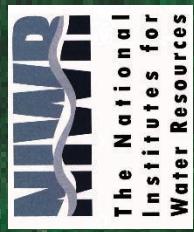
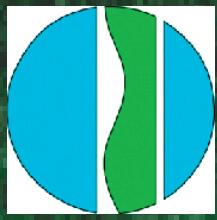


# Streamside Buffers: What are they, why do we need them, and how you can help to restore them?



Cornell University

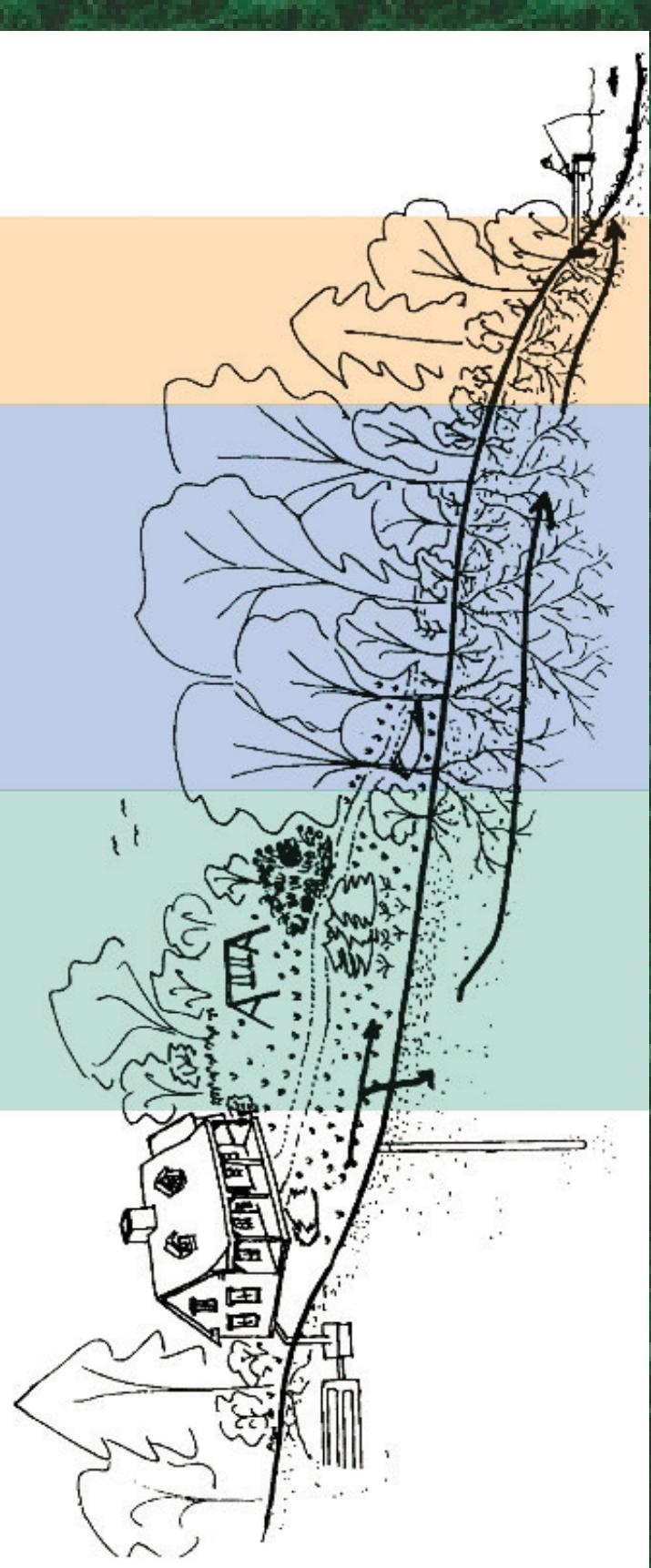


# Overview

- What is a streamside buffer?
- Importance of buffers
- Threats to buffers
- Selecting a buffer (site) to restore
- Buffer zones
- Plant species
- Designing a planting plan
- How to plant
- Follow-up maintenance



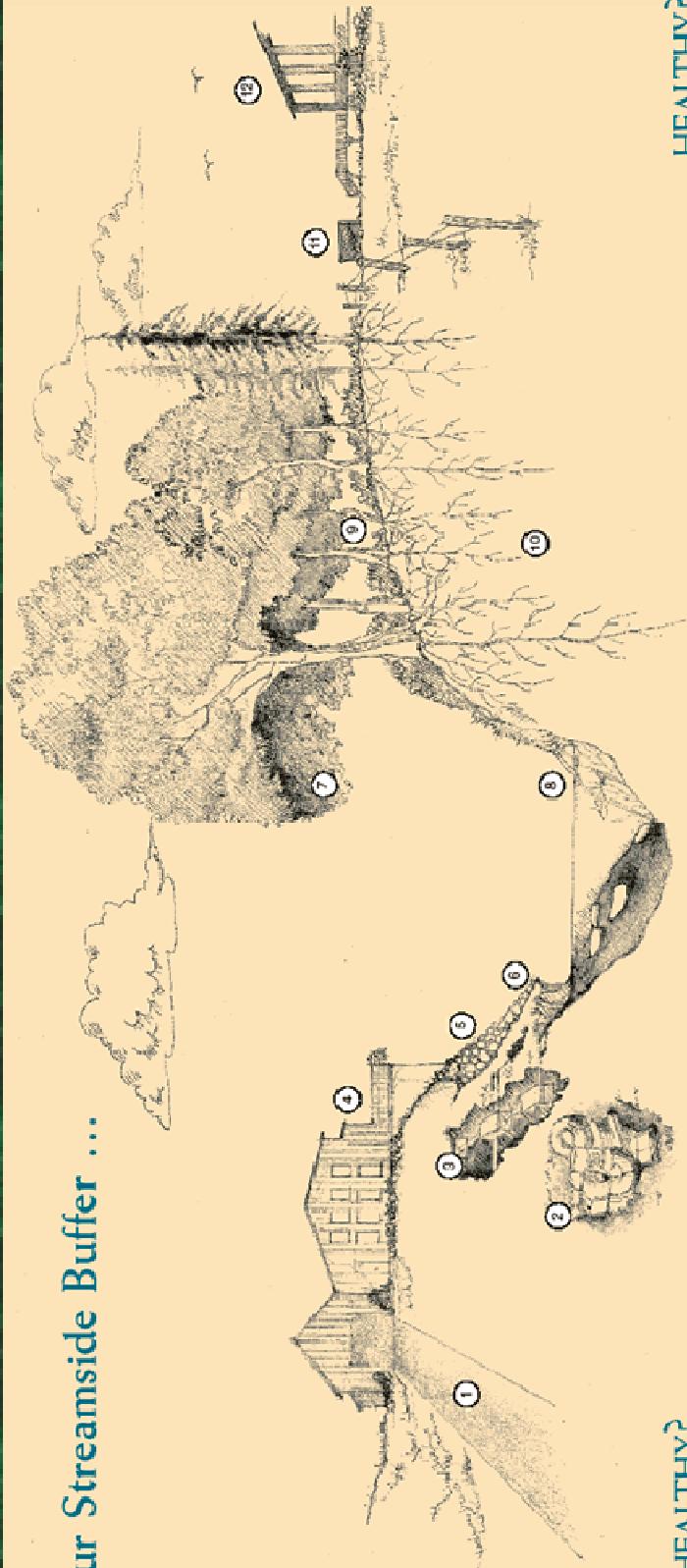
# What is a Streamside, or *riparian*, Buffer?



- Vegetated protective area between a waterbody and human activity.

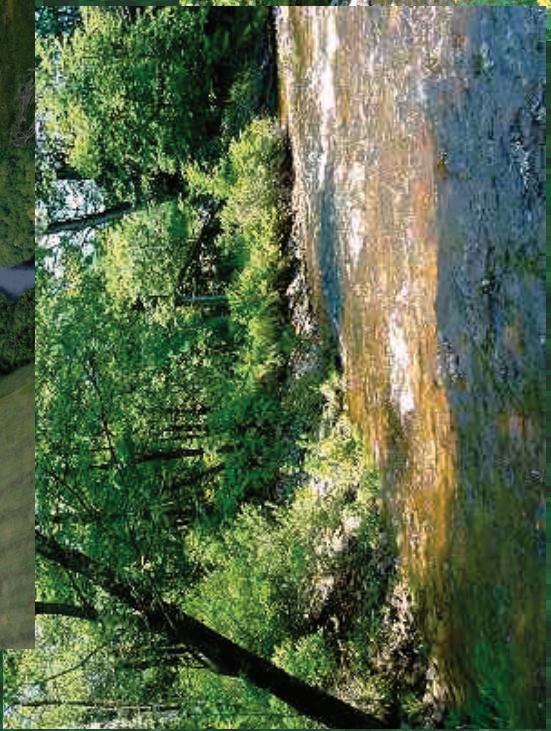
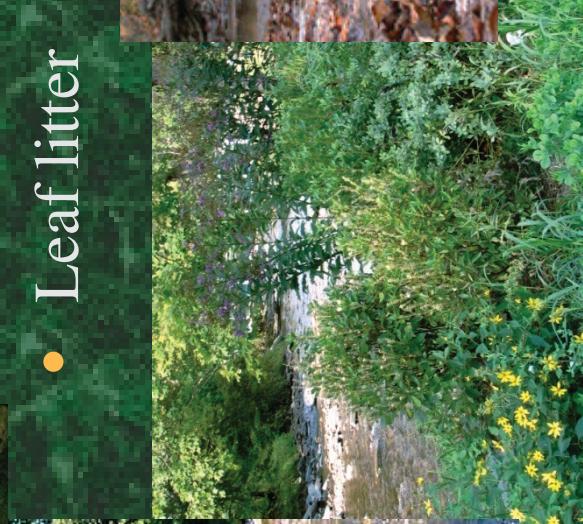
# Unhealthy VS. Healthy Buffers

Your Streamside Buffer ...



# What Does a Healthy Buffer Look Like?

- Adequate width
- Diverse vegetation
  - Overstory
  - Middlestory
  - Understory
- Shade water in summer months
- Leaf litter



# What Does an Unhealthy Buffer Look Like?

- Impervious & built structures in floodplain
- Lawn to water's edge
- Hardened shoreline
  - Inadequate buffer widths
  - Plants (grass) with weak root systems



# Ecological Benefits of Riparian Buffers

- Reduces pollution entering waterways & improves water quality
  - Slows down & filters runoff
  - Extends retention times
- Provides wildlife habitat
  - Shoreline transition zone
  - Wildlife travel corridors
- Reduces water temperatures
- Increases biodiversity
- Food source



# Economic Benefits of Riparian Buffers

- Reduces flooding
  - Absorbs high velocity flows
- Reduces erosion
  - Roots stabilize shoreline
  - Trees & shrubs dissipate waves
- Privacy screen
- Increased property value
  - Mature trees increase property value by up 20%
- Goose deterrent
- Improved fishing habitat & access



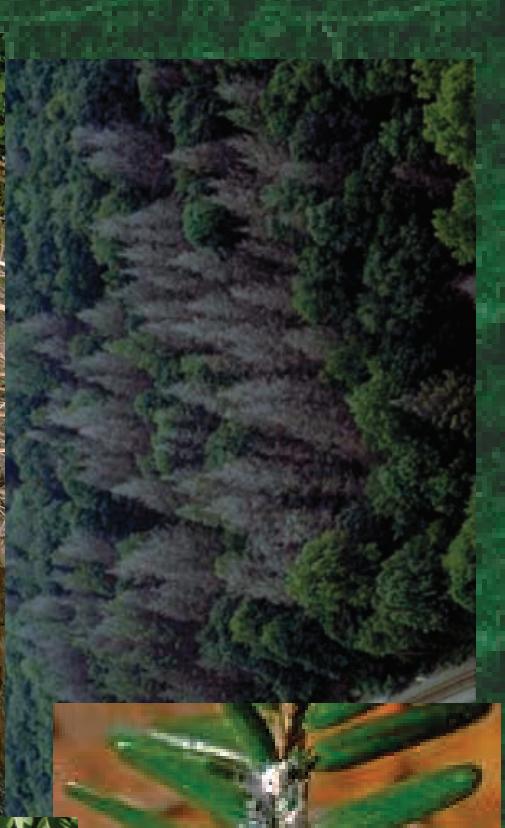
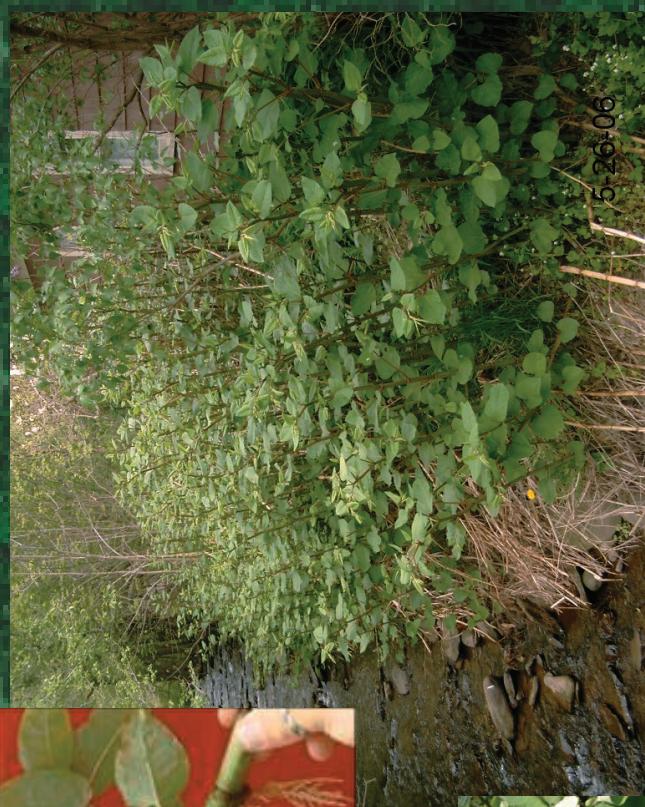
# Threats to Riparian Buffers

- Development
  - Subdivisions
  - Roads & parking lots
  - “Wal-mart Syndrome”
- Suburban attitudes
  - The perfect lawn
  - Views of river
  - Water access

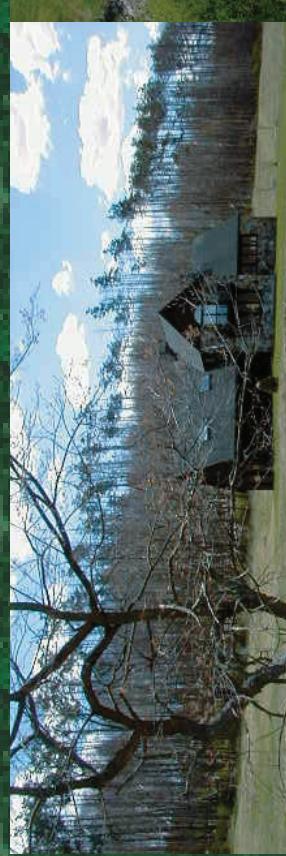


# Threats to Riparian Buffers cont.

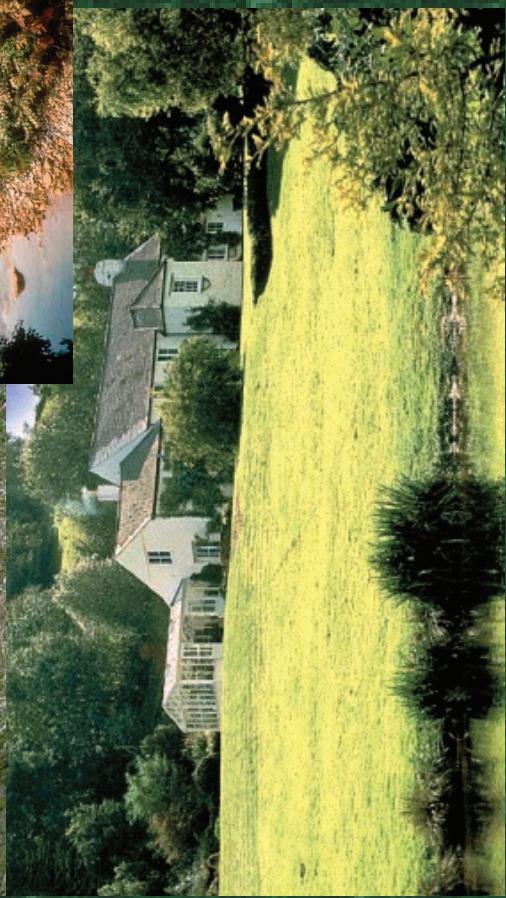
- Invasives
  - Japanese knotweed
  - Mile-a-minute vine
  - Hemlock woolly adelgid
- Infrastructure maintenance
  - Central Hudson



# Selecting a Buffer Site?



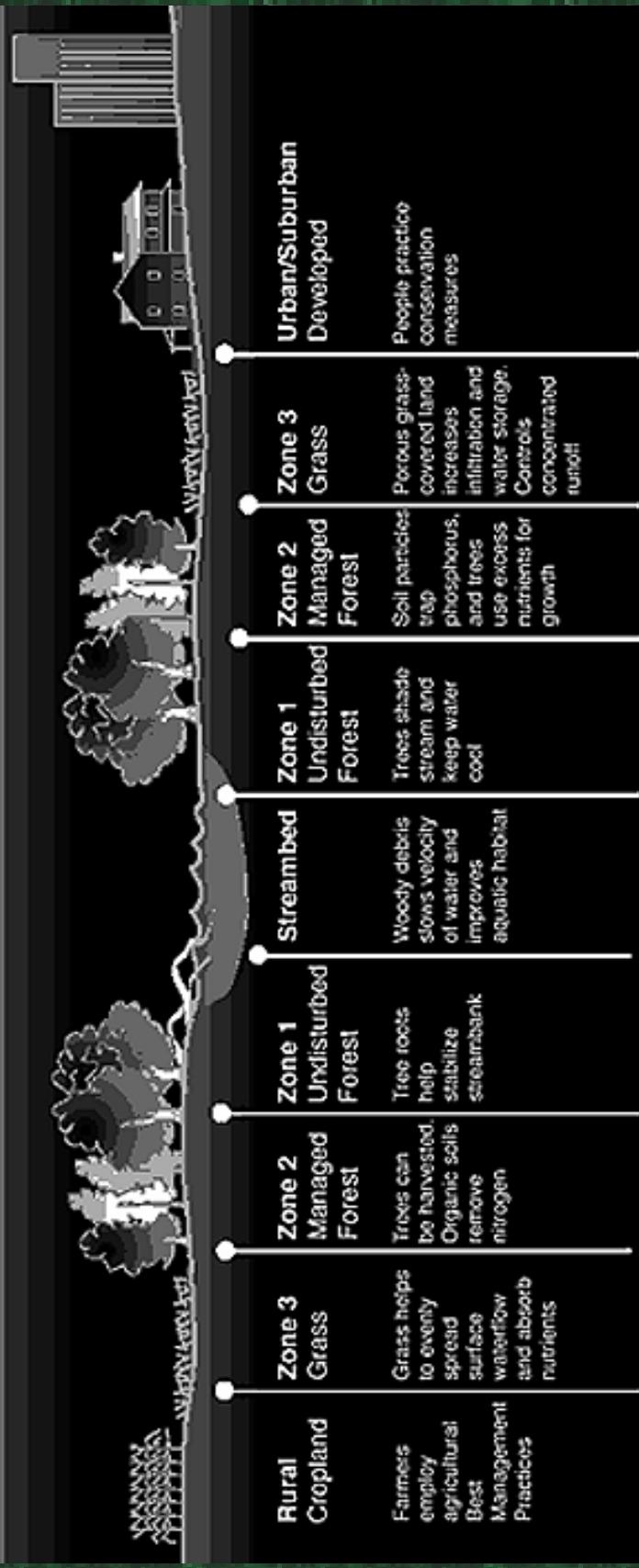
- Site Selection
  - Avoid unstable streambanks
  - Avoid buffers infested with invasive plants
- Site Preparation
  - Mowing
  - Removing and/or cutting invasives



# Designing a Riparian Buffer: The Three-Zone Concept

The width of a riparian forest buffer is site specific and dependent on the landowner's objectives

The three-zone buffer concept provides a framework for the establishment and maintenance of a long-term riparian buffer.



# Zone 1: Undisturbed Forest

- Components
  - ~15' width
  - Streambank stabilization
    - Bioengineering
    - Native riparian tree establishment
    - Provide shade
    - Provide deadfall & leaf litter inputs
- Tree Species
  - Sycamore
  - Silver Maple
  - Black Willow
- Shrub Species
  - Buttonbush
  - Willow species
  - Silky Dogwood



# Zone 2: Managed Forest

- Components
  - ~60' width
- Tree Species
  - Red Maple
  - Swamp White Oak
  - Ironwood
  - River Birch
  - Black Gum



- Shrub Species

- Serviceberry
- Red & Black Chokeberry
- Summersweet
- Redosier Dogwood
- Winterberry
- Spicebush
- Ninebark
- Elderberry
- Arrowwood Viburnum
- Cranberry Bush Viburnum
- Native Grasses
- Native Wildflowers
- Native Ferns



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# Zone 3: Grass/Transition Zone

- Components
  - ~20' width
- Native grass filter strip
  - Big Bluestem
  - Switchgrass
  - Little Bluestem
  - Indian Grass



# Available Plant Species

## Buttonbush



- Native decid. shrub
- 9'x9'
- Full sun
- Wet/Flooded soils
- Zone 1 and/or 2



## Redosier Dogwood

- Native decid. Shrub
- 9'x9' (massing)
- Full sun to part. sun
- Wet soils
- Zone 1 and/or 2

## Silky Dogwood



- Native decid. shrub
- 10'x10' (massing)
- Full sun to part. sun
- Moist to wet soils
- (will tolerate others)
- Zone 1
- Does well on streambanks

## Streamco Willow

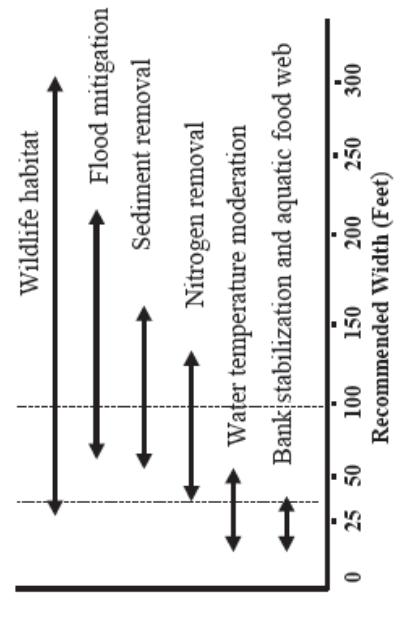


- Deciduous shrub
- 10-20' ht. (massing)
- Full sun
- Moist soils
- Zone 1
- Erosion control on streambanks

# Developing a Planting Plan

- Adapting the three-zone system to your site.
- What is your buffer intent?
- How wide will your buffer be?
- What is the length of stream you intend to plant?
- What plants have you selected?
- Are you acquiring more plants or seed?

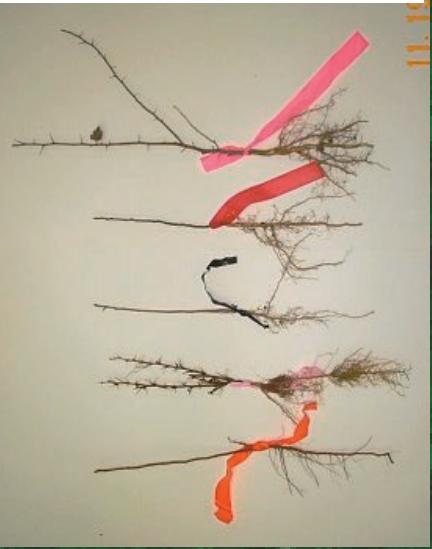
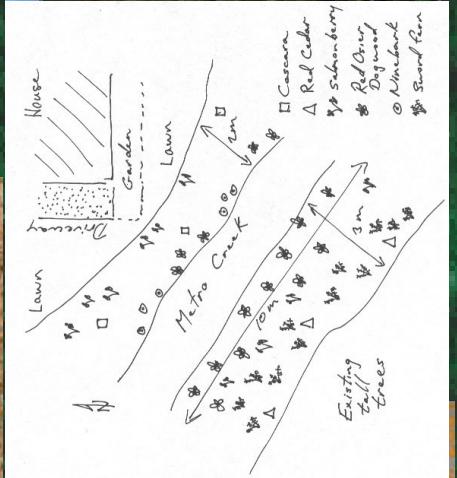
FIGURE 1. Minimum Recommended Buffer Widths for Different Functions



Spacing (ft.)	Seedlings (#) per acre (43,560 sf)
3x3	4,840
5x5	1,742
10x10	436

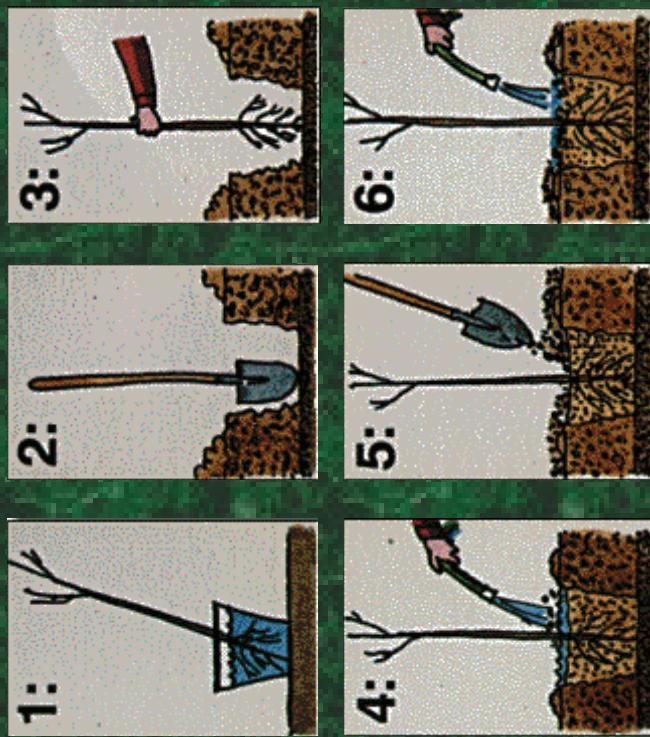
# Laying Out Your Plants

- Drawing a planting plan
- Following the contours
- Flagging seedling locations
- Spray painting seedling locations
- Field layout during planting
  - Natural groupings vs. grid
  - Flagging seedlings



# How to Plant Your Seedlings

- Keep in dark, cool area until you're ready to plant.
- During planting, keep roots moist & avoid sun (1).
- Dig a hole wider than seems necessary (2).
- Remove any grass within a 3' area around the plant.
- Spread out the roots as much as possible.
- The root crown should be even or above existing grade (3).
- Fill with native soil, firming down with moderate pressure.



- Construct a water berm & generously water (4).
- Mulch a 2-3' diameter around the seedling, to a 2" depth (5).
- Water again (6).

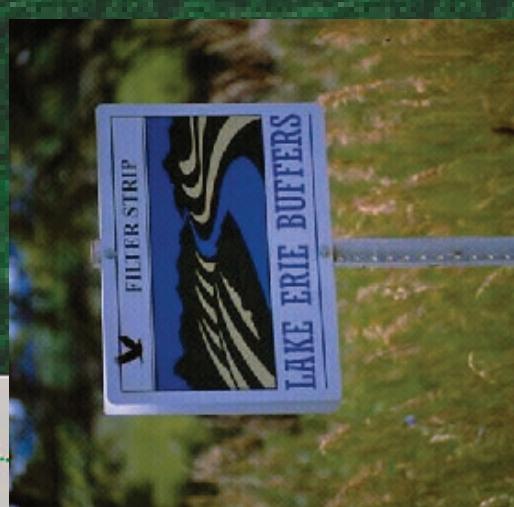
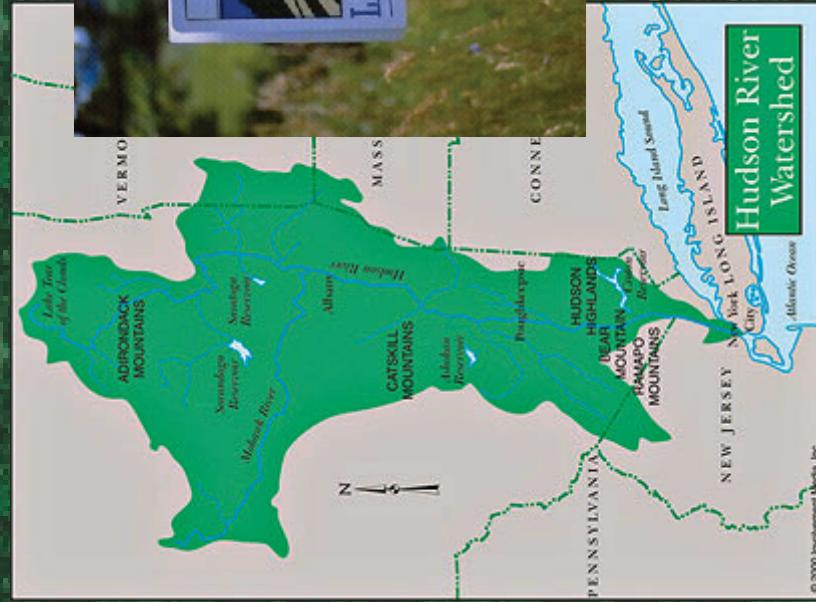
# Follow-up Maintenance



- Weeding!!
- Weed mats
- Tree tubes and tree nets
- Watering during droughts
- Pruning dead branches
- Recording survivability rates, noting flood events
- Signage

# What's in Store for the Future?

- Fall planting projects
  - Native trees and shrubs
- Mapping riparian buffers in the Hudson River Estuary Watershed
- Backyard Buffer program
- Riparian buffer website
- Riparian buffer signs
- Lower Hudson Riparian Buffer Conference (Nov. 2007)



STORY 25

# Any Questions?



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