



John Merriman, left, a member of the Lake Sunapee Protective Association, and Ian Rogers, an intern with the association, place a solar panel onto an instrument buoy, designed by Merriman, after loading it onto Merriman's truck. The buoy, made of aluminum and extruded plastic, will relay information about the water and weather

conditions on the lake to a computer database. Researchers are gathering similar information from several lakes around the world in an effort to learn about basic lake health and to track the effects of development and climate change on lakes.

VALLEY NEWS — DENISE FARWELL

# Testing the Lake Waters

## Eye on Sunapee's Health Is Part of a Global Initiative

By KRISTEN FOUNTAIN  
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A new bright yellow buoy will soon be bobbing on Lake Sunapee, connecting the water body and surrounding communities to lakes in Israel, Finland and China and to lake scientists around the world.

Members of the Lake Sunapee Protective Association expect to install the floating tripod today. It will look much like its close neighbors, the red and white markers that warn boaters away from rocks around the Loon Island lighthouse. But this will be no simple navigational aid.

The buoy, powered by solar panels, carries several instruments that continuously monitor the temperature and level of oxygen in the water as well as the surrounding air temperature and wind speed.

Every 10 minutes, that information will be transmitted by radio frequency to a computer database at the lake association office in Sunapee Harbor. From there, the data will be shared with an international network of lake scientists and the public via the Internet.

The measurements are nothing new; it's the frequency at which they can be taken. Volunteers and staff with the lake association have studied water quality in Lake Sunapee for decades the old-fashioned way: by hand, leaning out of a boat. The organization made sure the time-consuming process occurred monthly, but that still limited what could be learned about how the lake functions.

"The lake has a daily cycle," said LSPA executive director June Fichter. "Of course, when you take measurements once a month, you miss that."

Algae and other lake plants release oxygen into the water while turning sunlight into energy through a chemical process called photosynthesis. During the day, that process delivers more oxygen to the water than fish and other animals breathe in and bacterial processes use up. When the sun sets, oxygen production stops and the animals draw down the store of gas built up during the day. Fish and other higher organisms cannot survive in a lake with low oxygen levels.

For the next several months, the lake association expects to collect a trove of data on the minute-to-minute changes occurring in the lake. (The buoy will be removed for the winter, but returned to its moorings next spring.) The group plans to make the information accessible to the public via its own revamped Web site as well as to an international group of scientists who have formed a collaboration called the Global Lake Ecological Observatory Network (GLEON).

Building the buoy and planning for its placement took the association almost a year. "There are endless little details," said John Merriman, an LSPA member who lives in Georges Mills and is a retired engineer.

Purchased off-the-shelf, the entire system would likely have cost around \$70,000. But using the help of three fifth-year students at Dartmouth College's Thayer School of Engineering and tapping association members with engineering expertise, the association had this buoy constructed by G.K. Stetson Blacksmiths in Newport for around \$20,000, said Merriman.

The association also worked with the New Hampshire Marine Patrol to find an appropriate place for the buoy, said Fichter.

"We didn't want it to be a navigation hazard," she said.

But their efforts will be worth it, said Kathie "Kak" Weathers, a scientist at the Millbrook, N.Y.-based Institute for Ecosystem Studies who connected the group to the global network.

By collecting such detailed measurements, the Lake Sunapee Protective Association will be able to attract researchers who can help them understand what they need to know about the lake to keep it healthy. "Scientists love this kind of information," said Weathers, whose parents live in Sunapee.

The buoy project was funded primarily through a grant from the Michigan-based Frey Foundation, started by Weathers' mother's family.

For their part, the researchers are pleased to have the Sunapee association on board, said one of GLEON's founders, Tim Kratz, a scientist at the University of Wisconsin-Madison.

The network wants to bring together comparable information on different kinds of lakes around the world, Kratz said. Currently, there are 14 lakes with monitors similar to Lake Sunapee's that are participating, including Lake Kinneret in Israel, Lake Paajarvi in Lammi, Finland and Lake Taihu in China. Other lakes being monitored are located in Australia, New Zealand, South Korea and Taiwan, as well as in Wisconsin and Florida.

Having information on lakes in different locations, of different sizes and in different environments will give scientists tools for learning about basic lake processes, as well as for tracking the effects of development and climate change.

"Sunapee is a nice example of a lake that is in relatively good shape, but is starting to show some early signs of problems," particularly algal blooms, said Kratz.

The Sunapee association is valuable to the project as a model of cooperation between a community group and scientists. "We're looking at that as sort of an interesting first example," he said. "Coupling

**"The lake has a daily cycle. Of course, when you take measurements once a month, you miss that."**

June Fichter,  
Lake Sunapee  
Protective Association

Kathie Weathers with LSPA, it's a really powerful thing."

The project would not have been possible without the help of volunteers, including blacksmith Dean Stetson, who volunteered his time, and the work of students at Dartmouth and Colby-Sawyer College, said Fichter.

"With all that support, it allows a small organization like us to have the confidence to say, yeah, we can do this," she said.

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