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Environmental Protection
Agency

Office of Water (4503F)
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The Quality of Our Nation's Waters

A Summary of the National Water Quality Inventory: 1998 Report to Congress

o v e r v i e w

States, territories, tribes, and interstate commissions assessed 23% of the nation's 3.6 million miles of rivers and streams for their 1998 water quality assessment reports to EPA. Of the assessed stream miles, 55% are rated as good, 10% good but threatened, and 35% impaired. States and other jurisdictions assessed 42% of the nation's 41.6 million acres of lakes, reservoirs, and ponds and reported that 46% of assessed lake acres are rated as good, 9% good but threatened, and 45% impaired. States and other jurisdictions assessed 32% of the nation's 90,500 square miles of estuaries and reported that 47% of assessed estuary square miles are rated as good, 9% as good but threatened, and 44% as impaired. Principal pollutants causing water quality problems include nutrients, siltation, metals, and pathogens.

Why Do States and Other Jurisdictions Assess Water Quality?

Section 305(b) of the Clean Water Act requires states, territories, tribes, and interstate commissions to assess the health of their waters and the extent to which their waters support state water quality standards and the basic goals of the Clean Water Act. The goals of the Clean Water Act are to achieve and maintain water quality that provides for healthy communities of fish and shellfish and that allows for recreation in and on the water. States collect data and information that allow them to characterize whether water quality meets these and other uses for their waters which are expressed in standards that each state sets.

States and other jurisdictions such as territories, tribes, and interstate commissions submit their water quality assessments to the U.S. Environmental Protection Agency (EPA) every 2 years. EPA summarizes this information in a biennial report to Congress. The *National Water Quality Inventory: 1998 Report to Congress* is the twelfth biennial report to Congress and the public about the quality of our nation's rivers, streams, lakes, ponds, reservoirs, wetlands, estuaries, coastal waters, and ground water.

States' Section 305(b) assessments are an important component of their water resource management programs. These assessments help states:

✓ **Implement** their water quality standards by identifying healthy waters that need to be maintained and impaired waters that need to be restored

✓ **Prepare** their lists of impaired waters under Section 303(d) of the Clean Water Act

✓ **Identify** priority watersheds for protection and restoration using their Watershed Restoration Action Strategies, total maximum daily loads, and pollutant source controls

✓ **Evaluate** the effectiveness of activities undertaken to restore impaired waters and protect healthy waters.

The 305(b)/ 303(d) Connection

Under Section 303(d), the Clean Water Act includes a second reporting requirement—that states provide a prioritized list of all their impaired waters. Current requirements are that states submit these 303(d) lists to EPA every 2 years. The most recent set of 303(d) lists were submitted to EPA in April 1998.

These lists of impaired waters are then used to prioritize state restoration activities. One of the most important restoration tools is the development of Total Maximum Daily Loads (TMDLs)—calculations of the amount of a pollutant that a waterbody can receive and still meet water quality standards. A TMDL is the sum of all available loads of a single pollutant from all contributing point and nonpoint sources. It includes reductions needed to meet water quality standards and allocates these reductions among sources in the watershed.

The 305(b) and 303(d) reporting processes are connected. State 305(b) data is used to assist in the identification and priority ranking of 303(d) waters, although for their 303(d) listings, states may supplement the 305(b) information with other assessments or choose only that data in which they have the highest confidence. As a result, the findings on impaired waters reported by the states in their 303(d) lists build on, and are, in general, consistent with their 305(b) reports to EPA. Both sources find similar amounts of impaired waters and conclude that siltation, nutrients, bacteria, and metals are among the top pollutants causing impairments.

EPA and the states continue to work to improve and harmonize both these assessments through better and more extensive monitoring. Our goal is comprehensive monitoring of all waters for all applicable water quality standards—a challenging task given the demands placed on limited state, tribal, and federal resources, but a particularly vital one because of the important and costly water resource management decisions that depend on high quality water data.

This National Water Quality Inventory report reflects incremental progress toward the goal of comprehensive assessment. It includes information submitted by all 50 states, the District of Columbia, and 5 territories, 4 interstate commissions, and 9 Indian tribes. In addition, the amount of waters assessed for this report has increased slightly since the previous report. States assessed 150,000 more river and stream miles and 600,000 more lake acres in 1998 than in 1996.

How Do States and Other Jurisdictions Assess Water Quality?

Water quality assessment begins with setting goals through water quality standards adopted by states, tribes, and other jurisdictions such as territories. These standards must then be approved by EPA before they become effective under the Clean Water Act.

Water quality standards have three elements:

1. **Designated uses.** The Clean Water Act envisions that all waters be able to provide for recreation and the protection and propagation of aquatic life. Additional uses described in the Act that can be adopted in standards by states and tribes include drinking water supply and fish consumption.

2. **Criteria.** Criteria help protect designated uses. For example, criteria include chemical-specific thresholds that protect fish and humans from exposure to levels that may cause adverse effects. They may also include descriptions of the best possible biological condition of aquatic communities such as fish and insects.

3. **Antidegradation policy.** This policy is intended to prevent waters that do meet standards from deteriorating from their current condition.

After setting water quality standards, states then assess their waters to determine the degree to which these standards are being met and report this information in their 305(b) reports.

Currently states use two categories of data to assess water quality. The first and most desirable category is monitored data. This refers to field measurements, not more than 5 years old, of biological, habitat, toxicity, and physical/chemical conditions in water, sediments, and fish tissue. The second category, frequently used to fill information gaps, is evaluated data. Evaluated data includes field measurements that are more than 5 years old and estimates generated using land use and source information, predictive models, and surveys of fish and game biologists. This type of data provides an indicator of potential water quality.

Because evaluated data varies in quality and confidence, it is used for different purposes by different states. Most states use evaluated data to supplement monitoring data for their 305(b) reports. This information helps states identify waters that need additional monitoring.

After comparing water quality data to standards, states, tribes, and jurisdictions classify their waters into the following general categories:

Attaining Water Quality Standards

- **Good/Fully Supporting**: These waters meet applicable water quality standards, both criteria and designated uses.
- **Good/Threatened**: These waters currently meet water quality standards, but water quality may degrade in the near future.

Not Attaining Water Quality Standards/Impaired

- **Fair/Partially Supporting**: These waters meet water quality standards most of the time but exhibit occasional exceedances.
- **Poor/Not Supporting**: These waters do not meet water quality standards.

Water Quality Standards Not Attainable

- **Not Attainable**: The state has performed a use-attainability analysis and demonstrated that support of one or more designated uses is not attainable due to specific biological, chemical, physical, or economic/social conditions.

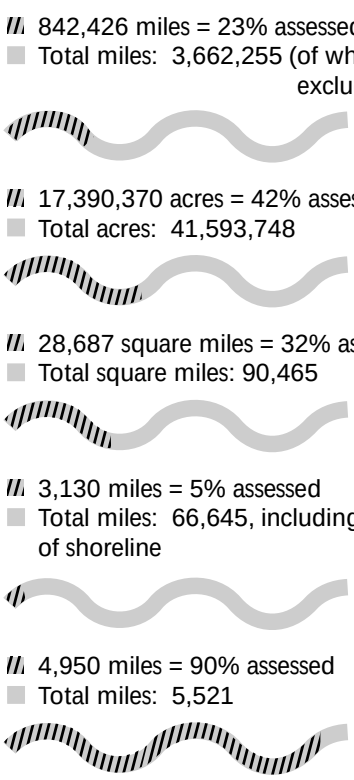
How Many of Our Waters Were Assessed for 1998?

This report does not describe the health of all U.S. waters because states and other jurisdictions have not yet achieved comprehensive assessment of all their waters (see Figure 1). Therefore, this report summarizes the health of only the subset of waters that states assessed in their individual 1998 water quality inventories: 23% of river and stream miles, 42% of lake acres, 32% of estuary square miles, 5% of ocean shoreline miles, and 90% of Great Lakes shoreline miles.

Oceans, coral reefs, wetlands, and ground water quality are poorly represented in state monitoring programs. In part, this is due to the fact that few states have adopted water quality standards for these resources. EPA's wetlands and ground water protection programs continue to work with states to develop assessment methods and water quality standards and to improve monitoring coverage. EPA is initiating a coastal monitoring program, Coastal 2000, that will provide a national baseline characterization of coastal waters and data needed to assist in development of water quality standards (particularly biological and nutrient criteria) for these waters.

Figure 1

Percentage of Waters Assessed for the 1998 Report



Source: 1998 Section 305(b) reports submitted by states, tribes, territories, and commissions.

What Is the Status of Our Assessed Waters?

Rivers and Streams

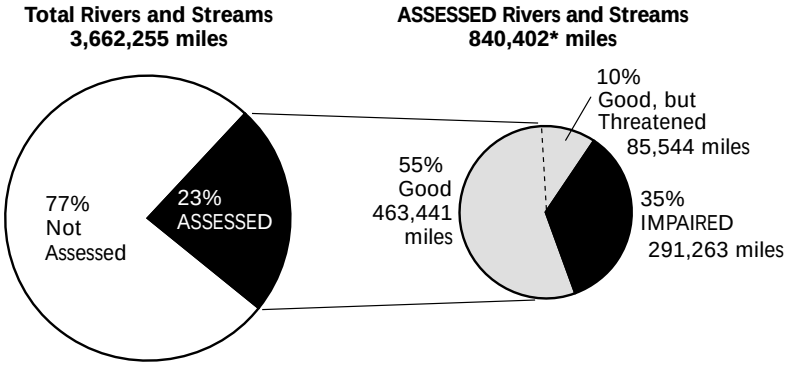
The United States has a total of 3,662,255 miles of rivers and streams. States and other jurisdictions assessed 23% of these river and stream miles, focusing primarily on perennial streams (i.e., those that flow year round). Altogether, the states and other jurisdictions reported that of the 23% of assessed stream miles, 65% fully support designated uses and 35% are impaired. They also report that 10% of the assessed rivers and streams are fully supporting but are threatened for one or more uses (Figure 2). Aquatic life use is the most frequently impaired individual use in assessed rivers and streams (Figure 3).

According to the states and other jurisdictions, siltation and bacteria are the most common pollutants affecting assessed rivers and streams (Figure 4). Siltation alters aquatic habitat and suffocates fish eggs and other bottom-dwelling organisms. Excessive siltation can also interfere with drinking water treatment processes and recreational use of a river. Bacteria provide evidence of possible fecal contamination that may cause waters to be unsafe for swimming and other recreational activities. Both pollutants raise the costs of drinking water treatment to remove them.

States and other jurisdictions reported agriculture as the most widespread

Figure 2

Summary of State Assessments of Rivers and Streams



*Includes miles assessed as not attainable.

States assessed 23% of river and stream miles for the 1998 305(b) report. For the subset of assessed waters, 55% are rated as good, 10% as good but threatened, and 35% as impaired.

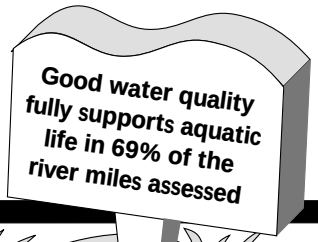


Figure 3

Individual Use Support in Rivers and Streams

Designated Use	Miles Assessed	Percent: Good (Fully Supporting)	Good (Threatened)	Fair (Partially Supporting)	Poor (Not Supporting)	Not Attainable
Aquatic Life Support	706,291	58	11	20	10	<1
Fish Consumption	381,952	87	1	5	7	<1
Primary Contact – Swimming	435,807	69	3	11	13	5
Secondary Contact	261,767	76	2	14	7	<1
Drinking Water Supply	140,956	87	4	6	3	<1
Agriculture	336,690	97	<1	2	1	0

This figure presents a tally of the river and stream miles for each key designated use. For each use, the figure presents the percentage of assessed waters in each water quality category.

source of pollution in assessed rivers and streams. Agricultural activities may introduce siltation, nutrients, pesticides, and organic matter that deplete oxygen in surface water. Nutrients and pesticides can also leach into and contaminate ground water. While the impact of agricultural activities is significant, it should be considered in context of the amount of land supporting agricultural activities. According to the 1997 Census of Agriculture, 41% of the continental United States, about 900 million acres, is used for agricultural production.

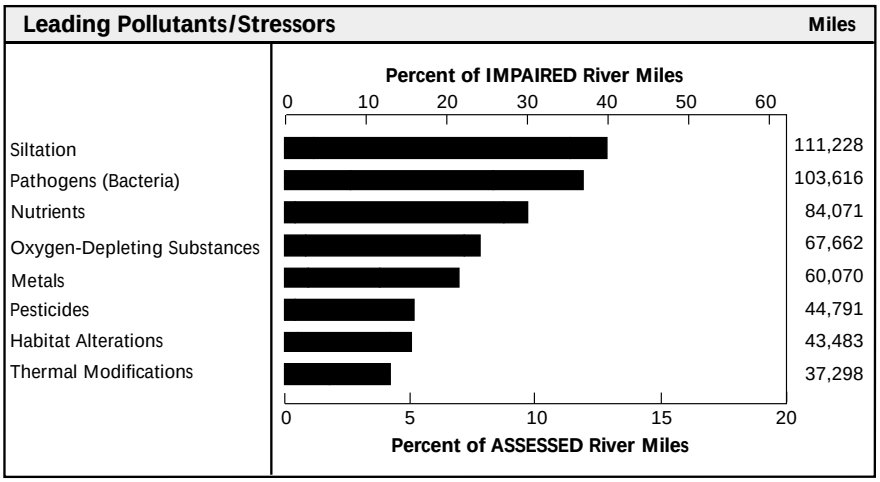
Other leading sources of pollution in assessed rivers and streams include hydromodifications such as flow regulation and modification, channelization, dredging, and construction of dams—which may alter a river's habitat in such a way that it becomes less suitable for aquatic life—and urban area runoff and storm sewer discharges.

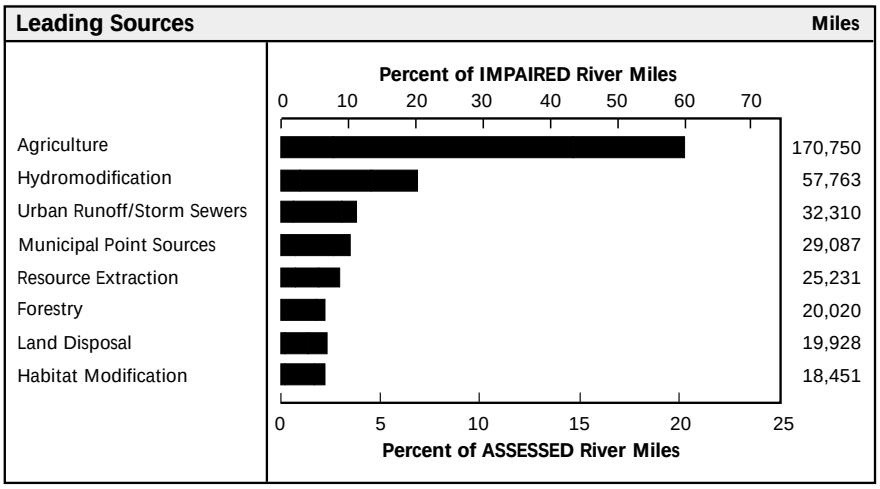
Lakes, Reservoirs, and Ponds

There are a total of 41,593,748 acres of lakes, reservoirs and ponds in the United States. In 1998, states and other jurisdictions assessed 42%, or about 17.4 million acres. Altogether, states and jurisdictions reported that of the 42% of lake acres assessed, 55% fully support all of their uses and 45% are impaired. They also reported that 9% of the assessed acres are fully supporting but threatened for one or more uses (Figure 5).

Figure 4

Leading Pollutants and Sources Impairing Assessed Rivers and Streams

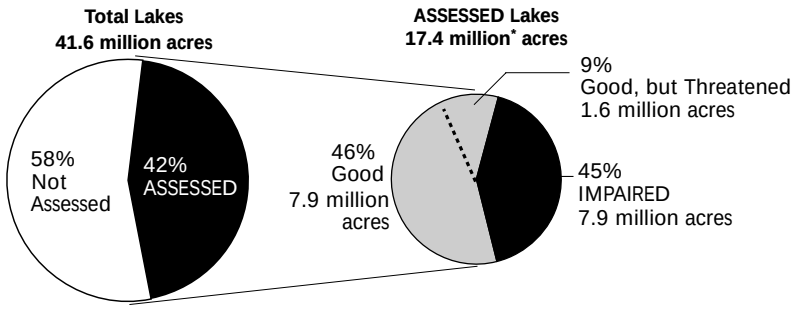




These bar charts present the leading pollutants and sources reported by the states. The percent scale on the lower axis compares the miles impacted to the total ASSESSED miles. The upper axis compares the miles impacted to the total IMPAIRED miles.

Figure 5

Summary of State Assessments of Lakes, Reservoirs, and Ponds



*Includes acres assessed as not attainable.

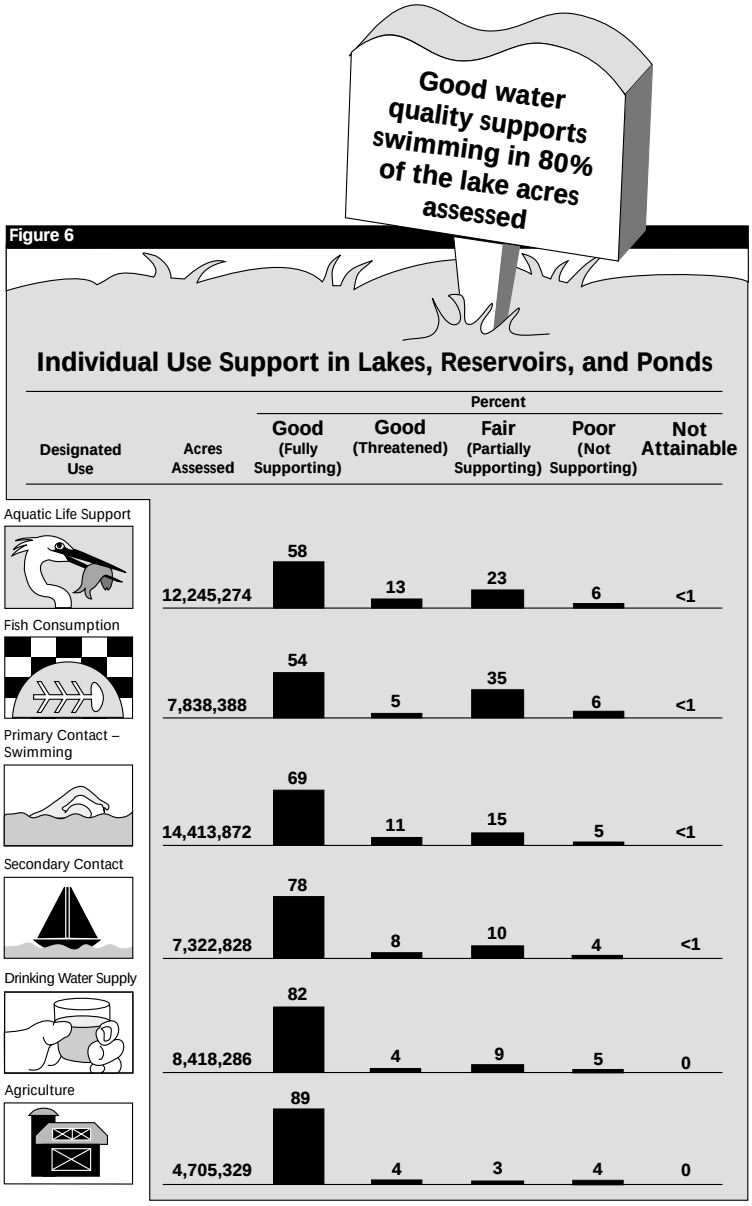
States assessed 42% of lake, reservoir, and pond acres for the 1998 305(b) report. For the subset of assessed waters, 45% are rated as good, 9% as good but threatened, and 45% as impaired.

More lake, reservoir, and pond acres were reported as impaired for aquatic life use support than any other assessed use (Figure 6). However, where fish consumption use was assessed, it was responsible for a higher percentage of impaired acres. (Many states did not evaluate fish consumption use support in lakes because they have not included this use in their water quality standards.) Through separate tracking of state fish consumption advisories, EPA estimates that about 6.5 million lake acres were under fish consumption advisories in 1998.

According to the states and other jurisdictions, nutrients are the most common pollutant affecting assessed lakes, reservoirs, and ponds (Figure 7). While healthy lake ecosystems contain nutrients in small quantities from natural sources, too many nutrients disrupt the balance of lake ecosystems. Nutrient overenrichment can initiate a chain of impacts that includes algal blooms, low dissolved oxygen conditions, fish kills, foul odors, and excessive aquatic weed growth that can interfere with recreational activities.

Metals are the second most common pollutants in assessed lake acres, mainly due to the widespread detection of mercury in fish tissue samples. The mercury problem is especially complex because it often includes atmospheric transport from power-generating facilities, waste incinerators, and other sources.

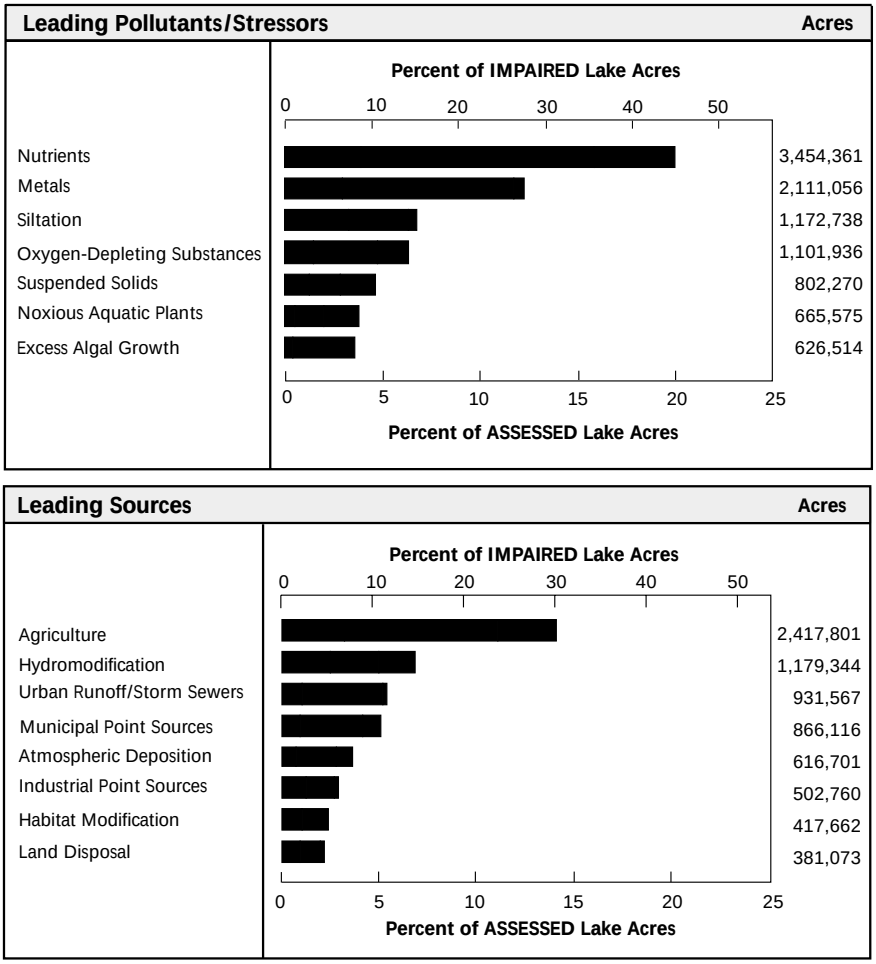
The most widespread source of pollution reported for assessed lakes is agriculture, followed by hydrologic modification, urban runoff and storm sewers, municipal point sources, and atmospheric deposition (Figure 7).



This figure presents a tally of the lake, pond, and reservoir acres assessed for each key designated use. For each use, the figure presents the percentage of assessed waters in each water quality category.

Figure 7

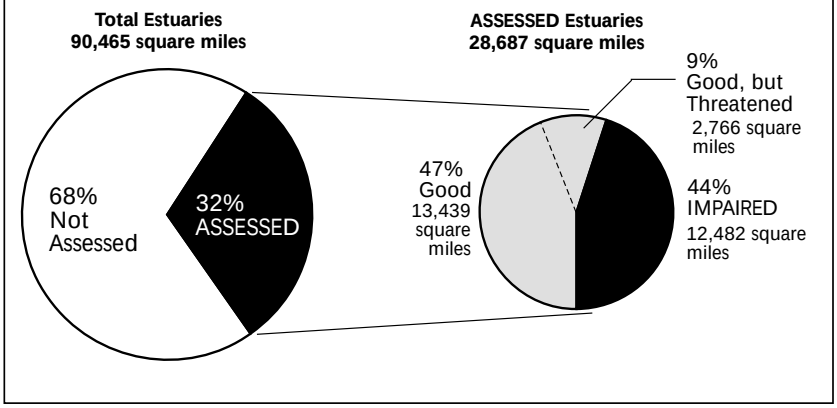
Leading Pollutants and Sources Impairing Assessed Lakes, Reservoirs, and Ponds



These bar charts present the leading pollutants and sources reported by the states. The percent scale on the lower axis compares the acres impacted to the total ASSESSED acres. The upper axis compares the acres impacted to the total IMPAIRED acres.

Figure 8

Summary of State Assessments of Estuaries



States assessed 32% of estuary square miles for the 1998 305(b) report. For the subset of assessed waters, 56% are rated as good, 9% as good but threatened, and 44% as impaired.

Coastal Resources—

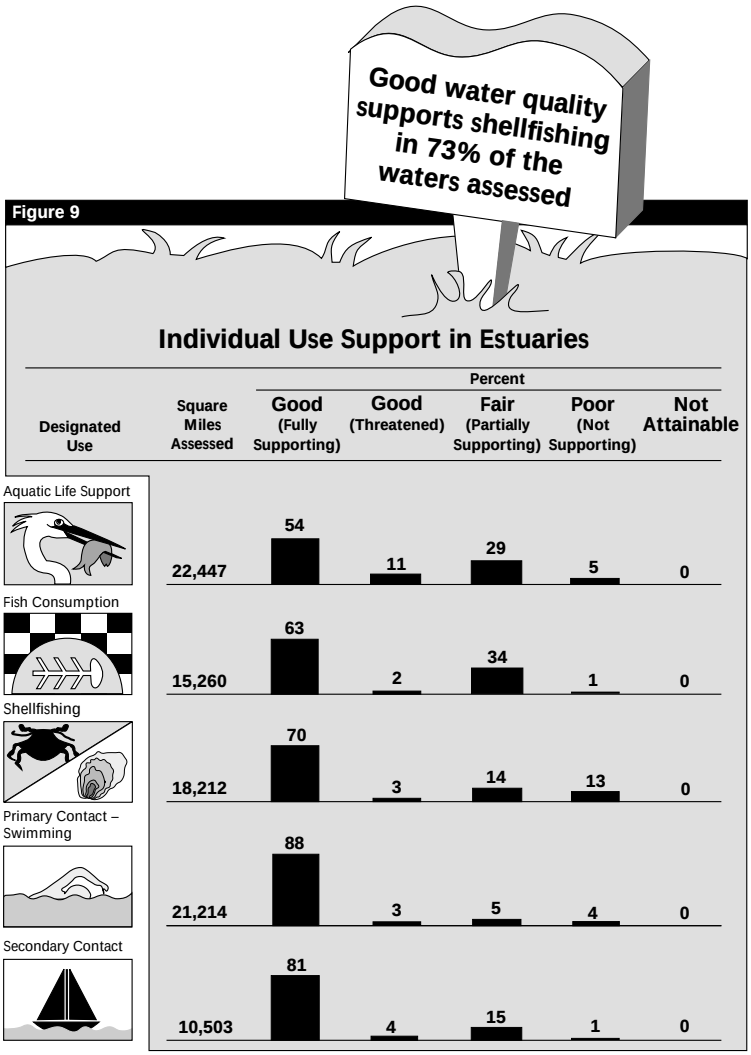
Estuaries, The Great Lakes, Ocean Shoreline Waters, and Coral Reefs

The United States' extensive coastal resources include nearly 67,000 miles of ocean shoreline, more than 5,500 miles of Great Lakes shoreline, about 90,500 square miles of tidal estuaries, and extensive coral reef areas.

Estuaries

There are 90,465 square miles of estuaries in the United States. Estuaries are where rivers meet oceans, and they include bays and tidal rivers. They serve as nursery areas for many commercial fish and most shellfish populations, including shrimp, oysters, crabs, and scallops. States and other jurisdictions assessed 32% of the total square miles of estuaries in the country (Figure 8). Altogether, states and other jurisdictions reported that of the 32% of estuarine square miles assessed, 56% fully support designated uses and 44% are impaired. They reported that 9% of the assessed square miles are fully supporting but threatened for one or more uses. Aquatic life use is the most frequently impaired individual use in assessed estuaries (Figure 9).

States reported that bacteria (pathogens) are the most common pollutants affecting assessed estuaries. Most states monitor indicator bacteria, such as *Escherichia coli*, which provide evidence that an estuary is contaminated with sewage that may contain numerous viruses and bacteria that cause illness in people. Humans can become exposed to



This figure presents a tally of the estuary square miles assessed for each key designated use. For each use, the figure presents the percentage of assessed waters in each water quality category.

these pathogens by consuming contaminated fish and shellfish or contacting or ingesting contaminated water during swimming.

In addition to pathogens, the states also reported that oxygen depletion from organic wastes, metals, nutrients, thermal modifications, PCBs, and priority toxic chemicals impacts more square miles of estuarine waters than other pollutants and stressors.

Municipal point sources and urban runoff and storm sewers are cited as the most widespread sources of pollution in assessed estuaries (Figure 10). These urban sources are significant contributors to the degradation of estuarine waters because large cities are located near most U.S. estuaries.

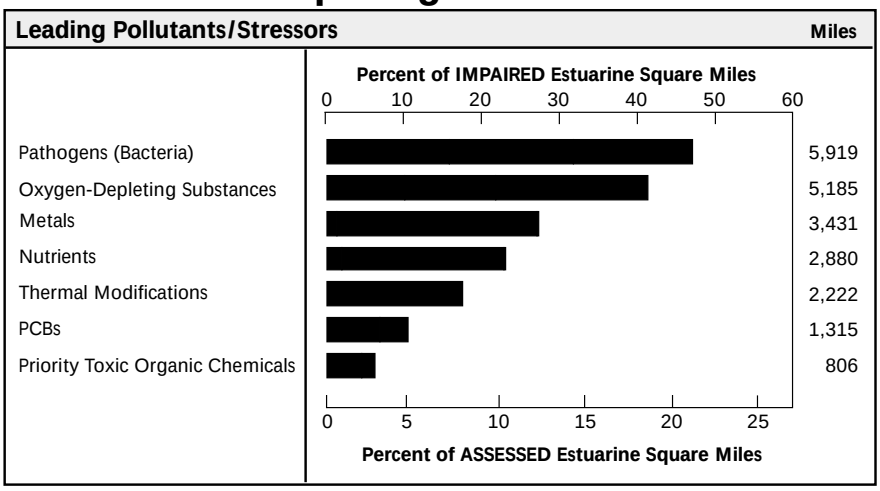
The Great Lakes

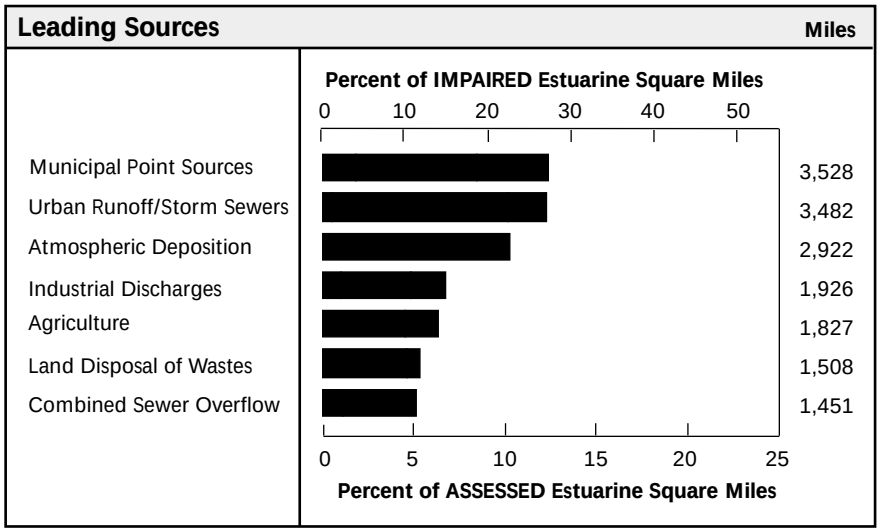
There are 5,521miles of Great Lakes shoreline in the United States. The Great Lakes contain nearly one-fifth of the fresh surface water on earth. Despite their large size, the Great Lakes are sensitive to the effects of a broad range of contaminants that enter the Lakes from polluted air, ground water, surface water, wastewater discharges, and overland runoff. For the 1998 report, five of the eight Great Lakes states assessed conditions of 90% of the nation's total Great Lakes shoreline miles (Figure 11). The states reported that of the 90% of assessed shoreline miles, 4% fully support designated uses and 96% are impaired. They also report that 2% of the assessed waters are fully supporting but threatened for one more uses.

The reporting states indicated that the greatest impacts to Great Lakes shoreline are on fishing activities (Figure 12). The states bordering the Great Lakes have issued advisories to restrict consumption of fish caught along their entire shorelines. Depending upon the location, mercury, PCBs, pesticides, or dioxins are found in fish tissues

Figure 10

Leading Pollutants and Sources Impairing Estuaries

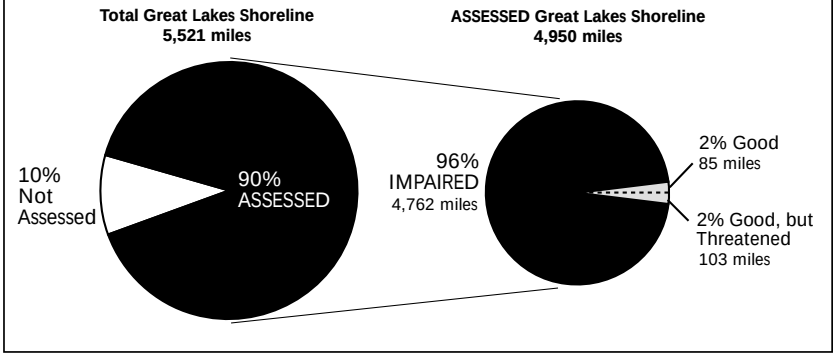




These bar charts present the leading pollutants and sources reported by the states. The percent scale on the lower axis compares the square miles impacted to the total ASSESSED square miles. The upper axis compares the square miles impacted to the total IMPAIRED square miles.

Figure 11

Summary of State Assessments of Great Lakes Shoreline



States assessed 90% of Great Lake shoreline miles for the 1998 305(b) report. For the subset of assessed waters, 2% are rated as good, 2% as good but threatened, and 96% as impaired.

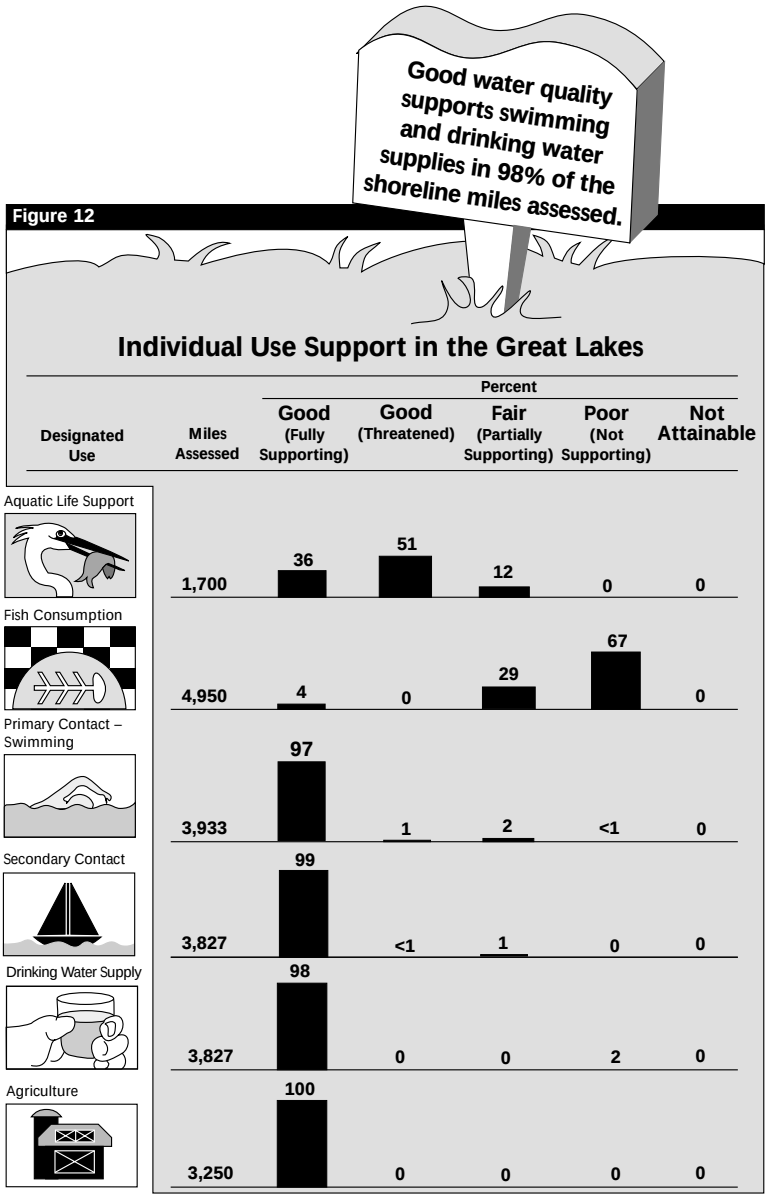
at levels that exceed standards set to protect human health.

Priority organic chemicals, pesticides, and nonpriority organic chemicals are the most common pollutants affecting the waters along the Great Lakes shoreline, according to the three states that reported on pollutants and sources (Figure 13). These states reported that atmospheric deposition, discontinued discharges from factories that no longer operate, and contaminated sediments are the primary sources of these pollutants.

Ocean Shoreline Waters

There are 66,645 miles of ocean shoreline in the United States, including Alaska. Our ocean shoreline waters provide critical habitat for various life stages of commercial fish and shellfish (such as shrimp), provide habitat for endangered species (such as sea turtles), and support popular recreational activities, including sport fishing and swimming. Despite their vast size and volume, oceans are vulnerable to impacts from pollutants, especially in nearshore waters that receive inputs from adjoining surface waters, ground water, wastewater discharges, and nonpoint source runoff.

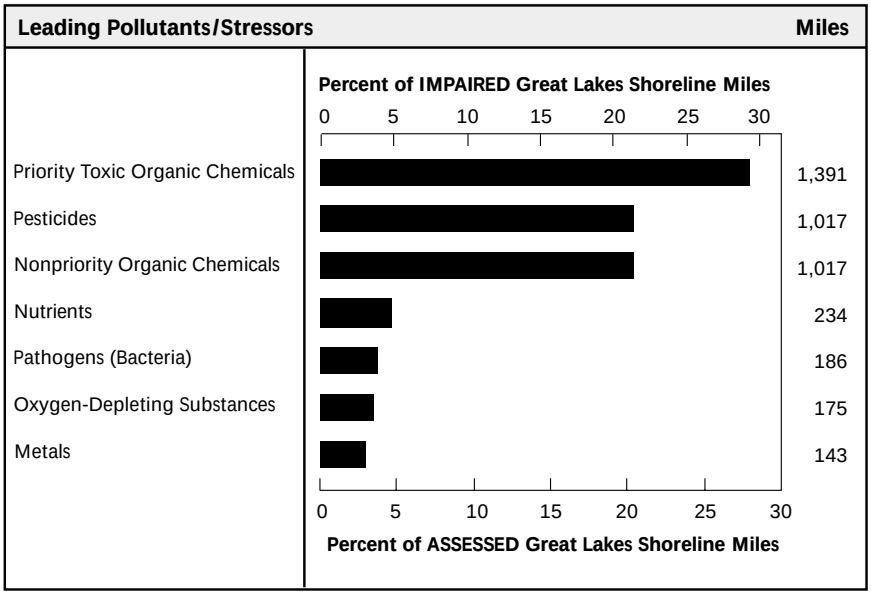
Fifteen of the 27 coastal states and territories assessed conditions in 5% of the nation's total ocean shoreline miles (Figure 14). The states and territories reported that of the 5% assessed, 88% of ocean shoreline miles fully support designated uses and 12% are impaired. They report that 8% of the assessed miles are threatened for one or more uses.

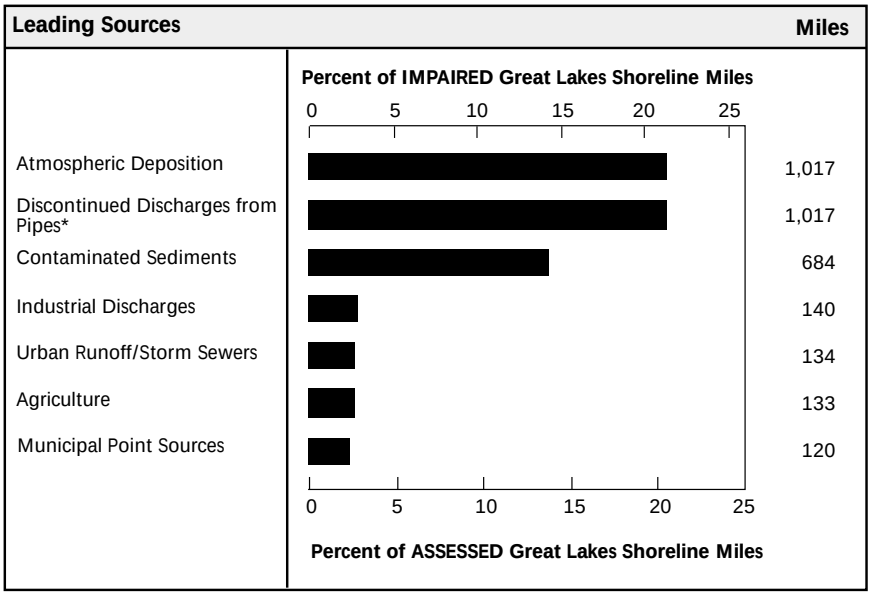


This figure presents a tally of the Great Lakes shoreline miles assessed for each key designated use. For each use, the figure presents the percentage of assessed waters in each water quality category.

Figure 13

Leading Pollutants and Sources Impairing Great Lakes Shoreline

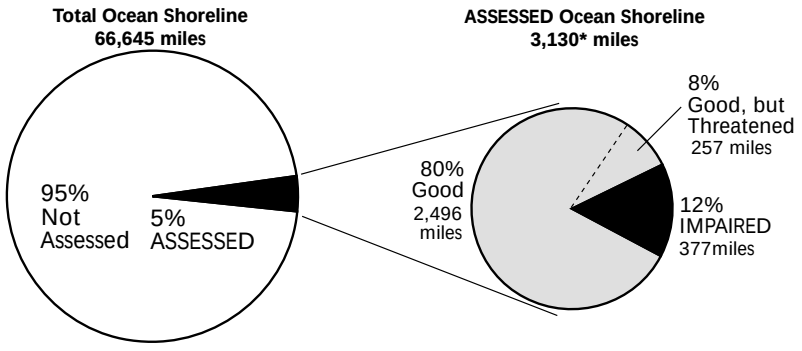




These bar charts present the leading pollutants and sources reported by the states. The percent scale on the lower axis compares the miles impacted to the total ASSESSED miles. The upper axis compares the miles impacted to the total IMPAIRED miles.

Figure 14

Summary of State Assessments of Ocean Shoreline



*Includes miles assessed as not attainable.

States assessed 5% of ocean shoreline miles for the 1998 305(b) report. For the subset of assessed waters, 80% are rated as good, 8% as good but threatened, and 12% as impaired.

Swimming was the most frequently assessed use in ocean shoreline waters (Figure 15).

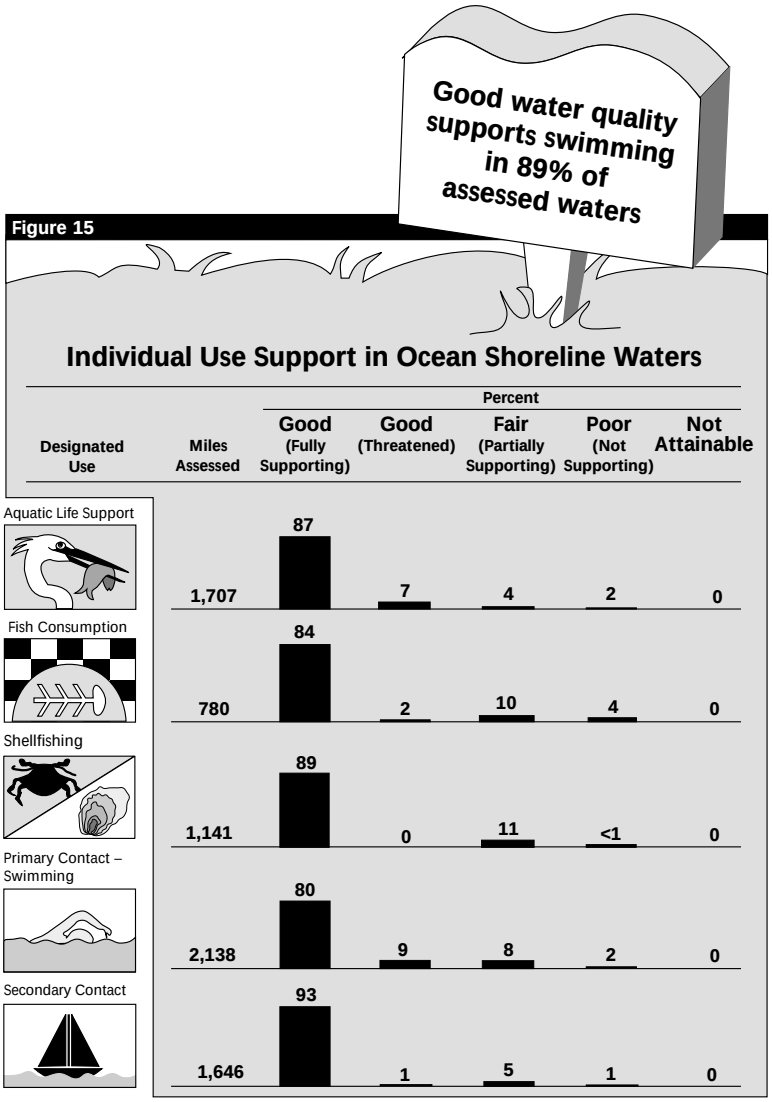
Bacteria (pathogens), turbidity, and excess nutrients are the most common pollutants affecting the assessed ocean shoreline. The primary sources of pollution to assessed shoreline miles include urban runoff and storm sewers and land disposal of wastes (Figure 16).

Coral Reefs

Coral reefs are among the most productive ecosystems in the ocean. They are inhabited by a wide variety of fish, invertebrates, and plant species and provide important economic opportunities, primarily in terms of fishing and tourism. Coral reefs are found in three states—Hawaii, Florida, and Texas, and five U.S. territories—American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands (Figure 17).

Recent evidence indicates that coral reefs are deteriorating worldwide. To prevent further deterioration of coral ecosystems, President Clinton signed Executive Order 13089 on Coral Reef Protection. This order created the U.S. Coral Reef Task Force, composed of representatives from the states and territories with coral resources. In response, these areas have initiated or increased efforts to identify the causes of coral reef degradation and approaches to prevent further loss.

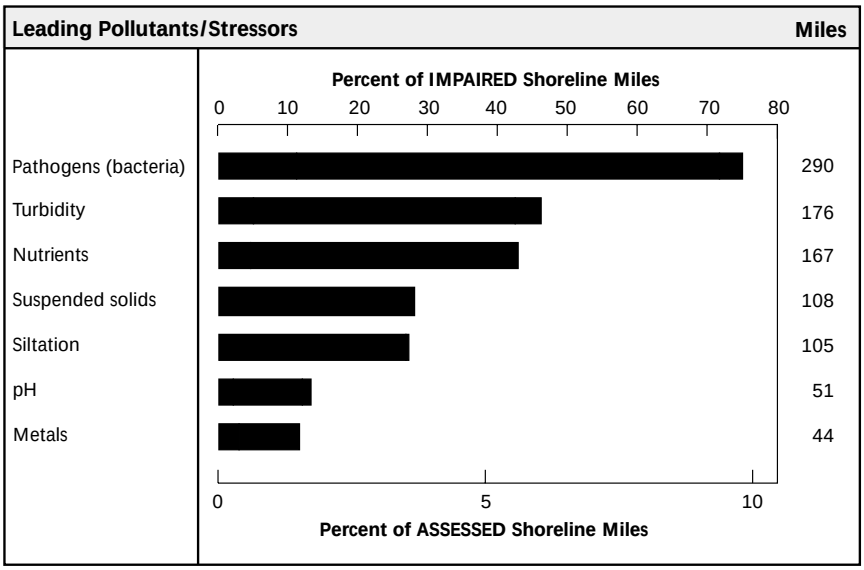
Efforts are under way in Hawaii, Florida, and American Samoa to assess the status of coral reefs and identify pollutants and stressors to coral reef ecosystems.

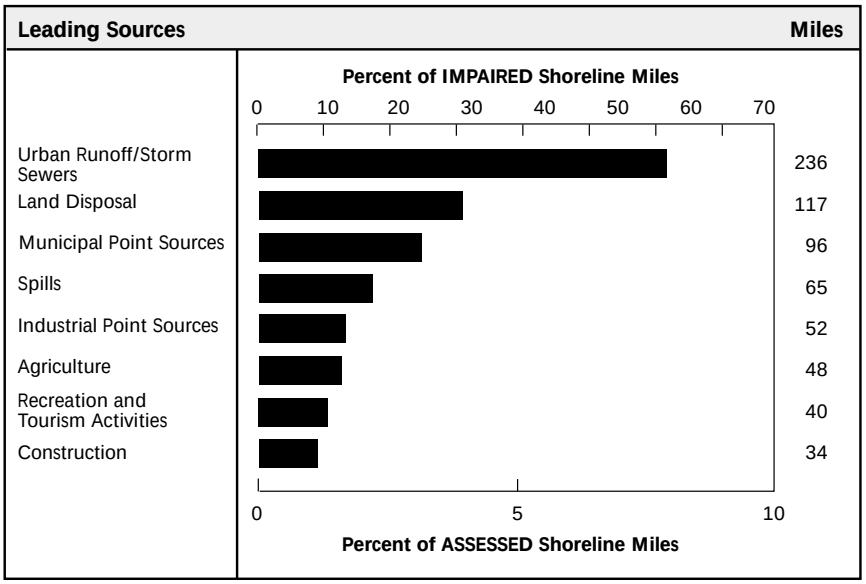


This figure presents a tally of the ocean shoreline miles assessed for each key designated use. For each use, the figure presents the percentage of assessed waters in each water quality category.

Figure 16

Leading Pollutants and Sources Impairing Ocean Shoreline

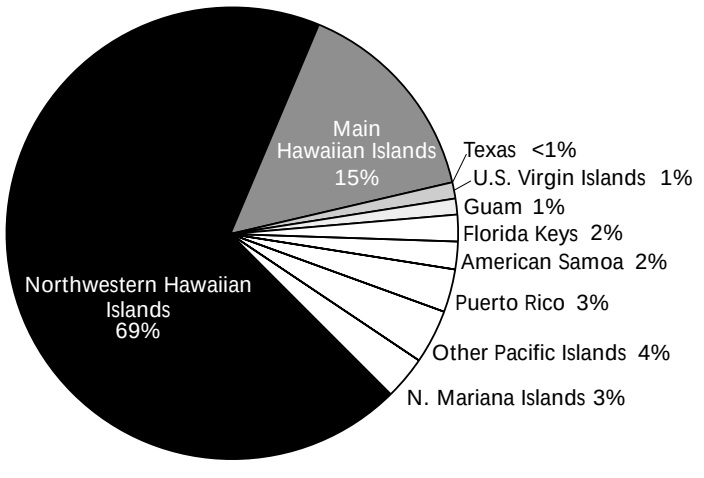




These bar charts present the leading pollutants and sources reported by the states. The percent scale on the lower axis compares the miles impacted to the total ASSESSED miles. The upper axis compares the miles impacted to the total IMPAIRED miles.

Figure 17

United States Coral Reef Areas



The findings will be used to develop management actions to protect coral reefs in these areas. Coral reef stressors identified to date include invasive species, marine debris, petroleum spills, nutrient runoff, and septic discharges.

Wetlands

Wetlands are intermittently or permanently flooded areas that are the link between land and water. The functions and values of healthy wetlands include the following:

- **Storage of water –** Wetlands help prevent flooding by storing and slowing the flow of water through a watershed.
- **Storage of sediment and nutrients –** Wetlands act like filters that purify water in a watershed.
- **Growth and reproduction of plants and animals –** Wetlands produce a wealth of natural products, including fish and shellfish, wildlife, timber, and wild rice.
- **Diversity of plants and animals –** Wetlands are critical to the survival of a wide variety of plants and animals, including numerous rare or endangered species as well as many species of great commercial value to man.

It is estimated that over 200 million acres of wetlands existed in the lower 48 states at the time of European settlement. Since then, extensive wetlands acreage has been lost, with many of the original wetlands drained and converted to farmland and urban areas. Today, less than half of our nation's original wetlands remain. Recent federal studies estimate an average net loss of wetlands around 100,000 acres per year in the contiguous United States. Although losses continue to decline, we still have to make progress toward our Administration's goal of an annual net gain of 100,000 wetland acres per year by the year 2005 and every year thereafter.

Eleven states and tribes listed sources of recent wetlands loss in their 1998 305(b) reports. Eight states cited agriculture as a leading source of current losses. Other losses were due to construction of roads, highways, and bridges; residential growth and urban development; filling and/or draining; construction; industrial development; commercial development; and channelization.

The states and tribes are making progress in incorporating wetlands into water quality standards and developing designated uses and criteria specifically for wetlands. But many states and tribes still lack wetland-specific designated uses, criteria, and monitoring programs for wetlands. Without criteria and monitoring data, most states and tribes cannot evaluate use support.

Ground Water

Ground water—water found in natural underground formations called aquifers—is an important component of our nation's fresh water resources. About 77,500 million gallons of the nation's ground water are withdrawn daily for use in drinking and bathing, irrigation of crop lands, livestock watering, mining, industrial and commercial uses, and thermoelectric cooling applications (Figure 18). Unfortunately, this valuable resource is vulnerable to contamination, and ground water contaminant problems are being reported throughout the country. Ground water contamination can occur through relatively well defined, localized pollution plumes emanating from specific sources such as leaking underground storage tanks, or it can occur as a general deterioration of ground water quality over a wide area due to diffuse nonpoint sources such as agricultural fertilizer and pesticide applications, septic systems, and urban runoff.

Based on results reported by states in their 1998 305(b) reports, ground water quality in the nation is good and can support the many different uses of this

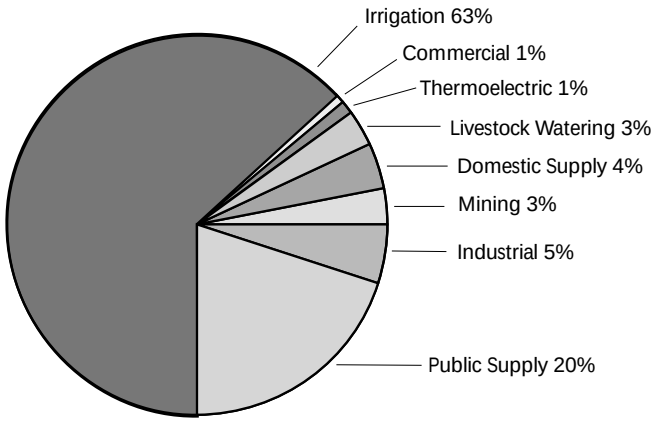
resource. However, despite these positive results, measurable negative impacts to aquifers across the nation have been detected, and they are usually traced back to human activities.

States identified leaking underground storage tanks as an important potential threat to our nation's ground water resources. This was based on the sheer number of underground storage tanks and the risk posed to human health and the environment from releases. States also report that the organic chemicals found in petroleum products such as gasoline are common ground water contaminants. Other potential sources of ground water contamination include septic systems, landfills, industrial facilities, fertilizer and pesticide applications, accidental spills, surface impoundments, and animal feedlots. Contaminants occur in the form of organic compounds, metals, and nitrate.

Assessing the quality of our nation's ground water resources is no easy task. An accurate and representative assessment of ambient ground water quality requires a well-planned and well-executed monitoring plan. Although the 305(b) ground water program is improving, there is still much to be done. States need to increase their monitoring coverage and focus on collecting ground water data that are most representative of the resource.

Figure 18

National Ground Water Use



Source: *Estimated Use of Water in the United States in 1995.* U.S. Geological Survey Circular 1200, 1998.

How Does Impaired Water Quality Impact Public Health and Aquatic Life?

Water pollution threatens both public health and aquatic life. Public health may be threatened directly through the consumption of contaminated food or drinking water or indirectly through skin exposure to contaminants present in recreational and boating waters. Aquatic organisms can be affected by the presence of toxic chemicals in their environment and are also particularly susceptible to changes in the physical quality of their environments, such as changes in pH, temperature, dissolved oxygen, and habitat.

Public Health Concerns

The 1998 EPA Listing of Fish and Wildlife Advisories listed 2,506 advisories in effect in 47 states, the District of Columbia, and American Samoa (Figure 19). Mercury, PCBs, chlordane, dioxins, and DDT (with its byproducts) caused 99% of all the fish consumption advisories in effect in 1998.

In their 1998 305(b) reports, 11 of the 27 coastal states and jurisdictions reported shellfish harvesting restrictions in over 2,300 square miles of estuarine waters. These areas are monitored for bacteria as part of the National Shellfish Sanitation Program.

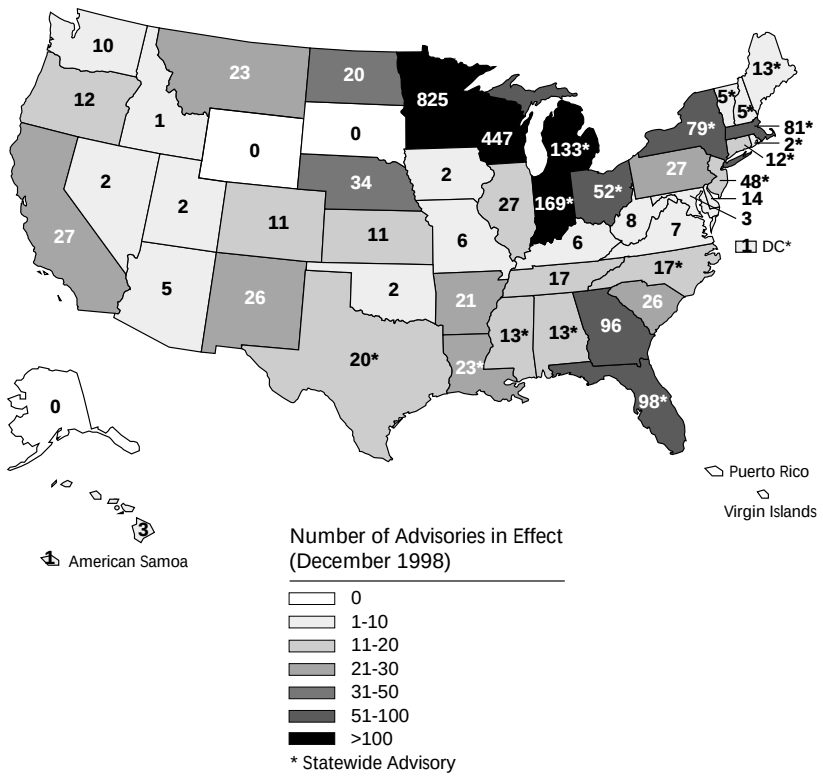
Advisories were also issued to warn the public about health risks from water-based recreation. Sixteen states and tribes identified 240 sites where recreation was restricted at least once during the reporting cycle. The states and tribes identified sewage treatment plant bypasses and malfunctions, urban runoff and storm sewers, and faulty septic systems as the most common sources of elevated bacteria concentrations in bathing areas.

Thirty-eight states, tribes, and other jurisdictions provided information about the degree to which drinking water use is met. Of the 23% of river and stream miles assessed, only 3% do not support drinking water where it is a designated use; of the 42% of lake and reservoir acres assessed, 5% do not support drinking water use.

Increasingly, states are coordinating their efforts under the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) to assess sources of drinking water. SDWA requires states to determine the susceptibility to contamination of drinking water sources, while the CWA calls for them to assess the ability of waters to support drinking water use. Assessments under both laws will provide the information necessary for states to develop tailored monitoring programs and for water systems to work with states and local governments to protect drinking water sources.

Figure 19

Fish and Wildlife Consumption Advisories in the United States



Note: States that perform routine fish tissue analysis (such as the Great Lakes states) will detect more cases of fish contamination and issue more advisories than states with less rigorous fish sampling programs. In many cases, the states with the most fish advisories support the best monitoring programs for measuring toxic contamination in fish, and their water quality may be no worse than the water quality in other states.

Aquatic Ecosystem Concerns

A fish kill is one of the most obvious effects of pollution on aquatic life. This phenomenon is normally attributed to exceptionally low dissolved oxygen levels—usually due to excessive nutrients in the water—or to the discharge of toxic contaminants to the water column. A more insidious impact of pollution on aquatic organisms is the development of growths, lesions, and eroded fins, or increased body burden of toxic chemicals.

The most common impact of pollution on aquatic life is the shift of a waterbody's naturally occurring and self-sustaining population from one type of aquatic community to another. An example is the shift of a cold water trout stream to a warm water carp-dominated stream. Changes in aquatic community structure and function may occur due to a variety of reasons, but the most common are an elevation of temperature, a lowering of available dissolved oxygen, and an increase in sedimentation due to land use practices within the watershed.

The persistence of chemicals in bottom sediment poses risks to both aquatic life and humans. These chemicals may be toxic to bottom-dwelling aquatic organisms. Some of these chemicals, like mercury and PCBs, bioaccumulate in fish tissue and pose a potential threat to humans and other organisms that consume the fish. In their 1998 305(b) reports, 11 states and tribes listed 115 separate sites with contaminated sediments. These states and tribes most

frequently listed metals, PCBs, pesticides, PAHs, and other priority organic chemicals as the source of contamination. They identified industrial and municipal discharges (both past and present), landfills, resource extraction, and abandoned hazardous waste disposal sites as the primary sources of contamination.

What Is Being Done to Restore and Maintain Water Quality?

Public polls consistently document that Americans value water quality. In addition to its economic benefits, clean water provides recreational and aesthetic benefits. As a result, local, state, and federal agencies, the private sector, and other organizations are working to improve water quality. According to President Clinton's *Clean Water Act Initiative: Analysis of Costs and Benefits*, these partners spend between $63 billion and $65 billion dollars each year to improve and protect water quality.

This study estimated that private sources spend a combined total of about $30 billion per year on pollution prevention and control efforts. Agriculture spends another $500 million per year on activities that reduce its impact on water quality, including implementation of best management practices to control the effects of nonpoint source runoff. Municipalities spend a total of $23 billion per year, primarily on wastewater treatment plants, drinking water treatment, and storm water pollution control.

State governments dedicate almost $500 million and federal governments dedicate almost $10 billion to water resource protection and restoration efforts each year. These efforts include developing and revising water quality standards, monitoring and assessing water quality, characterizing causes and sources of impairment, developing total maximum daily loads and allocating these loads to point and nonpoint sources, implementing permitting programs to address point sources, and developing and implementing best management practices to control nonpoint source pollution.

Significant resources are dedicated to restoring and maintaining water quality. Water quality monitoring and assessment is a critical tool to help ensure that these resources are used effectively to achieve water quality goals. EPA and state environmental agencies recognize that water quality monitoring and assessment programs need continued strengthening to be able to evaluate the effectiveness of water quality protection and restoration efforts.

EPA continues to work with states and other partners to increase the quality and comprehensiveness of water quality monitoring and assessment programs. This is achieved through data sharing and development of consistent monitoring designs and assessment criteria. EPA provides technical assistance, guidance, and resources for monitoring design and implementation. EPA and its partners including states, tribes, other federal agencies, and other public and private monitoring organizations are developing a Consolidated Assessment and Listing Methodology (CALM) that will provide a consistent approach for characterizing water quality under both Sections 305(b) and 303(d) of the Clean Water Act.

For more information on CALM, visit EPA's website at **www.epa.gov/owow/monitoring/wqreport.html.**

For More Information

For more information about the *National Water Quality Inventory: 1998 Report to Congress*, visit EPA's Office of Water 305(b) website at http://www.epa.gov/305b, call EPA's Assessment and Watershed Protection Division at (202) 260-7040, or contact:

U.S. EPA (4503F)
Assessment and Watershed Protection Division
401 M Street, SW
Washington, DC 20460

For a copy of the *National Water Quality Inventory: 1998 Report to Congress* (EPA-841-R-00-001) or related materials, call 1-800-490-9198, fax your order to EPA's National Service Center for Environmental Publications at (513) 489-8695 (include EPA number and document title), or send your order to:

National Service Center for Environmental Publications
11029 Kenwood Road, Building 5
Cincinnati, OH 45242

- ❑ *National Water Quality Inventory: 1998 Report to Congress* (434 pages) (EPA841-R-00-001)
- ❑ *National Water Quality Inventory: 1998 Report to Congress Appendixes* (diskette) (EPA841-C-00-001)
- ❑ *Water Quality Conditions in the United States: A Profile from the National Water Quality Inventory: 1998 Report to Congress* (2 pages) (EPA841-F-00-006)