

WINTERKILL

AQUATIC ANIMAL TIPSHEET

WHAT IS WINTERKILL?

Winterkill is the most common fish mortality event and is generally caused by a depletion of dissolved oxygen, especially in backyard ponds and smaller bodies of water. Although the fish typically die during the winter months, dead fish are observed floating at the surface when the ice starts to break up in the spring. These fish are often decomposing as a result of autolysis and investigations into the cause of mortality don't show obvious signs of infectious disease.

Oxygen is critical for all life including aquatic plants, algae, bacteria and fish. Dissolved oxygen in lakes and rivers comes not only from exchange with the air at the water's surface, but from photosynthesis of aquatic plants and algae. When ice and snow cover a body of water, it limits the sunlight and oxygen that can reach the surface of the water. Without sunlight, aquatic plants and algae stop photosynthesizing and begin "dark phase" reactions that consume oxygen and produce carbon dioxide. When aquatic plants are not exposed to sunlight for a prolonged period of time, the plants begin to die and the subsequent decomposition uses even more oxygen. This causes the dissolved oxygen in the water to decrease followed by fish death. The critical threshold for fish is usually around 2-3 mg/L. Due to the lack of surface turnover during the winter months, the low oxygen is most severe at the bottom of the lake and moves up towards the surface as oxygen deprivation progresses.

PREVENTING WINTERKILL

Winterkill can be avoided by preventing complete icing over of the water surface and good management of the water body (especially in backyard ponds) to prevent the accumulation of excessive algae and organic debris. Aerating the water body with a diffuser will help to maintain a small, open water area. Removal of at least 30% of the snow from the surface of a pond usually provides adequate sunlight transmission for aquatic plants to resume photosynthesis. Be sure the ice is safe before clearing any snow!

FISH RECOVERY

The biomass of fish in a pond prior to the winter is an important factor. Fish health is also important as some conditions affecting the gills such as parasites or infections will decrease the respiratory capacity of fish making them more sensitive to winterkill. When winterkill events occur in larger lakes, it is rarely serious long term because lakes support thousands of fish. If you suspect a winterkill event in a wild fish community, call the Ministry of Natural Resources and Forestry at 1-800-667-1940.

WINTER SEVERITY

The most important factors contributing to winterkill are abundant organic matter in a shallow water body coupled with winter severity. Mild winters result in little ice formation and some open water. Cold winters with early ice formation and an accumulation of snow on top are the most significant for winterkill because sunlight will not penetrate through the ice. Shallow lakes and backyard ponds have less volume, less dissolved oxygen and are less resistant to icing over and losing sunlight penetration.

Ice barrier forms on the surface, preventing oxygen circulation



Accumulated snow blocks sunlight & impede photosynthesis



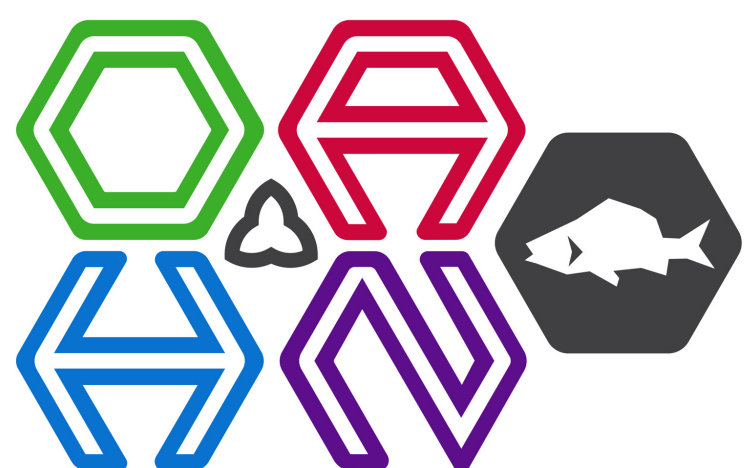
Aquatic vegetation dies, limited oxygen used for decomposition



Oxygen depletion becomes critical



Fish death



For more information:

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