Rouge Growing Green

A Series of Green Infrastructure Workshops

Rouge Friendly Landscaping: Native Plants for Better Water Quality

Alliance of Rouge Communities

OURS TO PROTECT

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Why is Green Infrastructure Important?

Noel Mullett, Jr.

Wayne County Department of Environment

What is Green Infrastructure?

- Green Infrastructure is nature…its vegetation and the soil it grows in.
- The purpose of GI is to sustain life on earth.

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Green Infrastructure can be…

- Parks & Nature Preserves
- Native Trees
- River Friendly Lawns
- Wildflower Gardens
- Riparian Buffers
- Rain Gardens
- Green Roofs
- Native Plant Meadows
- Schoolyard Habitats
- No-Mow Areas
- Butterfly Gardens
- Streambank Stabilization

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The Solution 2 Pollution is Vege2tion!!!!! ☺

- Mother Nature is a Better Engineer than We Will Ever Be!!
- Plants are Our Teachers, Our Models, Our Waste Treatment/Pollution Control Experts
- Native Plants are the Heart, the Arteries, the Skin and the Hair of Our Earth.

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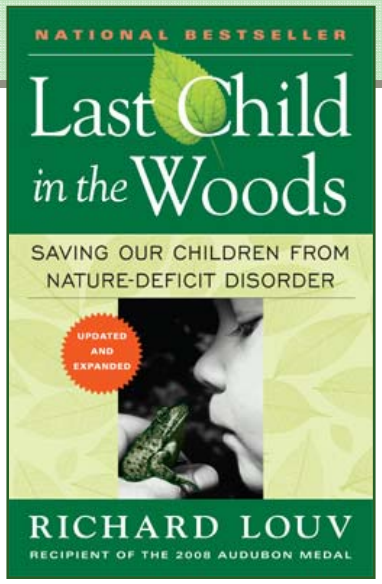
Why is Green Infrastructure Important?


Because its Nature Close To Home…



KIDS NEED NATURE!!

Lost Green Infrastructure causes:

- Nature Deficit Disorder
- Attention Deficit Disorder
- Child Obesity & Diabetes

- Loss of Purpose/Spirituality
- No sense of "place"

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GI SAVES MONEY!!!

-Energy Savings
-Storm Water Detention
-Maintenance Cost savings

Hines Park Grow Zones
-$85,000 storm water detention savings
-$84,000 maintenance per year savings

Child chasing butterfly … PRICELESS!!

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What Happens to the "Green Infrastructure"

Determines the:

- Quality of Our Water,
- Quality of the Air We Breath
- Quality of Our Recreation Opportunities – the Quality of Our Communities

Ultimately "Green Infrastructure" Determines the:

- the Economic Viability of Our Communities,

AND

- the Quality of Our Lives!!!

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Use Your Head - You Live in a Watershed !!

- Recognize Your Home is Water Front Property
  - impervious surfaces
  - storm sewers
- Admit You are Part of the Problem and Want To Be Part of the Solution!!
- Use Water As a Resource **Not** a Waste.

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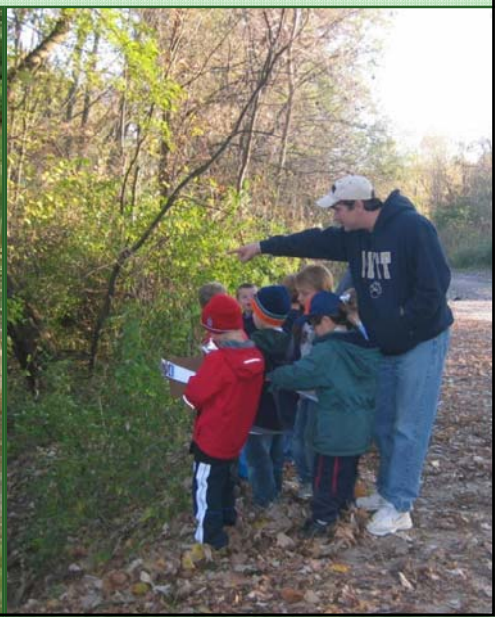
Why is Green Infrastructure Important?



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Rain Gardens and Bioswales

Leigh Thurston,
Landscape Architect

Canton Township

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What Are They?

- A Rain Garden is a small depression in the landscape designed to collect surface water.
- A Bioswale is a shallow ditch designed to collect surface water.

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Rain Garden

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Bioswale

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Why?

- Trap Water
- Absorb Water
- Filter Pollutants
- Reduce Flooding in Watershed
- Create a Different Garden Feature Adding Diversity to Landscape

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Drainage Problem

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Examples

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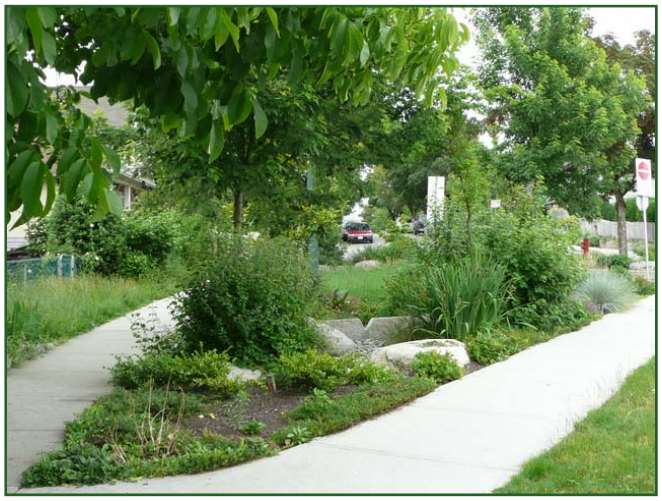
Examples



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Examples

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Examples

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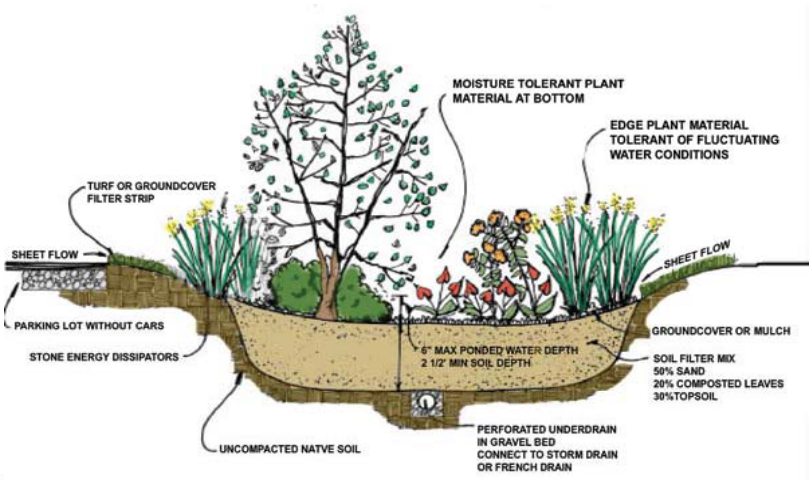
Construction



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Approach

- Large area – native seed
- Residential scale – native wildflower and grass plugs, shrubs
- Formal
- Informal

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Considerations

- Soil
- Location
- Saturation
- Scale
- Flower Color, Season

Native Plants

- Native plants adapted to our region and wet conditions are well suited for rain gardens and bioswales
  - Hardiness
  - Beneficial butterflies and insects, Hummingbirds
  - Deep roots soak up rain
  - Filter pollutants

Flowers

- Boneset
- Joe-pye Weed
- Marsh Blazingstar
- Sneezeweed
- Culver's Root
- Boneset
- Beardtongue
- Golden Alexanders
- Cutleaf Coneflower
- White Turtlehead
- Blue Vervain
- Great Blue Lobelia
- Blue Flag Iris
- Ironweed
- Spiderwort
- Mountain Mint
- Monkey Flower
- Bottle Gentian

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Flowers

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Grasses

- Switch Grass
- Big Bluestem
- Indian Grass
- Prairie Dropseed
- Graceful Grass
- Sedge

Grasses

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Shrubs

- American Cranberrybush
- Black Chokeberry
- Buttonbush
- Ninebark
- Meadowsweet
- Nannyberry
- Redosier Dogwood
- Shrubby Cinquefoil
- Shrubby St. Johnswort
- Spicebush
- Steeplebush
- Michigan Holly
- American Elder

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Shrubs

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Maintenance

- Mulch
- Weeding
- Pruning
- Cleanup
- Plant Replacement
- Watering

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Plymouth-Canton Community Schools Field Elementary School's

Schoolyard Habitat

Rick Plecha, MSE
Director

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Goal Statement

The goals of Field School's Schoolyard Habitats are:

- Revert a small portion of the playground to a more naturalized state
- Integrate the K-5 curriculum with the naturalized habitat
- Provide protection for the plants and animals
- Increase student exposure to the habitat's diversity

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Timeline

- 1997 - initial inquiry, data collection
- 1998 - staff and PTO invited, student submit designs
- 1999 - Friends of the Rouge, Media One, Inc., science curriculum integrated, outdoor classroom constructed
- 2000 - Wayne County Environmental Improvement Grant, bird houses and nesting boxes introduced

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Timeline

- 2001-EPA Grant awarded through Tilton Associates, Inc., Friends of the Rouge and Field Schoolyard Habitat partnership.
- 2002 planning and design phase
- 2003 Pond and webcam installation

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Timeline

- 2003 Eagle Boy Scout Project – covered walkway
- 2005 Environmental Badge Project – Girl Scout Bird house
- Bat house installation
- Boy Scout Planter Boxes installation

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Timeline

- 2006-2009 Introduction of native plants
- Maintenance of Nature Center
- Recording of plant and animal species
- Ongoing Boy and Girl Scout projects

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Schoolyard Habitat Plants and Animals

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Integrating the Curriculum

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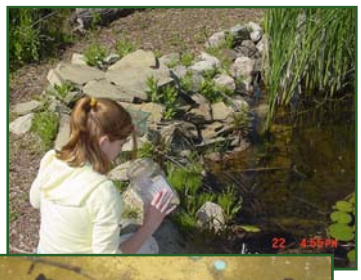
Integrating the Curriculum



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Integrating the Curriculum

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Protecting Nature

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Bonus Benefits

- Respect for the outdoors
- Increase knowledge of how science and math is used to increase understanding of the natural world
- Increased awareness of the interdependence of diverse life forms found living at the Nature Center

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Detention Basins: Maintenance & Enhancements

Kelly C. Karll, P.E.
Senior Civil Engineer

SEMCOG
Southeast Michigan Council of Governments

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Achievable Outcomes

Covington Square Subdivision (2002)

Covington Square Subdivision (2007)

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Achievable Outcomes

Echo Forest Subdivision

Echo Forest Subdivision

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Achievable Outcomes

River Meadow

River Meadow

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Achievable Outcomes

Central Park South (2007)

Central Park South (2009)

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Maintenance Responsibility

- Counties
- Municipalities
- Private Property Owners

- Agreements are Key to Identifying Responsibility
- Covenants & Restrictions
- Bylaws
- Develop a Maintenance Plan

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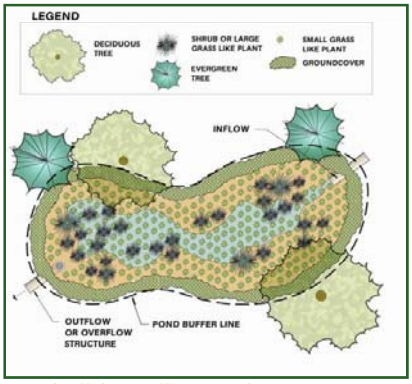
Maintenance Agreements

- Recordable Document
- Identify Storm Water Facilities
- Include in Easement for Public Access with Legal Description
- Construct to Plans/Specs – Approval of As-Builts
- Long-Term Maintenance Plan

Maintenance Evaluation: Design Parameters

- Review Engineering and Landscape Plans. As-Builts/Final Measures are Critical
- Final Approval? Maintenance Bonds/Letters of Credit
- Know your Design
- Understand Functionality
- Constraints
- Maintenance Agreement on File



www.land2plan.com/Stormwater.htm

Design Parameters: Prep for Field Evaluation?

- Type of Basin
- Design Storm and Opportunities /Limitations to Retrofits
- Presence of Forebay or Other Pretreatment
- Location of Access and all Structural Features
- Was it Constructed to Approved Plans?

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Inspection Basics: What & When?

- Structural Components
  - Inlets/Outlet Pipe
  - Embankment
  - Clogging
- Good Housekeeping –
  - Trash/Debris
  - Street Sweeping
  - Hire Contractor
  - Illegal Dumping
- Vegetation –
  - Presence of Erosion
  - Plant Diversity
  - Invasive Species
- Sediment Management
  - Sediment Plumes
  - Mechanical Dredging

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Field Evaluation: Structural Features – Inlet Pipes

Immediate Repair Needed

Vactor/Sewer Truck @ $100/hour
Backhoe @ $50/hour
(plus labor)
Catch Basin Cleaning @ $120 each

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Field Evaluation: Structural Features – Outlet Pipe/Structure

Clogged Outlet

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Field Evaluation: Structural Features- Outlet Structure

Immediate Repair Needed

- Clogged/Blocked Outlet Causing Change in Permanent Pool

Routine Maintenance Needed

- Erosion Around Pipe/Structure
- Vegetation Growing in Stone
- Clogging of Stone

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Field Evaluation: Structural Features

- Emergency Spillway & Embankments
  - Inspect for Seepage
  - Changes in Vegetation Color, Species, Diversity on Downstream Side
  - Professional Consultant; Dam Safety; Civil/Geotechnical Engineer

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Field Evaluation: Vegetation

- Upland Areas
- Pond Edge
- Deep Water
- Restore Eroded Areas
- Establish Native Plantings
- Inspect for & Remove Invasive Species

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Field Evaluation: Vegetation

- Upland Areas
- Erosion/Bare Areas
- Convert to Riparian Buffer
- Deters Unwanted Waterfowl

aster, marsh blazing star, prairie bergamot, black-eyed Susan, cosmos

1) Herbicide turf; wait 2 weeks
2) Rototill
3) Soil Enhancement
4) Plant Seed and Stabilize

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Field Evaluation: Vegetation

- Wetland/Pond Edge (0″ to 18″ Depth)
- Plant Natives/Diversity
- Nursery Habitat

Arrow arum, pickerel weed, softstem bulrush, iris, sweet flag

1) Order Plants Late Fall/Winter
2) Schedule Volunteers/Dates to Plant
3) Plant Deep to Shallow
4) Plugs Easy to Install

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Field Evaluation: Vegetation

White and Yellow Water Lilies

- Deep Water (18″ +)
- Lower Water Temperatures
- *Bare Root vs. Weighted Seed*

1) Order Plants Late Fall/Winter
2) Schedule Volunteers/Dates to Plant
3) Plant Deep to Shallow
4) Plugs Easy to Install

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LID Manual for Michigan
Appendix C Recommended Plant Lists

Zone A

Planting Zone = two-to-four inches below water level

These species require continual inundation within the given water depths in order to thrive. Although slight, short-term variances may be tolerated (+/-five inches for a period of 48 hours or less), water levels must remain in this range for a majority of the growing season for maximum plant growth and survival.

Botanical Name	Common Name	Height	Color	Bloom Time	Sun	Salt Tolerant	Ecoregion
Woody Species:							
Cephalanthus occidentalis	Buttonbush	15'	White	Jun-Aug	F/PS	N	51,55,56,57
Grasses/Sedges/Rushes:							
Acorus calamus	Sweet flag	1'-4'	Green	May-Jun	F/P	N	50,51,55,56,57
Scirpus acutus	Hard-stemmed bulrush	4'-6'	Brown	Apr-Aug	F	Y	50,51,55,56,57
Scirpus validus	Great bulrush	4'-8'	Brown	May-Aug	F	Y	50,51,55,56,57
Sparganium americanum	American bur reed	2'-3'	Green	Jun-Aug	F/P	N	50,51,55,56,57
Sparganium eurycarpum	Common bur reed	2'-4'	Green	May-Aug	F	N	50,51,55,56,57
Forbs:							
Asclepias incarnata	Swamp milkweed	3'-5'	Pink	Jun-Sep	F/P	N	50,51,55,56,57
Decodon verticillatus	Swamp loosestrife	2'-4'	Purple	Jul-Sep	F/P	N	51,55,56,57
Iris virginica	Blue flag iris	2'-3'	Purple	May-Jul	F/PS	N	50,51,55,56,57
Pelandra virginica	Arrow arum	2'-3'	Green	Jun-Jul	F/PS	N	55,56,57
Pontederia cordata	Pickerelweed	1'-3'	Violet	Jun-Sep	F/P	N	50,51,55,56,57
Sagittaria latifolia	Arrowhead	1'-4'	White	Jun-Sep	F/P	N	50,51,55,56,57

Representative Zone A Species

Buttonbush

Swamp Milkweed

Pickerel Weed

Arrowhead

Blue Flag Iris

Source: JFNew

LID Manual for Michigan – Appendix C Page 412

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Field Evaluation: Sediment Management

- Bare Areas on Side Slopes
- Bank Slope Erosion
- Edge Slope Erosion
- Erosion Around Structures
- Sediment Accumulation

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Field Evaluation: Sediment Management

- Monitor Sediment Accumulation
- Compare Design Permanent Pool Depth to Field Conditions – Bathymetric Survey
- Presence of Significant Plumes
- Low Flow Channel Full

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Field Evaluation: Sediment Management

<u>Immediate Repair Needed</u>

- Design 3' of Permanent Pool
- Field Inspection 6"

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Field Evaluation: Good Housekeeping

- Trash Removal
- Street Sweeping
- Illegal Dumping
- Access Area
- Fencing
- Source Control-Other LID Techniques

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Invasive Species

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Common Invasive & Nuisance Aquatic Species

- Cattails
- Purple Loosestrife
- Phragmites
- Algae
- Curly Leaf Pondweed
- Eurasian Milfoil
- Starry Stonewort
- Chara

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Common Invasive Species: Cattails

- Level 1 Cattail Presence
  - Interspersed in Native Vegetation
  - Enhances Diversity
  - Utilizes Excess Nutrients from Fertilizers
  - Provides Shade /Habitat
  - Stabilizes Soil on Banks
- Management Method
  - Leave Alone

Cattails

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Common Invasive Species: Cattails

- Level 2 Cattail Presence
  - Dense Ring around Pond Edge
- Management Method & Timing
  - Chemical Treatment
  - Cut/Remove Dead Material
- Costs & Timing
  - $1500/pond acre
  - June-Sept (seed head just forming)

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Common Invasive Species: Cattails

- Level 3 Cattail Presence
  - Complete Pond Coverage
- Management Method & Timing
  - Mechanical Dredging
- Costs & Timing

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Common Invasive Species: Purple Loosestrife

- Level 1
  - Isolated Plants
- Management Method& Timing
  - Remove by pulling/digging out entire root structure
  - Prior to seed head forming

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Common Invasive Species: Purple Loosestrife

- Level 2
  - Interspersed in Other Vegetation
- Management Method& Timing
  - Chemical Treatment (Early to Mid-July)
  - Biological Treatment - Beatles (*Galerucella* spp)

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Common Invasive Species: Purple Loosestrife

- Level 3
  - Complete Coverage
- Management Method& Timing
  - Mechanical Dredging
  - Biological Treatment
  - Chemical Treatment
- Costs and Timing
  - Chemical ($5,000/pond acre)

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Common Invasive Species: Phragmites

- Level 1: Isolated Plants
  - Chemical Treatment @ $1,500/pond acre
- Level 2: Dense Ring Around Pond Edge
  - Chemical Treatment @ $1,500/pond acre
- Level 3: Complete Pond Coverage
  - Chemical Treatment @ $5,000/pond acre
  - Mechanical Dredging

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Nuisance Aquatic Species: Algae

- Sources
  - Sediment in or upstream of pond
  - Fertilizer
- Management Alternatives
  - Source control to reduce P load (*think green infrastructure & no P fertilizer/soil test*)
  - Native riparian and wetland plants
  - Aeration
  - Chemical Treatment *(Copper Sulfate; Black Onyx Dye)*

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Lessons Learned

- Ongoing Review of Program
- Must Have Buy-In – Even So No Guarantees
- Annual Inspections & Maintenance Critical
- Home Owners' Associations Boards Transfer Educational Knowledge
- Monitor Annually (i.e. algae, vegetative growth, invasive species)

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A Series of Green Infrastructure Workshops

Alliance of Rouge Communities
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Working together, restoring the river

Thank You

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Questions?

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Rouge Friendly Landscaping:
Native Plants for Better Water Quality

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