Dissolved Oxygen Map

Kinnickinnic River Watershed

- Meets Water Quality Standards at least 85% of the time.
- Meets Water Quality Standards between 50% and 85% of the time.
- Meets Water Quality Standards less than 50% of the time.

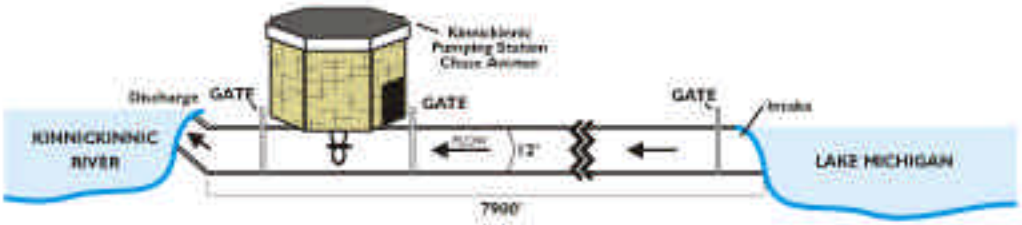
Dissolved Oxygen

In order to sustain or improve fish populations, fish must have plenty of dissolved oxygen, as do the other aquatic organisms that make up the stream or river's food chain and ecosystem. Many factors influence the amount of dissolved oxygen in water including: sunlight, water temperature, the presence of aquatic plants, turbulence of the water, and the amount and type of sediments, to name a few.

Just like humans, fish and other aquatic organisms need oxygen to live. When fish and aquatic organisms breathe, water moves past their gills, and oxygen in the form of microscopic bubbles (dissolved oxygen or DO) is transferred from the water to their bloodstream. Without enough oxygen in the water, desirable species of fish and other aquatic life cannot survive. The amount of dissolved oxygen in water is one of the most important water quality indicators.

For example, the amount of dissolved oxygen increases wherever the water flow becomes turbulent; as water rushes over rapids or cascades over a waterfall, oxygen molecules from the air are absorbed by the water. The more turbulence, the more water is brought into contact with the air, thus allowing more oxygen to dissolve into the water.

The Kinnickinnic River has a long history of dissolved oxygen problems. At the turn of the 19th century, before wastewater treatment existed, sanitary waste ran directly into many of Milwaukee's rivers causing water quality problems, odors and severe dissolved oxygen depletion. At the time, the only solution to the problem was dilution. The City of Milwaukee built two Flushing Tunnels to dilute the polluted river waters with clean Lake Michigan water. One such tunnel, the Kinnickinnic River Flushing Tunnel, was built in 1907. The Flushing Tunnel was designed to pump clean water from the Lake Michigan intake (located at the foot of E. Russell Avenue) nearly 1 ½ miles through a 12-foot diameter pipe to the pump station (located at S. Chase Avenue), where it is discharged into the Kinnickinnic River.



Kinnickinnic Flushing Tunnel

The Flushing Tunnel was capable of pumping approximately 225 million gallons of Lake Michigan water per day into the Kinnickinnic River. By increasing the flow of the Kinnickinnic River, stagnant water was moved downstream, water quality was temporarily improved and the Kinnickinnic River regained some of its aesthetic characteristics. The tunnel was originally powered by a coal-fired steam engine, but today runs on electricity. In the present day it is still used to raise dissolved oxygen levels of the lower Kinnickinnic River when levels drop below 3.0 milligrams per liter of water (mg/L), generally 6 to 12 times per year.

The summer season presents special environmental conditions that greatly influence the amount of dissolved oxygen in the Kinnickinnic River. Because warm water holds less oxygen than cold water, as summer progresses, less oxygen is available for fish and other animals than at summer's onset. Additionally, as people begin to fertilize their lawns, "fertilized" stormwater runoff enters our waterways where it can encourage algae to grow to nuisance levels (blooms) that can further deplete dissolved oxygen. Algae are microscopic aquatic plants that add dissolved oxygen to the water during daylight hours by a process called photosynthesis. However, this process is reversed at night when this same algae consumes dissolved oxygen during respiration. Because fish, plants and other aquatic organisms need oxygen 24-hours a day, the day-to-night fluctuations of dissolved oxygen can be significant, even at times reaching the point where there is no available oxygen!

Dissolved Oxygen Stats

Nearly all of the Kinnickinnic River Watershed has dissolved oxygen concerns with the exception of the very lowest Lake Michigan-influenced section of the Kinnickinnic River. Dissolved oxygen concentrations are generally reported in units of milligrams per liter of water (mg/L). Wisconsin Warm Water Quality Standards require a minimum of 5 mg/L of dissolved oxygen in rivers and streams classified to support full fish and aquatic life.