

Chapter 10

Conclusions and Future Challenges

This report has been prepared in response to a request by Congress for information related to CSOs and SSOs. EPA collected data and performed technical analyses to determine the environmental and human health impacts of CSOs and SSOs; the location, volume, frequency, and constituents of such discharges; the technologies used by municipalities to address CSOs and SSOs; and the resources spent by municipalities on CSO and SSO control.

In its preparation of this report, EPA found that:

- The occurrence of CSOs and SSOs is widespread. CSOs and SSOs contain pollutants that are harmful to the environment and human health, and there is evidence that CSOs and SSOs may cause or contribute to environmental and human health impacts.
- CSOs and many SSOs are caused by wet weather conditions and occur at the same time that storm

water and other nonpoint source pollutant loads are delivered to surface waters. This often makes it difficult to directly attribute specific water quality impacts to CSOs and SSOs. This suggests that a holistic approach should be used to address wet weather impacts.

- There are many existing structural and non-structural technologies that are well-suited for CSO and SSO control. Implementation of emerging technologies and improved information management hold promise for increased effectiveness and efficiency.
- Costs associated with the technologies for controlling CSOs and SSOs are often substantial. Planning is needed to spread costs over time, as appropriate, in developing comprehensive, long-term programs.

These findings are consistent with programmatic initiatives currently being implemented by EPA's Office of Water. They correspond with emerging needs and the findings

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of other recent studies such as the National Water Quality Inventory, the BEACH Program, the Gap Analysis, and the Clean Watersheds Needs Survey. Further, they support EPA's position that discharges from urban areas—particularly wet weather discharges resulting from rainfall or snowmelt—continue to be significant contributors to water quality impairments nationwide.

Current challenges for clean water encompass CSO and SSO control, and include:

- Protection of existing infrastructure;
- Development, approval, and implementation of CSO LTCPs under the CSO Control Policy;
- Development and implementation of SSO controls;
- Implementation of Best Management Practices (BMPs) to reduce pollution from storm water runoff in accordance with EPA's Storm Water Phase I and II Programs;
- Integration of wet weather programs to increase the value of monitoring, reporting, tracking, and permitting to support information-based environmental management;
- Coordination of permits on a watershed basis; and
- Maintenance of valued partnerships with key stakeholder groups.

Several initiatives and actions that will enable EPA, states, municipalities, and citizens at large to achieve success in meeting these future challenges are described below.

Protecting Infrastructure

Since 1972, EPA has worked to implement the Clean Water Act as it relates to the collection, conveyance, and treatment of wastewater. The national investment in municipal wastewater infrastructure has been substantial. This investment has resulted in water quality and human health improvements throughout the United States. Today, however, the nation's wastewater infrastructure is aging and in need of attention. The continued ability of existing infrastructure to safeguard the clean water accomplishments realized since 1972 is at risk. Further, its ability to serve as the platform for future expansion of wastewater collection and treatment capacity is jeopardized.

Proper O&M of the nation's sewers is integral to ensuring that wastewater is collected, transported, and treated at POTWs; and to reducing the volume and frequency of CSO and SSO discharges. Municipal owners and operators of sewer systems and wastewater treatment facilities need to manage their assets effectively and implement new controls, where necessary, as this infrastructure continues to age. Innovative responses from all levels of government and consumers are needed to close the gap.

Implementing the Watershed Approach

CSOs and SSOs are two among many sources of pollution that can impact receiving water quality. The watershed approach is central to water quality assessments and the identification of control strategies that include all sources of pollution that affect water quality. The presence of sewer systems in most developed watersheds across the country underscores the potential for SSOs to affect water quality on a widespread basis. Similarly, the presence of CSOs in 32 states places

them in many watersheds across the country.

As described in this Report to Congress, CSOs and wet weather SSOs occur simultaneously with the generation of storm water and other forms of nonpoint source pollution, making it difficult to identify and assign specific cause-and-effect relationships to observed water quality problems. Attainment and maintenance of water quality standards requires that appropriate attention is given to all sources. Better integration of all of EPA's wet weather programs will provide for

Sanitation District No. 1 of Northern Kentucky received an EPA grant to work with the State of Kentucky to develop a watershed permitting approach and to investigate the feasibility of implementing the approach. The District includes Campbell, Kenton, and Boone counties, and covers an area of 580 square miles. Located on the southern bank of the Ohio River, directly across from Cincinnati, Ohio, this three-county area contains approximately 40 incorporated cities, each with its own political and administrative structure.

Prior to July 1995, the operation and maintenance of the sewer systems in these counties was the responsibility of the respective municipal jurisdictions. Ownership for most of the sewer systems in Northern Kentucky was transferred to the District in 1995 as a result of revisions to state legislation. With this consolidation, the District became responsible for managing 1,400 miles of combined and separate sanitary sewers, one major wastewater treatment facility, eight small wastewater treatment facilities, and approximately 100 CSO outfalls. Recently, with the development of a regional facilities plan, the District has embarked on a program to construct two new regional wastewater treatment facilities at a cost of more than \$200 million over the next 10 years. In addition, the District is responsible for implementing a CSO LTCP that includes an integrated watershed approach to planning and an SSO Plan (requested by the Kentucky Division of Water) to reduce the number of unauthorized discharges.

At this time, the District and the Kentucky Division of Water have agreed to pursue additional dialog on the development of a draft watershed permit for Banklick Creek. This watershed was selected because it is impacted by urban storm water runoff, CSOs, SSOs, septic systems, and rural runoff. It should be noted that the District's wastewater treatment plant does not discharge into the Banklick Creek watershed. The new watershed permit will enable the District to invest resources (time, labor, and money) more effectively in water quality improvement projects. The watershed permitting approach will also take advantage of the extensive database of water quality and GIS information that the District has compiled for its service area. Further, it provides an opportunity to consolidate monitoring and reporting activities.

Implementing the Watershed Approach: Kentucky



some economies of scale in achieving this end. Similarly, concentration of resources under the watershed approach will help advance the control of CSOs and SSOs in a cost-effective manner.

Improving Monitoring and Information-Based Environmental Management

In developing this Report to Congress, EPA found that the data necessary to answer many of Congress' questions were limited. Improved monitoring and reporting programs would provide better data for decision-makers to assess the frequency and magnitude of CSO and SSO events, the impact these discharges have on the environment and human health, and the importance of CSO and SSO discharges with respect to other pollution sources.

Numerous federal, state, and local government agencies as well as non-governmental organizations and

citizens are involved in monitoring. Monitoring and reporting efforts include collection of water quality information, tracking impacts of known activities affecting water quality, linking water quality to human health, and other activities. Effective monitoring programs provide the data and information needed to support sound decision making. Too often, however, the monitoring data do not meet the needs of specific programs or are not readily available. Better alignment of monitoring programs to address environmental management and human health issues is needed. Improved monitoring and reporting may foster a better understanding of cause-and-effect relationships. It may also improve state/local government and citizen access to environmental information.

Along with improved monitoring and reporting, data need to be effectively managed. Modernization of EPA's PCS will help in this regard. Use of standardized reporting formats for information on the occurrence

Improving Monitoring and Information-Based Environmental Management: Wisconsin

A cooperative effort between the Milwaukee Metropolitan Sewerage District (MMSD), the Wisconsin Department of Natural Resources, USGS, and several academic institutions resulted in the development of a single database for environmental data. The project team is compiling data sets from various federal, state, and local agencies in a centralized database of hydrology, water chemistry, macroinvertebrate, fish, habitat, and GIS information for stream corridors in the MMSD service area. The database is available on-line and allows the user to run queries and retrieve data currently in the system.

The database serves as a comprehensive inventory of stream corridor conditions, allowing for an improved understanding of the inter-relationship between the various types of data and establishing a baseline of existing conditions. Using these baseline conditions, impairments can be identified and assessed, and strategies can be developed to address the most significant problems. MMSD plans to use the database as a tool to prioritize future efforts to control CSO, SSO, and storm water discharges. Future data incorporated into the database will allow verification of improvements and identification of necessary adjustments or additional steps.

and control of CSOs and SSOs will enable EPA, states, and others to track pollutant loads and performance measures. Further, recent EPA efforts such as Watershed Assessment, Tracking, and Environmental Results (WATERS) are working to unite national water quality information that was previously available only from

several independent and unconnected databases.

Building Strategic Partnerships

The success that the nation has achieved in improving water quality since passage of the Clean Water Act is due to the

The Watershed Initiative for a Safer Environment (WISE) was started by the Cities of Elkhart, Mishawaka, and South Bend, Indiana. These cities have 102 CSO outfalls that discharge to 48 miles of the St. Joseph and Elkhart Rivers. Land use within the two-county area is 72 percent rural. Concentrations of *E. coli* in the main stem and at the mouths of the tributaries routinely exceed water quality standards. A single watershed tool was needed to educate the public and to assist in the selection of cost-effective strategies to reduce point and non-point pollutant sources, including CSOs. WISE utilized a stakeholder-driven approach to watershed planning involving numerous stakeholders, including:

- Indiana Department of Environmental Management
- City of Elkhart Public Works & Utilities
- City of Goshen Wastewater Utility
- City of Mishawaka Wastewater Utility
- City of South Bend Wastewater Utility
- Elkhart County Planning Division
- Jimtown Community School Corporation
- Juday Creek Task Force
- Local Farm Bureau Agency
- Michiana Area Council of Governments
- St. Joseph County Area Plan Commission
- St. Joseph County Surveyor
- St. Joseph and Elkhart County Health Departments
- St. Joseph and Elkhart County Soil and Water Conservation Districts
- Concerned citizens

WISE secured federal funding through the Clean Water Act 205(j) grant program to conduct coordinated river sampling and to develop a calibrated water quality model of the two rivers. WISE also expects to receive a 104(b)(3) grant in January 2004 to continue development of the model, including:

- Isolating the sources of *E. coli*;
- Identifying additional types of appropriate controls;
- Displaying the anticipated improvements in river water quality from different source controls along with the cost for implementation; and
- Evaluating whether refined water quality standards are appropriate.

This work will provide a single model that can be used in NPDES programs to further refine contaminant sources and assist in the selection of cost-effective strategies toward meeting, and possibly refining, water quality standards.

Strategic Partnerships: Indiana



collective efforts of federal and state agencies, municipalities, industry, non-governmental organizations, and citizens. Maintenance and enhancing existing cooperation among these groups is essential to meet the challenges to clean water that lie ahead.

As described in this Report to Congress, threats to water quality and human health have numerous origins and sources; establishing direct cause-and-effect relationships is often difficult. The information necessary to manage water quality problems also comes from many sources.

EPA recognizes the value of working with stakeholders and has pursued a strategy of extensive stakeholder participation in its policy-making on CSO and SSO issues. This effort should continue to improve knowledge on the impacts of CSOs and SSOs. Similarly, as communities continue to implement CSO and SSO controls, further cooperation with municipal, industry, and environmental organizations is essential to ensure successful development and implementation of environmental programs.