

1996 Ohio Water Resource Inventory Fact Sheet: Streams & Rivers Causes & Sources of Impairment



water, sediment and effluents; data on the contaminants in fish flesh; and data on the physical nature of streams (*i.e.*, aquatic habitat, siltation). This data is essential to identify the factors that are limiting or impair aquatic life and which constitute threats to human health.

Causes of impairment are the "agents" that actually damage or impair the aquatic life in a stream, such as the toxic effects of heavy metals or acidic water. **Sources** of impairment are the origin of the agent. For example, an industry may discharge a heavy metal or a coal mine may be the source of acid water leaching into a stream.

The leading **causes** of impairment to aquatic life in Ohio streams are listed in the adjacent figure (bottom left). The leading cause is **organic enrichment**, which includes low dissolved oxygen and excessive organic pollutants. This largely originates from the inadequate treatment of municipal wastewater (a "point source") and is the most rapidly *declining* cause of impairment. **Habitat alterations** and **siltation** are the second and third leading causes and will likely emerge as the leading causes in two or three years. These causes are termed "nonpoint source" in origin because they do not emanate from pipes, but instead are a result of

Ohio's streams and rivers have seen a substantial improvement in quality over the past 10-15 years. The majority of this improvement has been a result of investments and improvements in municipal wastewater treatment plants across Ohio.

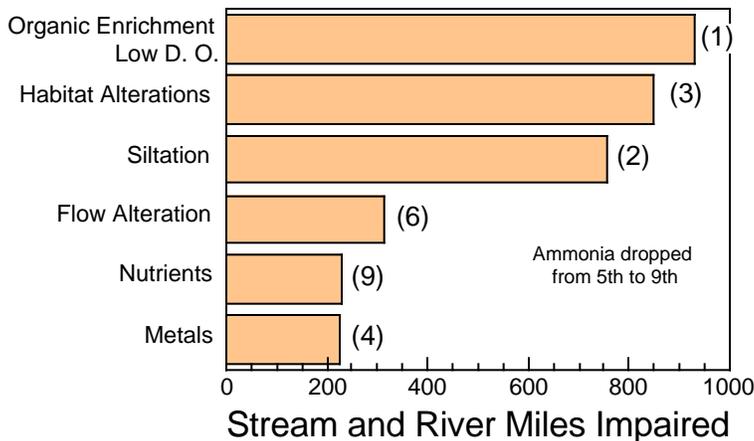
Ohio uses the fish and invertebrate communities found in streams to assess conditions in Ohio's flowing waters. Aquatic animals are generally more sensitive to pollutants compared to other animals because they inhabit the water all of the time. A healthy stream community is also associated

with higher quality recreation opportunities (e.g., fishing, canoeing, and other outdoor-related activities).



In addition to the biological data, Ohio EPA also collects information on the chemical quality of the

Six Leading Causes of Aquatic Life Use Impairment

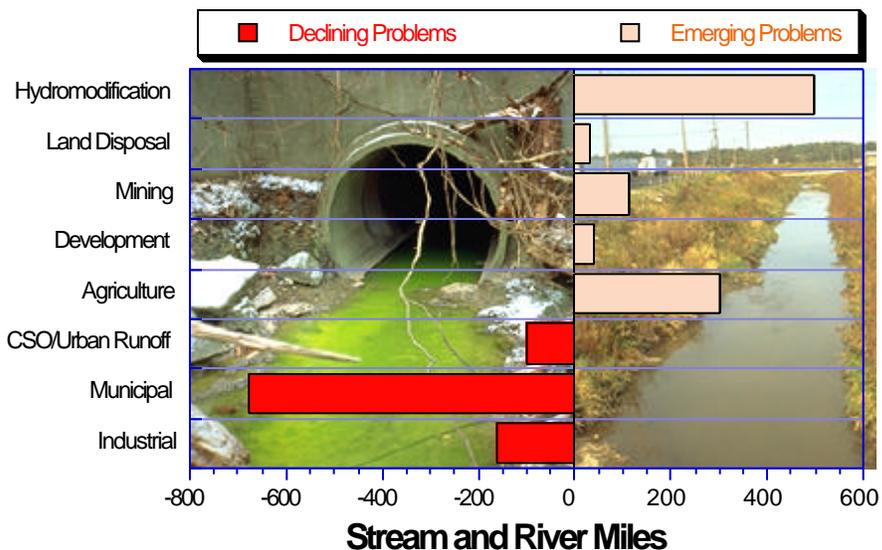


Causes of Impairment in Ohio's Rivers and Streams

land use activities or direct disturbance of stream ecosystems (e.g., by dredging, urbanization, riparian vegetation removal).

Other point source-related **causes** of aquatic life impairment have also declined in importance (see top right figure). Impacts from heavy **metals** (e.g., copper, cadmium, lead, etc.) have declined from the third leading cause to the sixth since 1988. **Ammonia**, a toxic component of municipal wastewater, has dropped from the second leading cause in 1988 to ninth. This dramatic improvement resulted from the construction of new sewage treatment plants in the 1980s at a cost of approximately \$6 billion throughout Ohio.

The leading **sources** of impairment are listed in the figure below. **Point sources** of impairment are the most rapidly declining source. The importance of **hydromodification** (activities that result in habitat degradation) as a leading source of impairment will likely increase over the



Identification of declining and emerging sources of aquatic life impairment

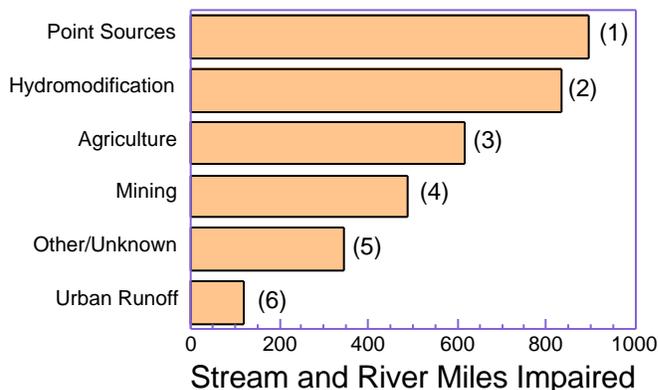
next several years. This trend is illustrated in the figure (see above) that compares declining and emerging sources of impairment over the past 15 years. Such impacts are termed "emerging" problems because while always present, they were frequently masked by the more severe point source impacts of the past.

The information and knowledge illustrated in this fact sheet will be incorporated into the Ohio EPA strategic planning process, which will direct future efforts to protect and restore the water resources of Ohio in a cost-effective and scientifically sound manner.



The aquatic life in a stream is a sensitive measure of the overall quality of the resource.

Six Leading Sources of Aquatic Life Use Impairment



Sources of Impairment in Ohio's Rivers and Streams

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