

Shorelines



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Presentation Overview

- Why native plants and shoreline naturalization?
- Planting considerations
- Working with landowners
- Site visit and design
- Finalizing the site plan
- Organizing planting day
- Erosion control and methods
- Recommended regional plants



Current Landscaping Issues



INVASIVE SPECIES

- Periwinkle/Myrtle, Goutweed, False Spirea – currently recommended shade plants and groundcover
- Promotion, popularity and spread of *Miscanthus* species
- Source of serious invasions (e.g. Japanese Knotweed, aquatic invasives, *Phragmites Australis*)



Photo credit: Adirondack Daily Enterprise

Phragmites Australis



Photo credit: Julia Sutton



Photo credit: Julia Sutton

Kudzu - “The plant that ate the south”



Photo credit: BBC News

Available for sale until proven invasive - “Cannot be shipped to the U.S. where it has become a serious weed in the south.” - Richters Seed Catalogue

Current Landscaping Issues

LOSS OF HABITAT AND FUNCTION



Photo credit: Julia Sutton

Current Landscaping Issues

EXPERTISE AND KNOWLEDGE

Lack of native plant expertise and attitudes towards native plants

NEONICOTINOID PESTICIDES AND BEE DEATHS

“The plants grown in nurseries and greenhouses are safe for people to buy and plant in their yards. By the time homeowners put the plants in their garden any pesticide residues would be virtually undetectable or not existent altogether.” -Canadian Nursery Landscape Association

Not always the case

Why Natural Shorelines?

BIODIVERSITY

- “RIBBON OF LIFE” – core habitat and wildlife corridors
- 80% to 90% of all life depend on the shoreline
- Fish and wildlife depend on this habitat - logs, branches, leaves, debris, undercuts, vegetation, nooks and crannies



Why Natural Shorelines?

RUNOFF AND WATER QUALITY

- Slow runoff from roads, driveways and buildings and helps mitigate flooding
- Filters contaminants and sediment before entering the lake
- Scientific studies have proven that in order to maintain water quality, 75% of the shoreline must be kept in a natural state for a minimum of 100 feet.

If there is significantly less than 75%, water quality will degrade over time.

Why Natural Shorelines?

WATER TEMPERATURE

- Helps keep water temperatures cooler in the summer
- Temperature changes can result in a change of species



Photo credit: Julia Sutton

Why Natural Shorelines?

COST – EFFECTIVE EROSION CONTROL

- Natural materials bend
- Much easier to maintain, versus manmade structures that break and are much more costly
- Help absorb wake action from boats



Photo credit: Julia Sutton

Why Natural Shorelines?

RESILIENCE

- Upcoming forest pests and diseases
- Impacts from climate change
- Impacts from invasive species



Photo credit: NRC



Planting Considerations

- What are the existing site characteristics?
- Is there erosion?
- What type of naturalization fits?
- Natural vegetation at or near the site
- Buffer size



Photo credit: Julia Sutton

Planting – Site Considerations

- Soil (or lack of) type
- Soil moisture
- Light requirements
- Slope
- Know your regional plants



Photo credit: Julia Sutton

Photo credit: Julia Sutton

Questions For Landowners

- Existing or desired openings (view points) and structures (docks, gazebos, boathouses)
- Septic system location
- Existing issues – erosion, geese, etc.
- Drainage areas/wet areas
- Areas to hide
- Level of desired maintenance
- Water source and ability to water gardens
- Desired plants or wildlife
- Opportunities to restore areas and minimize disturbance? (e.g. pathways to water)

Potential Features

- Habitat creation - on land, shoreline and in-water
- Garden themes – pollinator garden, food garden, flowers, etc.
- Areas or species of interest
- Reinforce areas of runoff



Photo credit: Julia Sutton

Decide on a Long-Term Site Plan

- Stage areas if necessary
- Site maintenance
- Expectations
- Watering and ability to maintain plants until established



Photo credit: Julia Sutton

Site Visit

- Equipment – shovel, measuring tape, camera
- Plant and soil i.d. books are helpful
- Sun movement throughout the day, based on the direction the property faces
- Clues on changes in soil moisture or water table—changes in plant communities
- Dig holes in several areas and determine soil type(s) and moisture level
- Measure planting area



Photo credit: Julia Sutton

Site Visit

- Existing slopes and erosion potential
- Site challenges – areas that will take longer for species to establish (e.g. bare sand, thin and rocky soil), runoff issues (erosion), building proximities
- What plants are at the site which will eventually start to colonize the area?
- Invasive plant species on-site?
- Photos

Finalize Site Plan

- Mimic nature – different height levels and textures
- Incorporate features agreed upon with landowners
- Break planting areas down between plant types
- Calculate area to be planted
- Create species list and site design
- Project budget including other supplies (tree guards, soil, compost)
- Make sure landowners are comfortable with budget and plan before ordering
- Permit?

Organize Planting Day

- Using volunteers?
- Plan for rain
- Orchestrate supply deliveries and equipment
- Organize with landowners
- Plant layout or markings
- Refreshments and appreciation



Photo credit: City Stream Watch, Rideau Valley Conservation Authority

Erosion

- Some erosion is okay
- Natural process, especially in river systems
- Undercut banks create great fish habitat
- Consider slope
- Consider all approaches
 - do nothing
 - degree of interference (dependent on site characteristics)



Erosion

- Depending on severity, bioengineering is the least invasive and most cost-effective
- Bioengineering may require machinery
- Slope measurements are required for bioengineering
- Timing consideration - done in late fall or early spring – need dormant plant material

If you haven't done bioengineering before, consult bioengineering professionals or agencies

Bioengineering

- Combines engineering with ecological function (mimics what nature does)
- Old science, used since 28 B.C.
- Uses specific plant species (willows and dogwoods) to create structures that form large root masses to stabilize soil
- Nodes sprout along branches when contact soil
- Results in a much stronger root mass than a single plant



Bioengineering

- Immediate erosion control
- Exposed vegetation increases roughness on the bank, causing flow to dissipate its energy against the structure instead of the soil
- Dense root systems hold soil together and increase overall bank stability
- Vegetation acts as a buffer against the abrasive effect of transported materials
- Dense vegetation can cause sediment deposition



Bioengineering - Benefits

- Aesthetic benefits
- Improved habitat values (nesting, shelter, food, nutrients)
- Improved water quality (filters contaminants, uptake of phosphorus)
- Structural benefits – root network protects soil
- Intercepts high water flows and helps dissipate flow energy
- Improves water infiltration
- Plants repair themselves and are flexible, unlike harder structures
- Can be used on steep or sensitive slopes (limited access, no heavy machinery)

Bioengineering Methods

- Fascines
- Brush Mattresses
- Combination of fascines and brush mattresses
- Crib Walls
- Soil Lifts

Fascines

- Long, tubular structures, built from overlaying live cuttings of willows and dogwoods
- Installed horizontally along the shoreline or vertically to help mitigate gully erosion
- Use in conjunction with other bioengineering techniques



Photo credit: Julia Sutton

Fascine – Staked and Installed



Photo credit: Julia Sutton

Brush Mattress

- Place a fascine at low water mark
- Place intertwining layers of willows and dogwoods in fan shapes, at top of fascine
- Stake and cover with dirt
- Stabilizes shoreline slope and can be used on steep sites
- To deal with a large slope, alternate brush mattresses and fascines up the slope



Brush Mattress Installation



Photo credit: Julia Sutton

Installation Finished



Photo credit: Julia Sutton

Live Crib Wall

- Interlocking logs or timbers filled with rock, soil and live cuttings or rooted plants
- Live cuttings or rooted plants will develop roots and top growth to take over structural functions
- Maximum height is usually less than 6 feet
- Critical to set the toe securely below the estimated maximum scour

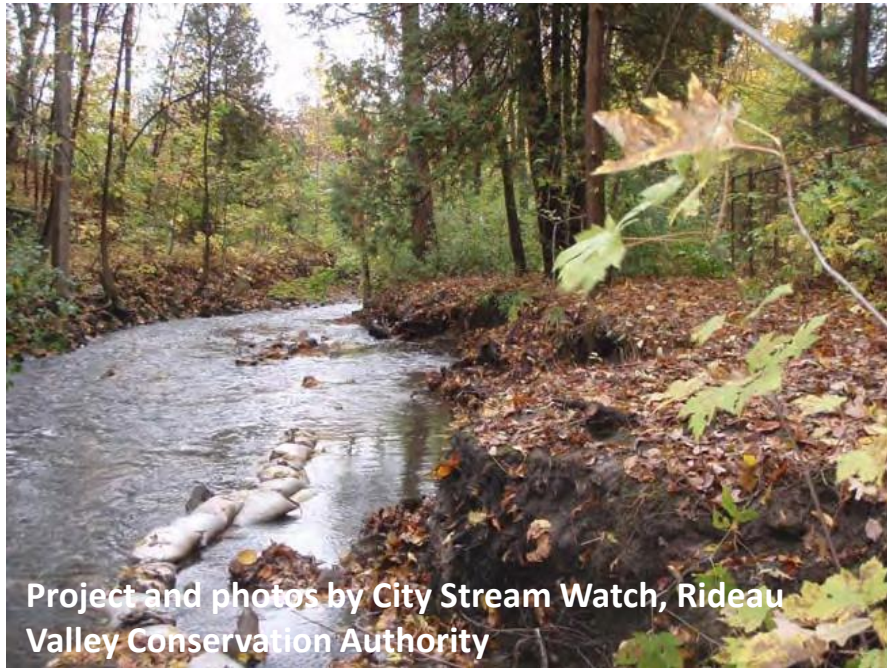


Photo credit: Julia Sutton

Soil Lifts

- Staircase of wrapped soil, with live cuttings between layers
- Plant top of slope with native vegetation
- Install fascine at bottom of soil lift
- Requires machinery
- Use on low to high slopes
- Useful where soil runoff is a concern

Soil Lifts – Before and After



Building and Installing the Fascine



Project and photos by City Stream Watch, Rideau Valley Conservation Authority



Project and photos by City Stream Watch, Rideau Valley Conservation Authority

A Few Years Later...



Project and photos by City Stream Watch, Rideau Valley Conservation Authority

Bioengineering Considerations

- Slope
- Site Access
- Permits
- Sediment Control
- Timing window for in-water works

Typical Site Conditions and Characteristics

- Rocky (open or shady) – shrubs and trees that can survive poor soils (White Pine, Hemlock, etc.)
- Open/grassy/marshy – herbaceous, water tolerant plants
- Shady/mature – mainly treed, undergrowth a mix of shade tolerant shrubs and tree saplings, native shade herbaceous species



Recommended Species – Bedrock/Shallow Soil

- Herbaceous Plants – Goldenrod, Wild Strawberry, Canada Columbine, Pussytoes
- Shrubs – Wild Blueberry, Sweetgale, Sweet Fern, Ninebark
- Trees – White Birch, White Pine, Hemlock, White Cedar



Photo credit: Julia Sutton

Recommended Species – wet, low slope, open/sunny



Water's edge

- Arrowhead, Pickerelweed, Bur-rush, Sedges, Bulrushes, Water Lilies, Blue Flag Iris, Sensitive Fern, Sweet Flag, Water Plantain, Cattails

Shoreline Plants

- Swamp Milkweed, Cardinal Flower, Nodding Bur-Marigold, Tall Meadowrue, Blue Vervain, Spotted Joe-Pye Weed, Boneset



Recommended Species - shade

- Ground layer – Canada Mayflower, Foamflower, Bunchberry, Blue Bead Lily, Prince's Pine, Jack-in-the-Pulpit, Trout Lily, Large Flowered Bellwort, Large Leaf Aster, Woodland Strawberry, Wild Ginger
- Herbaceous Layer – False Solomon's Seal, Wild Sarsaparilla, Ferns, Spikenard, White Snakeroot, Blue-stem Goldenrod
- Shrubs – Beaked Hazel, Alternate Leaved Dogwood, Hobblebush, Maple Leaf Viburnum
- Vines – Virginia Creeper
- Small Trees – Striped Maple, Mountain Maple



Photo credit: Julia Sutton



Photo credit: Julia Sutton

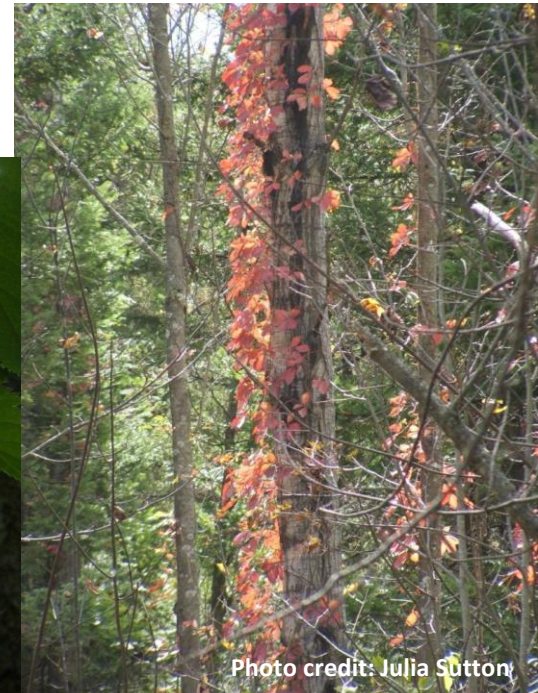


Photo credit: Julia Sutton

Native Shade Groundcovers



- Native groundcovers are effective AND beautiful
- LOTS of choice for native, shade plantings!



Recommended Shrubs

- Dogwoods – Red Osier and Alternate Leaf
- Viburnums - Highbush Cranberry, Nannyberry, Wild Raisin
- Bush Honeysuckle
- Black Chokeberry
- Ninebark
- Meadowsweet
- Serviceberry
- Smooth Rose
- Sweetgale
- Sweet Fern
- Elderberry
- Shrub Willows
- Winterberry
- Buttonbush



Trees – What's Around?

- Basswood
- Beech
- Maples
- White Pine
- White Spruce
- White Cedar
- White Birch
- Yellow Birch
- Oak
- Red Pine
- Tamarack
- Cherries (Pin, Choke, Black)



Fish and Wildlife Habitat

DO

- Overhanging vegetation
- Multiple layers and species of vegetation
- Consider corridors
- Use appropriate lighting
- Add in-water structure – logs, branches, rocks, plants
- Allow sucker growth
- Trim “windows” in trees for views

DON'T

- Clean up the property
- Cut down trees to create views
- Hardscape the shoreline
- Recommend or use pesticides or fertilizers
- Use lights that zap insects



Photo credit: Julia Sutton

Plant a Pollinator Garden

- Sustain, not just attract
- Species: Butterfly Weed, Asters, Goldenrod, Coneflower, Joe Pye Weed, Pearly Everlasting, Wild Bergamot, Blue Vervain, Wild Strawberry, Canada Wild Rye, Dense Blazing Star, Swamp Milkweed, Cardinal Flower, Great Blue Lobelia, Smooth Rose, native shrubs, Basswood
- Consistent blooms throughout summer
- Water source
- Nesting areas – sticks, branches
- Resting/sunning areas – rocks, logs
- Can mix in non-invasive edible annuals (dill, cilantro)



Have Fun! Plant a Native Edible Patch

- Ostrich Fern (fiddleheads)
- Wild Leeks
- Wild Gooseberries
- Wild Raspberries
- Wild Blueberries
- Common Blackberry
- Elderberries
- Black Chokeberry
- Chokecherry
- Highbush Cranberry



Photo credit: Julia Sutton

Questions?



Photo credit: Julia Sutton