

# Vegetated Buffers on the Lakeshore

*How they Benefit You, Me, & the Bumble Bee*



*March 14, 2024*

**Sponsored by:**

Friends of Lake Winnecook  
Waldo County SWCD



**Presented by:**

Jennifer Jespersen, Ecological Instincts  
Andrea Stevens, Maine Lakes



# Friends of Lake Winnecook



[Watershed Protection Plan](#) [Lake Smart](#) [Membership](#) [Resources](#) [FOLW Board](#) [Our Store](#)



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To Preserve, Protect and Enhance the Beauty of  
**Lake Winnecook**

Website: [lakewinnecook.org](http://lakewinnecook.org)



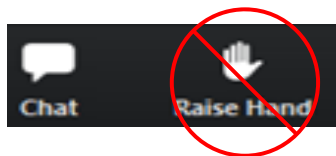
## 2024 FOLW Ice out Contest

2024 FOLW Ice-Out Contest is complete, Ice-Out has been called on March 11th! Please click on the link below to see the winner!

# Housekeeping



- All attendees are on mute with no video
- Use CHAT for general information to share with the whole group



- Use CHAT to ask questions for presenters (will be answered at the end of the presentation).

# Presenters



**Jennifer Jespersen, CLM**  
Principal & Senior Scientist  
Ecological Instincts



**Andrea Stevens**  
LakeSmart Program Manager  
Maine Lakes





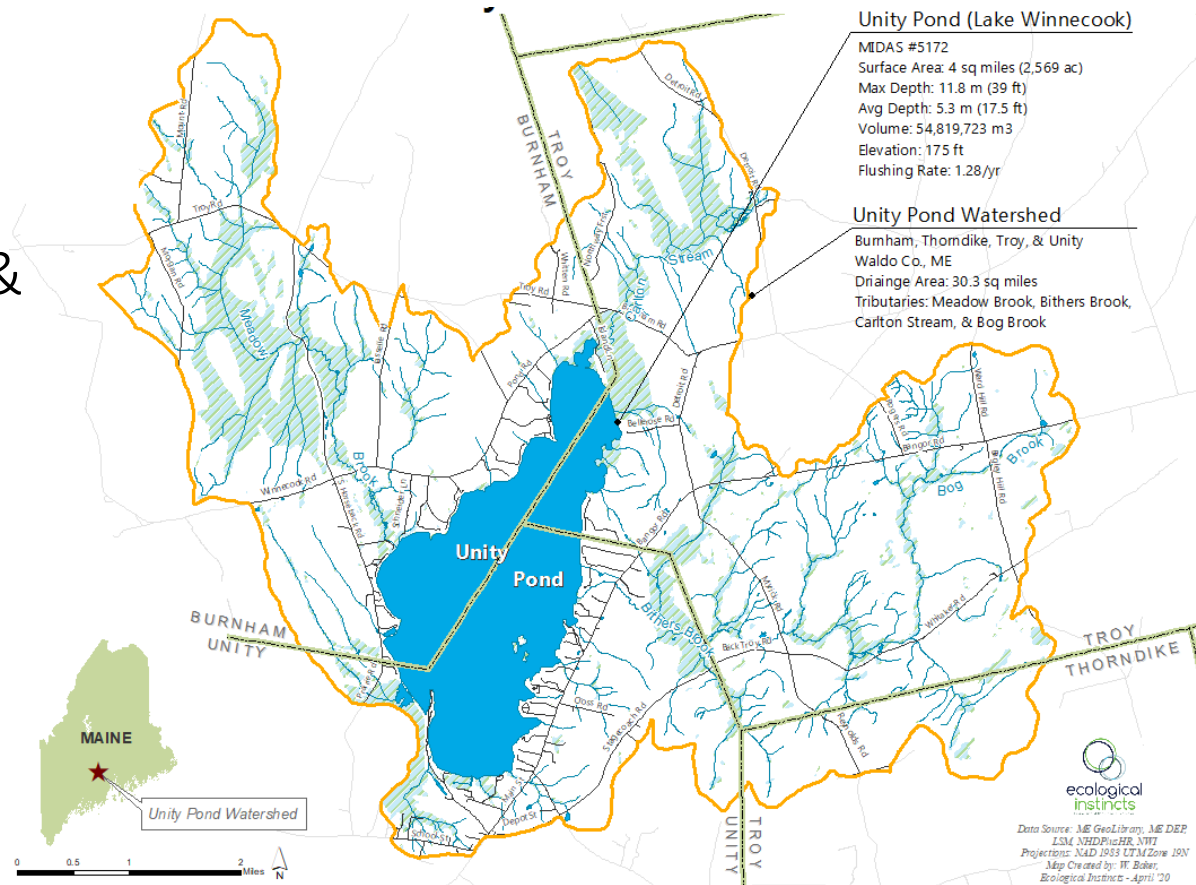
# OVERVIEW



- Unity Pond Case Study
- Benefits of Buffers
- Native Plants
- LakeSmart
- Building Resilient Buffers
- Questions

# UNITY POND WATERSHED

- ❖ Watershed- 30.3 mi<sup>2</sup>
- ❖ Lake- 2,569 acres
- ❖ Towns of Unity, Troy & Burnham

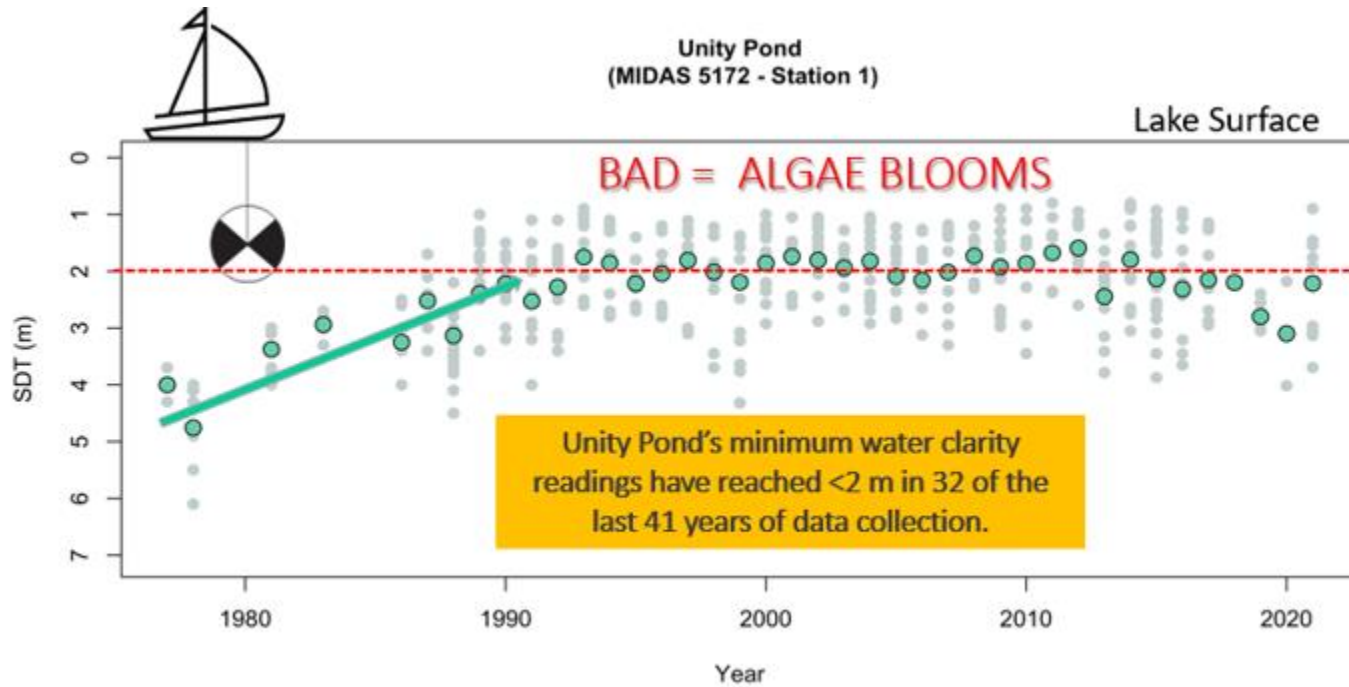


# THE TRENDS



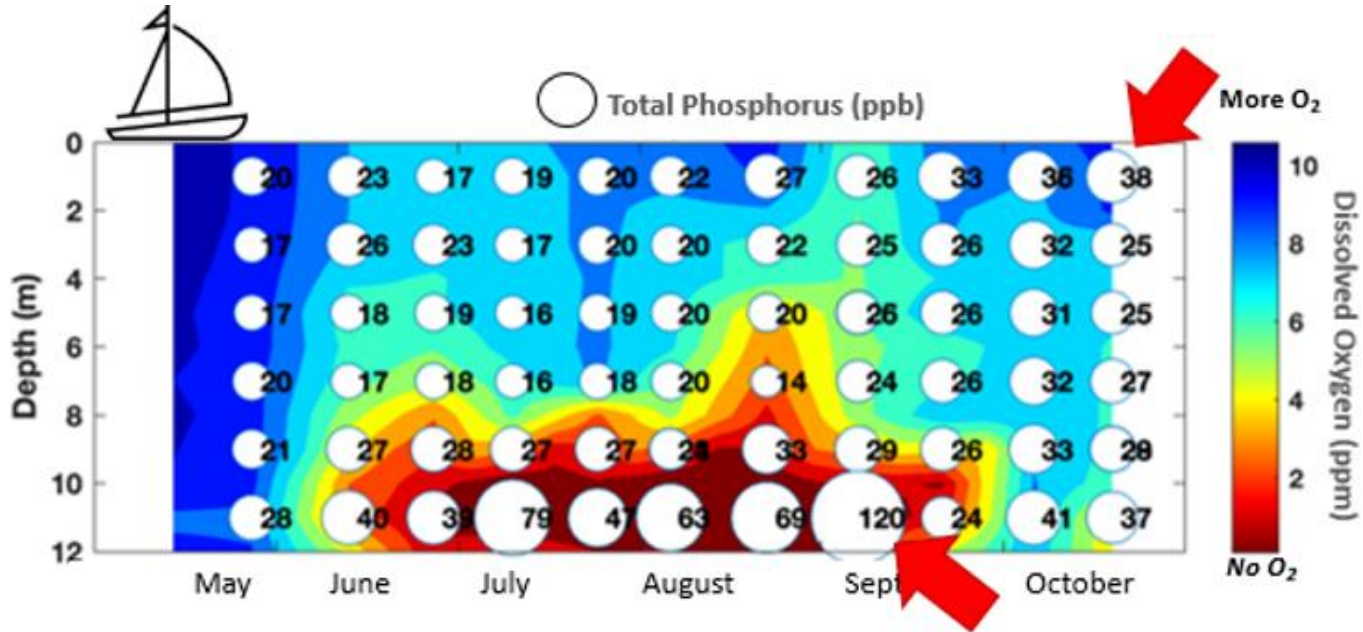
1. Annual nuisance algal blooms
2. Water clarity < 2 meters
3. Loss of dissolved oxygen during the summer
4. Increasing levels of phosphorus during the summer/fall

# WATER CLARITY

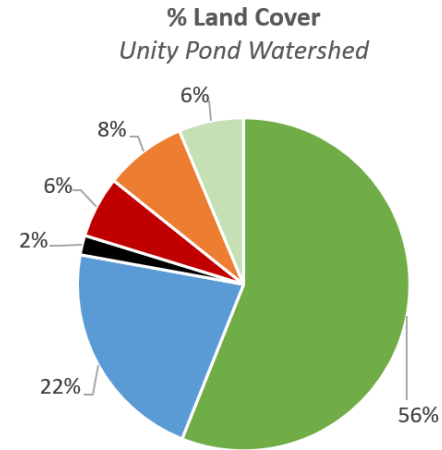
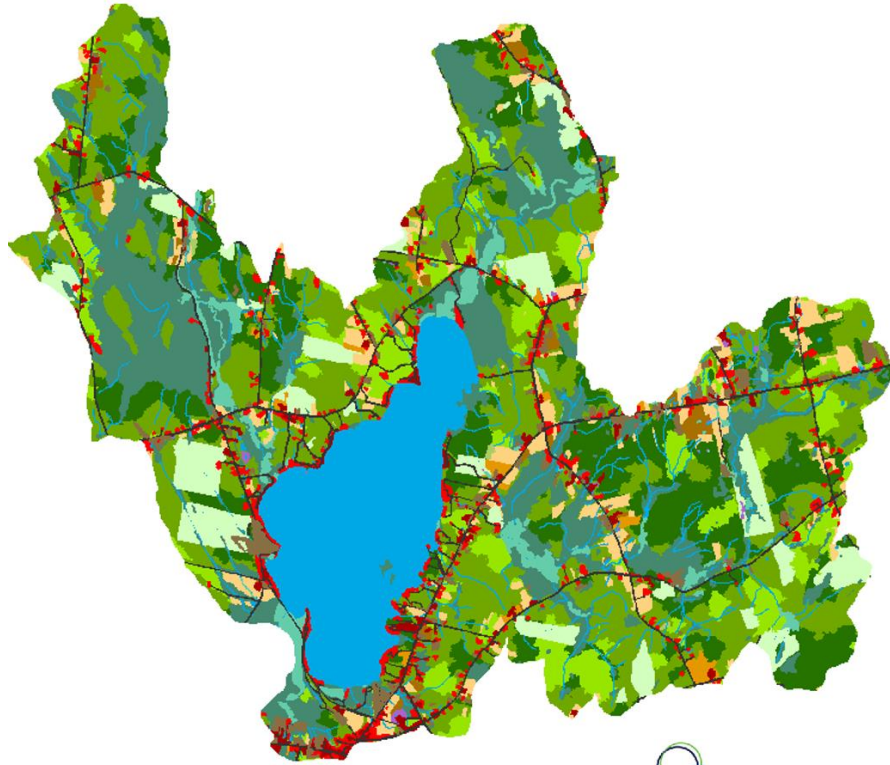




# DISSOLVED OXYGEN



# LAND COVER



- ❖ **62%** Forested
- ❖ **22%** Wetlands
- ❖ **2%** Roads
- ❖ **6%** Developed Land
- ❖ **8%** Agriculture

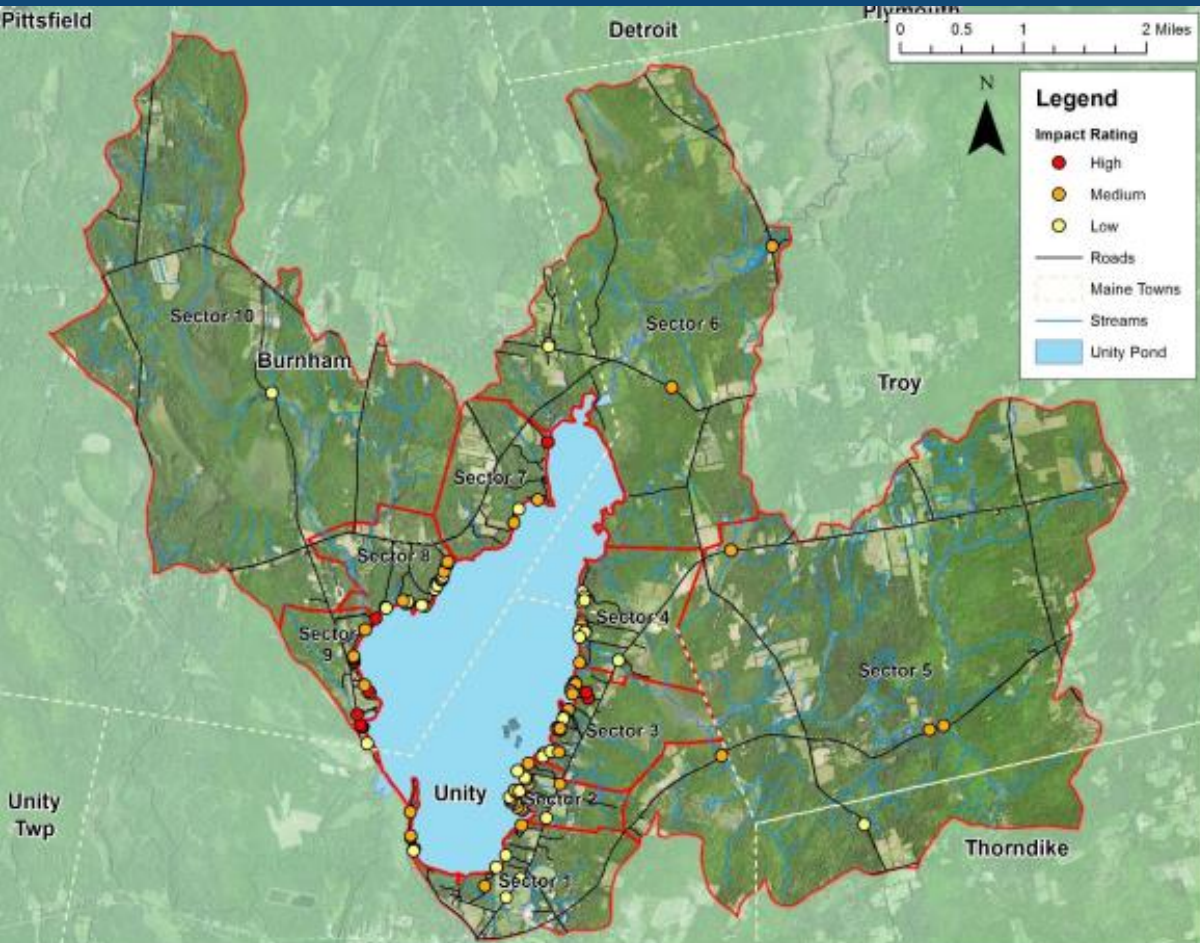
0 0.375 0.75 1.5 2.25 3 Miles



Source: ME Geolibary, NHDPlusHR, NWI,  
Ecological Instincts  
Projection: NAD 1983 UTM Zone 19N  
K. Goodwin, Ecological Instincts - July 2021



# WATERSHED SURVEY



- 109 Sites Identified
- 53% Residential
- 16 High Impact Sites



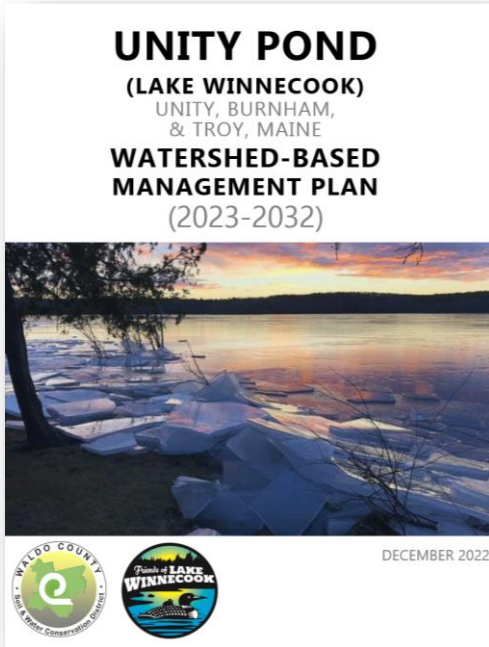
# WATERSHED SURVEY



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# WATERSHED-BASED MANAGEMENT PLAN



## GOAL:

Reduce P in the lake by 8 ppb (from 27 to 19 ppb)

- Shoreline Erosion (BUFFERS!)
- Gravel Road Erosion
- Septic Systems
- Agricultural Runoff
- Forest Roads & Logging Erosion

*\* FOLW is currently pursuing a Maine DEP 319 grant to begin addressing these sites through cost-share grants to road associations and camp owners.*

# BENEFITS OF PLANTING (& PROTECTING) BUFFERS



- Environmental
- Wildlife
- Other Benefits
- Examples of Buffer Plantings

# WHAT IS A BUFFER?

- ❖ Undisturbed (or restored) natural areas consisting of native vegetation and uncompacted soil that separate and BUFFER the lakeshore from developed land surfaces.
  - The transition zone between the lakeshore and human activity.
  - The last line of defense for preventing stormwater from the built environment from getting to the lake.

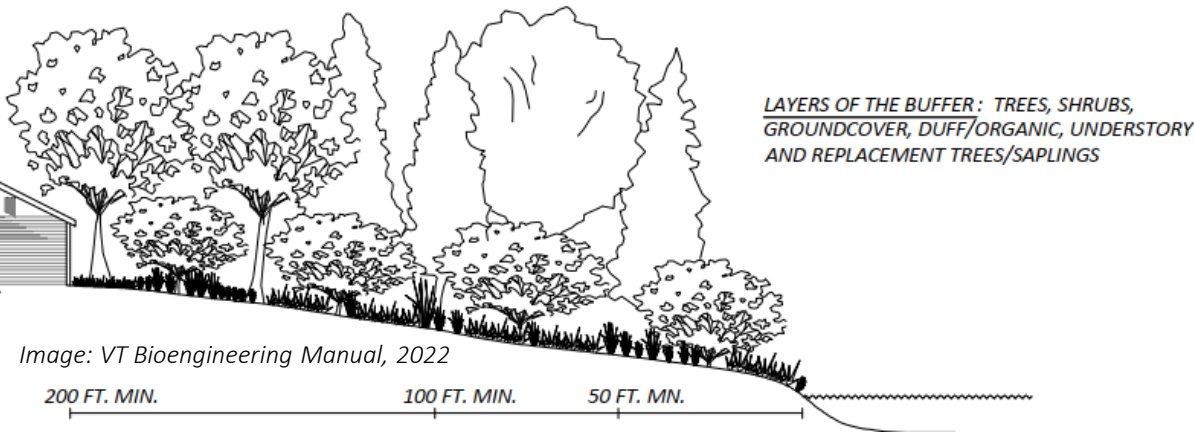
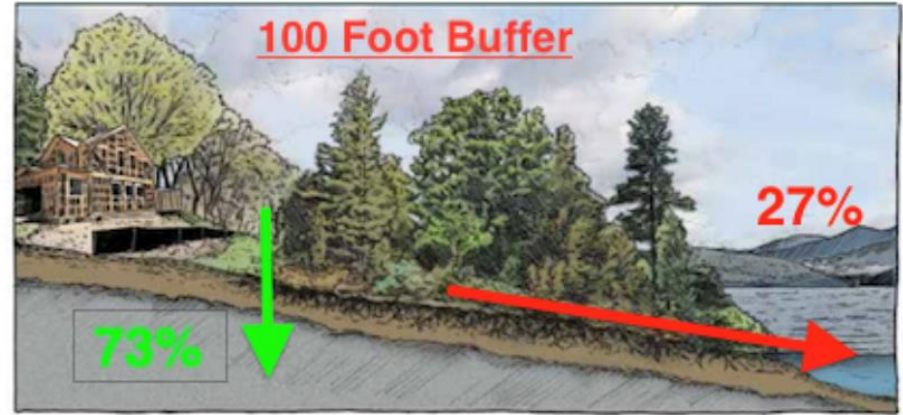
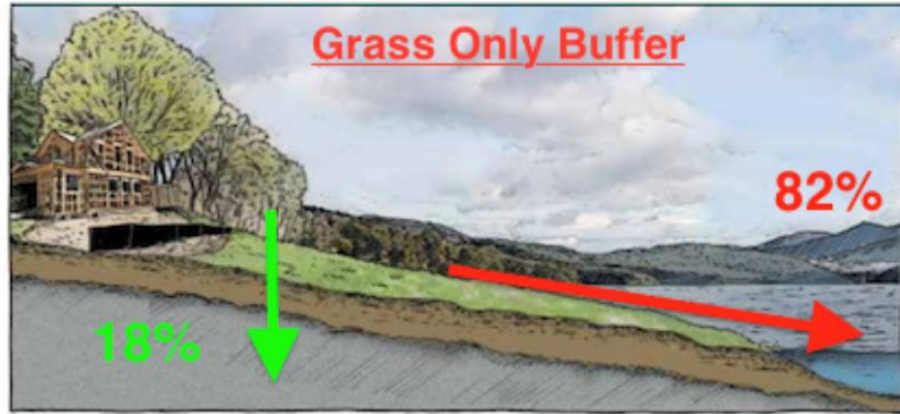


Image: VT Bioengineering Manual, 2022

# WHY BUFFER DEPTH MATTERS



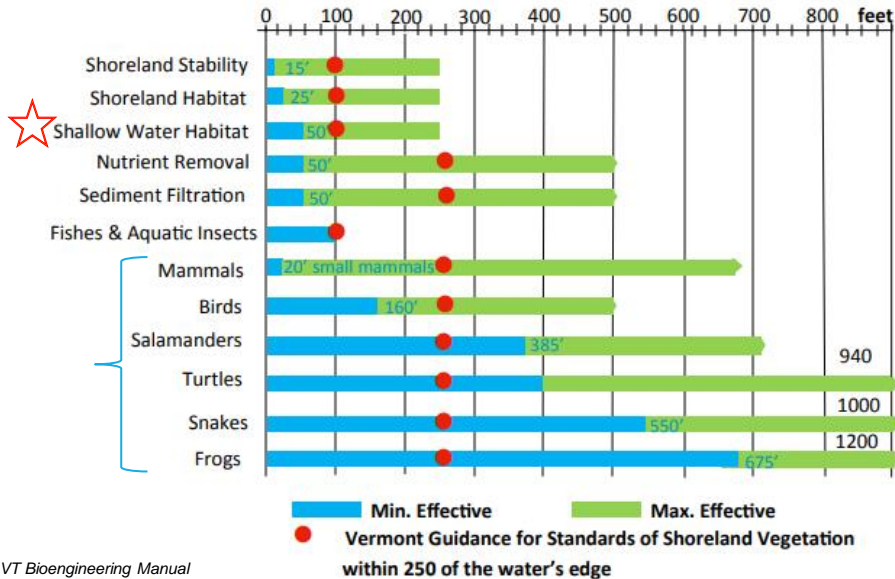
Adapted from: [LakeGeorgeAssociation.org](http://LakeGeorgeAssociation.org)



# BUFFER WIDTH CONT.

## Natural Lakeshore Vegetation:

- filters and cleans dirty runoff from uphill land uses
- provides shoreland and shallow-water habitat
- stabilizes banks
- increases lake aesthetics



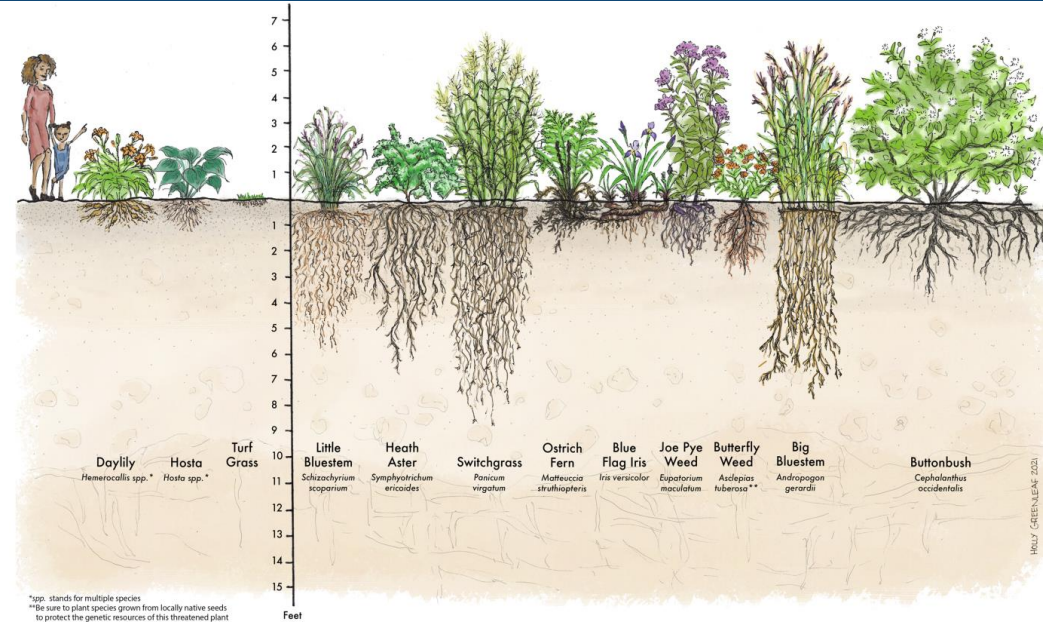
- Steeper slopes & shallower soils need wider buffers
- ANY BUFFER IS BETTER THAN NO BUFFER!

# ENVIRONMENTAL BENEFITS OF BUFFERS



- ❖ Acts as a sponge to soak up water, filter sediments & nutrients
- ❖ Helps recharge the groundwater
- ❖ Naturally resilient to changing climate
- ❖ Native plants are adapted to site conditions
- ❖ Provides shade for shallow water habitat
- ❖ ROOTS- stabilize slopes, infiltrate water, deflect impacts of waves and ice scour

# ROOTS & NATIVE PLANTS



- ✓ Adapted to regional rainfall
- ✓ Adapted to dry and wet/immersed locations
- ✓ Deeper roots for drought tolerance/less irrigation
- ✓ Deep roots provide more infiltration & soil stabilization

# BENEFITS TO WILDLIFE



*Photo: Denis A. Doucette*

Buffers provide **habitat for native wildlife** that spend all or some part of their life cycle in the water.

- Dragonflies & damselflies use trees as refuge while transforming from their aquatic phase into their adult phase



# BENEFITS TO WILDLIFE



Photo: Freshwaters Illustrated



Photo: Alamy.com

- Lawns & lack of buffers reduce food supply for fish
- Up to 42% of freshwater fish protein comes from insects dropped into the water from native plants
- Overhanging plants help moderate temperature in shallow areas and provide shading, refuge, and a food source

# BENEFITS TO WILDLIFE (FOOD SOURCE)



Photo: Maryland Biodiversity Project



Photo: Nature Friend Magazine

- 96% of birds depend entirely on insect protein to feed their young
- Chickadees make 146 trips/day to feed their young
- Insects, mammals, birds depend on berries, nuts & seeds provided by native plants

# FOOD SOURCES



Photo: [strawberryplants.org](http://strawberryplants.org)

- Pollinators (bees, butterflies) are much more likely to forage on the nectar of native plants.
- Thoughtful landscaping can help maintain biodiversity by selecting natives that bear fruit or seeds at different times of the year.

# OTHER BENEFITS



*Photo: VT Lake Wise Program*

- Privacy & sound barrier
- Aesthetically pleasing & improved recreational value
- Low maintenance & low cost
- Improve economic value of shoreline property



# TREES & LOW GROWING PLANTS



Trees may be the **MOST** important part of a riparian buffer

- Provide greatest amount of shading
- Intercept rainfall/dampen erosive rain energy
- Provide habitat structure & food for the littoral zone
- Stabilize the shoreline

# NATIVE PLANTS



*Photo: Maine Audubon*

- ❖ Occur naturally in a particular region without human intervention
- ❖ Have developed over hundreds of thousands of years
- ❖ Part of a natural system of plants and wildlife.
  - Choose natives over ornamentals!

# NON-NATIVE & INVASIVE PLANTS



*Purple Loosestrife*



*Japanese Knotweed*



*Common Reed (Phragmites)*

- ❖ Outcompete native species
- ❖ Not as beneficial to wildlife as food or habitat
- ❖ Make soil susceptible to erosion
- ❖ Prolific seeders- difficult to manage once established



# NATIVE PLANT RESOURCES

**LAKES**  
*like less lawn*

Photo by Mark Hunt

## Common Shrubs of Central Maine Shorelines

**Sue Gawler**  
and  
**Jack Bouchard**

### HARDY PLANTS FOR THE LAKESHORE

Canopy	<b>Northern Red Oak</b> <i>Quercus rubra</i> ☼☼☼	<b>Red Maple</b> <i>Acer rubrum</i> ☼☼☼☼	<b>Yellow Birch</b> <i>Betula alleghaniensis</i> ☼☼☼☼	<b>Balsam Fir</b> <i>Abies balsamea</i> ☼☼☼☼		
	Small Trees	<b>Shadbush</b> <i>Amelanchier canadensis</i> ☼☼☼☼	<b>Striped Maple</b> <i>Acer pennsylvanicum</i> ☼☼☼	<b>Pussy Willow</b> <i>Salix discolor</i> ☼☼☼☼	<b>Common Witch-hazel</b> <i>Hamamelis virginiana</i> ☼☼☼	
		Shrubs	<b>Highbush Blueberry</b> <i>Vaccinium corymbosum</i> ☼☼☼☼☼☼	<b>Redosier Dogwood</b> <i>Cornus sericea</i> ☼☼☼☼	<b>Common Winterberry</b> <i>Ilex verticillata</i> ☼☼☼☼	<b>Buttonbush</b> <i>Cephalanthus occidentalis</i> ☼☼☼☼
			<b>Black Chokeberry</b> <i>Aronia melanocarpa</i> ☼☼☼☼	<b>Bog Rosemary</b> <i>Andromeda polifolia</i> ☼☼☼☼	<b>Summer sweet</b> <i>Clethra alnifolia</i> ☼☼☼☼	<b>Juniper*</b> <i>Juniperus spp.</i> ☼☼☼☼☼☼
Ground Cover			<b>Bunchberry</b> <i>Cornus canadensis</i> ☼☼	<b>Ferns **</b> Many different species ☼☼☼☼☼☼	<b>Lowbush Blueberry</b> <i>Vaccinium angustifolium</i> ☼☼☼☼	<b>Bearberry</b> <i>Arctostaphylos uva-ursi</i> ☼☼☼
	<p>*J. communis selections: <i>compressa</i>, <i>Coreiagan</i>, <i>effuse</i>, <i>green carpet</i>, <i>repanda</i>, "AmiDak" (Blueberry delight), <i>copper delight</i>, <i>J. horizontalis</i> selections: <i>Bar Harbor</i>, <i>mottled lobe</i>, <i>blue rug</i>, <i>lime glow</i>, <i>Andromeda</i>, <i>blue chip</i>, <i>blue prince</i>, <i>hugues</i>, <i>Prince of Wales</i>, <i>tree life</i> **Christmas, cinnamon, hayscented, interrupted, lady, long beech, maidenhair, marginal wood, ostrich, royal, sensitive, spinulose wood</p> <p>☼ Full Sun   ☼☼ Partial Sun/Shade   ☼☼☼ Full Shade   ☼☼☼☼ Wet   ☼☼☼☼☼ Moderate   ☼☼☼☼☼☼ Dry   ☼☼☼☼☼☼ Wildlife Friendly</p>					

Photo Credits: Sue Gawler and Jack Bouchard (9, 10, 13, 14, 15, 17, 18, 23, 24, 25, 30, 31, 37), Mark H. Brand (1, 2, 3, 4, 7, 11, 12, 21, 24, 25, 29, 36, 38), Can Stock Photo, Mikep3(5), @reg346(2), LiannM (14), demann (22), starover (34), patgrover (35), Gary Fish (32, 33), Julie Makin (8), Stephanie Brunstage (20), Phyllis Weyand (6), Pete Dzok (19). Full photo credits listed at [lakes.me/protect](https://lakes.me/protect).

Maine DEP: <https://www.maine.gov/dep/land/watershed/materials.html>

Maine Lakes: [lakes.me/protect](https://lakes.me/protect)





# SUPER SIMPLE BUFFER SOLUTIONS



## ESTABLISH A NO MOW ZONE

Designate areas as low or no mow zones and restrict lawn solely to pathway areas (“mow where you go”) helps protect the shoreline and dissipates stormwater runoff.



## PLANT WILDFLOWER SEEDS

Overseed shoreline areas with a native wildflower seed mix for a bounty of color from spring through fall and reap the benefits of aesthetics and improved wildlife habitat.

# INSPIRATION #1



- ❖ Designate areas for walking paths & common areas
- ❖ Blueberry sod for stabilizing bare soil
- ❖ Erosion Control mix for walking paths



# INSPIRATION #2

**BEFORE**



**AFTER**





# INSPIRATION #3



**LACK OF BUFFER**



**NATIVE PLANTS & ECM**



# INSPIRATION #4



- ❖ Coir logs for terracing
- ❖ Blueberry sod for stabilizing bank
- ❖ Erosion Control Mix for covering bare soil



# INSPIRATION #5



- ❖ Coir logs for terracing
- ❖ Native shrubs & trees for stabilizing bank
- ❖ Superhumus for stabilizing bare soil
- ❖ Rocks for supporting coir logs



# INSPIRATION #6



**BEFORE**



**AFTER**

- ❖ Native Plants  
(juniper, sweet fern, bee balm)
- ❖ Erosion Control Mix



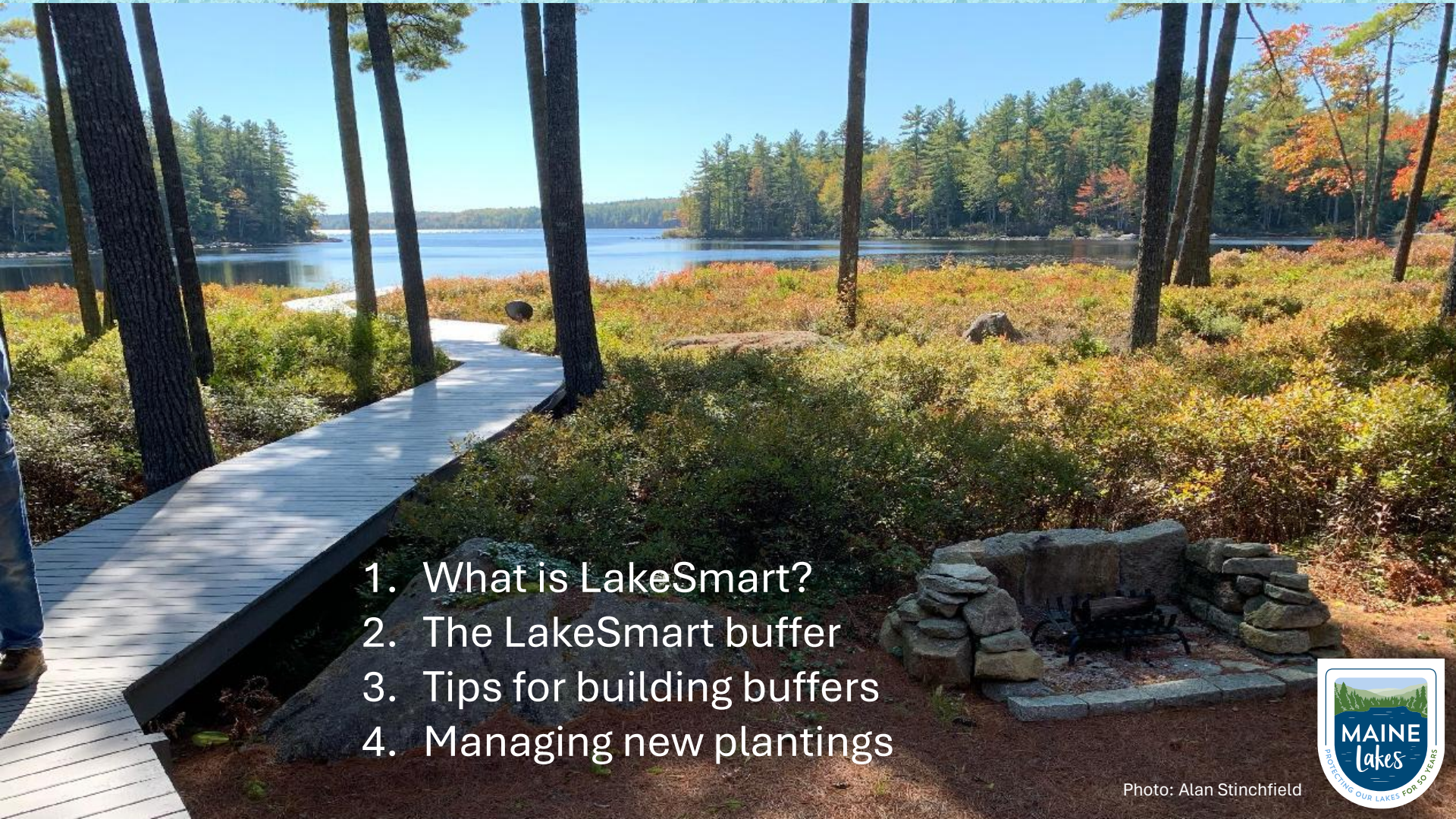
- 
1. What is LakeSmart?
  2. The LakeSmart buffer
  3. Tips for building buffers
  4. Managing new plantings

Photo: Alan Stinchfield





# WHAT IS LAKESMART?

ANDREA STEVENS, LAKESMART MANAGER

- Educates shoreland homeowners
- Evaluates water quality standards
- Recommends BMPs
- Volunteer-driven
- Non-regulatory, voluntary, confidential, and free!

Photo: Whitney Baker

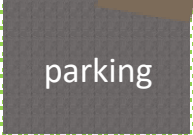




1. Driveway/Parking

driveway

2. Structures



parking

development footprint

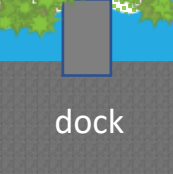
3. Yard



footpath

5. Shoreline Buffer

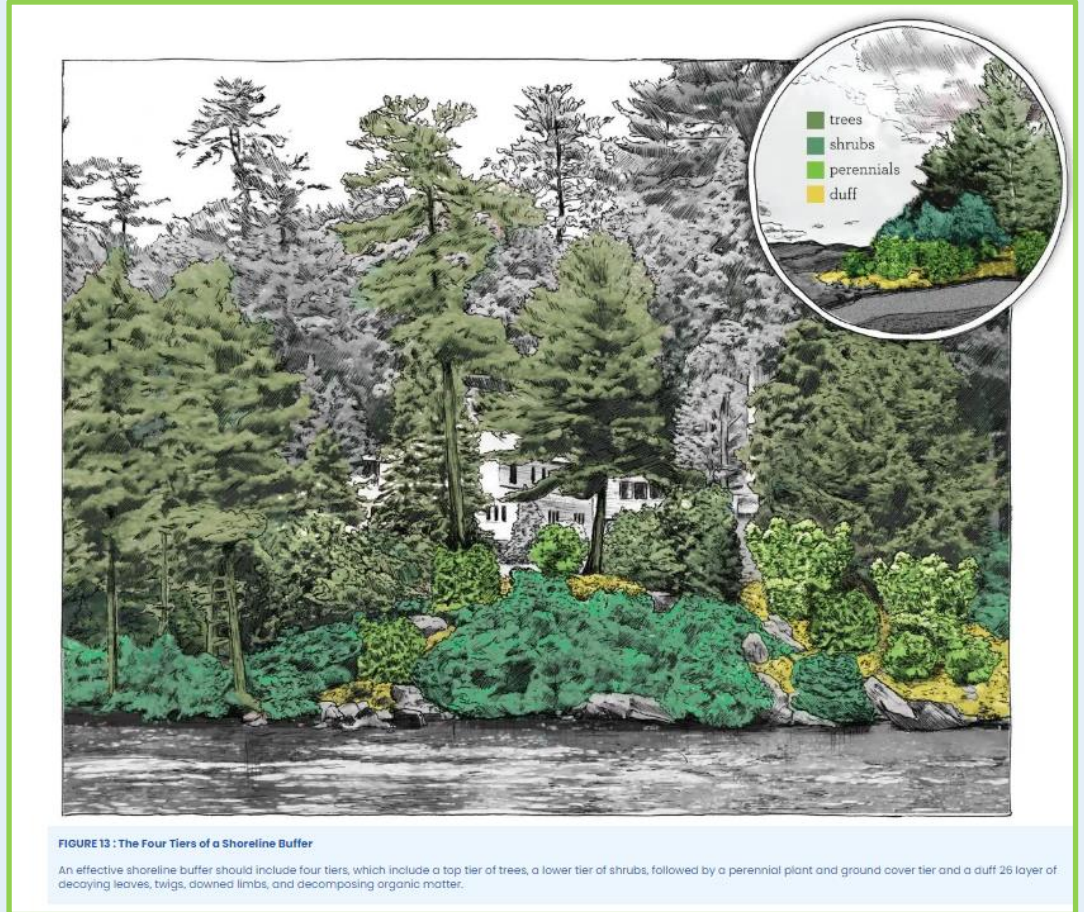
4. Shoreline



dock

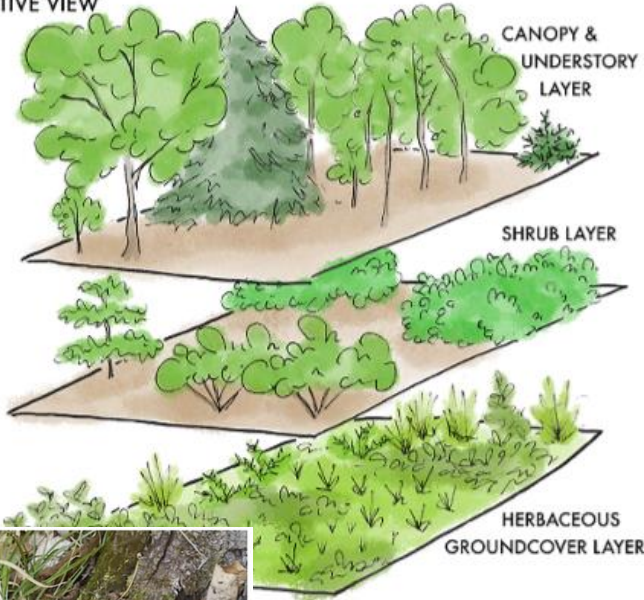
# THE LAKESMART BUFFER

1. Depth
2. Slope
3. Layers
4. Breaks
5. Ground Surface
6. Erosion





## MULTI-LAYERED BUFFER PLANTING PERSPECTIVE VIEW



Vermont Bioengineering Manual  
Vermont Agency of Natural Resources  
p.25



Mowed  
Grass

Wildflowers

Grasses and  
Sedges

Shrubs

Trees

# Mowed Grass vs. Native Root Systems

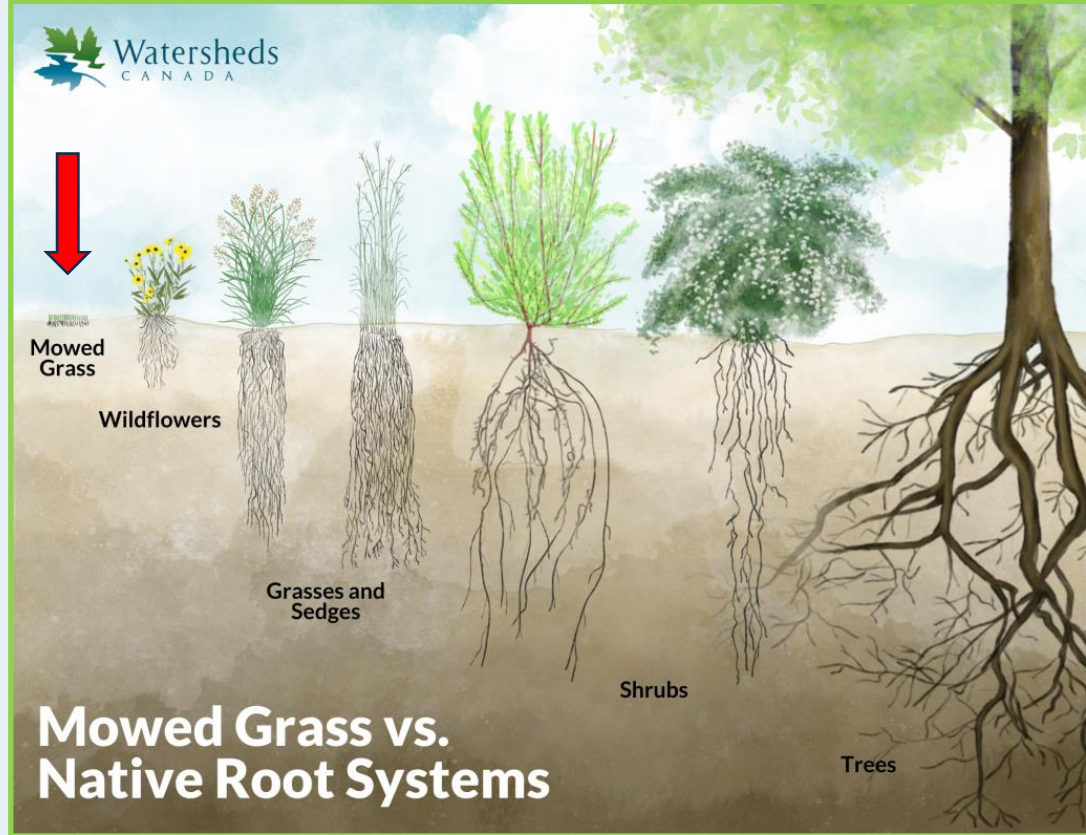






Photo: Caröline Murray





Photo: Sue Carrington







# TIPS FOR BUILDING A BUFFER

## 1. Identify goals

- Erosion control, infiltration, nutrient removal – protective of lake
- Mimic nature
- Wildlife food and shelter
- Low maintenance
- Balance nature and recreation
- Frame views of lake





## 2. Get to know your shoreland

### Soil Textures



West-facing shoreline with afternoon sun

Upland (dry)

Transition (moist)

Wetland Margin (wet)

Pl@ntNet



### 3. Selecting Native Plants: Right Plant, Right Place

Native Plant Trust Garden Plant Finder

<https://plantfinder.nativeplanttrust.org/Plant-Search>

Filters by tree, shrub, groundcover, sun exposure, soil moisture, wildlife attracted, flower and fruit color, fall foliage, growth habit (compact, spreading), *ecoregion*.

Maine Audubon Native Plant Finder

<https://mainenativeplants.org/>

A Guide to Healthy Lakes Using Lakeshore Landscaping

<https://dec.vermont.gov/watershed/lakes-ponds/lakeshores-lake-wise/resources>

## 4. Shrubs as a foundation for your buffer



**Black Chokeberry**

*Aronia melanocarpa*

Photo: CapeCodNativePlants.org

(Association to Preserve Cape Cod)

Good for soil  
stabilization

Birds attracted to berries

Leaves turn red in fall

Grows in saturated  
wetlands to dry sandy  
soils

Forms colonies





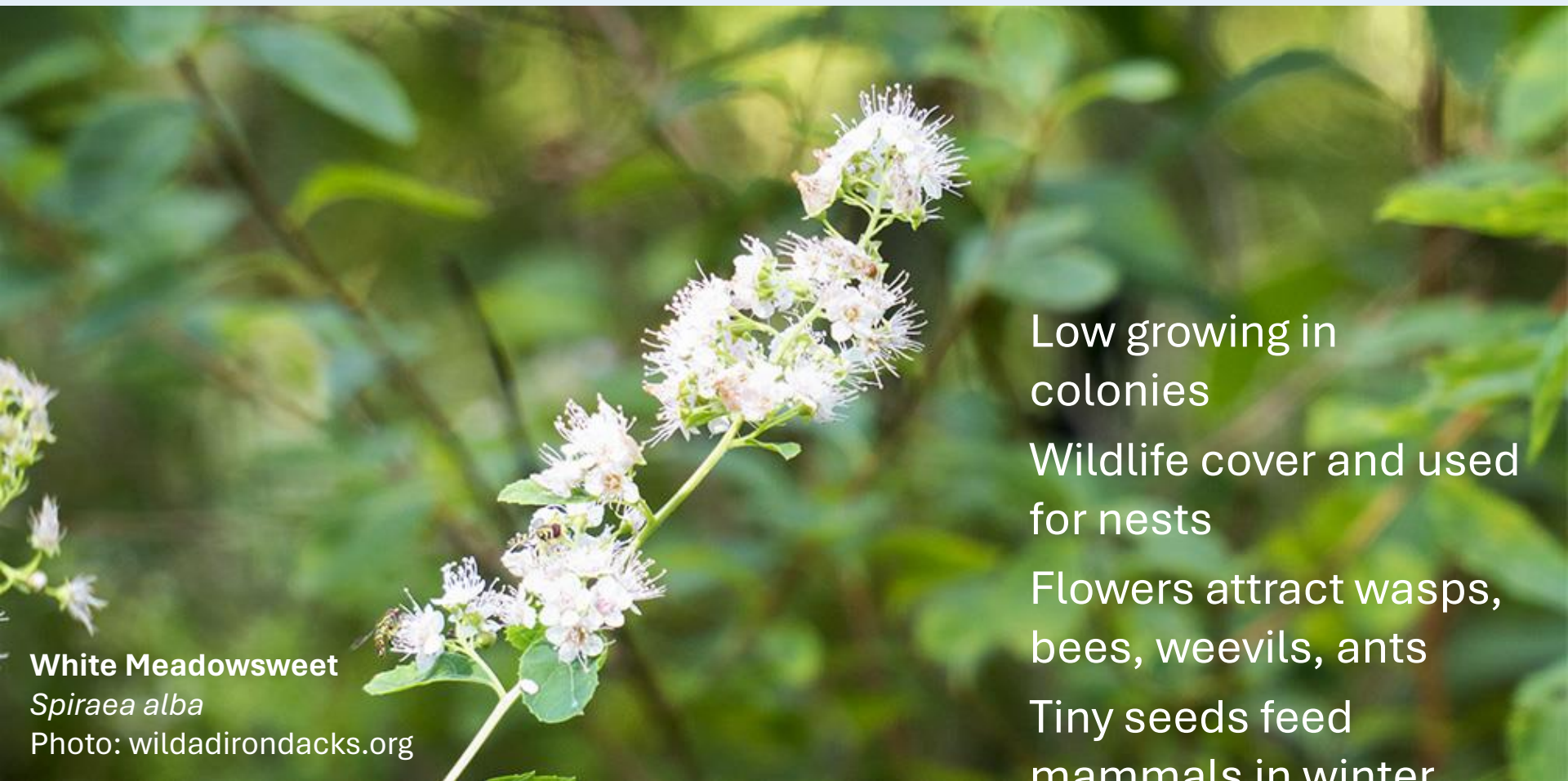
**Shadbush or Serviceberry**

*Amelanchier canadensis*

Photos: CapeCodNativePlants.org  
(Association to Preserve Cape Cod)

- Early spring flowers
- Host to more than 100 butterfly/moth caterpillars
- Pollinated by hummingbirds, bees
- Songbirds feed on berries





**White Meadowsweet**

*Spiraea alba*

Photo: wildadironacks.org

Low growing in colonies

Wildlife cover and used for nests

Flowers attract wasps, bees, weevils, ants

Tiny seeds feed mammals in winter





**Mapleleaf Viburnum**  
*Viburnum acerifolium*  
Photo: Gary Flewless

Cover for ground nesting birds  
Red/purple leaves in fall  
Birds like bluish fleshy fruit  
Larval host to many butterflies  
and moths







**Highbush Blueberry**

*Vaccinium corymbosum*

Larval host to more  
than 200 moth and  
butterfly species

Blueberries for  
wildlife and people!

## Sweet Pepperbush

*Clethra alnifolia*

Photo: CapeCodNativePlants.org

Association to Preserve Cape Cod

Fragrant flowers

Pollinated by butterflies,  
bees, hummingbirds

Seed for winter birds

Multi-stemmed







**Winterberry**  
*Ilex verticillata*

Small flowers pollinated by bees  
Bright red berries remain into  
winter for birds





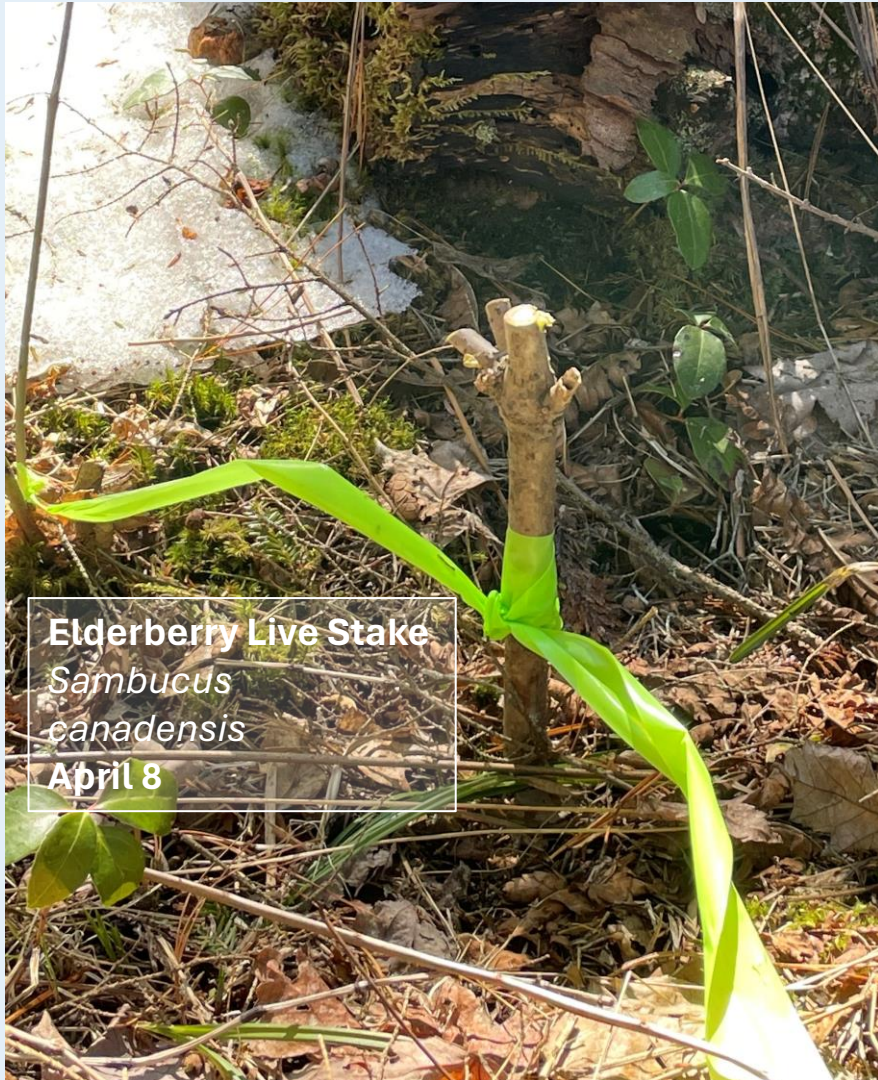
**Buttonbush**

*Cephalanthus occidentalis*

Spherical flowers attract  
butterflies, honey bees,  
bumble bees

Wetland tolerant





Elderberry Live Stake  
*Sambucus*  
*canadensis*  
April 8



Elderberry  
Live Stake  
May 16



## 5. Fill in your buffer with ground cover

### **Bearberry (shrub)**

part sun/shade (dry)

### **Pennsylvania Sedge**

part sun/shade (dry/medium)

### **Sweet Fern**

sun/part sun (dry/medium)

### **Bunchberry**

Shade (dry/medium/wet)

### **Foam Flower**

part sun/shade (medium)

### **Maidenhair Fern**

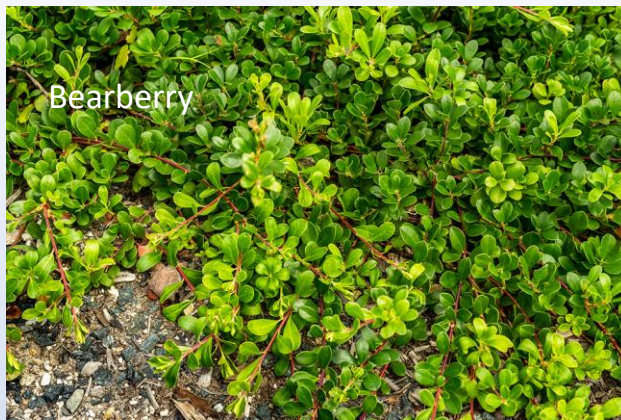
part sun/shade (medium)

### **Blue Iris**

sun/part sun (medium/wet)

### **Royal Fern**

sun/part sun/shade (medium/wet)



Bearberry, Foam Flower, Blue Iris photos by Martha Moss, courtesy of Native Gardens of Blue Hill. Royal Fern photo by R.H. Mohlenbrock, USDA SCS, 1989, Midwest Wetland Flora. USDA-NRCS Plants Database.

# WHEN TO PLANT and HOW TO MANAGE and MONITOR A BUFFER

- Before planting, contact your local Code Enforcement Officer about permitting requirements.
- Plant in Spring or early Fall
- Mulch and water regularly
- If plants aren't doing well, add others that are
- Ensure roots not exposed
- Let plants spread and colonize
- Welcome native “volunteers”





# QUESTIONS?

## **Jen Jespersen**

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Photo: Sue Carrington