

Yellow 'submarine' hunts for answers to Willard Pond's blue-green algae problem

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SOMERSWORTH — A yellow "submarine" that was launched on a mission Friday in Willard Pond will provide important information on levels of cyanobacteria, or blue-green algae, in the pond.

After the pond's high water levels and seemingly blocked drainage, which are thought to contribute to the cyanobacteria bloom, students and professors at the University of New Hampshire have made the pond a focus of study in tandem with Dover and Somersworth's joint mitigation efforts. Dover recently approved money to fund a state grant that will study mitigation options for the pond.

"The potential outcomes here are tremendous for both communities," said Chris Parker, director of Planning and Community Development in Dover, who came out to watch the launch. "This is one of those things where it's really great to be near a university."

Professor and Chairman of the Department of Zoology at UNH Jim Haney organized the launch with Yellow Springs Instruments Inc. to add more information to cyanobacteria studies already under way through the graduate research of Amanda Murby. She is studying the spatial distribution of potentially toxic cyanobacteria for her master's degree in zoology.



EJ Hersom/Staff photographer Rob Ellison of Yellow Springs Instruments launches a remote-controlled submersible vehicle in Willard Pond to test water quality Friday.

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Kevin McClurg of Yellow Springs Instruments sets up an unmanned submersible vehicle used in testing water quality at Willard Pond in Somersworth Friday. EJ Hersom/ Staff photographer

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neurotoxic reactions and stomach and intestinal illnesses are some of the health problems that can be caused by exposure to cyanobacteria for a certain period of time, and these effects can also occur in animals and may be deadly to fish or wildlife in the pond area — UNH students, officials from Somersworth, Dover and the Department of Environmental Services have performed studies to determine what might be causing cyanobacteria blooms in the water.

A student presentation in May gave evidence that high levels of phosphorous cause the algae to bloom, and during Friday's launch, limnology professor Al Baker, who said he has studied cyanobacteria "for years," agreed.

"The connection to phosphorous is so clear," he said, adding the most "revealing" thing about Willard Pond's situation is the high level of nutrients — mainly phosphorous — coming into the pond. "It has incredibly high levels of phosphorous."

The "submarine," which is really an Autonomous Underwater Vehicle, or AUV, provides "incredibly high-resolution data" using depth and pressure sensors, according to Robert Ellison, global market and business development manager at YSI.

Friday's mission sent the AUV all over the pond at different depths based on where the cyanobacteria might be located. Ellison explained algae moves up and down in the water column as a result of stratification, or layering of hot and cold water, and is impacted by the temperature.

"The data is pretty powerful," Ellison said during a presentation in Spaulding Hall at UNH before the launch. Ellison, who had the AUV during the presentation, described how it functions by following a mission that is loaded onto the AUV's memory.

The mission, which is designed on a computer program, tells the AUV where to go in the pond, how deep to dive and how long to stay in a given area. This type of mission will be helpful to study Willard Pond because the AUV can chart any area of the pond at any depth, thus providing accurate information about where cyanobacteria is collecting and in what quantities.

As cyanobacteria is dangerous to humans and pets — liver damage,



EJ Hersom/Staff photographer Ben Clarke of Yellow Springs Instruments prepares an unmanned submersible vehicle used in testing water quality at Willard Pond in Somersworth Friday.

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EJ Hersom/Staff photographer Amanda Murby, graduate student, and professor Jim Haney of the University of New Hampshire prepare a device to test water quality in Willand Pond Friday in Somersworth.

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A large group of UNH professors, officials from YSI and Somersworth and Dover gathered at the Route 108 boat launch area of Willand Pond to see off the AUV on its mission. A laptop computer nearby displayed the route the AUV would be taking around the pond and at what depth it would be going at certain points.

Murby and other students went out in canoes to use a device called a multi-parameter probe, which uses the same sensors as the AUV but cannot take as varied data as the AUV since it must be used from the surface by a person. Murby has used this probe on other occasions to collect data about cyanobacteria levels in the pond and said, so far, she has found there are "significant differences from one end of the lake to the other. Blooms are pretty unpredictable."

She did find cyanobacteria, however, and is hoping to get comparable data from the AUV mission.

The AUV completed its mission in two hours. Results will be available in about two weeks and will be posted on the Dover city website at www.ci.dover.nh.us.