



WELCOME TO THE FALL EDITION

Wolfeboro Waters Quarterly E-Newsletter

Edited by Abigail Adams and Libby Peard

Wolfeboro Waters is a committee created in response to the Town of Wolfeboro's concerns about the water quality of our lakes and ponds.

We came into existence after the first cyanobacteria outbreak occurred in Winter Harbor on Lake Winnepesaukee in 2018.

We are a committee of volunteer citizens appointed by and reporting to Wolfeboro Board of Selectmen.

[Wolfeboro Waters.org](http://WolfeboroWaters.org)

We initiate communication and outreach programs to develop more community awareness and involvement in protecting these precious resources.

Leaves are natural. How can they be considered litter?



Leaves are natural - how can they be considered litter?! When leaves fall to the ground, they naturally decompose and restock the soil with nutrients and organic matter. But, what happens when there's no soil to land on? What happens to those nutrients when leaves land on the streets and driveways where they can't be recycled into the soil? Here's the short answer: they litter the lake with pollution!

Without any natural soil to soak into, when it rains, nutrients released by decaying leaves are washed into runoff water which eventually ends up in lakes. Unfortunately, additional nutrients in a lake is not a good thing--the nutrient phosphorus fuels the growth of algae, including toxic algae. When algae blooms die off, decomposing organisms use up the oxygen in the water. When this happens, the lake and its native plant and animal inhabitants suffer--low oxygen can even kill fish.

The good news is you can help prevent leaves from littering your favorite lake! Here's what you can do to turn leaf litter into treasure:

- Leaves make fantastic mulch for your lawn and garden! Use the mower to shred those leaves and leave them on the lawn to decompose and put that phosphorus back into the soil where it belongs. Add shredded or whole leaves right to your garden beds to suppress weeds, provide insulation, and nourish tired soil. It's free and your trees and veggies will thank you.
- If you want to go the extra mile, rake the leaves off your driveway (and street too!) and onto your lawn before it rains! This could reduce phosphorus in runoff by up to 60 percent according to a study done by the University of Minnesota.

- Share your leaves! If you are not into gardening, some municipalities have yard waste and brush drop sites. Or, consider bagging up your leaves and dropping them off at your local community garden!

If leaves do get into the lake, it is best to leave them there--do not use a rake in the water to remove them. Raking the bottom disturbs the critters living in and on the lake bottom. Raking in the lake also suspends sediment and phosphorus into the water column, causing violations of state water quality standards and fueling algae blooms.

Thank you for doing your part to not let leaves litter lakes!

We hope that you will share this article with others--we just ask that you include the following: This article was originally published by NH LAKES. Thank you!

NH LAKES is the only statewide, member-supported nonprofit organization working to keep New Hampshire's lakes clean and healthy, now and in the future. The organization works with partners, promotes clean water policies and responsible use, and inspires the public to care for our lakes. For more lake-friendly tips, visit www.nhlakes.org or call 603.226.0299.

From the editors: Leaves have always fallen into the lake. They do little harm, if they can decompose without using up all the oxygen. It is when too many enter the lake too quickly that oxygen is depleted during decomposition. So, we shouldn't add to the leaves naturally falling into the lake.

Who Plows your Snow? Go Green!



Winter is around the corner. Ask your snow plower about road salt reduction to protect our lakes and waters.

NH DES is certifying winter maintenance professionals in salt reduction practices that improve water quality while protecting public safety.

Dramatic and rising concentrations of chloride from salt applications have been identified in New Hampshire waters and mirror a trend that is being seen in colder regions of the United States and Canada due to the application of de-icing chemicals. In 2008, New Hampshire listed 19 chloride-impaired water bodies on the 303(d) list under the Clean Water Act.

In 2020, that number increased to 50. At concentrations exceeding 230 mg/l, chloride can be toxic to some aquatic species and can impart a salty taste in drinking water supplies.

At this time, the only way to prevent chloride from reaching surface waters and groundwater is to reduce the amount applied to our roadways, parking lots, and sidewalks without compromising safety. When road salt dissolves in water, the chloride molecule is not retained by the soil and easily moves with water flow.

Chloride is not significantly removed by chemical reactions, evaporation or vegetation. Therefore, nearly all of the chloride applied to the land surface as road salt will eventually end up in nearby surface waters or groundwater. To protect New Hampshire waters from increased chloride concentrations, the NHDES Green SnowPro Program offers snow and

ice management professionals training and certification in state of the art salt reduction practices that prioritize public safety while mitigating salt usage.

In return for their efforts, commercial salt applicators certified by NHDES Green SnowPro under [RSA 489-C](#), and property owners or managers who hire them, are granted liability protection against damages arising from snow and ice conditions under [RSA 508:22](#).

Here is a [List of Certified Green SnowPro Contractors](#). This list is continuously updated, and some contractors may hold valid certifications but are not yet shown on this list. If you have questions regarding current, or past, certification, please contact Aubrey Voelker at [\(603\) 271-5329](tel:6032715329) or Aubrey.R.Voelker@des.nh.gov.

- [Best Management Practices: How Salt Works](#)
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Wolfeboro Waters has been busy. Here is Citizen Science at work.



The Assessment Subcommittee of Wolfeboro Waters (some of whom are shown in photo of our citizen science lab) is made up of volunteer members. They have worked intensively over the last two years, in collaboration with Wolfeboro lake associations and scientific experts from a variety of state and national sources, to research Cyanobacteria and its presence in our lakes. Since the cyanobacteria bloom in Winter Harbor in 2018, we have worked closely with NHDES' cyanobacteria program and have identified several different types of cyanobacteria found in Wolfeboro's waters. These include the very visible late-summer *Gloeotrichia*, and *Dolichospermum*, which was observed in bloom quantities in Jockey Cove this summer, as well as the tiny *Picocyanobacteria*, called cyanobium, which are not visible to the human eye.

With the help of UNH and other experts, we are looking at our own lake water to identify and quantify the naturally occurring cyanobacteria.

In addition to the continued water quality monitoring for clarity and phosphorus levels, Wolfeboro Waters can now also use these 2 new techniques for all lakes and surface waters in Wolfeboro:

Fluorometry: This measurement tells us quickly whether we are observing a green alga or a type of cyanobacteria, and perhaps even some measure of its ability to produce toxins. This provides quick answers when a suspected algae bloom is reported.

PCR-Thermocycler for DNA analysis: Through Bigelow Laboratory for Ocean Sciences

in East Boothbay, Maine (they study the chemistry of and microorganisms in lakes and oceans), senior scientist Dr. Peter Countway has trained assessment subcommittee volunteers to operate our recently purchased portable PCR-Thermocycler analytical device.

We may be one of the few citizen science groups using PCR to identify cyanobacteria. We can use this on any Wolfeboro lake or pond when there is a suspicious bloom.

What is a PCR-thermocycler? Very simply, this tool amplifies the DNA of the biological material in a water sample. It is the same technology used in COVID 19 testing. Using the PCR in the lab is not easy to do and requires hours of volunteer training.

Is the Cyanobacteria bloom toxic? We must assume yes until proven otherwise. Rapid results on the presence of toxins are needed to advise those seeking to swim in or to drink from the affected waters.

The Assessment subcommittee is investigating technologies (with LWA and Bigelow Labs) to quickly (within hours) determine if cyanotoxins are present.

In summary, with growing knowledge of scientific techniques and practices, we hope that Wolfeboro Waters will identify correlations between our cyanobacteria and the different forms of phosphorus and nitrogen that we measure in the lakes. Armed with this information we can advise the Town of Wolfeboro on mediation practices and public works projects that are key to keeping our lakes healthy for the future.

Our Newest Water Quality Samplers for Back Bay



Water Samplers in Wolfeboro sample our surface waters in cooperation with UNH, Wolfeboro Waters, Wentworth Watershed Association, Mirror Lake Association, Rust Pond Association, and Lake Winnepesaukee Association.

Wolfeboro Waters recently added sampling of Upper Beech Pond, which is the water supply for the Town of Wolfeboro. Below, Bridget Hubbard of Wolfeboro Water Treatment Plant takes a water sample.

Water Quality Samplers



Mary and Paul Lyon of Wolfeboro are assisting in Wolfeboro Waters' effort to sample the major streams flowing into Back Bay as the Town (in partnership with the Lake Winnepesaukee Association) begins a detailed study examining the health of Wolfeboro Bay, Back Bay, and the land and water that empty into these water bodies. This **Wolfeboro Bay Watershed Environmental Study** will identify the primary sources of phosphorus entering Wolfeboro Bay, prioritize identified sources for further action, conduct educational efforts to make landowners and visitors aware of the sources and impacts of pollution, and develop preliminary designs to address sources of impairment.

We thank Mary and Paul for sampling at regular intervals throughout the summer and for also sampling after big rain storm events.

Cyanobacteria



Cyanobacteria and the Summer of 2022

A Summer of Cyano: By Bree Rossiter, Conservation Program Manager, Lake Winnepesaukee Association

Our changing climate as well as other physical, biological, and chemical factors have an adverse effect on Lake Winnepesaukee. Cyanobacteria are photosynthetic microorganisms that can produce Harmful Algal Blooms (HABs). These HABs have the potential to produce toxins at differing rates with varying health impacts.

In June 2022, the University of New Hampshire released the NH Climate Assessment report. The report's key predictions for years to come include a regional increase in precipitation, a significant decline in the snowpack, and a new normal of high temperatures. A forecasted increase in precipitation events means more runoff, which equals more potential for nutrients such as nitrogen and phosphorus, to enter our waterbodies, and feed plant and algal growth.

A few of the physical and chemical factors that contribute to the formation and persistence of cyanobacteria blooms in freshwater systems are; light availability, water temperature, nutrient loading, and vertical mixing/lake turnover. These factors likely have an important role in determining HAB composition and toxin production.

This summer saw a higher number of cyanobacteria observations, alerts, and advisories on Lake Winnepesaukee, than in previous years. In 2022, there were 18 alerts/observations of cyanobacteria blooms, with four leading to advisories. This represents a considerable increase from 2018 when there was only one observation and one advisory. This data does not include the two advisories on Lake Kanawatka or other alerts/observations for other waterbodies that are within the Lake Winnepesaukee watershed.

Advisories are issued by NHDES when samples are collected and cell counts exceed the threshold of 70,000 cells/mL. Alerts are issued by NHDES for lake-goers to be on the lookout for developing conditions, especially those nearshore with high recreation potential. Observations are cyanobacteria sightings that have been visually confirmed. It is difficult to say for certain if more blooms are occurring, or if people are getting better at recognizing and reporting. Either way, cyanobacteria are present in the Big Lake, and it is up to all of us to keep a watchful eye out for this increasing threat.

LWA is dedicated to tracking cyanobacteria findings throughout the Winnepesaukee watershed, Check out our weekly report and Winni Bloom Watch map to see where cyanobacteria have been observed.



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