

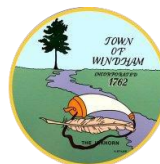
KEEP

Highland Lake

CLEAN & HEALTHY

Highland Lake's Guide to Lake-Friendly Living

HELP US
HELP OUR
LAKES



Working Together to *Protect Highland Lake*

The beauty of Highland Lake's waters has made it a popular destination. Traditional summer camps are turning into year-round homes as more and more people want to enjoy the beauty and tranquility of lakeside living. As you spend more and more time on Highland Lake, take a moment to make sure you're living a lake-friendly life by following the tips in this guide.

How Does Highland Lake's Water Quality Impact Me?

Recent studies have linked water quality with property values on lakes throughout the US. Lakeshore properties are in demand, and the value of these properties depends upon the quality of the lake. People prefer clean water and will pay more to live on lakes with better water quality. What you and your neighbors do to protect and improve the water quality of Highland Lake will protect your quality of life and lakeshore property investment.



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Reduce Runoff

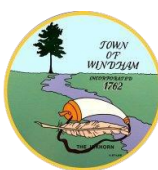
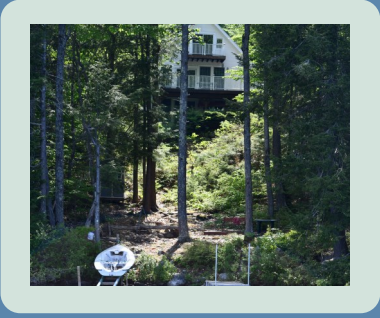
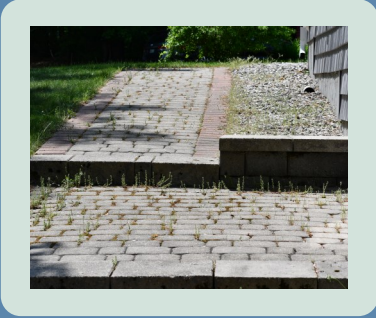
Store & Divert Water

- Spread a layer of organic mulch around plants to retain moisture in the soil.
- Choose native shrubs and groundcovers instead of turf for steep slopes and isolated strips.
- Install a rain barrel to collect runoff from your roof and use it to water your garden. *Look for Portland Water District's annual spring rain barrel sale.*
- Direct your downspouts onto your lawn or into a rain barrel, rain garden, or dry well, away from your driveway and other impermeable surfaces.
- Don't have gutters? Install dripline trenches to capture roof runoff.

Use Less Water

Create less runoff by measuring rainfall and aiming for 1-1.5 inches of water once or twice a week for your lawn.

Water your lawn and gardens in the morning (6 to 10 AM) when temperatures are cooler to minimize evaporation.



Ways to Protect *Water Quality*



Anything that enters Highland Lake can impact the health of the water, including common pollutants such as soil, fertilizers, pesticides, pet waste, litter, road salt, and many others. These pollutants can make the lake less desirable for us to live beside by making the water unsafe to swim or fish in or ruining the view with algal blooms, murky water, and litter. Bass, eagles, loons, and other wildlife also need a healthy lake for their home.

This guide provides ways to protect Highland Lake's water and your investment. If we all practice lake-friendly living, we can all enjoy the beauty and health of Highland Lake for generations to come.

Did you know?

Most of Maine's freshwater water quality issues are from **nonpoint source pollution**, meaning they're caused by things such as soil, fertilizers, pesticides, and pet waste from our yards, driveways, and roads running off into the lake with the rain.

Three Ways to Healthy Water Quality

Minimize Runoff

Runoff picks up pollutants and carries them to the lake. The key to protection is to minimize the hard surfaces that create runoff.

Eliminate Pollutants

Eliminate pollutants at their source. Avoid using fertilizers, pesticides, and other chemicals. Maintain your septic system, prevent soil erosion, and pick up after your pet.

Capture and Infiltrate

Prevent polluted runoff from reaching the lake by using rain barrels, rain gardens, and shoreline buffers to store it, slow it down, or let it soak into the ground.

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Limit Lawn Size

The Power of Plants

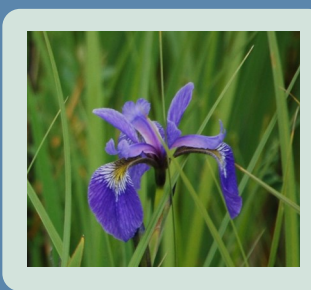
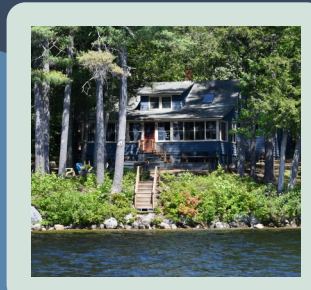
The natural landscape has multiple ways to absorb and filter water—from the tree canopy, to the understory of smaller trees and shrubs, to the plants’ roots. These natural systems protect soil, limit erosion, and filter pollutants before they reach waterbodies.

Lakes Like Less Lawn

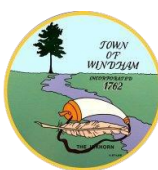
When updating your home’s existing landscape, consider reducing your lawn size to limit runoff and protect Highland Lake. You can swap your lawn for flower and vegetable gardens, groundcovers for shady parts of your yard, and pervious paver pathways and patios. For remaining sections of lawn, make sure to keep it natural—See www.cumberlandswcd.org/yardscape for tips.

Use Native Plants

Native plants have deeper roots to absorb and filter runoff than the short roots of turf and other ornamental plants while requiring less maintenance. Use these in the vegetative buffers, rain gardens, and other landscaped sections of your yard.



FOR MORE INFORMATION on limiting lawn size, check out our partner resources at www.highlandlakemaine.org/communications/guides-and-resources.



Additional Resources

Natural Shoreline Protection



Vegetative Buffers & Rain Gardens

A **vegetative buffer** is a strip of natural vegetation along the shoreline of a lake or waterbody that reduces runoff into the lake. Ideally, the vegetation should cover at least 50-75% of the property's lake frontage.

A **rain garden** is a vegetated depression that collects rainwater. This allows the rain that falls on rooftops, driveways, and patios to soak into the ground instead of becoming stormwater runoff.

Buffer Myth

Having a vegetative buffer doesn't mean you lose your view of the lake!

You can use a mix of native shrubs, flowers, tall grasses, and other plants that can easily be seen over while protecting your shoreline from erosion, filtering stormwater pollutants, and creating habitat for wildlife on land and in the lake.

Use the Natural Landscape as Your Guide

As you think about your vegetative buffer or rain garden, use Mother Nature as your guide. Create layers with large native shrubs, flowers, and groundcover. Pick plants that grow in our zone - Highland Lake is in the plant hardiness zone of 5b.

Visit www.cumberlandswcd.org/yardscape to find resources about rain gardens, vegetative buffers, and native plant recommendations.

How to Get Started

Contact the **Highland Lake Association**! We can help you get free technical advice and even grant funding to design and install a vegetative buffer or rain garden that will work well for your property. There are also additional planting and maintenance guides at www.highlandlakemaine.org to help you get started!

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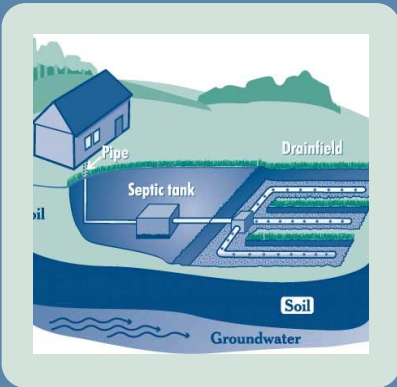


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 Septic System Maintenance

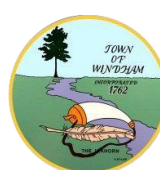
What's the Difference Between Septic and Sewer

A septic system (left picture) is wastewater infrastructure for an individual property that functions as both a treatment and disposal area. This is different from municipal sewer systems that collect wastewater from multiple properties and pipe the wastewater to a large wastewater treatment plant.

For septic systems, household wastewater flows to the septic tank (middle picture) with sludge settling to the bottom and liquid and scum rising to the top. The liquid flows through the outlet onto the leach field (right picture). When the leach field is properly functioning, the contaminants in the liquid are bound to soil, diluted, filtered out, or die off. The solid waste will eventually build up enough that it must be pumped from the septic tank.



FOR MORE INFORMATION on septic system ownership, maintenance, and inspections, visit www.epa.gov/septic.



Additional Resources

Septic System Maintenance

Malfunction

Malfunctioning septic systems can cause local water pollution issues, most commonly caused by excess fecal bacteria, nitrogen, and phosphorus that the soil cannot absorb.

Malfunction can look like standing water over your septic system, bad odors near the system, lush grass over the system during dry weather, and high algal growth in front of your property but not your neighbors'.

Maintenance

Because septic systems are private, the property owner is responsible for all maintenance. Renters and guests are responsible for the proper use of the system. With proper maintenance, septic tanks can last over 30 years between replacements!

- **Pump the tank every 2-3 years for year-round homeowners, 4-5 years for seasonal residents.**
- Mark the septic system area to prevent vehicle traffic that can crush the system.
- Plant grass or small groundcover plants over the septic tank and leach field so the roots don't clog the pipes. Larger perennials and shrubs should be planted on the downhill side of your leach field to help filter out contaminants before they reach the lake.
- Don't flush anything other than toilet paper and your waste! Tissues, paper towels, wipes (even "flushable" ones), and other items can block your pipes and septic tank, causing your sewage to back up into your house.
- Direct stormwater runoff away from your leach field using rain barrels, rain gardens, or roof dripline trenches.

Inspections

Request a system inspection as part of your septic tank pumping. These inspections are helpful at finding blockages, structural damage, and future issues for your system so you have time to fix them.

System inspections are a few hundred preventative dollars, whereas system replacements or repairs can be several thousands to tens of thousands of dollars!

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 Got Dirt?

Keep it Covered

Any bare spot of soil, whether it's on your driveway, walkway, yard, or shoreline, is getting eroded by rain, snowmelt, and wind and adding phosphorus to the lake.

To keep dirt in its place, you want to stabilize it with plants, mulch, gravel, or some other covering.

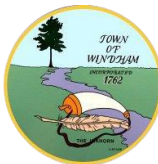
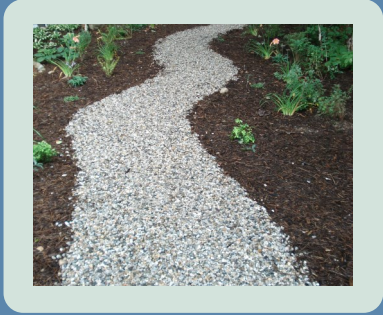
You can prevent erosion from happening at these common sites.

Path & walkway stabilization
 To prevent issues with your path or walkway, make sure it is:

- Less than 6' wide
- Winding to help slow water down and soak into the ground
- Built with pervious material such as crushed stone, erosion control mulch, or pervious pavers.

Driveway diverters
 To quickly shed water from your driveway:

- Paved driveway: Crown or superelevate it to send water off to the sides instead of down your driveway.
- Dirt driveway: Install a water diverter (e.g., rubber razor, open top culvert, or angled speed bump) to send water from your driveway into nearby vegetation.



Additional Resources

Preventing Erosion

Did you know?

Activities within **75 feet** of Highland Lake or its 12 stream tributaries require a **Natural Resources Protection Act (NRPA) permit** and any activity within **250 feet** of the lake is regulated by **shoreland zoning laws**.

Activities that require permitting include:

Building, repairing, or altering any permanent structures.
Removing or displacing soil, sand, vegetation, or other materials.

First step: Contact your Code Enforcement Officer to ask about regulations and permitting.

Falmouth Code Enforcement:
(207) 699-5310

Windham Code Enforcement:
(207) 894-5960 x 1

Leave the Duff Layer

"Duff" is the layer of leaves and pine needles that covers the forest floor and protects the soil from erosion. Instead of raking it up, leave it for a free and natural way to protect your soil.

Construction

If you do need to disturb soil for construction, you can prevent erosion by doing the following:

- Preserve existing vegetation where possible and avoid driving or parking machinery near trees to prevent root damage.
- Properly install a silt fence or erosion control mulch berm downslope and between your project and the water before beginning the project.
- Keep any soil piles covered with tarps and located away from the water.
- Replant and mulch the bare soil areas as soon as possible.

Reminder: Contact Code Enforcement for information on shoreland zoning rules and which NRPA permit to submit to the Department of Environmental Protection before construction begins.



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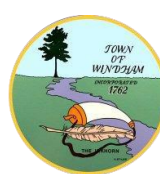


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YardScaping

If your property has an existing lawn, keep it natural! A natural lawn is more resistant to weeds, bugs, disease, and drought.

- **Mow better.** Cut high (3 inches) for strong roots and to shade out weeds. Leave clippings behind for a natural source of nutrients.
- **Build your soil.** Aerate and topdress your lawn with compost.
- **Add new grass.** Overseed with native shade-tolerant grass varieties (fescues and perennial ryegrasses).
- **Test your soil.** Before applying fertilizers or lime, check how much it needs (if any).
- **Feed your lawn.** Once established, most lawns can get all the nutrients they need from grass clippings and growing with white clover.
- **Compost safely.** Keep yard waste away from the water and ditches, where phosphorus can easily reach the lake.

For more information, visit www.cumberlandswcd.org/yardscape.



Additional Resources

What's Phosphorus?

Did you know?

Soil is the #1 freshwater pollutant in Maine.

Soil causes a lot of problems all on its own, such as adding nutrients that grow algae, discoloring and making the water cloudy, increasing the water temperature, and reducing the water's ability to hold enough dissolved oxygen.

Unfortunately, soil also binds to other pollutants, such as bacteria from pet waste and chemicals from our vehicles and homes and brings them with it when it erodes.

Phosphorus is a natural nutrient that plants use to grow in freshwater lakes. Increased phosphorus can stimulate algae and excessive plant growth, negatively impacting boating, fishing, swimming, and your property values. Even small increases of phosphorus can have a devastating impact on the water quality of a lake or stream.

Phosphorus Impacts

Just 1 lb. of phosphorus can produce up to 500 lbs. of green, smelly, and potentially toxic algae! When algae die and decay, the water is robbed of dissolved oxygen. This can devastate fish populations if it occurs for a long period of time or the fish have nowhere else to go. Algae also make the water murky and potentially hide water hazards, making it unsafe or undesirable to swim and boat.

Where Does Phosphorus Come From?

Some exists naturally in lakes and streams, but human activities from residential and agricultural areas contribute a significant amount of phosphorus. Stormwater runoff travels across land and picks up phosphorus from **fertilizers, eroded soil particles, septic systems, and pet waste** and discharges it into nearby streams and the lake.



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Soil Testing

A soil test provides users with information about existing soil conditions including nutrient levels, pH, organic matter, potential heavy metal contaminants, and tailored amendment recommendations for desired plants. You should test your soil before applying any nutrients or pH amendments.

Testing Procedure

1. Collect and combine multiple samples throughout a similar location (e.g., front yard lawn).
2. Complete the sampling box and form (available through Cooperative Extension, CCSWCD, and NRCS offices) information.
3. Fill box with a mixture of sampled soil. Remove any sticks or rocks.
4. Place sample box, form, and payment in an appropriate mailing container and send it to Maine Soil Testing Lab (address on the testing form).
5. Results are typically provided 2-3 weeks later. Providing an email can shorten the wait time.

Tips

Ask your landscaping professional to taking a soil test and follow the recommended results to make sure you're only applying and paying for what your lawn needs.



Additional Resources

Amend Your Soil



Calculating Fertilizer

If your soil test indicates your soil needs fertilizer and an alternative is not available, here's how to match the recommended ratio.

As an example, you may have a 20 lbs. fertilizer bag with 20-0-5 on the front. The numbers are percentages of the total bag weight. Thus, 20% of 20 lbs. is 4 lbs. of nitrogen and 5% of 20 lbs. is 1 lb. of potassium. This bag doesn't have any phosphorus. If your **soil test** calls for 5 lbs. of nitrogen per 1,000 sq. ft., take the aforementioned 5 lbs. and divide it by 0.20 (% nitrogen in bag). You would need to apply 25 lbs. of the 20-0-5 fertilizer per 1,000 sq. ft. to achieve the desired nitrogen levels. **However, if you leave your grass clippings when you mow, you need to apply half the calculated amount and apply it sometime between late-August to mid-September.**



Applying Recommendations

Calibrating your spreader properly and applying at the right time will ensure you're applying the correct rate and reduces the risk of fertilizer ending up in Highland Lake.

- **Apply fertilizer as far from the lake as possible; at least 75' is ideal.**
- Use a drop spreader for more accurate distribution.
- Fill your spreader on a hard surface and sweep up any spills immediately.
- Avoid spreading on soon-to-be or already saturated soils.
- Reduce spreader settings by half and apply north to south, then east to west. Walk at a slow and steady pace for equal distribution levels.
- Grow a vegetative buffer to absorb any nutrients before they reach the lake.



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 Doing Your Doody

Double the Trouble

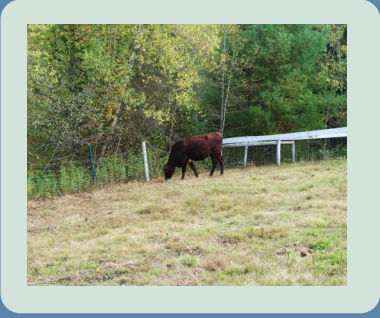
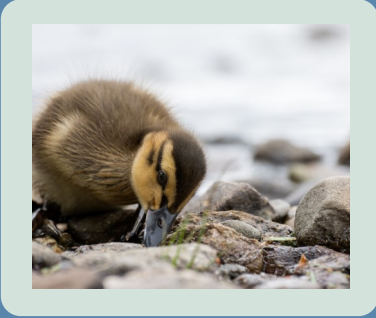
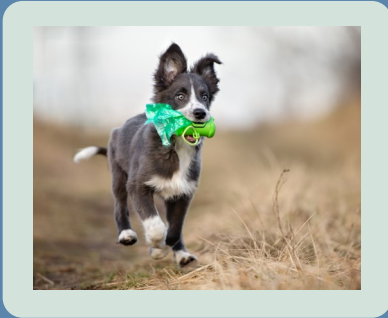
From farm animals to household pets to wildlife, all animal waste contains nutrients and pathogens such as parasites, bacteria, and viruses. To prevent these pollutants from reaching Highland Lake and making the water unsafe to swim in and fish from, consider the following:

- Scoop, bag, and trash dog waste whether it's in your yard or happens during a walk.
- Keep wildlife wild by not feeding ducks and geese to help keep the birds healthy and reduce their waste.
- Contact CCSWCD for site-specific recommendations for managing farm animal manure.

Did You Know?

Dog waste can add nutrients, bacteria, and parasites to our water.

Our natural ecosystem can support 2 dogs per square mile. The Highland Lake Watershed has approximately 68 dogs per square mile.



Additional Resources

Don't Waste Our Water

Home Sweet Home

It's not just us contributing pollutants to Highland Lake. Our 570+ dogs living in the watershed can too.

570+ Dogs



Did You Know?

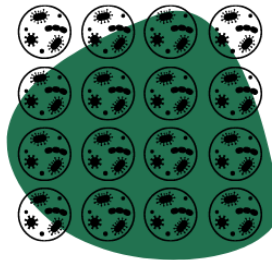
Due to their diet, dog waste (both poop and urine) has highly concentrated amounts of nutrients that can burn and kill your lawn. Those nutrients can be picked up by stormwater runoff and carried to the lake.

The Ick Factor

Over the course of a year, the average dog produces 2.75 pounds of phosphorus and 2.8 trillion fecal bacteria in their waste.



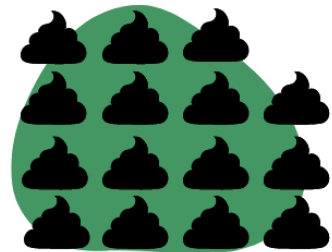
1.6 quadrillion



Fecal Bacteria

Over 1.6 quadrillion fecal bacteria are produced by dogs per year in the Highland Lake Watershed.

1.5 thousand



Phosphorus

Over 1,500 pounds of phosphorus are produced by dogs per year in the Highland Lake Watershed.

Protect the Lake

Excess fecal bacteria can close Highland Lake to swimming and fishing.



Any excess phosphorus entering the lake can lead to an unwanted algal bloom.



Be the Solution to Water Poo-llution

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Creating Waves

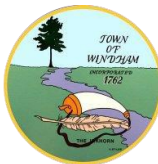
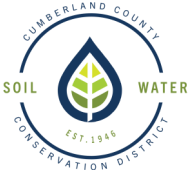
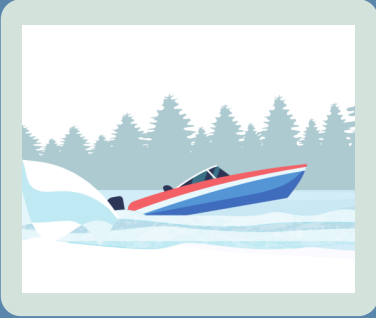
Wakes over 3', especially ones within 500' of shore or in waters less than 20' deep, can cause many issues, including:

- Shoreline erosion
- Scouring the lake bottom, which damages fish habitat and stirs up phosphorus
- Damage to loon nests and displacing eggs
- Safety hazards for nearby smaller watercrafts and swimmers
- Damage to docks, floats, and moored boats

To reduce these issues, boat in large, deep areas so wakes have time to diminish before reaching shore.

Did You Know?

Large wakes are more commonly caused by boats in between headway and planing speed. When a boat's bow angles up, the propeller angles down, which creates a large wake and stirs up the lake floor in shallow water.



Additional Resources

Where to Boat on Highland Lake?

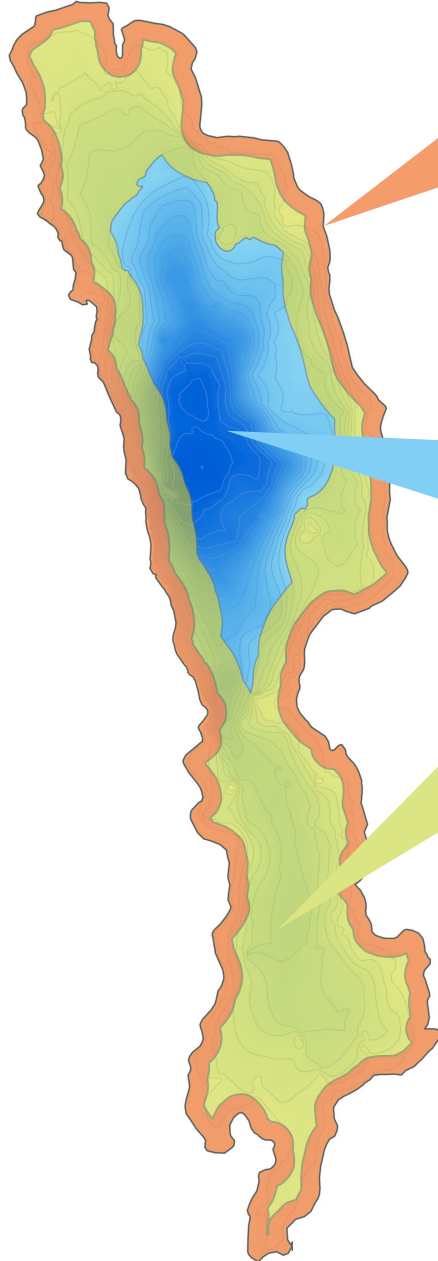
Tips

Operate your boat at headway speed* within 200' of shore or in shallow waters 20' or less.

**Headway speed is the slowest possible speed at which you can still steer and control your boat.*

Avoid boating in small bays, channels, and enclosed areas.

Leave and approach shore in a straight line as turns create large wakes.



No Wake Zone

Maine boating laws prohibit operating a boat faster than headway speed within 200' of shore.

Large Wake Activities

There are no wave restrictions in this portion of Highland Lake. Wakeboarding, tubing, surfing, and other activities are safe here.

Small Wake Activities

The Highland Lake Association recommends no wakes over 3' high in this zone to protect water quality. This zone includes areas within 500' of shore and/or shallow waters of 20' or less.

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 Shoreland Zone

Where's the Shoreland Zone
 Your property is in the Shoreland Zone if it is within 250' of Highland Lake or 75' of a stream. Property modifications within the Shoreland Zone are regulated by town ordinances and State law to help protect water quality and wildlife habitat. Contractors disturbing material in the shoreland zone must be certified by the State of Maine in Erosion and Sediment Control.

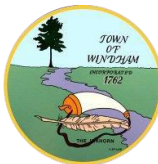
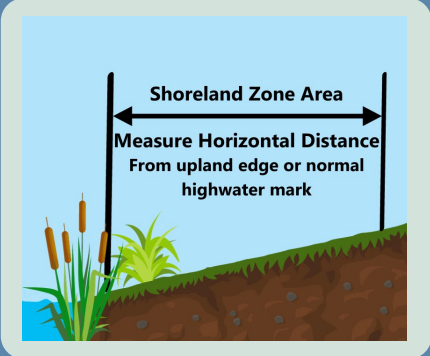
- Within the Shoreland Zone, permits are required for the following activities:
- Cutting large shrubs and trees, with removal dependent on the size and number of plants.
 - Installing stone (riprap) along your shoreline or replacing an existing retaining wall. Alternatives to stone are often recommended for lake and wildlife health.
 - Loam and other material brought in for yard enhancements. Crushed stone brought in for seating areas and paths is often restricted. Beach sand is prohibited from being brought into the shoreland zone.

Ask the Expert

Contact your Code Enforcement Officer to ask about regulations and permitting.

Falmouth Code Enforcement:
 (207) 699-5310

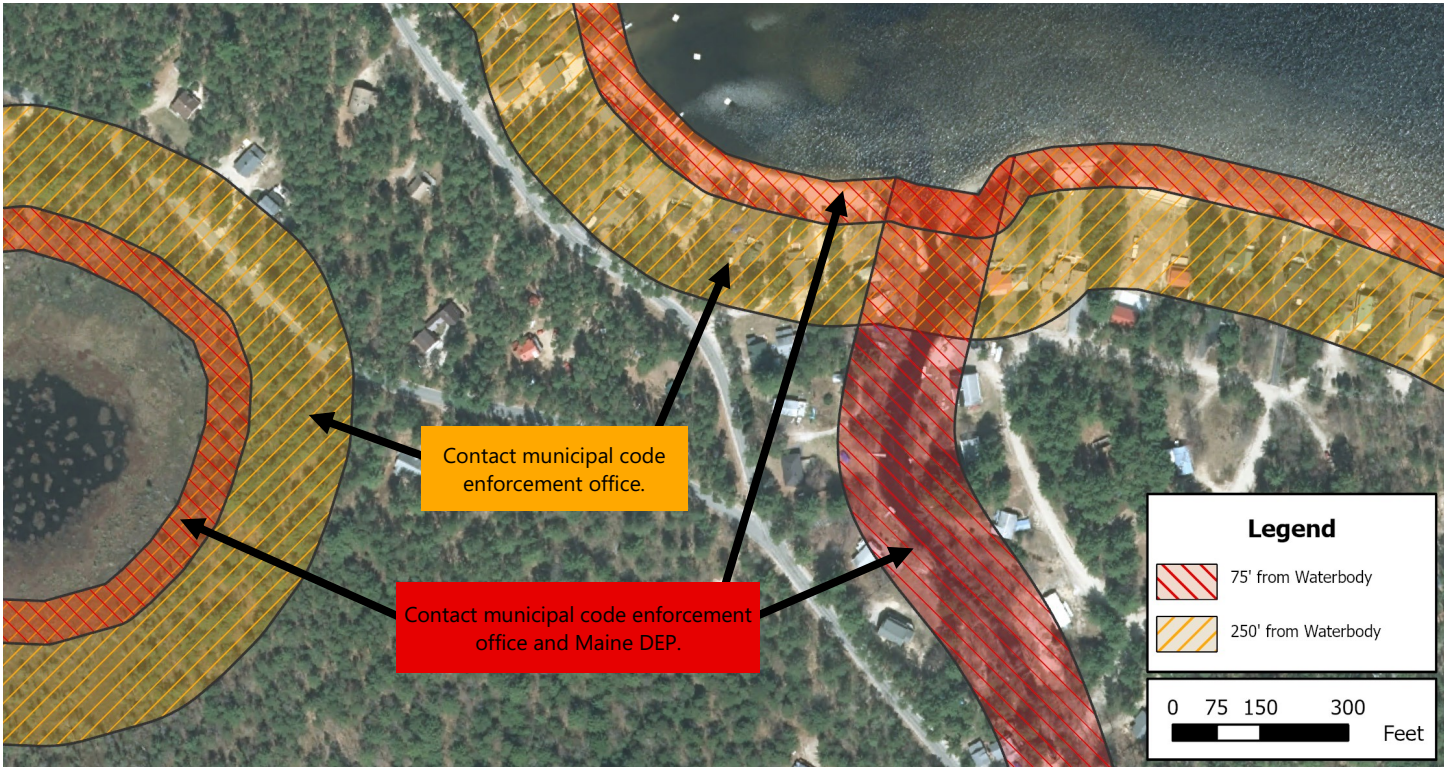
Windham Code Enforcement:
 (207) 894-5960 x 1



Example

Shoreland Zoning

The shoreland zone applies to all land within 250 horizontal feet of the normal high-water line of any great pond or river; all land within 250 horizontal feet of the upland edge of a defined freshwater wetland or coastal wetland, including all areas affected by tidal action; and all land within 75 horizontal feet of the normal high-water line of certain streams. **Your municipality may have additional overlay zones within or that expand the shoreland zone area and have additional restrictions.**



Permit By Rule

The Maine DEP issues Permits By Rule (PBR) to areas closest to the water to provide additional protections under the Natural Resources Protection Act (NRPA).

NRPA/PBR and Municipal Shoreland Zones for wetlands have additional applications outside of what is depicted here depending on the size, type, and neighboring waterbodies. Contact your local municipal code enforcement officer to identify your specific wetland regulations.

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Join Us!

Highland Lake Association



Our mission is to preserve, enhance, and protect the natural resources of Highland Lake and its watershed.

The Highland Lake Association (HLA) is a registered 501(3)(c) non-profit organization, started in 1989. Our organization is staffed by volunteers from around the lake and is supported by our member dues.

The HLA has established itself as a leader in watershed education and water quality monitoring. Protecting water quality remains our top priority. The HLA Water Quality Committee monitors lake water quality using recognized standard methods, including analysis of natural and invasive plant species, and coordinates additional testing, education, and personnel as warranted.

We collaborate with our local partners (the Cumberland County Soil & Water Conservation District; the Towns of Windham, Falmouth, and Westbrook; as well as USM, UNH, and the DEP) to improve and maintain the water quality of Highland Lake for the benefit of the residents, the Towns, and future generations.

The first summer camps appeared around 1900 on Highland Lake, a lake less than 12 miles from Portland, Maine. There are now more than 500 residences around the lake shore and more than 1,000 within the watershed. The area around the dam (Duck Pond corner) served as the industrial center of the residential settlement dating back to the late 1700s. The site served as a rag mill as well as a lumber mill. HLA is proud to maintain the lake's history and dedication to pure enjoyment in pure water!

HLA welcomes residents along the shoreline and beyond to join in our efforts to keep Highland Lake at its best!

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