



Researchers found a diverse meadow of brown-fruited rush, water lobelia, quillwort and dwarf hyssop at the bottom of Big Carr Lake on March 1, 2015.

A world beneath the ice

PAUL SKAWINSKI

AQUATIC GREENERY THRIVES, EVEN IN THE WHITE SEASON.

Paul Skawinski

Aquatic plants grow in nearly all lakes, streams and wetlands. They provide oxygen, shelter for aquatic creatures and habitat for spawning fish; they stabilize sediment and absorb wave energy. Aquatic plants perform all of these functions day-in and day-out, and are readily visible all summer long. But what happens to this underwater flora when the water freezes? During the winter of 2012, a small group of intrepid biologists — myself included — set out to get some answers.

First, I had to find someone else crazy enough to walk frozen lakes all day in the middle of winter, drilling holes and getting wet. That someone had to be willing to identify aquatic plants in varying stages of growth or decay. Fellow aquatic biologist Susan Knight, UW-Trout Lake Station, agreed to be the other half of this crazy duo. We found several others eager to assist in different regions, including Chris Hamerla of Golden Sands Resource Conservation & Development Council, Inc., Andrew Teal (now with Bayfield County Land & Water Conservation Department) and Carol Warden of UW-Trout Lake Station. Together we would drill hundreds of holes across 14 lakes, tapping into a mystery only a few eccentric biologists could get excited about.

Aquatic plant communities can vary

based on sediment type and water chemistry, so we selected lakes to visit based on their characteristics. In some cases, we had personal experience sampling these lakes and were familiar with their characteristics. We selected others based on their region and by reviewing water chemistry data from the Wisconsin Citizen Lake Monitoring Network.

Once lakes were selected, we had to address the question of how we would observe the plants below each hole in the ice. I decided to fashion a homemade cage made of PVC pipe to mount an underwater camera. Another mount for a submersible floodlight would illuminate the darkness under the ice and snow. After adding a rope and some strategically placed weights, it was ready for its first adventure.

What we saw in our first hole was ex-

citing! Not only were there plants down there, they were green and attracting all kinds of aquatic life! *Daphnia* — tiny crustaceans, also called water fleas — scooted around between the plants, caddisflies scraped algae off of them and various fish hid among the leaves. It was a scene reminiscent of summer, except that the creatures moved much more slowly.

Every time we drilled a hole, we first lowered the camera to record video of what was in the area surrounding the hole. We could identify most plants by simply watching the video footage. Then we used a long-handled rake to sample the vegetation and collect specimens to deposit as official records in the UW-Stevens Point Freckmann Herbarium.

Each lake yielded a different mix of aquatic plants. The hard-water, mineral-rich lakes tended to have a mostly dormant aquatic plant community, with mostly macro-algae persisting through the winter, including species of *Chara* and *Nitella*, known as stonewarts. Most larger plants had gone dormant, with stems and leaves in various stages of decay. Soft-water, mineral-poor lakes in our study tended to have a larger group of evergreen species. One of them, Tomahawk Lake in Oneida County, had a whopping 10 species present on a single sandbar in the middle of January!

So why did soft-water lakes have a



Ten species of native aquatic plants were collected from a sandbar on Tomahawk Lake in mid-January.

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From left to right, Susan Knight, Paul Skawinski and Andrew Teal haul equipment back from a cold day on Tomahawk Lake.



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The author sends his homemade camera setup down the first hole.

much oxygen, but they certainly appear to provide shelter and food for a wide variety of invertebrates and fishes.

Winter is here once again. It is an unforgiving season that appears frozen in time. But beneath the bitter winds, crunching snow and unforgiving ice, lakes live on. ❧

Paul Skawinski is the statewide coordinator of the Wisconsin Citizen Lake Monitoring Network. He also teaches Aquatic Plant Taxonomy at UW-Stevens Point, and is the author of Aquatic Plants of the Upper Midwest: A Photographic Field Guide to our Underwater Forests.



WATCH ON YOUTUBE

The underwater research team posted a video clip to YouTube from a trip to Big Carr Lake in Oneida County. Watch "Winter in the Underwater Forest" at [youtube.com/watch?v=5bsfC4ARIYs](https://www.youtube.com/watch?v=5bsfC4ARIYs).

CHRIS HAMERLA