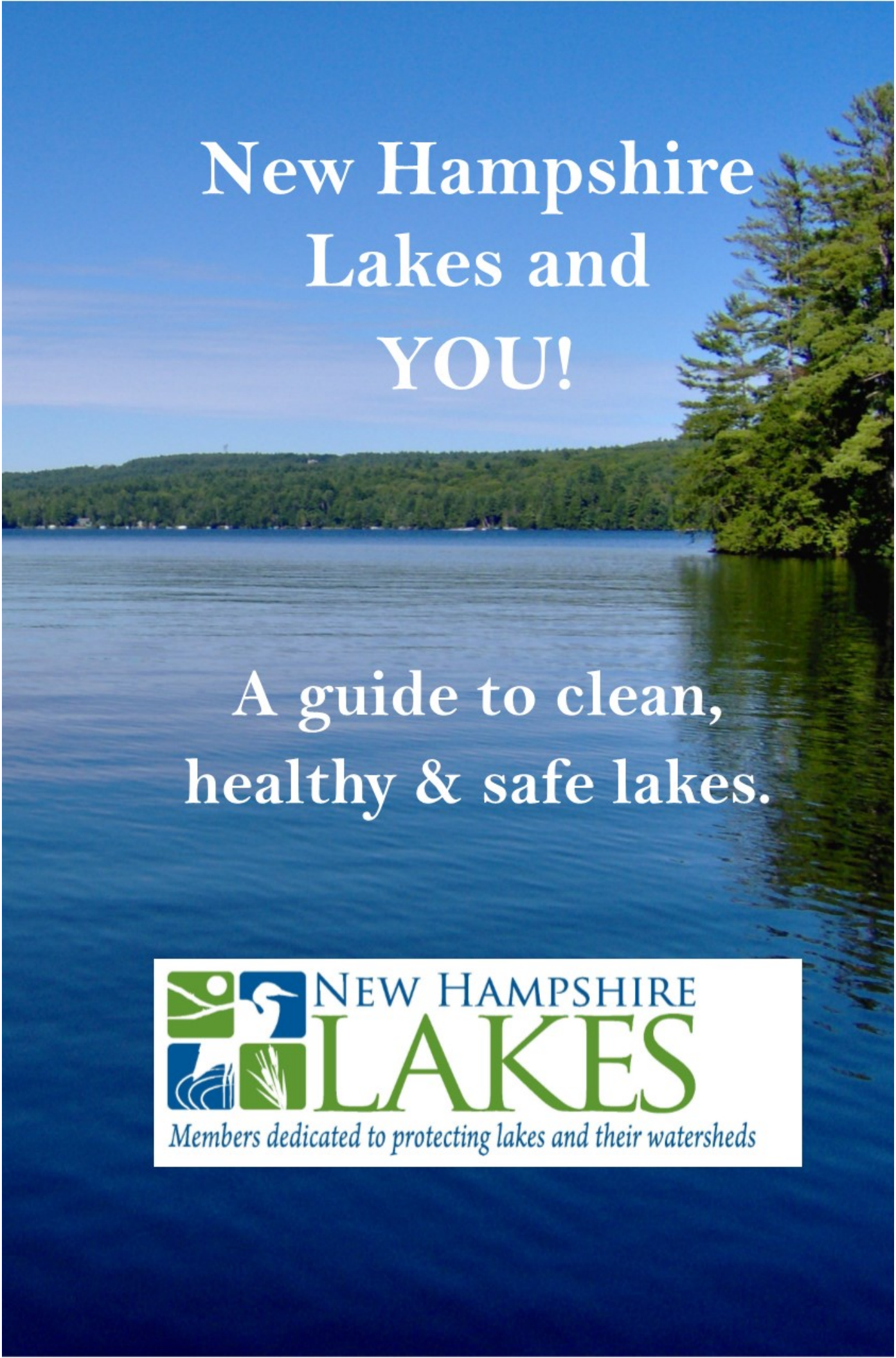


New Hampshire Lakes and YOU!

A guide to clean, healthy & safe lakes.

NEW HAMPSHIRE LAKES

Members dedicated to protecting lakes and their watersheds

NEW HAMPSHIRE LAKES

Members dedicated to protecting lakes and their watersheds

This publication was funded by grants from:

The Wolfeboro Fund
The Bea and Woolsey Conover Fund
and
The Peter H. and Susan R. Goodwin Fund

The New Hampshire Lakes Association (NH LAKES) serves as a resource to the general public on all aspects of lake vitality in New Hampshire. If you have any questions, please feel free to call us at (603) 226-0299 or email us at info@nhlakes.org.

NH LAKES relies on tax-deductible contributions from individuals like you who have formed a deep and profound connection to the beautiful lakes and ponds of New Hampshire.

If you have not already done so, please join NH LAKES today! You can make a membership contribution online at **www.nhlakes.org,** by calling (603) 226-0299, or by sending in the membership envelope enclosed with this publication.

Your gift will help protect New Hampshire lakes and their watersheds for generations to come.

This guide is brought to you by:

NH LAKES
(603) 226-0299
info@nhlakes.org
www.nhlakes.org

2008 First Printing
2011 Second Printing
2016 Third Printing

You can find a PDF version of this publication on our website at www.nhlakes.org.

Table of Contents

About the New Hampshire Lakes Association

Our Mission: Protecting the Lakes You Love

The New Hampshire landscape features nearly 1,000 lakes and ponds. In, on, and around these waters is where many of our most cherished memories are created with family and friends. At the New Hampshire Lakes Association (NH LAKES), we turn your love of New Hampshire lakes into the practices that protect them. And we provide easy access to reliable, timely, and well-researched information to help you make important decisions to ensure that your favorite lake is healthy, clean, and safe for years to come.

25+ Years of Collaboration

NH LAKES was formed in 1992 by the collective vision of an organization whose focus was on advocacy and another whose mission was geared toward educating the public on lake issues: The New Hampshire Lakes Legislative Coalition, Inc., and The New Hampshire Lakes Federation, Inc. respectively. Now, nearly 25 years later, NH LAKES continues that collaborative tradition by working alongside local groups and people like you who are best positioned to meet the unique needs of their lake and community.

Doing Big Things...And Getting Results

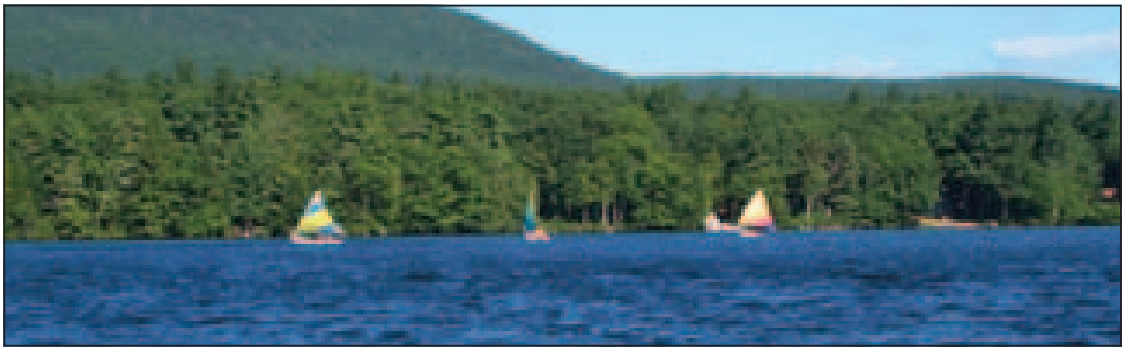
Every summer, our impact expands exponentially as we train 280+ seasonal employees and 500 volunteers to serve as Lake Hosts at 100 of the most highly-used boat ramps throughout the state. Lake Hosts teach boaters the simple actions they can take to prevent the spread of aquatic invasive species which can ruin the health and enjoyment of our lakes. In addition to the Lake Host Program, the presence and vigilance of NH LAKES at the State House has resulted in programs and laws that will protect the future quality of New Hampshire lakes for the benefit of people and wildlife for years to come.

Introduction

New Hampshire boasts some of the most pristine and beautiful lakes in the country. Overall, these waterbodies are of high quality and are particularly important to the citizens and visitors of New Hampshire. These waterbodies not only provide a vast array of year-round recreational opportunities, they also provide critical fish and wildlife habitat, and many serve as public drinking water supplies. Numerous jobs in the state are dependent upon high quality lakes and ponds and the services that they provide. Simply put, New Hampshire's lakes and ponds are important to the state's economy, its natural environment, and our overall quality of life.

NH LAKES has developed this guide to provide you with a basic understanding of lake ecology and watersheds, and the connections between lake quality and your activities in your home, on your property, along the shoreline, and out on the lake itself. This guide will also provide you with some simple suggestions on how to minimize your impact on the lake, where to find more specific information about permit requirements for land clearing, structure building, and other development projects near lakes, and how to become actively involved in lake protection programs.

Thank you for helping NH LAKES protect New Hampshire lakes and their watesheds!



SECTION 1: LAKE BASICS

What is a watershed and why does it matter?

A watershed is all the land that drains into a common waterbody, such as a lake, pond, or river. This waterbody is where all the water from precipitation and groundwater not used in other ecological processes eventually collects. A watershed can be only a few square miles or several hundred square miles in size. We all live in a watershed! You can determine the watershed boundary of a particular waterbody by connecting the points of highest elevation around that waterbody.

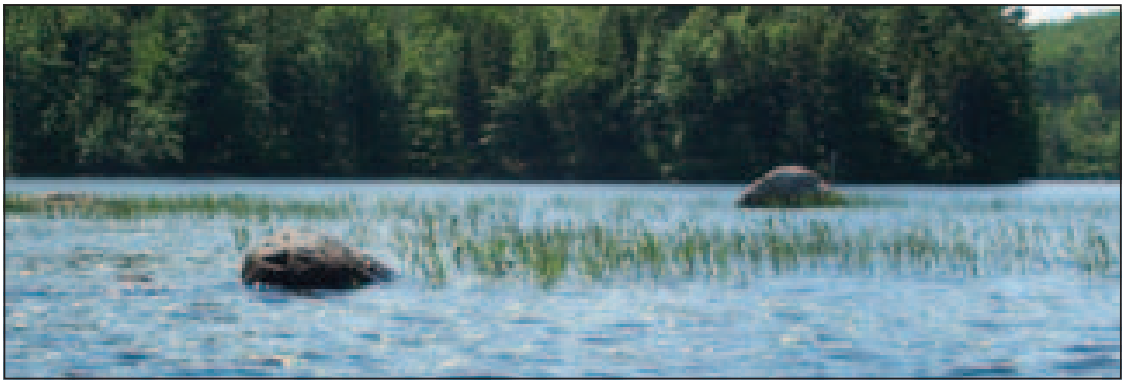
During rain events, soil and various pollutants such as fertilizers, pesticides and herbicides, oils and other chemicals, and animal manure (including waste from septic systems) can be transported from the land surface within a watershed into waterbodies that are miles away.

Improper management of lawns, eroding gullies and shorelines, malfunctioning septic systems, and runoff water from urban and agricultural land allows higher concentrations of pollutants, including nutrients and sediments, to find their way into rivers and lakes than would naturally occur. Increased nutrient loading can cause algae blooms and excessive aquatic plant growth, thus greatly accelerating the natural lake aging process, as well as polluting them with harmful substances.

We all live in a watershed, whether our home is located along the shoreline or miles away from the nearest body of water.

The Life of the Lake

Lakes age with time. Most New Hampshire lakes are approximately 15,000 years old and have been going through a natural process of filling in over thousands of years. The natural aging process in which a lake fills in with material (such as sediment and decayed organic material) and gets shallower continues as a lake progresses to a pond, a pond to marsh, a marsh to meadow, and a meadow to dry land. Although most of New Hampshire's natural lakes are approximately the same age, they are filling in at different rates.



Lake aging and filling in is a natural process.
(Photo courtesy of NHDES.)

In New Hampshire, young lakes typically contain low concentrations of nutrients, are steep-sided, have clear water, have sand or rock along most of the shoreline, contain few aquatic plants, and support little algal growth. Older lakes contain high concentrations of nutrients, are shallow, have sediment accumulated on most of the lake bottom, contain extensive plant beds, and support much algal growth.

Humans can accelerate the natural lake aging process by increasing the amount of nutrients (particularly phosphorus) and sediment that would naturally flow into a lake from its watershed. Changes in how watershed land is used can result in changes in nutrient runoff from the watershed. Studies have shown that the amount of phosphorus entering waterbodies from agricultural land is at least five times greater than from forested lands, and from urban areas is more than ten times greater than from forested lands!

Phosphorus and Lake Quality

Phosphorus is a nutrient that all aquatic plants and animals need to survive, but in excessive quantities can have negative impacts on lake quality. The removal of natural vegetation within the watershed and the creation or expansion of surfaces that do not absorb water (called impervious surfaces), such as roofs or paved driveways, increases the amount of phosphorus reaching surface waters. Impervious surfaces do not allow rainwater or snowmelt water to sink into the ground where phosphorus can be removed by the soil. Actions that can contribute phosphorous to a waterbody include:

- Applying lawn and garden fertilizers.
- Doing laundry or bathing in the lake.
- Dumping grass clippings and leaves into or near the lake.
- Failing septic systems.
- Feeding waterfowl.
- Removing natural vegetation and exposing bare soil.
- Washing cars and boats in or near the lake.

Increased phosphorus loading to a waterbody fertilizes the lake and can cause nuisance algal and plant growth. Algal blooms can cloud lake water and cause taste and odor issues in drinking water sources. Excessive phosphorus can also lead to toxic bacteria and algae blooms.

Cyanobacteria

Cyanobacteria are bacteria that use sunlight to produce their own food. They occur in all of our lakes, and have been there for thousands of years. When nutrient levels become elevated in a waterbody, cyanobacteria may bloom and form surface scums that are green or blue-green in color. Some species of cyanobacteria are toxic. When toxic cyanobacteria become concentrated and are ingested, they can be harmful to wildlife, pets, and people. Human exposure to cyanobacteria may result in symptoms such as nausea,

vomiting, diarrhea, mild fever, skin rashes, and eye and nose irritations.

Generally, the water quality of New Hampshire lakes is very good. However, lake water should not be consumed unless it is treated for such use. Neither in-home water treatment systems nor boiling the water will eliminate cyanobacteria toxins if they are present.

When toxin-producing cyanobacteria blooms occur in surface waters in excessive amounts, the New Hampshire Department of Environmental Services (NHDES) may issue an advisory recommending that lake users avoid contact with the water in areas experiencing blooms.

Cyanobacteria blooms like this can be dangerous to your health.
(Photo courtesy of NHDES.)

If you observe a cyanobacteria bloom or scum:

- Avoid swimming or wading in the water.
- Do not drink the water.
- Keep pets and livestock out of the water.
- Call NHDES at (603) 419-9229 to report the problem.

Section 2: Lake-Friendly Actions

In Your Home

A septic system digests the wastewater from the household(s) it is connected to. The most common systems consist of a septic tank with a leach field connected to it. The septic tank holds solid waste, while the wastewater flows off into the leach field. The soil around the leach field filters the water.

Nutrients build up in household wastes and are dissolved in the wastewater that ends up in the leach field. Those nutrients that do not get filtered out naturally by the soil will eventually drain into groundwater or nearby waterbodies, including lakes.

The following practices can help you reduce the amount of phosphorus that flows from your septic system:

Conserve water.

- When you use less water, the possibility of nutrients leaking into nearby waterbodies is reduced.
- Take shorter, less frequent showers, turn off the water while brushing your teeth, and run laundry and dishwashing cycles with full loads only.
- Install water-saving devices in your toilet tanks, sink faucets, and shower heads.

Use cleaning products containing no phosphates.

- By choosing soaps and detergents containing no phosphates, you will avoid adding excess phosphorus into your domestic wastewater, and ultimately into groundwater and surface waters.
- Just because something is biodegradable does not mean that it is good for the environment. Check the label for phosphates and other pollutants.
- You can purchase phosphate-free household products from environmentally-friendly companies.

Be careful what you flush.

- Heavy toilet paper, paper towels, and cigarette butts can clog septic systems and are not easily broken down by natural processes.
- Paint products, bleach, septic tank additives, and toilet deodorizers can kill the good bacteria in septic systems that break down waste, causing the waste to accumulate and the system to malfunction.

Compost your kitchen waste.

- Using a garbage disposal adds excess solid waste to septic systems that can slow its function, and shorten its life. By decreasing the amount of solid waste in the system, you will not have to pump the tank as frequently.

- Composting kitchen and yard waste (away from the water) will help prevent nutrients from entering surface waters.

Have your septic system pumped regularly.

- Have your tank pumped at least every two or three years. If settled solids are not removed from the tank, they can wash into and clog the leach field.
- Organize a neighborhood septic system pump-out. You and your neighbors may be able to get a lower price!

Have your septic system inspected by a licensed inspector.

- Upgrade or replace your septic system if it is outdated or undersized.
- Make sure that none of the pipes (such as the drain pipe from your washing machine) flow into or run off into streams, rivers, or lakes.
- The typical life expectancy of a conventional septic system and leach field is approximately 20 years. If your system is approaching this age, or if you have added bedrooms and/or bathrooms to your house since your septic system was built, have your system evaluated by a licensed septic system installer to determine if it is operating properly.

On Your Property

No matter where you live, you live in a watershed. Whether you live next to a stream, river, or lake, or live miles away from the nearest waterbody, what you do on your property could potentially harm the health of waterbodies, near or far. Fortunately, there are several simple ways you can reduce your impact on waterbody quality in your watershed.

Can you see this house along this lake?
One way to minimize your impact on the lake and the surrounding watershed is to blend structures into the landscape.

Minimize Landscaping

Keep native deep-rooted trees, shrubs, and groundcover.

- These are already suited for the area and require less water and fertilizer than manicured lawns. They also stabilize erosion-prone soils and filter runoff water before it reaches surface waters.

Reduce the size of grassy areas and replace with native plantings.

- A mixture of trees, shrubs, and groundcover will add depth and diversity to your property, and habitat for wildlife.
- The University of New Hampshire (UNH) Cooperative Extension Education Center can help you with selecting native plantings for your property. For assistance, contact (877) EXT-GROW or visit extension.unh.edu/Gardening-Resources.

Suggested Native Plant Species

Trees:

Balsam Fir, White Spruce, White Pine, Eastern Hemlock, Red and White Oak, Red Maple, Sugar Maple, Shadbush, and Sweet, Yellow or Paper Birch

Shrubs:

Alder, Dogwood (silky, gray, red osier), Winterberry, Elderberry, Blueberry, Inkberry, Mountain Laurel, Witch Hazel, Rosebay Rhododendron, Swamp Azalea, Sweet Pepperbush, and Viburnum (arrow-wood, nannyberry, hobblebush, highbush cranberry)

Ground Covers:

Virginia Creeper, Bunchberry, Barren Strawberry, Lowbush Blueberry, and Wintergreen

Avoid fertilizing your lawn or using herbicides and pesticides.

- Try using alternatives made from natural ingredients. Look in bookstores and on the internet for all-natural gardening information or contact the UNH Cooperative Extension Education Center for more information.

If you must use fertilizer, herbicides, or pesticides, use sparingly and, within 250 feet of lakes and rivers, according to the Shoreland Water Quality Protection Act.

- The Shoreland Water Quality Protection Act prohibits the use of all fertilizers except limestone within 25-feet of the high water mark of lakes, ponds, and major rivers.
- Twenty-five feet beyond the high water mark, low phosphate, slow release nitrogen fertilizer or limestone may be used.

Reduce the amount of runoff water (stormwater) that your property generates.

- Collect rainwater from your roof in a rain barrel and use it to water your garden.
- Create a rain garden and divert roof and surface water runoff into it. A rain garden is a depression in the ground vegetated with water-loving plant species.
- Replace grassy areas with a diverse mixture of native plantings.
- If you must have a grassy lawn, minimize the size of the area and leave or create a vegetated buffer (trees, shrubs, and ground cover) along streambanks and shorelines. Leave grass at least two to three inches high. The taller the grass, the deeper its roots and the greater its ability to absorb more water and nutrients, reducing the amount of water running off the landscape and into lakes and rivers.

Before **After**

This rain garden (right) will help prevent erosion and reduce the amount of surface water running downhill and into the lake.

- Re-vegetate bare areas to help hold soil in place.
- Place crushed stone at the outfall of gutters to help prevent erosion and allow for runoff water to soak into the ground.
- Install porous (pervious) pavers or pavement on your driveway which allow water to soak into the ground. This will reduce the amount of water running off the landscape.

Before **After**

A dripline trench of crushed stone was installed (right) to catch water that runs off of the roof, allowing it to sink into the soil instead of running downhill and picking up pollutants before flowing into the lake.

(Photos courtesy of the Acton Wakefield Watersheds Alliance Youth Conservation Corps.awwatersheds.org.)

Improve the quality of runoff water your property generates.

- Avoid using fertilizer, herbicides, and pesticides.
- Correct erosion problems by planting deep-rooted vegetation and groundcover.
- Divert the flow of runoff water from driveways and roofs to rain gardens and other vegetated areas. Never divert runoff water into streams, rivers, or lakes.
- During the winter, use de-icing agents and sand on your driveway and walkways sparingly. Sweep up residues between storms and at the end of winter.

Along the Shoreline

The New Hampshire Shoreland Water Quality Protection Act (RSA 483-B) was passed in 1991 and became fully effective in 1994. It protects surface water quality by setting minimum standards and requirements for the development, use, and subdivision of land within the 250-foot shoreland buffer zone. If you plan to clear any land or build any structure near the shoreline, you should consult the Shoreland Water Quality Protection Act well-before starting your project. (*See Section 5 for required permit information.*)

If wisely managed, your shoreline can be an efficient natural buffer system between the lake and the surrounding landscape. And, it can add value to your property as well!

Please note that all of the guidelines discussed in the "On Your Property" section of this guidebook are also applicable to shoreline properties.

Avoid dumping sand or creating new beaches.

- Sandy beaches that are not naturally occurring will not last. The sand will either be carried away by water currents or will slowly settle onto the bottom of the lake where it will contribute to the rate of lake filling in and aging.

- The addition of sand along the shoreline will smother bottom-dwelling organisms, alter the food chain, destroy fish spawning and nesting sites, and damage fish gills. As the lake becomes shallower, more sunlight will reach the lake bottom, which can lead to increased plant growth.
- It is illegal to dump sand or create a beach in New Hampshire without a permit from the New Hampshire Department of Environmental Services. *(See Section 5 for required permit information.)*

Leave the shoreline and nearshore area in its natural state.

- Do not remove trees and other vegetation within 250-feet of the shoreline unless you have received a Shoreland Surface Water Quality Protection Act Permit which allows you to do so. Trees and shrubs help to stabilize the soil and reduce the amount of runoff water that flows into and pollutes lakes and other surface waters.
- Do not remove rocks and native aquatic plants. Rocks and aquatic plants help break waves and prevent bank erosion.

Restore altered shorelines.

- Much of the shoreline along New Hampshire's lakes has already been altered and degraded by the removal of natural vegetation for the construction of docks, houses, lawns, and roads. While it is not required by law for shoreline property owners to restore altered shorelines, it is encouraged. It can be relatively easy, too!
- Convert a human-made sandy beach to a completely vegetated area.
- If you must have a sandy human-made beach, construct a perched beach. A perched beach has little or no slope and is set back from the water. Perching a beach will help correct erosion problems on a sloping, sandy beach that leads directly to the water. Contact the New Hampshire Department Environmental Services for permit requirements. *(See Section 5 for required permit information.)*

Perched beaches like this one help minimize the erosion of sand into lakes.

- Limit foot-traffic to and from the shoreline by providing only one meandering pathway surrounded by vegetation.
- Prevent runoff water from flowing off your property and into the lake by redesigning walkways and paths, and by adding rain gardens and vegetated buffers.
- Contact NH LAKES about an erosion or runoff water problem on your property. NH LAKES staff can provide you with information on how to address these problem areas.

Before **After**

Reducing the steepness of an eroding soil pathway and stabilizing it with vegetation and gravel reduces the potential for erosion into the lake.
(Photos courtesy of the Acton Wakefield Watersheds Alliance Youth Conservation Corps. awwatersheds.org)

Avoid attracting waterfowl.

- Refrain from feeding waterfowl.
  - Feeding waterfowl will attract more to the site. A single goose can create up to three pounds of waste per day. Waterfowl waste typically contains significant amounts of phosphorus.
  - Fecal matter can contain harmful parasites and bacteria that can contaminate swimming areas, causing what is commonly called 'swimmers itch' for some people.
  - Waterfowl are healthier when they consume the foods they naturally forage.
- Make shoreline property unattractive to waterfowl.
  - Grassy lawns attract geese and ducks. Providing barriers, such as dense shrubs, between the shoreline and the property will discourage waterfowl from the visiting the lawn.

While waterfowl may be pretty to look at, they can negatively affect the quality of a lake.

Do not bathe yourself or your pets in the water.

- Soaps and shampoos will add nutrients and other pollutants to the lake. Even camping soaps or biodegradable soaps may contain undesirable pollutants.

Do not remove aquatic plants without a permit.

- Aquatic plants help prevent erosion by stabilizing lake bottoms and shorelines with their roots and by absorbing wave energy.
- Aquatic plants are also important for fish spawning and nursery areas, and provide habitat for insects and other organisms that support the food chain of the lake.
- Not only is it illegal to remove aquatic plants without a permit, removing native plants may open up habitat for invasive plants to take over.
- Before any invasive plant, such as variable milfoil, can be managed, the waterbody must have a long-term management plan approved by the New Hampshire Department of Environmental Services. *(See Section 5 for required approval information.)*

If you use a de-icer device to protect shoreline structures from ice damage, open up just enough water to keep your structure disconnected from the ice sheet.

- Opening up more ice than is needed to sufficiently protect shoreline structures can create hazardous conditions for people who recreate on the ice and can adversely impact water quality.
- All de-icing equipment operation requires a New Hampshire Department of Safety Permit and a "Thin Ice" sign of a specific size and design. Permits and additional information are available from your local Town of City Clerk.

Section 3: Lake-Friendly Boating & Recreation

Motorboats, ski craft, and personal watercraft can affect lake quality, plants and animals, and the stability of the shoreline. If you use a motorboat or craft, following these guidelines can help ensure a healthy lake environment.

Buying a Motorboat

Low-pollution 4-cycle and 2-cycle direct fuel injection outboard engines have been developed to reduce toxic air emissions from marine engines and reduce the release of gasoline into waterways. As of 2006, you can no longer purchase a non-direct fuel injection engine. By purchasing and using these cleaner burning engines, you can help protect New Hampshire's air and water quality, while greatly reducing your fuel costs. Although these engines may cost more

up-front, they provide many economic and environmental benefits since they:

- Burn 35 to 50 percent less gasoline, which means more fuel savings.
- Use up to 50 percent less oil.
- Reduce air emissions by 75 percent.
- Reduce the amount of gasoline released into surface waters.
- Are much quieter!

Operating Your Boat

Operate away from shallow areas.

- Motors can churn-up sediment on the lake bottom. This leads to phosphorus being re-suspended in the water, which contributes to algal growth and decreased lake clarity.
- Motors can fragment invasive plants, such as variable milfoil, potentially causing new areas of infestations as the fragments travel to other parts of the lake.
- Wildlife and waterfowl may be frightened away from their homes and nests by noisy motors.

Operate away from loons and loon nesting areas.

- Many of New Hampshire's lakes are home to the Common Loon, a threatened species.
- Approaching loons in the water or on their nest will stress the animals.
- If you see an adult loon on the water, slow down as loon chicks are often difficult to see.

Eliminate unnecessary idling.

- It pollutes the air and water, and the wasted fuel can be expensive.

Do not operate within 150 feet of any shoreline at greater than headway speed (6 mph).

- Not only is it illegal, but boat wakes can erode the shoreline and damage wildlife habitat. Excessive speed is also a danger to others.

Maintaining and Fueling Your Boat Engine

Keep engines well-tuned.

- Routinely check for fuel leaks and keep a shallow pan under engines to collect any leaking liquids.

Avoid overfilling fuel tanks.

- Use a funnel or a spout with an automatic stop device to prevent overfilling the gas tank. Use absorbent materials or petroleum absorption pads while fueling to catch splash-back and any drops when the nozzle is transferred back from the boat to the fuel dock.

Avoid pumping any bilge water with an oily sheen.

- Use absorbent pads in the bilge area that capture or digest oil and dispose or recycle this material properly. Contact your local marina to purchase absorbent materials.

Cleaning Your Boat

Wash boat hulls by hand out of the water.

- Use non-toxic and phosphate-free detergents and cleaning products. If possible, use natural cleansers such as baking soda or lemon juice.
- Rinse water should not be discharged to surface waters or storm drains.

Disposing of Wastes

Use marina sewage pumpout and dump stations.

- It is illegal to discharge boat sewage in any surface water in New Hampshire. It contains nutrients and potentially disease-causing organisms. Pumpout stations allow you to empty holding tanks and portable toilets after a day on the water. The New Hampshire Department of Environmental Services maintains information on the locations of pumpout and dump stations. (*See Section 6 for program and contact information.*)

Prevent the Introduction and Spread of Invasive Plants and Animals

Variable milfoil, an invasive plant, is found in approximately 79 waterbodies in New Hampshire.

Invasive aquatic plants and animals are those species of water-loving flora and fauna that are not native to New Hampshire, and that have certain characteristics that allow them to grow more rapidly than native plants and animals, thereby allowing them to take over a waterbody. Native aquatic plants and animals, on the other hand, are vital to a healthy lake or pond and their growth is regulated through natural controls including predators and other environmental factors.

The primary ways invasive species have been introduced and spread from waterbody to waterbody in New Hampshire are:

- Boaters transporting invasive species from infested to uninfested waterbodies (new infestations are typically found near boat launch sites).
- Dumping fish tanks or aquarium plants into waterbodies.
- Natural transport (waterfowl, animals, etc.).

Invasive species infestations make recreation in and on the water dangerous and unpleasant, disrupt the ecological balance of lakes, reduce shoreline property values, and are difficult and expensive to control, and nearly impossible to get rid of once firmly established.

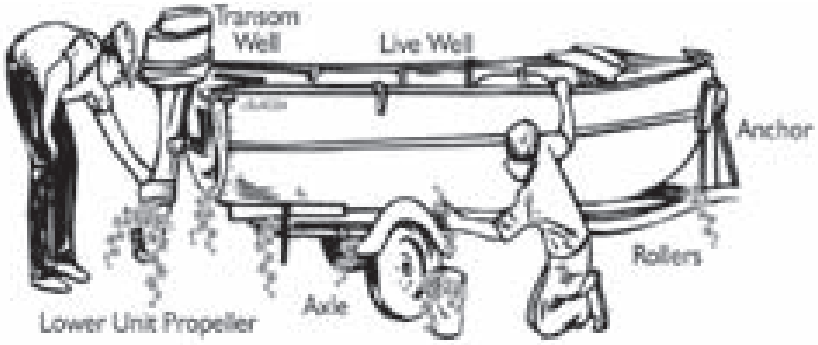
While there are state laws that regulate the sale and transport of aquatic invasive species, as of the writing of this guide, invasive aquatic species are found in at least 95 waterbodies in New Hampshire. Seventy-nine waterbodies contain variable milfoil, and four systems contain the invasive Asian clam. In addition, at least a couple dozen waterbodies contain the invasive Chinese mystery snail. Some waterbodies have multiple infestations of species.

You can help prevent the spread of aquatic invasive species!

If you trailer a boat (motor boat, personal watercraft, sail boat, canoe or kayak) into and out of more than one waterbody per boating season, there are some simple steps you can take to prevent the spread of aquatic invasive species.

BEFORE leaving the launch area:

- ✓ **CLEAN** off any mud, plants, animals and debris off your boat, trailer, and gear. Clean off anchor lines, water intake grates on jet-powered craft, and paddles, too!
- ✓ **DRAIN** water from boat motor, bilge, live wells, ballast tanks, storage compartments, and gear. Blow out all water in jet-powered craft and tip paddle craft to let out water. **OPEN** all drain plugs and keep open while transporting.
- ✓ **DRY** off anything that came in contact with the water to remove invasive species not easily seen. To use your boat again within five days, thoroughly rinse with clean water away from waterbodies and towel dry.



There are several places on a typical boat and trailer where boaters should check for and remove hitchhiking aquatic plant fragments.

Here are some more ways you can help prevent the spread:

- If you have unwanted aquarium plants, dry, burn or compost (away from the water), or dispose of them in the trash.
- Do not boat through areas designated as "Restricted Use Areas." These are areas with small, contained invasive species infestations. Limiting access to such areas helps prevent fragmentation and spreading of invasive plants.
- If you have renters or guests that bring boats to the lake, encourage them to bring their boats, trailers, and gear, cleaned, drained, and dry. Consider providing them with a copy of the "Clean, Drain, and Dry" brochure published by NH LAKES. To obtain free copies, contact us at info@nhlakes.org or (603) 226-0299.
- If there's a boat launch in your community, check to see that it has a "Clean, Drain, and Dry" sign. Signs can be obtained from the New Hampshire Department of Environmental Services at no cost by contacting Amy.Smagula@des.nh.gov or (603) 271-2248.
- If there's a kiosk at a local boating access site, make sure that it contains aquatic invasive species prevention information. For free posting information, contact NH LAKES at info@nhlakes.org or (603) 226-0299.
- If you think you may have found a new invasive species infestation in a waterbody, contact the New Hampshire Department of Environmental Services at Amy.Smagula@des.nh.gov or (603) 271-2248.

Section 4: Get Involved!

Join a local lake association.

If your lake has an association, join it! Lake associations are typically non-profit, voluntary organizations that are concerned with lake protection efforts and other local lake-related issues. Most associations have a variety of members, including shoreline property owners, neighboring residents, and lake enthusiasts, and are usually open to any interested individual wishing to join.

Lake associations serve many functions, including providing outreach and educational opportunities, assisting with water quality monitoring, conducting invasive species prevention and management activities, monitoring loons and other wildlife, and working closely with a variety of stakeholders on developing lake management plans. Also, being a member of a lake association is a great way to make friends and have fun!

If there is no lake association in your area, start one! NH LAKES can help.

Join NH LAKES

NH LAKES is a statewide, nonprofit, member-supported organization dedicated to protecting New Hampshire lakes and their watersheds. NH LAKES serves as a source of information about lakes through educational materials and programs, and through work with state legislators. NH LAKES advocates on issues of water quality, boater education and boating safety, invasive species prevention, appropriate public access, wildlife habitat protection, shoreland and watershed protection, and balanced use of lakes.

Become a Lake Advocate

Sign up to receive the *NH LAKES Advocacy Alert!* e-newsletter (email info@nhlakes.org or sign up at www.nhlakes.org). Write letters, call, and e-mail your legislator(s) when called upon. Attend committee hearings, testify, and collaborate with NH LAKES staff and individual legislators to craft programs and laws that protect our lakes.

Become a Lake Host

Developed in 2002 by NH LAKES, in cooperation with the New Hampshire Department of Environmental Services, the Lake Host™ Program is the first line of prevention when it comes to aquatic invasive species. Trained Lake Hosts (seasonal employees and volunteers) teach boaters at boat ramps throughout the state how to "Clean, Drain, and Dry" their boats, trailers, and gear to prevent the spread of aquatic invasive species.

For more information:
(603) 226-0299
info@nhlakes.org
www.nhlakes.org

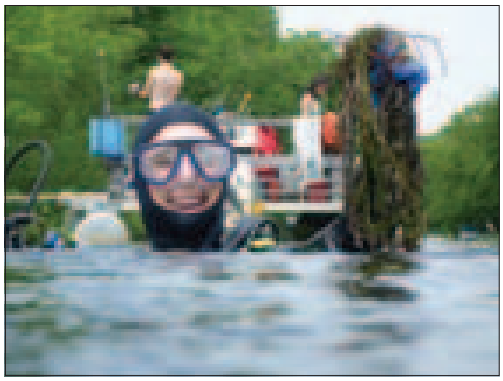
Become a Weed Watcher

The Weed Watcher Program is a cooperative program between lake residents, lake associations, and the New Hampshire Department of Environmental Services. Weed Watchers are trained to monitor lakes and ponds for the growth of invasive species. Volunteers are instructed on how to conduct a survey, what to look for, and who to contact if there is a problem.

For more information:
(603) 271-2248,
Amy.Smagula@des.nh.gov
des.nh.gov/organization/divisions/water/wmb/exoticspecies/index.htm

Become a Weed Control Diver or Tender

One common invasive aquatic plant control technique that is routinely used in just about every infested waterbody is some modification of basic hand removal. Because an infestation can easily be spread by such attempts to control, the process is regulated by the Department of Environmental Services. Individuals interested in helping their local group manage an invasive plant infestation are encouraged to assist with the effort as a certified Weed Control Diver or Weed Control Tender.



For more information:
(603) 271-2248,
Amy.Smagula@des.nh.gov
des.nh.gov/organization/divisions/water/wmb/exoticspecies/index.htm

Participate in a Water Quality Monitoring Program

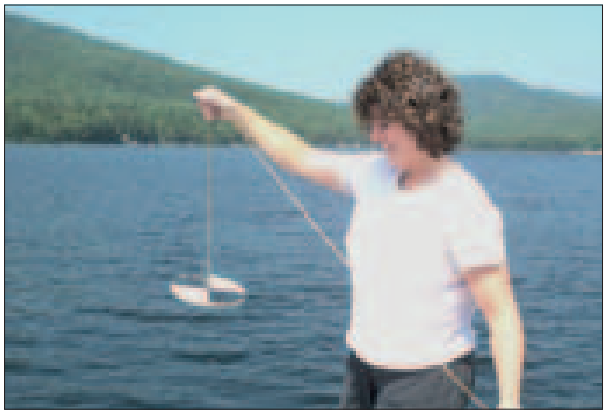
Volunteer lake monitoring efforts throughout the state supplement those efforts of the New Hampshire Department of Environmental Services and the University of New Hampshire. By collecting water samples from a lake and the streams that flow into and out of it several times each year over a period of years, volunteer monitors help detect changes in water quality and identify pollution sources before the lake is seriously impacted. If pollution sources can be eliminated, this saves lake residents, lake associations, municipalities, and the state the cost of expensive lake clean-up projects.

The Volunteer Lake Assessment Program (VLAP) is a cooperative program between lake residents and the New Hampshire Department of Environmental Services.

For more information:
(603) 271-2658
Sara.Steiner@des.nh.gov
des.nh.gov/organization/divisions/water/wmb/vlap/index.htm

The Lakes Lay Monitoring Program (LLMP) is administered jointly through the Cooperative Extension and the Center for Freshwater Biology at the University of New Hampshire.

For more information:
(603) 862-3696
bob.craycraft@unh.edu
extension.unh.edu/Volunteer/NH-Lakes-Lay-Monitoring-Program



(Photo courtesy of NHDES.)

Participate in the Soak Up the Rain NH Program

(Photo courtesy of NHDES.)

Soak Up the Rain New Hampshire (SOAK) is a voluntary program, managed by the New Hampshire Department of Environmental Services (NHDES), with the goal of protecting and restoring clean water in the state's lakes, streams, and coastal waters from the negative impacts of runoff water (stormwater) pollution.

Every single property has the potential to contribute to water pollution. The SOAK Program helps property owners who want to be part of the stormwater solution. By working with local Partner groups and individual property owners, the SOAK Program provides training, coordination, and assistance to install rain gardens, rain barrels, and other stormwater practices to reduce stormwater runoff and pollution from homes and businesses throughout the state.

For more information:
(603) 271-8475
jillian.mccarthy@des.nh.gov
soaknh.org

Participate in the Mercury in Fish Program

Studies have shown that fish from lakes and ponds in New Hampshire contain mercury and can pose a potential human health risk. Mercury is emitted by volcanoes, forest fires, weathering, and through activities such as burning of municipal waste and fossil fuels (which is the greatest cause of emission). Mercury then becomes incorporated into the food chain and concentrated in certain fish.

The New Hampshire Department of Environmental Services Mercury in Fish Program, with the help of volunteers, samples fish from the state's lakes and ponds for mercury content. This data is used to determine statewide and waterbody-specific fish consumption guidelines.

For more information

(603) 271-3414
des.nh.gov/organization/divisions/water/wmb/vlap/mercury/sampling.htm

Become a Loon Preservation Committee Volunteer

The Loon Preservation Committee (LPC) was created in 1975 in response to concerns about a dramatically declining loon population and the effects of human activities on loons. LPC's mission is to restore and maintain a healthy population of loons throughout New Hampshire; to monitor the health and productivity of loon populations as sentinels of environmental quality; and to promote a greater understanding of loons and the larger natural world.
Field volunteers help monitor the number and breeding success of loons on lakes throughout the state; conduct the annual Loon Census; report injured or dead loons and unhatched eggs to LPC staff; build and float nesting rafts and signs; post educational signs; watch over nesting loons; and work to educate lake users and prevent conflicts between loons and people.

For more information

(603) 476-5666
www.loon.org
volunteers@loon.org

(Photo courtesy of LPC.)

Section 5: Required Approvals and Permits

If you are planning a land development project either in the watershed or along a waterbody, or a project in the water, in addition to any local permits that are needed, your project may require a state permit from the New Hampshire Department of Environmental Services (NHDES). For projects that do not require a state permit, there may be standards you must follow during construction. Information regarding the most common state permits needed for watershed or shoreline land development projects is provided below. If you have any questions about whether or not your project requires a permit, do not hesitate to contact your municipal office, as well as NHDES at (603) 271-3503. A quick phone call could save you time and money and protect the water resources in your community.

If you plan to operate a boat, moor a boat, designate a swimming area or waterski course, fish, or host an event on the water you may need state approval in the form of a permit, license, or registration.

New Hampshire Department of Environmental Services (NHDES)

29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
(603) 271-3503
www.des.nh.gov

Alteration of Terrain Permits

(603) 271-2303
des.nh.gov/organization/divisions/water/aot/index.htm

This permit protects New Hampshire surface waters, drinking water supplies, and groundwater by controlling soil erosion and managing stormwater runoff from developed areas.

An **Alteration of Terrain Permit** is required whenever a project proposes to:

- Disturb more than 100,000 square feet of contiguous terrain (50,000 square feet, if any portion of the project is within the protected shoreland).
- Disturb an area having a grade of 25 percent or greater within 50 feet of any surface water.
- In addition to these larger disturbances, the Permit by Rule applies to smaller sites.

Exotic Species Program

(603) 271-2248
des.nh.gov/organization/divisions/water/wmb/exoticspecies/index.htm

If a waterbody contains an exotic aquatic plant, the waterbody must have a New Hampshire Department of Environmental Services approved **long-term management plan** before any control activities can be conducted.

Shoreland Protection Program

(603) 271-2147
shoreland@des.nh.gov
des.nh.gov/organization/divisions/water/wetlands/cspa/

The Shoreland Water Quality Protection Act provides protection to the state's public waters by establishing a 150-foot forested buffer area as well as restricted use areas within 250 feet of lakes, ponds, and our state's largest rivers.

A **Shoreland Impact Permit** is needed for all construction, excavation, or filling activities within 250 feet of the shoreline. In addition, a 50-foot waterfront buffer in which vegetation removal is restricted, the application of pesticides and herbicides are prohibited, and impervious surface limitations have been established.

Subsurface Systems Bureau

(603) 271-3501
des.nh.gov/organization/divisions/water/ssb/index.htm

- Purchase and sales agreement on developed waterfront within 250 feet of tidal waters or a great pond without municipal sewer requires a **Site Assessment Study.**
- Building a residential dwelling, adding bedrooms, or expanding living space anywhere not serviced by municipal sewer requires a **Septic System Construction Approval and Septic System Operational Approval.**
- Subdividing land for a single family home, condominium, apartment, or campground anywhere not serviced by municipal sewer requires a **State Subdivision Approval.**
- Installing a well closer than 75 feet to a property line (anywhere) or a septic system requires a **Recorded Well Release**.

Wetlands Bureau

(603) 271-2147
des.nh.gov/organization/divisions/water/wetlands/index.htm

A **Wetlands Permit** is required for:

- Installing, repairing, or expanding a dock or any type of shoreline structure.
- Impacting the bank of any waterbody (i.e. bank stabilization or constructing or repairing retaining walls).
- Adding sand to a beach or constructing a new beach.
- Dredge, fill, or construction in any jurisdictional wetland, tidal buffer zone, or sand dune.

New Hampshire Department of Safety

Marine Patrol Unit

(603) 293-2037
In emergency situations, call (603) 293-2037 or (877) 642-9700
marinepatorol@dos.nh.gov
www.nh.gov/safety/divisions/nhsp/fob/marine-patrol/index.html

Generally, the Marine Patrol is responsible for the following:

- Enforcement of state boating laws and administrative rules.
- Enforcement of state criminal laws.
- Investigation of all boating accidents and drownings.
- Installation, maintenance, and removal of state owned marine aids to navigation.

You will need to obtain a **Marine Patrol Permit** if you plan on:

- Designating a public or private swim area with swim lines.
- Hosting a fishing event, race/regatta, parade, water ski show/exhibition, or other special event on the water.
- Installing a waterski course.

Boater Education

(603) 267-7256
www.nh.gov/safety/divisions/nhsp/fob/marine-patrol/boating-education/index.html

New Hampshire Law now requires that **all** persons who operate a powerboat with a motor greater than 25 horsepower to obtain a Boating Education Certificate.

Boat Registration

www.nh.gov/safety/divisions/dmv/registration/index.htm

Any boat operated on the public waters of New Hampshire, including tidal and coastal waters and all inland waters, must be registered and must display the bow number issued by the Department of Motor Vehicles, except for the following:

- Sailboats under 12 feet in length, rowboats and canoes powered by sail, oars, paddles, or other human power.
- Vessels registered in another state or country temporarily using the waters of this state for not more than 30 consecutive days.

Moorings Program

(603) 267-6453
www.nh.gov/safety/divisions/nhsp/fob/marine-patrol/moorings/index.html

Mooring permits are required for seven New Hampshire lakes. (Bow Lake, Lake Ossipee, Lake Sunapee, Lake Winnipesaukee, Lake Winnisquam, Newfound Lake, and Squam Lake.)

New Hampshire Fish and Game Department

11 Hazen Drive
Concord, NH 03301
www.wildlife.state.nh.us

Fishing Licenses

www.wildlife.state.nh.us/licensing/index.html

If you plan to fish in New Hampshire waters and you are 16 years old or older, you will need a **fishing license**.

Fishing Tournament Permits

www.wildlife.state.nh.us/fishing/tournaments.html

If you plan to host a fishing tournament in New Hampshire, you will need to obtain a **Fishing Tournament Permit** from the New Hampshire Fish and Game Department (as well as a **Water Event** Permit from the NH Marine Patrol).

Section 6: Programs and Contact Information

The following list of program contact information for New Hampshire watershed and lake-related non-profit organizations, governmental agencies, and academic institutions should help you to find out more information about the lake and watershed programs that you are interested in and also answer any questions that have not been answered in this guide.

If this listing does not help you find the information you are looking for, please do not hesitate to contact NH LAKES and we will help you find the answers to your questions.

Please note that the individual names and contact information provided below were current when this guidebook was printed, but may change over time.

New Hampshire Lakes Association (NH LAKES)

14 Horseshoe Pond Lane
Concord, NH 03301
(603) 226-0299
info@nhlakes.org
www.nhlakes.org

The Loon Preservation Committee

183 Lee's Mill Road
Moultonborough, NH 03254
(603) 476-Loon (5666)
info@loon.org
www.loon.org

The New Hampshire Department of Environmental Services (NHDES)

29 Hazen Drive, PO Box 95
Concord, NH 03301
(603) 271-3503
www.des.nh.gov

Beach Inspection Program
Sonya Carlson, Coordinator
(603) 271-0698
Sonya.Carlson@des.nh.gov
des.nh.gov/organization/divisions/water/wmb/beaches/index.htm

Clean Lakes Program
des.nh.gov/organization/divisions/water/wmb/cleanlakes/index.htm

Clean Vessel Act
(603) 271-8803
cva@des.nh.gov
des.nh.gov/organization/divisions/water/wmb/cva/index.htm

Exotic Species Program
Amy Smagula, Coordinator
(603) 271-2248
Amy.Smagula@des.nh.gov
des.nh.gov/organization/divisions/water/wmb/exoticspecies/index.htm

Lakes Management and Protection Program
Tracie Sales, Coordinator
(603) 271-8811
Tracie.Sales@des.nh.gov
des.nh.gov/organization/divisions/water/wmb/lakes/index.htm

Public Information and Permitting Unit Center
(603) 271-8876
info@des.nh.gov
des.nh.gov/organization/commissioner/pip/index.htm

Shoreland Protection Program
(603) 271-2147
shoreland@des.nh.gov
des.nh.gov/organization/divisions/water/wetlands/cspa/index.htm

Stormwater Program
Jillian McCarthy, Nonpoint Source Specialist
(603) 271-8475
jillian.mccarthy@des.nh.gov
des.nh.gov/organization/divisions/water/stormwater/index.htm

Volunteer Lake Assessment Program
Sara Steiner Coordinator
(603) 271-2658
Sara.Steiner@des.nh.gov
des.nh.gov/organization/divisions/water/wmb/vlap/index.htm

Wetlands Bureau
(603) 271-2147
des.nh.gov/organization/divisions/water/wetlands/index.htm

The New Hampshire Fish and Game Department

11 Hazen Drive
Concord, NH 03301
(603) 271-3421
info@wildlife.nh.gov
www.wildlife.state.nh.us

The New Hampshire Department of Safety

Bureau of Marine Patrol
31 Dock Road
Gilford, NH 03249
(877) 642-9700 (603) 293-2037

The University of New Hampshire

Cooperative Extension Education Center
(877) EXT-GROW (398-4769)
extension.unh.edu/Gardens-Landscapes/Home-Gardening

Lakes Lay Monitoring Program
Bob Craycraft, Educational Program Coordinator
(603) 862-3696
bob.craycraft@unh.edu
extension.unh.edu/Volunteer/NH-Lakes-Lay-Monitoring-Program

SECTION 7: REFERENCES

Connor, Jody N., and Robert H. Estabrook. *Answers to Common Lake Questions.* 3rd edition. Concord, NH: New Hampshire Department of Environmental Services, 1992.

Holdren, Chris, Bill Jones, and Judy Taggart. *Managing Lakes and Reservoirs.* Madison, WI: North American Lakes Management Society and the Terrene Institute, 2001.

Moore, John L. *A Special Place - New Hampshire's Lakes.* Lake Winnipesaukee Association, 1994.

Moore, Libby. *The Lake Book: Actions You Can Take to Protect Your Lake.* 6th edition. Congress of Lake Associations of Maine. Yarmouth, ME, 1993.

New Hampshire Department of Environmental Services. "Frequently Asked Questions: Shoreland Water Quality Protection Act." <des.nh.gov/organization/divisions/water/wetlands/cspa/categories/faq.htm>

New Hampshire Department of Environmental Services. "Got Permits?" <des.nh.gov/organization/divisions/water/lrm/documents/got-permits.pdf >.

New Hampshire Department of Safety Marine Patrol. *The Boaters Guide of New Hampshire: A Handbook of Boating Laws and Responsibilities.* <www.boat-ed.com/newhampshire/handbook/book.html>

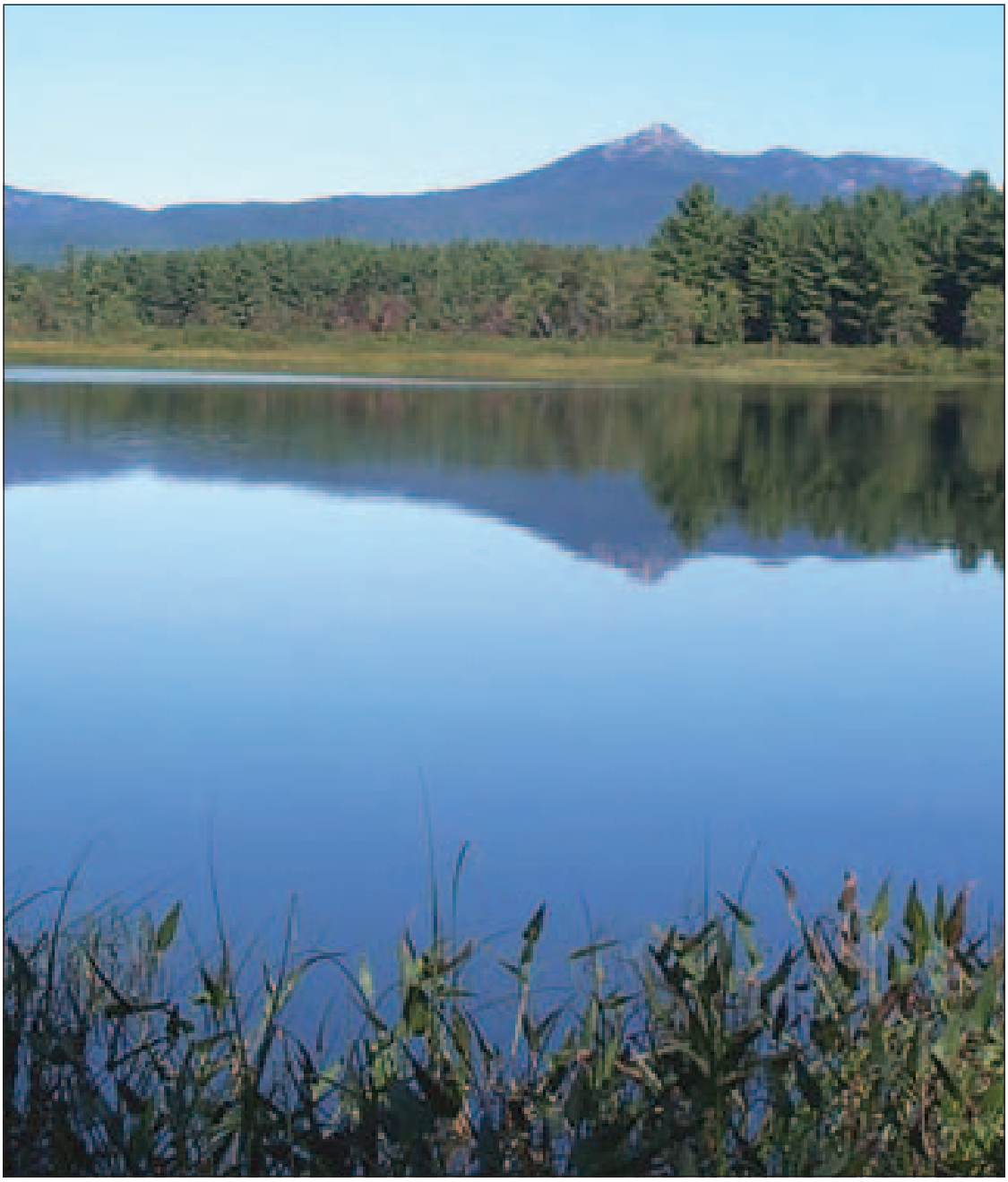
New Hampshire Lakes Association (NH LAKES). *Watershed Steward Program: A Citizen's Guide to Watershed Protection.* NH LAKES. Concord, NH, 2000.

Phillips, Nancy, Martin Kelly, Judith Taggart, and Rachel Reeder. *The Lake Pocket Book.* 1st edition. Alexandria, VA: Terrene Institute, 2000.

University of New Hampshire. *Landscaping at the Water's Edge: An Ecological Approach.* 1st edition. University of New Hampshire Cooperative Extension, 2007. < extension.unh.edu/resources/files/resource004159_rep5940.pdf>

Vigmostad, Karen E. "*Your Lake & You.*" North American Lake Management Society. Vol. 1 (2001): 1-8.

York County Soil and Water Conservation District (YCSWCD). "*For Your Lake's Sake.*" brochure, produced by York County Soil and Water Conservation District, ME.



NEW HAMPSHIRE LAKES

Members dedicated to protecting lakes and their watersheds