

# Landscaping at the Water's Edge: Challenges in promoting ecologically based practices to homeowners and their service providers

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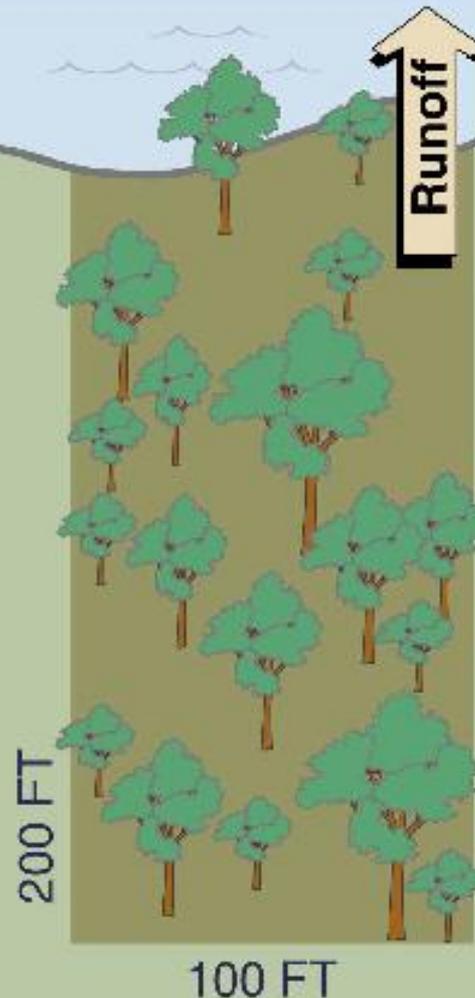
Cathy Neal

UNH Department of Plant Biology



## Undeveloped – Apr.-Oct. phosphorus/sediment runoff model

- maple-beech forest
- 6% slope to lake
- sandy loam soil



### IMPACT ON LAKE (April - Oct.)

- 1,000 ft<sup>3</sup> runoff to lake
- 0.03 lbs. phos. to lake
- 5 lbs. sediment to lake

Source: Wisconsin Dept. of Natural Resources

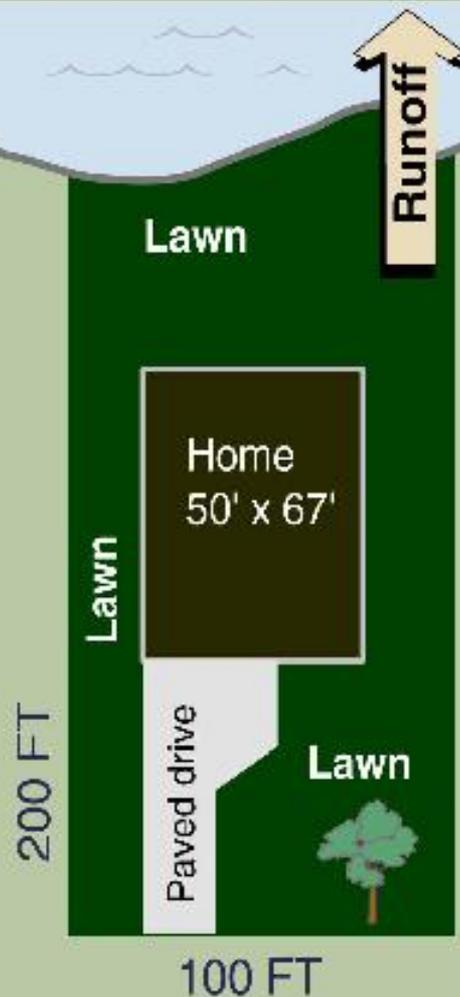
The Wisconsin Lakes Partnership



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## 1990s development – Apr.-Oct. phosphorus/sediment runoff model

- maintained lawn, soil graded
- 6% slope to lake
- home 3,350 ft<sup>2</sup> perimeter
- paved drive 770 ft<sup>2</sup>



### IMPACT ON LAKE (April - Oct.)

- 5,000 ft<sup>3</sup> runoff to lake
- 0.20 lbs. phos. to lake
- 90 lbs. sediment to lake

5x

7x

18x

Source: Wisconsin Dept. of Natural Resources

The Wisconsin Lakes Partnership



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# Multidisciplinary Team

- Integrated Pest Management
- Environmental Horticulture
- Water Quality/Resource Protection
- Turf Specialists
- Ornamental Specialist
- Soil Scientists
- Ecological Landscape Designer



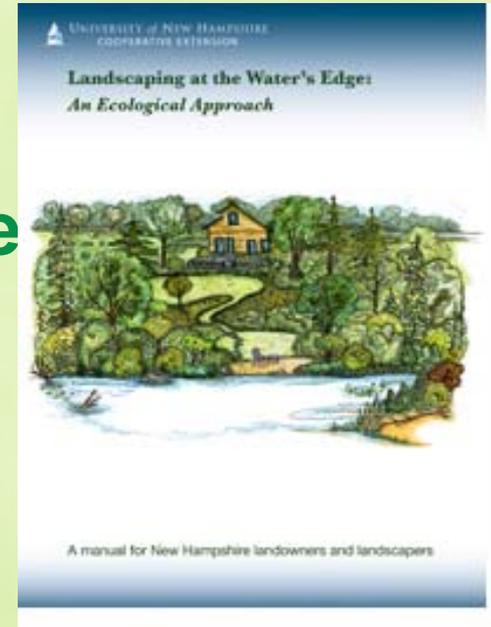
# Outreach Gap Analysis

- Regional Sustainable Landscapes Program
- RI Healthy Landscapes
- Northern New England LEAP Program
  - Maine: Rain Garden Design, Youth Conservation Corps
  - Vermont: Shore Erosion Control, Institutional Landscaping Initiative
  - NH: Following the Flow, Natural landscapes



# Table of Contents

- **Ch. I. Landscaping on the Edge**
  - Watershed
  - Non-point source pollution
  - Soil properties
  - Nutrients and pesticides
- **Ch. II. Go With the Flow: How water moves onto and away from your site**
  - How to assess runoff situation
  - Strategies for minimizing runoff (berms, rain gardens, swales, trenches, etc.)
- **Ch. III. Vegetative Buffers**
  - What they're composed of
  - Benefits



# Table of Contents

- **Ch. IV. The Landscape Design Process**

- Ten principles
- Inventory, site analysis, plant selection

- **Ch. V. Planting and Maintaining the Shoreland Buffer**

- Soil & site prep.
- Irrigation
- Fertilization and weed control



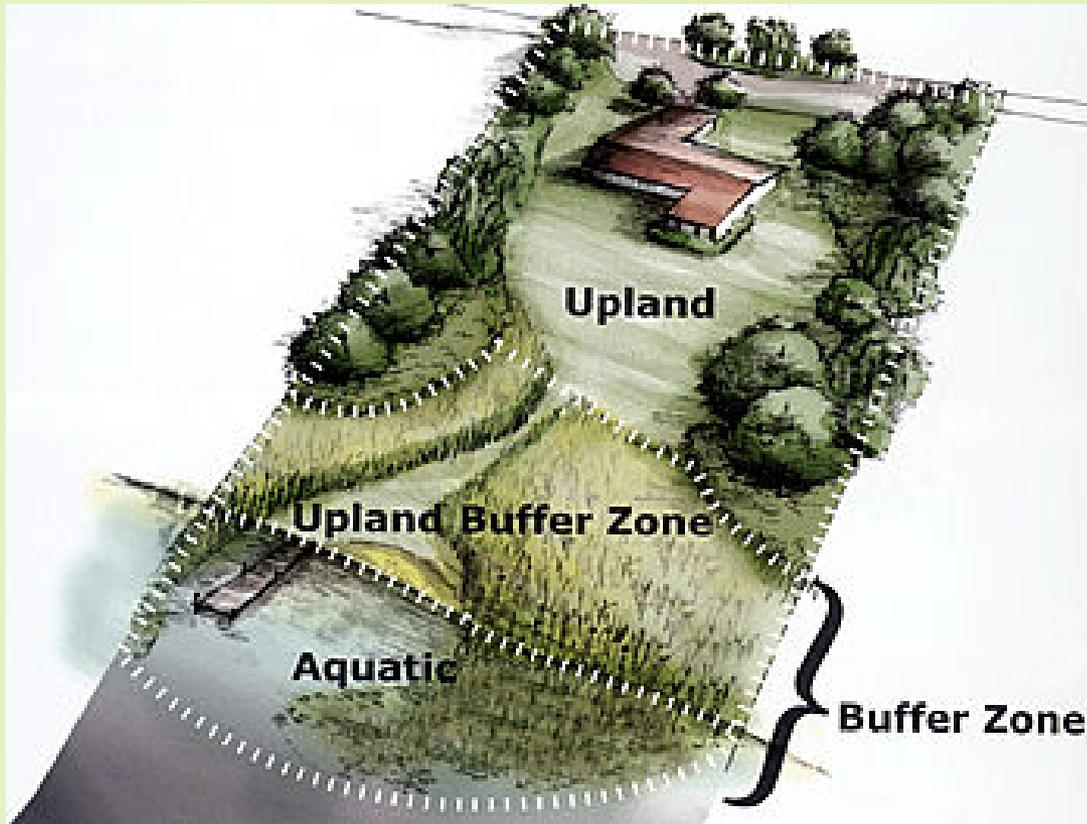
- **Ch. VI. Environmentally-Friendly Lawn Care**

- Benefits of lawn
- Grass selection, establishment, IPM, fertilization

- **Appendices-Regs, Plant List, Resources**

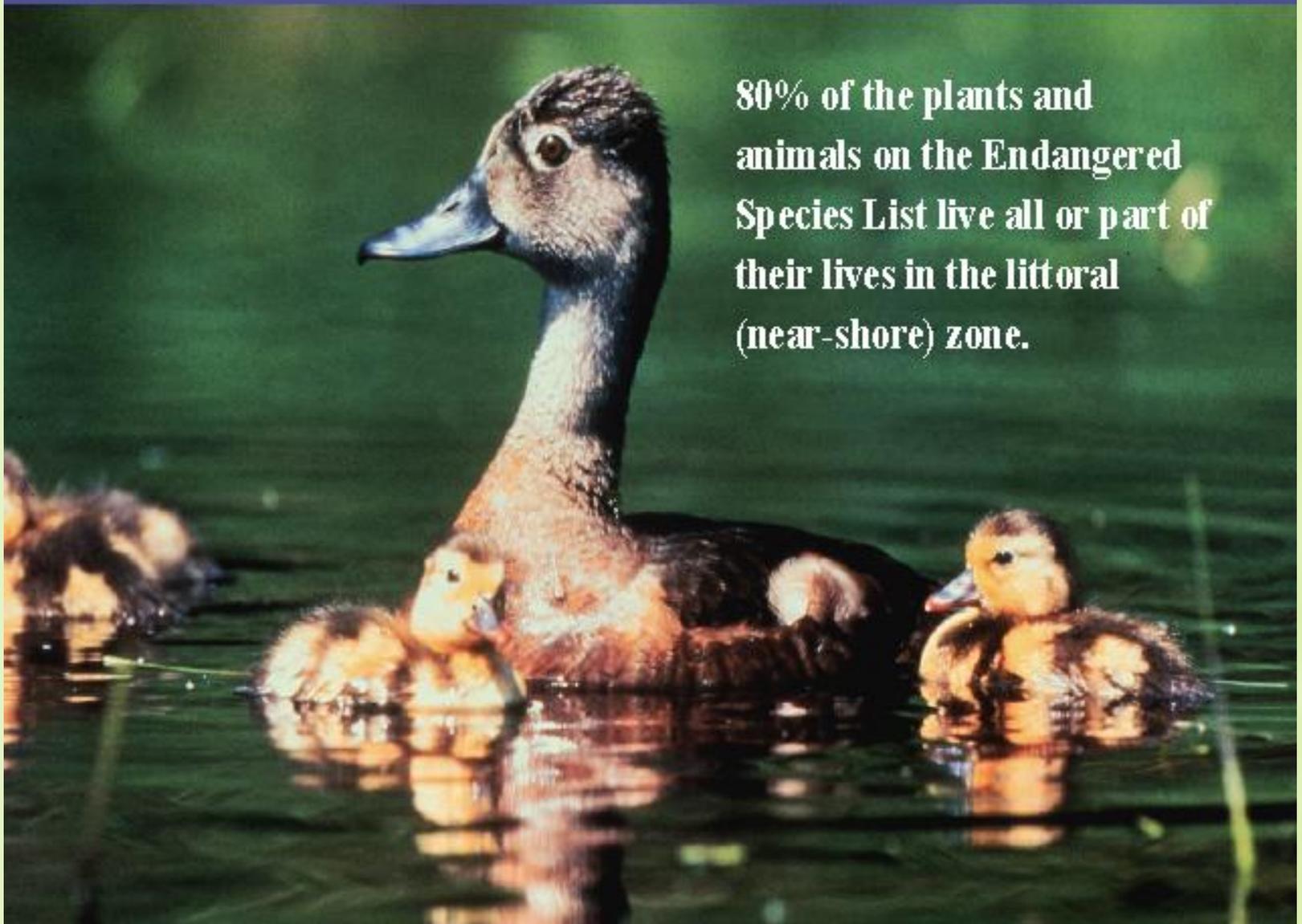


# The Importance of Shallow Water and Riparian Habitat Can't be Overstated

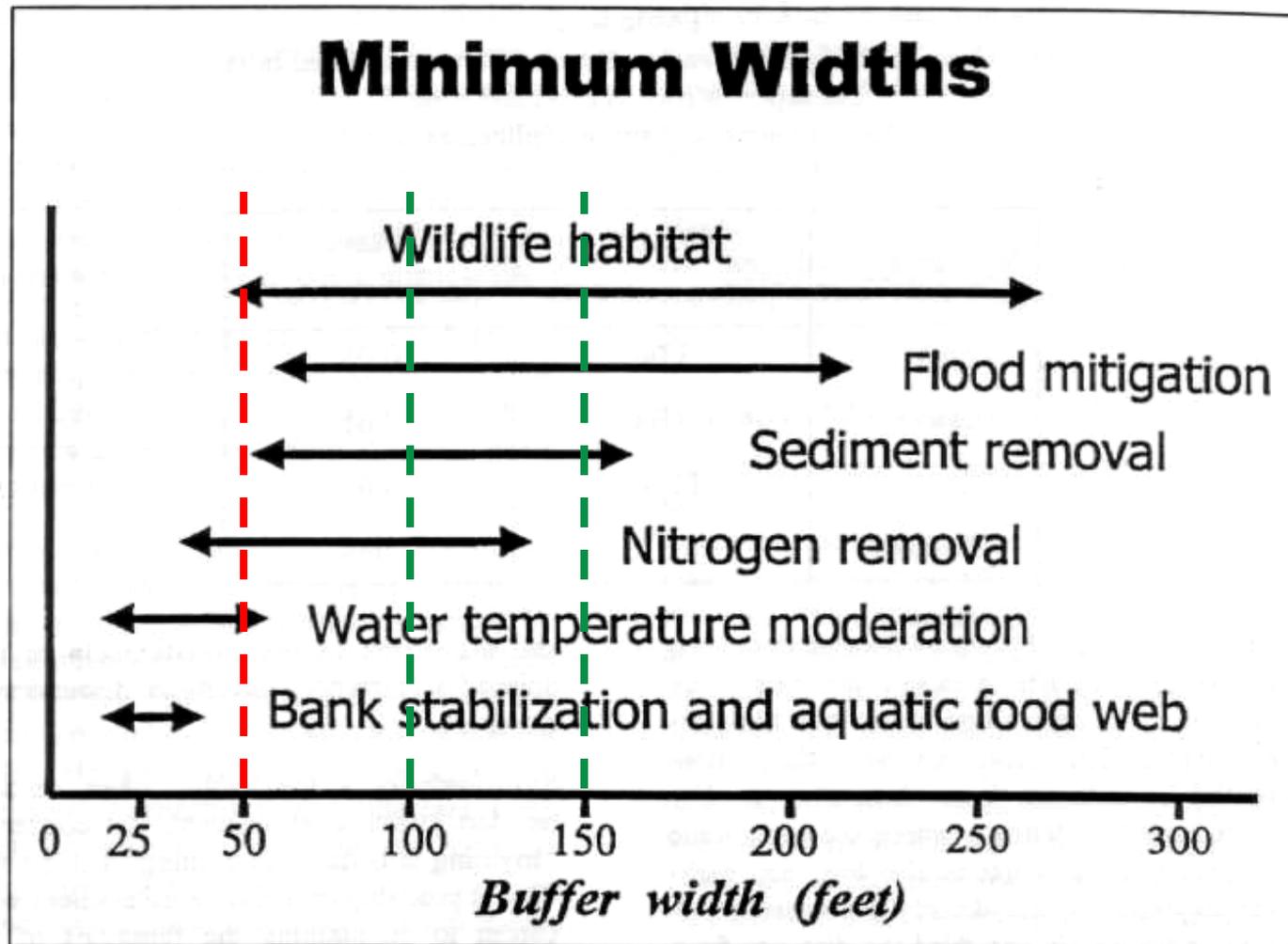


## The water's edge

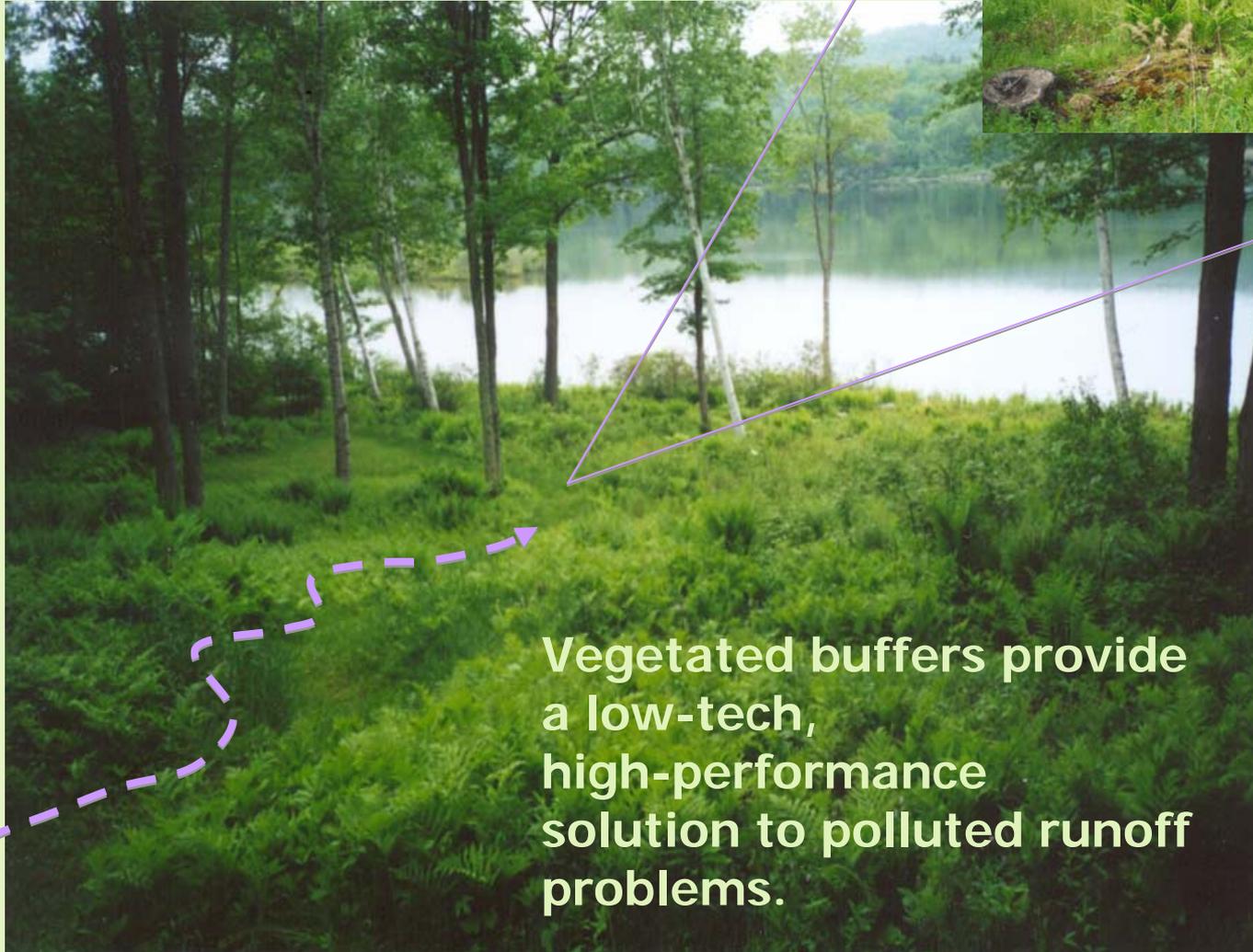
**80% of the plants and animals on the Endangered Species List live all or part of their lives in the littoral (near-shore) zone.**



# Range of Minimum Buffer Widths for Meeting Specific Buffer Objectives



# Vegetated Buffers

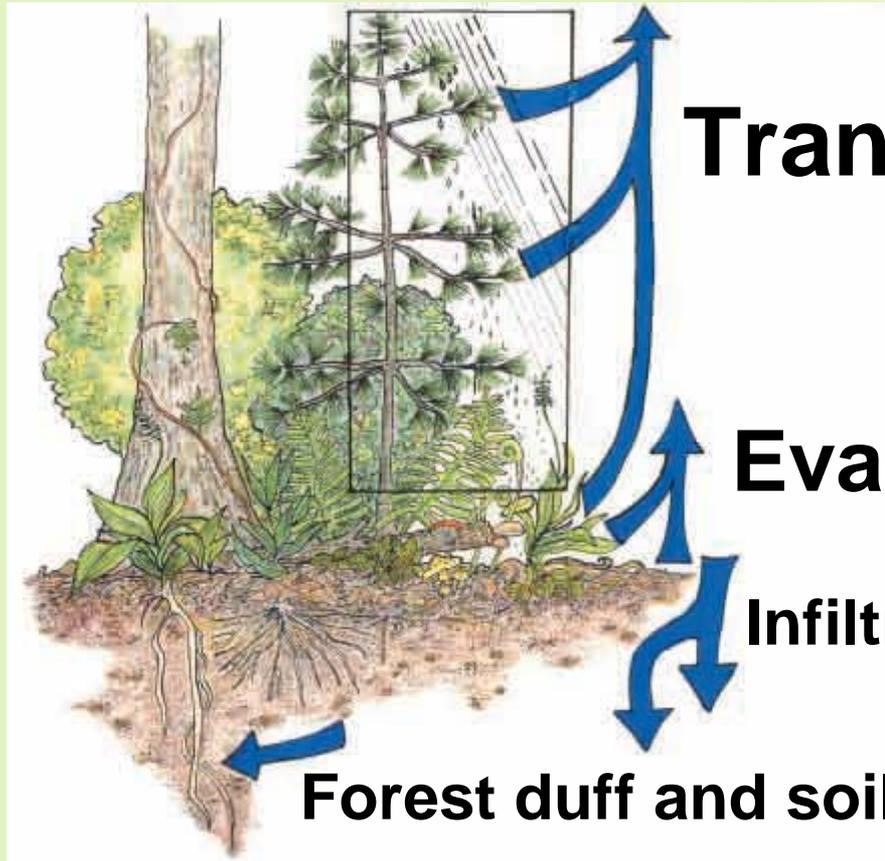


Vegetated buffers provide a low-tech, high-performance solution to polluted runoff problems.





# Importance of Layered 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)**



# High shrubs/grasses will also discourage geese from coming on shore



(Richardson's) Cackling Goose  
Lido Beach, Nassau Co., NY  
7 Jan 2005 Photo: Angus Wilson

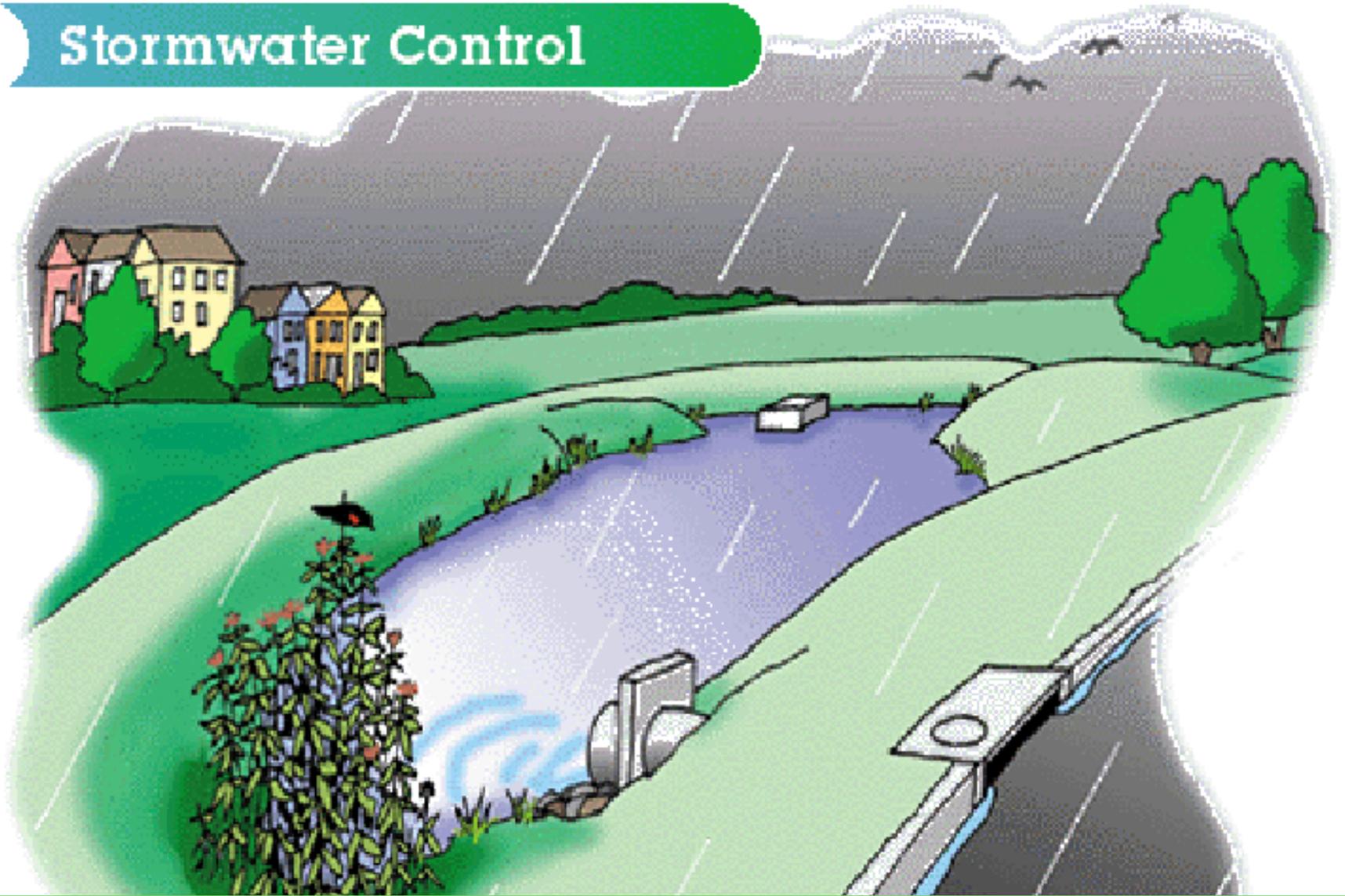




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# Stormwater Control



UNH Center for Stormwater Technology Evaluation and Verification (CSTEV):  
<http://www.unh.edu/erg/cstev/>

**Research increasingly shows  
the benefits of:**

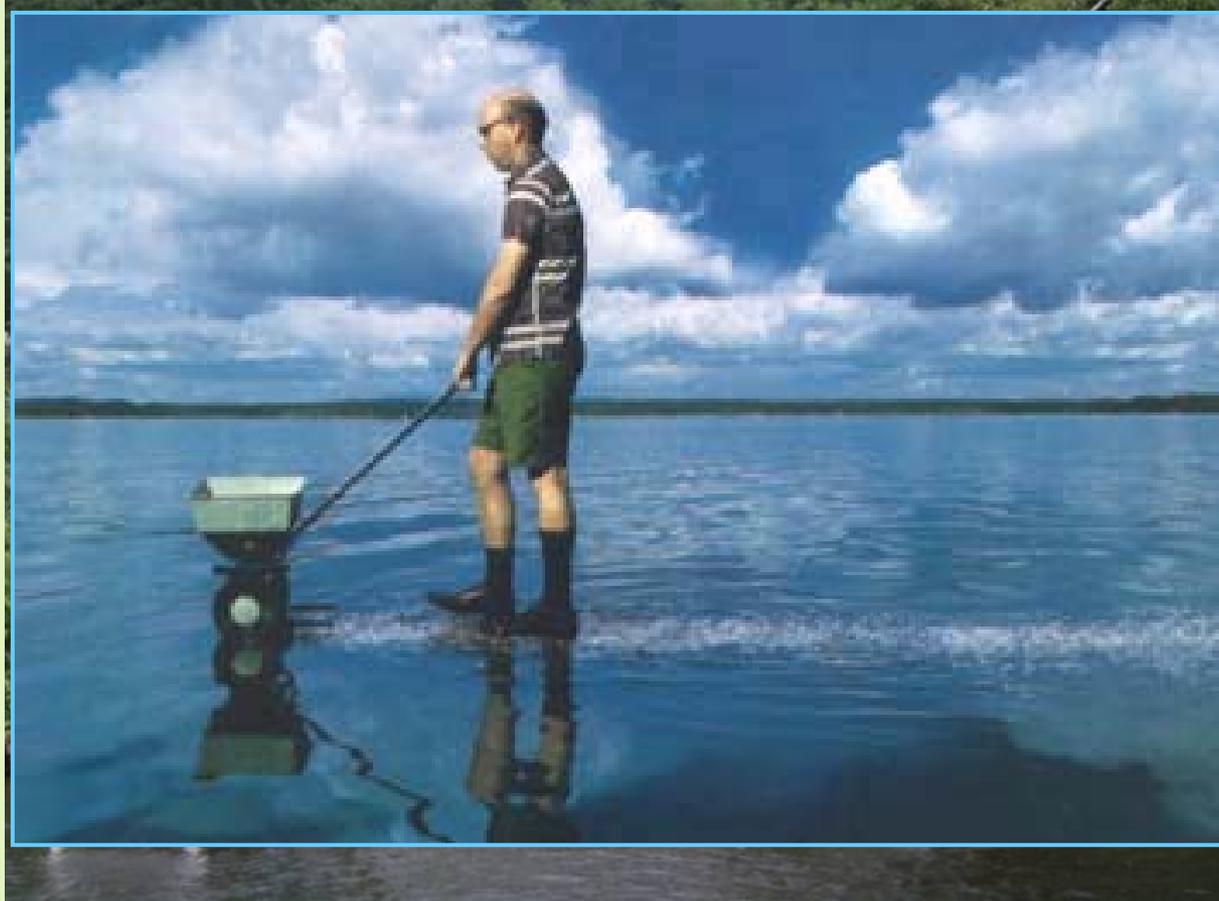
**OPEN VS. CLOSED**

**VEGETATED VS. MECHANICAL**

**INFILTRATION VS. RETENTION**



# Let's Change the Approach!



Landscape architects can have the solution



# Following the flow

- What is the extent of lands and roads above your site that contribute runoff water, and where will the runoff enter your property?
- Where does the water that runs off impervious surfaces (driveways, walkways, roof, compacted soils, plastic, etc.) go?
- How will that water, along with the additional runoff generated in your new design, run over the site?
- Where will that water then run off from your site? Does it enter the water body directly?
- Most importantly: How might you tweak your design to take advantage of these factors in creating diversions, detention and infiltration areas?



# Dealing With Home-Site Runoff

Minimize Contributing Waters Sources

- **From Off-site**

- Roads, Neighboring Properties

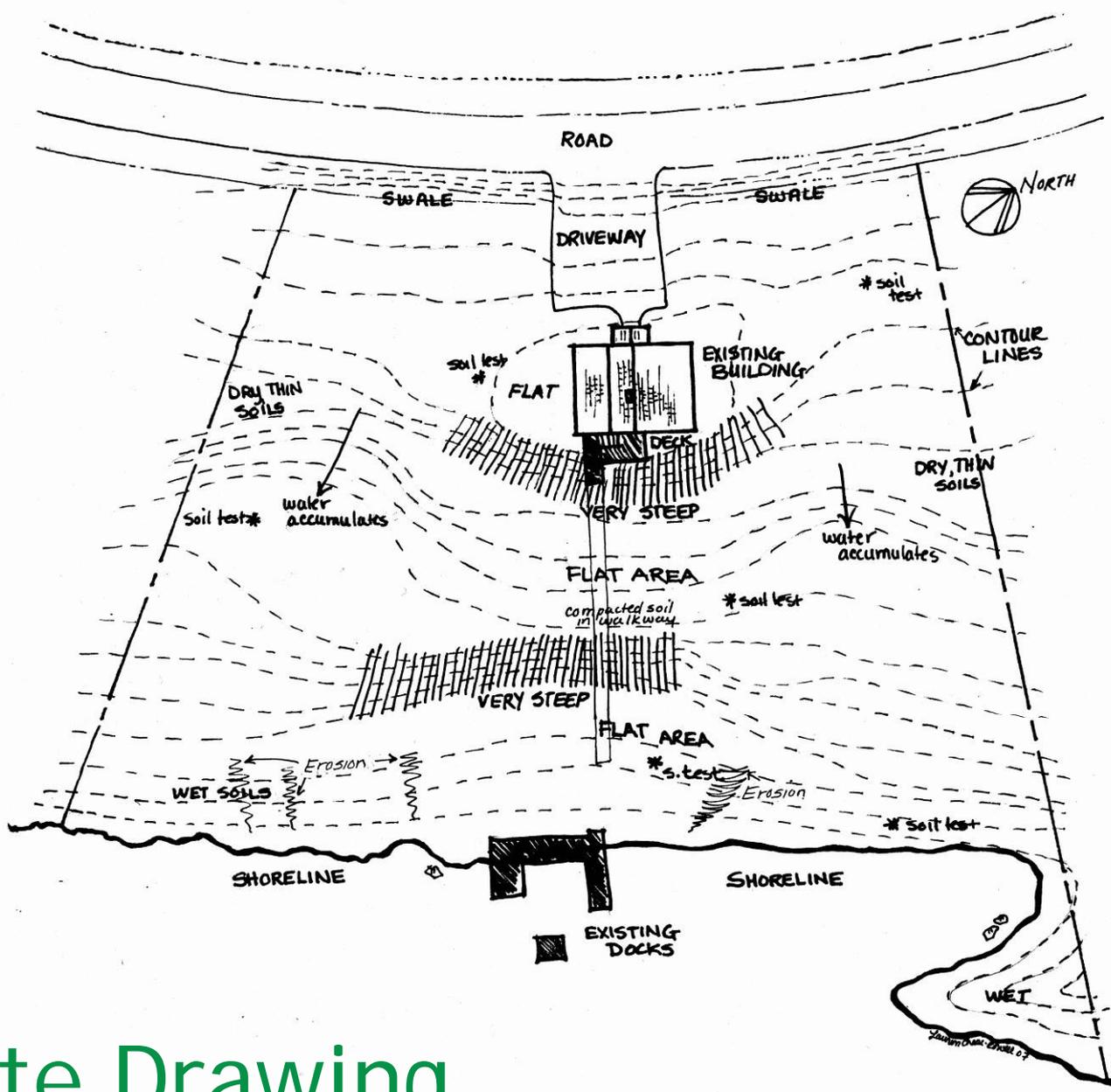
- **From Your Site**

- Driveways, Boat ramps, Foot paths, Compacted Surfaces

- Gutters, Sump Pumps

- Seeps





# Site Drawing



# Dealing With Home-Site Runoff

- Diversion -away from steep areas into vegetated areas
- Interruption- break up the flow so it can't build up velocity
- Spread the flow over a flat vegetated area
- Increase groundwater recharge
- Protect shore area with riparian buffer



# Swales and Berms

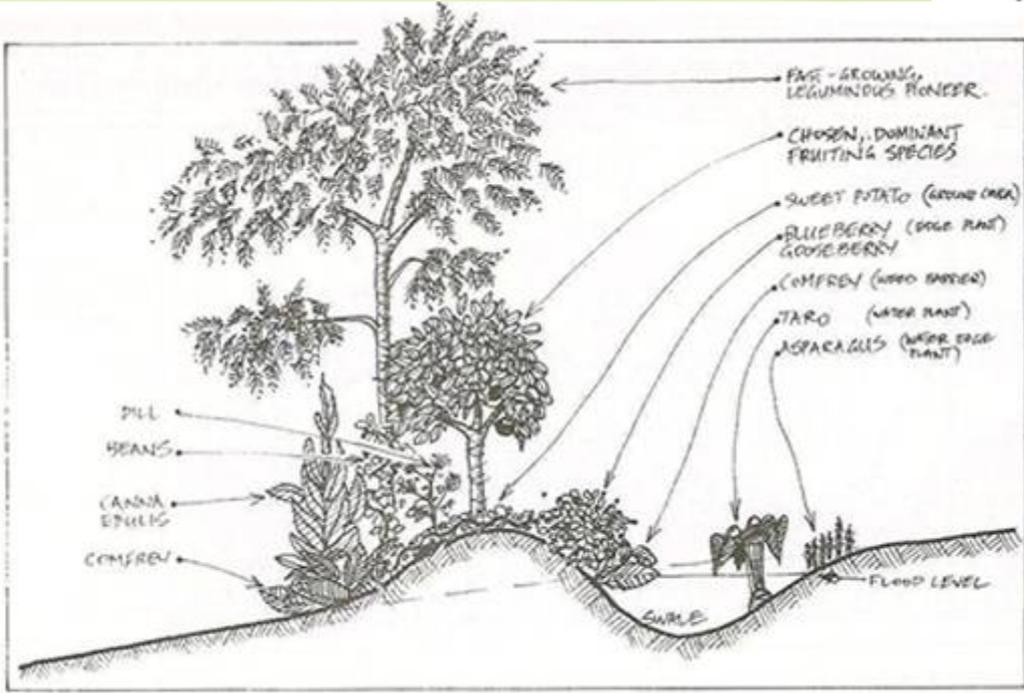
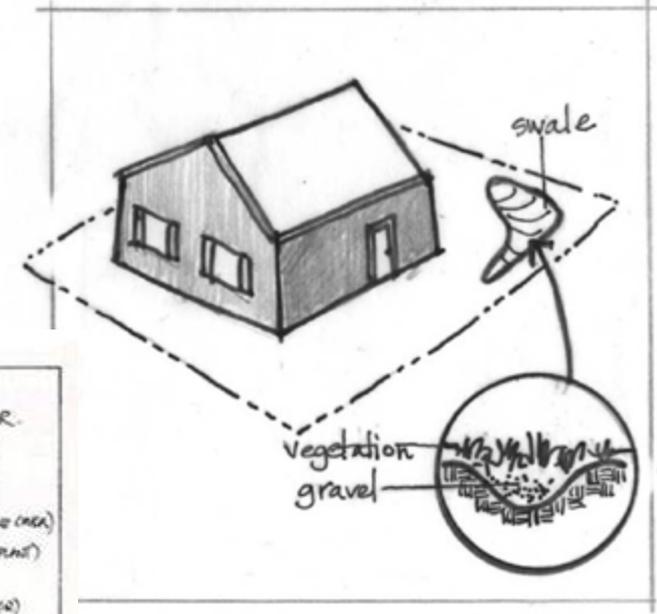


FIGURE 6.4 Trees planted off swale bank to take advantage of wet-season water.

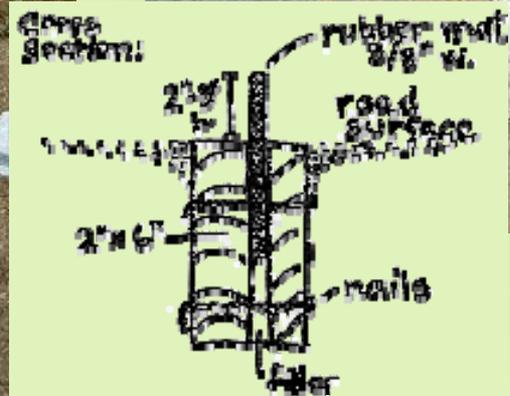
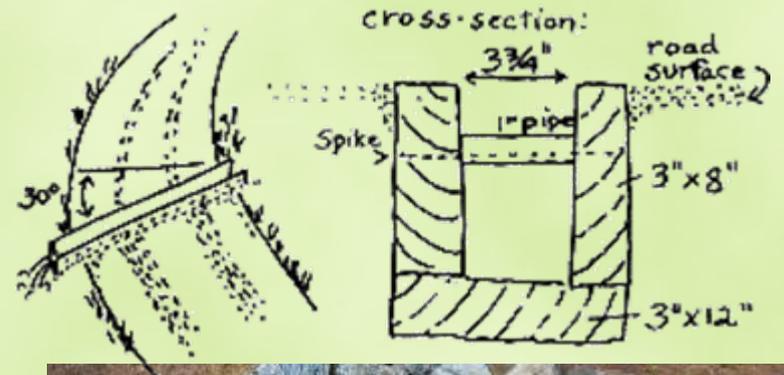
# Infiltration (Drip) Trench



# Infiltration Steps



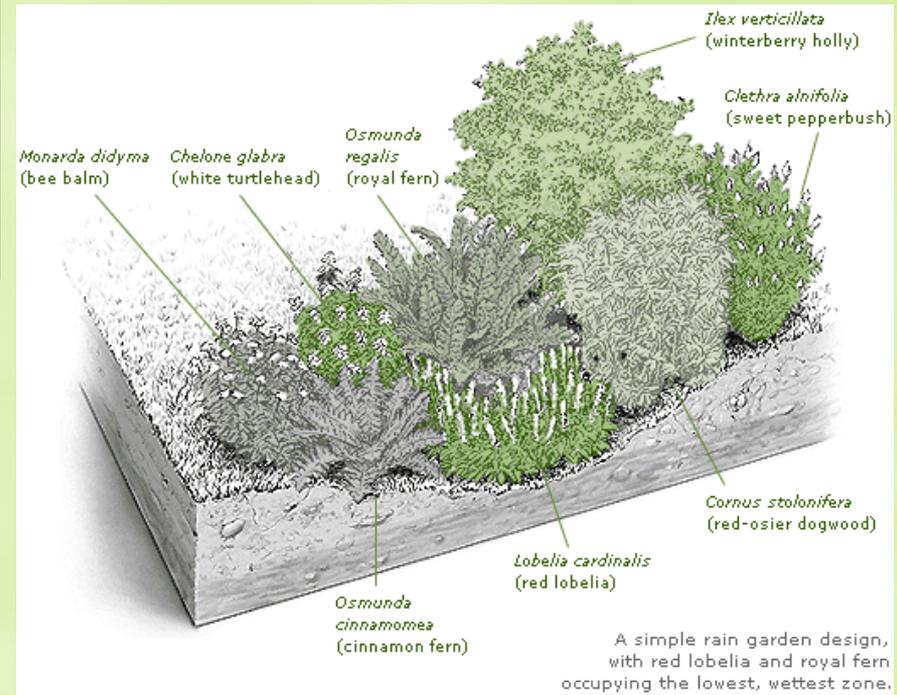
# Waterbars



# Rain gardens



- Captures and soaks up storm water runoff
- Plants that tolerate temporary ponding



# Ten design principles to help protect and improve shoreland property:

1. Protect and improve soil quality
2. Include as many vegetative layers as possible
3. Use plants to slow the flow
4. Maximize the amount of vegetative buffer along shorelines
5. Rethink the size of lawns



# Ten design principles (continued):

6. Design for low inputs
7. When choosing plants, select the “right plant for right place for the right function”
8. Design a low-maintenance landscape
9. Minimize areas of impermeable surface
10. Remember, all of your actions on land directly affect the water body





# Minimize Impervious, Use Vegetation Infiltrate





“Biolog” to reduce wake erosion

Shoreland Property Taken from Dock



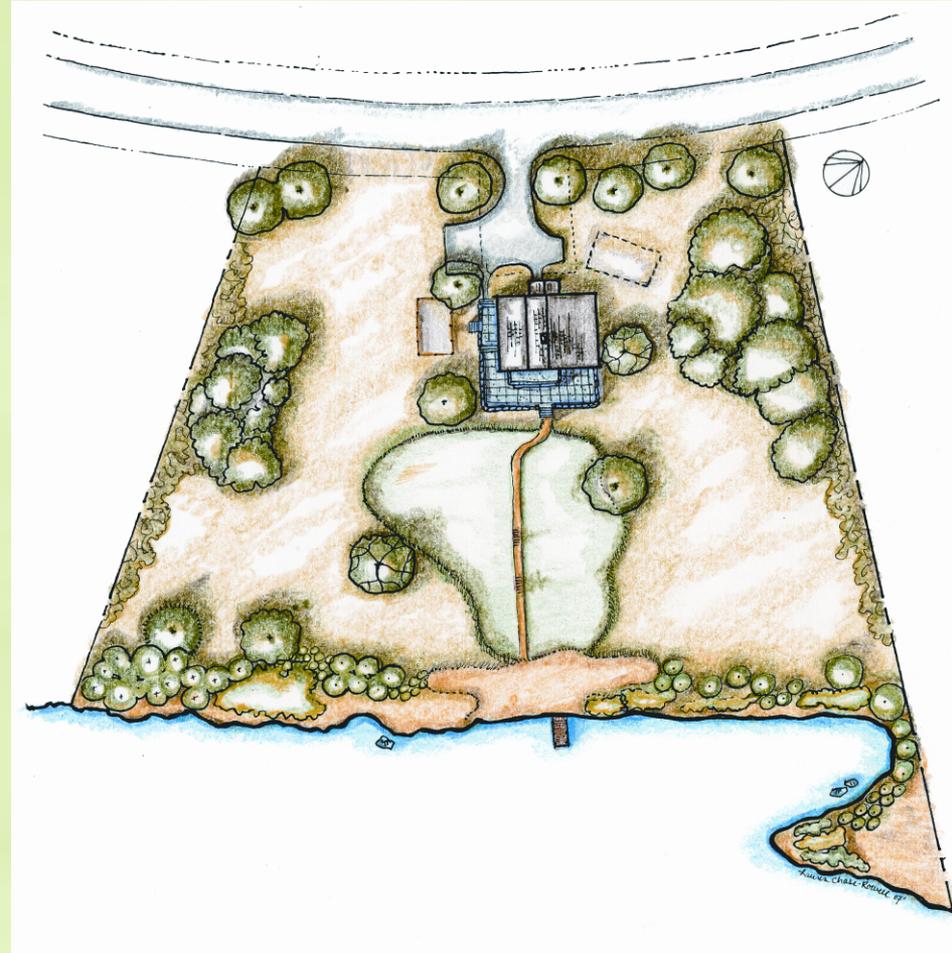
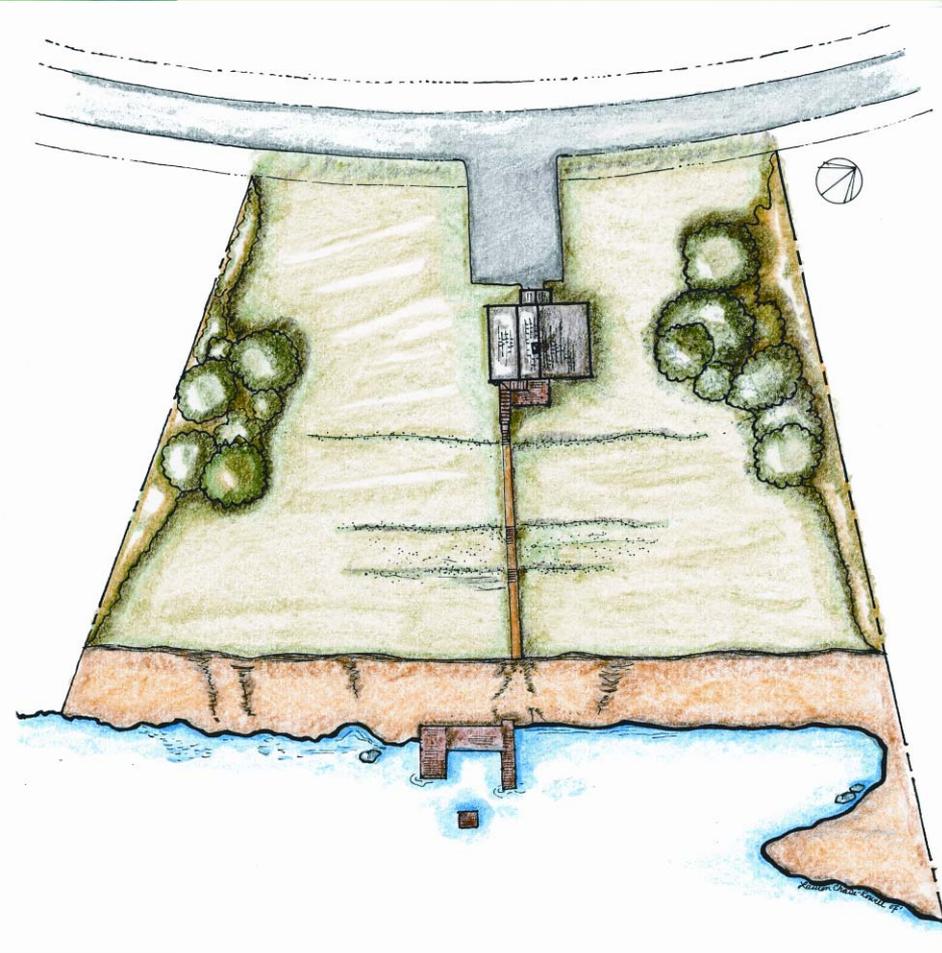
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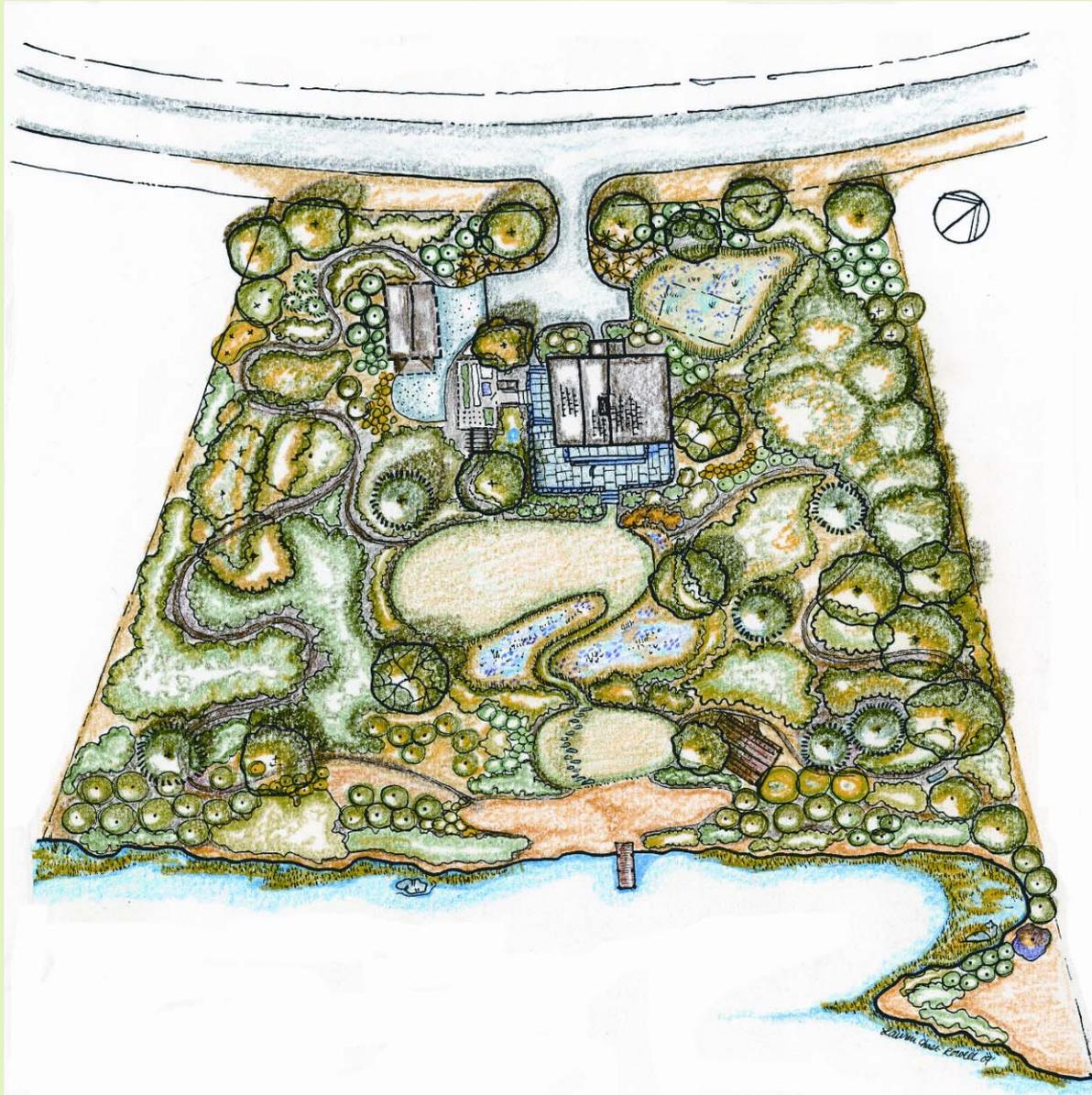


# Emergent Plants

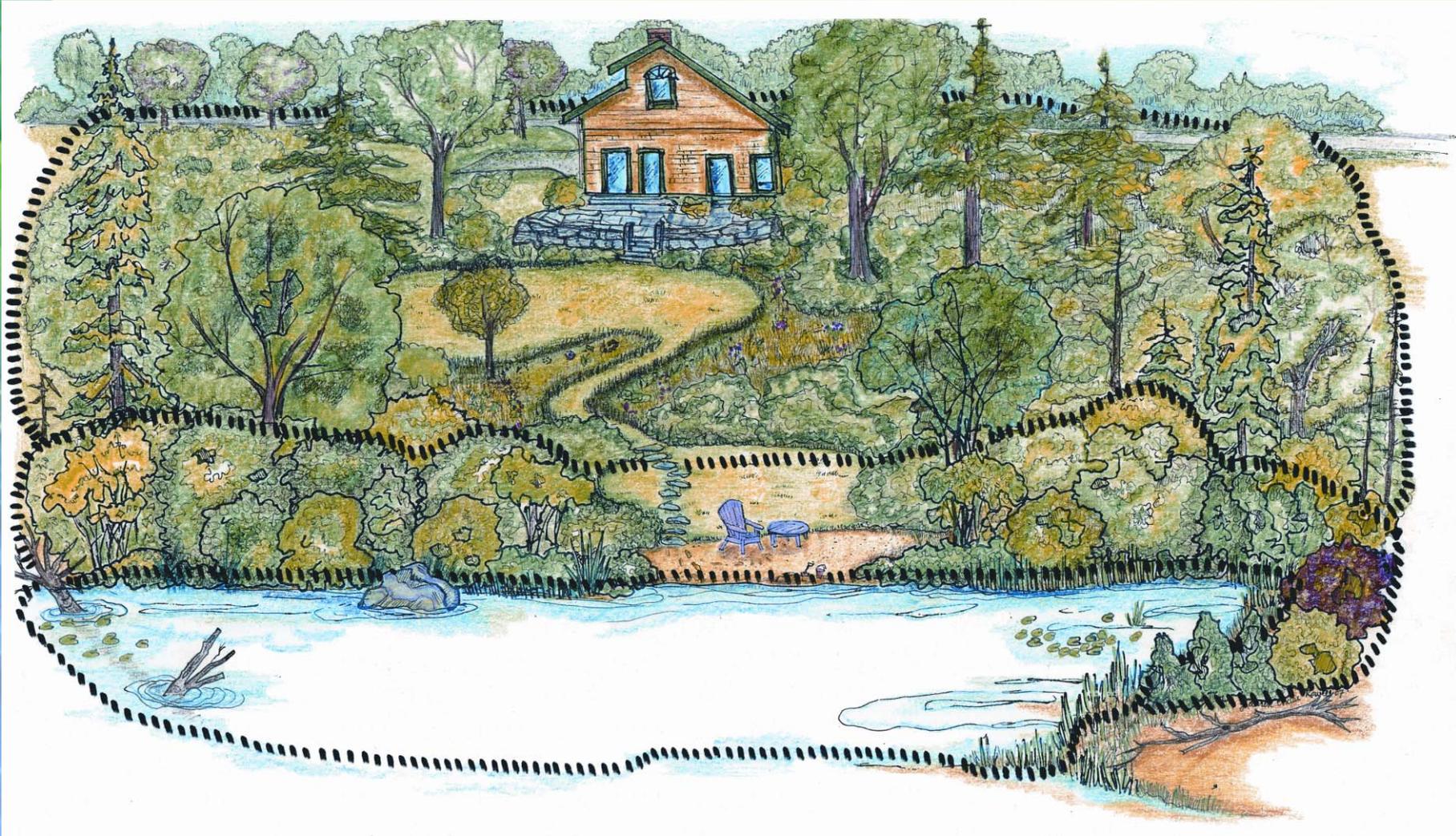


# A long-term commitment

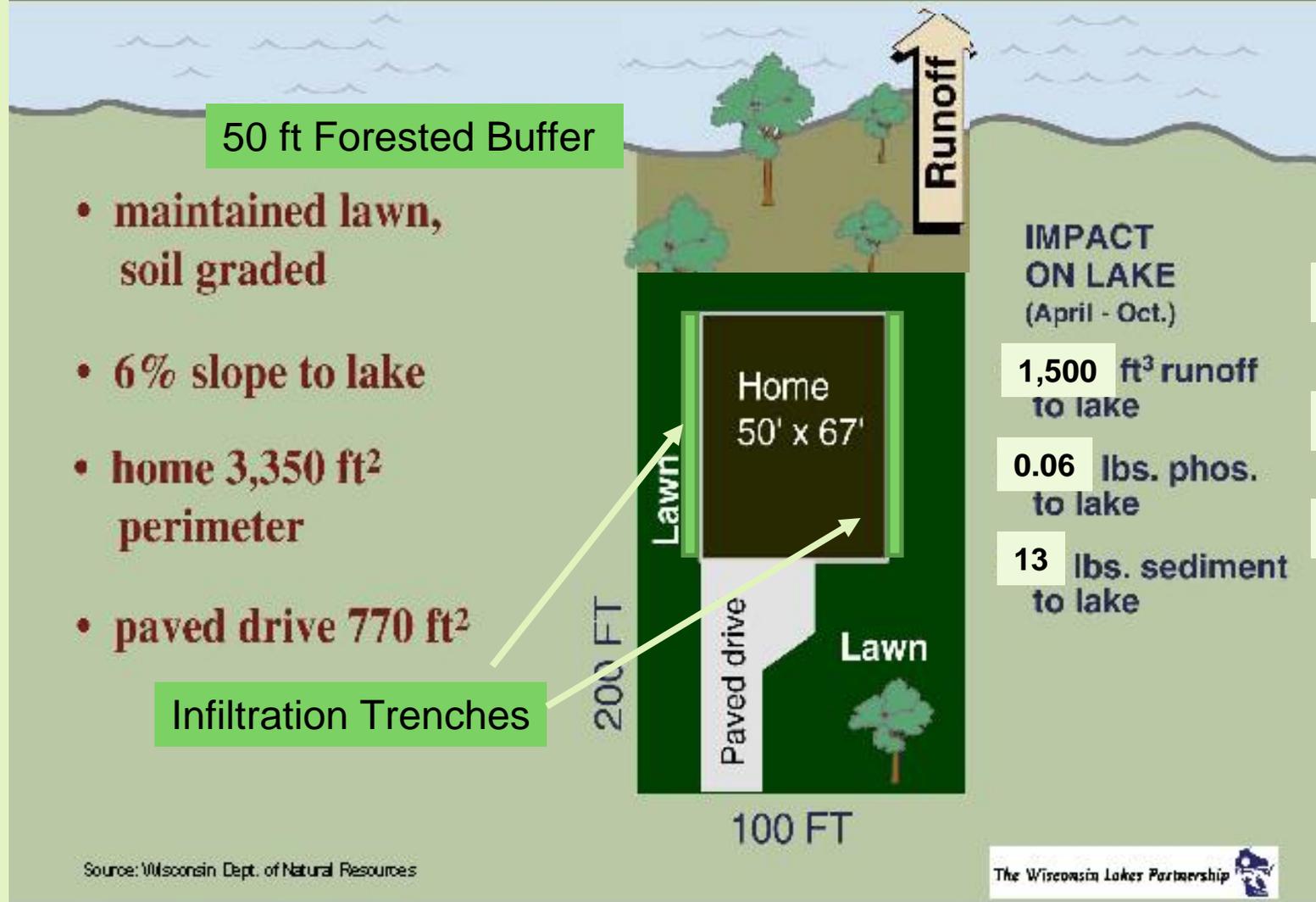




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# 1990s development – Apr.-Oct. phosphorus/sediment runoff model



**Previous Example with Best Practices**





# Evaluations

- >90% improvement in advice and recommendations to customers and citizens.
- >85% reported they are using less fertilizer and encouraging riparian buffers for clients/ themselves/ institutions.
- >95% Shared info on low impacted practices informally



# Evaluations

- “I feel much braver to try these approaches given the great materials.”
- “You gave us both the *whats* but also the *hows*.”
- “I wish all landscapers, homeowners, designers, road agent and realtors had to take this training.”
- “Its incumbent on us to let our customers know about this.”





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