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Native Landscaping for Water Quality

Jason Fritz
Cardno JFNew Native Plant Nursery

What are Native Plants?

- Naturally occurring plants within a specific habitat of a specific biogeographic region.
- Adapted to the soil and climate in which they live
- Have evolved defenses to many diseases and insect pests.
- Focus on time and geography

Why Use Native Plants?

- Low maintenance
- Little or no watering (once established)
- No fertilizer
- No pesticides
- No mowing (once established)
- Attracts wildlife and provides habitat
- Deep roots help water table recharge

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What's the Problem?

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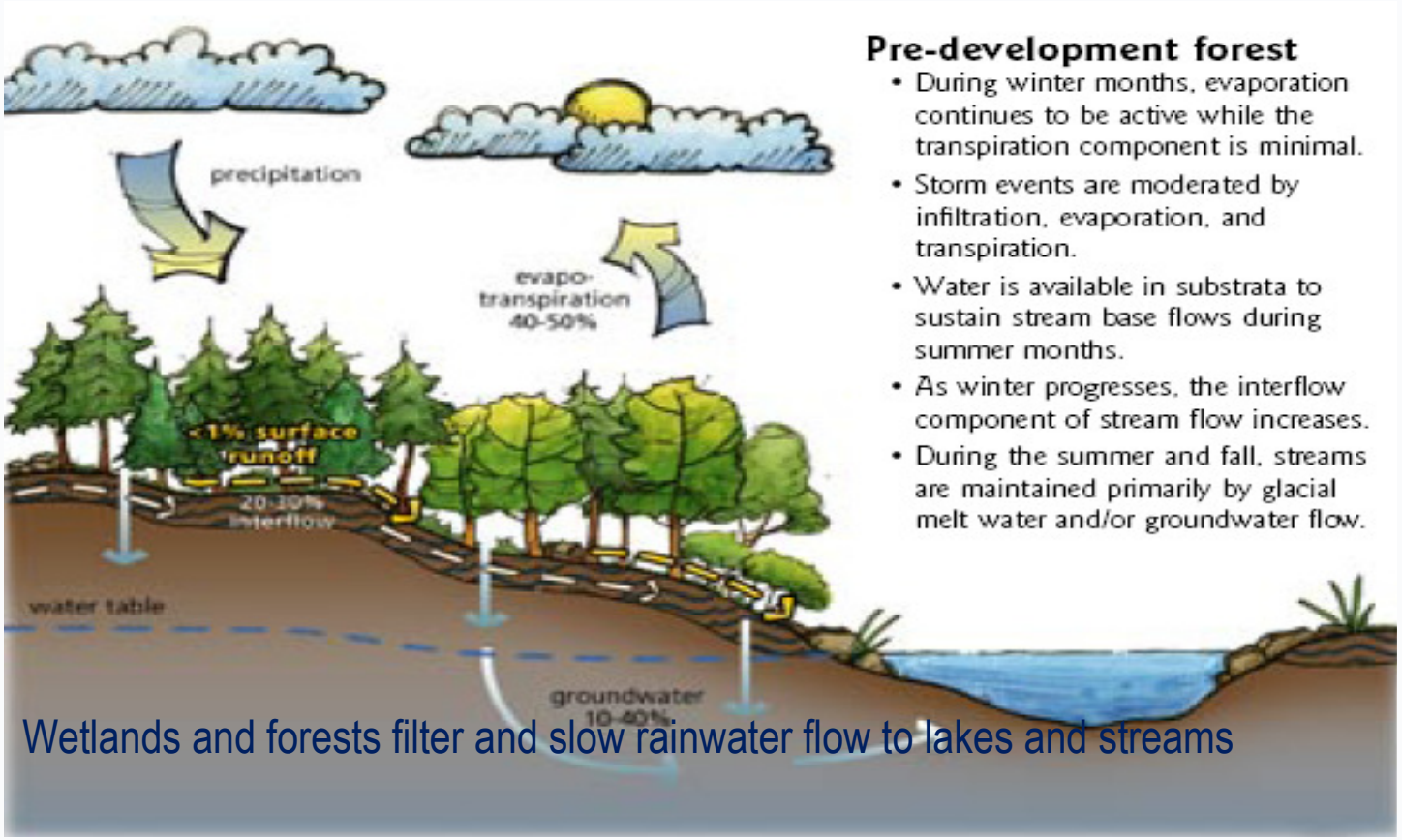
Ecosystem Stormwater Services



Pre-development forest

- During winter months, evaporation continues to be active while the transpiration component is minimal.
- Storm events are moderated by infiltration, evaporation, and transpiration.
- Water is available in substrata to sustain stream base flows during summer months.
- As winter progresses, the interflow component of stream flow increases.
- During the summer and fall, streams are maintained primarily by glacial melt water and/or groundwater flow.

Wetlands and forests filter and slow rainwater flow to lakes and streams

Source: Puget Sound Action Team, 2005 Low Impact Development: Technical Guidance Manual For Puget Sound.

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20th Century Landscape Alterations

- Remove native trees and vegetation to build
- Regrade and compact soils during construction
- Tile and drain any low/wet areas to make more space
- Build in tight grid to maximize number of units
- Connect grids with impervious concrete and asphalt
- Cover the rest in weed-free and fertilized turf grass

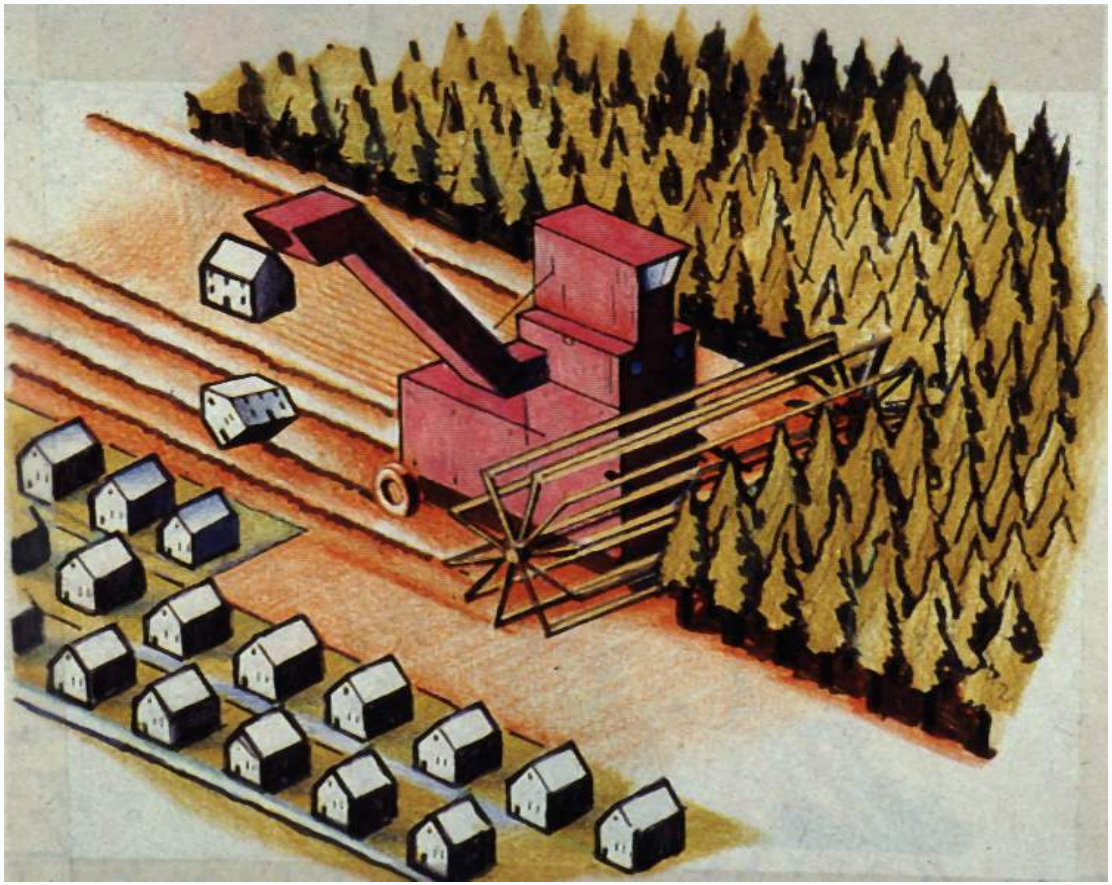
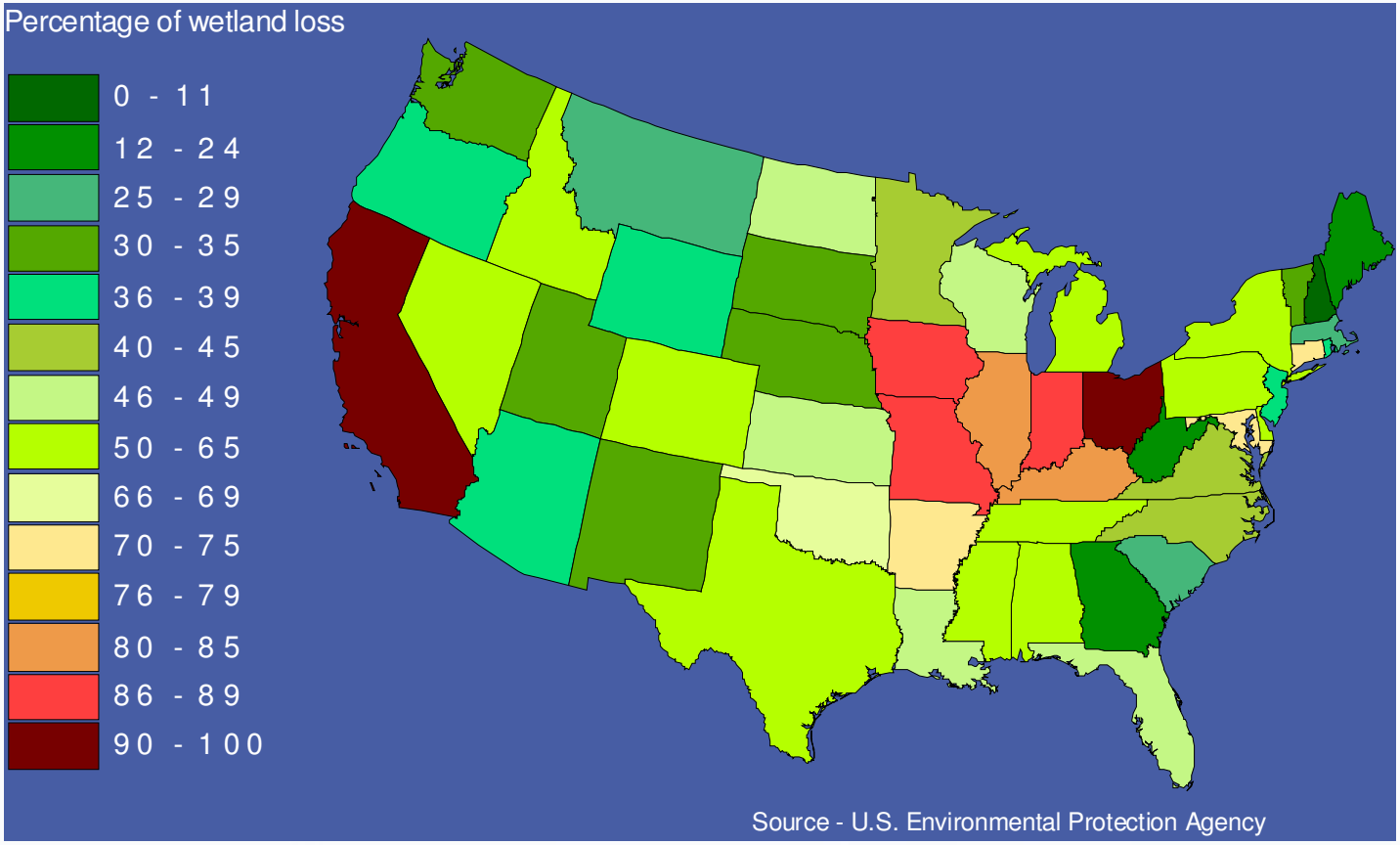


*Image courtesy of **Cahill & Associates.***

Wetland Loss from Time of European Settlement



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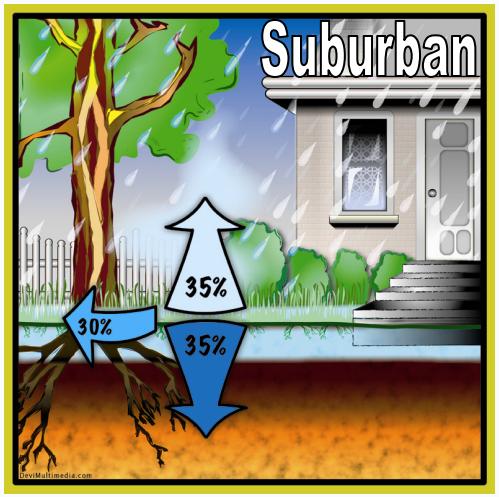
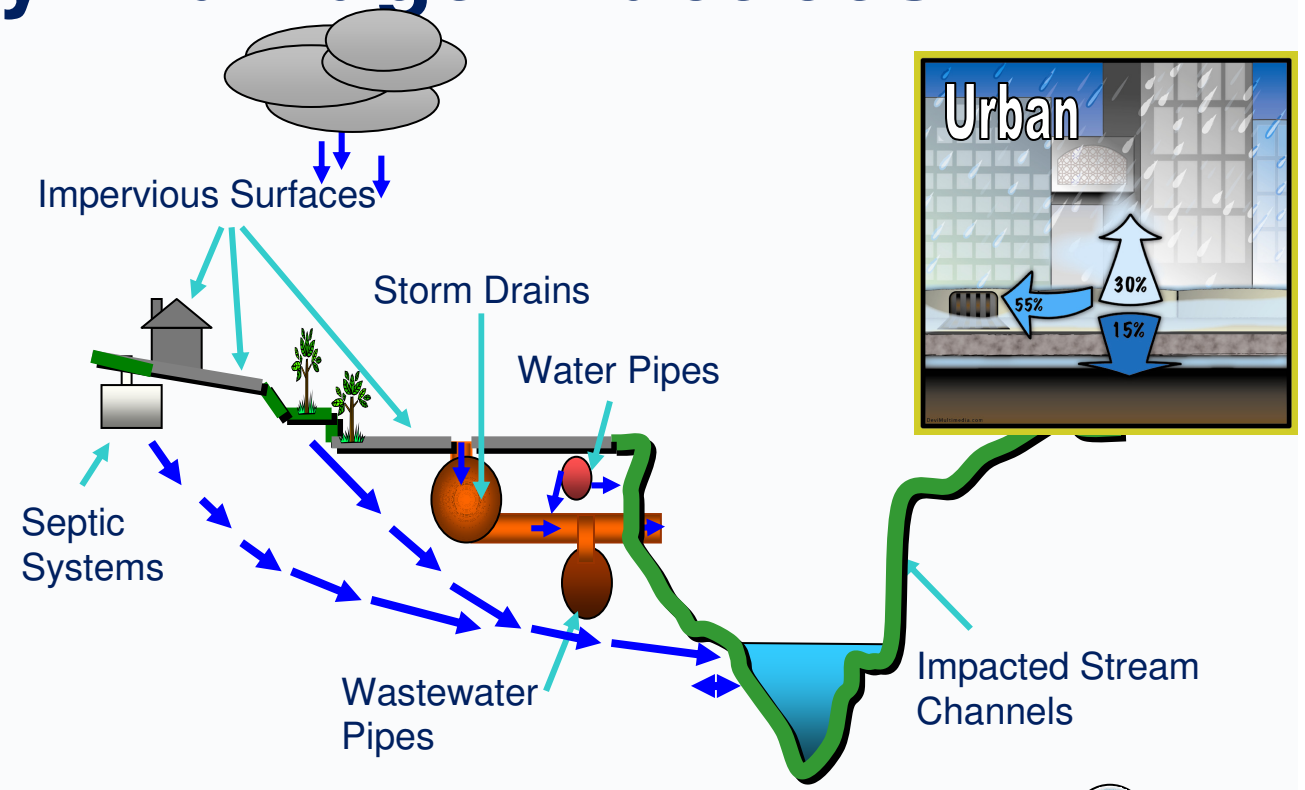
20th Century Drainage Practices

- Remove water from rooftops, driveways, parking lots, and roads rapidly to nearest stream or lake in concrete pipes .
- Combine stormwater with wastewater in Combined Sewers in many cities.





IUPUI

30% to 55% of Rainwater Runs Off Very Quickly

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Effects of 20th Century Practices

- Increased transport of nutrients and sediments to our streams and lakes
- Reduction of rainwater return to groundwater
- Erosion of aquatic habitats
- Degraded fisheries
- Degraded water quality
- Impaired recreational use

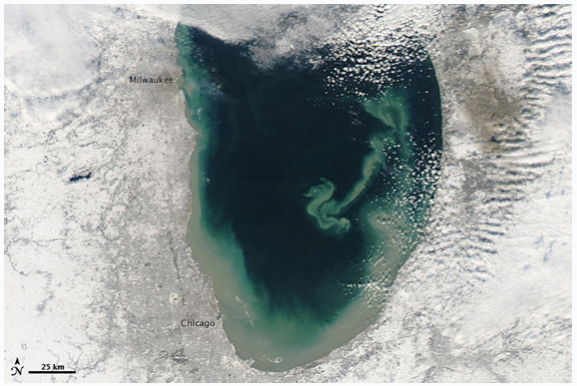

*Image courtesy of **USGS.***

Beauty Creek
*courtesy of **Save The Dunes.***

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Goals of 21th Century Practices

- Soften our urban and suburban landscapes
- Remove and reduce impervious surfaces and concrete pipes
- Replace with porous surfaces and vegetated areas
- Reintroduce natural areas and ecosystem services to our cities and towns

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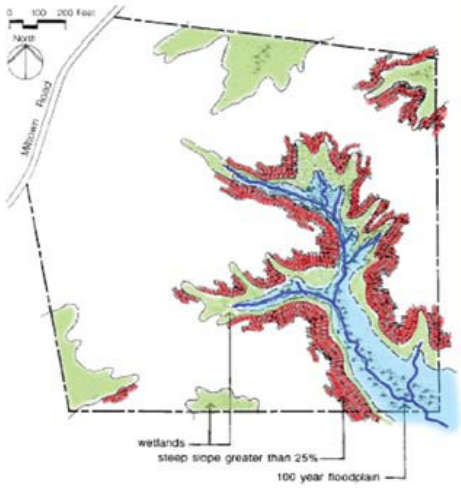
Goals of 21th Century Practices

- Reduce or halt transport of nutrients and sediments to our streams and lakes
- Enhance rainwater return to groundwater
- Restore and improve aquatic habitat
- Recover our fisheries
- Improve water quality
- Improve recreational use



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Alternative Drainage Practices for the 21st Century

- Cities now required to slow stormwater and separate it from wastewater
- Goal is to capture rainwater close to where it falls and hold or filter it to prevent it from carrying sediments and nutrients to our lakes and streams
- Stormwater Best Management Practices (BMPs) attempt to replace rainwater capture and filtering services of ecosystems (forests, wetlands) with distributed engineered systems

<u>Options for Residential Property Owners</u>

- Rain Gardens
- Rain Barrels
- Vegetated Swales
- Turf Grass to Native Conversion
- Porous Pavement in Parking Areas

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Benefits of Rainwater Capture

- Improve landscape appearance, provide habitat for urban wildlife and native pollinators (which are disappearing)
- Lower water bill (with rain barrels)
- Stored water can be used to…
  - Water lawn, garden, or indoor plants
  - Wash car or windows
- Helps reduce speed of stormwater runoff and reduces erosion, nutrients and sediment load to local streams
- May help reduce the likelihood of flood events by reducing peak flows if enough BMPs are installed

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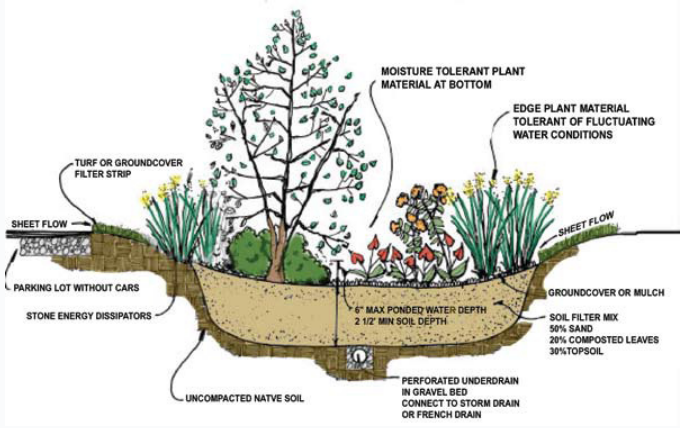
Rain Gardens

- Rain gardens are planted low areas designed to store and filter rainwater
- Typically designed to hold the first inch of a rain event
- In areas with clay soils, amended soils with high sand and organic content are often recommended
- Can be planted with a variety of attractive, water-loving plants
- Typical Cost: **$2,500** for a residential rain garden including design and installation
- Maintenance: Rain gardens should be weeded and cleaned of trash on a regular basis, roughly 3 times per year. Regular watering during first year



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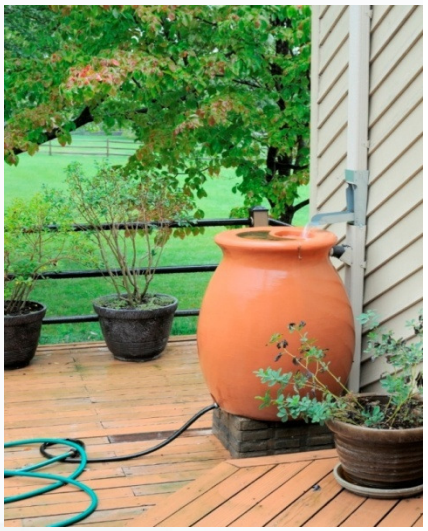
Rain Barrels

- Rain barrels capture and store 50 to 70 gallons of rainwater from each downspout
- Installation is simple – cut downspout, install diverter, set rain barrel in place
- Typical Cost: **$300** installed
- Maintenance: Rain barrel must be emptied between rain events to be effective
- Stored water can be used for watering plants or yard or washing cars
- Screens on barrels prevent mosquitoes



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Porous Pavement

- Porous pavements allow rainwater to pass through the pavement to underground aggregate/stone base
  - Interlocking Porous Pavers
  - Porous Concrete
  - Porous Asphalt
- Slows the release of stormwater while filtering nutrients and pollutants
- Usually requires demolition and replacement of existing pavements
- Typically requires an underdrain system to drain stone base
- Typical Costs: **$175-$250** per square yard of pavement
- Maintenance: Must be periodically vacuumed to remove fines that block pores with special equipment

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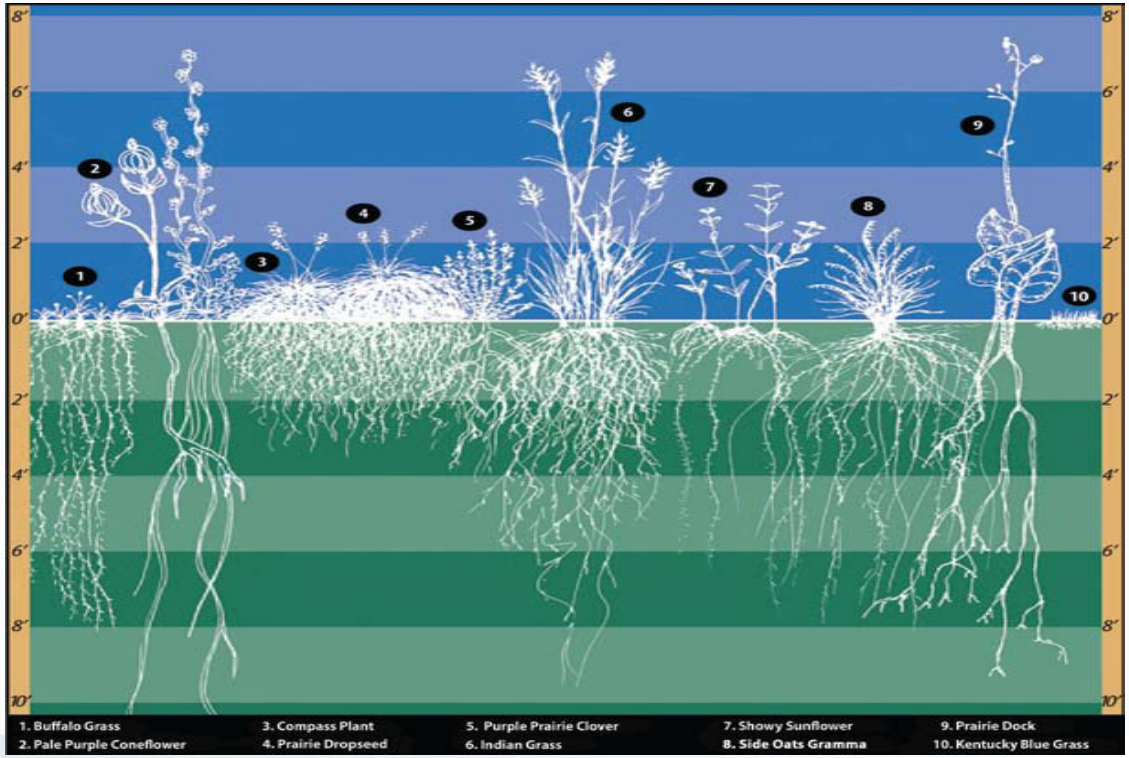
Vegetated Swales

- Vegetated swales are similar to rain gardens but positioned along driveways or roads to collect runoff from driving surfaces
- Typically designed to hold first inch of rain event (most pollutants mobilize during first flush of rainfall)
- Typical Cost: **$3,000** including design and installation (depends on length and materials)
- May require amended soils in areas of clay
- Maintenance: Weeding and trash removal on a regular schedule
- Plants installed should be salt and pollutant tolerant



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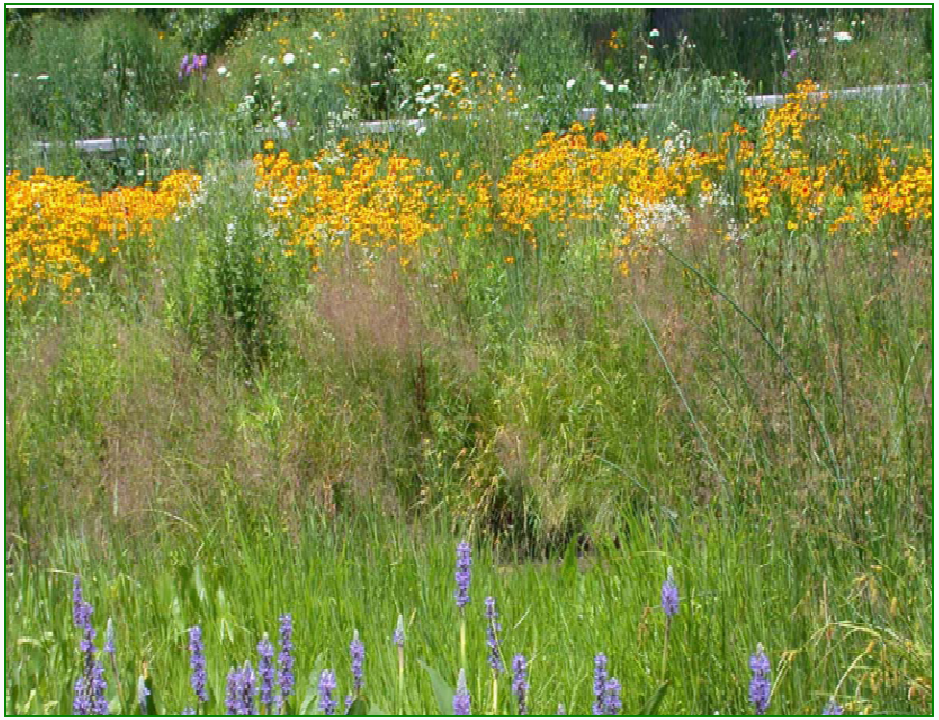
Putting it all together

Options for your home landscape:

- Raingardens
- Vegetated Swales
- Naturalized plantings
- Low intensity lawns
- Turf reduction

Rain Gardens

During planting



After establishment

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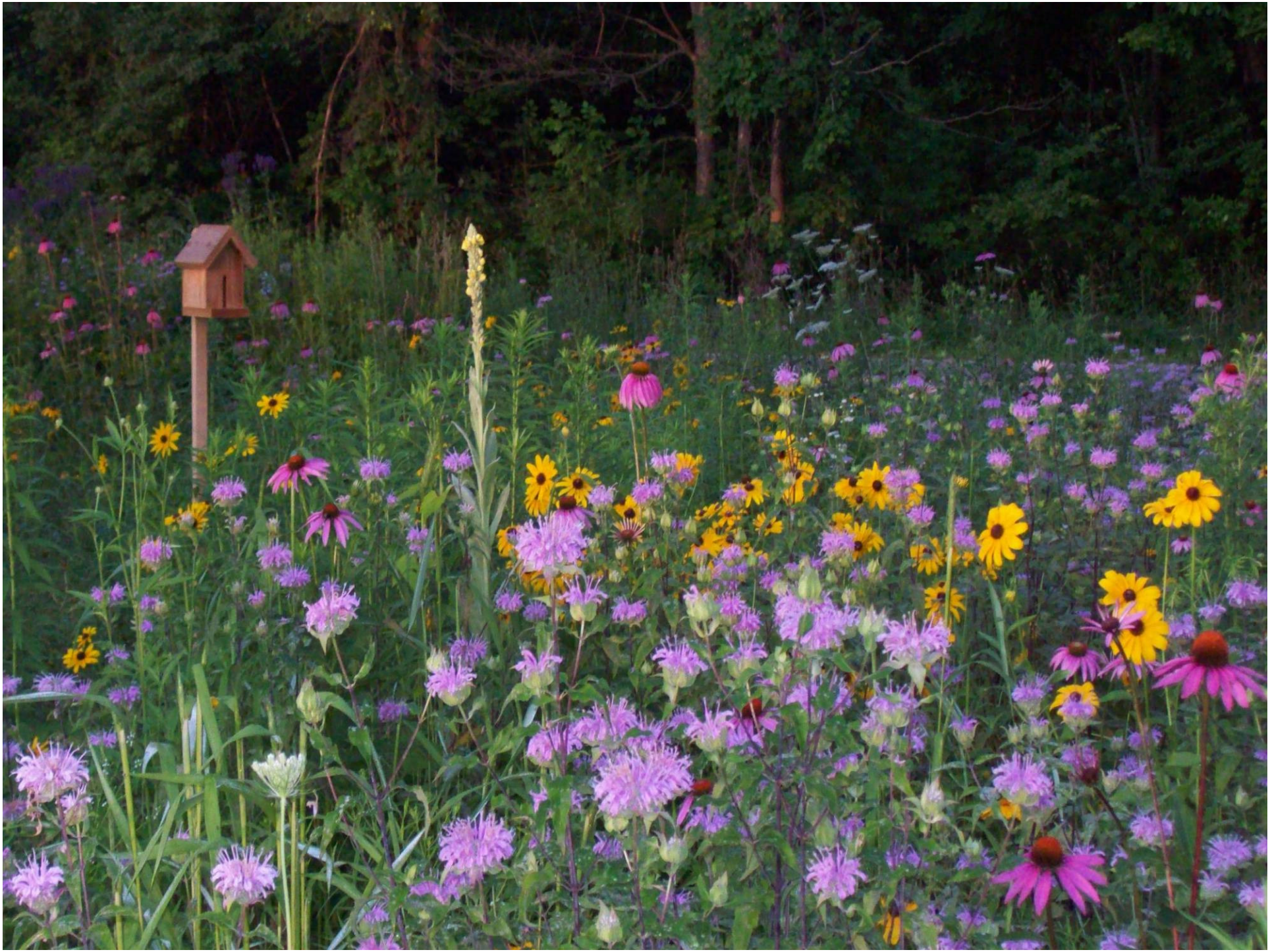
Rain Garden Construction


75°
Vegetated Swale


Naturalized Plantings




Low Maintenance Lawns

Turf Reduction

November 2005

June 2008


April 2006


May 2006


August 2006


June 2008

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Species Selection

Things to Consider

- Soil Moisture and Type
- Sun vs. Shade
- Potential Competition
- Project Goals

Just what are you trying to accomplish??

- Aesthetics
- Wildlife
- Erosion Control

"Begin with the end in mind" – Stephen Covey

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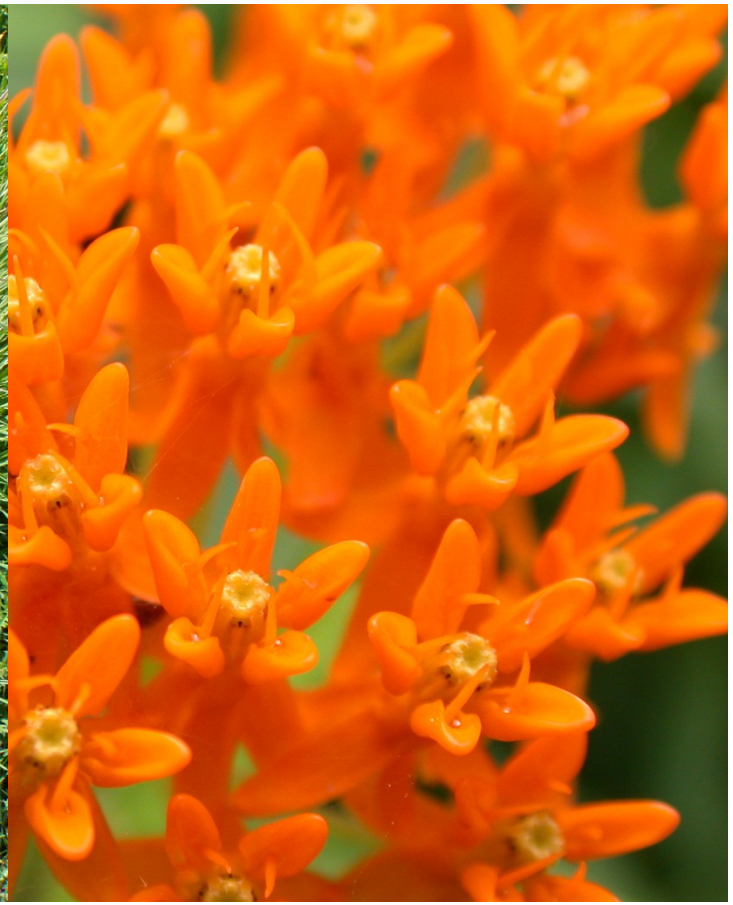
Upland/Dry Soil

Butterfly Milkweed
(*Asclepias tuberosa*)



Upland/Dry Soil

Little Bluestem
(Schizachyrium scoparium)

Upland/Dry Soil

Blue False Indigo
(Baptisia australis)

Upland/Dry Soil

Prairie Coreopsis
(Coreopsis palmata)


Upland/Dry Soil
Purple coneflower (*Echinacea purpurea*)


Medium Soil
Prairie Dropseed (*Sporobolus heterolepis*)

Medium Soil

Wild Columbine
(*Aquilegia canadensis*)

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Medium Soil

Wild Bergamot, Bee Balm
(*Monarda fistulosa*)

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Medium Soil

Blazing Star
(*Liatris pycnostachya*
or *L. spicata*)


Medium Soil
Yellow or Grey-headed Coneflower
(*Ratibida pinnata*)

Wet/Moist Soil

Blue Flag Iris
(Iris virginica)


Wet/Moist Soil
Great Blue Lobelia (*Lobelia siphilitica*)

Wet/Moist Soil

Swamp Milkweed
(Asclepias incarnata)

Wet/Moist Soil


Common Bur Sedge
(Carex grayi)


Bottlebrush Sedge
(Carex lurida)

Wet/Moist Soil

Obedient Plant
(Physostegia virginiana)

Wet/Moist Soil

Wet/Moist Soil

Golden Alexanders
(Zizia aurea)

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Direct Additional Questions to:

Jason Fritz

Native Plant Nursery Sales Manager

Jason.fritz@cardno.com

577.586.2412

www.cardnojfnew.com/nursery