This document contains the National Water Quality Inventory: Report to Congress, 2002 Reporting Cycle: Background.

The report can be downloaded from:

http://www.epa.gov/305b/

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Background

Photo courtesy of John Theilgard

Under Section 305(b) of the Clean Water Act, states, territories, and other jurisdictions of the United States are required to submit reports on the quality of their waters to the U.S. Environmental Protection Agency (EPA) every two years. In the past, states submitted these reports in hardcopy format, and EPA prepared a national hardcopy report that summarized their findings (see http://www.epa.gov/305b). Under Section 303(d) of the Clean Water Act, states also biennially provide a separate prioritized list of waters that are impaired and require the development of pollution controls (to learn more about Section 303(d) reporting, visit http://www.epa.gov/owow/tmdl).

Beginning with the 2002 reporting cycle, EPA urged states to combine these two reporting requirements into one integrated report and to submit these reports electronically. Few states submitted fully integrated reports for the 2002 cycle, although an increasing number are expected to do so in future reporting cycles. This electronic information on water quality assessment results is housed in the 2002 National Assessment Database. To increase the usefulness of this information to the public, EPA is presenting state-reported assessment information (which does not include Section 303(d) information prioritizing impaired waters for 2002) on the Internet at http://www.epa.gov/waters/305b.

About the National Assessment Database

The 2002 National Assessment Database presents electronic water quality information for almost all states, the District of Columbia, and the U.S. Virgin Islands. Three states (Alabama, North Carolina, and Washington), Puerto Rico, the tribal nations, and the island territories of the Pacific did not provide data electronically in 2002. This lack of data may account, at least in part, for the fewer number of river miles, lake acres, and estuarine square miles reported as assessed in 2002 compared to the previous reporting cycle.

To view the 2002 National Assessment Database, go to http://www.epa.gov/waters/305b and click on the map to find summary information and assessment results for specific states, watersheds, and waterbodies of interest. A series of tables and charts summarizing water quality information for the nation as a whole, based on the 2002 state reports, can also be viewed at this Web site.

One of the goals of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters."

The information contained in the National Assessment Database is useful for the snapshot view it provides of waters assessed by the states during the 2002 reporting cycle. The database collects the findings of 49 state and territory water quality monitoring programs for 2000–2002; lists which pollutants and pollution sources affected individual waters, watersheds, and states; and reports which waters met the uses for which they were designated. This state data can be viewed through the National Assessment Database's interactive mapping tool, which displays a wide range of environmental information.

Integrated Water Quality Reporting

EPA has encouraged states to combine biennial state water quality reporting requirements under Sections 305(b) and 303(d) of the Clean Water Act for several reasons. Integrating these reports will merge environmental data from a variety of water quality programs and will benefit the public by providing a more informed summary of the quality of state waters. It will also provide decision makers with better information on the actions necessary to protect and restore these waterbodies. The integrated report will also streamline state reporting requirements by eliminating the need for two separate reports.

In the 2004 cycle, EPA expects to see state progress toward integration of Sections 305(b) and 303(d) water quality reporting, although full integration may not occur until 2006 or beyond. To facilitate the states' efforts to improve integrated reporting, EPA published new integrated reporting guidance in August 2005. For information on the current status of 303(d) lists of impaired waters and integrated reporting, go to http://www.epa.gov/owow/tmdl.

Comparability of Water Quality Data

Although the information in the National Assessment Database provides a picture of state assessment results, these data should not be used to compare water quality conditions between states or to identify trends in statewide or national water quality. The following are reasons for this lack of comparability:

- The methods states use to monitor and assess their waters, including what and how they monitor and how they report their findings to EPA, vary from state to state and within individual states over time. To better protect the health of their citizens, many states target their limited monitoring resources to waters that are suspected of being impaired or to address local priorities and concerns; therefore, the small percentage of waters assessed may not reflect statewide conditions. States may monitor a different set of waters from one reporting cycle to another, or they may monitor fewer waters when state budgets are limited.
- The science of monitoring and assessment varies over time, and many states are better able to identify problems as their monitoring and analytical methods improve. For example, states are conducting more fish tissue sampling than in previous years. The use of improved assessment methods to collect more and better information may result in more extensive and protective fish consumption advisories, even though water quality conditions themselves may not have changed.
- 2002 was a transition period between traditional 305(b) reporting and integrated 305(b)/303(d) reporting. States that included 303(d) assessment information may have relied on more stringent rules for data acceptability than those states without integrated reporting.
- Under the Clean Water Act, each state has the authority to set its own water quality standards; therefore, each state's definition of its designated uses (e.g., Warm Water Fishery or Livestock Watering) may differ from definitions used by other states, along with the criteria against which states determine impairments. (See the *Assessing Water Quality* section for more information.) EPA has collected the 2002 data into a set of national use categories defined in the National Water Quality Standards Database at http://www.epa.gov/wqsdatabase. These use categories are somewhat different from those outlined in previous national 305(b) reports.

The most efficient way to get a good understanding of national water quality conditions and trends is to use probability surveys. Probability surveys are scientifically based studies designed to sample water quality conditions at randomly selected sites that are statistically representative of the nation's many distinct ecological regions. EPA and its monitoring partners have used this methodology to develop a series of *National Coastal Condition Reports* (http://www.epa.gov/nccr). These reports summarize the findings of the National Coastal Assessment, a probability-based study. Another probability-based project currently underway is the National Study of Chemical Residues in Lake Fish Tissue (http://www.epa.gov/waterscience/fishstudy), the first national fish contamination survey to have statistically selected sampling sites. EPA has also conducted a probability-based Wadeable Streams Assessment (http://www.epa.gov/owow/streamsurvey) to determine the biological condition of small streams in the United States. The Wadeable Streams Assessment was completed in 2006.

To learn more about the water quality monitoring, assessment, and reporting practices of a specific state, visit the state's water quality Internet site and read the

Reporting Results of Statewide Probability Surveys

The 2002 National Assessment Database contains only electronically reported waterbody-level information from the states. A few states conduct statewide or regional probability-based surveys (based on statistical random sampling) to supplement this information and to draw broad-scale conclusions about ecologically related waters. EPA fully supports these efforts to increase the percentage of assessed waters. Although the results of these state surveys are not included in the 2002 database, future versions of the database will incorporate the results of state probability surveys.

explanatory and programmatic information included in most reports. The National Assessment Database contains the Web address for each state water quality Internet site.

Assessing Water Quality

States assess the quality of their waters based on water quality standards they develop in accordance with the Clean Water Act. Water quality standards may differ from state to state, but must meet minimum requirements. EPA must approve these standards before they become effective under the Clean Water Act.

Water quality standards are comprised of three elements: the **designated uses** assigned to waters (e.g., recreation, public water supply, the protection and propagation of aquatic life); the **criteria** or thresholds (expressed as numeric pollutant concentrations or narrative requirements) that are necessary to protect the designated uses; and the **antidegradation** policy intended to prevent waters from deteriorating from their current condition. Waters may be designated for more than one use. To learn more about water quality standards, visit http://www.epa.gov/waterscience/standards.

After setting water quality standards, states assess their waters to determine the degree to which the standards are being met. State water quality assessments are normally based on five broad types of monitoring data: biological integrity, chemical, physical, habitat, and toxicity. (Examples of the different types of data used to determine a state's water quality are shown in the box *Types of Monitoring Data*.) Each type of monitoring data yields an assessment that must be integrated with other data types for an overall assessment. Depending on the designated use, one data type may be more informative than others for making the final assessment.

Water quality monitoring results are used for a variety of purposes, including to determine if waters are meeting a state's water quality standards (Photo courtesy of Lynn Betts, National Resources Conservation Service).

Designated Use Categories in this Report

The states have different names for the various uses they have designated for their waters. For example, one state might designate as Class A those waters that are capable of supporting fish species of commercial and recreational value (e.g., salmon and trout), whereas another state might classify similar waters as Cold Water Fishery waters. In order to be consistent with EPA's Water Quality Standards Database, the 2002 National Assessment Database groups state-reported uses according to the following overall categories:

- **Fish, Shellfish, and Wildlife Protection and Propagation**—Is water quality good enough to support a healthy, balanced community of aquatic organisms?

Photo courtesy of Brad Ashbaugh

- **Recreation**—Can people safely swim or enjoy other recreational activities in and on the water?
- **Public Water Supply**—Does the waterbody safely supply water for drinking after standard treatment?
- **Aquatic Life Harvesting**—Can people safely eat fish caught in the waterbody?
- **Agricultural**—Can the waterbody be used for irrigating fields and watering livestock?
- **Industrial**—Can the water be used for industrial processes?
- **Aesthetic Value**—Is the waterbody aesthetically appealing?
- **Exceptional Recreational or Ecological Significance**—Does the waterbody qualify as an outstanding natural resource or support rare or endangered species?

You can find out which state classifications fit under each of these categories by clicking on the individual use category name in the National Assessment Database.

Hundreds of organizations in the United States conduct water quality monitoring. Monitoring organizations include federal, state, interstate, tribal, and local water quality agencies; research organizations such as universities; industries and sewage and water treatment plants; and citizen volunteer programs. For example, EPA and the U.S. Geological Survey (USGS) are two federal agencies that collect water quality monitoring data. Monitoring organizations may collect water quality data for their own purposes or to share with government decision makers. States evaluate and use much of these data when preparing their water quality reports.

The states, territories, and tribes maintain monitoring programs to support several objectives, including assessing whether water is safe for drinking, swimming, and fishing. States also use monitoring data to review and revise water quality standards, identify impaired and threatened waters under Clean Water Act Section 303(d), develop pollutant-specific total maximum daily loads (TMDLs), determine the effectiveness of control programs, adjust drinking water treatment requirements, measure progress toward clean-water goals, and respond to citizen complaints or events such as spills and fish kills.

Types of Monitoring Data

- **Biological Integrity Data**—Objective measurements of aquatic biological communities (usually aquatic insects, fish, or algae) used to evaluate the condition of an aquatic ecosystem. Biological data are best used when deciding whether waters support aquatic life uses.
- **Chemical Data**—Measurements of key chemical constituents in water, sediments, and fish tissue. Examples of these constituents include metals, oils, pesticides, and nutrients such as nitrogen and phosphorus. Monitoring for specific chemicals helps states assess waters against numerical criteria, as well as identify and trace the source of the impairment.
- **Physical Data**—Characteristics of water, such as temperature, flow, suspended solids, sediment, dissolved oxygen, and pH. These physical attributes are often useful indicators of potential problems and can have an effect on the impacts of pollution.
- **Habitat Assessments**—Descriptions of sites and surrounding land uses; condition of streamside vegetation and banks; and measurement of key features, such as stream width, depth, and substrate. These assessments are used to supplement and interpret other kinds of data.
- **Toxicity Testing**—Measurements of mortality of a test population of selected organisms, such as fathead minnows or daphnia ("water fleas"). These organisms are exposed to known dilutions of water taken from the sampling location. The resulting toxicity data indicate whether an aquatic life use is being attained. These tests can help determine whether poor water quality results from toxins or from habitat degradation.

Habitat assessment data may include measurements of streamside vegetation and stream width, depth, and substrate (Photo courtesy of Colin Hill, Tetra Tech, Inc.).