



Native Plants and Green Infrastructure  
**Long Term Maintenance**

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# What will we learn?

Bioswales and Stormwater  
Filtration

Native Plant Installation and  
Selection

Common Problems and  
Maintenance

Bioswales in Action





## Bioswales and Stormwater

- Any vegetated swale, ditch, or depression that accumulates stormwater
- Stormwater runoff has pesticides, herbicides, gases, oils, grease, pathogens, bacteria, CSO containments
- Bioswales remove and immobilize pollutants

# Bioswale Function

## Non-Compacted Soil

- it will support many of the living organisms that make the biofilter work
- the permeability of the substrate affects the movement of water through the biofilter
- many chemical and biological transformations take place within the substrate as part of the soil food web
- contaminate storage is provided

## Microbial Action

- microorganisms work in a symbiosis with the plants to capture and uptake the pollutants and nutrients in the storm water runoff.
- establishment and maintenance of a healthy biological colony may be the most important aspect of the construction and continuing viability of the biofilter.
- mycorrhizae fungi help the vegetation root structure bring in water and nutrients from as much as fifty feet away from the plant roots. These organisms can help the plant survive in the summer and in drought conditions.

## Vegetation

- Vegetation will consume pollutants and transfer them into their plant matter.
- Native plant species are a must for use in biofilter design.
- LONGER, DEEPER roots
- Native species usually provide high habitat value for indigenous birds and other animals. Non-native species can become invasive if allowed to proliferate.

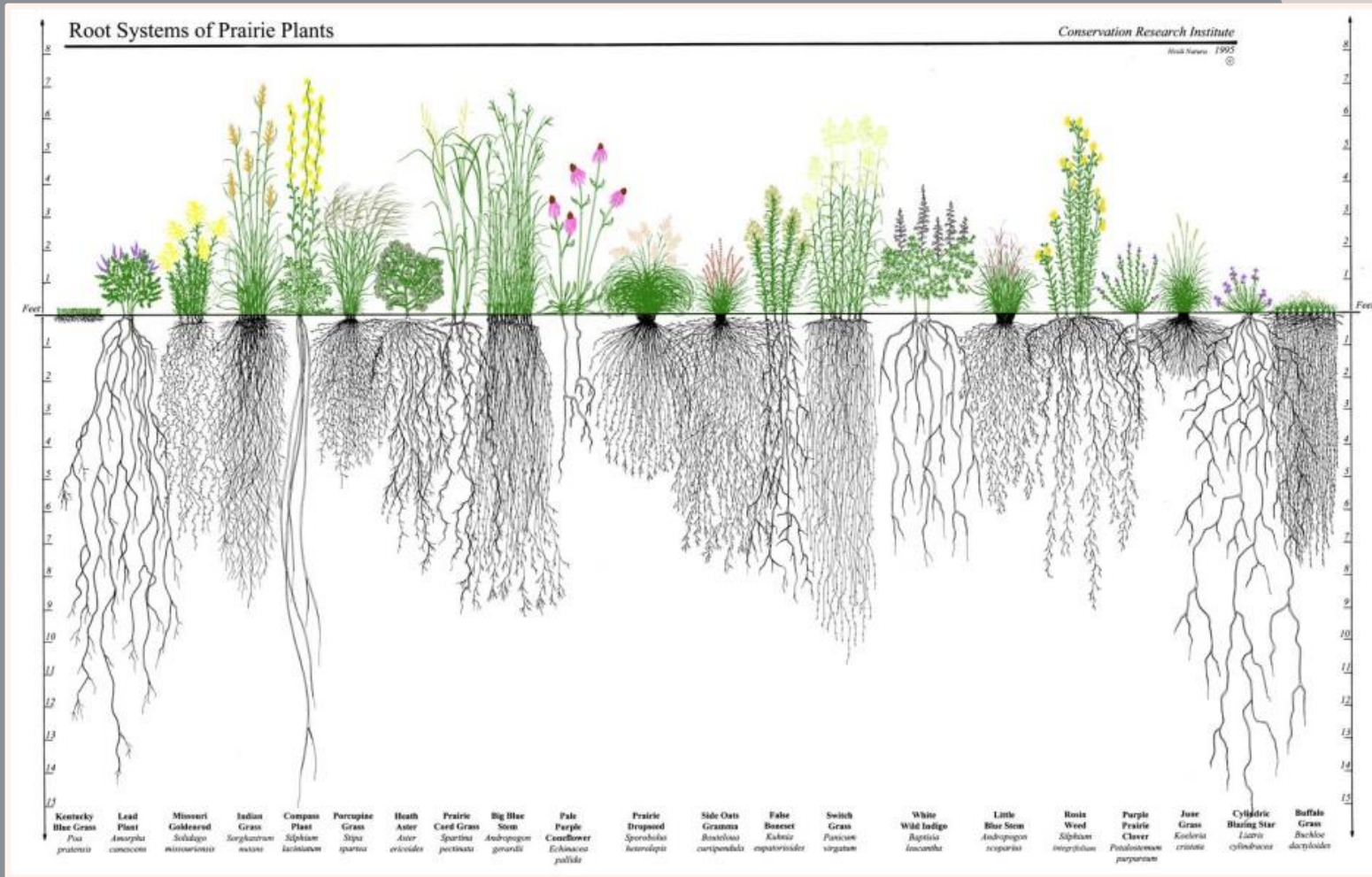


# Plant Selection



- **Three Vegetated Zones**
  - **Highest:** species adapted for drier conditions.
  - **Middle (mesic):** species that tolerate slightly drier conditions and more infrequent fluctuating water levels. Middle zone plants, along the slopes, are often selected for erosion control
  - **Lowest:** species that can tolerate standing water and fluctuating water levels.

# Considerations in Selection



- Public Visibility
- Height (line of sight issues)
- Blooming time and color
- Aesthetic Appeal

# So, what plants exactly?

## Hardy, Resilient Plants

- Salt Tolerant
- Adaptable to many soil types
- Deep perennial roots
- Strong reproduction
- Vigorous growth



PURPLE  
CONEFLOWER  
*Echinacea purpurea*



LANCE LEAF  
COREOPSIS  
*Coreopsis lanceolata*



BEARDTONGUE  
*Penstemon* spp.

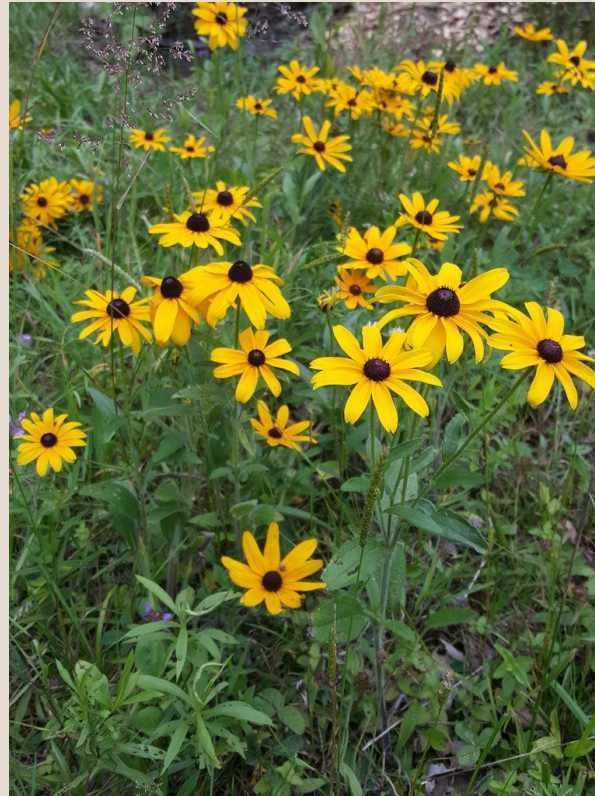
# Some of my favorites



FALSE BLUE INDIGO  
*Baptisia australis*



GOLDEN ALEXANDER  
*Zizia aurea*



BLACK EYED SUSAN  
*Rudbeckia hirta*



BLUE FLAG IRIS  
*Iris virginica shrevei*



# Caring for Native Plants in Bioswales



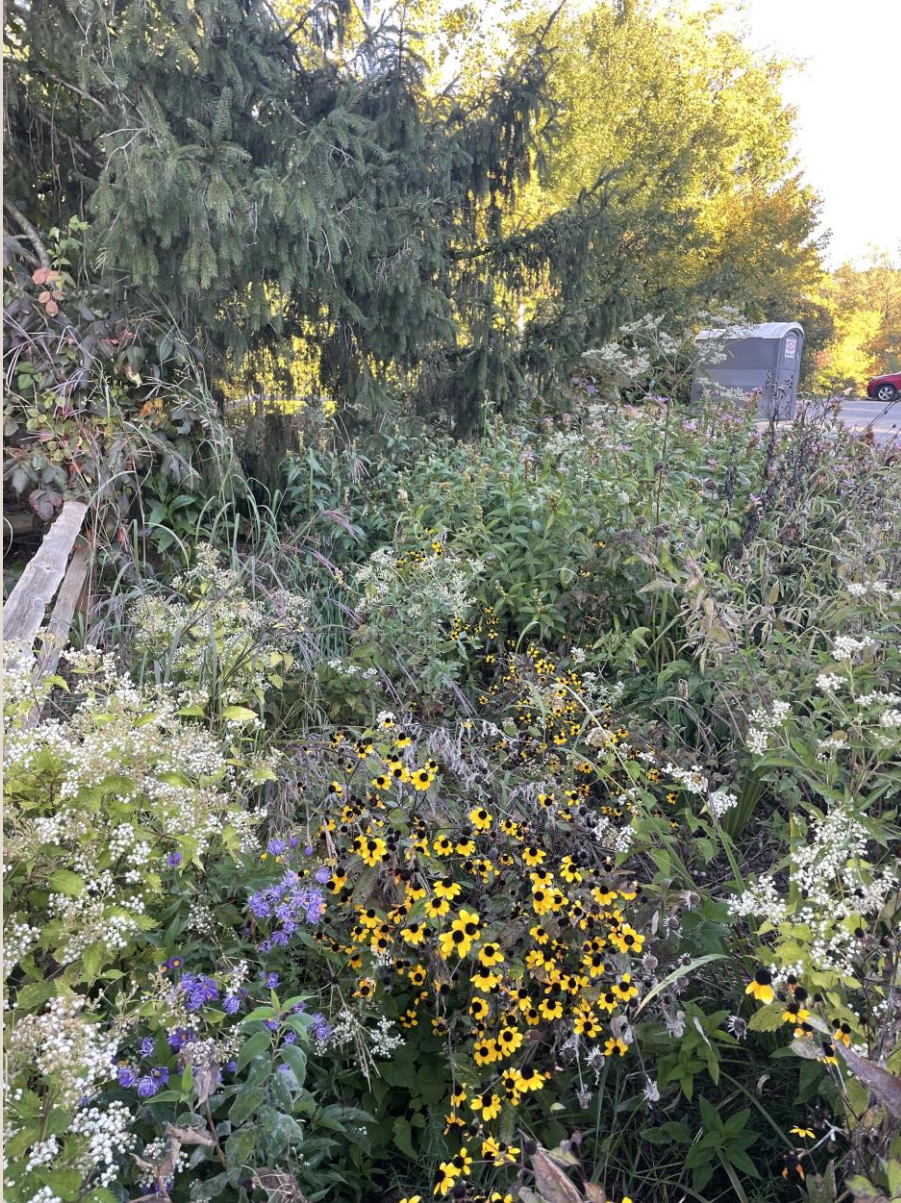
## Spring Maintenance

- Spring Inspection (visit during or shortly after a rain event)
- Sediment and debris removal
- Repairs to infrastructure
- Plant replacements
- Hand weeding, preemergent herbicide, and herbicide pass for woodies and weeds
- Mulching
- Selective mowing



# Summer Maintenance

- Based on your sites needs, 6-12 maintenance visits
- Watering through droughts
- Hand weeding and herbicide
- Manage undesirable woody and weeds
- Selective cutting and mowing of annual weeds
- Sediment and debris removal



# Fall Maintenance



- Herbicide on woodies and perennial weeds
- Cut back (could be selective or non-selective to allow for habitat and native reseeding)
- Hauling away all debris and sediment
- Ensure all drains are free and clear



# Common Issues

INVASIVE  
SPECIES



EROSION/CHANNELING



SEDIMENT/WATER  
FLOW



# Common Invasive Species

CURLY DOCK



CANADA THISTLE



FESCUE

SWEET CLOVER



# Solutions

## Invasive Species

- Early identification and treatment
- Selective herbicide or hand weeding
- Haul away seed heads
- Planting/seeding to fill the voids



## Sediment and Slow Water Flow

- Visit regularly to remove accumulated sediment
- Clean curbs and street drains
- Create a prefilter
- Plant water tolerant plants
  - Iris
  - Golden alexander

## Erosion and Channeling

- Rip Rap
- Erosion Control Blankets
- Plants
  - Large root masses
  - Resilience to sediment
  - Sediment capturing
  - Flood and drought resistant
  - Graminoids



# Pogue's Run

This channeling bioswale is a CSO in Indianapolis. It fills with water during significant rainfall and drains within 24 hours. Rip rap, plants, drains, erosion control, and maintenance all ensure this system is functional.



# Greene Park

This is a parking lot bioswale with pervious pavers, sediment traps, grass prefilter, u shaped structure with beautiful native plants







# thank you

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QUESTIONS?