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Part I

Water Quality Assessments

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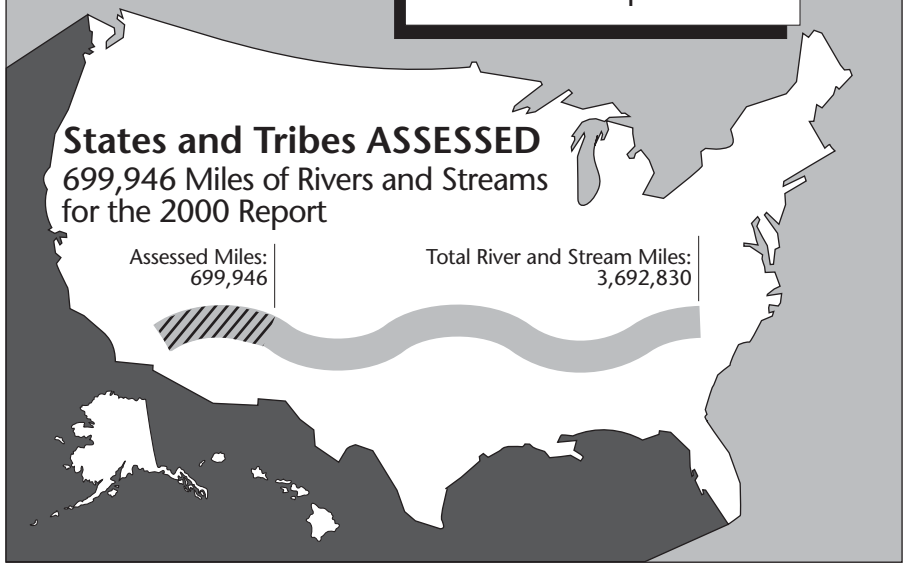
Rivers and Streams

All 50 states, 2 interstate river commissions, American Samoa, Guam, Puerto Rico, the District of Columbia (collectively referred to as states in the rest of this chapter), and 3 American Indian tribes rated river water quality in their 2000 Section 305(b) reports (see Appendix A, Table A-1, for individual state and tribal information). These states and tribes assessed water quality in 699,946 miles of rivers and streams (19% of the total miles of all rivers and streams in the country) (Figure 2-1). Most of the assessed rivers and streams are perennial waterbodies that flow all year, although some assessments included nonperennial streams that flow only during wet periods.

Altogether, the states and tribes assessed 142,480 fewer river and stream miles in 2000 than in 1998. This 17% decrease is primarily a result of changes in assessment and reporting methods in a few states. The changes for the most part reflect a move toward the use of more reliable monitoring data and a greater reluctance to include qualitative

States and Tribes ASSESSED 19% of their total river and stream miles[a] for the 2000 report

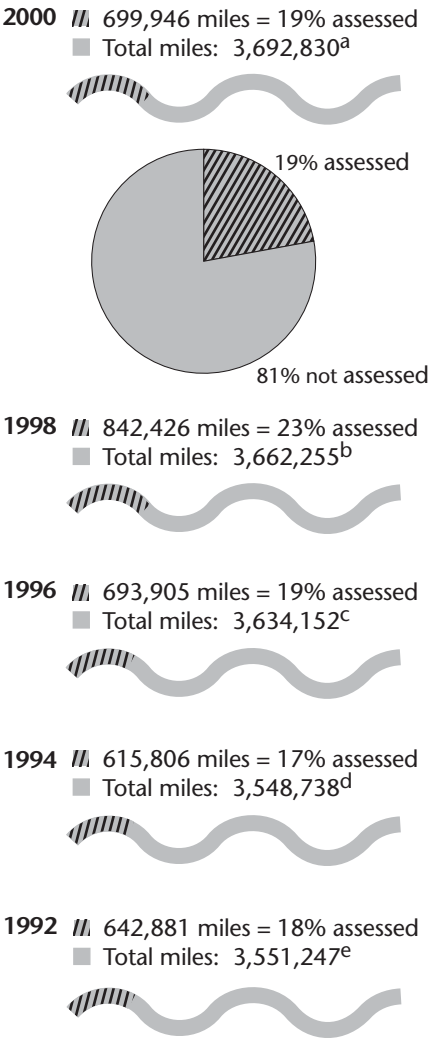
Figure 2-1



This figure compares the total miles of rivers and streams (combination of perennial and intermittent) with the subset that were assessed by states for the 2000 water quality report.

Based on data contained in Appendix A, Table A-1.

River and Stream Miles Assessed by States and Tribes



[a]Source: 2000 state and tribal Section 305(b) reports.
[b]Source: 1998 state and tribal Section 305(b) reports.
[c]Source: 1996 state and tribal Section 305(b) reports.
[d]Source: 1994 state and tribal Section 305(b) reports.
[e]Source: 1992 state and tribal Section 305(b) reports.

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information or older data in water quality assessments. For instance, in Wyoming, a new "Credible Data" law prevented the state from submitting over 90,000 miles of river and stream assessments that were based on older, evaluated data. For this reporting cycle, New York reclassified almost 50,000 river and stream miles as "unassessed" because limited reliable monitoring data were available to support assessments made in previous years. In the past, New York had listed all these waters as assessed with good quality unless specific problems were reported. The state is currently revising its monitoring program and plans to revisit these unassessed waters in coming years. Virginia has revised its assessment strategy in a similar way based on EPA guidance, which has led to a decrease of 10,000 assessed miles since 1998. Virginia is placing greater emphasis on highly reliable monitoring data, and is also better able to track the size of monitored waters with the use of an EPA-developed database. All of these cases indicate a shift toward the use of higher quality data to make more accurate water quality assessments.

Some states did see an increase in the number of river and stream miles assessed from 1998 to 2000. For instance, Pennsylvania's efforts to survey previously unassessed waters resulted in the addition of over 20,000 assessed miles. Other states reported significant increases in assessed river and stream miles because of changes in their monitoring program or assessment process.

In 2000, the states and tribes used recent monitoring data to determine water quality conditions in 46% of their assessed river and stream miles, compared to 43% in 1998 (see Appendix A, Table A-2, for individual state and tribal information). Evaluated assessments, based on qualitative information or monitoring information more than 5 years old, were used for 36% of the assessed river and stream miles for the 2000 reporting cycle. States did not specify whether the remaining 18% of assessed river and stream miles were monitored or evaluated.

The summary information presented in this chapter applies strictly to the portion of the nation's rivers and streams assessed by the states and tribes. EPA cannot make generalizations about the health of all of our nation's rivers based on data extracted from the 305(b) reports.

Summary of Use Support

Most states and tribes rate how well a river supports individual uses (such as swimming and aquatic life) and then consolidate individual use ratings into a summary table. This table divides assessed rivers into those miles that are

- **Good** – Fully supporting all of their uses or fully supporting all uses but threatened for one or more uses
- **Impaired** – Partially or not supporting one or more uses
- **Not attainable** – Not able to support one or more uses.

Forty-four states, two tribes, one interstate commission, American Samoa, Guam, Puerto Rico, and the District of Columbia reported summary use support status for rivers and streams in their 2000 Section 305(b) reports (see Appendix A, Table A-2, for individual state and tribal information). Another six states reported individual use support status but did not report summary use support status. In such cases, EPA used aquatic life use support status to represent summary water quality conditions in the state's rivers and streams.

Altogether, states and tribes reported that 61% of 699,946 assessed river and stream miles fully support all of their uses. Of the assessed waters, 53% fully support designated uses and approximately 8% fully support all uses but are threatened for one or more uses. These threatened waters may need special attention and additional monitoring to prevent further deterioration (Figure 2-2). Some form of pollution or habitat degradation impairs the remaining 39% of the assessed river and stream miles.

It is important to note that 10 states did not include the effects of statewide fish consumption advisories for mercury when calculating their summary use support status in rivers and streams. Connecticut, Indiana, Kentucky, Maine, Massachusetts, New Hampshire, New Jersey, North Carolina, Ohio, and Vermont excluded the impairment associated with statewide mercury advisories in order to convey information that would have been otherwise masked by the fish consumption advisories. New York excluded the effect of a statewide PCB/chlordane/mirex/DDT fish consumption advisory for rivers and streams in its summary data. If these advisories had been included, all of these states' rivers and streams would have received an impaired rating.

Individual Use Support

Individual use support assessment provides important detail about the nature of water quality problems in our nation's surface waters. There are six general use categories that EPA uses to summarize the often more detailed uses reported by the states and tribes.

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61% OF ASSESSED river and stream miles have good water quality.

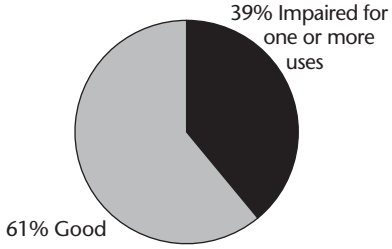
Assessed Waters

Total rivers and streams = 3,692,830 miles[a]
Total assessed = 699,946 miles

Of the assessed miles:

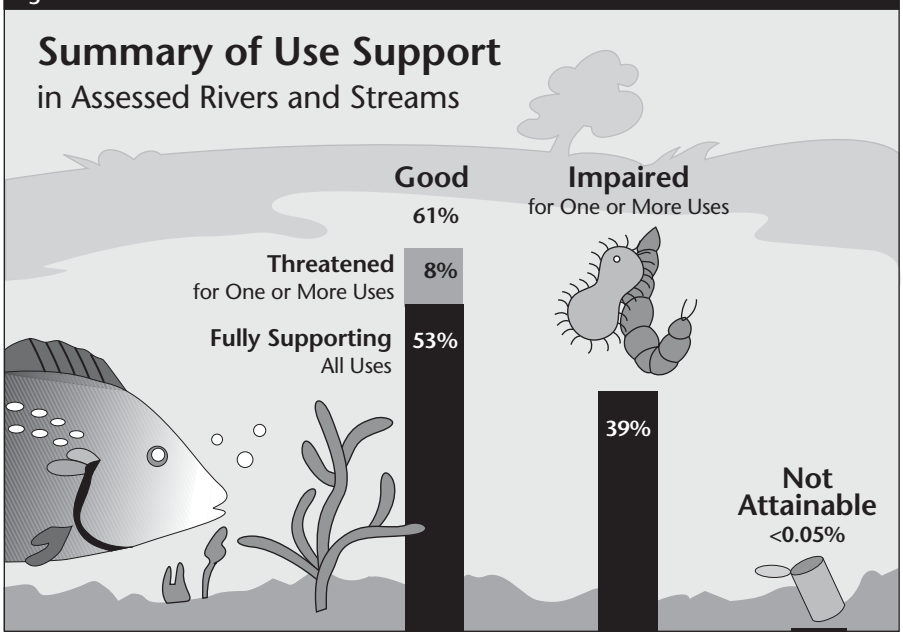
- 46% were monitored
- 36% were evaluated
- 18% were not specified

Summary of Assessed Water Quality



[a]Source: 2000 state and tribal Section 305(b) reports.

Figure 2-2



This figure presents the status of the assessed miles of rivers and streams. Of the close to 700,000 miles of rivers and streams assessed, 61% fully support their designated uses and 39% are impaired for one or more uses. Eight percent of the assessed waters are fully supporting uses but threatened.

Based on data contained in Appendix A, Table A-2.

Note: Figures may not add up to 100% due to rounding.

■ **Aquatic life support** – Is water quality good enough to support a healthy, balanced community of aquatic organisms including fish, plants, insects, and algae?

■ **Fish consumption** – Can people safely eat fish caught in the river or stream?

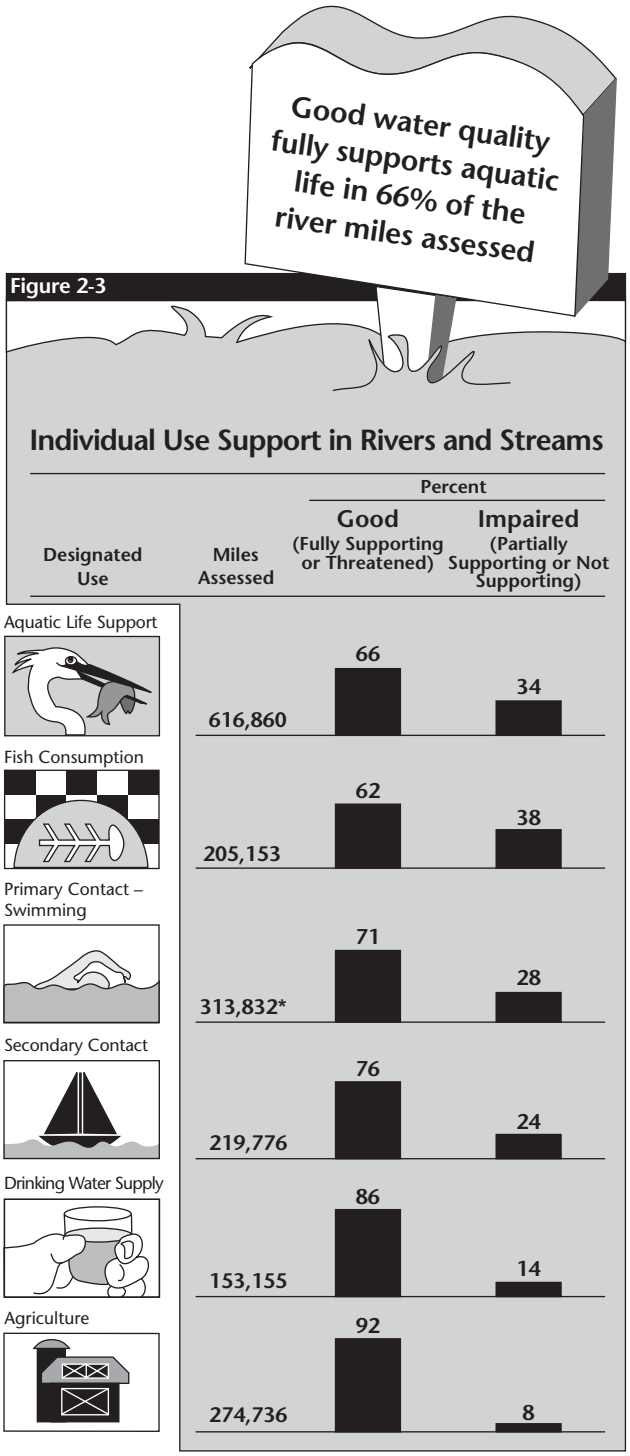
■ **Primary contact recreation** (swimming) – Can people make full body contact with the water without risk to their health?

■ **Secondary contact recreation** – Is there a risk to public health from recreational activities on the water, such as boating, that expose the public to minimal contact with the water?

■ **Drinking water supply** – Can the river or stream provide a safe water supply with standard treatment?

■ **Agricultural uses** – Can the water be used for irrigating fields and watering livestock?

Only four states and one tribe did not report individual use support status of their rivers and streams (see Appendix A, Table A-3, for individual state and tribal information). The reporting states and tribes assessed the status of aquatic life and swimming uses most frequently (see Figure 2-3) and identified more impacts on aquatic life and swimming uses than on the four other individual uses. These states and tribes reported that fair or poor water quality affects aquatic life in 210,790 stream miles (34% of the 616,860 miles assessed for aquatic life support). Fair or poor water quality conditions also impair swimming activities in 88,679 miles (28% of the 313,832 miles assessed for swimming use support).



This figure presents a tally of the miles of rivers and streams assessed by states for each category of designated use. For each category, the figure summarizes of the proportion of the assessed waters rated according to quality.

*0.5% rated "Not Attainable."

Based on data contained in Appendix A, Table A-3.

Water Quality Problems Identified in Rivers and Streams

When states and tribes rate waters as impaired, they also attempt to identify the causes and sources of impairment. Figures 2-4 and 2-5 identify the pollutants and sources of pollutants that impair the most river and stream miles. It is important to note that information about pollutants and sources is incomplete because the states cannot always identify the pollutant(s) or source of pollutant(s) responsible for every impaired river segment.

Pollutants and Stressors Impacting Rivers and Streams

A total of 55 states and tribes reported the number of river and stream miles impaired by individual pollutants and stressors (see Appendix A, Table A-4, for individual state and tribal information).

The states and tribes report that bacteria (pathogens) pollute 93,431 river and stream miles (13% of the assessed river and stream miles and 35% of the impaired river and stream miles). Bacteria provide evidence of possible fecal contamination that may cause illness in people. States use bacterial indicators to determine if waters are safe for swimming and drinking. Bacteria commonly enter surface waters in inadequately treated sewage, fecal material from wildlife, and in runoff from pastures, feedlots, and urban areas.

The states and tribes report that siltation, comprising tiny soil particles, remains one of the most widespread pollutants affecting assessed rivers and streams. Siltation, which is also referred to as sedimentation, impairs 84,503 river and stream miles (12% of the assessed river and stream

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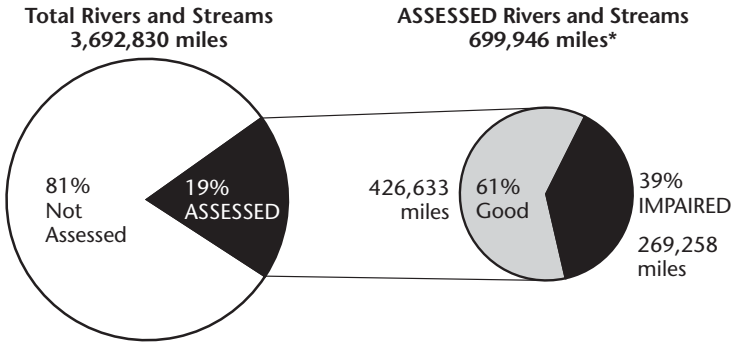
miles and 31% of the impaired river and stream miles). Siltation alters aquatic habitat, suffocates fish eggs and bottom-dwelling organisms, and can interfere with drinking water treatment processes and recreational use of a river (see Figure 2-6). Sources of siltation include agriculture, urban runoff, construction, and forestry.

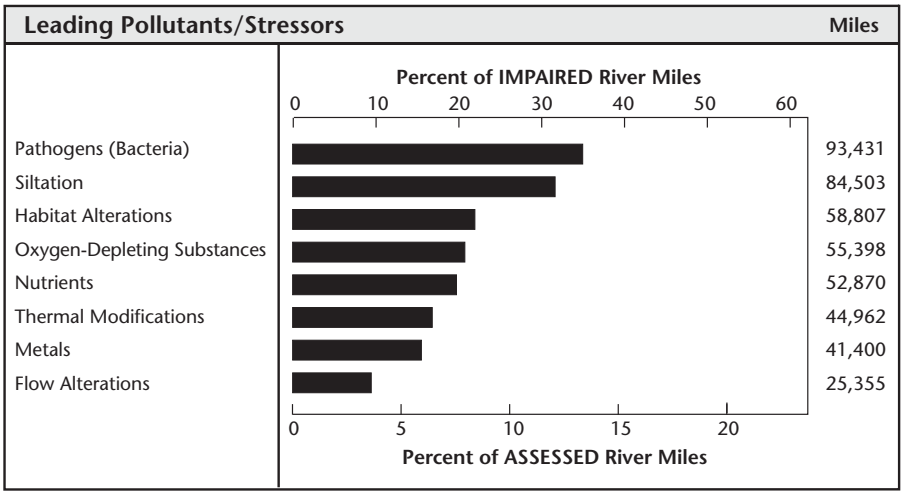
Alteration to river and stream habitats was reported by the states and tribes to cause impairment to 58,807 miles (8% of the assessed river and stream miles and 22% of the impaired river and stream miles). In this case, only habitat alterations that do not affect water flow are considered because states and tribes report stream flow alterations (such as dams and irrigation) under a different category. Habitat alterations that do not directly affect stream flow, such as the removal of woody debris or stream bottom cobblestones, can adversely affect aquatic organisms whose health and abundance depend on specific physical and environmental conditions. (For example, small organisms such as young fish use submerged logs to gain protection from predators.) Habitat modifications result from human activities such as flow regulation, logging, and land-clearing practices.

In addition to siltation, bacteria, and nonflow habitat alterations, the states and tribes also reported oxygen-depleting substances, nutrients, thermal modifications, metals, and flow alterations as leading stressors. Often, several pollutants and stressors adversely affect a single river segment. For this reason, the river and stream miles impaired by each pollutant or stressor do not add up to 100% in Figure 2-4.

Figure 2-4

Leading POLLUTANTS in Impaired Rivers and Streams





States assessed 19% of the total miles of rivers and streams for the 2000 report. The larger pie chart on the left illustrates this proportion. The smaller pie chart on the right shows that, for the subset of assessed waters, 61% are rated as good and 39% as impaired. When states identify waters that are impaired, they describe the pollutants or processes causing or contributing to the impairment. The bar chart presents the leading causes and the number of river and stream miles impacted. The percent scales on the upper and lower x-axes of the bar chart provide different perspectives on the magnitude of the impact of these pollutants. The lower axis compares the miles impacted by the pollutant to the total ASSESSED miles. The upper axis compares the miles impacted by the pollutant to the total IMPAIRED miles.

Based on data contained in Appendix A, Table A-4.

*Includes miles assessed as not attainable.

Note: Percentages do not add up to 100% because more than one pollutant or source may impair a river segment.

Sources of Pollutants Impacting Rivers and Streams

A total of 55 tribes and states reported sources of pollution related to human activities that impact some of their rivers and streams (see Appendix A, Table A-5, for individual state and tribal information). The most commonly reported sources include agriculture, hydrologic modifications, and habitat modifications.

Agriculture is listed as a source of pollution for 128,859 river and stream miles (18% of assessed river and stream miles, 48% of impaired river and stream miles) (Figure 2-5). For the 30 states and tribes that reported the number of river and stream miles affected by specific types of agricultural activities, the most common types are: nonirrigated crop production (degrades 26,830 miles), animal feeding operations (degrades

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24,616 miles), and irrigated crop production (degrades 17,667 miles).

Hydrologic modifications include flow regulation and modification, channelization, dredging, and construction of dams. These activities may alter a river's habitat in such a way that it becomes less suitable for aquatic life. For example, dredging may destroy the river-bottom habitat where fish lay their eggs. The states and tribes report that hydrologic modifications degrade 53,850 river and stream miles (8% of the assessed miles and 20% of the impaired miles).

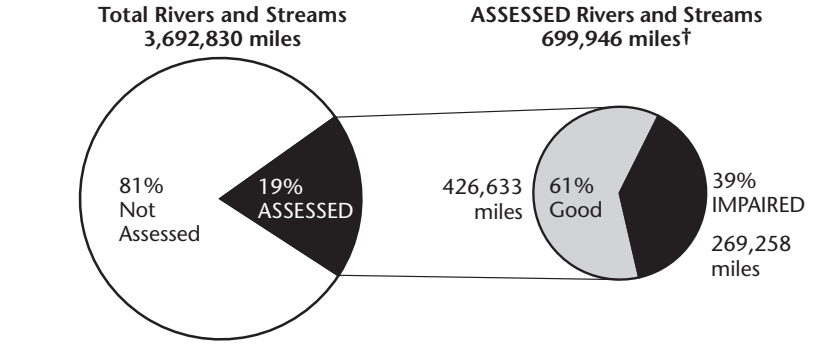
Identifying Sources Is a Challenge

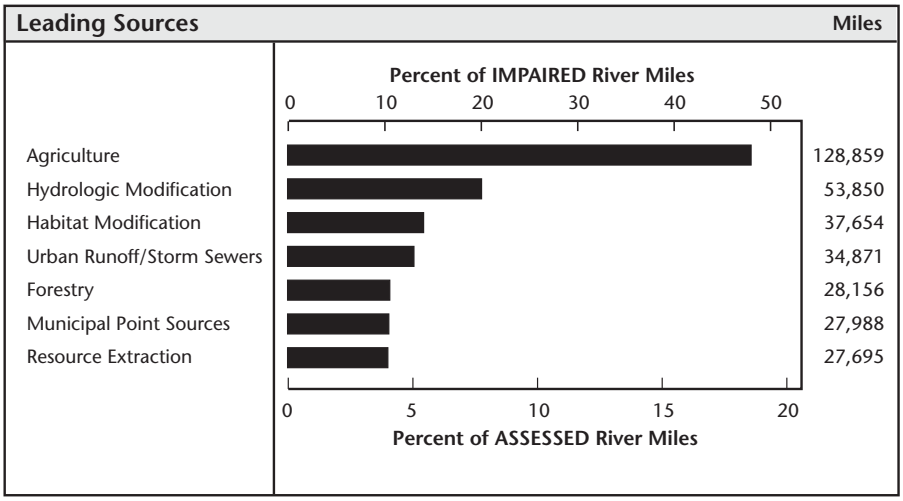
It is relatively easy to collect a water sample and identify pollutants causing impairments, such as fecal coliform bacteria indicating pathogen contamination. However, detecting and ranking sources of pollutants can require monitoring pollutant movement from numerous potential sources, such as failing septic systems, agricultural fields, urban runoff, municipal sewage treatment plants, and local waterfowl populations. Often, states are not able to determine the particular source responsible for impairment. In these cases, many states report the source of impairment as "unknown." In the 2000 305(b) reports, states reported unknown sources impairing 39,056 river and stream miles (6% of the assessed river and stream miles).

The pollutants/processes and sources shown here may not correspond directly to one another (i.e., the leading pollutant may not originate from the leading source). This may occur because a major pollutant may be released from many minor sources. It also happens when states do not have the information to determine all the sources of a particular pollutant/stressor.

Figure 2-5

Leading SOURCES of River and Stream Impairment*





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Based on data contained in Appendix A, Table A-5.

*Excluding unknown and natural sources.

†Includes miles assessed as not attainable.

Note: Percentages do not add up to 100% because more than one pollutant or source may impair a river segment.

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PATHOGENS are the most common pollutant affecting assessed rivers and streams. Pathogens

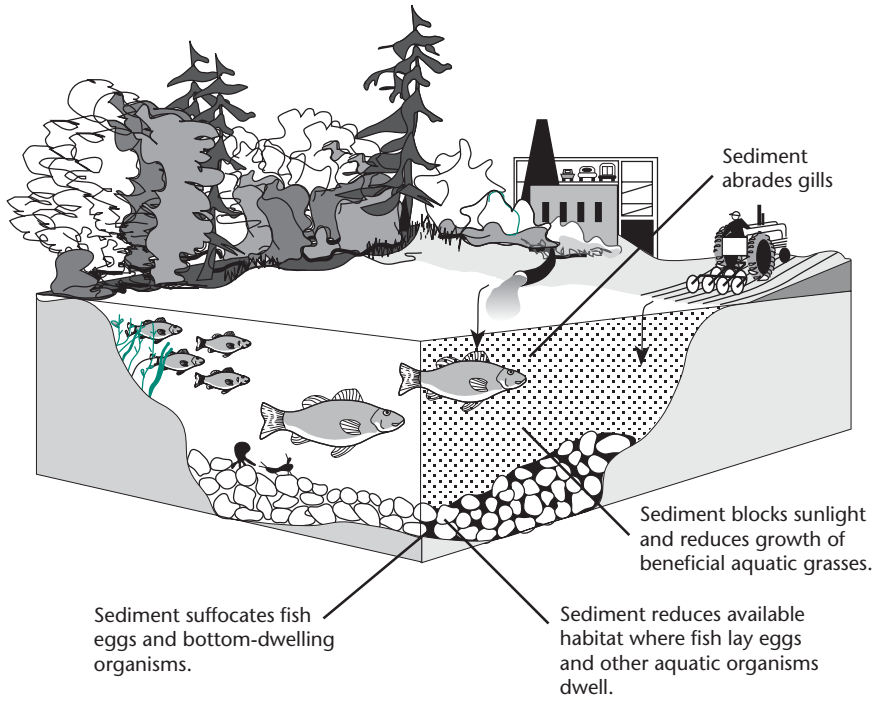
- Are found in 13% of the assessed rivers and streams (see Figure 2-4).
- Contribute to 35% of reported water quality problems in impaired rivers and streams.

AGRICULTURE is the leading source of pollution in assessed rivers and streams. According to the states, agricultural pollution problems

- Affect 18% of the assessed rivers and streams
- Contribute to 48% of reported water quality problems in impaired rivers and streams (see Figure 2-5).

Figure 2-6

The Effects of Siltation in Rivers and Streams



Siltation is one of the leading pollution problems in the nation's rivers and streams. Over the long term, unchecked siltation can alter habitat with profound adverse effects on aquatic life. In the short term, silt can kill fish directly, destroy spawning beds, and increase water turbidity resulting in depressed photosynthetic rates.

Habitat modifications—changes such as the removal of riparian (stream bank) vegetation—can make a river or stream less suitable for the organisms inhabiting it. The states and tribes report that habitat modifications degrade 37,654 river and stream miles (5% of the assessed miles and 14% of the impaired miles).

In urban areas, runoff from impervious surfaces may include sediment, bacteria (e.g., from pet waste), toxic chemicals, and other pollutants. Development in urban areas can increase erosion that results in higher sediment loads to rivers and streams. Storm sewer systems may also release pollutants to rivers and streams during wet weather events. The states and tribes report that urban runoff and storm sewers pollute 34,871 river and stream miles (5% of the assessed miles and 13% of the impaired miles).

The states and tribes also reported resource extraction, municipal point sources (sewage treatment plants), and commercial forestry activities as leading sources of pollution to rivers and streams. In addition, the states and tribes reported that unknown sources impair almost 40,000 miles of rivers and streams, and natural sources impair approximately 31,000 miles of rivers and streams. Natural sources include soils with natural deposits of arsenic or salts that leach into waterbodies, waterfowl (a source of nutrients and bacteria), and drought, which causes low-flow conditions and elevated water temperatures.

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