

Lake Oxygen Levels and Winterkill

As most know every winter brings on the possibility of a spring fish kill on our lakes. Over the past few years that threat has been minimal due to the mild winters and low snowfall, but that has not been the case this winter.

Winterkill happens when the dissolved oxygen (DO) levels in lakes fall below the minimum level for them to survive. Different fish species have different minimum DO tolerance levels. Walleyes are the least tolerant to low DO levels, 1.5ppm, followed by bass 1.0ppm, panfish 0.6ppm, northern pike, carp and perch 0.2ppm, bullheads 0.1ppm, and flathead minnows 0.1ppm or less. Flathead minnows can also survive for a short period of time without oxygen, they have adapted very well to low oxygen environments.

Winterkill is a natural event in shallow lakes and ponds, but does not happen in every lake. If a lake is deep enough, generally if 25 percent of the lake is 15 feet or deeper, there is enough oxygen in the water to get fish through the winter. At the start of the winter the cold lake water holds about 14 parts per million (ppm) of DO, but as soon as the ice forms there is no more atmospheric exchange with the water and the clock starts ticking.

When oxygen levels reach 5ppm fish get stressed and when it hits 2ppm they become real nervous. The last 2ppm goes fast and there is a good chance that nearly all the oxygen will disappear. Also, lethal gases can form. Ammonia and hydrogen sulfide are produced from the decaying vegetation and without the ability for it to be released into the atmosphere it becomes toxic to the fish.

That brings us to this winter. The combination of early cold weather and calm conditions allowed for most lakes to freeze over very quickly and early. Early snow fall and continued cold temperatures followed and the lakes had the perfect recipe for a potential winterkill. As mention above, with a layer of ice on the lake there is no more atmospheric exchange with the water, and with the early snowfall on top of that ice no light can reach the aquatic plants below stopping oxygen generation through photosynthesis.

We will see what happens this February, March and April. Sometimes the February thaw will bring oxygenated runoff to the lake and an early ice off will re-oxygenate the lakes saving some fish. If this does not happen we may see a larger than normal fish kill this spring on our shallow lakes and ponds. Stay tuned...