

*CLEAN WATER ACTION PLAN:
RESTORING AND PROTECTING
AMERICA'S WATERS*

LETTER TO THE VICE PRESIDENT

February 14, 1998
The Honorable Albert Gore, Jr.
Vice President of the United States
The White House
Washington, D.C. 20500

Dear Mr. Vice President:

On October 18, 1997, the 25th anniversary of the 1972 Clean Water Act, you directed us to work with other federal agencies and the public to develop a Clean Water Action Plan that charts a course toward fulfilling the original goal of the Clean Water Act - "fishable and swimmable" waters for all Americans. We are pleased to submit the enclosed Clean Water Action Plan on behalf of the Department of Agriculture, the Environmental Protection Agency, and the other federal agencies that assisted us in its development.

Over the past 25 years, America has made outstanding progress in reducing water pollution and restoring our rivers, lakes and coastal waters. In communities across the country, restoration of water quality has had dramatic environmental, recreational, and economic benefits. Despite this progress, serious water pollution problems persist. States report that about 40 percent of the waters they assessed do not meet water quality goals. About half of the nation's over 2,000 major watersheds have serious or moderate water quality problems.

This Clean Water Action Plan provides a blueprint for restoring and protecting the nation's precious water resources. The Action Plan builds on the Clinton Administration's accomplishments over the past five years and proposes aggressive new actions to strengthen the program.

A key element in the Action Plan is a new cooperative approach to watershed protection in which state, tribal, federal, and local governments, and the public first identify the watersheds with the most critical water quality problems and then work together to focus resources and implement effective strategies to solve those problems. The Action Plan also includes new initiatives to reduce public health threats, improve the stewardship of natural resources, strengthen polluted runoff controls, and make water quality information more accessible to the public.

We look forward to working with you to ensure that the nation continues to make steady progress in restoring and protecting the health of water resources in ways that make sense for the communities that depend upon them.

Sincerely,

[s]
Carol Browner
Administrator
U.S. Environmental Protection Agency

[s]
Dan Glickman
Secretary
U.S. Department of Agriculture

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Clean Water Action Plan: Overview

CLEAN WATER - THE ROAD AHEAD

Over the past quarter century, America has made tremendous strides in cleaning up its rivers, lakes, and coastal waters. In 1972, the Potomac River was too dirty to swim in, Lake Erie was dying, and the Cuyahoga River was so polluted it burst into flames. Many rivers and beaches were little more than open sewers. The improvement in the health of the nation's waters is a direct result of a concerted effort to enhance stewardship of natural resources and to implement the environmental provisions of federal, state, tribal and local laws. In particular, the Clean Water Act has stopped billions of pounds of pollution from fouling the nation's water, doubling the number of waterways safe for fishing and swimming. Today, rivers, lakes, and coasts are thriving centers of healthy communities.

"Americans have stood as one in saying 'no' to things like dirty water, and 'yes' to giving our children an environment as unspoiled as their hopes and dreams."

- President Clinton, May 1995

Despite tremendous progress, 40 percent of the nation's waterways assessed by states are still unsafe for fishing and swimming. Pollution from factories and sewage treatment plants, soil erosion, and wetland losses have been dramatically reduced. But runoff from city streets, rural areas, and other sources continues to degrade the environment and puts drinking water at risk. Fish in many waters still contain dangerous levels of mercury, polychlorinated biphenyls (PCBs), and other toxic contaminants.

Clean Water Program at a Crossroads

After 25 years of progress, the nation's clean water program is at a crossroads. Implementation of the existing programs will not stop serious new threats to public health, living resources, and the nation's waterways, particularly from polluted runoff. These programs lack the strength, resources, and framework to finish the job of restoring rivers, lakes, and coastal areas. To fulfill the original goal of the Clean Water Act - "fishable and swimmable" water for every American - the nation must chart a new course to address the pollution problems of the next generation.

Charting a New Course

In his 1998 State of the Union Address, President Clinton announced a major new Clean Water Initiative to speed the restoration of the nation's precious waterways. This new initiative aims to achieve clean water by strengthening public health protections, targeting community-based watershed protection efforts at high priority areas, and providing communities with new resources to control polluted runoff.

On October 18, 1997, the 25th anniversary of the Clean Water Act, Vice President Gore directed the Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) to work with other federal agencies and the public to prepare an aggressive Action Plan to meet the promise of clean, safe water for all Americans. This Action Plan forms the core of President Clinton's Clean Water Initiative in which he proposed \$568 million in new resources in his FY 1999 budget to carry it out. The Action Plan builds on the solid foundation of existing clean water programs and proposes new actions to strengthen efforts to restore and protect water resources. In implementing this Action Plan, the federal government will:

- support locally led partnerships that include a broad array of federal agencies, states, tribes, communities, businesses, and citizens to meet clean water and public health goals;
- increase financial and technical assistance to states, tribes, local governments, farmers, and others; and
- help states and tribes restore and sustain the health of aquatic systems on a watershed basis.

Four Tools for Clean Water

Federal, state, tribal, and local governments have many tools they can use to clean up and protect water resources. Regulation, economic incentives, technical assistance, research, education, and accurate information all have a role to play in meeting clean water goals. This Action Plan is built around four key tools to achieve clean water goals.

A Watershed Approach

This Action Plan envisions a new, collaborative effort by federal, state, tribal, and local governments; the public; and the private sector to restore and sustain the health of watersheds in the nation. The watershed approach is the key to setting priorities and taking action to clean up rivers, lakes, and coastal waters.

Strong Federal and State Standards

This Action Plan calls for federal, state, and tribal agencies to revise standards where needed and make existing programs more effective. Effective standards are key to protecting public health, preventing polluted runoff, and ensuring accountability.

Natural Resource Stewardship

Most of the land in the nation's watersheds is cropland, pasture, rangeland, or forests, and most of the water that ends up in rivers, lakes, and coastal waters falls on these lands first. Clean water depends on the conservation and stewardship of these natural resources. This Action Plan calls on federal natural resource and conservation agencies to apply their collective resources and technical expertise to state and local watershed restoration and protection.

Informed Citizens and Officials

Clear, accurate, and timely information is the foundation of a sound and accountable water quality program. Informed citizens and officials make better decisions about their watersheds. This Action Plan calls on federal agencies to improve the information available to the public, governments, and others about the health of their watersheds and the safety of their beaches, drinking water, and fish.

A Watershed Approach - The Key to the Future

This Action Plan proposes a new collaborative effort by state, tribal, federal, and local governments, the private sector and the public to restore those watersheds not meeting clean water, natural resource, and public health goals and to sustain healthy conditions in other watersheds.

For the past 25 years, most water pollution control efforts relied on broadly applied national programs that reduced water pollution from individual sources, such as discharges from sewage treatment plants and factories, and from polluted runoff. Today, there is growing recognition that clean water strategies built on this foundation and tailored to specific watershed conditions are the key to the future.

Why Watersheds?

Clean water is the product of a healthy watershed - a watershed in which urban, agricultural, rangelands, forest lands, and all other parts of the landscape are well-managed to prevent pollution. Focusing on the whole watershed helps strike the best balance among efforts to control point source pollution and polluted runoff, and protect drinking water sources and sensitive natural resources such as wetlands. A watershed focus also helps identify the most cost-effective pollution control strategies to meet clean water goals.

Working at the watershed level encourages the public to get involved in efforts to restore and protect their water resources and is the foundation for building strong clean water partnerships. The watershed approach is the best way to bring state, tribal, federal, and local programs together to more effectively and efficiently clean up and protect waters. It is also the key to greater accountability and progress toward clean water goals.

Key Elements of the Watershed Approach

This Action Plan proposes a watershed approach built on several key elements.

Unified Watershed Assessments. States, tribes, and federal agencies currently set priorities for watershed action in many different ways. For example, state water quality agencies are developing lists of impaired water bodies, defining source water protection areas for drinking water, identifying coastal protection priorities, and defining priority areas for agricultural assistance programs. Similarly, federal, state and tribal natural resource agencies set their priorities for watershed restoration and protection in various ways to meet their mandates for natural resource conservation. These processes are designed to meet valid objectives, but too often opportunities to work together to meet common goals are overlooked.

This Action Plan creates a strategic opportunity for states and tribes, in cooperation with federal land and resource managers on federal lands, to take the lead in unifying these various existing efforts and leveraging scarce resources to advance the pace of progress toward clean water. As a number of states and tribes have demonstrated, they can meet existing requirements more efficiently and develop more coordinated and comprehensive priorities on a watershed basis.

Unified watershed assessments are a vehicle to identify:

- watersheds that will be targeted to receive significant new resources from the President's FY 1999 budget and beyond to clean up waters that are not meeting water quality goals;
- pristine or sensitive watersheds on federal lands where core federal and state programs can be brought together to prevent degradation of water quality; and
- threatened watersheds that need an extra measure of protection and attention.

Watershed Restoration Action Strategies. The Action Plan encourages states and tribes to work with local communities, the public, and federal environmental, natural resource, and land management agencies to develop strategies to restore watersheds that are not meeting clean water and natural resource goals. Watershed Restoration Action Strategies will spell out the most important causes of water pollution and resource degradation, detail the actions that all parties need to take to solve those problems, and set milestones by which to measure progress. Funds made available to federal agencies through the FY 1999 Clean Water and Watershed Restoration Budget Initiative will be used to help states implement these strategies.

Watershed Pollution Prevention. Protecting pristine or sensitive waters and taking preventive action when clean water is threatened by new activities in the watershed can be the most cost-effective approach to meeting clean water goals. This Action Plan encourages states, tribal, and federal agencies to bring core programs and existing resources together to support watershed

pollution prevention strategies to keep clean waters clean.

Watershed Assistance Grants. Federal agencies will provide small grants to local organizations that want to take a leadership role in building local efforts to restore and protect watersheds. These grants will ensure that local communities and stakeholders can effectively engage in the process of setting goals and devising solutions to restore their watersheds.

Strong Federal and State Standards

This Action Plan calls on federal, state, and tribal governments to strengthen existing programs to support an accelerated effort to attack the nation's remaining water quality problems. Federal, state, and tribal standards for water quality and polluted runoff are key tools for protecting public health, preventing polluted runoff, and ensuring accountability. Some of the specific actions called for in this Action Plan are identified below.

Improve Assurance that Fish and Shellfish are Safe to Eat

Federal agencies will work with states and tribes to expand programs to reduce contaminants that can make locally caught fish and shellfish unsafe to eat, particularly mercury and other persistent, bio-accumulative toxic pollutants, and to ensure that the public gets clear notice of fish consumption risks.

Ensure Safe Beaches

Federal, state, and local governments will work to improve the capacity to monitor water quality at beaches, develop new standards, and use new technologies such as the Internet to report public health risks to recreational swimmers.

Expand Control of Storm Water Runoff

EPA will publish final Phase II storm water regulations for smaller cities and construction sites in 1999. EPA will also work with its partners to make sure that existing storm water control requirements for large urban and industrial areas are implemented.

Improve State and Tribal Enforceable Authorities to Address Polluted Runoff

Federal agencies will work with states and tribes to promote the establishment of state and tribal enforceable authorities to ensure the implementation of polluted runoff controls by the year 2000.

Define Nutrient Reduction Goals

EPA will establish by the year 2000 numeric criteria for nutrients (i.e., nitrogen and phosphorus)

that reflect the different types of water bodies (e.g., lakes, rivers, and estuaries) and different ecoregions of the country and will assist states and tribes in adopting numeric water quality standards based on these criteria.

Reduce Pollution from Animal Feeding Operations

EPA will publish and, after public comment, implement an Animal Feeding Operations Strategy for important and necessary actions on standards and permits. In addition, by November 1998, EPA and USDA will jointly develop a broad, unified national strategy to minimize the environmental and public health impacts of Animal Feeding Operations.

Natural Resource Stewardship

Nearly 70 percent of the United States, exclusive of Alaska, is held in private ownership by millions of individuals. Fifty percent, or 907 million acres, is owned by farmers, ranchers, and their families. Another 400 million acres are federal lands. Most of the rainfall in the country falls on these lands before it enters rivers, lakes, and coastal waters. Effective management of these croplands, pastures, forests, wetlands, rangelands, and other resources is key to keeping clean water clean and restoring watersheds where water quality is impaired.

This Action Plan commits all federal natural resource conservation and environmental agencies to focus their expertise and resources to support the watershed approach described above. In addition, these agencies will work with states, tribes, and others to enhance critical natural resources essential to clean water.

Federal Land Stewardship

More than 800 million acres of the United States, including Alaska, is federal land. These lands contain an immense diversity and wealth of natural resources, including significant sources of drinking water and public recreation opportunities.

By 1999, the U.S. Department of the Interior (DOI) and USDA will take the lead in developing a Unified Federal Policy to enhance watershed management for the protection of water quality and the health of aquatic systems on federal lands and for federal resource management. Federal land managers will improve water quality protection for over 2,000 miles of roads and trails each year through 2005 and decommission 5,000 miles each year by 2002. Federal land managers will also accelerate the cleanup rate of watersheds affected by abandoned mines and will implement an accelerated riparian stewardship program to improve or restore 25,000 miles of stream corridors by 2005.

Protect and Restore Wetlands

This Action Plan sets a goal of attaining a net increase of 100,000 wetland acres per year by the year 2005. This goal will be achieved by ensuring that existing wetland programs continue to slow the rate of wetland losses, improving federal restoration programs, and by expanding incentives to landowners to restore wetlands.

Protect Coastal Waters

Federal agencies, led by the National Oceanic and Atmospheric Administration (NOAA), will work in partnership to improve the monitoring of coastal waters, expand research of emerging problems like *Pfiesteria*, amend Fishery Management Plans to address water quality issues, and ensure the implementation of strong programs to reduce polluted runoff to coastal waters.

Provide Incentives for Private Land Stewardship

This Action Plan relies on a substantial increase in the technical and financial assistance available to private landowners as the primary means of accelerating progress toward reducing polluted runoff from agricultural, range, and forest lands.

USDA, working with federal, state, tribal, and private partners, will establish by 2002 two million miles of conservation buffers to reduce polluted runoff and protect watersheds, direct new funding for the Environmental Quality Incentives Program to support watershed restoration, and develop as many new agreements with states as practicable to use the Conservation Reserve Enhancement Program to improve watersheds. The Plan also envisions new and innovative methods to provide incentives for private landowners to implement pollution prevention plans, including risk management protection for adoption of new pollution prevention technologies and market recognition for producers that meet environmental goals.

In addition, DOI will expand its existing Partners for Wildlife Program, which restores degraded fish and wildlife habitats and improves water quality through partnerships with landowners. The program provides technical and financial assistance, and gives priority to threatened and endangered species.

Informed Citizens and Officials

Effective management of water resources requires reliable information about water quality conditions and new tools to communicate information to the public. Federal agencies, led by the U.S. Geological Survey (USGS), will work with states and tribes to improve monitoring and assessment of water quality, focusing on nutrients and related pollutants. Federal agencies will also work with states and tribes to develop and use state-of-the-art systems, such as EPA's Index of Watershed Indicators on the Internet, to communicate meaningful information to the public about water quality conditions in their communities.

CLEAN WATER AND WATERSHED RESTORATION BUDGET INITIATIVE

To support the new and expanded efforts to restore and protect the nation's waters as proposed in this Clean Water Action Plan, the President's FY 1999 budget proposes a Clean Water and Watershed Restoration Budget Initiative. The funding provided in this budget initiative will dramatically increase federal financial support for clean water programs in FY 1999 and beyond. Specifically, the Clean Water and Watershed Restoration Budget Initiative will:

- increase direct support to states and tribes to carry out a watershed approach to clean water;
- increase technical and financial assistance to farmers, ranchers, and foresters to reduce polluted runoff and enhance the natural resources on their lands;
- fund watershed assistance programs and grants to engage local communities and citizens in leadership roles in restoring their watersheds;
- accelerate progress in addressing critical water quality problems on federal lands, including those related to roads, abandoned mines, riparian areas, and rangelands;
- expand and coordinate water quality monitoring programs; and
- increase efforts to restore nationally significant watersheds, such as the Florida Everglades and the San Francisco Bay-Delta.

A Continuing Commitment to Clean Water

The publication of this Action Plan is just the beginning of a long-term effort. Many of the proposed actions will provide for later public review and comment and federal agencies are committed to working closely with states, tribes, and others to ensure successful implementation of specific actions.

In addition, regular reports will keep the public apprised of progress and remaining challenges. By the end of the year 2000 and periodically thereafter, status reports on progress in implementing watershed restoration plans and related programs will be provided to the President, the nation's governors, tribal leaders, and the public.

Clean Water and Watershed Restoration Budget Initiative

Budget Authority - \$ in millions

Funding Summary		
Total 1999 increase		568
Percent Increase 1999 over 1998		35%
Total Increase 1999-2003		2,338
Total Spending 1999-2003		10,516

	1998 Enacted	1999 Budget
<u>Funding by Agency</u>		
<u>Environmental Protection Agency:</u>		
State Grant Assistance		
Polluted runoff control grants (Sec.319)	105	200
State program management grants (Sec.106)	96	116
Wetlands protection grants	15	15
Water quality cooperative agreements	20	19
Water quality program management	248	279
Total, EPA	484	629
<u>Department of Agriculture:</u>		
Natural Resources Conservation Service: Environmental Quality Incentives Program	200*	300*
Natural Resources Conservation Service: Locally led conservation	0	20
Natural Resources Conservation Service: Watershed health monitoring	0	3
Forest Service: Improve water quality on federal lands	239	308
Agriculture Research Service: Watershed health research	0	2
Total, USDA	439	633
<u>Department of the Interior:</u>		
Bureau of Land Management: Improve water quality on federal lands	133	157
Office of Surface Mining: Clean streams	5	7
US Geological Survey: Water monitoring and assessment	125	147
Fish and Wildlife Service: Wetlands restoration	36	42
Bureau of Indian Affairs: Improve water quality on tribal lands	0	5
Total, DOI	299	358
<u>National Oceanographic and Atmospheric Administration:</u>		
Polluted runoff and toxic contaminants	0	13
Harmful algal blooms	0	9
Total, NOAA	0	22
<u>Army Corps of Engineers:</u>		
Wetlands program	106	117
Challenge 21: Floodplain restoration initiative	0	25
Total, ACE	106	142
<u>Interagency Projects:</u>		
Florida Everglades	228	282
California Bay Delta	85	143
Elimination of overlap between Everglades and other water programs listed above	-5	-5
Total, Interagency Projects	308	420
Total Clean Water and Watershed Restoration Initiative (with Mandatory Spending)	1636	2204

*indicates Mandatory Spending

Source: Office of Management and Budget

Introduction

With the enactment of the Clean Water Act in 1972, the nation rejected past practices that had resulted in widespread pollution of rivers, lakes, and coastal waters and made a new commitment to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

America has honored its commitment to clean water. Since enactment of the Clean Water Act, the number of waters that are safe for fishing and swimming has doubled. National clean water standards stop billions of pounds of industrial pollution from flowing into waters each year and the number of Americans served by sewage treatment facilities has more than doubled. Before 1972, Oregon's Willamette River was off-limits to recreation. The Potomac River near the nation's capital was badly polluted and unfit for swimming. Today, these and many other water bodies that were once severely polluted are well on the way to recovery and people are increasingly using these waters for fishing, swimming, and other recreation.

Despite impressive progress, many of the nation's rivers, lakes, and coastal waters do not meet water quality goals. Many waters that are now clean face the threat of degradation from diverse pollution sources. States report that close to 40 percent of the waters they surveyed are too polluted for basic uses like fishing or swimming. The success in cleaning up pollution from point sources (e.g., factories and sewage treatment plants) has not yet been matched by controls over polluted runoff from sources such as farms, urban areas, forestry, ranching, and mining operations. Natural areas that are critical to the health of aquatic systems, such as wetlands, stream corridors, and coastal areas, are not adequately protected. In addition, water pollution poses a continuing threat to public health. The number of fish consumption advisories and beach closings is rising each year and new threats, such as the toxic microorganism *Pfiesteria*, demand effective responses.

Restoring and Protecting America's Waters

On October 18, 1997, the 25th anniversary of the enactment of the Clean Water Act, the Vice President called for a renewed effort to restore and protect water quality. The Vice President asked that the Secretary of Agriculture and the Administrator of the Environmental Protection Agency (EPA), working with other affected agencies, develop a Clean Water Action Plan that builds on clean water successes and addresses three major goals:

- (1) enhanced protection from public health threats posed by water pollution;
- (2) more effective control of polluted runoff; and
- (3) promotion of water quality protection on a watershed basis.

The Vice President called for the Clean Water Action Plan to be developed within 120 days and that it be based on three principles. First, federal agencies are to develop cooperative approaches

that promote coordination and reduce duplication among federal, state, and local agencies and tribal governments wherever possible. Second, agencies are to maximize the participation of community groups and the public, placing particular emphasis on ensuring community and public access to information about water quality issues. Finally, agencies are to emphasize innovative approaches to pollution control, including incentives, market-based mechanisms, and cooperative partnerships with landowners and other private parties.

A Broad and Participatory Approach

The U.S. Department of Agriculture (USDA) and EPA, in collaboration with many other federal agencies, responded to the Vice President's directive by establishing a broad, participatory process to guide the development of this Clean Water Action Plan.

Ten federal work groups, comprised of a large and diverse membership representing all concerned federal agencies, addressed major topics, including: watershed management, reducing polluted runoff, agricultural initiatives, public health, wetlands, coastal pollution, and monitoring and assessment. The workgroups met frequently and developed the recommendations that form the core of this Action Plan.

On November 7, 1997, USDA and EPA jointly published a Federal Register notice (62 F.R. 60448, November 7, 1997), that contained the full text of the Vice President's memorandum and invited the public to comment on actions that the agencies should take in response to the memorandum. About 150 commenters, including a full range of citizens and community groups, business organizations, government, and others responded to the notice.

Representatives of USDA, EPA, and other federal agencies also held meetings to elicit public comment in Atlanta, Georgia; Columbia, Missouri; and Sacramento, California. Federal agencies also had numerous informal meetings and consultations with state, tribal, and local government leaders, elected officials, representatives of affected groups, and citizens.

Most commenters concurred with the broad goals defined in the Vice President's memorandum. Their comments addressed various topics, and reflected the following themes:

- Watersheds provide an appropriate focus for future efforts to restore and protect water quality. Many commenters noted that people will participate most readily and actively in protecting the quality of waters in areas where they and their families live and work.
- The Clean Water Action Plan should rely as much as possible on existing frameworks, programs, and mechanisms. Existing programs should generally be enhanced and made more effective, but not eliminated or replaced. Increased funding was also recommended by many as important to clean water efforts.
- The federal government should continue its emphasis on achieving polluted runoff

prevention goals. A number of commenters noted the importance of reducing polluted runoff through voluntary programs and incentives. Other commenters stressed the important role that state, tribal, and local enforceable authorities and increased monitoring play in ensuring that best management practices are implemented to reduce polluted runoff. Finally, many commenters identified significant gaps in the Clean Water Act's authority for addressing polluted runoff.

Based on the work of the interagency workgroups and comments from the public, USDA, EPA, and other federal agencies developed this Action Plan.

The Clean Water Action Plan: Beginning a Process

The submission of this Clean Water Action Plan begins a process; it does not end one. The Vice President specifically asked the federal agencies to establish a national consensus on the issues highlighted in the Action Plan.

Many of the elements of this Action Plan provide for additional development of information, assessment, and dialogue. These processes will assure multiple opportunities for input by the public before significant decisions are made.

In addition to providing opportunities for input on specific action items, the Action Plan calls for publication of reports on overall progress of the new initiative in restoring and protecting the nation's watersheds. Progress reports are to be presented to the President, the nation's governors, tribal leaders, and to the public at the end of the year 2000 and periodically thereafter.

Setting the Stage: Successes, Challenges, and New Directions

CLEAN WATER SUCCESSES AND CHALLENGES

For the past 25 years, federal, state, territorial, tribal, and local governments have worked with the public and businesses to implement a variety of programs to improve the quality of the nation's water resources, including programs established by the Clean Water Act, the Coastal Zone Management Act, the 1990 and 1996 Farm Bills, and other laws. These efforts have resulted in a dramatic reduction in water pollution and, in many cases, a rebirth of the diverse environmental, recreational, and economic values of many of the nation's most treasured waters.

At the same time, serious water pollution problems persist throughout the country. Water pollution today degrades the quality of rivers, lakes and coastal waters, but also affects quality of life by reducing recreational opportunities, undermining local economic prosperity, and threatening drinking water supplies and public health.

"Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land."

- Luna Leopold

Clean Water Successes

All Americans can be proud of the progress the nation has made toward clean water over the past 25 years:

- In 1972, most estimates were that only 30 to 40 percent of assessed waters met water quality goals such as being safe for fishing and swimming. Today, state monitoring data indicate that between 60 to 70 percent of assessed waters meet state water quality goals.
- Twenty-five years ago, wetland losses were estimated at 460,000 acres each year. Today, wetland losses are estimated to be about one-fourth of that rate.
- Since 1982, soil erosion from cropland has been reduced by more than one-third, saving over a billion tons of soil each year and substantially reducing sediments, nutrients, and other pollutants that reach streams, lakes, and rivers.
- Twenty five years ago, sewage treatment plants served only 85 million people. Today, the number of people who have access to adequate wastewater treatment facilities has more than doubled, to 173 million people.

- Compliance with national standards for discharges from industrial facilities result in the removal of billions of pounds of pollutants from wastewater each year.

Describing water quality accomplishments purely in terms of statistics, however, does not do them justice and leaves much unsaid. Many Americans can still remember the disastrous condition of many of the nation's waters before the Clean Water Act. A stench rose from Lake Erie. People said the Androscoggin River in Maine was "too thick to paddle and too thin to plow." The Connecticut River was thought of as "the best-landscaped sewer in the country." Oregon's Willamette River was off limits to recreation and the mighty salmon perished. Boston Harbor was called "America's dirtiest harbor." And the Cuyahoga River burned. Today, these waters are well on the way to recovery and forms an individual piece of the larger success story of the Clean Water Act.

Economic Benefits of Clean Water

Improvements in water quality not only convey aesthetic benefits, but they also generate jobs and economic growth.

The recreation and tourism industry is the second largest employer in the nation. A significant portion of recreational spending comes from water-related activities, such as swimming, boating, sport fishing, and hunting. Each year, Americans take more than 1.8 billion trips to water destinations, largely for recreation, spending money and creating jobs in the process. American anglers, who depend on clean water, spend roughly \$24 billion annually on their sport, generating \$69 billion for the nation's economy.

The commercial fish and shellfishing industry contributes \$45 billion to the economy. This industry also relies on clean water to sustain the fisheries and deliver products that are safe to eat. Farmers use clean water to irrigate about 15 percent of American farmlands to grow essential food and fiber. Crops grown on irrigated lands are valued at nearly \$70 billion a year - about 40 percent of the total value of all crops sold.

Water quality improvements have led to economic gains on even the most infamous of polluted waters. Lake Erie is recovering from a time when pollution levels soared and beach closures were common. Today, Lake Erie supports a \$600-million-per-year fishing industry. Along the Willamette River in Oregon, water quality improvements have again made possible boating, skiing, swimming, and fishing. And, after the fire on the Cuyahoga River, much work has been done to revitalize this once-polluted urban river. Now the harbor area where the Cuyahoga River and Lake Erie meet is bustling with pleasure boaters and tourists, generating substantial economic revenue for the City of Cleveland.

Foundations of Success

The progress to date in reducing water pollution is largely the result of the aggressive implementation of a wide array of programs created by the 1972 Clean Water Act and other laws. Although some of the most dramatic successes have come from control of discharges from sewage treatment and industrial facilities, all levels of government, the private sector, and concerned citizens, have played essential roles in reducing water pollution.

Improving Sewage Treatment

Perhaps the single biggest reason for the dramatic progress in reducing water pollution is the remarkable improvement in the treatment of municipal wastewater. When left untreated, raw sewage, wastewater, and street debris can spill into waterways, degrading water quality, imposing a danger to public health, impairing recreational activities, and limiting commercial fishing and shellfishing.

Potomac River: The Jewel of the Nation's Capital

Twenty-five years ago, the Potomac River frequently carried raw sewage through the nation's capital. Disease-causing bacteria and nuisance algae blooms plagued the Potomac. Fish kills and public health warnings were common. As a result of dramatic improvements in sewage treatment, funded in large part by the Clean Water Act, fish and wildlife are returning to the Potomac. Fall-migrating waterfowl, absent in the estuary for 15 winters, have returned and lengthened their stay. Residents and visitors regularly enjoy walking and jogging its banks, fishing, windsurfing, and water skiing. Annual benefits from water pollution control investments are estimated to be worth \$90-150 million.

Federal, state, tribal, and local governments made this success possible by investing close to \$100 billion since 1972. But perhaps more important than providing funds, the Clean Water Act provided uniform national treatment standards (i.e., secondary treatment) for all sewage treatment systems across the country. This national commitment to a single sewage treatment goal helped overcome extended debates over treatment levels and forged a partnership among engineering professionals, construction contractors, and government that became the foundation for the successful construction of almost 14,000 municipal sewage treatment facilities.

Controlling Industrial Waste

Progress in improving water quality does not result from sewage treatment alone. Controls over thousands of industrial discharges were imposed at the same time that municipalities were improving sewage treatment facilities nationwide.

Today, more than 50 major categories of industry comply with national, minimum standards for the discharge of conventional and toxic pollutants. Compliance with these national standards results in the removal of billions of pounds of conventional pollutants and more than one billion

pounds of toxic water pollutants from industrial discharges each year.

Other Clean Water Act Programs

Federal agencies work with states, territories, tribes, and local governments to implement a number of other clean water programs that have made vital contributions to maintaining and improving water quality.

- The Clean Water Act requires that sewage treatment plants, industries, and other pollution dischargers have discharge permits. In most states and territories, EPA has authorized states to issue these permits. Where national minimum treatment standards are not strict enough to ensure that a water body meets its goals, these permits require additional treatment. By enforcing these requirements, states and the federal government protect public health and the environment.
- States and a number of tribes are organized to implement programs under section 319 of the Clean Water Act to reduce polluted runoff from “nonpoint” or diffuse sources. A wide variety of activities under way by states and tribes are successfully addressing water quality problems caused by nonpoint source pollution.
- Local, state, tribal, and federal governments oversee programs to ensure industries discharging into sewage treatment plants “pretreat” their waste to remove pollutants that pose a threat to water quality or to the safe operation of the plant.

Reducing Industrial Pollution

In 1987, EPA issued national standards limiting the discharge of pollutants from the organic chemicals, plastics, and synthetic fibers industries. These industries include facilities that manufacture such products as industrial-grade coal tar, natural gas, and petroleum-based organic chemicals. Approximately 1,000 of these facilities are in the United States - mainly located in coastal regions or on waterways near large population centers.

EPA set limits on the discharge of more than 60 pollutants, including a variety of organic pollutants, heavy metals and cyanide. EPA estimated that these national standards were responsible for reducing pollutant discharges of conventional pollutants by 108 million pounds annually and toxic pollutants by almost 24 million pounds annually.

Conservation of Agricultural and Forest Land

USDA oversees several conservation programs that reduce soil erosion, prevent pollution of streams and lakes, improve water quality, establish aquatic life and wildlife habitats, and enhance

forest and wetland resources. Many federal lands and watersheds, such as national forests, parks, grasslands, and wildlife refuges, represent some of the nation's most pristine and valuable natural resources. Federal land managers are responsible for protecting these waters.

Programs such as the Conservation Reserve Program and the Wetlands Reserve Program encourage farmers to restore environmentally sensitive acres. The Conservation Reserve Program encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Currently, this program protects and restores up to 36.4 million acres of the most highly erodible and environmentally sensitive agricultural lands. The Wetlands Reserve Program is a voluntary program to restore and protect wetlands on private property. It provides landowners financial incentives through purchase of easements and cost-sharing agreements to restore wetlands on their lands. Nearly one million acres of wetlands are scheduled for restoration under this program by the year 2002.

The Environmental Quality Incentives Program and the Wildlife Habitat Incentives Program provide landowners with technical, educational, and financial assistance to improve the management of their operations to prevent pollution and enhance wildlife habitat. These programs help producers improve their management of nutrients and pesticides, reduce erosion, and adopt innovative grazing management systems and other practices to protect water quality and wildlife habitat. More than 35 million acres of agricultural land will be protected through these programs by 2002.

Through a partnership with state foresters, the Forest Stewardship Program has helped landowners develop comprehensive plans for millions of acres of private forest lands since 1990. Other cooperative programs, such as Forest Legacy and the Urban and Community Forestry Program, help conserve forests threatened by growth and development and restore valuable forests in urban watersheds. To date, more than 100,000 acres have been protected under conservation easements through the Forestry Legacy Program. Urban forestry assistance has been provided to thousands of communities through programs such as the Urban Resources Partnership. Through cooperative efforts with states, tribes, and other parties in specific watersheds such as Florida's Everglades, the San Francisco Bay-Delta, the Platte River Basin, the Columbia Basin, the Pacific Northwest forests, and the Colorado River Basin, federal land and resource managers have focused attention and resources on resolving water quality issues. For example, over 500 National Wildlife Refuges totaling nearly 100 million acres support and protect watersheds within their river basins. The 376 units of the National Park System include some of the nation's most pristine waters. Federal land managers are responsible for protecting over 180,000 miles of riparian streams, and 16 million acres of wetlands are protected within the 270 million acres managed by the Bureau of Land Management (BLM) in 10 western states and Alaska. Federal land managers have undertaken hundreds of actions to build watershed partnerships, improve the delivery of federal programs, and pioneer watershed and ecosystem approaches to land management and pollution prevention on federal lands.

Protecting and Restoring Coastal Waters

A number of programs have been established to protect and restore coastal resources. In addition to the general water pollution control programs under the Clean Water Act, the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce implements a range of programs to protect coastal waters and works with coastal states to implement programs to protect coastal resources under the Coastal Zone Management Act.

Recognizing the seriousness and magnitude of polluted runoff in the degradation of coastal resources and water quality, Congress enacted legislation in 1990 expanding the coastal zone management program to specifically address polluted runoff in coastal areas. Today, 29 coastal states and territories have developed programs to prevent polluted runoff to coastal waters; NOAA and EPA have approved most of these, with conditions for further improvements.

Additionally, in 1987, the Clean Water Act was amended to establish the National Estuary Program to protect and restore the health of estuaries and to support economic and recreational activities. The program brings together a wide variety of stakeholders to provide for the health of the estuary. Currently, 28 estuary programs around the country are demonstrating practical and innovative ways to revitalize and protect their estuaries.

Restoring the Florida Everglades

The Everglades is one of the nation's unique national treasures, whose natural systems sustain South Florida's economy and quality of life. Over the past century, changes in land and water use have altered the flow and content of the water that has sustained south Florida and resulted in the loss of over half of the original Everglades. The restoration of this 60-mile-wide and 300-mile-long watershed is the largest ecosystem restoration effort ever undertaken and is one of the Administration's highest priorities. In partnership with the State of Florida and tribal and local governments, the Administration is working to improve water quality, restore natural hydro patterns, and reduce the loss of water from the watershed to meet the needs of the environment and the economy. This effort serves as a model for the coordination of federal agency activities and the involvement of government, public, and private interests in improving water quality and quantity problems in a watershed.

Protecting Wetlands

Wetlands are essential to protecting water quality and health of aquatic systems. The United States is continuing to lose wetlands, but the loss has slowed to a rate well below that experienced in the 1970s and 1980s, according to reports from the USDA and the U.S. Fish and Wildlife Service.

Factors contributing to the marked decline in the loss rate include implementation and enforcement of the wetlands permitting program of the Clean Water Act; state, tribal, and local wetland regulatory programs; increased public awareness and support for conservation; expansion of federal, state, tribal, local, and private- sector restoration programs that have contributed 78,000 acres a year to the national wetlands base; enactment of Swampbuster, Wetlands Reserve, and Conservation Reserve measures in the Farm Bills since 1985; and a decline in the profitability of converting wetlands brought about by 1986 tax reform.

Today's Water Quality Challenges

Despite significant progress in reducing water pollution, serious water quality problems persist throughout the country. The bottom line of the assessments described below is that about 1,000 of the over 2,000 watersheds nationally are in need of restoration and protection efforts in order to meet clean water goals.

Too Many Waters Are Impaired

Every two years, states report on the condition of their waters and the EPA provides a summary report of this information to Congress. In 1996, the states found that:

- Of the *rivers and streams* surveyed (19 percent of all stream miles), 36 percent were partially or fully impaired and water quality threatened in an additional eight percent.
- Of the surveyed *lakes* (40 percent of all lake acres), 39 percent were partially or fully impaired, with water quality threatened in an additional 10 percent.
- Of the *estuaries* surveyed by coastal states (72 percent of all estuarine waters) 38 percent are reported to be partially or fully impaired, with water quality threatened in an additional four percent.
- Of the *Great Lakes* shore miles surveyed (94 percent of all shore miles), 97 percent were reported to be partially or fully impaired, with water quality threatened in an additional one percent.

Based on water quality monitoring, states and tribes identify water bodies that do not meet or are not expected to meet water quality standards even after implementation of national minimum controls over sewage and industrial discharges. In 1996, states and tribes identified about 15,000 water bodies not meeting water quality goals. States are in the process of revising lists of impaired waters for submission to the EPA in April 1998.

Index of Watershed Indicators - A Watershed View

Conventional water quality monitoring identifies instances where pollutant levels in a river

segment exceed safe levels for the specific pollutant. This information is useful, but does not present a full picture of the health of the aquatic system. In order to better describe the overall health of aquatic systems on a watershed scale, EPA worked with other federal agencies, states, tribes, and private organizations to produce the *Index of Watershed Indicators*.

The *Index of Watershed Indicators* organizes information on 15 indicators of watershed health and uses them to assess the condition and vulnerability to future degradation of the aquatic system in each of the more than 2,000 watersheds in the country. These indicators include conventional water quality data as well as information on sediment contamination, fish consumption advisories, wetlands loss rates, soil loss, and other environmental conditions. In October 1997, EPA released the first *Index of Watershed Indicators* report and provided the information to the public through the Internet (<http://www.epa.gov/surf/iwi>). The *Index* suggests that:

- Sixteen percent of the watersheds in the continental United States have good water quality;
- Thirty-six percent have moderate water quality problems;
- Twenty-one percent have serious water quality problems; and
- Twenty-seven percent of the watersheds lack sufficient information to make an overall assessment. In addition, the Index of Watershed Indicators reveals that one in 14 of the nation's watersheds are vulnerable to future problems.

Other Perspectives on Water Quality

There are several other important perspectives on the condition of the nation's waters:

- The U.S. Geological Survey in the Department of the Interior monitors and studies water resources. Its National Water Quality Assessment (NAWQA) Program is designed to evaluate water quality conditions across more than 50 river basin and aquifer systems nationwide, covering more than 60 percent of the population. NAWQA studies have identified some improving water quality conditions and areas of concern. For example, although some metals (e.g., lead) have decreased in environmental concentrations over the last 20 years, several metals (e.g., arsenic and zinc) exhibit increasing trends.
- NOAA conducts extensive monitoring of coastal waters and of living resources that rely on these waters. NOAA's Status and Trends program and other reports indicate that habitat loss, pollution, and over-fishing have reduced populations of coastal fish and other species to historically low levels of abundance and diversity. Rapid population growth and increasing demand for recreation and economic development in many coastal areas have degraded natural resources and have led

to declines in both environmental integrity and general productivity.

- Contamination of the nation's waters from atmospheric sources is a pervasive and complex problem. Not only are the sources of toxic contaminants in the air diverse - including fossil fuel combustion, incinerators, mobile sources, and industrial and agricultural activity - but wind currents often carry these substances for long distances before they are deposited. As much as 90 percent of certain toxic pollutants in the Great Lakes has been attributed to airborne deposition.
- The Environmental Monitoring and Research Initiative, organized through the National Science and Technology Council's Committee on Environment and Natural Resources, is designed to coordinate and integrate agency efforts and to improve the scientific information base and other natural resource assessment and decision-making.

Polluted Runoff is the Most Important Source of Water Pollution

Leading causes of water quality impairments reported by states include siltation, nutrients, bacteria, oxygen-depleting substances, metals, habitat alteration, pesticides, and organic toxic chemicals. The majority of this pollution results from polluted runoff (see table below). Nationally, agriculture is the most extensive source of water pollution, affecting 70 percent of impaired rivers and streams and 49 percent of impaired lake acres. Other national or regional sources include municipal point sources, hydrologic and habitat modification, urban runoff and storm water, resource extraction, removal of streamside vegetation, and forestry.

Consequences of Water Pollution

Water pollution clearly degrades environmental quality, but it also diminishes recreational and economic opportunities and poses clear threats to public health. There is growing evidence that degradation of rivers, lakes, and coastal waters takes a toll on recreation and the economy.

- In the Gulf of Mexico, a hypoxic zone (an area with low levels of oxygen), threatens the livelihood of fishermen. The area is affected by excess amounts of nutrients from the Mississippi River watershed, which ultimately drains into the Gulf of Mexico.
- Of the nation's 382 million acres of croplands, over 70 million acres suffer erosion rates that threaten long-term productivity. Poor land management and agricultural practices directly affect hundreds of thousands of the nation's surface waters.
- Polluted runoff from urban and agricultural areas adds sediment into waters that carry it downstream and deposit it into harbors or reservoirs. Federal and non-federal dredging in coastal areas and the disposal of dredged materials costs about

\$1 billion per year.

Perhaps most important, there is growing recognition that water pollution poses serious threats to public health.

- In certain Maryland and Virginia tributaries to the Chesapeake Bay and in the Neuse River in North Carolina, the microorganism *Pfiesteria* has killed fish and may pose a risk to people. Other harmful algal blooms and biotoxins have also affected the health and taken the lives of people, in addition to harming fish, shellfish, and other wildlife. *Pfiesteria* and harmful algal blooms have been associated with excessive nutrients in water.
- People have become sickened and as many as 100 have died in Milwaukee from ingesting *Cryptosporidium*, a disease-causing microorganism in drinking water.
- In 1996, 2,193 fish consumption advisories were issued in 48 states. Mercury, PCBs, chlordane, dioxin, and DDT were responsible for almost all fish consumption advisories in 1996.
- Coastal states report unhealthy levels of pollution-related bacteria at swimming beaches; there were more than 2,500 beach closings and advisories in 1996. Illnesses caused by these bacteria are of special concern to families with children.
- Polluted runoff and discharges from thousands of abandoned mines cause water quality degradation, diminish recreational uses, threaten drinking water sources, and harm fish and wildlife habitat.

A New Institutional Arrangement

Today, federal, state, tribal, and local governments manage a complex array of programs to identify, restore, and protect watersheds and to monitor progress toward clean water goals. New federal programs have been enacted through the Safe Drinking Water Act, the 1996 Farm Bill, coastal nonpoint source programs under the Coastal Zone Management Act, and state nonpoint source programs under the Clean Water Act need to be better integrated with existing programs to protect and restore watersheds. In addition, hundreds of watershed partnerships that have sprung up across the country to address a multiplicity of water quality and natural resource concerns are often implemented independently and miss opportunities to leverage resources and talent. Businesses are increasingly marshaling their resources and expertise to prevent pollution and solve local environmental problems.

These developments create new opportunities to achieve clean water goals faster and more effectively. This Action Plan outlines a new institutional arrangement to bring all these resources together in creative ways to solve this nation's remaining water pollution problems.

TEN PRINCIPLES FOR RESTORING AND PROTECTING AMERICA'S WATERS

In 1972, responding to public outrage over the deplorable condition of the nation's waters, Congress enacted the Clean Water Act. America's clean water program has been a spectacular success - perhaps one of the best examples in the post-war era of the power of the government to do good. This success is largely the result of an aggressive policy for restoring and protecting clean water that was established in 1972 and that essentially has remained unchanged for 25 years.

The basic approach in the Clean Water Act for the last 25 years has been successively more stringent control of "point sources" of water pollution - primarily factories and city sewers, along with controls on activities that destroy wetlands. In the last decade, Clean Water Act authorities have been strengthened several times by complementary changes and events. These include changes in federal farm policies to substantially improve technical and financial assistance to farmers to protect the environment, new changes in federal land management policies to increase protection of aquatic resources and watersheds, new authorities to protect coastal waters, and a rise in the number of broad-based watershed organizations.

The 25th anniversary of the Clean Water Act is a good opportunity to reflect on the past and on the road ahead. What has been accomplished? What still needs to be done? What worked well and what can be improved? How have science and society changed and do these changes offer ways to do things better? Asking these questions about the national clean water program suggests some general principles to guide clean water efforts in the future.

Ten key principles to guide clean water efforts in the years to come are described below. These principles provide an overall context for the specific initiatives proposed in this Clean Water Action Plan and for investments of additional federal funds proposed in the FY 1999 Clean Water and Watershed Restoration Initiative. Several principles reaffirm key elements of the clean water program defined in 1972. Taken together, however, these principles suggest a new course for the nation's clean water program and its evolution based on assessment of past experience and anticipated changes in the broader arena in which it will operate.

1. Strong Clean Water Standards

The strong clean water standards established in the 1972 Clean Water Act and other subsequent statutes have served the nation well. Government, industry, and the public have made the Clean Water Act work; a renewed commitment to these baseline programs will be a key part of finishing the cleanup of the nation's waters.

National minimum standards that limit pollution from sewage treatment plants and factories have resulted in most of the nation's progress in reducing water pollution. These national standards ensure that every discharger meets or beats the performance of the best technology available.

With these national standards in place, local areas are not asked to choose between clean water and keeping jobs, and industries do not threaten to relocate if asked to clean up water pollution. Further, national sewage treatment standards make sure that every community does its fair share to clean up waters. Preserving these standards and establishing national standards for additional industrial categories are critical to maintaining progress in cleaning up the water.

River Action Teams - Catalyst for Watershed Restoration

The Tennessee Valley Authority's Clean Water Initiative is helping communities set and achieve local goals for watershed improvement through River Action Teams assigned to each of the region's 12 watersheds. These teams serve as a catalyst for local action. They help to bring stakeholders together, identify problems, build support for solutions, secure technical and financial resources, or do whatever else may be necessary to enable the community to address water resource problems. TVA's Wheeler-Elk River Action Team, for example, has garnered the support and participation of landowners and 20 different agencies and organizations in efforts to enhance water quality in the Paint Rock River in northern Alabama. The river contains 98 fish and 44 mussel species, many threatened by sedimentation. The cooperative initiative involves stabilizing stream banks, implementing best management practices, and increasing public awareness.

EPA has defined water quality "criteria" for over 100 specific water pollutants. These criteria draw on the best science to ensure that a water body is clean enough for basic uses established by the state (e.g., fishing, swimming). States and tribes use these criteria as the basis for adopting enforceable water quality standards for specific pollutants. EPA reviews and approves or disapproves the standards. Now that many pollution sources have implemented basic treatment requirements, water quality standards will play a critical role in defining problem areas and setting pollution reduction goals. EPA will develop strong criteria for nitrogen and phosphorus that protect public health and the environment; expand efforts to assess the overall health of waters; and work with states and tribes to assure the adoption of a full set of needed water quality standards.

The enforceable mechanism for implementing water pollution control requirements is the discharge permit required under the Clean Water Act. For the past decade, most discharge permits have been issued by state agencies with oversight by EPA. Discharge permits are a proven tool for reducing water pollution. Existing permits must be reviewed and revised in a timely manner and key types of unpermitted discharges (e.g., certain animal feeding operations, storm water discharges from small cities and towns) must be brought into the permit program.

2. Clean Water: Healthy People

The primary objective of the Clean Water Act is to protect the "chemical, physical and biological

integrity of water.” Aggressive efforts to reduce water pollution over the past 25 years have also had dramatic benefits for public health. Advances in pollution control, medicine, and science have swept aside the concerns of past generations that drinking water and swimming in a lake or at the beach posed a risk of cholera, polio, and other diseases.

Despite dramatic progress, water pollution still poses serious threats to human health. The potential of polluted runoff to cause serious illness is now better understood. Microorganisms, such as *Pfiesteria* and *Cryptosporidium*, are recognized as threats to human health. There is growing recognition of the value of keeping sources of drinking water clean to reduce the need for treatment and associated costs for treatment plants. In areas where the fish are contaminated with mercury and other long-lasting pollutants, states issue advisories recommending that local populations or sensitive populations limit fish consumption. Thanks to better monitoring, beach closures as a result of water pollution threats to swimmers are increasing. Recent studies suggest that some water pollutants may be disrupting the endocrine systems of aquatic species, wildlife, and humans. To reduce human health threats from water, fish, and shellfish, federal, state, territorial, tribal, and local governments must work together to more clearly establish and enforce public health standards and programs. Employing a watershed framework and improving coordination between clean water and safe drinking water programs at all levels of government is a critical part of this effort.

3. Watershed Management:

The Key to the Future For the past 25 years, most water pollution control efforts relied on nationwide programs that addressed the biggest sources of water pollution, such as discharges from sewage treatment plants and factories. Today, however, there is a growing recognition of the need to better coordinate the implementation of national programs in specific geographic areas. For water resources, watersheds provide an appropriate geographic unit of management.

Watershed management fosters the coordinated implementation of programs to control point source discharges, reduce polluted runoff, and protect drinking water and sensitive natural resources such as wetlands. A watershed approach highlights opportunities to go beyond reducing chemical contamination to think about ways to enhance the overall health of the aquatic system and preserve biodiversity. Watershed management also fosters greater interest and involvement from the public and provides a foundation for partnerships among government, the public, and the private sector.

The successful evolution of clean water programs to a watershed approach will require the commitment and leadership of the states and tribes, many of which are now moving toward the implementation of water quality programs on a watershed basis. As they have learned, integration of diverse clean water programs at the watershed level requires intimate knowledge of the environmental conditions in a watershed and the mix of agencies and institutions that must play a part in achieving a coordinated and comprehensive solution to problems. Federal agencies can provide technical and financial help to facilitate watershed management, but state and tribal

leadership is essential to bring all levels of government, the private sector, and the public together to make watershed management work.

Finally, if the clean water program is to make a transition to watershed management, the public must support this effort by getting actively involved in the formation of watershed partnerships. Through such partnerships, roles are clarified, resources are shared, and cost effective, practical solutions are put in place. As a result, in watershed after watershed, a better informed and more involved public is committed to lasting environmental improvements in their own communities. Federal agencies, states, and tribes can support and promote these efforts by providing improved information, technical and financial assistance and training.

Governors Endorse Watershed Management

“Historically, this nation has approached water resources as isolated and categorical, with programs designed specifically for certain waters depending upon where they are found. Now we know that our water resources are part of an interrelated, hydrologic, and environmental system that demands systematic management. The governors believe that the future demands a new model for managing water resources, based on well-defined geographic units such as basins or watersheds that recognizes all the interconnections within the watershed that define the hydrologic cycle in that area, including surface and groundwaters as well as wetlands. . . .

A systems management approach would involve the development and operation of a comprehensive water resource management program - though ultimately it need not be limited to water resources within the specific geographic area encompassing the basin or watershed. Components of such a comprehensive program would include water supply, water quality, water conservation, flood protection, land use, and protection of fish and wildlife resources.”

- National Governors’ Association Water Resources Management Policy Statement, February 1993

4. Restore Watersheds Not Meeting Clean Water Goals

In 1972, water pollution seemed almost ubiquitous. Today, although serious water quality problems remain, they are increasingly found in discrete clusters or problem areas. Improved monitoring and recent advances in computer mapping or “georeferencing” of waters is making precise definition of problem areas and sources much easier than in the past.

The Clean Water Act provides for states and tribes to identify waters that do not meet water quality goals and develop plans to reduce pollutants in the water bodies. This effort was a low priority for many years while clean water programs concentrated on getting basic controls in place

for major sources. EPA is working with states, tribes, and other federal agencies to focus greater attention on defining and restoring impaired waters that do not meet clean water goals. States and tribes are developing revised lists of waters not meeting clean water goals and long-term schedules for developing corrective actions to be submitted by EPA by April 1998. Federal land management and natural resource agencies are pioneering watershed assessment methods and locally led processes for addressing water quality problems.

In the future, the national water program will “scale up” assessments of problem areas from localized pollution problems in segments of water bodies to a larger landscape of watersheds. This process should grow beyond assessment of whether chemical contamination exceeds standards, to include other factors (e.g., health of wetlands, sediment quality, drinking water sources) and an assessment of whether the aquatic system in the watershed is functioning properly. The assessment process should also look to sources and impacts outside of the watershed itself, and include an assessment of the biological attributes of water resources.

Existing assessments of watershed health suggest that about 1,000 watersheds - almost half of the watersheds in the nation - have serious or moderate water quality problems. A key goal of the nation’s clean water program will be to define the specific steps necessary to restore the health of the aquatic systems in these watersheds and marshall the public- and private-sector commitment to implement needed actions.

The National Academy of Sciences Favors Restoration

“Without an active and ambitious restoration program in the United States, our swelling population and its increasing stresses on aquatic ecosystems will certainly reduce the quality of human life for present and future generations. By embarking now on a major national aquatic system restoration program, the United States can set an example of aquatic resource stewardship that ultimately will set an international example of environmental leadership.”

-Restoration of Aquatic Ecosystems,
National Research Council,
National Academy of Sciences, 1992

5. Build Bridges Between Water Quality and Natural Resource Programs

Much of the focus of the clean water program over the past 25 years has been to reduce chemical contamination of waters. Chemical contamination, however, addresses just one element of the Clean Water Act’s charge to “restore and maintain the *chemical, physical, and biological* integrity of the nation’s waters” (italics added). As the clean water program moves to address

problems on a watershed basis, other impairments to aquatic systems (e.g., damage to fish habitat, loss of wetlands that are nurseries of aquatic life, stream corridor degradation) have become more obvious and of greater concern.

Natural resources - croplands, forests, wetlands, rangelands, and riparian areas - are the building blocks of most watersheds. The health of the nation's watersheds and the quality of the water is a reflection of how well those natural resources are cared for. Stewardship of natural resources is the fundamental first step toward clean water and pollution prevention.

Most of the land in watersheds is in the care of farmers, ranchers, and federal land managers. Linking federal natural resource conservation and federal land management programs more closely with federal and state clean water programs is a promising opportunity to quicken the pace of clean water efforts across the country. Actions to enhance assistance to private landowners and to strengthen the stewardship of federal lands on a watershed basis are major elements of this Action Plan.

A critical goal for pollution control and natural resource protection is to continue to slow the rate of wetlands loss nationwide and accomplish a net gain of at least 100,000 acres of wetlands each year by the year 2005. The Secretary of the U.S. Department of Agriculture has committed to an aggressive goal to establish two million miles of greenways along with buffers to prevent pollution and protect stream corridors.

Other federal agencies, such as the Departments of the Interior, Energy, Defense, and Commerce, are working with states and tribes to manage and better protect natural resources. Building bridges between these water pollution control programs and natural resource programs will require improved coordination and communication among the responsible agencies.

6. Respond to Growth Pressures on Sensitive Coastal Waters

In the early years of the clean water program, there was little recognition that the coasts might need special attention. With the exception of a small number of laws such as the Coastal Zone Management Act, coastal waters were generally managed like other waters. Certain policies, such as waivers under the Clean Water Act from secondary treatment for coastal discharges, allowed for even less stringent control of pollution discharged to coastal waters.

In the last decade, however, awareness of the vital role that coastal waters and estuaries play in supporting healthy fisheries has grown. In addition, the decline of treasured resources, such as the Chesapeake Bay, prompted greater recognition of the threat to coastal waters. The 1990 census provided striking new data on the shift of the nation's population to coastal areas and the sharp growth rates in these areas. In response to this new information and awareness, federal, tribal, and state agencies have stepped up efforts to protect coastal waters and expand efforts to understand, prepare for, and address the changes that will occur in coastal areas. It is critical that the quality of coastal waters is maintained and improved so that those waters can continue to

support the increasing numbers of people who live, work, and play on the coast, as well as those who eat or otherwise enjoy coastal living resources.

7. Prevent Polluted Runoff

After 25 years, the clean water program has addressed many of the major pipe discharges of sewage and industrial waste. By far, the predominant source of remaining water pollution problems is runoff from urban and agricultural lands and facilities such as animal feeding operations and mines. Watershed management holds promise for correcting the polluted runoff problems that now exist and, more importantly, to prevent polluted runoff in the first place.

A critical challenge for the clean water program in the future will be to foster a national commitment to preventing polluted runoff. Some of the actions that will prevent polluted runoff are the responsibility of federal, state, tribal, and local governments. In many cases, however, the responsibility for preventing polluted runoff falls to individual citizens. Governments must pick up the pace of existing efforts to reduce polluted runoff and must provide the information and the financial incentives citizens need to make decisions that support clean water.

8. Stewardship of Federal Lands and Resources

Lands and resources managed by the federal government cover over 800 million acres and include many of the nation's most treasured water resources. In many watersheds, these lands are the headwaters of streams and rivers and valued sources of clean water for sport fishing, recreation, and drinking water. Policies for protecting and managing these lands must balance these diverse interests and needs. In the past, water quality was not always a top priority. Federal agencies also manage other resources such as water, fisheries, and forests.

Federal land and resource managers have made substantial contributions to watershed restoration and protection. Opportunities exist for building on many of the watershed projects already under way, such as aquatic and conservation elements of the Northwest Forest Plan and Columbia River Ecosystem Assessment, protection of Puget Sound and Lake Tahoe, the Tennessee Valley Authority's Clean Water Initiative, and protection of the Everglades.

By further implementing a watershed approach, federal land managers can gain a greater understanding of watershed functions, promote the identification and targeting of priority projects, encourage greater stakeholder involvement, and build partnerships with states, tribes, and local governments.

9. Improve Water Information and Citizens' Right to Know

Information about the condition of waters was of interest, but of limited importance, in the early years of the clean water program. Much of the effort was devoted to implementing pollution controls based on national minimum standards (e.g., secondary treatment). Because the

implementation of these controls did not require detailed information on water quality impacts, development of information systems describing water quality became a low priority. Also, many water pollution problems and their sources were obvious.

Today, as the clean water program moves to a watershed approach with a commitment to identify and address the remaining water quality problem areas, good information about the condition of waters and the health of aquatic systems on a watershed scale is absolutely critical. Federal, state, territorial, and tribal governments and the private sector will need to make increased investments in water quality information. More important, existing monitoring programs and resources can be better coordinated and focused under the leadership of the National Council on Water Quality Monitoring, recently established by the Department of the Interior (DOI).

Better data is important, but this information needs to be delivered to the public in a useful and easily accessible form. Using new computer systems capable of mapping water quality data, it is now possible to generate detailed information about the condition of specific waters and watersheds around the country. In addition, the Internet makes it possible to deliver detailed and localized water quality data and maps to home computers throughout the nation. By providing this information and the assessment tools to make it meaningful, government agencies can inform people about the condition of waters where they live and thereby empower citizens to get involved in restoring and protecting water quality.

“Public involvement is crucial. This is the priority that [when overlooked] most impedes the achievement of goals.”

- Mark Bellwood, Saline County, Missouri

10. Ensure Compliance and Protect All Citizens Fairly

Full and fair implementation of clean water programs requires strong compliance and enforcement efforts and a firm commitment to protect all citizens equally.

Sustaining compliance will require supplementing existing tools with new efforts to ensure that program requirements, especially newer programs to control wet- weather sources of pollution, are understood by both the regulated community and the public. For example, working with its coastal state partners and through public feedback, NOAA will continue to evaluate the performance of state coastal management programs, with new attention to programs designed to reduce polluted runoff. EPA is working with states to establish sector-based compliance assistance centers, including one for municipalities. EPA and states will also pursue incentives to encourage regulated entities to voluntarily discover, disclose, and correct violations and adopt comprehensive environmental management systems to improve overall environmental performance.

EPA and the states, and to a growing extent, tribal governments, will continue to aggressively enforce compliance where noncompliance is significant and to assure that compliance rates improve overall. Escalation of enforcement responses and assessment of appropriate penalties, including recovery of economic benefit, will continue as a cornerstone of these efforts. Criteria for defining high-priority areas for enforcement will include high environmental risk, disproportionately exposed populations, high rates of noncompliance, and environmental justice.

Federal agencies will expand efforts to work with states, tribes, and minority communities to ensure that all citizens enjoy the environmental and economic benefits of clean water. A top priority will be better information to minorities and immigrants about fish consumption risks. Environmental justice will be considered when setting priorities for restoration of waters and watersheds and when allocating water pollution control funds.

ACTIONS TO STRENGTHEN CORE CLEAN WATER PROGRAMS

Federal, state, territorial, tribal, and local governments work in close cooperation to implement a wide range of programs to protect and restore water quality. Over the past 25 years, the combined effect of these efforts has been to restore the environmental, recreational, and economic benefits of waters around the nation.

Implementation of existing programs at the current pace, however, will not eliminate threats to public health and the health of aquatic systems. If the nation is to continue to make steady progress in reducing water pollution, government, the private sector, and the public must renew their commitment to the original goal of the Clean Water Act - fishable, swimmable waters for all Americans - and chart a new course to achieve that goal.

“Water has a voice. It carries a message that tells those downstream who you are and how you care for the land.”

- Bernie McGurl, Lackawanna River Association

The centerpiece of this Action Plan is a new initiative to integrate existing efforts to restore and protect water quality and related natural resources on a watershed basis. Organizing restoration and protection on a watershed basis creates the opportunity to achieve clean water goals in many more places, more quickly. This new initiative is described in Chapter III.

At the same time, strengthening and enhancing existing programs with specific new actions is an essential element of a renewed effort to restore and protect water quality. Many clean water programs are basically sound and effective. These programs, however, need to be strengthened and expanded to:

- protect public health;
- enhance stewardship of natural resources;
- strengthen polluted runoff standards and controls; and
- improve information and citizens' right to know.

Specific actions to immediately expand and improve existing water quality programs are described below. Implementation of these key actions by federal, tribal, and state agencies is supported by a long-term commitment of billions of dollars and is designed to support the watershed work outlined in Chapter III. The FY 1999 budget includes a Clean Water and Watershed Restoration Initiative that provides increased funding to support key elements of this Action Plan.

CLEAN WATERS: HEALTHY PEOPLE

People depend on clean water for their health and well-being. Safe drinking water is critical to good health. While most people get drinking water from a system that treats it to ensure safety, there is growing recognition of the value of protecting the high quality of drinking water sources. Recreational fishermen, low-income people, ethnic minorities, and others who regularly catch and consume fish and shellfish from nearby rivers, lakes, and coastal waters are more highly exposed to mercury and other pollutants. The greatest risk of harm exists for women of child-bearing age, as fetal nervous systems are more sensitive than adult systems.

Millions of people enjoy the beach each year, but growing evidence indicates that sewage and other pollutants pose serious health risks to children and other recreational swimmers. In addition, new research suggests that some water pollutants disrupt the endocrine systems of fish, wildlife, and humans, and are a threat to reproduction and development.

Actions to ensure that the nation's waters support healthy people are needed in four key areas:

- (1) ensure effective public notice of fish and shellfish consumption risks and reduce

- contamination to levels which assure that locally caught fish and shellfish are safe to eat on a regular basis;
- (2) improve safeguards for the health of children and other recreational swimmers at beaches;
- (3) ensure that sources of drinking water are adequately protected; and
- (4) respond to the impact of endocrine disrupting chemicals on reproduction and development of fish, wildlife, and humans.

Improve Assurance that Fish and Shellfish are Safe to Eat

In 1996, 2,193 public advisories restricting the consumption of locally caught fish were in effect. States and tribes issue advisories to notify and protect their citizens from unsafe levels of contaminants in fish tissue that make the fish unsafe to eat or unsafe to eat in large quantities. Fish consumption advisories now apply to 15 percent of the nation's lake acres and to five percent of river miles. In addition, 100 percent of the Great Lakes and their connecting waters, a large portion of the nation's coastal waters, and about 20 percent of the National Wildlife Refuges with fishing are also under fish consumption advisories.

Although advisories in the United States have been issued for a total of 45 chemicals, most include mercury. As it cycles between the atmosphere, land, and water, mercury undergoes a series of complex chemical and physical transformations. The *Mercury Study Report to Congress* (December 1997) outlines these scientific issues.

Cost-effective opportunities to deal with mercury during the product lifecycle, rather than just at the point of disposal, need to be pursued. A balanced strategy that integrates end-of-pipe control technologies with material substitution and separation, design-for-environment, and fundamental process change approaches is needed.

In addition, international efforts to reduce mercury emissions as well as greenhouse gases will play an important role in reducing inputs to the global reservoir of mercury.

Mercury: A Complex Environmental Challenge

Mercury cycles in the environment as a result of natural and human activities. The amount of mercury released into the biosphere has increased since the beginning of the industrial age. Mercury in the atmosphere can be transported thousands of miles from sources of emission and can circulate in the atmosphere for up to a year. Most of the mercury in water, soil, sediments, or plants and animals is in the form of inorganic mercury salts and organic mercury (e.g. methylmercury). The inorganic form of mercury, when either bound to airborne particles or in a gaseous form, is readily removed from the atmosphere by precipitation and is also dry deposited. As it cycles between the atmosphere, land and water, mercury undergoes a series of complex chemical and physical transformations, many of which are not completely understood. Mercury

accumulates most efficiently in the aquatic food web. Predatory organisms at the top of the food web generally have higher mercury concentrations. Nearly all of the mercury that accumulates in fish tissue is methylmercury.

Fish consumption dominates the pathway for human and wildlife exposure to methylmercury. The Mercury Report to Congress supports a plausible link between anthropogenic releases of mercury from industrial and combustion sources in the United States and methylmercury in fish. However, these fish methylmercury concentrations also result from existing background concentrations of mercury (which may consist of mercury from natural sources, as well as mercury which has been re-emitted from the oceans or soils) and deposition from the global reservoir (which includes mercury emitted by other countries). Given the current scientific understanding of the environmental fate and transport of this element, it is not possible to quantify how much of the methylmercury in fish consumed by the U.S. population is contributed by U.S. emissions relative to other sources of mercury (such as natural sources and re-emissions from the global pool).

The typical U.S. consumer eating fish from restaurants and grocery stores is not in danger of consuming harmful levels of methylmercury from fish and is not advised to limit fish consumption. The levels of methylmercury found in the most frequently consumed commercial fish are low, especially compared to levels that might be found in some non-commercial fish from fresh water bodies that have been affected by mercury pollution. While most U.S. consumers need not be concerned about their exposure to methylmercury, some exposures may be of concern. Those who regularly and frequently consume large amounts of fish - either marine species that typically have much higher levels of methylmercury than the rest of seafood, or freshwater fish that have been affected by mercury pollution - are more highly exposed. Because the developing fetus may be the most sensitive to the effects from methylmercury, women of child-bearing age are regarded as the population of greatest interest.

-Experts from the Mercury Study Report to Congress, December 1997, (Volume 1, Executive Summary), <http://www.epa.gov/oar/mercury.html>

EPA proposes to take the following actions in consultation with other federal agencies and with the involvement of states, tribes, and other stakeholders.

- *Control emissions from air point sources.* EPA has taken several important steps to reduce the levels of mercury and other pollutants in fish, including reducing emissions from municipal waste combustors and medical waste incinerators. These actions, once fully implemented, will reduce mercury emissions caused by human activities by 50 percent from 1990 levels. Actions to reduce emissions of carbon dioxide to control climate change will also have a significant co-benefit in reduced mercury emissions. Additional work is being done in EPA's Total Maximum Daily

Load (TMDL) program to evaluate the linkage of air emissions to water quality impacts, to help determine appropriate reduction actions.

- *Water-related mercury actions.* EPA will publish new analytical methods for mercury, expand compliance and enforcement activities for direct and indirect dischargers of mercury into surface waters, expand outreach to publicly owned treatment works about preventing mercury pollution in sewage discharges, and revise water quality criteria development plans, as appropriate.
- *Seek reductions in uses of mercury and improve information and citizens' right to know.* These use-reduction measures will reduce the levels of mercury in waste streams as well as the danger of accidental releases. Generally, EPA will look to voluntary rather than regulatory approaches to reduce mercury use. Additionally, EPA is considering changing the reporting requirements for mercury under the Toxic Release Inventory which could result in additional reporting of mercury releases.
- *An environmentally acceptable disposal method for mercury wastes designated as hazardous wastes.* This will allow many hazardous mercury wastes to be safely treated and permanently disposed, and therefore will reduce the amount of mercury being recovered (which is the current requirement) for which there may be no demand. This will also reduce emissions from the recovery processes.
- *Seek reduction in exposure to highly exposed populations.* Because it will take a long time before reductions in mercury releases are reflected in lower fish-tissue levels, EPA will continue public information and outreach programs, including continued support and strengthening of the states' and tribes' fish advisory programs.
- *Encourage international efforts to reduce mercury releases.* The global circulation of mercury requires concerted efforts by all countries to solve the mercury problem in any one country.
- *Further research on all aspects of the mercury problem.* A research strategy will permit targeting of federal research on the most important data gaps.

KEY ACTION: EPA and NOAA will conduct a national survey of mercury and other contaminant levels in fish and shellfish throughout the country during the period 1998-2000. This effort will be coordinated with state and tribal efforts to maximize geographic coverage.
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Fish advisories have also been issued for other long-lasting toxic pollutants, including polychlorinated biphenyls (PCBs), chlordane, dioxins, and DDT, even though the use of PCBs, chlordane, and DDT was banned or drastically restricted many years ago. Many of these

pollutants settle into the sediments where they can remain as a source of contamination well after the original source is controlled.

KEY ACTION: By 1998, EPA will develop a multimedia strategy addressing mercury and other persistent, bioaccumulative, and toxic pollutants that cannot be fully addressed through single media controls and approaches. The strategy will include enforcement and compliance efforts to address noncompliance associated with contaminated fish and shellfish areas.

KEY ACTION: EPA will release its Contaminated Sediment Strategy that will coordinate its programs to address the following goals: (1) preventing the volume of contaminated sediment from increasing; (2) reducing the volume of existing contaminated sediment; (3) ensuring that sediment dredging and disposal are managed in an environmentally sound manner consistent with the needs of waterborne commerce; and (4) developing scientifically sound sediment management tools for use in pollution prevention, source control, remediation, and dredged material management.

KEY ACTION: In 1998, EPA will initiate place-based contaminated sediment recovery demonstration projects in five watersheds selected from those identified in EPA's National Inventory of Sediment Quality as being of the greatest concern. Remediation efforts will be coordinated with federal natural resource trustees.

Even with aggressive implementation of measures to reduce the levels of mercury and other pollutants that cause fish to be unsafe to eat, it will take many years to stop and then reverse the buildup of these pollutants. In the period before pollution reduction measures reduce pollutant levels in fish to safe levels, federal, state, and tribal agencies need to work together to ensure that the public has accurate information about the health risks of consuming fish from specific waters.

KEY ACTION: EPA will work with NOAA and other federal agencies, states, tribes, and other interested parties to adopt, by December 1999, nationally consistent processes for monitoring water quality and fish tissue, and review EPA guidelines for decision-making on issuance of fish consumption advisories. EPA will support state actions and, after consultation with the state, will issue fish consumption advisories if a state fails to do so.

KEY ACTION: The Agency for Toxic Substances and Disease Registry (ATSDR) will contribute additional funding and coordinate epidemiology studies in the Great Lakes to improve understanding of the health effects associated with exposure to contaminants in locally caught fish.

KEY ACTION: In 1998, EPA and ATSDR will develop a brochure in Spanish and Asian languages explaining how to reduce the health risks of exposure to contaminants in locally caught fish and shellfish. The brochure will be given to pediatricians, obstetricians, and health care organizations for distribution to the public, particularly women with children.

Shellfish Harvests Resume in Navesink River, NJ

The Navesink River in New Jersey was closed to shellfishing in the early 1970s because of extensive pollution from industrial, marina, and agricultural sources. A Memorandum of Understanding was signed by the New Jersey Departments of Environmental Protection and Agriculture, EPA, Natural Resources Conservation Service, and 12 county, municipal, academic, and private organizations to restore recreational and commercial shellfish harvesting to the Navesink by reducing the amount of bacteria that enters the river. After years of implementing innovative pollution control measures, the Navesink was re-opened to shellfishing in 1997 and now generates an estimated \$10 million annually for the local economy.

KEY ACTION: In 1998, EPA and ATSDR will develop outreach materials for health care professionals, identifying the health risks of eating noncommercial fish and shellfish contaminated with PCBs and explaining how women and children can reduce these risks.

Contaminated shellfish or diseased fish stocks can have serious repercussions for the seafood and aquaculture industries and the public's faith in the quality of the food supply. Current shellfish bed closures signal serious regional problems with environmental contamination. The 1995 National Shellfish Register reports that 6.7 million acres of shellfish-growing waters are restricted nationally. For 72 percent of those (4.9 million acres), water pollution was the cause.

KEY ACTION: In 1998, NOAA will report on the status of shellfish bed conditions nationally and the factors contributing to areas of harvest limitation. This report will link shellfish bed conditions and watersheds for use in assessments.

KEY ACTION: EPA will direct enforcement and compliance assistance efforts, together with state and local authorities, at regulated sources contributing to conditions leading to closures of shellfish areas. These efforts will address sanitary sewer overflows, combined sewer overflows, storm water discharges, wet-weather discharges that contain substantial amounts of contaminants, and other point sources that are not discharging in compliance with applicable requirements.

Ensure Beaches Are Safe for Swimming

In 1996, over 2,500 beaches in the United States were posted with warnings or closed for at least one day due to bacteriological or other types of contamination. Many other beaches, however, are either not monitored adequately or not monitored at all. Illness can result from swimming or playing in water that is contaminated with disease-causing microorganisms. Illnesses range from minor gastrointestinal upsets and skin rashes to hepatitis and more severe infections. Children tend to be at increased risk because of longer exposure times and incidental ingestion.

The most frequent sources of recreational water contaminants are sewage overflows, polluted storm water runoff, boating wastes, and malfunctioning septic systems. Numerous federal, state, tribal, and local partners work to control these sources, reduce the contamination, monitor recreational waters, and inform the public when a health threat exists. The Coast Guard, for example, helps protect marine environments through ballast water management enforcement, promotion of marine sanitation devices for use by recreational boaters, enforcement of sewage discharge prohibitions, and reduction and prevention of oil and hazardous materials spills. Also, EPA's new Beaches Environmental Assessment, Closure and Health (BEACH) Program is designed to dramatically improve the information available to the public about the quality of water at recreational beaches.

KEY ACTION: In early 1998, EPA will release a BEACH Action Plan describing priority actions for federal, state, tribal, and local implementation of beach monitoring and notification programs. The BEACH Action Plan will include priority research, training, and guidance needs for the implementing agencies.

KEY ACTION: In May 1998, EPA will release the first Internet-based, federal database on beach advisories and closings in the United States. In addition to advisories and closings, this database will list which beaches provide monitoring and which do not.

KEY ACTION: In 1998, EPA will develop a specific plan and schedule for the development of a new generation of microbiological criteria for nationally protective beach water quality standards. New standards will be issued by 2003. The plan will include necessary research and interagency coordination, and describe the transition from the total coliforms/fecal coliforms currently in most state and tribal water quality standards to EPA's recommended *E. coli* and *Enterococcus* criteria, and new indicators for ear, skin, and respiratory infections. To ensure a nationally consistent system, EPA will establish a schedule for federal promulgation of standards where states fail to enact protective measures.

KEY ACTION: EPA will direct enforcement and compliance assistance efforts, together with state and local authorities, at regulated sources contributing to beach closings. These efforts will address sanitary sewer overflows, combined sewer overflows, storm water discharges, wet weather discharges that contain substantial amounts of contaminants, and other point sources that are not discharging in compliance with applicable requirements.

Ensure Water is Safe to Drink

Drinking water in the United States is typically safe. However, there are a number of threats to the safety of drinking water, including both chemical and microbial contamination. There is growing recognition of the value of protecting the high quality of waters that are a source of drinking water as a means of reducing the cost of treatment systems required under the Safe

Drinking Water Act.

Microbial contamination of drinking water, such as bacteria, viruses, and pathogens, is an area of special concern. While filtration and disinfection of drinking water can effectively remove microbiological contaminants, the reliability of these microbial treatment systems is not as high as some chemical treatment systems. Ensuring the high quality of sources of drinking water is especially important for reducing risks from microbial contamination. Microbiological contaminants are of greatest concern because they can cause immediate and sometimes deadly health threats, especially to sensitive members of the population. Because children, especially infants, may drink more fluids per pound of body weight than adults, they could be more vulnerable to these contaminants.

The 1996 amendments to the Safe Drinking Water Act provided for new efforts to identify sources of drinking water and to protect these sources. Such efforts can be enhanced by improved coordination with the water pollution control programs implemented under the Clean Water Act and other water quality protection laws, especially efforts to protect critical watersheds. As part of this effort, federal, state, and tribal agencies need to assess, on a watershed basis, the problems that impair the designated uses of waters, with a priority on waters designated for use as drinking water. These agencies need to ensure the effective coordination of tools available under the Safe Drinking Water Act and Clean Water Act, as well as other federal programs to help protect watersheds. Finally, federal, state, and tribal agencies need to gather information to support standard-setting and targeting of priorities in the future.

KEY ACTION: In October 1998, EPA will lead an agreement among federal agencies for directing program authorities, technical assistance, data, and enforcement resources to help states, tribes, and local communities design and implement their drinking water source water assessment and protection programs within the unified watershed protection and restoration efforts described in Chapter III. This agreement will draw on program authorities under relevant laws to assign priority to drinking water source water areas needing protection.

KEY ACTION: EPA will increase enforcement and compliance assistance in those watersheds where sources of drinking water are contaminated or threatened.

Reduce Exposure to Endocrine - Disrupting Pollutants

A growing body of research indicates that many industrial chemicals and pesticides may interfere with the normal functioning of human and wildlife endocrine systems. The endocrine or hormone system is a body's chemical control mechanism found in nearly all animals, including mammals, insects, fish, and birds. Consequently, endocrine, or hormone, disruptors may cause a variety of problems with development and reproduction.

Further research, monitoring, and testing are needed to improve understanding of the potential impacts of endocrine-disrupting chemicals. The National Science and Technology Council's

Committee on Environment and Natural Resources convened a working group led by EPA, DOI, and the National Institute of Environmental Health Sciences, that included NOAA and other federal agencies. This working group has developed a multi-agency research strategy for endocrine disruptors. Federal agencies are working with others to implement this research strategy.

The Food Quality Protection Act of 1996 and the Safe Drinking Water Act Amendments of 1996 require EPA to develop and present to Congress a screening program for endocrine disruptors by 1998 and to implement the program by 1999. EPA has asked a multi-stakeholder, public-private Endocrine Disruptor Screening and Testing Advisory Committee to provide advice on how to structure such a program. Several federal agencies including NOAA, DOI, and the Department of Health and Human Services are represented on the committee. The committee's report is due to be completed in late 1998. In addition, the National Research Council of the National Academy of Sciences is conducting a major study of endocrine disruption that is scheduled for release later this year.

KEY ACTION: In response to the requirements of the Food Quality Protection Act and the Safe Drinking Water Act, EPA will publish in 1998 a strategy for evaluating chemicals for their potential to cause effects through endocrine disruption, will implement the strategy no later than 1999, and provide Congress with a status report on this work by the end of 2000.
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KEY ACTION: EPA will address recommendations in the National Academy of Sciences' report on endocrine disruption and develop an appropriate national strategy.
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ENHANCE NATURAL RESOURCES STEWARDSHIP

Healthy watersheds are the key to maintaining and restoring water quality. Natural resources, soils, cropland, rangeland, forests, and wetlands are the building blocks of our watersheds. The quality of water is, in many respects, a reflection of the health of the natural resources and the stewardship of farmers, ranchers, and federal land managers. Stewardship of natural resources is the fundamental first step in pollution prevention.

Managing natural resources on a watershed basis offers a geographic context within which the interactions of lands, waters, human activity, and natural threats can be monitored, assessed, and understood. Watersheds also provide a good mechanism for helping residents to understand the relationship between their activities in one part of the watershed and the environmental consequences to rivers, streams, lakes, and coastal waters.

Protecting New York City's Drinking Water

The New York City water supply system provides drinking water to almost nine million residents of New York City and surrounding suburbs. Most of the City's drinking water comes from the

1,900 square-mile Catskill/Delaware watershed that extends 125 miles north and west of the city. Through a landmark agreement with EPA, New York State, and upstate communities, the City is pursuing an aggressive watershed protection program. The federal Surface Water Treatment Rule allows some water supply systems to avoid filtration provided there is high-quality water protected through watershed management and other measures. Under the agreement, the City is supporting a number of watershed partnerships and taking several other actions to protect and restore the watershed. Watershed partnerships are working to upgrade sewage treatment plants, improve nutrient and manure management on dairy farms, create buffers around reservoirs and wetlands, protect stream corridors, and improve storm water management. By working together in the watershed, the City and watershed residents strive to keep contaminants out of the City's water supply in the first place. Although the City is still required to filter water coming from an adjoining watershed, ratepayers may save billions of dollars through this watershed approach to pollution prevention.

Federal lands, particularly in remote and mountainous portions of the western United States, include watersheds that are in relatively pristine condition. These watersheds are extremely important as sources of clean water for drinking water, fish, and wildlife, and for other purposes. Protecting the integrity of these sensitive watersheds and recognizing their value as sources of high-quality water are important goals. Activities such as road building, logging, mining, grazing, hydrologic modification, or excessive recreational use can degrade the integrity of these watersheds and require actions to reduce their harm. In other instances, watersheds on federal lands may be impaired and require restoration to meet clean water goals. Strategies to reduce soil erosion, minimize nutrient runoff, or restore and repair riparian zones can help to improve these impaired watersheds.

In rural watersheds, stewardship of privately owned croplands, pastures, wetlands, and rangelands is the key to pollution prevention. These watersheds are largely in the care of millions of farmers, ranchers, and other private landowners. The skill with which they manage their lands is key not only to producing food and fiber for the nation, but also to the health of watersheds. Ensuring that farmers and ranchers have the technical, financial, and educational assistance they need to be good stewards of their lands is a fundamental element of a comprehensive clean water program.

"The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased and not impaired in value."

- Theodore Roosevelt

The waters associated with these federal or rural watersheds, whether pristine, sensitive, or impaired, often flow to urban or suburban areas where other human-caused activities can affect water quality. Policies and programs specifically designed to address the runoff of urban and

suburban pollutants can help to mitigate their effects. But programs designed to prevent pollution in upper portions of the watershed can complement and support efforts to reduce urban runoff and help reduce the cost of water treatment.

A watershed-based strategy for dealing with polluted runoff through improved natural resources stewardship, in addition to treating polluted runoff from urban and suburban environs, is much more likely to be successful than a single strategy focused on only one segment of the watershed. The key to watershed health is to coordinate and link up natural resources stewardship and polluted runoff prevention strategies throughout the watershed, protecting those portions of the watershed that remain pristine while, at the same time, minimizing those sources of polluted runoff causing the greatest harm.

Stewardship of Federal Lands and Resources

Over 800 million acres of the United States is federal land. These lands contain an immense diversity and wealth of natural resources and their use and stewardship are important to the American public. These lands include significant sources of drinking water and public recreation opportunities. Over 65 percent of all threatened and endangered plants, animals, and fish find protection on federal lands. Stewardship of federal lands may include whole watersheds under the jurisdiction of a single federal agency or any agency's lands intermingled with and affected by other federal, state, and local ownerships. Increasingly, competition for the use of these lands and their natural resources can create conflicts and stakeholder concerns. The need to continue advancing a coordinated and cooperative approach to clean water on federal lands has never been greater.

Hundreds of actions have already been taken by federal agencies to build watershed partnerships, improve the delivery of federal programs, and pioneer watershed and ecosystem approaches to land management and pollution prevention. However, much more needs to be done to involve stakeholders in watershed planning and management activities, to reorient programs to support watershed efforts, and to ensure full compliance with environmental laws and management directives. Federal facilities and land encompass a wide diversity of missions and activities. Many federal lands and watersheds, such as national forests, parks, grasslands, and wildlife refuges, represent some of the most pristine and valuable natural resources. Restoration is also needed where historical and past uses have resulted in damage to watershed conditions or water quality.

Unified Policy to Enhance Watershed Management on Federal Lands

Federal agencies will develop a unified policy that provides a framework to ensure that federal land and resource management activities demonstrate water quality stewardship and ensure the health of aquatic ecosystems on federal lands. This policy will ensure a watershed approach to federal land and resource management that emphasizes assessing the function and condition of watersheds, incorporating watershed goals in planning, enhancing pollution prevention, monitoring and restoring watersheds, recognizing waters of exceptional value, and expanding

collaboration with other agencies, states, tribes, and communities. This policy will address consistency and compliance with state and tribal programs as required by federal laws, including the Clean Water Act, Safe Drinking Water Act, and the Coastal Zone Management Act. The Unified Policy will include:

- (1) Coordination and planning of federal programs and resource management activities on a watershed basis to achieve clean water objectives, emphasizing state, tribal, and federal priority watersheds, taking into account different federal, state, and tribal approaches, programs, and guidelines; and creating “living laboratories” for adaptive management of watersheds and water quality.
- (2) Coordinated development and application of enhanced watershed assessment, hydrologic analysis, resource inventory, and classification; monitoring and evaluation methods; and compatible data standards.
- (3) Control of nonpoint sources of pollution through training in and implementation of best management practices, working with states and tribes to meet performance goals, and establishing appropriate memorandums of agreement.
- (4) Enhanced watershed restoration efforts, including the integration of watershed restoration as a key part of land management planning and program strategies.
- (5) Development of a process and guidelines for identifying and designating waters or watersheds on federal lands that may have significant human health, public use, or aquatic ecosystem values and a need for special protection.
- (6) A greater role for citizen stakeholders in completing watershed assessments, monitoring pollution sources, and planning and implementing restoration efforts through collaborative stewardship approaches.

<p>KEY ACTION: By 1999, DOI and USDA, in consultation with other federal agencies, states and tribes, and other stakeholders, will develop a Unified Federal Policy to enhance watershed management for the protection of water quality and the health of aquatic ecosystems on federal lands.</p>

Water Quality Improving on Public Lands in Oregon, Washington, and California

The President’s Northwest Forest Plan, initiated in April 1994 and signed by the Secretaries of the Departments of Agriculture and the Interior, set in motion unprecedented collaborative action for managing 25 million acres and improving water quality on public lands in Oregon, Washington, and Northern California. A key element of the Northwest Forest Plan is the Aquatic Conservation Strategy, a framework for managing federal lands, with an emphasis on restoring

habitats for stocks at risk - including various salmon and trout - and improving water quality. The strategy has four main elements to achieve its objectives: (1) riparian reserves, (2) delineation of critical watersheds, (3) analysis of watershed conditions and hydrologic functions, and (4) watershed restoration. To date, an interagency effort has completed watershed analysis on approximately 70 percent of the land base within the Northwest Forest Plan area. Since FY 1994, approximately \$22-\$26 million dollars a year have been allocated to the Bureau of Land Management and the U.S. Forest Service to continue the program of ecosystem restoration, community assistance, and job creation for displaced timber workers.

Increase Forest Road Maintenance and Obliteration

Roads and trails are primary sources of sediment runoff on federal lands. Each federal land management agency has standards for road maintenance that include practices for protecting water resources. However, a significant backlog of maintenance needs exists. For example, due to funding constraints, the U.S. Forest Service currently maintains only 40 percent of its road system to standard. Using funds from forest receipts as allowed under PL-62-430, the U.S. Forest Service can increase such maintenance of roads and trails 20 percent or more. The U.S. Forest Service and the Bureau of Land Management (BLM) will increase maintenance of roads and trails and aggressively relocate problem roads and trails to better locations. Where unneeded roads pose threats to water quality, they will be obliterated and the land restored. Efforts will be aimed at improving watercourses affected by erosion and sediment from roads/trails and at improving watersheds with priority water quality or habitat improvement needs.

KEY ACTION: Substantially increase maintenance of forest roads and trails on federal lands to protect water quality beginning in 1998; relocate and improve water quality protection for over 2,000 miles of roads and trails per year through 2005; and decommission or obliterate 5,000 miles per year by 2002.

KEY ACTION: The U.S. Forest Service will publish new forest transportation regulations by 1999. Stakeholder involvement will be solicited in the development of these regulations, which will consider public needs, funding, and scientific and environmental information in determining the size, purpose, and extent of the forest transportation system. In 1998, a temporary moratorium on new road construction in roadless areas of greater than 5,000 acres will be in effect for 18 months or until the U.S. Forest Service publishes new forest transportation regulations.

KEY ACTION: In consultation with other federal agencies and states, in 1999, EPA will consider whether to revise Clean Water Act permit regulations relative to forest roads and develop a pilot permit program for forest roads on federal lands.

Enhance the Condition of Riparian Areas and Stream Corridors

Riparian areas comprise a small percentage of the landscape, yet are critical to water quality protection and to the maintenance and health of streams and aquatic habitat. The condition of many riparian areas suffers from past effects and many continue to receive tremendous pressure for use. Streams and riparian zones reflect the overall health of the watershed and are often the focal point for conflicting resource demands. Protecting and restoring these vital resources represents a challenge for public land managers. Estimates show that, at the current rate of restoration, it will take more than 50 years to restore critical areas. Through completion of actions in assessment, education, technology transfer and monitoring, restoration projects, and collaboration with states, tribes, and local communities, federal agencies will enhance the quality of streams and riparian zones and accelerate restoration.

KEY ACTION: The BLM, the U.S. Forest Service, and other federal land management agencies will implement an accelerated program to improve or restore 25,000 miles of stream corridor by 2005.

Sustain Forest Health to Protect Watersheds and Water Quality

The health of many streams and watersheds is tied directly to forests. Forests increase the resiliency of watersheds through water storage, soil protection, and filtering processes. Forests are also an integral part of future strategies for reducing global warming, controlling storm water, and improving quality of life. In the East, stream water quality is directly related to the amount and condition of forests in a watershed, and riparian forests and wetlands are critical as buffers for upslope activities. In the West, many watersheds are severely affected each year by wildfires, intensified by declines in forest health. Catastrophic fires can destroy watershed functions and stream conditions for decades. Forest health has been affected by overcrowding, air pollution, and disease, as well as by fragmentation of land use in the urban/rural interface. The effect of forest loss and the importance of sustaining the health of forests should be recognized as an integral part of future watershed, water quality, and pollution prevention strategies.

KEY ACTION: By 2000, land management agencies will implement a strategy for assessing threats to watersheds and water quality stemming from forest health, and for targeting fuel treatments or other techniques to priority watersheds most threatened by damage from disease and wildfire.

KEY ACTION: The U.S. Forest Service, the BLM, and EPA will develop and implement a strategy for assisting states and tribes in watershed-based assessments and actions where urban-rural interactions threaten forest health and water quality.

KEY ACTION: The U.S. Forest Service will expand implementation of forest health survey and monitoring within all 50 states by 2005.

Improve the Health of Federal Rangelands

Although public rangelands are in better condition today than at the turn of the century (when unregulated grazing and drought caused extensive rangeland degradation), improvement is still needed on many BLM lands and an estimated 10 million acres of National Forest System rangelands.

In many areas, rangeland condition and trends are unknown. In addition, stream, riparian, and fish habitat conditions are often tied to rangeland health. More intense inventory, analysis, and monitoring will be undertaken to focus on rangelands which are in unsatisfactory condition. Implementing decisions were made on 1,295 allotments in FYs 1996 and 1997, with 544 decisions planned for FY 1998 and 1,200 expected in FYs 1999 and 2000. The U.S. Forest Service has scheduled the analysis of 6,886 grazing allotments over a 15-year period ending in 2010 as the foundation for improved management practices. A combination of management activities, including re-vegetation with native species, soil stabilization measures, stream protection and restoration, and grazing adjustment, will be used to help restore upland and riparian range.

KEY ACTION: The U.S. Forest Service and the BLM will accelerate range allotment planning, implement management changes, and accelerate restoration actions to restore the sustainability, function, and diversity of rangeland ecosystems. This process will be accomplished through improved allotment management decisions; development by the year 2000 of a standardized rangeland health inventory, classification, and monitoring system in accordance with the BLM, the Natural Resources Conservation Service, and the U.S. Forest Service; adoption of comprehensive guidelines for managing resources now at risk; and restoration of stream, riparian, and other degraded areas .

KEY ACTION: By 2002, the U.S. Forest Service, the BLM, and the Natural Resources Conservation Service will develop and implement rangeland vegetation classifications; establish baseline inventory data and an interagency training program for rangeland inventory and monitoring; and aggressively begin to implement management changes and restoration activities to eliminate ecological, management, or erosion problems that cause degraded water quality.

Prevent Water Pollution from Abandoned/Active Mines

Federal agencies have been studying for some time how best to approach the restoration of watersheds affected by abandoned hard rock mines on land under their jurisdiction, custody, or control. Abandoned hard rock mine sites may affect public health and the environment due to releases of hazardous substances from waste materials and acid drainage. Affected watersheds usually involve federally managed lands intermixed with private or state lands. Cleanup of environmental problems on the federal portion of mixed ownership watersheds should be coordinated with cleanup of state, tribal, and private lands wherever possible. Cooperation among

federal land management agencies, states, tribes, and EPA will help ensure that proposed actions result in success.

Federal land management agencies have been developing inventories of thousands of abandoned mines on federal lands. The scope and number of abandoned mine sites and the watersheds they affect require setting priorities. To better focus scarce financial and human resources, federal agencies developed an Interdepartmental Abandoned Mine Land Watershed Initiative, which includes a collaborative effort with state and local agencies, tribes, and private parties. Work began in two pilot states in 1996. Both USDA and DOI continue to expand the program with available funding. Another action that federal land management agencies can take to accelerate cleanup is to leverage their available funds by pursuing the parties responsible for the contamination on federal lands and requiring them to conduct cleanup actions. USDA experience indicates that over the next five to 10 years, the value of work performed by responsible parties may be two to three times the investment possible using only appropriated funds. Over the life of the program, as much as one-third of the total cost for cleanup could be contributed by responsible parties.

KEY ACTION: Using the approach outlined in the Interdepartmental Abandoned Mine Lands Watershed Initiative, Federal land managers will work in partnership with EPA, state agencies, tribes, private parties, and other interested groups to accelerate the rate of cleanup of watersheds affected by abandoned hard rock mines. With special emphasis on ensuring that viable responsible parties contribute their share of cleanup costs, federal land managers will, beginning in 1999, add three to five watersheds or major mine cleanup actions to the program each year through 2005. The USDA program is expected to meet a substantial portion of this target. USDA targets for 1999 include investigation and cleanup on an estimated 50 hard rock mine sites. Responsible parties have performed over \$30 million in work on federal lands managed by USDA during the past two years.

KEY ACTION: By 1999, federal land management agencies and EPA will forge a partnership, consistent with the watershed-based strategy described above and building on the existing Memorandum of Understanding, to help resolve issues and enhance review, planning, and operations for active mining operations.

Many streams and much ground water on federal and private lands in the East have been seriously affected by acid runoff and releases from abandoned coal mines. In many areas, entire watersheds are unable to support aquatic life and present hazards to the public. For example, more than 100 abandoned coal mines are discharging acid drainage into the South Fork of the Cumberland River. In many situations, cleanup needed to improve conditions on federal lands must take place in upstream private watersheds.

KEY ACTION: By 2000, the Office of Surface Mining in DOI, in cooperation with EPA and land management agencies, will increase by 50 percent the number of cooperative projects to clean up rivers and streams polluted by coal mine drainage. The Office of Surface Mining will continue to

work with key local stakeholders, including watershed associations, state, and tribal agencies, and local units of government.

KEY ACTION: EPA will revise effluent guidelines to better address coal mining in arid western areas, and will develop new effluent guidelines to address coal re-mining operations.

Increase Understanding of Ecosystems at the Watershed Scale

Historically, much of the management of rivers and watersheds has seen simple solutions applied to complex problems. Success in protecting water quality and restoring degraded watershed conditions requires an adequate understanding of the ecological processes that govern watershed functions, and ultimately water quality, in a given water body. Federal land managers have already piloted a number of innovative analysis tools and efforts. Further increasing and improving available information and analysis tools will help public as well as private land managers. By working toward consistent and proven methods for conducting land inventory, characterizing the watershed, identifying reference conditions, and formulating procedures for analysis and evaluation, federal agencies will improve decision-making, save resources, reduce legal challenges, and be able to transfer new technology to others involved in watershed management. New technological tools, such as geographic information systems, and enhanced understanding of ecological relationships make increasing efforts in this arena timely.

Federal agencies do not often have a capability or framework for freely sharing information among agencies or across watershed or jurisdictional boundaries. Land managers are also faced with incomplete watershed assessments and inadequate tools for conducting watershed analysis, characterizing watershed condition, determining landscape capability, and estimating the expected impacts of proposed management actions.

KEY ACTION: Federal agencies will expand efforts to complete watershed assessments and to establish compatible data standards and resource classification and inventory methods and protocols that will allow sharing of ecological, resource condition, land use, and monitoring information among federal and other stakeholders.

Restoring the California Bay-Delta Ecosystem

The Bay-Delta region of California, the largest estuary in the West, is an intricate web of waterways created by the blending of the San Francisco Bay with the confluence of the Sacramento and San Joaquin Rivers. The Delta provides drinking water to 20 million people and irrigation for 200 crops, including forty-five percent of the nation's fruits and vegetables. This special area is a critical habitat for more than 120 fish and wildlife species. As a result of these demands, the ecosystem has suffered greatly. Habitats are declining, and fish populations have plummeted, with several species listed as threatened or endangered. The system no longer serves as a reliable source of high quality water and levees face an unacceptably high risk of

breaching.

In June 1994, the key state and federal agencies joined together to protect and restore the Bay-Delta while ensuring adequate supplies of clean water. In December 1994, these CALFED agencies, along with urban, agricultural, and environmental stakeholders, signed the Bay-Delta Accord. The three-year Accord has already helped to slow the ecological decline. Thus far, progress has been made on each of its major elements:

- under the Clean Water Act, EPA approved the state's water quality standards in September 1995;*
- coordination of operations of the State Water Project and federal Central Valley Project is ongoing;*
- an intensive planning process for long-term ecosystem restoration and improved water management is underway; and*
- funding has been dedicated by urban water users, the federal government, and the state to begin immediate restoration actions.*

CALFED is developing a long-term plan for ecosystem restoration and improved water management, including improvements for storing and conveying water to meet multiple objectives. CALFED is currently analyzing various alternatives for these purposes, including common programs for ecosystem restoration, water quality protection, levee improvements, and water use efficiency, with regular input from stakeholders. A final plan is anticipated by the end of 1998.

KEY ACTION: By 2000, the U.S. Forest Service, the BLM, USGS, and EPA will test the watershed analysis process developed under the Northwest Forest Plan for subsequent application in targeted watersheds, representing a diversity of major ecosystem types throughout the country.
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KEY ACTION: By 2000, the Bureau of Reclamation, with assistance from USGS, will assess water quality of reservoirs and streams affected by the Bureau's operations and, by 2003, develop strategies in cooperation with others for water quality improvements.
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Permits, Licenses, and Leases on Federal Land to Protect Water Quality

Much of the activity that takes place on federal land is authorized through federal permits, licenses, and leases, including recreation facilities, pipe and transmission lines, service facilities, ditches and dams, and hydrologic modifications. Federal agencies will ensure that environmental safeguards and appropriate water quality provisions are incorporated into special use permits, leases, and licenses. Agencies will strive to direct resources to the monitoring of active operations to ensure compliance and to take necessary steps, including involving state agencies or EPA, when non-compliance with water quality protection is encountered.

KEY ACTION: Federal land and resource management agencies will work with states and tribes to immediately begin a review of existing processes to ensure that the issuance and renewal of use authorizations and licenses, adequately address water quality protection, monitoring, and compliance measures and will revise and upgrade those processes as needed by 2000. By 2005, federal agencies will amend use authorizations and licenses, as authorities allow, to: require appropriate monitoring; protect or enhance watershed and stream health; use specific state and tribal best management practice requirements; and ensure compliance with water quality standards.

Restore and Protect America's Wetlands

The nation's wetlands are areas where the flow of water, the cycling of nutrients, and the energy of the sun produce specially adapted communities of plants and animals.

Wetlands contribute to the environment in ways that parallel rain forests in more tropical climates and perform many functions that are important to the nation's economy and quality of life. As waters flow across watersheds through wetlands, chemicals that otherwise would contaminate waterways are removed through natural processes that assimilate pollution. When heavy rains fall and deep snowpacks melt, wetlands store and slow down the release of floodwaters, thereby reducing damage to downstream farms and communities. Some wetlands recharge aquifers and sustain the yield of water for human use as well as for dry-season flows in rivers.

Wetlands Provide Flood Protection for Boston

In a demonstration of the ability of wetlands to reduce flooding, the Army Corps of Engineers (the Corps) elected to acquire and preserve wetlands along the Charles River in Massachusetts through acquisition rather than construct extensive flood damage reduction facilities. Through the purchase of 8,115 acres of wetlands, the Corps reduced flood damage and preserved other wetland functions that would have been lost. The annual cost of the project averaged \$617,000 and the annual benefits averaged \$2.1 million.

Many plants and animals depend upon wetlands, which are essential for maintaining biodiversity. Wetland species are the base of commercial and recreational enterprises that provide jobs and income important to thousands of communities around the country. Three quarters of the nation's commercial fish and shellfish, which provide approximately \$2 billion of revenue annually, are dependent on coastal bays and their wetlands. Trees that grow in southeast forested swamps are harvested for timber, and ducks and geese in all flyways use wetlands for feeding, nesting, and resting during migration.

Because the importance of wetlands was poorly understood in the past, over half of the wetlands in the contiguous states have been lost since the time of European settlement. In some states and

many watersheds, less than 10 percent of the original acreage of wetlands remains. Although the rate of loss has been dramatically reduced in recent years, the United States continues to sustain a net loss of approximately 100,000 acres of wetlands every year.

Recognizing the important value of wetlands to the nation, the President announced a comprehensive 40-point plan in 1993 to make federal wetlands programs more fair, more flexible, and more effective. The cornerstone of the President's 1993 Wetlands Plan was the formal adoption of an "interim goal of no overall net loss of the nation's remaining wetlands, and the long-term goal of increasing the quality and quantity of the nation's wetland resource base." Concerns and suggestions from people with a stake in the way federal agencies administer wetlands programs were considered as this plan was developed and implemented. As a result of the 1993 Wetlands Plan, wetland losses continue to decline and the rights of property owners are protected. Regulatory programs are more efficient and burdens on permit applicants have been reduced.

The Clean Water Action Plan will move further to actually reverse the historic pattern of wetland losses in the United States and achieve a net increase of 100,000 acres of wetlands each year, beginning in 2005.

A Net Increase of 100,000 Acres of Wetlands per Year by 2005

Regulatory protections for wetlands stemmed the tide of wetland losses through the 1970s and 1980s. In the 1990s, these programs have become even more effective. Wetland regulation and enforcement will continue to play an important role in the overall wetland strategy, as improvements in program effectiveness continue to reduce losses. Achieving a net increase in wetlands will require working cooperatively with landowners and communities to encourage and support the restoration and enhancement of wetlands, while at the same time ensuring that the regulatory program results in no overall net losses. USDA's Wetlands Reserve Program, to restore 975,000 acres of wetlands by 2002, will be an important part of the strategy, as will other federal efforts to restore wetlands such as USDA's Conservation Reserve Program and the Department of the Interior's Partners for Wildlife program. Continuing progress in state, tribal, local, and private efforts will also be important. Strengthening partnerships among federal programs and nonfederal efforts will be a necessary prerequisite to achieving the net gain goal.

The planned pathway to achieve the goal is:

The Baseline

- Based on the most recent survey, the annual net loss of wetlands is estimated at approximately 100,000 acres. At this rate, achieving a net increase of 100,000 acres per year will require an increase in gross wetland gains of 200,000 acres annually.

- Existing federal, state, tribal, local, and private programs are expected to continue to reduce the wetland loss rate as they have over the past 25 years. Some of these losses are, however, due to natural factors or are caused by activities which are not regulated. Therefore, for purposes of estimating how much restoration is needed to achieve a net gain of 100,000 acres, federal agencies will identify programs which are expected to create or restore 200,000 acres of wetlands. If, as expected, actual losses continue to decline, the net increase would actually exceed the goal.
- To meet the goal, unavoidable wetland losses that are authorized by section 404 of the Clean Water Act program will be offset fully by gains achieved through successful compensatory mitigation in 2005 and each succeeding year.

A Net Increase

- Federal programs key to achieving this projected net gain through wetland restoration include USDA's Wetland Reserve and Conservation Reserve programs, the Army Corps of Engineers (the Corps) Environmental Restoration programs, the Department of the Interior's Partners for Fish and Wildlife program, and the North American Wetlands Conservation Act.
 - Agriculture programs will yield an estimated gain of 125,000 to 150,000 acres of wetlands per year by the year 2005.
 - Other federal programs will yield an estimated gain of at least 40,000 to 60,000 acres per year by the year 2005.
- Non-federal programs will play a vital part in meeting the goal by contributing approximately 35,000 acres per year by the year 2005. As new information on wetland trends and effectiveness of these programs becomes available, or if changes are made in the programs on which this pathway is based, re-evaluation and mid-course corrections may be necessary to ensure that the goal is met by 2005.

KEY ACTION: The Corps and EPA, working with other federal, state, tribal, and local agencies, will emphasize avoidance of wetland losses, deterrence of unpermitted losses, and enforcement of permit conditions to protect wetlands under Clean Water Act authorities. For unavoidable wetland losses, no overall net loss will be achieved in the regulatory program through mitigation accountability and by improving the reliability of restoration.

KEY ACTION: The Administration will work with Congress to expand the Wetlands Reserve Program to allow up to 250,000 acres of wetlands each year. In conjunction with other agricultural incentive programs, this initiative will enable the enrollment of 150,000 acres for wetlands restoration in 2005 and subsequent years.

KEY ACTION: By 2005, the Corps will increase by at least 50 percent the wetlands restored and enhanced through its programs. This includes wetlands restored as part of the President's "Riverine Ecosystem and Flood Hazard Mitigation" program in the FY 1999 budget and succeeding years.

KEY ACTION: The Corps, EPA, USDA, the Fish and Wildlife Service, and NOAA, through the Institute for Water Resources, will initiate a review of the effectiveness of wetlands mitigation banking by an independent body, such as the National Academy of Sciences or a science/environmental advisory board by the year 2000.

KEY ACTION: By 2005, working with Wetlands and River Corridor Restoration Partners, a group of 30 governmental and non-governmental organizations involved in habitat restoration, EPA will have cooperated on wetland projects in 500 watersheds.

KEY ACTION: By 2005, NOAA will increase the acreage of wetlands restored annually, to improve coastal water quality and benefit living marine resources, by encouraging wetlands restoration planning in state coastal zone management programs, and by continuing state and local partnerships under the Coastal Wetlands Planning, Protection, and Restoration Program settlement funds and community-based restoration funds. NOAA also will work with other federal, state, tribal, and local agencies to encourage the use of existing wetland restoration programs in coastal areas.

KEY ACTION: In the enforcement programs, EPA and the Corps will emphasize restoration and mitigation of wetlands as remedies for section 404 violations. EPA will also use Supplemental Environmental Projects (SEPs) that restore wetlands as remedies in programs enforcing non-404 requirements of law. Compliance with permit conditions will also be monitored and improved.

KEY ACTION: The Federal Highway Administration will increase net wetlands acreage resulting from federal-aid highway projects by 50 percent in 10 years, and will finance wetland mitigation projects for remediation of adverse effects from past federal aid highway improvements when such projects are determined to be appropriate and reasonable by the project sponsors.

Consistent Determination of Wetlands Losses and Gains

A necessary prerequisite to achieving the wetlands goal is ensuring that reliable systems are in place to collect and analyze data on losses and gains in the nation's wetlands inventory. Better methods will assist with accurately tracking progress toward the goal, evaluating the impact of policy and program decisions on the goal, and making the inventory more sensitive to relatively small changes in acreage.

The federal government currently supports two major statistical wetlands inventories. These two

approaches do not produce consistent determinations of wetland loss rates and do not provide adequate tracking of the gain in wetland acres achieved through restoration. The following key actions will reconcile the differences between these two approaches and provide better information on wetlands gains and losses.

KEY ACTION: By May 1, 1998, the White House Wetlands Working Group will finalize a plan to use existing inventory and data collection systems to support a single status and trends report by the year 2000. In addition, the White House Wetlands Working Group will convene a peer review panel to evaluate, by June 1998, a plan to track annual changes of less than 100,000 acres in the nation's wetlands.

KEY ACTION: By October 1999, EPA, the Corps, the Natural Resources Conservation Service, the Fish and Wildlife Service, and NOAA will issue technical guidance on the restoration, creation, and enhancement of wetland functions.

KEY ACTION: The White House Wetlands Working Group will, by October 1999, establish an interagency tracking system (based on the wetlands layer of the National Spatial Data Infrastructure) that will more accurately account for wetland loss, restoration, creation, and enhancement. This task will include establishing accurate baseline data for federal programs that will contribute to net wetland gains. The system will be peer reviewed.

Geographic-Based Planning to Protect and Restore Wetlands

Small, piecemeal losses of wetlands and other aquatic habitats accumulate to significant levels of environmental damage in many areas of the United States. One way to better protect these valuable resources is to integrate wetlands and similar habitats into geographic-based planning programs, including the watershed approach and other planning programs that address coastal resources, habitat, floodplains and river corridors, and management of water resources and public lands. Because wetlands assimilate chemicals that otherwise would pollute our rivers, lakes, and bays, their protection and restoration is an integral component of clean water planning. Because they are also areas of high biological productivity, wetlands are a critical part of any effort to maintain or restore populations of fish and wildlife, as well as the diversity of species.

Geographic-based planning offers the potential to develop a cohesive framework that addresses both clean water and aquatic habitat, reflecting the interdependent relationships between water chemistry and ecological processes in the natural environment. To realize this potential, planning processes should include an inventory of wetlands and other aquatic sites that remove pollutants, reduce flood damages and/or supply food and shelter for fish and wildlife. Environmental, economic, and quality-of-life values of these areas should be assessed, their location and areal extent determined, historic losses estimated, adverse consequences of past losses evaluated, and priorities for conservation and restoration ranked.

While geographic-based planning relies on strong local leadership and is enhanced with state or tribal backing, federal agencies will contribute by strengthening existing assistance programs and developing new ways to provide support. Information from federal agencies is available to help identify important aquatic habitat, for example, through NOAA's Essential Fish Habitat program. Federal financial and technical assistance may enhance the workability of options to acquire, preserve, and/or restore aquatic habitat. Regulatory and disincentive programs affect planners' considerations of activities that would adversely impact wetlands and other aquatic habitat. Guidance on those programs will help ensure the implementation of completed geographic-based plans. For activities that meet or exceed federal environmental standards, mechanisms are available to link regulatory decisions to geographic-based plans.

Challenge 21: Riverine Ecosystem Restoration and Flood Hazard Mitigation

In FY 1999, the Army Corps of Engineers is proposing a new program to focus on a community-based, watershed approach to riverine ecosystem restoration and flood hazard mitigation projects. Challenge 21 will play a significant role in helping the Corps meet its commitment to increase, by at least 50 percent, the wetlands restored and enhanced through its programs.

This new Corps program will reach out to local communities and within the Corps to promote greater use of non-traditional, non-structural flood hazard mitigation strategies through increased fiscal and policy incentives. Non-traditional strategies include the purchase of easements, land acquisition, construction of setback levees, and structural floodproofing. These strategies have much less impact on riverine ecosystems than traditional structural projects, and so help to restore and sustain valuable natural areas such as wetlands.

KEY ACTION: The Fish and Wildlife Service, NOAA, the Corps, the Natural Resources Conservation Service, and EPA, coordinating with states and tribes, will improve access to information on programs for wetlands and other habitat. Such information will be made available to geographic-based planners through toll-free help lines, the Internet, one-stop information centers, dedicated staff for outreach, and/or newsletters and other publications.
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KEY ACTION: Watershed Assistance Grants will be established to ensure that those whose wetland interests may be affected by planning have the means to participate in the process. Because active involvement requires a financial investment that may exceed the capability of some interests, these grants would contribute on an as-needed basis to the cost of participation.

KEY ACTION: The Corps, NOAA, the Fish and Wildlife Service, the Natural Resources Conservation Service, the National Park Service, and EPA will provide technical and/or financial assistance to states and tribes to integrate habitat considerations into geographic-based planning programs, and will offer incentives to programs that appropriately balance clean water and habitat
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factors.

Protect Coastal Waters

The nation's coastal resources provide enormous natural, economic, and public health benefits. A majority of Americans depend on them in some measure for their livelihood, food, recreation, and enjoyment.

Coastal waters are also critical to a wide variety of marine life, from manatees to migratory waterfowl to salmon. Coastal waters are especially vulnerable to pollution because of their high-density human populations, the intensity of land uses, the high population growth rates, and their role as receiving waters for the nation's major watersheds.

Expand Federal Coastal Programs

Coastal waters are important recreational and economic resources, but are under increasing pressure from development and other stressors. Recent experience has underscored the vulnerability of these waters to outbreaks of *Pfiesteria*, harmful algal blooms, and other biotoxins. While it is not known exactly what triggers the toxic form of *Pfiesteria*, 75 percent of the known outbreaks have occurred in waters over-enriched with nutrients.

Harmful algal blooms, biotoxins, and pathogen contamination indicate habitat deterioration and have important implications both in terms of fish disease and human health. Harmful and toxic algal blooms have impacted many coastal areas in recent years. Marine biotoxins can be carried by shellfish, water, or air to humans and wildlife. Outbreaks can kill and injure people, fish, and wildlife; harm the viability of the fishing and aquaculture industries and related enterprises; and ruin the aesthetic and economic benefits of the affected waters.

KEY ACTION: NOAA and EPA, in cooperation with other federal agencies, will develop a coordinated response system that supports state and local efforts in coastal waters for major events, such as harmful algae blooms and *Pfiesteria* outbreaks. Where appropriate, EPA will work with state and local governments to help focus existing enforcement authorities on reducing pollutant discharges contributing to such events.

KEY ACTION: NOAA and EPA will support the efforts of coastal states to reduce polluted runoff that may contribute to local or regional *Pfiesteria* problems, by providing technical and financial assistance for implementation of state coastal nonpoint pollution control programs under the Coastal Zone Act Reauthorization Amendments and state nonpoint source management programs under the Clean Water Act.

KEY ACTION: NOAA, DOI, EPA, USDA, and other federal agencies will work with states, academia, and others to implement the current National Harmful Algal Bloom Research and

Monitoring Strategy. The interagency strategy addresses characterization of environmental conditions likely to support toxic species, predictions of the onset of conditions conducive to bloom formation, and means to prevent, control, or mitigate their impacts.

Controlling Polluted Runoff to South Carolina Waters

The South Carolina coastal program has taken innovative steps to deal with runoff from bridges and golf courses. For example, for the Ocean Golf Course on Kiawah Island, the State developed a chemical management plan to guide seasonal application of chemicals so that resident terrestrial and aquatic species would be protected.

The coastal program also worked with the State Department of Transportation to develop criteria and best management practices to protect water quality and shellfish resources from storm water runoff from bridges crossing coastal waters. The state first implemented the criteria and best management practices in the design and construction of the Isle of Palms Connector, a three-kilometer causeway that connects Mt. Pleasant to the Isle of Palms barrier island. The bridge spans over ecologically sensitive tidal creeks, marshes, oyster harvest areas, and the intra-coastal waterway.

KEY ACTION: NOAA and Regional Fishery Management Councils will amend Fisheries Management Plans, including the identification of essential fish habitat, by October 1998. The amended Fisheries Management Plans will include options and recommendations to minimize adverse effects caused by state or federal activities.

KEY ACTION: The Corps and EPA will expand their efforts to promote the beneficial use of dredged materials to restore critical coastal habitats.

Approve and Implement State Coastal Polluted Runoff Control Programs

The Coastal Zone Management Act provides for federally approved state and territorial programs to preserve, protect, develop, and - where possible - enhance the resources of the nation's coastal zone. In 1990, Congress enacted legislation calling for states and territories to supplement these programs with efforts designed to reduce polluted runoff in these critical coastal areas.

The coastal polluted runoff control program was designed to integrate land and water management and water quality protection programs at the federal (e.g., NOAA and EPA) and state (coastal management and water quality agencies) levels. Together, these programs contain two significant features. First, they provide for implementing pollution control practices that conform to national technical guidance defining the best available, economically achievable measures to reduce nonpoint pollution in coastal waters. Second, these programs are to include appropriate enforceable policies, mechanisms, and back-up authorities to ensure implementation

of the management measures and to protect coastal waters. EPA and NOAA have already approved, with conditions to improve the programs in certain respects, most of the 29 submitted coastal programs. Another three states recently have begun development of coastal nonpoint programs for later approval. The federal agencies will provide national technical and programmatic workshops, one-on-one and regional assistance, and resources to help all coastal states and territories to implement approved programs and satisfy any conditions needed for full approval.

KEY ACTION: NOAA and EPA will work with coastal states and territories to ensure that they have developed programs to reduce polluted runoff in coastal areas and that these programs are at least conditionally approved by June 1998 and that all programs are fully approved by December 1999, with appropriate state-enforceable policies and mechanisms.

Build Coastal Partnerships

The federal government cannot act alone to restore and protect the coasts. States, tribes, local governments, businesses, and all sectors of the public must be involved in order to achieve clean water and public health goals in the coastal zone. This objective will require that more information be readily available, existing partnerships strengthened, and new partnerships established.

KEY ACTION: NOAA and EPA will further develop and support partnerships with state, tribal, and local governments and organizations to provide technical assistance and information to local decision makers in coastal areas. NOAA and EPA, in cooperation with other federal agencies, will broadly share lessons learned from National Estuary Programs and the National Estuarine Research Reserve System. NOAA, in cooperation with USDA, will expand the Nonpoint Education of Municipal Officials program.

KEY ACTION: NOAA, EPA, USDA, DOI, and other federal departments and agencies will use 1998, the International Year of the Ocean, to educate citizens, landowners, and consumers across the nation about their reliance and impacts on coastal waters.

Coastal Research and Monitoring

Effective enhancement of coastal ecosystems requires a comprehensive strategy that draws on the full array of tools and skills available from federal agencies and programs, as well as active participation and support from state, tribal, and local governments, businesses, and the public.

The first basic need is research to understand the mechanisms that transport pollutants to coastal waters and the impacts of pollutants on human activities, habitat, and living resources. Although such research is under way, it is often focused on specific pollutants, sources, or geographic areas. In order to restore and maintain the health of the nation's coastal waters, that knowledge and research must be integrated into a Coastal Research Strategy. The Strategy should include a

comprehensive review of existing research programs related to the generation, transport, and effect of coastal pollutants (including air deposition) on coastal waters, habitats, and living and economic resources. The Coastal Research Strategy should identify areas of overlap and recommend improvements, identify actions to integrate research results, and improve communication of research results to natural resource managers and the public.

KEY ACTION: NOAA and EPA will lead the development of a multi-agency Coastal Research Strategy to be issued in 1999.

Coastal areas are experiencing dramatic population growth. Additionally, coastal waters are highly vulnerable to pollution from diverse sources. Effective monitoring of coastal water conditions is essential.

Today, monitoring of coastal waters is conducted by several agencies. NOAA conducts the Status and Trends Program that reports on the condition of coastal waters and supports monitoring of shellfishing areas. EPA conducts some monitoring of coastal waters, especially related to coastal point source discharges, coral reefs, air deposition, hypoxia, and ocean dumping of dredged material. States and tribes monitor and assess coastal and estuarine waters to varying degrees. The USGS conducts limited monitoring of coastal waters, but has significant information about pollution loads in inland waters that are carried by rivers to coastal basins.

KEY ACTION: NOAA, EPA, DOI, and USDA, in cooperation with other federal agencies, states, and tribes, will develop a plan by the end of 1999 for coordinated monitoring of coastal waters and will, by the end of 2000, develop a comprehensive report to the public on the condition of the nation's coastal waters.
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Incentives for Private Land Stewardship

Most of the land in the watersheds of the contiguous United States is in the care of farmers, ranchers, and other private landowners and managers. This Action Plan envisions substantial increases in assistance to farmers and ranchers to encourage voluntary adoption of conservation plans as the primary means to accelerate pollution prevention on private agricultural and forest lands.

Through USDA's Environmental Quality Incentives Program (EQIP), farmers and ranchers will receive the technical, financial, and educational assistance they need to prevent pollution while protecting their bottom lines. This assistance will help farmers put in place integrated pest and crop management systems, develop nutrient and animal waste management plans, use a new generation of pesticides that have lower use rates and less environmental impact, and install practices to reduce erosion and runoff from their lands. New funds proposed in the FY 1999 Clean Water and Watershed Restoration Budget Initiative will be made available through EQIP and delivered through the watershed approach described in the next chapter.

Other USDA programs, such as the Conservation Reserve Program, the Conservation Reserve Enhancement Program, and the Conservation Technical Assistance Program will be broadly available to farmers and ranchers as a foundation for pollution prevention across the rural landscape. These programs will protect and restore riparian areas and establish conservation buffers in rural watersheds all across the country.

This Action Plan proposes innovative approaches to providing pollution prevention incentives to farmers and ranchers including risk management tools, marketing recognition for pollution prevention, and producer financed incentive programs through marketing and production orders.

Restore Riparian Areas and Establish Conservation Buffers

Riparian zones are rich in biodiversity and are critical links between the land and the nation's waters. They range in size from a few feet on either side of a small stream to several miles wide on large river systems. These small but critically important ecosystems directly affect water quality and the quality of fish and wildlife habitat. As much as 75 percent of terrestrial wildlife species are associated with riparian areas. These areas can also be effective traps for sediment, nutrients, and other potential pollutants before they enter streams and lakes.

Riparian zones are often a focal point for conflicting resource demands and a catalyst for community action. Federal agencies will work in collaboration with states and local communities to enhance the quality of riparian areas.

KEY ACTION: Before December 1999, USDA, EPA, DOI, the Corps, Tennessee Valley Authority, NOAA, and other partners will showcase the application of stream corridor restoration technology in 12 demonstration project areas for water quality improvement.

Conservation buffers are strips of land that are maintained in permanent vegetation and designed to intercept pollutants before they reach rivers, streams, and lakes. They can enhance wildlife habitat, improve water quality, and enrich the aesthetics on farmlands. These "green stripes" painted across watersheds can substantially reduce sediment and nutrients in runoff. The 1996 Farm Bill created a major new opportunity to prevent pollution and restore watersheds through a focused effort to put conservation buffers in place in every rural watershed in this country. USDA will take the following actions to promote conservation buffers on agricultural lands:

KEY ACTION: By 2002, USDA, working with federal, state, tribal, and private partners, will establish two million miles of conservation buffers on agricultural lands to prevent pollution and help meet water quality goals. USDA will review and increase, where appropriate, the incentives available under the Conservation Reserve Program continuous sign-up, the Environmental Quality Incentives Program, the Wetlands Reserve Program, and the Forestry and Stewardship Incentives Programs to ensure that incentives are adequate to establish two million miles of buffers by 2002.

KEY ACTION: USDA will reserve four million acres from the Conservation Reserve Program for the establishment of conservation buffers.

KEY ACTION: USDA, working through a National Conservation Buffer Team and the National Buffer Council, will pursue partnerships with the private sector, farm and conservation organizations, and states, tribes, and federal agencies to develop a coordinated campaign to encourage landowners to put conservation buffers on their farms and ranches.

KEY ACTION: USDA will issue a Federal Register notice by early 1998 announcing the availability of the Conservation Reserve Enhancement Program (CREP) and providing programmatic and administrative guidance to states for submitting proposals for CREP agreements.

Watershed Restoration at Pike Run in Pennsylvania

The Pike Run Watershed Restoration Project in Pennsylvania demonstrates the effectiveness of including habitat restoration techniques in a watershed treatment program. Restoring riparian areas and wetlands benefits landowners by providing direct economic gain through increased land values and better livestock health, and by providing excellent habitat for a variety of wildlife. Alternative livestock water structures have been constructed, almost 22 miles of riparian restoration has been completed, a total of 40 wetland acres have been restored by fencing cattle out of degraded wetlands, and approximately 1,000 acres of native warm season grasses have been planted. The project included broad-based partnerships among the Fish and Wildlife Service, EPA, Natural Resources Conservation Service, Ducks Unlimited, Pennsylvania Game Commission, the Audubon Society, and many other public and private partnerships under the Partners For Wildlife and Clean Water Act section 319 nonpoint source programs.

KEY ACTION: USDA will work with states to help develop proposals leading to as many CREP agreements as practicable to address critical water quality, soil erosion, and fish and wildlife habitat needs, including those for threatened and endangered species.

In implementing these actions, the Departments of the Interior, Commerce, and other federal agencies will work cooperatively with private landowners to develop increased flexibility in conserving fish and wildlife habitat while providing regulatory certainty and assurances to non-federal landowners. These efforts include the development of Candidate Conservation Agreements with assurances for private property owners, the streamlining of the habitat conservation planning process, and the development of the “Safe Harbor” policy that assures landowners that voluntary improvements to habitat will not restrict long-term land use options.

Agricultural Marketing and Promotion Orders

Improving land stewardship and reducing polluted runoff from agricultural lands depends on the management decisions of farmers and ranchers across the United States. The work of these private individuals is ultimately responsible for preventing pollution. A key element of this effort is to engage the private sector directly by creating innovative, market-based incentives to improve the management of agricultural lands.

The Commodity Promotion, Research and Information Act of 1996, part of the 1996 Farm Bill, authorizes the Secretary of Agriculture, in partnership with agricultural producers, to establish “marketing and promotion orders.” The purpose of such orders is to help agricultural producers develop new markets and promote their products. Helping producers meet their conservation objectives is also a stated purpose of establishing marketing and promotion orders.

Marketing and production orders are self-financing. They are funded through deductions or “check-offs” from private commodity transactions with oversight from USDA. Producers, processors, and importers pay the assessments and control how the funds are spent.

To date, most of these check-off funds have been used for marketing, promotion and research. Recently, however, producers have been exploring opportunities to use these self-help funds for conservation purposes. The National Pork Board, for example, is funding an Environmental Audit program that helps pork producers manage environmental problems on their farms. The use of marketing and promotion orders to support pollution prevention is a significant opportunity to engage farmers, ranchers, and other sectors of the agricultural production system directly, through self-directed and self-funded activities, in preventing pollution from agricultural lands.

KEY ACTION: USDA will work with agricultural producers to encourage the use of marketing and promotion orders to assist them in meeting their pollution prevention objectives.

Reduce Risks Associated with More Efficient Fertilizer and Pesticide Use

Many new and innovative technologies have been developed that both improve the efficiency of fertilizers and pesticides and reduce the potential for these agricultural chemicals to run off into lakes and streams. In many cases, these innovative technologies promise to both protect the environment and improve the producer’s bottom line. In general, these new technologies allow farmers to apply chemicals precisely when and where they are needed, based on better information about actual levels of pest infestations or nutrient requirements gathered while the crop is growing.

For example, a producer may apply nitrogen fertilizer based on a new soil testing technology that estimates the nitrogen required by a crop already growing in the field. This technology allows the farmer to match the amount of fertilizer applied much more closely to the needs of the crop. In the process, the farmer increases efficiency and reduces the potential for nitrogen to run off or leach into the environment. There are many other examples of new technologies used for nutrient management, integrated pest management, and management of irrigation systems.

Such new technologies can be effective pollution prevention measures, but they do present new risks for the producers. In the example described above, the farmer who waits to apply his fertilizer until the crop is growing - and he can make more precise estimates of crop nitrogen needs - may have only a two-week window in which to apply fertilizers after the test results are in. If rain or other poor weather prevents a farmer from getting into the fields during this window, the producer can suffer serious losses in yield and profit.

Crop insurance has been effectively used for years to help farmers manage the risk of weather-induced losses in crop yields. Risk management instruments could be modified to help farmers manage these and other risks of adopting new and innovative pollution prevention technologies. Such risk management instruments would provide effective, market-based incentives for producers to prevent pollution from their land.

KEY ACTION: USDA will work with private insurance companies and foundations to review the feasibility of providing an insurance program that enables producers to offset risks of utilizing new technologies to manage fertilizers and pesticides to prevent pollution. USDA will assist in developing public- private partnerships that facilitate risk protection policies and programs for producers adopting pollution prevention systems.

Marketing Recognition for Agricultural Producers

Many consumers are interested in seeking out products that are produced in an environmentally sound manner. In particular, consumers have demonstrated (e.g., through purchases of organically grown products, often at premium prices) an interest in purchasing food that has been grown and processed in a manner that is both environmentally sound and healthful. An approach that defines and recognizes sound agricultural management practices protecting water quality would help promote producers' use of such practices.

Many industrial facilities have adopted international standards of good environmental management such as ISO 14000. Today, no set of voluntary environmental management practices and procedures has been developed for agricultural producers. If a set of core environmental management practices were developed, producers complying with the standards might be authorized to market products with a marketing recognition device, like a packaging seal.

KEY ACTION: USDA will lead a task force to work with agricultural producers, businesses, and interested constituencies to explore the feasibility of defining standards and establishing a "Blue Water" marketing recognition program to identify agricultural products produced under sound environmental management guidelines.

Grape Growers and Environment Profit in Napa

In Napa County, California, grape growers voluntarily removed crops from various stream

banks after applying an economic model developed by a local agency. The model demonstrated that if development of a stream buffer eliminated stream maintenance, a farm could make more profit by removing production from the buffer zone. The model allowed a shift from “production per acre” as a measure to “profit per farm” and resulted in improved water quality, greater habitat quantity and value, and higher profits for the farmers.

STRONG POLLUTED RUNOFF CONTROLS

Polluted runoff is the greatest source of water quality problems in the United States today. Polluted runoff is rainwater and snowmelt that moves across the land, picking up pollutants and delivering them to streams, rivers, lakes, wetlands, and coastal waters. Polluted runoff, as the term is used in this Action Plan, is generated by many activities managed by states, territories, and tribes as nonpoint source pollution, as well as a number of activities that may be regulated as point sources under the Clean Water Act.

Bad River Watershed, South Dakota

The Bad River watershed, 3,172 square miles that drain into the Missouri River, did not support certain uses such as sport fishing because of the large amount of sediment entering the system. Many partners, including USDA Farm Services Agency, Natural Resources Conservation Service, U.S. Geological Survey, Fish and Wildlife Service, EPA, and other state, local, and environmental organizations, agreed to set up a project to demonstrate the array of practices that can help alleviate the sediment problem. These measures include erosion control structures, riparian re-vegetation, range seedings, water spreader systems, and alternative stock watering facilities. The result of this section 319 project has been a significant reduction from 82.7 tons of sediment per acre/foot of runoff in 1990, to an average annual sediment deposit of 10.2 tons per acre-foot measured in 1993 through 1995.

The 1996 National Water Quality Inventory, which summarizes state surveys of water quality in the United States, indicates that about 40 percent of surveyed U.S. waterbodies are impaired by pollution, with the leading source being polluted runoff. About 70 percent of impaired rivers and streams and 49 percent of lakes are impaired by runoff or discharges from agriculture. While the nation has begun to make progress in controlling polluted runoff, meeting clean water goals in the next decade and beyond will require picking up the pace of this effort.

The development and implementation of plans to restore water quality on a watershed basis will result in a significant reduction of polluted runoff. Chapter III of this Action Plan presents a unified watershed assessment and restoration approach to pull together the many state, tribal, and federal programs that can help quicken the pace of reducing polluted runoff. In addition to these

programs targeted to specific problem areas, more needs to be done to prevent polluted runoff and to help ensure that waters that are now meeting clean water goals continue to do so.

Strengthen State and Tribal Polluted Runoff Programs

States and authorized tribes now implement general programs to reduce polluted runoff under section 319 of the Clean Water Act. These programs are successfully preventing polluted runoff from a wide range of existing facilities and locations and are helping to ensure that new facilities and projects are designed to minimize polluted runoff impacts. Actions to improve the effectiveness of these programs are described in the following text.

Help States and Tribes Implement Strengthened Nonpoint Source Programs

The Clean Water Act provides for broad state and tribal programs to address polluted runoff. Section 319 of the Act identifies key elements of polluted runoff programs and authorizes grants to states and tribes to develop and implement the programs. EPA currently provides grants to states and authorized tribes of about \$100 million; states and tribes provide a 40-percent match of these federal funds.

In May 1996, EPA and the states reached agreement to upgrade section 319 programs to prevent polluted runoff to address nine key elements, including, among others, establishing short- and long-term goals and objectives; strengthening working partnerships with all appropriate public- and private-sector groups; focusing on impaired waters and waters threatened by new sources and activities; implementing better-focused programs to address these problems; working to promote consistency of federal programs among state and tribal nonpoint source programs; and using monitoring and feedback loops to ensure continued progress. One state has developed program upgrades in all nine key areas; many other states are working toward that goal.

An essential feature of effective nonpoint source programs will be the coordination and integration with other closely related state- and tribal-managed water quality programs, such as coastal nonpoint pollution control programs under section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, source water protection programs under the Safe Drinking Water Act, and total maximum daily load programs under section 303(d) of the Clean Water Act. The strengthening of partnerships as described above will ensure that all appropriate programs, authorities, and resources are used effectively and consistently to solve shared problems.

KEY ACTION: EPA and other federal agencies will provide technical assistance to states and tribes to help upgrade polluted runoff programs to address all nine key program elements. Beginning in FY 1999, EPA and all states, territories, and tribes will expedite incorporation of the nine key elements established in national guidance into section 319 Nonpoint Source Management Programs. Also in FY 1999, EPA will advise states and tribes that, beginning in FY 2000, EPA will award any section 319 monies exceeding the \$100 million authorized level only to those states and tribes that have incorporated all nine key elements into an approved section 319

North Carolina Cherokee Tribe Treats Critical Area

Severe erosion along access roads on Cherokee tribal trust lands was adding 150 tons of soil per acre each year to nearby streams, degrading habitat for animals. With the help of an EPA Clean Water Act section 319 grant, sections of the road were re-graded and re-seeded to permanent vegetation. Since its completion, soil loss has fallen to less than six tons of soil per year. Now, species of bear, deer, and small game birds are active in the area and stream habitats have improved; native trout have returned to many streams.

Improve Anti-degradation Policies to Reduce Polluted Runoff

EPA's water quality standards regulations require that each state and tribe adopt an anti-degradation policy to maintain and protect existing levels of water quality as part of their water quality standards. Where a state or tribe issues a discharge permit or takes other actions related to water bodies with good water quality, such actions must not increase water pollution levels.

States and tribes may, however, allow some increase in water pollution levels, but not to such an extent that water quality standards are violated, where such increased pollution is "necessary to accommodate important economic or social development." In allowing any degradation of waters with good water quality, the regulations require states and tribes to ensure that "all cost-effective and reasonable best management practices" be applied to reduce polluted runoff.

EPA has not defined this requirement for implementation of polluted runoff controls in detail, and many states have not developed procedures to ensure compliance with this regulation.

KEY ACTION: EPA will develop guidance that more specifically defines expectations and procedures for states to follow in fully implementing anti-degradation policies related to polluted runoff and will publish final guidance on this subject by December 1998.

Ohio Revolving Loan Fund Finances Conservation Easement

Ohio EPA recently awarded the first low-interest water pollution control loan to foster creek bank conservation. The Nature Conservancy received the \$110,000 loan award to purchase a permanent conservation easement along Ohio Brush Creek in Adams County. This is the first time The Nature Conservancy has obtained financing for stream restoration and protection from a state revolving loan fund established under the Clean Water Act.

A significant statewide water resource, the creek supports four state/federally listed endangered aquatic species, including the club shell mussel. The 154-acre permanent conservation easement will prevent future development and will provide a buffer to The Edge of Appalachia Preserve, a system managed by The Nature Conservancy. The Water Pollution Control Loan Fund is jointly administered by Ohio EPA and the Ohio Water Development Authority. Since 1989, this fund has loaned more than \$1 billion for a variety of water pollution control projects.

Improve State and Tribal Enforceable Authorities

An important component of an effective state program to control polluted runoff is enforceable authority that can be used to ensure that pollution controls are actually implemented if voluntary efforts fail. States, EPA, and NOAA have developed considerable experience with state enforceable policies and mechanisms for polluted runoff in working with coastal states to develop coastal nonpoint pollution control programs. The Environmental Law Institute recently completed a study concluding that nearly all states have some general authority to deal with nonpoint source discharges that can be shown to result in water pollution. However, the legal reach and practical utility of these authorities vary widely. There is even wider variability with respect to state authorities that specifically address particular priority classes of sources (e.g., agriculture, forestry or development) or priority watersheds.

KEY ACTION: EPA and, in coastal states and territories NOAA, will promote by the year 2000 the establishment of enforceable state and tribal authorities needed to ensure the implementation of nonpoint source controls to achieve water quality standards. EPA, in consultation with NOAA, will publish guidance describing existing and potential models of enforceable authority related to polluted runoff and will assist states and tribes in this effort.

Increase Commitment of Clean Water Loan Funds to Polluted Runoff

The 1987 amendments to the Clean Water Act created State Revolving Loan Funds to finance the construction of sewage treatment and other water pollution control facilities. EPA provides annual grants to states to capitalize the loan funds, and states provide a 20-percent match. States then make low-interest loans to communities for construction of water pollution control facilities. Money repaid to the State Revolving Loan Fund is then loaned to other communities to support additional projects.

The total value of the state funds is about \$25 billion, making over \$2 billion in new loans each year, drawing on both repayments of existing loans and capitalization grants from the federal government. Although traditionally used to finance sewage treatment facilities, loans are used increasingly for projects to prevent polluted runoff. About three percent of the total loans made to date are for polluted runoff projects.

States indicate that some of the reasons for the small number of loans for polluted runoff projects

are that sewage treatment projects have a higher priority than polluted runoff projects, that the risk of loan default is higher for polluted runoff control projects, and that potential loan recipients usually prefer grants rather than loans.

The investment of state clean water loan funds in polluted runoff control projects could be increased if EPA helped states identify ways to reduce risks of loans for polluted runoff projects, defined ways to identify polluted runoff control projects in the planning process, and set clear goals for increasing investments in these projects. EPA will work with states and territories to ensure that state loan funds are used for the highest priority polluted runoff projects that meet the programs' financial criteria.

KEY ACTION: EPA will work with states to increase the number and dollar amount of loans made through clean water revolving loan fund programs for priority projects to prevent polluted runoff, with the goal of increasing the annual percentage of funds loaned for this purpose to at least 10 percent (or about \$200 million) by the year 2001. EPA will also work with states toward the goal of increasing to 25 the number of states using integrated priority-setting systems to make clean water funding decisions by the year 2000.

Reduce Nutrient Over-enrichment

Nutrients, in the appropriate amounts, are essential to the health and continued functioning of aquatic ecosystems. Excessive nutrient loadings will, however, result in excessive growth of macrophytes or phytoplankton and potentially harmful algal blooms (HAB), leading to oxygen declines, imbalance of aquatic species, public health risks, and a general decline of the aquatic resource. Nutrient over-enrichment has also been strongly linked to the large hypoxic zone in the Gulf of Mexico and to recent outbreaks of *Pfiesteria* along the mid-Atlantic Coast.

State water quality reports indicate that over-enrichment of waters by nutrients (nitrogen and phosphorus) is the biggest overall source of impairment of the nation's rivers and streams, lakes and reservoirs, and estuaries. In the 1996 National Water Quality Inventory, states reported that 40 percent of surveyed rivers, 51 percent of surveyed lakes, and 57 percent of surveyed estuaries were impaired by nutrient enrichment. Agriculture is the most widespread source of these impairments, followed by municipal sewage treatment plants, urban runoff and storm sewers, and various other nonpoint pollution sources, including air deposition.

Define Nutrient Reduction Goals

Although nutrient over-enrichment is clearly a major challenge for the nation's waters, the assessment of the seriousness and extent of the problem is often based on subjective criteria that can result in widely varying assessments. Research to improve the basis for understanding and assessing nutrient over-enrichment problems is critical to better control of nutrient levels in waters and to meeting the nation's clean water goals.

EPA is developing a strategy to establish an objective, scientifically sound basis for assessing nutrient over-enrichment problems. Specifically, EPA will develop nutrient criteria - numerical ranges for acceptable levels of nutrients (i.e., nitrogen and phosphorus) in water. Unlike other criteria that EPA has developed, nutrient criteria will be established as a menu of different numeric values based on the type of water body (i.e., river, estuary, lake) and the region of the country in which the water is located. It is vital that this work be done to provide the technical basis for pollution reduction plans.

EPA will develop nutrient criteria for the various water body types and ecoregions of the country by the year 2000. Under the Clean Water Act, states use pollutant criteria established by EPA as the basis for adopting water quality standards. Within three years of EPA issuance of applicable criteria, all states and tribes with water quality standards should have adopted water quality standards for nutrients. Where a state or tribe fails to adopt a water quality standard for nutrients within the three-year period, EPA will begin to promulgate the nutrient criteria appropriate to the region and water body type. When promulgated, the EPA standard would apply until a state or tribe adopts, and EPA approves, a revised standard.

<p>KEY ACTION: EPA will establish, by the year 2000, numeric criteria for nutrients (i.e., nitrogen and phosphorus) that are tailored to reflect the different types of water bodies (e.g., lakes, rivers, and estuaries) and the different ecoregions of the country, and will assist states in adopting numeric water quality standards based on these criteria over the following three years. If a state does not adopt appropriate nutrient standards, EPA will begin the process of promulgating nutrient standards.</p>

Assess and Reduce Air Deposition of Nitrogen

Nitrogen gas makes up 78 percent of the atmosphere. However, bio-available nitrogen causes many health and environmental problems. Nitrogen oxides in the air can cause deep lung irritation and decrease lung function in children who are active outdoors and can contribute to the formation of ground-level ozone. Bio-available nitrogen has also become a major concern in many water bodies because it can acidify lakes, cause algal blooms, lower dissolved oxygen, and kill fish.

More than 23 million tons of nitrogen are emitted to the atmosphere each year. About half of the nitrogen compounds emitted from fossil-fuel-burning plants, vehicles, and other sources in the United States are deposited on U.S. watersheds. Nitrogen compounds are released from a variety of other sources, including application of fertilizers and manure, and publicly owned treatment works. EPA has moved, under the Clean Air Act, to reduce emissions of nitrogen oxides (NO_x) from new vehicles and electric power plants since the 1970s. EPA has proposed NO_x emissions “budgets” for 22 states and the District of Columbia to reduce regional NO_x emissions in the eastern United States. As the states take action under their plans to meet the new ozone and particulate standards, NO_x emissions will be further reduced.

KEY ACTION: EPA and NOAA will work with other federal, state, tribal, and local government agencies and others to better quantify the risks associated with atmospheric deposition of nitrogen compounds and other pollutants to water bodies.

KEY ACTION: EPA will work through the TMDL program to evaluate the linkage of air emissions to the water quality impacts to help determine appropriate reduction actions. EPA will work with states, tribes, and federal land management agencies to employ both Clean Water Act and Clean Air Act authorities to reduce air deposition of nitrogen compounds and other pollutants that adversely affect water quality. EPA will develop a report on methods for this work by the spring of 1999.

Improve Subsurface Sewage Disposal

Decentralized wastewater systems currently serve about 25 percent of the U.S. population and approximately 37 percent of new development. The vast majority of these systems are conventional onsite wastewater systems (or sometimes cesspools).

States report that these wastewater systems have failed because of inappropriate siting or design or inadequate long-term maintenance and that septic tanks constitute the third most common source of ground water contamination. Onsite systems can also cause surface water quality problems. Improved management of these sources is essential to achieving water quality goals.

KEY ACTION: In 1998, EPA will publish technical guidance providing detailed information on onsite sewage disposal management programs, performance standards, water conservation techniques, and alternative and innovative onsite disposal system designs. EPA will also, in 1999, develop voluntary national standards for onsite management programs that address siting, performance, design, and maintenance of these systems.

KEY ACTION: EPA will promote the use, where appropriate, of centralized management of decentralized wastewater systems. This initiative will include financial and technical support of state, tribal, and local efforts to consolidate management of decentralized wastewater programs so that they are consistently managed and administered. Beginning in 1999, EPA will also fund projects that demonstrate how to overcome barriers to decentralized sewage management. EPA will publish guidance on the appropriate use of state loan funds to support these systems in 1999.

Expand Clean Water Act Permit Controls

The Clean Water Act provides that discharges of pollutants from a pipe or other point source are required to have a permit that limits the discharge as necessary to attain the water quality standard for the receiving waters. For many years, EPA and states worked to develop and issue permits to large point source dischargers, such as sewage treatment plants and industrial facilities. Recently, additional attention has been focused on point sources that discharge polluted runoff from urban

areas and large facilities such as confined animal feeding operations. These permits are expected to make a significant contribution to reducing the water quality impacts of polluted runoff.

Expand Control of Storm Water Runoff from Cities and Construction Sites

Storm water runoff is one of the leading remaining causes of water quality problems in the United States. On December 16, 1997, EPA proposed to expand controls of storm water runoff to cover smaller cities (with populations under 100,000) and for small construction sites (under five acres). This proposal builds on the storm water Phase I rule promulgated in 1990, which relies on Clean Water Act discharge permits to address runoff from cities with populations of more than 100,000 and from construction sites greater than five acres. The proposed Phase II storm water regulation provides a flexible approach that builds on the programs that are already in place in many areas. The proposal recommends ways to adjust coverage as appropriate to protect water quality in a watershed and suggests how to give incentives for smart growth.

The Phase II storm water regulation promotes the use of best management practices, such as preventing illicit sewage connections and providing information to the public about pollution prevention measures they can undertake to minimize storm water impacts as part of a municipal storm water program. For construction, best management practices might include silt fencing and sediment ponds to trap storm water runoff.

The benefits of controlling storm water runoff are numerous. The reduction in flow and movement of sediment reduces stream bank erosion, stream channeling and modifications to stream habitat from shallower waters. Sediment reduction will also greatly reduce the cost of dredging reservoirs and navigation channels and will generate recreation benefits, such as increased fishing and swimming opportunities and protection of spawning grounds.

KEY ACTION: EPA will publish final regulations in 1999 on Phase II of the storm water program, consider public comments on the proposal, and work with states, tribes, municipalities, and the regulated community to make sure that storm water control measures are implemented as required.

KEY ACTION: EPA will focus its compliance assistance and enforcement resources on addressing noncompliance with existing Phase I storm water requirements by targeting priority watersheds where storm water is of concern.

Substantially Reduce Pollution from Animal Feeding Operations

There are approximately 450,000 animal feeding operations (AFOs) throughout the United States. AFOs can range from small livestock production facilities with few animals to extremely large production facilities generating animal wastes equivalent in magnitude to that produced by a medium-sized city. Improperly managed AFOs, either singly, or in combination with other AFOs

or sources in a watershed, have been shown to cause significant environmental and public health concerns, including nutrient enrichment of surface and ground waters, contamination of water supplies, fish kills, and odors.

Of the 450,000 AFOs, only a small percentage currently have discharge permits under the Clean Water Act. Research, technical assistance, voluntary installation of best management practices, and educational programs have contributed to significant progress, but have not adequately addressed the scope of environmental impacts.

EPA has developed a draft AFO Strategy that outlines steps that it will take to minimize the environmental and public health effects of AFOs. The EPA draft strategy calls for improving data collection; expanding research on effects and control measures; increasing compliance assistance and enforcement with respect to applicable environmental laws and regulations; significantly expanding the number of Clean Water Act permits issued for CAFOs (with emphasis on the largest, unpermitted facilities); ensuring that permits address such activities as land application of animal waste; revising outdated regulations; and creating incentives for voluntary implementation of measures to protect the environment and public health.

KEY ACTION: EPA will publish and, after public comments, implement an AFO Strategy for important and necessary EPA actions on standards and permits by March 1998.

A broader strategy that covers key activities for both EPA and USDA will also be needed. EPA and USDA agree on the need for a joint, unified strategy to refocus the federal government's technical, financial, and programmatic efforts to more effectively address the environmental and public health issues associated with AFOs. The unified EPA/USDA National AFO Strategy will include the following key elements, in addition to outlining the roles of involved agencies:

- *Coordinate program and interagency cooperation.* USDA and EPA will work together in common areas of interest, including data collection and management, technical standards development, monitoring, and establishment and tracking of appropriate environmental performance measures. For example, USDA will continue to review and revise comprehensive technical standards and educational programs for AFOs in cooperation with other federal agencies. In addition, USDA and EPA will develop a plan to ensure that appropriate management systems are incorporated into Clean Water Act discharge permits by states and EPA.
- *Develop and implement comprehensive management systems for AFOs.* USDA and EPA will work to establish environmentally sustainable systems that will offer practical and cost-effective approaches to managing manures and carcasses. For example, USDA and EPA will establish comprehensive and verifiable management systems for AFOs by 2002, engage stakeholders to achieve use of farm-specific nutrient budgets for at least 50 percent of AFOs by 2005, and promote development of marketable products from animal wastes and carcasses from 1998

onward. Comprehensive management systems should be incorporated into Clean Water Act discharge permits issued by EPA and states. EPA will work with states to issue Clean Water Act discharge permits to all Confined Animal Feeding Operations (i.e., the largest facilities with more than 1,000 animal units) by 2005.

- *Revise and strengthen existing permit regulations.* EPA will work with USDA and states to revise the Clean Water Act discharge regulations, including comprehensive management measures (e.g., land application), by 2002; revise the existing feedlots effluent limitations guideline for poultry and swine by 2001 and for beef and dairy cattle by 2002; and develop improved tools for writing discharge permits under current regulations (e.g., case-by-case designation guidance and guidance on establishing best management practices and technology requirements) by the end of 1998.
- *Provide incentives to enhance environmental protection.* Federal agencies will encourage environmental protection beyond that required by regulatory controls through new initiatives such as an awards program recognizing efforts by AFOs to reduce pollution (by 2000); through the provision of incentives for the conversion of animal wastes into marketable products (by 2004); and through the formation of a public/private partnership to create market incentives to improve environmental performance.
- *Develop a coordinated plan for research.* Federal agencies will, in coordination with stakeholders, develop a coordinated plan for research, development, and assessment that establishes priorities for developing ways to better manage nutrients, pathogens, and other pollutants; modify animal diets to reduce nutrients in manure; mitigate sites with excess pollutants; and assess impacts of best management practices from farm and watershed perspectives.
- *Develop watershed nutrient budgets.* Federal agencies will determine the relative contributions of nutrients in watersheds from all sources. USDA will publish by 1998 data on counties having potential nutrient excess from animal manure. EPA and USDA will estimate by 2000 a baseline of nutrient loads to the watersheds identified above from animal data, fertilizer sales, Census of Agriculture, permit limits, and other estimates. USDA will revise the Census of Agriculture to include waste management practices by the 2002 Census.
- *Target activities to priority watersheds.* Federal and state agencies should ensure that activities such as permitting, inspections, enforcement, funding, education, outreach, and technical assistance for AFOs are targeted to priority watersheds. For example, EPA, with support from USDA, states, and tribes, will identify by 1999 watersheds at greatest risk from AFOs. EPA and USDA will develop criteria for and demonstrate the effectiveness of targeting coordinated assistance and

federal environmental subsidies to states and AFOs by 2000. EPA will also increase enforcement of existing permits and unpermitted discharges, require new permits where appropriate, and use emergency powers to address situations presenting an imminent and substantial endangerment, where appropriate.

- *Encourage establishment of a certification program.* The Strategy will encourage establishment of a certification program to ensure effective development and implementation of management systems for unpermitted AFOs.

KEY ACTION: EPA and USDA will jointly develop a unified national strategy to minimize the environmental and public health impacts of AFOs. This Unified Strategy will be published for public review and comment in July 1998 and will be finalized in November 1998.

Develop Incentives For Reducing Polluted Runoff

Federal agencies will work with diverse stakeholders to develop creative, new approaches to reducing polluted runoff, including expanding recognition of the benefits of “smart growth” policies and considering innovative tax policies for preventing water pollution and enhancing natural resources.

Smart Growth

Many state, tribes, and local governments and community organizations are engaging in efforts to create more sustainable communities and to avoid development that can aggravate polluted runoff and related pollution problems that undermine their quality of life. Development patterns can needlessly generate excessive pollution control costs and discourage the redevelopment and re-population of vital urban areas. Maryland and Oregon have already established groundbreaking policies to ensure “smart growth.”

KEY ACTION: In the current effort to develop federal policies and actions to strengthen America’s communities, the Interagency Work Group on Sustainable Communities will identify new mechanisms and needed revisions to existing policy to support locally initiated smart growth efforts that have benefits for water quality.

KEY ACTION: EPA will develop a means to credit pollution load reductions from local growth management efforts in the Total Maximum Daily Loads submitted by states and tribes to EPA under the Clean Water Act.

KEY ACTION: The Council on Environmental Quality will develop guidance to ensure that National Environmental Policy Act analysis fully considers the secondary impacts that can be avoided by smart growth policies.

Tax Incentives to Encourage Improved Stewardship

Tax incentives can be a powerful method for influencing private-sector actions for pollution prevention and improving natural resource management.

Implementing tax incentives related to water quality and natural resource enhancement would require amendments to the tax code. Several states have developed tax incentives for landowners to develop farm conservation plans. Other states are considering tax incentives that would encourage “smart growth” practices, support the development of easements for critical lands such as wetlands and lands providing buffers for streams and riparian areas, and define opportunities for exchanges of “debt for easement” with participants of USDA and other federal lending programs.

National water quality is heavily influenced by the character and management of private lands. Private forest lands comprise a significant share of critical watersheds. Trends in land ownership and development are causing the loss of critical watershed functions of substantial amounts of these lands. The current tax code can be a disincentive to hold these as forested lands. Tax incentives also can help landowners invest in best management practices that maintain and enhance water quality.

Over the next several years, it is likely that Congress will consider a range of amendments to the tax code. For Congress to consider tax incentives related to water pollution control and natural resource enhancement, more work must be done to identify the full range of possible measures, explore the effectiveness of measures that now exist at the state level, and evaluate relative costs and environmental and public health benefits of various proposals.

KEY ACTION: An interagency task force will, in consultation with the Department of the Treasury, identify and assess tax incentive proposals related to water pollution prevention and natural resource enhancement and identify potential changes, with any appropriate offsets, for proposal in future budgets.

Smart Growth Pays Dividends in Maryland

Baltimore County has developed a comprehensive county-wide watershed management strategy for its population of more than 700,000 people and more than 2,000 miles of streams. Developed through the consensus of a steering committee with broad and diverse local interests, the strategy and its corresponding regulations conserve forests and rural countryside and organize over \$24 million in county resources for watershed-based stream, wetland, and forest restoration; citizen participation; storm water retrofit; and waterway cleanup.

IMPROVE INFORMATION AND CITIZENS' RIGHT TO

KNOW

Today, the dramatic advances in information technology have created a good opportunity to provide people with significantly improved information about the quality of waters where they live. Over the next several years, water quality information will become much more understandable to the public, more specific to waters that are of interest to individuals, and more accessible using tools such as the Internet. By embracing this new technology, federal, tribal, state, and local agencies have the opportunity to empower citizens and foster a dramatic increase in public involvement in water quality planning and management.

Improve Monitoring and Assessment

Improved information on the conditions of water bodies and health of aquatic systems will support improved water pollution control programs and build public understanding of water pollution problems. A top priority for water monitoring is better information on nutrient over-enrichment of waters.

Better Monitor and Characterize the Condition of Water Resources

Improvements in monitoring, research, and assessments are needed to provide consistent and reliable information on the condition of, and threats to, aquatic resources, including habitat alteration, polluted runoff, and point source discharge. Much of the information is fragmentary and incompatible because it is collected through programs that are designed and conducted at different scales or for different objectives (compliance versus resource assessment), and because standards are inconsistent for sampling methodology and data management and sharing. The National Water Quality Monitoring Council and the Administration's Environmental Monitoring and Research Initiative are vehicles to enhance reliable information and effective management of water resources.

The National Water Quality Monitoring Council, recently convened by the Department of the Interior, serves as the major national forum for the coordination of consistent and scientifically defensible federal and state water quality monitoring methods and strategies. Such strategies are intended to improve understanding of different impacts, such as polluted runoff and habitat alteration, on water quality and to define a national agenda of needed monitoring, research, and assessment models and tools.

The Environmental Monitoring and Research Initiative, organized through the National Science and Technology Council's Committee on Environment and Natural Resources, is designed to integrate ongoing federal monitoring and assessments at watershed, regional, and national scales and connect to state, local, and non-governmental efforts. The Initiative is structured to monitor and assess interactions among land use, land-management practices, and water and air quality at the watershed scale, and to link that understanding to regional and national conditions through

modeling and remotely sensed information. The Initiative thereby facilitates evaluation of progress made in watershed restoration, as well as improves capacity to manage polluted runoff, alteration, and water diversions within a regional and national context. A demonstration of the feasibility and effectiveness of integrated monitoring was initiated as a pilot program in the Mid-Atlantic region in 1997. A Report Card on the health of the nation's ecosystems will be produced by 2001.

KEY ACTION: The National Water Quality Monitoring Council will, by the end of 2000, compare sampling and laboratory methods and protocols leading to performance-based acceptable methods; establish reference parameters for specific monitoring purposes; identify core environmental indicators; establish consistent use of biological metrics; and develop guidelines on quality assurance and control.

KEY ACTION: The National Water Quality Monitoring Council, in coordination with the Committee on Environment and Natural Resources, will publish a national report describing current state of monitoring and models for assessing sources and impacts of polluted runoff; critical gaps and targeted areas in need of monitoring and modeling; priority polluted runoff research and assessment projects; and recommendations for improvements, including institutional roles and reporting of results at watershed, tribal, state, and national levels.

Identify Sources, Transport, and Impacts of Polluted Runoff in Watersheds

More accurate estimates of the sources, transport, and impacts of polluted runoff are needed to guide the implementation of management actions. Effective monitoring of polluted runoff is challenging because of many variables, including intensity of storms, the time of year, and a mosaic of different environmental settings and land uses. Because of its wide distribution, monitoring alone cannot adequately characterize polluted runoff.

Better survey methods and computerized models are needed, with special attention given to determine the location and relative contribution of sources of nitrogen and phosphorus. This includes isotope studies to pinpoint sources from animal feeding operations versus chemical fertilizers; remote sensing; soil and water sampling devices; and source identification of sediments. Polluted runoff models need to better predict the timing and magnitude of contaminant loads at local, regional, and national scales under alternative land-management strategies because of the time lag between implementation of strategies and improvements in water quality and because of the variability in different environmental settings and land use.

Modeled estimates need to be validated using available water quality data from stations at the mouth of the watersheds. Improved USDA terrestrial surveys and input are needed on forest health, forest and agricultural chemical use, crop production and tillage practices, animal waste disposal practices, animal feeding operations, and basin characteristics that are important to movement of soil and chemicals from land to water. Relative contributions and transport of atmospheric nitrogen are also needed in the modeling process.

KEY ACTION: DOI, USDA, EPA, and NOAA, in concert with the Committee on Environment and Natural Resources and other federal and state agencies, will, by the year 2000, model and produce estimates of inputs, nutrient utilization (by major source category), transport, and net contributions of nitrogen and phosphorus in watersheds across the nation.

Measuring Progress and Reporting Results

Long-term monitoring and modeling are needed to track water-quality improvements over time that are associated with the implementation of best management practices and other programs designed to reduce nutrients. Concurrent efforts will be undertaken to identify where management practices are being implemented to reduce nutrients so that program efforts can be correlated to water quality changes. This information will be an important contribution to the Nation's Environmental Report Card.

KEY ACTION: In 1999, EPA, in collaboration with other federal agencies and states, will initiate a tracking system to report key indicators of the success of programs to reduce nutrient runoff to waters.

Improve Reporting of Point Source Discharges

EPA and most states require point source dischargers to monitor the levels of pollutants in their effluents and, in some cases, to monitor conditions in receiving waters. However, since these point source dischargers monitor and report only those pollutants specified in the Clean Water Act discharge permits, monitoring for nitrogen or phosphorus often is not required.

Standardizing the monitoring and reporting required as part of discharge permits for key pollutants, particularly nutrients, is needed to support more consistent assessment of their extent and sources. In addition, greater use of modeling techniques, validated with monitoring data, is necessary to expand knowledge of loadings. Federal agencies should work with clean water permit authorities, watershed planners, and the regulated community to adjust frequency and parameter coverage of required compliance monitoring, and link compliance monitoring and reporting with ambient water quality monitoring to produce information that supports management needs, consistent with recent revisions to the National Pollution Discharge Elimination System (NPDES) program.

KEY ACTION: In 1999, EPA, in cooperation with other federal agencies, states, tribes, and the National Water Quality Monitoring Council, will standardize monitoring and reporting by point source dischargers to support water quality and watershed management information needs.

Citizens' Right to Know

Most information about the condition of rivers, lakes and coastal waters has been collected and

managed by government agencies. Much of this information, however, is difficult for the public to locate and understand. Government agencies report on the condition of waters periodically, but these reports commonly describe conditions at a state or national level, rather than in a water body or watershed. Today, new management and communication tools have made it possible to make information about the condition of waters more accessible to the public and to provide information that is more specific to waters or watersheds.

Water Information Network

Federal agencies have tremendous amounts of information on services, programs and watershed conditions that may help the public to better understand water quality issues, but tracking down this information and expertise can be complicated and time consuming. Just a few examples of these programs and services illustrate how extensive this information is.

- The Flood Plain Management Services published by the Corps provides information on flood hazards and the actions people can take to reduce property damage and to prevent the loss of life caused by flooding.
- The National Park Service's Rivers, Trails, and Conservation Assistance program provides river-related assistance at the request of community partners, helping local organizations piece together resources from federal and nonfederal sources needed for restoration and protection activities.
- The Natural Resources Conservation Service (NRCS) provides assistance through the Environmental Quality Incentives Program, the Wetlands Reserve Program, the Conservation Reserve Program, the Farmland Protection Program, the Wildlife Habitat Incentives Program, Conservation Compliance, and the Emergency Watershed Protection Program. NRCS also provides leadership to Resource Conservation and Development (RC&D), a unique program that brings diverse groups of local volunteers together to identify issues and opportunities to protect their natural resources.
- The U.S. Geological Survey collaborates with federal, state, local, and private organizations from across the country to coordinate monitoring activities and meet the nation's water information needs. This initiative includes cooperative programs to collect, store, analyze, and disseminate water-quantity, water-use, and water-quality information locally and nationally, as well as various projects to support specific water quality and resource management activities.
- The Fish and Wildlife Service establishes partnerships with private landowners to restore important wildlife habitats for the benefit of public trust species. The North American Waterfowl Conservation Act is one of many examples of tools being applied to make funding more accessible to small-scale, local community groups

and conservation organizations.

- NOAA is developing a database summary of its own and EPA's approvals and findings on State Coastal Nonpoint Pollution Control Programs. Once completed in 1998, the database will contain information about each of the 29 states with coastal nonpoint programs, including information about management measures, legal authorities, exclusions, approval conditions, and success stories, for transfer to other states, territories, and communities.
- Both NOAA and USDA provide training and education for municipal officials, land use planners, and community groups on available best management practices and technologies to curb polluted runoff, current scientific information, and watershed planning. With NOAA's assistance, states and communities have used the Special Area Management Planning Process under the Coastal Zone Management Act to protect particular watersheds or other sensitive areas.
- NOAA is developing a Geographical Information System to map, monitor, and assess the quantity and quality of essential fish habitat.

A "road map" to finding this information is needed. The road map could be organized into categories such as financial assistance, regulations, planning, environmental data, and hands-on assistance to help make it easy to find information.

KEY ACTION: EPA, DOI, USDA, and NOAA, in cooperation with other federal agencies, will create a new, Internet-based Water Information Network to provide consolidated information on water and watershed programs and services.

Water Resources in Your Watershed

EPA recently established an Internet home page called "Surf Your Watershed." Anyone with an Internet connection can go to this home page and locate the watershed where they live. Citizens can then select from a menu of diverse information about the condition of water resources in their watershed, including information on chemical contamination of surface waters, wetlands loss rates, sediment contamination, and vulnerability to future water quality problems. Using this information, EPA's Index of Watershed Indicators provides the public with a guide to understanding the degree of existing water quality problems in each watershed and the relative vulnerability of the watershed to future contamination.

EPA maintains a major national repository of water quality monitoring data called "STORET." The monitoring data in the STORET system covers 25 years and provides a detailed record of water quality conditions and problems throughout the country. Access to the STORET database has largely been used by federal, state, tribal, and local agencies, but EPA has developed new tools to make STORET accessible to private citizens and organizations via the Internet starting in

1999.

KEY ACTION: EPA will collaborate with other federal agencies, states, and tribes to develop a state-of-the-art information system, building on the Index of Watershed Indicators, Surf Your Watershed, and STORET to present meaningful information to the public over the Internet about the health of aquatic systems in each of the more than 2,000 watersheds in the country.

AMERICA'S WATERSHEDS: THE KEY TO CLEAN WATER

For the past 25 years, most water pollution control efforts focused on nationwide programs that addressed various types of water pollution problems, such as discharges from sewage treatment plants and factories and polluted runoff, wherever they occur. These baseline, national programs have dramatically reduced water pollution and need to be maintained, and in some cases, expanded. Strengthening these baseline programs, as provided for in Chapter II of this Action Plan, is critical to making sure that clean rivers, lakes, and coastal waters stay clean into the next century.

"Forests, rivers, reefs, ocean depths...are not separate and independent entities; they are interrelated parts of the total system, the world of life."

- Marston Bates

Today, however, there is a growing recognition of the need to better coordinate and tailor the implementation of national programs in specific geographic areas, such as watersheds, where water quality is impaired or needs to be protected. Watershed management has several major benefits:

- A watershed approach fosters the coordinated and more efficient implementation of programs to control point source discharges, reduce polluted runoff, enhance sensitive natural resources such as wetlands and coastal waters, and protect drinking water supplies.

- A watershed approach highlights opportunities to go beyond reducing chemical contamination of water to find creative ways to enhance the overall health of the aquatic system in a watershed.
- Watershed management fosters greater accountability and involvement from the public, private landowners, and businesses who, in the end, directly implement measures to reduce polluted runoff.
- A watershed focus also helps identify the most cost-effective pollution control strategies to meet clean water goals.

At the same time that watershed solutions to water quality problems are gaining momentum, federal, tribal, state, and local governments are increasingly focusing attention on specific geographic areas where water quality problems persist. Some water quality problems occur as isolated degradation of a small stretch of river or area of a lake and can be corrected with a single control action. Many of the remaining water pollution problems, however, are clustered together and are the result of multiple, diverse sources within a watershed. Further, multiple solutions are often required to meet multiple water quality objectives (e.g., to protect drinking water and enhance wetlands). A watershed approach is often the most practical and effective way to solve multiple problems and meet diverse water quality objectives.

Many state, tribal, and regional governments are already managing clean water programs on a watershed basis and federal agencies are encouraging and fostering these efforts. This Action Plan calls for states, tribes, federal agencies, and others to affirmatively engage watershed management as a core, guiding principle for water quality management. Specifically, the Action Plan proposes to accelerate progress toward watershed management with action in several areas:

- A new cooperative, intergovernmental, and public process to assess watershed condition, including a public and accountable identification of watersheds where aquatic systems do not meet clean water and other natural resource goals.
- Implementation of diverse actions to restore watershed health on a watershed basis, supported by substantially increased federal resources in FY 1999 targeted to watershed restoration.
- Affirmative efforts to build watershed partnerships to speed protection and restoration of all watersheds.
- An institutional framework to promote and support watershed assessment, restoration, and management, including a new National Watershed Forum made up of diverse public and private sector representatives.

Many of the Key Actions identified in Chapter II of this Action Plan are designed to support, and

provide accountability for, the watershed process proposed here, especially efforts that strengthen the nation's efforts to address polluted runoff.

UNIFIED WATERSHED ASSESSMENTS

State, tribal and federal agencies currently use multiple processes to assess water quality and other natural resource conditions. States, interstate commissions, and tribes monitor water quality and identify waters and watersheds not meeting clean water goals through various means:

- Under section 305(b) of the Clean Water Act, collecting water quality information and reporting on the condition of waters every two years.
- Under section 303(d) of the Act, using monitoring and other water quality information to develop lists of waters not meeting clean water goals and needing response actions to restore water quality. New lists of problem waters and schedules for implementation plans for listed waters are to be developed by April 1998.
- Under section 319 of the Act, identifying water bodies that are impaired by nonpoint sources of pollution.
- Working with EPA and other federal agencies to organize diverse information concerning watershed health and to present this information for each of the over 2,000 watersheds in the country. Included are data on wetland loss, sediment contamination, discharge permit violations, and related factors.
- Conducting assessments of drinking water sources required under the Safe Drinking Water Act. These assessments will form a basis for actions to protect sources of drinking water.
- Developing project priority systems for clean water and drinking water state loan funds.
- With federal agencies, conducting flood plain studies and developing appropriate plans.
- Identifying coastal water quality problem areas as part of efforts to reduce polluted runoff to coastal waters.
- Developing assessments of wetland areas that need special attention or protection.

Federal agencies also use a diverse set of processes to identify watershed restoration and protection priorities for federal programs:

- The Natural Resources Conservation Service and Farm Services Agency use a locally led conservation process and state technical committees comprised of state and federal agencies and private organizations to recommend priorities for agricultural conservation programs to protect and restore water quality.
- The U.S. Forest Service, the BLM, and the Fish and Wildlife Service use a variety of watershed assessment processes to identify critical watersheds on public lands that need restoration and protection.
- Recovery plans prepared under the Endangered Species Act identify watersheds that need restoration to enhance aquatic habitat.

Federal agencies are working with states, tribes, and others to address water resource issues in specific areas of the country. These federal efforts support state actions to assess and address critical areas. Areas where federal agencies are now working include:

- the Chesapeake Bay;
- the Everglades;
- the Great Lakes;
- the Gulf of Mexico;
- the San Francisco Bay-Delta;
- the Northwest Forest;
- the National Estuary Program; and
- the National Estuarine Research Reserve System.

This Action Plan provides a new opportunity to bring together these multiple assessment processes to identify common priorities for watershed restoration and protection.

Unified assessments of water quality and watershed conditions will help make the assessment process more efficient and accountable, highlighting geographic areas where multiple problems exist (e.g., chemical water pollution, sediment contamination, wetland loss, and threats to drinking water). These assessments will also provide a basis for linking state, tribal, and federal programs with common objectives and resolving conflicting agency priorities.

States should take the lead, working with federal agencies, tribes, and the public, to prepare a single, Unified Watershed Assessment. This assessment should draw on the full range of available information to:

- Assess the health of watersheds and identify watersheds in need of restoration (i.e., watersheds that do not now meet clean water and other natural resource goals). In identifying watersheds in need of restoration, state, tribal, and federal agencies should consider conventional clean water goals (i.e., attainment of water quality standards), other measures of aquatic system condition (i.e., wetlands and other aquatic habitat), and, to the extent practicable, the condition of living and natural resources. Watersheds in need of restoration will be targeted for new funding in the FY 1999 Clean Water and Watershed Restoration Budget Initiative.
- Identify watersheds that need preventive action to sustain water quality using ongoing, core state, tribal, and federal programs.
- Identify pristine or sensitive watersheds on federal lands that need an extra measure of protection.

Federal agencies will work cooperatively with states and provide guidance and technical assistance for unified watershed assessments. Federal land managers will work cooperatively with states and tribes to identify impaired and sensitive watersheds on federal lands. States should recognize and respect the views of tribes on these matters and elicit public involvement in the assessment process. The National Watershed Forum (described later in this chapter) will provide a forum to ensure program and intergovernmental coordination and may assist with dispute resolution.

KEY ACTION: States should work with other appropriate agencies, governments, organizations, and the public to create Unified Watershed Assessments that identify watersheds that do not meet clean water and other natural resource goals and where prevention action is needed to sustain water quality and aquatic resources. Federal agencies will ask state conservationists and state environmental agency leaders to jointly convene this process and to involve a full range of appropriate parties.

KEY ACTION: Federal agencies will provide technical assistance or funding support for state efforts to develop unified assessments of watershed health.

RESTORE AQUATIC SYSTEM HEALTH ON A WATERSHED BASIS

Federal, state, tribal, and local governments, in partnership with local communities and the private sector, need to establish a systematic process to restore water quality and the health of the aquatic

system in the approximately 1,000 watersheds that do not now meet clean water, natural resource, and public health goals.

The first stage of this effort should proceed over the next two-and-one-half years and include the following elements:

- define watershed restoration priorities;
- implement Watershed Restoration Action Strategies in 1999-2000 using diverse funding sources, including new federal funding proposed for FY 1999; and
- draft a progress report and recommend next steps at the end of the year 2000 and periodically thereafter.

Define Watershed Restoration Priorities

Based on the Unified Watershed Assessment, each state should establish an overall approach to defining priorities for watershed restoration.

Unifying Clean Water Programs within Watersheds

“...current federal and state environmental programs and policies are fragmented and do not adequately emphasize restoration based on management of large interconnected aquatic ecosystems. The diverse responsibility of all layers of government affecting aquatic resources needs to be better coordinated if large-scale restoration is to be accomplished efficiently and effectively. Because aquatic ecosystems are interconnected and interactive, effective restoration efforts should usually be conducted on a large enough scale to include all significant components of the watershed.”

- *Restoration of Aquatic Ecosystems*, National Research Service, National Academy of Sciences, 1992

State processes for defining watershed restoration priorities will vary but should include the following core elements:

- Criteria for defining watersheds that do not meet clean water goals and are most in need of restoration.
- A long-term schedule for developing response plans, with focus on an initial schedule of actions in the 1999-2000 period.

- A process for involving diverse state and tribal agencies in setting watershed restoration priorities, including the agencies for water quality, drinking water, coastal zone management, agriculture, forestry, wildlife and fisheries, and transportation
- Consideration of existing restoration priorities, such as approved state priority rankings of impaired waters, priorities established in an approved National Estuary Program, Intended Use Plans for State Water Pollution Control and Drinking Water Revolving Funds, source water assessments, and environmental justice policies.
- Identification of interstate or intergovernmental coordination issues.
- A process for consulting with and involving tribal governments and applicable federal agencies including EPA, USDA, DOI, NOAA, and where applicable, federal land and resource management agencies.
- A process for involving local government, the public, and other interested groups in defining watershed restoration priorities.

KEY ACTION: By October 1998, states and tribes should work with appropriate agencies, organizations, and the public to define watershed restoration priorities, with special attention to watersheds most in need of restoration and protection. This schedule must be coordinated with section 303(d) of the Clean Water Act and provide an opportunity to bundle Total Maximum Daily Loads on a watershed scale. The schedule should identify the highest priority watersheds to be addressed in the first two years (through 2000).

KEY ACTION: EPA, in cooperation with other federal agencies, states, and tribes, will upgrade the National Index of Watershed Indicators in 1998 to support unified watershed assessments and to assist in evaluating the priority-setting process.

Watershed Restoration Action Strategies

For waters identified as not meeting clean water goals, the current Clean Water Act requires states and tribes to develop and implement response plans to restore the health of the water body.

A first step in this process is development of a “total maximum daily load” (TMDL) that sets the pollution reduction goals for the water body. Once the overall reduction targets are set, the responsibility for attaining the targets is assigned to point source dischargers, and other sources of pollution, including polluted runoff, in the form of “wasteload/load allocations” for the water body. States and tribes are required to submit TMDLs (including wasteload and load allocations and a margin of safety) to EPA for approval. EPA establishes the lists, priority rankings, and

TMDLs where the Agency disapproves a state submission.

This Action Plan proposes that, for those watersheds identified as having the greatest need for restoration, states and tribes should develop a Watershed Restoration Action Strategy for the watershed.

In most cases, the development of TMDLs and wasteload allocations for specific impaired waters within the watershed will form the core of a Watershed Restoration Action Strategy. By taking a watershed approach, however, states and tribes will be able to consolidate existing efforts to address problems on specific water bodies. By developing response plans on a “watershed” scale, rather than a smaller “water body” scale, states and tribes will be able to better account for cumulative effects of diffuse pollution sources and for pollution in one river segment that comes from upstream segments.

Watershed Restoration Action Strategies can be a smarter, more effective and cost-efficient way to implement TMDLs and wasteload/load allocations. The TMDL process, however, is generally used to address violations of chemical standards in rivers and streams. A Watershed Strategy creates an opportunity to bundle TMDLs, to strike an appropriate balance between controls over discharges and polluted runoff, and to consider other water-related problems in the watershed, including wetland loss, sediment contamination, aquatic species habitat degradation, drinking water protection, and health of riparian areas. By taking a more comprehensive approach to restoring the health of the aquatic system in the watershed, a Watershed Strategy can result in improvements in environmental conditions that are mutually reinforcing, with higher long-term success rates. Water bodies impaired by polluted runoff in most instances will require a watershed-wide effort to achieve the necessary restoration and clean water goals.

Development of Watershed Restoration Action Strategies is also an opportunity to identify and demonstrate innovative approaches to restoring water quality and protecting public health and the environment. For example, in watersheds with approved TMDLs, federal agencies will work to encourage programs based on the trading of pollutants to implement the TMDLs with appropriate safeguards to ensure compliance. Federal agencies will work to establish flexibility in program implementation to support innovation, especially where it can restore water quality faster and more cost-effectively than traditional approaches. Watershed Restoration Action Strategies should include appropriate efforts to ensure compliance with applicable federal and state requirements. Federal agencies will assist in resolving interstate or intergovernmental coordination issues where they are identified by federal, state, tribal, and local partners working on Unified Watershed Assessments.

New federal resources available in FY 1999 will be targeted to support implementation of actions called for in Watershed Restoration Action Strategies.

A water quality restoration effort on a watershed, rather than river segment, scale also offers citizens and other stakeholders better opportunities to participate in a water management process

that is understandable and meaningful. States and tribes should reach out to the public, especially minority groups, in developing Watershed Strategies. Outreach can occur through public meetings, participation in developing assessments and plans, use of the Internet, and other means.

Watershed Restoration Action Strategies should specifically identify funding needed to implement actions, including expected roles of available federal assistance programs, state funds, and other resources. Federal agencies, such as USDA, EPA, NOAA, and federal land management agencies, will work to bring current funding and financial resources together to implement watershed restoration plans while still meeting mandated goals and objectives.

Development of aquatic system restoration strategies on a watershed basis is a chance to meet the existing obligations of the current Clean Water Act and other federal laws in a cost-effective and common sense manner. Nothing in the current law requires a watershed approach to addressing water quality problems, but federal agencies want to offer incentives to develop Watershed Restoration Action Strategies. As an incentive to foster development of watershed strategies, federal agencies will target significant new resources made available through the FY 1999 Clean Water and Watershed Restoration Budget Initiative and beyond to support the implementation of pollution control and other measures identified in Watershed Restoration Action Strategies.

KEY ACTION: States and tribes should work with public agencies and private-sector organizations and citizens to develop, based on the initial schedule for the first two years, Watershed Restoration Action Strategies, for watersheds most in need of restoration. Federal agencies will focus current financial resources as appropriate to support watershed restoration plans. New federal resources available in FY 1999 will be targeted to support implementation of actions called for in Watershed Restoration Action Strategies.

KEY ACTION: Federal agencies will develop guidance on targeting expanded funding for FY 1999.

In some cases, individual water segments with discrete water pollution problems, including segments located on federal or tribal lands, may need to be addressed independently of a Watershed Restoration Action Strategy. EPA and federal natural resource land management agencies will continue to identify individual waters not meeting clean water goals. Federal agencies will work with states and tribes to provide them with assessment information and help them develop TMDLs and wasteload/load allocations for these waters.

KEY ACTION: Federal land and resource management agencies will expand assistance and provide assessment information and tools to states and tribes developing and implementing TMDLs on federal lands.

KEY ACTION: The Bureau of Indian Affairs will provide technical assistance, grants and/or contracts to improve water quality on tribal lands.

Watershed Restoration Progress Report

The federal government and the states should work closely together to prepare periodic reports to the President, the nation's governors, tribal leaders, and the public on the progress of watershed restoration efforts and make recommendations for adjustments to improve the program. The National Watershed Forum (described later in this Chapter) can help provide valuable advice and recommendations from public- and private-sector interests. Reports will be submitted at the end of the year 2000 and periodically thereafter.

KEY ACTION: EPA and USDA, in consultation with NOAA, DOI, and other federal agencies, the states, and the National Watershed Forum, will submit a Watershed Restoration Progress Report to the President, the nation's governors, tribal leaders, and the public, evaluating progress in implementing restoration actions and recommending any actions needed to improve progress toward meeting clean water goals. Reports will be provided at the end of the year 2000 and periodically thereafter.

BUILD STRONG PARTNERSHIPS TO SPEED RESTORATION AND PROTECTION

Federal, state, and tribal programs can help produce clean water and healthy watersheds, but the commitments and resources of local communities, private landowners, and citizens are essential to clean up and maintain lakes, rivers, coasts, and wetlands. Effective and strong partnerships are the foundation for both restoring impaired watersheds and sustaining watersheds that are currently healthy. Federal and state governments should commit to building and supporting partnerships among public and private parties, wherever and whenever they can, to restore and protect the health of all aquatic systems on a watershed basis.

The benefits of watershed partnerships are well documented. They build grassroots constituencies with a commitment to long-term environmental improvements. Collaboration can tap reservoirs of energy, talent, and inspiration. Watershed partnerships can also generate new ideas and information, help defuse polarization, and lead to a common understanding of individual roles, priorities, and responsibilities. By drawing attention to the cumulative impacts of various human activities and focusing efforts on the most critical problems within each watershed, partnerships provide opportunities for communities to build sustainable futures. Watershed partnerships can also promote a more efficient use of limited financial and human resources and can identify innovative and efficient means of meeting water quality goals.

Typically, the people involved in watershed partnerships are those who live and work in the watershed. Depending on the watershed, partnerships may include homeowners, farmers and ranchers, fishermen, community leaders, members of civic and environmental groups, water and sewer system managers, business and government representatives, and other watershed residents.

The roles of government agencies vary from watershed to watershed. In many places, local, tribal, state, and federal government agencies are facilitating the work of watershed partnerships by providing information, financial assistance, staff support, and technical assistance, as needed. In other places, government agencies may be active partners, helping to design management strategies and implement actions relating to clean water, public health goals, and government-owned and managed lands and facilities.

In addition to assisting community-based watershed partnerships, government agencies at all levels have other important responsibilities to carry out. They must set priorities for limited public resources and see that public funds are wisely invested and properly managed. They must also ensure that clean water and public health goals are met, not only within state boundaries, but across state lines. Finally, government agencies and other information-rich organizations need to work together to create a “big picture” of how local, regional and national efforts are succeeding in restoring and protecting the nation’s watersheds.

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it’s the only thing that ever has.”

- Margaret Meade

Watershed partnerships require consistent leadership, organizational management skills, outreach and communication skills, and good access to relevant information, tools, and technical assistance. Specific measures to support and enhance the number and effectiveness of these community-based partnerships are described below.

Watershed Assistance Grants

Watershed management works best when the programs and authorities of the public sector are enhanced and guided by the active involvement of local citizens and organizations that are interested in protecting the quality of waters where they live. In many cases, local initiatives to protect water quality and the health of aquatic systems can be dramatically enhanced by a small amount of grant assistance.

Today, many watershed partnerships are underway, more are emerging, and state as well as federal institutions are providing support. At the same time, current efforts have significant limitations. In large parts of the country, watershed partnerships are not functioning effectively. Many efforts are not very comprehensive, and few have actively addressed issues of scale, (e.g., coordinating the planning and management activities from a small watershed with a larger basin of which it is a part). Although many federal agencies currently operate some programs on a watershed basis, there is little coordination of federal support to watershed partnerships.

Watershed Management on the Idaho / Wyoming Border

Located in eastern Idaho and western Wyoming, the Henry's Fork watershed covers 1.7 million acres and includes part of Yellowstone National Park and the western slope of the Teton Mountains. Laced with more than 3,000 miles of rivers, streams and irrigation canals, the watershed includes high mountain streams and abundant springs that sustain healthy populations of fish and wildlife, including several threatened and endangered species.

More than 235,000 acres of farmland are irrigated using surface or ground water sources in Henry's Fork Basin. The region's recreation, tourism, and timber products industry all depend heavily on the Basin's water resources. In recent decades, these sectors were increasingly divided by conflict over water resource management issues. At least 25 federal, state and local agencies were found to have management or regulatory jurisdiction in the Basin - a situation that contributed to fragmented planning and decision-making.

In 1994, the Idaho Legislature chartered the Henry's Fork Watershed Council to ensure a collaborative approach to decision making. Comprised of citizens, scientists, and agency representatives who reside, recreate, make a living, and/or have legal responsibilities in the Basin, the Council uses a nonadversarial approach to problem solving and conflict resolution. The Council evaluates merits of projects proposed for the watershed against 10 primary criteria aimed at protecting watershed health and vitality.

Federal, state, and tribal governments should set aside a small portion of water-related resources to provide small grants to non-profit organizations to support development of watershed partnerships. In allocating grant assistance, governments should give priority to organizations with the capacity to assemble diverse interests to find creative ways to restore and sustain the health of aquatic systems on a watershed basis.

KEY ACTION: Beginning in FY 1999, federal agencies will coordinate with states and tribes to provide small grants to enable organizations to build watershed partnerships and advance watershed restoration efforts.
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Communities Supporting Watersheds

Many communities and community organizations have committed to restoring and protecting a watershed or other water, such as a lake, river, or bay. These local organizations engage the public in a range of activities related to clean water, including organizing stream cleanups, volunteering to monitor water quality, planting trees along eroding stream banks, and educating school children and the community about water quality problems.

With thousands of watershed alliances, volunteer monitoring organizations, and other groups active nationwide, federal agencies want to highlight opportunities to join existing efforts wherever possible and to encourage new watershed organizations where there are none. For example, several state and federal agencies are supporting local organizations in “Adopt Your Watershed” campaigns. Through this effort, agencies challenge citizens and organizations to “adopt” a watershed, river, lake, stream, or coastal water. “Adoption” means any citizen-based effort - large or small - to restore or protect a watershed or other water body. Organizations adopting watersheds can include watershed councils, school groups, civic organizations, garden clubs, Boy and Girl Scout troops, and any other public or private organization interested in helping protect water quality.

KEY ACTION: To support local organizations and citizens in locally based watershed protection efforts, and to encourage the organization of such groups nationwide, EPA, USDA, DOI, NOAA, and other federal agencies will increase information and technical assistance available to these groups.

National Watershed Awards

Well-designed and well-publicized awards serve two important functions: they reward excellence and they spread the word about creative solutions to problems. Awards can play an important role in building partnerships for protecting watersheds. A national watershed award now exists. The CF Industries National Watershed Award recognizes corporate and community excellence in watershed protection. Each year, one corporation and a few communities nationwide are recognized for their outstanding leadership in protecting America’s water resources. In 1997, Snowbird Ski and Summer Resort took corporate honors for improving Utah’s Little Cottonwood Canyon watershed, the resort’s home and source of much of the Salt Lake Valley’s drinking water. Community awards went to Grand Traverse Bay Watershed Initiative in Michigan, Heron Lake Watershed Restoration Association in Minnesota, Columbia-Pacific Resource Conservation and Development Council in Washington, and Lake Pontchartrain Basin Restoration Foundation in Louisiana.

KEY ACTION: EPA, USDA, DOI, NOAA, and other federal agencies will work with the present sponsors of the national watershed award to review options for broadening and expanding the awards program, including a watershed award in each state and awards for innovative solutions to specific problems.

Volunteers Monitor Water Quality in Missouri

Volunteer monitoring programs across the country have taken the initiative to organize and strengthen their activities by combining resources, sharing expertise, and exploring new cooperative relationships. For example, in Missouri, 1,000 Stream Teams are at work monitoring stream quality and restoring degraded waters under a program supported by the

Missouri Department of Natural Resources and Conservation and the not-for-profit Conservation Federation of Missouri. The program has resulted in a large core of citizens educated about environmental issues and involved in watershed projects statewide.

Expand Watershed Training

Agency personnel at federal, state, tribal, and local levels and citizens need access to tools and training on many aspects of collaborative watershed work.

Fortunately, excellent tools and training programs already exist or are under development. Some training programs provide a basic and broad foundation for the use of ecological, social, and organizational principles to guide activities to restore and sustain watershed conditions. Others focus on community capacity-building in specific areas, such as assessment techniques, group dynamics, outreach skills, best management practices, and innovative funding. Still others focus on setting environmental objectives and changing the operation of governmental programs to better support voluntary actions that improve and protect water resource conditions.

In 1994, EPA established a new clearinghouse called the Watershed Academy. In addition to offering core courses about watershed processes, functions, and management techniques, the Academy co-sponsors special training events on different aspects of the watershed approach and publishes a catalogue of Watershed Training Opportunities on the Internet, with information about dozens of other watershed-oriented training courses offered by agencies and private organizations.

<p>KEY ACTION: In 1998, federal agencies will complete an inventory of watershed training programs. Relevant offerings will be promoted through the Watershed Academy and through other means, as appropriate. From 1999 on, EPA and other federal agencies will join together with states, territories, tribes and other organizations to expand and improve watershed training offerings.</p>
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Enforcement and Compliance Assistance

Assuring compliance with the requirements of federal, state, and local laws will be an important component of the efforts outlined in this Action Plan to protect and restore the nation's waters. By coordinating compliance assistance and enforcement activities on a watershed basis, federal, state, and local governments will be better able to address the areas of noncompliance that are presenting a particular threat to the achievement of water quality goals.

Stakeholder Involvement is Key

“The Watershed management approach enables all stakeholders to cooperate and participate with government...As more emphasis is placed on developing and implementing watershed action plans and total maximum daily loads, there will be a growing need to coordinate the efforts of responsible agencies and document stakeholder agreements such as pollution reduction goals, pollutant load allocations, management solutions, funding options, and implementation schedules.”

- Clean Water for Texas: Solving Water Quality Problems, August 1997

In addition to conventional enforcement actions, some of the compliance assistance and enforcement tools that can contribute to restoration of watershed health include innovative use of Supplemental Environmental Projects in conjunction with enforcement actions, the use of EPA’s audit policy to encourage voluntary self-disclosure and correction of environmental violations, and compliance assistance.

In addition, federal and state inspections and monitoring should be increased in priority areas to better identify all important sources of contamination in those watersheds not meeting water quality goals. Such monitoring should include the use of innovative technologies to track contamination to its source and allow for more targeted enforcement and compliance assistance than self- monitoring alone provides.

<p>KEY ACTION: By October 1998, EPA will develop guidance to support cooperative efforts to ensure that compliance assistance and enforcement is used to effectively address noncompliance problems on a priority watershed basis.</p>

WATERSHED MANAGEMENT FRAMEWORK

Moving the clean water program to a watershed approach will require a cooperative, intergovernmental effort and a high degree of involvement and support of the public and the private sector. Engaging the full range of public and private interests in the transition to the watershed approach will require the development of an institutional framework to support watershed management. This Action Plan recommends an institutional framework to support watershed restoration and protection efforts, including a new National Watershed Forum, federal program coordinators, and reinvention opportunities.

National Watershed Forum

A National Watershed Forum will be convened to provide a coordinating mechanism for the development of watershed assessment, restoration, and protection efforts. The Forum will include a total of about 20 members, including representatives of:

- federal agencies;
- state agencies;
- tribal governments;
- local governments;
- other stakeholder organizations; and
- watershed partnerships and citizens.

KEY ACTION: The Secretaries of the Departments of Agriculture, Interior, Commerce, and Defense, and the Administrator of EPA, in cooperation with states and tribes, will convene a National Watershed Forum to coordinate watershed assessment, restoration, and protection.

Program Coordinators

Federal agencies are committed to improving access to information on programs and assistance available to achieve clean water goals. One step toward improving the local focus of clean water programs is to provide staff or resources to assist state and local watershed efforts, by serving as federal program coordinators.

Federal program coordinators will be familiar with conditions in the watershed and will help state, tribal, and local officials, and others get access to information about the watershed and federal water quality programs and services that apply to the watershed. In some watersheds, additional personnel from other interested agencies may work with the federal program coordinator. Federal program coordinators may be employed by one of several federal agencies. If the watershed is coastal, for example, NOAA might provide the coordinator. In areas with predominantly federally owned or managed land, the appropriate land management agency might provide the coordinator. Agencies will consult to ensure that responsibilities are evenly spread among their staff, possibly rotating every few years.

The direct involvement of citizens in identifying problems and devising solutions is key to the success of watershed strategies. Local, non-federal watershed coordinators can provide a focal point for engaging citizens and building commitment to watershed restoration and protection strategies. These local coordinators may work for conservation districts, resource conservation and development councils, local watershed councils, or other nongovernmental organizations.

KEY ACTION: By July 1999, federal agencies will use Watershed Assistance Grants or other appropriate means to support local watershed coordinators and will identify agency staff who can help coordinate federal programs for watershed restoration and protection.

Reinvention Opportunities

Although many federal and state agencies have already undertaken activities to provide nonregulatory incentives and streamline program operations to facilitate watershed management, much work remains.

To spur more innovative programmatic changes, federal agencies will review program operations to identify strategies and frameworks to: increase collaboration; eliminate inconsistencies; provide incentives for voluntary, nonregulatory actions; make permitting programs more flexible, efficient, and predictable; and, most important, ensure environmental improvements. For example, the use of trading in watersheds was a key element of the President's 1995 initiative for reinventing environmental protection. Such approaches - with appropriate safeguards to ensure compliance - can be used to achieve higher water quality in watersheds at lower cost.

Federal agencies will work together with states, tribes, and the National Watershed Forum to incorporate an assessment of federal reinvention opportunities into the report on watershed health submitted to the President, the nation's governors, and the public at the end of the year 2000. This process will also provide an opportunity for federal agencies to coordinate goals developed for the Governmental Performance and Results Act (GPRA) and to focus programs to better attain these goals.

KEY ACTION: Federal agencies will prepare an analysis and implementation plan (with milestones and measures) detailing opportunities (including staff training) to orient federal programs and regulatory processes on a watershed basis and make these programs more collaborative and innovative.

KEY ACTION: Federal agencies will coordinate Government Performance and Results Act (GPRA) goals related to watershed management, and identify opportunities for pooling resources, combining budgets, and reporting accomplishments.

EPILOGUE: TOWARD THE FUTURE

America has made remarkable progress in reducing water pollution over the past 25 years. This Clean Water Action Plan offers a blueprint for restoring and protecting water quality. It is one that builds on past successes while recognizing changing conditions and new opportunities. Implementing this Action Plan and maintaining steady progress in reducing water pollution into the next century will require a renewed commitment to clean water by all levels of government, the private sector, and the public.

Many of the components in this Action Plan are designed to provide for additional development of information, assessment, and dialogue prior to decisions on specific actions. These processes will assure multiple opportunities for input by the public before significant decisions are made.

A key step in maintaining national interest in the Clean Water Action Plan is the creation of a new National Watershed Forum that will actively monitor implementation of proposed key actions and will support federal, state, and tribal agencies in developing progress reports on watershed health for the President and the nation's governors at the end of the year 2000 and periodically thereafter. The National Watershed Forum will encourage government agencies, the private sector, and the public to make the commitment needed to ensure that key actions are implemented in a timely manner.

Ultimately, however, this Action Plan recognizes that the public needs to be involved, not only in reviewing and commenting on programs, but also in actively helping to protect and restore the watersheds where they live.

The Action Plan focuses special attention on defining specific actions to restore healthy aquatic systems in specific watersheds. By helping to identify watersheds with aquatic systems that need to be restored, citizens in these watersheds are more likely to get involved in implementing water pollution control and natural resource enhancement measures.

Another element of the Action Plan that will help sustain local interest in clean water programs is the support for and investment in building watershed partnerships as a framework for realizing the vision of healthy watersheds across the nation. By engaging local organizations and interested citizens, the public commitment to clean water will become a long-term, broad-based, and potent force.

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clearinghouse, the National Center for Environmental Publications and Information, 1-800-490-9198 (toll-free), P.O. Box 42419, Cincinnati, Ohio, 45242, (513) 489-8695 (fax). Ask for EPA-840-R-98-001. You can also order copies from the USDA by contacting Douglas Wilson, USDA-NRCS, Conservation Communications Staff, Room 0054-South Building, P.O. Box 2890, Washington, D.C. 20013-2890 or by fax: 202-720-6009. The Clean Water Action Plan is also available for viewing on the internet. Visit <http://www.epa.gov/cleanwater> or <http://www.nhq.nrcs.usda.gov/cleanwater/>