Conservation Matters
A monthly column focused on conservation education, as the result of collaboration among several area conservation commissions and organizations. If your town's commission or conservation organization would like to contribute articles, please contact Jessica Tabolt Halm jess_tabolt@hotmail.com

Title: Under the Ice

Written by: Lisa Doner, Plymouth Conservation Commissioner

January in New Hampshire brings with it a sense of nature on hold, frozen, trapped by ice and snow until the sun's strength returns in spring. Vistas of local ponds and lakes covered by sheets of ice strengthen the impression that life is absent. The ice becomes a favored platform for ice huts, snowmobile roads, pond hockey games and cross-country skiing. It is easy to forget that the ice is just a skin, an insulating cap that rides atop waters still carrying the traces left by the previous fall and summer seasons.

Under the ice, life abounds, but of a different sort than we usually envision. The waters are dark, the sun's brightest rays obscured by 2-3 feet of snow-clouded ice. And the waters are cold, just fractions of a degree above freezing. Well, except at the bottom, where the water may be several degrees warmer than at the surface. This phenomenon, called a temperature inversion, quite commonly develops in ice-covered lakes that are more than 10 feet deep. The reasons are simple and wonderful - fresh water is most dense at 39.2°F, but it doesn't freeze until it reaches 32°F. Between 39.2 and 32°, water molecules spread out into a network that will eventually become crystalline ice. Cold objects are almost always denser than warm objects, and so they sink to the bottom. But near-freezing water cannot sink below water at 39°, so it never makes it to the bottom of the lake.

It is in this relatively warm but very dark world at the bottom of lakes and ponds that life thrives and multiplies during winter. Microbes dominate this winter, under-ice ecosystem and are the key to the spring bloom that follows ice-out. All winter, microcrobes continue to use oxygen as they attack and decompose plant and animal remains (or any organic matter) that accumulate on the bottom of the lake all year. The more organic matter there is for the microbes to use, the more microbes there are. Sometimes there are so many microbes growing, eating and multiplying, that all the oxygen gets used up. This can result in fish kills and "dead zones" for oxygen-dependent life in the bottom waters.

This over-use of oxygen is really the only negative aspect of the microbes, because the benefits they provide to the lake's ecosystem are huge. By breaking down the organic material on the lake bottom, the microbes release the nutrients that were trapped in those dead organisms. In spring, when ice out allows wind to mix the waters again, the bottom waters rise to the surface, now filled with nutrients that help renew the normal array of plants and animals within the waters. Next time you look out over a frozen pond or lake, take a moment to appreciate the processes that continue to support that system, out of sight, in the quiet, warm darkness at the bottom of it all.

Photo Caption: In the depths of winter, people rarely stop to appreciate what is happening under the ice on NH’s lakes and ponds.