
Healthy Forests,
Healthy Lakes
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NH
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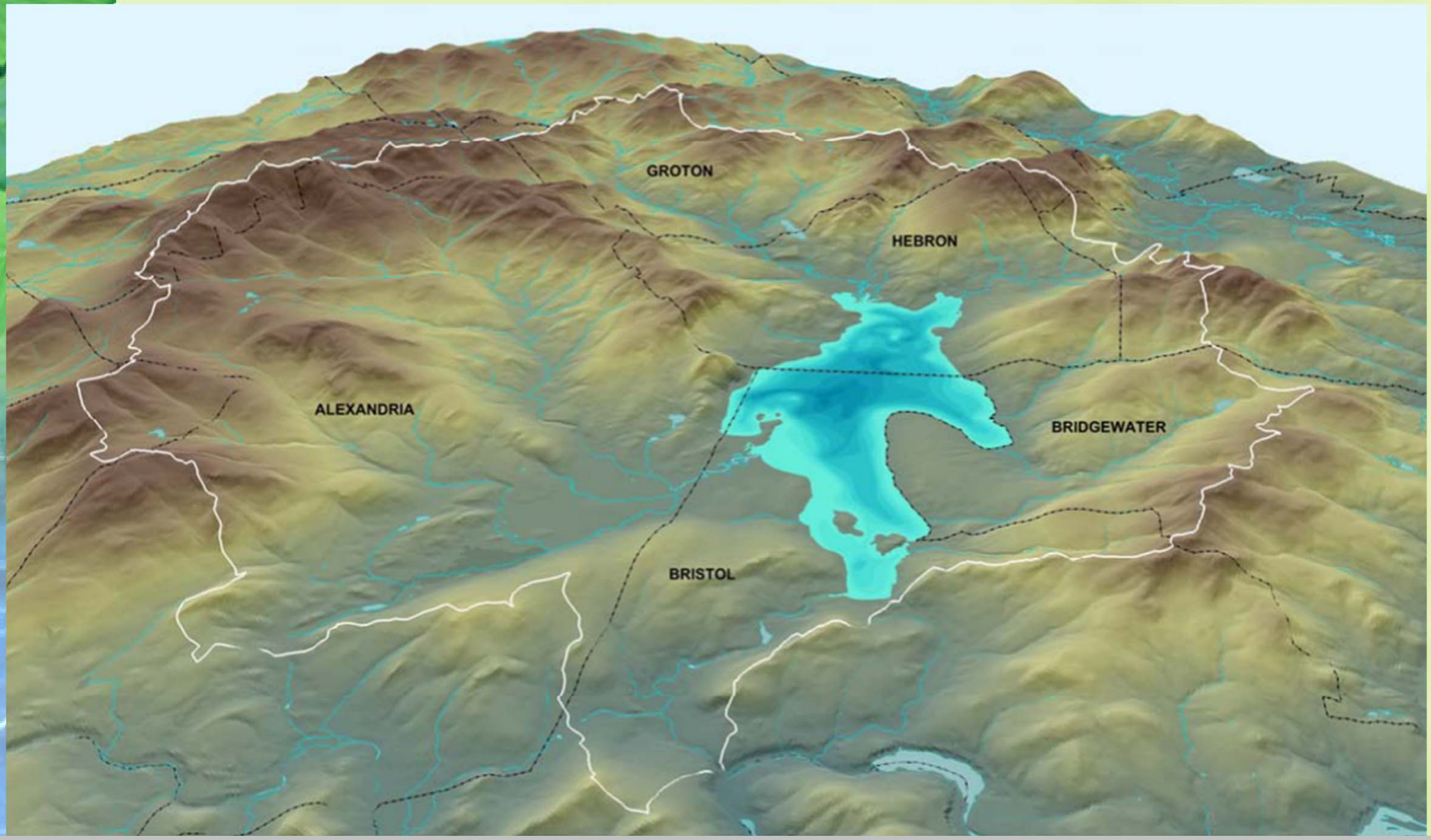
LAKE AGING (EUTROPHICATION)

- OLIGOTROPHIC
  - Sparse Plants
  - Low Algae
  - Clear Waters
  - High Oxygen Throughout
  - Rocky/Sandy Bottom
  - Cold Water Fishery Present

- EUTROPHIC
  - Abundant Plants
  - High Algae / Blooms
  - Turbid Waters
  - Low to No Oxygen in Lower Waters
  - Mucky Bottom
  - Cold Water Fishery Absent

- MESOTROPHIC

Newfound Lake Watershed



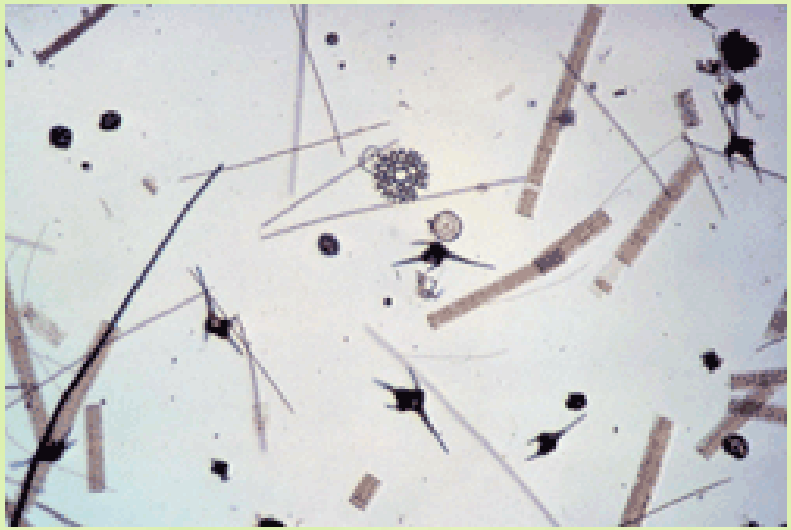
Source: Society for the Protection of NH Forests


Carving Up the Landscape
Courtesy of UCONN Cooperative Extension

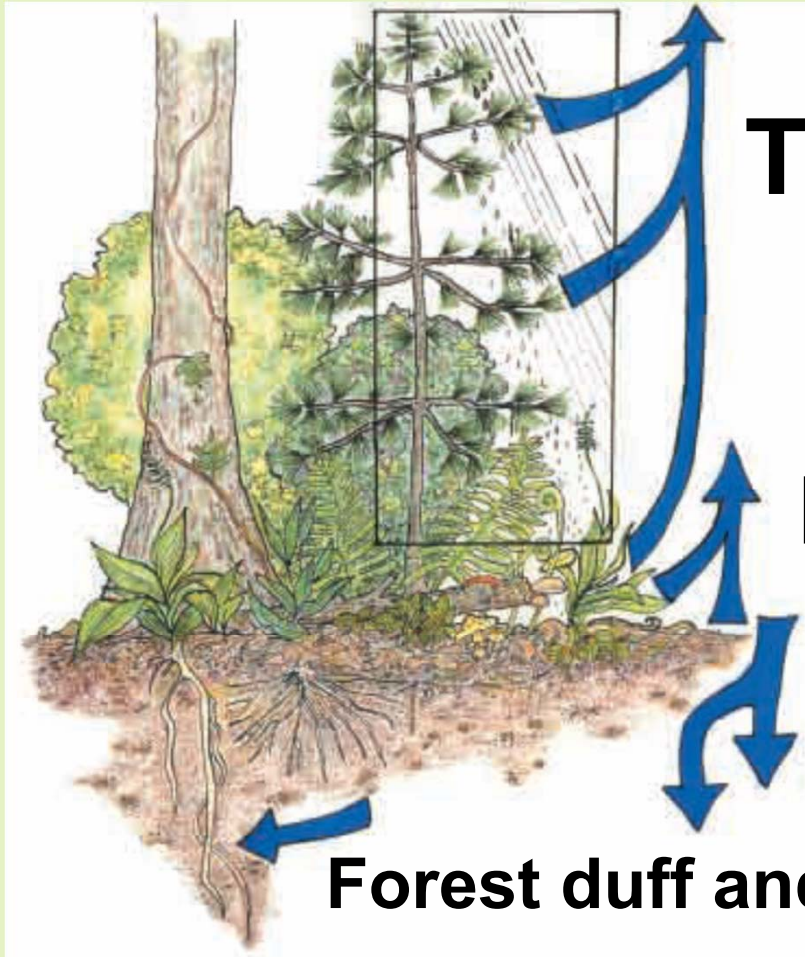
Phosphorus and Algal Growth

Phosphorus

- Limiting Nutrient for Most Fresh Waters
- Tend to be “sticky” so is transported by sediments and other matter



Importance of Vegetation



Transpiration

Evaporation

Infiltration through forest duff

Forest duff and soils act as a “sponge”

Roots stabilize soils preventing erosion and allow plants to pump up water back into the atmosphere (transpiration)

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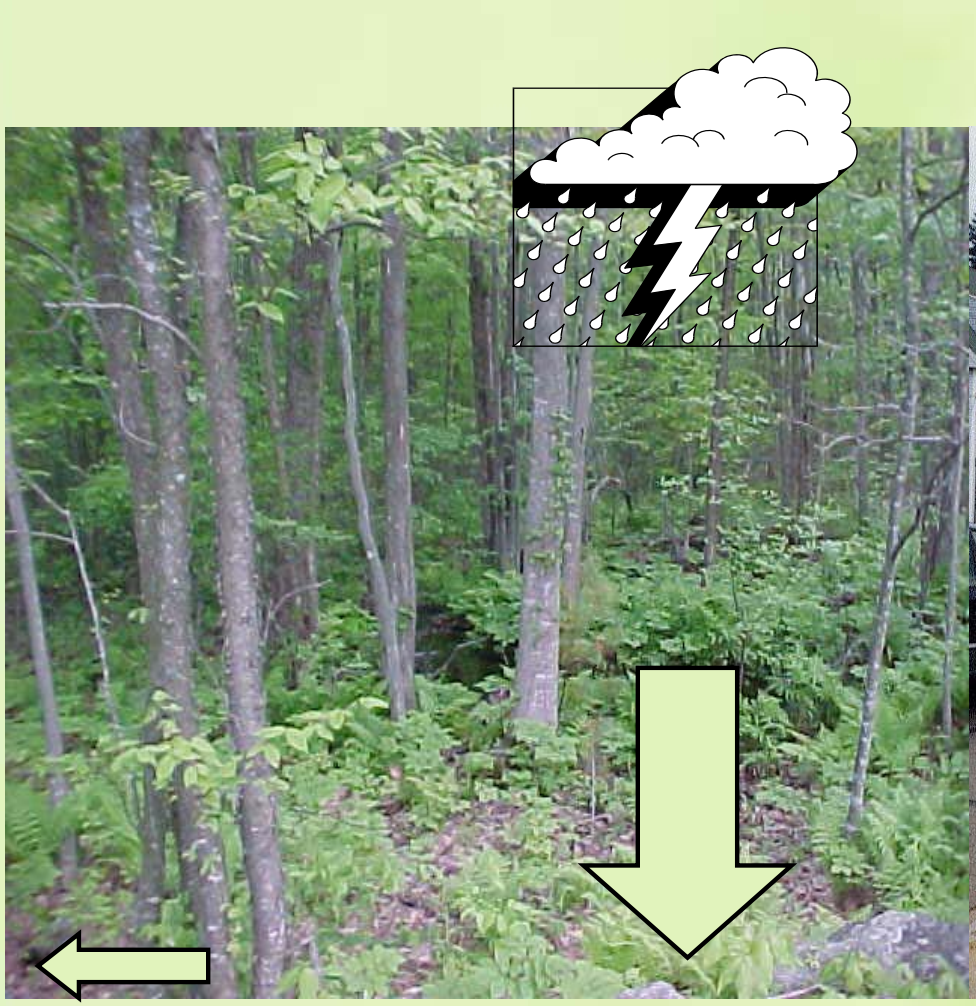
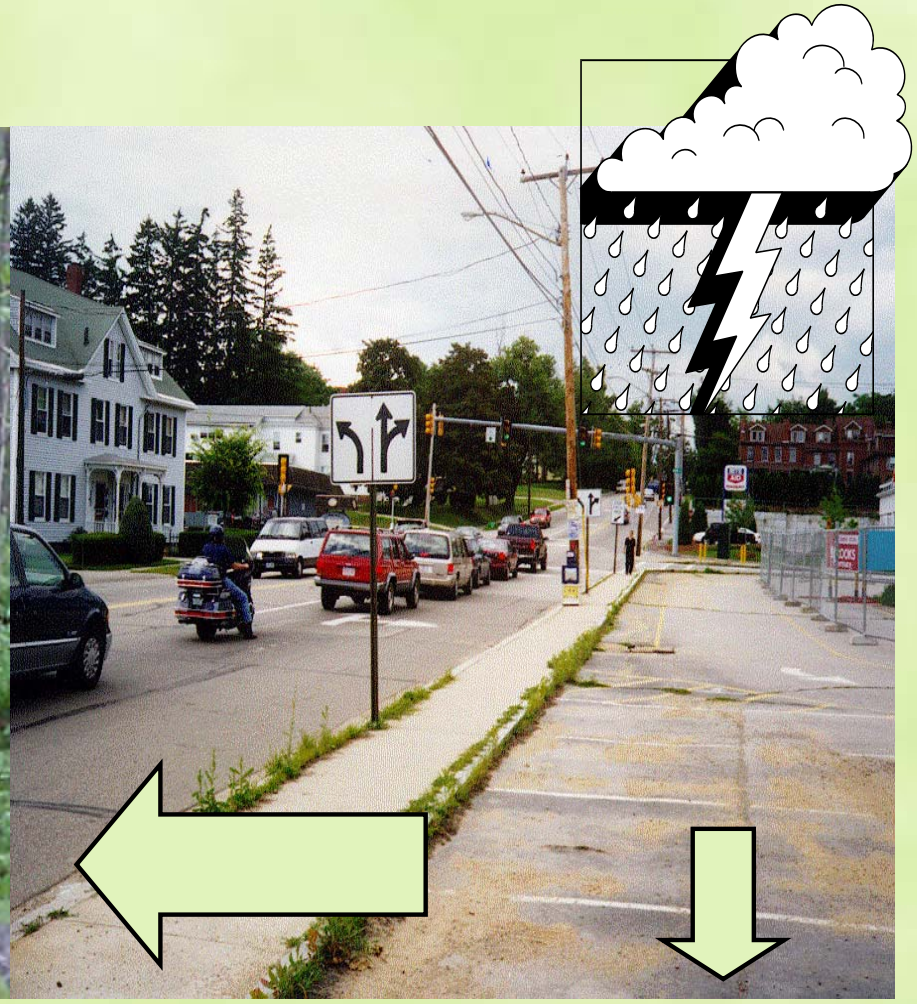
Effects of Development on Water Movement





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Concentrated roof runoff and resulting sediment displacement

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Figure 1: Newfound Lake Watershed (Generalized Landcover)

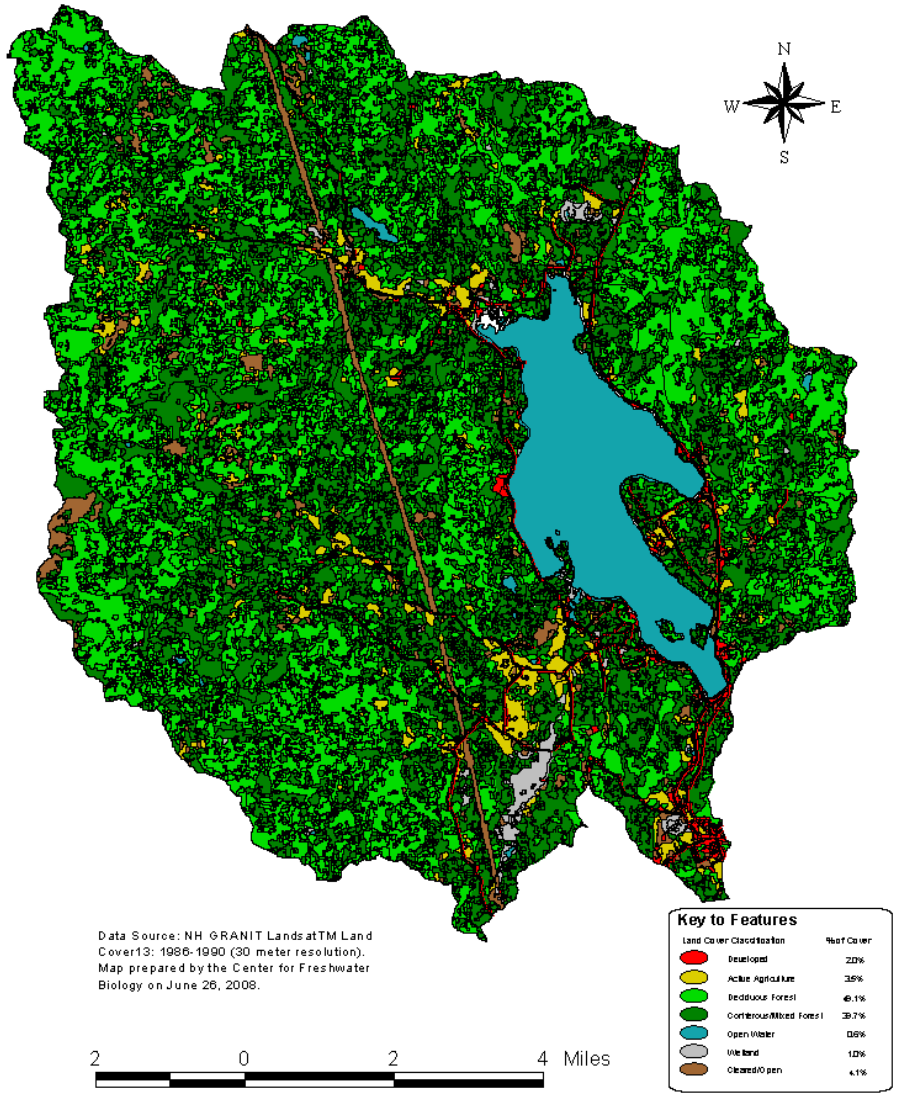
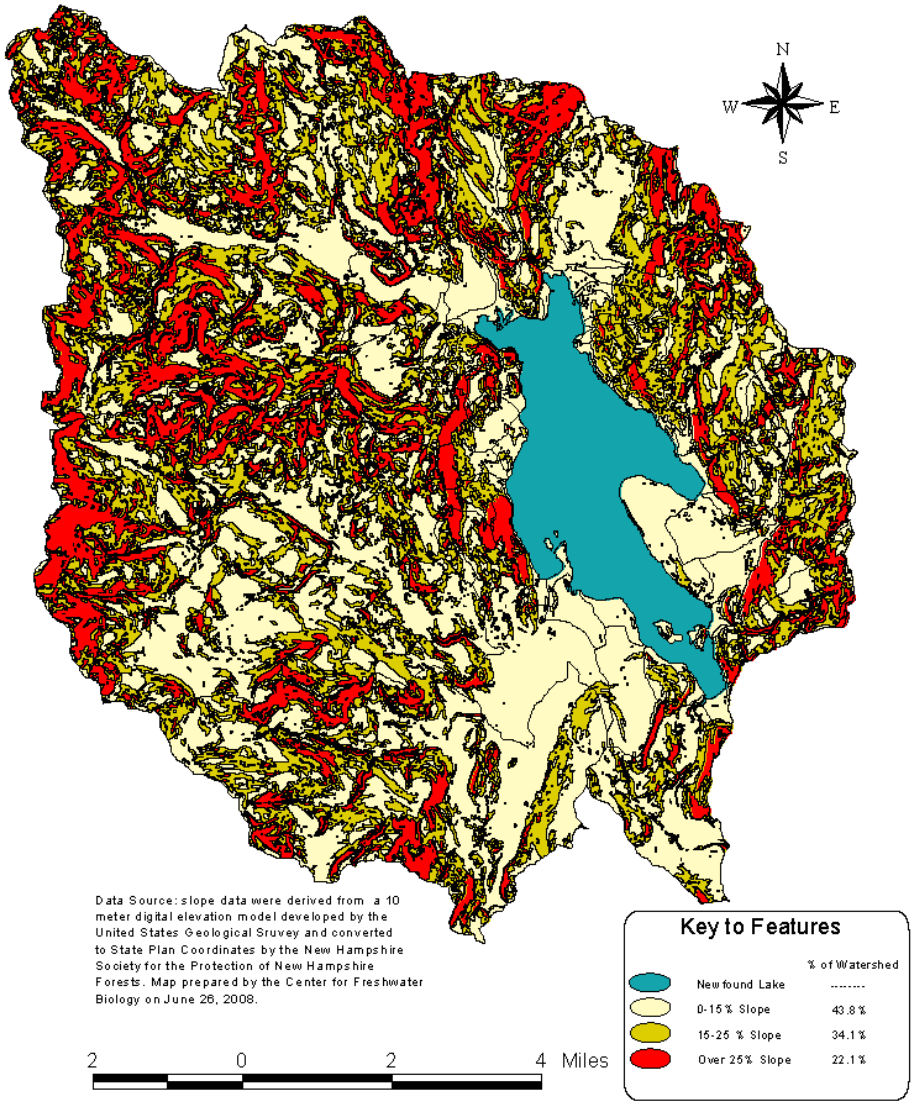


Figure 2. Newfound Lake Watershed (Slope)



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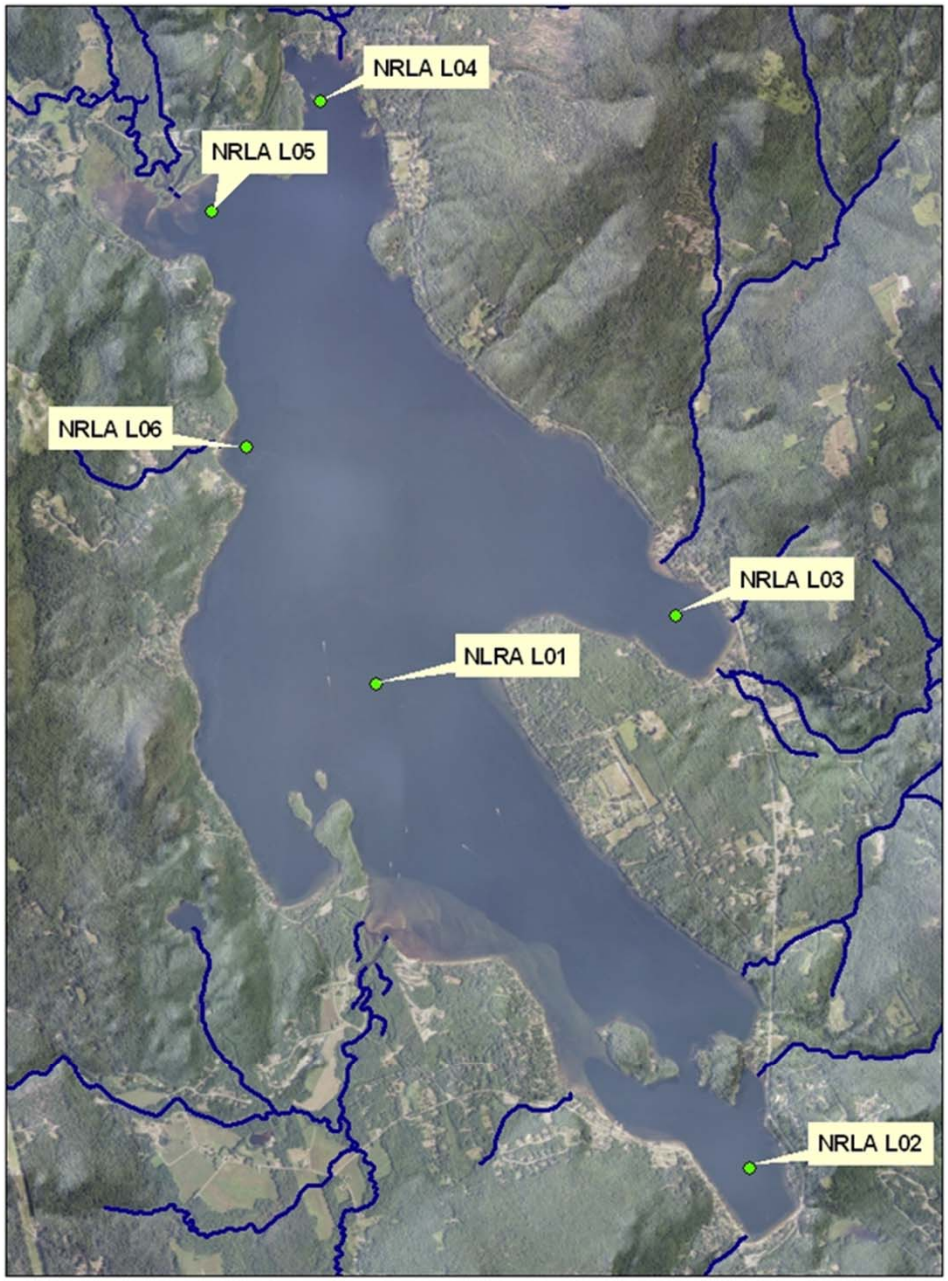
Newfound Lake (4106 acres)



Tropical storm Irene impacts NH on 8/28/2011

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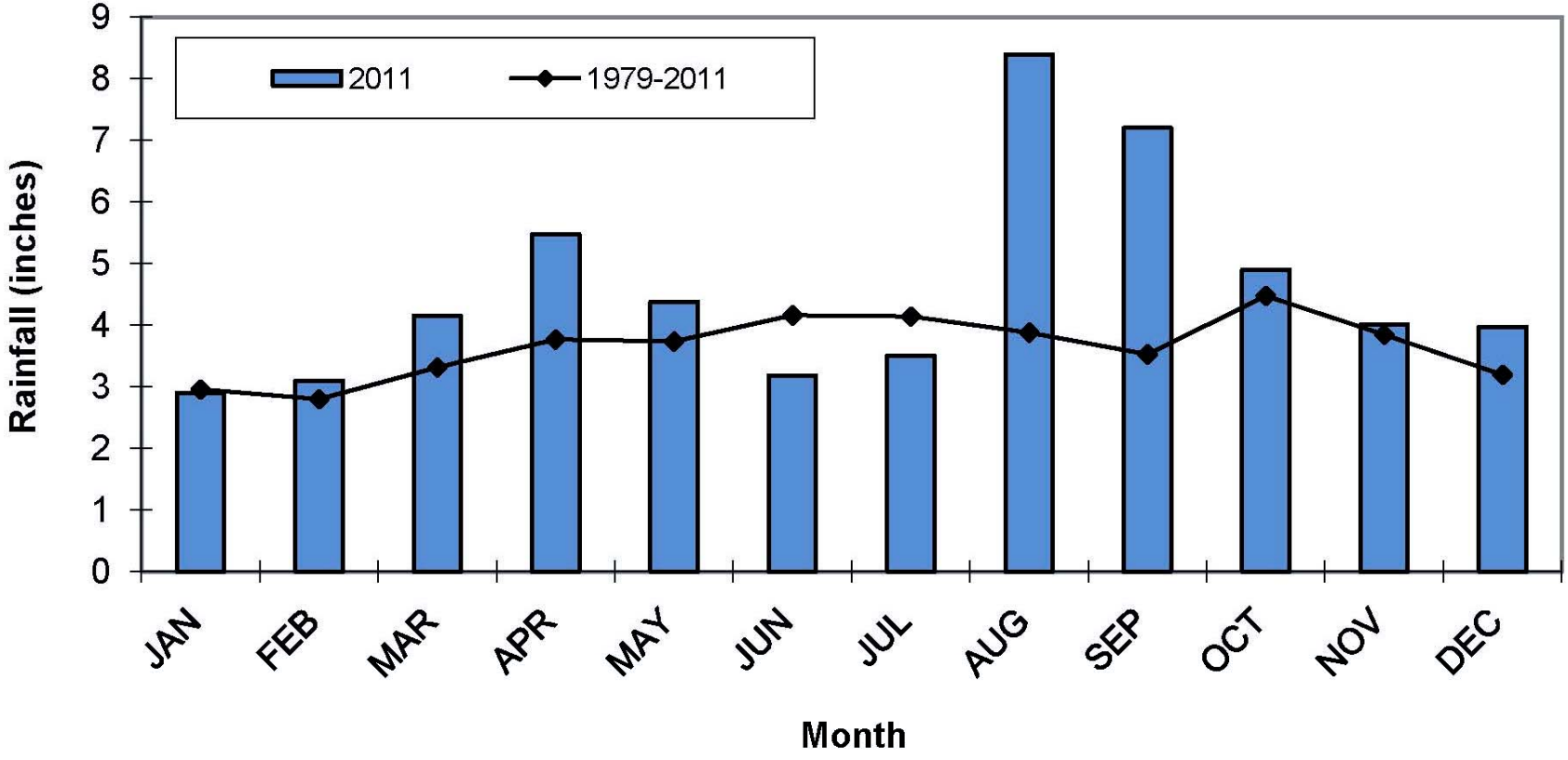
Figure 5: Lakeport 2 Climatological Sampling Station (Laconia, NH)
Monthly Precipitation (1979-2011)



Newfound Lake

2011 Secchi Disk Transparency: May 27 - October 18

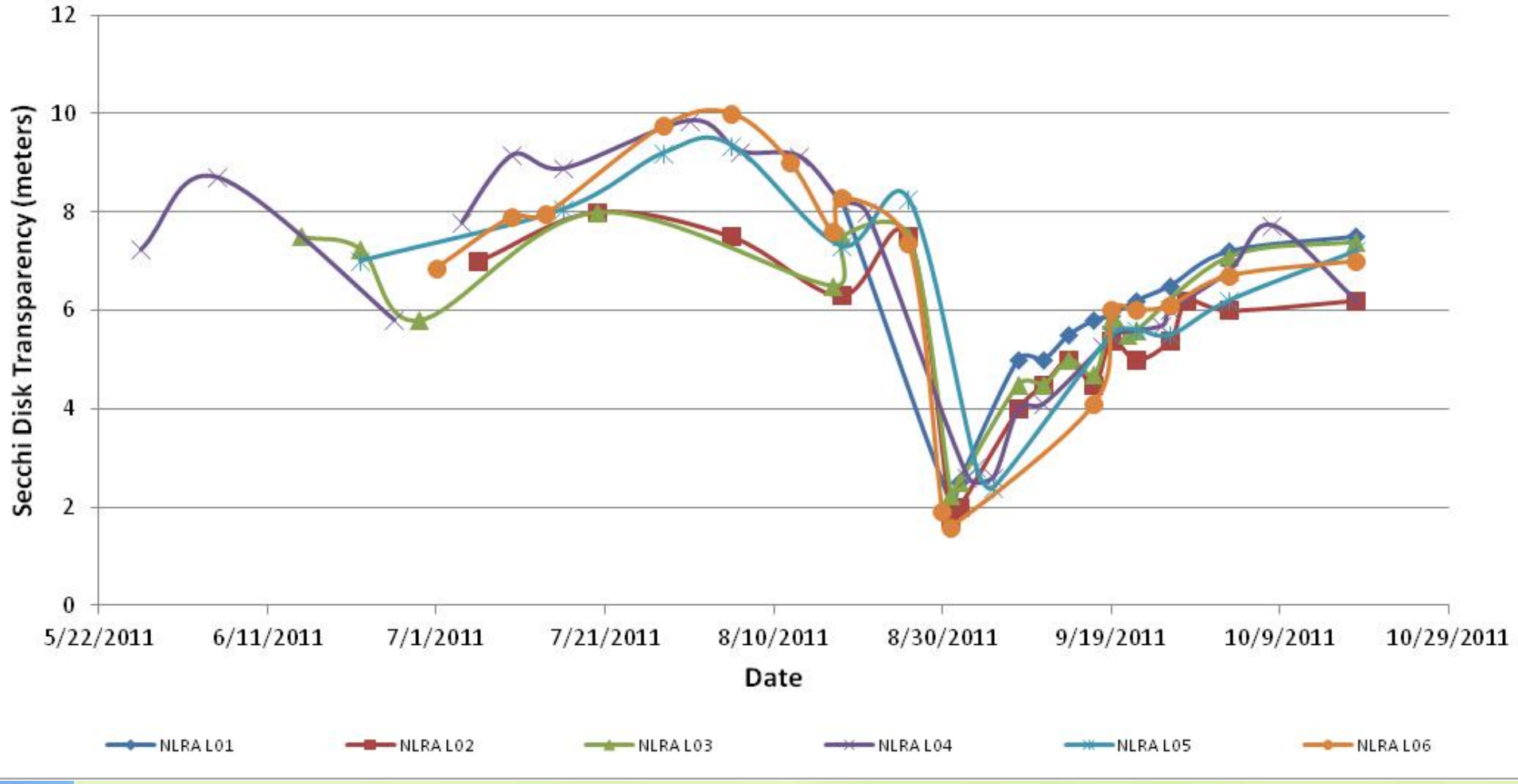


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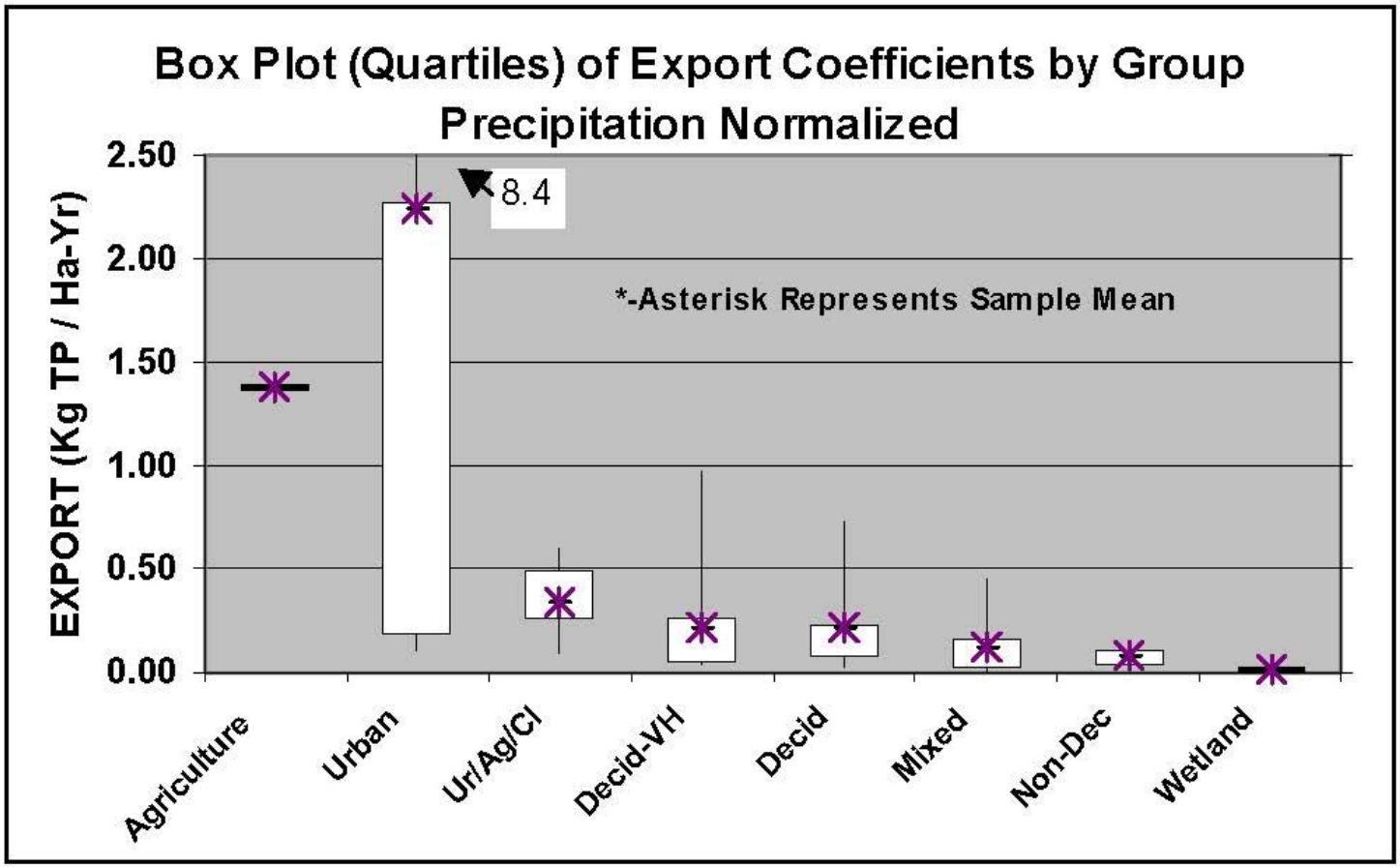
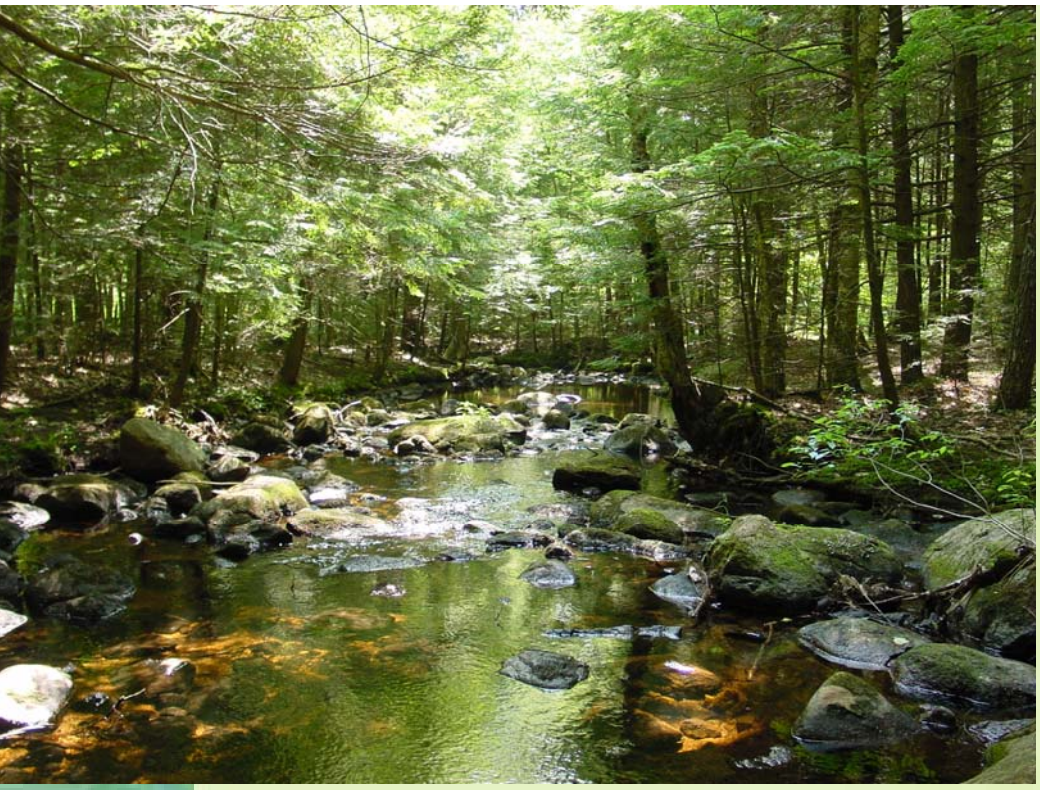
FIGURE 4 – BOX AND WHISKER PLOT OF SUBWATERSHED TP EXPORT BY GROUPING, NORMALIZED BY YEARLY PRECIPITATION



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Vegetated Buffers

Vegetated buffers provide a low-tech, high-performance solution to polluted runoff problems.

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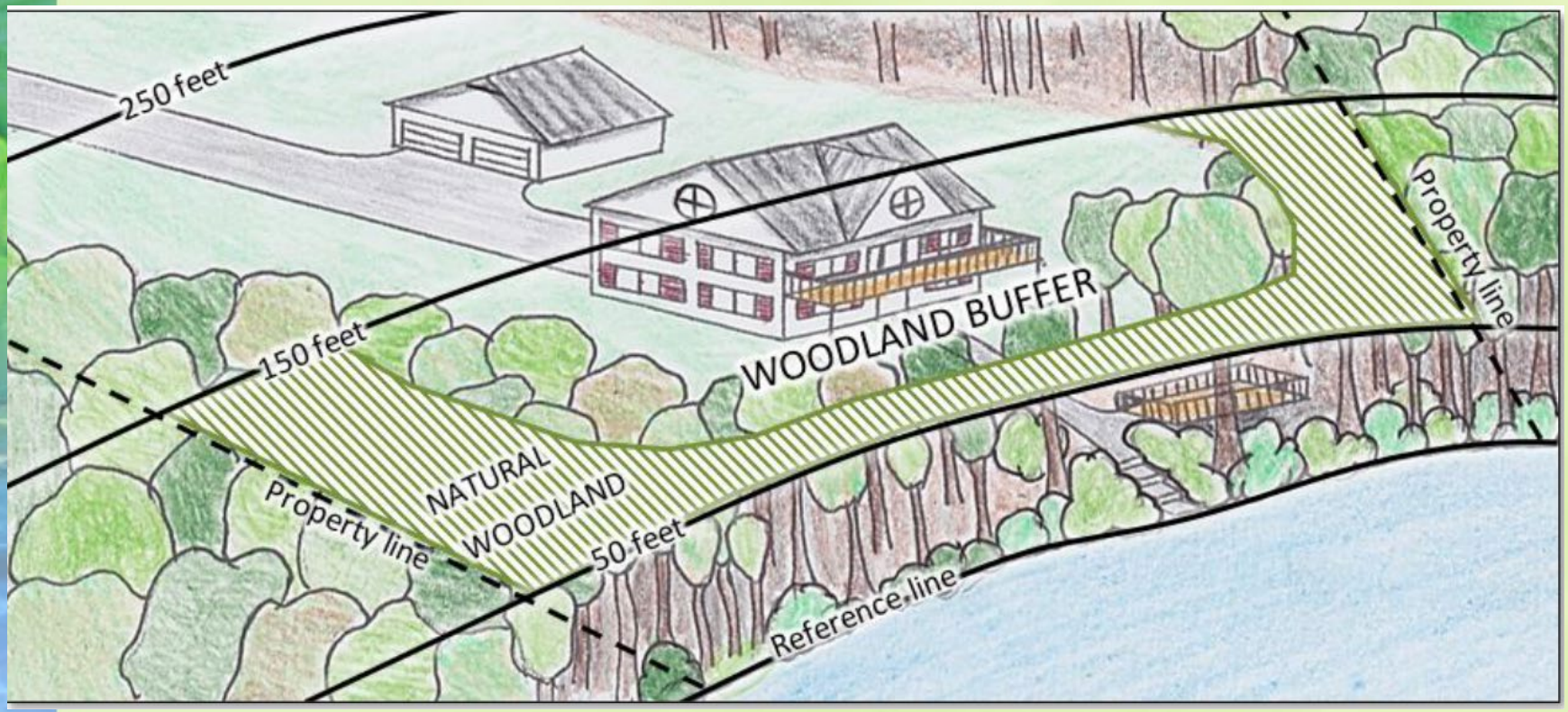
Regulatory Protection – Shoreland Protection Act



Shoreland Water Quality Protection Act regulates the removal of ground cover, shrubs and trees within 150 feet of public waters.

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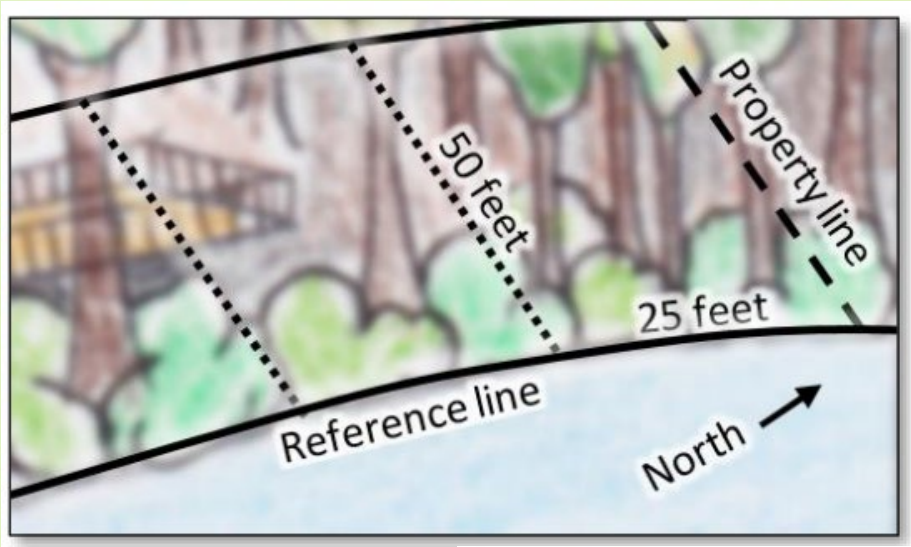
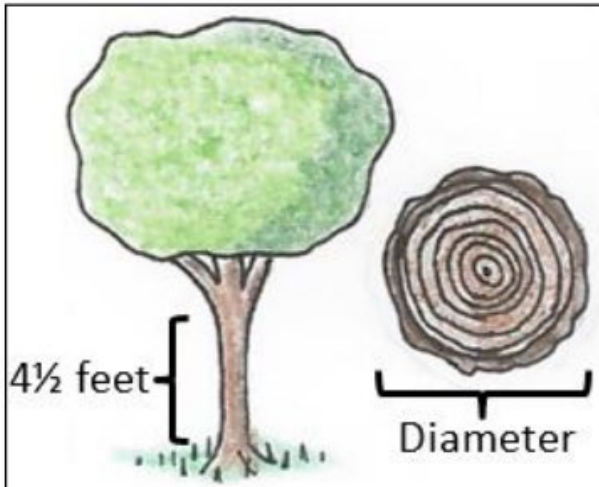
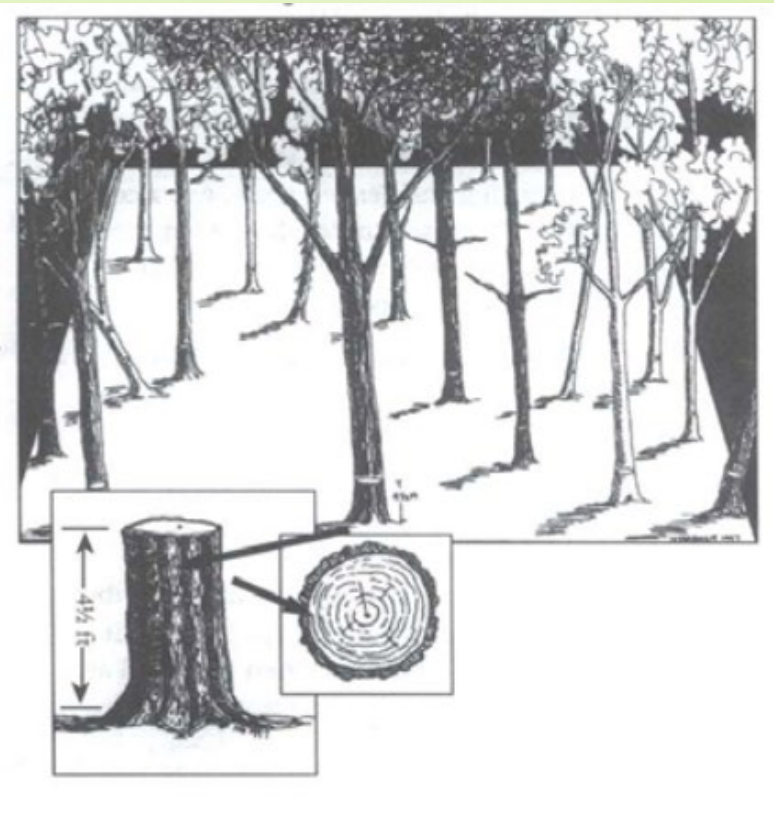
Regulatory Protection – Shoreland Protection Act

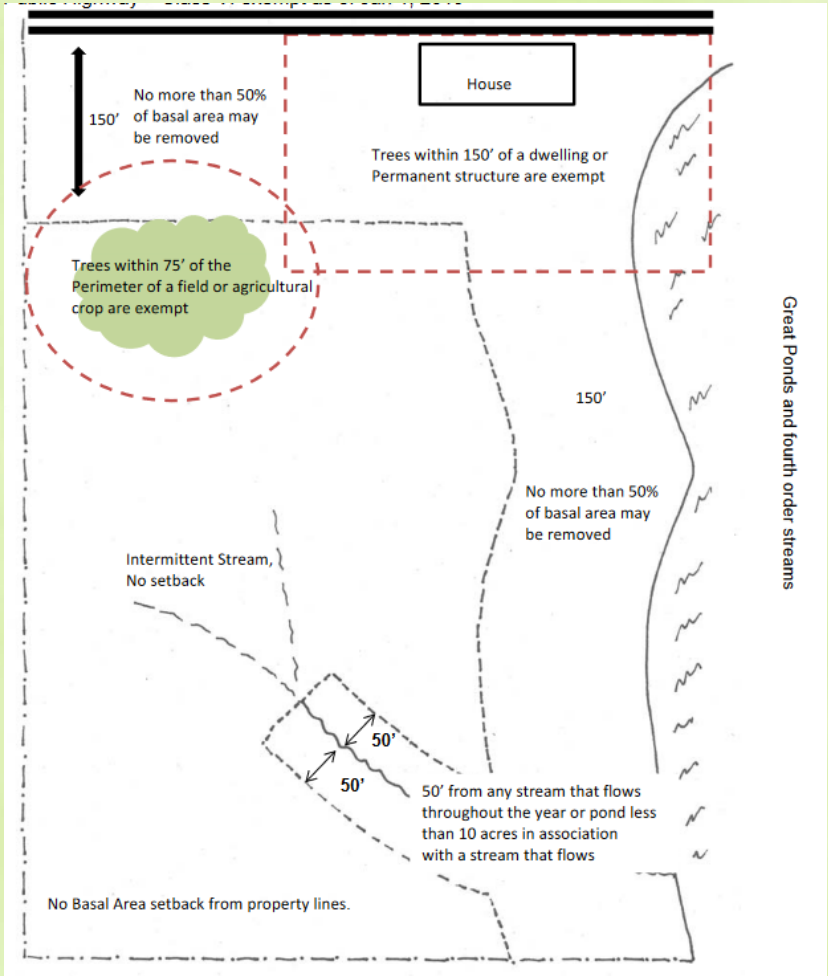




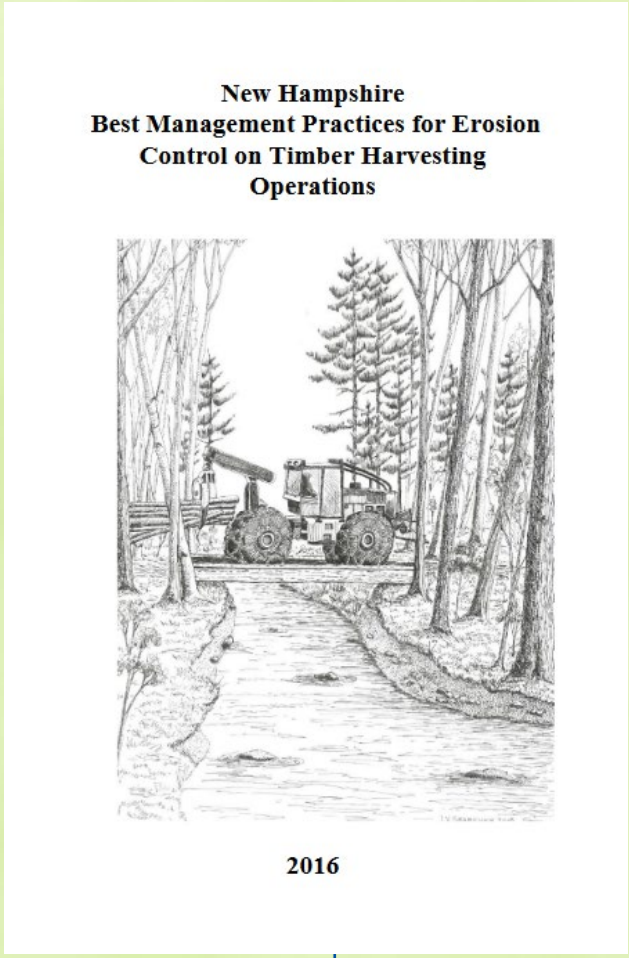
Diameter of tree at 4 ½ feet high.	Point score
1 to 3 inches	1
> 3 to 6 inches	5
> 6 to 12 inches	10
> 12 inches	15

Regulatory Protection – NH Basal Area Law





Best Management Practices for Erosion Control on Timber Harvesting Operations



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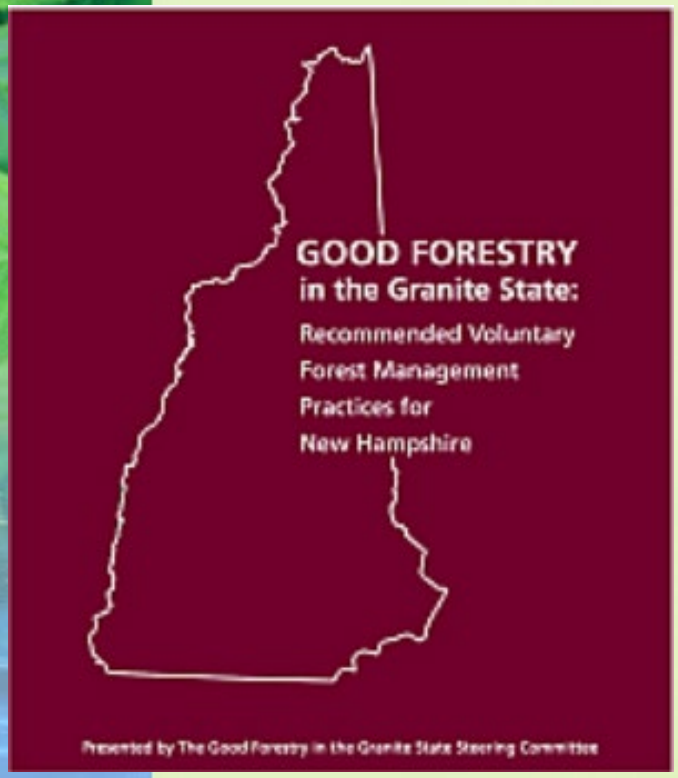
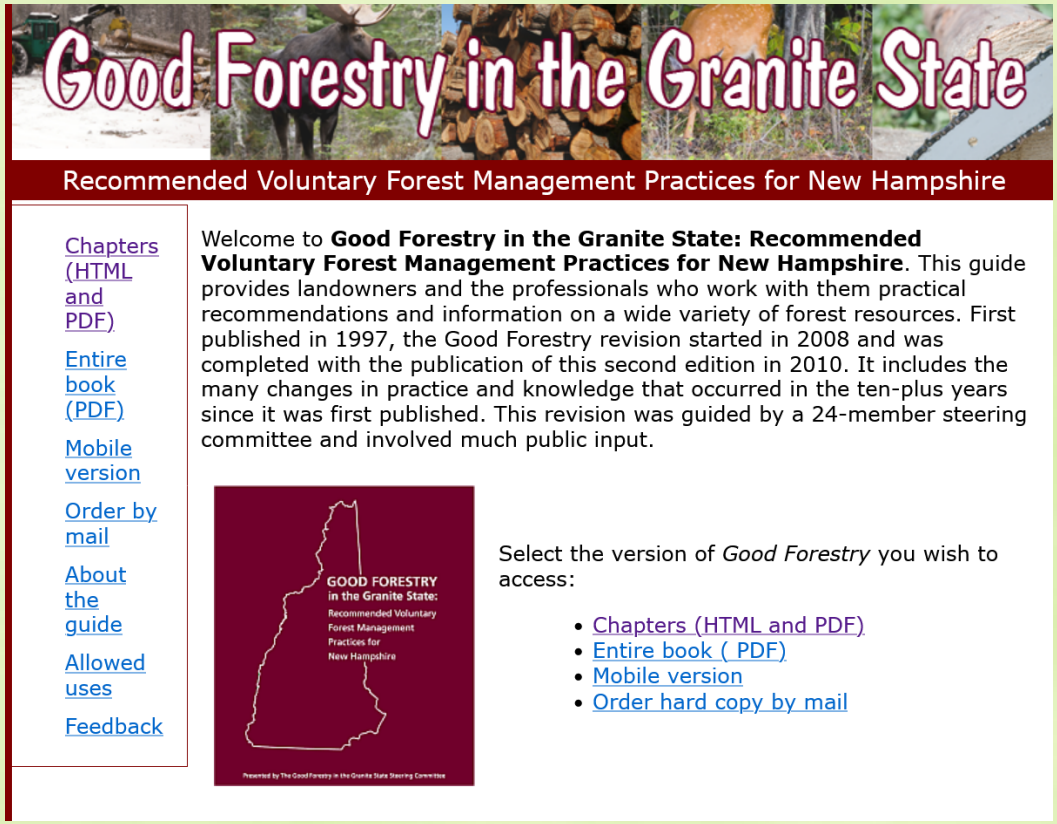
Voluntary Protection





https://extension.unh.edu/goodforestry/index.htm

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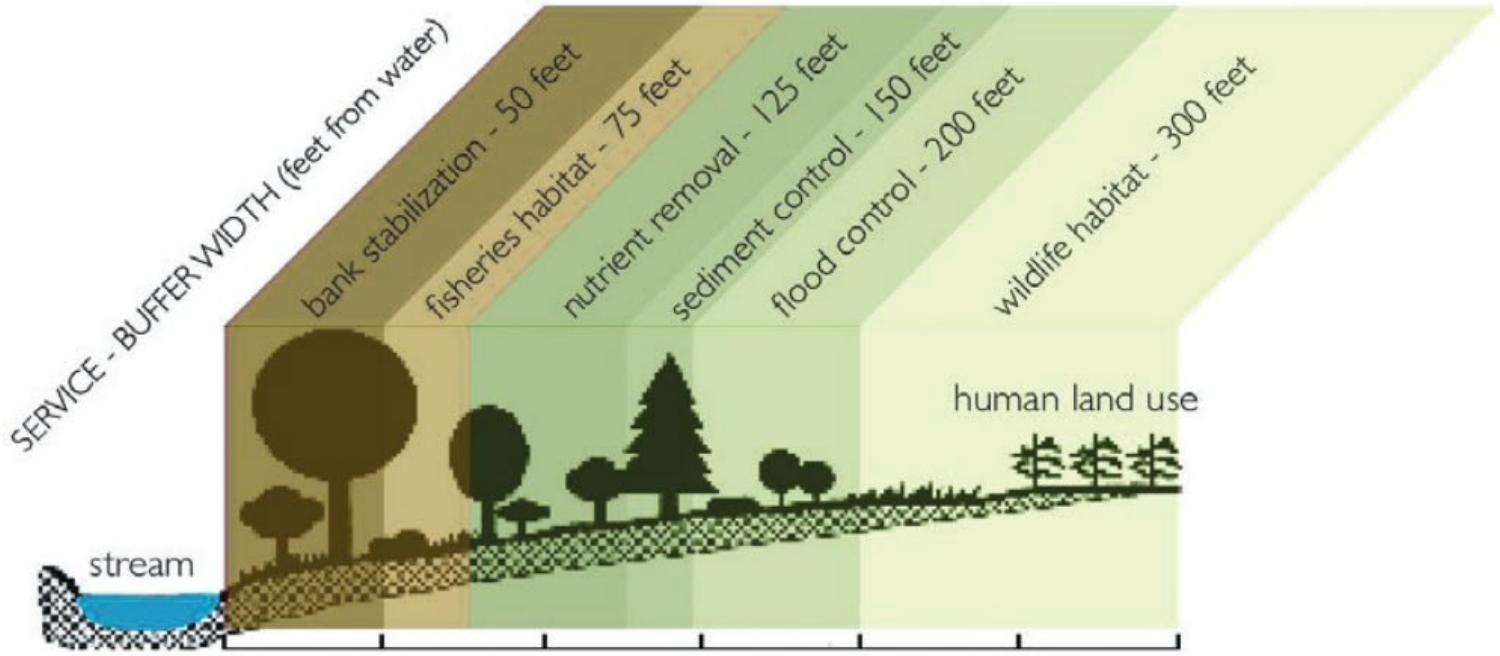
Voluntary Protection

Table 1. Guidelines for Riparian Management Zones

	Legally Required[1]		Recommended	
	Riparian Management Zone (feet)	No Harvest Zone[2] (feet)	Riparian Management Zone (feet)	No Harvest Zone[2] (feet)
Intermittent streams	none[1]	none	75	none
1st and 2nd order streams	50[1]	none	100	25
3rd order streams[5]	50[1]	none	300[4]	50[3]
4th order and larger streams[5]	150[1]	none	300[4]	25
Pond <10 acres	50[1]	none	100	none
Lake or Great Pond (>10 acres)	150[1]	none	300	25



Source: adapted from Connecticut River Joint Commission, 2000.

Healthy Trees and Forests

- Identify and monitor for forest health issues
- Identify and determine action regarding hazard trees

Is My Tree Healthy?

Things to look for:

- Good crown size, dense canopy
- It is normal to see branch dieback at bottom of crown
- Are there signs of disease or decay
- Good root flare
- Good wound closure

Are There Structural Issues? Potentially Hazardous Defects:

Cracks

Weak Branch Unions

Decay

Decay

- Wood that is rotted or missing
- Caused by decay fungi
- Has less structural strength
- Has reduced stability

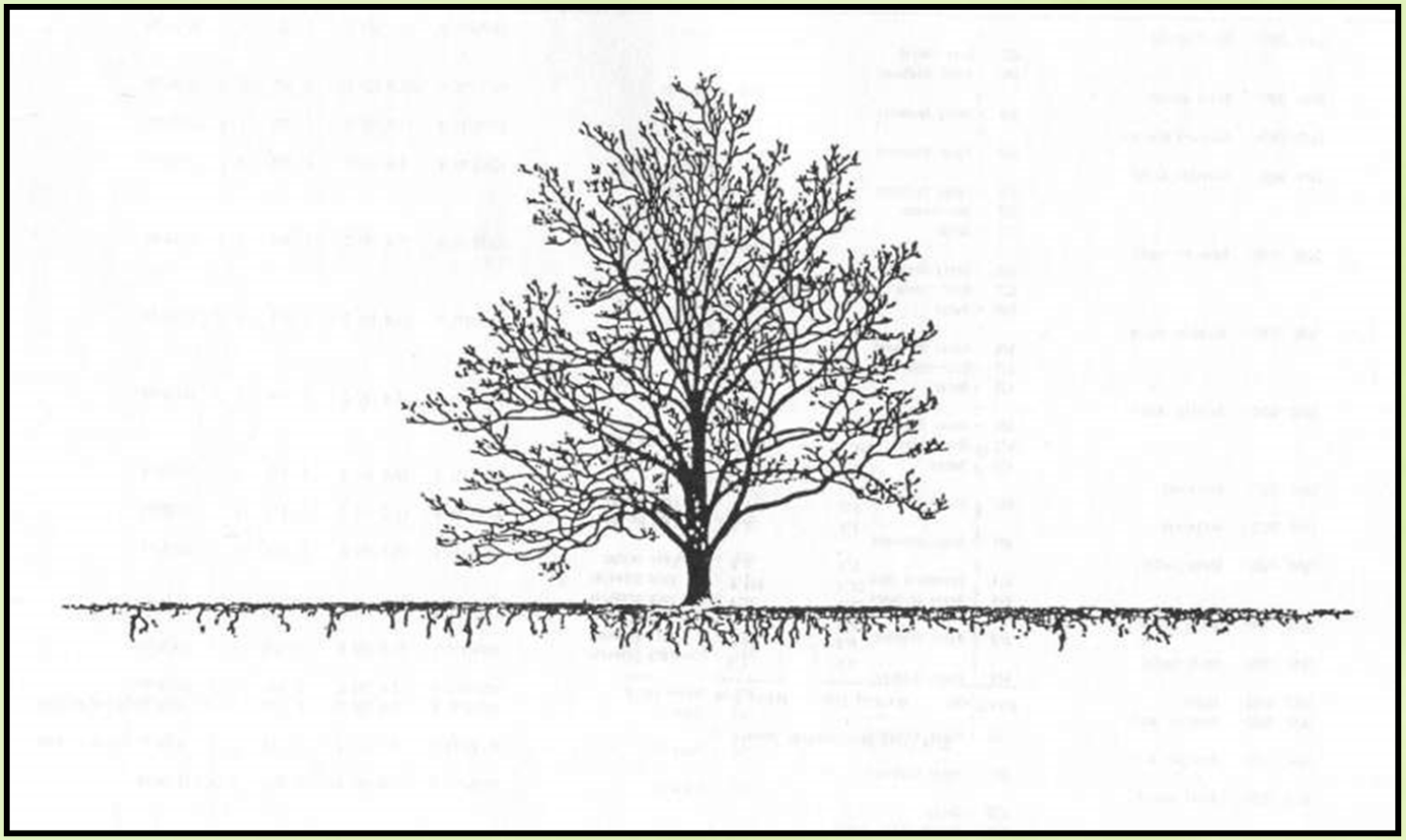
Evaluate your trees for defects and identify targets

Decay

- A tree usually decays from the inside out, eventually forming a cavity, but sound wood is also added to the outside of the tree as it grows.
- Shell thickness (undecayed, outer wood) determines the likelihood of failure.

Evaluate your trees for defects and identify targets

Roots



Roots can extend out 1 – 2 times the tree height

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Invasive Forest Pests – Hemlock Woolly Adelgid

- Native to China and Japan
- Arrived in Virginia in 1950
- Established in 17 states
- Has devastated native hemlock forests to our south
- Found in Portsmouth in
- 2000
- Can kill trees in 4-10
- years in our area

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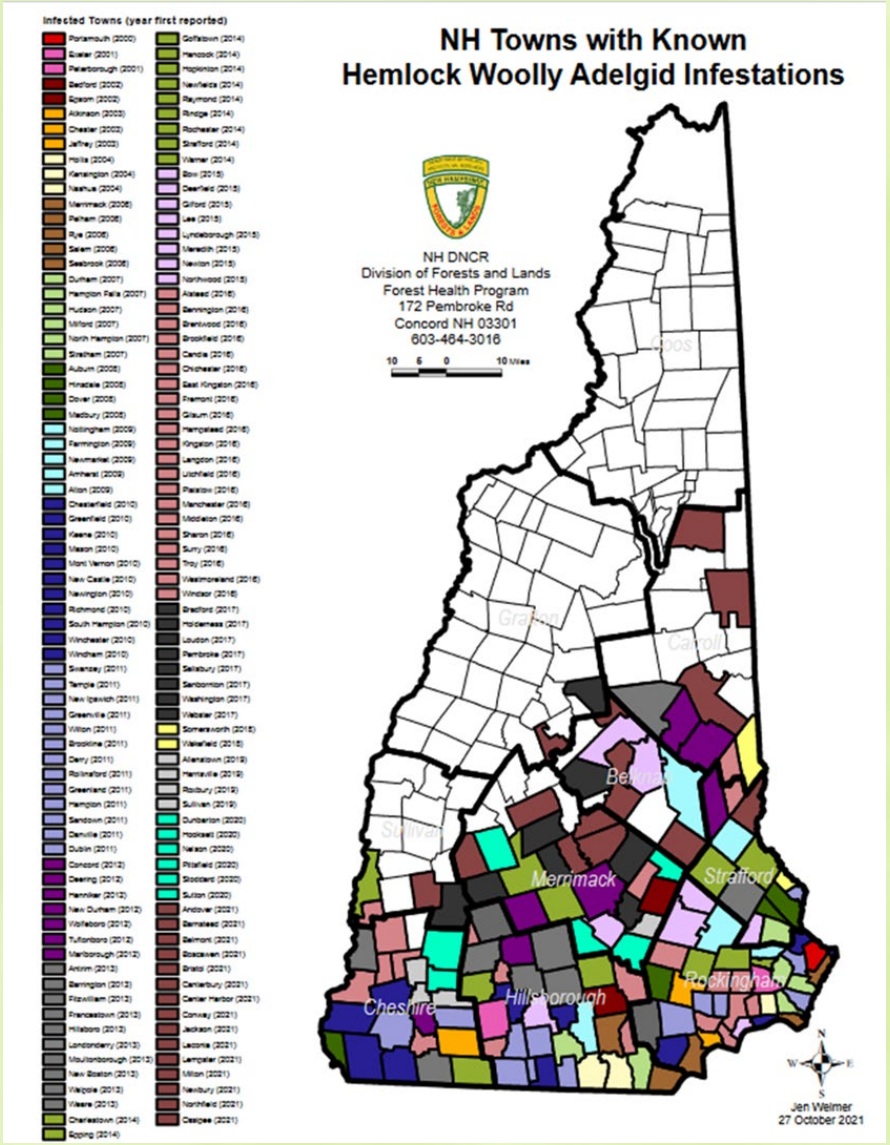
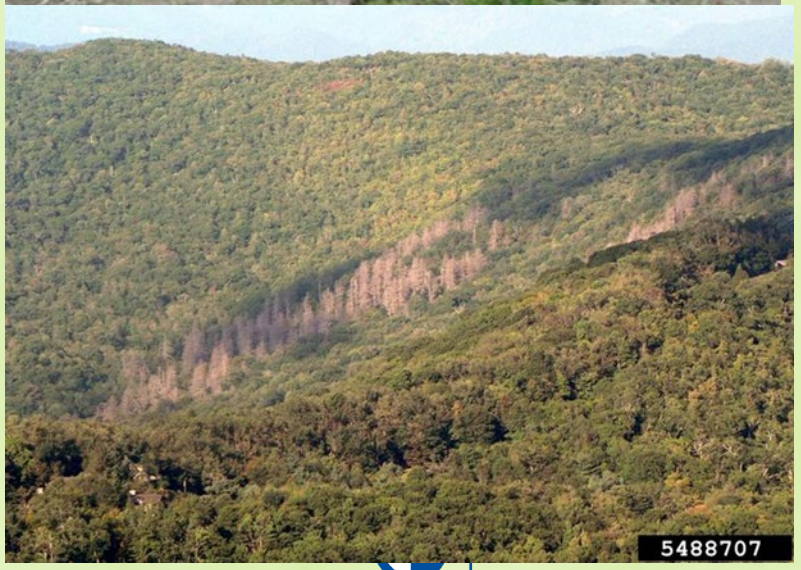
Hemlock Woolly Adelgid



Hemlock mortality further south



Elongate Hemlock Scale

Together with Hemlock Woolly Adelgid, these insects can kill hemlock trees in a few years if left untreated

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Hemlock Woolly Adelgid and our Lakes and Streams

Hemlock Woolly Adelgid

- Transported by birds, animals, and wind
- Can also be transported by infected logs and trees
- Look for it in trees adjacent to openings and along roads (these areas appeal to birds)
- Don’t hang birdfeeders in hemlock trees!
- Monitor for these insects!
- Plant a diversity of trees and shrubs for screening
- Keep trees healthy

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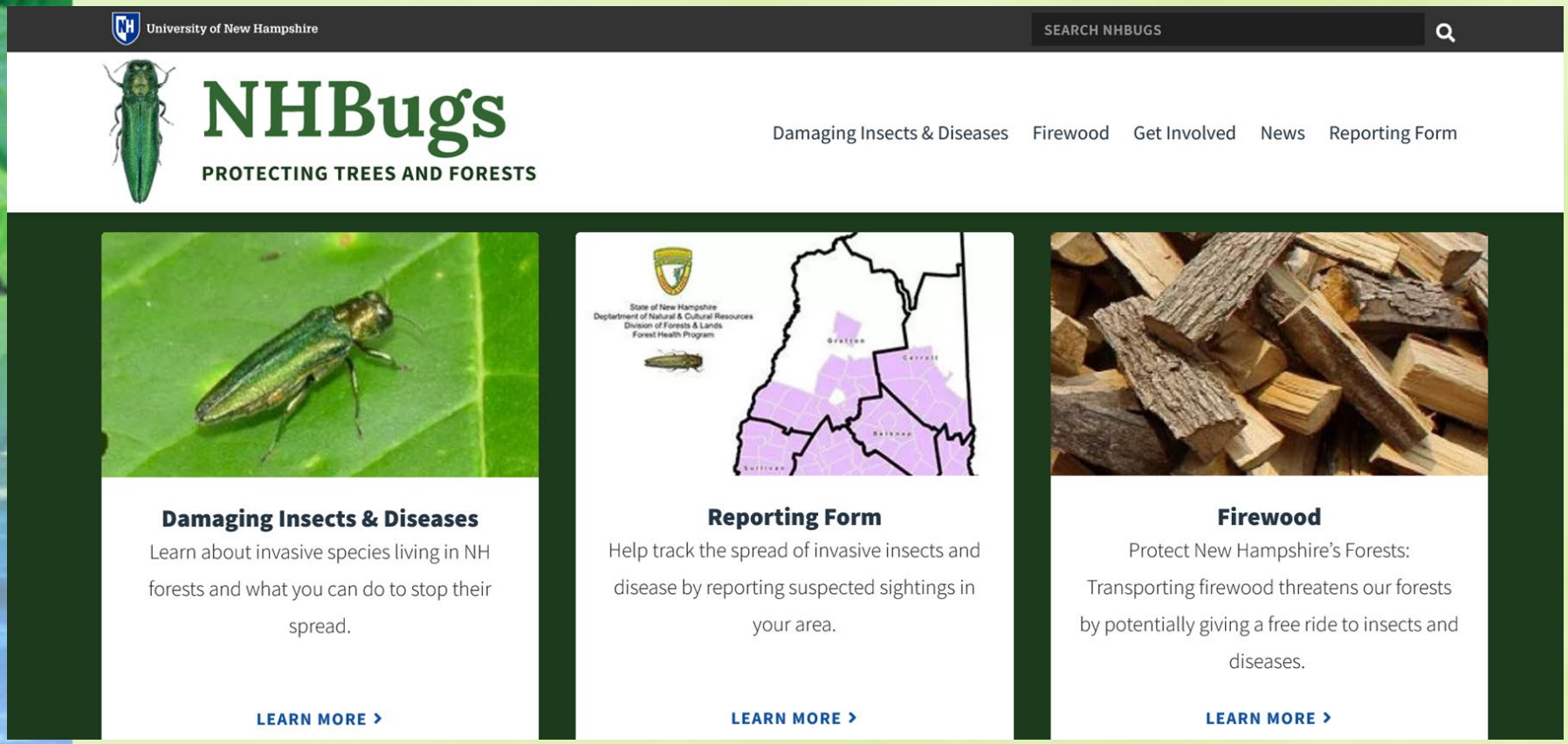
NHBugs.org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Damaging Insects & Diseases
Firewood
Get Involved
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Damaging Insects & Diseases
Learn about invasive species living in NH forests and what you can do to stop their spread.
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Forest Health Program
Reporting Form
Help track the spread of invasive insects and disease by reporting suspected sightings in your area.
LEARN MORE ›
Firewood
Protect New Hampshire's Forests: Transporting firewood threatens our forests by potentially giving a free ride to insects and diseases.
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Hemlock Woolly Adelgid

University of New Hampshire Cooperative Extension

CONTROLLING HEMLOCK WOOLLY ADELGID IN NEW HAMPSHIRE

Kyle Lombard, Forest Health Specialist, N.H. Division of Forests and Lands
Karen P. Bennett, UNH Cooperative Extension

There are many different strategies and control options to eradicate or manage hemlock woolly adlegid (HWA). To choose the best option for you, follow this three-step process.

Step 1: Assess key components of the infestation.

- Determine the geographic extent of the outbreak. Does the infestation cross ownership boundaries? Is the infestation isolated, increasing the likelihood of successful treatment, or part of a large area with most hemlock infested?
- Evaluate the severity of the infestation. Are many of the trees infested in the area or just a few? Determine the number in the high, moderate and low vigor classes.
- Evaluate the health and vigor of the infested trees. Are they healthy enough to respond to treatment, or are they too far gone?
- Evaluate the value of infested trees to the environment, soil stability, for timber, wildlife, privacy, or as landscape trees.

Hemlock Vigor Classes

Class	Dead Twig/Branch or Discolored Foliage
High	greater than 50%
Moderate	26 to 50%
Low	10 to 25 %
Healthy	less than 10%

Step 2: Decide on a plan. Based on the information collected in Step 1 you have several options.

1. **Do nothing.** The geographic extent may be too large and the severity too high to result in successful control. The value of hemlock may be too low to make control worthwhile.

2. **Use cultural control.** When the geographic extent is small and the value of the infested trees is low, removing the infested trees is the best option. Remove infested trees and treat the brush created. Brush could be chipped and piled, piled and covered, or simply piled and burned on-site. Chip brush before transporting and the receiving site must cover the chips or destroy them immediately.

3. **Use insecticides.** When the geographic extent is limited, access is good and value is high insecticides can be an effective option. Insecticides should only be applied by those with knowledge of the state and federal rules, pesticide applicator equipment, and an understanding of the best life stage to treat the insect. Proper safety equipment is needed and all instructions on the pesticide label must be followed.

   Foliar sprays are effective when infested trees are short, the volume of foliage is small, and foliage is accessible from all directions. The safest and least toxic foliar sprays are insecticidal soaps and horticultural oils. These products coat the insect and prevent breathing. Treat with oil sprays throughout the growing season, carefully following the timing suggested on the product label to prevent damage to foliage during hot summer months. Other foliar sprays which are effective but more toxic to non-target and beneficial insects are products with bifenthrin, or permethrin.

Contact the NH Division of Pesticide Control 271-3550 for information about pesticide use near water bodies

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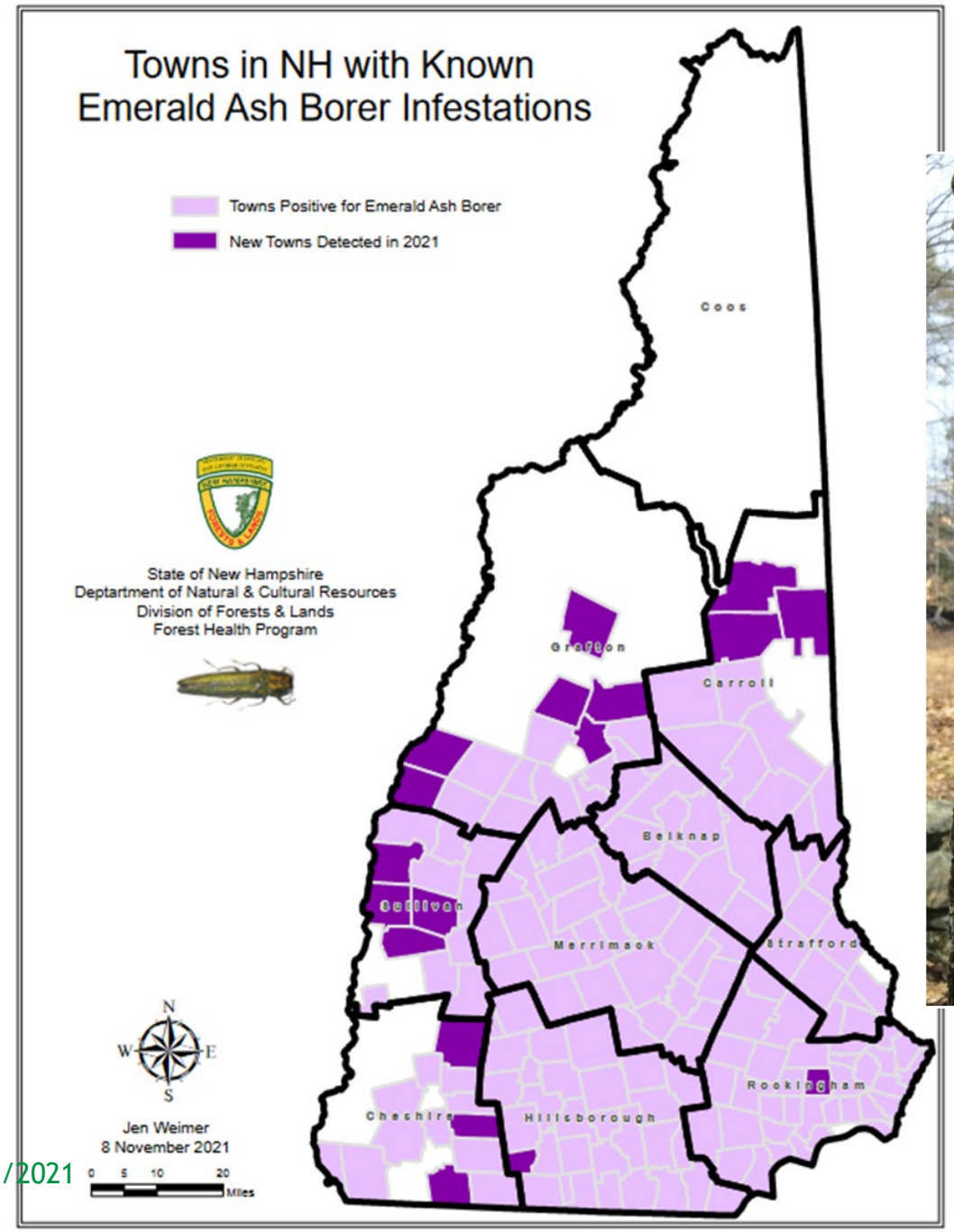
Invasive Forest Pests – Emerald Ash Borer

- Non-native
- First detected in US in 2002
- Can kill ash trees within 3-5 years
- White, black and green ash
- Has killed millions of ash trees
- Cannot be eradicated



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Emerald Ash Borer – Assess the Impact on Your Property

Determine what ash trees you have and whether they will become *hazard trees* when EAB arrives

(ash tends to like soils along streams where there is good moisture and nutrient levels).

Identify high-value trees.

There are three options for each tree:

1. Removal
2. Chemical treatment
3. Do nothing and let it die and fall

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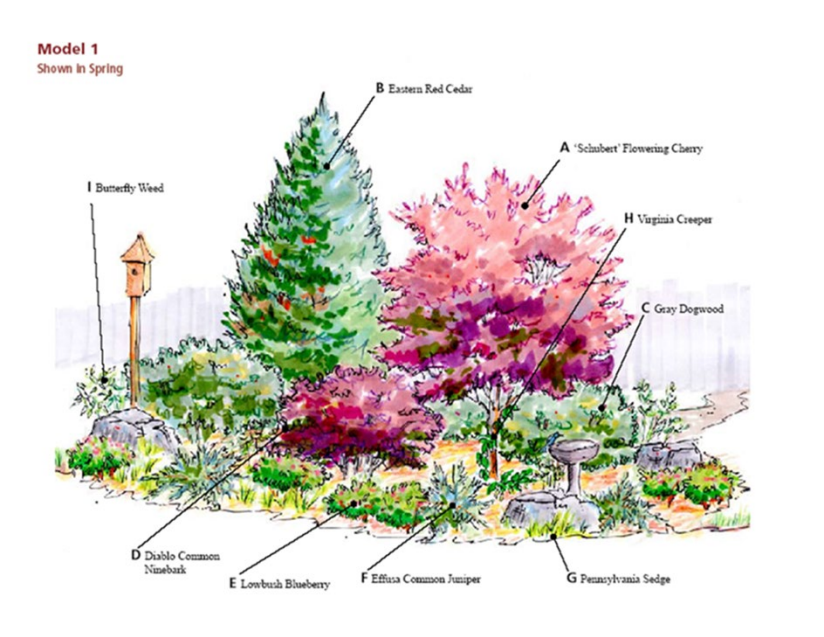
Emerald Ash Borer – Chemical Treatment

Other landscape health considerations – Create layers of vegetation and plant in groups

- Consider replacing lawns and individual trees with more natural landscaping
- Multiple canopy layers
- Ground cover
- Shrub layer
- Understory trees
- Overstory trees



- Multiple layers attract variety of wildlife species and can provide food and shelter

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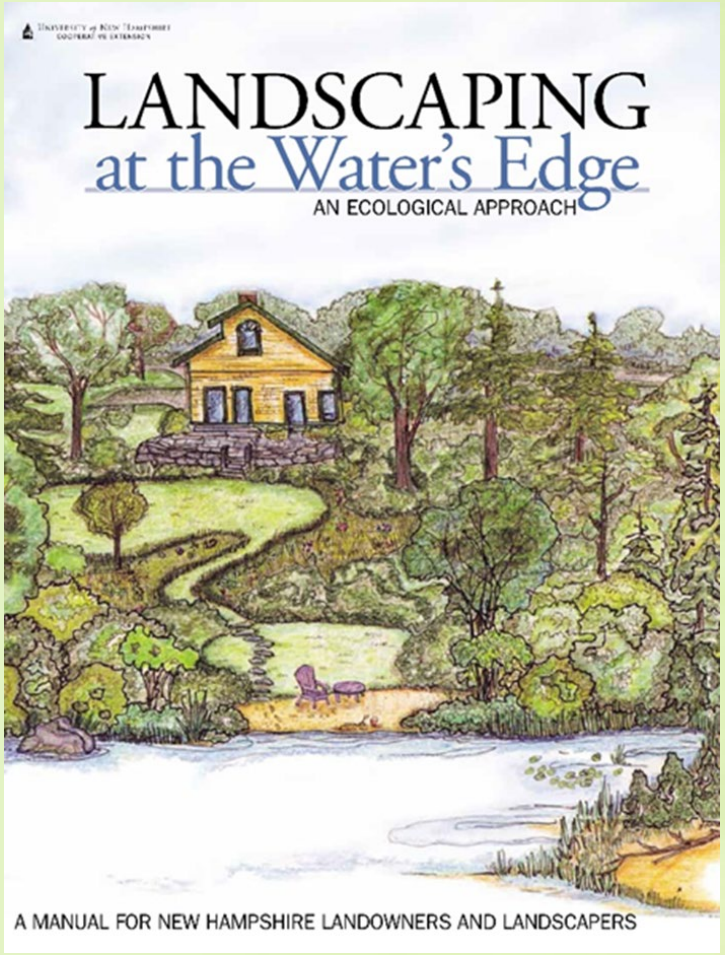
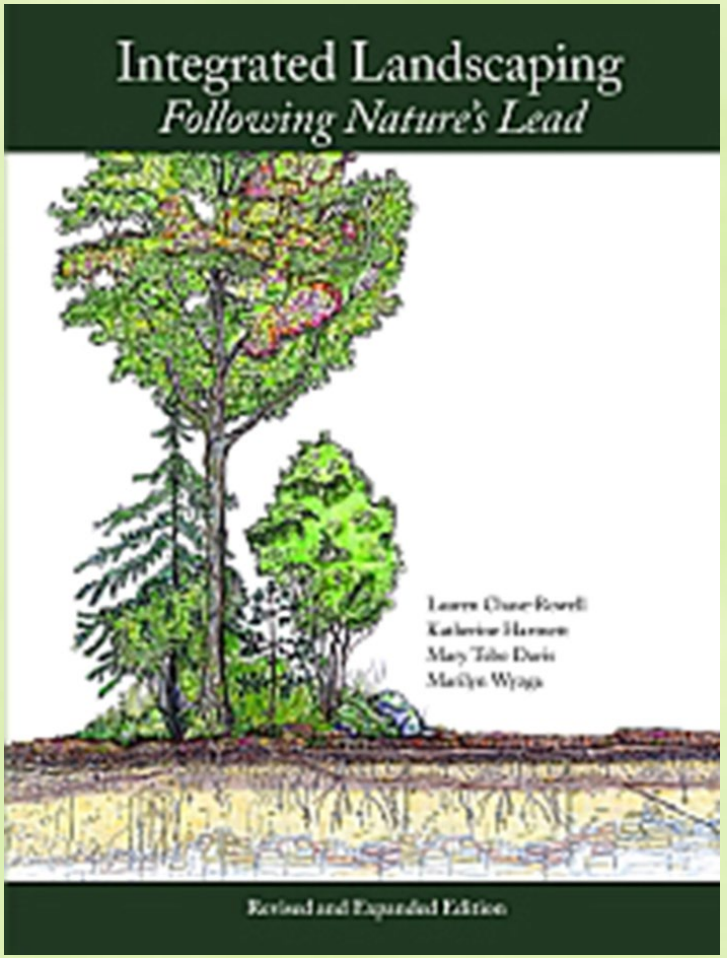
Minimize lawn area

- Replace lawns with more natural landscaping
- Mow a pathway and leave remaining lawn to grow into wildflowers.
- Mow edges annually to allow wildflowers to seed in and grow

- Plant shaded areas (that don't grow grass very well anyway) with moss, ferns, or other groundcovers that flourish in the shade.

Resources





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Thank You!

Questions?