

A publication of the North American Lake Management Society

LAKELINE

Volume 45, No. 1 • Spring 2025



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Work –
Small Things
Add Up**

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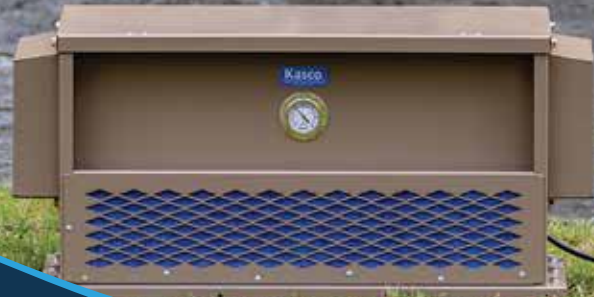
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Call for Abstracts

45th International Symposium of the
North American Lake Management Society

November 4–7, 2025

Navigating Change Together: Enhancing Lake, Reservoir, and Watershed Resilience

NALMS and the Board of Directors are pleased to invite you to join us at the beach for the 2025 Annual Symposium – Myrtle Beach, South Carolina. The annual conference returns to the southeastern United States and the timing is crucial as the region's coastal bay lakes face numerous ecological and anthropological challenges. Hazardous algal blooms, source water protection, fluctuating water levels, increased tropical storm frequency and strength and balancing reservoir needs for water supply and recreation are all topics of concern for natural resource managers. These topics and more will be deliberated during the conference, which will feature regional field trips, hands-on workshops, oral and poster presentations, and vendor displays.

We encourage you to explore the Myrtle Beach region and its abundance of outdoor recreation opportunities and tourist destinations before or after the conference. With numerous affordable lodging options, many world-class golf courses, and of course the beach, Myrtle Beach is a great base of operations for your explorations. In early November, average temperatures in Myrtle Beach are in the upper 60s and ocean temperatures are typically in the low to mid 60s. Its perfect beach weather for a final excursion prior to the coming winter, without the hassle of peak tourist season.

Important Deadlines

Abstract Submission Deadline
~~April 11, 2025~~ **EXTENDED TO MAY 2**

Registration Opens
Late Spring 2025

Presenter Registration Deadline
August 22, 2025

Hotel Group Rate Block Closes
October 9, 2025

Prospective Program

There will be technical workshops all day Tuesday, November 4. Beginning Wednesday, November 5, three days of presentations will be organized into themed tracks and sessions. We encourage oral and poster presentations on any aspect of lake and reservoir management, but especially invite valuable insights on the following:

- Carolina bay lakes
- Citizen science
- Human dimensions in lake science
- PFAS/PFOA
- Dam safety
- Coastal/inland water connections, including wetlands
- Stormwater
- Flooding, fire, and other natural disasters
- Watershed, river and sub-watershed projects
- Dissolved oxygen dynamics
- Modeling water quantity in river basins
- Water conservation
- HABs/nuisance cyanobacteria
- Lake Conestee case studies
- Piedmont area lakes
- Lake/reservoir issues across SC region
- Reservoir aging
- In-lake nutrient management
- Water Resources Center projects and research
- Utility reservoir projects
- Source water protection
- Invasive aquatic species
- **Any other lake related topic!**

Contact Us

www.nalms.org/nalms2025
nalms2025@nalms.org

If you are interested in organizing a Special Session of themed presentations, please email Chris Doyle and Amy Smagula, Program Co-chairs, directly to coordinate:
naiadconsultants@gmail.com & Amy.Smagula@des.nh.gov.

LAKELINE

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On the cover:

“Nature Imitating Art.” Photo by Ken Wagner.

From
Amy P. Smagula

the Editor

Happy spring! As the wet, rainy, and muddy season hits most of us, it's a good time to check in on some watershed based projects aimed at



slowing down and managing runoff headed for our surface waters. This issue of *LakeLine* includes articles from lake associations and other groups who have implemented

an array of techniques in their watersheds to keep their lakes and ponds healthy.

Karen Ogden and **Logan Freed**, with Bucks County Conservation District in Pennsylvania, lay out the problems and limitations with having turf as a primary (and very popular) landscape feature. They provide an overview of alternative landscaping options, from trees to native plants and shrubs, and rain gardens or meadows, and provide useful recommendations and sources of information and guidance to kick off projects like this.

Benjamin Rhoades shares an article about protecting shoreline areas in Virginia from erosion issues by using coir logs, or "biologs" as they are termed locally. His work is with Reston Association, which serves a large community (22,000 member households, including 1400 lakefront across four lakes) in Reston, VA. Ben shares information on efforts within the community, including programs to mitigate impacts on the aquatic resources, particularly from the shoreline community. Installation of these biologs involves contractors, shoreline residents and even kids involved in such programs as Boy Scouts and others.

LakeLine encourages letters to the editor. Do you have a lake-related question? Or, have you read something in *LakeLine* that stimulates your interest? We'd love to hear from you via e-mail, telephone, or postal letter.

The next article is from recent watershed and lake rehabilitation work in New Hampshire. **Kevin Kelly**, **Christine Wallace**, and **Lisa Hutchinson** detail the efforts of the Lake Kanasatka Watershed Association to reduce watershed based sources of runoff and nutrient loading, to ensure that the in-lake phosphorus inactivation project with aluminum can be sustained for years to come. Many watershed implementation projects are highlighted (and nutrient load reductions quantified), all of which are led and installed by shoreline and watershed residents. Their workgroup, "Boots on the Ground," is aptly named!

In New York, local residents and partners have been focusing stream and watershed stabilization projects to minimize impacts to downstream Skaneateles Lake, which is a drinking water supply for the City of Syracuse, New York. The tributary has had elevated nutrients and sediments that partners sought to remediate. **Frank Moses**, **Sistina Honold**, and **Monica Caves** share the efforts that have been taking place in this watershed, including stormwater interception efforts, stream stabilization, sediment capture, floodplain expansion and native plant installations.

Steve Lundt, NALMS Lakespert, shares his work with sourcing and distributing rain barrels in communities across Colorado, where water is limited, and every drop captured can be wisely reused, rather than running overland unchecked. Steve shares a great

partnership with a well-known company, as well as some legal changes that were needed to make water capture on private properties a legal activity.

NALMS President, **Victoria Chraibi**, provides a President's update. We also include a Call for Abstracts for [NALMS 2025 in Myrtle Beach, South Carolina](#), the 2025 NALMS Photo Contest announcement, and other updates and information.

Enjoy this issue, and please reach out with ideas for future articles or themed topics for *LakeLine*!

Amy P. Smagula is the Chief Aquatic Biologist and Director of the Jody Connor Limnology Center at the New Hampshire Department of Environmental Services. ✨

From Victoria Chraibi the President

Spring is burgeoning. Ice is breaking. Plants are budding. And for the limnologist, field work is beginning.



When it comes to conserving water bodies, it often truly does take a village. In this issue of *LakeLine*, I hope you enjoy the creativity and persistence

displayed by local groups and volunteers.

Volunteer efforts were also highlighted and applauded at the recent National Water Quality Monitoring Conference in Green Bay, where the National Monitoring Council recognized the efforts of individuals and communities that have dedicated decades of bright ideas and bright personalities to the cause of volunteer monitoring.

- **Barry Alan Long Award:** Jeff Schloss, Extension Professor/Specialist (Biology/Water Quality) Emeritus, University of New Hampshire Extension and Department of Biological Sciences
- **Elizabeth Jester Fellows Award:** Meghan Smart, Arizona Department of Environmental Quality
- **Vision Award:** Blue Thumb Water Quality Education Program Volunteer Program, Water Quality Division, Oklahoma Conservation Commission

May we all find new strategies for community-building and tips for implementing strategies, technologies, and tools to improve watershed health and lake water quality within these pages.

NALMS wishes everyone a sunny and safe start to the field season.

Victoria Chraibi is a tenured associate professor of aquatic ecology at Tarleton State University and the assistant director of Timberlake Biological Field Station, for which she coordinates educational outreach programming and manages student research initiatives. She holds a B.A. in biology and Spanish from Hanover College, Indiana; a Fulbright scholarship to McGill University, Quebec; an M.S. in water resources science from the University of Minnesota Duluth; and a Ph.D. in earth and atmospheric sciences from the University of Nebraska-Lincoln. As a paleolimnologist, past research includes Lake Memphrémagog, Lake Superior, and Yellowstone National Park. As a phycologist, current research focuses on Texas streams and reservoirs. Victoria joined NALMS as a student member in 2011, and has been a member of the Board of Directors since 2018. ✨

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NALMS STATEMENT TO OUR COMMUNITY

THE NORTH AMERICAN LAKE MANAGEMENT SOCIETY (NALMS) prides itself on the intersectionality of its membership. We often hear feedback from our conference attendees that we provide a unique and welcoming forum for scientists, lake management professionals, watershed associations, and community members to discuss the water resources we value and rely upon. The recent U.S. executive actions to reduce scientific funding, fire staff scientists and policy administrators, cancel environmental data collection and modeling services, blacklist research topics like climate change and environmental justice, remove public access to publication and data-sharing platforms, reduce pollution regulations, override carefully structured water resource plans, endanger federally protected lands, and block collaborative communication between American and Canadian scientists imperil the ethical and sustainable management of water bodies in North America. This statement outlines the intentions of NALMS to offer resources and support to our members most affected by these actions, as well as our role in protecting the future of lake and reservoir management.

NALMS stands with those who have recently lost employment, funding, or professional development opportunities in light of the recent U.S. Executive Orders. We will do our best to support those who find themselves in a difficult time of transition and uncertainty through our job postings, professional certification program, and providing a scientific publication that is free for members to submit manuscripts. We recently signed onto a letter from the Union of Concerned Scientists to Congress advocating for the protection of federal employees and federal funding for scientific research. We also signed a letter supporting the continued funding of the USGS stream gauge program. We intend to remain engaged in such advocacy on behalf of our members.

The absence of most federal attendees at the National Water Quality Monitoring Conference in Green Bay was deeply and sorely felt. While many attendees were able to pivot to virtual attendance, we recognize that recorded presentations lack the personal networking and brainstorming opportunities that characterize in-person events. We left the conference with a renewed appreciation of the importance of the connections we maintain within our community. We continue planning our Myrtle Beach conference in November 2025, appropriately named “Navigating Change Together,” with an eye toward these commitments and values.

In context of the uncertainty surrounding DEI programs in the United States, NALMS confirms that it holds no intention of removing or reducing our JEDI program. In fact, we are in the process of formalizing it into our committee structure to ensure its continued impact. Along with our early career and outreach and education programs, we will continue to provide conference programming, workshops, internships, and grants that support the professional development of future generations of lake managers. You can find more information about our JEDI program, student programs, and early career resources on the NALMS website.

Even though NALMS has long established itself in public advocacy for lakes with programs like Lakes Appreciation Month and the Robert Carlson Secchi Dip-In, it is worth describing how the society does much behind the scenes. Our 314 Working Group develops and implements strategies to advocate for federal funding support for state and community water programs. We contract a legislative affairs consultant to assist our advocacy efforts in Washington, D.C., and keep us up to date on water-focused regulations. We are prepared to continue these efforts into the future and adapt the focus as best suits our mission.

To finish, it is worth refreshing in our minds the mission of NALMS: to forge partnerships among citizens, scientists, and professionals to foster the management and protection of lakes and reservoirs for today and tomorrow. We hold this mission as a guiding principle for everything we do. As a small, member-driven organization that does not rely on federal funding, we exercise the independence to represent the needs of our members to the best of our ability. We are grateful for your support of the NALMS mission and goals by maintaining your membership and offering your service on committees and programs.

It is a long and arduous journey ahead; it is best we row together.

Sincerely,
Victoria Chraibi
NALMS President

Philip Forsberg
NALMS Executive Director

Lakes Appreciation Month

Enjoy and help your favorite lake in July!



Photo: Philip Forsberg

The Month of July is Lakes Appreciation Month!

You work and play on them. You drink from them. But do you really appreciate them? Growing population, development, and invasive species stress your local lakes, ponds, and reservoirs. All life needs water, let's not take it for granted!

NALMS started Lakes Appreciation Month to focus attention on the value of lakes and reservoirs to society and the threats they face. Lakes and reservoirs are used for a variety of purposes: water supply for municipal, industrial and agricultural use; recreation; flood control; and aesthetic enjoyment. However, they are often considered "free" resources by users and this can result in abuse and neglect.

July is a great time to set aside some time to celebrate and help your favorite lake or reservoir. It's a time when many folks are vacationing and enjoying lakes and reservoirs. Just think, what would your life be like without lakes?

How Can I Participate?

Help make Lakes Appreciation Month great this year!

- Lakes Appreciation Month is a great time to participate in the Robert Carlson Secchi Dip-In, but feel free to submit data anytime during the year.
- Pursue media coverage for your local Lakes Appreciation events.
- Encourage students (grades K-12) to participate in the 2025 poster contest.
- Ask your governor to proclaim July as Lakes Appreciation Month.
- Share your stories, events, photos, videos, etc. on social media! Be sure to use the hashtag #LakesAppreciation.
- Arrange a lake or watershed clean-up event.
- Start a watershed storm drain stenciling program.

Need more ideas? Visit our website, www.nalms.org.

www.nalms.org | #LakesAppreciation

A Program of the North American Lake Management Society



Photo: Steve Lundt



Photo: Steve Lundt



Got mud?

Stormwater, homeowners, and conservation districts

Karen Ogden and Logan Freed

The American lawn, a symbol of economic success for some and ecological scarcity for others, presents a complex challenge in water management. A quick-draining yard and flowerbeds are to be envied, even if the surface runoff causes flooding downstream. On one thing, most can agree, mud is trouble.

Conservation Districts across the Country work to protect soil and water resources from countless ways they can be impacted. Urban development with concentrated stormwater flows, impervious surfaces, and construction site runoff demands intervention to keep rainwater clean and infiltrating the ground instead of flowing across it to enter streams. Agricultural operations place demands on soil health and water supply, challenges met through careful planning and best management practices including cropland and animal grazing rotations. Non-point source pollution, the cumulative effect of rain washing over human modified watersheds, can be managed through small actions taken by many.

The lawn dilemma

Turfgrass covers an astounding 40 million acres in the United States, which equates to two percent of the land area, making it the largest irrigated crop in the country (Milesi et al. 2005). From a soil and water conservation perspective, lawns pose significant problems, particularly for stormwater management (Figure 1).

Years of regular mowing compresses once-organic rich, spongy soils into a dense, impenetrable cake. This compacted soil is layered with a mat of thatch further restricting the downward movement of water and topped with three

inches of uniformly cut turfgrass. These conditions encourage rapid downhill water movement (Figure 2).

Consider a spot in a lawn where grass just won't grow. During a rain event, a large puddle grows then slowly recedes to expose a muddy ditch surrounded by clumps of sickly grass. Homeowners often try to remedy the problem by spreading more seed or fertilizer, which float and are whisked away by the next rain, joining other non-point source pollutants.

Conservation District staff are trained and well-practiced at viewing landscapes through the lens of water flow. It is a skill homeowners can learn by simply walking in their yard while raining and observing. Of course, rain falls from the sky, but where do surface

flows enter the yard? From the street, coursing off a driveway or patio, or jettisoned from a downspout? Once in the yard, find where the surface flow leaves the yard, does it collect in one area, or does it seemingly vanish? Mentally map the movement of the water then sketch it on paper or digitally. This can be useful in planning your near and long-term landscaping projects.

Environmental and economic impacts

Turfgrass lawns contribute to several environmental issues, including flooding, water pollution, resource depletion, biodiversity loss, and high maintenance costs. Surface runoff from lawns carries fertilizers, pesticides, soil, and other pollutants into waterways. Excessive water use through irrigation depletes

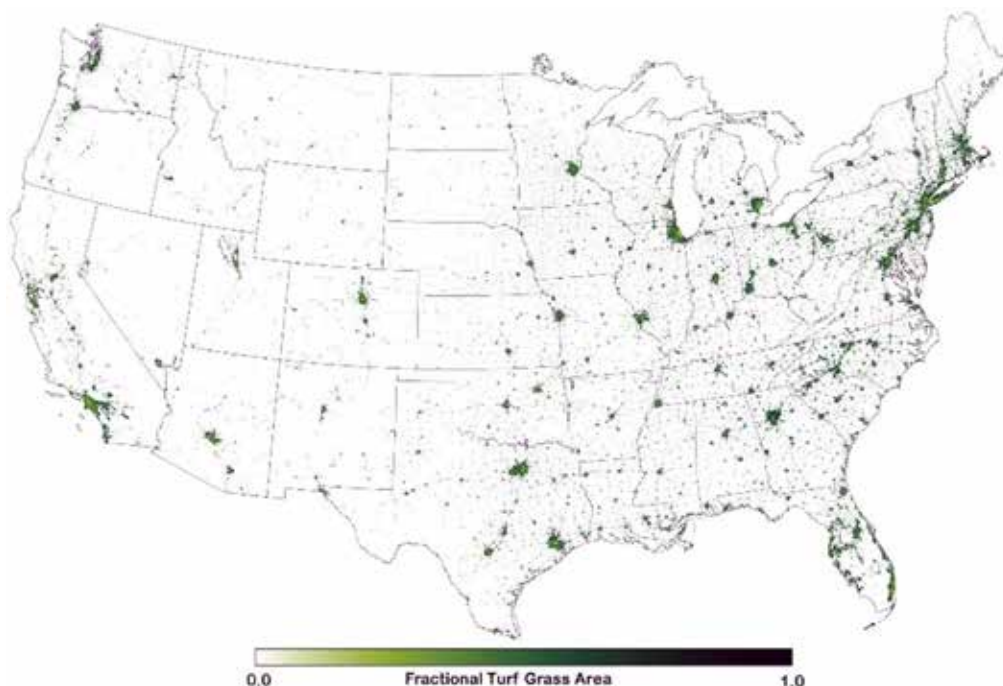


Figure 1. Distribution of the fractional turfgrass area (percent) in the conterminous U.S. (Milesi et al.)

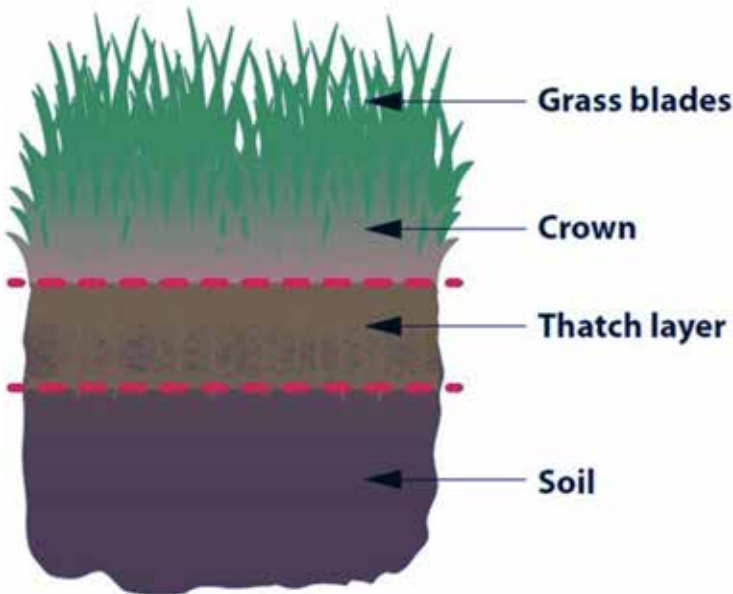


Figure 3. Photo of eroding streambank. (Reische)

Figure 2. Anatomy of turfgrass. <https://www.calgary.ca/water/programs/lawn-care.html>

groundwater resources while providing little or no habitat value for native wildlife. Turfgrass cannot support the insect diversity or biomass needed to sustain healthy populations of birds, amphibians, reptiles, or mammals. During heavy rains, manicured grass areas tend to produce more surface runoff and less water infiltration into soil, increasing the volume in creeks and streams. The storm flows fill channels to bank full, saturating the finer sediments that have been laid down over centuries. Eventually the saturated slurry collapses into the stream and is transported downstream (Figure 3). This process results in property loss and degraded water quality.

below the surface creates channels through which water can flow from the surface. The roots themselves grow and shed material that feeds a community of microorganisms increasing the organic component of soil that can hold or store water. Trees, oak trees in particular, are a workhorse in the yard. They move water, store carbon, cast cool shade, and provide

habitat for insects and their furry or feathered consumers. In fact, a single mature oak tree can provide food for over 500 species of caterpillar (<https://tinyurl.com/OakDiversity>): a smorgasbord for hungry nestlings and adult birds (Figure 4).

Maybe there is not enough space for a tree in that bare trouble spot or where

**Native trees and plants:
Nature's water managers**

To address water management, we have at our service a remarkably effective nature-based water management system. Consider comparing stormwater runoff of an acre of turfgrass and acre of forest, nearly twice as much water would run off the grassed site (<https://tinyurl.com/RunoffCoefficients>). Without question, trees are the best way to encourage infiltration and then transport excess water from the ground into the atmosphere through transpiration, or tree exhalation.

A mature oak tree moves nearly 110 gallons of water each day (Ozcelic 2017). Its root structure, extending 10 to 15 feet

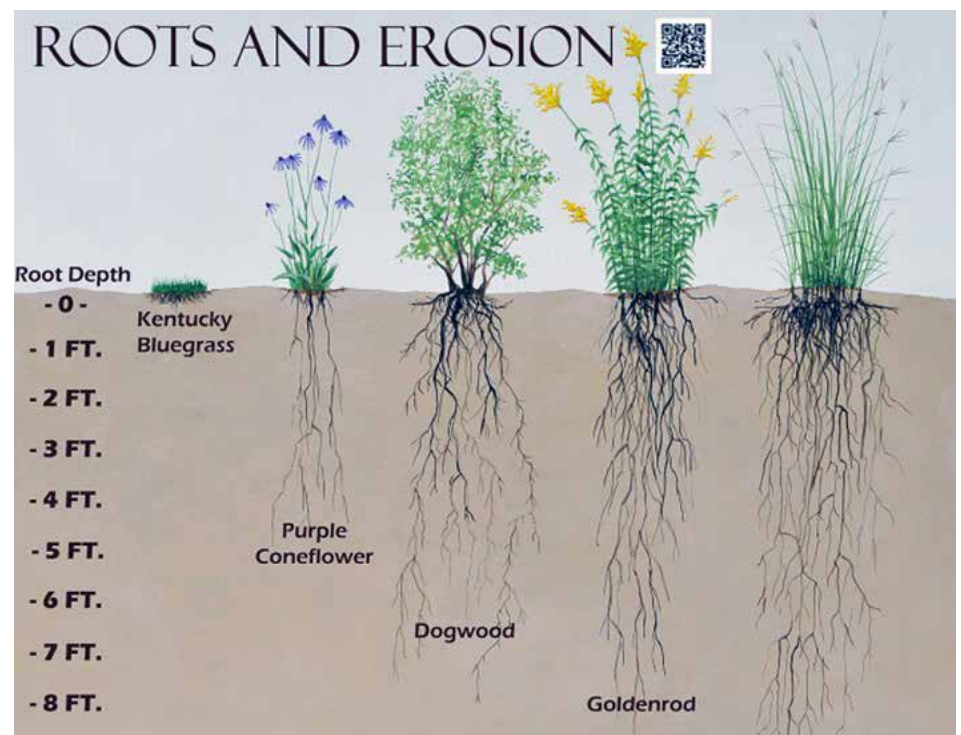


Figure 4. Descriptive diagram comparing the roots of turf grass to native plants. <https://www.lovgov.org/services/parks-recreation/parks-facilities/parks-reservation-spaces/mehaffey-park/mehaffey-park-arboretum>

the water courses off the roadway. It's not good practice to plant a tree at the base of downspout, so what else can be done?

Think native. Plants and shrubs that were present in your region before colonization are perfectly adapted to the climate and soils in your yard. These plants can thrive in occasionally flooded areas and create beautiful, low-maintenance spaces. These conditions are tough for most ornamental varieties, but home to native species.

Transforming the wet, problem area into a native planting, whether a seeded buffer strip or a formal bed, will address the mud problem and create beautiful spaces that appeal to people and pollinators alike. To get a native planting or seeding off to a good start, the aggressive turfgrass species must be removed or killed. Start with a blank slate for the best chance of success.

Removing turfgrass is challenging and there are several approaches to suit personal values or priorities. Manual removal by scraping or digging out the grass and root mass is hard work but effective. Be aware of the erosion potential of unvegetated areas. Another option is to smother the grass under cardboard or a tarp, after thoroughly wetting the area. Leave in place several weeks, depending on weather conditions.

If downspout volume is the issue, a rain garden may be the solution. Rain garden design and installation is a bit more complicated than a native planting but is a doable DIY project and can become the focal point of your yard. The most important elements in rain garden construction are (1) correct sizing and location, (2) soil amendments for best infiltration, and (3) species selection for changing water levels. Rain garden guides that provide step-by-step instructions for designing and installing rain gardens are plentiful. This one is created by Wisconsin Department of Natural Resources and provides a great starting point: <https://tinyurl.com/RainGarden-How-toWI>.

For those with larger areas of manicured lawn who want to reduce mowing, manage water, and enhance the surrounding ecosystem, a native meadow may be the solution. But first, manage your expectations. Meadows are dynamic systems, slow to establish, and changing

in composition and appearance year by year. Native grasses are the foundation to a low maintenance meadow with flowering forbs more an accent rather than centerpiece. As with tree planting initiatives, lawn to meadow programs are often available in areas with dense residential areas.

Turf to meadow conversions usually begin with the application of an approved herbicide, precisely following label instructions. This method of site preparation has the added benefit of maintaining soil cover by the dead grass and thatch which also discourages germination of weed seeds remaining in the soil. After turf kill, no-till drill seeders cut a furrow through the thatch and deposit native seed mixes. Once established, native plantings must be monitored for competition from invasive, non-native plants.

Support: Sustainable landscaping

Across the United States, local, state, and non-governmental organizations are advancing or partnering to plant trees. Whether individual yard trees, street side or urban plantings, even large area conversions from turfgrass to woodland, there is often a program available to help. These initiatives are becoming competitive, a good sign of increasing public awareness of changing climate and the value of trees. For example, Pennsylvania's Watershed Forestry program of the Department of Conservation of Natural Resources has offered lawn to habitat grants since 2020. In its first five years, over 500 private landowners in southeastern Pennsylvania requested assistance from the program. Your local Conservation District may be able to direct you to the best fit tree planting program.

Volume and water quality issues in surface water reflect the cumulative effect of activities in the watershed. Point discharges, agricultural operations, and urbanization are major contributors, as is the American lawn and the industry that supports it. As an alternative and sustainable practice, homeowners can naturalize their yards incrementally or all at once with support from local Conservation Districts and networks of non-profit organizations working toward healthier ecosystems.

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Karen Ogden and Logan Freed are dedicated individuals of the Bucks County Conservation District, combining their experience to further watershed and conservation initiatives

Karen works as the watershed specialist, sharing her expertise with a M.S. in biology coastal zones from the University of West Florida. Her background includes water quality data collection, environmental education, natural resource management, and consulting on environmental impact assessments.



Logan is the administrative assistant and conservation specialist. A graduate of Delaware Valley University with a B.S. in Conservation and Wildlife Management and a minor in Media and Communications, Logan interned with the District in 2023 before transitioning to a full-time role in 2024. She supports administrative functions while contributing to watershed and conservation projects. ✨



Protecting shorelines in Reston, Virginia

Benjamin Rhoades

Erosion creeps up on everyone. In Reston, Virginia, this has been the experience of dozens of homeowners who once thought their smooth transition from turf to lake would last forever. What they may not have realized is that those contours pre-dated a shoreline and the action of waves on our artificial lakes.

Reston Association (RA) is a large community association in northern Virginia that serves over 22,000 member-households, 1,400 of which are lakefront across four lakes. Since its establishment in the early 1960s as a planned community, staff and community members at the Reston Homeowners Association, now Reston Association, have held environmental preservation as a core value. While all members may utilize the lakes for boating and fishing, they have limited impact on the resource they enjoy.

The relatively small number of lakefront owners, on the other hand, make up the majority of the lakes' shoreline areas, and therefore, have an outsized impact on lake health. As such, RA works closely with lakefront owners through various

rules and programs – no-wake and no-gas-motor requirements, boat inspections, riparian zoning education, and shoreline stabilization – the focus of this article. RA's shoreline stabilization program has been a long-running aspect of our protection of the lakes.

While understated, the program has been successful enough that the folksy portmanteau of "biolog" has been assigned to the type of shoreline project primarily implemented by this program. This article reviews the beginning of the program through its implementation via design

guidelines, technical assistance, and cost-sharing measures.

Background and early observations

Reston Association's four lakes – Newport, Anne, Thoreau, and Audubon, were all established through the impoundment of small, headwaters streams in the Difficult Run watershed (Figure 1). These small lakes (ranging from 13 to 44 acres) have residential lots to the waterline, meaning that grass and loose soils are common sights along the shoreline. While some residents have protected their

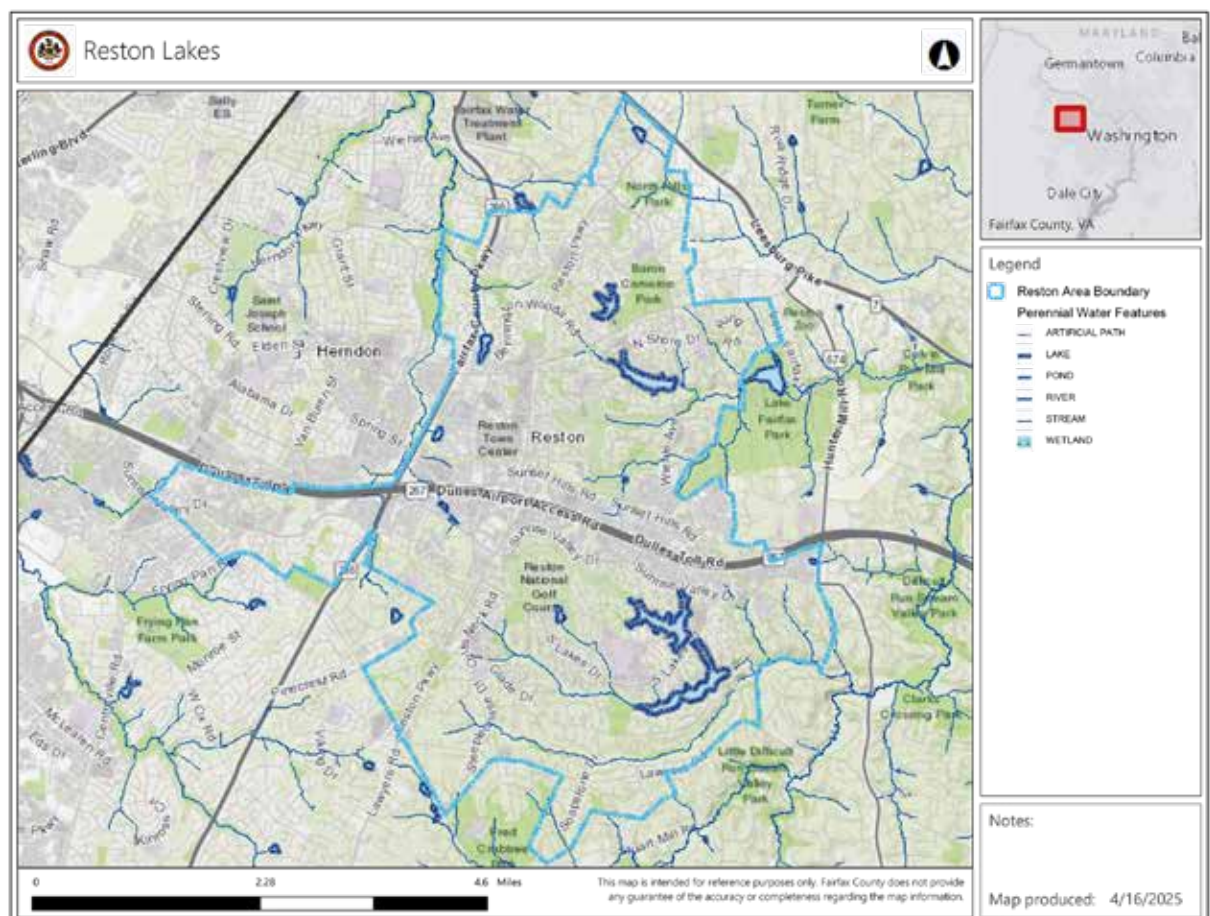


Figure 1. Map showing Reston area lakes and surrounding community.

shorelines from erosion, RA staff have observed over the years that bulkheaded shorelines caused down-shore erosion and riprap did not serve a function beyond erosion control (Figure 2). Additionally, those shorelines were devoid of habitat for the lakes' wildlife (Figure 3), a serious concern for the early environmental managers at RA hoping to encourage the artificial lakes' colonization by native flora and fauna.

Some early research led to the standardization by RA staff of a coir log living shoreline design for residents. The living shorelines RA and its residents typically implement use 12-16-inch in diameter, 10-foot-long coir logs – a dense log made of coconut fiber wrapped in jute netting – and a mix of native emergent, wetland, and upland plants planted in the shoreline, the lakebed, and the log itself (Figure 4). Nowadays, the implementation of coir log living shoreline practices is well-documented online. In brief – the coir log is laid in the water along the shoreline, staked into place into the lakebed, and planted. The coir material transforms into a thick soil-root mat in the best-case scenarios, and in the worst, provides shoreline protection until it biodegrades and needs to be replaced 5-10 years down



Figure 2. Bulkhead along Reston area lakes.

the road. Our local supplier has them available for \$60-\$90 per log, size dependent. In Reston, we have had a general landscaping contractor install many living shorelines, however, Boy Scout troops and residents themselves have also installed them (Figure 5).

Technical assistance

Situated in Northern Virginia, Reston is in an area with no naturally occurring lakes and relatively few large recreational reservoirs. With such a small market, there is a local knowledge gap surrounding shoreline erosion issues and stabilization practices. When a resident comes to RA with concerns about their shoreline, staff



Figure 3. Local flora and fauna in Reston Lakes (l:buttonbush; r: frog).





Figure 4. Established coir logs along shoreline of Reston area lakes.



Figure 5. Installation of coir logs.

have to be able to fill the gap by providing details about different shoreline stabilization methods. This gives RA a chance to guide a resident toward environmentally friendly options without being preempted by contractors who often install expensive alternatives. Typically, our wake-free, temperate lakes do not have much wave

action or ice so we can recommend the aforementioned DIY-friendly planted coir logs as an option for residents.

While shorelines may not be a common topic of conversation in the DC suburbs, the area is lucky to host numerous native plant and environmental advocacy groups that compile detailed plant lists for

residents, which RA staff can pass along when a resident wants to design a DIY living shoreline. Knowing the limits of these practices, RA has developed – and is working to improve – a shoreline stabilization guide for residents to better understand when to use each kind of shoreline stabilization technique on their property.

Design guidelines

As a community association with covenants dictating design and maintenance of properties, RA has had the opportunity to encourage living shorelines through shoreline stabilization design guidelines. In RA design guidelines, design priorities are laid out, with the least-desirable, or most impactful, options requiring higher levels of community review. When it comes to shoreline stabilization, RA has deemed living shorelines of the highest priority, and as such, does not require any design oversight – should a homeowner decide to replace the lawn along their shoreline with a stabilization practice, they are encouraged to choose native plantings and biodegradable materials. Should that same homeowner decide to install bulk-heading or stone, they would be required to submit an application to the community Design Review Board and acquire neighbor signatures. This gentle nudge from RA policy has helped many residents choose a living shoreline.

Property issues and cost sharing

A tricky component of RA's shoreline protection program has been property lines. Unlike some lakes, RA's have a geostatic parcel boundary, meaning some lake parcels encroach upon the dry land of residents, and some resident parcels encroach into the waters of the lake. Because of this, bulkhead projects undertaken by residents often require surveying and a deed-recorded maintenance agreement if they encroach onto RA's lake-parcel. Living shorelines, with their minimal maintenance needs, are a great compromise in this regard. Because of the co-benefits of these projects, RA has long-undertaken cost share arrangements with residents for these shoreline projects. Considering the relatively low cost of coir logs, RA arranges to purchase the logs and plants for residents at commercial rates, as long as they can provide their own labor for installation and maintenance of the

shoreline. The arrangement eases the process for residents and lowers the barrier for entry, making a living shoreline option more enticing for residents.

Challenges

As we have passed the 60th anniversary of Reston's founding, many of our lake shorelines are needing renewed stabilization efforts. Residents and staff are starting to see early bulkheads buckle and rot at around 40-50 years old and early living shorelines become shaded out or require maintenance at around 20-30 years old. Despite the aging of living shorelines, their overall success has been encouraging. In many instances they become invisible even to their owners, who ask about options for planting their shoreline when there are wooden stakes left from decades-old coir logs and lingering buttonbush or pickerelweed from the prior planting. In those cases, we have helped residents refresh plantings and monitor their shorelines.

Much more challenging are the aging bulkheads. In those cases, we are having

hard conversations with residents about the feasibility and cost of a more extensive living shoreline project than RA could assist with, the replacement of bulkheading, or other costly grading endeavors. Despite these challenges, it is clear residents see living, planted shorelines as the default over bulkheads or lawn. We hope that those residents will continue to ask hard questions about shoreline alternatives that promote wildlife habitat and protect our lakes.

Ben Rhoades is the watershed manager for the Reston Association, a large civic organization in northern Virginia, overseeing the monitoring and maintenance of four lakes and their earthen dams. In Reston, Ben works to educate residents about the importance of watershed management in protecting their lakes through citizen science monitoring programs, drainage and erosion site visits, and education programs. An early-career



professional, Ben received his B.A. in environmental and sustainability studies from George Mason University in 2020 where he got his start with watershed outreach interning for the local Northern Virginia Soil and Water Conservation District. Ben joined NALMS in 2022 on the Enhanced Clean Lakes Program/Clean Water Act Section 314 Working Group and has been an advocate for protection and restoration of lakes since! 🌱



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From green to blue: Working together to restore Lake Kanasatka's crystal clear water

Kevin Kelly, Christine Wallace, and Lisa Hutchinson

Lake Kanasatka is a 353-acre body of water in the Lakes Region of New Hampshire. This lake and other lakes across the 4,528-acre watershed have had a long history of excellent water quality. In August of 2020, Lake Kanasatka residents and visitors alike, noticed something concerning about the water quality throughout the lake. Unlike more common cyanobacteria blooms, with telltale signs of colored scums near or along shore, Kanasatka had turned a bright fluorescent green (Figure 1). Water clarity was also negatively impacted. After testing water samples, New Hampshire Department of Environmental Services (NHDES) issued a cyanobacteria advisory based on cell concentrations exceeding the 70,000 cells/ml threshold. Over the next three years, Kanasatka experienced cyanobacteria advisories ranging from 24 days up to 121 days in a given year, culminating in a thick lake-wide bloom in October 2023 which spilled over a dam and into Lake Winnepesaukee, the state's largest lake (Figure 2 and Figure 3).

The Lake Kanasatka Watershed Association (LKWA) Board of Directors, committee members, and many local residents understood the need to address this growing problem quickly. With financial support from the Town of Moultonborough and a GoFundMe page, a Watershed Based Management Plan (WBMP) took shape and was completed in August of 2022.

The WBMP clearly showed Kanasatka had two problems: phosphorus coming in from the surrounding watershed, and internal loading from a build-up of legacy phosphorus in the lake's bottom sediments. Across the watershed, the WBMP identified 22 problem sites and 121 (66 percent of the



Figure 1. Lake Kanasatka from a helicopter. Photo credit: John Stephens

182) shoreline parcels contributing excess phosphorus and in need of remediation. Internal/legacy phosphorus found in core sediment samples showed significant amounts available for release over the summer months. Both external and internal sources were feeding the cyanobacteria, and each needed to be addressed.

Homeowners and volunteer teams of neighbors got to work implementing solutions throughout the watershed to meet phosphorus reduction requirements

specified in the WBMP, with the first round completed by the end of 2023. As the cyanobacteria blooms continued, residents learned that external phosphorus loading had to be reduced even more widely. To that end, LKWA's traditional July 4th boat parade, which included a lively display of boats big and small, transitioned to a smaller, "human-powered" boat parade, thereby tempering the damaging wave action produced by such a cluster of larger boats, which was uprooting shoreline vegetation and



Figure 2. Cyanobacteria bloom accumulating above the Lake Kanasatka Dam.



Figure 3. Blackey Cove in Lake Winnepesaukee, downstream of Lake Winnepesaukee, viewed from helicopter: Photo credit: John Stephens

depositing nutrient-rich sediment into the lake.

After much of the watershed work was completed or at least underway, LKWA completed an alum treatment (Figure 4) with funds raised by the lake community and with a grant from the State of New Hampshire in May of 2024. The aluminum compound settles on the bottom sediments and binds to the phosphorus, preventing it from being released back into the water column. The alum treatment successfully achieved its goal through the first season, and monitoring will continue to ensure that a durable reduction of internal loading is maintained (again, with the understanding that continued watershed work was necessary to implement and maintain). Throughout the remaining 2024 season, Kanasatka experienced beautifully clear water (up to 9.3 meters) with no cyanobacteria advisories. The longevity of the treatment depends on us. Lake



Figure 4. Lake Kanasatka aluminum treatment. Photo Credit: Bill Gassman

stewardship never ends. We know we must remain active and vigilant.

Our strategy and approach

Our strategy, and the key to our success to date, is getting as many community members as possible engaged and involved as soon as possible on many fronts. We found remediation is not necessarily difficult or complicated, but we needed to set examples, share success stories, and help others get started on their own journey to protect the lake. While several of these programs are detailed later in this article, the following actions have also been instrumental to the recovery of Kanasatka's water quality.

- Employing multiple modes of communication to reach as many of our community members as possible, including:
 - Making our website more user-friendly, and including practical how-to information/resources
 - Targeting our posts on Facebook (updates, lake-friendly living, boating practices, and homeowner projects)
 - Emailing out regular newsletters full of informative articles and updates from the board and the community
 - Hosting a community forum on the findings in the WBMP, including next steps, and making the recorded session available for anyone who could not attend in person
 - Providing each property owner with their personalized shoreline survey results, along with helpful remediation sources and links to the WBMP information
 - Running a Capital Campaign, to fund the steps identified in the WBMP mailed to all residents of our watershed, as well as nearby residents on downstream Lake Winnepesaukee
 - Continually promoting NH Lakes LakeSmart Program, leading by example, understanding that as more properties gain certification, many others will follow.
 - Proactively expanding our monitoring program with the University of New Hampshire Lakes Lay Monitoring Program

(LLMP) to inform the WBMP and track progress. Kanasatka has participated in this citizen-scientist-based program for over 40 years.

We enhanced testing and increased frequency; added more community volunteers, more sampling locations in the watershed (including an upstream pond), and more parameters and samples at multiple sites.

- Septic systems are calculated at 10 percent of phosphorus load in the WBMP. Phosphorus and other nutrients can enter the lake from old, overloaded, or poorly maintained septic systems through groundwater, stormwater runoff, and overflow. Of the 41 percent of property records found during the WBMP research, only 25 percent had septic systems newer than 25 years old. Our research showed many older (circa 1950s and 1960s) systems on the lake. However, incentivizing residents to get their septic systems inspected by a licensed professional is having a positive impact. The LKWA Board, using monies raised from a community yard sale, funded an initial \$5,000 to cover half of the cost, or up to \$250 of a certified inspection for any member of

LKWA. This program was fully subscribed in 2024, and the Board has already approved an extension of the program for 2025.

- A unique stormwater management technique being used to divert stormwater from gravel driveways and foot paths, into suitable infiltration, was discovered when two residents were visiting an Audubon facility in Maine. These devices are called water razors, rubber razors, or water bars (Figure 5). They consist of a rubber "blade" made from recycled conveyor belt material that is sandwiched between and supported by two 2"x6" pressure treated wooden boards. The device is embedded in the surface of a gravel or dirt driveway or path so that only the four-inch blade is exposed (Figure 6). The rubber blade can be driven over, then it will spring back to its upright position. A razor is installed at a 30-degree angle across the path, so that it intercepts runoff and diverts it to an area where it can naturally infiltrate or flow to an existing structure like a rain garden, vegetated swale or dry well. Water razors are typically spaced 30 feet apart. They do require periodic sediment removal on the uphill side and are not recommended for areas managed by



Figure 5. Lake resident installing a razor for runoff control.



Figure 6. Lake resident installing a razor for runoff control.

snowplows. At the request of a homeowner, our lead watershed implementation volunteer evaluates the property for stormwater diversion opportunities, then fabricates the razors, and ensures proper installation. Property owners are charged for the cost of materials only, which is approximately \$5 per linear foot. If the property owner is not able to install the razor, volunteers do the work at no further cost. To date, our lead volunteer has supplied 37 water razors totaling nearly 400 linear feet to 16 separate properties.

LakeSmart activities

NH LAKES is a non-profit organization dedicated to preserving and restoring New Hampshire's estimated 1,000 lakes and ponds. They offer a program called "LakeSmart," adopted from other model programs from Maine and other states. LakeSmart is a voluntary, no-cost, and non-regulatory education and recognition program encouraging community members to take action to

loading to the lake. Following are some examples of LakeSmart directed projects.

One couple's property is a great example of how helpful LakeSmart can be. They moved into their Lake Kanasatka home just as the cyanobacteria blooms began. To do their part in restoring the lake's health, they requested a LakeSmart property assessment. LakeSmart recommended a professional septic system inspection. The inspection revealed their system was in complete failure. A second abandoned tank, still full of untreated waste, was also discovered on the property. They had a new state-of-the-art system installed. They did not stop there. They paid close attention to how stormwater was impacting their property and took steps to divert and infiltrate it. They increased the vegetated buffer along the waterfront, stabilized and "perched" their small beach area, installed stepping stones and thick mulch on pathways, then created a rain garden for infiltration.

Another shoreline resident is an exemplary example of a lake friendly

protect lake water quality, habitat, and property values. Stormwater control can be overwhelming for the average homeowner, but this user-friendly program simplifies the steps.

To date, 29 of the 180 Lake Kanasatka properties have earned the prestigious LakeSmart Award, and at least 11 others are currently in the process. As a result, LKWA was presented with the Community LakeSmart Award in July of 2024. This shows that individual efforts can motivate an entire community and reduce total phosphorus (TP)

property owner. She moved into her Lake Kanasatka cottage in 2020. Her immediate concern was the lack of septic system records available for this 1950s home. She had the system inspected and it was found to be in fair condition and functioning as intended. Fair condition was not good enough for her, so she upgraded the distribution box and a connector pipe. After completing a number of projects to divert and control runoff, she next turned to her true passion- landscaping and gardening. The waterfront was mostly bare of vegetation and had a sandy beach that was vulnerable to erosion. In her words, this became a reclamation project with the challenge of determining which plants would grow in such sandy soil. The result of her work is a wide vegetated buffer along the waterfront. Wood chips and pine needles were used for erosion control and soil amendment. She chooses native plants whenever possible because they grow deeper roots and become the best erosion and runoff control of all. She has since emerged as a leader in our lakefront community by writing numerous articles for our publications about the benefit of native plants, where to purchase them and the best practices for planting and yard maintenance (Figure 7). She consults one-on-one with others who seek the LakeSmart designation. Most recently, she has begun collecting and trading seeds from native plants. She also grows native perennials and gives them away to other Lake Kanasatka residents. While not a formal program, she fondly refers to her contribution to the lake community as "Plants in the Ground," a follow-on to another Lake Kanasatka program called "Boots on the Ground," mentioned later in this article. The estimated estimated TP reduction is 0.22 kg/yr.

Another lake resident lives on a gravel road with a deep stormwater swale along the distant side of the road. Two large culverts convey stormwater under the roadway and onto his property. This concentrated flow eventually created a deep intermittent stream that carried nutrient-rich water and large amounts of sediment directly into the lake. He and his brother-in-law, who lives next door, are both in their eighties, but they fit into the "highly capable" category. The brothers, along with others, have spent countless hours standing in the rain, brainstorming possible solutions. An effective remedy



Figure 7. Lake resident's walkways to limit directional flow down the shoreline.

was to place sediment control socks at regular intervals along the length of the 300' stream, to slow and spread the stormwater for infiltration. Their hard work and diligence resulted in a whopping TP reduction of 1.10 kg/yr, and the LakeSmart Award. The brothers also belong to a private Beach/Road Association. They maintain the sloping roadway leading to the beach. For years, they have employed railroad ties to divert the stormwater into the woods. Last year, they installed several of the custom fabricated water razors, which made the road more vehicle friendly. One of the brothers spray painted the rubber section for increased pedestrian visibility and safety. This project yielded an impressive TP reduction of 1.37 kg/yr. (Note: this road is not plowed in the winter.)

Infiltrate high

Watershed residents are encouraged to contact local lake association leads for assistance with stormwater management. Most of Lake Kanasatka's waterfront properties are sloping toward the lake.

Quite often, homeowners try to fix their runoff problems right at the waterfront, but this is not always effective. One of the local mottos is "infiltrate high," which simply means finding infiltration opportunities on higher ground, as far away from the lake as possible. Accomplishing this quite often reduces problems below. However, experience has taught us that during a rainstorm, stormwater tends to create a new flow approximately every 30 feet. That is why the recommended interval between

water razors is 30 feet. Lake Kanasatka volunteers found that the most effective way to troubleshoot stormwater runoff is to actually "stand in the rain" and observe the flows. After the remediation work is completed, the property is revisited during or after a rainstorm to determine how successful the solutions have been.

Many property owners have been able to install their own water razors and infiltrate their own stormwater effectively, but there were many who needed help. Lake association leads use a tractor/backhoe to aid neighbors around the lake. Some larger projects required more laborers. Requests for volunteers were posted on LKWA's Facebook Page. The response was amazing, and the spirit was contagious. Photos of the work in progress and a group photo taken at the end of the day were posted on LKWA Facebook Page for the entire community to see. The sense of pride, accomplishment and unity was obvious in the photos. Somewhere along the way, the work crews were named "Boots on the Ground" (Figure 8). They work safely, accomplish a lot and make new friends along the way. Some neighbors who have been on the lake for over 40 years met for the first time through Boots on the Ground.

An important factor in LKWA's eligibility for the necessary alum treatment permit was a demonstrated commitment to reducing external phosphorus loading. Through our individual and group efforts, we left no doubts about our commitment. We realize our work will never be finished. Remediated sites require periodic maintenance and new problem areas will appear in the future. The effectiveness and longevity of our 2024 alum treatment is up to us, and LKWA is in this for the long run.



Figure 8. Boots on the Ground crew from Lake Kanasatka.

Kevin Kelly is retired from a public sector executive leadership position. His volunteer experiences include serving as a volunteer in Lake Kanasatka water quality monitoring and stewardship for 41 years; past president of Lake Kanasatka Watershed Association (LKWA); past chair of LKWA Water Quality Monitoring Teams; and member of Implementation Team for LKWA Alum Treatment. Kevin is also currently serving as a member of LKWA board of directors. Kevin established LKWA's "Boots on the Ground," volunteer storm water remediation work crews, and is implementation committee member for LKWA Section 319, CDS Grants and streams assessment project. Kevin also chairs the Moultonborough Cyanobacteria Committee, and volunteers time with the Lakes Region Food Pantry and maintaining Moultonborough Conservation Commission hiking trails. He is a member of Center Harbor Bay (Lake Winnepesaukee) Watershed Based Management Plan Steering Committee, and he actively



participates as a presenter at the NH Lakes Annual Congress (2020, 2024, 2025).

Chris Wallace has a long history in New Hampshire, starting with her birth in the northern forests and then summers spent in the Lakes Region. Four generations of her family have enjoyed more than 65 years on Lake Kanasatka. Chris is mindful of the need to balance the recreational aspects of time spent at the lake with maintaining the land in as close to its natural state as possible – complete with rocks, fallen tree limbs, pine needles, and leaves.



Lisa Hutchinson is a board member of Lake Kanasatka Watershed Association in Moultonborough NH. She has chaired its water quality committee since 2017, leading a



team of volunteer monitors, and has been a volunteer monitor since 2014. She is the key local citizen-scientist water quality resource, deepening collaboration with the University of New Hampshire Lakes Lay Monitoring Program, FB Environmental consulting firm, and New Hampshire Department of Environmental Services. She has been a proactive member of the Watershed Based Management Plan (WBMP) steering committee since 2021, focused on research, development, and implementation of the WBMP, where her involvement most recently includes grants and the 2024 alum treatment. 🌟

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From runoff to results:

The Willow Creek Watershed Improvement Project

Frank Moses, Sistina Honold, Monica Caves

Skaneateles Lake is a vital drinking water source for over 165,000 people, including the City of Syracuse, and remains one of the few unfiltered municipal water supplies in New York State. Its pristine waters, however, are increasingly threatened by sediment and nutrient runoff, which can impair water quality and contribute to Harmful Algal Blooms (HABs). Addressing these challenges often requires a collaborative approach, balancing large-scale conservation initiatives with the everyday actions of local landowners.

For landowners like Dan Pajak, taking action to protect both their property and the lake was a clear choice. “With neighboring development and more intense storms, we needed to do something to protect our land

from eroding and do our part in caring for the lake,” said Pajak. “We were more than happy with the outcome and are fortunate to have the Skaneateles Lake Association navigating a pathway to success.”

The Willow Creek Watershed Improvement Project embodies this approach. This tributary, historically a source of sediment and nutrient runoff, was identified as a priority restoration site under the Skaneateles Lake Watershed Improvement Project (SWIP) initiative. In response, the Skaneateles Lake Association (SLA) partnered with conservation experts, landowners, and regional funding programs to implement science-based restoration efforts aimed at improving water quality and reducing sediment loading.

Willow Creek has long been a contributor to sediment and nutrient runoff, which can carry phosphorus and nitrogen that ultimately feed algal blooms and degrade water quality. Its proximity to one of the City of Syracuse’s drinking water intake pipes made it a key site for intervention. Prioritizing this project was essential to reducing phosphorus and sediment entering the lake and safeguarding drinking water quality (Figure 1).

Restoration effort

The Willow Creek restoration effort, designed by Anchor QEA engineers, incorporated a variety of best management practices to stabilize streambanks, manage stormwater, and enhance habitat resilience.



Figure 1. Lower Willow Creek “chocolate milk” flood prior to improvement project.

The overall project included two key locations and multiple improvement strategies. First, in the upper reaches of the stream, a diversion channel was installed to intercept high-flow stormwater and settle out nutrients in an expanded wetland basin before returning to the stream (Figure 2). Second, in the lower reaches of the stream before entering the lake, a series of sediment capture and stream stabilization elements were incorporated. The lower Willow Creek project consists of root wads installed to slow down the stream flow, reduce its erosion energy, and capture sediment. Additionally, the floodplain area was expanded and native plants were established to take up nutrients after they settled (Figure 3).

Local businesses also saw an opportunity to contribute. Eric Brillo noted that their team’s expertise in land improvement services and machinery made partnering with the Willow Creek project a natural fit. “With our business including land improvement services and having machinery and know-how to support Willow Creek in our own backyard, it was a perfect fit for us

to support the project and Skaneateles Lake.”

Assessing progress

A critical yet often overlooked aspect of restoration projects is assessing their impact. To fill this gap, the Upstate Freshwater Institute (UFI), in partnership with SLA, launched a monitoring program in August 2024. Using Onset HOBO water pressure loggers, stream levels are being measured every 15 minutes to track peak flow events – critical moments when sediment and nutrients are most likely to be transported downstream. Targeted water sampling during high-flow events provides crucial data on turbidity and nutrient concentrations, including phosphorus, nitrogen, and total suspended solids. Early results reveal a promising 18 percent reduction in sediment between the upstream and downstream sites at lower Willow Creek. While these are preliminary results, continued monitoring through 2025 will provide valuable insights into long-term trends and effectiveness.

Costs

The total cost of the Willow Creek project, including design, implementation, and ongoing monitoring, was estimated at just over \$225,000. Funding sources included \$95,000 from the Skaneateles Lake Association, \$45,000 from the Great Lakes Commission via the Great Lakes Sediment & Nutrient Reduction Program, and additional cost-sharing and in-kind contributions from landowners.

Beyond financial support, community engagement played a key role. SLA and its partners hosted educational workshops and site visits to inform local residents about best management practices. The success of the Willow Creek project is a testament to the landowners, businesses, and organizations that came together to protect the watershed. By demonstrating the impact of these projects, more landowners have been inspired to implement similar measures on their own properties.

While large-scale projects like Willow Creek require significant planning and investment, they demonstrate the power of simple, cost-effective steps that individuals



Figure 2. Upper Willow Creek’s high-flow diversion structure sending overflow sediment and water to a wetland basin.



Figure 3. Stabilization efforts along lower Willow Creek during storm capturing sediment.

can take to improve water quality. Key takeaways include stabilizing creek banks through native plantings or rock stabilization, establishing buffer zones to filter runoff, reducing impervious surfaces to slow runoff, and participating in local watershed programs to gain access to resources and expertise (Figure 4).

As data collection continues, the monitoring program will refine our understanding of how restoration projects influence long-term water quality. Future restoration efforts will build upon these findings, ensuring that best management practices are as effective as possible. The Willow Creek Watershed Improvement Project highlights the importance of proactive, community-driven conservation. Whether through large-scale restoration efforts or individual property stewardship, protecting Skaneateles Lake is a shared responsibility. By working together, we can ensure that its waters remain clean, clear, and healthy for generations to come.

Frank Moses serves as the Skaneateles Lake Association's (SLA) executive director. Frank joined the effort in protecting Skaneateles Lake in 2019. He brings with him a strong



background in water ecology, non-profit management, conservation, and community engagement. Frank has been instrumental in advancing SLA's mission through its key program areas in Invasive Species Prevention and Management, Watershed Wide Community Collaboration, Environmental Education, and addressing Harmful Algal Blooms through research and data-driven decision making associated with implementation of Skaneateles Lake Watershed Improvement Projects. He can be reached at frank.moses@skaneateleslake.org.

Sistina Honold (she has elected not to submit a bio or headshot)

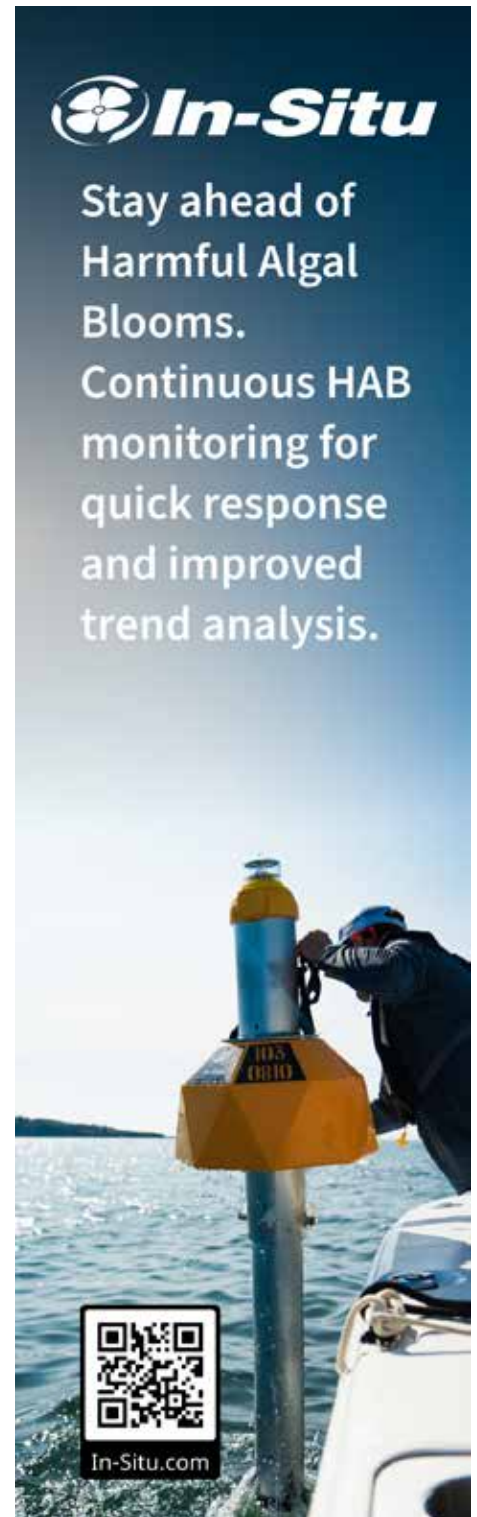
Monica Caves is a research scientist and outreach coordinator at the Upstate Freshwater Institute – a Syracuse, NY-based not-for-profit organization devoted to advancing freshwater research and education.



With a lake management background from SUNY Oneonta, she thrives on translating complex data into actionable insights for lake stakeholders, helping to drive informed decisions that protect and enhance freshwater ecosystems. Visit www.upstatefreshwater.org to learn more about the UFI team. 🌟



Figure 4. Enhanced plant area along lower Willow Creek.

An advertisement for In-Situ. At the top, the In-Situ logo is displayed in white on a dark blue background. Below the logo, the text reads: "Stay ahead of Harmful Algal Blooms. Continuous HAB monitoring for quick response and improved trend analysis." The background of the advertisement is a photograph of a person on a boat using a yellow and blue In-Situ monitoring device. A QR code is located in the bottom left corner of the advertisement, with the text "In-Situ.com" below it.

Tahoe Keys Property Owner's Association

Recognized for Aquatic Plant Management Initiatives

The Tahoe Keys Property Owner's Association (TKPOA) has been awarded the International Integrated Pest Management Award of Excellence at the 11th IPM (International Pest Management) Symposium in early March due to their work on the extensive three-year Control Methods Test (CMT) project. The International IPM Symposium is a global event for bringing scientists from various disciplines to present and learn about the latest research, strategies and solutions for effectively managing pests in agriculture communities and natural areas.

TKPOA is a recreational-oriented residential community of 1,528 property owners on the shores of Lake Tahoe. In 2022, TKPOA began the CMT to apply innovative methods to control the largest infestation of aquatic invasive weeds in the Lake Tahoe Basin. Aquatic invasive species pose a serious risk to Tahoe's water quality and clarity, native species, and the public's enjoyment of the lake.

The three-year CMT Project (2022 - 2024), has achieved key milestones, including securing multiagency approval for the first-ever, one-time herbicide testing at Lake Tahoe, combining herbicides with non-herbicide tools for aquatic plant management. It took ten years of planning and development and once the project began there were 12 management teams and over 100 staff involved in coordinating extensive monitoring of plant treatments and water quality. Results found a 75 percent-reduction in invasive plant biovolume and demonstrated the effectiveness of integrated methods such ultraviolet light treatment, bottom barriers, and diver-assisted suction harvesting (DASH). Additionally, the CMT provided data that refined habitat management and improved long-term aquatic plant strategies. Funded through a public-private-NGO partnership, the project has fostered greater public understanding and support through regular communication with stakeholders.

To be recognized internationally for the achievements of the CMT and be awarded the IPM Award of Excellence is a huge accomplishment and a feat for the Tahoe Keys. This affirms the work that the association has done to protect the lagoons and Lake Tahoe as TKPOA strives to continue to find long-term and large-scale solutions. We encourage those interested in learning more about the Tahoe Keys' innovative testing to control aquatic invasive species in the Lake Tahoe Basin to visit www.keysweedsmanagement.org and www.tahoekeysweeds.org.

Editor's Note: A special session on the projects at Tahoe Keys was held at the NALMS Symposium in Lake Tahoe in 2025, with several presentations highlighting to great work that was done. We encourage the lake association and its partners to convert those presentations to articles for inclusion in LakeLine, to share the findings with LakeLine readers!



The International Integrated Pest Management Award of Excellence plaque above the waters of Lake Tahoe.



Members of the Tahoe Keys Property Owner's Association accepting the International Integrated Pest Management Award of Excellence.

UPCOMING IN LAKELINE

Summer 2025: Harmful Algal Blooms –

Every other summer we like to focus on Harmful Algal Blooms (HABs), and include a range of articles highlighting new data, activities, monitoring techniques and reporting strategies, among other topics. If you are working on something now related to HABs, please consider writing up your work for an article in *LakeLine*

Draft articles for the summer issue of *LakeLine* are due by June 15, 2025, for publication in July 2025.

Fall 2025: Tires and Lakes –

Tire wear particles can influence the health of our aquatic systems. Leached chemicals from tires, including the compound 6PPD-quinone, as well as microplastics can be harmful to aquatic life and water quality. When these particles break down on land they are flushed into aquatic systems through runoff patterns. Once in a waterbody they can affect these systems in a variety of ways. Articles focusing on the breakdown of tire material and transport of these particles and chemicals to aquatic systems (fate and transport) as well as documented impacts to aquatic systems and water quality will be the focus on this issue. If you have been working on topics related to this issue, please consider submitting an article for fall *LakeLine*.

Draft articles are due by September 15, for publication in the fall issue in mid-October 2025.

Please contact Amy Smagula, *LakeLine* Editor, with any questions, or to propose an article for one of the above-listed themes. Do you have a topic that doesn't match a theme? That's ok, we can include the article in any of these issues, or use it to build a themed issue. Amy can be reached at lakeline@nalms.org

YOU could be the winner of the 2025 NALMS Annual Photo Contest!

Two winning images will be selected, a Member's Choice winner selected by Symposium attendees and an Editors' Choice winner selected by the editor and production editor for the entry that will make the best *LakeLine* cover. Prizes will be awarded to the contest winners, and your favorite lake or reservoir photo could grace a cover of *LakeLine*!

Entries will be judged during the 2025 NALMS Symposium in Myrtle Beach, South Carolina.

How to Participate:

- You must be a NALMS member to submit an entry.
- Only electronic submissions will be accepted.
- Photos should be of sufficient resolution to print from 4" x 6" (at least 300 dpi at 8.5" x 11"). Portrait or landscape orientation are welcome.
- A caption for the photo must be included.
- One entry per person.

Entries must be received by Friday October 17, 2025.

Email your entry to:
Amy Smagula, *LakeLine* Editor
LakeLine@nalms.org



LAKE AND RESERVOIR MANAGEMENT

A scientific publication of NALMS published up to four times per year solicits articles of a scientific nature, including case studies.

If you have been thinking about publishing the results of a recent study, or you have been hanging on to an old manuscript that just needs a little more polishing, now is the time to get those articles into your journal.

There is room for your article in the next volume.

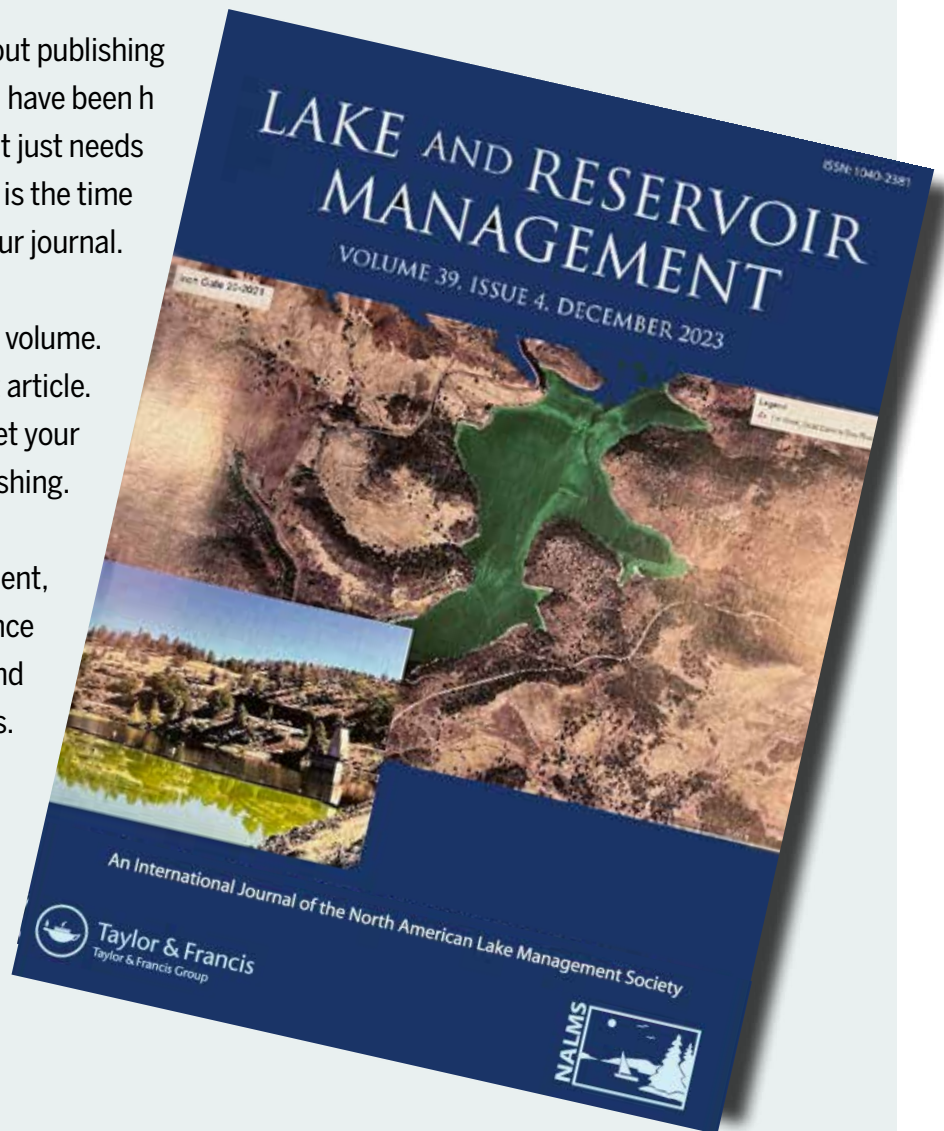
Don't delay sending your draft article.

Let the editorial staff work with you to get your article ready for publishing.

You will have a great feeling of achievement, and you will be contributing to the science of managing our precious lakes and reservoirs.

Anyone who has made or plans to make presentations at any of the NALMS conferences, consider writing your talk and submitting it to the journal.

It is much easier to do when it is fresh in your mind.



Send those articles or, if you have any questions at all, contact:
Tom James, Editor, *Lake and Reservoir Management*; lrmeditor@nalms.org.

If there is anyone who would like to read articles for scientific content, please contact the editor.
The journal can use your help in helping the editorial staff in editing articles.





“Lakespert” – Rain Harvesting, 55 Gallons at a Time

Steve Lundt, CLM

A small effort I have been involved with over the years is helping homeowners install rain barrels. My goal is to get watershed residents to better understand the connectivity of their rooftops to downstream lakes.

So, I have become the “Barrel Guy.” I have made a connection with the local Coca-Cola production plant where I frequently pick up used 55-gallon, food-grade barrels. These white, plastic barrels once held the sweet, dark secrets to classic coke. After a good rinse, their second life continues locally as a rain barrel. Instead of discarding them, Coco-Cola has gladly teamed up with local rain harvesting efforts across the country to repurpose their barrels.

A handful of non-profit, watershed-friendly organizations then come to me in the spring asking for 50+ barrels at a time for their rain barrel workshops. This has been going on since 2016 when the state of Colorado first legalized rain harvesting. With just 14 inches of rain on the populated east side of the Rockies, water scarcity finally moved the political needle to allow for rain harvesting. The law states that only individual homes can collect roof runoff with a maximum of two 55-gallon barrels. All harvested rainwater is for outside use, not for consumption, and not considered a water right. This is just a small taste of our arid, western water laws.

I figure this small, grassroots effort to conserve water can also have a positive impact on watershed health and water quality. I enjoy seeing people realize that they play a key role in the water cycle, especially in the city where people tend to over trust bottled water, have no clue where their drain leads to, or do not know where their coffee water comes from.

This small thing – being the “Barrel Guy” – can seem odd and a bit out of place for this Lakespert, but it feels good to be a part of a bigger effort. I like to think that small nutrient load reductions are happening each time it rains because of these barrels.

It just takes the smallest stone to make an ever-expanding ripple. Each barrel that I have handed out will have a positive impact for years to come.



Getting ready for the rain barrel workshop season this spring by stocking up on used barrels from Coca-Cola.

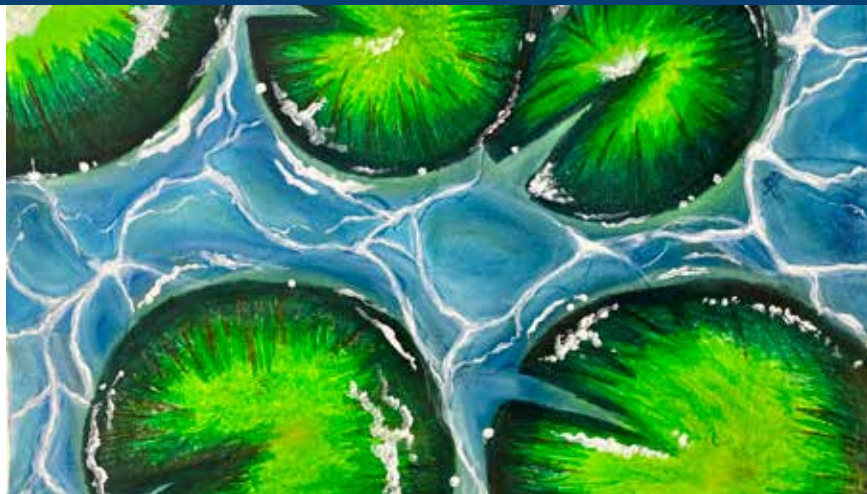
Steve Lundt, Certified Lake Manager, has monitored and worked to improve water quality at Barr Lake (Denver, Colorado) for over 20 years. Steve is active with the Colorado Lake & Reservoir Management Association and is a past Region 8 director for NALMS and an active member since 1998. *



LAKES APPRECIATION MONTH POSTER CONTEST



*Three posters will win a \$300 cash prize!
\$250 to the artist's school or organization /
\$50 to the artist*



July has been Lakes Appreciation Month for the past 27 years! To help us celebrate, appreciate, and bring attention to lakes, students of all ages are encouraged to submit posters reflecting how important lakes are to all of us! Submitted artwork will be a big part of NALMS' celebrations through July across North America. <https://www.nalms.org/lakes-appreciation-month/poster-contest/>

Instructions:

All grades K -12 welcome to participate!

Send an electronic version of your poster artwork to lakesappreciation@nalms.org

Each entry must include student name, grade, school, and contact information

Prizes will be awarded to the top entry in each grade division

Deadline: June 20, 2025

