



WATER POLLUTION CONTROL

25 years of Progress and Challenges for the New Millennium

In 1972, Congress responded to public outrage over the deplorable condition of the nation's waters by enacting the Clean Water Act. Discharges of untreated wastewater from municipalities, industries, and commercial businesses caused widespread pollution of rivers, lakes, and coastal waters. Congress rejected these conditions and made a new commitment in the Clean Water Act to restore and maintain the chemical, physical, and biological integrity of the nation's waters. EPA and state implementation of water quality programs under the Act have been a spectacular success - perhaps one of the best examples in the post-war era of the power of the government to do good, in this case making significant strides in improving public health and the environment.

Progress

The basic approach in the Clean Water Act (CWA) over the past 25 years has been greater control of "point sources" of water pollution - primarily factories and city sewers, along with controls on activities that destroy wetlands. In the last decade, federal law and policy has been strengthened several times. 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, and new authorities to protect coastal waters. As a result of the Clean Water Act, waters that are safe for fishing and swimming have doubled. National clean water standards stop billions of pounds of pollutants from industries from flowing into waters each year. 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 and fishing. 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.



The CWA requires all wastewater treatment facilities to obtain discharge permits under the National Pollutant Discharge Elimination System (NPDES) Program. In addition to industrial and municipal wastewater treatment facilities, the NPDES permit program includes urban storm water management, control of combined sewer and sanitary sewer overflows, and biosolids (sewage sludge) management. This permitting program covers about 16,000 permitted municipal wastewater

treatment facilities. About 3,000 of these municipal wastewater treatment facilities (or Publicly Owned Treatment Works (POTWs)) also participate in the National Pretreatment Program, a cooperative effort of federal, state, and local environmental regulatory agencies. The program is designed to reduce the amount of pollutants discharged into municipal sewer systems by industry and other non-domestic wastewater sources, thus, reducing the amount of pollutants released into the environment through wastewater. The objective of the program is to protect the POTW from pollutants that may interfere with plant operation, prevent pollutants from being introduced into the POTW, that may pass through untreated and to improve opportunities for the POTW to reuse wastewater and sludges that are generated. While the program is regulatory, its success is measured in the large number of water quality improvements in the United States. Many rivers and streams were off limits to recreational activities which affected economic prosperity; now with these regulations, many of the rivers and streams have been reopened for public use.

Because of the CWA, thousands of municipalities have received federal funds to construct or expand wastewater treatment facilities to prevent or reduce the discharge of pollutants to the Nation's rivers, lakes and streams. To date, EPA has awarded more than \$62 billion in grants to help municipalities with the clean up effort and many water bodies have shown improvement.

Amendments were made to the CWA in 1987. These amendments introduced an innovative method of financing a range of projects that promote water quality, including municipal wastewater collection and treatment facilities. This program is the State Revolving Fund (SRF) which presently boasts more than \$26 billion in assets with approximately \$3 billion distributed in new loans annually. Since its beginning, the SRF has provided more than 5,700 loans throughout the United States and Puerto Rico. One of the benefits of the SRF is that it gives the states flexibility to provide funding for projects that address their highest priority water quality needs such as urban storm water and nonpoint source management practices, estuarine and groundwater protection programs, and sanitary sewer overflow control projects.

Discharges from combined sewer or sanitary sewer overflows caused beach closings, fish and shellfish bans, flooded basements, and a wide range of public health problems. Many of these overflows were the result of deteriorating or antiquated collection systems. To date, more than \$6 billion has been awarded to rehabilitate collection systems to reduce these wet weather overflows, thus, improving water quality and making it safe for public use and enjoyment.

Challenges for the New Millennium

Despite impressive progress, many of the nation's rivers, lakes, and coastal waters do not meet water quality goals. Some waters face the threat of degradation from diverse pollution sources which affect citizens' quality of life by reducing recreational opportunities, undermining local economic prosperity, and threatening drinking water supplies and impairing public health. 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.

It is estimated that \$139.5 billion are still needed to construct or improve wastewater treatment facilities to correct current water quality or public health problems. These dollars would be used for replacing or repairing existing sewer collection systems, constructing new sewers or interceptors, treating wastewater overflows from combined sewers, continuing needs for municipal storm water management, and controlling nonpoint sources of pollution.

In addition, there are new technical challenges in addressing control of toxic pollutants and the management of residual biosolids (sewage sludge). Greater concern about toxic pollutants suggests the need for higher levels of wastewater treatment coupled with industrial pretreatment, which in turn will generally lead to the production of greater quantities of biosolids. These higher level processes will be more expensive to build and operate.

Restoring and Protecting America's Waters: The Clean Water Action Plan

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 EPA, working with other affected agencies, develop a Clean Water Action Plan that builds on clean water successes and addresses three major goals.

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

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. EPA responded to the Vice President's call for action on February 14, 1998.

Consistent with the goals of the new Clean Water Action Plan, the Office of Wastewater Management (OWM) has renewed its commitment to improving the quality of water in the United States for the benefit of all citizens.

Enhancing protection from public health threats posed by water pollution

The strong clean water standards established by the 1972 Clean Water Act and its amendments 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.

- EPA is committed to seeking an increase in the number and dollar amount of Clean Water State Revolving Fund (CWSRF) loans used to prevent polluted runoff. In addition, OWM has committed to substantially increase the number of states using integrated priority setting systems, which allow states to direct CWSRF assistance to a variety of point and nonpoint source projects based on environmental priorities. Under the Clean Water Action Plan, OWM will guide states on the use of loan funds in support of decentralized sewage management systems.
- The Agency's biosolids (sewage sludge) management program promotes stakeholder-based environmentally friendly practices for managing biosolids as an important part of environmental protection. Partnerships with stakeholders both at the national and more local levels are being fostered to improve practice and public acceptance of biosolids recycling. The goal is for biosolids and other similar by-products to be used in a manner that is beneficial to agriculture while sustaining the quality of our natural resources.
- Decentralized wastewater treatment systems are those that are either constructed onsite to serve a single home or business, or those that treat and dispose of relatively small volumes of wastewater from a cluster of homes and businesses. When adequately managed, decentralized systems are a cost-effective, long-term option for meeting public health and water quality goals, particularly in less densely populated areas. Efforts under the Clean Water Action plan include: (1) providing technical guidance on management programs, performance standards, water conservation techniques and alternative/innovative designs for onsite wastewater systems; (2) developing voluntary national standards for onsite system siting, performance, design and maintenance, and (3) providing financial and technical support to state and local programs which provide for centralized management of onsite systems, including support of demonstration projects and providing guidance on the use of State loan funds for onsite management systems.

More effective control of polluted runoff - a new focus

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 and have been largely responsible for the spectacular improvements in water quality over the past 30 years.



However, 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.

- The direction of the National Pollutant Discharge Elimination System (NPDES) Permit Program is now being focussed on storm water management including control of combined sewer and sanitary sewer overflows. Under the Clean Water Action Plan, the storm water program, promotes the use of best management practices, such as eliminating illicit connections in municipalities to minimize flow of untreated sewage and other contaminants to the nations waterways. This program also controls runoff from developed areas and from new construction to ensure reduction in flow and movement of sediment, so as to reduce stream bank erosion, stream channeling and massive modifications of stream habitat. Sediment reduction also greatly reduces the cost of dredging reservoirs and navigation channels and generates recreation benefits, such as increased fishing and swimming opportunities and protection of spawning grounds. In conjunction with the Plan, the storm water program also provides for a more informed public about pollution prevention measures that can be taken to minimize storm water impacts.
- Under the Clean Water Action Plan, the Office of Wastewater Management (OWM) along with the Department of Agriculture is developing and administering a unified strategy to ensure that animal feeding operation (AFO) wastes are managed to minimize environmental and public health effects. The resulting control programs will provide for improved data collection, expanded research on effects and control measures, and increased compliance assistance and enforcement with respect to applicable environmental laws and regulations. The number of CWA permits issued will be significantly expanded, ensuring that such activities as land application of animal waste are properly addressed. Obsolete regulations will be updated and incentives will be created for voluntary implementation of measures to protect the environment and public health.
- The Office of Surface Mining, DOI, EPA (Office of Wastewater Management) and the land management agencies will work collectively to increase clean up of rivers and streams by polluted coal mine drainage and abandoned hardrock mines.
- Forest roads are one of the main sources of sediment runoff on federal lands. However, these sources are now exempt from many NPDES regulations. EPA is charged with the task of considering whether to revise the Clean Water Act permit regulations relative to forest roads and to develop a pilot permit program for forest roads on federal lands. This task is being performed in consultation with other federal agencies and states.

Promotion of water quality protection on a watershed basis

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. With a wide array of project eligibilities, innovative uses of the CWSRF should provide broad based financial support for many watershed based Key Actions listed in the Clean Water Action Plan. Nonpoint Source and estuarine activities that have been or can be funded by the CWSRF include agricultural Best Management Practices (BMPs), storm water abatement, erosion controls, corrective actions for landfills, source water protection, wildlife habitat restoration, purchases of conservation easements and wetlands restoration. EPA will address beach and shellfish area closings, implement drinking water protection programs, increase the acreage of wetlands restored, implement coastal NPS programs, establish conservation buffers on agricultural lands, reduce polluted runoff from AFOs, define watershed priorities, support watershed restoration plans and support locally based watershed protection efforts.

Summary

We have made a lot of progress in the past 25 years, but there is still much work to be done. Thousands of treatment plants need to expand or upgrade their wastewater or biosolids treatment capabilities; thousands of industries need to provide better pollution control, and thousands of failing individual septic systems require corrective action to prevent ground water contamination. In addition, more than 2,500 new wastewater treatment plants will be needed by the year 2008. Municipalities will also be faced with rising demands to manage storm water more effectively, coastal urban nonpoint source runoff, and mitigate wet weather related water quality impacts.

Today there are nearly 16,000 municipal wastewater treatment facilities, serving 190 million people and treating approximately 32 trillion gallons of wastewater each day. Nearly 98 percent of all municipal wastewater treatment plants are providing secondary or more stringent levels of treatment. The percent of water bodies meeting water quality standards has almost doubled since 1972 from 36 to 63 percent. Secondary treatment removes about 85 percent of the organic matter in sewage by making use of the bacteria in it. This is a significant improvement compared to 5 percent of the municipal plants that provided secondary treatment in 1972.

Federal, state, local governments and industry have invested approximately \$200 billion to improve treatment plants and pretreatment facilities during the same period. This investment in construction of wastewater collection and treatment facilities has yielded significant gains in the level of treatment and in pollution reduction.



It will continue to take the combined efforts of federal, state and local governments as well as environmental organizations, industry and the general public to reach the goals of the 1972 Act for “fishable . . . swimmable waters” in the future.

By implementing the Clean Water Action Plan, OWM and its partner organizations will bring significant improvements to water quality in the future, thus providing a better quality of life for citizens through improving recreational opportunities, promoting economic prosperity, ensuring safe drinking water, and protecting public health.

Further Information

For additional information on protecting your environment write:

*Office of Wastewater Management
United States Environmental Protection Agency
Mail Code (4204)
401 M Street, S.W.
Washington, D.C. 20460
Web Site: <http://www.epa.gov/owm/>*