Moose Pond Matters
FALL 2013

# Inspector Prevents Invasive Milfoil From Entering Moose Pond

On a routine Sunday morning shift as a Courtesy Boat Inspector, Brian Cushing found a piece of variable-leaf milfoil hanging from a boat trailer preparing to launch into Moose Pond.

Variable-leaf milfoil, or *Myriophyllum heterophyllum*, is an invasive plant that has been found growing in eighteen southern Maine lakes, but not Moose Pond.

The motor boat, which on quick inspection looked clean, had last been in Sebago Lake, Cushing recalled. Knowing that invasive milfoil grows in parts of Sebago, that raised a red flag for him to inspect the boat and trailer extra carefully. "It was clean except for that one dried plant, which looked suspicious. I bagged it and took it to Peter Lowell at LEA. It was rehydrated and it was milfoil," Cushing said.

"Most of the milfoil found during boat inspections is generally from someone who has been in the Sebago Lake corridor," Lowell said. "The Lower Songo River is the Typhoid Mary of the whole area."


"Boat inspecting is like being a lifeguard. You have to always be vigilant, for the rare time a swimmer might be in trouble, or in this case, a boat is carrying invasive plants. Even a small fragment of a hitchhiking invasive plant can harm a lake; it can rehydrate, root and spread into a full-blown infestation." BRIAN CUSHING

"Boat inspecting is like being a lifeguard," Cushing said, "You have to always be vigilant, for the rare time a swimmer might be in trouble, or in this case, a boat is carrying invasive plants. Even a small fragment of a hitchhiking invasive plant can harm a lake; it can rehydrate, root and spread into a full-blown infestation."

"Part of the whole deal is educating people to inspect their own boats," Cushing said. "I worry about the times we're not here or people put in late, when there is no inspector. It underlines the importance of educating the public so it is automatic that they inspect their boats for plants."

Most boaters were friendly, expressed thanks for his work and some wanted to learn more about invasive plants, Cushing said.

For several years now, the Moose Pond Association has helped fund boat inspectors at both the Route 302 launch in Bridgton and the Denmark launch from late May through late September. Courtesy boat inspectors are hired, trained and scheduled by the LEA. Cushing, of Bridgton, works part-time as an inspector, mostly on the weekends. This fall he returns to the University of Maine at Farmington to teach geography.

It was Colin Patterson's first year inspecting boats. "I really think it is a good job," said the Sanford High School student. "You get to do stuff for the lake, which means a lot when you live on the lake. You hear a lot about other lakes that are infested, and it is just awful."

Besides looking at the boats, the inspectors also encouraged boaters to check their entire boat, propeller, fishing gear and trailer for plants and to use the boat wash stations at the West Bridgton

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RHONA WENDLER

*Milfoil Bugs Us! The MPA's float in Bridgton's Fourth of July Parade won the Judges' Choice Award*

Welcome to our first newsletter. On the surface, Moose Pond and the shoreline may look much the same, but a lot has happened this past year and we want to share the news with you.

The biggest event was that variable-leaf milfoil was found clinging to a boat trailer entering Moose Pond. It was removed by the boat inspector and identified by the Lakes Environmental Association. The Moose Pond Association works directly with LEA, utilizing their knowledge, experience and personnel to support our efforts. It is important for Moose Pond members to also belong to and support LEA. We couldn't do it without them.

This is the last year of the funded Watershed Project for Moose Pond. Through the project, both large and small improvements have been made to some shoreline properties to reduce erosion, but there is still lots that can be done to positively affect the water quality. Visit the Articles and Guides section on our Web site, www.moosepondassociation.org, for more ways to reduce undesirable runoff into the pond.

Standard water testing for clarity, chlorophyll and phosphorous shows that the 2012 numbers are worse than the long-term average. In 1999, Moose Pond's water quality was ranked in the "moderate to average concern," but has now risen to "high concern."

*MPA officers: Laurie Vance, clerk; Mark Patterson, VP; David Ehrman, president; and Paul Dwyer, treasurer.*

In addition, the Moose Pond Association funded some additional testing by LEA and we found that an algae called Gloeotrichia is prevalent in our lake.

We've made several visits to Caruso Island to work on stabilization of the erosion problems there.

These stories and others are all in our newsletter. If you have other ideas or stories to tell please let us know and we'll publish them on our Web site: www.moosepondassociation.org.

The mission for the Moose Pond Association is the following: Maintaining and Improving the Health of Moose Pond. Our best hope for having clean, clear water for generations to come is an informed and caring public. In both small and large ways, we can all contribute to the effort to improve our lake's water quality and keep Moose Pond free of invasive plants. So please take a moment to read the news. Let us know your thoughts. We'll continue to count on your support to make Moose Pond a place for people to enjoy for all time.

Best regards,

David Ehrman, *President*

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Fire Station, just east of the Route 302 launch, and another one south of the Denmark launch across from the public beach. The MPA maintains these boat wash stations, with the help of Collins Plumbing of Bridgton.

This year, there were a total of 1,098 paid CBI hours and 104 volunteer hours, for which the Moose Pond Association contributed $11,676. A grant of $1,500 from the Maine Department of Environmental Protection also helped fund the 1,978 boat inspections that were done this past summer. The grant is funded by the cost of the milfoil stickers. The total cost of the inspectors, wash stations and miscellaneous costs was $16,495. With this investment of resources, Moose Pond had inspectors stationed at the two launches 10 hours each day during the summer, which was more time than most lakes in the area.

From these inspections, 85 plant fragments were found, one of which was confirmed to be invasive milfoil.

# Controlling Erosion on Caruso Island *by* ALICE GOLD

Caruso Island, that frequently photographed speck of land just to the south of the causeway, is eroding. Moose Pond Association members are working to do something about it both for the island's scenic value and to keep eroding land out of the pond.

Association members have been monitoring erosion on the island for several years. In the past, the island has been a stopping point for boaters, creating a potentially unstable situation because of the wear and tear and loss of vegetation. Beginning in 2011, native ground cover was planted to help control the erosion. The current posted signs asking boaters to stay off the island have been successful in deterring visitors, but last winter Mother Nature seemed to have taken over despite MPA's best efforts. This past spring significant new erosion was discovered.

The soil under the roots of several of the red pines on the island had significantly worn away, baring large sections of the roots. In addition, two new deep gullies had formed on the east and west sides of the island. If these gullies had continued to deepen through erosion, chunks of land may well have separated from the island. Colin Holme, assistant director of LEA, developed an erosion control plan for MPA to remedy the problems.

On September 14th, a group of seven volunteers including Alice Gold, Mark, Ian and Colin Patterson, Herb and Susan Farnsworth and Steven Whitten spent an afternoon working on the island. Hay was stuffed between the bare roots and soil to prevent further erosion under the roots, with the hope that the hay would decompose into mulch, which, in turn, would provide a layer of soil-like matter, enriching the existing poor soil. The second step was to fill the gullies with erosion-control mulch, which is a coarse mulch made from shredded wood products and contains some stones. It is less likely to be washed away by storms, so it is an ideal medium for all types of erosion control projects, including residential paths and banks. It is available in bulk from local suppliers.

This effort was completed under the watershed erosion control grant that Moose Pond Association had obtained from the state through the Cumberland County Soil and Water Conservation District. As a result, our expenses were covered. Many thanks to all our volunteers, Heather True at the Conservation District, and Colin Holme at LEA. We all hope next spring we will be able to declare this project a success.

COLIN HOLME, LAKES ENVIRONMENTAL ASSOCIATION

## Update on Route 302 Reconstruction

Earlier this fall when the Department of Transportation held their final meeting in Fryeburg about the planned reconstruction of Route 302, protecting Moose Pond from erosion was discussed.

MPA President David Ehrman, Joseph Coletti, president of the Alpine Village Association, as well as State Representative Lisa Villa, raised concerns about the project's effect on the lake's water quality. The work planned spans from just west of the Moose Pond causeway at the Stack Em Inn Road to about five miles west at the Stanley Hill Road in Fryeburg. The construction, budgeted at $6.4 million, is slated to begin in the spring of 2015 and end in the summer of 2016.

Although the area between Stack Em Inn Road and the causeway is outside of the project, Ehrman, Coletti and Villa encouraged the DOT representatives to include that short distance in the work while all the equipment and materials are there and to make sure the lake is thoroughly protected from the disruption.

In October, Bob Carrell, Project Manager for the Maine DOT, said that they are addressing the culvert east of the Stack Em Inn Road. The work will likely not be part of the main Route 302 project, but may be done beforehand. When the rebuilding project is underway, Carrell said the DOT will use their Best Management Practices to control erosion.

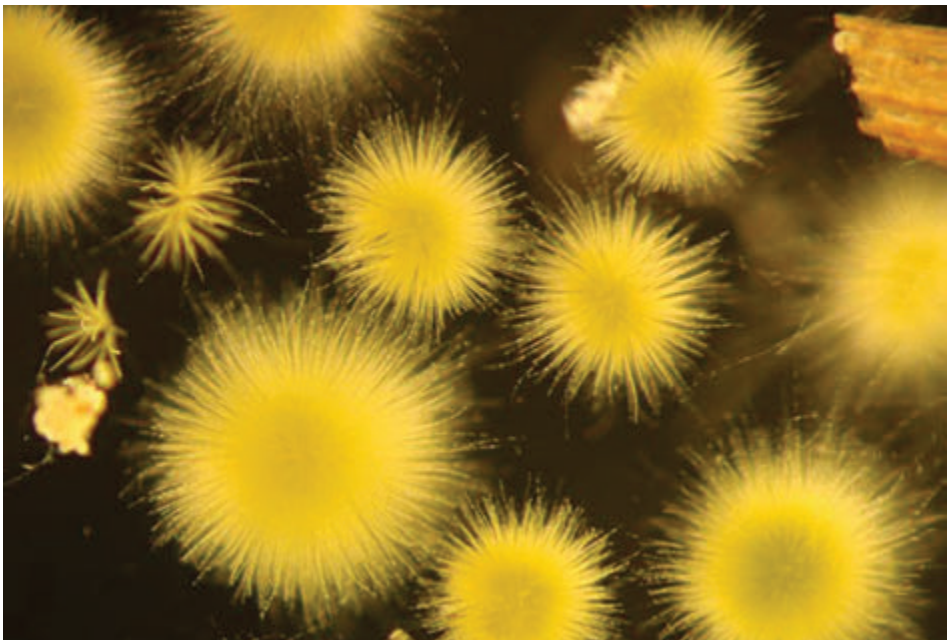
# Research Reveals Algae in Moose Pond

*Gloeotrichia echinulata*, (GLEE-oh-TRICK-ee-ah e-KIN-yoo-LAIT- a) or simply "Gloeo," was discovered in Moose Pond this summer when the Lakes Environmental Association (LEA) stepped up its water testing parameters. Gloeo looks like small, fuzzy, yellow-green floating dots.

Amanda Pratt, who earned her undergraduate degree in Environmental Science from the University of Southern Maine and a Masters degree in River Basin Management from the University of Stirling in Scotland, was hired by LEA to conduct research this past summer. Her project was to implement the testing of three new parameters: temperature, Gloeo and core sediment for iron and aluminum. The Moose Pond Association teamed up with LEA to have Amanda conduct these additional tests in the middle basin. They also took sediment cores from the upper and lower basins.

For four decades, LEA has been monitoring the water quality of Moose Pond, which has long been considered one of the cleanest lakes in the region. Usually, algal blooms are associated with bad water quality due to high phosphorus in the water column. Gloeo is a bit different from most other algae in that it grows on sediments. When phosphorus increases, Gloeo feed on it and grow. Though it doesn't necessarily release phosphorus back into the water, it has the capacity to do this.

Concern exists because Gloeo is a cyanobacterium that contains low levels of toxins. It can affect the liver of livestock, dogs and other small animals that drink water. It won't affect your skin and you'd have to consume a lot of water for it to affect you. "It's capable of producing toxins," says Pratt, "but that doesn't mean it does all the time. One reason we're concerned about it is that traditionally we haven't seen huge numbers of Gloeo in New England lakes. Decades ago, when algal surveys were conducted, there was no Gloeo. We're probably seeing it now due to the high temperatures of the past couple of decades—they're favoring the Gloeo. They might have always been present on the sediments, but they just weren't growing enough to be in the water column."



JONATHAN DUFRESNE, UNIVERSITY OF NEW HAMPSHIRE

Of the lakes Pratt tested, Moose Pond had the most visible bloom, with the maximum growth occurring in early August, when the water was the warmest. The testing site was in the middle basin near Lakeside Condominiums. Amy Tragert, who conducted a dock-to-dock informational tour on Moose Pond, also saw Gloeo in other locations. Pratt explained that Moose Pond is so clean and clear that it's probably helping fuel Gloeo's growth because it's able to take advantage of plenty of sunlight. "I feel like if the bloom was really, really bad it might look like pollen scum," says Pratt, "But I never saw it to the degree where it formed a scum."

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Though Moose Pond had the highest concentration of the lakes tested in this region, region, it was not a huge amount compared to lakes in New England and around the world. Gloeo is difficult to see unless you are actually looking for it. Consequently, it doesn't get a lot of media attention, so if you haven't heard of it before, you aren't alone.

The big question is what to do about it. Similar to other algal blooms, it all boils down to reducing erosion and phosphorus flowing into the pond. To learn more about the top ten ways to protect lakes, visit the LEA Web site at www.mainelakes.org.

# Testing the Waters

For decades, Harold "Hal" Arthur has been ferrying monitors to test the water quality of Moose Pond. In his aluminum boat, Hal takes them to two sites—one off of Camp Winona and the other in the north basin.

"I love the lake and trying to do the little bit I can to help keep it pristine," is Hal's answer when asked why he's been doing this for so long. "I also love the interaction with all of the interns from Bridie to all the guys who work on the Milfoil project on the Songo River. You name them and I've worked with them on Moose Pond." When he began, Hal did some of the testing, but since the state instituted stricter rules and required training, he's content to ferry the monitors about in his boat and jot down readings for them.

Testing is not only important to properly identify current or potential issues, but also to establish data for future comparisons.

First, the Secchi disk is used to measure the clarity of the water. The Secchi disk is a metal or plastic disk with two black and white quadrants painted on top. It's attached to a calibrated metric tape. The monitor slowly lowers the disk into the water, while simultaneously looking through an aquascope to note when the white quadrants are no longer visible. The disk is raised a bit and lowered again to make sure it's at the right depth. The clearer the water, the deeper the disk is lowered. The metric reading of the tape at the surface of the water is recorded.

The next test involves a dissolved oxygen meter and sensing probe. The probe is attached to the instrument via a long cord. Since the monitor knows the depth of the water, the probe is lowered meter by meter to one meter above the floor of the pond. This prevents it from getting ruined or stuck in the bottom sediment. At every meter, the probe is jigged and the monitor records an accurate digital reading of the water temperature and oxygen level. This data is double-checked at two or three readings.


LAKES ENVIRONMENTAL ASSOCIATION

Cold water contains more oxygen than warm water. Fish, like landlocked salmon and lake trout, need the oxygen in the deeper, cooler water to survive. Too much algae growing in the warmer surface water may prevent that from happening.

After getting an oxygen and temperature profile, the monitor takes water samples to measure phosphorus and chlorophyll. Though phosphorus is a natural element in soil, when too much of it flows from other sources, it becomes a significant threat to water quality because algae thrive on it. As algae grow, water clarity decreases. Chlorophyll, the green plant pigment, is measured to determine the size of the algae population.

For these tests, the monitor collects water to be evaluated in a laboratory. First, the bottles and beakers are labeled with information about Moose Pond. After rinsing hands, bottles and beakers to remove contaminates, the core tube is lowered to the thermocline, clamped and quickly pulled to the surface. It fills with water during this process. The end is placed in a mixing jug and the clamp released, allowing the water to flow. Then it's poured into several bottles and vials to be tested for pH, color, alkalinity and conductivity, phosphorus analysis and chlorophyll content.

In addition, this summer LEA hired Researcher Amanda Pratt to conduct additional tests for *Gloeotrichia echinulata*, a cyanobacteria, plus iron and aluminum in bottom sediments. Amanda also used temperature sensors to take readings every fifteen minutes over several months on Moose Pond. In a separate article you can read about her Gloeo findings. As of this writing, she has not yet completed her studies of the two chemicals and the temperature. Overall, her research will give LEA and the Moose Pond Association a baseline from which to compare future data.

In the past few years, the water quality tests have yielded worse results than had been recorded historically. The scientific details of the 2013 report will be available later this year at mainelakes.org.

We all need to pitch in, like Hal, and do our part to help keep this the pristine body of water we all love. Whether helping with water testing or carrying out erosion control efforts on your own property, everyone can contribute.

**Do you have a boat and some free time in the early spring/late fall? LEA is looking for a volunteer to ferry the monitors on Moose Pond during the fringe seasons. If you can help, please contact Peter Lowell at 207.647.8580.**

# Stabilizing the Moose Pond Watershed

Every little bit helps.

Every bit of phosphorus kept out of the water helps the lake's health.

Every waterfront erosion problem fixed keeps more phosphorus out of the lake.

To find the places where excess phosphorus is entering the lake, properties on Moose Pond were surveyed.

In 2010, the Moose Pond Association, in conjunction with Lakes Environmental Association and Cumberland County Soil and Water Conservation District (CCSWCD) conducted a watershed survey. A watershed survey is a volunteer effort to identify sites of runoff and erosion.

Ten teams were trained by Heather True, project manager of CCSWCD and Wendy Garland, grant administrator for the Maine Department of Environmental Protection. The goal was to identify sources of erosion, e.g. exposed roots and stones, road ruts, bare soil, accumulated or transported sediment and deltas in the pond. For the most part, teams spent less than fifteen minutes at a site, noted roof runoff and any other problems, identified the site on a tax map, took photos and GPS readings, wrote a brief description of any problems and described the fixes.

Fixes include directing runoff to stable vegetation by creating meandering footpaths to the pond, installing a drip edge trench along the drip line of a house without a gutter, using a rain barrel to capture water, planting vegetated buffers, crowning a road or driveway, installing runoff diverters such as rubber razors or open-top culverts, etc.

This watershed survey was not a finger-pointing experience. Instead, it was meant to be an overall review of the area with the common goal of preserving long-term water quality. Once the survey was completed, MPA and LEA worked with the DEP to seek funding from Grant Section 319 of the Clean Water Act to fix high impact sites. The high impact sites included Winona Camps, Mountain Road and Cedar Drive.

The work at Winona focused on the runoff coming from the Junior Wiggy building toward the Kearns Amphitheater. Director Spencer Ordway explained that they worked with a landscape architect to better handle water running off of the large roof. At the drip line, perforated drains were installed in a trench up to seven feet deep in places, covered with crushed stone to cause the roof runoff to infiltrate in the ground before reaching the lake. The drains also directed excess runoff away from Moose Pond. The new drainage plan was carried out by Warren Excavation using a variety of landscape cloth, hay mats, erosion control mulch and other materials. Besides stabilizing this area, a section of shoreline near the camp's "Round House" was also improved with hay mats and stone. Before completing the terracing and stone retaining wall, bare roots of ancient pine trees were exposed.

Taking care of these erosion problems and doing their part to maintain the water quality of the lake is important to the Ordway family. "The whole Winona experience relies on the symbiotic relationship with Moose Pond and the natural surroundings. If we were not able to swim and boat and play in Moose Pond, I'm not sure where Winona would be," Ordway said.

*Spencer Ordway and Laura Ordway, directors at Winona Camps, stand on seven feet of crushed stone drip edge installed to catch roof runoff*

They continue to work on other sections of their shorefront to minimize erosion, while also upgrading camp roads to handle the heavy rains that have fallen in recent years.

Further south on Moose Pond, Steve Sudduth, a director at Wyonegonic Camps, said that over the past 15 years they have installed silt collection pools and catch basins to handle runoff from roads and especially from large roofs near the lake. This fall, they are working to re-grade a parking lot so runoff has more space to absorb before reaching Moose Pond.

At the East Area of Shawnee Peak, erosion problems in the parking area were addressed with help from the CCSWCD field engineer, said General Manager Ed Rock. The work involved improving ditching and culverts so water is filtered before arriving at the ditches on the uphill side of Mountain Road.

"We spend a lot of time and energy on erosion control at the mountain," Rock said. "If we have ruts from erosion, it causes us to have to make more snow to cover up the rougher terrain, which costs us more time and money."

During the summer, the crew maintains culverts and water bars on the trails so that water is directed into the woods to disperse before it flows downhill toward the road and lake. "We want to be good stewards of Moose Pond, it is a huge asset to the entire area," Rock said.

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Heavy rains on Mountain Road have caused washouts over the last few years. In response, the public works departments from both Bridgton and Denmark have stabilized areas alongside the road. At one particular gully, water was cascading around a boulder, washing out the road and continuing on to a tributary stream. The area has been stabilized with rocks. Also, new gravel and sloped ditches improved the erosion and pooling situation on Cedar Drive, located adjacent to the upper basin of the pond.

All residential landowners were also given the opportunity to apply for matching grants. These sites are small, but the cumulative impact affects the pond's water. A few remaining funds are available, but the work must be completed by the end of 2013. If you are interested in technical assistance, contact Heather True at htrue@cumberlandswcd.org. It's important to remember that permitting is needed to stabilize any site.

Moose Pond covers a surface area of 1,617 acres, while its watershed includes 11,170 acres. Healthy watersheds are the main goal for a healthy environment and economy. Phosphorus is an important nutrient that occurs naturally throughout the environment. Excess phosphorus in aquatic systems, however, can lead to over-fertilization in the pond and result in an algal bloom, which can deplete oxygen from the water through the decaying process. As water quality declines and habitat is damaged, lakefront property values decline, affecting individuals landowners and the economics of the entire community.

Developed watersheds mean vegetation has been removed and the land smoothed out for homes, lawns, driveways and roads. Five to ten times more phosphorus comes from developed watersheds. In contrast, forested watersheds filter storm water naturally through pine needles, leaves and other vegetated buffers that slow runoff.

The Moose Pond Association strongly encourages water quality protection practices implemented on the landscape that can reduce or eliminate overland runoff water.

# Lowering the Water

In mid-October, water levels in Moose Pond began to drop as the gates of the dam in Denmark were opened.

Denmark Public Works Director Ken Richardson said he keeps the water high through the fall foliage season when people still like to get out boating, but then begins dropping the lake level a vertical foot before the pond freezes for the winter. If the water level freezes high, then the ice will create pressure ridges, move rocks and cause erosion, he said.

Regulating the dam in the spring is trickier, Richardson said. "It depends on Mother Nature. If there's a lot of spring rains, we open it up. If it's dry, or forecast to be dry, we try to keep the lake filled up. But it is hard to predict."

While the town of Denmark manages the Moose Pond Dam, both Bridgton and Denmark contribute to the costs.

*before*

*after*

## Causeway Erosion Corrected

A small project that should have a big effect was done this fall near the bridge that connects the north and south basins. The work was done just to the west of Sabattus Island, midway across the causeway. A sandy, eroded area that has been used as a foot path and also as an old boat launch for canoes and kayaks, was greatly improved. In early September, the Maine Department of Transportation partnered with the Cumberland County Soil and Water District to repair the site. They installed rip rap, sediment traps and erosion control mulch to improve this area where water had previously been channeling sediment toward the lake. The approach is still accessible to pedestrians, but is no longer navigable for vehicles. In the future, in conjunction with some work planned for the bridge there, a guardrail will be installed here, said John Maclaine, DOT Environmental Coordinator for Region 1. The DOT will maintain the sediment traps.

The project cost about $3,500, Maclaine said, paid for by the DOT, and the CCSWD chipped in the erosion control mulch. Heather True of the CCSWD said that in time, as the erosion control mulch breaks down, it will create some organic matter and some natural vegetation may grow.

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