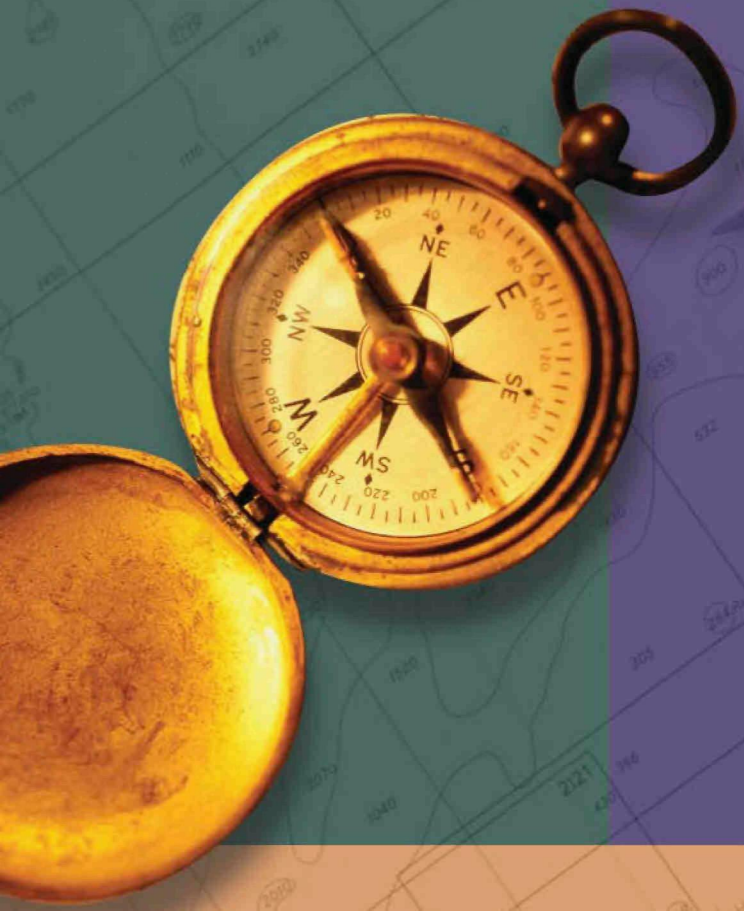
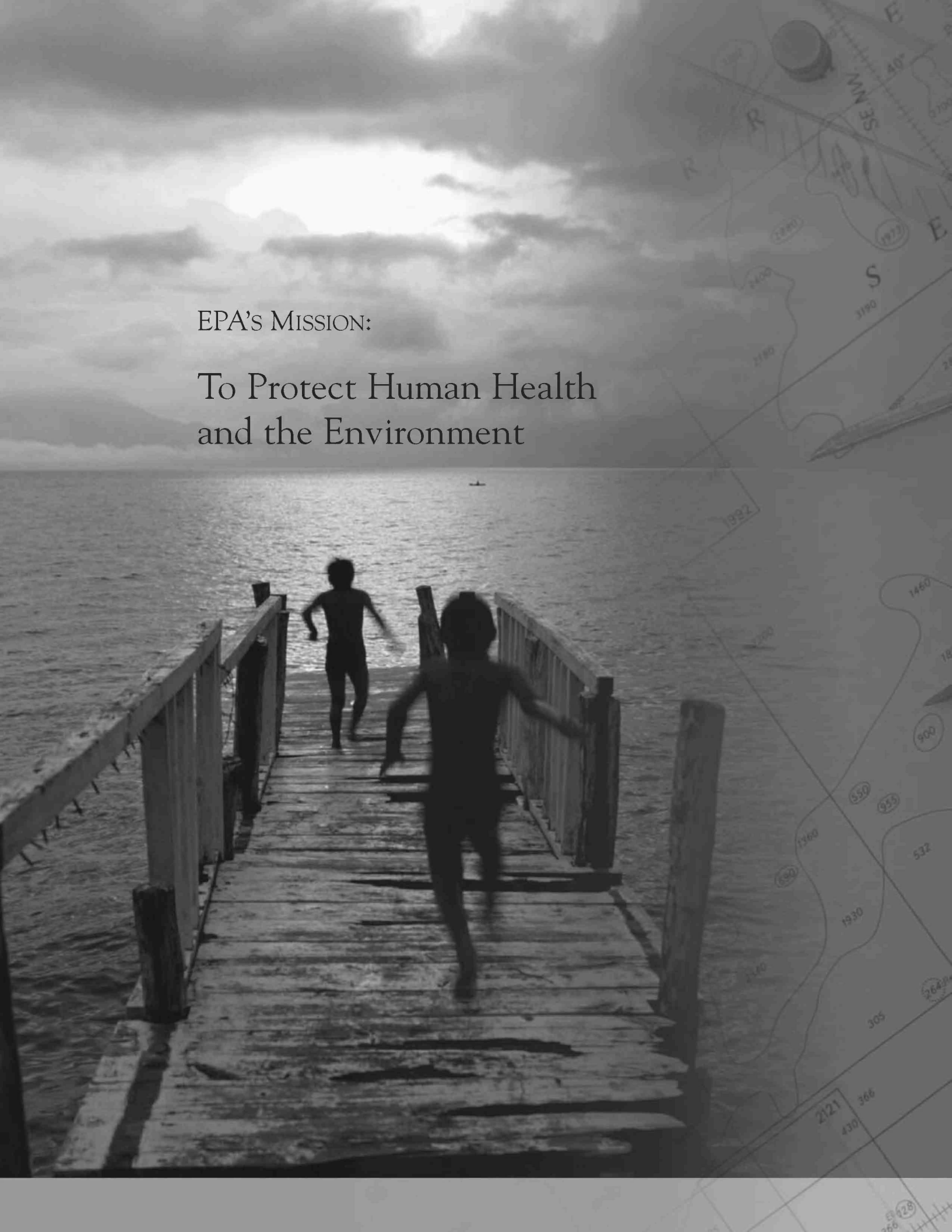
2006-2011 EPA Strategic Plan

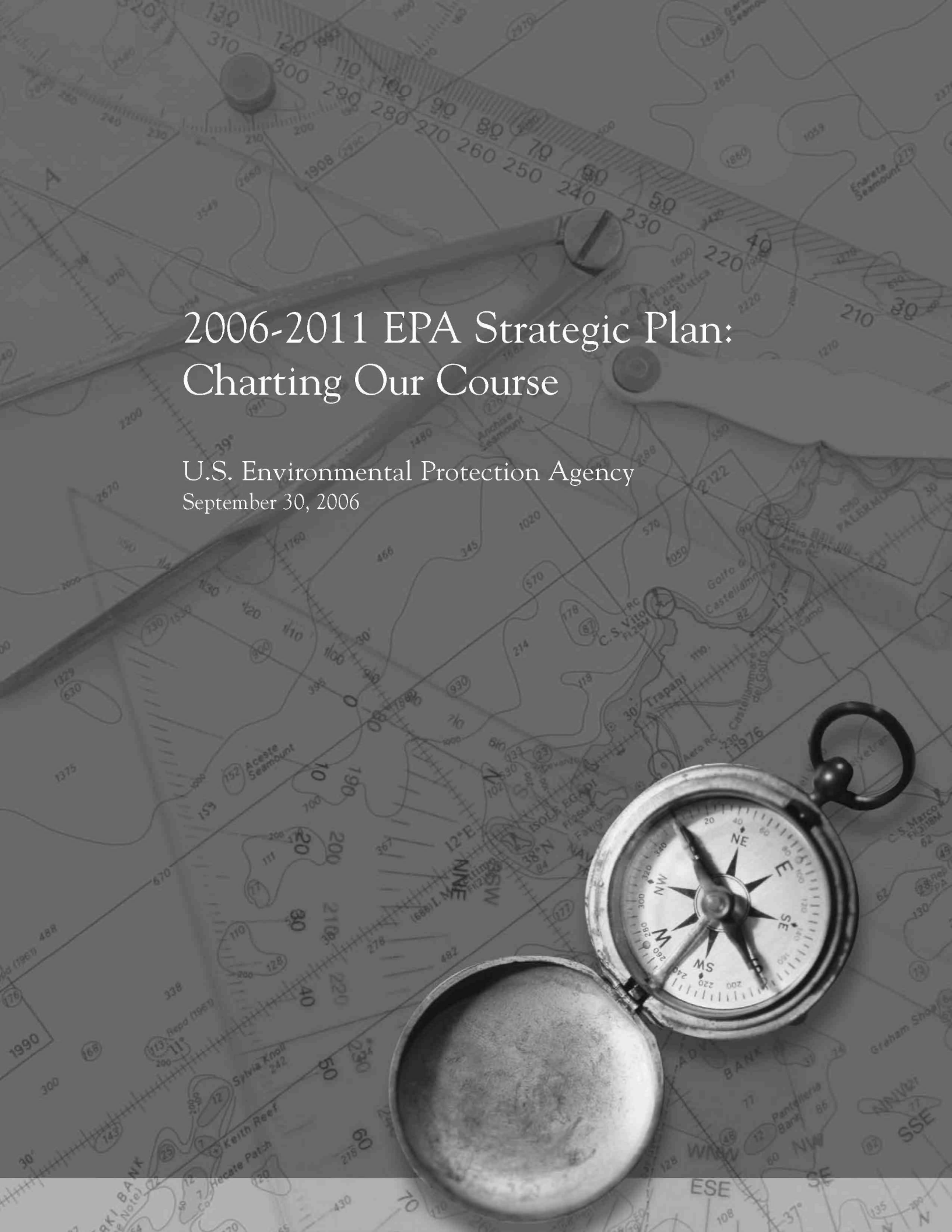
Charting Our Course





EPA's Mission:

To Protect Human Health and the Environment



2006-2011 EPA Strategic Plan: Charting Our Course

U.S. Environmental Protection Agency
September 30, 2006

Message from the Administrator

September 2006

I am pleased to present the U.S. Environmental Protection Agency's (EPA) *2006-2011 Strategic Plan*, which charts an ambitious course for the Agency's work over the next five years.

This *Strategic Plan* maintains the five goals that were first described in the *2003-2008 Plan* and discusses important new challenges and opportunities that are likely to arise in the coming years. The *2006-2011 Plan* better expresses the results of our work and more clearly identifies the environmental and human health outcomes the public can expect. The *Plan* also expands upon some of our more significant geographic initiatives and reflects increased collaboration with our state, tribal, local, and federal partners.

In December 2005, EPA celebrated 35 years of working to protect human health and the environment. Since 1970, EPA—in collaboration with our partners and stakeholders—has been delivering a cleaner, healthier environment for the public. From regulating auto emissions to banning the use of DDT; from cleaning up toxic waste to protecting the ozone layer; and from increasing recycling to revitalizing inner-city brownfields, EPA's achievements have resulted in cleaner air, purer water, and better protected land.

The President has charged EPA with accelerating the pace of environmental protection while maintaining our nation's economic competitiveness. This Plan lays the foundation to meet our long-term goals and demonstrate progress along the way, consistent with our principles of results and accountability, innovation and collaboration, and the use of the best available science. We are grateful to our partners and stakeholders for their continuing help in achieving these goals, and pledge to continue our efforts to ensure a safe and healthy environment for future generations.

Stephen L. Johnson
Administrator

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INTRODUCTION

Since the U.S. Environmental Protection Agency (EPA) was established in 1970, we have worked with our federal, state, tribal, and local government partners to advance our mission to protect human health and the environment. Together, we have made tremendous progress in protecting and restoring the nation's air, water, and land.

But while we have achieved a great deal, we recognize that much work remains. The environmental problems we are facing in 2006 are more complex than those of 30 years ago, and implementing solutions is more challenging. Recent national and international events, such as the devastation left by Hurricane Katrina, the advance of Avian flu, threats to homeland security, and population growth and its associated resource consumption, are altering the environment in unprecedented ways. Scientific advances and emerging technologies offer new opportunities for protecting human health and the environment, but also pose new risks and challenges. We recognize that today's environmental problems cannot be solved by traditional regulatory controls alone; they will require the combined expertise, perspectives, and resources of many. More than ever before, we need to look toward the future to anticipate potential threats to human health and the environment, establish clear priorities, and prepare ourselves to address them.

Goals of the 2006-2011 Strategic Plan

- Clean Air and Global Climate Change
- Clean and Safe Water
- Land Preservation and Restoration
- Healthy Communities and Ecosystems
- Compliance and Environmental Stewardship

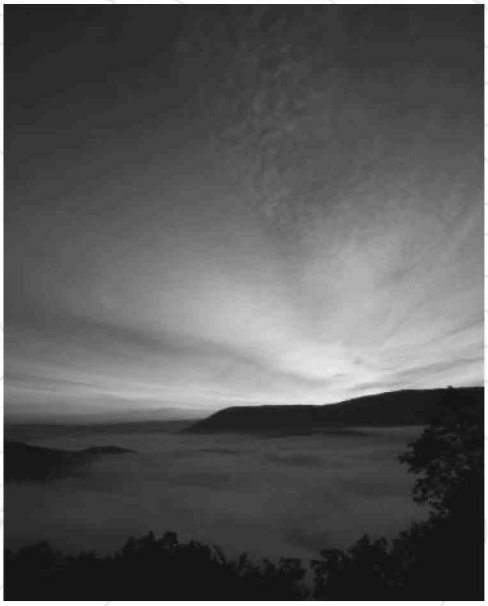
Cross-Goal Strategies

- Results and Accountability
- Innovation and Collaboration
- Best Available Science

Our Goals and Strategies

EPA's *2006-2011 Strategic Plan* sets out an ambitious road map for environmental protection over the next 5 years. In developing this *Plan*, we have sharpened our focus on achieving measurable environmental results. Our five strategic goals reflect the results we are striving to achieve: Clean Air and Global Climate Change, Clean and Safe Water, Land Preservation and Restoration, Healthy Communities and Ecosystems, and Compliance and Environmental Stewardship.

EPA Administrator Steve Johnson has established key principles to accelerate the pace of environmental protection, and these three principles are reflected in our "cross-goal" strategies—common themes for our work under each of our strategic goals:



- ***Results and Accountability.*** EPA is committed to being a good steward of our environment and a good steward of America's tax dollars. To provide the public with the environmental results it expects and deserves, we must operate as efficiently and effectively as possible. Accountability for results is a key component of the President's Management Agenda, designed to make government citizen-centered, results-oriented, and market-based.
- ***Innovation and Collaboration.*** Our progress depends both on our ability and continued commitment to identify and use innovative tools, approaches, and solutions to address environmental problems and to engage extensively with our partners, stakeholders, and the public. Under each of our goals, we are working to promote a sense of environmental stewardship and a shared responsibility for addressing today's challenges.
- ***Best Available Science.*** EPA needs the best scientific information available to anticipate potential environmental threats, evaluate risks, identify solutions, and develop protective standards. Sound science helps us ask the right questions, assess information, and characterize problems clearly to inform Agency decision makers.

Guiding Management and Budget Decisions

In setting out our goals for the coming 5 years and describing how we intend to achieve them, our *Strategic Plan* provides the foundation for all of EPA's planning, budgeting, performance measurement, and accountability processes. We will design annual performance goals and measures, which are presented in the President's budget request to Congress, to achieve the long-term strategic goals set out in this *Plan*. We will report on our performance against these annual goals and measures in our annual *Performance and Accountability Report* and use this performance information as we establish priorities and develop future budget submissions. This process will come full circle as we evaluate these performance data to develop our 2009-2014 and future *Strategic Plans*. In addition, our strategic planning and decision making

benefit from information provided by new environmental indicators that we are developing, in particular for our forthcoming *Report on the Environment*. Information derived from these indicators help us better articulate and further improve the long-term measures contained in our *Strategic Plan*.

Improving Our Strategic Plan

While EPA's *2006-2011 Strategic Plan* retains the five-goal structure introduced in our 2003 *Plan*, it contains a number of improvements and additions. For example, under each goal we have provided a discussion of "Emerging Issues and External Factors"—important new challenges and opportunities that are likely to arise in the coming years. The goal chapters also include new information about developing the long-term measures included in the *Plan*, particularly their relationship to annual performance measures, measures provided in the Office of Management and Budget's Program Assessment Rating Tool, and the new environmental indicators being developed for *EPA's Report on the Environment*. This *Plan* also reflects our increased emphasis on activities and measures that address tribal environmental and health issues, environmental justice concerns, environmental stewardship, and strategic management of human capital.

We have prepared this *Strategic Plan* to present our vision for the future and to guide our work over the coming years to achieve these results. We hope that you will join with us to realize our common desire for a cleaner, healthier environment for all Americans.

Lyons Gray
Chief Financial Officer

GOAL 1:

Clean Air *and* Global Climate Change

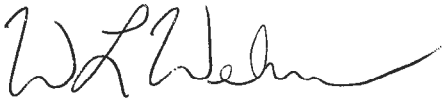
Protect and improve the air so it is healthy to breathe and risks to human health and the environment are reduced. Reduce greenhouse gas intensity by enhancing partnerships with businesses and other sectors.

EPA, together with state, tribal and local partners, is addressing a broad range of national air quality problems cost-effectively with a variety of regulatory and non-regulatory approaches, including innovative, market-based techniques such as emissions trading, banking, and averaging. EPA also works closely with public- and private-sector partners and stakeholders to develop tools, such as monitoring, modeling, and emission inventories, that allow states, tribes, and localities to address more localized problems. Many of these tools employ innovative techniques, such as partnership programs for retrofitting diesel engines or community-based approaches to toxics, which are well-suited to the local nature of these challenges.

EPA's programs will allow us, together with our partners, to make substantial progress in protecting human health and ecosystems from air pollution. By 2011, virtually all of the country will have put in place controls to meet current air quality standards. New motor vehicles, including trucks and buses, will be 75 to 95 percent cleaner than they were in 2003. Power plant emissions will be reduced by approximately 40 percent from 2003 levels. Taken together, these programs, when fully implemented, will prevent tens of thousands of premature deaths and hospitalizations, and prevent millions of lost work and school days each year. These national programs will be supplemented by local control strategies designed to ensure that the air quality standards are achieved and maintained.

Reductions in emissions of air toxics will substantially reduce risks to human health. Toxic emissions from cars, trucks, and buses will be cut in half, and all major industrial sources of air toxics will meet technology-based standards. Additional risk reductions will be achieved by voluntary programs aimed at indoor hazards such as radon, tobacco smoke, and asthma triggers, and outdoor hazards such as overexposure to the sun. Radiation releases will be minimized, and our ability to monitor such releases will be enhanced. Should a radiation release occur, EPA personnel and assets will be in place and prepared to support federal emergency response and to minimize impacts to human health and the environment.

Significant achievements will also be realized in EPA's domestic and international efforts to protect and restore the world's atmosphere. By 2011, worldwide efforts to protect the earth's ozone layer will reach a watershed, as total effective equivalent stratospheric chlorine reaches its peak and begins to decline. And EPA's voluntary climate protection programs will put us on track to exceed the President's greenhouse gas intensity goal.



William L. Wehrum
Acting Assistant Administrator
Office of Air and Radiation

GOAL 1:

Clean Air and Global Climate Change

Air pollution comes from many sources: factories and power plants; drycleaners; cars, buses, and trucks; even windblown dust and wildfires. It can threaten human health, causing breathing difficulties, long-term damage to respiratory and reproductive systems, cancer, and premature death. Certain chemicals emitted into the air diminish the protective ozone layer in the upper atmosphere, resulting in overexposure to ultraviolet radiation and increased rates of skin cancer, cataracts, and other health and ecological effects. Air pollution can also affect the environment by reducing visibility; damaging crops, forests, and buildings; acidifying lakes and streams; and stimulating the growth of algae in estuaries and the build-up of toxins in fish. These effects pose a particular risk to Native Americans and others who subsist on plants, fish, and game. Rapid development and urbanization in other countries are creating air pollution that threatens not only those countries but also the United States, since air pollution can travel great distances and across national boundaries.

OBJECTIVES

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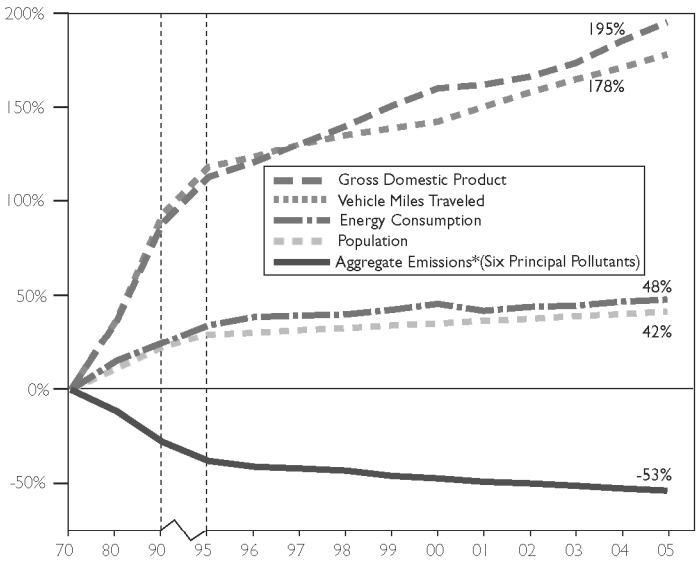
EPA works to protect human health and the environment by developing regulations and establishing partnerships with other federal agencies, states, tribes, local governments, business and industry, environmental groups, and other stakeholders in programs to reduce air pollution. And according to our annual summary of air quality trends since the 1970s,[1] air quality in the United States has steadily improved. Even as our economy has grown, miles traveled by cars and trucks increased, and energy consumption risen, the trend toward cleaner air has continued.

EPA is dedicated to improving the quality of the air Americans breathe, and we will continue to look for innovative, effective solutions to the nation's remaining air pollution problems. We use a variety of approaches and tools to accomplish this. For example, we are addressing problems with broad national or global impact—emissions from power plants and other large sources, pollution from motor vehicles and fuels, and stratospheric ozone depletion—at the federal level, using our traditional regulatory tools as well as innovative, market-based techniques such as

emissions trading, banking, and averaging. We are working with states, tribes, and local agencies to address regional and local ambient air problems. Collaborating with public- and private-sector partners, we are developing tools and innovative strategies, such as partnership programs for retrofitting diesel engines or community-based approaches to toxics, to help solve local problems and promote a community ethic of environmental stewardship. We work with developing countries to reduce transboundary air pollution, improve the health of our citizens and theirs, and reduce greenhouse gas emissions.

Comparison of Growth Areas and Emissions



***Pollutants:** Ozone, Particulate Matter, Carbon Monoxide, Nitrogen Dioxide, Sulfer Dioxide, Lead

Many reports have highlighted the importance of the indoor environment to human health, including the 1997 report of the Presidential/Congressional Commission on Risk Assessment and Risk Management. To improve the quality of the air in homes, schools, and commercial buildings, EPA relies on partnership-based information and outreach programs, which encourage and promote voluntary action. Our radon and other indoor air programs have helped to reduce asthma triggers, respiratory ailments, ear infections, exposure to secondhand tobacco smoke, and hospitalizations.

EPA research continues to identify new air pollution issues, in areas from indoor air to radiation. We will work with our federal, state, tribal, local, and international partners and stakeholders to address these issues using approaches and programs that encourage cost-effective technologies and practices.

OBJECTIVE 1.1: HEALTHIER OUTDOOR AIR

Through 2011, working with partners, protect human health and the environment by attaining and maintaining health-based air-quality standards and reducing the risk from toxic air pollutants.

Sub-objective 1.1.1: Ozone and $PM_{2.5}$. By 2015, working with partners, improve air quality for ozone and $PM_{2.5}$ as follows:

Strategic Targets

- By 2015, reduce the population-weighted ambient concentration of ozone in all monitored counties by 14 percent from the 2003 baseline.
- By 2015, reduce the population-weighted ambient concentration of $PM_{2.5}$ in all monitored counties by 6 percent from the 2003 baseline.
- By 2011, reduce emissions of fine particles from mobile sources by 134,700 tons from the 2000 level of 510,550 tons.

- By 2011, reduce emissions of nitrogen oxides (NO_X) from mobile sources by 3.7 million tons from the 2000 level of 11.8 million tons.
- By 2011, reduce emissions of volatile organic compounds from mobile sources by 1.9 million tons from the 2000 level of 7.7 million tons.
- By 2018, visibility in eastern Class I areas will improve by 15 percent on the 20 percent worst visibility days, as compared to visibility on the 20 percent worst days during the 2000–2004 baseline period.
- By 2018, visibility in western Class I areas will improve by 5 percent on the 20 percent worst visibility days, as compared to visibility on the 20 percent worst days during the 2000–2004 baseline period.
- By 2011, with EPA support, 30 additional tribes (6 per year) will have completed air quality emission inventories. (FY 2005 baseline: 28 tribal emission inventories.)
- By 2011, 18 additional tribes will possess the expertise and capability to implement the Clean Air Act in Indian country[2] (as demonstrated by successful completion of an eligibility determination under the Tribal Authority Rule). (FY 2005 baseline: 24 tribes.)

Sub-objective 1.1.2: Air Toxics. By 2011, reduce the risk to public health and the environment from toxic air pollutants by working with partners to reduce air toxics emissions and implement area-specific approaches as follows:

Strategic Targets

- By 2010, reduce toxicity-weighted (for cancer risk) emissions of air toxics to a cumulative reduction of 19 percent from the 1993 non-weighted baseline of 7.24 million tons.
- By 2010, reduce toxicity-weighted (for non-cancer risk) emissions of air toxics to a cumulative reduction of 55 percent from the 1993 non-weighted baseline of 7.24 million tons.

Sub-objective 1.1.3: Chronically Acidic Water Bodies. By 2011, due to progress in reducing acid deposition, the number of chronically-acidic water bodies in acid-sensitive regions of the northern and eastern United States should be maintained at or below the 2001 baseline of approximately 500 lakes and 5,000 kilometers of stream-length in the population covered by the Temporally Integrated Monitoring of Ecosystems/Long-Term Monitoring Survey. The long-term target is a 30 percent reduction in the number of chronically-acidic water bodies in acid-sensitive regions by 2030.

Strategic Targets

- By 2011, reduce national annual emissions of sulfur dioxide (SO_2) from utility electrical power generation sources by approximately 8.45 million tons from the 1980 level of 17.4 million tons, achieving and maintaining the acid rain statutory SO_2 emissions cap of 8.95 million tons.

- By 2011, reduce total annual average sulfur deposition and mean ambient sulfate concentration by 30 percent from 1990 monitored levels of up to 25 kilograms per hectare for total sulfur deposition and 6.4 micrograms per cubic meter for mean ambient sulfate concentration.
- By 2011, reduce total annual average nitrogen deposition and mean total ambient nitrate concentration by 15 percent from 1990 monitored levels of up to 11 kilograms per hectare for total nitrogen deposition and 4.0 micrograms per cubic meter for mean total ambient nitrate concentration.

Means and Strategies for Achieving Healthier Outdoor Air

Our strategy for reducing outdoor air pollution is based on collaboration at the federal, state, and local levels. States are primarily responsible for maintaining and improving air quality and meeting national ambient air quality standards (NAAQS) established by EPA. State programs develop emission inventories, operate and maintain air monitoring networks, perform air quality modeling, and develop State Implementation Plans (SIPs) that lay out control strategies for improving air quality and meeting NAAQS.

Multi-jurisdictional organizations (MJOs) are vital in addressing regional issues, collaborating with states on control strategies, and providing technical assistance in data analyses and air quality modeling.

EPA assists states, tribes, local agencies, and MJOs by providing technical guidance and financial assistance to support their efforts. We also develop regulations and implement programs to reduce pollution from the most widespread and significant sources of air pollution: mobile sources, such as cars, trucks, buses, and construction equipment, and stationary sources, such as power plants, oil refineries, chemical plants, and dry cleaning operations. In addition, we address at a national level air quality issues that exceed the reach of state and tribal authorities—such as interstate transport of pollutants.

EPA is authorized to implement air quality programs in Indian country; however, eligible tribes may be authorized to develop and implement their own Clean Air Act programs. We are working with tribes to acquire more and better data on the quality of air on tribal lands,[3] build tribal capacity to administer air programs in Indian country, and establish mechanisms that will enable EPA and states to work effectively with tribal governments on regional and national policy issues. We will assist any tribe interested in making a determination on its air quality by providing data, data analysis, and technical support.

We will continue to involve communities, civic organizations, and other stakeholders in designing programs to achieve healthier outdoor air. We will work closely with the National Environmental Justice Advisory Council, community-based organizations, and other stakeholders (including schools and universities, environmental organizations, and business and industry groups) to ensure that environmental justice is an integral part our programs, policies, and activities. To support this commitment, we will develop baseline data that will enable us to track our progress in addressing environmental justice concerns.

EPA will continue to apply sound science to help us better understand and characterize the results of our efforts to achieve clean air. EPA scientists will determine the relative risks that air pollution poses to human health and the environment; identify the best means to detect, abate, and avoid environmental problems associated with air pollutants; and evaluate the effectiveness of control programs in reducing exposure to harmful levels of air pollution. We are committed to common-sense, cost-effective solutions that result in cleaner air, and we will continue to integrate critical scientific assessment with policy, regulatory, and non-regulatory activities. Using mathematical models, data from ambient monitoring and deposition monitoring, and other information, we will work with states and tribes to evaluate control options, control plans, the impacts of alternative emission scenarios, and the effect of federal rules and other control strategies. We will continue to conduct exposure and risk assessments on criteria and hazardous air pollutants, integrating monitoring and modeling information to characterize the impacts of sources of air pollution within and outside of the United States.

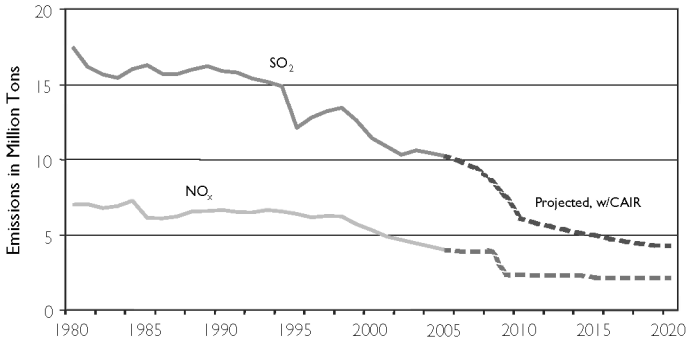
Ozone and Particulate Matter

To improve air quality, EPA will continue to focus on implementing the fine particulate matter ($PM_{2.5}$) standards and 8-hour ozone standards. In support of state efforts, we will develop federal programs for mobile and stationary sources that achieve large, nationwide, cost-effective reductions in emissions of PM and its contributors (SO_2, NO_X, and elemental and organic carbon), ozone-forming NO_X, and volatile organic compounds. We will work with states to reduce emissions of PM and ozone precursors and mercury from electric-generating units and to better integrate ozone and PM efforts, for example, by improving emission inventories, developing comprehensive air quality modeling approaches, controlling sources of precursors common to both, and coordinating control strategy planning cycles. Working with MJOs, we will develop strategies for reducing regional haze.

Key to our efforts is implementing the Clean Air Interstate Rule (CAIR), promulgated in May 2005, to address pollution from power plants that drifts across state borders. Like the cap-and-trade approach of our Acid Rain Program, CAIR provides incentives for power plant operators to find the best, fastest, and most efficient ways to make the required emission reductions. We expect CAIR to reduce SO_2 emissions by 4.3 million tons (more than 70 percent) and NO_X emissions by 1.7 million tons (more than 60 percent) from 2003 levels. As we implement CAIR, we will also continue to support passage of the President's Clear Skies legislation, which would achieve broader reductions of SO_2 and NO_X and provide more certainty for industry and state and local air quality planners.

CAIR is an important component of EPA's plan to help states in the eastern United States meet EPA's health-based air quality standards. Through CAIR and other Clean Air Act programs, 92 of the 108 areas that had not met the standards for 8-hour ozone and 17 of the 36 areas that had not met the standards for $PM_{2.5}$ as of April 2005 will achieve these health-based national standards by 2011. We estimate that by 2015 air quality improvements from CAIR and other Clean Air Act programs could generate more than $100 billion in health and visibility

Significant Cuts in NO_X and SO_2 Power Plant Emissions Projected with CAIR



Source: EPA

Environmental Justice: Reducing Diesel Exhaust in High Impact Areas

EPA's National Clean Diesel Campaign (NCDC) supports diesel retrofit projects to reduce PM, NO_x, and other emissions. As one important criterion for distributing grant funds, we consider how well a project serves areas that are experiencing disproportionate impacts from diesel exhaust. To reduce children's exposure to particulate matter and other pollutants, the campaign also targets diesel emissions from school buses. By regulating new engines more stringently and building partnerships to address the existing diesel fleet, the NCDC furthers EPA's efforts to encourage environmental stewardship.

benefits per year. We expect that by reducing sulfur and nitrogen deposition, these programs will also reduce the incidence of chronically acidic lakes and streams.

Working with our partners, EPA will implement a series of national programs to dramatically reduce emissions from a wide range of mobile sources:

- The Tier 2 Vehicle and Gasoline Sulfur Program, to be fully implemented by 2009, will make new cars, sport utility vehicles, pickup trucks, and vans 77 to 95 percent cleaner than 2003 models, while reducing sulfur levels in gasoline by 90 percent.
- Our Clean Diesel Truck and Bus Program will require that, beginning in 2007, all new highway diesel engines be as much as 95 percent cleaner than current models, while reducing sulfur levels in highway diesel fuel by more than 97 percent.
- The Clean Air Nonroad Diesel Rule will cut emission levels from construction, agricultural, and industrial diesel-powered equipment by more than 90 percent, while removing 99 percent of the sulfur in nonroad diesel fuel by 2010. As part of this effort, we are also developing more stringent standards for locomotives, large marine diesel engines, and small gasoline engines (such as those used in lawn and garden equipment).

To address diesel emissions, EPA's National Clean Diesel program will continue to develop new engine and fuel standards and conduct activities to reduce emissions from the 11 million diesel engines already in use. For example, we will create cost-effective diesel-retrofit partnerships to reduce NO_X and PM emissions from older, high-polluting trucks, buses, and nonroad equipment, concentrating on nonattainment areas and areas with sensitive populations and raising public awareness of the risks diesel emissions pose to health. We will provide grants for retrofitting, replacing, and reducing idling from vehicles and equipment in the trucking, railroad, construction, school bus, and port sectors and encourage states and industry to support local diesel retrofit projects. These innovative initiatives will support states' efforts to meet national air quality standards.

Implementing provisions of the Energy Policy Act of 2005 will be a major undertaking for EPA. Central to this effort is the Renewable Fuel Standard (RFS) program, which requires that the U.S. gasoline supply contain specific volumes of renewable fuel each calendar year, starting with 4 billion gallons in 2006 and increasing to 7.5 billion in

2012. Developing and implementing the RFS program will require a substantial investment of resources: expertise in renewable fuels (production, distribution, and blending); vehicle testing to assess the impacts of renewable fuels on emissions; refinery modeling; transportation modeling and life-cycleanalysis; consideration of energy security impacts; and economic analyses (including farm/agricultural impacts).

Air Toxics

EPA regulates emissions of 186 toxic air pollutants, including dioxin, asbestos, toluene, and such metals as cadmium, mercury, chromium, and lead compounds.[4] To complement the national standards that address major stationary sources of air toxics, we are conducting national, regional, and community-based efforts to reduce multimedia and cumulative risks. Characterizing emissions and the risks they pose nationally and locally, such as in Indian country, will require significant effort. We will need to update the science and keep the public informed about these issues. Toxic pollutants are of particular interest to the environmental justice community because of the proximity of many low-income and minority communities to sources of toxic emissions, such as industrial facilities, waste transfer stations, roadways, and bus terminals. To better address areas that may suffer disproportionately, EPA will use tools and indicators to identify locations with potential environmental justice concerns.

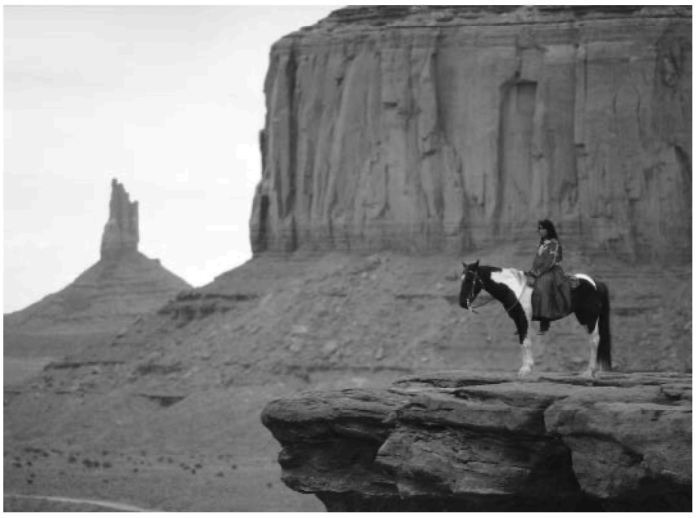
EPA will continue implementing the Clean Air Mercury Rule (CAMR), promulgated in May 2005, to permanently cap and reduce mercury emissions from coal-fired power plants. CAMR establishes standards of performance that limit mercury emissions from new and existing coal-fired power plants and creates a market-based cap-and-trade program that will reduce utility emissions of mercury nationwide in two phases. The cap for the first phase is 38 tons, and utilities can take advantage of "co-benefit" reductions, such as mercury reductions achieved by reducing SO_2 and NO_X emissions under CAIR. In the second phase, which begins in 2018, coal-fired power plants will be subject to a second cap, which will ultimately reduce emissions to 15 tons. Like CAIR, the CAMR program has stringent emissions monitoring and reporting requirements modeled after those of the Acid Rain Program. The flexibility of allowance trading creates financial incentives to look for new and low-cost ways to reduce emissions and improve the effectiveness of pollution control equipment.

The Clean Air Act also requires EPA to establish standards to reduce emissions of air toxics from motor vehicles and their fuels. In March 2006, EPA proposed standards to limit the benzene content of gasoline and to reduce emissions from passenger vehicles and portable gasoline containers. EPA will finalize this rule in 2007 and implement it in subsequent years.

EPA continues to develop and refine tools, training, handbooks, and information to assist our partners in characterizing risks from air toxics, and we will work with them on strategies for making local decisions to reduce those risks. As EPA implements its community-based air toxics programs, including Community Action for a Renewed Environment (CARE), we will evaluate how program activities affect areas with potential environmental justice issues. We will work with affected communities to address risks and track progress. We will use data from our national toxics monitoring network and from local assessments to better characterize risk and assess priorities.

Working with Tribes and Other Partners

To reduce risks and protect the health of all people living in Indian country, EPA is committed to working with tribes on a government-to-government basis to develop the infrastructure and skills they need to assess, understand, and control air quality on their lands. In consultation with tribes, we will establish needed federal regulatory authorities consistent with EPA's Indian Policy, and we will support tribal traditions and culture. We will help tribes develop and manage their own air programs, providing technical support, assistance in developing and analyzing data, and opportunities to participate in planning and policy-setting at the regional and national level. When tribes choose not to develop their own programs, EPA will implement air quality programs directly. We will continue to support air monitoring in Indian country, and we are exploring opportunities for mercury and other deposition monitoring. EPA has developed new rules for new or modified major and minor sources of air pollution in Indian country, and we will work with tribes to delegate or implement these rules directly in all of Indian country.



As we develop and implement clean air strategies, we will involve the public in meaningful ways and work with other federal agencies to ensure a coordinated approach. Our federal partners include the U.S. Department of Agriculture (in the areas of animal feeding operations, agricultural burning, and controlled burning), the U.S. Department of Transportation (for transportation-related air quality issues), the U.S. Department of Energy (for electric utilities, electricity generation, and energy efficiency issues), and the U.S. Department of the Interior (concerning visibility in national parks and wilderness areas).

Effective partnerships are also key to our sound science efforts. For example, we will continue to collaborate with the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) to develop a consistent, national numerical air quality model for short-term air quality forecasts for ozone and PM. EPA will also work with the international science community to better understand the movement of pollutants in and out of the United States and to assess potential mitigation strategies.

Criteria air pollutants, such as ozone and fine particles, as well as persistent bioaccumulative toxins (PBTs), such as mercury, dioxins, and polychlorinated biphenyls (PCBs), can be transported across national borders. EPA is also working with other agencies and other governments to address this transboundary pollution. We will work with NOAA, the National Aeronautics and Space Administration, and other agencies to detect, track, and forecast the effects of these air pollutants from international sources. By engaging with the international scientific community, we hope to improve our understanding of international flows and our tools for analyzing and evaluating response policies. Working through bilateral agreements, international partners, and multilateral international organizations (such as the United Nations Environment Program and the Organization for Economic Cooperation and Development), we will promote capacity building, technology transfer, and other strategies to reduce foreign sources of pollution.

EPA will continue to lead the United States in a variety of international partnerships and agreements:

- The Partnership for Clean Fuels and Vehicles (www.unep.org/pcfv) is working to phase out leaded gasoline worldwide, to reduce sulfur in fuels, and to adopt clean vehicle technologies.
- The Partnership for Clean Indoor Air (www.pciaonline.org) is reducing the health risks faced by the more than 2 billion people who burn biomass fuels indoors for cooking and heating.
- The Convention on Long-Range Transboundary Air Pollution (www.unece.org/env/lrtap) and the Stockholm Convention on Persistent Organic Pollutants (www.pops.int) are controlling sources of internationally transported pollutants to protect U.S. interests.

We will continue to work with Canada, Mexico, and key stakeholders to manage air quality along our common borders. Among our existing agreements are the U.S.-Mexico La Paz Agreement (http://air.utep.edu/bca/jac/agreement.html), the U.S.-Canada Air Quality Agreement (www.epa.gov/airmarkt/usca/agreement.html), and the North American Agreement on Environmental Cooperation (www.naaec.gc.ca/eng/agreement/agreement_e.htm).

OBJECTIVE 1.2: HEALTHIER INDOOR AIR

Through 2012, working with partners, reduce human health risks by reducing exposure to indoor air contaminants through the promotion of voluntary actions by the public.

Sub-objective 1.2.1: Radon. By 2012, the number of future premature lung cancer deaths prevented annually through lowered radon exposure will increase to 1,250 from the 1997 baseline of 285 future premature lung cancer deaths prevented.

Sub-objective 1.2.2: Asthma. By 2012, the number of people taking all essential actions to reduce exposure to indoor environmental asthma triggers will increase to 6.5 million from the 2003 baseline of 3 million. EPA will place special emphasis on children and other disproportionately impacted populations.

Sub-objective 1.2.3: Schools. By 2012, the number of schools implementing an effective indoor air quality management plan will increase to 40,000 from the 2002 baseline of 25,000.

Means and Strategies for Achieving Healthier Indoor Air

Air inside homes, schools, and workplaces can be more polluted than outdoor air in the largest and most industrialized cities.[5] Given that people typically spend close to 90 percent of their time indoors,[6] many of us may be more at risk from indoor than from outdoor air pollution. Moreover, people who are apt to spend the most time indoors—children, the elderly, and the chronically ill, especially those suffering from respiratory or cardiovascular disease—may be those most susceptible to indoor air pollutants. EPA is also concerned about minority, low-income, or other populations that may be facing disproportionate risks from indoor air pollution, such as secondhand tobacco smoke and other asthma triggers.

To improve indoor air quality, EPA relies on innovative, non-regulatory outreach and partnership programs that inform and educate the public about indoor air quality concerns, such as radon, and actions they can take to reduce potential risks in homes, schools, and workplaces. We collaborate with groups such as health care providers in urban areas, who treat children prone to or suffering disproportionately from asthma attacks; school personnel, who manage school environments; county and local environmental health officials; and housing and building organizations. To support these partnerships, we provide policy and technical recommendations based on the most current science available.

EPA will provide tools and technical assistance as requested to assist tribes in collecting data on indoor pollutants, such as radon and mold, as well as environmental triggers of asthma. This data will help tribal communities assess the pervasiveness of indoor air quality problems and develop a baseline from which to measure success in improving indoor air, including the accomplishments and benefits provided by such programs as Tribal Effective Asthma Management (www.epa.gov/region08/air/iaq/asthma/asthma.html#2) and Tools for Schools (www.epa.gov/iaq/schools/index.html). We will work with other federal agencies to provide guidance and assistance on reducing these contaminants in all Indian communities. Through the State Indoor Radon Grant Program, we will continue to help states and tribes develop and implement effective radon assessment and mitigation programs.

OBJECTIVE 1.3: PROTECT THE OZONE LAYER

By 2011, total effective equivalent stratospheric chlorine will have reached its peak and begun its gradual decline to a value less than 3.4 parts per billion of air by volume.

Strategic Targets

- By 2015, reduce U.S. consumption of Class II ozone-depleting substances to less than 1,520 tons per year of ozone depleting potential from the 2003 baseline of 9,900 tons per year.
- By 2165, reduce the incidence of melanoma skin cancer to 14 new skin cancer cases avoided per 100,000 people from the 1990 baseline of 13.8 cases avoided per 100,000 people.

Means and Strategies for Protecting the Ozone Layer

Scientific evidence amassed over the past 3 decades has shown that chlorofluorocarbons and hydrochlorofluorocarbons (used as refrigerants, solvents, and for other purposes), halons, (fire-extinguishing agents), methyl bromide (a pesticide), and other halogenated chemicals used around the world are depleting the stratospheric ozone layer. As a result, more harmful ultraviolet (UV) radiation is reaching

the earth,[7] increasing the risk of overexposure and consequent health effects, including skin cancer, cataracts, and other illnesses. More than a million new cases of skin cancer are diagnosed each year;[8] 1 in 5 Americans is expected to experience skin cancer; and more than half of all Americans develop cataracts by the time they are 80 years old.[9]

As a signatory to the *Montreal Protocol on Substances that Deplete the Ozone Layer*,[10] the United States regulates and enforces Montreal Protocol provisions domestically. In accordance with this international treaty and related Clean Air Act requirements,[11] EPA will continue implementing domestic programs to reduce and control ozone-depleting substances (ODS) and enforcing rules on their production, import, and emission. Our approach combines market-based efforts with sector-specific technology guidelines to facilitate alternatives to hydrochlorofluorocarbons. We will work in partnership with stakeholders to smooth the transition to ODS substitutes that reduce greenhouse gas emissions and save energy and act on 100 percent of the petitions for substitutes within 90 days of receipt. To help reduce emissions internationally, we will assist in transferring technology to developing countries and work with them to accelerate the phase-out of ODS. We estimate that from 1990 to 2165, worldwide phase-out of ODS will save 6.3 million lives from fatal skin cancer, avoid 299 million cases of nonfatal skin cancers, and avoid 27.5 million cases of cataracts in the United States alone.[12]

Because the ozone layer is not expected to recover until the middle of this century at the earliest,[13] the public will continue to be exposed to high levels of UV radiation.[14] To address this concern, we will continue education and outreach efforts to encourage school children and their caregivers to change their behavior to reduce UV-related health risks. The SunWise program (www.epa.gov/sunwise/), which we expect to grow from 200 participating kindergarten–grade 8 schools in 2000 to 20,000 by 2011, will teach thousands of school children and adults how to protect themselves from overexposure to the sun.

OBJECTIVE 1.4: RADIATION

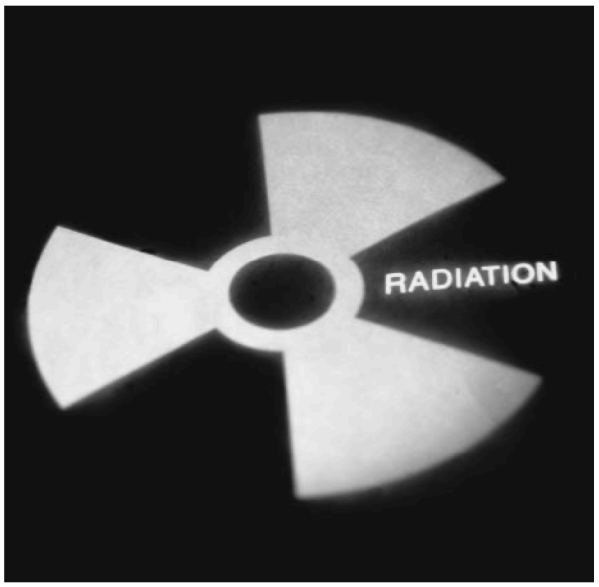
Through 2011, working with partners, minimize unnecessary releases of radiation and be prepared to minimize impacts to human health and the environment should unwanted releases occur.

Strategic Targets

- By 2011, 77 percent of the U.S. land area will be covered by the RadNet ambient radiation air monitoring system. (2001 baseline is 35 percent of the U.S. land area.)
- By 2011, the radiation program will maintain a 90 percent level of readiness of radiation program personnel and assets to support federal radiological emergency response and recovery operations. (2005 baseline is a 50 percent level of readiness.)

Means and Strategies for Minimizing Releases of Radiation and Related Impacts

EPA continues to meet statutory mandates for managing radiation waste and controlling radioactive emissions and to fulfill its responsibilities under presidential decision directives for radiological emergency preparedness and response. These responsibilities form the core of our strategy to protect the public and the environment from unnecessary exposure to radiation. We will work with states, tribes, and industry to develop innovative training, public information, and partnership programs to minimize these exposures. We will also conduct radiation-risk assessments to evaluate health risks from radiation exposure; determine appropriate levels for cleaning up contaminated sites; and develop radiation protection and risk management policy, guidance, and rules.



Mining and processing naturally radioactive materials for use in medicine, power generation, consumer products, and industry inevitably generate emissions and waste. EPA will provide guidance and training to help federal and state agencies prepare for emergencies at U.S. nuclear plants, transportation accidents involving shipments of radioactive materials, and acts of nuclear terrorism. EPA will also develop guidance for cleaning up radioactively–contaminated Superfund sites. To manage radioactive releases and exposures, we will conduct health-risk site assessments; risk modeling, cleanup, and waste management activities; voluntary programs to minimize exposure to radiation in commercial products and industrial applications; national radiation monitoring; and radiological emergency response.

In response to state and local organizations, EPA will continue to provide advice and guidance to help locate, identify, and dispose of radioactive sources that find their way into non-nuclear facilities, particularly scrap yards, steel mills, and municipal waste disposal facilities. We will work with the International Atomic Energy Agency and other federal agencies to prevent metals and finished products suspected of having radioactive contamination from entering the country. Through partnerships with states, local agencies, and tribes we will locate and secure lost, stolen, or abandoned radioactive sources within the United States and investigate and promote practices to reduce industrial radioactive releases. We will expand our ongoing efforts to ensure that tribes receive assistance in dealing with radon exposures in their homes and schools.

One of EPA's major responsibilities related to radiation is certifying that all radioactive waste shipped by the U.S. Department of Energy (DOE) to the Waste Isolation Pilot Plant is disposed of safely and according to EPA's standards. We inspect waste generator facilities and biennially evaluate DOE's compliance with applicable environmental laws and regulations.

OBJECTIVE 1.5: REDUCE GREENHOUSE GAS EMISSIONS

By 2012, 160 million metric tons of carbon equivalent (MMTCE) of emissions will be reduced through EPA's voluntary climate protection programs.[15]

Sub-objective 1.5.1: Buildings Sector. By 2012, 46 MMTCE will be reduced in the buildings sector (compared to the 2002 level).

Sub-objective 1.5.2: Industry Sector. By 2012, 99 MMTCE will be reduced in the industry sector (compared to the 2002 level).

Sub-objective 1.5.3: Transportation Sector. By 2012, 15 MMTCE will be reduced in the transportation sector (compared to the 2002 level).

Means and Strategies for Reducing Greenhouse Gas Emissions

In 2002, the President announced a U.S. climate policy to reduce greenhouse gas (GHG) intensity by 18 percent over the next decade. EPA's strategy for helping to achieve this goal is to collaborate with private and public organizations to reduce GHG intensity while providing additional benefits, from cleaner air to lower energy bills. At the core of these efforts are government-industry partnership programs designed to encourage consumers, businesses, and organizations to make sound investments in energy efficient equipment, policies and practices, and transportation choices.

EPA is collaborating with other federal agencies to maximize results under our climate protection programs. In addition to reducing greenhouse gas emissions and supporting such EPA goals as clean air, these programs can help other agencies achieve their strategic goals. For example, EPA and the Department of Energy (DOE) jointly implement the ENERGY STAR Program to promote energy-efficient products and practices (www.energystar.gov). Not only does ENERGY STAR support EPA's objective to reduce GHG emissions from homes, businesses, and industry, it also supports DOE's goal to cost-effectively improve energy efficiency (DOE Strategic Theme 1: Energy Security). ENERGY STAR can also help make housing more affordable by delivering energy savings to low-income and subsidized areas. We are coordinating our ENERGY STAR marketplace activities with DOE's research and development, regulatory activities, and technology demonstrations, and we are using complementary measures of our progress in the buildings sector.

We will also continue collaborating with DOE through EPA's SmartWay Transport Partnership, which works with fleets and the trucking and railroad industries to promote energy-efficient strategies, such as reducing idling, using low-carbon fuels like E85 and biodiesel, and reducing PM and NO_X emissions (www.epa.gov/smartway). SmartWay also supports DOE's goals for increasing energy diversity and cost-effectively improving energy efficiency (DOE Strategic Theme 1: Energy Security). To promote efficient, energy-saving technologies that reduce GHG, NO_X, and PM, we are working together to:

- Increase the number of filling stations that offer E85 ethanol by leveraging market forces, tax incentives, regulations, and state and local efforts.

- Promote idling control technologies, such as plug-in electric power at truck stops and auxiliary power units, which can save fuel and eliminate associated emissions.
- Develop protocols for measuring heavy duty truck fuel efficiency, allowing transporters to choose fuel-efficient trucks and increase fuel savings.

To assess progress under these joint efforts, EPA is working with other federal agencies to adopt complementary measures of performance. In one pilot effort, for example, EPA and DOE will be working jointly to promote idling technologies that will save fuel and to add new fueling stations offering E85 ethanol.

EPA will be managing a number of other partnership efforts to inform the marketplace and more quickly deploy technology in the residential, commercial, and transportation sectors:

- Partnerships with the energy, industrial, and agricultural sectors to promote technologies and practices for reducing methane and other potent GHGs (www.epa.gov/nonco2/voluntaryprograms.html).
- The Green Power, Combined Heat and Power, and other partnerships to encourage developing and purchasing clean and renewable energy (http://epa.gov/cleanenergy).
- The Best Workplaces for Commuters Program to benefit commuters and reduce vehicle trips and miles traveled (www.commuterchoice.gov).
- Climate Leaders, an EPA-industry-government partnership to develop long-term comprehensive climate change strategies and set corporate-wide goals for reducing GHGs (www.epa.gov/climateleaders).
- The Clean Energy-Environment State Partnership to support states in increasing the use of clean energy (www.epa.gov/cleanenergy/stateandlocal/partnership.htm).

EPA also promotes international partnerships to reduce GHGs and deploy clean technologies. Through the Methane to Markets Partnership, we will work with other countries and the U.S. private sector to reduce global methane emissions, enhance economic growth, promote energy security, and improve the environment by using cost-effective methane recovery technologies (www.methanetomarkets.org). In addition, the United States has joined Australia, China, India, Japan, and South Korea in the Asia-Pacific Partnership on Clean Development and Climate (www.asiapacificpartnership.org), which will advance the President's goal for cleaner and more efficient technologies and practices.

We will also continue to develop and assess innovative technologies for achieving clean air. We will continue to develop advanced clean and fuel-efficient automotive technology. We will collaborate with our private-sector partners to promote the transfer of technologies to help meet the more demanding size, performance, durability, and towing requirements of sport utility and urban delivery vehicles without compromising performance, safety, or reductions in emissions. We will also promote renewable fuel blends with the greatest environmental benefits to maximize their potential for reducing GHG intensity and improving air quality.

OBJECTIVE 1.6: ENHANCE SCIENCE AND RESEARCH

THROUGH 2012, PROVIDE SOUND SCIENCE TO SUPPORT EPA'S GOAL OF CLEAN AIR BY CONDUCTING LEADING-EDGE RESEARCH AND DEVELOPING A BETTER UNDERSTANDING AND CHARACTERIZATION OF HUMAN HEALTH AND ENVIRONMENTAL OUTCOMES.

MEANS AND STRATEGIES FOR ENHANCING SCIENCE AND RESEARCH

EPA's Air Research Program provides information we need to set and implement NAAQS and to ensure that residual risks associated with exposure to hazardous air pollutants (air toxics) are being reduced. We conduct research at EPA laboratories, through extramural grants (including five Particulate Matter Research Centers), and by co-funded partnerships (for instance, with the National Institute of Environmental Health Sciences and the Health Effects Institute [HEI]).

We are targeting our air research to achieve measurable improvements in two areas: reducing uncertainty in the science that supports us in setting air standards and reducing uncertainty about the effects of air pollutants on human health. To achieve these goals, our air research program will focus on:

Developing data and tools to support NAAQS. EPA research will provide new and updated data and new methods and models to characterize and estimate source emissions. Enhanced air quality models that more accurately reflect meteorological effects and improve our ability to forecast air quality changes will enable EPA, states, and tribes to alert the public to air quality concerns. Advances in receptor-based models will more accurately identify which source categories contribute to ambient concentrations, enabling us to target control strategies. Research will also investigate technologies for addressing multiple pollutants from key sources contributing to non-attainment or air toxics problems. We will also be developing a framework for assessing the impact of regulatory measures in improving air quality and environmental and human health.

Understanding the effects of air pollution on health. With HEI and other research partners, we are undertaking a systematic evaluation of PM attributes that will help us understand how exposure to PM and related air toxics can affect various aspects of health, including pulmonary, cardiovascular, immunological, neurological, reproductive, and developmental health, and we will focus particularly on susceptible populations.

Linking sources and effects. Research will enable us to link health effects more closely to specific sources and PM attributes, advancing the state of air pollution science and allowing us to better target sources of greatest impact and improve control measures and strategies to minimize the impact of particle and air toxics emissions. This will be the major theme of the Particulate Matter Centers' 5-year program.

HUMAN CAPITAL

EPA has been successful in recruiting and retaining talented staff with the scientific and technical backgrounds we need in several areas. For example, the EPA National Vehicle and Fuel Emissions Laboratory and the Clean Air Technology program have attracted high quality engineers and scientists.

However, EPA faces a shortage of staff skills to implement new air program requirements, such as CAIR and the Energy Policy Act of 2005. For example, to implement CAIR we will need to develop the workforce skills to support emissions measurement, engineering technology, environmental assessment, and computer database development and administration. Similarly, to develop a national renewable fuel standard and promulgate regulations to implement it, EPA will need staff with expertise in renewable fuels, vehicle testing, refinery modeling, transportation modeling and life-cycle analysis, energy security impacts, and economic analysis. The recruiting strategy we will use to address these gaps includes cooperative agreements with several top engineering colleges.

PERFORMANCE MEASUREMENT

EPA has made great strides in developing measures that focus on the environmental results of our clean air and global climate change work. Our strategic targets directly track and measure our annual performance goals (APGs), established in EPA's Annual Plan and Budget and reported on in our annual *Performance and Accountability Report*. For instance, the APGs for reductions in the population-weighted ambient concentration of ozone and $PM_{2.5}$ programs set annual targets based on our strategic targets. We have also developed annual measures that directly track strategic targets for the number of people taking all essential actions to reduce exposure to indoor environmental asthma and the number of schools implementing effective indoor air quality management plans.

To track our annual progress toward our research objectives, we will use a number of objective measures of customer satisfaction, product impact and quality, and efficiency. For example, we rely on independent expert review panel ratings, client surveys on the usefulness of our products, and analyses demonstrating the actual use of EPA research products.

We have aligned our strategic and annual measures with environmental indicators to be included in EPA's forthcoming 2007 *Report on the Environment*. Environmental indicators reflected in this *2006–2011 Strategic Plan* include trends of national ambient concentrations and emissions of criteria air pollutants (and their precursors, such as ozone and fine particulate matter), mercury point-source emissions,

ambient levels of stratospheric chlorine (which can deplete the ozone layer), and greenhouse gas emissions.

We have also included as strategic targets all of the clean air and global climate change long-term, outcome-oriented measures developed through Office of Management and Budget (OMB) Program Assessment Rating Tool (PART) assessments. These targets include the population-weighted ambient concentration targets for ozone and $PM_{2.5}$, and the toxicity-weighted risk reduction goals for air toxics.

Improving Performance Measurement

As we developed this *2006–2011 Strategic Plan*, we examined some of the longer-term opportunities to improve our measures of environmental outcomes for the future. We are continuing our work to develop long-term measures that capture the environmental benefits of the air and climate change programs, for example, by measuring the benefits of reduced ultraviolet exposure on human health directly.

USING FEEDBACK FROM PERFORMANCE ASSESSMENTS AND PROGRAM EVALUATIONS

Ambient Air Quality Program

In the PART evaluation of the Acid Rain Program, OMB recommended that EPA work to: (1) overcome statutory limitations that set maximum emission reduction targets and limit the scope of emissions trading and program benefits; and (2) develop efficiency measures based on the full cost of the program. We have addressed the first recommendation by promulgating CAIR, which is projected to reduce SO_2 and NO_X emissions beyond Title IV and uses a cap-and-trade approach modeled after the Acid Rain Program. We are addressing the second recommendation by developing data and methods to support efficiency measures that reflect industry and EPA costs.

The National Academy of Sciences evaluated the nation's air quality management system[16] and concluded that while emitted pollutants have been substantially reduced over the past 30 years, further progress is hindered by scientific and technical limitations in the current system. To address some of these issues, EPA is: (1) developing air quality-ecosystem indicators for the future tracking of trends in human exposure and ecological condition; (2) exploring opportunities to co-locate ambient air monitoring and atmospheric deposition monitoring with long-term ecological research study sites; and (3) improving methods for monitoring atmospheric inputs to ecosystems, such as ambient mercury concentrations and mercury deposition. We are also developing and expanding the use of high-order health and ecological indicators and characterizing the movement of air pollutants through ecosystems over time.

Indoor Air

OMB's PART assessment has led our Indoor Air Program to better quantify the relationship between funding levels and results, improve transparency by making state radon grantee performance data more accessible to the public, and improve the program's efficiency measures to more clearly demonstrate cost effectiveness.

Mobile Source–Clean Air Technology Program

As a result of a 2005 PART evaluation, the Clean Air Technology (CAT) program is developing better performance measures that more clearly link program efforts to greenhouse gas reduction potential.

Research

In 2005, the Board of Scientific Counselors (BOSC) evaluated the Particulate Matter and Ozone Research Program and recommended developing long-term measures as well as periodic assessment of customer satisfaction. Recommendations were incorporated into the 2005 PART evaluation of the NAAQS Research Program.

A committee of air pollution experts formed under the National Research Council completed a series of reports in 2004 and made three specific recommendations concerning the management of scientific research:

- EPA should work toward a higher level of sustained integration and interaction among the scientific disciplines and among the full range of public and private research funding organizations.
- Research is needed to develop stronger tools to compile and synthesize the large amounts of new information being developed in this research program.
- Sustained and substantially enhanced management of this program by EPA, accompanied by a continuing mechanism for independent review and oversight of the program, will be the only way to ensure that this investment is being soundly made.

EPA will include actions and milestones to address these recommendations, as well as recommendations on air research that we received from BOSC and PART assessments, in our revised multiyear plan for air research.

EMERGING ISSUES AND EXTERNAL FACTORS

The current, fundamental imbalance between energy supply and energy demand, and the effect of that imbalance on the economy, is debatably the most significant environmental issue that has emerged since EPA developed our *2003–2008 Strategic Plan*. Concerns around energy supply, economic prosperity, national security, and the environment present unprecedented opportunities for technological innovation in the marketplace.

Higher, more volatile energy prices could create pressures affecting air quality programs and goals. EPA will need to ensure that renewable fuels programs, such as those required under the Energy Policy Act of 2005, are implemented smoothly. Increases in energy prices and the turnover of capital stock in the energy sector will provoke interest in new and more efficient technologies—many of which could improve air quality. EPA will need to work with industry to develop and deploy these technologies in all economic sectors, including transportation and electricity production and end-use. For example, as demand for domestic coal resources increases, EPA will work with the U.S. Department of Energy, coal producers, and others to promote development and marketing of new coal technologies that generate extremely low air emissions, such as integrated gasification combined cycle (or, more broadly, coal gasification with carbon capture and sequestration).

We face another challenge in the rising level of emissions that originate in other countries, threatening progress in the United States and affecting our ability to achieve our public health and environmental standards. The effects of international and intercontinental transport are already apparent, and as energy use and development rapidly increase in Asia and other regions, the United States may feel the impact. Decreasing emissions in developing countries will not replace the need for reducing air pollution emissions within the United States. Rather, international efforts will complement our local and regional control efforts to protect public health and our domestic investments. Thus, to achieve our own domestic goals, we will need to better understand sources of pollution in other countries and work cooperatively to decrease these emissions.

Recent scientific studies indicate that the stratospheric ozone layer is likely to take longer to heal than previously anticipated.[17] Therefore, we expect more people to be exposed to excess UV radiation over a longer period. Timely, comprehensive action by all nations, including the United States, will be more important than ever to restore the

ozone layer and protect people from skin cancer, cataracts, and other illnesses.

A number of external factors could affect achievement of our strategic goals. We rely on state, tribal, and local government programs to meet many of our clean air performance targets; however, reduced budgets and resource constraints could impede their progress. Lawsuits and court action may require EPA to adjust schedules and could delay achievement of critical milestones. Economic conditions and development patterns in the United States and the world and evolving energy and transportation policies could also affect our ability to attain our objectives for clean air and climate change.

Finally, weather conditions and meteorological patterns have a very important effect on air quality. For example, high temperatures and bright sunlight can increase the formation of ozone. Wind can carry air pollution from one area to another, while conditions of little or no wind can cause air pollutants to remain in an area and build up to unhealthy levels. We must also consider these factors as we develop and implement plans and strategies for achieving and maintaining clean air.

To learn more go to: www.epa.gov/ocfo/futures/perspectives.htm.

Notes:

1. U.S. EPA. March 2006. *Air Emissions Trends—Continued Progress Through 2005*. Available online at www.epa.gov/airtrends/2006/econ-emissions.html: EPA Office of Air and Radiation Web Site. Access: April 26, 2006.
2. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.
3. Ibid.
4. Clean Air Act, Title I, Section 112. Available online at: www.epa.gov/air/caa/caa112.txt: EPA Clean Air Act Web Site. Access: April 26, 2006.
5. U.S. EPA. 1987. *The Total Exposure Assessment Methodology (TEAM) Study: Summary and Analysis: Volume I*. EPA 600-6-87-002a. Washington, DC: Government Printing Office.
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10. United Nations Environment Programme. *The Montreal Protocol on Substances that Deplete the Ozone Layer, as adjusted Beijing 1999*. Nairobi, Kenya. Available online at http://ozone.unep.org/pdfs/Montreal-Protocol2000.pdf: UNEP, The Ozone Secretariat Web Site. Access: April 26, 2006.

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13. United Nations Environment Programme. 2002. *Scientific Assessment of Ozone Depletion*. Available online at http://ozone.unep.org/Publications/6v_science%20assess%20panel.asp: UNEP, The Ozone Secretariat Web Site. Access: April 26, 2006.

14. UV irradiance has increased since the early 1980s by 6 to 14 percent at more than 10 sites distributed over mid- and high latitudes of both hemispheres. Information from: United Nations Environment Programme. 2002. *Scientific Assessment of Ozone Depletion*. Available online at http://ozone.unep.org/Publications/6v_science%20assess%20panel.asp: UNEP, The Ozone Secretariat Web Site. Access: April 26, 2006.

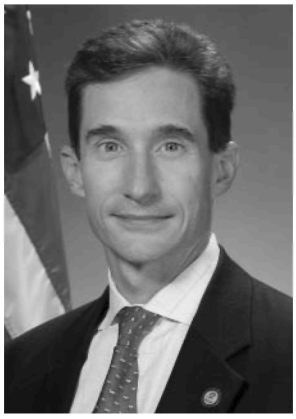
15. EPA's climate protection programs contribute to the President's 18 percent GHG emissions intensity reduction goal for 2012. The goal requires prevention of more than 100 MMTCE nationwide in 2012 in addition to the business-as-usual savings that are expected to occur. Of the 103 MMTCE that EPA programs achieve, 80 MMTCE, or about 80 percent, count towards that approximate 100 MMTCE increment. The remaining reductions will come from other programs and initiatives. For more information see www.whitehouse.gov/news/releases/2002/02/climatechange.html.

16. National Research Council of the National Academies. 2004. *Air Quality Management in the United States*. Available online at: http://fermat.nap.edu/books/0309089328/html. Access: April 26, 2006.

17. New York Times, December 7, 2005, Scientists Say Recovery of the Ozone Layer may take Longer Than Expected, Kenneth Chang. Available online at: www.nytimes.com/2005/12/07/science/07ozone.html?ex=1291611600&en=6e8ca9c8549a6f6b&ei=5090&partner=rssuserland&emc=rss. Access: April 26, 2006.

Clean *and* Safe Water

Ensure drinking water is safe. Restore and maintain oceans, watersheds, and their aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife.



This "Clean and Safe Water" goal defines the improvements that EPA expects to see in the quality of the nation's drinking water and of surface waters over the next 5 years. These goals include improving compliance with drinking water standards, maintaining safe water quality at public beaches, restoring more than 2,000 polluted waterbodies, and improving the health of coastal waters.

Three key strategies will drive progress toward these clean and safe water goals:

- ***Core Programs:*** Continue effective implementation of core national water programs, giving priority to improving water quality monitoring and information management, as well as working with state partners to strengthen water quality standards, improve discharge permits, and reduce pollution from diffuse or "nonpoint" sources.
- ***Water Infrastructure:*** Help sustain and secure the network of pipes and treatment facilities that constitute the nation's water infrastructure through investments in State Revolving Loan funds, pursuit of innovative financing, local adoption of sustainable management practices, and an increased commitment to water efficiency as well as partnerships and technical assistance to enhance the abilities of utilities to plan for, prevent, detect, and respond to security threats.
- ***Watershed Restoration and Protection:*** Apply a watershed approach to restoring polluted waters across the country, including developing Total Maximum Daily Loads, implementing clean-up plans on a watershed basis, and promoting innovative, cost-effective practices like water quality trading and watershed permitting to restore and protect water quality.

Benjamin H. Grumbles
Assistant Administrator
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GOAL 2:

Clean and Safe Water

Since the Clean Water and Safe Drinking Water Acts were enacted over 3 decades ago, government, citizens, and the private sector have worked together to make dramatic progress in improving the quality of surface water and drinking water. Thirty years ago, many of the nation's drinking water systems provided water to the tap with very limited treatment. Drinking water was too often the cause of illnesses linked to microbiological and other contaminants. Today, drinking water systems monitor the quality of the water they provide and treat water to ensure compliance with standards covering a wide range of contaminants. In addition, efforts to protect waters that are sources of drinking water are helping to keep drinking water safe.

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Thirty years ago, about two-thirds of the surface waters assessed by states were not attaining basic water quality goals and were considered polluted.[1] Some of the nation's rivers were open sewers posing health risks, and many water bodies were so polluted that swimming, fishing, and recreation were impossible. Today, the number of polluted waters has been dramatically reduced, and many clean waters are getting even healthier. A massive investment of federal, state, and local funds has resulted in a new generation of sewage treatment. More than 50 industrial sectors now comply with nationally consistent discharge regulations. In addition, sustained efforts to implement best management practices have helped reduce runoff of pollutants from diffuse, or "nonpoint," sources.

Cleaner, safer water has renewed recreational, ecological, and economic interests in communities across the nation. The recreation, tourism, and travel industry is one of the largest employers in the country, and a significant portion of recreational spending comes from swimming, boating, sport fishing, and hunting.[2] In addition, each year, more than 180 million people visit beaches for recreation.[3]

The dramatic restoration of some of the nation's most polluted waters has paid large dividends in enhanced recreation, healthier fisheries, and stronger local economies. Many of the nation's best-known water pollution problem areas are showing the results of years of restoration efforts. The Cuyahoga River, once so polluted that it caught fire, is now busy with boats and harbor businesses. Oregon's Willamette River has been restored to provide swimming, fishing, and water sports. In Boston, the Charles River, once badly polluted, increasingly supports boating and related recreation.

Despite numerous improvements in the quality of water, serious water pollution and drinking water problems remain in certain areas. Population growth continues to generate higher levels of water pollution and places greater demand on drinking water systems. Continued progress toward clean waters and safer drinking water will require that the country maintain its commitment to the core programs that have proven so effective in the past and implement partnership approaches to improve water quality and protect human health.

To learn more go to: www.epa.gov/water/.

OBJECTIVE 2.1: PROTECT HUMAN HEALTH

PROTECT HUMAN HEALTH BY REDUCING EXPOSURE TO CONTAMINANTS IN DRINKING WATER (INCLUDING PROTECTING SOURCE WATERS), IN FISH AND SHELLFISH, AND IN RECREATIONAL WATERS.

Sub-objective 2.1.1: Water Safe to Drink. By 2011, 91 percent of the population served by community water systems will receive drinking water that meets all applicable health-based drinking water standards through approaches including effective treatment and source water protection. (2005 baseline: 89 percent.)

Strategic Targets

- By 2011, 90 percent of community water systems will provide drinking water that meets all applicable health-based drinking water standards through approaches including effective treatment and source water protection. (2005 baseline: 89 percent.)
- By 2011, community water systems will provide drinking water that meets all applicable health-based drinking water standards during 96 percent of person months (i.e., all persons served by community water systems times 12 months). (2005 baseline: 95.2 percent.)
- By 2011, 86 percent of the population in Indian country[4] served by community water systems will receive drinking water that meets all applicable health-based drinking water standards. (2005 baseline: 86 percent.)
- By 2011, minimize risk to public health through source water protection for 50 percent of community water systems and for the associated 62 percent of the population served by community water systems (i.e., "minimized risk" achieved by substantial implementation, as determined by the state, of actions in a source water protection strategy). (2005 baseline: 20 percent of community water systems; 28 percent of population.)
- By 2015, in coordination with other federal agencies, reduce by 50 percent

the number of homes on tribal lands[5] lacking access to safe drinking water. (2003 baseline: Indian Health Service data indicate that 12 percent of homes on tribal lands lack access to safe drinking water [i.e., 38,637 homes lack access].)

Sub-objective 2.1.2: Fish and Shellfish Safe to Eat. By 2011, reduce public health risk and allow increased consumption of fish and shellfish, as measured by the following strategic targets:

Strategic Targets

- By 2011, reduce the percentage of women of childbearing age having mercury levels in blood above the level of concern to 4.6 percent. (2002 baseline: 5.7 percent of women of childbearing age have mercury blood levels above levels of concern identified by the National Health and Nutrition Examination Survey [NHANES].)
- By 2011, maintain or improve the percentage of state-monitored shellfish-growing acres impacted by anthropogenic sources that are approved or conditionally approved for use. (2003 baseline: 65 to 85 percent of the 16.3 million acres of state-monitored shellfish-growing acres estimated to be impacted by anthropogenic sources are approved or conditionally approved for use.)

Sub-objective 2.1.3: Water Safe for Swimming. By 2011, improve the quality of recreational waters as measured by the following strategic targets:

Strategic Targets

- By 2011, the number of waterborne disease outbreaks attributable to swimming in or other recreational contact with coastal and Great Lakes waters will be maintained at 2, measured as a 5-year average. (2005 baseline: An annual average of two recreational contact waterborne disease outbreaks reported per year by the Centers for Disease Control over the years 1998 to 2002, adjusted to remove outbreaks associated with waters other than coastal and Great Lakes waters and other than natural surface waters [i.e., pools and water parks].)

- By 2011, maintain the percentage of days of the beach season that coastal and Great Lakes beaches monitored by state beach safety programs are open and safe for swimming at 96 percent. (2005 baseline: Beaches open 96 percent of the 743,036 days of the beach season [i.e., beach season days are equal to 4,025 beaches multiplied by variable number of days of beach season at each beach].)

Means and Strategies for Protecting Human Health

Water Safe to Drink

More than 280 million Americans count on the safety of tap water provided by their local water systems. EPA's strategy for ensuring safe drinking water includes developing and implementing drinking water standards, supporting infrastructure, protecting waters that are a source of drinking water, strengthening the security of water systems, and improving access to safe drinking water on tribal lands.

Drinking Water Standards

The Safe Drinking Water Act (SDWA) directs EPA to establish national standards for contaminants in drinking water provided to consumers by water systems. EPA sets standards based on sound science and rigorous technical and economic analyses. To date, EPA has established standards for 91 contaminants.

Over the next several years, EPA will conduct the second 6-year National Primary Drinking Water Rule Review to help determine whether existing standards need to be revised. We will also continue to assess the need for new drinking water standards. Guided by recommendations from the National Research Council, the National Drinking Water Advisory Council, and other stakeholders, we will evaluate data on health effects and the risk of exposure to various contaminants; gather information on technologies that prevent, detect, and remove contaminants; and evaluate compliance costs.

Ensuring Compliance

We will work closely with states (49 of which have primary enforcement authority for health-based standards under SDWA), tribes, and owners and operators of municipal water systems to ensure that Americans are served by community water systems providing water that meets health-based standards—including new regulations, such as recent rules for cryptosporidium and disinfection byproducts. To promote compliance with drinking water standards, states carry out a variety of activities, such as conducting onsite sanitary surveys of water systems and working with small systems to improve their capabilities. EPA will work to improve compliance rates by providing guidance, training, and technical assistance; ensuring proper certification of water system operators; promoting consumer awareness of drinking water safety; maintaining the rate of system sanitary surveys and onsite reviews; and taking appropriate action for noncompliance.

Small community water systems are more likely to have difficulty complying with drinking water standards. Many serve low-income populations and are located in rural areas. Water systems such as those serving tribal areas,[6] Pacific Island Territories, Alaska Native villages, and communities along the U.S.-Mexico border face special challenges in providing safe water. To support small communities, EPA

will provide training and assistance in using cost-effective treatment technologies, properly disposing of waste, and complying with standards for high-priority contaminants, including microbes, disinfectants, disinfection byproducts, and arsenic. We will also work with states to strengthen small systems' technical, management, and financial capabilities.

The Safe Drinking Water Information System is a database that serves as the primary source of information on compliance with SDWA requirements. To help states and authorized tribes manage their drinking water programs, EPA will continue to improve the database to ensure that it reflects all applicable drinking water regulatory requirements and that data are complete, accurate, timely, and consistent.

Improving Tribal Drinking Water System Compliance

Often small and rural, tribal water systems face significant challenges in meeting drinking water standards and protecting sources of drinking water. EPA is taking steps to improve tribal water systems by:

- Developing quick-reference guides to help tribes comply with drinking water regulations.
- Promoting watershed protection on tribal lands and implementing source water protection plans.
- Implementing the Public Water System Supervision and Underground Injection Control programs directly on tribal lands.
- Participating in an interagency effort that encourages using available funds to improve tribal access to safe drinking water.

Sustainable Infrastructure

Providing drinking water that meets public health standards often requires an investment in constructing or maintaining infrastructure. The Drinking Water State Revolving Fund (DWSRF) provides water systems with low-interest loans to improve infrastructure.

According to EPA's Gap Analysis Report (2002), even with financial assistance from the DWSRF the country faces a multi-billion-dollar gap in capital infrastructure financing over the next 20 years.[7] Assuming no growth in revenue, the gap is estimated to be approximately $100 billion between 2000 and 2019. Assuming a real rate of growth of 3 percent per year, this gap shrinks to a point of $45 billion. EPA will continue its commitment to provide capitalization grants to state DWSRFs until 2018. Low-interest loans from the state DWSRFs support needed infrastructure improvements. EPA will work with states to ensure their SRFs are sustainable and to ensure that, nationally, the DWSRF will provide $1.2 billion annually in the long term. In addition, EPA will work with states to ensure that DWSRF funds are managed effectively, and encourage water system owners and operators to adopt sustainable management systems.

Sources of Drinking Water

Protecting sources of drinking water, such as surface and ground waters, can reduce violations of drinking water standards. We will provide training and technical assistance to states, tribes, and communities taking measures to prevent or reduce contamination of source water, and we will collaborate with stakeholders to protect source water. We are also protecting ground water that is a source of drinking water by working with states, tribes, industry, and other stakeholders to ensure safe underground injection of waste materials. This work includes identifying and evaluating risks from Class V shallow wells and addressing emerging issues, such as carbon sequestration and disposing of drinking water treatment residuals. Finally, we will work with states and tribes to use Clean Water Act authorities to prevent contamination of waters that serve as public water supplies and will encourage other federal programs to focus protection efforts in source water areas.

Water Infrastructure Security

The President has given EPA primary responsibility for coordinating federal, state, and local authorities in the protection of drinking water systems. The Bioterrorism Act of 2002 requires community water systems serving more than 3,300 people to develop vulnerability assessments and to certify emergency response plans. With most of this work now completed, EPA has shifted its focus to reducing risks associated with these vulnerabilities. Our water security program will provide tools and assistance to prevent, detect, respond to, and recover from intentional acts and natural disasters; encourage mutual aid agreements within states and regions; and provide training and exercises to improve water utilities' preparedness.

We are also undertaking two significant initiatives: (1) EPA's Homeland Security Sentinel Initiative (formerly known as Water Sentinel), which will deploy and test a contamination warning system; and (2) the Water Alliance for Threat Reduction, which will provide direct water security training to drinking water utilities serving more than 100,000 people. Collectively, these efforts will represent a robust approach for addressing the threats, vulnerabilities, and consequences facing the water sector.

Tribal Access to Safe Drinking Water

The 2002 World Summit on Sustainable Development in Johannesburg adopted the goal of reducing the number of people lacking access to safe drinking water and basic sanitation by 50 percent by 2015.[8] In the United States, EPA will focus on providing infrastructure to increase the number of tribal homes with access to safe drinking water and basic sanitation. We will support development of drinking water and wastewater facilities in Indian country and Alaska Native villages using set-aside funds from the Drinking Water and Clean Water State Revolving Funds as well as targeted grants.

We will also work with other federal agencies that play key roles in addressing this problem, such as the U.S. Departments of Health and Human Services, Interior, and Agriculture, to coordinate a strategy for improving tribes' access to water and sanitation. (Note that projects to improve infrastructure along the U.S.-Mexico Border and in the Pacific Islands will also increase peoples' access to safe drinking water and basic sanitation. They are described under Goal 4: Healthy Communities and Ecosystems.)

To learn more go to: www.epa.gov/safewater/.

Fish and Shellfish Safe to Eat

Some toxic contaminants that enter water bodies can move up the food chain, building up to levels in fish that make them unsafe to eat. The majority of fish consumption advisories issued today, for example, are the result of unhealthy levels of mercury, released into the air from combustion sources, such as coal-fired power plants and incinerators. The mercury is then deposited by rainfall onto land and water, where it is methylated by bacteria and moves up the aquatic food web through fish to people. To make more fish safe to eat, EPA is working to reduce releases of mercury to the air through controls on combustion sources. Federal market-based and other regulatory air programs, for example, will reduce electric-generating unit emissions of mercury. (See Goal 1: Clean Air and Global Climate Change.)

In addition to reducing mercury emissions, EPA is working to improve water and sediment quality. We will continue to implement Clean Water Act programs designed to reduce discharges from stormwater systems, combined sewer overflows, and concentrated animal feeding operations and to reduce runoff from nonpoint sources. We are also working to restore the quality of aquatic sediment in critical water bodies, with special emphasis on the Great Lakes. To reduce the potential for future sediment contamination, EPA is working with its partners to reduce the use of polychlorinated biphenyls (PCBs), a major sediment contaminant, in electrical equipment. (See Goal 4: Healthy Communities and Ecosystems.)

A key element of EPA's strategy for making more fish safe to eat is expanding information about fish safety and making it available to the public. The National Listing of Fish Consumption Advisories website, for example, allows states and tribes to post their advisories and provide information about locations, fish affected, and the number of meals or amount of fish that a person can safely eat. EPA will continue to guide states and tribes in monitoring fish safety and issuing fish consumption advisories.

To learn more go to: www.epa.gov/waterscience/fish/.

Like fish, shellfish can be unsafe for consumption as a result of accumulating disease-causing microorganisms and toxic algae. The U.S. Food and Drug Administration (FDA), Interstate Shellfish Sanitation Commission (ISSC), and coastal states work together to manage the safety of shellfish. States monitor shellfishing waters and can restrict harvesting if shellfish are unsafe. Such restrictions can be the result of poor water quality due to anthropogenic activity, such as discharges from sewage treatment plants. Through its surface water program, EPA is addressing anthropogenic sources that result in such closures. We will continue to work with states, FDA, ISSC, and the National Oceanic and Atmospheric Administration (NOAA) to increase the percentage of shellfishing acres open for harvesting by improving water conditions.

These agencies have developed an information system that uses state monitoring data to pinpoint areas where shellfishing has been restricted. This system, now operating in 13 of 22 shellfishing states, enables EPA and states to identify possible sources of pollutants restricting the use of shellfishing waters. EPA will also use this information to help develop watershed plans, implement National Estuary Program plans, issue or reissue permits to point sources, enforce existing permits, and implement controls over polluted runoff.

To learn more go to: www.epa.gov/waterscience/shellfish/.

Water Safe for Swimming

Recreational waters, especially beaches in coastal areas and the Great Lakes, provide outstanding recreational opportunities for many Americans. Swimming in some recreational waters, however, can pose an increased risk of illness as a result of exposure to microbial pathogens. In some cases, these pathogens can be traced to sewage treatment plants, malfunctioning septic systems, and discharges from storm water systems and animal feeding operations. EPA is implementing a three-part strategy to protect public health and the quality of the nation's recreational waters.

First, we will be working with states to ensure that state-adopted criteria for pathogens and bacteria in waters designated for recreational use are current and scientifically sound. (In a related effort, EPA has developed new analytic methods for monitoring pathogen levels at beaches and other recreational waters.) We will continue to work with state, tribal, and local governments to deliver core programs of the Clean Water Act: developing and implementing Total Maximum Daily Loads and implementing the discharge permit; urban storm water control; and nonpoint pollution control programs. In addition, we will be encouraging state, tribal, and local governments to adopt voluntary guidelines for managing on-site/decentralized sewage treatment systems and using Clean Water Revolving Loan Funds to finance systems where appropriate.

Second, we are implementing controls for combined sewer overflows (CSOs), which occur in about 770 communities around the country. CSOs can affect the quality of recreational waters by releasing untreated wastewater potentially containing high levels of pathogens. EPA, states, and local governments are making steady progress toward reducing overflows under the "CSO Policy."[10] Most communities with CSOs have now implemented basic control measures, and 48 percent of permittees have adopted schedules for implementing long-term control plans for CSOs. By 2011, permittees will have completed long-term control plans and EPA and states will be monitoring progress toward fully implementing the controls called for in these plans.

To learn more go to: www.epa.gov/npdes/cso.

The third element of our strategy focuses on public beaches along coastal areas and the Great Lakes. Under the Beaches Environmental Assessment and Coastal Health (BEACH) Act, EPA provides grants to state, tribal, and local governments for programs to monitor beach water quality and notify the public when bacterial contamination poses a risk to swimmers. We will continue to expand public access to internet-based beach information on our website. Governments receiving BEACH Act grants will post information on water quality, beach monitoring and advisory programs, and beach closures, which will enable beach-goers to make informed choices.

To learn more go to: www.epa.gov/beaches/.

OBJECTIVE 2.2: PROTECT WATER QUALITY

PROTECT THE QUALITY OF RIVERS, LAKES, AND STREAMS ON A WATERSHED BASIS AND PROTECT COASTAL AND OCEAN WATERS.

Sub-objective 2.2.1: Improve Water Quality on a Watershed Basis. By 2012, use pollution prevention and restoration approaches to protect the quality of rivers, lakes, and streams on a watershed basis.

Strategic Targets

- By 2012, attain water quality standards for all pollutants and impairments in more than 2,250 water bodies identified in 2002 as not attaining standards (cumulative). (2002 baseline: 39,798 water bodies identified by states as not meeting water quality standards. Water bodies where mercury is among multiple pollutants causing impairment may be counted toward this target when all pollutants but mercury attain standards, but must be identified as still needing restoration for mercury [1,703 impaired water bodies are impaired by multiple pollutants including mercury, and 6,501 are impaired by mercury alone].)
- By 2012, remove at least 5,600 of the specific causes of water body impairment identified by states in 2002 (cumulative). (2002 baseline: Estimate of 69,677 specific causes of water body impairment identified by states.)
- By 2012, improve water quality conditions in 250 impaired watersheds nationwide using the watershed approach (cumulative). (2002 baseline: 0 watersheds improved of an estimated 4,800 impaired watersheds of focus having 1 or more water bodies impaired. The watershed boundaries for this measure are those established at the "12-digit" scale by the U.S. Geological Survey [USGS]. Watersheds at this scale average 22 square miles in size. "Improved" means that 1 or more of the impairment causes identified in 2002 are removed for at least 40 percent of the impaired water bodies or impaired miles/acres, or there is significant watershed-wide improvement, as demonstrated by valid scientific information, in 1 or more water quality parameters associated with the impairments.)

- Through 2012, the condition of the nation's wadeable streams does not degrade (i.e., there is no statistically significant increase in the percent of streams rated "poor" and no statistically significant decrease in the streams rated "good"). (2006 baseline: Wadeable Stream Survey identifies 28 percent of streams in good condition; 25 percent in fair condition; 42 percent in poor condition.)

- By 2012, improve water quality in Indian country at not fewer than 50 baseline monitoring stations in tribal waters[11] (cumulative) (i.e., show improvement in one or more of seven key parameters: dissolved oxygen, pH, water temperature, total nitrogen, total phosphorus, pathogen indicators, and turbidity). (2006 baseline: 185 monitoring stations on tribal waters located where water quality has been depressed and activities are underway or planned to improve water quality, out of an estimated 1,661 stations operated by tribes.)
- By 2015, in coordination with other federal agencies, reduce by 50 percent the number of homes on tribal lands[12] lacking access to basic sanitation (cumulative). (2003 baseline: Indian Health Service data indicate that 8.4 percent of homes on tribal lands lack access to basic sanitation [i.e., 26,777 homes lacking access out of an estimated 319,070 homes].)

Sub-objective 2.2.2: Improve Coastal and Ocean Water. By 2011, prevent water pollution and protect coastal and ocean systems to improve national coastal aquatic ecosystem health by at least 0.2 points on the "good/fair/poor" scale of the National Coastal Condition Report. (2004 baseline: National rating of "fair/poor," or 2.3, where the rating is based on a system ranging from 1.0 to 5.0 in which 1 is poor and 5 is good using the National Coastal Condition Report indicators for water and sediment, coastal habitat, benthic index, and fish contamination.)

Strategic Targets

- By 2011, at least maintain aquatic ecosystem health on the "good/fair/poor" scale of the National Coastal Condition Report in the Northeast Region. (2004 baseline: Northeast rating of 1.8.)
- By 2011, at least maintain aquatic ecosystem health on the "good/fair/poor" scale of the National Coastal Condition Report in the Southeast Region. (2004 baseline: Southeast rating of 3.8.)
- By 2011, at least maintain aquatic ecosystem health on the "good/fair/poor" scale of the National Coastal Condition Report in the West Coast Region. (2004 baseline: West Coast rating of 2.0.)
- By 2011, at least maintain aquatic ecosystem health on the "good/fair/poor" scale of the National Coastal Condition Report in the Puerto Rico Region. (2004 baseline: Puerto Rico rating of 1.7.)
- By 2011, 95 percent of active dredged material ocean dumping sites will have achieved environmentally acceptable conditions (as reflected in each site's management plan and measured through onsite monitoring programs). (2005 baseline: 94 percent.)

Means and Strategies for Protecting Water Quality

Improve Water Quality on a Watershed Basis

To improve water quality, EPA will work with states, interstate agencies, tribes, local governments, and others in three key areas: maintaining strong core programs that emphasize watershed protection; identifying and restoring impaired waters on a watershed basis; and investing in water infrastructure and strengthening management practices to improve the sustainability of water systems.

Strong Core Programs

Building on the progress toward clean water achieved over the past 30 years, EPA is working with states and tribes to implement four critical components of the Clean Water Act: scientifically sound water quality standards; effective water monitoring; strong programs for controlling nonpoint sources of pollution; and strong discharge permit programs.

Scientifically sound water quality standards are vital to protecting water for swimming, public uses, and fish and wildlife, and they provide the environmental baselines for water quality programs. EPA supports state and tribal programs by providing scientific water quality criteria information. For example, we are developing or improving criteria for nutrients and pathogens in ambient water and determining how to address emerging contaminants, such as pharmaceuticals and personal care products found in the aquatic environment. We will continue to work with states and tribes to improve water quality standards and to assist them in adopting appropriate designated uses and criteria. We will also work with states and tribes to operate and administer the standards program effectively. Every 3 years states and authorized tribes are expected to review their standards and revise them if necessary; EPA is committed to review and approve or disapprove changes to standards promptly.

To learn more go to: www.epa.gov/waterscience/standards/.

To improve water quality, we need complete, reliable data on the condition of the nation's rivers, lakes, streams, and wetlands. Among our top priorities for the next 5 years are continuing long-term cooperative EPA-state surveys of water conditions similar to the recently completed survey of wadeable streams and focusing next on lakes and rivers; implementing state and tribal water-monitoring strategies on established schedules; and improving water quality data bases. This monitoring work will help inform assessments of fish tissue contamination and of the conditions of coastal waters, ground water, and beaches.

To learn more go to: www.epa.gov/owow/monitoring/.

Implementing Core Programs on a Watershed Basis

EPA and states are delivering core Clean Water Act programs on a watershed basis. For example, we are:

- Issuing watershed discharge permits.
- Implementing water quality trading at the watershed level.
- Assessing infrastructure needs by watershed.
- Demonstrating watershed scale program integration through targeted watershed assistance grants.

A key component of the Clean Water Act is controlling nonpoint sources of pollution. EPA will continue working with states

to reduce nonpoint pollution by implementing best management practices and providing education and technical assistance. We will help states develop plans for watersheds with impaired water quality caused by nonpoint sources and use those plans to coordinate monitoring, implementation, and efficient use of federal and other funding. A critical step in this effort is forging strategic partnerships with a broad range of agricultural interests, and we will work with federal partners to ensure that federal resources are managed in a coordinated manner.

To learn more go to: www.epa.gov/owow/nps/.

Improving Water Quality on Tribal Lands

To improve and protect water quality on tribal lands, EPA is working with tribes to:

- Develop water quality standards and monitoring strategies.
- Develop nonpoint pollution programs under Section 319 grants.
- Develop water permit programs.
- Develop tribal wetlands programs.
- Develop watershed protection plans.
- Involve tribes in developing Total Maximum Daily Loads.
- Provide Clean Water Indian Set-Aside and Alaska Native Villages Sanitation Grants to address wastewater infrastructure issues.
- Increase access to basic sanitation and safe drinking water.

The National Pollutant Discharge Elimination System (NPDES) requires point sources discharging to the nation's waters to have permits for those discharges and industrial facilities that discharge to sewer systems to have pretreatment programs to reduce their impact on sewage treatment plants.

Over the next 5 years, EPA will continue to strengthen management of the permit program. We will:

- Monitor implementation of the follow-up actions that resulted from the Permitting for Environmental Results Strategy we recently completed to address concerns about the backlog in issuing permits and the health of state NPDES programs.
- Continue to support states in using innovative permit tools. Momentum is building for watershed-based permitting and pollutant trading, and over the next 5 years EPA expects to begin to see the results of early efforts in this area.
- Work to ensure that permits issued by state and local governments to control storm water from industrial sites, construction sites, and municipal storm sewers are promptly reissued when they expire.
- Ensure that industrial discharges to publicly-owned sewage treatment works are pretreated effectively. We will provide tools for states and localities to work with industrial dischargers and will monitor the percentage of significant industrial facilities meeting pretreatment requirements.
- Revise rules for discharges from Concentrated Animal Feeding Operations (CAFOs) to reflect court findings. We expect that after the revised rules take effect in 2007, permits will be issued promptly, and CAFOs will begin implementing nutrient management plans.
- Develop or revise national regulations addressing key industrial sources of pollution. EPA will consider promulgating new wastewater regulations for airport deicing and drinking water

treatment residuals and revising regulations for some chemical manufacturers.

- Continue working with states to address and resolve significant noncompliance with discharge permits in a timely manner, emphasizing instances of significant noncompliance in which excessive effluents contribute to impaired waters.
- Continue working with states and sewage treatment plants to improve compliance with permit conditions.

To learn more go to: www.cfpub.epa.gov/npdes/.

Restore Impaired Waters on a Watershed Basis

In reports to EPA, states identify waters as "impaired" when one or more of the uses designated in water quality standards is not being attained. EPA, states, interstate agencies, and tribes are expanding and strengthening efforts to meet our 2012 goal of restoring more than 2,250 of the 39,798 waters that states identified as impaired in 2002. In a related effort, we are also working to restore and protect large-scale ecosystems around the country. (See Goal 4: Healthy Communities and Ecosystems.)

Over the next several years, we will continue to work with states to coordinate identification of impaired waters and improve data on location and causes of impairment. Better data will enable EPA and states to identify watersheds where impaired waters are clustered and determine likely causes and remedies. Improved data will also help states refine schedules for developing TMDLs so that TMDLs needed to restore a group of impaired waters can be coordinated. Developing TMDLs on a watershed basis will be cost effective and create opportunities for coordinating response programs and innovations such as watershed-based permitting and water quality trading. Water quality trading is a valuable tool that promotes shared responsibility for controlling discharges within a watershed and reduces pollutants at lowest cost.

EPA will work with states to develop coordinated watershed restoration plans focused on small, "12-digit" watersheds as defined by the U.S. Geological Survey. These plans will demonstrate how to coordinate planning and implementation of pollution control actions to improve water quality.

We will also continue working with states to develop TMDLs consistent with state TMDL development schedules and court-ordered deadlines. Since 2000, states and EPA have made significant progress in developing and approving TMDLs, and we have completed more than 20,000 TMDLs across the country. We expect to maintain the current pace of approximately 3,500 TMDLs completed and approved per year.

To learn more go to: www.epa.gov/owow/tmdl/.

As additional TMDLs are developed to support those already in place, the number of impaired water bodies and watersheds ready for implementing pollution controls will increase. EPA and states must carefully define and schedule restoration actions resulting

from TMDLs. In some cases, a single permit revision or enforcement action may bring about restoration. In other cases, water body or watershed-scale restoration plans linking point source controls, nonpoint source management practices, and financing support will be needed.

To support this effort, EPA will refine the selection and issuance of "high-priority" permits—those expired permits that states determine have a significant environmental impact. A permit might be accorded high priority, for example, if the permitted facility were contributing to impaired waters or if the permit incorporated new TMDLs and water quality standards or had the potential to contribute to watershed restoration. EPA will ensure that these critical permits are issued promptly.

Support Sustainable Wastewater Infrastructure

Sustaining water and wastewater infrastructure is a critical challenge. Existing systems are aging—some have components more than 100 years old—and growing, shifting populations require investment in new systems. EPA's Gap Analysis Report (2002) estimated that if capital spending for wastewater infrastructure remained at current levels, the potential gap in funding between 2000 and 2019 would be about $120 billion. Assuming a real annual rate of growth in revenues of 3 percent, the gap shrinks to $21 billion. Furthermore, many utilities have not focused attention on managing for long-term sustainability.

To address this challenge, the nation must fundamentally change the way it views, values, invests in, and manages water infrastructure. All parties will need to collaborate to find effective, efficient, and fair solutions; EPA is one partner in a larger, cooperative effort to address this nationwide infrastructure problem. To help facilitate solutions, we have developed a Sustainable Infrastructure Strategy, organized around four main themes or "pillars:"

- **Sustainable Management Practices:** We will work with utilities and associations to promote sustainable management practices and finalize a national strategy in early 2007.
- **Water Efficiency:** We will develop "WaterSense," a voluntary partnership program modeled after EPA's Energy Star program, to create a consumer market for water-efficient products.
- **Full Cost Pricing:** We will identify the range of approaches used to set rate structures based on full cost pricing, and we will develop options we can share with communities.
- **A Watershed Approach:** We will work with utilities, watershed organizations, and others to provide tools and information that will promote a watershed approach to infrastructure decisions.

EPA is developing an Internet-based Clean Watersheds Needs Survey (CWNS) data system that will allow communities and states to enter and update information on their pollution prevention and treatment project needs. CWNS data will be easily accessible for setting project priorities, Internet mapping analyses, and other purposes that support infrastructure management. We are also undertaking a major research and development initiative to identify water infrastructure needs that can be addressed through innovation.

Clean Water State Revolving Funds (CWSRFs), another tool supporting sustainable infrastructure management, provide low-interest loans to help finance wastewater treatment facilities and other clean water projects. A portion of CWSRF funding is set aside each year for water infrastructure improvements on tribal lands, including expanding access to basic sanitation. EPA provides grants to capitalize state CWSRFs which may be used to fund projects that support an integrated watershed approach, including repairing and upgrading onsite treatment systems. As of early 2006, the federal government had invested more than $23 billion in capitalizing state CWSRFs.[13] The revolving nature of the funds and substantial additions from states have increased that investment, cumulatively over the years making $55 billion available for loans.[14] We will continue our commitment to provide annual capitalization grants to CWSRFs until 2011. Additionally, we will work with state CWSRF programs to maintain their excellent fiduciary condition.

To learn more go to: www.epa.gov/owm/cwfinanceomdex/htm.

Improve Coastal and Ocean Waters

EPA tracks progress in improving coastal and ocean waters through the National Coastal Condition Report, a cooperative EPA, NOAA, U.S. Department of Agriculture (USDA), and Department of the Interior (DOI) project established in 2002. In describing the ecological and environmental condition of U.S. coastal waters, the report indicates that, overall, coastal waters are improving. To maintain this progress, we will focus on:

- **Assessing coastal conditions.** The National Coastal Condition Report uses five indicators to determine the condition of coastal waters. EPA and other federal agencies will review changing conditions and periodically issue updated assessments. To support this work, we are developing indices for measuring the health of coral reefs and monitoring compliance with environmental requirements at ocean dumping sites.
- **Reducing vessel discharges.** Discharges from vessels threaten U.S. waters and ecosystems. Ships discharge pollutants, and discharges of ballast water can spread invasive species, such as zebra mussels. We will assess the need for discharge standards for cruise ships operating in Alaskan waters; cooperate with the U.S. Department of Defense on establishing discharge standards for armed forces vessels; and assess our programs to reduce sewage discharges. To address the problem of

invasive species, we will assist the U.S. Coast Guard in developing ballast water discharge standards and continue to pursue this issue at the international level.

- **Implementing coastal nonpoint source pollution programs.** Rapid growth in coastal areas can result in increased pollution from nonpoint sources. We will continue to work with NOAA, coastal states, and Great Lakes states to reduce nonpoint source pollution in the "coastal zone."
- **Managing dredged material.** Several hundred million cubic yards of sediment are dredged from waterways, ports, and harbors every year. EPA and the U.S. Army Corps of Engineers (the Corps) share responsibility for regulating the disposal of this sediment. To ensure that sediment is disposed of safely and properly, we will work with the Corps to evaluate disposal sites, designate and monitor sites, and review disposal permits. We will also work with states and other federal agencies to ensure that major ports and harbors have plans for managing dredged material, which include provisions for beneficial reuse of the material.
- **Supporting international marine pollution control.** With the U.S. Coast Guard, NOAA, and the U.S. Department of State, EPA is negotiating international standards at the International Maritime Organization. We will use these standards as a mechanism to address invasive aquatic species, harmful antifoulants, bilge water, and marine debris.

We will coordinate these efforts with those of other federal agencies, states, tribes, and public and private parties. To improve coastal waters, we must successfully implement pollution controls in inland watersheds (see Sub-objective 2.2.1). Our progress will also be tied to geographically focused projects, such as the National Estuary Program,as well as ecosystem protection programs. (See Goal 4: Healthy Communities and Ecosystems.)

To learn more go to: www.epa.gov/owow/oceans/nccr/.

OBJECTIVE 2.3: ENHANCE SCIENCE AND RESEARCH

By 2011, conduct leading-edge, sound scientific research to support the protection of human health through the reduction of human exposure to contaminants in drinking water, fish and shellfish, and recreational waters and to support the protection of aquatic ecosystems—specifically, the quality of rivers, lakes, and streams, and coastal and ocean waters.

Means and Strategies for Enhancing Science and Research

EPA conducts research dedicated to the drinking water and water quality programs, and brings to bear additional research on human health and ecological issues conducted in support of other programs. (See Goal 4: Healthy Communities and Ecosystems.)

Drinking Water Research Program

The SDWA Amendments of 1996 direct EPA to conduct research to strengthen the scientific foundation for standards that limit public exposure to drinking water contaminants. The program's primary goals focus on developing research products that the Agency will use to make regulatory decisions on candidate drinking water contaminants and review

existing regulations. In addition, EPA regional offices, states, tribes, municipalities, and utilities often need technical advice to put new and revised drinking water regulations into action. Our Drinking Water Research Program (DWRP) develops drinking water treatment strategies, compliance monitoring methods, and tools for source water protection to support EPA and its partners in implementing SDWA. We will advance methods for assessing exposure and monitoring contaminants; study contaminant mode-of-action and dose-response; determine treatment, performance, and cost parameters; and study the effects of distribution systems on water quality. By providing the science and engineering information that we and our partners need, our research contributes measurable results that advance our efforts to ensure safe drinking water.

Water Quality Research Program

EPA's Water Quality Research Program (WQRP) priorities reflect the research needs of our national water program, regions, states, and tribes. We are targeting our research efforts to achieve measurable results: protective criteria for designated uses of aquatic systems; diagnostic and forecasting techniques related to designated uses of aquatic systems; and sustainable watershed technologies. For example, WQRP research will help the Agency promulgate protective standards; identify contaminants and how they contribute to impaired waters; and use tools for restoring and protecting the nation's waters that consider point and nonpoint sources of contamination and the treatment and beneficial use of biosolids. WQRP activity directly supports the Agency's goals for improving water quality and will contribute to the environmental outcomes we are working to achieve.

HUMAN CAPITAL

Over the past 20 years, EPA has delegated significant authority for protecting surface water and drinking water to state governments. As a result, our role increasingly is one of providing our partners and stakeholders with guidance, assistance, and financial and information resources. We will continue to be responsible for coordinating national water policy and evaluating water programs, as well as for directly implementing certain programs for some states and tribes.

Our evolving role in protecting water quality means that our workforce must be competent in communication, policy development, and managing contracts and assistance agreements, as well as in engineering and life science disciplines. EPA's water program is establishing a Workforce Council to review workforce initiatives and advise senior managers on priorities for improving quality of work life.

The water program is also assessing the optimal skill mix needed to fulfill mission-critical assignments, the distribution of tasks among those positions, and expected trends in staff retirement. It has formed a

Recruitment Council of staff and managers to plan and coordinate participation in job fairs, train employees on the recruitment process, and improve recruitment information sharing. In addition, water program offices have established or are working to establish ties to historically black colleges, as well as to other colleges and universities, to ensure a diverse workforce into the future.

Recognizing that today's staffers are tomorrow's leaders, our water program has initiated several long-term efforts to provide employees with training and career guidance. The Water Careers Program provides a variety of opportunities related to individual development plans, mentoring and coaching, and leadership. About 100 water program staff members have participated in this leadership development program, instituted in 2002. The water program also provides key training programs to EPA and state employees including the Drinking Water Academy, the Water Quality Standards Academy, the Watershed Academy, and the NPDES Permit Writer's Course.

PERFORMANCE MEASUREMENT

Most of the strategic targets we have established to achieve our goal of clean and safe water are measurable and reportable on an annual basis. Using a "bottom up" approach, our national water program works closely with our regional offices and states to develop annual national targets, which are captured in annual national water program guidance. To track annual progress toward our research objective, we use a number of objective measures of customer satisfaction, product impact and quality, and efficiency.

Using such sources as program evaluations and environmental indicators, we have developed two new strategic targets and related measures that will also be included in the Agency's forthcoming *Report on the Environment (ROE)*.[15] One measure addresses the chemical, biological and physical condition of wadeable streams; the second expresses the mercury blood-levels of women of child-bearing age, a reflection of the health risk from consuming contaminated fish.

Improving Performance Measurement

As we incorporated improved measures in this *Strategic Plan*, we also made a preliminary assessment of longer-term opportunities for improving performance measurement. Based on this assessment, we will work to expand and sustain a scientifically—sound, statistically-valid monitoring regimen to characterize the condition of the nation's waters, to advance measurement of water quality conditions on tribal lands, and to improve measures related to environmental justice.

Environmental Justice Measures

Our water program is participating in an Agency-wide effort to develop and strengthen measures to ensure that the environmental and public health benefits of programs are equitably shared. Under our goal for clean and safe water, we will measure tribal water systems' compliance with drinking water standards, the condition of tribal waters, and tribal access to safe drinking water and basic sanitation.

In the future, our national water program expects to be able to use established, Agency-wide criteria that identify "environmental justice" areas for which we will develop measures of progress in improving drinking water safety and restoring impaired waters. EPA will strive to deliver program resources so that progress toward clean and safe water in these areas is equal to or better than progress reported nationwide.

USING FEEDBACK FROM PERFORMANCE ASSESSMENTS AND PROGRAM EVALUATIONS

EPA's water program assesses program and regional performance on a continuing basis and prepares mid- and end-of-year performance reports using the environmental and program measures established in its annual national water program guidance to describe program progress. These reports include recommendations to improve specific instances of poor performance, disseminate "best practices," and inform the development of future annual guidance and strategic plans. Through this process, we have identified the need for performance improvements such as integrating clean water and drinking water programs, reducing data reporting lags in the drinking water program, and expediting reviews of tribal applications to administer EPA regulatory programs.

In addition, water program managers visit three to four EPA regional offices and great water body offices each year to discuss program management and performance. Topics include assessing regional performance against measures in the *Strategic Plan*, regional water issues identified in regional plans, and the program commitments that states and tribes make annually in their grant work plans. These assessments help identify innovations or "best practices" developed by regions, states, tribes, watershed organizations, and others, which can be described in water program performance reports and shared across the country.

Water programs are also evaluated periodically by EPA and organizations such as EPA's Office of Inspector General (OIG), the Government Accountability Office, the Office of Management and Budget (OMB), and the National Academy of Sciences. We have used the results of such evaluations to formulate some of the water program goals and strategies presented in this *Strategic Plan*. For example, after evaluating the Agency's work with states and tribes to implement clean water programs on a watershed basis, OIG recommended that we redesign our watershed measure and revise supporting program activity measures. EPA responded by developing a new measure addressing improvement in water quality in "12 digit" watersheds and expanding and revising watershed-related program activity measures in its annual national water program guidance. The new watershed measure addresses smaller geographic areas than did our previous measure and is more flexible in that it recognizes improvement in water quality as well as full restoration of impaired waters.

In another study which influenced this *Strategic Plan*, OIG evaluated the implementation of programs to protect sources of drinking water. Based on OIG's assessment, our national program and regional managers worked with states and tribes to revise and simplify measures related to source water protection. This effort has helped us better define an ambitious and realistic target for implementing source water protection programs by 2011.

A number of water programs were reviewed using OMB's Program Assessment Rating Tool (PART). These include Public Water Supply Supervision, rated Adequate; Underground Injection Control, rated Adequate; Surface Water Protection, rated Moderately Effective; and Oceans and Coastal Protection, rated Adequate.

The EPA Board of Scientific Counselors (BOSC) and OMB evaluated the Drinking Water Research Program in 2005. BOSC found the research to be of high quality and national importance and the program relevant and critical to EPA's mission. OMB found that the program has developed annual and long-term measures of performance, coordinates its work with other agencies, employs good oversight of competitively awarded grants, and requires grantees to work toward program goals. Input from these evaluations was instrumental in revising our long-term drinking water research plans.

To learn more go to: www.epa.gov/water/waterplan.

EMERGING ISSUES AND EXTERNAL FACTORS

Over the past several years, EPA has assessed emerging issues that can affect our goals for clean and safe water. Among the issues identified were:

- **Decaying Water Infrastructure and Population Growth:** Municipal wastewater infrastructure constructed in the 1970s and 1980s, and an increasing percentage of drinking water infrastructure, is nearing the end of its useful life. Responding to this challenge is complicated by the demands of a steadily growing population for drinking water supplies, wastewater treatment, and storm water management. EPA is in the first stages of an innovative, broad-based collaboration with states and municipalities to implement new strategies to strengthen water infrastructure management, including new initiatives related to water efficiency, sustainable management practices, and innovative financing of infrastructure.

- **Water Scarcity:** Demand for water for municipal and other uses is growing steadily. Meeting this demand while protecting ecological values of aquatic resources will be a significant challenge.
- **Nanotechnology:** The predicted explosion in the use of nanotechnology offers potential for both innovative water treatment methods and harm to aquatic systems from the release of nanoscale devices and products.

- **Remote Sensing Technology:** Dramatic progress in miniaturizing sensors and gathering environmental data from remote locations will open new avenues for monitoring the condition of waters.
- **Climate Change:** Understanding of the effects of climate change on the health and productivity of coastal waters and habitats, fisheries, and wetlands is necessary to inform sound environmental management and protection of these resources.
- **Pharmaceuticals in Wastewater:** More pharmaceutical products of more varied types are reaching aquatic systems through wastewater systems, with the potential for unanticipated impacts on ecological systems and human health.
- **Renewable Energy:** As energy needs increase and costs from conventional sources climb, demand for alternatives, including renewable energy, will grow. Recent studies have demonstrated the potential for sewage treatment plants and animal feeding operations to generate significant amounts of renewable energy from treatment process by-products.

To learn more go to: www.epa.gov/ocfo/futures/perspectives.htm.

As we address these emerging water issues and continue to strengthen and improve current programs, a number of external factors can affect our success. For example, much of our progress in achieving our goals will depend on maintaining strong partnerships. States, our primary partners in implementing clean water and safe drinking water programs, are facing budget problems and perhaps deficits. EPA recognizes that state budget shortfalls are an external factor that may limit progress toward clean and safe water goals.

Local governments also play a critical role in implementing clean and safe water programs. Municipalities and other local entities have partnered with states and the federal government to finance wastewater treatment and drinking water systems, and their continued contribution is essential to meeting water goals. Municipalities are also taking on additional responsibilities for addressing storm water and CSOs. In the case of the drinking water program, effective local management of drinking water systems, including protection of source waters, is essential to maintaining high rates of compliance with drinking water standards. More than 90 percent of the nation's 52,000 community water systems are smaller systems (serving 10,000 or fewer people) that often struggle to provide safe drinking water.[16] Continued consultation with local governments is critical to achieving clean and safe water.

EPA implements programs in Indian country, helps build tribes' capacity to administer clean and safe water programs, and works as co-regulators with authorized tribes. Tribal resource needs are great, however, and unlike states, many tribes are still developing programs to administer clean and safe water programs. Inadequate progress in developing these programs is another factor that could limit progress toward our clean water goals.

Key elements of the national water program, including nonpoint source control, source water protection, and watershed management, require broad partnerships among many federal, state, and local agencies and the private sector. Over the next several years, building partnerships with the agricultural community (such as USDA, state agricultural agencies, and local conservation districts) is a top priority for meeting clean water goals. We will continue to provide water quality data and technical assistance that can help USDA target its runoff control programs.

Similarly, we rely on many agencies for monitoring data to measure progress toward our clean and safe water goals. States lead the effort in water quality monitoring. Other agencies also provide critical information; for example, USGS maintains water-monitoring stations throughout the nation, and NOAA provides information on coastal waters.

Other federal partnerships are critical to achieving our water program goals. EPA relies on the Corps to co-administer the Section 404 program of the Clean Water Act. In fact, the Corps acts as the lead federal agency for permitting the discharge of dredged or fill material and, as part of its civil works projects, addressing dredged material management issues in U.S. waters. We will continue to work with the U.S. Agency for International Development, Department of State, and other interested stakeholders to improve access to safe drinking water and sanitation worldwide in support of the United Nations Millennium Goals. To this end, we will promote the international use of Water Safety Plans as a health-based risk assessment tool for improving water systems.

Finally, all of our coastal and oceans activities are carried out in partnership with other federal agencies and, in some cases, with international, state, local, and private entities as well. We rely on the efforts of the U.S. Department of Defense, the U.S. Coast Guard, Alaska and other states, and a number of cruise ship and environmental and nongovernmental organizations to manage wastewater discharges from vessels.

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4. Use of the terms "Indian country," "Indian lands," "tribal land," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.
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Land Preservation *and* Restoration

Preserve and restore the land by using innovative waste management practices and cleaning up contaminated properties to reduce risks posed by releases of harmful substances.

The land preservation and restoration goal presents EPA's strategic vision for managing waste, conserving and recovering the value of wastes, preventing releases, responding to emergencies, and cleaning up contaminated land. The stakes can be high because uncontrolled wastes can cause acute illness or chronic disease and can harm the environment. Cleanup almost always costs more than prevention, and contaminated land can be a barrier to bringing jobs and revitalization to a community. Disposed wastes also represent a loss of important material and energy values.

EPA employs a hierarchy of approaches to protect the land, including reducing waste at its source, recycling waste for materials or energy values, managing waste effectively by preventing spills and releases of toxic materials, and cleaning up contaminated properties. We are helping develop public-private partnerships to conserve resources in key areas. Moreover, over the next 5 years, we will establish or update approved controls to prevent dangerous releases at approximately 500 hazardous waste treatment, storage, and disposal facilities and also will address 2 long-standing tribal waste management concerns: increasing the number of tribes covered by integrated waste management plans and cleaning up open dumps.

To reduce and control the risks posed by accidental and intentional releases of harmful substances, we plan to maintain a high level of readiness to respond to emergencies, lead or oversee the response at more than 1,600 hazardous waste removals and reduce by 25 percent the number of gallons of oil spilled by facilities subject to Facility Response Plan regulations relative to previous levels. EPA and its partners, and responsible parties will remediate contaminated land, reduce risk to the public, and enable communities to return properties to beneficial reuse. We will also apply leading-edge scientific research to improve our capability to assess conditions and determine relative risks posed by contamination at hazardous waste sites.

Susan Parker Bodine

Susan Parker Bodine
Assistant Administrator
Office of Solid Waste and Emergency Response

GOAL 3:

Land Preservation and Restoration

Uncontrolled, wastes released on the land can migrate—contaminating drinking water, causing illness or disease, and threatening healthy ecosystems. EPA is working to minimize risks and to preserve and restore land using the most effective waste management and cleanup methods available. We rely on a variety of strategies: reducing waste at its source, recycling, managing waste to prevent spills and releases, and cleaning up contaminated property. We are especially concerned about threats to our most sensitive populations: children, the elderly, and people with chronic diseases.

OBJECTIVES

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Objective 3.2: Restore Land 67

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The Resource Conservation and Recovery Act (RCRA)[1] and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund)[2] provide the legal authority for most of EPA's work to preserve and restore the land. We use Superfund authority to clean up uncontrolled or abandoned hazardous waste sites and return land to productive use. Under RCRA, we work in partnership with states and tribes to address risks associated with leaking underground storage tanks and generation and management of hazardous and non-hazardous wastes. Tribal governments are the primary parties for setting standards, making environmental policy decisions, and managing programs consistent with federal standards and regulations for reservations, and our regional offices work directly with them as the recognized independent authorities for reservation affairs.

We also use authorities provided under the Clean Air Act,[3] Clean Water Act,[4] and Oil Pollution Act of 1990[5] to protect against spills and releases of hazardous materials. Controlling the many risks posed by accidental and intentional releases of harmful substances presents a significant challenge. To minimize these risks, EPA integrates prevention, preparedness, and response efforts. We conduct spill-prevention activities to keep harmful substances from being released to the environment. And we continue to improve our readiness to respond and minimize contamination and harm to the environment when spills do occur by coordinating with our partners at all levels of government, developing clear authorities, training personnel, and providing proper equipment.

EPA is committed to ensuring environmental justice for all people, regardless of race, color, national origin, or income. Recognizing that minority and/or low-income communities frequently may be exposed disproportionately

to environmental harm and risks, we work through our land preservation and restoration program to protect them and other burdened communities from adverse human health and environmental effects. We implement these programs consistent with existing environmental and civil rights laws and their associated regulations, as well as the Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." Ensuring environmental justice means not only protecting human health and the environment for everyone, but also making certain that all people are treated fairly and given the opportunity to participate meaningfully in making decisions that will affect their health and communities.

OBJECTIVE 3.1: PRESERVE LAND

By 2011, reduce adverse effects to land by reducing waste generation, increasing recycling, and ensuring proper management of waste and petroleum products at facilities in ways that prevent releases.

Sub-objective 3.1.1: Reduce Waste Generation and Increase Recycling. By 2011, reduce materials use through product and process design, and increase materials and energy recovery from wastes otherwise requiring disposal.

Strategic Targets

- By 2011, increase reuse and recycling of construction and demolition debris by 6 percent from a baseline of 59 percent in 2003.
- By 2011, increase the use of coal combustion ash to 50 percent from 32 percent in 2001.
- By 2011, increase by 118 the number of tribes covered by an integrated waste management plan compared to FY 2006.
- By 2011, close, clean up, or upgrade 138 open dumps in Indian country[6] and on other tribal lands[7] compared to FY 2006.

Sub-objective 3.1.2: Manage Hazardous Wastes and Petroleum Products Properly. By 2011, reduce releases to the environment by managing hazardous wastes and petroleum products properly.

Strategic Targets

- By 2011, prevent releases at 500 RCRA hazardous waste management facilities by implementing initial approved controls or updated controls. (The universe of facilities will be reassessed in FY 2009. However, we currently estimate that there will be about 820 facilities that will require these controls. The goal of 500 represents about 60 percent of the universe of 820 facilities.)
- By 2011, increase the percentage of UST facilities that are in significant operational compliance with both release and detection and release prevention requirements to 71 percent from 66 percent in 2006

(an increase of 5 percent) out of a total estimated universe of approximately 245,000 facilities.

- Each year through 2011, minimize the number of confirmed releases at UST facilities to 10,000 or fewer from a universe of approximately 650,000 UST tanks.

Means and Strategies for Preserving Land

In setting goals for conserving resources and managing waste under our Resource Conservation Challenge Program, EPA has high aspirations for our nation. We are striving for a future when materials once considered wastes suitable only for landfills will be continually reused and recycled, when "industrial ecology" will be the mantra of corporate executives across the nation, and when our landfills will become obsolete.[8] To lead this move toward sustainability, we are establishing a national challenge to recycle 40 percent of our municipal solid waste by 2011.[9] Meeting this challenge will take the combined efforts of all levels of government, large and small businesses, and dedicated citizens. It will mean that we have reached a milestone on the path to a future when we produce no waste at all.

We will work with stakeholders to establish effective strategic targets that benchmark and quantify our environmental progress toward sustainable resource conservation. These targets will provide a vivid picture of the significant environmental and economic benefits of reducing, reusing, and recycling materials. Under our Resource Conservation Challenge, we have set new targets for recycling construction and demolition debris and for using coal combustion ash rather than disposing of it. In the coming years, we will focus on developing a target or targets that contribute to the national 40 percent municipal solid waste recycling challenge, and we will be developing broader measures that capture the benefit of our resource conservation efforts. (As EPA makes the transition to new measures, we will maintain the goal of recycling 35 percent of municipal solid waste by 2008.)

Establishing and Expanding Partnerships

We are establishing and expanding partnerships with industry, states, and other entities to reduce waste generation and develop and deliver tools that will help businesses, manufacturers, and consumers prevent waste and increase recycling. Our WasteWise and Coal Combustion Products Partnership programs, for example, capitalize on voluntary efforts to reduce waste and increase recycling and serve as models for new alliances between agencies, industries, and businesses.

For more information go to: www.epa.gov/epaoswer/non-hw/reduce/wastewise/about/index.htm and www.epa.gov/epaoswer/osw/conserve/c2p2/index.htm.

We will continue to support our tribal partners in improving practices for managing solid waste on Indian lands.[10] EPA is responsible for implementing RCRA hazardous waste and UST programs directly in Indian country. Recognizing the challenges unique to tribal lands, we will work with tribes on a government-to-government basis in a way that affirms our federal trust responsibility to the 572 federally-recognized tribal governments and acknowledges the importance of conserving natural resources for cultural uses. To upgrade tribes solid waste management

infrastructure, we will continue to work with them to develop integrated waste management plans, codes, ordinances, recycling programs, and alternatives to open dumping. Through these efforts, we will help to clean up existing dumps, reducing the risks they pose to human health and the environment. A municipal solid waste landfill is considered to be an "open dump" if it does not meet EPA's Municipal Solid Waste Landfill Criteria, and is considered "upgraded" when modified so that it meets such criteria.[11] Over the next 5 years, EPA will build on the work of the National Interagency Workgroup, which annually contributes funding to the Solid Waste Assistance Grant Program for tribes, and we will forge partnerships with other federal agencies to identify and resolve waste problems in Indian country and on other tribal lands.

Stimulating Infrastructure Development, Product Stewardship, and New Technologies

A key strategy for reducing waste is developing infrastructure that will make it easier for industry, businesses, and consumers to reduce the waste they generate, to acquire and use recycled materials, and to purchase products containing recycled materials. We will continue to promote development of new and expanded markets for recycled materials and new and better recycling technologies. In addressing municipal solid waste, we will focus on specific commodity streams—paper, organics, containers, packaging, and electronics—which offer great potential for recycling. The carpets and electronics sectors, for example, present promising opportunities for collaboration because key industries and states recognize the environmental benefits to be derived from reducing waste. Similarly, our new GreenScapes partnership www.epa.gov/greenscapes will increase end-markets for compost while teaching homeowners how to save time, money, and natural resources by reducing and recycling their yard wastes.

EPA also is working with tribes to increase recycling and composting at large, public venues such as tribally-owned and operated casinos, shopping centers, and amphitheaters. "Recycling on the Go"[12] projects in such locations can prevent recyclable and compostable materials from reaching landfills. Such projects also promote partnerships and build strong working relationships between EPA, tribes, and local governments.

We will continue to promote recycling of industrial by-products, concentrating on three large-quantity material streams: coal combustion products, construction and demolition debris, and foundry sands. Our Coal Combustion Products Partnership (www.epa.gov/epaoswer/osw/conserve/c2p2/index.htm) will prevent waste by encouraging the beneficial use of coal combustion products. EPA's construction initiative (www.epa.gov/epaoswer/osw/conserve/priorities/bene-use.htm) will foster recycling of industrial materials, including construction and demolition debris, in major transportation and building construction projects. Through the Green Highways Initiative (http://www.greenhighways.org/), we will collaborate with government, business, and

industry to reuse industrial materials for transportation sector needs; reduce, reuse, and recycle municipal solid waste; and consider options for "green procurement." And we will continue working with the foundry industry to encourage recycling of spent foundry sands and develop a numerical goal to quantify these efforts.

EPA will also promote new and better recycling technologies and ways to obtain energy or products from waste. For example, through bioreactor technology, which accelerates stabilization of municipal solid waste, the collection of landfill gases containing methane offers promise as a source of energy. We will continue to support initiatives that revamp technologies to reduce or eliminate the use of virgin materials, recover energy to produce power, and improve waste management.

Providing Education, Outreach, Training, and Technical Assistance

As a result of EPA's continuing outreach to nonprofit organizations, major retailers, electronics manufacturers, and other industries, messages on conservation, waste prevention, and recycling have become more prevalent. These messages increase public awareness of waste disposal issues, encouraging consumers, young people, and underserved communities to make smarter, more responsible environmental choices. We will work with our partners to encourage students and teachers to begin innovative recycling programs, and we will develop unique tools and projects to promote waste reduction, recycling, and neighborhood revitalization in Hispanic and African-American communities and on Indian lands. By funding training programs and providing resources for tribal employees, EPA will continue to support the development of tribal waste management programs, including adequate and recently-approved, integrated solid waste management plans, community education and outreach, and other cleanup activities.

Addressing Global Concerns Through Partnerships

Because waste management and recycling of paper, plastics, and electronics have become increasingly global enterprises, "Global Environment" is a core priority in EPA's Action Plan (www.epa.gov/adminweb/administrator/actionplan.htm). EPA waste management programs will continue working with other countries and international agencies to devise efficient, rational solutions and voluntary and regulatory initiatives to protect the global environment.

Through our membership on the Commission for Environmental Cooperation's Hazardous Waste Task Force, EPA will promote the safe handling of waste imports and exports among North American Free Trade Agreement countries. This work will improve tracking of transboundary hazardous waste shipments, strengthen compliance, enhance border security, and reduce administrative burden and costs to private and government agencies in the United States and abroad. Under the U.S.-Mexico Border 2012 Plan (http://www.epa.gov/usmexicoborder/intro.htm), EPA will work with Mexican authorities to clean up and prevent tire piles and remediate contaminated sites along the border. In other international efforts, we will work with the Organization for Economic Cooperation and Development to minimize waste generation, remove barriers to recycling, and streamline exports and imports of

hazardous waste recyclables;[13] work with a global public-private partnership under the Basel Convention to enhance the design, collection, reuse, and recycling of mobile phones; and, under the auspices of the International Maritime Organization's environmental committee, participate in negotiations (through 2009) to develop a new international convention for the safe and environmentally sound dismantling and recycling of ships.

Managing Hazardous Wastes and Petroleum Products

A key element of EPA's strategy for managing hazardous wastes that must be treated, stored, or disposed is making waste management facilities more efficient. Working with our state, tribal, and local government partners, we are focusing on permitting processes and improving permitting conditions where appropriate. EPA will continue to work with authorized states—particularly those with a large number of facilities lacking initial approved controls—to remove obstacles to obtaining permits or putting other approved controls in place and to transfer successful strategies from other states.

Today, while the vast majority of the approximately 650,000 active USTs have the required leak detection and other equipment in place, significant work remains to ensure that UST owners and operators maintain and operate their systems properly.[14] RCRA Subtitle I allows state UST programs approved by EPA to operate in lieu of the federal program, and EPA recognizes that the number and diversity of UST systems puts state authorities in the best position to regulate USTs and set program priorities.[15] As a result, even states that have not received formal state program approval from EPA are most often the primary implementing agencies and receive annual grants from EPA. We will continue to support state programs; strengthen partnerships among stakeholders; and provide technical assistance, compliance assistance, and training to promote and enforce UST facility compliance. We will work with states on innovative approaches and outreach and education tools designed to bring more tanks into compliance.

The Energy Policy Act, which focuses on preventing releases to keep our nation's land and water safe, will require major changes to federal and state UST programs. The Energy Policy Act extends the LUST Trust Fund tax through 2011; and includes provisions regarding inspections, operator training, delivery prohibition, secondary containment, financial responsibility, and cleanup of releases that contain oxygenated fuel additives. EPA and states will work closely with tribes, other federal agencies, tank owners and operators, and other stakeholders to bring about the mandated changes affecting UST facilities, ultimately increasing compliance and preventing UST releases.

OBJECTIVE 3.2: RESTORE LAND

By 2011, control the risks to human health and the environment by mitigating the impact of accidental or intentional releases and by cleaning up and restoring contaminated sites or properties to appropriate levels.

Sub-objective 3.2.1: Prepare for and Respond to Accidental and Intentional Releases. By 2011, reduce and control the risks posed by accidental and intentional releases of harmful substances by improving our nation's capability to prevent, prepare for, and respond more effectively to these emergencies.

Strategic Targets

- By 2011, achieve and maintain at least 95 percent of the maximum score on readiness evaluation criteria in each region.
- By 2011, complete an additional 975 Superfund-lead hazardous substance removal actions. (In FY 2005, 175 of these actions were completed.)
- By 2011, oversee and complete an additional 650 voluntary removal actions. (In FY 2005, 137 of these actions were completed.)
- By 2011, reduce by 25 percent the gallons of oil spilled by facilities subject to Facility Response Plan regulations relative to the 601,000 gallons of oil spilled in 2003.
- By 2011, inspect (and ensure compliance at) 90 percent of the estimated 4,200 facilities subject to Facility Response Plan regulations, up from 50 percent in 2004.

Sub-objective 3.2.2: Clean Up and Revitalize Contaminated Land. By 2011, control the risks to human health and the environment at contaminated properties or sites through cleanup, stabilization, or other action and make land available for reuse.

Strategic Targets

- By 2011, make final assessment decisions at 40,491 of 44,700 potentially hazardous waste sites evaluated by EPA to help resolve community concerns on whether these sites require long-term cleanup to protect public health and the environment and to help determine if they can be cleared for possible redevelopment. (By the end of FY 2005, a total of 38,770 final site assessment decisions had been made.)

- By 2011, control all identified unacceptable human exposures from site contamination for current land and/or groundwater use conditions at approximately 85 percent (1,316) of 1,543 Superfund human exposure sites. (The universe of 1,543 is the number of National Priorities List [NPL] sites with potential human exposure pathways as of FY 2005 and includes 172 Superfund federal facility sites. Baseline: By the end of FY 2006, approximately 82 percent [1,266] of sites had human exposures under control.) By 2011, increase to 95 percent the high National

Corrective Action Prioritization System (NCAPS)-ranked RCRA facilities with human exposures to toxins controlled. (The universe of all facilities that need RCRA Corrective Action will be finalized by the end of 2007 and will include high, medium, and low ranked facilities.)[16]

- By 2011, control the migration of contaminated groundwater through engineered remedies, natural processes, or other appropriate actions at 74 percent (1,017) of 1,381 Superfund groundwater sites. (The universe of 1,381 sites is the number of NPL sites with groundwater contamination as of FY 2005 and includes 166 Superfund federal facility sites. Baseline: By the end of FY 2005, 68 percent [937] of sites had groundwater migration under control.) By 2011, increase to 80 percent the high NCAPS-ranked RCRA facilities with migration of contaminated groundwater under control. (The universe of all facilities that need RCRA Corrective Action will be finalized by the end of 2007 and will include high, medium, and low ranked facilities.)[17]
- By 2011, reduce the backlog of LUST cleanups (confirmed releases that have yet to be cleaned up) that do not meet state risk-based standards for human exposure and groundwater migration from 26 percent to 21 percent. By 2011, increase to 22 percent the RCRA facilities with final remedies constructed. (The universe of all facilities that need RCRA Corrective Action will be finalized by the end of 2007 and will include high, medium, and low ranked facilities.)[18] By 2011, complete construction of remedies at approximately 76 percent (1,171) of 1,547 Superfund sites. (The universe of 1,547 sites is the total number of sites on the NPL as of FY 2005 and includes 172 Superfund federal facility sites. Baseline: By the end of FY 2005, 62 percent or 966 sites had completed construction.) (Note that construction completion is a milestone which indicates that all significant construction activity has been completed, even though additional remediation may be needed for all cleanup goals to be met.)
- By 2011, ensure that 36 percent (345) of 966 final and deleted construction complete NPL sites are ready for reuse site-wide. (As of July 2006, 20 percent [195] of the 966 final and deleted construction complete NPL sites, including 14 Superfund federal facility sites, met EPA's definition for ready for reuse site-wide.)

Sub-objective 3.2.3: Maximize Potential Responsible Party Participation at Superfund Sites. Through 2011, conserve federal resources by ensuring that potentially responsible parties conduct or pay for Superfund cleanups whenever possible.

Strategic Targets

- Each year through 2011, reach a settlement or take an enforcement action before the start of a remedial action at 95 percent of Superfund sites having viable, liable responsible parties other than the federal government.
- Each year through 2011, address all unaddressed costs in statute of limitations cases for sites with unaddressed total past Superfund costs equal to or greater than $200,000.

Means and Strategies for Restoring Land

EPA leads the federal effort to reduce risks posed by contaminated land by responding to releases and potential releases of harmful substances and undertaking cleanups and other activities to return land to beneficial use. We develop and implement prevention measures, improve response capabilities, ensure that response and cleanup actions are effective, and promote protective, sustainable, and productive uses of formerly contaminated properties. We collaborate with private organizations, communities, businesses, and government agencies at every level to accomplish these ends. We also work to increase public understanding of environmental issues and develop a sense of environmental stewardship for land that has been returned to beneficial use.

Preparedness and Response

National preparedness is essential to ensure that emergency responders are able to deal with multiple, large-scale emergencies, including those that may involve chemicals, oil, biological agents, radiation, or weapons of mass destruction. EPA will continue to enhance its core emergency response program by providing specialized training on the Incident Command System; developing additional health and safety materials; participating in exercises with federal, state, and local government agencies, including Regional Response Teams; and strengthening response readiness across multiple regions.

We also are working to improve coordination and communication. For example, as part of the National Incident Coordination Team, we will continue to improve mechanisms for coordinating responses to national emergencies. Under the Continuity of Operations/Continuity of Government program, we will upgrade and test plans, facilities, training, and equipment to ensure that essential government business can continue during a catastrophic emergency. And we will expand our National Response Team capabilities for coordinating large-scale responses with the Department of Homeland Security; Federal Emergency Management Agency; Federal Bureau of Investigation; and other federal, state, and local government agencies.

We also are improving our capability for responding to incidents involving harmful chemical, oil, biological, and radiological substances. Each year, EPA personnel assess, respond to, mitigate, and clean up thousands of releases—whether accidental, deliberate, or naturally occurring. These range from small spills at chemical or oil facilities to larger accidental releases in train and highway accidents, and from

natural disasters, such as hurricanes Katrina and Rita, to national emergencies, such as terrorist events. Over the next 2 years, we will expand our current core emergency response program to address prevention and preparedness and cover all aspects of emergency environmental management.

An important component of our land strategy is preventing oil spills and being prepared for spills that do occur so that oil does not reach our nation's waters. Under the Oil Pollution Act,[19] we require certain facilities to develop Facility Response Plans (FRPs) for use in the event of a spill and to practice implementing them. At the end of FY 2004, EPA had inspected (and found in compliance) 50 percent of the estimated 4,200 FRP facilities; over the next 5 years we will work to ensure at least 90 percent compliance.

Cleaning Up and Revitalizing Contaminated Sites

EPA's cleanup programs strive to protect Americans from risks posed by contaminated land; restore the nation's contaminated land; and enable communities safely to return these properties to beneficial economic, ecological, and social use. We work with our federal, state, tribal, and local government partners to identify sites and facilities that need attention and collaborate to clean them up.

EPA's One Cleanup Program is a long-term initiative that encourages our cleanup programs to work together and with all levels of government to ensure that appropriate cleanup tools are used; resources and activities are coordinated; results are effectively communicated to the public; and cleanups are protective and contribute to revitalizing communities, including those with environmental justice concerns. We will strive to treat people fairly, to provide equal opportunity for participating in cleanup decisions, and to ensure that no population bears a disproportionate burden or risk. The One Cleanup Program reflects our effort to coordinate all of EPA cleanup programs, yet provides the flexibility to accommodate different statutory authorities and approaches.

All of our cleanup programs include common elements: initial assessment, stabilization (when needed to control actual or potential exposure and protect local populations), site investigation, selection of appropriate site remedies, implementation and completion of remedies, and promotion of protective uses/reuses.

Investigating and Assessing Sites. With our partners, we identify the type and extent of contamination and the actual or potential exposure to people and environmental receptors. We use the data we collect to determine risks and to select remedies. To better address environmental justice concerns and identify areas that may suffer disproportionate impacts, we will encourage broader use of improved sample collection techniques, analytical tools, and indicators.

Selecting and Implementing Remedies. We select remedies based on such criteria as affected media (soil, air, groundwater, etc.), cleanup objectives, compliance with applicable laws, implementation issues, and acceptability to state and tribal governments and the affected communities. Cost and efficiency of the overall cleanup process are also important. When remedies involve leaving contamination in place, EPA will continue

to include institutional controls, such as notices and easements, to prevent inappropriate uses of the land or water and unacceptable exposures.

Completing Construction and Post-Construction. Once appropriate remedies have been selected, completing construction of all remedies at a site or facility is an important milestone for EPA's cleanup programs. For example, the RCRA program has developed a long-term goal of implementing and completing construction of final remedies at 95 percent of all facilities that need RCRA corrective action by 2020,[20] and we will be developing interim annual targets (such as our 2011 target of 22 percent) to measure progress toward this goal.[21]

The Superfund program conducts reviews every 5 years to ensure that the remedy is functioning as intended and remains protective. Given the many sites moving into the post-construction-completion stage, we will implement a strategy to manage post-construction-completion activities and ensure that response actions will protect human health and the environment for the long term (PCC Strategy www.epa.gov/superfund/action/postconstruction).

A key milestone for all cleanup programs is the point at which all cleanup goals for a particular remedy or an entire site/facility are achieved. This can mean that no contamination is left above levels of concern and that the land has no restrictions on its use or that site-specific goals that allow restricted uses of the property have been met. EPA's cleanup programs have set a national goal of returning formerly contaminated sites to long-term, sustainable, and productive use. EPA will continue to foster revitalization (www.epa.gov/oswer/landrevitalization/) by developing policies and systems for the safe long-term use of remediated land; identifying and removing unintended barriers to beneficial reuse of contaminated properties; working with the marketplace to make formerly contaminated properties commercially attractive; and developing revitalization measures and indicators for all EPA cleanup programs.

Maximizing Potentially Responsible Party Participation at Superfund Sites

Under Superfund Program enforcement authorities, EPA leverages private party resources to conduct cleanup actions and to reimburse the federal government for federally financed cleanups. We will continue to pursue two strategies for conserving federal funds: "Enforcement First" and cost recovery. Under the Enforcement First strategy, EPA takes enforcement actions at sites where viable, liable potentially responsible parties exist, requiring them to pay for or perform the cleanups. To ensure that these parties are able to meet their cleanup obligations, EPA developed a national strategy to assess companies' compliance with federal financial assurance requirements and will implement it over the next several years.

Cost recovery is another way to leverage private party resources. Superfund provides EPA the authority to compel private parties to pay back federal money spent to conduct cleanup activities.[22] We will continue to address 100 percent of the unaddressed past costs for statute of limitations cases at sites with unaddressed total past Superfund costs equal to or greater than $200,000 and to report the value of costs recovered.

OBJECTIVE 3.3: ENHANCE SCIENCE AND RESEARCH

THROUGH 2011, PROVIDE AND APPLY SOUND SCIENCE FOR PROTECTING AND RESTORING LAND BY CONDUCTING LEADING-EDGE RESEARCH, WHICH, THROUGH COLLABORATION, LEADS TO PREFERRED ENVIRONMENTAL OUTCOMES.

MEANS AND STRATEGIES FOR ENHANCING SCIENCE AND RESEARCH

EPA will continue to improve its capability to assess environmental conditions and determine the relative risks that contaminated land poses to health and the environment. We will ensure that the environmental data we collect are of known, documented, and acceptable quality by implementing necessary field and lab procedures, practices, and controls. We will continue to integrate technological advances to enhance our site investigation capabilities, implement cost-effective remedies, and improve the operation and maintenance of existing remedies. In addition, we will continue to coordinate with other agencies on our land research priorities.

EPA scientists are developing methods for assessing multimedia risks, including the Multimedia, Multipathway, and Multireceptor Risk Assessment (3MRA) modeling system to support the Hazardous Waste Identification Rule. As a part of this effort, EPA will be conducting research to provide a preliminary risk screening for electronics waste and better understand the risks posed by hazardous constituents during recycling operations, disposal, or component reuse. The 3MRA model will also evaluate on a national basis relative risks of various waste disposal options for use in regulatory decision making. We have also planned research that targets specific materials for volume reduction and others for reuse and conservation.

To support cradle-to-cradle materials management, EPA scientists will evaluate landfill caps to improve containment technologies and conduct research on operating landfills as bioreactors. This research addresses operation and monitoring parameters and evaluates such risks as increased fugitive emissions. We will incorporate our findings in the training and technology transfer materials we provide to state permitting officials.

EPA's land research program helps accelerate scientifically defensible, cost-effective cleanup decisions at complex sites, in accordance with CERCLA. We are targeting our research to make measurable progress in managing material streams, conserving resources, and managing waste and in mitigating and managing contaminated sites.

Toward these ends, we will focus research on contaminated sediments, ground water contamination, site characterization, and technical support to reduce uncertainties in assessing contaminated sediments and develop and evaluate options for remediation. We are investigating sediment remedies with the potential to be more cost-effective than conventional dredging or capping remedies.

Research will also focus on bioremediation of organics, electrochemical degradation, and conventional and reactive landfill caps. To identify and explore best management practices, we will work with the U.S. Army Corps of Engineers and the Strategic Environmental Research and Development Program on a number of research projects to evaluate the field performance of dredging and capping of sediments.

We will continue ground water research—stressing ground water remediation of inorganic plumes and ground water-surface water assessment strategies—to develop applications for permeable reactive barriers and address fate and transport and treatment methods for contaminants. Our research on dense nonaqueous phase liquids (DNAPL) source remediation focuses on demonstrating, evaluating, and optimizing DNAPL remediation technologies; assessing and predicting the benefits of partial DNAPL depletion; and developing and assessing integrated DNAPL source remediation approaches. Our technical support centers will continue to provide site-specific assistance.

Our research to support the LUST program will provide fate and transport studies and information on the effectiveness of remediation alternatives. Research on fate and transport and risk management strategies for petroleum and non-petroleum oil spills will support EPA and its partners in responding to oil spill emergencies.

HUMAN CAPITAL

EPA's emergency prevention, preparedness, and response staff are key to the Agency's ability to preserve and restore land. We will continue to ensure their readiness and protect their health and safety when responding to releases of dangerous materials or cleaning up contamination by providing annual on-scene coordinator readiness training conferences, specialized Incident Command System training, health and safety materials, and exercises with federal, state, and local government agencies. We will also enhance the capabilities of our workforce by acquiring and maintaining appropriate response equipment, providing experience with routine cleanup operations, and predeploying responders for national special security events. EPA's Superfund response program will develop and maintain the skill base needed to achieve its goals through numerous training and enhancement programs focusing on needs identified in its competency gap analysis.

EPA's RCRA national waste management, waste minimization and recycling, and cleanup programs rely on a cadre of technically adept and program management-oriented people. Within the RCRA program, our development efforts include state-of-the-art technical training and focus on maintaining a superior level of competency in areas such as project management, communications, and other skills. These competencies are necessary to support our work with the vast array of public and private sector partners who are interested in waste and materials management. Our recruiting efforts have been particularly successful in bringing on high quality staff at the entry level to help us build a core group of seasoned employees who are ready to assume future leadership roles.

PERFORMANCE MEASUREMENT

To support our national goal of returning formerly contaminated sites to sustainable and productive use, all of EPA's cleanup programs are developing new measures of revitalization. As a first step, the Superfund program has set a "site ready for reuse" target to demonstrate cleanup progress. This measure tracks National Priority List sites where construction of the remedy is complete; where cleanup goals in the Record of Decision have been achieved such that there are no unacceptable risks associated with current and reasonably anticipated future uses; and where all institutional controls required in the Record of Decision have been implemented. These measures will capture the total number and acreage of sites for which EPA has some level of accountability, the number of sites and acres EPA has determined to be ready for reuse (or protective of existing uses), and whether and how the sites are being used (for industrial, commercial, residential, or other purposes).

To track our annual progress toward our research objectives, we will use a number of objective measures of customer satisfaction, product impact and quality, and efficiency. For example, we rely on independent expert review panel ratings, client surveys on the usefulness of our products, and analyses demonstrating the actual use of EPA research products.

Most of the strategic targets established for the waste management, UST, and Superfund programs are based on the long-term, outcome-oriented measures developed for use in the Office of Management and Budget's (OMB) Program Assessment Rating Tool (PART) assessments.

As a result of the self-evaluation we conducted during the FY 2005 OMB PART process, the Superfund program: (1) enhanced a key outcome measure to better communicate progress towards long-term human health; (2) added a new measure to reflect the lasting effects of land cleanup and restoration; (3) improved reporting on annual and long-term performance data to ensure accountability; and (4) implemented a new program review process and conducted its first benchmarking study to seek improved performance, effectiveness and efficiencies, and protection. The OMB PART for the Oil Removal Program led to new measures and related targets, as well as a commitment to develop a second long-term outcome measure and at least one annual outcome measure.

Improving Performance Measurement

As we considered revisions and improvements for this *Strategic Plan*, we also conducted a preliminary assessment of longer-term opportunities to better articulate strategic, outcome-oriented commitments. For our land goal, we identified four themes to help guide our efforts to improve our measures: extent of contaminated land; extent of land restored to potential use; extent of previously contaminated land in productive use; and impacts of waste-management efforts on human and environmental condition. These themes will help guide our efforts to improve our measures of performance.

USING FEEDBACK FROM PERFORMANCE ASSESSMENTS AND PROGRAM EVALUATIONS

In undertaking the PART process, the Superfund Program made several new commitments. It will encourage continuous improvement by strengthening its strategic planning—initiating regular procedures to track and document key decisions and work products. To improve the accuracy and reliability of its performance information, the program will evaluate the quality of data from key sources. Finally, the Superfund program will create a forum that allows regional offices to share best practices, resulting in an overall improvement in program performance and efficiency.

In July 2004, EPA's Science Advisory Board (SAB) conducted an advisory review of our Contaminated Sites and RCRA Multiyear Plans. The Board found the plans to be "programmatically and scientifically sound" and noted "the remarkable coordination of the program's research with that of the relevant program offices and other institutions" and "the judicious use of leveraging opportunities to significantly stretch limited resources to meet more of the Agency's needs." In response to SAB recommendations, the research program combined the two multiyear plans into one document and more clearly linked research activities to program activities under Objectives 3.1 and 3.2.

The SAB also reviewed the 3MRA modeling system and reported its findings in November 2004. EPA is addressing the Board's recommendations by continuing to develop 3MRA modeling system validation protocols, modeling system evaluation, and additional uncertainty analysis.

EMERGING ISSUES AND EXTERNAL FACTORS

A number of emerging technologies present potentially important implications for waste management strategies and programs. Waste to Energy, a technology which uses waste materials that are unlikely to be recycled as feedstock for energy production, has significant implications for energy supply. Research is also being conducted on applying nanotechnology to remediate hazardous waste sites. Using nanomaterials for remediation could enable more rapid or cost-effective cleanups than do current conventional approaches. (More information is available in the external peer review draft of EPA's White Paper on Nanotechnology at www.epa.gov/osa/nanotech.htm.)

Our ability to respond as the federal on-scene coordinator for releases of harmful substances in the inland zone may be affected by several external factors. The National Response System ensures that EPA will respond when necessary, but relies heavily on the ability of responsible parties and state, local, and tribal agencies to respond to most emergencies. The need for EPA to respond is a function of the quantity and severity of spills that occur, as well as the capacity of state, local, and tribal agencies to address spills.

EPA's ability to respond to homeland security incidents is affected by circumstances surrounding each event. For instance, if travel or communication is severely impeded, our response may be delayed or less efficient. In the case of a single large-scale incident, our resources are likely to be concentrated on that response, reducing our ability to address other emergency releases that may occur. In severe cases, our current emergency response workforce and resources may not be sufficient to address simultaneous large-scale incidents.

A number of external factors could also substantially affect our ability to achieve our objectives for cleanup and prevention. These include our reliance on private-party response and state and tribal partnerships, new environmental technologies, other federal agencies' efforts, and statutory barriers. Because states are primarily responsible for implementing the RCRA Hazardous Waste and UST programs, our ability to achieve our goals depends on the strength and funding of state programs. Similarly, our success in meeting our goals for compliance depends on a strong state presence.

The Superfund Program was intended to provide permanent site solutions to the extent practicable. Complications can arise, however, when new scientific information suggests that cleanup decisions were based on outdated risk assessments. As appropriate, the Superfund Program must incorporate emerging science into decision making while maintaining its commitment to provide permanent solutions.

Achieving our waste reduction and recycling objectives will depend on federal, state, tribal, local government, industry, and public participation in partnerships to reduce waste generation and increase recycling. EPA provides national leadership to encourage these partnerships and to promote the campaign to reduce or reuse waste that would ultimately be sent for disposal. However, both domestic and foreign economic stresses can adversely affect markets for recovered materials.

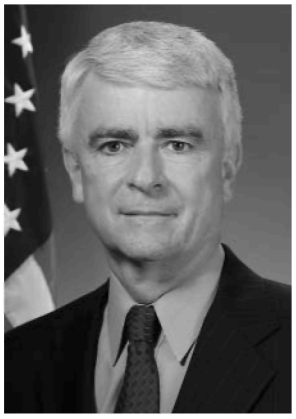
Finally, we rely on our partnerships with other federal agencies and tribal governments to upgrade, clean up, or close open dumps in Indian country and to provide tribes access to information on modern waste management. And to achieve our objectives for waste management on tribal lands, EPA will continue to depend on cooperation and participation by tribes and other federal agencies.

1. 42 *U.S.* Code 6901-6992k.
2. 42 *U.S.* Code 9601-9675.
3. 42 *U.S.* Code 7401-7671q.
4. 33 *U.S.* Code 1251-1387.
5. *U.S.* Code 2701-2761.
6. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.
7. Ibid.
8. Beyond RCRA: Waste and Materials Management in the Year 2020 (www.epa.gov/epaoswer/osw/vision.htm).
9. In the *2003-2008 Strategic Plan*, EPA established a goal of 35 percent recycling of municipal solid waste by 2008. EPA will continue to measure progress toward this goal through 2008.
10. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.
11. U.S. EPA's Municipal Solid Waste Landfill Criteria are defined in 40 CFR 257 and 258.
12. U.S. EPA, Office of Solid Waste and Emergency Response. Resource Conservation Challenge/Recycling on the Go web site: www.epa.gov/osw/conserve/onthego/.
13. Core Performance Elements of the Guidelines for Environmentally Sound Management of Wastes, April 24, 2003, Environment Policy Committee, OECD.
14. Memorandum from Cliff Rothenstein, Director, EPA Office of Underground Storage Tanks to Underground Storage Tank Division Directors in EPA Regions 1-10, dated December 15, 2005. *FY 2005 End-of-Year Activity Report*.
15. 42 *U.S.* Code 6901-6992k.
16. The 2020 RCRA Corrective Action universe will include all facilities that need RCRA corrective action as well as those on the current high-priority list, additional facilities that have a permitting obligation, and other appropriate and important facilities identified by EPA regions and states.
17. Ibid.
18. Ibid.
19. 33 *U.S.* Code 2701-2761.
20. Beyond RCRA www.epa.gov/epaoswer/osw/vision.htm.
21. The 2020 RCRA Corrective Action universe will include all facilities that need RCRA corrective action as well as those on the current high-priority list, additional facilities that have a permitting obligation, and other appropriate and important facilities identified by EPA regions and states.
22. 42 *U.S.* Code 9601-9675.

GOAL 4:

Healthy Communities *and* Ecosystems

Protect, sustain, or restore the health of people, communities, and ecosystems using integrated and comprehensive approaches and partnerships.



Goal 4 encompasses EPA's strategic approach to protecting, sustaining, or restoring the health of communities and ecosystems. In pursuit of this goal, EPA brings together a variety of programs, tools, and resources; creates strong partnerships with federal, state, tribal, and local government agencies; and enlists the support of many nongovernmental stakeholders.

With a mix of regulatory programs and partnership approaches the Agency achieves results in ways that are efficient, innovative and sustainable. A key component of Goal 4 is identifying, assessing, and reducing the risks presented by the thousands of chemicals and pesticides on which our society and economy have come to depend. EPA continues to work collaboratively with other nations and international organizations to identify, develop, and implement policy options to address global environmental issues of mutual concern. Following this, EPA strives to build a community's capability to make decisions that affect the environment. EPA's efforts to share information and provide assistance offers the tools needed to effectively address the myriad aspects of planned development or redevelopment. These contributions are tailored to circumstances spanning the issues of sensitive communities and international cooperation. In a similar manner, EPA's ecosystem protection programs encompass a wide range of approaches that address specific at-risk regional areas, such as large waterbodies. EPA also works with partners to protect larger categories of threatened systems, such as estuaries and wetlands. In cooperation with the U.S. Army Corps of Engineers, EPA will assure "no net loss" of wetlands.

Science guides EPA's identification and treatment of emerging issues and advances our understanding of long-standing human health and environmental challenges. EPA's research is typically crosscutting, multidisciplinary, and at the cutting edge of environmental science; reflects the dynamic nature of science; and brings scientific rigor to the characterization of uncertainty and risk.

Jim Gulliford
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George Gray
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GOAL 4:

Healthy Communities and Ecosystems

Communities and ecosystems are extremely complex systems of enormous variety. To protect and sustain them, EPA is working to manage environmental risks—from risks presented by the pesticides and chemicals on which we depend, to threats to our watersheds, to hazards posed by pollutants entering our homes, schools, workplaces, and neighborhoods. We work to protect critical ecosystems, such as wetlands and estuaries, and collaborate with states and others on "place-based" efforts to protect resources such as the Great Lakes, Chesapeake Bay, and Gulf of Mexico. We direct our risk-management efforts toward the greatest threats in our communities and the most sensitive populations, including children, the elderly, Native Americans, and residents of areas that may be disproportionately exposed to environmental hazards.

Our strategy for reducing risk calls first for preventing pollution at its source. When programs to prevent pollution are not viable, however, we strive to minimize the waste generated, avoid harming habitat, ensure that wastes are disposed of safely, and remediate contamination that does occur.

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Key to protecting the health of people, communities, and ecosystems is identifying, assessing, and reducing the risks presented by the thousands of chemicals on which our society and economy have come to depend. We ensure that chemicals and pesticides entering the market meet health and safety standards and register them for use. And we continue to review chemicals already in commerce to reduce potential risk.

Many of EPA's programs to achieve and sustain healthy communities and ecosystems are designed to bring tools, resources, and approaches to bear at the local level. We build community capacity by providing information to understand risk and to evaluate the effects of development on health and the environment. We encourage redevelopment by providing funds to inventory, assess, and clean up the hundreds of thousands of properties that lie abandoned or unused due to previous pollution. Ensuring that homes have access to clean, safe drinking water and basic sanitation is a high priority, and we are assisting communities in addressing local pollution and infrastructure challenges. These local and regional initiatives often rely on collaboration among federal, state, tribal, and

local government agencies; business and industry; environmental groups; and other stakeholders. Such successful partnerships have been instrumental in soliciting community involvement and promoting a sense of environmental stewardship to sustain environmental improvements.

EPA's programs for protecting ecosystems encompass a wide range of approaches that address specific at-risk regional areas—"placed-based initiatives"—and larger categories of threatened systems, such as estuaries and wetlands. Pollution generated locally, combined with pollutants carried by rivers and streams or deposited from the air, can accumulate in ecosystems and degrade them over time. Large water bodies, such as the Gulf of Mexico, Great Lakes, and Chesapeake Bay, have been exposed to substantial pollution over many years, and coastal estuaries and wetlands are also vulnerable. As the population in coastal regions grows, the challenges to preserve and protect these important ecosystems increase. Working with our partners and stakeholders, we have established special programs to protect and restore these unique resources.

Collaborative efforts are also key to enhancing and sustaining environmental progress domestically and abroad. EPA works with other U.S. government agencies and cooperates with other nations and international organizations to identify, develop, and implement policies for addressing environmental problems. Through such organizations as the North American Commission on Environmental Cooperation, we implement agreements to reduce transboundary pollution and protect the health of citizens on our borders. We strive to leverage funding and other resources to assist developing countries in managing their natural resources and protecting their citizens' health. We work to incorporate and support environmental protection provisions in all international trade agreements negotiated by the United States.

Underpinning all of this work is sound science. Sound science guides us in identifying and addressing emerging issues and advances our understanding of long-standing human health and environmental challenges. EPA's research is at the leading edge of environmental science; it cuts across environmental media and academic disciplines to characterize potential risks and benefits. EPA conducts "core research" that builds scientific knowledge of human health and ecology and informs decision making. To further our ability to measure and describe environmental conditions, EPA researchers advance monitoring and assessment programs and enable such reviews as EPA's Report on the Environment.[1] Our research encourages stewardship and sustainable solutions that can prevent pollution by building environmental protection into national economic and individual consumer decisions.

OBJECTIVE 4.1: CHEMICAL, ORGANISM, AND PESTICIDE RISKS

By 2011, prevent and reduce pesticide and industrial chemical risks to humans, communities, and ecosystems.

Sub-objective 4.1.1: Reduce Chemical Risks. By 2011, prevent and reduce chemical risks to humans, communities, and ecosystems.

Strategic Targets

- By 2011, eliminate or effectively manage risks associated with 100 percent of High Production Volume (HPV) chemicals for which unreasonable risks have been identified through EPA risk assessments. (Baseline: EPA screening of data obtained through the HPV Challenge Program is commencing in 2006; actions to obtain additional information needed to assess risks will commence subsequently as chemicals are identified as priority concerns through the screening process.)[2]
- Through 2011, ensure that new chemicals introduced into commerce do not pose unreasonable risks to workers, consumers, or the environment. (The FY 2004 and FY 2005 baseline is 100 percent.)[3]
- By 2011, achieve a 26 percent cumulative reduction of chronic human health risk from environmental releases of industrial chemicals in commerce since 2001. (Baseline: Cumulative reduction reported from 2002-2003 is 6.6 percent.)[4]
- By 2010, eliminate childhood lead poisoning as a public health concern by reducing to 0 the number of cases of children (aged 1-5 years) with elevated blood lead levels (>10ug/dl). (The 1999-2002 baseline is 310,000 cases.)[5]
- By 2010, reduce to 28 percent the percent difference in the geometric mean blood lead level in low-income children 1-5 years old as compared to the geometric mean for non-low-income children 1-5 years old. (The 1991-1994 baseline is 37 percent.)[6]

- By 2011, through work with international partners, eliminate the use of lead in gasoline in the remaining 35 countries that still use lead as an additive, affecting more than 700 million people. (Baseline: As of January 2006, 35 countries had not phased lead out of gasoline.)[7]
- By 2011, through work with international partners, more than 3 billion people will have access to low-sulfur fuel in 10 countries, including China, India, Mexico and Brazil. (Baseline: As of January 2006, none of the developing countries had access to low-sulfur fuel.)[8]

Sub-objective 4.1.2: Reduce Chemical Risks at Facilities and in Communities. By 2011, protect human health, communities, and the environment from chemical releases through facility risk-reduction efforts and building community preparedness and response capabilities.

Strategic Targets

- By 2011, continue to maintain the Risk Management Plan (RMP) prevention program and further reduce by 5 percent the number of accidents at RMP facilities. (The baseline is an annual average of 340 accidents, based on RMP program data through 2003.)
- By 2011, reduce by 5 percent the consequences of accidents at RMP facilities, as measured by injuries, fatalities, and property damage. (The baseline is an annual average of 358 injuries, 13 fatalities, and $143.5 million in property damage at RMP facilities from 1995-2003.)
- By 2011, vulnerability zones surrounding RMP facilities will be reduced by 5 percent from the 2004 baseline, which will result in the reduction of risk for more than 4 million people in the community. (The 2004 baseline is 1,086,428 mi_2 of cumulative area of RMP facility vulnerability zones.)[9]
- By 2011, improve by 10 percent from the 2007 baseline the capabilities of Local Emergency Planning Committees (LEPCs) to prevent, prepare for, and respond to chemical emergencies (as measured by a survey of those LEPCs), thereby reducing the risk to communities from the potentially devastating effects of chemical accidents.

Sub-objective 4.1.3: Protect Human Health from Pesticide Risk. Through 2011, protect human health by implementing our statutes and taking regulatory actions to ensure pesticides continue to be safe and available when used in accordance with the label.

Strategic Targets

- By 2011, reduce the concentration of pesticides detected in the general population by 50 percent. (Baselines are determined from 1999-2002 Centers for Disease Control-National Health and Nutrition Examination Survey [NHANES] data.)[10]
- Through 2011, protect those occupationally exposed to pesticides by improving upon or maintaining a rate of 3.5 incidents per 100,000 potential risk events. (Baseline: There were 1,385 occupational pesticide incidents in 2003 out of 39,850,000 potential pesticide risk events/year.)[11]
- By 2011, improve the health of those who work in or around pesticides by reaching a 50 percent targeted reduction in moderate to severe incidents for 6 acutely toxic agricultural pesticides with the highest incident rates: chlorpyrifos, diazinon, malathion, pyrethrins, 2,4-dichlorophenoxy

acetic acid (2,4-D), and carbofuran. (Baselines will be determined from the Poison Control Center (PCC) Toxics Exposure Surveillance System (TESS) database for 1999-2003.)[12]

Sub-objective 4.1.4: Protect the Environment from Pesticide Risk. Through 2011, protect the environment by implementing our statutes and taking regulatory actions to ensure pesticides continue to be safe and available when used in accordance with the label.

Strategic Targets

- By 2011, reduce the percentage of urban watersheds that exceed the National Pesticide Program aquatic life benchmarks for three key pesticides of concern (diazinon, chlorpyrifos, and malathion). (The 1992–2001 baselines as a percentage of urban watersheds sampled that exceeded benchmarks are: diazinon, 40 percent; chlorpyrifos, 37 percent; and malathion, 30 percent.)[13]
- By 2011, reduce the percentage of agricultural watersheds that exceed EPA aquatic life benchmarks for two key pesticides (azinphos-methyl and chlorpyrifos). (Based on 1992–2001 data, 18 percent of agricultural watersheds sampled exceeded benchmarks for azinphos-methyl and chlorpyrifos.)

Sub-objective 4.1.5: Realize the Value from Pesticide Availability. Through 2011, ensure the public health and socio-economic benefits of pesticide availability and use are achieved.

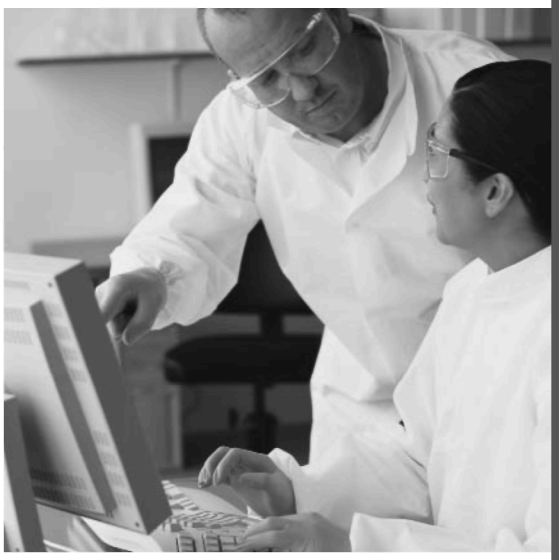
Strategic Targets

- By 2011, annually continue to avoid $1.5 billion in crop loss by ensuring that safe and effective pesticides are available to address emergency pest infestations.[14]
- By 2011, annually continue to avoid $900M in termite structural damage by ensuring that safe and effective pesticides are registered/re-registered and available for termite treatment.[15]

Means and Strategies for Reducing Risks from Chemicals and Pesticides

EPA works with other federal agencies, states, tribes, industry, environmental groups, international entities, and other stakeholders to reduce the risks that chemicals and pesticides can present to people, communities, and ecosystems. Our strategies for protecting public health and the environment rely heavily on these partnerships and on voluntary efforts by manufacturers, consumers, and the public.

Reducing Risks from Chemicals



EPA uses a two-pronged strategy to prevent and reduce risks posed by chemicals and microorganisms: prevent chemicals and organisms that pose unreasonable risks from entering U.S. commerce, and screen chemicals already in commerce for potential risk.

The 1977 Toxic Substances Control Act (TSCA) requires that EPA review all new industrial chemicals and organisms before they can be produced or imported and that we be notified of significant new uses for certain chemicals that we have already reviewed.[16] We will continue to screen, assess, and reduce risks posed by the 66,600 chemicals that were in use before TSCA was enacted. Thousands of these chemicals are still used today, and nearly 3,000 of them

are HPV chemicals, produced or imported into the United States in quantities exceeding 1 million pounds per year. Under the HPV Challenge Program,[17] approximately 400 companies and 100 consortia have voluntarily provided critical hazard screening data on almost 1,400 HPV chemicals, and we will continue to make this information available to the public.[18] We will continue to participate in the Organization for Economic Cooperation and Development (OECD) Screening Information Data Set program,[19] the international equivalent of our domestic HPV Challenge Program.

Under our New Chemicals Program, we will continue to review pre-manufacture notices to assess 1,300-1,500 new chemicals or organisms each year. Using advanced screening tools, we can estimate the potential health and environmental hazards of chemicals released to the environment.[20] We will also use these tools to encourage development of safer or "greener" new chemicals. Under our Sustainable Futures initiative, we provide chemical manufacturers with the same screening tools we use to evaluate potential health risks and environmental impact.[21] As more companies voluntarily pre-screen their products, we expect to see fewer problematic new chemicals, leading to measurable efficiencies in our review efforts. We will continue to submit our screening tools and models for rigorous peer review, and we will update and expand them accordingly.

Addressing Lead and Other High-Risk Chemicals

EPA targets risk-reduction efforts at specific chemicals and environmental justice concerns. For example, as a result of federal efforts since the 1990s, children's blood lead levels in the United States have declined dramatically, and we expect to eliminate childhood lead poisoning as a public health concern by 2010. Toward that goal, we are developing a program to address lead hazards created by renovation, repair, and painting. We are also working to eliminate the disparity in blood lead levels between low-income and other populations and to address other environmental justice concerns. We will exercise continued vigilance to ensure that no resurgence in childhood lead poisoning occurs.

Internationally, we will reduce children's exposure to lead through the global Partnership for Clean Fuels and Vehicles, which is working to eliminate lead from gasoline, reduce sulfur in fuels, and introduce cleaner vehicle technologies. Reducing sulfur in fuel will decrease vehicle emissions of particulate matter, addressing a growing public health concern in many countries, particularly in the developing world.

EPA is also evaluating emerging chemical concerns and taking action to manage risks. Perfluorooctanoic acid (PFOA), a persistent chemical causing systemic and developmental toxicity in animal studies, has been found in

human blood and has a half-life in humans measured in years.[22] We will work with the 8 major U.S. operations that generate or use PFOA to reduce their facility emissions and the levels of PFOA, PFOA precursors, and related chemicals in their products by 95 percent no later than 2010 and to eliminate them by 2015.

Mercury is a potent neurotoxin that places adults, children, and developing fetuses at risk for a variety of health problems, including developmental delays. The United States has been a catalyst for increasing international collaboration, building other countries' capacities, and promoting data-sharing to characterize and reduce mercury use and releases around the world. We will participate in demonstration, training, public awareness, and information-sharing programs to achieve measurable reductions in the commercial and manufactured products, coal combustion, artisanal and small-scale gold mining, and chlor-alkali sectors, which together account for up to 80 percent of global anthropogenic mercury emissions.

We will continue our multimedia efforts to prevent new persistent, bioaccumulative, toxic (PBT) chemicals from entering commerce and to reduce the risks associated with PBTs already in use, including mercury and polychlorinated biphenyls (PCBs). We will ensure that PCB waste is stored and disposed safely, and we will advise the regulated community on remediating PCB contamination, handling PCB disposal applications promptly, and overseeing PCB-permitted storage and disposal facilities.

Tribal environmental and health issues will continue to be a priority for our chemical program. We will use risk assessment methods that take into account the different risk profiles of some tribal lifestyles, and we will provide information and tools to help prevent adverse effects on these sensitive populations. EPA will also implement lead, asbestos, and PCB programs in tribal communities.

Reducing Risks from Accidental Chemical Releases

EPA is working to identify, better understand, and prevent potential risks from accidental chemical releases. Under our Risk Management Plan (RMP) Program,[23] we have audited approximately 1,800 RMP facilities and processed more than 12,000 RMPs since 2003. We will continue to analyze data collected under the RMP and Emergency Planning and Community Right-to-Know[24] programs to identify the types and locations of facilities with the greatest potential for chemical accidents and releases and to identify susceptible and sensitive populations that may be at higher risk. We will use this information to develop voluntary initiatives for high-risk facilities and geographic areas.

In the event that a chemical emergency does occur, protecting federal, state, and local first responders and on-site personnel is critical. EPA provides emergency personnel with information they need to take necessary precautions and treat individuals who may be on the scene. We are collaborating with other federal, private, and academic organizations to more quickly develop Acute Exposure Guideline Levels, which emergency responders use in planning and mitigation efforts.[25]

Reducing Pesticide Risks to Health

EPA's Pesticide Program screens new pesticides before they reach the market and ensures that pesticides already in commerce are safe.[26] Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Federal Food, Drug, and Cosmetic Act

(FFDCA), and the Food Quality Protection Act (FQPA) of 1996 that amended FIFRA and FFDCA, EPA is responsible for licensing and re-licensing pesticides to protect consumers, pesticide users, workers who may be exposed to pesticides, children, and other sensitive populations. To make regulatory decisions and establish tolerances or maximum allowable pesticide residues on food and feed, we must balance the risks and benefits of using the pesticide, consider cumulative and aggregate risks, and ensure extra protection for children.

Our Pesticide Registration Program will continue to screen pesticide products before they enter the market.[27] We will review pesticide data and implement use restrictions and instructions needed to ensure that pesticides used according to label directions will not result in unreasonable risk. During our pre-market review, we will consider human health and environmental concerns as well as the pesticide's potential benefits. Under our Reregistration Program, we will continue to review existing registrations to ensure they meet current scientific standards and address concerns identified after the original registration.[28] In addition, we will meet a provision under FQPA (related to the FIFRA requirement for reregistration) for Registration Review, a periodic review of existing pesticide registrations to ensure that they meet the most current standards.

EPA began promoting reduced-risk pesticides in 1995 by giving registration priority to pesticides that will have low impact on human health; low toxicity to non-target birds, fish, and plants; low potential for contaminating ground water; lower use rates; and low pest resistance potential and that will comport with Integrated Pest Management approaches.[29] Several countries and international organizations have instituted programs to facilitate registering reduced risk pesticides. We will continue to work with the international scientific community and OECD member countries to register 12 new reduced-risk pesticides and to establish related tolerances (maximum residue limits). Through these efforts, we can help to reduce risks to Americans from foods imported from other countries.

An important part of our Pesticide Program is the work done in the field to ensure that the decisions made during our licensing and re-licensing processes are implemented in pesticide use. An estimated 1.8 million agricultural workers could be exposed to pesticides, and millions of individuals use pesticides in occupations such as lawn care, healthcare, food preparation, and landscape maintenance.[30] Each year, the risk assessments that we conduct yield extensive risk-management requirements for hundreds of pesticides and uses. Working closely with states, tribes, and other federal agencies, our field programs address worker safety, provide certification and training on using more hazardous pesticides, protect endangered species, and encourage environmental stewardship. For example, through our Pesticide Environmental Stewardship Program, we form partnerships with pesticide users and work with them on pollution prevention strategies and Integrated Pest Management techniques that can reduce their use of pesticides and lower risks. We will continue to reduce the number and severity of pesticide exposure incidents by promulgating regulations under the Worker Protection Standard, training and certifying pesticide applicators, assessing and managing risks, and developing effective communication and outreach programs. Working with our state, tribal, and other regulatory partners, we will acquire information on local pesticide use patterns, geological conditions, location of endangered species, and tribal cultural practices that will help us assess risks and make practical, effective decisions.

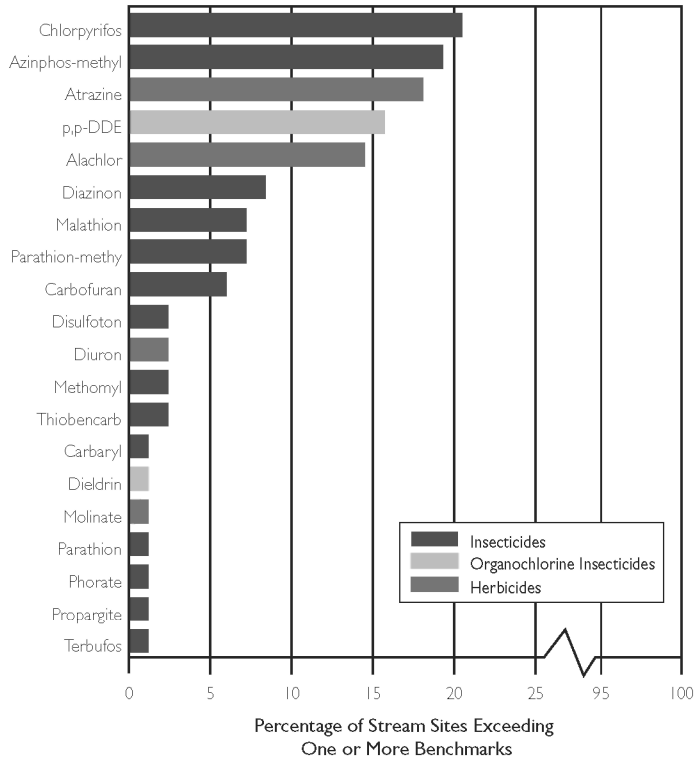
Reducing Pesticide Risks to Ecosystems

Along with assessing the risks that pesticides pose to human health, EPA conducts ecological risk assessments to determine potential effects on plants, animals, and ecosystems. We work to protect ecosystems, particularly the plants and animals that are not targets of the pesticide, and we have additional responsibilities under the Endangered Species Act (ESA).[31] Under FIFRA, we must determine that a pesticide is not likely to harm the environment, and we may impose risk mitigation measures such as restricting uses, denying uses, or requiring monitoring of environmental conditions, such as effects on water sources.[32]

Reduced concentrations of pesticides in water sources indicate the efficacy of EPA's risk assessment, management, mitigation, and communication activities. Using sampling data collected under the U.S. Geological Survey's (USGS) National Water Quality Assessment program, we will monitor the impact of our regulatory decisions for four pesticides of concern—diazinon, chlorpyrifos, malathion, and azinphos-methyl—and consider whether any additional action is necessary.[33] We will work with USGS to develop sampling plans and refine goals, and we will ask USGS to add additional insecticides to sampling protocols and establish baselines for newer products that are replacing organophosphates, such as synthetic pyrethroids.

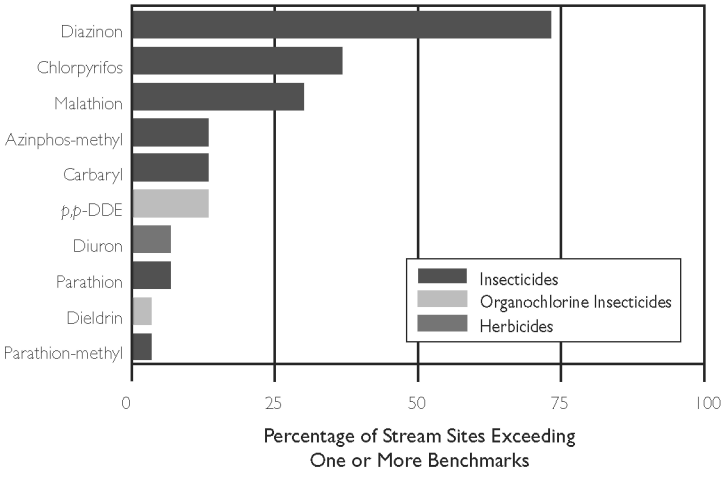
Under ESA, we must ensure that pesticide regulatory decisions will not adversely modify critical habitat or jeopardize listed species.[34] Given approximately 600 active ingredients in more than 19,000 products—many of which have multiple uses—and approximately 1,200 listed species with diverse habits and habitat requirements, this presents a great challenge. We are working with the U.S Fish and Wildlife Service and National Marine Fisheries Service to

Pesticides With Concentrations Greater Than an Aquatic-Life Benchmark, Agricultural Streams



Contributions of individual pesticides to exceedances of aquatic-life benchmarks for water show the significance of insecticides in urban streams, particularly diazinon, chlorpyrifos, and malathion during the 1992-2001 study period. In agricultural streams, most exceedances of benchmarks were by chlorpyrifos, azinphos-methyl, atrazine, *p,p'*-DDE, and alachlor.

Pesticides With Concentrations Greater Than an Aquatic-Life Benchmark, Urban Streams



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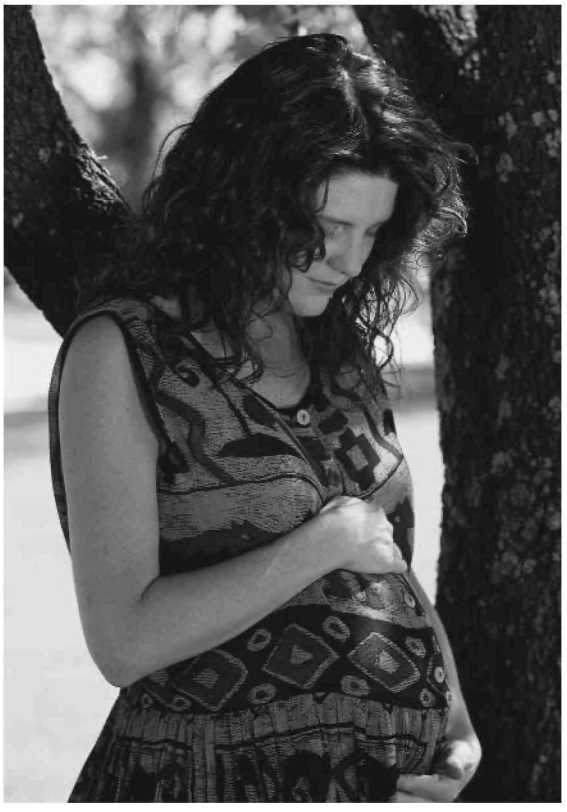
establish an efficient process for carrying out our ESA obligations. Together, we are developing "counterpart regulations" that provide EPA authority to make certain determinations without further consultation. We will make assessing risks to endangered species a priority and consider endangered species routinely in EPA reviews.[35]

Realizing the Value of Pesticide Availability

To protect public health and the environment from risks posed by pesticides and to promote safer means of pest control, EPA registers pesticides under the authority of Section 3 of FIFRA. FIFRA requires us to determine that the pesticide will not present an unreasonable adverse effect, that is, "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide." EPA's registration programs under FIFRA thus ensure that the nation has access to effective pesticides that eliminate or limit losses and are protective of human health and the environment. For example, an estimated $900 million in termite damage is avoided each year through the availability of effective termiticides. While some effective termiticides have been removed from the market due to safety concerns, EPA continues to work with industry to register safe alternatives that meet or exceed all current safety standards and offer a high level of protection.



In the event of an emergency, FIFRA Section 18 also provides EPA the authority to temporarily exempt certain pesticide uses from registration requirements. We must ensure that, under the very limiting provisions of the exemption, such emergency uses will not present an unreasonable risk to the environment. EPA's timely review of emergency exemptions has avoided an estimated $1.5 billion in crop losses per year. Exemptions may be granted for one-time events or to respond to emergency situations resulting from new pests on crops when exemptions are necessary while progress is made towards full registration. In such cases, EPA's goal is to complete the more detailed and comprehensive unreasonable risk review conducted for pesticide registration within 3 years.

Endocrine Disruptors

EPA needs valid tests to assess new chemicals' and pesticides' potential for endocrine disruption. The Endocrine Disruptor Screening Program will work to validate the screens and tests needed before large-scale reviews can take place. We will continue to obtain technical advice on the validation of tests from external experts. EPA is also working to minimize the use of animals for these tests.

OBJECTIVE 4.2: COMMUNITIES

SUSTAIN, CLEAN UP, AND RESTORE COMMUNITIES AND THE ECOLOGICAL SYSTEMS THAT SUPPORT THEM.

Sub-objective 4.2.1: Sustain Community Health. By 2011, reduce the air, water, and land impacts of new growth and development through use of smart growth strategies in 30 communities that will achieve significant measurable environmental and/or public health improvements. (Baselines for criteria air pollutants, land consumption, and storm water run-off prior to EPA assistance will be established for each community.)[36]

Sub-objective 4.2.2: Restore Community Health Through Collaborative Problem-Solving. By 2011, 30 communities with potential environmental justice concerns will achieve significant measurable environmental or public health improvement through collaborative problem-solving strategies. (Baseline: In 2006, 20 communities with potential environmental justice concerns are in the process of using collaborative problem-solving strategies in efforts to achieve environmental or public health improvement. Community-specific baselines will be developed by 2008 for assessing improvement.)[37]

Sub-objective 4.2.3: Assess and Clean Up Brownfields. Working with state, tribal, and local partners, promote the assessment, cleanup, and sustainable reuse of brownfields properties.

Strategic Targets

- By 2011, conduct environmental assessments at 13,900 (cumulative) properties. (Baseline: As of the end of FY 2005, EPA assessed 7,900 properties.)

- By 2011, make an additional 1,125 acres of brownfields ready for reuse from the 2006 baseline. (The 2006 baseline will be available in 2007. See "Performance Measurement" section below.)
- By 2011, leverage $12.9 billion (cumulative) in assessment, cleanup, and redevelopment funding at brownfields properties. (FY 2005 baseline is $7.5B.)[38]

Sub-objective 4.2.4: Sustain and Restore the U.S.-Mexico Border Environmental Health. By 2012, sustain and restore the environmental health along the U.S.-Mexico border through implementation of the "Border 2012" plan.

Strategic Targets

- By 2012, achieve a majority of currently exceeded water quality standards in impaired transboundary segments of U.S. surface waters. (2002 baseline: 17 currently exceeded water quality standards were identified for 10 transboundary segments of U.S. surface waters.)

- By 2012, provide safe drinking water to 25 percent of homes in the U.S.-Mexico border area that lacked access to safe drinking water in 2003. (2003 baseline: 98,515 homes lacked access to safe drinking water.)[39]
- By 2012, provide adequate wastewater sanitation to 25 percent of homes in the U.S.-Mexico border area that lacked access to wastewater sanitation in 2003. (2003 baseline: 690,723 homes lacked access to wastewater sanitation.)[40]
- By 2012, cleanup five waste sites (two abandoned waste tire sites and three abandoned hazardous waste sites) in the U.S.-Mexico border region.

Sub-objective 4.2.5: Sustain and Restore Pacific Island Territories. By 2011, sustain and restore the environmental health of the U.S. Pacific Island Territories of American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands.

Strategic Targets

- By 2011, 95 percent of the population in each of the U.S. Pacific Island Territories served by community drinking water systems will receive drinking water that meets all applicable health-based drinking water standards throughout the year. (2005 baseline: 95 percent of the population in American Samoa, 10 percent in the Commonwealth of the Northern Mariana Islands, and 80 percent of Guam served by community water systems received drinking water that meets all applicable health-based drinking water standards throughout the year.)
- By 2011, the sewage treatment plants in the U.S. Pacific Island Territories will comply 90 percent of the time with permit limits for biochemical oxygen demand (BOD) and total suspended solids (TSS). (2005 baseline: The sewage treatment plants in the Pacific Island Territories complied 59 percent of the time with the BOD and TSS permit limits.)
- By 2011, beaches in each of the U.S. Pacific Island Territories monitored under the Beach Safety Program will be open and safe for swimming 96 percent of days of the beach season. (2005 baseline: Beaches were open and safe 64 percent of the 365-day beach season in American Samoa, 97 percent in the Commonwealth of the Northern Mariana Islands, and 76 percent in Guam.)

Sub-objective 4.2.6: Reduce Persistent Organic Pollutant Exposure. By 2011, reduce the mean maternal serum blood levels of persistent organic pollutant (POP) contaminants in indigenous populations in the Arctic.[41]

Strategic Targets

- By 2011, reduce mean maternal blood levels of polychlorinated biphenyls (PCBs) (measured as

Aroclor 1260) in indigenous populations in the Arctic to 5.6 µg/l. (The 2006 calculated baseline mean maternal serum level for PCBs was 6.3 µg/l.)

- By 2011, reduce mean maternal blood levels of chlordane (measured as the metabolites oxychlordane and trans-nonachlor) in indigenous populations in the Arctic to 1.1 µg/l. (The 2006 calculated baseline mean maternal serum level for total chlordane was 1.3 µg/l.)

Means and Strategies for Sustaining and Restoring Communities

EPA is committed to sustaining and restoring the health of our communities and the ecological systems that support them. We are working to build capabilities in communities across the United States to ensure clean and safe water for drinking, swimming, and fishing; healthy air; and safe management of waste and waste by-products. Our work with communities will also include efforts to address environmental justice and tribal issues and to advance environmental stewardship and sustainable practices. Achieving these goals will require cross-media coordination and innovative strategies, tailored by community stakeholders. As we expand our knowledge of environmental conditions, stressors, and solutions, we expect community-based strategies for environmental protection to become even more effective.

EPA's strategy for community-based protection of local natural resources is based on four components:

- *Inform local decision making*. We will continue to improve information exchange and access to environmental information.
- *Build local capacity*. We will develop and deliver tools to help local agencies and community groups use environmental assessment and planning data, work collaboratively and cooperatively with a range of stakeholders, and participate more fully in environmental decision making.

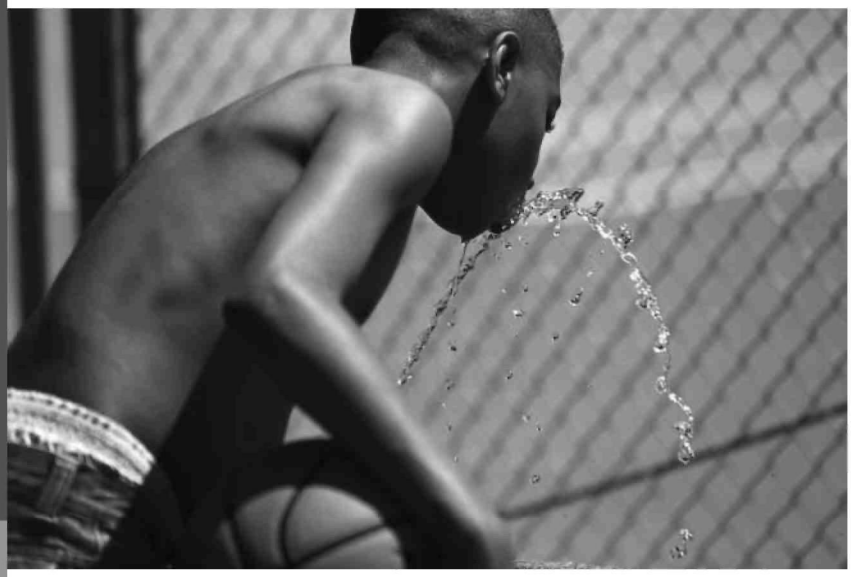
- *Provide technical and financial assistance directly to communities*. We will help neighborhood groups adopt comprehensive, integrated approaches to environmental problems. For example, our Community Action for a Renewed Environment (CARE) Program provides competitive grants to help communities create collaborative partnerships to reduce releases and minimize exposure to toxins.[42] Through programs like CARE, we expect that by 2011 more than 100 community partnerships will be involving the public in addressing disproportionate environmental risks. Through international free trade

agreements, our community assistance efforts will extend to some of our international trading partners, promoting ecologically compatible development abroad.

- *Ensure that national policies and programs support, rather than hinder, comprehensive, integrated management of local resources.* We will review new policies and regulations to ensure that federal programs are compatible with local efforts and promote overall environmental improvement. We will continue collaborating with other federal agencies to remove barriers and create incentives for smart growth and integrated environmental management.

Restoring Healthy Communities: Environmental Justice

EPA remains committed to environmental justice for all people, regardless of race, color, national origin, or income, in accordance with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."[43] Recognizing that minority and/or low-income communities may be disproportionately exposed to environmental hazards and risks, we will work to protect these and other affected communities. Environmental justice means not only protecting human health and the environment for everyone, but also ensuring that all people are treated fairly and are given opportunities to participate meaningfully in developing, implementing, and enforcing environmental laws, regulations, and policies.



EPA is establishing measurable environmental justice commitments for eight national priorities: reducing asthma attacks, reducing exposure to air toxics, increasing compliance with regulations, reducing incidence of elevated blood lead levels, ensuring that fish and shellfish are safe to eat, ensuring that water is safe to drink, revitalizing brownfields and contaminated sites, and using collaborative problem-solving to address environmental and public health concerns. We will promote environmental justice in all aspects of our work by training staff; providing guidance, online tools, and other resources; sharing information about successful strategies; and enhancing staff skills in working with community-based organizations. We will continue to use dispute resolution, facilitation, listening sessions, and other consensus-building techniques and to convene stakeholders to address environmental and public health issues.

Assessing and Cleaning Up Brownfields

Brownfields are real properties where expansion, redevelopment, or reuse may be complicated by the presence or potential presence of hazardous substances, pollutants, or contaminants. Assessing brownfields can help communities understand the risks these properties pose and provides the information needed to undertake cleanup and reuse. Cleaning up and reinvesting in these properties may increase local tax bases, facilitate job growth, utilize existing infrastructure, take development pressures off undeveloped land,

and improve and protect the environment. EPA will continue to award competitive grants to assess and clean up brownfields and to provide job training opportunities within affected communities.

Awards are based on a number of factors including how well the project reduces threats to human health and the environment, and creates and/or preserves greenspace. In addition, the Brownfields Revitalization Act requires us to consider "the extent to which the grant would address or facilitate the identification and reduction of threats to the health or welfare of minority or low-income communities, or other sensitive populations," underlining our commitment to environmental justice.[44] Our Brownfields Program is also developing a methodology to assess the relationship between EPA-funded brownfields projects and the sensitive, socio-economically disadvantaged communities that they serve. EPA will use this methodology to improve how the Brownfields Program incorporates environmental justice concerns into its operations.

We will continue to provide funds to state and tribal governments to establish and enhance response programs that oversee the majority of brownfields assessments and cleanups. These programs provide technical oversight and assist property owners; create inventories of brownfields sites; and develop policies, regulations, and ordinances. Funding can also be used to conduct assessment and cleanup activities at brownfields properties. EPA funding is often critical for operating these response programs, particularly for tribal governments.

We will also continue to provide outreach and technical assistance to communities confronting brownfields and perform targeted assessments at sites where stakeholders are seeking federal assistance to identify the extent of contamination. Through the Brownfields and Land Revitalization Technology Support Center,[45] we will help streamline site investigations and cleanup processes, identify technology options, evaluate contractor capabilities and recommendations, and explain complex technologies to communities. Technical tools such as Triad[46] and SMARTe[47] can aid communities' brownfields efforts. EPA will continue to sponsor brownfields workshops and educational events that provide forums for sharing ideas, lessons learned, and best practices.

Reducing Transboundary Threats Along the U.S.-Mexico Border

The U.S.-Mexico Border 2012 Program, a joint effort between the governments of the United States and Mexico, works with the 10 border states and border communities to reduce transboundary threats to improve the region's environmental and ecosystem health.[48]

As part of our continuing commitment to environmental justice, EPA is working with some disadvantaged border communities to improve water quality in both the United States and Mexico. For decades, raw sewage posed a significant public health and environmental threat to U.S. and Mexican communities. Inadequate water and sewage treatment cause border residents to suffer disproportionately from hepatitis A and other waterborne diseases. EPA assists communities in the U.S.-Mexico border region to increase the number of homes with access to safe

drinking water and basic sanitation. As this infrastructure comes on line, discharges of raw sewage will be reduced and surface water quality will improve. Restoration of surface water quality on 10 impaired transboundary waters is an EPA priority.

EPA also will address health and environmental risks presented by abandoned tires and hazardous waste. Piles of waste tires breed mosquitoes and other disease-carrying organisms, and they are prone to fires that are difficult to extinguish. Contaminated hazardous waste sites pose acute and long-term risks from metal poisoning. We will address key sites on the border, laying the foundation for future remediation efforts.

To learn more, go to: www.epa.gov/owm/mab/mexican.

Restoring Island Communities

The U.S. Pacific Island Territories of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam face severe environmental problems. Poor wastewater conveyance and treatment systems that contaminate drinking water wells and surface waters pose an immediate danger to residents. Island beaches, with important recreational, economic, and cultural significance, are polluted and frequently placed under advisories.

EPA is targeting infrastructure and nonpoint source grants toward the most serious deficiencies. We are providing technical assistance to improve island utilities' capacity for protecting public health and the environment. With island and federal partners, we will continue to develop a Territories Bond Bank that will provide access to more affordable financing, greatly enhancing the islands' ability to fund critical capital improvement projects.

Protecting Arctic Indigenous Communities

POPs transported in the atmosphere and deposited across borders pose a continuing threat to human health and the ecosystems in North America, especially the Arctic. Traditional foods expose indigenous Arctic populations, including those in Alaska, to higher levels of POPs than other populations. Addressing international sources can reduce POP levels in the Arctic, and the United States is a strong supporter of the Stockholm Convention on Persistent Organic Pollutants, a global treaty to reduce POPs which EPA helps to implement.[49]

The Arctic Monitoring and Assessment Program, which documents indigenous populations' exposure to toxics in remote areas, indicates that Russia and China are among the largest sources of POPs and other pollutants in the Arctic.[50] We will work with Russia and other Arctic Council members to reduce these pollutants and to collect, safely store, and dispose of stockpiles of obsolete pesticides. Based on EPA-led Arctic Council projects, we estimate that about 24,000 metric tons of POP pesticides will be removed from unsafe storage and destroyed by 2008,[51] and about 12,000 metric tons of PCB oil will be destroyed by 2009.[52] We will continue working to raise awareness about POPs, build capacity to prevent pollution, and share technologies to protect indigenous Arctic communities.

OBJECTIVE 4.3: RESTORE AND PROTECT CRITICAL ECOSYSTEMS

PROTECT, SUSTAIN, AND RESTORE THE HEALTH OF CRITICAL NATURAL HABITATS AND ECOSYSTEMS.

Sub-objective 4.3.1: Increase Wetlands. By 2011, working with partners, achieve a net increase in wetlands acres with additional focus on assessment of wetland condition.

Strategic Targets

- By 2011, working with partners, achieve a net increase of 100,000 acres of wetlands per year with additional focus on biological and functional measures and assessment of wetland condition. (2004 baseline: 32,000 acres annual net wetland gain.)[53]
- By 2011, in partnership with the U.S. Army Corps of Engineers, states, and tribes, achieve "no net loss" of wetlands each year under the Clean Water Act Section 404 regulatory program, beginning in 2007. (Baseline: New baseline to be determined in 2008.)

Sub-objective 4.3.2: Facilitate the Ecosystem-Scale Restoration of Estuaries of National Significance. By 2011, working with partners, protect or restore an additional (i.e., measuring from 2007 forward) 250,000 acres of habitat within the study areas for the 28 estuaries that are part of the National Estuary Program. (2005 baseline: 449,242 acres of habitat protected or restored, cumulative from 2002.)

Sub-objective 4.3.3: Improve the Health of the Great Lakes. By 2011, prevent water pollution and protect aquatic systems so that the overall ecosystem health of the Great Lakes is at least 23 points on a 40-point scale. (2005 baseline: Great Lakes rating of 21.5 on the 40-point scale where the rating uses selected Great Lakes State of the Lakes Ecosystem indicators based on a 1 to 5 rating system for each indicator, where 1 is poor and 5 is good.)[54]

CRITICAL ECOSYSTEMS

- Wetlands
- Estuaries
- Great Lakes
- Chesapeake Bay
- Gulf of Mexico
- Long Island Sound
- South Florida Ecosystem
- Puget Sound Basin
- Columbia River Basin

Strategic Targets:

- Through 2011, maintain or improve an average annual 5 percent decline for the long-term trend in average concentrations of PCBs in whole lake trout and walleye samples. (1990 baseline: Concentration levels at stations in Lakes Superior [0.45 ppm], Michigan [2.72 ppm], Huron [1.5 ppm], Erie [1.35 ppm] and Ontario [2.18 ppm].)[55]
- Through 2011, maintain or improve an average 7 percent annual decline for the long-term trend in average concentrations of toxic chemicals (PCBs) in the air in the Great Lakes Basin. (1992 baseline: Concentration levels for U.S. stations: Lake Superior [100 pg/m3], Lake Michigan [289 pg/m^3], and Lake Erie [431 pg/m^3].)[56]

- By 2010, restore and delist a cumulative total of at least 8 Areas of Concern within the Great Lakes Basin (2005 baseline: 0 Areas of Concern de-listed as of 2005 of the 31 total Areas of Concern.)[57]
- By 2011, remediate a cumulative total of 7 million yards^3 of contaminated sediment in the Great Lakes. (2005 baseline: Of the 75 million yards estimated to need remediation, 3.7 million yards^3 of contaminated sediments from the Great Lakes have been remediated from 1997 through 2004.)[58]

Sub-objective 4.3.4: Improve the Health of the Chesapeake Bay Ecosystem. By 2011, prevent water pollution and protect aquatic systems so that the overall aquatic system health of the Chesapeake Bay is improved.

Strategic Targets

- By 2011, achieve 45 percent (83,250 acres) of the 185,000 acres of submerged aquatic vegetation necessary to achieve Chesapeake Bay water quality standards. (2005 baseline: 39 percent [72,935 acres] of submerged aquatic vegetation necessary to achieve Chesapeake Bay water quality standards.)[59]
- By 2011, achieve 40 percent (29.92 km^3) of the long-term restoration goal of 100 percent attainment of the dissolved oxygen water quality standards in all tidal waters of the Bay. (2005 baseline: 34 percent [25.40 km^3] of dissolved oxygen goal achieved.)[60]
- By 2011, achieve 59 percent (95.88 million pounds) of the implementation goal for nitrogen reduction practices necessary to achieve Chesapeake Bay water quality standards, expressed as nitrogen reduction in relation to achieving a 162.5 million pound reduction from 1985 levels (based on long-term average hydrology simulations). (2005 baseline: 41 percent nitrogen goal achieved.)[61]
- By 2011, achieve 74 percent (10.63 million pounds) of the implementation goal for phosphorus reduction practices necessary to achieve Chesapeake Bay water quality standards, expressed as phosphorus reduction in relation to achieving a 14.36 million pound reduction from 1985 levels (based on long-term average hydrology simulations). (2005 baseline: 58 percent of phosphorus goal achieved.)[62]
- By 2011, achieve 74 percent (1.25 million tons) of the implementation goal for sediment reduction practices necessary to achieve Chesapeake Bay water quality standards, expressed as sediment reduction in relation to achieving a 1.69 million ton reduction from 1985 levels (based on long-term average hydrology simulations). (2005 baseline: 54 percent of sediment goal achieved.)[63]

Photo: National Oceanic and Atmospheric Administration/ Department of Commerce

Sub-objective 4.3.5: Improve the Health of the Gulf of Mexico. By 2011, the overall health of coastal waters of the Gulf of Mexico will be improved from 2.4 to 2.6 on the "good/fair/poor" scale of the National Coastal Condition Report. (2004 baseline: Gulf Coast rating of fair, or 2.4, is based on a scale where 1 is poor and 5 is good.)

Strategic Targets

- By 2011, restore water and habitat quality to meet water quality standards in 162 impaired segments (cumulative) in 13 priority coastal areas (2002 baseline: 812 impaired segments identified in Section 303(d) listings.)[64]
- By 2011, restore, enhance, or protect a cumulative 20,000 acres of important coastal and marine habitats. (2005 baseline: 16,000 acres restored, enhanced, or protected; Gulf of Mexico coastal wetland habitats include 3,769,370 acres.)[65]
- By 2015, reduce releases of nutrients throughout the Mississippi River Basin to reduce the size of the hypoxic zone in the Gulf of Mexico to less than 5,000 km^2, as measured by the 5-year running average of the size of the zone. (Baseline: 2002-2006 running average size = 14,944 km^2.)[66]

Sub-objective 4.3.6: Restore and Protect Long Island Sound. By 2011, prevent water pollution, improve water quality, protect aquatic systems, and restore the habitat of Long Island Sound by working through the Long Island Sound Management Study Conference partnership.

Strategic Targets

- By 2014, reduce point source nitrogen discharges to Long Island Sound by 58.5 percent as measured by the Long Island Sound Nitrogen Total Maximum Daily Load (TMDL). (TMDL 2000 baseline: 213,151 lbs/day; 2014 goal: 85,238 lbs/day.)[67]
- By 2011, reduce the size of hypoxic area in Long Island Sound (i.e., defined as the area in which the long-term average maximum July-September dissolved oxygen level is <3mg/l) by 25 percent; reduce average duration of maximum hypoxic event by 25 percent. (2005 baseline derived from 19-year averages as of December 2005;[68] size: 203 mi^2; duration: 58 days.)
- By 2011, restore or protect an additional 300 acres of coastal habitat, including tidal wetlands, dunes, riparian buffers, and freshwater wetlands from the 2005 baseline. (2005 cumulative baseline: 562 acres restored and 150 acres protected.)[69]
- By 2011, reopen an additional 50 miles of river and stream corridor to anadromous fish passage from the 2005 baseline through removal of dams and barriers or installation of by-pass structures such as fishways. (2005 cumulative baseline: 81 miles reopened.)[70]

Photo: National Oceanic and Atmospheric Administration/ Department of Commerce

Sub-objective 4.3.7: Restore and Protect the South Florida Ecosystem. Protect and maintain the South Florida ecosystem, including the Everglades and coral reef ecosystems.

Strategic Targets

- By 2011, achieve "no net loss" of stony coral cover (mean percent stony coral cover) in the Florida Keys National Marine Sanctuary (FKNMS) and in the coastal waters of Dade, Broward, and Palm Beach Counties, Florida, working with all stakeholders (federal, state, regional, and local). (2005 baseline: Mean percent stony coral cover 6.7 percent in FKNMS and 5.9 percent in Southeast Florida.)[71]

- Through 2011, beginning in 2008, annually maintain the overall health and functionality of sea grass beds in the FKNMS as measured by the long-term sea grass monitoring project that addresses composition and abundance, productivity, and nutrient availability. (The 2005 baseline index of sea grass health will be available in December 2006.)[72]
- Through 2011, beginning in 2008, annually maintain the overall water quality of the near shore and coastal waters of the FKNMS. (2005 baseline: For reef sites, chlorophyll less than or equal to 0.2 µg/l and vertical attenuation coefficient for downward irradiance [k_d, i.e., light attenuation] less than or equal to 0.13 per meter; for all sites in FKNMS, dissolved inorganic nitrogen less than or equal to 0.75 micromolar and total phosphorus less than or equal to 0.2 micromolar.)[73]
- Through 2011, beginning in 2008, improve the water quality of the Everglades ecosystem as measured by total phosphorus, including meeting the 10 parts per billion (ppb) total phosphorus criterion throughout the Everglades Protection Area marsh and the effluent limits to be established for discharges from storm water treatment areas. (2005 baseline: Average annual geometric mean phosphorus concentrations were 5 ppb in the Everglades National Park, 10 ppb in Water Conservation 3A, 13 ppb in the Loxahatchee National Wildlife Refuge, and 18 ppb in Water Conservation Area 2A; annual average flow- weighted total phosphorus discharges from storm water treatment areas ranged from 13 ppb for area 3/4 and 98 ppb for area 1W.)[74]

Sub-objective 4.3.8: Restore and Protect the Puget Sound Basin. By 2011, improve water quality, air quality, and minimize the adverse impacts of rapid development in the Puget Sound Basin.

Strategic Targets

- By 2011, improve water quality and enable the lifting of harvest restrictions in 1,000 acres of shellfish

bed growing areas impacted by degraded or declining water quality. (Baseline: As of January 2006, approximately 30,000 acres of shellfish bed growing areas had harvest restrictions due to water quality impairments in Puget Sound.)[75]

- By 2011, remediate 200 acres of prioritized contaminated sediments. (Baseline: As of January 2006, approximately 5,000 acres of remaining contaminated sediments required some level of remediation.)[76]
- By 2011, restore 3,500 acres of tidally- and seasonally-influenced estuarine wetlands. (Baseline: A total of approximately 45,000 acres of intertidal and near-shore habitat were identified by state, tribal, and local groups as potential restoration sites in the 2006 Puget Sound Near-Shore Restoration Site Inventory Database.)[77]
- By 2011, reduce total diesel emissions in the Puget Sound airshed by 8 percent through coordinated diesel emission mitigation efforts. (Baseline will be available in December 2006.)[78]

Sub-objective 4.3.9: Restore and Protect the Columbia River Basin. By 2011, prevent water pollution and improve and protect water quality and ecosystems in the Columbia River Basin to reduce risks to human health and the environment.

Strategic Targets

- By 2011, protect, enhance, or restore 13,000 acres of wetland habitat and 3,000 acres of upland habitat in the Lower Columbia River watershed. (2005 baseline: 96,770 acres of wetland and upland habitat available for protection, enhancement, or restoration.)

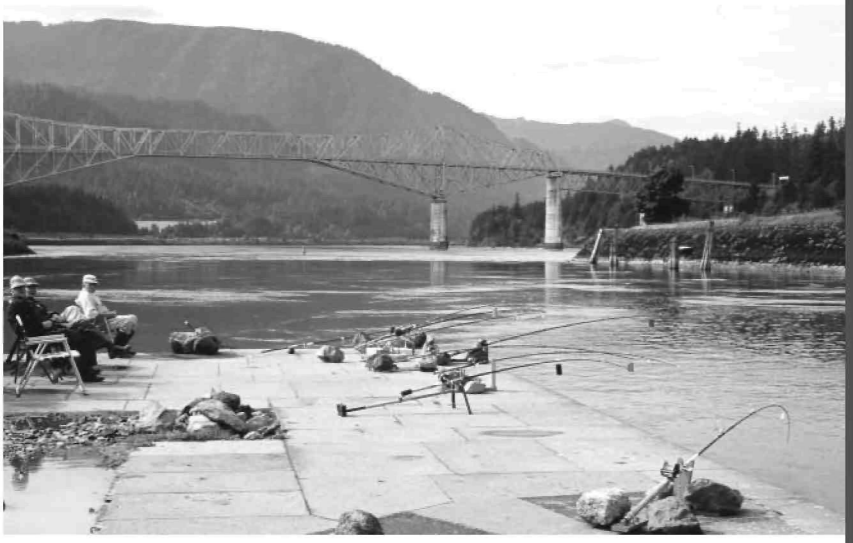


Photo: National Oceanic and Atmospheric Administration/ Department of Commerce

- By 2011, clean up 150 acres of known highly contaminated sediments. (Baseline: 400 acres of known highly contaminated sediments in the main-stem of the Columbia River and Lower Willamette River as of 2006.)
- By 2011, demonstrate a 10 percent reduction in mean concentration of contaminants of concern found in water and fish tissue. (Chemical-specific baselines will be available in 2006.)[79]

Means and Strategies for Restoring and Protecting Ecosystems

EPA protects, sustains, and restores the health of natural habitats and ecosystems by identifying and evaluating problem areas, developing tools, and improving community capacity to address problems. Over the next 5 years, we will target wetlands, estuaries, and high-priority areas such as the Great Lakes, Chesapeake Bay, Gulf of Mexico, Long Island Sound, South Florida ecosystem, Puget Sound Basin, and Columbia River. Our place-based ecosystem protection strategies focus on critical watersheds to develop and implement water quality control practices and design other tools for managing ecosystems that can be transferred to other areas nationwide.

Increasing Wetlands

Healthy wetlands protect water quality, provide habitat for fish and wildlife, store floodwater, and reduce the erosive potential of surface water. However, since the 1700s, the United States has lost more than 115 million acres of wetlands to development, agriculture, and other uses.[80] Excessive sedimentation, nutrient over-enrichment, pesticides, invasive species, habitat loss, and fragmentation are degrading wetlands.[81] And many of the wetlands we have created, while beneficial, fail to fully replace the diverse plant and animal communities of wetlands lost. To help address this issue, EPA and the U.S. Army Corps of Engineers (the Corps) jointly proposed a rule in 2006 that sets clear criteria for compensatory mitigation of wetland impacts authorized by Clean Water Act permits.

EPA is also cooperating and collaborating with federal, state, and tribal governments and other stakeholders to achieve the President's goal, set in 2004, to restore, improve, and protect 3 million acres of wetlands by 2009.[82] (Progress under the President's Initiative is reported annually in a report by the Council on Environmental Quality, *"Conserving America's Wetlands: Implementing the President's Goal."*)[83] Key EPA programs supporting this effort include the Five Star Restoration Challenge Grants, the National Estuary Program, and the Nonpoint Source Management Program.

Additionally, EPA works with the Corps to ensure "no net loss" of wetlands under Section 404 of the Clean Water Act. A key area of cooperation is applying the 404(b)(1) guidelines requiring that discharges of dredged or fill material into U.S. waters be avoided and minimized to the extent practicable and that unavoidable impacts be fully compensated. EPA will continue collaborating with the Corps to develop a set of science-based standards for all types of mitigation that compensate for wetland and other aquatic resource destruction.[84] We will also work with the Corps to enhance data collection; track Section 404 permitted projects and associated compensatory mitigation; and provide this information to federal, state, and tribal agencies and the public.

EPA will continue to build state and tribal capacity to measure wetland function and condition. Broad-based, integrated monitoring and assessment programs inform decision makers, target restoration activities, and help us address significant stressors. Through Wetland Program development grants, EPA provides technical and financial support to strengthen state and tribal regulation, monitoring, restoration, water quality standards, mitigation compliance, and partnership-building. Programs such as the Five Star Restoration Challenge Grant Program,[85] regional geographic initiatives,[86] targeted watershed grants,[87] the National Estuary Program, and nonpoint source grants[88] provide funding, technical support, and information to help communities implement riparian, coastal, and wetland restoration projects. We are also integrating wetlands protection into our Clean Water and Brownfields Programs.

To learn more go to: www.epa.gov/owow/wetlands.

Restoring Estuaries

Estuaries are among the most biologically productive ecosystems on earth, providing numerous ecological, economic, cultural, and aesthetic benefits and services. They are also among the most threatened ecosystems, largely as a result of rapid growth and development.[89] Estuaries tend to accumulate sediments, nutrients, and other pollutants from adjacent and upstream land-based sources, profoundly affecting water quality, habitats, living resources, and human health. Overuse of natural resources and conflicts among recreational and commercial users have also resulted in a host of challenges to estuarine resources.

EPA's National Estuary Program (NEP) provides inclusive, community-based planning and action in 28 nationally significant estuaries selected by Congress and the states' governors. EPA will support and monitor all 28 NEPs in implementing approved comprehensive conservation and management plans, which identify more than 2,000 priority actions needed to protect the estuaries and restore estuarine resources. In addition, we support broad priorities identified by the NEP: developing approaches to identify and rank priority habitats; providing tools to integrate local and regional plans for growth with stormwater management; supporting development of TMDLs for coastal waters; developing and implementing nutrient management strategies, including development of nutrient water quality criteria; addressing problems of invasive species; and reducing wet weather runoff from urban and agricultural areas.

Healthy estuarine ecosystems also depend on high-quality habitat. Through interagency partnerships with federal resource agencies, such as the Estuary Habitat Restoration Council and Coastal America, we will help to protect habitat on an ecosystem-wide basis.

Estuaries in the National Estuary Program

- Albemarle-Pamlico Sounds, NC
- Barataria-Terrebonne, LA
- Barnegat Bay, NJ
- Buzzards Bay, MA
- Casco Bay, ME
- Charlotte Harbor, FL
- Coastal Bend Bays and Estuaries, TX
- Lower Columbia River, OR/WA
- Delaware Estuary, DE/NJ
- Delaware Inland Bays, DE
- Galveston Bay, TX
- Indian River Lagoon, FL
- Long Island Sound, NY/CT
- Maryland Coastal Bays, MD
- Massachusetts Bay, MA
- Mobile Bay, AL
- Morro Bay, CA
- Narragansett Bay, RI
- New Hampshire Estuaries, NH
- New York/New Jersey Harbor, NY/NJ
- Peconic Bay, NY
- Puget Sound, WA
- San Francisco Bay, CA
- San Juan Bay, PR
- Santa Monica Bay, CA
- Sarasota Bay, FL
- Tampa Bay, FL
- Tillamook Bay, OR

To learn more go to: www.epa.gov/owow/estuaries.

Great Lakes

The Great Lakes are the largest system of surface freshwater on earth, containing 20 percent of the world's surface freshwater and accounting for about 84 percent of the surface freshwater in North America. The watershed includes 2 nations, 8 American states, a Canadian province, more than 40 tribes, and more than 1/10th of the U.S. population.

While certain persistent toxic substances (PTS) have been reduced significantly in the Great Lakes Basin ecosystem over the past 30 years, they continue to be present at levels that threaten human and wildlife health, warrant fish consumption advisories in all 5 lakes, and disrupt a way of

life for many in the Basin.[90] To address such problems, the President established two major Great Lakes efforts: a "Great Lakes Interagency Task Force"[91] and a Great Lakes "Regional Collaboration of National Significance" (GLRC).[92] The Great Lakes Task Force brings together 10 Cabinet department and federal agency heads to coordinate restoration of the Great Lakes, focusing on outcomes, such as cleaner water and sustainable fisheries, and targeting measurable results. In December 2005, the GLRC developed a Great Lakes Regional Collaboration Strategy[93] that federal agencies are using to guide their Great Lakes efforts. For its part, EPA is coordinating responses to new aquatic invasive species; developing a system for tracking progress toward GLRC goals; developing policy on managing peak flows at sewage treatment plants; conducting surveillance for emerging chemicals of concern; and implementing the Great Lakes Legacy Act.

The Great Lakes Legacy Act targets additional resources to clean up contaminated sediments, a significant source of PTS. Work conducted under the Legacy Act to reduce and eliminate PTS also supports the Great Lakes Binational Toxics Strategy. This international effort applies voluntary and regulatory pollution prevention tools to mercury, PCBs, dioxins/furans, certain canceled pesticides, and other targeted substances. Both the Legacy Act and the Great Lakes Binational Toxics Strategy support EPA's work with states to delist all 31 of the remaining Areas of Concern by 2025.

To learn more go to: www.epa.gov/greatlakes.

Chesapeake Bay

EPA's Chesapeake Bay work is based on a unique regional partnership formed to direct and conduct restoration of the Bay and its tidal tributaries. Partners include Maryland; Virginia; Pennsylvania; Delaware; New York; West Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; EPA, which represents the federal government; and participating citizen advisory groups. Chesapeake 2000, a comprehensive and far-reaching agreement, guides restoration and protection efforts through 2010, and focuses on improving water quality.[95] Our challenge is to reduce pollution and restore aquatic habitat to the extent that the Bay's waters can be removed from the Clean Water Act "impaired waters" list.

We will work with our partners to improve two key measures of Bay water quality: restoring submerged aquatic vegetation (SAV) and attaining the dissolved oxygen (DO) standards in the Bay's tidal waters. The Chesapeake Bay Program's long-term goal for SAV restoration is 185,000 acres and long-term goal for DO restoration is 100 percent attainment of DO standards in all tidal waters of the Bay. To achieve these long-term goals, Bay watershed models estimate that long-term annual nitrogen loadings must be reduced by 162.5 million pounds, phosphorus reduced by 14.36 million pounds, and sediment reduced by 1.69 million tons per year from 1985 levels.[96]

To achieve water quality standards in the Chesapeake Bay as soon as possible, EPA is committed to increasing the current pace of restoration. Working with our Bay Program partners, we will identify opportunities to reduce nutrient and sediment loads and find new economies and innovations to accelerate progress dramatically. A key strategy to reduce nutrient discharges is implementing advanced wastewater treatment. Another key strategy to reduce nitrogen, phosphorus, and sediment loadings is restoring and protecting riparian forests that prevent sediment and nutrient pollution from entering waterways from the land. Implementing best agricultural management practices to reduce nutrients and sediment is also key to achieving Chesapeake Bay goals, and will require close cooperation with U.S. Department of Agriculture. We will continue to work with other federal agencies and states on related initiatives to protect and restore critical Bay watershed habitat and improve fisheries management.

To learn more go to: www.epa.gov/region3/chesapeake.

Gulf of Mexico

The Gulf of Mexico's estuaries and near coastal waters support fisheries and wildlife habitats that contribute to the national and Gulf state economies. However, population growth, land development, and coastal and commercial activities are threatening the sustainability of the Gulf's marine resources. Hurricanes Katrina and Rita also wrought widespread environmental harm in 2005.

EPA's Gulf of Mexico Program[97] helps Gulf states and stakeholders work in partnership to develop a regional, ecosystem-based framework for restoring and protecting the Gulf. The 5 Gulf states have also formed a Gulf of Mexico Alliance[98] to increase collaboration, and 13 federal agencies have organized a regional partnership[99] to support the alliance.

REDUCING THE GULF HYPOXIC ZONE

Although nutrients, such as nitrogen and phosphorous, are essential for healthy marine and freshwater environments, an overabundance can trigger excessive algal growth. In the near-shore Gulf of Mexico, excessive algal growth is decreasing dissolved oxygen in the bottom water, causing a corresponding loss of aquatic habitat. This "hypoxic zone" is the largest area of hypoxia in U.S. waters that is associated with human activities.

EPA is working to reduce the hypoxic zone in the Gulf of Mexico through:

- Multi-year funding strategies that will enable states to implement measures to reduce nutrients.
- Collaborative monitoring and assessment to measure the performance of nitrogen reduction efforts.
- Updating information, in partnership with USGS and sub-basin committees, on flow, nutrient concentrations, and loadings at the mouths of each major sub-basin.
- Modeling of the hypoxic zone.
- Cooperatively implementing industry-led nonpoint source nutrient reduction strategies.
- Re-assessing nutrient load reductions achieved and the response of the hypoxic zone; water quality throughout the basin; and economic and social effects of Gulf of Mexico hypoxia.

We are also working with other partners on a national hypoxia task force to carry out key actions outlined in the Action Plan for Reducing, Mitigating, and Controlling Hypoxia in the Northern Gulf of Mexico, with the goal of reducing the size of the hypoxic zone from about 14,000 km^2 to less than 5,000 km^2 by 2015.

(Mississippi River/Gulf of Mexico Watershed Nutrient Task Force. 2001. *Action Plan for Reducing, Mitigating, and Controlling Hypoxia in the Northern Gulf of Mexico.* Washington, DC. Available on the internet at: www.epa.gov/msbasin/taskforce/pdf/actionplan.pdf. See also Mississippi River Basin and Gulf of Mexico Hypoxia Task Force internet site: www.epa.gov/msbasin/taskforce/index.htm.)

In 2006, the Gulf of Mexico Alliance developed the Governors' Action Plan for Healthy and Resilient Coasts[100] that identifies five key priority coastal and ocean issues that are regionally significant and can be effectively addressed through cooperation at the local, state, and federal levels: (1) water quality for healthy beaches and shellfish beds, (2) wetland and coastal conservation and restoration, (3) identification and characterization of Gulf habitats for management decision making, (4) reductions in nutrient loadings, and (5) strategic environmental education across the five-state region.

To learn more go to: www.epa.gov/gmpo.

Long Island Sound

EPA is working with the States of New York and Connecticut and other federal, state, and local Long Island Sound Management Conference partners to implement a comprehensive conservation and management plan (CCMP) to restore the Long Island Sound.[101] Since levels of dissolved oxygen are critical to the health of aquatic life and viable public use of the Sound, the CCMP focuses on controlling nitrogen discharges to meet applicable water quality standards.

A bi-state nitrogen reduction agreement relies on flexible and innovative approaches, notably "bubble" management zones and exchange ratios that allow sewage treatment plant operators to "trade" nitrogen reduction obligations with each other. This approach meets water quality improvement goals while allowing plant operators to save an estimated $800 million by allocating reductions to those plants where they can be achieved most economically.[102]

We are also working with Management Conference partners to restore degraded habitats; reopen rivers and streams to anadromous fish passage; improve riparian buffers; restore SAV in key embayments; reduce the impact of toxic substances, pathogens, and floatable debris on the ecology; and promote environmental education, management, and stewardship throughout the watershed.[103]

To learn more go to: www.epa.gov/region01/eco/lis.

South Florida Ecosystem

The South Florida ecosystem encompasses 3 national parks, more than 10 national wildlife refuges, a national preserve, and a national marine sanctuary. It is home to two Native American nations and it supports the largest wilderness area east of the Mississippi River, the only living coral barrier reef adjacent to the United States, and the largest commercial and sport fisheries in Florida. But rapid population growth is threatening the health of this vital ecosystem. South Florida is home to about 8 million people, more than the populations of 39 individual states. Another 2 million people are expected to settle in the area over the next 10 to 20 years. Fifty percent of the region's wetlands have been lost to suburban and agricultural development, and the altered hydrology and water management throughout the region have had a major impact on the ecosystem.

EPA is working in partnership with several local, regional, state, and federal agencies to ensure the long-term sustainability of the region's varied natural resources, while also providing for extensive agricultural operations and an expanding population. EPA's South Florida Geographic Initiative (SFGI) is designed to protect and restore communities and ecosystems affected by environmental problems.[104] SFGI efforts include activities related to the Section 404 wetlands protection program; the comprehensive Everglades Restoration Program; the water quality protection program for the Florida Keys National Marine Sanctuary; the Southeast Florida Coral Reef Initiative, directed by the U.S. Coral Reef Task Force; the Brownfields Program; and a number of other waste management programs.

EPA will continue to implement the South Florida Assessment Project, an ecosystem assessment of the Everglades, and to work with stakeholders to develop and implement community-based approaches to mitigate sources of pollution and cumulative risk.

To learn more go to: www.epa.gov/region4/water/southflorida.

Puget Sound Basin

The Puget Sound Basin is the largest population and commercial center in the Pacific Northwest, supporting a vital system of international ports, transportation systems, and defense installations. The ecosystem encompasses roughly 20 rivers and 2,500 miles of sheltered inland waters that provide habitat to hundreds of species of marine mammals, fish, and sea birds. Puget Sound salmon landings average more than 19 million pounds per year and support an average of 578,000 sport fishing trips each year. However, while the Puget Sound currently leads U.S. waterways in shellfish production, 30,000 acres of shellfish beds have been closed to harvest since 1980. These closures affect local economies and cultural and subsistence needs for these traditional resources.

Excess nutrients have created hypoxic zones that further impair shellfish and finfish populations. In addition, recent monitoring assessments indicate that marine species in the Puget Sound have high levels of toxic contamination. Almost 5,700 acres of submerged land (about 9 mi^2) are currently classified as contaminated with toxics and another 24,000 acres as at least partially contaminated. And additional pollutants are being released: approximately 1 million pounds of toxics are released into the water and 5 million pounds into the air each year, with many pollutants finding their way into Puget Sound.

To address these issues, EPA is working with other federal agencies, states, and tribes to protect local watersheds and near-shore habitat; to protect shellfish-growing areas; to reduce nutrient and toxic discharges; and to develop more comprehensive storm water management programs. We are taking action to reduce short- and long-term discharges of toxics through diesel emissions, which are a major source of pollutants into the Sound. An essential component of our strategy for protecting Puget Sound will be addressing contaminated estuary bottom sediments while developing more effective source control strategies. Working with our state and other NEP partners, we are also initiating a comprehensive toxics source control strategy, and we expect to have an expanded toxics source control action agenda in place by 2008.

To learn more go to: www.epa.gov/pugetsound.

Columbia River Basin

More than 1,200 miles long, the Columbia River spans portions of Oregon, Washington, Idaho, Wyoming, Nevada, Utah, Montana, and a substantial portion of British Columbia. The 260,000 square mile Columbia River Basin comprises ecosystems that are home to a variety of biologically significant plants and animals and supports industries vital to the Pacific Northwest, including sport and commercial fisheries, agriculture, transportation, recreation, and electrical power generation.

Columbia River salmon and steelhead runs—once the largest on earth—are now a fraction of their original size. EPA studies and state monitoring programs have found significant levels of toxins in fish and the waters they inhabit, including dichloro-diphenyl-trichloroethane (DDT), PCBs, and dieldrin.[105] To address this problem, we will continue working with Oregon, Washington, Idaho, Columbia Basin tribal governments, the Lower Columbia River Estuary Partnership, local governments, citizen groups, industry, and other federal agencies. Together we have launched the Columbia River toxics strategy to identify and clean up contaminated sediments; restore critical wetlands; and reduce toxins in water, land, and fish. Within available resources, EPA, states, and tribes are systematically expanding such

key activities as fish, water, and sediment monitoring; pesticide stewardship partnerships; targeted pesticide/toxics collections; and precision agriculture. We are implementing TMDLs by reducing sediment loads and restoring riparian areas, and we are cleaning up the Portland Harbor Superfund site and PCB contamination in the Columbia River at Bradford Island.

The NEP also plays a key role in addressing toxics and restoring critical wetlands in the Lower Columbia River estuary. Through the NEP, we will identify contaminants of concern, identify data bases that can provide baseline data and establish new monitoring efforts to fill data gaps, and identify and implement best management practices for reducing contaminants of concern.

To learn more go to: www.epa.gov/Region10/columbia.

OBJECTIVE 4.4: ENHANCE SCIENCE AND RESEARCH

THROUGH 2011, IDENTIFY AND SYNTHESIZE THE BEST AVAILABLE SCIENTIFIC INFORMATION, MODELS, METHODS, AND ANALYSES TO SUPPORT AGENCY GUIDANCE AND POLICY DECISIONS RELATED TO THE HEALTH OF PEOPLE, COMMUNITIES, AND ECOSYSTEMS. FOCUS RESEARCH ON PESTICIDES AND CHEMICAL TOXICOLOGY; GLOBAL CHANGE; AND COMPREHENSIVE, CROSS-CUTTING STUDIES OF HUMAN, COMMUNITY, AND ECOSYSTEM HEALTH.

MEANS AND STRATEGIES FOR ENHANCING SCIENCE AND RESEARCH

To help us understand environmental problems and support innovative approaches and solutions, research must be forward-looking. EPA's research programs support our goals for protecting and restoring communities and ecosystems by developing computational toxicology, bioinformatics, and related technologies; developing environmental and human health monitoring systems and indicators, such as the emerging Global Earth Observation System of Systems (GEOSS); and improving the utility of research results by incorporating uncertainty analysis.

HUMAN HEALTH RESEARCH

The research that EPA is conducting under the Human Health Research Plan (HHRP) will enable risk assessors and risk managers to reduce their reliance on default assumptions in human health risk assessment. By addressing uncertainties in risk assessment, HHRP will support a number of environmental laws, including FQPA, SDWA, and CAA; address a variety of national environmental program research priorities; and assist risk assessors, such as those associated with the Integrated Risk Information System (IRIS) and National Ambient Air Quality Standards (NAAQS).

We are also conducting research to set priorities and screen chemicals. Methods, models, and data derived from this work will help us understand the basis for differential response to chemicals at various stages in life. EPA will focus a portion of this work on assessing differential exposure and response in children and another portion on older populations. We will also emphasize the potential long-term health effects following developmental exposure to environmental agents. Extramural sources that are jointly funded by EPA and the National Institute of Environmental Health Sciences will provide research in environmental influences on neurodevelopment, asthma, and disease. Other lines of research will help us develop principles for evaluating the effectiveness of risk management decisions at the local and regional level. We will collaborate with the Centers for Disease Control and other federal agencies to accomplish this work.

ECOLOGICAL RESEARCH

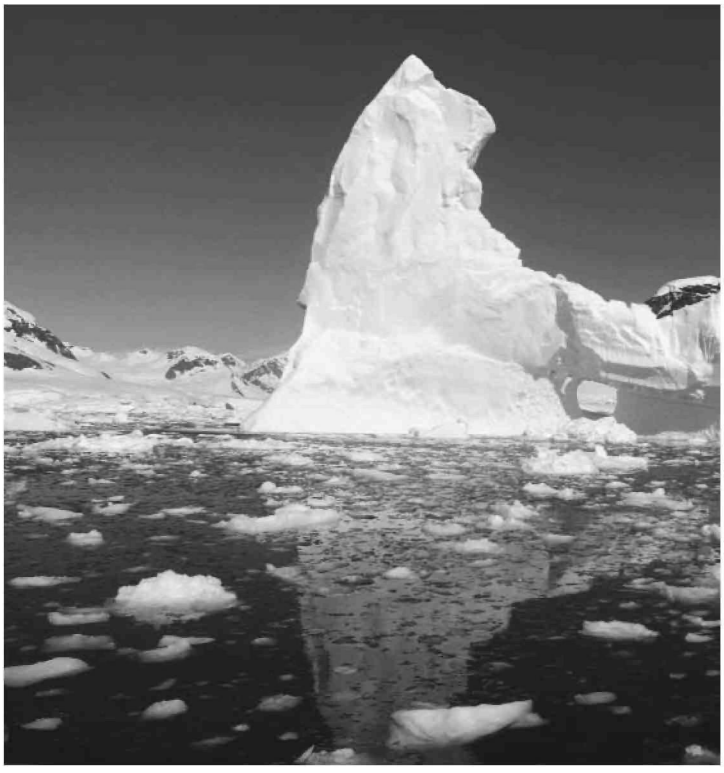
Under our Ecological Research Program, we will develop analytical tools to help evaluate the stressors that development and urban sprawl place on ecosystems and determine how we can efficiently control and reduce harmful effects. Improving our understanding of indicators of ecological condition and of the services ecosystems provide will

help us develop assessment tools for local decision makers. More states and tribes will be able to use a common monitoring design and appropriate indicators to determine the status of resources, trends, and program effectiveness. To inform our decision making, we must closely coordinate ecological research with environmental research, human health research, and public health, and these connections offer extensive opportunities for local partnerships.

Global Climate Change Research

Our Global Change Research Program primarily assesses the potential consequences of global change on air quality, water quality, ecosystems, and human health in the United States. It will provide scientific information about the impact of global change on specific geographic areas, as well as models for evaluating and implementing adaptation policies to protect air and water quality.

This research will support two goals of the U.S. Climate Change Science Program (CCSP): understanding the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes (CCSP Goal 4), and exploring the uses and identifying the limits of evolving knowledge to manage risks and opportunities related to climate variability and change (CCSP Goal 5).



Like the CCSP, EPA's Global Program is emphasizing improved decision making and adaptive management. Toward this end, we will develop a dynamic "decision inventory" that identifies different classes of climate-sensitive decisions in different regions of the country and evaluates the effectiveness of this scientific information in informing those decisions.

Endocrine Disruptors Research

Over the last several years, concern has grown about exposure to endocrine-disrupting, or hormonally active, chemicals. Evidence suggests that exposure to chemicals that mimic hormones (endocrine disruptors) may cause adverse health effects in wildlife and may affect human health as well.

Our endocrine disrupter research will reduce uncertainty about effects, exposure, assessment, and management of endocrine disrupters. It will help us to determine the impact that endocrine disruptors may have on humans, wildlife, and the environment and will encourage screening and testing assays. Research to understand the effects of endocrine disruptors has shifted from animal exposure testing to the relatively new field of computational toxicological research. In addition, our increasing ability to sequence the human genome has led to a rapid development of laboratory methods to assess gene expression on a genome-wide basis, and provided additional tools for endocrine disruptor research. Continued expansion of this field may also facilitate research into the effects of endocrine disruptors.

Human Health Risk Assessment Research

The Human Health Risk Assessment Program provides state-of-the-science health hazard assessment information on hazardous substances that are accorded high priority by EPA, state, and local risk assessors. This research will help us to improve the quality and objectivity of health assessments.

We will continue to use IRIS, the Air Quality Criteria Document (AQCD), and other assessments to support EPA's decisions. For example, we are revising AQCDs for ambient air pollutants (as mandated in the Clean Air Act) to reflect the best available scientific information on the effects on health and the environment from exposure to these pollutants, and we will incorporate this information in reviewing and promulgating NAAQS. We are working to produce more assessment information and to enhance its quality by incorporating the latest advances in risk assessment science. These activities are coordinated across EPA research and program offices through the IRIS consensus review, the Risk Assessment Forum, and other processes.

Computational Toxicology Research

Computational toxicology integrates modern computing and information technologies with molecular biology and chemistry to help set priorities for data requirements and chemical risk assessments. EPA's National Center for Computational Toxicology will generate methods, models, and data needed for better, faster, and cheaper approaches to testing chemicals and emerging technologies, such as bio- and nanotechnology. Associated research will help in assessing cumulative effects on humans from multiple exposures and in identifying and characterizing diseases resulting from changing environmental factors and factors such as pharmacological exposure. Using these tools, scientists can gain a finer understanding of the hazards and risks of a large number of chemicals. ToxCast, a forecasting tool, will provide EPA programs the ability to prioritize, screen, and assess the potential hazards of chemicals more rapidly than do current methods.

Customized DNA arrays and tools for modeling and virtual prototyping are two important research products that enable this scanning to be done efficiently and at greatly reduced expense. EPA scientists are leading this new field of environmental protection, and we will apply new capabilities gained from this research to future efforts.

Mercury Research

EPA's Mercury Research Program will provide us a better understanding of the transport and fate of mercury, from its release to its effects. The program is focusing on several key questions:

- How much of the methyl mercury in fish consumed in the United States is contributed by emissions, compared to other sources?
- How much of the mercury emissions from coal-fired utility boilers and other combustion systems can be reduced?
- What is the magnitude of mercury released from non-combustion sources?
- What risks do exposure to methyl mercury pose to wildlife species and other significant ecological receptors?
- How does exposure to environmental sources of mercury affect the health of the most susceptible human sub-populations?
- How can we most effectively inform susceptible populations about these risks?

We are also focusing research on increasing the accuracy, precision, and effectiveness of continuous emission monitors. These results will help us evaluate the effectiveness of the new Clean Air Mercury Rule. We are coordinating this research across several of EPA's programs and internationally, for example, through the United Nations Environment Program Fate and Transport Partnership.

Another high priority for the Mercury Program will be providing information to states and utilities on alternative control technologies. Researchers are also working to identify mercury deposition "hot spots" that already exist or may occur as a result of market trading of mercury emissions.

Homeland Security Research

Threat and consequence assessment research focuses on rapid evaluation of chemical, biological, and radiological risks associated with a terrorist threat or attack. This research will enable better emergency and follow-up responses by developing products for locating, collecting, and analyzing samples; protecting emergency responders, the public, and the environment; decontaminating buildings; and disposing of contaminated materials. EPA researchers will be developing and refining advisory levels for various contaminants of concern, improving risk assessment methods and communication tools, and supporting emergency and follow-up responders.

Our water infrastructure protection research will continue to focus on treatment operations; drinking water distribution systems; and, to a lesser degree, wastewater collection, treatment operations, and treated water discharge. This work involves laboratory and field testing and evaluating technologies to detect, contain, treat, and recover from intentional attacks on drinking water and wastewater facilities.

Decontamination and consequence management research will support rapid and cost-effective remediation and restoration of buildings and broad outdoor areas. This research involves laboratory and field testing and evaluation of technologies to decontaminate and dispose of materials and areas affected by intentional attacks.

We will provide the results of our homeland security research to the emergency and remedial response community, elected and appointed officials, and the general public.

Safe Pesticides and Products Research

By developing and applying the latest molecular and computational approaches, EPA's Safe Pesticides/Safe Products (SP2) Research Program will provide new tools for interpreting exposure, hazard identification, and dose-response information, strengthening our ability to develop risk assessment methods to protect birds, fish, and other wildlife. This research has become increasingly linked to advances in computational toxicology. Scientific progress in sequencing the human genome has rapidly led to laboratory methods for assessing gene expression on a genome-wide basis, which will contribute to the tools available for SP2 research.

EPA researchers will be developing methods for extrapolation among wildlife species and exposure scenarios of concern (e.g., exposure of endangered species) to advance the scientific foundation for conducting probabilistic risk assessments for wildlife populations. SP2 research will also contribute to evaluating potential ecological effects of biotechnology products, developing risk management approaches, and developing methods for assessing the potential allergenicity of genetically engineered plants.

HUMAN CAPITAL

To achieve our goals for healthy communities and ecosystems, EPA will require a workforce with a well-balanced combination of skills, experience, and expertise. We will need toxicologists with expertise in chemical testing, registration, and monitoring; biologists to evaluate the exposure impact of chemical releases on wetlands; specialized chemical engineers to reduce risks at chemical facilities; and modelers to evaluate risks of chemicals to populations and fragile ecosystems. We have also identified a gap in the number of economists, epidemiologists, human exposure modelers, and hydrologists needed to fill mission-critical scientist/researcher positions.

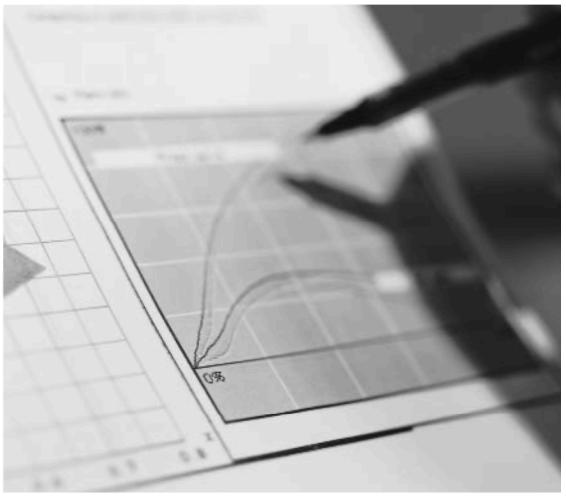
PERFORMANCE MEASUREMENT

Many of our strategic targets for protecting, sustaining, or restoring the health of people, communities, and ecosystems rely on measures or indicators of changes in the environment or human health, such as habitat and water quality conditions or blood lead levels. Collecting and analyzing these data are often expensive and time-consuming. Moreover, because changes in environmental and health conditions that result from EPA programs may not be evident for several years, it is not always practicable or useful to collect these data annually. Consequently, while these environmental and health outcome measures and data are excellent indicators of EPA's long-term performance, the Agency also uses other shorter-term measures and data to manage programs.

The Brownfields Program has developed a new strategic target for the acres of brownfields made ready for reuse. This new strategic target better represents the outcome of the Brownfields Program than the program's long-standing strategic target of brownfield properties assessed. The number of brownfield properties assessed will eventually be tracked only as an annual performance measure rather than as a strategic target.

Another new strategic target set under this goal involves human body-burden of pesticides. It embodies metrics presented as environmental indicators in EPA's forthcoming *Report on the Environment.* We have also incorporated in this *Strategic Plan* most of the long-term, outcome-oriented measures currently used in the Office of Management and Budget (OMB) Program Assessment Rating Tool (PART) assessments of various pesticide, toxics, brownfields, and geographic programs.

Measuring progress toward research goals can be challenging, not only for EPA but for science and research programs across the government. We use a number of objective measures of customer satisfaction, product impact and quality, and efficiency to assess our results. For example, we rely on expert review panel ratings on the extent to which



clients use EPA research products; surveys designed to gather data on their utility and effect, and analyses that can demonstrate actual use of EPA research products.

Improving Performance Measurement

As we considered revising and improving performance measures for this *Strategic Plan*, we also assessed longer-term opportunities for developing more results-based, outcome-oriented commitments. Under our communities and ecosystems goal, for example, we will focus collaborative research plans to better represent risks to human health and ecosystems from toxic substances and pesticides. We are working with the Board of Scientific Counselors and others to develop a means for using independent expert review to assess the success of all of our research programs. We also have identified as a priority developing a Chesapeake Bay Water Quality Index to represent the Bay's aquatic health more comprehensively.

We are also integrating environmental justice considerations under each of our *Strategic Plan* goals for the first time. In particular, we have identified eight national environmental justice priorities as deserving

of special attention.[107] While this *Strategic Plan* identifies actions and/or strategies to address these priorities, we can make further progress in developing tailored targets and measures to evaluate changes in areas with potential environmental justice concerns. Our ability to target resources and measure progress will improve as we gain experience, develop new tools, and further integrate environmental justice considerations into EPA's work. In addition to the performance measures already established, we will assess progress with respect to the following national environmental justice priorities: asthma attacks, exposure to air toxics, blood lead levels, fish and shellfish safe to eat, water safe to drink, and revitalization of brownfields and contaminated sites.

USING FEEDBACK FROM PERFORMANCE ASSESSMENTS AND PROGRAM EVALUATIONS

Programs supporting our goal of healthy communities and ecosystems are assessed in three ways: internal EPA program evaluations, including those conducted by EPA's Office of the Inspector General (OIG) and Board of Scientific Counselors (BOSC); OMB PART reviews; and external assessments by organizations such as the Government Accountability Office (GAO) and the National Academy of Sciences (NAS).

Internal Program Evaluations

The BOSC Human Health Subcommittee evaluated the Agency's Human Health Research Program's four long-term goals, which are related to the use of information in risk assessment, aggregate and cumulative risk, susceptible sub-populations, and public health outcomes. In response to BOSC recommendations, we increased

communication and collaboration among research areas, developed specific peer review goals, and articulated a decision-making process.

Several program offices are developing program-specific evaluations. For example, the Brownfields Program is reviewing headquarters and regional operations to obtain feedback on program objectives, ensure accountability, evaluate decision-making processes, and identify best practices. The review, to be completed in FY 2008, is intended to enhance program quality overall.

OIG has conducted extensive reviews of programs supporting the healthy communities and ecosystems goal. Over the past several years, OIG has:

- Assessed how well EPA has integrated environmental justice in our operations and provided recommendations for reaffirming our commitment to environmental justice and strengthening planning efforts.
- Reviewed our implementation of the Food Safety Act and provided recommendations for considering sub-populations, responding to petitions, and increasing public participation.
- Assessed implementation of the Brownfields Program and provided recommendations for managing resources and improving the grant application and selection process.

Program Assessment Rating Tool (PART)

Many of the programs supporting Goal 4 have been assessed under OMB's PART process. Summaries of all completed PART studies are available at www.whitehouse.gov/omb/expectmore/. Among the programs evaluated were:

- New Chemicals Program—rated moderately effective.
- Existing Chemicals Program—rated adequate.
- Pesticide Registration—rated adequate.
- Brownfields Revitilization—rated adequate.
- U.S.-Mexico Border Water Infrastructure—rated adequate.
- The Ecological Research Program—rated ineffective. (The program is conducting follow-up actions to address this issue.)
- Human Health Research—rated adequate.
- Endocrine Disrupting Chemicals Research—rated adequate.

External Evaluations

EPA participates with outside organizations, such as GAO and NAS, in evaluating program effectiveness and recommending improvements in program management and policies. GAO has conducted numerous evaluations of programs supporting the healthy

communities and ecosystems goal; a complete list is available at www.gao.gov/docsearch/repandtest.html. Some examples include:

- Chemical Regulation: Options Exist to Improve EPA's Ability to Assess Health Risks and Manage its Chemical Review Process (June 2005).
- Brownfield Redevelopment: Stakeholders Cite Additional Measures that Could Complement EPA's Efforts to Clean Up and Redevelop Properties (April 2005).
- Wetlands: Corps of Engineers Needs to Better Support its Decisions for Not Asserting Jurisdiction (September 2005).
- Great Lakes: Organizational Leadership and Restoration Goals Need to be Better Defined for Monitoring Restoration Progress (September 2004).
- Chesapeake Bay: Improved Strategies Are Needed to Better Assess, Report, and Manage Restoration Progress (October 2005).
- Columbia River Basin: A Multi-layered Collection of Directives and Plans Guides Federal Fish and Wildlife Activities (June 2004).

NAS has developed reports and recommendations on a range of community and ecosystem issues. For example, in 2006 NAS released "Rebuilding the Unity of Health and the Environment in Rural America" and in 2004, "Valuing Ecosystem Services: Toward Better Environmental Decision Making." EPA's risk assessment forum has also convened external reviews to evaluate programs when appropriate. The Endocrine Disruptor Chemical Research Program was evaluated in this manner.

BOSC has initiated a cycle of review for EPA's research programs and is evaluating an average of three programs each year for relevance, quality, and performance. Between 2005 and 2006, BOSC reviewed and made recommendations for improving four research plans supporting healthy community and ecosystem goals: human health, ecosystems, global climate change, and endocrine disrupting chemicals.

EMERGING ISSUES AND EXTERNAL FACTORS

Rapidly changing technologies will have significant implications for EPA's work to protect and restore communities and ecosystems. In the area of nanotechnology, for example, nanoscale materials—chemical substances containing structures on the scale of approximately 1 to 100 nanometers, or 1 to 100 billionths of a meter—will present an emerging challenge for our chemicals program. Due to their small size, nanomaterials may have different molecular properties than do other chemical substances and may present unique risks. EPA is currently reviewing pre-manufacture notices for several new nanoscale chemical substances, and we anticipate that we will soon be receiving applications to register pesticides containing nanoscale materials. (The first public inventory of nanotechnology products that have entered commercial use is available at www.nanotechproject.org/inventories).

EPA's nascent nanotechnology research program is focusing on decision support and guiding safe commercial and environmental applications. Between 2007 and 2011, our nanotechnology research will address four broad areas:

- Developing approaches to assess risk.
- Assessing risks to human health and ecosystems, particularly for applications that disperse nanomaterials.
- Assessing—from a lifecycle perspective—what impact products containing nanomaterials might have on human health and the environment and how, because of their likely durability and longer shelf life, they might conserve energy and other resources, prevent pollution, and advance sustainability.
- Identifying and developing research technologies that use nanomaterials to detect, monitor, and remediate environmental releases of conventional pollutants and nanoparticles.

We are also responding to nanotechnology with a new environmental stewardship program that will complement TSCA regulatory tools. In partnership with chemical manufacturers, processors of nanoscale materials, and other stakeholders, we will gather data to inform our risk assessment and risk reduction activities. We will use this data and information gained from strategic testing to determine whether commercial activities involving nanoscale materials present potential risks, and we will respond appropriately. EPA may also be able to provide companies with tools that will help them anticipate environmental risks and invest in safer products and production procedures.

EPA is also anticipating the use of DNA micro-arrays in environmental chemical testing. DNA micro-arrays are a type of technology that profiles the genomes of plant and animal species and uses sequences like probes to recognize substances. These technologies have the potential to change and enhance chemical testing in multiple environmental areas. EPA researchers are making significant progress in using DNA micro-arrays (gene chips) and related developments, particularly in computational toxicology.

Distributed sensor networks, another emerging technology, have the potential to enhance EPA's environmental monitoring. It is possible to envision a network of physical, chemical, and biological sensors that will

feed into a central environmental data management and analysis system, such as EPA's GEOSS. Through distributed sensor networks, we could collect and transmit data faster and more frequently, improve data quality, enhance data integration, and improve data sharing. Distributed sensor networks could also provide better environmental health information that allows us to measure progress at multiple temporal and spatial scales. This technology could support our *Report on the Environment*, advance our foresight capabilities, and provide data that accurately portrays environmental conditions on a real-time basis.

Renewable energy and fuel sources such as biofuels could have many implications for EPA. We will need to examine how producing new renewable and non-renewable forms of energy and the infrastructure for distributing and storing them might affect the environment. For example, the use of pesticides and loss of habitat that attend production of biofuels can potentially affect human health and the environment. We will also need to characterize the potential for emissions generated from producing and using biofuels.

Global climate change, loss of habitat to sprawl, exploitation of natural resources, invasive species, nonpoint source pollution, and the accumulation and interaction of these conditions represent emerging ecological challenges. Our ability to achieve our strategic objectives depends on a number of factors over which we have little or no influence. The success of partnerships, international collaboration, and efforts at global harmonization; economic influences (including increased trade and foreign investment); industrial accidents; natural disasters; litigation; and new legislation all can affect our progress in achieving our goals.

To learn more go to: www.epa.gov/ocfo/futures/perspectives.htm.

Notes:

1. For information on EPA's National Land Cover Database, see U.S. EPA, Landscape Ecology Study Areas internet site: www.epa.gov/nerlesd1/land-sci/. Las Vegas, NV: Office of Research and Development. See also U.S. Department of the Interior, Multi-Resolution Land Characteristics Consortium internet site: www.mrlc.gov/. Sioux Falls, SD: U.S. Geological Survey. Also see U.S. Department of the Interior, Earth Resources Observation and Science (EROS), Global Land Cover Characterization internet site: edcsns17.cr.usgs.gov/glcc/. U.S. Geological Survey (updated June 27, 2005). For information on EPA's Environmental Monitoring and Assessment Program, see U.S. EPA, *Environmental Monitoring and Assessment Program* (EMAP) internet site: www.epa.gov/emap/. For information on *EPA's Report on the Environment*, see U.S. EPA *Report on the Environment* internet site: www.epa.gov/indicators/index.htm. Washington, DC.
2. Measurement Mechanism: EPA risk management action tracking tools, including RAPIDS (not publicly available) and HPVIS. See U.S. EPA, High Production Volume Information System (HPVIS) internet site: http://epa.gov/hpvis/. Washington, DC: Office of Prevention, Pesticides and Toxic Substances. Once HPV challenge chemicals have been through the EPA multi-tier risk assessment process, any found to present unreasonable risks under the Toxics Substance Control Act is tracked for action, such as Significant New Use Rules (SNURs) that bind all manufacturers and processors to terms and conditions that prevent unreasonable risks, other regulatory action, guidance, referral to other Agency statutes, etc.
3. Measurement Mechanism: Number of TSCA 8(e) Chemical Hazard Notifications associated with Pre-manufacture notice (PMN)-reviewed chemicals verified to identify the occurrence of unreasonable risks. Starting in FY 2005, EPA expanded its assessment of incoming TSCA 8(e) reports, required to be submitted whenever companies learn of "substantial risks" to determine whether EPA properly identified those potential hazards/risks in previously reviewed PMNs. The results of this new assessment process enables the program to identify potential flaws in its PMN review protocols and act quickly to make associated improvements.
4. Target assumes annual 3.0% reductions for remaining years through 2011. Measurement Mechanism: EPA's Risk Screening Environmental Indicators (RSEI) model. See U.S. EPA Risk Screening Environmental Indicators (RSEI) internet site: www.epa.gov/opptintr/rsei/. Washington, DC: Office of Prevention, Pesticides and Toxic Substances.
5. Centers for Disease Control and Prevention. 2005. Blood Lead Levels-United States, 1999-2002, MMWR: 54(2): 513-516. Available online at: www.cdc.gov/mmwr/PDF/wk/mm5420.pdf.
6. Centers for Disease Control and Prevention. 1994. Update: Blood Lead Levels--United States, 1991-1994. MMWR: 43(30): 545-548. Available online at: www.cdc.gov/mmwr/preview/mmwrhtml/00032080.htm.
7. United Nations Environment Program and the Partnership for Clean Fuels and Vehicles maintain a global database on fuel quality, which is updated periodically. See United Nations, Partnership for Clean Fuels and Vehicles internet site: http://webapps01.un.org/dsd/partnerships/public/partnerships/178.html#top. New York, NY: Division for Sustainable Development, Department of Economic and Social Affairs.

8. Ibid.

9. The baseline for this strategic target is derived by totaling the vulnerability zones around individual RMP facilities. In many instances, a facility's vulnerability zone overlaps with the vulnerability zones of other facilities. Consequently, the baseline for this measure exceeds the spatial extent of vulnerable areas, but accurately reflects cumulative progress in reducing potential sources of risk.

10. This strategic target is based on the levels of several key pesticides found in people as measured by the Centers for Disease Control's bi-annual National Health and Nutrition Examination Survey (NHANES) (1999-2002). Center for Disease Control had collected these data for sufficient time to establish a meaningful baseline. The target provides an indicator of the body burden in the general population resulting from pesticide exposure. See www.cdc.gov/nchs/nhanes.htm.

11. The term "risk events" is based on the assumption that every pesticide application has the potential to create a pesticide incident with adverse health effects. The number of pesticide applications was derived by taking the universe of occupationally exposed individuals and estimating the number of pesticide applications per individual per year. Data sources: EPA's annual count of certified applicators; U.S. Department of Labor. March 2005. *Findings from the National Agricultural Workers Survey (NAWS) 2001 - 2002. A Demographic and Employment Profile of United States Farm Workers*, Research Report No. 9., Washington, DC: Office of the Assistant Secretary for Policy, Office of Programmatic Policy (available online at: www.doleta.gov/agworker/naws.cfm) and; American Association of Poison Control Centers' Toxic Exposure Surveillance System: www.aapcc.org/poison1.htm.

12. American Association of Poison Control Centers' Toxic Exposure Surveillance System: www.aapcc.org/poison1.htm.

13. USGS National Water-Quality Assessment (NAWQA) program, as reported in Gilliom, R. J., J. E. Barbash, et al. 2006. *The Quality of Our Nation's Waters: Pesticides in the Nation's Streams and Ground Water, 1992–2001*. Reston, Virginia: U.S. Geological Survey, Circular 1291: 172 p. Available online at: http://pubs.usgs.gov/circ/2005/1291/.

14. Annual Report of the Interregional Research Project No. 4 (IR-4Project) (NRSP-4/IR-4): January 1, 2005-December 31, 2005: http://ir4.rutgers.edu/Other/annreports.html.

15. EPA's estimate of annual termite structural damage avoided is derived from an estimated $2,500 average termite damage per house, 3,620,000 units receiving termite treatment, and an estimate that 10 percent of housing units would have received termite damage absent the treatment ($2,500 x 3,620,000 units = $9.05 billion x 0.1 = $9.05 million/year termite structural damage avoided.)

16. Toxic Substances Control Act Section 5: Manufacturing and Processing Notices, *Public Law* 94-469, October 11, 1976.

17. U.S. EPA, High Production Volume (HPV) Challenge Program internet site: www.epa.gov/chemrtk/. Washington, DC: Office of Prevention, Pesticides, and Toxic Substances (updated April 20, 2006).

18. U.S. EPA, High Production Volume Information System (HPVIS) internet site: www.epa.gov/hpvis/index.html. Washington, DC: Office of Prevention, Pesticides and Toxic Substances.

19. Organisation for Economic Co-operation and Development, Co-operation on the Investigation of Existing Chemicals, Description of OECD Work on Investigation of High Production Volume Chemicals internet site: www.oecd.org/document/21/0,2340,en_2649_34379_1939669_1_1_1_1,00.html. See also Global HPV Portal and existing databases internet site: www.oecd.org/document/9/0,2340,en_2649_34379_35211849_1_1_1_1,00.html. Also see United Nations Environmental Program, Chemical Screening Information Data Set (SIDS) for High Volume Chemicals internet site: www.chem.unep.ch/irptc/sids/OECDSIDS/sidspub.html.

20. Advanced tools developed under the NCP include QSAR - Quantitative Structure Activity Relationships. There is no defined base data set required before PMN, and the TSCA does not require prior testing of new chemicals. Consequently, less than half of the PMNs submitted include toxicological data. In these cases, EPA scientists assess the chemical's structural similarity to chemicals for which data are available—called structure-activity relationship (SAR)–to help predict toxicity. A useful discussion of SAR is found in an OECD monograph, *US EPA/EC Joint Project on the Evaluation of (Quantitative) Structure Activity Relationships*, Environment Monograph No. 88, Organisation for Economic Co-Operation and Development, Paris, 1994. Available online at: www.epa.gov/opptintr/newchems/pubs/ene4147.pdf.

The Ecological Structure Activity Relationships (ECOSAR) is a personal computer software program used to estimate the aquatic toxicity of chemicals. The program predicts the toxicity of industrial chemicals to aquatic organisms such as fish, invertebrates, and algae using (Q)SARs. ECOSAR estimates a chemical's acute (short-term) toxicity and, when available, chronic (long-term or delayed) toxicity. ECOSAR is available on the internet at U.S. EPA, Pollution Prevention (P2) Framework, Hazard Models internet site: www.epa.gov/oppt/p2framework/docs/hazard.htm#Sub2. Washington, DC: Office of Pollution Prevention and Toxics (updated June 1, 2006).

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25. U.S. EPA, Acute Exposure Guideline Levels Program internet site: www.epa.gov/opptintr/aegl/. Washington, DC: Office of Prevention, Pesticides and Toxic Substances.

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28. U.S. EPA, Pesticide Tolerance Reassessment and Reregistration internet site: www.epa.gov/pesticides/reregistration.

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36. Community-specific baselines for criteria air pollutants, land consumption, and storm water run-off to EPA assistance prior will be compared to environmental impacts from community actions affecting growth and development, as predicted in computer-modeled alternative future development scenarios within each

community and validated by actual environmental measurements and indicators. EPA uses a customized version of Criterion's proprietary INDEX computer model for developing community development and growth scenarios and assessing their impacts and impacts avoided. See Criterion Planners Inc. (2006). Smart Growth INDEX. Portland, OR: www.crit.com.

37. The term "significant" is used in a manner analogous to its use under the National Environmental Policy Act, involving considerations of both "context" and "intensity." See 40 CFR 1508.27. Under this definition, "…in the [context] of a site-specific action, significance would usually depend upon the effects in the locale… Both short- and long-term effects are relevant." With respect to intensity, issues such as the magnitude of the impact (positive and negative) will be considered.

38. U.S. EPA, Environmental Data Registry, Assessment, Cleanup, Redevelopment, Exchange System internet at: http://iaspub.epa.gov/ed/edr_proc_qry.navigate?P_LIST_OPTION_CD=CSALL&P_REG_AUTH_IDENTIFIED=1&P _DATA_IDENTIFIED=97509&P_VERSION=1.

39. Census estimate of homes lacking access minus homes provided with access between 2000 and 2003.

40. 2000 Census estimate of homes lacking access to adequate wastewater sanitation minus homes provided with access between 2000 and 2003.

41. These initial baselines were calculated from Arctic Monitoring and Assessment Programme data that includes human health data points from indigenous maternal populations across the Arctic, including Alaska, Canada, Norway, and the Russian Federation. Measurement Mechanism: Assessment of data from AMAP, an existing international scientific working group, which advises governments of the eight Arctic countries on issues related to pollution in the Arctic. AMAP data is presented in periodic scientifically-based assessments, which are a result of cooperative efforts involving a large number of scientists and other stakeholders, who follow agreed quality assurance and control protocols consistent with such practices common in the United States. For summary of source data, see AMAP, 2002. Arctic Pollution 2002 (Persistent Organic Pollutants, Heavy Metals, Radioactivity, Human Health, Changing Pathways). Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. xii+112 pp. See also Persistent Toxic Substances, Food Security and Indigenous Peoples of the Russian North. Final Report. Arctic Monitoring and Assessment Programme (AMAP), Oslo, 2004. 192 p. AMAP Report 2004:2. Documents are available on the AMAP internet site: www.amap.no/.

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43. Clinton, William J. February 16, 1994. Federal actions to address environmental justice in minority populations and low-income populations. Executive Order 12898, 59 FR 7629. Available online at: www.archives.gov/federal-register/executive-orders/1994.html#12898.

44. Small Business Liability Relief and Brownfields Revitalization Act (Public Law 107-118 (H.R. 2869), 115 stat. 2356). Available online at: www.epa.gov/swerosps/bf/sblrbra.htm#status.

45. Brownfields and Land Revitalization Technology Support Center internet site: www.brownfieldstsc.org/. U.S. EPA's Office of Superfund Remediation and Technology Innovation, U.S. Army Corps of Engineers, and Argonne National Laboratory.

46. Triad Resource Center internet site: www.triadcentral.org/. Triad is an innovative approach to decision making for hazardous waste site characterization and remediation. The Triad approach proactively exploits new characterization and treatment tools. The Triad Resource Center provides the information hazardous waste site managers and cleanup practitioners need to implement the Triad effectively. The U.S. EPA, U.S. Army Corps of Engineers, U.S. Army, U.S. Navy, Argonne National Laboratory, State of New Jersey Department of Environmental Protection, and the Interstate Technology Regulatory Council support Triad.

47. SMARTe (Sustainable Management Approaches and Revitalization Tools) internet site: www.smarte.org/smarte/home/index.xml. SMARTe is an open-source, web-based, decision support system for developing and evaluating future reuse scenarios for potentially contaminated land. SMARTe contains guidance and analysis tools for all aspects of the revitalization process including planning, environmental, economic, and social concerns. The U.S. EPA's Office of Research and Development and Office of Brownfields Cleanup and Redevelopment, the German Federal Ministry of Education and Research, and the Interstate Technology Regulatory Council support its development.

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49. Stockholm Convention on Persistent Organic Pollutants. Signed by USA on May 23, 2001. Entered into force on 17 May 2004. See www.pops.int/. See also www.epa.gov/oppfead1/international/pops.htm.

50. Arctic Monitoring and Assessment Programme internet site: www.amap.no/.

51. Arctic Council, www.arctic-council.org under "Activities" (ACAP/Obsolete Pesticides Project).

52. Arctic Council, www.arctic-council.org under "Activities" (ACAP/PCB Project).

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57. U.S. EPA, Areas of Concern (AoCs) On-line, Great Lakes internet site: www.epa.gov/glnpo/aoc/index.html. Chicago, Illinois: Great Lakes National Program Office.

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87. U.S. EPA, Targeted Watershed Grants Program internet site: www.epa.gov/owow/watershed/initiative/. Washington, DC: Office Wetlands, Oceans, and Watersheds.

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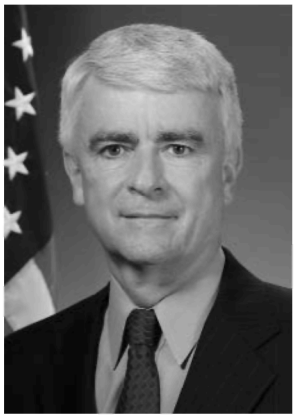
GOAL 5:

Compliance *and* Environmental Stewardship

Protect human health and the environment through ensuring compliance with environmental requirements by enforcing environmental statutes, preventing pollution, and promoting environmental stewardship. Encourage innovation and provide incentives for governments, businesses, and the public that promote environmental stewardship and long-term sustainable outcomes.



Under Goal 5 EPA will accelerate the pace of environmental protection by taking compliance and enforcement actions that produce environmental results, by preventing pollution at the source and advancing other forms of environmental stewardship, and by embracing the tools of innovation and collaboration.

Effective compliance assistance and strong, consistent enforcement are critical to achieving the human health and environmental benefits expected from our environmental laws. By offering compliance assistance to those who want to comply with environmental regulations and standing ready with a strong enforcement program, we will ensure that the public receives the benefits promised by our environmental laws. We will achieve significant environmental results by focusing our efforts on priority problem areas identified through consultation with states and tribes. We will protect the public by criminally prosecuting willful, intentional, and serious violations of the federal environmental laws.

At the same time, EPA will promote the principles of responsible stewardship, sustainability, and accountability to achieve all of its strategic goals. Collaborating closely with our federal, state, and tribal partners, the Agency will focus efforts on innovations that assist businesses and communities in improving their environmental performance. To achieve pollution prevention goals, we will work with industrial, governmental, and non-governmental partners to increase the effectiveness of voluntary and self-directed approaches that minimize or eliminate the generation of pollution. In addition, EPA will continue to conduct research on pollution prevention, new and developing technologies, social and economic issues, and decision-making.

Granta Nakayama
Assistant Administrator
Office of Enforcement and Compliance Assistance

Jim Gulliford
Assistant Administrator
Office of Pollution Prevention and Toxic Substances

GOAL 5:

Compliance and Environmental Stewardship

EPA is working to ensure that government, business, and the public comply with federal laws and regulations designed to protect the environment and human health. We employ several strategies to achieve this goal. Our compliance assurance program provides compliance assistance and incentives, monitors compliance efforts and trends, and enforces against violators. Our pollution prevention programs and other innovative partnerships promote self-directed action to minimize or eliminate pollution before it is generated. We also work with other nations, including key international trading partners, as they develop and enforce their own environmental protection programs. Increasing environmental compliance in other countries will lead to lower levels of pollution that can cross borders and affect the United States.

We use the term "environmental stewardship" to describe the sense of responsibility and ownership that goes with not only meeting, but exceeding, existing regulatory requirements. Stewards of the environment recycle wastes to the greatest extent possible, minimize or eliminate pollution at its source, conserve natural resources, and use energy efficiently to prevent harm to the environment or human health. We use science and research to inform Agency policy decisions and guide our efforts to promote environmental stewardship. To meet our domestic environmental challenges, we continue to cooperate and coordinate with our international partners to promote environmental stewardship globally.

In cooperation with our partners, we use four tools to maximize compliance: provide assistance to promote understanding of environmental regulations; offer incentives that encourage facilities voluntarily to identify, disclose, and correct violations; monitor compliance through inspections, evaluations, and investigations; and conduct civil and criminal enforcement actions to correct violations and deter future non-compliance.

OBJECTIVES

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Objective 5.4: Enhance Society's Capacity for Sustainability Through Science and Research 140

Currently, EPA is in the process of examining and revising Objective 5.1, the associated sub-objectives, and the performance measures used to track progress in improving compliance. The current objective, sub-objectives, and measures focus on the use of the four tools described above. The revised version will link outcomes achieved in reducing or eliminating pollution, key environmental risks, and non-compliance patterns to program implementation of the national priority strategy for enforcement. As an example, a measure and target may be developed related to compliance and enforcement activities at combined sewer overflows that are located within 1 mile upstream of surface drinking water uptakes. As these new measures are developed, the older measures contained within this Plan will be amended and replaced.

OBJECTIVE 5.1: ACHIEVE ENVIRONMENTAL PROTECTION THROUGH IMPROVED COMPLIANCE

By 2011, maximize compliance to protect human health and the environment through enforcement and other compliance assurance activities by achieving a 5 percent increase in the pounds of pollutants reduced, treated, or eliminated by regulated entities, including those in Indian country.[2] (Baseline: 3-year rolling average FYs 2003-2005: 900,000,000 pounds.)

Sub-objective 5.1.1: Compliance Assistance. By 2011, prevent noncompliance or reduce environmental risks, with an emphasis on achieving results in all areas including those with potential environmental justice concerns, through EPA compliance assistance by maintaining or improving on the following percentages for direct assistance provided to regulated entities, including those in Indian country: 50 percent of the regulated entities receiving direct assistance improve environmental management practices;[3] and 12 percent of the regulated entities receiving direct assistance reduce, treat, or eliminate pollution. (Baselines are determined each year based on prior year results.)

Sub-objective 5.1.2: Compliance Incentives. By 2011, identify and correct noncompliance and reduce environmental risks, with an emphasis on achieving results in all areas including those with potential environmental justice concerns. Use of compliance incentives will result in a 5 percentage point increase in the number of facilities that use EPA incentive policies to conduct environmental audits or other actions that reduce, treat, or eliminate pollution or improve environmental management practices at their facilities, including those in Indian country. (Baseline: 3-year rolling average FYs 2003-2005: 940 facilities.)

Sub-objective 5.1.3: Monitoring and Enforcement. By 2011, identify, correct, and deter noncompliance and reduce environmental risks, with an emphasis on achieving results in all areas including those with potential environmental justice concerns, through monitoring and enforcement of regulated entities' compliance,

including those in Indian country, by achieving: a 5 percent increase in the number of facilities taking complying actions[4] during EPA inspections and evaluations after deficiencies have been identified (baseline to be determined based on FY 2006 results); a 5 percentage point increase in the percent of enforcement actions requiring that pollutants be reduced, treated, or eliminated (FY 2005 baseline: 28.8 percent); and a 5 percentage point increase in the percent of enforcement actions requiring improvement of environmental management practices. (FY 2005 baseline: 72.5 percent.)

Means and Strategies for Achieving Compliance

Environmental laws can achieve their purposes only when facilities and companies comply with requirements. Facilities and companies that do not comply can gain an unfair economic advantage over those that do invest the resources necessary to meet their environmental obligations. EPA works with state, tribal, and local agencies to secure and maintain compliance with the nation's environmental laws and regulations.

Over the next 5 years, we will continue working with state, tribal, and local environmental compliance assurance programs to:

- Ensure a consistent level of effort among state and tribal enforcement and compliance assurance programs.
- Identify national priorities for enforcement and compliance.
- Better integrate state, tribal, regional, and national strategic planning efforts.
- Share information about patterns of noncompliance or emerging risks which need to be addressed.

- Explore opportunities for developing common performance measures for state and tribal enforcement and compliance assurance programs.
- Continue to ensure compliance in Indian country by improving data collection and reporting and by building tribal capacity for managing compliance and enforcement programs.

We will also work with some of our state and tribal partners, and with the U.S. Departments of State, Justice, the Interior, and other federal agencies, to encourage other countries' efforts to develop and ensure compliance with their own domestic environmental programs.

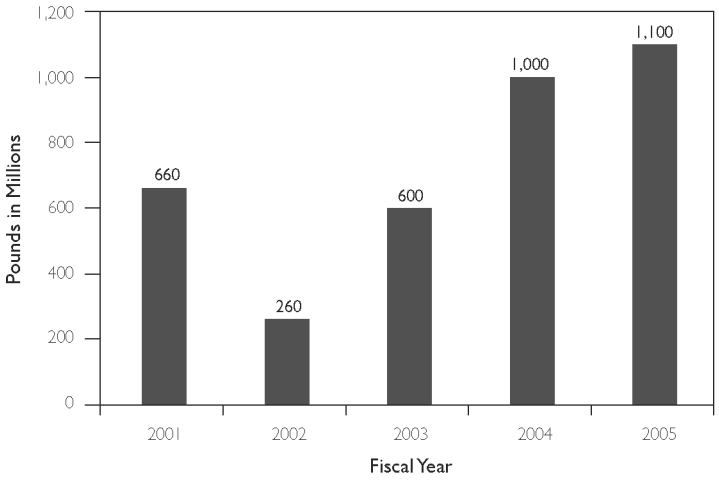
Compliance Assistance

EPA will continue to assist the regulated community in complying with environmental laws and regulations by providing training, workshops, on-site visits, and telephone contacts. Our 14 virtual Compliance Assistance Centers (www.epa.gov/compliance/assistance/centers/index.html) provide assistance directly to regulated entities and offer access to resources such as pollution prevention information. We will also provide

assistance to regulated entities indirectly by tailoring compliance assistance tools and making them readily available on our websites, as free publications, and through trade associations and other groups. Our National Environmental Compliance Assistance Clearinghouse provides federal, state, tribal, and local governments; academia; trade associations; and other organizations a forum for sharing information on best practices, new compliance assistance materials, and performance measurement. As part of our compliance assistance, we also encourage environmental stewardship by establishing partnership programs designed to minimize or eliminate the generation of pollution.

Through the Environmental Assistance Network, we will continue to coordinate EPA's efforts to assist specific industry sectors, such as health care or construction, in improving their environmental performance. The Network brings EPA programs together around specific sectors to identify opportunities for common metrics and measures and to develop coordinated approaches for providing assistance, preventing pollution, and promoting environmental stewardship.

Estimated Pollutant Reduction Commitments Obtained Through Formal Case Conclusions



FY 2005 Data Source: Integrated Compliance Information System (ICIS), & Manual Calculations, October 27, 2005

Disclaimer: Due to enhanced data quality reviews, minor corrections may have been made to previously reported data. As such, this FY 2005 end-of-year report contains updated enforcement and compliance data for prior years.

Compliance Incentives

Offering the regulated community incentives to address problems proactively helps foster a sense of environmental stewardship. EPA provides a number of incentives to encourage public and private entities to assess their compliance with environmental requirements, voluntarily disclose concerns, correct them, and prevent recurring problems. The Small Business Compliance Policy, for example, allows businesses with fewer than 100 employees reduced penalties for discovering, disclosing, and correcting federal violations. We will continue to make the Audit Policy (Self-Policing Policy) and compliance incentives such as reduced penalties for violations and extended time for correction available to the regulated community. We will also encourage owners of multiple facilities to enter into corporate-wide auditing agreements, which offer them the opportunity to review their operations more comprehensively while providing certainty about their environmental liability. Corporate-wide auditing agreements, particularly those following mergers and acquisitions, offer the potential for significant environmental benefits because environmental compliance issues are addressed simultaneously across the corporation.

Compliance Monitoring and Enforcement

Federal environmental regulations establish a consistent baseline for compliance levels nationwide. States and tribes that have been delegated responsibility for specific programs may set more stringent standards and enforce against them.

At the national level, EPA will use strategic targeting to conduct monitoring and enforcement activities—inspections, evaluations, civil and criminal investigations,

administrative actions, and civil and criminal judicial enforcement. By identifying the most egregious violators and returning them to compliance as quickly as possible, we can address the most significant risks to human health and the environment and relieve disproportionate burdens on certain populations. EPA will continue to base its national enforcement and compliance assurance program on two components: (1) a limited number of national priorities that focus on significant environmental risks and patterns of noncompliance and (2) core program activities that implement all environmental laws and requirements. We will continue to collaborate with states and tribes in analyzing compliance data and trends to identify priorities for attention.

OBJECTIVE 5.2: IMPROVE ENVIRONMENTAL PERFORMANCE THROUGH POLLUTION PREVENTION AND OTHER STEWARDSHIP PRACTICES

By 2011, enhance public health and environmental protection and increase conservation of natural resources by promoting pollution prevention and the adoption of other stewardship practices by companies, communities, governmental organizations, and individuals.

Sub-objective 5.2.1: Prevent Pollution and Promote Environmental Stewardship. By 2011, reduce pollution, conserve natural resources, and improve other environmental stewardship practices while reducing costs through implementation of EPA's pollution prevention programs.

Strategic Targets

- By 2011, reduce 4.5 billion pounds of hazardous materials cumulatively compared to the 2000 baseline of 44 million pounds reduced.
- By 2011, reduce, conserve, or offset 31.5 trillion British Thermal Units (BTUs) cumulatively compared to the 2002 baseline of 0 BTUs reduced, conserved, or offset.
- By 2011, reduce water use by 19 billion gallons cumulatively compared to the 2000 baseline of 220 million gallons reduced.
- By 2011, save $791.9 million through pollution prevention improvements in business, institutional, and governmental costs cumulatively compared to the 2002 baseline of $0.0 saved.
- By 2011, reduce 4 million pounds of priority chemicals from waste streams as measured by National Partnership for Environmental Priorities (NPEP) contributions, Supplemental Environmental Projects (SEPs), and other tools used by EPA to achieve priority chemical reductions.

Sub-objective 5.2.2: Promote Improved Environmental Performance Through Business and Community Innovation. Through 2011, improve environmental performance with sustainable outcomes through sector-based approaches, performance-based programs, and assistance to small business.

Strategic Targets

- By FY 2011, the reported results of Performance Track member facilities collectively will show the following normalized annual reductions: 5.1 billion gallons in water use; 13,000 tons of hazardous materials use; 230,000 megatons of carbon dioxide equivalent ($MTCO_2E$) of greenhouse gases; 300 tons of toxic discharges to water; and 5,500 tons of combined NO_x, SO_x, VOC, and PM emissions. (Performance Track member facilities make commitments to, and report yearly progress on, performance improvements in up to four environmental areas. In FY 2005, Performance Track members achieved normalized annual reductions of 3.4 billion gallons in water use; 8,794 tons of hazardous materials use; 151,129 $MTCO_2E$ of greenhouse gases; 186 tons of toxic discharges to water; and 3,533 tons of combined NO_x, SO_x, VOC, and PM emissions.)
- By 2011, the participating manufacturing and service sectors in the Sector Strategies Program will achieve an aggregate 10 percent reduction in environmental releases to air, water, and land, working from a 2004 baseline and normalized to reflect economic growth. (Baseline and normalization factors to be developed by December 2006.)

Sub-Objective 5.2.3: Promote Environmental Policy Innovation. Through 2011, achieve measurably improved environmental results, promote stewardship behavior, and advance sustainable outcomes by testing, evaluating, and applying alternative approaches to environmental protection in states, companies, and communities. This work also will seek to improve the organizational cost effectiveness and efficiency for regulatory agencies as well as regulated entities. Specifically, by 2011, innovation projects under the State Innovation Grant Program and other piloting mechanisms will achieve, on average, an 8 percent or greater improvement in environmental results (such as reductions in air or water discharges, improvements in ambient air or water air quality, or improvements in compliance rates), or a 5 percent or greater improvement in cost effectiveness and efficiency. (Each project's achievement will be measured by the goals established in the grantee's proposal. Baselines for ambient conditions or pollutant discharges or costs of compliance will be developed at the beginning of each project, and improvements for each project will be measured after full implementation of the innovative practice.)

Means and Strategies for Improving Environmental Performance

EPA is committed to developing and promoting innovative strategies that achieve better environmental results, reduce costs, and promote environmental stewardship. In collaboration with states and tribes, we will continue to focus on innovations that will help small businesses and communities improve both their environmental and economic performance.

The Pollution Prevention Act of 1990 encourages prevention and source reduction as preferred methods for keeping pollutants from release to the environment. EPA will

promote partnerships to achieve our pollution prevention goals and encourage responsible stewardship, sustainability, and accountability. We will work with industry to design manufacturing processes and products that prevent pollution and will team with states, tribes, and governments at all levels to find innovative, cost-effective approaches for preventing pollution. A key element of our strategy is the Pollution Prevention State Grant Program. Annually, EPA provides approximately $5 million to states and tribes to support their efforts to provide industry with technical assistance, information sharing, and outreach.

As mandated by Executive Order 13101, we will work with federal agencies to ensure that their purchasing decisions minimize damage to the environment. Through our Environmentally Preferable Purchasing Program (www.epa.gov/epp), and such initiatives as the Federal Electronics Challenge (www.federalelectronicschallenge.net) and the Electronic Products Environmental Assessment Tool (www.epeat.net/ and http://epa.gov/oppt/epp/pubs/products/epeat.htp), we will continue to promote purchasing, operating, and disposing of electronic products in ways that protect the environment. In addition, we will work with our partners and key stakeholders to enhance international awareness and use of pollution prevention measures and environmental stewardship approaches, in particular by focusing on key trading partner countries that are major emitters of critical transboundary pollutants.

Our Innovations Strategy relies on continued outreach to states, tribes, and businesses to help identify innovative approaches that merit testing, evaluation, and implementation. To provide leadership on the cutting edge of environmental policy, EPA works continually to identify, test, and implement innovative strategies that are effective and efficient. Some innovations relate to policies and programs, such as permitting or the regulation of small sources. Other innovations change the way EPA does business. For example, we will utilize our staff expertise in working with state, community, and business leaders to strengthen partnerships that encourage collaboration and meaningful public involvement. To bring innovations to full-scale implementation, we will initiate regulatory change, such as more flexible permitting approaches, and encourage states to adopt new strategies.

Improving Environmental Performance

EPA will advance environmental protection through innovative and collaborative approaches with business and government that produce measurable environmental results. For example, our National Environmental Performance Track Program is a public-private partnership that encourages continuous environmental improvement through the use of environmental management systems, local community involvement, and measurable environmental results. Performance Track motivates high-performing facilities to measurably reduce their environmental footprint beyond legal requirements and changes the way government regulates these facilities. Through the Performance Track Program, we will establish new relationships with business

based on recognition, mentoring, sharing knowledge, incentives (including placing a lower priority on routine inspections), and a sustained pattern of superior performance.

Under our Sectors Strategy Program, we will continue to work with sectors of the U.S. economy that make a significant impact on the environment to improve their environmental performance. Although overall the program is intended to promote environmental stewardship while minimizing regulatory burden, individual sector projects address our specific air, water, land, and ecosystem objectives as well. The Sectors Strategy Program supports the Administrator's goal to "accelerate the pace of environmental protection" by addressing the "driver and barrier" factors in each sector that affect environmental management decisions. We will emphasize results and accountability by tracking sector-wide trends in pollutant emissions and resource conservation in the *Sector Strategies Performance Report*, available at www.epa.gov/sectors/performance.html.

EPA will continue to promote widespread use of environmental management systems (EMSs) domestically and internationally. EMSs provide a structured system and approach for managing environmental responsibilities (including areas not subject to regulation, such as product design, resource conservation, energy efficiency, and other sustainable practices) to improve overall environmental performance. Through a variety of partnership programs and our EMS website, we will provide information and technical assistance for organizations implementing EMSs. We will also fund research on the effectiveness of EMSs in the private and public sectors.

We also remain committed to identifying and testing new approaches to improving environmental performance by partnering with states, tribes, and industry through the State Innovation Grant Program. We will use this grant program to fund projects that promote innovative approaches to permitting or improve corporate environmental performance. One example of an innovative program receiving a State Innovation Grant is the Environmental Results Program, an approach first developed by the Commonwealth of Massachusetts to regulate small sources such as drycleaners and printers more cost effectively. We will measure and track results for the State Innovation Grant program by requiring grantees to include performance measures in project planning, to report regularly on implementation of their projects, and to file a final report on results achieved. We plan to conduct an evaluation of the State Innovation Grant Program by 2011.

Cost Saving Technologies that Prevent Pollution

We will continue to conduct EPA programs to prevent pollution while realizing economic savings:

- Our Green Chemistry Program[5] supports research and fosters innovative chemical technologies to prevent pollution in a scientifically sound, cost-effective manner.

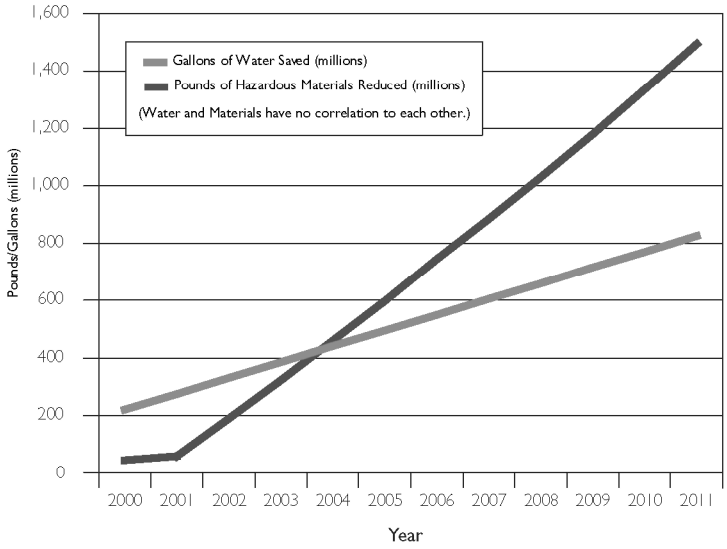
- The Green Suppliers Network works with the U.S. Department of Commerce's Manufacturing Extension Program and state technical assistance programs to provide manufacturing suppliers with information on cost saving opportunities and technologies to eliminate waste and increase energy efficiency.
- The Presidential Green Chemistry Challenge Award Program recognizes superior achievement in the design of chemical products and encourages chemical designers to prevent pollution, conserve water, and reduce energy use in achieving measurable results.
- Our Design for the Environment[6] Industry Partnership Program offers technology assessments and outreach to encourage businesses to adopt cleaner, cheaper, and smarter pollution prevention practices.

We will continue to work with industry sectors to measure results in reducing risks to human health and the environment, improve performance, and save costs associated with existing and alternative pollution prevention technologies or processes.

Waste Minimization

To reduce priority chemicals in wastes going to landfills, EPA focuses on key waste streams and waste generators. For example, through the NPEP, a part of the Agency's Resource Conservation Challenge, we will encourage state and local governments, manufacturers, and other nongovernmental organizations to form partnerships to reduce the generation of waste containing any of the 31 priority chemicals. Companies that become NPEP partners are publicly recognized for their contribution to the national waste reduction goal.

Green Chemistry Challenge
Cumulative Results



We will continue to protect the environment and children's health through innovative and collaborative approaches that produce measurable environmental results. Our Schools Chemical Cleanout Campaign will help to decrease the number of injuries and school days lost due to poor chemical management and chemical spills. Working with other federal agencies, states, tribes, and local governments, we will provide technical assistance and grant funding to clean out chemicals and prevent future chemical management problems.

Preventing Environmental Impacts Through NEPA Review

Working with the White House Council on Environmental Quality, EPA will prevent adverse environmental impacts associated with large federal projects subject to National Environmental Policy Act (NEPA) review[7]. Section 309 of the Clean Air Act requires EPA to review and make public its comments on the environmental impacts of other federal agencies. We will also assist other federal agencies developing environmental impact statements, help them develop projects to

avoid adverse environmental impacts, support streamlined environmental review processes, and participate in rotational assignment programs and interagency work groups.

Pollution Prevention Work with Tribal Partners

The environmental and public health issues facing tribes are a priority for EPA, and one focus of our effort to ensure environmental justice. We will expand green technologies on tribal lands,[8] especially for buildings constructed decades ago. We are working with the U.S. Department of Housing and Urban Development to provide tribes with information and training on "green buildings," to incorporate green building guidance in tribal housing grants, and to implement advisory group recommendations.

OBJECTIVE 5.3: IMPROVE HUMAN HEALTH AND THE ENVIRONMENT IN INDIAN COUNTRY

Protect human health and the environment on tribal lands by assisting federally-recognized tribes to build environmental management capacity, assess environmental conditions and measure results, and implement environmental programs in Indian country.

Strategic Targets

- By 2011, increase the percent of tribes implementing federal environmental programs in Indian country to 9 percent. (FY 2005 baseline: 5 percent of 572 tribes.)
- By 2011, increase the percent of tribes conducting EPA-approved environmental monitoring and assessment activities in Indian country to 26 percent. (FY 2005 baseline: 20 percent of 572 tribes.)
- By 2011, increase the percent of tribes with an environmental program to 67 percent.[9] (FY 2005 baseline: 54 percent of 572 tribes.)

Means and Strategies for Improving Health and the Environment in Indian Country

Under federal environmental statutes, EPA is responsible for protecting human health and the environment in Indian country. Our American Indian Environmental Office (AIEO) leads an Agency-wide effort to work with 572 federally-recognized tribes, as well as intertribal consortia,[10] located in 9 of EPA's 10 regions. The land in Indian country totals more than 70 million acres, and reservations range from less than 10 to more than 14 million acres.

EPA's strategy for achieving our objectives in Indian country has three major components. First, we will continue to distribute Indian General Assistance Program (GAP) capacity-building grants. GAP grants help tribes

cover the cost of planning, developing, and establishing environmental protection programs. Our goal is help every federally-recognized tribe establish an environmental presence. To demonstrate the results achieved by these funds more effectively, we are developing more and better environmental and public health measures to track tribal environmental progress.

Second, we will develop the information technology infrastructure needed to assess environmental conditions in Indian country and measure the results achieved by the environmental programs operating on those and related lands. The Tribal Program Enterprise Architecture (TPEA) complements GAP by organizing environmental data on a tribal basis and providing a picture of current environmental conditions at the local level. As tribes assume management of their own environmental programs (through the "treatment in a manner similar to a state" process available under several environmental statutes or by developing a tribal program under tribal law), they will be able to use TPEA data to help identify program priorities. We will continue to coordinate EPA's efforts with those of other federal agencies (including the U.S. Department of the Interior's Geological Survey and Bureau of Reclamation and the U.S. Department of Health and Human Services' Indian Health Service) to create a comprehensive, integrated Tribal Enterprise Architecture. TPEA will supplement our national systems by allowing tribes and EPA regional offices to supply information on local environmental conditions. As data gaps are identified, EPA will work with tribes to obtain the data needed to address high risks in Indian country.

Third, we will guide and closely track the implementation of our programs directly on Indian lands.[11] In reaching out to tribes, EPA's water, air, land, pollution prevention, and enforcement and compliance programs have developed specific tribal strategies. As part of our strategic planning, we will continue to consult and collaborate with tribes. The Tribal Caucus, which has provided input to EPA on tribal issues for several years, will continue to serve as our focal point and help develop and strengthen EPA-tribal partnerships. We will also engage other EPA-sponsored tribal groups, such as the Tribal Committee of the Forum on State and Tribal Toxics Action, the Tribal Pesticides Program Council, the Tribal Science Council, the National Tribal Air Association, and the Tribal Water Council.

Beyond improving environmental conditions in Indian country, our engagement with the tribes will support their work as the first stewards of our nation's environment. All of EPA's environmental programs will benefit by integrating tribal stewardship perspectives.

OBJECTIVE 5.4: ENHANCE SOCIETY'S CAPACITY FOR SUSTAINABILITY THROUGH SCIENCE AND RESEARCH

Conduct leading-edge, sound scientific research on pollution prevention, new technology development, socioeconomics, sustainable systems, and decision-making tools. By 2011, the products of this research will be independently recognized as providing critical and key evidence in informing Agency polices and decisions and solving problems for the Agency and its partners and stakeholders.

Means and Strategies for Enhancing Sustainability Through Science and Research

The principles of environmental stewardship are based on the belief that our nation's natural resources are the common property of all society. Effective stewards of the environment enhance environmental protection and achieve sustainable outcomes. Science and research programs supporting this strategic goal help identify efficient and sustainable practices, materials, and technologies to improve environmental performance and advance stewardship.

Science and Technology for Sustainability

The Science and Technology for Sustainability (STS) research program develops models, tools, and technologies that provide decision makers with options that can promote stewardship and lead to sustainable outcomes. STS research will achieve measurable results by providing the enhanced science and technology that can catalyze innovation and advance environmental protection; developing more efficient and sustainable practices, materials, and technologies; and providing science to support sound management decisions, policies, and practices for sustainable resource management. Fundamental research under the STS program includes developing Life Cycle Assessment and Material Flow Analysis methodologies; theoretical modeling of sustainable systems; developing new science-based sustainability metrics and indicators; and the People, Prosperity, and the Planet Student Design Competition program.

STS research will support the regulated community in implementing more efficient, sustainable, and protective practices and using materials and technologies that can improve performance while protecting the environment. We will work with our industry partners to research new methods, alternative chemicals, and industrial practices and to develop tools, for example, that bench chemists can use to evaluate the environmental dimensions of new chemicals and

production pathways. We have expanded our Environmental Technology Verification Program to include an effort focused on sustainability, the Environmentally Sustainable Technologies Evaluation Program. We will develop quality-controlled test protocols to help verify the capabilities of new technologies. In addition, we will continue to conduct our Sustainable Environmental Systems research program, which draws on economics, ecology, law, and engineering to find systems-based solutions to regional environmental problems.

Economics and Decision Sciences

EPA's Economics and Decision Sciences (EDS) research provides methods and data to conduct economic analyses and evaluate the effectiveness of our policies. The results of these analyses will inform our decision making and help us develop innovative, cost-effective approaches.

EDS research will focus on three areas. First, to improve EPA's cost-benefit analyses, researchers will develop benefit transfer methods and original estimates for health and ecological benefits. Second, researchers will analyze information and education strategies for changing behavior, helping us to promote compliance, improved performance, and environmental stewardship. Finally, we will conduct EDS research on using trading programs for new pollutants, media, or geographical areas. This research will help design market-based programs to improve environmental performance at the lowest cost. We will also be investigating the implications that trading programs may have for environmental justice issues

HUMAN CAPITAL

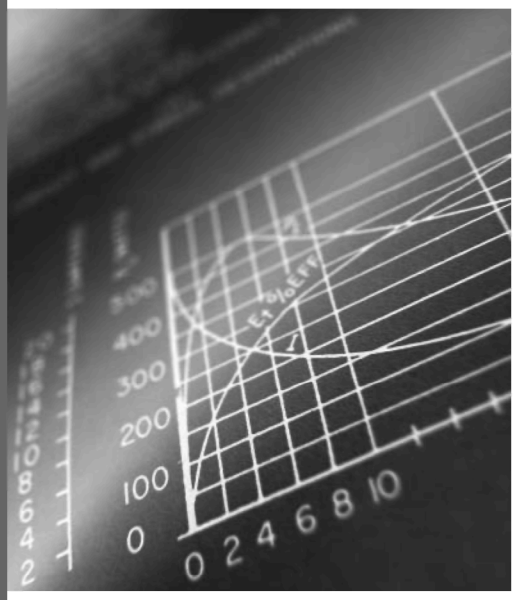
To achieve our goals for compliance and environmental stewardship, we must be proficient in a number of areas. Our staff must understand applicable requirements, possess sector-specific knowledge about business and industrial processes, keep current on best practices, and be able to assess a situation and advise regulated entities seeking help and guidance.

To improve our interaction with the regulated community, we will recruit skilled facilitators and communicators, and we will encourage current employees to take advantage of rotations and other opportunities at the state and local level. Experience in addressing local or regional problems will provide staff a broader perspective on the challenges facing regulators and the regulated community. We recognize that a broad spectrum of regulatory and stewardship approaches will be necessary to advance environmental protection and that a well-informed EPA workforce, skilled in collaborative approaches, will be the key to our success.

To conduct our compliance assistance program and develop incentives for compliance, EPA attorney-advisors, engineers, environmental protection specialists, and others review material submitted by the regulated community, assess compliance, and craft the Agency's response, which could include fines or penalties. EPA will work to ensure that staff have the necessary skill sets to carry out compliance monitoring and enforcement programs (including inspections), civil and criminal investigations, and administrative and judicial enforcement actions.

PERFORMANCE MEASUREMENT

EPA's compliance strategy is based on activities that will reduce pollutants entering the environment, treat them appropriately, or eliminate them entirely. To assess our progress, we track pounds of pollution estimated to have been reduced, treated, or eliminated—a measure also included in OMB's Program Assessment Rating Tool (PART) assessment of the compliance program. We have also incorporated the PART long-term, outcome-oriented measures for EPA's GAP grants into this *Strategic Plan*.



To track our annual progress toward our research objectives, we will use a number of objective measures of customer satisfaction, product impact and quality, and efficiency. For example, we rely on independent expert review panel ratings, client surveys on the usefulness of our products, and analyses demonstrating the actual use of EPA research products.

Improving Performance Measurement

For the compliance objective of Goal 5, EPA will begin a process for redesigning the objective, sub-objectives, and measures. This redesign will change the focus of the program, moving from a tool-oriented approach that measures outcomes from assistance, incentives, monitoring, and enforcement, to a problem-oriented approach that measures the extent to which key environmental problems are reduced or eliminated. To more accurately characterize the state of compliance for particular sectors and regulations, our compliance program uses statistically-valid compliance rates. Our focus will be on environmental problems with significant environmental risks and important patterns of noncompliance, specifically in national priority areas.

We are also working to supplement our pollutant reduction outcome measure with information that characterizes the hazards presented by pollutants and potential public exposure. We are using air pollution models to estimate the human health benefits of reduced air pollutants. As a result, in FY 2005, the compliance assurance program reported that the 10 largest air pollution cases produced annual human health benefits valued at more than $4.6 billion dollars by reducing pollutants by more than 620 million pounds annually. The compliance and air programs will continue working together to expand the types of information on human health benefits that can be reported for air pollution cases, and we are exploring opportunities to report similar information for cases involving other environmental media.

EPA will use a set of nationally consistent environmental justice indicators of health, environment, compliance, and demographics to identify "Areas with Potential Environmental Concerns." We will then emphasize activities in these areas. This effort will better protect all communities, including minority and/or low-income communities. We will report on the impact of our compliance efforts on these areas, including minority and/or low-income communities. Based on our experience with the indicators, we will develop specific environmental justice measures and targets for compliance assurance activities.

EPA is committed to developing meaningful performance measures that will allow us to assess our pollution prevention programs. We will continue to collaborate with states and tribes to improve our performance measures and, through the PART process, review and refine them to be more outcome oriented.

USING FEEDBACK FROM PERFORMANCE ASSESSMENTS AND PROGRAM EVALUATIONS

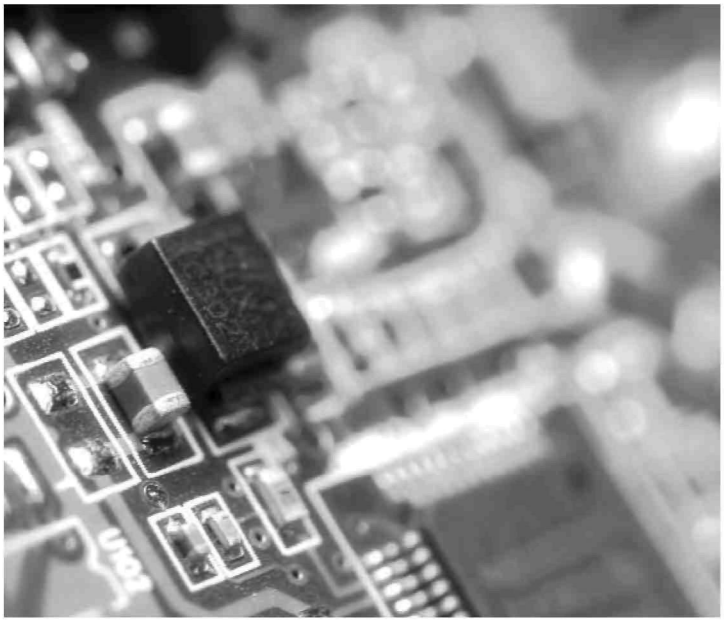
EPA met its original goal for reducing priority chemicals in 2003 (2 years earlier than anticipated), and we have achieved further reductions while re-setting the goal for this *2006–2011 Strategic Plan*. Our early success is not proving easily sustainable, however, as we have begun to exhaust the more obvious opportunities for waste minimization. Achieving future reductions will be more difficult and require a different approach. We are working with states to develop an approach that targets sectors and will allow more direct technology transfer between facilities involved in similar industrial processes.

The Harvard Regulatory Policy Program evaluated several aspects of EPA's Performance Track Program, including differences among facilities applying for the program, characteristics of facilities motivated to apply, and the differences in environmental performance between Track members and non-members. The evaluation affirmed the value of EPA recognition as an incentive for environmental improvements. The study also stressed the importance of low transaction costs as a way of encouraging participation in innovative programs. We will work to increase recognition of Performance Track and the branding associated with the program, and we will identify firms that are providing environmental leadership and refocus our recruiting efforts at the corporate level.

EPA's Enforcement and Compliance Program has undergone three PART assessments since FY 2003: civil enforcement (2003), criminal enforcement (2004), and pesticides grants (2005). OMB recommendations resulting from these PART assessments have been focused on individual program areas and limited to certain aspects of the Enforcement and Compliance Program's management. The program will continue to improve and refine outcome measurement and to expand use of statistically-valid compliance rates. These activities are directly related to PART follow-up actions.

EMERGING ISSUES AND EXTERNAL FACTORS

Rapidly changing technology presents EPA with unique opportunities and challenges. By 2011, we can expect several significant scientific external factors arising in nanotechnology, genomic research, computational toxicology, computer sciences, and the cognitive and behavioral sciences. Developing and applying nanotechnologies, biotechnologies, and sensor technologies could significantly enhance our ability to protect human health and the environment. Progress in these areas will also determine the future direction of our research programs.



Advances in measurement technology could also have a significant effect on EPA programs. As more sensitive technology for detecting and measuring emissions is installed in facilities, emissions reporting will become more accurate. As a result, we may find emission rates to be higher or lower than previously reported.

Distributed sensor network technologies, remote sensing, and hyperspectral imaging are developing rapidly. These technologies have the potential to support compliance monitoring by increasing the frequency and speed of data collection and transmission; improving data quality; enabling data integration; and facilitating data access and data sharing. Sensors might also facilitate the acquisition and use of empirical data and aid in tracking and analyzing the flow of materials and elements throughout the industrial cycle.

Nanotechnology could present new opportunities for pollution prevention and environmental stewardship (see www.epa.gov/osa/nanotech.htm). Emerging nanotechnology applications could potentially reduce energy demand, develop cleaner energy, and improve the efficiency of manufacturing processes, reducing material use and waste generation. Pollution prevention programs can provide a forum for industry and academia to exchange information on the environmental effects and benefits of innovative nanomaterials and promote environmentally responsible manufacturing processes and product design. A growing number of institutional players are encouraging policymakers to study nanotechnology and develop responses.

These emerging technologies may also present novel risks. Anticipating the risks and developing tools to identify them will become increasingly important as these technologies develop and enter the marketplace.

NOTES:

1. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.
2. Pounds of pollutants "reduced, treated, or eliminated" is an EPA measure of the quantity of pollutants that will no longer be released to the environment as a result of a noncomplying facility returning to its allowable limits through the successful completion of an enforcement settlement. (Facilities may further reduce pollutants by carrying out voluntary Supplemental Environmental Projects.) Online compliance information is available to the public via EPA's Enforcement and Compliance History Online (ECHO) Web Site: www.epa.gov/echo/ EPA's Office of Enforcement and Compliance Assurance. Washington, DC. Access July 25, 2006.
3. "Environmental management practices" refers to a specific set of activities EPA tracks to evaluate changes brought about through assistance, incentives, and concluded enforcement actions. Implementing or improving environmental management practices—for example, by changing industrial processes; discharges; or testing, auditing, and reporting—may assist a regulated facility in remaining in compliance with environmental requirements. Further information on environmental management practices is available in EPA's *Case Conclusion Data Sheet Training Booklet*, available online at: www.epa.gov/compliance/resources/publications/planning/ caseconc.pdf: EPA's Office of Enforcement and Compliance Assurance. Washington, DC.
4. Complying actions are actions taken by a facility to address deficiencies, which are potential violations, identified during on-site inspections and evaluations. Examples of a complying action include correcting record keeping deficiencies, requesting a permit application, improving pollutant identification (labeling, manifesting, etc.), improving management practices (storage, training, etc.) or reducing pollution through use reduction, industrial process change, or emissions or discharge change.
5. U.S. EPA, Office of Pollution Prevention and Toxics. Green Chemistry Web Site, www.epa.gov/greenchemistry. Washington, DC. Access September 9, 2006.
6. U.S. EPA, Office of Pollution Prevention and Toxics. Design for the Environment Web Site: www.epa.gov/dfe. Washington, DC. Access September 9, 2006.
7. U.S. EPA, Office of Enforcement and Compliance Assurance. National Environmental Policy Act Web Site: www.epa.gov/compliance/basics/nepa.html#requirement. Washington, DC. Access September 9, 2006.
8. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.
9. A tribe is counted as having an environmental program for the purposes of this measure if the tribal government has taken at least one of the following actions, in combination with having "an organizational structure which includes EPA-funded environmental office or coordinator that has been staffed in the most recent year":
   (a) Complete a Tier III TEA, as evidenced by a document signed by the tribal government and EPA.
   (b) Establish environmental laws, codes, regulations, ordinances, resolutions, policies, or environmental compliance programs, as evidenced by a document signed by the tribal government.
   (c) Complete solid and/or hazardous waste implementation activities.
   (d) Complete an inter-governmental environmental agreement (e.g., state-tribe MOA, federal-tribe MOA, etc).
10. Intertribal consortia are groups of federally-recognized tribes that meet the criteria for EPA purposes that join to work together.
11. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.

Cross-Goal Strategies

Cross-Goal Strategies

Many of EPA's efforts—strengthening our partnerships with states and tribes, improving the quality and availability of the environmental and health information on which we base our decisions, and improving our management systems to achieve better results—contribute to our progress toward all five of our goals. This cross-Agency, cross-media work includes both support functions, such as administrative and financial management or legal services, and the strategies or means we employ to help accomplish our objectives, such as science and research or information management.

Each of these efforts is a significant component of our work and plays a critical role in the accomplishment of all of our goals. This chapter highlights a few of these cross-goal strategies: Partnerships, Information, Innovation, Human Capital, Science, Homeland Security, and Economic and Policy Analysis. For each, we will discuss the Agency's approach, explain how the strategy will contribute to the achievement of our goals, and describe some of the activities we will conduct and results we hope to achieve using this approach.

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RESULTS AND ACCOUNTABILITY

EPA is committed to being not only a good steward of the environment, but also a good steward of the public's tax dollars. Guided by the principles of the President's Management Agenda (PMA)[1]—to be "citizen-centered, results-oriented, and market-based"—we are working to improve the efficiency and effectiveness of our programs and activities. We are continuing to make progress under each of the PMA initiatives and other significant efforts to improve program effectiveness and efficiency as described below.

Assessing the State of the Environment and Measuring Progress

To define our goals, measure our progress, and hold managers accountable for achieving results, EPA needs accurate, timely environmental data. Based on the preliminary work we did to prepare EPA's *Draft Report on the Environment—2003*, we are developing and using a suite of scientifically sound indicators to track trends in environmental conditions and environmental influences on human health. This indicator information, which we will present in our *Report on the Environment—Technical Document* (to be released in 2007), will provide a snapshot of current environmental conditions and a baseline against which we can measure our accomplishments.

Our environmental indicators work is critical to EPA's strategic planning. We have used our latest set of environmental indicators in developing this *Strategic Plan*; indicator information has guided us in establishing our 2006-2011 strategic goals, objectives, sub-objectives, and associated strategic targets, which define the measurable environmental results we are trying to achieve. Information on trends in environmental conditions and human health will also help us identify key environmental concerns and emerging issues and assess the effect of federal, state, local, tribal, and private efforts in improving environmental quality. We will continue to use environmental indicator information and our *Report on the Environment* to determine critical data needs for future strategic planning.

Making Information More Accessible

EPA's information systems ensure that we and our federal, state, tribal, and local agency partners have the accurate, timely information we need to make sound decisions. To make environmental information readily accessible, we have created a computer network that connects EPA and our contractors with states and tribes, standardized our computer systems, implemented data standards, and instituted a variety of streamlining efforts.

EPA will continue to identify information technology and information management challenges and to address them as effectively and cost efficiently as possible. Over the next 5 years, we will focus on four major areas:

- *Analytical Capacity.* We will continue to convert raw environmental data into information that decision makers can use more easily. For example, our geospatial work is converting millions of pieces of data into maps.
- *Governance.* We will ensure that the data EPA collects are of appropriate quality and design, that the data will serve many users, and that we minimize system overlaps to avoid conflict and reduce costs.
- *Excellence in Information Service Delivery.* EPA will use the latest technology to streamline management and data processes and link data partners, making information more accessible to all.
- *Innovation in Information Management.* Through electronic government (E-Gov) efforts, we will continue to convert paper-based administrative or regulatory processes into electronic systems, improving transparency and accessibility, and reducing paper waste.

Integrating Budget and Performance Information

One of the first federal agencies to link our planning and budgeting structures, EPA is now working to align our financial and human resources more closely with the environmental results we deliver.
Our Budget and Performance Integration effort under the PMA promotes better performance; enables more informed decision making; increases accountability; and allows more transparent, comprehensive reporting of environmental results to the public.

To ensure consistent, effective performance across EPA, we have developed long-term measures of program performance in our *Strategic Plan* that establish ambitious yet reasonable expectations for future environmental outcomes. These long-term measures establish the framework for crafting annual performance and efficiency measures that meet Office of Management and Budget's Program Assessment Rating Tool requirements. EPA collects and analyzes performance information against these measures to assess program performance over time and to evaluate the effectiveness of our approaches to environmental problems. Based on these evaluations, we can adjust or modify our strategies to achieve better results.

To encourage EPA staff and our partners to be accountable for delivering environmental results effectively and cost efficiently, we are also incorporating performance measures in EPA managers' performance agreements and, as appropriate, in our contracts, grants, and memoranda of understanding. These performance measures strengthen the connection between an individual's or organization's contribution and the delivery of environmental results. Linking our staff's and our partners' performance to EPA's mission, goals, and expectations for environmental outcomes increases everyone's commitment to improving results.

Improving Financial Performance and Eliminating Improper Payments

EPA has undertaken a multi-office data integration effort which uses financial

information to improve program efficiency and ensure sound financial management. We are focusing on financial information related to one business process at a time as part of our efforts under the PMA. In FY 2005, for example, we reviewed grants management. We have made progress in linking grants management and financial data, producing better information that shows the relationship between grant projects and EPA's environmental objectives. Next we will review emergency management and, in future efforts, analyze such key risk areas as debt management and contracts management.

In another PMA initiative to improve our financial performance, we are working to eliminate improper payments. Under this effort we will identify, prevent, and eliminate erroneous payments and document that the government is using tax dollars for their intended purpose. While EPA's improper payments are minimal, we are committed to reducing the error rate for improper payments even further. For example, in FY 2004 EPA's error rate in the Drinking Water and Clean Water State Revolving Funds, 2 of EPA's largest sources of grant funding, was 0.51 percent, or $10.3 million; by the end of FY 2005 we reduced it to 0.16 percent, or $3.1 million. We will continue to uphold high standards of integrity for financial performance.

Meeting Human Capital Needs

EPA has designed our Human Capital Strategy to ensure that our workforce is high-performing, results-oriented, aligned with our strategic goals and objectives, and accountable for delivering environmental results consistent with the PMA. Toward this end, our human capital planning will require us to identify the skills we will need for future work, attract and retain diverse talent, provide continuing opportunities for organizational learning, develop leaders, and ensure adequate succession planning.

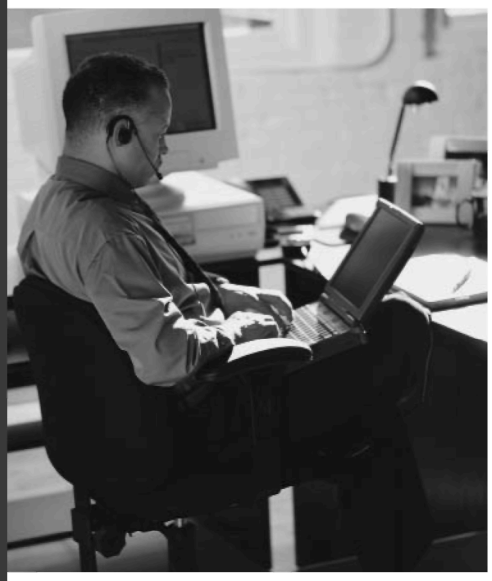
Moreover, because EPA increasingly relies on partnerships and collaborative endeavors to accomplish our work, our strategic human capital planning must also consider our relationships with such partners as other federal agencies, state and local governments, tribes, grantees, contractors, and other stakeholders. We need to ensure that all available expertise is brought to bear to achieve our goals for protecting human health and the environment.

Over the next 5 years, we anticipate a dramatic increase in "baby boomer" retirements across both the public and private sectors. To attract and retain the right people in the right jobs for both the short and long terms, we will work to elevate EPA's profile as an employer of choice, increase our use of hiring flexibilities, and emphasize intern and career development programs.

Increasing Efficiency through Competitive Sourcing

Competitive sourcing—using competition to determine whether federal or private sector employees can most efficiently and effectively perform work that is not inherently governmental—is a key element of the PMA and EPA's effort to deliver environmental results and ensure accountability. Competitive sourcing helps EPA determine the optimal mix of federal employees and contractor personnel for achieving the best results and highest quality of service for our investment. The competitive process drives innovation and efficiency, enabling us to reinvest resultant savings in high-priority activities.

Our competitive sourcing program aligns EPA's business needs with our Human Capital Strategy and uses our planning process to identify activities for competition and reinvestment. Through competitive sourcing, we have already realized efficiencies in delivering certain of our financial and information technology services; as a result, we expect to make savings of more than $10 million available for reinvestment during the next 5 years. Over the next 3 years, we plan to conduct competitive sourcing competitions for additional information technology and administrative support services, and we anticipate that these competitions will save EPA 15-25 percent.



Increasing Efficiency through Electronic Government (E-Gov)

EPA is pursuing a number of opportunities for leveraging electronic tools and capabilities to provide one-stop access to services and transactions, reduce duplication in collecting information, and provide transparent, timely, on-line data. Whether for improving electronic processing and streamlining flows of the Toxics Release Inventory data, or developing new geospatial tools for analyzing environmental data, our E-Gov work is making current data more accessible to EPA managers and stakeholders.

EPA is participating in 18 of the 25 E-Gov initiatives included in the PMA. As the "managing partner" for the E-Rulemaking initiative, we are coordinating the efforts of nine other agencies to redesign the rulemaking process. E-Rulemaking uses the internet to make the rulemaking process more accessible to interested parties. While federal rulemaking was once a paper-based process, E Rulemaking now offers one-stop access and user services such as text and document search capabilities and the ability for the public to submit comments electronically. EPA's system will serve as a template to improve existing "E-DOCKET" systems and will replace duplicative systems in many federal agencies.

As a leader in E-Gov, we are helping to simplify and unify common work processes across federal agencies and within EPA. We will continue applying new principles and methods to achieve better results, improve customer service, and provide greater savings to the American people.

INNOVATION AND COLLABORATION

EPA's progress over the next several years will depend greatly on our ability and commitment to find more effective tools and approaches to meet today's complex environmental challenges. Broad-based problems, such as polluted runoff, global climate change, and loss of habitat and biodiversity, are often the result of diffuse causes and cannot be solved fully with conventional regulatory controls. Rapid technological and scientific advances can bring breakthrough solutions, but also pose unknown or unexpected environmental and public health risks.

As EPA faces these complex challenges and a tightening federal budget, we increasingly turn to two important strategies that cross all of our goals and programs: finding innovative solutions and collaborating with others. In the coming years we must work even more effectively with organizations engaged in environmental issues, leveraging

limited resources and coordinating our authorities and capabilities. We also must involve other government agencies, businesses, communities, and individuals who might not ordinarily focus on environmental matters, yet have the distinctive expertise, perspectives, and resources to help solve environmental problems.

To make the greatest progress, we will promote an ethic of environmental stewardship that engages all parts of society—businesses, companies, communities, and individuals—in taking responsibility for environmental quality and achieving sustainable results. Environmental stewardship is based on the premise that government cannot meet environmental challenges alone. Rather we need all parts of society to understand how environmental protection aligns with broader social and economic interests and to engage with us in actively creating a sustainable future.

Innovating to Improve Environmental Results

Innovation is key to environmental progress. Innovation involves developing new ideas, testing their effectiveness, and then determining useful applications. It also involves making proven approaches even more effective or adapting them to address other needs. To drive progress under this *Strategic Plan*, EPA's innovation strategy is based on four elements.

Promoting State and Tribal Innovation. Because states and tribes are on the frontlines of environmental protection, they are in the best position to recognize problems and craft innovative solutions. EPA is committed to supporting innovation in state and tribal programs in a variety of ways. For example, states participate in EPA's Innovation Action Council. Through this senior-level policy forum, we jointly develop an innovation work plan that focuses attention on priority issues. Together, we are finding innovative

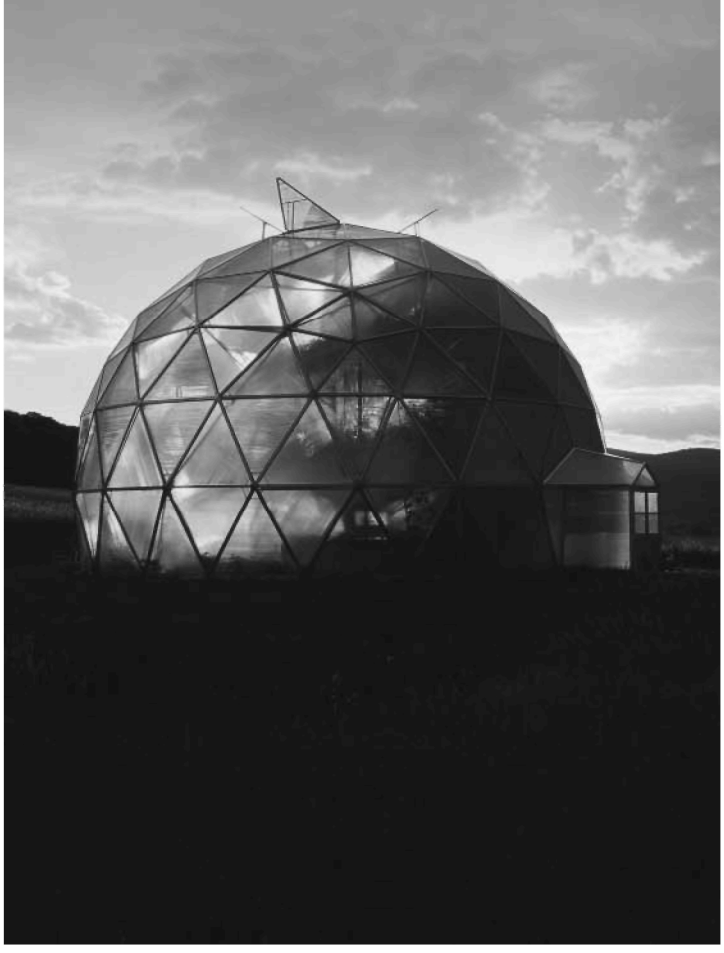
approaches to program management challenges, such as developing total maximum daily loads for impaired water bodies or using alternative approaches for managing hazardous waste under the Resource Conservation and Recovery Act.

We also support states through the competitive State Innovation Grant program which, since 2003, has provided funding to help states explore innovative approaches in three areas of mutual interest to EPA and states—environmental permitting, environmental management systems, and performance-based leadership programs. For example, these funds have been instrumental in helping states adapt an innovative approach to permitting first developed in Massachusetts. Today, 15 states are developing or applying programs similar to Massachusetts' Environmental Results Program to improve environmental performance in small business sectors, such as dry cleaning and printing.

Similarly, our Innovative Funding Workgroup, supported through EPA's Indian Program Policy Council, is developing options for the strategic and innovative use of funding, resources, and other opportunities to effect environmental change. The workgroup seeks to understand all of the various mechanisms that EPA and other agencies are using or could use to enhance coordination and environmental protection in Indian country.[2]

Supporting the Growing Interest in Green Building

Buildings and development have extensive effects on human health, natural resource use, and environmental quality. However, a growing interest in green building aims to reduce those impacts. Green building is the practice of creating healthier, more resource-efficient models of construction, renovation, operation, maintenance, and demolition. While many EPA programs work with the building and construction sectors to improve environmental performance, a cross-Agency Green Building Workgroup is bringing these programs together to share information, leverage resources, and pursue their common objectives with external stakeholders who have joined the green building movement. The Workgroup is a model of collaboration, and its emergence represents the kind of culture change that is called for in EPA's Innovation Strategy. It shows how EPA recognized an external trend and is responding with a multimedia approach that can advance all five of our strategic goals.



Focusing on Priority Problems. While innovation is essential for addressing all environmental challenges, EPA's innovation strategy targets a set of priority problems that are national in scope and in need of creative new ideas to assure progress: reducing greenhouse gases and ozone, restoring water quality, and addressing the funding gap for water infrastructure. Our strategy commits us to consider all potential avenues to address these diverse issues–regulations, policy, guidance, voluntary initiatives, and compliance assistance. By exploring such options, we can create a more diverse portfolio of solutions for these and future problems.

Developing Problem-Solving Tools and Approaches. EPA needs new tools and approaches to solve existing environmental protection problems and to prevent the emergence of new ones. We believe the future environmental protection system will rely less on technology requirements and more on strategies tailored to address whole facilities, communities, or industry sectors. It also will emphasize pollution prevention and natural resource conservation. Our innovation strategy focuses on developing tools that will expand current capabilities, for example, by supporting environmental technology innovation, increasing incentives, encouraging the use of environmental management systems, and developing results-oriented performance goals and measures.

Creating a Culture and Organizational Systems to Foster Innovation. Under the fourth element of our innovation strategy, we are working to foster innovation by changing our organizational culture and management systems. We recognize the need to improve our planning, budgeting, and accountability processes and invest in our human capital. We are also committed to futures planning to ensure that we and our partners are aware of and ready to respond to new trends and opportunities that can affect environmental quality.

Collaborating on Common Goals

Collaboration is critical to addressing today's more complex and often controversial issues. EPA has a long history of working successfully with others on environmental problems, breaking through institutional and other barriers to achieve more comprehensive results than we could by working alone. Collaborative approaches can produce more effective and durable decisions, because they generate a shared sense of ownership among the stakeholders who will implement them. Collaboration on data gathering and analysis boosts the potential for agreement and can transform our understanding of environmental problems.

We will continue to enhance our capacity to collaborate with others, and we will increase our managers' and staff's "collaboration competency," helping them know when and how to engage productively with others. Further, we are identifying new opportunities for involving stakeholders, making internal and external collaborative process experts more available to help facilitate complex decision making, and implementing a set of initiatives with other federal agencies to strengthen our collective ability to work with the public.

With States

The unique relationship between EPA and states is a cornerstone of the nation's environmental protection system: working together, we have significantly improved environmental quality and public health. Delegated state programs conduct much of the day-to-day work involved in environmental programs—including issuing permits, conducting compliance and enforcement activities, and monitoring environmental conditions—and EPA oversees these activities.

In addition to our partnerships with individual state environmental, public health, and agriculture agencies, EPA works at the national level with a variety of associations representing state governments. These organizations provide the state perspective that EPA needs to shape policies and programs. We work closely with the National Governors Association, National Council of State Legislatures, and the Environmental Council of the States, as well as with groups representing managers of specific environmental media programs, such as the Association of State and Interstate Water Pollution Control Administrators.

In 1995, EPA and state officials created the National Environmental Performance Partnership System, the foundation for our work with states. Through this system of performance-based partnerships, EPA and states are setting environmental priorities and program strategies, improving how we measure performance, implementing innovative solutions to environmental problems,

A Strategy for Reducing Electronics Waste

With America's increasing reliance on electronics, how can we best address the burgeoning problem of electronic waste? Part of the solution is supporting the market for environmentally-preferable electronic products. That is the goal of the Federal Electronics Challenge, an EPA partnership program that leverages the $65 billion spent annually in the United States on electronic equipment and services. Under this challenge, government agencies commit to making electronic purchases that meet certain environmental criteria, such as reduced use of toxic substances, virgin materials, and energy, thereby harnessing their considerable buying power to ensure that these greener goods are available for many other purchasers as well.

Collaborating with States on Environmental Data

One of the best examples of state and EPA collaboration is the National Environmental Information Exchange Network. Designed to help states and EPA share information more efficiently and effectively over the internet, this system provides real-time access to high quality data while saving agencies time and money once spent on paper-based data entry and reporting. Since 2002, EPA has provided more than $80 million in grants to help states, as well as tribes and territories, develop this Web-based system. The results are revolutionizing the exchange of environmental data. Several states are now using the Exchange Network to allow industries to submit their water discharge monitoring reports electronically. Others are using it to provide the public with timely beach closure and advisory information.

and strengthening data collection and management. Critical to this work is finding ways to maximize flexibility so that states can address their own priority needs while ensuring accountability for results.

With Tribes

EPA's work with tribes is based on the recognition that tribes have unique cultural, jurisdictional, and legal issues that must be considered when coordinating and implementing environmental programs in Indian country. One of their cultural distinctions is a longstanding commitment to environmental stewardship. Native Americans recognize the importance of not only protecting the environment, but of pursuing a longer-term goal of sustainability—a perspective that has much to offer as EPA pursues stewardship efforts.

EPA works with each tribe on a government-to-government basis. The Agency's 1984 Indian Policy formally recognizes the uniqueness of tribes and their rights as sovereign governments. In keeping with that policy, EPA will pursue innovative and coordinated programs that complement tribal government structures and incorporate tribal priorities to protect human health and the environment in Indian country.

As part of the National Tribal Operations Committee, EPA's Administrator, Deputy Administrator, and other senior Agency officials work with 19 elected or appointed tribal leaders, who comprise the National Tribal Caucus, to address environmental and human health issues in Indian country. EPA's nine regions with federal Indian tribes have similar working relationships or mechanisms in place for this purpose.

With Local Governments

Local governments are uniquely positioned to collaborate with EPA, other public agencies, and the private sector in finding ways to make life better for their citizens. Regulatory tools, such as land use planning authorities, building and health codes, and other ordinances allow local governments to address problems falling outside federal or state jurisdiction. At the national level, EPA's Local Government Advisory Committee provides advice and recommendations for building state and local capacity to deliver environmental services and programs.

With Other Federal Agencies

The President's 2004 Executive Order on Cooperative Conservation placed new emphasis on the need for collaboration on environmental problem-solving by calling for expanded cooperation among federal agencies with environmental and natural resource responsibilities. EPA will continue to be an active partner in Cooperative

Conservation and seek opportunities for further coordination with our federal partners.

One especially important component of Cooperative Conservation is a competency-based approach to developing collaboration and partnering skills in the federal workforce. In 2006, EPA developed a dynamic initial plan, which will be revised through dialogue with Agency staff and management, to ensure that these skills are a part of hiring, training, and recognizing EPA employees. By implementing this plan, we will enhance EPA's capability to foster collaborative problem-solving and attain our environmental and public health objectives.

With Other Countries

As our understanding of environmental issues has increased, so has our appreciation of the need to partner with other countries on environmental goals. International cooperation is vital to achieving our mission, and EPA has established three strategic priority areas for our international engagement.

Reduce Transboundary Pollution. Air pollution and toxic substances generated in other countries circulate through the atmosphere and can ultimately reach the United States. To meet many of our domestic environmental protection goals, therefore, we must address international sources of pollutants. In many cases, it is more efficient to reduce emissions from foreign sources than from domestic ones. For example, the majority of all mercury deposited in the United States originates from outside of our borders, and water-borne disease is greater along the U.S.-Mexico border than in the rest of the United States due to inadequate wastewater treatment. We must collaborate with our international partners to solve these and other problems.

Advance U.S. Interests Abroad. Our shared goals for environmental protection can open doors between the United States and foreign governments. Assisting other countries in their environmental protection efforts can be an effective part of a larger U.S. strategy for promoting sustainable

Learning from Local Leaders

Bartow County, Georgia is a model for collaborative environmental problem-solving at the local level. A fast-growing area northwest of Atlanta, Bartow County is implementing the first county-wide environmental management system in the nation. Designed to significantly reduce pollution across the county, this program is the result of a partnership that includes six cities, two school districts, the local chamber of commerce, several industry leaders, and the agricultural community. Over the past several years, the county has conducted a baseline audit of environmental performance and has developed environmental management resources, such as a Web site database for tracking air emissions, waste minimization, and water quality, and an air quality "tool box" for local officials. Air emissions have already been reduced by 25 percent. Based on its results, the Bartow County program is gaining attention at all levels of government; it was among the models showcased at the 2005 White House Conference on Cooperative Conservation.

development and advancing democratic ideals. EPA supports U.S. diplomatic, trade, and foreign policy goals that extend far beyond our domestic agenda.

Promote Good Environmental Governance. Good environmental governance abroad not only yields a cleaner environment, it helps ensure that U.S. companies and communities compete on an equal footing in the international marketplace. In particular, EPA works with U.S. trading partners to help them enforce their own environmental laws. Through leadership in the Organization for Economic Cooperation and Development, EPA supports environmental performance reviews of other countries so that good governance best practices—such as providing access to information, collaborating with diverse stakeholders, and providing transparency in environmental decision making—are shared and countries continually improve.

BEST AVAILABLE SCIENCE

Effective, proactive environmental protection requires a strong foundation of scientific knowledge. EPA uses the best available scientific approaches, data, and models to anticipate potential threats, evaluate risks, identify solutions, and develop standards that protect the environment and safeguard human health. Our science strategy is designed to generate the data we need to understand and manage risks and to guide research that can inform our decision making.

Asking the Right Questions

EPA works with states and tribes and across public and private sectors, drawing on the best scientific information available to help us ask the right questions and characterize problems clearly.

Our intramural research program conducts leading-edge research to help us understand the biological, physical/chemical, social, and other processes that drive environmental systems, and it provides the fundamental scientific basis for addressing a wide variety of environmental problems. For example, our intramural research program produces information used to conduct assessments for EPA's Integrated Risk Information System (IRIS), an electronic database of information on human health effects that may result from exposure to various chemicals in the environment. IRIS is a valuable risk assessment tool for EPA's regulatory programs, states, and industry. To guide our intramural program, EPA prepares multiyear research plans that set out the research goals we intend to achieve over a 5-10 year period and establish annual performance goals and measures of our progress.[3]

Each of EPA's environmental programs is supported by scientists and engineers with specialized program knowledge. Toxicologists, hydrologists, ecologists, and other experts apply best available science to implement our programs. For example, these experts may identify appropriate criteria for assessing water quality, set air pollutant standards that protect human health, explain fate and transport of pollutants in soil and groundwater, or characterize complex ecosystem responses to stress.

EPA's regional offices also rely on scientific expertise. The National Regional Science Council (NRSC), composed of representatives from each of 10 Regional Science Councils, develops informational products; sponsors conferences, workshops, and training; fosters collaboration; and identifies common regional needs.[4] The Tribal Science Council provides another forum that encourages key stakeholders to work with us on environmental science issues in Indian country,[5] including research, monitoring, modeling, data, technology, and training.

Our competitive Science to Achieve Results (STAR) program funds research grants and graduate fellowships in many environmental science and engineering disciplines. STAR engages the nation's best scientists and engineers in targeted research that complements EPA's intramural research program and those of our federal agency partners. Through this competitive process, we also periodically establish large research centers to address specific areas of national concern, such as children's health, hazardous substances, particulate matter, and estuarine and coastal monitoring.

EPA's Science Inventory[6] reflects the full range of our science activities: research, technical assistance, assessments, scientific and technical products, and peer reviews. A searchable catalogue of science activities, peer-reviewed products, and EPA archival records, the Inventory helps EPA scientists and managers track and coordinate scientific initiatives and serves as a resource for people interested in state-of-the-science at EPA.

Assuring Science Quality

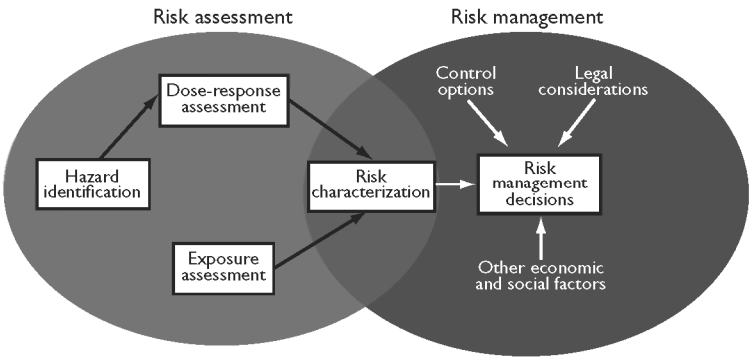
EPA's quality assurance programs ensure the integrity of environmental data by overseeing monitoring programs, approving data collection activity plans, and evaluating monitoring and laboratory practices. For example, as part of EPA's 2002 Information Quality

Guidelines,[7] we must ensure that the material our regulatory programs present to support risk assessments is comprehensive and informative. The information must be accessible enough to make our methodology, as well as our plans for identifying and evaluating risk, understandable to affected populations.

A key strategy for assuring science quality is peer review, an EPA priority for many years. EPA's Peer Review Policy[8] requires that major scientific and technical work products be reviewed by qualified, independent scientists outside of EPA. Peer review enhances credibility, uncovers technical problems, identifies additional information needs, and ensures that conclusions that follow from data comport with generally accepted scientific standards. The National Academy of Sciences (NAS), our Science Advisory Board (SAB), and the Board of Scientific Counselors (BOSC) are among the scientific organizations that review our products and advise EPA.

Using Science Correctly

EPA organizes much of its scientific information around the principles of risk assessment and risk management. We conduct risk assessments to help us understand the relative size (magnitude) and likelihood (probability) of risk that environmental stressors, such as air pollution or



Source: EPA Office of Research and Development

chemicals in drinking water, pose to human health and ecosystems. Risk management involves determining whether and how to reduce such risks.

Risk assessment is critical to EPA's work; we integrate risk assessments with economic data, engineering studies, and other information to provide the comprehensive scientific analyses we need to inform our decisions. Our Risk Assessment Forum, a standing committee of senior EPA scientists, focuses on fundamental, generic issues concerning risk assessments and related science policy and promotes Agency-wide consensus on difficult or controversial issues. EPA's Risk Characterization Policy and Handbook[9] guides our scientists in characterizing risk assessments properly.

Our Action Development Process also ensures that EPA's decisions are well informed by sound science and high quality data. Through this process, EPA's senior managers can consider a broad range of regulatory and non-regulatory options and analytic approaches in the earliest stages of project planning. The Action Development Process ensures that EPA scientists, economists, and other technical experts are appropriately involved in determining research and analysis needs, identifying alternatives, and selecting options.

A number of entities within EPA support our science efforts:

- The Office of Science Policy applies scientific expertise from within EPA's Office of Research and Development to ensure that consistent, cross-Agency scientific results, aided by technical evaluation and peer review, are part of our regulatory and policy decisions.
- Our Science Policy Council (SPC), chaired by the EPA's Science Advisor, addresses significant Agency-wide science policy issues. The SPC has produced the Genomics Action Plan, EPA's Nanotechnology White Paper, and the Risk Assessment Principles and Practices Staff Paper.
- The Council on Regulatory Environmental Modeling guides us in developing and using environmental models. The Council has developed an inventory of the EPA models that are used most frequently and continues to promote open, transparent model design.

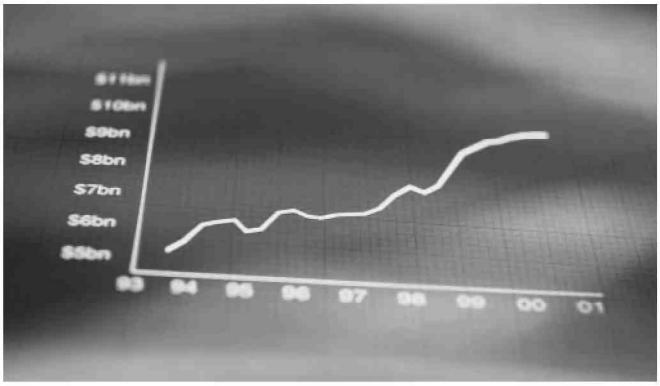
Scientific information often includes some degree of uncertainty, inviting a diversity of interpretations. However, scientists are increasingly able to calculate and quantify uncertainty. For example, states most often cite nutrients, pathogens, and sediments as the stressors contributing to impaired surface waters. But our ability to measure pathogens and infer their sources within watersheds is very limited, and the quantitative dose-response data for sediments are virtually non-existent. As a result, uncertainty is high, and it limits EPA's and states' ability to meet water quality goals. Accordingly, we attach a high value on research to address these problems. Similarly, EPA places a high priority on efforts to reduce the uncertainty associated with calculating the reference dose, reference concentration, or benchmark dose. The Stochastic Human Exposure and Dose Simulation model and the Exposure Related Dose Estimating Model are two examples of promising physically-based probabilistic computer models designed to estimate human exposure, absorbed dose, and eliminated dose.

Measuring Success

Measuring our performance is key to improving it. Regulatory agencies are accountable for demonstrating that their expenditures result in measurable outcomes. For EPA, that means linking regulatory and policy decisions—reducing emissions of particulate matter, for example—to quantifiable improvements in public health and ecological condition-fewer deaths from cardiovascular disease.

Empirical observations and research are increasing our ability to measure the effectiveness of our programs and to adjust and improve them to gain efficiencies and meet our goals. We will continue to improve the ways we use existing information to assess our performance by strengthening systems that monitor environmental conditions and developing surveillance systems that track ecological or health outcomes.

EPA's *Report on the Environment* work has also advanced our performance measurement, using existing and new analytical information to describe current national environmental conditions and trends and identify additional research needs. The work we are doing to prepare our *Report on the Environment*—



Technical Document (to be released in 2007) will further our efforts to frame innovative solutions to complex cross-goal issues and advance rigorous scientific approaches to measuring associated outcomes.

Under the President's Management Agenda initiative, EPA is applying explicit research and development (R&D) investment criteria to improve R&D program management, inform funding decisions, and increase public understanding of the benefits of their R&D investments. EPA's R&D programs have well-conceived plans that identify program goals and priorities and are linked to regional and national needs. These plans are developed by Research Coordination Teams, comprising program office, regional, and research program representatives, to ensure strong coordination.

Notes

1. U.S. Office of Management and Budget. 2002. *The President's Management Agenda: FY 2002*. Washington, DC: U.S. Government Printing Office. Available online at: www.whitehouse.gov/omb/budget/fy2002/mgmt.pdf: Executive Office of the President, OMB Web Site. Date of Access: September 15, 2003.
2. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.
3. Refer to: www.epa.gov/osp/research.htm.
4. Refer to: http://intranet.epa.gov/ospintra/scienceportal/.
5. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.
6. Refer to: www.epa.gov/si.
7. Refer to: www.epa.gov/quality/informationguidelines/.
8. See "Peer Review and Peer Involvement at the U.S. Environmental Protection Agency" and the second edition of the Peer Review Handbook, which provides detailed guidance for implementing the policy (www.epa.gov/peerreview.)
9. Refer to: www.epa.gov/OSA/spc/pdfs/rchandbk.pdf.

APPENDIX A:

Social Costs and Benefits

APPENDIX A—SOCIAL COSTS AND BENEFITS

Evaluating the benefits and costs of EPA programs is extremely useful for strategic planning at EPA. Generally, we examine how we can allocate resources and target policies so as to achieve the maximum net benefits for society, given statutory and other considerations. In addition to using benefit-cost analysis in our strategic planning, Presidential Executive Order 12866, "Regulatory Planning and Review,"[1] requires EPA to use benefit-cost analysis when formulating economically significant regulations. Specifically, Executive Order 12866 directs that agencies "in choosing among alternative regulatory approaches…should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages, distributive impacts, and equity), unless a statute requires another regulatory approach." In a similar manner, strategic goals and objectives also should reflect approaches that maximize net benefits and provide the best investment of society's limited resources.

EPA regularly publishes benefit-cost analyses of its proposed and final regulations, and the Office of Management and Budget also produces estimates of the economic consequences of federal regulations in its annual *Report to Congress on the Costs and Benefits of Federal Regulations*.[2] It is often very difficult to provide quantitative estimates of the costs, and particularly the benefits, of environmental policies because many health and ecological benefits do not easily lend themselves to monetization. However, even when data are limited, assessing benefits and costs still can be valuable because it enumerates the types of beneficial and detrimental consequences resulting from policy actions.

Appendix 1 of EPA's *2003-2008 Strategic Plan* described the social costs and benefits of its programs for the year 2002. The analysis was limited largely because EPA's economic models and tools have not been developed to estimate the aggregate costs and benefits of achieving the kind of ambitious, broad, long-term goals adopted in strategic planning.

Although new analyses have not been performed for the *2006-2011 Strategic Plan*, EPA will separately be providing additional information on some of the social costs and benefits of its programs and policies. For example, we anticipate releasing a report by Summer 2007 on the results of our 2006 Pollution Abatement Cost and Expenditures Survey. Earlier versions of the survey support many of the estimates used in the *2003-2008 Strategic Plan* appendix, but results from the current survey will not be available in time to be used in the *2006-2011 Strategic Plan*. EPA's *2003–2008 Strategic Plan* Social Costs and Benefits Appendix can be accessed at: www.epa.gov/ocfo/plan/2003sp.pdf (pages 173-214).

1. The Executive Order 12866—(Federal Register: September 30, 1993, Vol. 58, No. 190, Pg. 51735) can be accessed at: www.epa.gov/fedgstr/eo/eo1286.htm.
2. OMB's annual report to Congress can be accessed at: www.whitehouse.gov/omb/inforeg/regpol-reports_congress.html.

APPENDIX B:

Proposed Future Program Evaluations

APPENDIX B—PROPOSED FUTURE PROGRAM EVALUATIONS

Program evaluation is a formal assessment, through objective measurement and systematic analysis, of the manner and extent to which government programs achieve intended objectives. A focused program evaluation will examine specifically identified factors of a program in a more comprehensive way than day-to-day experience provides. Evaluating environmental programs enables EPA to continuously streamline and modernize our operations while managing our programs, promoting continuous improvement, and supporting innovation. We can also incorporate the lessons we learn into other programs. This appendix lists proposed program evaluations that support EPA's five strategic goals by goal and objective.

GOAL 1			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Measuring Effectiveness of the Air Toxics Monitoring Program in the EPA Region 9 office	Goal 1, Objective 1	EPA is planning to conduct a systematic analysis of the effectiveness of its San Francisco regional office's Air Toxics Monitoring Program in meeting program objectives. The evaluation will include analysis of data from several sources, which will be used to develop a logic model based on outcomes, resources, customers, and federal, state, local, and tribal activities. As a result of the evaluation, quantitative measures will more clearly link the region's contributions to the national Air Toxics Program's GPRA goals, and the assessment will be relevant to national program design developments.	FY 2007

GOAL 2			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Assessment of Public Water Supply Logic Model	Goal 2, Objective 1	The proposed project is an assessment of the FY 2006 piloting of the Public Water System Supervision logic model as a tool for oversight, program assessment, and program management. Discussion will center on lessons learned, recommendations from pilot regions and states on possible changes to the oversight process, and ideas for new indicators or revisions to existing indicators. Based on the assessment, EPA also will consider which logic model indicators should be included in the next *EPA Strategic Plan* (2009-2014).	FY 2007

GOAL 2 (*continued*)			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Assessment of Public Water Supply Logic Model *(Continued)*	Goal 2, Objective 1	Information will be collected through interviews and facilitated discussion with EPA regional offices and state managers and staff.	FY 2007
Measuring Effectiveness of the Beaches Environmental Assessment and Coastal Health (BEACH) Act Grants	Goal 2, Objective 2	EPA's Office of Water administers the BEACH Act by making available almost $10 million in grants each year to 35 eligible coastal states/territories to protect public heath at the nation's beaches. States/territories use these grants to monitor water quality at their beaches and to notify the public when water quality problems exist. The ultimate goal is to protect millions of Americans from exposure to unhealthy levels of pathogens at coastal beaches by giving them the information to make informed choices on where to swim. The evaluation will assess the effectiveness of state and territory BEACH monitoring/notification programs by reviewing relevant beach monitoring and notification data and studies completed by the local beach authorities. EPA will also visit nine state officials who administer monitoring and public notification data to obtain their perspectives on the utility of monitoring and the effectiveness of their programs.	FY 2008
Review of State On-Site/ Decentralized Programs	Goal 2, Objective 2	This review will look at the elements of state on-site/decentralized programs to evaluate whether they are adequate to protect public health and the environment. The elements to be reviewed include planning, performance, site evaluation, design, construction, operations and maintenance, compliance inspections and monitoring, residuals management, record keeping, inventory and reporting, public education, and funding/financial assistance. Data will be collected through document reviews and meetings with regional and state staff.	FY 2008
Program Evaluation of Tribal 106 Grant Guidance	Goal 2, Objective 2	With the FY 2007 grant cycle, EPA's Office of Water is beginning to use the new Tribal 106 Grant Guidance to lead tribes in a more structured direction for managing their water quality protection programs. The new guidance guides tribes through various alternatives for designing their water quality programs and tiers of improvement. The guidance also lays the foundation for a new era of monitoring and collecting data on tribal waters.	FY 2008

GOAL 2 (*continued*)			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Program Evaluation of Tribal 106 Grant Guidance *(Continued)*	Goal 2, Objective 2	The evaluation will focus on a core subset of tribes (most likely those tribes committed to meeting Program Activity Measure WQ-9 and implementing monitoring strategies in FY 2007) to assess the effectiveness of the guidance in meeting new tribal water quality requirements, such as development of tribal monitoring strategies, data collection, and submission to EPA. It will include a narrative assessment of tribal water quality, and will monitor EPA's ability to define, as per the guidance, a baseline for tracking and assessing the quality of waters in Indian country.[1]	FY 2008
Evaluation of the Clean Water Act Section 319 Non-Point Source Program	Goal 2, Objective 2	The Clean Water Act establishes a "national policy" to develop and implement non-point source (NPS) programs expeditiously to achieve the goals of the Act. The Section 319 program addresses NPS pollution, which is the largest remaining cause of water quality impairments. Section 319 is the only program to address all sources of NPS pollution. Section 319 can be used for monitoring and watershed planning, for which U.S. Department of Agriculture funds cannot be used. Evaluation methodology will include analysis of project documents and monitoring results, site visits, and discussion sessions and interviews with state managers and staff and regional project officers.	FY 2008
Measuring the Success of Water Quality Trading to Meet NPDES Permit Limits	Goal 2, Objective 2	One of EPA's key priorities is to foster innovative, market-based solutions to environmental problems. Trading pollutant credits among point and non-point sources is a flexible way to meet NPDES permit limits and obtain substantial cost savings. This evaluation will identify lessons learned from successful voluntary water quality trading programs; potential barriers to trading; and opportunities for improving Agency policies, guidance, and outreach/education efforts to foster water quality trading. The evaluation will collect information through interviews with federal employees, state NPDES permit writers, and local champions/developers of water quality trading programs.	FY 2007
Program Evaluation of the Targeted Watersheds Grants (TWG)	Goal 2, Objective 2	The TWG focus on identifying watersheds for which community-based collaborative partnerships are ready to implement watershed plans that, when funded, will lead to accelerated and measurable environmental results.	FY 2007

GOAL 2 (*continued*)			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Program Evaluation of the Targeted Watersheds Grants (TWG) *(Continued)*	Goal 2, Objective 2	EPA plans to evaluate the extent to which environmental results are being achieved as a result of TWG Implementation grants. The evaluation will also assess factors that contribute to implementing projects successfully and achieving quantifiable environmental results, including expanding grant recipients' technical and organizational capacity. Evaluation methodology will include analysis of project documents and monitoring results, site visits, and discussions and interviews with selected grantees and their regional project officers	FY 2007

GOAL 3			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Measuring the Effectiveness of the CORE Emergency Response (ER) Program Review Process	Goal 3, Objective 2	EPA's Office of Emergency Management (OEM) CORE ER review process appears to have improved response preparedness in all the regions. The program has reached certain goals, expressed as CORE ER scores, that are taken to be a measure of each region's preparedness. OEM will test whether reaching those goals makes a difference in the real response world. In addition, OEM needs to improve the CORE ER instrument (checklist) to address lessons learned from recent responses. This project will evaluate whether perceived improvement in preparedness is providing more efficient and effective response to real incidents. CORE ER involves all 10 EPA regions.	FY 2007
Superfund Program Reviews	Goal 3, Objective 2	The Superfund program review is a 24-month process where each region will undergo a review on selected program elements. The review elements are selected based on their relative importance in meeting program targets such as construction completions, human exposures under control, contaminated groundwater under control, and deletions. This process involves conducting in-depth regional interviews and discussion sessions on the selected program elements, using carefully designed governing questions.	Complete first Superfund program review cycle in second quarter of FY 2008. Initiate second Superfund program review cycle in third quarter FY 2008 and complete this cycle in FY 2010.

GOAL 3 (*continued*)			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Joint Project with EPA's Conflict Prevention and Resolution Center on Impacts and Effectiveness of the Collaborative Decision-Making Process at Superfund Sites	Goal 3, Objective 2	This project will assess the effects of the collaborative process compared with an alternative, such as litigation. It will evaluate whether or not the collaborative process leads to a Record of Decision stage at Superfund sites and provides a better environmental result than the alternative process. Evaluation results will inform the collaborative decision-making process.	Estimated completion date FY 2007
Superfund Workload Assessment Project	Goal 3, Objective 2	This project will develop a sound analytical basis for ensuring that human resources are used effectively and efficiently to achieve program goals. A Working Group, composed of representatives of all major EPA Superfund stakeholders, will use a bottom-up approach to determine work years required to implement and support the program.	Estimated completion date FY 2008
Re-evaluation of Site-Specific Payroll Charging	Goal 3, Objective 2	This evaluation will focus on whether improvement has occurred based on the site-specific payroll benchmarking effort completed in second quarter of FY 2006.	This is a follow-up project to work completed in second quarter FY 2006.
Broaden Core Emergency Response (ER) Program and Evaluate Annually	Goal 3, Objective 2	We will extend the Core ER program to include all aspects of emergency management activities (i.e., emergency response, emergency preparedness, and accident prevention.) We will use the baseline already developed under Core ER, to adapt and broaden the Core ER process, and then annually evaluate all aspects of the emergency management program.	Implement changes and begin evaluations during FY 2007.

GOAL 4			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Evaluation of the National Estuary Program	Goal 4, Objective 3	The purpose of this evaluation is to assess the progress the 28 estuaries have made in meeting their goals since the inception of the National Estuary Program in 1987. Effort will be made to characterize and assess best practices that can be transferred to other geographic-based programs.	2007-2008

GOAL 4 (*continued*)			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Program Evaluation of EPA's Wetlands Program Development Grants	Goal 4, Objective 3	EPA is authorized to manage a Wetland Program Development Grant program to empower partners in developing comprehensive state and tribal wetlands programs. EPA's Wetlands Division would like to evaluate the effectiveness of the grants in achieving program outcomes. EPA will use a retrospective data mine of its databases supplemented by information from sources such as interviews with regional staff and data from organizations such as the Association of State Wetland Managers and the Environmental Law Institute. Statistical analysis will answer some questions, while others will be best answered with descriptive narratives.	Scoping and refinement of questions to be answered during the evaluation and methodology to be conducted in 2007. Evaluation to be conducted in 2008.

GOAL 5			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Evaluating EPA's Petroleum Refinery National Priority Performance-Based Strategy Implementation	Goal 5, Objective 1	As part of EPA's strategic planning process, our Office of Enforcement and Compliance Assurance (OECA) develops a national program priority component that focuses attention on specific environmental problems and patterns of non-compliance. This evaluation will help identify components of a successful priority work process for addressing significant national environmental problems. OECA is currently midway in implementing 9 priority strategies under its FY 2005-2007 work planning cycle, and seeks to learn more about the specific aspects of the petroleum refinery process that worked well, and can be applied to other industry sectors and media programs and replicated at the regional and state levels. Knowledge gained from an effective exit strategy for the Petroleum Refinery process will help to inform the process for the nine current priorities and future efforts. Evaluation methodology includes interviews with EPA staff, partners, and stakeholders. In addition, the evaluation will require a review of strategy documents and supporting data.	FY 2007

GOAL 5 (*continued*)			
Evaluation Topic	**Strategic Goal and Objective**	**Proposed General Scope and Issues To Be Addressed**	**Timeframe**
Evaluation of the full implementation of the State Review Framework	Goal 5, Objective 1	This evaluation will address the effectiveness of implementing the State Review Framework (SRF) in all 50 states and 5 territories. The SRF is a tool to assess performance in core enforcement and compliance assurance for state air, water, and hazardous waste programs. The SRF was piloted in 10 states in FY 2006. By the end of FY 2007, the remaining states and territories will be reviewed. The evaluation methodology will include surveys of state environmental agencies that were reviewed under the SRF and surveys of state media association members.	The evaluation will be conducted in FY 2008 when the implementation phase is complete.
EPA New England Marina Initiative	Goal 5, Objective 2	Under the EPA New England marina initiative, which ran from 2001 to 2005, a variety of marina environmental assistance projects were implemented and the results were measured. The primary goal of this effort was to help marinas meet required and desired practices managing stormwater, oil and fuel, and hazardous waste. Under the measurement component, environmental indicators were established and measured using statistically valid methods, including on-site assessment visits to monitor progress. The evaluation will determine the extent to which the program achieved its intended objectives. Evaluation methodology includes a review of the results of 140 on-site marina visits, as well as a review of regulatory records.	FY 2007
Evaluation of the National Environmental Performance Track (NEPT) program	Goal 5, Objective 2	This third party evaluation will review the effectiveness of the NEPT program in meeting its stated goals. The project will evaluate whether the program is likely to achieve the intended results, and will make appropriate recommendations on program design and implementation.	FY 2008: Initiate evaluation. FY 2009: Complete evaluation and develop recommendations to implement findings.

Notes

1. Use of the terms "Indian country," "Indian lands," "tribal lands," "tribal waters," and "tribal areas" within this *Strategic Plan* is not intended to provide any legal guidance on the scope of any program being described, nor is their use intended to expand or restrict the scope of any such programs.

APPENDIX C:

Summary of Consultation Efforts

APPENDIX C—SUMMARY OF CONSULTATION EFFORTS

Consultation with EPA's federal, state, local, and tribal government partners and with our many stakeholders has been an integral part of the Agency's strategic planning process. The views, comments, and concerns of our partners and stakeholders form the basis for developing our 5-year *Strategic Plan*, and their ongoing participation is vital to achieving the goals and objectives we have set forth.

EPA's national and regional managers organized meetings, participated in conferences, and presented briefings to ensure that our partners and stakeholders fully understood our process for developing this *Strategic Plan* and had the opportunity to participate. We distributed our proposed strategic architecture–goals, objectives, sub-objectives, and associated strategic targets–and subsequently the full-text draft of the *Strategic Plan* to hundreds of our partners and stakeholders. We posted working papers, the draft *Strategic Plan* architecture, and the full-text draft of the *Plan* on EPA's internet website, and we offered several options for individuals and groups to provide their comments. We carefully considered all the comments we received at each stage of the development process.

This appendix summarizes major activities we conducted to consult with parties interested in or likely to be affected by EPA's *Strategic Plan*. It briefly describes our consultation with the Congress and our state and tribal partners. It also includes a list of all organizations (for example, state, tribal, and industry associations) as well as federal agencies from which we solicited or received comments.

Early Consultation on State and Tribal Issues and Priorities

Since states and tribes are major partners with EPA in environmental protection, we were very interested in their views and concerns. In August 2005, EPA regional offices consulted with states and tribes about the issues and priorities they felt were important for EPA to consider as we revised our *Strategic Plan*. Regional offices prepared brief summaries of the concerns highlighted; these were posted on EPA's internet site for public view and provided to our strategic goal teams for consideration. We also posted goal team responses describing how the state and tribal issues and priorities raised were considered in revising the *Plan*.

Release of Draft Architecture and Full-Text Draft

EPA considered all comments received from our state and tribal partners on our draft strategic architecture, which we sent to more than 800 organizations for review and comment in mid-February 2006. We solicited comments on the draft architecture from Members of Congress; states and state organizations; all federally recognized tribes; tribal organizations; local government representatives; other federal agencies; members of environmental, academic, and public policy groups; and representatives of the regulated community through March 2006.

We took into account all the comments we received on the draft architecture as we developed a full-text draft of the *Strategic Plan*. We provided this full-text draft to the more than 800 recipients noted above and solicited their comments through mid-July 2006.

Reviewers were offered multiple alternatives for submitting comments on the architecture and full text draft—electronically, via EPA's internet website; by mail; and by telephone. We designed a database to capture comments, which were immediately forwarded to appropriate staff and managers for consideration.

Consulting with State Partners

In addition to the early outreach to states and tribes described above, EPA goal teams worked with media-specific state associations to develop the strategic architecture and means and strategies for achieving our goals and objectives. EPA also collaborated with the Environmental Council of the States (ECOS), the national association of state and territorial environmental commissioners, participating in several national meetings sponsored by ECOS and ensuring that ECOS members were well informed about the *Strategic Plan* revision process and the opportunities for engagement. ECOS assisted us during the development of this *Strategic Plan* by providing information and materials for review to individual state agencies and by coordinating responses from ECOS members on the full-text draft. In addition, Agency goal teams were encouraged to work with the appropriate ECOS media committees throughout the revision process.

Consulting with Tribal Partners

In June 2005, EPA staff participated in the National Tribal Conference on Environmental Management to discuss the revision of EPA's *Strategic Plan*. This meeting brought together tribal leaders and senior tribal environmental managers from across the country and provided a forum for soliciting tribal perspectives on the most important environmental challenges in the years ahead.

We continued to consult with tribes at the national and regional levels throughout the development of the *Strategic Plan*. EPA representatives met with the National Tribal Caucus in March 2006 to discuss their comments on the draft strategic planning architecture. Our strategic goal teams were encouraged to work with tribal liaisons identified by the Tribal Caucus and with tribal media associations. EPA representatives also participated regularly in Tribal Caucus meetings to keep members aware of progress and opportunities for engagement.

Consulting with the Congress

In February 2006, we provided the Chairmen and Ranking Minority Members of EPA's authorizing and appropriations committees, their staffs, and other interested Members with copies of our draft strategic architecture. We provided the full-text draft of EPA's *Strategic Plan* to Members and Congressional staff in early June. Congressional contacts were encouraged to submit comments on these documents electronically, via the database link to EPA's internet site, by telephone, or by mail.

On April 11, 2006, EPA met (hosted by staff of the Senate Environment and Public Works Committee) with interested Senate staff to discuss the requirements of the Government Performance and Results Act, EPA's strategic planning process, our draft strategic architecture, and plans for next steps in developing the full-text draft of the *Strategic Plan*. This consultation session was followed by a briefing on May 10, 2006 for additional staff members of the Senate Environment and Public Works Committee. A briefing on the full-text draft for staff of the Committee was held on June 23, 2006.

List of Organizations Consulted

In preparing our *2006-2011 Strategic Plan*, EPA consulted with several hundred organizations and individuals. In addition to the groups mentioned above, we solicited or received input on our draft documents from the following organizations.

Organizations

Alameda County, California, Waste Management Authority
Alaska Intertribal Council
Alternatives for Community and Environment
American Association for the Advancement of Science
American Chemical Society Task Force on Environmental Health and Safety
American Chemistry Council
American Farmland Trust
American Forest and Paper Association
American Forests
American Indian Science and Engineering Society
American Industrial Health Council
American Lung Association
American Petroleum Institute
American Public Health Association
American Rivers
American Society of Civil Engineers
American Water Works Association
ARI Technologies
Arizona Department of Environmental Quality
Aroostook Band of Micmacs
Association of American Pesticide Control Officials
Association of Metropolitan Water Agencies
Association of State Drinking Water Administrators
Association of State and Interstate Water Pollution Control Administrators
Association of State and Territorial Health Officials
Association of State and Territorial Solid Waste Management Officials
Association of State Drinking Water Administrators
Association of State Wetland Managers
Bowdoin College
Business Roundtable
California Department of Health and Human Services
California Indian Basketweavers Association
Center for Biological Diversity
Center for International Environmental Law
Center for Regulatory Effectiveness
Central States Air Resources Agencies
Cheyenne River Sioux Tribe
Children's Defense Fund
Chippewa Ottawa Resource Authority
Clean Water Action
Clean Water Network
Coalition for Effective Environmental Information
Coalition for Environmentally Responsible Economics
Columbia River Intertribal Fish Commission
Concurrent Technologies Corporation
Confederated Tribes of Siletz Indians
Confederated Tribes of the Umatilla Indian Reservation
Conservation Fund
Construction Materials Recycling Association
Corporate Environmental Enforcement Council
Council of Energy Resource Tribes
Council for Excellence in Government
Council of State Governments
CropLife America
Defenders of Wildlife
Duke University
EarthJustice Legal Defense Fund
Eco-Cycle
Ecological Society of America
Electric Power Research Institute
Environmental Council of the States
Environmental Defense
Environmental Health Coalition
Environmental Law Institute

Environmental Working Group
Friends of the Earth
Fund for Animals
Georgia Environmental Protection Division
Great Lakes Indian Fish and Wildlife Commission
Greengoat
Greenpeace
Haudenosaunee Environmental Task Force
Hualapai Nation
Humane Society of the United States
Idaho Department of Environmental Quality
Indigenous Environmental Network
Indigenous Waters Initiative
Institute for Tribal Environmental Professionals
Intertribal Advisory Committee of the Nez Perce Tribe
Intertribal Agriculture Council
Intertribal Bison Cooperative
Intertribal Council of Arizona
Intertribal Council of Michigan
Intertribal Environmental Council of Oklahoma
Intertribal Timber Council
International City/County Management Association
Iowa Department of Natural Resources
Kansas Department of Health and Environment
Lac Vieux Desert Band of Lake Superior Chippewa Indians
Local Government Advisory Committee
Louisiana Department of Environmental Quality
Maine Board of Pesticide Control
Mercatus Center
Midwest Alliance of Sovereign Tribes
Midwest Tribal Aquaculture Network
Minnesota Pollution Control Agency
Missouri Department of Agriculture, Bureau of Pesticide Control
Missouri Department of Natural Resources
Mni Sose Intertribal Water Rights Coalition
Montana Department of Environmental Quality
Montana Department of Natural Resources
Morgan, Lewis and Bockius
National Academy of Public Administration
National Advisory Council for Environmental Policy and Technology
National Association of Attorneys General
National Association of Home Builders
National Association of Manufacturers
National Association of Schools of Public Affairs and Administration
National Association of State Departments of Agriculture
National Association of State Universities and Land Grant Colleges
National Audubon Society
National Congress of American Indians
National Council for Science and the Environment
National Environmental Trust
National Federation of Independent Business
National Fish and Wildlife Foundation
National Fisheries Institute
National Indian Health Board
National Mining Association
National Parks Conservation Association
National Pesticide Management Association
National Pollution Prevention Roundtable
National Research Council
National Tribal Air Association
National Tribal Caucus
National Tribal Environmental Council
National Wildlife Federation
Native American Fish and Wildlife Society
Native American Rights Fund
Native American Water Association
Native Ecology Initiative, Incorporated
Natural Resources Defense Council
Navajo Nation
Nevada Division of Environmental Protection
New England Interstate Water Pollution Control Commission
New Jersey Department of Environmental Protection
New Mexico Environmental Department, Surface Water Quality Bureau
New York State Department of Health
North Carolina Department of Environment, Health, and Natural Resources
Northwest Indian Applied Research Institute

Northwest Indian Fisheries Commission
Ocean Conservancy
Oglala Sioux Tribe
Oklahoma Office of the Environment
Oklahoma Water Resources Board
OMB Watch
Oregon Department of Environmental Quality
Pennsylvania Department of Environmental Protection
People for the Ethical Treatment of Animals
Pesticide Policy Coalition
PPG Industries, Incorporated
Prescott Land and Livestock
Princeton University
RAND Public Policy Research
React For Environmental Justice
Resources for the Future
River Network
Rocky Mountain Institute
San Francisco Department of the Environment
Solid Waste Association of North America
Southern Organizing Committee for Economic and Social Justice
State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials
Tribal Science Council
Tribal Solid Waste Advisory Network
U.S. Chamber of Commerce Environment, Energy and Technology Affairs
U.S. Composting Council
U.S. Public Interest Research Group
Union of Concerned Scientists
United South and Eastern Tribes, Incorporated
University of Minnesota, Department of Soil, Waste, and Climate
Utah Department of Environmental Quality
Vermont Department of Environmental Conservation
Vermont Water Supply Division
Virginia Department of Environmental Quality
Washington State Department of Health
Waste Management, Incorporated
West County Toxics Coalition (California)
West Virginia Department of Environmental Protection
Western Governors Association
Western Regional Air Partnership
Wilderness Society
Wildlife Habitat Enhancement Council
World Resources Institute
Yukon River Intertribal Watershed Council

Federal Agencies

Army Corps of Engineers
Consumer Product Safety Commission
Department of Agriculture
Department of Commerce
Department of Defense
Department of Education
Department of Energy
Department of Health and Human Services
Department of Housing and Urban Development
Department of the Interior
Department of Justice
Department of Labor
Department of State
Department of Transportation
Department of Treasury
Federal Emergency Management Agency
Federal Energy Regulatory Commission
General Services Administration
National Aeronautics and Space Administration
National Oceanic and Atmospheric Administration
National Science Foundation
Nuclear Regulatory Commission
Office of Management and Budget
Small Business Administration
Tennessee Valley Authority
U.S. Agency for International Development
U.S. Geological Survey
U.S. Trade Representative

APPENDIX D:

Areas of Coordination Between EPA and Other Federal Agencies

APPENDIX D—AREAS OF COORDINATION BETWEEN EPA AND OTHER FEDERAL AGENCIES

Areas of continued cooperation or coordination with other federal agencies for each of EPA's five strategic goals (indicated by an "X"):

Department / Agency	Goal				
	Goal 1: Clean Air and Global Climate Change	**Goal 2:** Clean and Safe Water	**Goal 3:** Land Preservation and Restoration	**Goal 4:** Healthy Communities and Ecosystems	**Goal 5:** Compliance and Environmental Stewardship
Agriculture	X	X	X	X	X
Army Corps of Engineers	X	X	X	X	X
Commerce	X			X	
Consumer Product Safety Commission	X	X	X	X	X
Defense	X	X	X	X	X
Education	X	X	X	X	X
Energy	X	X	X	X	X
Federal Emergency Management Agency		X	X	X	
General Services Administration			X		X
Health and Human Services	X	X	X	X	X
Homeland Security	X	X	X	X	X
Housing and Urban Development	X	X		X	X
Interior	X	X	X	X	X
Justice	X	X	X	X	X
Labor		X		X	X
National Aeronautics and Space Administration	X	X	X	X	X
National Science Foundation				X	X
Nuclear Regulatory Commission	X	X			
Small Business Administration	X	X	X		X
State	X	X		X	
Transportation	X	X	X	X	X
Treasury	X				X
Tennessee Valley Authority		X		X	
U.S. Agency for International Development	X	X		X	
U.S. Trade Representative				X	

Clean Air and Global Climate Change

Protect and improve the air so it is healthy to breathe and risks to human health and the environment are reduced. Reduce greenhouse gas intensity by enhancing partnerships with businesses and other sectors.

Clean and Safe Water

Ensure drinking water is safe. Restore and maintain oceans, watersheds, and their aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife.

Land Preservation and Restoration

Preserve and restore the land by using innovative waste management practices and cleaning up contaminated properties to reduce risks posed by releases of harmful substances.

Healthy Communities and Ecosystems

Protect, sustain, or restore the health of people, communities, and ecosystems using integrated and comprehensive approaches and partnerships.

Compliance and Environmental Stewardship

Protect human health and the environment through ensuring compliance with environmental requirements by enforcing environmental statutes, preventing pollution, and promoting environmental stewardship. Encourage innovation and provide incentives for governments, businesses, and the public that promote environmental stewardship and long-term sustainable outcomes.

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