

Difference in Water Quality Impairments: Lakes vs. Rivers

Use support varies between lakes and rivers

As shown in Figures 4 and 5, not all of the beneficial uses designated for each waterbody in Iowa are equally likely to be identified as impaired. Although the primary contact recreation (swimming-type) uses of both lakes and rivers/streams are the most likely of all beneficial uses to be impaired, aquatic life uses of lakes are assessed as “fully supporting” most of the time, while this use in river/stream waterbodies has a higher probability of being assessed as impaired (~45% of river and stream segments assessed as “impaired” for aquatic life uses). The tendency of rivers and streams to be impaired for aquatic life uses reflects the greater potential impacts to river/stream aquatic life when compared to lakes (for example, higher turbidity, larger watersheds, greater susceptibility to fish kills from pollution inputs). It also reflects that a calibrated biotic index is available for streams, something that is being prepared for lakes, but is not currently available.

The degree to which drinking water use is supported also varies between lakes and rivers. This difference is related to the tendency for levels of nitrate and other contaminants (for example, arsenic) to be higher in rivers than in lakes. Fish consumption uses of both lakes and rivers/streams are seldom assessed as impaired. This reflects the generally low levels of toxic contaminants in Iowa fish.

Lakes and rivers/streams: impaired by different water quality problems

The types of water quality problems that impair lakes are different than those that impair rivers and streams. Lake water quality is most commonly impacted by reduced water clarity caused by either too much algae or suspended sediment and other material in the water column, high levels of pH caused by excessive algae, or high levels of indicator bacteria (*E. coli*) at lake beaches (Figure 6). The most commonly identified impairments of Iowa’s rivers and streams are (1) high levels of indicator bacteria, (2) biological condition less than the reference condition as measured by analysis of the fish and

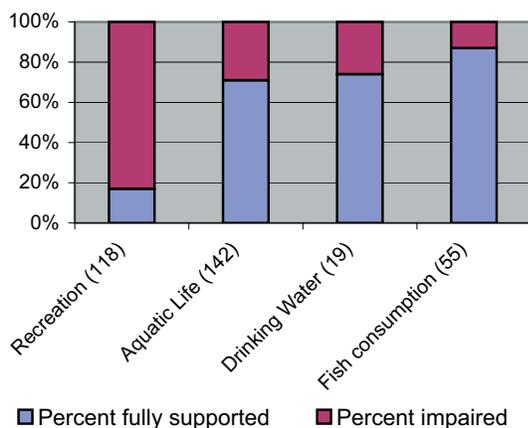


Figure 4. Percent of assessed lakes impaired versus fully supported by designated beneficial use. Number of lakes assessed for each use is in parentheses.

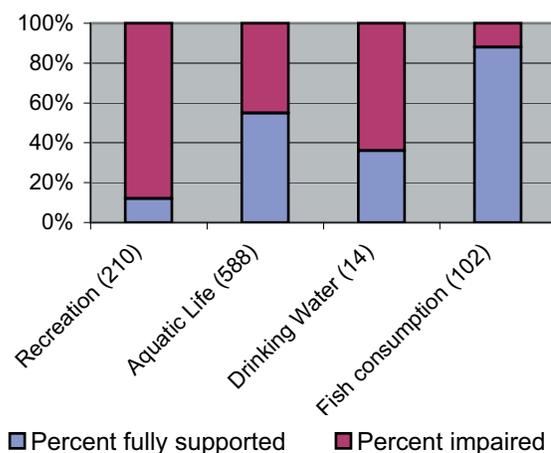


Figure 5. Percentage of assessed river/stream waterbodies impaired versus fully supported by designated beneficial use. Number of stream/river segments assessed for each use is in parentheses.

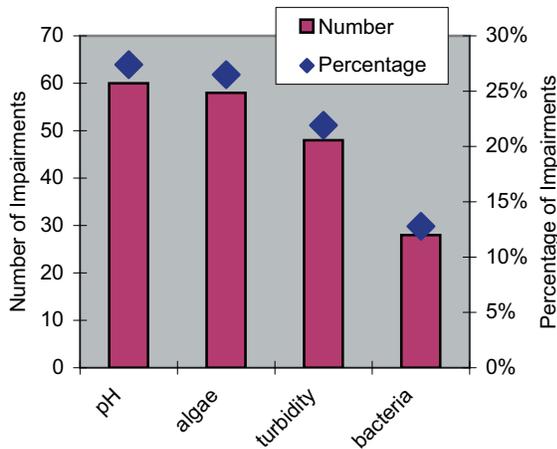


Figure 6. Most commonly identified causes of impairment at Iowa lakes, 2008.

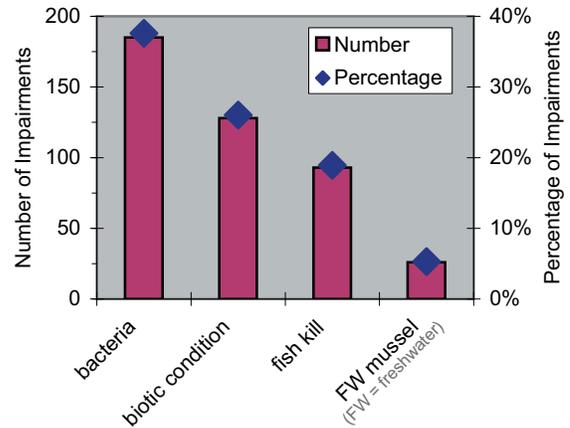


Figure 7. Most commonly identified causes of impairment in Iowa river/stream segments, 2008.

invertebrate populations, (3) fish kills caused primarily by unintended discharge of animal waste and fertilizer to streams and rivers, and (4) large declines in populations of freshwater mussels over the last 25 years (Figure 7).

Just as the types of impairments at lakes differ from those in rivers and streams, the most common causes of impairment of a given beneficial use in lakes can differ from those in rivers and streams. For example, swimming use in lakes is most likely to be impaired by poor water clarity caused either by too much algae or suspended material in the water column. In rivers, however, high levels of indicator bacteria are the most commonly – in fact, the only – reported cause of impairment of swimming use.

None of the leading causes of impairment of aquatic life use identified for Iowa’s lakes are the same as those impairing the aquatic life use of Iowa’s rivers and streams. Lake aquatic life use is most often impaired by levels of pH that exceed state water quality criteria. Turbidity (poor water clarity), especially as it affects the ability of fish and other aquatic life to grow and reproduce, is the second-leading cause of aquatic life use impairment at Iowa’s lakes.

The leading cause of impairment of aquatic life uses in Iowa’s rivers and streams, however, is a level of biotic condition that does not meet the regional reference condition of biotic integrity. See Water Fact Sheet 2001-3 Biological Assessment of Iowa’s Streams and Rivers (www.igsb.uiowa.edu/webapps/gsb-pubs/pdf/WFS-2001-03.pdf) for more information.

Pollutant-caused fish kills, often caused by animal waste or fertilizer spills, is the second leading cause of impairment of aquatic life use in streams. The third leading cause of impairment of aquatic life use of rivers and streams is the decline in populations of freshwater mussels based on comparisons of state-wide surveys conducted in 1985 to follow-ups conducted in 1998 and 1999. The relatively large number of mussel-related impairments reflects the drastic reductions in the state’s mussel populations.

