

Planning Pathways

Preventing erosion and intercepting runoff

Lake friendly living means using lakeshore

BEST MANAGEMENT PRACTICES

BMP

Planning Pathways

STANDARDS

Recreation Area

- Soil erosion is not occurring on site (no eroding pathways, or exposed dirt)

LAKE BENEFITS

Properly designed pathways direct foot traffic, absorb water, reduce the rate of flow, and protect soil. Pathways can also reduce the potential for erosion and minimize the amount of pollutants flowing from your property into local streams and lakes.

MATERIALS

This is a mix of wood fibers, soil, and gravel, which holds up to runoff and has a natural look. Crushed stone is available from your local gravel pit. One option for pathway materials includes setting stepping stones into a crushed stone base. The crushed stone allows runoff to infiltrate, and the stepping stones are comfortable for bare feet.

Planning Pathways

Description: Meandering pathways that utilize crushed stone and Erosion Control mix for filtration.

Purpose: Properly designed pathways direct foot traffic, absorb water, reduce the rate of flow, and protect soil. Pathways can also reduce the potential for erosion and minimize the amount of pollutants flowing from your property into local streams and lakes.

How to: Install narrow, meandering pathways in high-use areas. Reroute paths that go directly down steep slopes or install steps or waterbars* to break up the slope.

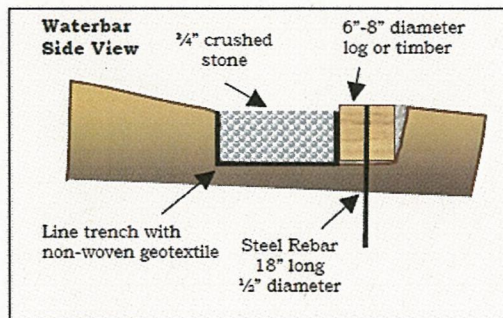
- Ideally, paths should be no more than 3'-4' wide.
- The walking surface should be covered with 3"-4" of material such as Erosion Control Mix, pine needles, bark mulch, crushed stone, wood chips, or other material. This will define the path, guide foot traffic, and reduce soil erosion.
- Paths should be meandering, depending on the slope, to provide opportunities for runoff to disperse into adjacent vegetation.
- If formal pathways do not currently exist, the new paths can be clearly marked with strategic plantings, stones, solar lights, etc. along the edges.

Maintenance: To maintain these structures, periodically remove accumulated debris from the surface. Mulched pathways may need to be re-shaped and additional material may be needed to replace what has washed or worn away. Using non-woven geotextile fabric below stone pathways will extend their life.

***Waterbars:** Install waterbar "speed bumps" to break up the slope and keep water from concentrating on a pathway. Fill behind with crushed stone to help runoff soak into the ground and direct water into vegetated areas. Rot resistant logs such as cedar and hemlock or pressure treated timbers can be used. Extend past the outside edge of both sides of the path and install at a 30-degree angle. Secure the waterbar with large stones on the downhill side and/or pound in with pieces of rebar steel.



Source: hoehtenlandscaping.com



Source: Maine DEP

Best Management Practices for Lakeshore Vegetation

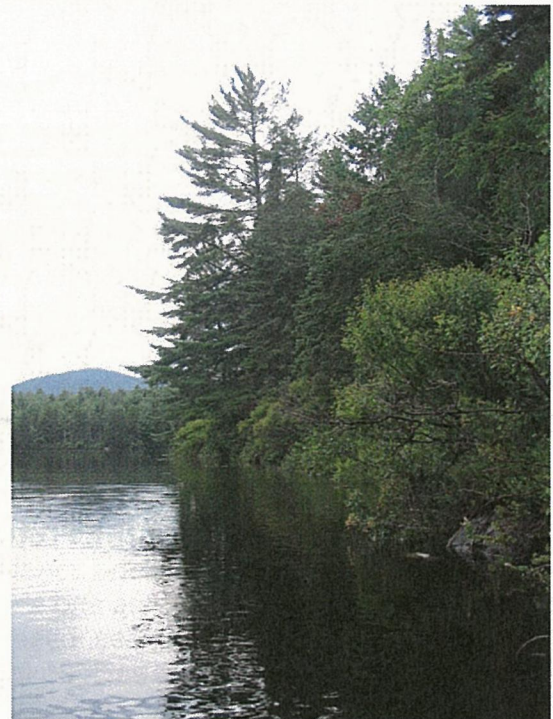


Adopted from Maine's shoreland zoning standards, which are proven to effectively protect their lakes

These guidelines are intended for the lakeshore owner to understand how to follow the Shoreland Best Management Practices, and not meant for a forester interested in timber harvesting. (Timber harvesting standards are shown in the *Accepted Management Practices for Forestry*, found on the Vermont Dept of Forest and Parks web site at: <http://www.vtfor.org/watershed/ampprog.cfm>)

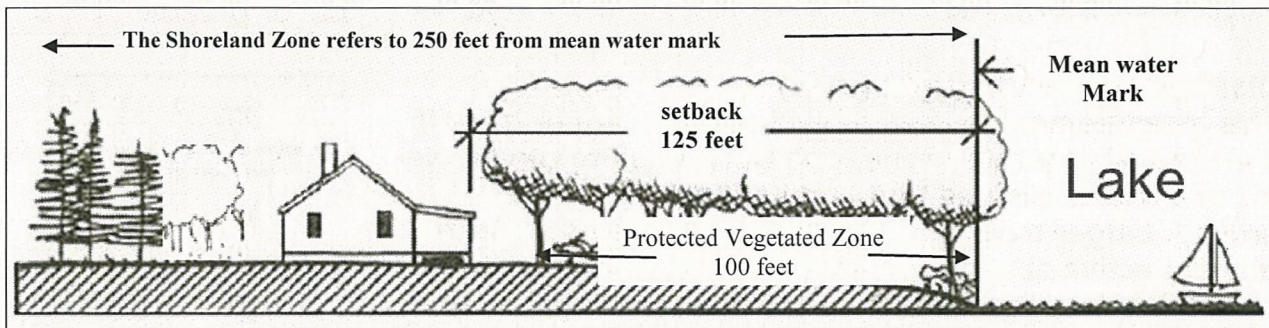
1. Do Nothing. Leave the Woods Under Natural Conditions.

This is the best way to avoid "over managing" the shoreland, native plant species and putting at risk the important benefits they provide to the lake, such as bank stability; stormwater runoff filtration; aquatic habitat; shade; wildlife habitat; natural beauty; and mix of types, sizes, and ages of plants that compose a healthy woodlands.



2. Selective Pruning

The graphic below shows the Protected Vegetated Zone extending 100 feet in width from the lake. Managing vegetation within this zone is best done according to a point system. Managing vegetation beyond 100 feet from the lake's mean water level (back from the Protected Vegetated Zone) is best explained by the Forty Percent Clearing Principle.



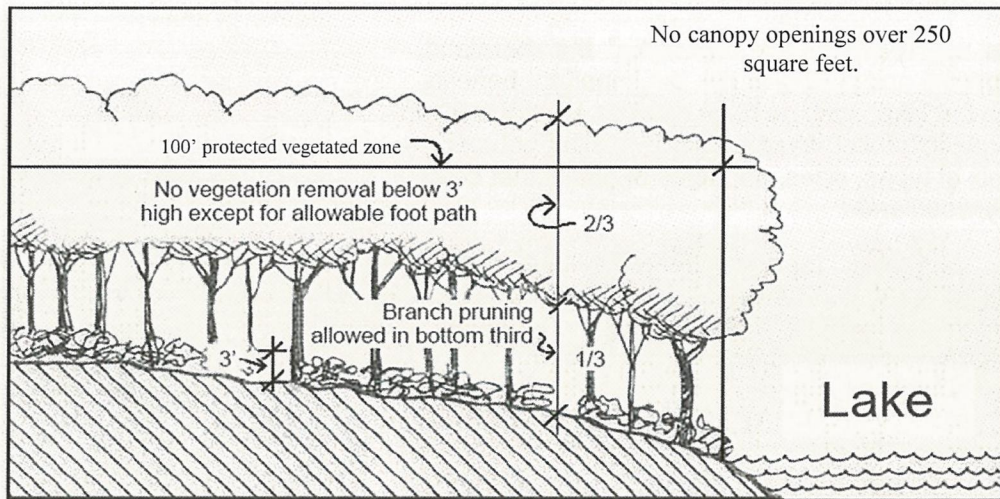
The Protected Vegetated Zone

This term refers to the 100 foot wide, naturally vegetated strip that surrounds the lakeshore.

•Vegetation less than three feet in height, including ground-cover and duff layer, should not be removed. •There should be no openings in tree cover greater than 250 square feet.

•Pruning of branches on the lower one third of tree height is acceptable, as well as a six foot wide path down to the lake. Following these standards provides the most effective protection for the lake.

The techniques and management practices described below are for a single 25 foot by 25 foot section of the waterfront, and should be maintained for each equivalent section (or scaled to fit) in a lakeshore property.



Managing Vegetation in the Protected Vegetated Zone

The management of shoreland vegetation is best based on a rating system that determines the minimum number of trees and shrubs needed to protect the lake. The rating system assigns scores to individual trees, based on the tree diameter at breast height (DBH). Within the protected vegetated zone, each 25 foot by 25 foot section should be maintained by the land-owner with:

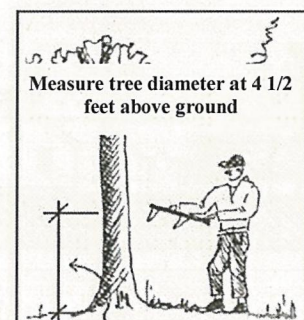
- a minimum number of 12 total “points” worth of trees
- at least five saplings (trees less than 2.5” DBH) in the same area.

Points are assigned to trees depending on their diameter at breast height (DBH). The table indicates how points are assigned.

Diameter (DBH)	Points
Under 2"	0
2" to < 4"	1
4" to < 8"	2
8" to < 12"	4
12" or greater	8

Diameter at Breast Height (DBH)

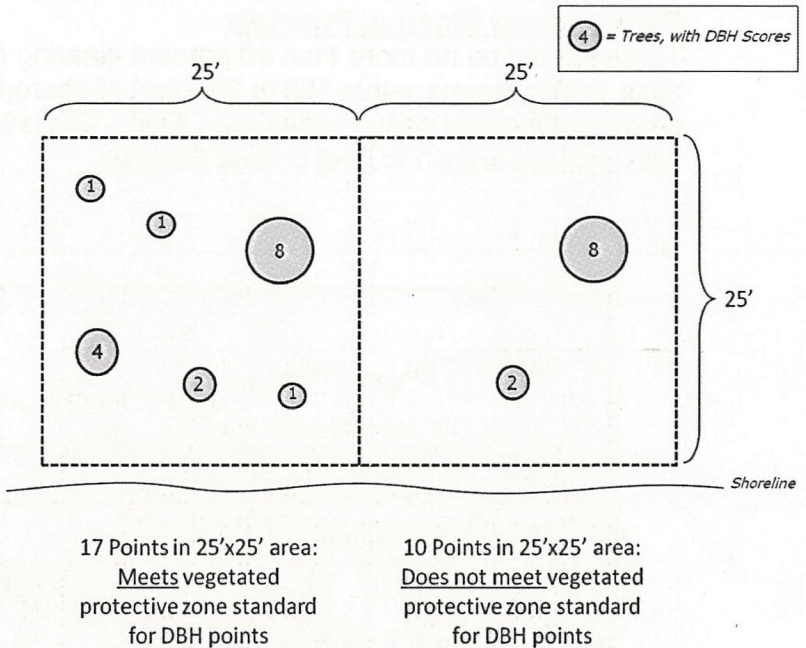
This measurement is used to evaluate the size of trees in a protected vegetated zone, and DBH refers to the diameter of a tree measured four and half feet above the ground. Larger trees have deeper root systems and are more effective at slowing and filtering stormwater runoff before it enters the lake. They are measured and counted as a critical component in establishing a shoreland protected vegetated zone.



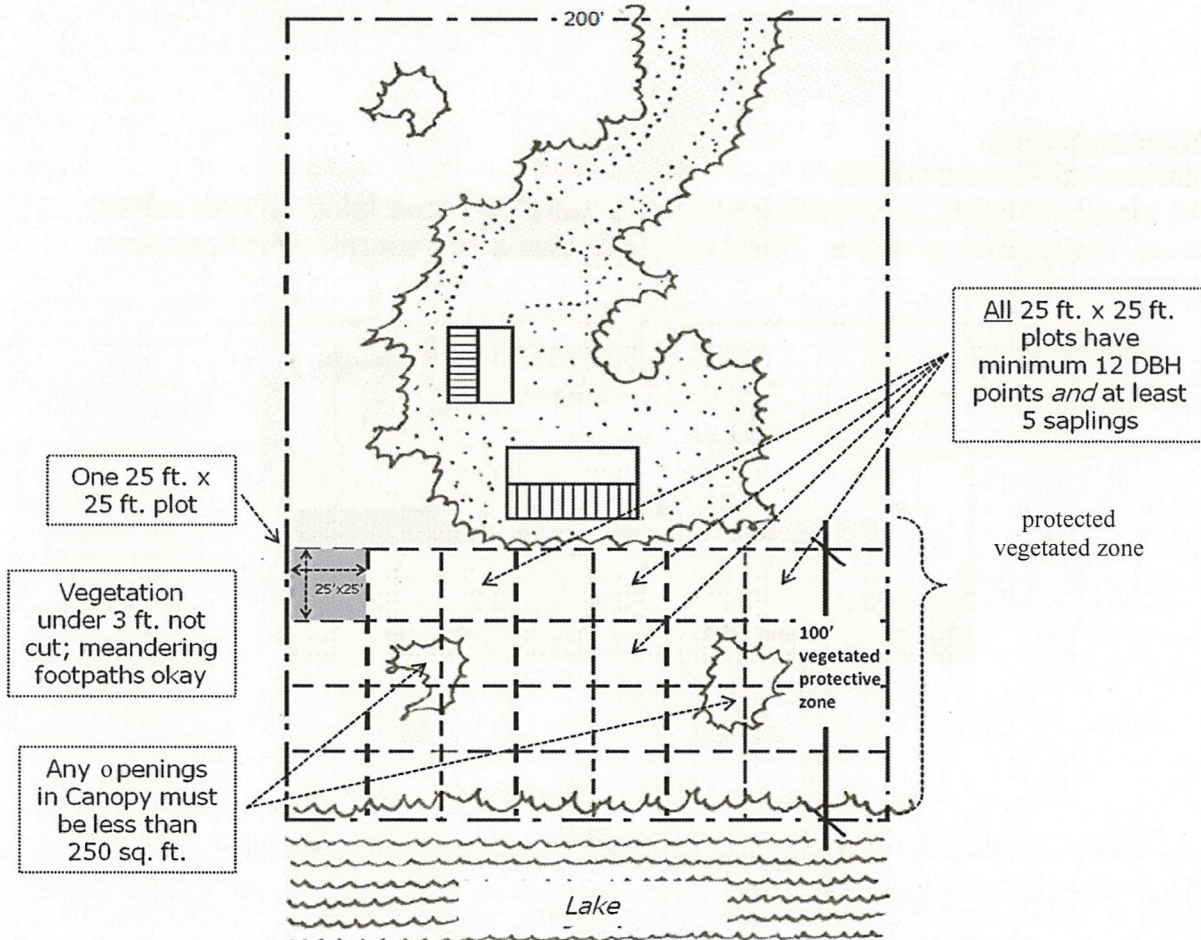
Example of Property Owner Shoreland Vegetation Management

This diagram represents two adjacent 25 foot by 25 foot protected vegetated zones. The plot on the left meets the DBH Standard of 12 points minimum; the plot on the right does not. All plots in a shoreline property would need to have a minimum of 12 points for the property to be in compliance with the protected vegetated zone standards.

NOTE: It is not a good practice to prune out all of one species, as a healthy woodlands needs a variety of plant species. For example, some trees have shallow roots and grow well on bedrock, while others grow in acidic or wet soils, etc. A mix is best.

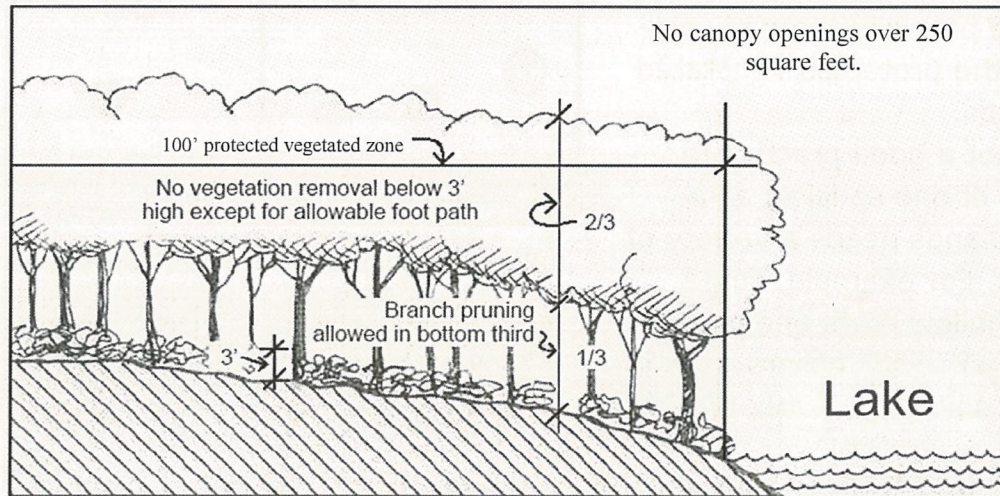


Vegetation Requirements for the Protected Vegetated Zone



Forty Percent Clearing Principle

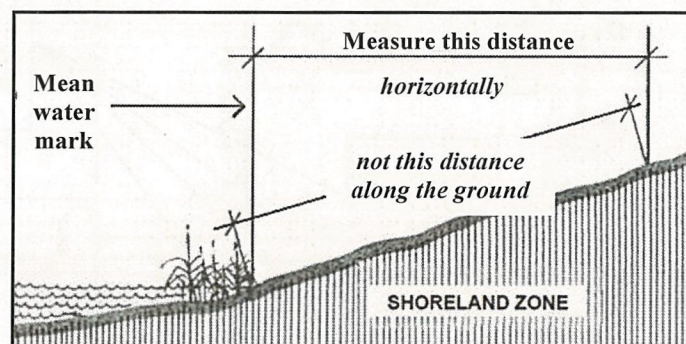
There should be no more than 40 percent clearing outside of the protected vegetated zone, which means within 100 to 250 feet of shore there should not be more than 40 percent of cleared native vegetation. Again, this is based on the science-backed practices that are known to best protect the lake.

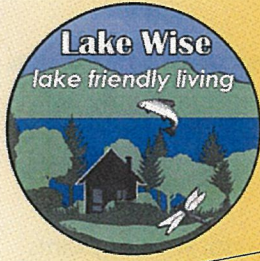


Measurements

Horizontal Measurement

All measurements are measured horizontally from the lake's mean water level, regardless of slope. This graphic shows a horizontal measurement.





Establishing No-mow Zones

Preventing erosion, intercepting runoff and protecting lake habitat

Lake friendly living
means using lakeshore
BEST MANAGEMENT
PRACTICES

BMP

Establishing No-mow Zones

STANDARDS

Shorefront

- Natural conditions
- Clean runoff to lake
- Shallow water areas natural and not "cleaned up"
- Minimum of 15 ft wide vegetated zone for existing developed sites

LAKE BENEFITS

Establishing no-mow zones naturally stabilizes the shore, filters and cleans dirty runoff, maintains greater privacy, increases property value, enhances scenic beauty, prevents erosion and allows for healthy habitat for fish, birds, and other important species. Furthermore, it is the best practice for protecting your property against storm damage.

Establishing No-mow Zones

Description: A mix of trees, shrubs, and groundcover between the lake and camps or houses which is not mowed.

Purpose: To allow shoreland vegetation to maintain lake quality and wildlife habitat. A naturally vegetated zone along the shore builds up a duff layer, which is a spongy, absorbant layer of decomposing leaf and twig litter. Duff is essential for healthy lakes because it naturally filters storm runoff by intercepting and absorbing pollutants, and it provides a protective ground cover, preventing erosion. No-mow zones stabilize banks with roots from native species that grow up, and these zones benefit all wildlife.

How to:

1. **Stop mowing** a zone adjacent to the shoreline as wide as feasible for your property. Prioritize lawn areas and move them back from the shoreline wherever possible. For sloped banks, the no-mow zone should extend beyond the top of a bank because research shows that a minimal of 15 feet of vegetation will stabilize the shore. A "no-mow" zone allows native plants to colonize the area, but jump-starting the vegetation by planting a few favorite native species, like blueberry bushes, alternative leaf dogwood, beautiful white flowering viburnums, etc., can also be help maximize the benefits of this important zone along the lakeshore.



The water quality is protected by this beautiful no-mow zone.



This photo shows several decades of natural re-growth of native species on a shore that had previously been cleared of all its vegetation; it now serves as a family picnic grove for the shoreland owners.

Establishing No-mow Zones

Preventing erosion, intercepting runoff, and protecting lake habitat

2. You can then **selectively prune out** the species you don't want and encourage those you do. Woody plants (trees and shrubs), groundcover, and wildflowers all hold the soil together better than mowed grass, which has shallow roots.
3. **Add desired plants** to a no-mow zone (see the lakeshore BMP on *Planting and Maintaining Vegetated Areas* for a listing of beautiful native species that grown naturally along lakeshores).
 - ◆ Select native species to avoid spreading aggressive exotic (invasive) species.
 - ◆ Select plants based on their mature size and characteristics. For instance, choose shrubs if you want to be able to see over the top of them. Or select trees for privacy and shade, and as the tree grows prune off some of the lower branches so you can see the lake to the extent desired.
 - ◆ Select species that provide fruits for birds or yourself to eat, or shrubs with attractive flowers.
 - ◆ Transplanting plants from farther uphill on your property to the lakeshore saves nursery costs and you can be sure the species grows well in your area. Late fall or early spring before the buds open are the best times to transplant.

By coordinating these no-mow sections with your neighbors, you can provide greater sized areas of good fish and wildlife habitat and stable banks.



These photos show two very differently managed properties on the same lake. Although by today's understanding, both camps were situated too close to the lake, the lakeshore owner on the left has allowed the native cedar trees to stabilize the bank, and with a little pruning, has a wonderful view.



In the photo on the right, the camp owners choose to clear their shore and plant grass, which has led to costly repairs to stabilize their bank with a sea wall. The property continues to have sink holes, erosion, and runoff problems. Even after building a sea wall, the benefits of a no-mow zone on the top of the bank would not only help protect this property, but would help protect water quality as well.



Resloping, Rock Toe and Rip Rap

Bank stabilization

Lake friendly living
means using lakeshore
BEST MANAGEMENT
PRACTICES

BMP

Resloping, Rock Toe and
Rip Rap

STANDARDS

Shorefront

- Stable bank
- Natural Conditions

LAKE BENEFITS

All bank stabilization BMPs reduce the effects of erosion to shorelines and stream banks that empty into lakes and ponds. By reducing erosion, landowners are also reducing the amount of sediment and phosphorus that enters the lake. The most natural form of erosion control is the best option. As a result the BMPs are listed in order of implementation. Riprap should be considered a last resort for erosion control.

Resloping, Rock Toe and Rip Rap

Where erosion has already occurred, consider methods that will allow you to mimic a natural shore, rather than building a retaining wall. Walls are expensive to build, offer no lake habitat or ecological benefits, are a barrier to wildlife, and will require replacement over time.

RESLOPING

Description: Resloping is a term that describes the regrading of an eroded bank to a moderate and more natural slope.

Purpose: To reduce the erosion of sediment and phosphorus into a lake by stabilizing a lake bank. Resloping also allows you to replace old retaining walls, as the drawing on the right illustrates.

How To: Reslope, if necessary to smooth erosion gullies, and replant native species above the rock toe. A 2:1 slope (2 feet horizontal to 1 foot vertical) or less can generally be stabilized with just vegetation. Use an erosion control blanket (example of straw), to cover bare soil while herbaceous vegetation becomes established.

Plant water-loving plants just below the eroding area. These will dampen the wave energy and trap eroding soil from above. Unless the erosion is severe, it may eventually self-stabilize. Choose quick growing native species and stay away from invasive species.

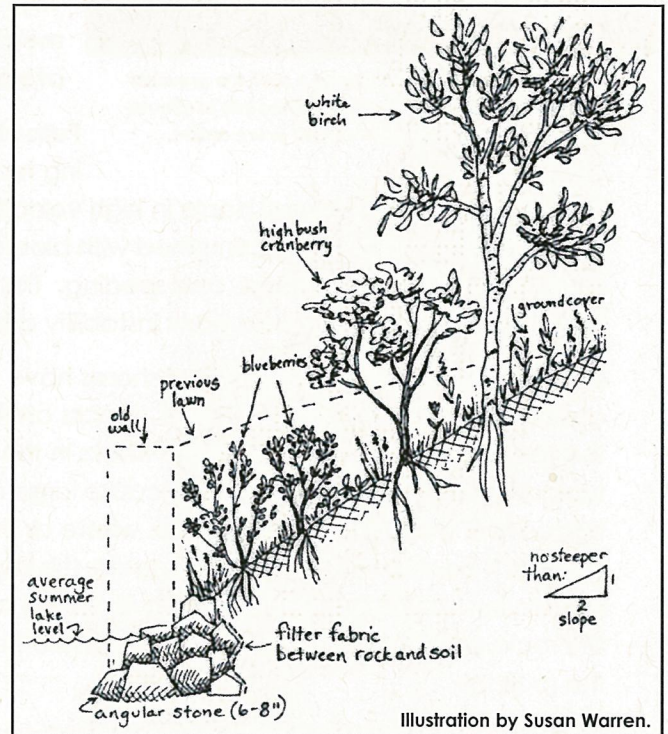


Illustration by Susan Warren.

A resloped bank stabilized with native vegetation and a shallow rock toe that is only partially visible above water giving it a natural look.



Note: Any work that occurs in the lake, below the average summer water level, requires a [Shoreland Encroachment Permit](#). Read the BMP supplement *Understanding the Shoreland Encroachment Permit* for more details.

Resloping, Rock Toe and Rip Rap

Bank stabilization



Shrubby vegetation planted above a rock toe prevents erosion better than grass or a lawn especially in circumstances of flooding and intense wave or ice action.

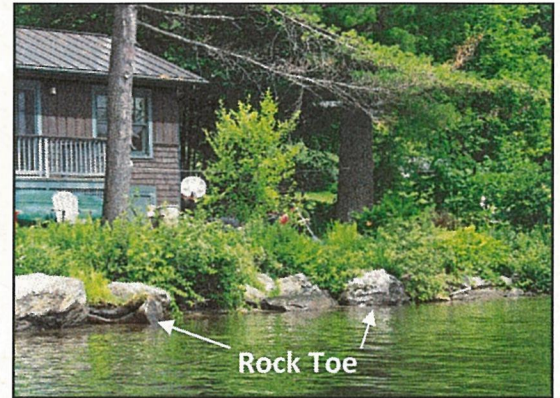
ROCK TOE

Description: Rock toes are low structures of rock placed along the water's edge of a shoreline. They often occur naturally along many Vermont lakeshores and are man made as a structural reinforcement of the bank, when wave action is the primary cause of the loss of bank material.

Purpose: Rock can be layered at the toe of the shoreline as an armoring technique to provide additional strength to banks. This will reduce

the scouring of the toe and banks in high velocity wave events. Rock lining the shoreline toe is more effective at protecting the bank when combined with bioengineering practices such as live staking, plantings, and seeding. This combination is how natural lakeshores avoid bank instability and erosion problems.

How To: Most undeveloped natural shores have a line of cobble and rocks right at the water's edge. If rocks are already present at the water's edge, leave them there. Rocks in the 10-16 inch size are typically better than larger ones because large rocks tend to just transfer the wave energy elsewhere, whereas the smaller size rock deflects it back and forth between rocks. It is important to have vegetation overhanging the rocks to keep the sun from heating up the rocks and the water, as well as to provide bank support above the rock toe.



If the area is undergoing serious erosion, it may be necessary to excavate in order to establish a rock toe. Install filter fabric against the back side of the rocks to prevent soil from washing out from behind the rocks (see the illustration on the first page). The smaller size rock (10-16 inches) also grips more tightly together, holding in the soil better with less chance of soil being washed out through any large holes among the rock. The rock toe only needs to extend about six to nine inches above the water level. Using this approach allows you to mimic and re-establish a naturally vegetated shore.

RIPRAP

Description: Riprap is heavy, large, irregular-shaped rock fit into place, without mortar, to manage severely eroded lake banks or shorelines.

Purpose: Controlling shoreline erosion often does not require the use of riprap and should be used as a last resort. Instead, shoreline erosion problems can frequently be addressed by limiting foot traffic, diverting upland runoff, and stabilizing banks with native vegetation. These are more affordable and lower-impact solutions that still protect water quality and property values. Riprap should be used only where necessary and never to replace a stable, naturally vegetated shoreline.



Source: Maine DEP

Resloping, Rock Toe and Rip Rap

Bank stabilization

How to:

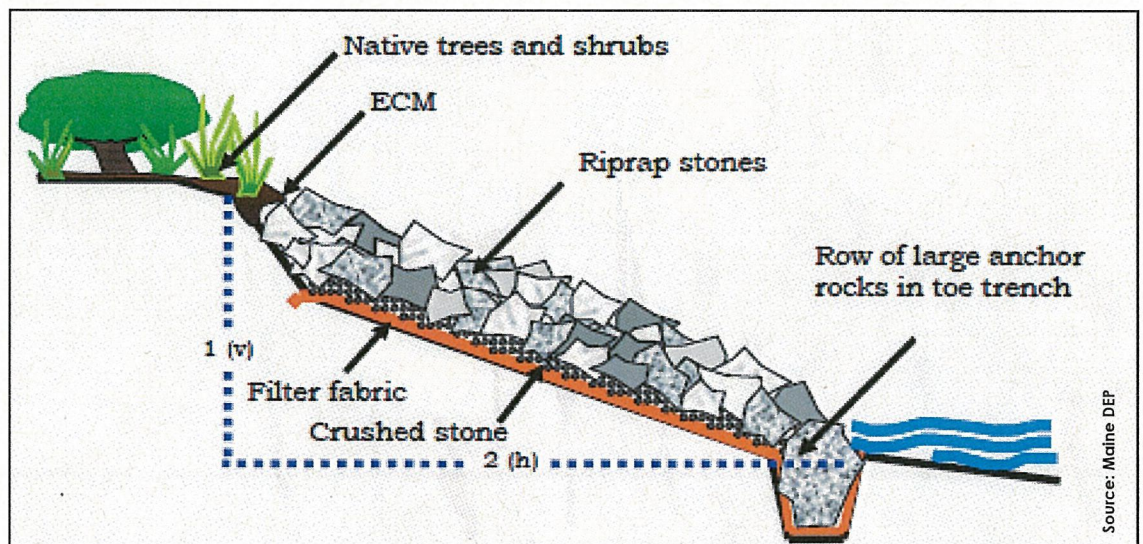
1. If necessary, excavate the bank so that the final riprap slope will be no steeper than 1:1 (horizontal to vertical) and no shallower than 3:1 (horizontal to vertical). Do not remove existing vegetation. Create a trench in the bank toe that is at least as deep as the height of your largest riprap stone (see illustration below).
2. Place a layer of filter fabric over on top of the exposed slope to prevent soil movement under the riprap. If filter fabric is used, it should be followed by a three inch thick layer of clean three fourths (3/4) inch crushed stone. Bury in filter fabric at the top of the riprap edge and at the base, extend it into the toe trench. If filter fabric is not used, a six inch layer of crushed stone ranging from three fourths to three (3/4 - 3") inches must be placed down. (Filter fabric is highly recommended because it protects the soil from being washed out from any gaps between the rocks.)
3. Immediately install the riprap layer. First place an anchoring row of large rocks in the trench at the toe of the bank. Riprap stones should then be hand-placed or very carefully dumped so that smaller stones fill the voids between larger ones. The riprap layer should be at least twice as thick as the average rock diameter.

Ensure that the riprap extends up the slope no more than two feet above the normal high water line.

1. Native trees and/or shrubs should be planted above the riprap. Vegetation provides habitat and can filter nutrients and pollutants from runoff, and helps stabilize the bank and secure the riprap. Planting non-native plants in the disturbed area is not permitted.
2. Disturbed soil above the riprap should be immediately stabilized with seed and hay mulch or permanently mulched.

Materials:

- Riprap: Purchase large angular stones from your local quarry or gravel pit. Do not take them from the shoreline (because they help prevent erosion) or from below the normal high water line (because they provide habitat for aquatic life).
- Filter fabric (also known as a geotextile) and available at most garden stores.
- Crushed stone may be purchased from your local quarry or gravel pit. Ask for washed stone only.
- Buffer plants can be purchased at local nurseries. See Lake Wise BMPs— *Live Staking and Planting and Maintaining Vegetation Areas*.



Riprap installation.

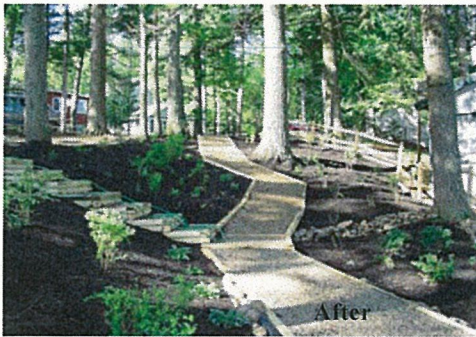
Vermont Lake Wise

Lake Property Owners, Lake Associations, Summer Camps, and State Parks

If you are interested in bringing the Lake Wise Program to your favorite lake, and/or would like to participate as a Lake Wise Leader, then please contact: Amy Picotte, at Amy.Picotte@state.vt.us or tel. 802-490-6128



Before



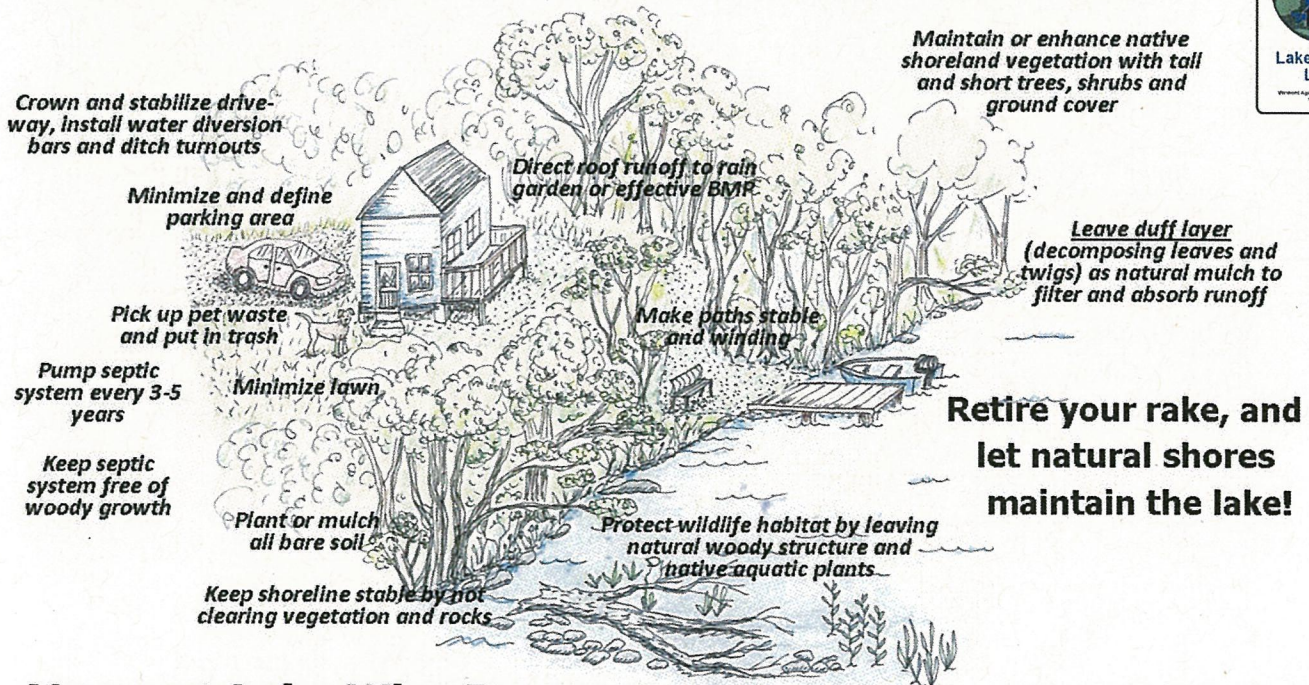
After

Lake Wise is a Vermont Agency of Natural Resources program that awards lake-friendly shoreland property. A property that earns the Lake Wise Award represents a “model” shoreland property. The Lake Wise Award certifies a property is well managed, using shoreland Best Management Practices, and is protecting the lake water quality and habitat.

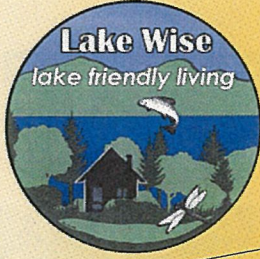
Lake Wise Leaders are local, volunteer Lake Wise contacts. A Leader’s job is to encourage shoreland owners to use better management practices and to earn the Lake Wise Award. Lake Wise Leaders conduct preliminary assessments of interested shoreland property owners on their lake to advise them of what needs to be done, if anything, before the official *Lake Wise Evaluator* is called out to assess the property.

Take advantage of free technical assistance through the Lake Wise Program and have your shoreland property assessed for controlling runoff and preventing erosion. The Lake Wise Program offers solutions - Best Management Practices - for managing shoreland property and making it lake-friendly for all. Most of the property improvements can be done by the landowners themselves. Learn how simple it is to live Lake Wisely!

This Property is Lake Wise! Typical of many Vermont lakeshore homes, this house was built too close to the lake to allow for the best standard of lake protection -- a 100 foot wide vegetated shore -- but fortunately, this landowner is using all the lake friendly practices below to protect the lake.



Retire your rake, and let natural shores maintain the lake!



Planting & Maintaining Vegetated Areas

Preventing erosion, stabilizing soils, and protecting lake habitat

Lake friendly living
means using lakeshore
BEST MANAGEMENT
PRACTICES

BMP

Planting and Maintaining
Vegetated Areas

STANDARDS

Shorefront

- Minimum of 15 feet width of vegetation along the shore
- Stable bank
- Clean runoff to lake
- Natural conditions, including healthy lake habitat

LAKE BENEFITS

Vegetated areas naturally stabilize the shore, filter and clean dirty runoff, maintain greater privacy, increase property values, enhance scenic beauty, prevent erosion, and allow for healthy habitat for fish, birds, and other wildlife species.

MATERIALS

- Compost and/or top soil.
- Spade shovel.
- Native plants representing flowering and fruiting plants, all size classes, and those specific to moisture and light needs of your site.

NOTE: As of 2011, it is illegal to use lawn fertilizers containing phosphorus. Additionally, no fertilizer can be applied to within 25 feet of the lake between October 15 and April 1st while the ground is frozen.

Planting & Maintaining Vegetated Areas

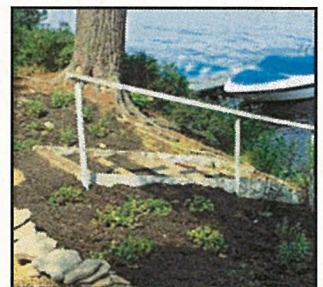
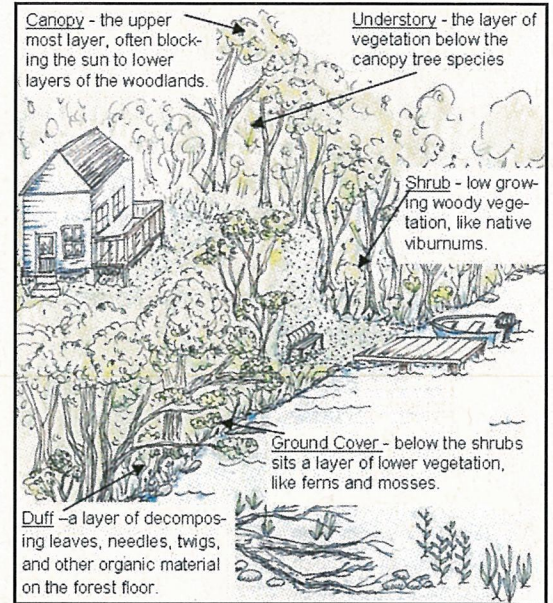
Description: A mix of trees, shrubs and unmown groundcover along the lakefront. Naturally vegetated lakeshores typically would have five tiers or layers of vegetation: canopy, understory, shrub, ground cover, and duff layer.

Purpose: Restore the shore with vegetation of different types (groundcover, shrubs and trees) to stabilize the bank and prevent erosion.

How to:

1. Plan out and use a path to access the lake (see BMP *Planning Pathways*). Then you will be able to allow native shrubs and trees to grow along the shore. Selectively prune out the species you don't want and encourage the ones you do.
2. To restore the shore, these suggestions may help:
 - Place angular stone (6-8 inch size) at the toe of the bank. Angular rocks lock in place better than rounded or flat stone, and larger rocks cause erosion by concentrating the wave and/or ice energy elsewhere. The stone should extend approximately six inches above the average summer water level so most of the waves hit the stone. Lay filter fabric between the rock and soil of the bank to prevent the washing out of soil from behind the rock.
 - Grade bank back to no steeper than 2:1 (two horizontal feet to every one vertical foot). An erosion control fabric might be needed to hold soil in place until the vegetation becomes established.
 - Plant a mixture of native groundcover, shrubs and trees and allow them to naturalize. Don't mow around the woody vegetation. Careful pruning can keep vistas open.

Note: Any work that occurs in the lake (below the mean lake level) requires a Shoreland Encroachment Permit. Also, see the BMP supplement, *Understanding the Shoreland Encroachment Permit*.



Planting & Maintaining Vegetated Areas

Preventing erosion, stabilizing soils, and protecting lake habitat

Choosing the Right Plants

Use native species.

Trees and shrubs that are native to the northeast are resistant to most diseases and insects and provide good food and habitat for wildlife. They are low maintenance and have the same landscape values of cultivated species. Many nurseries will carry at least some native species.

To be sure you are getting native species, you need to know the scientific (Latin) name. Often the same common name is used for several different plants.

The best clue to what will grow well on your lakeshore is to look at undeveloped stretches of the lake and observe what is growing there. If you own land uphill of the lake you can transplant some species down to the lakeshore.

The following three tables list trees, shrubs and groundcover plants that grow well on lakeshores in Vermont. For more options for using native species for lakeshore plantings, check out the booklet, [Native Vegetation for Lakeshores, Streamsidess, and Wetland Buffers](#), available on the Vermont Watershed Management Division's web site.

Redosier dogwood (*Cornus stolonifera*) is stunning in all seasons because of its beautiful red stems.



Keep it Vermont Native!

Many trees, shrubs and herbaceous plants used in landscaping are exotic or non-native species. A number of these plants have escaped from cultivations and threaten native species and diversity. In particular, avoid *rugosa* rose species, honeysuckles, and purple loosestrife. For a listing of species to avoid and for information on how to manage already established invasive species, visit the [Vermont Landowner's Guide Invasive Terrestrial Plant Management](#) at the Vermont Nature Conservancy's web site.

Trees	Soil Conditions	Mature Height	Aerial Spread	Comments
Red Maple (<i>Acer rubrum</i>)	Wet to dry	75-100 ft	50-75 ft	Bright red fall foliage, fast growing
Shadbush or Serviceberry (<i>Amelanchier canadensis</i>)	Drier soils	10-15 ft	8-10 ft	Lovely early spring flowers and fruits, (a favorite of birds), colorful foliage
Paper birch (<i>Betula papyrifera</i>)	Well-drained soil, tolerant of less well-drained situations	75+ ft	n/a	White attractive bark, small cones are good winter bird food
Green ash (<i>Fraxinus pennsylvanica</i>)	Moist, tolerant of periodic flooding	60-80 ft	35-50 ft	Relatively rapid growth, attractive branching
White pine (<i>Pinus strobus</i>)	Moderately well-drained, creates acidic soils	75-100 ft	20-40 ft	Long-lived evergreen, good for wildlife, little grows under mature trees
Red oak (<i>Quercus rubra</i>)	Drier soils	70-90 ft	60-75 ft	Grand tree with reddish-brown bark, dark leaves, good for wildlife
Northern white cedar	Moist, intolerant of acidic soils	25-50 ft	10-15 ft	Can be maintained as a hedge, easily shaped



Planting & Maintaining Vegetation Areas

Preventing erosion and stabilizing soils, and protecting lake habitat

Shrubs	Soil Conditions	Light Tolerance	Mature Height	Comments
American hazelnut (<i>Corylus americana</i>)	Drier soils	Adapted to shade but does well on an edge or more open situations	8-12 ft	Reddish and ornamental
Silky dogwood (<i>Cornus amomum</i>)	Wet to dry	Full sun but has fair shade tolerance	6-8 ft	Relatively rapid growth, good food and cover for birds
Red-osier dogwood (<i>Cornus stolonifera</i>)	Moist to wet	Fair shade tolerance	6-10 ft	Bright red stems that are especially distinct in winter, spreads rapidly by underground stems
Witch hazel (<i>Hamamelis virginiana</i>)	Moist	Shade tolerant	8-16 ft	Delicate clusters of yellow flowers in the fall after leaves fall off, good as an understory species in moist areas
Winterberry (<i>Ilex verticillata</i>)	Wet to moist	Full or partial sun	6-8 ft	Bright red berries persist into winter
Highbush or lowbush blueberry (<i>Vaccinium corymbosum</i> and <i>angustifolium</i>)	Acid, wet soils to drier conditions	Sun or shade	Up to 10 ft or 6-18 in.	Attractive form, edible berries
Nannyberry (<i>Viburnum lentago</i>)	Drier soils but tolerant of wet conditions	Sun or shade	Up to 20 ft	Spreads relatively aggressively, retains berries into late winter and thus good for birds
Groundcovers	Site Conditions	Height	Comments	
Cinnamon fern (<i>Osmunda cinnamomea</i>)	Wet soils, mostly shady	2-4 ft	Vase-shaped clumps, attractive fertile fronds	
Interrupted fern (<i>Osmunda claytonia</i>)	Wet to somewhat dry soils, mostly shady	2-3 ft	Vase-shaped clumps	
New England aster (<i>Aster novae-angliae</i>)	Fertile soil, adequate moisture, full sun	4 ft	Attractive dark purple late summer flowers, will spread by rhizomes	
Bunchberry (<i>Cornus canadensis</i>)	Cool and shady, adequate moisture, acid soil	6 in	Spreading groundcover of attractive leaves, white flowers, red berries	
Blue flag iris (<i>Iris versicolor</i>)	Wet soil, full sun	1-3 ft	Spreads well, avoid the invasive yellow iris	
Partridgeberry (<i>Mitchella repens</i>)	Shady, acid soils	1-2 in	Dark green attractive leaves, red berries, trailing plant	
Cardinal flower (<i>Lobelia cardinalis</i>)	Wet to moist soils, sun and shade	2-4 ft	Brilliant red flowers loved by hummingbirds	



Planting & Maintaining Vegetated Areas

Preventing erosion and stabilizing soils, and protecting lake habitat

Planting & Caring for a Vegetated Area

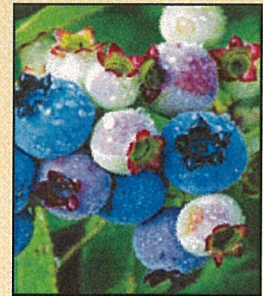
1. Early spring or fall are the optimum times to plant.
2. Dig a hole twice as big as the root ball, and partially fill the hole with existing soil. If the soil is poor, compost or topsoil can be mixed in.
3. Be sure the plant is placed in the hole so that the original soil level on the stem matches the new soil level.
4. Press the fill around the plant using your hands, not feet. If the roots are bare, carefully spread them out in a natural shape and gently press soil in around them.
5. Water but don't fertilize the plants at planting time. Continue to water often so that the soil remains moist for at least 6 weeks. If planting has occurred in the summer, plan on watering the plant every other day for 8 weeks.
6. Pruning should not occur until the plant has had one or two full growing seasons (with the exception of removal of broken branches). Pruning too early will weaken the plant. When pruning do so lightly so as not to stress the plant. Eventually you can prune regularly and selectively, keeping hedges low and encouraging trees to grow tall.
7. Make sure you always have plenty of young "replacement" trees on the way. Either allow saplings to grow naturally, or occasionally plant new small trees in your buffer.
8. **Do not mow** or otherwise maintain a lawn under your buffer's trees and shrubs. **The spongy duff layer of fallen or rotting plant material is critical to the water-cleansing function of a buffer.**
9. Fertilize plants with composted vegetation or manure rather than chemical fertilizer.
10. Leave dead, dying or down trees unless they threaten to fall on structures; they are important habitat for numerous species of birds. If a tree right on the lake bank is dying and needs to be removed, cut it in the winter and leave the roots and stump in place. Note that a tree fallen in the water makes great fish habitat, so it's best to leave them there.



When planting a "bare root" tree or shrub, spread the roots out carefully and fill in soil by hand, pressing gently but firmly to avoid leaving air holes. Mulch around the newly planted tree or shrub to keep competition down while it gets established. Don't pile up the mulch around the stem. The mulch should be shallow right at stem so that the correct ground level is maintained, otherwise the mulch can rot the stem.

A SWEET OPPORTUNITY FOR LANDOWNERS

The Federation of Vermont Lakes and Ponds (FOVLAP) **Buffers for Blue Lakes Program** encourages lake-shore owners to plant blueberries on their properties. Planting native blueberries and other native fruits is sure to provide you a sweet treat every year, plus colorful fall foliage.



You can choose from low bush, half-high and high-bush blueberry shrubs and plant them directly into your bank or add amended soil to encourage dense fruiting and vigor.

For a guide on choosing the right blueberries for your buffer visit the resources link at FOVLAP's web site: www.vermontlakes.org

