United States General Accounting Office

GAO

Report to the Chairman, Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure, House of Representatives

March 2000

WATER QUALITY

Key EPA and State Decisions Limited by Inconsistent and Incomplete Data

GAO

Accountability * Integrity * Reliability

GAO/RCED-00-54

Contents

Letter 3

Executive Summary 4

Chapter 1 Introduction 16

Chapter 2 National Water Quality Inventory Does Not Accurately Represent Water Quality Conditions Nationwide 24

Chapter 3 States Have Insufficient Data for Several Key Activities to Manage Water Quality 43

Appendixes

Appendix I: Copy of GAO Questionnaire 58

Appendix II: Comments From the Environmental Protection Agency 69

Appendix III: GAO Contacts and Staff Acknowledgments 73

Tables

Table 1: Monitoring Designs Described in EPA's Water Quality Reporting Guidelines 28

Figures

Figure 1: States With a Majority of the Data Needed for Activities to Manage Water Quality 7
Figure 2: Percentage of Waters Monitored, Evaluated, and Not Assessed 9
Figure 3: Examples of Point and Nonpoint Sources of Pollution 17
Figure 4: Steps in Managing Water Quality 19
Figure 5: Percentage of Waters Monitored, Evaluated, and Not Assessed in the 1996 305(b) Report 26
Figure 6: Monitoring Types and Pollutants or Conditions That They Measure 31
Figure 7: States With a Majority of the Data Needed for Activities to Manage Water Quality 44
Figure 8: Number of States With a Rotating Basin Plan in Place or Under Development 48

Abbreviations

EPA	Environmental Protection Agency
GAO	General Accounting Office
IWI	Index of Watershed Indicators
TMDL	Total maximum daily load

GAO
Accountability * Integrity * Reliability

United States General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-284241

March 15, 2000

The Honorable Sherwood L. Boehlert
Chairman
Subcommittee on Water Resources
and Environment
House of Representatives

Dear Mr. Chairman:

As requested, we are reporting on the Environmental Protection Agency's (EPA) *National Water Quality Inventory* and the adequacy of water quality data for key water quality decisions required by the Clean Water Act.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 7 days from the date of this letter. At that time, we will send copies to the appropriate congressional committees; the Honorable Carol M. Browner, Administrator, EPA; and the Honorable Jacob J. Lew, Director, Office of Management and Budget. We will make copies available to others upon request.

Please call me at (202) 512-6111 if you or your staff have any questions. Major contributors to this report are listed in appendix III.

Sincerely yours,

Peter F. Guerrero
Director, Environmental
Protection Issues

Executive Summary

Purpose

One of the states' key responsibilities under the Clean Water Act is to collect data to monitor the condition of the nation's waters. The act further requires states to submit reports on the condition of their waters to the U.S. Environmental Protection Agency (EPA), which then compiles the states' submissions into a report called the *National Water Quality Inventory*. These data, and EPA's report, have become increasingly important as national attention has focused on the most effective and efficient way to target the nation's water pollution problems and, in particular, on the soundness of the regulatory decisions that will be required to deal with the nation's most heavily polluted waters.

Concerned about the adequacy of the data to support water quality policy and key regulatory decisions, the Chairman, Subcommittee on Water Resources and Environment, House Committee on Transportation and Infrastructure, asked GAO to examine several issues relating to EPA's report on water quality and water quality management. Specifically, GAO was asked to (1) determine whether the information in EPA's *National Water Quality Inventory* is reliable and representative of water quality conditions nationwide and (2) determine if available data are sufficient to allow state officials to make key decisions about activities required by the Clean Water Act, such as identifying waters that do not meet water quality standards and developing strategies to address those waters.

Background

The Clean Water Act makes states responsible for developing programs to manage water quality; the programs are intended to achieve the act's goals of supporting aquatic communities, protecting human health, and sustaining other uses and provides for funding to implement the act. The programs that manage water quality generally include functions such as developing water quality standards by which to assess whether waters are of acceptable quality; monitoring water quality; and issuing permits to, and conducting inspections of, facilities that discharge pollutants into bodies of water. The Clean Water Act requires states to report to EPA biennially on the quality of their waters and directs EPA to compile the states' reports and analyze them. EPA's compilation, called the *National Water Quality Inventory*, is the primary report for the public about the condition of the nation's waters and is often used to characterize the nation's progress in achieving the act's goals. The report's data are also used as a basis for making key management decisions regarding water quality, such as how certain Clean Water Act funds are to be allocated among the states.

In addition to providing a basis for satisfying the act's national reporting requirements, the states need reliable and complete data to identify water quality problems and develop cost-effective strategies to address them. Of particular concern to EPA and the states are "nonpoint" sources of pollution—diffuse sources that include a variety of land-based activities, such as timber harvesting, agriculture, and urban development—which are widely regarded as contributing to the largest share of remaining water quality problems.

Sound data on water quality are becoming increasingly important as numerous lawsuits are directing nationwide attention to the accelerated cleanup of water quality problems through the development of total maximum daily loads (TMDLs). TMDLs are used to restore water quality by identifying how much pollution a body of water can receive and still meet standards and then reducing the amount of pollution entering the water to that level. The Clean Water Act requires states to develop TMDLs when other mechanisms to restore water quality have not worked. The basis for many of the lawsuits is that EPA and the states have not implemented this requirement of the act and have not thoroughly identified all waters needing TMDLs. EPA proposed revisions to its regulations on the management of water quality in August 1999 to strengthen the TMDL program.

To address this review's objectives, GAO conducted a data reliability evaluation of the *National Water Quality Inventory* by obtaining information from EPA and state water quality officials on the processes used to generate the report and by examining the controls in place to ensure that the information was reliable. GAO also interviewed EPA officials in headquarters and regions responsible for water quality issues to discuss the Clean Water Act's requirements for managing water quality and the guidance provided to states for implementing them. GAO conducted a mail survey of the 50 states and the District of Columbia and met with water quality officials in 4 states to discuss their programs to manage water quality, the management and regulatory decisions that rely on water quality data, and the issues that states face in carrying out their programs.

Results in Brief

The *National Water Quality Inventory* does not accurately portray water quality conditions nationwide. A major reason is that states collectively assess only a small percentage of waters in the United States. Specifically, 19 percent of the nation's rivers and streams were assessed for the 1996 *Inventory* (the latest report), as were 6 percent of ocean and other

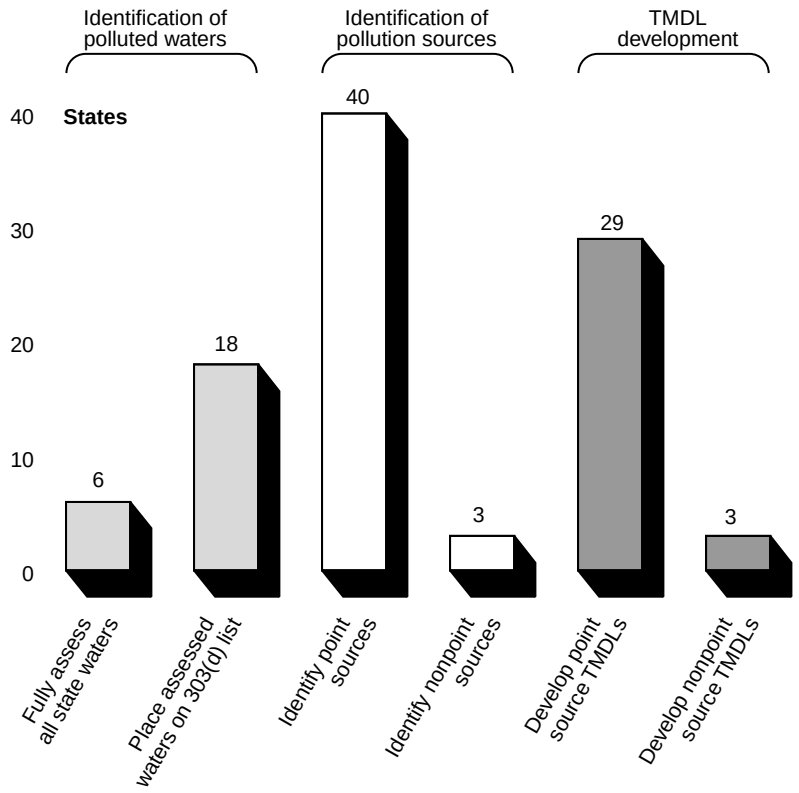
shoreline waters—which have been the subject of an increasing number of beach advisories and closures in recent years. It would be cost-prohibitive to physically monitor all of the waters in the country, and, therefore, almost all states monitor a subset of their waters. However, most monitoring is not done in a way that allows for statistically valid assessments of water quality conditions in unmonitored waters. In addition, the *Inventory* is not reliable because wide variation exists in (1) the way that individual states select their monitoring sites, (2) the kinds of tests they perform on their waters and how the results of these tests are interpreted, and (3) the methods they use to determine the causes and sources of pollution in waters that do not meet water quality standards. As a result, the information in the *Inventory* cannot be meaningfully compared across states.

EPA uses information from the *Inventory* as a basis for a number of important decisions and activities, such as deciding how to allocate federal funds for Clean Water Act programs to states and measuring and communicating EPA's and states' progress in implementing the act. However, the dearth of the waters actually monitored, combined with the wide variation among states' monitoring and assessment approaches, make the national statistics unreliable and subject to misinterpretation and, therefore, of limited usefulness for these purposes. While these limitations may call into question some of EPA's decisions that rely on these data, there is little doubt among experts that the remaining problems are considerable and that solutions will entail significant expenditures. What is uncertain, however, is the precise extent of water quality problems, where and what the most severe problems are, and the location of high-quality waters that need to be protected.

The limitations of the information in the *Inventory* extend well beyond the problems associated with the national uses of the report. State-level activities, such as identifying water quality problems and setting priorities among them to obtain the most improvement in water quality for the dollar spent, are also affected by data limitations. GAO's survey shows that data gaps limit states' abilities to carry out several key management and regulatory activities on water quality. As figure 1 illustrates, these data gaps are particularly serious in the case of nonpoint sources, which are widely accepted as contributing to the majority of the nation's water quality problems. Only six states reported that they have a majority of the data they need to assess whether their waters meet water quality standards. Moreover, a vast majority of states reported that they have less than half

the data they need to (1) identify nonpoint sources that are causing waters not to meet standards and (2) develop TMDLs for those waters.

Figure 1: States With a Majority of the Data Needed for Activities to Manage Water Quality



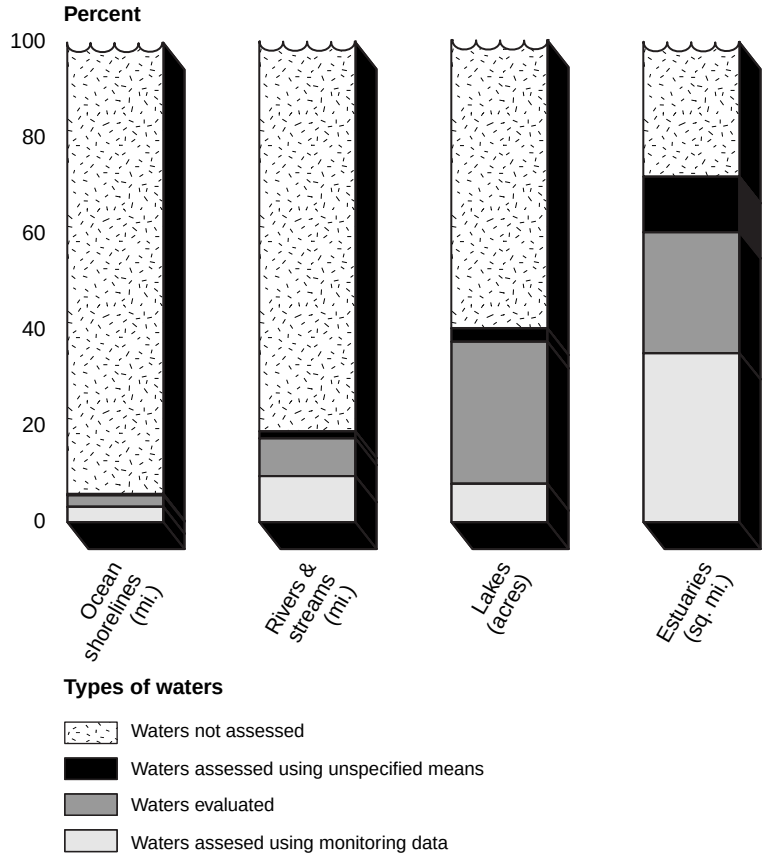
Among the recommendations GAO makes in this report are that EPA better convey the limitations of the *Inventory* and that the agency reexamine the implications of using the report for national decisions. GAO also recommends a number of actions that EPA should take to provide the tools, information, and assistance that states need to conduct critical water quality activities.

Principal Findings

Inventory Does Not Accurately Describe Water Quality Conditions Nationwide

As figure 2 illustrates, only a small percentage of U.S. waters are assessed for the *National Water Quality Inventory*—19 percent in the case of rivers and streams. Importantly, however, only about half of these assessments are based on current, site-specific monitoring information. The states assess conditions in the other waters by using monitoring data more than 5 years old or by relying on other data, such as land use information or anecdotal evidence of water quality, that serve as subjective indicators of whether a body of water is meeting standards. (These assessments are referred to as *evaluated assessments*.) Both EPA and state officials indicated that they are less confident of some of these assessments' accuracy because they may not reflect changes in water conditions and are sometimes based on unconfirmed information. However, EPA did not distinguish between the two types of assessments when presenting information on the percentage of waters meeting standards in the 1996 *Inventory*.

Figure 2: Percentage of Waters Monitored, Evaluated, and Not Assessed



Source: 1996 *National Water Quality Inventory.*

EPA encourages states to use statistical monitoring in order to capture a more comprehensive picture of water quality. GAO's survey of the 50 states and the District of Columbia, however, revealed that few states employ such a sampling design for a majority of their waters. Most states target their limited monitoring resources on areas with known problems and areas that are used by the public. The reliability of the data in the *Inventory* is limited because there is considerable variation in the analytical methods that states use to evaluate water quality. For example, states vary in the extent to which they rely on monitoring the chemical and physical properties of their waters (i.e., temperature, dissolved oxygen levels, or the presence of chlorine, mercury, and other chemicals) versus biological properties (i.e., species diversity and habitat quality). In addition, as

allowed by the Clean Water Act, states may evaluate water quality against different standards. As a result, the *Inventory* does not represent water quality conditions nationwide, and the data are not reliable for comparisons across states.

EPA has attempted to address the inconsistencies among states primarily through a workgroup whose members include EPA and state water quality staff, and the agency has incorporated several of the workgroup's recommendations into reporting guidelines for the *Inventory*. These are steps in the right direction, but they will not guarantee improved consistency because states are not legally required to comply with the reporting guidelines. In addition, the *Inventory* does not integrate findings from other monitoring programs to supplement state-reported information and help portray water quality conditions nationwide.

Among the key activities that rely on data from the *Inventory* is the formula that EPA uses to allocate funds to states to help them implement their water quality programs. In the past, such funds were allocated on the basis of several factors, such as the number of industrial dischargers and power plants in a state, which were intended as indirect measures of potential water quality problems. EPA recently revised this formula, in consultation with the states, and the new formula includes the amount of waters not meeting standards as reported in the *Inventory* by the states. Given the differences in the methods that states use to assess their waters, however, the resulting allocation may not reflect the relative magnitude of water quality problems in states but, instead, reflect assessment and reporting differences across them. While EPA acknowledged limitations with using the *Inventory* and therefore decided to phase in the increased weighting of waters not meeting standards beginning in fiscal year 1999, the agency does not have a plan to resolve the limitations.

While the lack of reliable information may call into question some of EPA's decisions that rely on data from the *Inventory*, there is widespread agreement that many waters still do not meet standards and that addressing these problems will be difficult and will require a considerable commitment of resources. What is uncertain is the precise extent of the problems, where and what the most severe problems are, and the location of high-quality waters that need to be protected.

States Have Little of the Data They Need for Several Key Water Quality Activities

The results of GAO's survey highlight the need for more comprehensive state monitoring and call into question the extent to which unknown and potentially serious problems are going undetected. Only six states reported having a majority of the data needed to fully assess all their waters, and less than half the states have a majority of the data needed to determine if their waters that have been assessed should be placed on their lists of waters that do not meet standards. While state officials believe they have identified their most serious pollution problems, many acknowledge that more comprehensive monitoring would reveal additional problems. A study of toxins in Maine's lakes, for example, unexpectedly showed widespread elevated levels of mercury. As a result of this more comprehensive monitoring effort, Maine and other New England states issued advisories against the consumption of fish for all their lakes.

In terms of addressing known pollution problems, there is a sharp division between the adequacy of data for point sources and of that for nonpoint sources. By and large, states have adequate data for identifying point sources that cause waters not to meet standards and developing TMDLs for these sources. Much of the Clean Water Act's implementation over the last 27 years has focused on addressing point sources. Additionally, it is relatively easy to determine the point sources that are contributing to water quality problems because they generally enter the water at a distinct point. Accordingly, 40 states responding to GAO's survey reported having a majority of the data they need to identify point sources that are causing waters not to meet standards, and more than half reported having a majority of the data needed to develop TMDLs for those waters.

Yet, while water quality officials responding to GAO's survey reported having a majority of the data they need to deal with point sources of pollution, few respondents reported having a majority of the data needed to deal with nonpoint sources. Specifically, almost all states reported that they did not have a majority of the data they need to identify nonpoint sources of pollution and develop TMDLs for waters polluted primarily by nonpoint sources. The data on nonpoint sources of water quality problems are of particular importance because the nation's remaining water quality problems are widely viewed as being caused, at least in part, by nonpoint sources. In 1998, for example, Texas officials reported that nonpoint sources contributed to almost all of the state's water quality problems.

States have always needed to obtain comprehensive and reliable water quality data, but such data have become more important in recent years. The increased emphasis on statutory and regulatory requirements for

assessing waters and developing TMDLs has heightened the need for states to have sound information to make these decisions. Of particular concern are the thousands of TMDLs that states must develop for their most heavily polluted waters, as required by the Clean Water Act. GAO's survey indicated that states will need additional tools, resources, and assistance in developing TMDLs for their waters—a task that will significantly tax already limited resources over a sustained period of time.

EPA has a number of initiatives under way that are designed to help states deal with specific problems, such as guides for developing TMDLs for specific pollutants that degrade waters and analytical methods for determining airborne sources of water pollution. However, states identified other areas in which they need assistance, such as additional tools for evaluating nonpoint sources of pollution and technical assistance on using analytical methods. EPA has initiated a strategy for supporting TMDL development, but this effort has been put on hold because of other workload demands. Until this strategy is finalized, it is not clear whether states' needs will be addressed.

Recommendations

GAO makes a number of recommendations to the Administrator, EPA, to appropriately characterize and improve the usefulness of the *National Water Quality Inventory*. GAO also makes recommendations for EPA to work with the states to finalize its strategy to support TMDL development.

Agency Comments

GAO provided EPA with a draft of this report for review and comment. EPA's comments and GAO's evaluation are discussed at the end of chapters 2 and 3. EPA's comments are reproduced in appendix II.

EPA generally agreed with the report, noting that it underscores the need to improve water quality monitoring and assessment across the country. EPA also offered more specific comments dealing with the report's discussion of (1) the sufficiency of state data for key water quality management activities, (2) the *National Water Quality Inventory*, and (3) the *Inventory's* use in grant allocation decisions.

First, EPA pointed out that states need not wait until "perfect data" are collected before taking actions to improve water quality. GAO agrees that perfect data are not needed before actions can be taken to improve water quality but continues to believe that data of better quality are needed to

make more informed and defensible decisions. EPA also asked that GAO acknowledge the agency's efforts that could help improve water quality data, such as the modernization of its primary computer system that stores and retrieves water quality data. GAO recognizes that EPA has many efforts aimed at improving water quality data overall, but notes that some of these efforts are limited in their ability to address the types of problems with water quality data identified. EPA also recommended that GAO add language to the report on the implications of inadequate data for identifying waters that do not meet standards. GAO agrees with this suggestion and has added a discussion of this issue to chapter 3.

Second, EPA made several points about the content and presentation of the information in the *National Water Quality Inventory*. The agency states that GAO's report should more strongly note that the *Inventory* is, by law, a summary of states' assessments of whether their waters are meeting standards and "is not intended to be a national water quality report on a selected, consistent set of water quality parameters." GAO acknowledges this point and has stated so in this report. However, the broader question that the Subcommittee posed to GAO asked how well the report characterizes water quality conditions nationwide. As such, this report discusses the utility of the *Inventory* for characterizing water quality nationwide.

Moreover, because the *Inventory* is used to help make national policy and regulatory decisions, GAO believes it is prudent for EPA to take steps to ensure that the information presented is as reliable as possible. Where it is not, EPA should clearly explain the reasons why and assess the possible implications on national decision-making. EPA points out that past *Inventory* reports have clearly explained that its information does not consistently characterize nationwide water quality and that it has continued to highlight this point in its draft 1998 report. GAO acknowledges the caution noted by EPA in how the *Inventory*'s data should be interpreted. However, by aggregating data across states, EPA is implicitly suggesting that these data can, in fact, be compared and in doing so is increasing the likelihood that the data will be misused or misinterpreted. GAO believes that aggregating data in different ways and adding language to characterize the potential implications of similarities and differences among state programs would present a clearer picture of how the state-reported information can be used.

In response to GAO's recommendation that the agency supplement the current information in the *Inventory* by including findings from other

programs (e.g., the U.S. Geological Survey's National Water Quality Assessment Program), EPA pointed out that it already includes descriptions of this information in the *Inventory*. GAO believes, however, that EPA can improve the presentation and usefulness of the report if it takes this descriptive approach a step further by integrating the findings of these studies with the report's own presentation of state data, where appropriate.

Third, EPA commented that it appears that GAO did not obtain a complete description of the process used to develop and evaluate the agency's new formula for allocating grant funds to states under section 106 of the Clean Water Act. The agency stated that it conducted extensive data searches and data source evaluations before selecting the *Inventory* as a source of information on the extent of water pollution in each state. In addition, EPA said that it evaluated numerous data scenarios to determine whether certain data components unduly influenced distributions of grant funds to states. GAO has incorporated a number of technical clarifications that EPA provided, as appropriate. However, according to an EPA official, the data scenarios referred to assessed the impact of using different data elements in the formula—not how differences among state monitoring and assessment methods may affect formula results, as GAO recommends.

Introduction

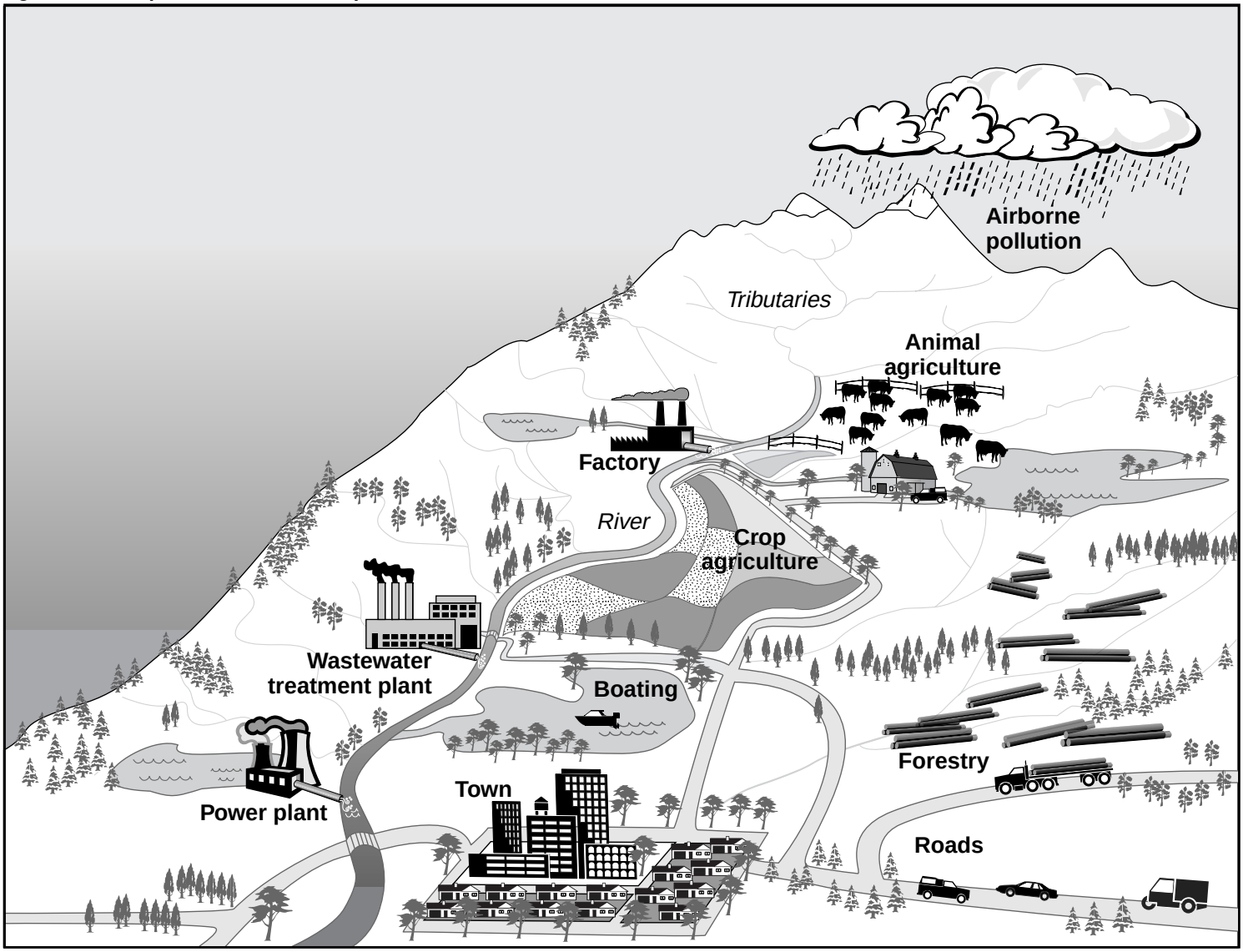
The Federal Water Pollution Control Act, commonly referred to as the Clean Water Act, was enacted in 1972.[1] One of its primary goals is to achieve and maintain water quality for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water. At the time the act was passed, water quality in the United States had deteriorated to the point where some rivers had severe pollution problems due to discharges of raw sewage and others were severely contaminated by industrial chemicals.

The Clean Water Act has been credited with greatly improving the condition of waters in the United States. Much of this improvement has been attributed to the National Pollutant Discharge Elimination System, a program that controls pollutant discharges from industrial facilities and wastewater treatment plants, which are often referred to as "point sources" of pollution. The program sets up a process for issuing permits to facilities that discharge pollutants and imposes requirements for the pollution control mechanisms they must use to reduce the amount and toxicity of the pollutants they discharge. The Congress added provisions to the act in 1987 that called attention to another source of pollution that was believed to be largely responsible for continued water quality problems—nonpoint source pollution.

Nonpoint sources of pollution include many different types of activities such as agriculture, timber harvesting, and urban development. Nonpoint sources contribute pollution as rainwater, snowmelt, or irrigation water moves over or through land surfaces. This causes pollutants, either dissolved or solid, to be transported and eventually deposited into surface waters. Airborne pollutants, sometimes carried through the air over long distances and then deposited into bodies of water, are also considered nonpoint pollution. The types of pollutants vary with the activity involved and include sediment, nutrients, pesticides, pathogens (such as bacteria and viruses), salts, oil, grease, toxic chemicals, and heavy metals. Figure 3 provides examples of point and nonpoint sources of pollutants.

[1] 33 U.S.C. sections 1251-1387.

Figure 3: Examples of Point and Nonpoint Sources of Pollution



Examples of point source pollution are indicated on the left side of the river.

Examples of nonpoint source pollution are indicated on the right side of the river.

Today, much attention is being focused on dealing with nonpoint sources of pollution. States and the Environmental Protection Agency (EPA) are facing increased pressure to address pollution problems as a result of

numerous lawsuits charging that they are violating the Clean Water Act by not doing so. In 1998, the administration introduced the Clean Water Action Plan, which is intended to strengthen federal and state actions to address pollution problems; addressing nonpoint source pollution is a major component. As part of this action plan, for example, funding for grants to states to deal with nonpoint source pollution almost doubled from $105 million in fiscal year 1998 to $200 million in fiscal year 1999. This level of funding was maintained for fiscal year 2000. In addition, EPA and the U.S. Department of Agriculture jointly developed a national strategy for minimizing environmental and public health impacts from nonpoint source pollution coming from animal feeding operations. Furthermore, the plan includes actions to ensure beaches—which have been subject to an increasing number of advisories and closures in recent years—are safe for swimming.

States Implement the Clean Water Act Through Programs to Manage Water Quality

While EPA is responsible for developing regulations and guidance for implementing the Clean Water Act and ensuring that it is properly implemented, states have primary responsibility for implementing programs to manage water quality. States are provided with federal funds through EPA to develop and implement these programs. In addition to the program that regulates point sources of pollution, other activities to manage water quality include developing water quality standards to protect public health and aquatic life, monitoring water quality to assess whether standards are attained, and implementing strategies to address pollution problems.

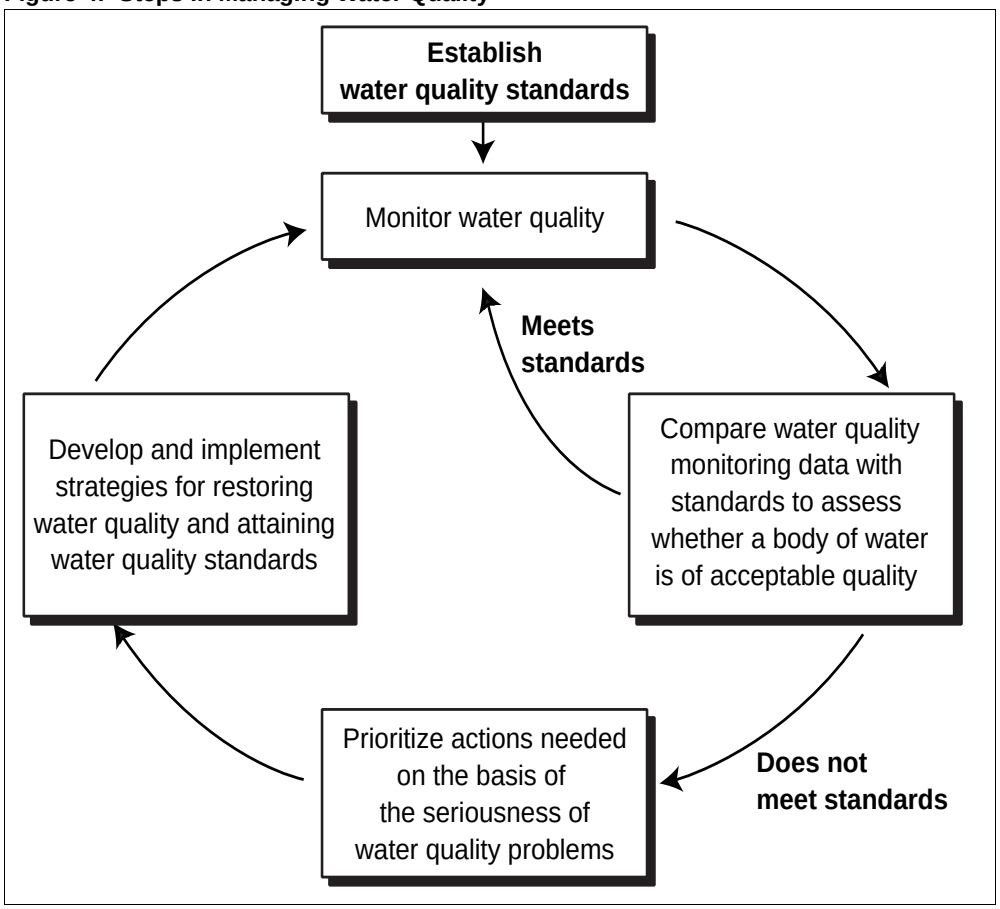
Water Quality Standards

The Clean Water Act requires states to establish water quality standards as a way to ensure that the goals of the act will be met. These goals include the achievement and maintenance of water quality for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water. To develop water quality standards, states classify waters according to how they will be used and adopt water quality criteria to protect those uses. Criteria—which can be numeric or narrative—indicate the acceptable levels of chemicals allowed, or physical or biological characteristics required, in a water in order for it to meet its designated use. Waters that do not meet standards are often referred to as “impaired.” Without standards, a state has no basis to assert whether waters are of acceptable quality. By law, states are allowed to set their own water quality standards; as a result, standards differ across states.

Water Quality Monitoring and Assessment

Monitoring water quality is the linchpin for many management activities regarding water quality. Figure 4 depicts this relationship, showing that monitoring water quality is essential to identifying water quality problems and determining whether actions taken to restore water quality have been successful.

Figure 4: Steps in Managing Water Quality



States either monitor water quality, use data collected by other entities to assess water quality, or rely on a combination of the two. Monitoring data include information such as the presence of chemicals, physical characteristics such as temperature, and biological characteristics such as the health and abundance of fish and other aquatic species. As shown in figure 4, states compare monitoring data with water quality criteria to determine if waters meet standards. If a state's assessment of a body of

water indicates that it does not meet the criteria—for example, if it has levels of chlorine that are too high to support aquatic life—then the water is considered not to be supporting its intended use of aquatic life. This indicates that the body of water needs pollution reduction strategies to correct the problem.

The Clean Water Act sets forth a procedure for states to follow in addressing waters that do not meet standards. This requires states to submit to EPA a list of all of their waters that do not or are not expected to meet applicable water quality standards.[2] For the lists developed in 1998, states identified about 21,000 waters that did not or were not expected to meet standards. The Clean Water Act further requires that states take steps to ensure that waters that do not meet standards are improved sufficiently to support their designated uses. This is done through developing total maximum daily loads (TMDLs), which refers to the maximum amount of a pollutant a body of water can receive on a periodic basis and still support its designated uses. Generally, TMDLs are developed by (1) analyzing the pollutants and sources of those pollutants causing a water quality problem and (2) determining how much the pollutants need to be reduced in order to enable the body of water to meet standards. A key part of the TMDL is assigning the pollutant reductions necessary among the various sources contributing to the water quality problem.

Data used in the development of TMDLs are becoming increasingly important. For example, legal actions have been taken in more than 30 states asserting that the states and EPA have not adequately implemented water quality standards. Most of these lawsuits have been filed in the last 5 years and largely focus on the adequacy of states' lists identifying water quality problems or on the lack of state and EPA action in developing TMDLs. In August 1999, EPA proposed changes to water quality management regulations in order to strengthen the TMDL program.

[2]This list is commonly referred to as the 303(d) list.

State and EPA Water Quality Reporting

Another requirement of states under the Clean Water Act that relies on monitoring and assessment information is found in section 305(b), which requires states to report biennially to EPA on the quality of their waters and EPA to produce a report analyzing the states' information. A further requirement that the report be transmitted to Congress was recently repealed.[3] The information that states submit to EPA for this report, called the *National Water Quality Inventory* but generally referred to as the 305(b) report, includes (1) the amount of waters the state assessed; (2) whether those waters meet water quality standards; (3) the pollutants, such as toxic chemicals or bacteria, that cause waters to not meet standards; (4) the sources, such as industrial facilities or wastewater treatment plants, that contribute those pollutants; and (5) a description of the state's water quality program.

The 305(b) report is the primary report for informing the public about the conditions of the nation's waters. Therefore, it is often relied on to make statements regarding water quality conditions nationwide and to support national-level decisions. For example, the 1996 report's summary statistic that forty percent of the waters assessed by states are unsafe for swimming and fishing was a leading factor in the Administration's argument for the need for the Clean Water Action Plan and associated requests for budget increases. In addition, the report's summary information on causes and sources of water quality impairments contributed to EPA's decision to develop new regulations for animal feeding operations and criteria for evaluating a group of pollutants referred to as nutrients.

Objectives, Scope, and Methodology

As agreed with the Chairman, Subcommittee on Water Resources and Environment, House Committee on Transportation and Infrastructure, the objectives of this review were to (1) determine whether the information in EPA's *National Water Quality Inventory* is reliable and representative of water quality conditions nationwide and (2) determine if available data are sufficient to allow state officials to make key decisions about activities

[3]The Federal Reports Elimination and Sunset Act of 1995, Pub. L. No. 104-66, 109 Stat. 707 (Dec. 21, 1995), provides that most statutory requirements for annual reports by federal agencies to the Congress are eliminated as of December 21, 1999. However, according to EPA, the states are still required to submit reports on their waters every 2 years. Accordingly, EPA officials told us they intend to continue to produce, in some form, an analysis of the state reports and to use it to measure states' progress and communicate to the public.

required by the Clean Water Act, such as identifying waters that do not meet water quality standards and developing strategies to address those waters.

To determine the reliability and representativeness of EPA's *National Water Quality Inventory* (the 305(b) report), we followed generally accepted data reliability and information systems audit methodologies. We reviewed EPA's guidelines for preparing the 305(b) report and other EPA guidance documents regarding monitoring and assessment techniques. We reviewed the last two 305(b) reports, issued for 1994 and 1996. We interviewed EPA headquarters staff and contractor personnel responsible for compiling state reports into a national summary. We also interviewed EPA regional officials involved in helping states to administer their monitoring programs and prepare their reports on water quality.

We also conducted a mail survey of the agencies that administer water quality management programs in the 50 states and the District of Columbia. Our survey asked state officials to identify the primary monitoring design and analytical methods used, the sources of data relied on, and their opinions on the 305(b) assessment and reporting process and EPA's information systems. We pretested our questionnaire with officials in Illinois, Maryland, and North Carolina and also obtained comments from officials in EPA's offices of Water and Inspector General. We received survey responses from all 50 states and the District of Columbia.

In addition, we met with water quality management officials in Illinois, Maine, North Carolina, and Texas to discuss the processes they use to assess water quality and provide EPA with information for reporting purposes. We judgmentally selected these states to represent diversity among (1) water quality monitoring designs, (2) the percentage of waters assessed, (3) geographical settings, (4) EPA regions, and (4) the type of information systems used to store data. We spoke with EPA regional officials in each of the regions responsible for the states we visited. We also obtained reports issued by EPA's Office of Inspector General pertaining to water quality management programs in five states and discussed their findings with staff involved with those reviews.

We also used the survey and site visits to address our second objective. Our survey included questions regarding the adequacy of data to conduct various water quality management activities. We asked states to comment on issues that help or hinder them in carrying out their water quality management responsibilities. We used our site visits to the four states to

obtain a more detailed understanding of the primary water quality management and regulatory decisions that rely on water quality data, the way in which states obtain the data needed to carry out these activities, and the data limitations that states face.

We met with several officials representing the monitoring and TMDL programs in EPA's Office of Water to discuss guidance that states are provided with in these areas and the activities under way that may address states' needs. We also spoke with officials in the offices of Wastewater Management and General Counsel to discuss EPA's authority under the Clean Water Act regarding state programs for monitoring, assessing, and reporting on water quality.

We conducted our work from April 1999 through February 2000 in accordance with generally accepted government auditing standards.

National Water Quality Inventory Does Not Accurately Represent Water Quality Conditions Nationwide

The 305(b) report is not a reliable representation of nationwide water quality conditions.[1] The assessments of water quality that states report generally do not represent conditions in all the waters in their state but, instead, represent only the subset of waters that the states assessed.[2] An underlying reason for the differences among state programs is that the Clean Water Act allows states to have different standards by which to assess the level of quality of their waters. In addition, there is considerable variation among states in many aspects of monitoring and assessing water quality. EPA uses information from the 305(b) report for many important national decisions, such as deciding how to allocate federal funds for water quality activities to states, measuring the progress that states and EPA are making toward implementing the Clean Water Act, communicating water quality issues to the public, and making major regulatory decisions. Given the lack of the representativeness of the data in the report and their inconsistency, they are of limited usefulness for these purposes.

EPA has taken steps to address problems with the 305(b) report, such as modifying reporting guidelines. However, because states are not required to follow the guidelines, their implementation is not guaranteed. In addition, integrating information from other sources with state-reported information in the 305(b) report may help provide a more accurate picture of water quality conditions nationwide.

Data in the 305(b) Report Are Incomplete and Are Not Consistent Across States

Assessment data in the 305(b) report are not complete because they do not represent all of the states' waters, either through a census (i.e., the monitoring of all waters in a state) or through statistical sampling that would yield data that are projectable to all state waters. In addition, there is substantial variation among states in virtually every aspect of monitoring and assessment. Variations are found in (1) the standards states use to assess water quality, (2) the way that states select their monitoring sites, (3) the kinds of monitoring tests that states perform and how they interpret the results, and (4) the methods that states use to determine the causes and sources of pollution.

[1]As defined in GAO's *Assessing the Reliability of Computer-Processed Data*, data reliability exists when data are sufficiently complete and error free to be convincing for their purpose and context.

[2]For the purpose of this report, "states" refers to the 50 states and the District of Columbia.

The 305(b) Report Does Not Provide Complete Information on Water Quality Conditions Nationwide

A major reason why the 305(b) report does not accurately portray nationwide water quality conditions is that only a small percentage of waters are actually assessed. This small percentage would not necessarily be a problem for nationwide reporting if the waters were selected for monitoring in a statistically projectable manner. However, the waters that are monitored are not generally selected in a way that would allow for projecting water quality conditions in other waters. In addition, the conditions in many of the waters reported on in the 305(b) report are not based on current water quality monitoring but, instead, are assessed on the basis of dated information or subjective determinations.

A Small Percentage of U.S. Waters Are Assessed

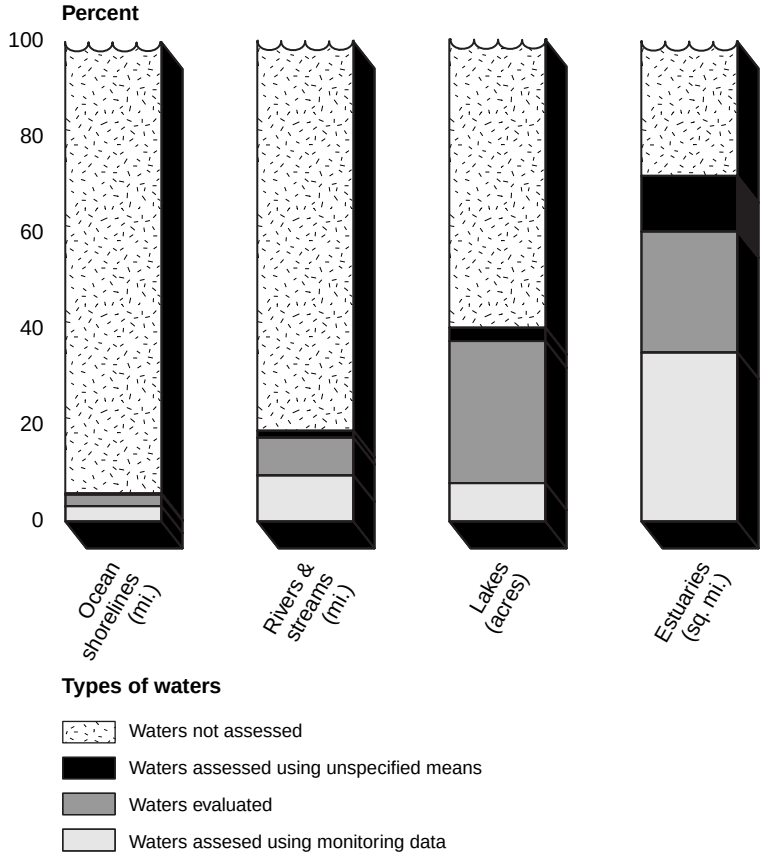
Given that there are over 3.5 million miles of rivers and streams and 42 million acres of lakes, ponds, and reservoirs in the United States, it is cost prohibitive for states to assess all of their waters. As a practical matter, therefore, states almost always limit their assessments to a subset of total waters; the result is that a majority of U.S. waters remain unassessed. For example, the percentage of waters assessed in the 1996 report was 6 percent for ocean shoreline waters; 19 percent for rivers and streams; 40 percent for lakes, ponds, and reservoirs; and 72 percent for estuaries.

For many years, EPA has encouraged states, through 305(b) reporting guidelines, to improve the coverage of state waters in their monitoring efforts. The guidelines for the 1998 305(b) report suggest that states should develop a strategy for achieving the goal of comprehensively assessing all state waters. The monitoring techniques suggested by the guidance include a combination of monitoring known problem waters, as well as monitoring randomly selected sites, which would allow inferences to be made about entire categories of waters. The guidelines also suggest that states include information from federal agencies and other relevant organizations in their 305(b) reports to increase the breadth or extent of assessments. State responses to our survey indicate that many states currently consider information from various sources in their assessments of water quality. EPA requests that states describe their progress toward the goal of comprehensive coverage in their 305(b) reports.

Many Assessed Waters Are Not Actually Monitored

Of the waters that are assessed, only a portion are done so in a fashion that meets EPA's definition of a "monitored" assessment—that which is based on water quality monitoring data that are less than 5 years old. As figure 5 illustrates, of the 19 percent of river and stream miles that were assessed for the 1996 report, half were assessed using these types of data.

Figure 5: Percentage of Waters Monitored, Evaluated, and Not Assessed in the 1996 305(b) Report



Source: 1996 National Water Quality Inventory.

The remaining assessments were based on data that are either older than data used for monitored assessments, data calculated using water quality models, or qualitative information, including sources such as land use data, the location of pollution sources, or evaluations made by fish and game biologists of water quality or wildlife conditions. This type of information is used as an indicator of potential water quality in waters that are not actually monitored. Assessments based on such information are called evaluated assessments and can vary in quality and reliability. EPA officials said that while some types of evaluated assessments can be used with a relatively high degree of confidence, others are more open to question because they may not reflect changes in water conditions or may be based on unconfirmed information. Thirty-nine states used evaluated data for their assessments of rivers and streams in the 1996 report, and 19 of them used such data for half or more of their assessments.[3] In the 1996 report, EPA identified the percentage of evaluated and monitored assessments. However, it did not distinguish between the two types when presenting information on the percentage of waters not meeting water quality standards.

In addition to using older and potentially subjective information as a basis for water quality assessments, some states also assess waters by "extrapolating" assessments from one monitoring site to other unmonitored waters. EPA's 305(b) report guidelines state that this practice is acceptable if the monitored site is representative of other parts of the body of water and specify conditions present in the water that might change water quality or habitat and therefore preclude extrapolation. Officials in several states we visited said they use extrapolated assessments in preparing their 305(b) report. Additionally, a few states make presumed assessments, which are assumptions that water quality is of a certain level in the absence of any quantitative data to make a determination of quality. EPA's guidelines for the 305(b) report advise against using such assessments.

States' Selection of Monitoring Sites Does Not Yield Representative Data

The methods that states use to select monitoring sites affect how the resulting data can be used. Monitoring sites that are chosen on the basis of a random or statistical sample will result in data that are representative of the condition of all waters in a population, such as all streams of a certain size or type. EPA encourages states to include this type of design in their

[3] Two states did not specify whether their assessments were evaluated or monitored, and three states did not report any assessments at all.

monitoring programs in order to capture a more comprehensive picture of water quality. Conversely, monitoring sites that are targeted toward waters with specific characteristics, such as known pollution problems or high levels of public use, result in data that can provide information only on those particular waters that were monitored. Additional information on monitoring designs is provided in table 1.

Table 1: Monitoring Designs Described in EPA's Water Quality Reporting Guidelines

Design	EPA's description	GAO's comments
Targeted (problem-based)	This method allows questions to be addressed that are focused on site-specific problems. The aggregation of these site-specific results to make comprehensive assessments is open to question regarding the representativeness of those sites to the resource as a whole.	This design is intended to represent only the site itself—not other bodies of water.
Sample survey or probabilistic	This method is intended to produce snapshots of the condition of an entire resource when that resource cannot be subject to a census. Sample surveys rely on the selection of monitoring sites that are representative of the resource. Randomization in the site selection process is one way to ensure that the sites represent the resource of interest.	Randomization is the only method that allows statistically valid inferences to be drawn to a population as a whole.
Judgmental	This design is based on some criterion other than randomness. Judgmental selection of sites is based on the judgment that the sites are representative of the target resource. Such judgmentally based sample surveys require strong defense regarding the representativeness of the sites selected, and it may not be possible to estimate the uncertainty with which inferences are made as it is when using probability-based sample surveys. This method is a nonrandom selection of sampling sites *with the intent of using assessment results for drawing inferences on a population as a whole.* [Emphasis added.]	We put EPA's assertion in italics because, in general, using nonrandom judgmental samples to project results beyond the actual sites surveyed is questionable. If strong, compelling evidence demonstrates that the sites selected to sample are like the non-selected sites in the area, perhaps—and with clearly stated, strong caveats—limited inferences could be made beyond just the sample sites. No clear, statistically defensible statement is possible under this method.

Source for EPA's description *Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates* (Sept. 1997).

By and large, states use a targeted approach to select monitoring sites and focus monitoring efforts in problem areas or publicly used waters; very few states use a statistical approach. According to our survey, only nine states reported using a statistical approach for a majority of their water quality monitoring of biological conditions, and five states reported doing so for the monitoring of chemical conditions. As a result of the limited use of statistical sampling by states, most of the data they gather are not suitable for representing statewide conditions. State officials told us that

information on the condition of specific waters is more essential to state programs for managing water quality than the kind of general information provided by statistical designs. Because states have limited resources for monitoring and assessment activities, they tend to use statistical monitoring in limited cases or relegate it to a lower priority.

The 305(b) Report Does Not Provide Data That Are Consistent Across States

There are significant differences among states in virtually all aspects of the 305(b) assessment and reporting process. An underlying difference is that states can have different standards by which to assess the level of quality of their waters. In addition, states vary in how they select their monitoring sites, the kinds of monitoring tests they perform and how the results of these tests are interpreted, and the methods they use to determine the causes and sources of pollution.

States Vary in the Standards They Use to Assess Water Quality

The Clean Water Act allows states to set their own water quality standards. Specifically, states can designate waters to support multiple uses, such as for public water supplies, the propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and navigational purposes. States can also set their own criteria (i.e., acceptable levels of pollutants or conditions required in a water in order for it to support its intended uses) as long as they are at least as restrictive as EPA's. As a result, standards vary across the states. [4]

According to EPA, some differences in water quality standards are based on sound science. For example, criteria to protect aquatic life should reflect the different natural ranges of biological communities. Similarly, acceptable physical conditions can vary depending on geographic and other factors. For example, natural fluctuations in the temperature and clarity of lakes are different in states in the northeast from those in states such as Florida and therefore, state standards may vary to accommodate these differences. Even criteria set to prevent concentrations of metals from causing toxic effects can be different from state to state because the way that metals affect a body of water varies, depending on the water's natural mineral content and acidity. Because of differences such as these,

[4]In 1998 and 1999, EPA's Office of Inspector General issued reports on five states' water quality programs that, among other things, identified weaknesses in state water quality standards and the regional review of state standards. For example, some states had less restrictive criteria than EPA's and some did not adopt all applicable uses. In addition, EPA regions were not always reviewing state standards in the required time frames. In 1998, EPA issued a plan to strengthen water quality standards programs for both EPA and the states.

EPA believes it is appropriate for water quality standards to vary from state to state.

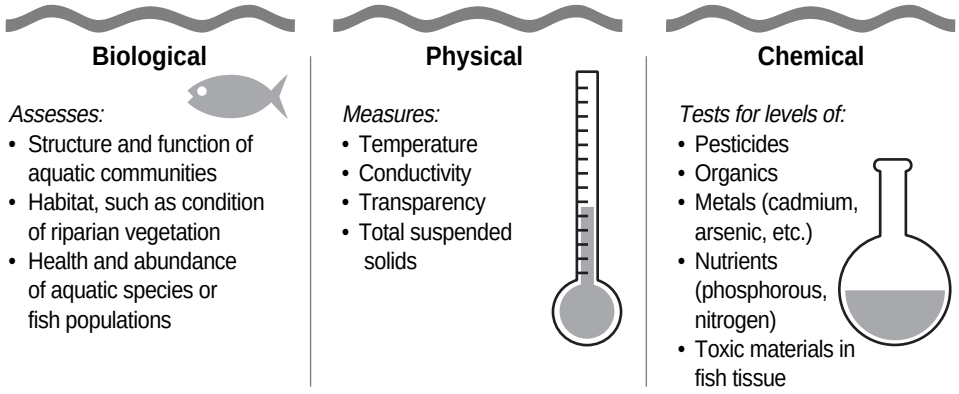
What is not appropriate, according to EPA, is the uneven development and implementation of standards among states. Some states assess water quality using a range of measures, such as physical, chemical, and biological measures, while other states may base their assessments on only one or two chemical measures. The rigor of state programs for water quality standards, both in terms of the types of different measures that are included and the monitoring programs used, should be consistent from state to state so that the findings of water quality assessments are comparable.

Currently, however, most states' water quality standards and monitoring programs are not comparable, yet in the 305(b) report, EPA does not provide details on these differences, nor does it discuss their potential implications on resulting national information. While one state may appear to have many more water quality problems than another state, it could actually be the result of more restrictive or more thorough standards. Likewise, if one state monitors a high percentage of its waters, it may identify more problems than a state that monitors fewer waters.

States Vary in the Types of Monitoring Tests That They Perform

The Clean Water Act outlines goals for attaining water quality in terms of the biological, chemical, and physical conditions of waters. EPA's 305(b) reporting guidelines discuss the different types of monitoring tests in each of these areas—each of which yields data about particular aspects of bodies of water. Physical monitoring tests the physical characteristics of bodies of water such as temperature and the amount of suspended solids in the water. Chemical monitoring tests for chemicals that may be present, such as chlorine or ammonia, and metals, such as mercury. Biological monitoring measures the health of aquatic communities and includes a variety of techniques, such as assessing species' health and abundance. These monitoring types and the additional pollutants or conditions that they measure are described in figure 6.

Figure 6: Monitoring Types and Pollutants or Conditions That They Measure



States compare water quality monitoring data—chemical, physical, biological, or a combination—with water quality criteria in order to determine whether waters are meeting the standards. Officials in the states we visited said that they tend to rely more heavily on one type of monitoring test to make these assessments. For example, Illinois and Maine rely primarily on biological monitoring to determine if rivers and streams meet water quality standards, while Texas relies on chemical and physical monitoring. This may cause differences in reporting on water quality because as a study conducted by Ohio showed, different monitoring tests may yield different results as to whether waters are of acceptable quality. The study's assessment of 645 waters revealed that 50 percent of the waters met chemical but not biological criteria.

Assessment results can also vary within a single type of monitoring. Many different pollutants or conditions can be monitored within a type of monitoring, but states generally do not monitor for all of them. Different assessments of water quality in a single body of water can result if different pollutants or conditions are monitored. An example given in EPA's 305(b) guidelines shows that in one body of water, toxicity levels were within the standards, but the levels of certain metals exceeded the standards. This is also the case for biological monitoring. Officials in North Carolina told us that because the types of biological tests performed vary from state to state, the resulting assessments should be compared with caution. Maine and Illinois both use biological tests to assess rivers and streams, for example, but their methods measure different aspects of the biological health.

States Do Not Use Consistent Data Analysis Methods

States vary in how they use information on water quality to make use assessments for individual waters, particularly the extent to which they use monitored or evaluated data. For the 1996 305(b) report, 39 states used evaluated data for assessing their rivers and streams, and 19 of these used such data for half or more of their assessments. Seven states reported that they did not use any evaluated assessments. Texas officials, for example, told us they assess only those waters for which they have current, site-specific data. Even though a majority of states do use evaluated assessments when preparing their 305(b) reports, some of the same states do not use these assessments as a basis for other decisions, such as whether to place waters on their list of waters that do not meet standards, because they consider the soundness of evaluated assessments to be questionable. For example, officials in Illinois said that when evaluated assessments show that a body of water does not meet standards, they first carry out additional monitoring at that site to determine with greater certainty whether the body of water is, in fact, below standards.

Further differences among states may arise as a result of whether and how they use assessments from one section of a body of water to represent conditions in other unassessed waters—a practice called extrapolation. EPA's 305(b) reporting guidelines state that this practice is acceptable as long as certain, similar conditions exist in the affected waters. Among the states we visited, we found variations in how states extrapolate water quality assessments. Officials in Texas do not use this practice at all, while officials in Illinois, Maine, and North Carolina do. However, North Carolina extrapolates only when assessments indicate that waters meet standards, while Illinois extrapolates all assessments, whether they indicate that waters meet standards or not.

States Use Inconsistent Methods to Determine Causes and Sources of Pollution

EPA's 305(b) reporting guidelines ask states to identify the causes—pollutants or stressors, such as sediment, nutrients, and chemical contaminants—that prevent a body of water from meeting standards. They also are to identify the sources—specific activities or entities such as agriculture, wastewater treatment plants, and industrial facilities—that contribute pollutants to waters. EPA's guidelines provide general definitions and list some of the types of information useful in determining the sources of water quality impairment, including categories of pollution sources, such as agriculture, storm sewers, and industrial point sources. However, the guidelines lack specific instructions on the methods for determining causes and sources.

The identification of causes and sources is an area in which officials in several of the states we visited said there is considerable subjectivity. An official in one state, for example, said that determining causes and sources for lakes is generally based on the best professional judgment of the monitoring staff members, and that while it may be a "reasonable guess," it is nonetheless a subjective process. Officials in another state told us they identify sources only if there are sufficient data to provide reasonable assurance that the source identification is accurate. One state official said that the reason for subjectivity in the identification of causes and sources is because EPA has provided little guidance in this area.

In the 1996 305(b) report, EPA acknowledged that states do not assign sources to all water quality problems identified. Despite this, EPA also states in the report that it rates the significance of sources of pollution by the amount of waters that states report is affected by each source. As a result, when comparing one state with another, or when aggregating state-reported causes and sources, some sources may appear to be less significant than others, when these differences might actually be a result of inconsistent or incomplete reporting.

Uses of the National Water Quality Inventory Are Undermined by Data Weaknesses

The flaws in the 305(b) report—incomplete data and differences in how states monitor and assess their waters—greatly limit its utility for national decisions and activities. Nevertheless, EPA uses the 305(b) report for several national-level activities because it is the only source of national information on whether waters are meeting water quality standards. There is widespread agreement that many waters are still not meeting standards and that addressing these problems will be challenging. What is not clear is the full extent of these problems, where and what the most severe problems are, and the location of high-quality waters that need to be protected.

Allocation of Clean Water Act Grant Funds

The Clean Water Act authorizes funds for grants to states to assist them in administering programs for the prevention, reduction, and elimination of pollution. These grants are the chief source of federal funding to states for water quality management activities and are used to support the monitoring and assessment of water quality and the regulation of pollution dischargers, among other things.

The Clean Water Act indicates that these funds should be allocated to the states on the basis of the extent of water pollution in each state. Prior to

1999, EPA used a formula that included point source factors, such as the number of industrial dischargers and power plants in a state, as well as other factors, such as population and land area. EPA revised this formula, effective fiscal year 1999, to be more in line with the act's intent to allocate grant funds on the basis of the extent of pollution and to improve the quality and consistency of the data used for the allocation of funds.

One of the components in the new formula is the number of waters identified in the 305(b) report as not meeting standards.[5] To account for the fact that not all of the formula components contribute equally to the extent of the pollution problem within the states and to address concerns regarding the current consistency of the 305(b) information, each component is weighted individually. Component weights are being phased in over the course of 5 years, and final component weights are to be phased in by fiscal year 2004. The 305(b) information was given a weight of 13 percent in fiscal year 1999 and will reach its maximum weight of 35 percent in fiscal year 2004. Also, as a part of the new formula, EPA instituted mechanisms to routinely update the data used.

Yet given the differences in the methods that states use to assess their waters, the information from the 305(b) report may not reflect the relative magnitude of water quality problems in states but, rather, assessment and reporting differences across them. Moreover, EPA has no plans to ensure that there will be greater consistency in the 305(b) reporting process by the time that the formula component reaches its maximum weighting in 2004, beyond encouraging states to adopt practices that would lead to more comparable data. In response to our survey, half of the states reported that they oppose using 305(b) data as a factor in allocating Clean Water Act funds. A few states wrote specific comments stating that they oppose EPA's use of 305(b) data in the formula because states' monitoring and assessment methods are not comparable.

EPA Internal Performance Measure

The Government Performance and Results Act of 1993 requires EPA and other agencies to clearly define their missions, establish long-term strategic goals (and annual goals linked to them) against which to measure their performance, and report this information to the Congress. Importantly, the

[5] The other components are surface water area, ground water use, point sources, nonpoint sources, and the population of urbanized areas.

statute emphasizes the need for agencies to focus on and achieve measurable program results.

Some of EPA's performance measures are tied to the percentage of waters meeting standards as identified in the 305(b) report. In EPA's fiscal year 2000 annual performance plan, a key strategic objective is for 75 percent of the nation's waters to support healthy aquatic communities by 2005.[6] However, the problems with the completeness and consistency of the data in the 305(b) report undermine its usefulness in tracking progress toward this goal. In fact, the agency acknowledged the problem in its fiscal year 2000 budget proposal, stating that "differing processes and methods among states can result in varying depictions of the nation's water quality" and concluding that "due to the manner by which data are currently collected, 305(b) data cannot be used to establish trends."

EPA Public Information Tool

Information from the 305(b) report is often used to characterize conditions in the nation's waters in statements asserting, for example, that a specific percentage of the nation's waters do not meet standards. Given the problems with the underlying data, however, the report does not provide a complete or reliable estimate of the extent of water quality problems, the types of these problems, and the identification of the primary causes and sources nationwide. An EPA official acknowledged that EPA and other users of the report do not always communicate that the 305(b) report is based on assessments of a subset of the nation's waters.

Many states question EPA's use of the 305(b) report to represent water quality conditions nationwide. Fourteen states responded that they oppose the use of the report in this manner. While 30 states responded that they support the use of 305(b), nearly half of these qualified their support, commenting that consistency in state reporting needs to be improved and that data should be held to higher standards.

EPA also uses information from the 305(b) report, among other information, in its Index of Watershed Indicators (IWI), as presented through EPA's "Surf Your Watershed" application, a map-based tool available on the Internet. EPA designed the IWI to be used by individuals interested in learning about the overall quality of the watersheds in which

[6]In this context, "waters" refers to rivers and streams, lakes, wetlands, estuaries, coastal areas, oceans, and ground waters.

they live. The IWI is also intended to provide a national baseline of the condition and vulnerability of aquatic resources that, over time, could be used to measure progress toward the goal that all watersheds be healthy and productive places.

The 305(b) water quality assessment information is 1 of 15 different "layers" of information in the IWI, but it is weighted more heavily than other layers in calculating an overall indicator of water quality for each watershed. An indicator of water quality (such as good water quality and low potential for problems) is provided for watersheds, which gives the impression that conditions can be compared across watersheds. However, given the considerable differences in the methods used to generate the underlying data, such comparisons are not well founded. The IWI could be particularly misleading, considering that most users are likely to be unaware that these inconsistencies exist.

Nineteen states reported that they do not support EPA's use of 305(b) data in the IWI. Several of them noted in particular that the IWI extrapolates water quality assessments far beyond a level for which they were ever intended. Officials in one state told us that when they reviewed the IWI data for their watersheds, they found many errors, such as dams that were located in the wrong watershed. In addition, several of the other 14 layers in the IWI are also data sources for states' assessments of whether waters meet standards. For example, physical-chemical data and fish consumption advisories are often used by states to make their 305(b) assessments of water quality. These data sources are also separate layers within the IWI, so they are essentially double counted, as some states observed.

EPA Recognizes Problems With the 305(b) Report and Has Taken Steps to Address Them

EPA recognizes that inconsistencies exist in how states monitor and assess their waters and that these inconsistencies impair the 305(b) report's utility for making comparisons across states. The agency has been working toward a long-term goal of improving the accuracy and consistency of the report. A key activity in this area is EPA's 305(b) consistency workgroup, whose members include representatives from states, tribes, federal agencies, and EPA regions and headquarters. EPA has incorporated several of the workgroup's recommendations for improving the accuracy and consistency of reporting into its guidelines for the 1998 report.[7] The

[7]According to EPA officials, the 1998 305(b) report is scheduled to be issued in early 2000.

guidelines include the goals of documenting and improving the quality of states' assessments and the states achieving comprehensive assessment coverage of their waters. However, because states are not legally required to adhere to EPA's guidelines, there is no assurance that the states will carry out the tasks necessary to meet these long-term goals.

To encourage consistency in states' 305(b) reporting, EPA developed an information system called the Assessment Database for states to store and transmit their water quality assessment data. This database is a relatively new system that replaced EPA's prior data storage system. Although EPA encourages states to use this database, it is not mandatory, and states are free to use another system. One of EPA's goals for using an automated system to store 305(b) data was for the agency to improve the quality and consistency of 305(b) reporting. While there appear to be adequate controls over the entry of data into the system, the considerable differences in the methods that states use to generate the data going into the database severely constrain the system's utility in improving the quality and consistency of the data presented in the 305(b) report.

Using Other Information Sources May Help Provide More Meaningful Water Quality Information in the National 305(b) Report

Providing information that is representative of water quality conditions nationwide would require the use of statistical monitoring designs and consistent assessment and reporting methods. Such an approach would require changes to state and federal monitoring programs, and additional resources would be needed to preserve states' water quality management programs while also conducting more comprehensive monitoring.

Although the availability of additional funding is uncertain, other sources of water quality information could be useful to EPA in compiling the 305(b) report. According to EPA, 18 federal agencies—including the U.S. Geological Survey, the National Oceanic and Atmospheric Administration, and EPA itself—conduct 141 monitoring programs on regional or national scales. None of these programs provide information that is representative of water quality conditions across the nation. Instead, they focus on a particular geographic area, a certain type of body of water, or specific pollutants; studies may also have other discrete purposes. They differ from states' assessments of water quality in that the states focus on water quality in relation to state-specific water quality standards, whereas these programs focus on broader program objectives. The individual programs generally have monitoring and assessment standards and procedures to ensure that consistent and comparable data are collected within a particular program.

EPA's Environmental Monitoring and Assessment Program, for example, is a research program that develops the tools necessary to monitor and assess the status and trends of national ecological resources. This program has undertaken statistically based monitoring projects to report on ecological conditions in several regions around the country. The Geological Survey's National Stream Quality Accounting Network currently focuses on water quality in four of the nation's largest river basins. The National Water Quality Assessment Program, also administered by the Survey, is a more comprehensive program, investigating water quality in major river basins that cover about one-half of the land area of the conterminous United States. This program seeks not only to determine water quality status and trends but also to identify and explain the major causes of observed conditions and changes. The National Oceanic and Atmospheric Administration's National Status and Trends Program is an effort to determine the extent and impact of contaminants on coastal and estuarine areas throughout the nation through monitoring conducted jointly by federal and state partners.

EPA included information on some of these programs in the 1996 305(b) report, such as responsible agency, program objectives, scope of coverage, and, in some cases, program findings. However, it did not aggregate the findings into a national assessment of water quality because of inconsistencies in the methods used across the programs, nor did it integrate the findings into the 305(b) report to support or explain state-reported information. If this information were assembled and comprehensively analyzed, however, it could provide useful insights into water quality conditions across the country and complement individual state reports.

Conclusions

EPA considers the 305(b) report to be an essential tool for reporting on the condition of the nation's waters and on the states' progress in meeting the goals of the Clean Water Act. The agency also uses information from the report to support certain national-level decisions. However, for a variety of reasons, the report does not portray nationwide water quality conditions. Of particular concern is that the report's results are based on more limited monitoring data than is implied by its presentation, and the report aggregates data from states that have different water quality standards and use widely different monitoring and assessment methods. We believe these weaknesses seriously limit the report's utility for the activities and decisions for which it is presently used.

EPA has acknowledged some of the report's flaws and has taken steps to improve it, including the establishment of a working group to promote greater consistency of states' reporting and the issuing of revised reporting guidelines. However, the prospects for significantly improving the report are limited in the near term by a number of practical barriers, including the limited resources among states to monitor a greater percentage of their waters. In the long run, it will be up to the Congress and the administration to determine whether the public's interest is better served by devoting higher priority to monitoring activities. In the meantime, however, we believe EPA should undertake a more holistic approach in addressing the report's current deficiencies.

Recommendations

We recommend that the Administrator of EPA take actions to more appropriately characterize state-reported information and more effectively use other available water quality data in the National Water Quality Inventory. Specifically, the Administrator should do the following:

- Identify other ways of aggregating state-reported information that take into consideration the inconsistencies between states' programs in order to minimize the potential for misuse and misinterpretation.
- Better convey the report's limitations in characterizing the nation's water quality by more clearly identifying (1) the percentage of waters that are actually monitored and the resulting assessments of quality and (2) the similarities and differences among states' water quality standards and monitoring and assessment methods, and the implications of these differences on nationally aggregated information.
- Supplement the current information in the Inventory by integrating, where appropriate, the findings from other programs to support or explain state-reported information. These programs include EPA's Environmental Monitoring and Assessment Program, the U.S. Geological Survey's National Water Quality Assessment Program, and others.
- Reexamine the implications of relying on the report's data for use in national decisions and communications to the public. Specifically, the Administrator should do the following:
  - Evaluate the potential impacts of inconsistent data on the extent of pollution in states on the allocation of the Clean Water Act's section 106 grant funds to states, determine what data are needed to reliably support allocations, and develop a plan for ensuring that such data will be developed and used.

- Identify the information that EPA will use for establishing a baseline of water quality conditions and measuring progress toward the goal of having 75 percent of U.S. waters supporting healthy aquatic communities and develop a plan to ensure that reliable information will be obtained and used.
- Evaluate the implications of using these data to generate an indicator of the quality of watersheds in the Index of Watershed Indicators and take any corrective actions needed to reliably represent water quality conditions.

Agency Comments and Our Evaluation

EPA shares our concern that a majority of the nation's waters have not been monitored. The agency notes, however, that states can be taking actions stemming from the data they have and that it would be inappropriate to wait until "perfect data" are collected on all waters before initiating actions on waters with known problems. We do not intend for the report to convey the message that actions cannot be taken to address known pollution problems in the absence of complete data. In fact, we address this issue by discussing states' opinions that they can take steps to improve water quality without complete data, for example, by implementing pollution control strategies for nonpoint sources. While states needn't be inactive with the data they have, we continue to believe that it is important to pursue the collection of more complete data in order to make more informed and defensible decisions.

EPA recognizes the need for more complete and reliable data to ensure that decision-making and resource allocations are better supported and states that it is working hard to achieve that goal. EPA suggested that we acknowledge additional activities that the agency feels will help improve water quality data—the modernization of its primary system for storing water data and work done through the National Water Quality Monitoring Council. In addition, EPA states that although we presented concerns regarding the Index of Watershed Indicators, the agency believes it is a very useful tool because, for the first time, multiple data layers are integrated to characterize water quality. We recognize that EPA has many efforts under way to improve water quality monitoring and associated activities. Some of these efforts, however, do not specifically address the problems we identified regarding the completeness and consistency of state data but instead are focused on broader issues. For example, while modernization of EPA's primary system for storing water data should help states store, access, and maintain water data, only one state commented that data storage and retrieval is a limiting factor in its ability to conduct more

comprehensive assessments or carry out other related activities. In addition, while we agree that the Index of Watershed Indicators provides a powerful presentation of water quality information, given the many concerns with the underlying data, we believe it is important for EPA to investigate the potential implications of data limitations on the information presented. Simply providing information in an easy-to-use format is just half the game; the information should be reliable as well.

EPA states that our report should more strongly note that the national 305(b) report is, by law, a summary of states' assessments of whether their waters are meeting standards and "is not intended to be a national water quality report on a selected, consistent set of water quality parameters." We recognize that section 305(b) of the Clean Water Act specifically provides that the 305(b) report include states' assessments of water quality in terms of state standards and EPA's analysis of them, as well as other information, and have stated this in our report. However, the broader question that the Subcommittee posed to us asked how well the 305(b) report characterizes water quality conditions nationwide. As such, our report discusses the utility of the Inventory for characterizing water quality nationwide.

Moreover, because the 305(b) report is used to help make national policy and regulatory decisions, we believe it is prudent for EPA to take steps to ensure that the information presented is as reliable as possible. Where it is not, EPA should clearly explain the reasons why and assess the possible implications on national decision-making. For example, as EPA points out in its letter, a major use of the 305(b) report is the allocation of grant funds to states, which is to be based on the extent of pollution in states. However, given the lack of complete information on water quality conditions and differences among state programs, EPA cannot be certain that the extent of pollution across states is accurately reflected in the report.

EPA points out that past 305(b) reports have clearly explained that its information does not consistently characterize nationwide water quality, and that it has continued to highlight this point in its draft 1998 305(b) report. We recognize that EPA has included statements in past reports to advise readers that the data should be used with caution because of differences in state water quality standards and monitoring and assessment methods. However, by aggregating the data across states, EPA is implicitly suggesting that these data can, in fact, be compared and in doing so is increasing the likelihood that the data will be misused or misinterpreted. For example, the statistic in the 1996 305(b) report that agriculture contributes pollution to 25 percent of the assessed river miles that do not

meet standards represents an aggregation of data from states using different assessment methods. While EPA states that this information should be used with caution because of differences across states' programs, users have no context from which to interpret the information because the common baseline is river miles–not states, where the differences occur.

Regarding our recommendation that EPA make greater use of water quality information from other sources, EPA states that it has included information from other studies in past 305(b) reports and plans to do so for the 1998 report. We acknowledge that EPA has included information from other programs in past reports. However, for the most part, this has been limited to a discussion about a specific program and its findings. We intended our recommendation to take this a step a further and correlate findings, where appropriate, with state data. Including other sources of information in the 305(b) report to support and/or explain state-reported information may be helpful because the report is often criticized for being of questionable quality. We have clarified our recommendation to indicate that EPA should integrate findings from other studies, where appropriate, to supplement state-reported information. EPA also pointed out that it has encouraged states to use data from other sources for their assessments for the 305(b) report. We recognize this and have added information from our survey on states' use of data from other sources.

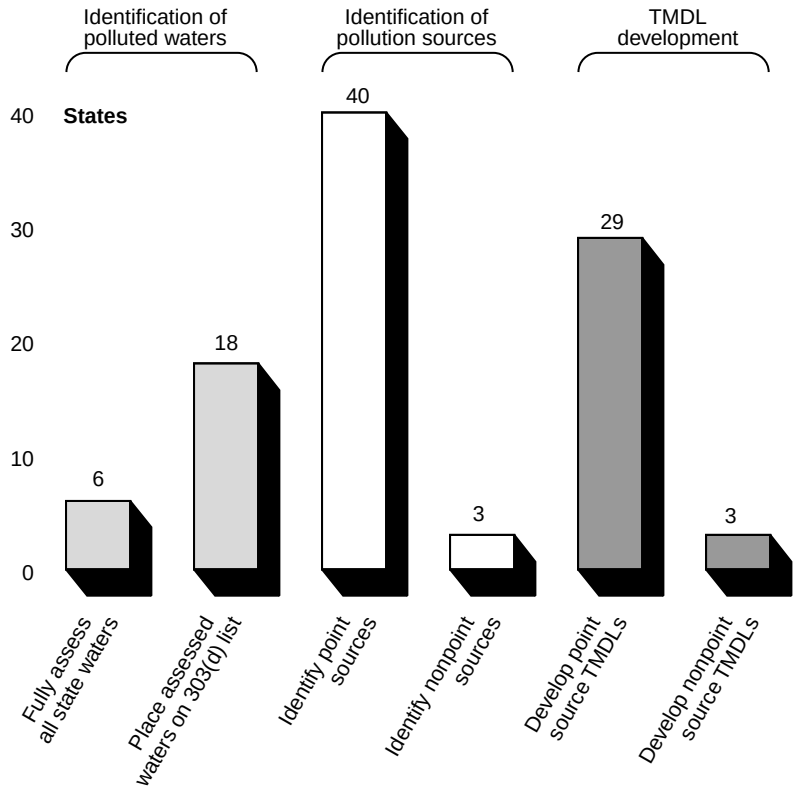
Finally, EPA commented that apparently, we did not obtain a complete description of the process used to develop and evaluate the agency's new formula for allocating grant funds to states under section 106 of the Clean Water Act. The agency stated that it conducted extensive data searches and data source evaluations before selecting the Inventory as a source of information on the extent of water pollution in each state. In addition, EPA said that it evaluated numerous data scenarios to determine whether certain data components unduly influenced the distributions of grant funds to states. We incorporated a number of technical clarifications that EPA provided, as appropriate. However, according to an EPA program official, these scenarios only assessed the impact of using different data elements in the formula and did not assess how differences among state monitoring and assessment methods may affect formula results, as we recommend.

States Have Insufficient Data for Several Key Activities to Manage Water Quality

Data limitations extend well beyond the problems associated with the *National Water Quality Inventory* and that report's ability to characterize water quality on a nationwide basis. States need water quality data to make critical regulatory decisions, as well as decisions on where to focus limited resources to obtain the most water quality improvement for the dollar. States' responses to our survey show that data gaps limit states' abilities to carry out several key activities to manage water quality.

As figure 7 illustrates, few states have sufficient data to assess all their waters for pollution problems. Even for the waters that have been assessed, most states reported that they did not have the data they need to determine if the waters meet standards. Where water quality problems have been identified, many states reported that they have a majority of the data they need to deal with those caused by point sources because much of the last 27 years of the Clean Water Act's implementation has focused on such sources. The picture is bleaker, however, for states' abilities to deal with nonpoint sources. Very few states have sufficient data to identify nonpoint sources of pollution and to develop total maximum daily loads for waters that do not meet standards due to such sources.

Figure 7: States With a Majority of the Data Needed for Activities to Manage Water Quality



States Have Insufficient Data to Identify Waters That Do Not Meet Standards

States report that they lack the data needed for two activities essential to the process of managing water quality: comprehensively assessing all state waters and compiling a list of waters that do not meet standards. EPA recognizes that these data limitations may prevent states from fully addressing their polluted waters and is encouraging states to take steps toward more comprehensive monitoring.

States Do Not Fully Assess Their Waters

Only six states responded to our survey that they have a majority of the data they need to fully assess all their waters. This response is consistent with the relatively low percentage of waters that states reported assessing for the 1996 305(b) report. For that report, for example, states assessed 19 percent of the nation's rivers and streams and 40 percent of the lakes and

reservoirs. The thorough assessment of state waters is essential because it enables states to identify polluted waters and prioritize them for remediation through the development of TMDLs or other means.

Despite not having assessed some of their waters, the state officials we interviewed said they feel confident that they have identified most of their serious water quality problems. States tend to focus their monitoring on waters with suspected pollution problems and areas used by the public in order to direct scarce resources to areas that could pose the greatest risk. However, studies that have more thoroughly monitored water quality conditions—either through monitoring previously untested waters or conducting different types of monitoring tests—have identified additional pollution problems. For example, a 1993 EPA-funded study of toxins showed widespread elevated levels of mercury in Maine's lakes. This finding ran counter to the expectations of Maine's water quality officials, who had assumed that these waters were likely meeting standards because they are in areas with little or no human activity. As a result of these findings, Maine issued advisories against the consumption of fish for all the state's lakes. Several New England states with presumably clean lakes considered their waters' vulnerability to mercury and also posted fish consumption warnings. In addition, a study conducted by Ohio's environmental protection agency found that using additional types of monitoring tests identified a significant number of pollution problems in waters that had been shown by other monitoring efforts to be meeting standards.

Even though the state officials we interviewed are confident that they have identified their most serious pollution problems, they nonetheless acknowledge that more thorough monitoring would likely reveal additional waters that do not meet standards. Likewise, 41 states reported in our survey that increasing the percentage of state waters that are monitored would be very helpful in carrying out their responsibilities for managing water quality.

Additional Data Needed to Complete States' Lists of Polluted Waters

Data limitations also affect states' abilities to accurately compile for submission to EPA a list of the waters that do not or are not expected to meet standards. States must develop TMDLs for waters on this list. Less than half the states reported that they have a majority of the data they need to determine whether they should list waters they have assessed. State officials said that their inability to make a listing decision stems, in part, from the fact that they are less confident of the accuracy of some of their

assessments because they are based on evaluated data. Evaluated data include site-specific monitoring data more than 5 years old and information that serves as an indicator of potential water quality conditions, such as land use or reports on wildlife or habitat conditions. EPA and state officials acknowledge that some of these data sources are less reliable than current, site-specific monitoring data. Several state officials told us that while they may use this information to make an assessment of water quality conditions for the 305(b) report, they prefer not to use it for making decisions about whether to list these waters because of the requirement to develop a TMDL once a water is listed. State officials said that they prefer to conduct additional monitoring of these waters to determine whether they are meeting standards.

While state officials allow that they may not have identified some waters that need TMDLs, they also told us that some waters that have been listed do not need TMDLs. The reasons for this varied widely among states. For example, officials in one state said that they mistakenly assessed some waters against higher standards than necessary; consequently, these waters were placed on their list of polluted waters. In another state, officials told us that about half of the waters on their list were placed there on the basis of evaluated data. Upon additional monitoring of these waters, the state found that many meet standards and, therefore, do not need TMDLs.

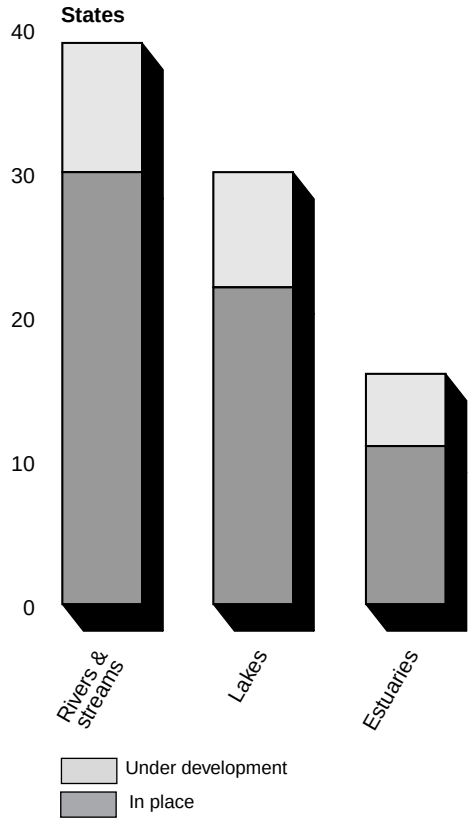
EPA Urges States to Comprehensively Assess their Waters

EPA officials are also concerned by the states' lack of comprehensive monitoring. Officials told us that data limitations may cause some water quality problems to go undetected and existing high-quality waters to be degraded because actions were not taken to protect them (the Clean Water Act requires states to protect existing good water quality). One regional official believes that states would identify many more waters that do not meet standards if more comprehensive monitoring were done.

EPA has been encouraging states in its guidelines for developing the 305(b) report to move toward more comprehensive assessments of their waters. EPA discusses the use of targeted monitoring as well as statistically based monitoring, which would allow inferences to be made about entire categories of waters, to achieve this goal. The guidelines also suggest that states use a rotating basin approach to help achieve more comprehensive assessments. A rotating basin approach essentially divides a state into major river basins and provides for data collection in selected basins each year. The monitoring rotates among the basins so that waters in all basins will be monitored on a periodic basis, such as every 5 years.

While many states are incorporating a rotating basin approach into their water quality management programs (see fig. 8), simply using this approach does not ensure that comprehensive data for statewide water quality conditions will result. The comprehensiveness of the data depends on the type of monitoring conducted within the rotating plan. An EPA regional official said, for example, that many states focus on the same monitoring locations within their rotating basin plans because of resource constraints and, therefore, do not significantly increase their monitoring coverage. Several states are, however, incorporating some statistical monitoring in order to capture a picture of water quality for waters that have not typically been monitored in the past.

Figure 8: Number of States With a Rotating Basin Plan in Place or Under Development



States Report Having Much of the Data They Need to Carry Out Point Source-Related Activities

In the waters that states have identified as not meeting standards, many states reported that they have a majority of the data they need to carry out management activities for problems that are caused primarily by point sources. States generally have better data for point source problems because much of the last 27 years of Clean Water Act implementation has focused on addressing point sources of pollution through pollution control programs. In addition, much of EPA's guidance on developing TMDLs, which dates back to the 1980s, has focused on point sources.

Forty states reported having a majority of the data they need to identify point sources of pollution. Point sources are easy to identify because they generally discharge pollutants into bodies of water from some discrete

conveyance, such as a pipe. Accordingly, it is relatively easy to determine the point sources that are contributing to water quality impairments.

In order to develop a TMDL for a pollution problem caused by point sources, states must identify how much of a particular pollutant the sources contribute to a body of water. This information is either already collected as a condition of a discharge permit or is directly measurable at the facilities' discharge point(s). Therefore, it is also relatively easy to identify how much pollution the individual sources are contributing.

Twenty-nine states reported having a majority of the data they need to develop TMDLs for water quality problems caused primarily by point sources. In fact, officials in the states we visited told us that they have been following the TMDL process for point sources for many years as a way of achieving water quality standards and developing appropriate discharge limits. These officials said, however, that EPA's review and approval of TMDLs was not a priority until the recent onset of TMDL lawsuits.

States Report Having Little of the Data They Need to Carry Out Nonpoint Source-Related Activities

While water quality officials responding to our survey reported having a majority of the data they need to deal with point sources of pollution, few respondents reported having a majority of the data needed to deal with nonpoint sources. Specifically, almost all states reported that they did not have a majority of the data they needed to identify nonpoint sources of pollution and develop TMDLs for waters polluted primarily by nonpoint sources.

States Have Difficulty in Identifying Nonpoint Sources

Forty-seven states reported that they have half or less of the data they need to identify nonpoint sources of water quality problems, and 29 of those states reported having much less than half or almost none of the data needed. Information on nonpoint sources is particularly important because there is general agreement that most remaining water quality problems are caused, at least in part, by nonpoint sources. For example, 35 percent of the waters that Texas officials identified as not meeting standards in 1998 were polluted solely by nonpoint sources, as compared with 5 percent that were polluted solely by point sources. Slightly more than half of Texas's reported water quality problems were caused by a combination of point and nonpoint sources. Similarly, in Maine, nonpoint sources contributed pollution to about half of the state's rivers and streams that were identified as not meeting standards.

Because of the diffuse nature of nonpoint sources, it is difficult to identify specific sources contributing to a particular water quality problem. Unlike point sources, where pollutant contributions can be directly measured as they come out of a pipe, nonpoint source pollution may come from many disparate sources. For example, rainwater may carry fertilizer, manure, pesticides, and soil with it as it runs off of farm fields into bodies of water. Urban sources may contribute oil and grease, animal waste, fertilizer, and pesticides as rainwater runs off of literally thousands of individual residences, businesses, and roads into nearby streams, or storm drains that discharge into streams or rivers.

Data Gaps Complicate the Development of TMDLs

Beyond the problems with simply identifying the nonpoint sources causing waters not to meet standards, it is difficult to directly measure pollutant contributions from individual nonpoint sources and, therefore, assign specific loadings to sources in order to develop TMDLs. Accordingly, only three states reported having a majority of the data they need to develop TMDLs for water quality problems that are caused primarily by nonpoint sources. Dealing with water quality problems that are caused by a combination of point and nonpoint sources is difficult because progress can be impeded by the weakest link—the inability to identify and quantify nonpoint source contributions.

Developing TMDLs generally involves data collection and analysis beyond what is done by routine water quality monitoring, especially for nonpoint source problems. An EPA study of 14 TMDL development efforts—all but one of which included nonpoint sources of pollution—found that each entailed additional data collection that averaged about 40 percent of the total cost of developing the TMDL.[1] Officials in one state said that it takes about 3 to 4 years to do the data collection, analysis, and other activities needed to prepare a TMDL for EPA's review. Officials in another state told us that because they lack the data for certain TMDL projects and they are uncertain of what level of data EPA will accept for a TMDL, they are focusing on TMDLs that are relatively easy to develop rather than those that are the highest priority. These officials said this is due to the pressure they feel to show that they are making progress on TMDL development.

[1]See *TMDL Development Cost Estimates: Case Studies of 14 TMDLs*, USEPA (1996). One of the TMDL projects did not provide separate cost data on additional data collection.

Several state officials told us that because most of the TMDLs they must develop are for pollution caused by nonpoint sources, they prefer to use methods that require less initial data collection prior to the implementation of pollution control strategies. Two-thirds of the state officials responded in our survey that using a phased TMDL approach—a process recognized in EPA's current guidance—is very helpful for addressing pollution problems. The state officials whom we spoke with said that a phased approach enables them to apply best management practices to nonpoint source activities identified as contributing to a problem, while at the same time, gathering additional monitoring data to better understand the relative contributions of sources.[2] Several state officials said they see this as a way to more quickly address water quality problems, rather than studying the problem extensively before taking any remediation actions.

As states develop more TMDLs, the need for additional water quality monitoring will increase accordingly. Current EPA guidance and proposed TMDL regulations require that states conduct monitoring after pollutant controls or other activities are implemented to determine if the TMDL is working and the body of water is attaining water quality standards. This means that significant new monitoring efforts will be needed, particularly for TMDLs addressing nonpoint sources of pollution. Nonpoint sources are largely addressed through the use of best management practices, which are generally changes in the behaviors of how individuals use land. The effectiveness of best management practices on improving water quality varies on the basis of site-specific conditions, such as soil type and climate. Therefore, additional monitoring is needed to see if the practices are having the desired effect of improving water quality.

Several Factors Limit States' Abilities to Obtain Needed Data and Carry Out Key Activities

Several factors were repeatedly identified by states as limitations to their ability to conduct monitoring and analyses to fully address their water quality management needs. Almost all states identified a need for additional resources, such as funding and staff, to carry out their duties. There was also strong evidence of the need for additional analytical methods and technical assistance to help states analyze complex pollution problems and develop TMDLs.

[2]Examples of best management practices are (1) leaving strips of farmland next to bodies of water uncultivated to minimize erosion and (2) using manmade ponds or basins to detain storm-water runoff from roads to minimize the velocity of water reaching bodies of water during storms and to allow sediment and other pollutants to settle.

States Cite Shortages in Funding and Staff as Key Limiting Factors

The limitation most often cited by states was that the amount of resources—in terms of funding and staff—devoted to monitoring, assessment, and TMDL development is far short of the task at hand. Forty-five states reported that the lack of resources was a key limitation to making more progress on water quality issues. In addition, several states pointed out that they are operating under a state-imposed staffing level ceiling, and other states said they are limited in how many samples they can analyze because of shortages in lab funding.

EPA water officials told us that overall, less resources are being devoted to monitoring and assessment at the state level than ever before. In addition, EPA and state officials told us that more requirements have been placed on state programs for managing water quality, such as issuing permits to implement new storm-water and sludge regulations. Of particular note, officials in two states said that the increased focus on addressing waters that do not meet standards is constraining their abilities to carry out monitoring and assessment activities.

EPA is conducting a study of funding shortfalls in states' water quality management programs and plans to identify alternative approaches for addressing the anticipated gap. The agency plans to finalize its methodology for estimating these shortfalls in the spring of 2000. On the basis of a preliminary analysis of 10 state programs, EPA found that states have shortfalls in most areas of water quality management, including water quality monitoring and TMDL development programs.

States Cite a Need for Additional Analytical Methods and Technical Assistance to Help Develop TMDLs

To assist with the development of TMDLs, EPA has issued multiple guidance documents since 1984. These, however, have largely focused on point source TMDLs. EPA has also been developing a watershed model and analysis tool called BASINS, which is intended for use in the development of TMDLs, particularly for the analysis of nonpoint sources.[3] The model was released about 3 years ago, although its capabilities have been evolving over that time. EPA is working on simplifying the model in order to make it easier to use. EPA has also provided a compendium of models—including those developed by other agencies and organizations—that are available for states to use in analyzing pollution problems.

[3]Watershed models are often used to analyze nonpoint source pollution impairments because they can take into account many of the factors that influence such pollution, such as land use, climate, and geographic features.

In response to our survey, however, a majority of states indicated that they need additional assistance for TMDL development. Specifically, 31 states reported that additional technical tools, such as models and analytical methods, would be very or extremely helpful for TMDL development; 28 states reported that additional technical assistance in these areas would also be helpful. According to our survey, states are most concerned about their abilities to develop TMDLs for nonpoint sources. Analyzing these sources is much more complex than the analysis of point source impairments and often relies on watershed models. However, several states pointed out that they are on the front end of the learning curve when it comes to using watershed models such as BASINS and developing TMDLs for nonpoint sources of pollution. While state officials told us they have in-house expertise with models used for analyzing point sources, they need assistance in selecting and using appropriate watershed models for nonpoint sources.

Some state officials told us that they are unsure of where to go for technical assistance or that experts they called on in the past were no longer available. For example, officials in two states told us that they previously obtained model development, troubleshooting, and refinement assistance from experts in EPA's modeling lab in Athens, Georgia. This assistance, however, is no longer available because of reductions in funding, according to an official in EPA's TMDL office. Moreover, this official told us that there is no systematic process for providing assistance to states on the development of TMDLs. He said that assistance is provided largely in an ad-hoc fashion by EPA staff in headquarters, regions, and labs. EPA regional officials identified several areas where they have provided states with assistance on TMDL issues. However, EPA does not keep a national inventory of state requests for assistance and what is done to address those requests.

Some states suggested that EPA should develop sample or standardized approaches, such as templates that states could use to guide them through certain types of TMDLs. In addition, several states pointed out the need for efficiency in developing TMDLs. For example, one state noted that states should be benefiting from others' experiences in developing TMDLs, rather than "reinventing the wheel."

EPA Activities Currently Under Way Could Address Some State Needs

Activities currently under way at EPA could help states in some of the areas identified above. Perhaps most directly relevant to states' needs are EPA's efforts to develop protocols for some of the more common pollutants causing waters not to meet standards—sediment, nutrients, and pathogens. (According to EPA, these pollutants were selected because the states report that they are the leading causes of water quality impairments.) The protocols are intended to provide states with an organizational framework for completing the technical and programmatic steps in the development of TMDLs for specific pollutants. EPA issued the sediment and nutrient protocols in October and November 1999, respectively. These documents appear to provide some of the information and specific guidance that states identified as needed, such as the suggestions for the kinds of data and analyses necessary to develop specific TMDLs. How helpful the protocols are will become clearer after they have been used in several TMDL development efforts.

In addition, EPA is conducting two pilot studies to investigate the relationship between air emissions of mercury and water quality impacts. The goal of the pilots is to examine the methods for taking air sources into account when determining TMDLs. In each of the two study areas—one is in a small lake in Wisconsin and the other covers a 700-square-mile area of the Florida Everglades—techniques will be evaluated for determining (1) the amount of mercury reductions needed to meet water quality standards, (2) the relative contributions of mercury from various sources, and (3) the geographic extent of sources contributing mercury. A legal analysis of federal and state programs to address airborne sources of mercury deposited in bodies of water is also being conducted. EPA plans to issue a "lessons learned" report on the findings of the pilots in the spring of 2000 to assist states in the development of TMDLs involving mercury from air sources.

EPA officials told us that they have also started a library of approved TMDLs to help facilitate information sharing among states. Currently, the library consists of a manual file of approved TMDLs and is maintained in headquarters. EPA regions receive a list of the TMDLs in the library and are to use it for referring states to specific TMDLs when they are working on similar water quality problems. In addition, EPA regions are in the process of assessing states' TMDL programs to help develop regional strategies for deciding how best to allocate available resources to support them. These assessments will include examining states' programs for water quality monitoring, prioritizing water quality problems, and developing and implementing TMDLs to identify areas needing additional resources.

EPA recognizes, however, that overall, its research and tools are not as fully developed as they need to be to support TMDL development. Therefore, the agency initiated the development of a strategy in the summer of 1999 to identify the critical needs for developing scientifically credible TMDLs and the actions necessary to address these needs. According to EPA, states and other stakeholder groups have provided input into the strategy. EPA has tentatively identified three broad areas in which it will address needs—the capacity to develop TMDLs, tools to support TMDL decisions, and the management of TMDL-related information. However, EPA staff working on the strategy have been diverted to work on other issues. The official in charge of developing the strategy told us that he hopes work can resume on the strategy in order to release a draft for public comment in the summer of 2000.

While it is encouraging that EPA has initiated the development of an overall strategy to support TMDL development, until complete, it is uncertain whether states' needs for additional assistance will be addressed. The regional assessments of states' programs, as well as states' requests for assistance from EPA headquarters, regions, and labs, could both provide valuable insight into the states' needs as EPA finalizes its strategy.

Conclusions

While states have always needed to obtain comprehensive and reliable water quality data, such data have become more important in recent years. An increased emphasis on regulatory requirements for assessing waters and developing TMDLs has heightened the need for states to have sound information to make these decisions. Of particular concern, states will be required to develop thousands of TMDLs for their most heavily polluted waters.

Our survey results show that states are missing much of the information they need to comprehensively assess their waters and develop TMDLs for some of the waters they have already identified as not meeting standards. They have said they need additional resources, tools and assistance in developing TMDLs for thousands of their waters—a task that will significantly tax already limited resources over a sustained period of time. EPA's analysis of funding gaps in states' programs should shed light on the resources needed to conduct these and other activities. It will then be up to the administration and the Congress to determine whether and how these needs will be met.

EPA has a number of targeted initiatives under way that are designed to help states deal with specific problems, such as providing protocols for pollutants that frequently cause water quality problems and developing information on airborne pollutants. In addition, EPA has initiated work on a strategy for supporting TMDL development, although it is not certain when this strategy will be finalized and what kind of support will be provided. As states face long-term challenges in carrying out important regulatory decisions, it is critical that EPA finalize its strategy and take actions to provide the support necessary to develop scientifically defensible TMDLs as efficiently as possible.

Recommendations

We recommend that the Administrator, EPA, finalize the agency's strategy for supporting TMDL development. As a part of this process, EPA should continue working with states and other stakeholder groups, as well as gather information on states' requests for technical assistance from headquarters, regions, and labs to obtain the most complete picture of states' needs as possible. We also recommend that as a part of its overall strategy, EPA establish a process for systematically tracking states' requests for technical tools and assistance and how these requests are addressed, on a routine basis, to ensure that it is addressing needs efficiently and to stay abreast of changing needs.

To facilitate more efficient information sharing regarding TMDL development, we recommend that the Administrator, EPA, expand the dissemination of its TMDL library. A first step should be for EPA to routinely send the list of TMDLs in the library to states, as well as to regions and to consider automating the library to facilitate more efficient access to the information.

Agency Comments and Our Evaluation

EPA commented that our draft report did not discuss states' lists of waters that do not meet standards, which serves as the link between the 305(b) report and the TMDL program, and the adequacy of state data for the list development process. We agree that this is an important issue and have added a discussion of this to our report. EPA also provided several clarifications on the TMDL program that we have incorporated, as appropriate.

Copy of GAO Questionnaire

U.S. General Accounting Office

GAO Survey of State Water Quality Data Managers

Introduction

The Congress has asked the U.S. General Accounting Office to review states' collection and use of water quality data. Specifically, the Congress is interested in state experiences in obtaining water quality data and their opinions about the processes used to collect and report these data.

As part of this review, we are surveying all 50 states and the District of Columbia to obtain a national picture of the collection and use of water quality data. The survey includes questions related to your state water monitoring program, sources of state water quality data, and experiences in collecting water quality data for rivers and streams; lakes, reservoirs, and ponds; and estuaries.

Your cooperation in completing this questionnaire is vital to our study. The survey's results will be discussed in our report to the Congress.

Instructions

When answering the questions in this questionnaire, please coordinate with the appropriate members of your staff and officials in other agencies/organizations within your state which have water quality monitoring or management responsibilities.

Please return your completed questionnaire in the enclosed, pre-addressed business reply envelope by August 4, 1999. If the envelope is missing or it is misplaced, please send your questionnaire to:

U.S. General Accounting Office
ATTN: Trish McClure
441 G Street, NW - Room 2T23
Washington, DC 20548

If you have any questions, please call Trish McClure at (202) 512-6318, (e-mail: mcclurep.rced@gao.gov) or Heather Halliwell at (202) 512-9840, (e-mail: halliwellh.rced@gao.gov).

Please provide the following information for the person we should contact should we have any questions.

Name: _____

Title: _____

Organization: _____

Phone #: _____

Definitions (in order of which they appear)

State Water Quality Monitoring Programs – State agency programs that collect and analyze water samples to assess the conditions of state surface waters. These may include monitoring conducted by the state departments of Agriculture, Health, Natural Resources, Environment, etc.

Compliance Monitoring – Effluent or discharge monitoring as well as in-stream monitoring to evaluate impact of a discharge.

Ambient Monitoring – Any in-stream monitoring regardless of its purpose other than compliance.

305b Assessments – A reporting requirement under the Clean Water Act for states to assess and determine the quality of all navigable waters and the extent to which they meet the objectives of the Act, such as swimming or fishing.

305b Submission – A report each state is required to compile under section 305b of the Clean Water Act that transmits results of the 305b assessments to the US Environmental Protection Agency (EPA).

Impaired Waters – Waters that do not meet water quality standards (do not fully support designated uses, such as swimming or fishing).

303d List of Waters – The list each state is required to compile under section 303d of the Clean Water Act that identifies impaired waters and waters that are not expected to achieve or maintain water quality standards with existing or anticipated required controls. States are to rank these waters in order of priority for development of total maximum daily loads.

Total Maximum Daily Load (TMDL) – A TMDL is a pollution limit that states are required to set for waters on their 303d list. As defined by EPA, a TMDL is the greatest amount of a pollutant a water body can receive daily, including point, nonpoint, and natural background sources of pollution, without violating state water quality standards.

Rotating Basin Program – A program that assesses a portion of the state's watersheds or basins in a single year, so that all watersheds or basins are assessed over a certain time period, such as five years.

Monitoring Program for State Surface Waters (Rivers and Streams; Lakes, Reservoirs and Ponds; and Estuaries)

1. Please indicate for your state's water bodies (rivers and streams; lakes, reservoirs, and ponds; and estuaries) :
   (1) in which of the following ways your state has monitored or coordinated the monitoring of water quality since 1995 (which would include data/information used in your 1996 and 1998 305b reports);
   (2) whether the majority of your state's monitoring efforts was based on statistically sampled (randomly selected) sites or not; and
   (3) which state agency is primarily responsible for conducting, funding, or overseeing the monitoring effort.

State Monitoring Efforts for Water Bodies	(1) Has your state conducted or coordinated this type of monitoring since 1995? *(Check one for each row; If yes, please answer→*		(2) Was a majority (over 50%) of your state's monitoring efforts based on statistically sampled (randomly selected) sites? *(Check one for each row)*		(3) Please provide the name of state agency (such as departments of agriculture, environment, health, or natural resources) or other entity that is primarily responsible for the monitoring effort *(If more than one agency is significantly involved, please list each)*
	Yes	No	Yes	No	
a. Chemical/Physical compliance monitoring (discharge/effluent monitoring or in-stream compliance monitoring)					
b. Biological compliance monitoring (e.g., whole effluent toxicity)					
c. Chemical/Physical ambient monitoring of surface waters					
d. Biological ambient monitoring of surface waters (e.g., benthic or fish community studies)					
e. Special study areas or pilot programs					
f. State-supported (funded or coordinated) volunteer monitoring					
g. Other (Please specify) _____					

2. Please use the space provided to briefly describe the characteristics of monitoring efforts mentioned in the question 1 above that you would like to further describe.

3. About what percent of your state's total water quality monitoring efforts are placed on the following water bodies? (*Enter percentage; if none, enter '0'. If your state does not have this water body type, check 'not applicable'.)*

_____ %	Rivers and Streams	[ ] Not applicable
_____ %	Lakes, Reservoirs, and Ponds	[ ] Not applicable
_____ %	Estuaries	[ ] Not applicable
_____ %	Other water bodies (*Please specify*) _____	[ ] Not applicable
100%	**Total**	

4. In the table below, for each type of water body listed across the top, about what percentage of your state's monitoring efforts is composed of the following? *(Enter percentage; if none, enter '0')*

	Rivers and Streams	Lakes, Reservoirs and Ponds	Estuaries	Other water bodies *(Please specify)*_____ _____
a. Chemical/physical compliance monitoring of effluents (discharge/effluent monitoring or in-stream compliance monitoring)	_____ %	_____ %	_____ %	_____ %
b. Biological compliance monitoring (e.g., whole effluent toxicity)	_____ %	_____ %	_____ %	_____ %
c. Chemical/physical ambient monitoring of surface waters	_____ %	_____ %	_____ %	_____ %
d. Biological ambient monitoring of surface waters (e.g, benthic or fish community studies)	_____ %	_____ %	_____ %	_____ %
e. Special study areas or pilot programs	_____ %	_____ %	_____ %	_____ %
f. State-supported (funded or coordinated) volunteer monitoring	_____ %	_____ %	_____ %	%
g. Other (Please specify) _____	_____ %	_____ %	_____ %	_____ %
Total	**100%**	**100%**	**100%**	**100%**

5. Please indicate whether you used data/information from the following monitoring activities for your state's evaluation of water bodies for the purposes of your state's (1) 1998 305b assessments, (2) 1998 listing of waters under 303d, and (3) TMDL development.

	(1) Did you use the data /information for 1998 305b assessments? *(Check one for each row)*		(2) Did you use the data/information for 1998 303d listing? *(Check one for each row)*		(3) Have you used the data/information for TMDL development? *(Check one for each row)*	
	Yes	No	Yes	No	Yes	No
State Monitoring Efforts						
a. Chemical/Physical compliance monitoring (discharge/effluent monitoring or in-stream compliance monitoring)						
b. Biological compliance monitoring (e.g., whole effluent toxicity)						
c. Chemical/Physical ambient monitoring of surface waters						
d. Biological ambient monitoring of surface waters (e.g., benthic or fish community studies)						
e. Special study areas or pilot programs						
f. State-supported (funded or coordinated) volunteer monitoring						
g. Other state monitoring efforts (*Please specify*) _____						
Other Monitoring data/information						
h. U.S. Geological Survey databases or studies (e.g., the National Water Quality Assessment Program)						
i. US Fish and Wildlife Service databases or studies						
i. US Forest Service databases or studies						
j. Natural Resources Conservation Service or other USDA databases or studies						
k. National Oceanic and Atmospheric Administration databases or studies						
l. National Marine Fisheries Service databases or studies						
m. US Environmental Protection Agency's databases or studies (e.g., Ecological Monitoring and Assessment Program-- EMAP)						
n. Interstate commissions						
o. Local government agency programs						
p. Environmental organizations						
q. Non-state supported volunteer groups						
r. University-sponsored research						
s. Other (*Please specify*) _____						

6. Consider all the state and other sources of data/information listed in question 5 above-- whether or not your state used it for the 1998 305b report. For each type of water body below, please list the three data sources that the state considers, overall, most important (such as in terms of quantity, quality, etc.) for conducting 305b assessments, 303d list of impaired waters and TMDL development. *(Enter letters from question 5 above, listing the most important first.)*

	305b Assessments	303d List of Impaired Waters	TMDL Development
Rivers and Streams			
a. Most important	_____	_____	_____
b. Second most important	_____	_____	_____
c. Third most important	_____	_____	_____
Lakes, Reservoirs, and Ponds			
d. Most important	_____	_____	_____
e. Second most important	_____	_____	_____
f. Third most important	_____	_____	_____
Estuaries			
g. Most important	_____	_____	_____
h. Second most important	_____	_____	_____
i. Third most important	_____	_____	_____

7. Please answer the following items in the table below:

(1) indicate whether a majority of your state's monitoring efforts for the water bodies listed below is part of a rotating basin program;
(2) if 'yes' in column 1, please briefly describe the program;
(3) if 'no' in column 1, is your state developing a rotating basin program; and
(4) if 'yes' in column 3, in what year will it begin operating?

	(1) Is a majority of your state's monitoring efforts for these waters a part of an operational rotating basin? *(Check one for each row)* ***(If yes, please answer column 2; If no, please answer column 3)***		(2) If your state has a rotating basin program for this water body, please briefly describe it in the space below or attach additional pages or documents describing the program.	(3) Is your state developing a rotating basin program? **(If yes, please answer column 4→)**		(4) In what year will the rotating basin program begin operating?
	Yes	No		Yes	No	
a. Rivers and Streams						_____ Year
b. Lakes, Reservoirs and Ponds						_____ Year
c. Estuaries						_____ Year

305b Assessments, 303d Listing and TMDL Development

8. For the 1998 305b report, how did your state submit the 305b report to EPA? *(Check one)*

   a. [ ] Both manually (hardcopy) and electronically

   b. [ ] Electronically only

   c. [ ] Manually (hardcopy) only

   d. [ ] Other

   Explain:_____

   e. [ ] Does not apply -- did not submit 305b report in 1998

9. How satisfied or dissatisfied were you with the following elements of the process for preparing and submitting your state's 1998 305b report to the US Environmental Protection Agency (EPA)? *(Check one for each row or check 'not applicable' box)*

   [ ] Not applicable-- Did not submit the 1998 305b report (Go to Question 11)

Elements	Very Satisfied	Generally Satisfied	Neither Satisfied Nor Dissatisfied	Generally Dissatisfied	Very Dissatisfied	No opinion
a. EPA guidelines for conducting 305b assessments						
b. EPA-sponsored training for conducting 305b assessments						
c. Technical assistance from EPA for conducting 305b assessments						
d. EPA guidelines for preparing 305b submissions (e.g., reporting guidelines).						
e. EPA guidelines for electronically transmitting the 305b submission, such as guidelines for converting state data formats into EPA formats						
f. EPA sponsored training for electronically transmitting the 305b submissions						
g. Technical assistance from EPA (or EPA contractors) for electronically transmitting the 305b submission						
h. EPA's entry of the state's 305b submission into its national assessment database.						
i. Overall process for transmitting 305b submissions to EPA						

10. Please briefly describe your responses to question 9 regarding your satisfaction with EPA's guidelines and technical assistance for preparing and submitting 305b assessments.

11. The following is a list of suggestions that may or may not help your state obtain better quality data for all state waters (rivers and streams; lakes, reservoirs, and ponds; and estuaries) for the purposes of 305b assessments, listing impaired waters under 303d, and development of TMDLs. In your opinion, overall, how helpful or not would each of these be for your state if they were implemented? *(Check one for each suggestion)*

Suggestions	Slightly or not helpful	Somewhat helpful	Moderately helpful	Very helpful	Extremely helpful	No opinion
a. More specific guidelines from EPA on how to conduct 305b assessments						
b. Additional technical assistance from EPA (e.g., knowledge sharing; training classes) for conducting 305b assessments						
c. Additional technical tools from EPA for conducting assessments (e.g., analytical methods)						
d. Standard requirements for all 305b assessments						
e. Increased percentage of the state's waters that are monitored						
f. Increased coordination of current monitoring efforts among agencies in your state						
g. Increased coordination of current monitoring efforts among multiple states						
h. Increased coordination of current monitoring efforts among state and federal agencies						
i. Nationally consistent monitoring program						
j. More specific guidance from EPA on how to develop 303d lists						
k. More specific guidance from EPA on how to remove waters from 303d lists						
l. Additional technical assistance from EPA for TMDL development (e.g., knowledge sharing, training classes)						
m. Additional technical tools from EPA for developing TMDLs (e.g., models or analytical methods)						
n. TMDL development using a process that requires data quantifying the contribution of each source						
o. TMDL development using a "phased" approach (available data is used to make initial allocation decisions with follow-up)						
p. Other suggestions (*Please specify*) _____						

12. Of the above suggestions in question 11, which are the top three suggestions that would most help your state do each of the following: 305b assessments, list of impaired waters under 303d, and TMDL development? *(Enter letter(s) from question 11 above)*

	305b Assessments	List of impaired waters under 303d	TMDL Development
Top suggestion	_____	_____	_____
2nd suggestion	_____	_____	_____
3rd suggestion	_____	_____	_____

13. Please briefly describe your responses to question 12 regarding suggestions that your state would benefit from, if implemented.

Opinions about Water Quality Activities

14. Which of the following activities do you support or oppose? *(Check one for each activity)*

Activity	Strongly support	Moderately support	Somewhat support	Neither support nor oppose	Somewhat oppose	Moderately oppose	Strongly oppose	Don't Know
a. EPA's use of 305b assessments for representing nationwide water quality conditions								
b. EPA's use of 305b assessments to allocate EPA's 106 funding to states								
c. EPA's use of 305b assessments for the Index of Watershed Indicators (IWI)								
d. EPA guidelines for development and prioritization of 303d lists								

15. Please briefly describe your responses related to your opinion about the various activities in question 14.

Data Needs

16. Listed below are items related to the availability of states' water quality data -- an issue that the Congress is interested in understanding. Considering all sources of available water quality data for all state waters (rivers and streams; lakes, reservoirs and ponds; and estuaries), to what extent, if any, do these data meet your state's needs to satisfy the following requirements/do each of the following activities? *(Check one for each activity)*

Activity	Has all the data it needs	Has much more than half the data it needs	Has more than half the data it needs	Has about Half the data it needs	Has less than half the data it needs	Has much less than half the data it needs	Has none or almost none of the data it needs	Don't know
a. Assess whether all state waters are meeting water quality standards (designated uses)								
b. Identify causes of use impairments (e.g., pollutants or other stressors that degrade water quality)								
c. Identify point sources that contribute to use impairments								
d. Identify nonpoint sources that contribute to use impairments								
e. Place assessed waters on the state 303d list								
f. Remove waters from the state 303d list								
g. Set priorities among the waters on the 303d list for development of TMDLs								
h. Develop TMDLs for water bodies primarily impaired by point sources								
i. Develop TMDLs for water bodies primarily impaired by nonpoint sources								

17. Currently, is there a lawsuit in your state regarding TMDLs, 303d listing, or another water quality issue?

a. [ ] No

b. [ ] Yes→ Please describe and provide legal citation for each case. Attach additional sheet, if necessary

Comments

18. Please provide below any comments you have about your water quality data needs.

19. What conditions, if any, limit your state's ability to obtain the water quality data it needs to monitor water quality, conduct 305b assessments, list impaired waters under 303d and develop TMDLs? What would most help you to eliminate these barriers?

    [ ] No limitations

20. Please add other comments or suggestions you have about the state water quality monitoring program, the 305b reporting process, or this questionnaire. *(Use space below or back of sheet)*

Thank you for your help!

Comments From the Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 17 2000

OFFICE OF WATER

Mr. Peter F. Guerrero
United States General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Guerrero:

Thank you for the opportunity to review GAO's draft report on water quality data and to provide comments for inclusion in the final report. As discussed with your staff, EPA and states are actively engaged in efforts to improve water quality monitoring programs across the country. We feel the General Accounting Office (GAO) report underscores the need for these efforts and heightens the urgency for continuing to improve water quality monitoring and assessment. We appreciate the time and effort that GAO put into preparing this report.

We have reviewed the draft report and are enclosing a marked-up version with corrections and clarifications that we believe will enhance the accuracy of the final report. This letter also provides comments on the key findings of the draft report. The key findings in the draft report included:

- States have insufficient data for key water quality management activities
- National Water Quality Inventory does not accurately represent water quality conditions nationwide
- Uses of the National Water Quality Inventory are undermined by data weaknesses

Sufficiency of State Data for Key Water Quality Management Activities

The draft GAO report concluded that states have little data to support key water quality activities. EPA recognizes that state ambient monitoring activities have not always kept pace with the growing data needs to implement a holistic water resource management program. Regular monitoring of 3.6 million miles of rivers and streams, 41.4 million acres of lakes, and 70.1 thousand miles of coastal shoreline against chemical, biological and physical parameters is a daunting challenge. EPA shares the concern that many waters have not been monitored. However, we believe that states do have a large body of good water quality monitoring data, and that they can take needed actions based on the data they have collected. If EPA or states were to wait for a perfect data set on all waters before initiating restoration activities on waters with known problems we would prolong and possibly exacerbate harm to natural resources and risks to public health.

Internet Address (URL) • http://www.epa.gov
Recycled/Recyclable • Printed with Vegetable Oil Based Inks on Recycled Paper (Minimum 20% Postconsumer)

2

We agree that efforts to improve the quality and completeness of water quality data are very important. We are encouraged that our many efforts to help states report better data in the 305(b) report; to upgrade data systems to allow them to store and retrieve that data; and to support integration of data from other agencies; as well as the increased attention to water quality monitoring from the U.S. Congress, State legislatures, and the public, will result in increased support and resources for state monitoring programs. We strongly believe that decision making and resource allocations will be better if the data supporting water protection and restoration needs are more complete and reliable, and are working hard to ensure that progress toward this goal continues.

The report would benefit from noting some of these efforts to improve water quality data, including EPA's modernization of STORET, our computer system that stores and retrieves water quality data, and our joint work with the U.S. Geological Survey and many other State, public, and private organizations through the National Water Quality Monitoring Council. We have also instituted other efforts to use additional water quality data to characterize national water conditions -- while you note in your report concerns about our Index of Watershed Indicators (IWI) and its "roll up" of information, the basic presentation of the data layers is of great utility in characterizing water quality, and represents the first time that such an integrated effort with multiple data layers for water quality has taken place. We also have an Internet program that allows users to see available water quality data in a variety of ways – for their watershed, for their state, or in links to other national sources of information. We believe that presenting information in ways that the public can relate to on a personal level – including depicting areas where data is very limited – can help stimulate public support for improvements in state monitoring and assessment programs.

The draft GAO report also describes some of the implications to state decision making of inadequacies and inconsistencies in water quality data. One very important implication, the adequacy of states' 303(d) lists of impaired waters, was not described in the report. The 303(d) list is supposed to be a comprehensive accounting of all impaired waters in a state. States do have enough data to list waters as impaired on their 303(d) list, and nationally over 20,000 waterbodies have been listed. However, it is likely that some states, perhaps most, do not have enough data to identify <u>all</u> of the impaired waters because they have not achieved comprehensive assessment of all state waters. It is also possible that some waters are erroneously identified as impaired or as meeting water quality standards. Also, once an impairment is identified, follow-up monitoring is usually needed to develop load estimates from each contributing source and calculate the TMDL.

Therefore, EPA recommends that GAO add a chapter to the report on 303(d) lists of impaired waters that parallels the chapter on the 305(b) water quality inventory. The survey that GAO distributed to the states included questions specific to data needed to develop 303(d) lists. States responses to those questions should be included in the new chapter.

3

National Water Quality Inventory

In characterizing the limitations of the EPA's *National Water Quality Inventory* (305(b) report), the GAO report needs to more strongly note that the national 305(b) report is by law a summary of the states' assessments as to whether state waters are meeting state standards. The report is not intended to be a national water quality report on a selected, consistent set of water quality parameters but a report on how state standards are being met. This is vital information, as the attainment of state water quality standards is the basic driver for a majority of our nation's water resource management decisions.

The current 305(b) report presents the aggregate findings states reported about the subset of waters that they have assessed. The report also explains that the findings do not characterize nationwide water quality consistently because states have not achieved comprehensive coverage of all waters and because assessment methods may differ among states. We have in each 305(b) report noted the limitations clearly, and have emphasized the point again in the draft 1998 305(b) report.

In our ongoing efforts to improve the *National Water Quality Inventory*, EPA has urged states for years to use appropriate data from other agencies and has supplemented the state data summaries with the results of other national and regional studies. The 1998 draft inventory report highlights findings from other studies that provide insights on water quality issues, such as the USGS study on nutrients and pesticides. While these studies provide important information on water quality conditions, it is important to note they have limitations as well. In the 1998 national water quality inventory, we strive to communicate both the utility and limitations of the information presented to the reader.

Use of the National Water Quality Inventory in Grant Allocations

The states' 305(b) water quality inventories are used in allocating grant funds authorized under Section 106 of the Clean Water Act. EPA recently revised the allocation formula, based on the recommendations of the EPA/State Section 106 Formula Work Group which was comprised of both senior EPA and State water quality managers. From the discussion in the GAO report, it appears that GAO did not obtain a complete description of the process used to develop and evaluate the formula, the data sources evaluated to calculate the state allocations, or the mechanics of using the formula to calculate the allocations.

The workgroup conducted extensive data searches and data source evaluations in the process of revising the Section 106 allocation formula. It evaluated and selected the best data sources currently available for inclusion in the revised formula (based on the criteria of data availability, currency, quality, national consistency, reliability). The workgroup selected the state 305(b) data because it is the most comprehensive data set available and because of state and EPA efforts to improve the completeness and consistency of the state inventories.

4

EPA also evaluated the impact of the 305(b) data on the individual state allocations. EPA directed the development and analysis of numerous data scenarios to determine whether certain data components unduly influenced the State distributions. EPA updated the 305(b) data, using the 1998 305(b) reports, to calculate the preliminary FY 2001 Section 106 allotments. The increased weight for the Water Quality Impairment Component in the formula did not substantially alter final FY 2001 individual State allocations.

In closing, I note that the GAO survey questions were thoughtful and comprehensive, and would appreciate receiving detailed survey results to help us as we embark on the next phase of a vigorous national program to strengthen the 305(b) guidance into a national assessment methodology that better supports both 305(b) and 303(d). If you have any questions, or wish to discuss the issues further, please contact Margarete Heber, Chief of the Monitoring Branch at 202-260-7144 or Don Brady, Chief of the Watershed Branch at 202-260-1261.

Sincerely,

Elizabeth Fellows

for Robert H. Wayland III
Director
Office of Wetlands, Oceans, and Watersheds

Enclosure

GAO Contacts and Staff Acknowledgments

GAO Contacts

Steve Elstein, Assistant Director, (202) 512-6111

Acknowledgments

Gillian Friedrichs, Heather Halliwell, Barbara Johnson, Karen Keegan, Trish McClure, Luann Moy, Dena Owens, and Judy Pagano made significant contributions to this report.

Ordering Information

The first copy of each GAO report is free. Additional copies of reports are $2 each. A check or money order should be made out to the Superintendent of Documents. VISA and MasterCard credit cards are accepted, also.

Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:
U.S. General Accounting Office
P.O. Box 37050
Washington, DC 20013

Orders by visiting:
Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders by phone:
(202) 512-6000
fax: (202) 512-6061
TDD (202) 512-2537

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (202) 512-6000 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

Orders by Internet:
For information on how to access GAO reports on the Internet, send an e-mail message with "info" in the body to:

info@www.gao.gov

or visit GAO's World Wide Web home page at:

http://www.gao.gov

To Report Fraud, Waste, or Abuse in Federal Programs

Contact one:

- **Web site: http://www.gao.gov/fraudnet/fraudnet.htm**
- **e-mail: fraudnet@gao.gov**
- **1-800-424-5454 (automated answering system)**

PRINTED ON RECYCLED PAPER

United States
General Accounting Office
Washington, D.C. 20548-0001

Official Business
Penalty for Private Use $300

Address Correction Requested

Bulk Rate
Postage & Fees Paid
GAO
Permit No. GI00