helps middle school students test water quality at a local water treatment plant.



Environmental
Information
Center

monitor the use of federal dollars and the results they achieve.

To learn more about available funding in the Pacific Southwest, visit www.epa.gov/region9/funding

Like EPA itself, states, tribes, and other recipients of agency funding are required to conduct outreach to small, minority, and woman-owned businesses when procuring construction, equipment, services, and supplies. EPA's Office of Acquisition Management lists agency-wide procurement opportunities at www.epa.gov/oam

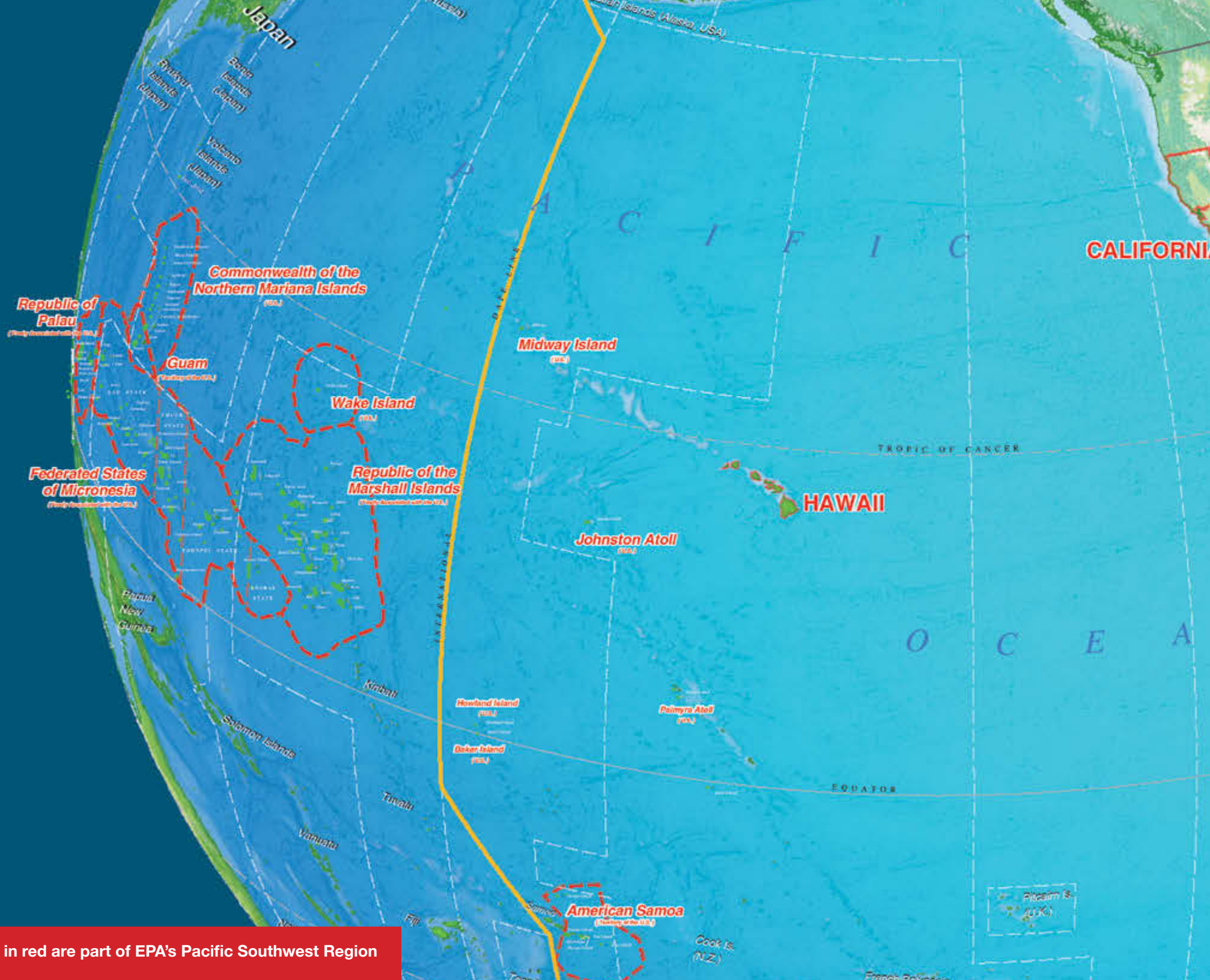
The Best and Brightest

EPA's regional office in San Francisco offers opportunities to work on environmental issues throughout the Pacific Southwest. Current job openings are always listed on the Web at www.epa.gov/region9/careers or through the national USAJOBS site at www.usajobs.gov

Over the past few years, EPA's regional Human Resources Office has increased EPA's visibility at local colleges and universities by establishing partnerships with faculty, career placement officials, and diversity employment program advisors to raise students' awareness of the agency's mission and programs.

EPA's Environmental Information Center/Library in San Francisco serves both EPA staff and the public.





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

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In June 2006, EPA's Pacific Southwest Regional Office achieved ISO 14001 re certification, a strict international management standard that establishes requirements for environmental responsibility through an Environmental Management System (EMS). Through its EMS, the regional office is continuing to decrease its environmental impacts from air emissions, energy use, material use and waste.

EPA Pacific Southwest/Region 9

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