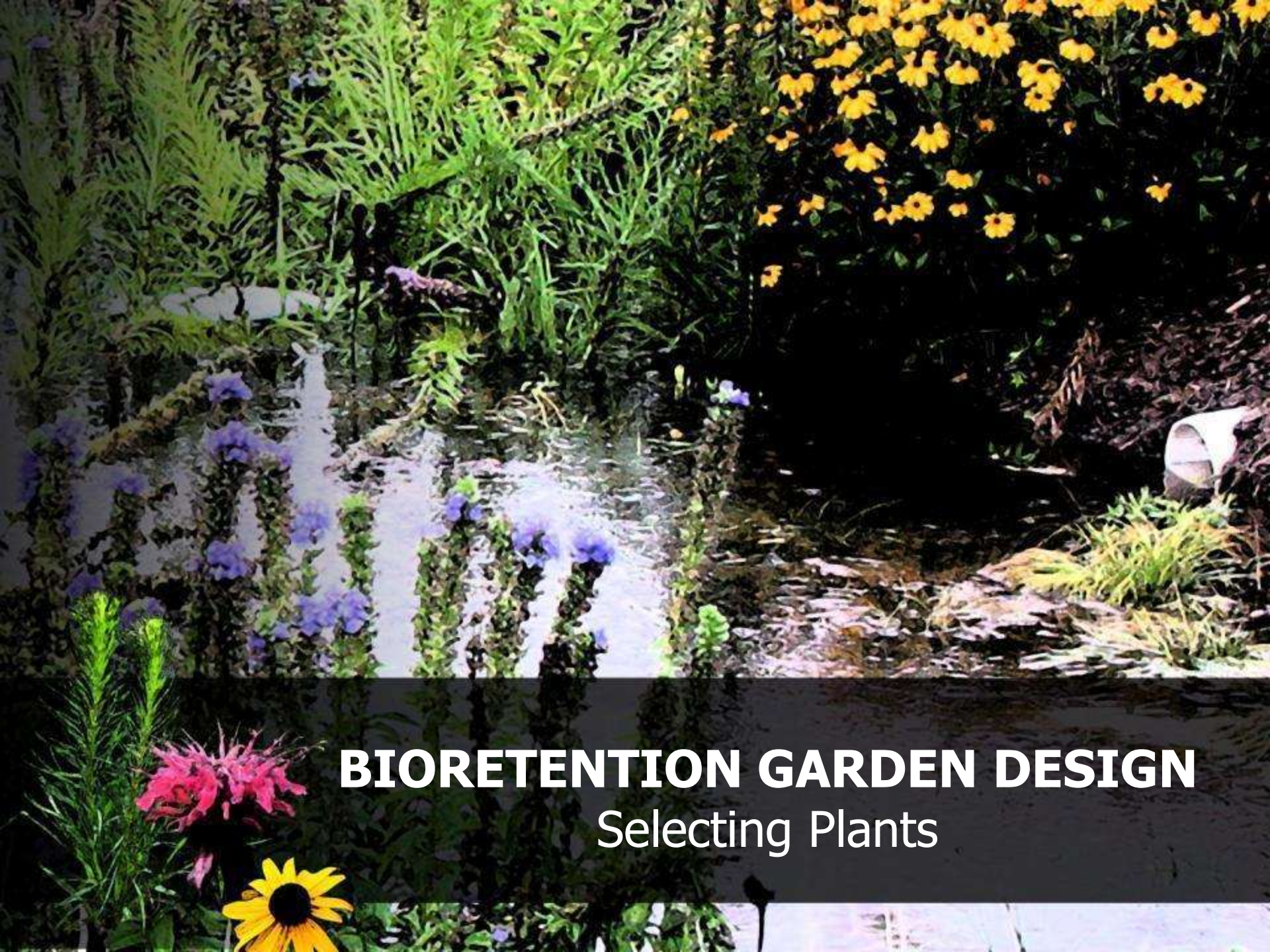
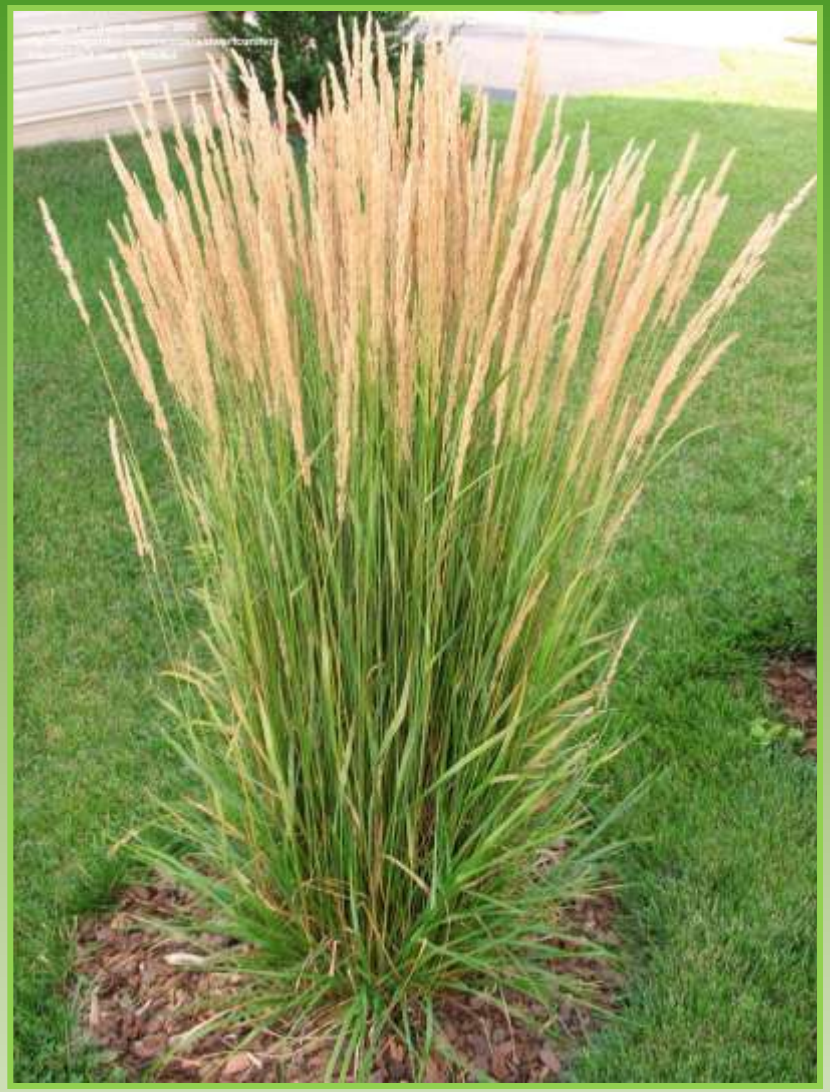


BIORETENTION GARDEN DESIGN

Selecting Plants

Ideal Plants - Aesthetically

- Form – distinct, upright; appropriate height and width; potential for "weediness" ?
- Longevity of interest/character
  - Length of flower bloom; potential for rebloom
  - Foliage texture or color – lasts all season
  - Fruit character, persistence
  - Winter interest
  - Sense of locality or region; "Nebraska-style"



Ideal Plants - Functionally

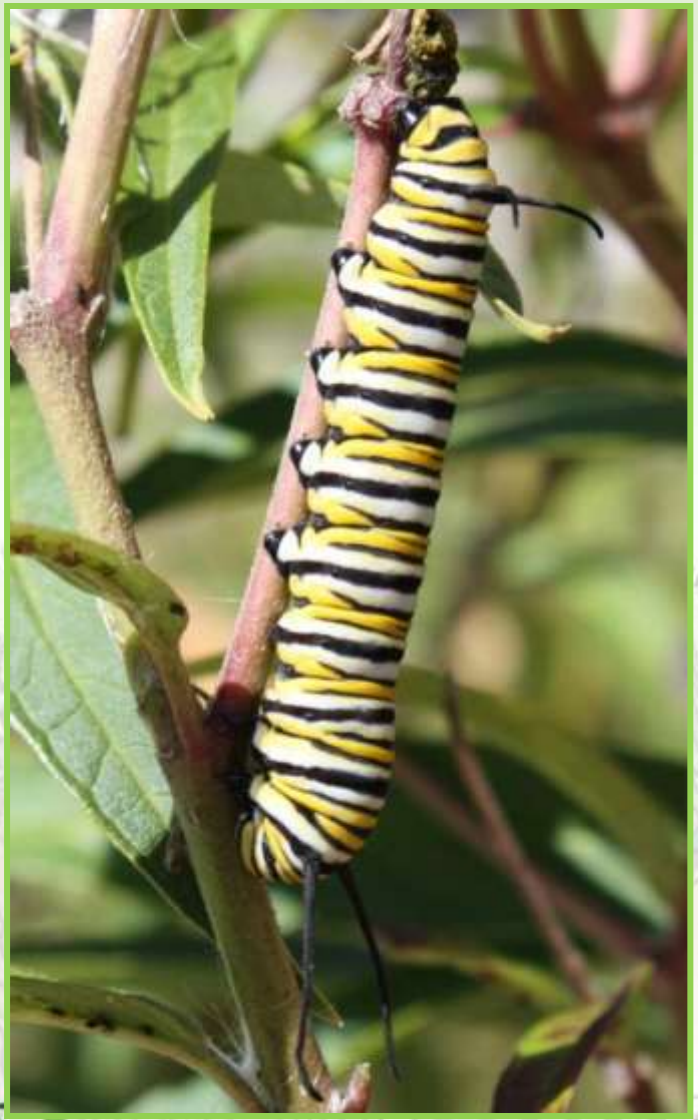
- Deep rooting
- Climate and water adaptability
- Habitat value
- Lack of invasiveness
- Overall enhancement of soil infiltration over time
- Native often best choice

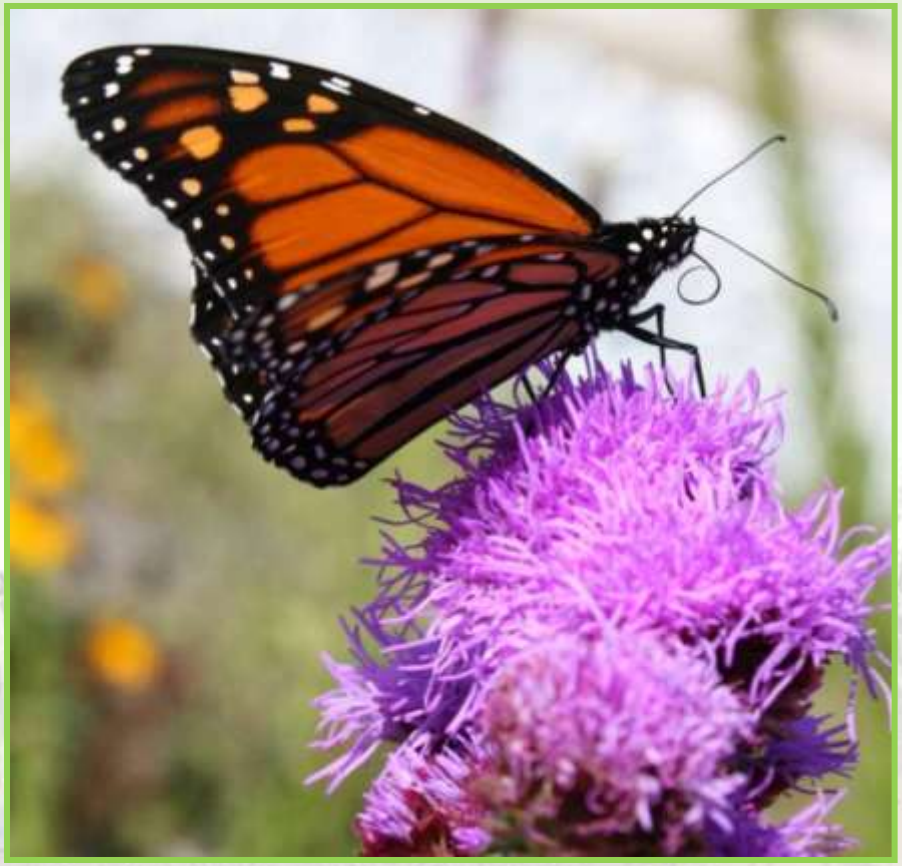
Adapted is also OK

- **NEWANIP***
  - Native [*AND]*
  - Ecologically well-adapted
  - Non-invasive
  - Plants

*from City of Omaha Environmental Element

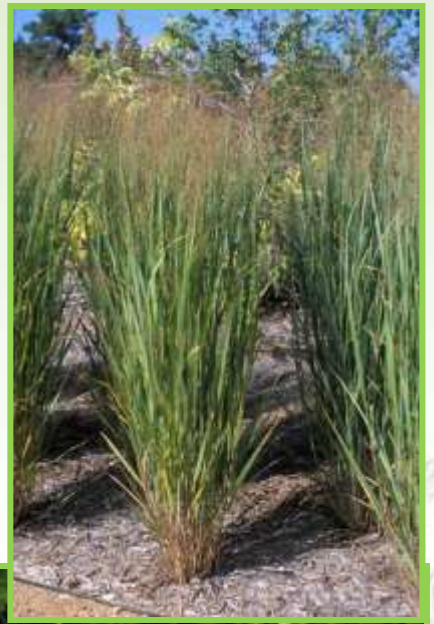
Habitat Value

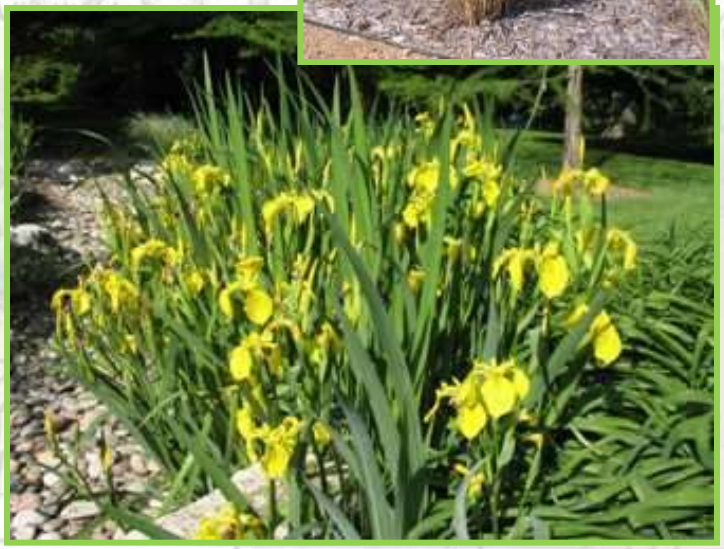




Aggressive Plants

- Invasive
  - Rhizomes, reseeding
- Plan ahead
  - Add aggressive species after several years
  - Consider site conditions and desire for aggressiveness
  - Potential to escape into natural areas?

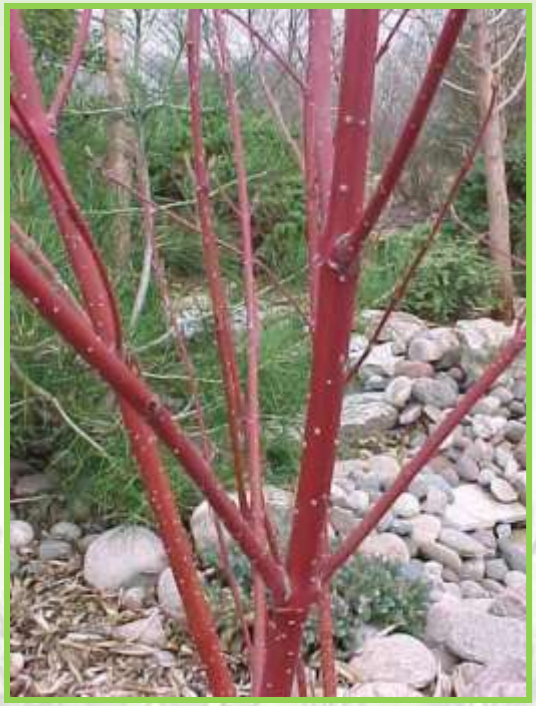


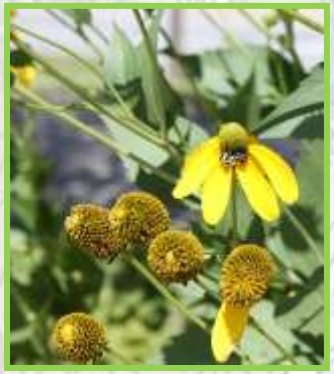


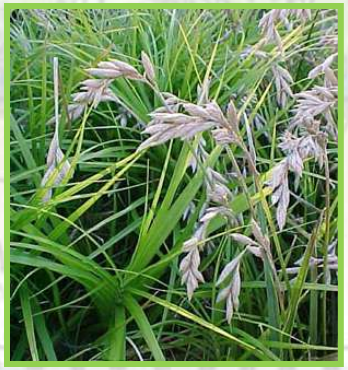
Size – Height & Spread

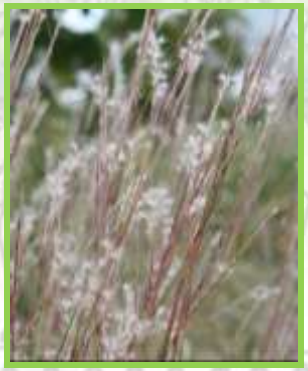
- Know ordinances, codes
- Large plants limit variety
- Floppy plants perceived as "weedy"
- 3' to 4' or less for relatively small gardens

Plant Types



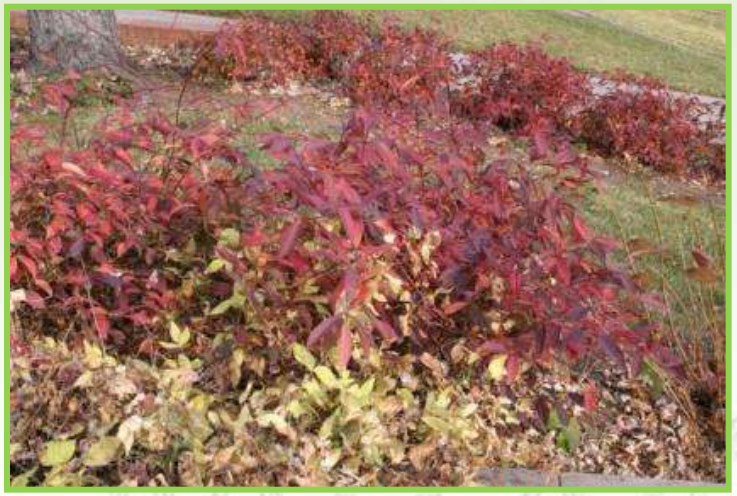


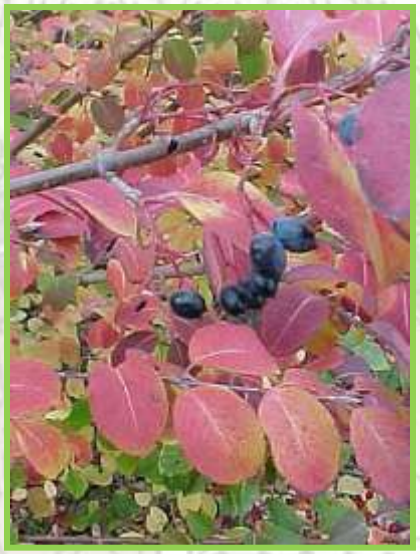




Shrubs

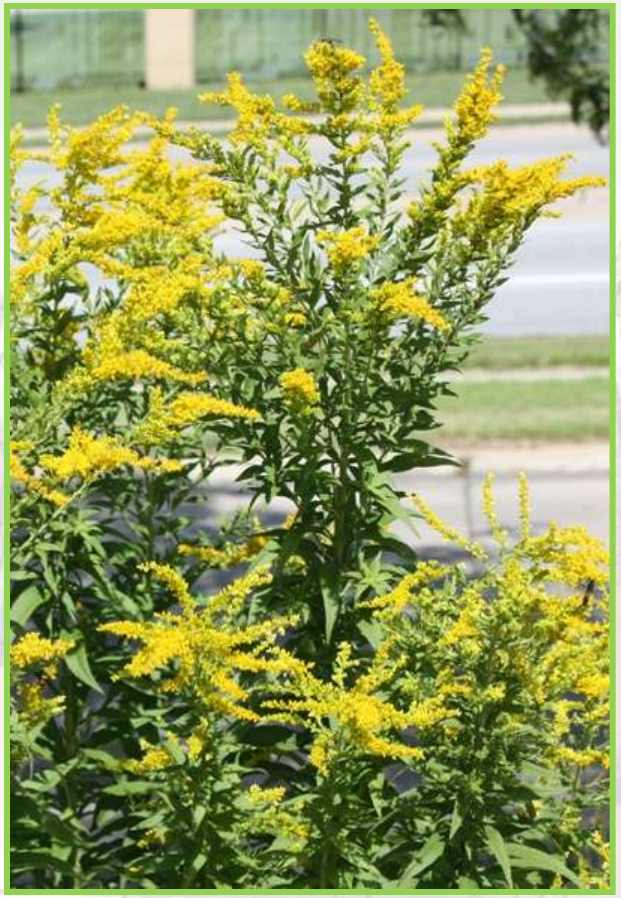
- Seasonal interest
- Variable conditions
- Garden structure
- Can take up significant space





Goldenrod

- Wide variety of species and cultivars
- Plant with an undeserved bad rap
- Variable water tolerance
- Consider shorter cultivars



Short Grasses

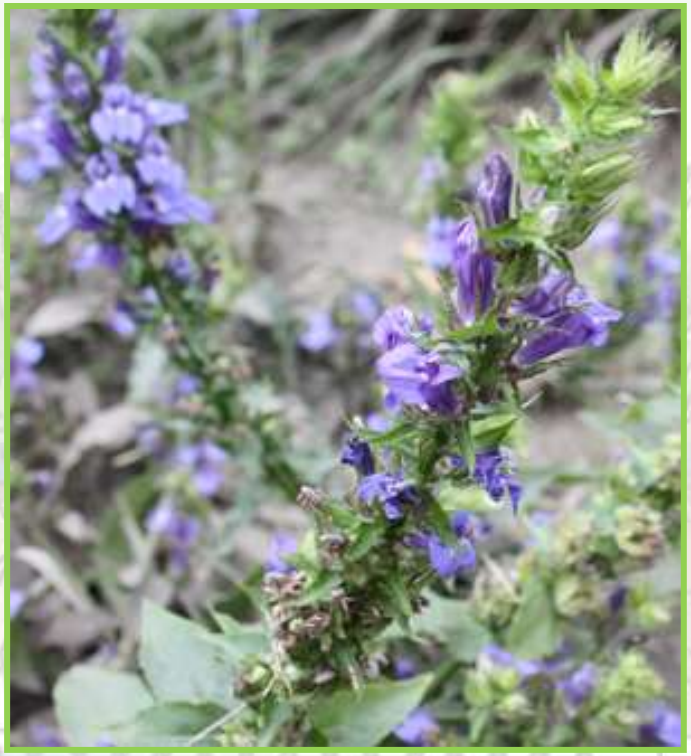
- Less flop
- Hardy once established
- Less water tolerance
- Some reseeding possible

Coneflowers

- Habitat value
- Tall species can look weedy
- Poor foliage retention; consider “hiding”
- Potential reseeding

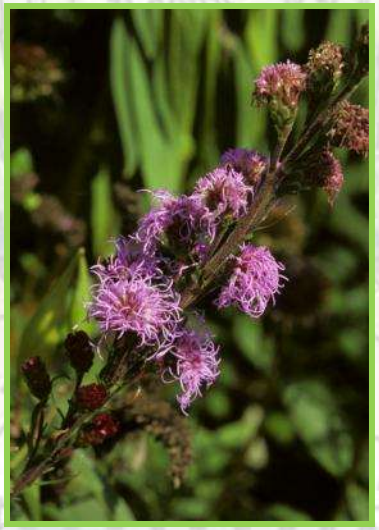
Short-lived Plants

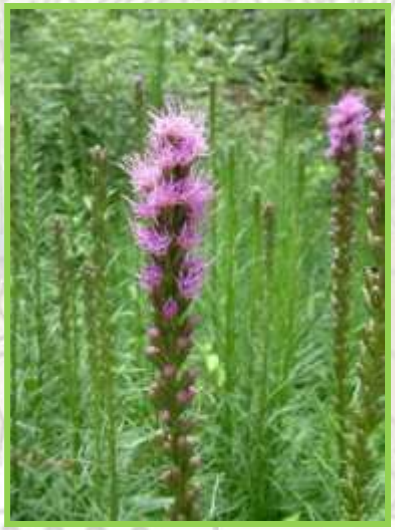
- Some particular to conditions
- Some just come and go
- Still worth incorporating



Gayfeather

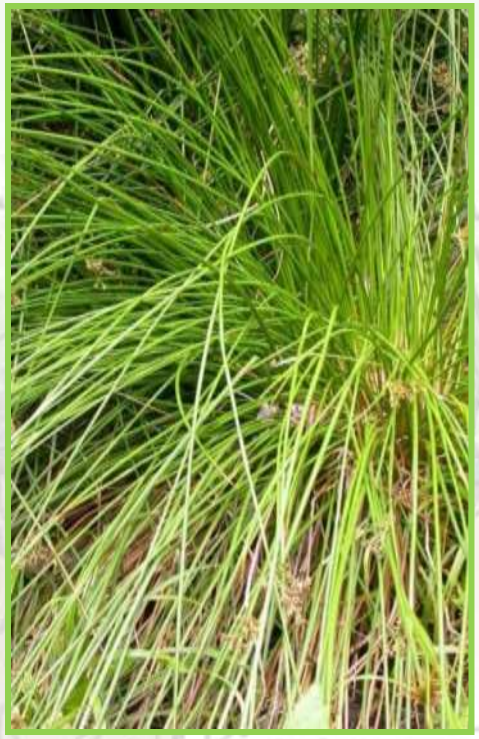
- Several popular species
- Variable on water tolerances
- High habitat value
- High flop tendency depending on species and cultivars; select accordingly

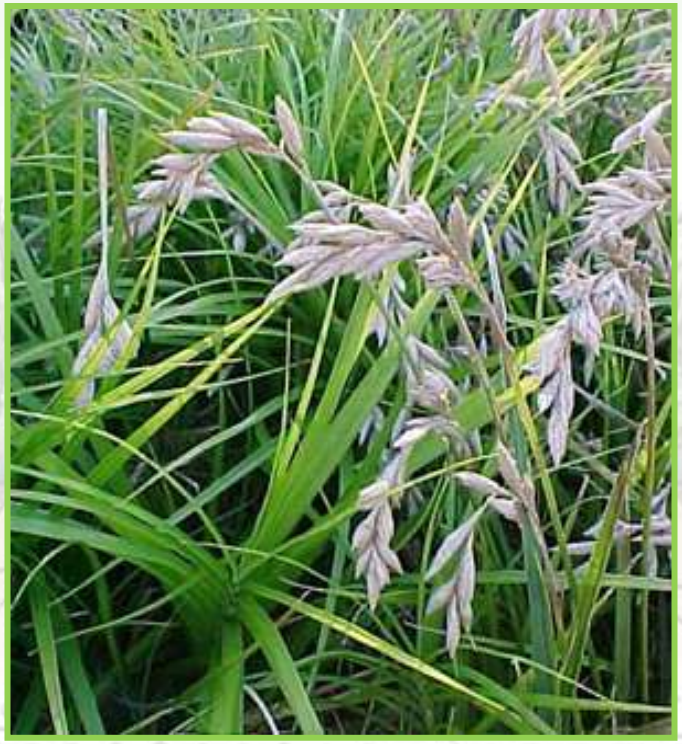





Sedges and Rushes

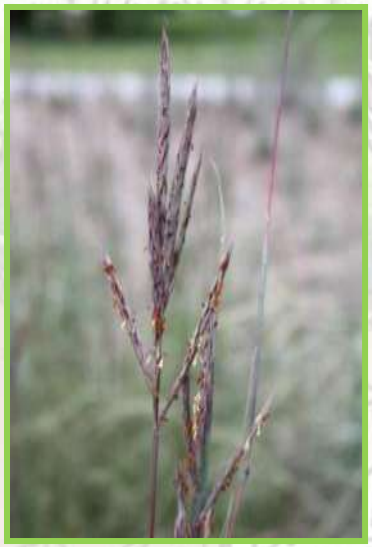
- Can be more difficult to find
- Wide variety of heights, textures, seed heads
- Tend to have high water tolerance

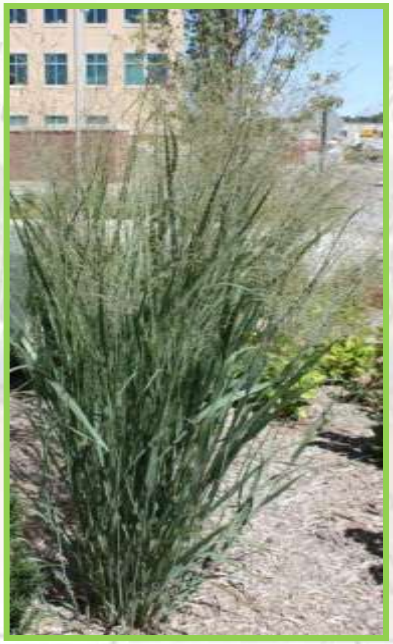




Tall Grasses

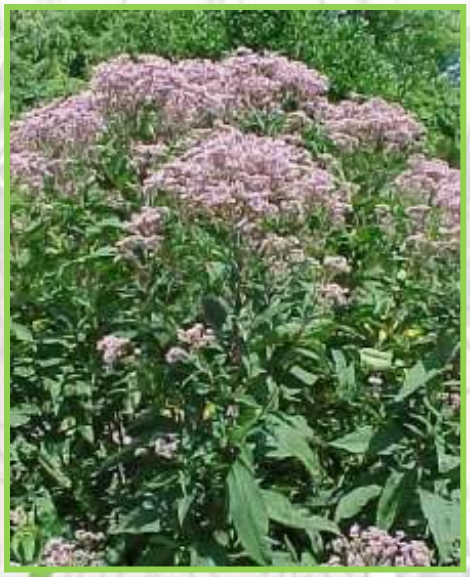
- Potential for flop and weedy look
- Potential for aggressive reseeding
- Relatively high water tolerances
- Many cultivars for specific colors, habits and heights

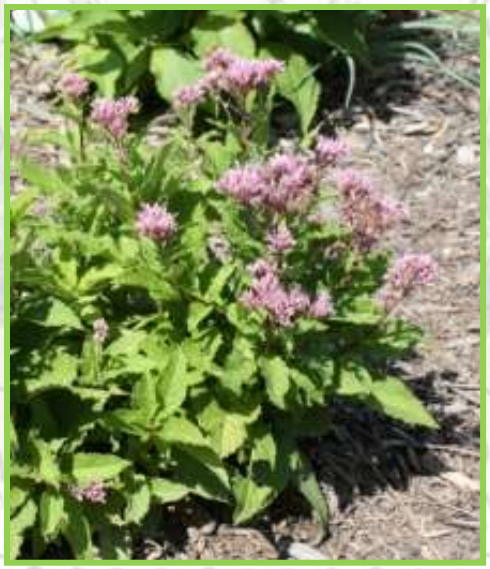




Joe Pye Weed

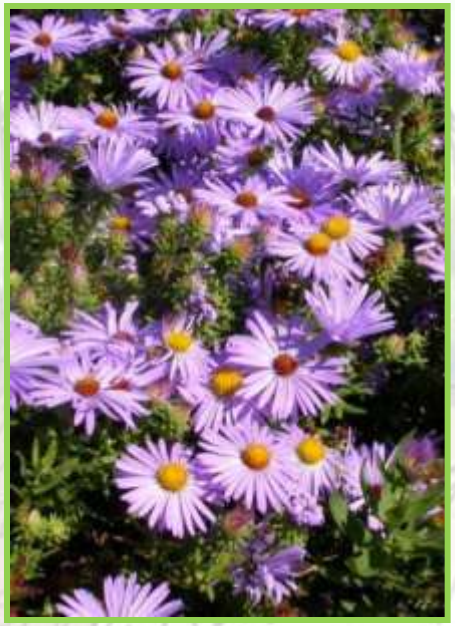
- Several species
- Water tolerance relatively high but varies by species
- Habitat value
- Consider compact cultivars to minimize flop

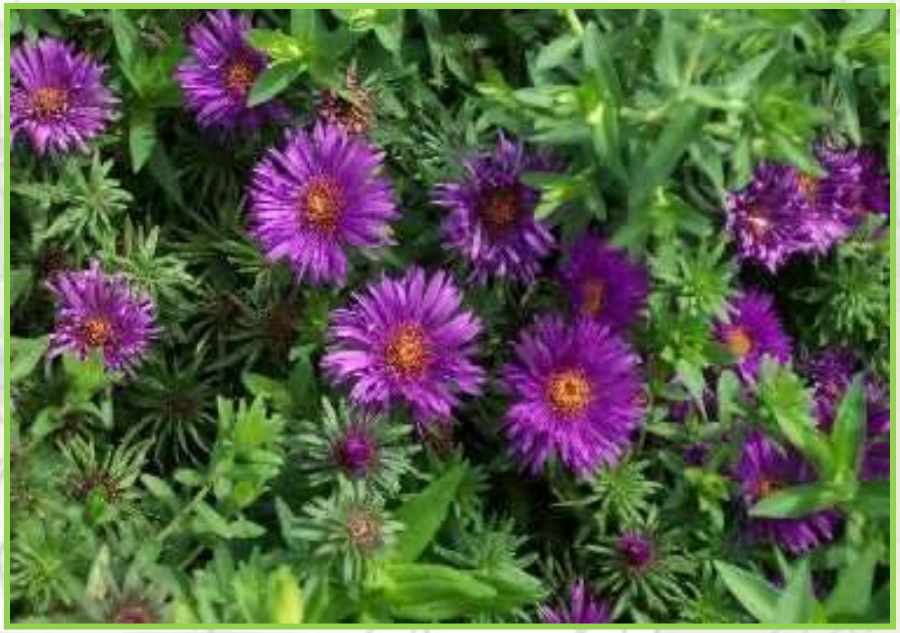




Aster

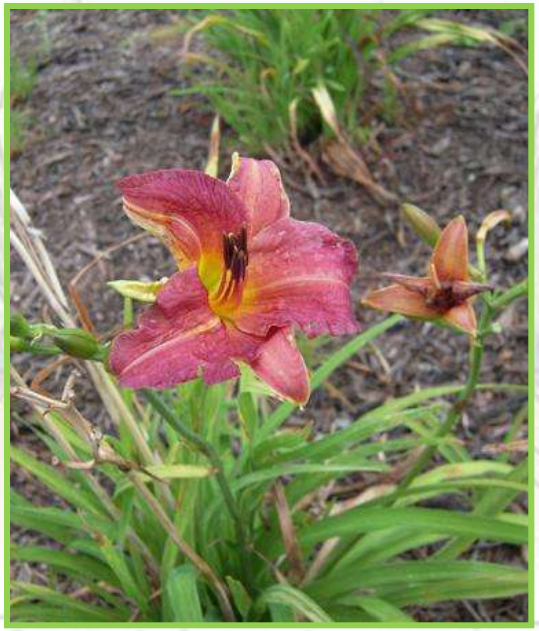
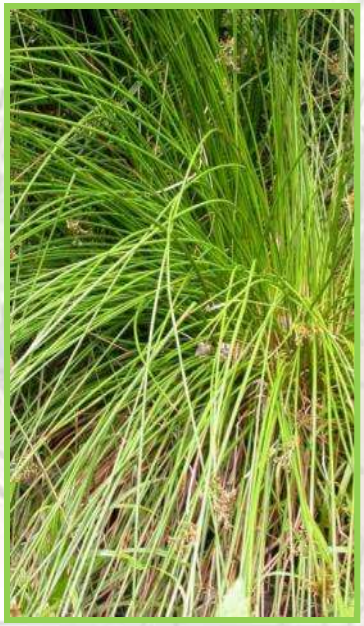
- Variable water tolerance
- Disease can be significant issue
- Consider shorter species and cultivars
- Significant fall bloom landscape value





Suckering and Spreading Plants

- Can be a blessing under tough conditions
- Can be a curse on an ideal site
- Variable water tolerance
- Plan ahead, consider maintenance trade-offs

Size/Condition Choices – Seeding

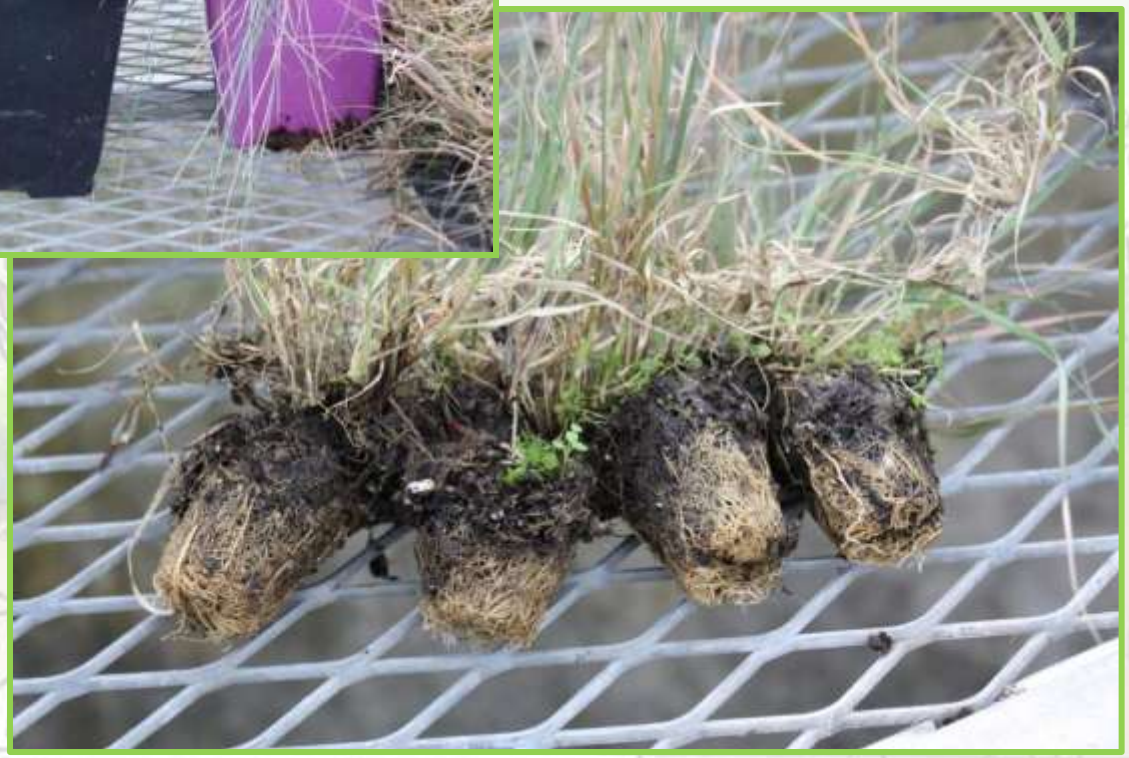
- Significant considerations (may include weeds, initial maintenance, slow establishment, mixed heights and textures)
- Drilling typically preferred to broadcasting
- Purchase high quality seed from reputable source
- Weed seed from straw can be problematic
- Tends to be less expensive… *initially*

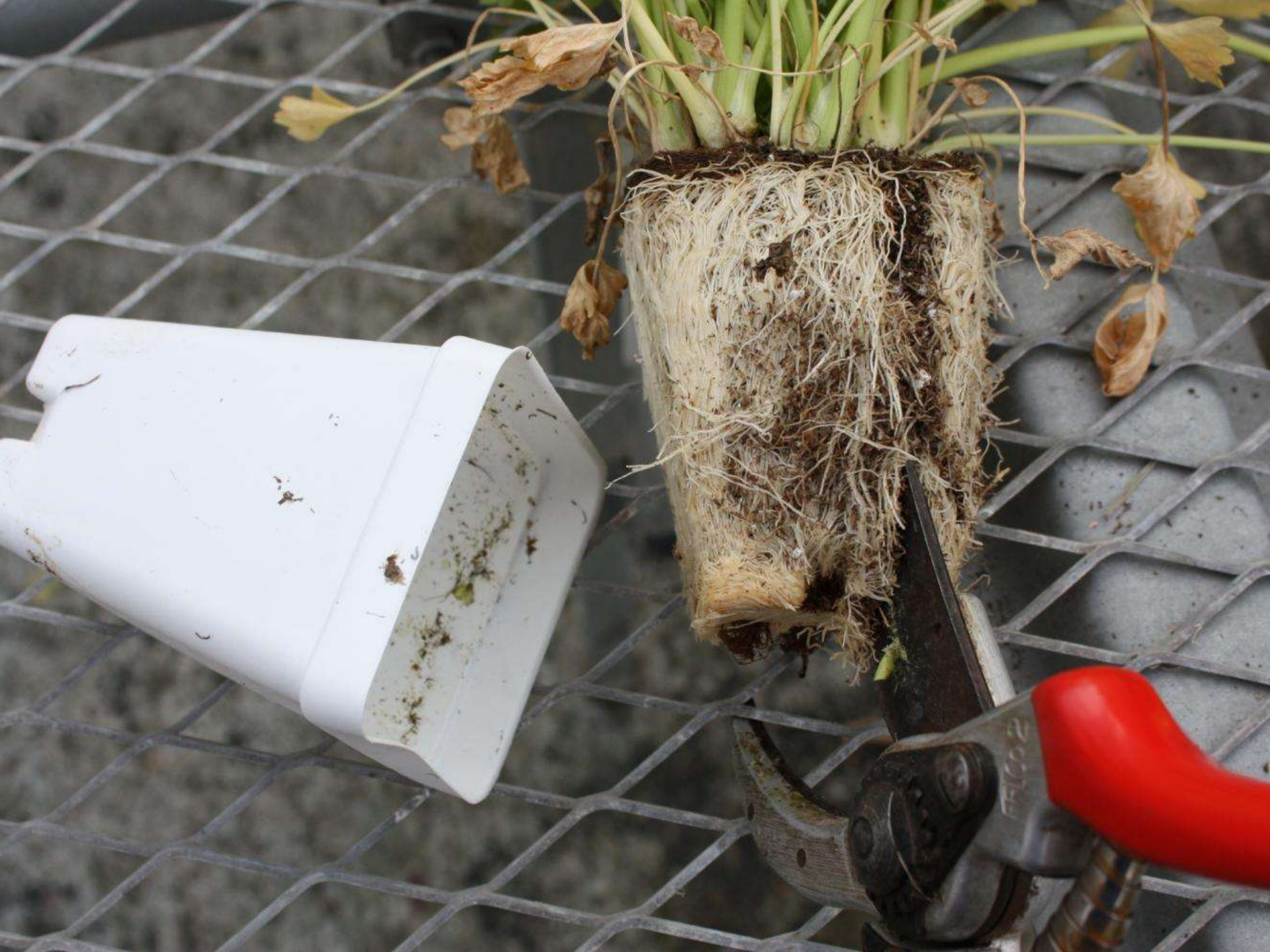
Size/Condition Choices (cont.)
Sod

- Relatively new, still assessing potential
- Cost-effective … or expensive? *it all depends*
- Immediate soil coverage and erosion control benefit; immediate visual effect
- Fewer plant choices
- Random plant patterns
- Plants will need to decide where to grow over time

Size/Condition Choices (cont.)
Potted Plants

- Various sizes; deep cell-plugs provide small but deep-rooted plants
- Potential for immediate visual impact (if large plants used) and relatively quick establishment
- Small plants initially more cost effective; with good growing conditions, can establish quickly
- Quality plants significantly enhance quality establishment





Plant Layout and Spacing

- Plan for approximate plant widths (which can vary by site conditions and plant cultivars)
- Adjustments typical to stretch/condense planting densities, react to actual site dimensions
- Reduced densities possible for self-seeding or suckering plants, or for cost savings (*don't overdo*….)
- Ultimately, nature will decide….

Planting, Fertilizing, Initial Watering

- Minimize soil compaction whenever possible
- Dig holes deep and wide enough for adequate backfill and full root extension
- Assure good soil/root contact through light compaction and thorough watering
- Mulch after planting, and use care in mulch placement
- Fertilizing typically not recommended

Managing Expectations

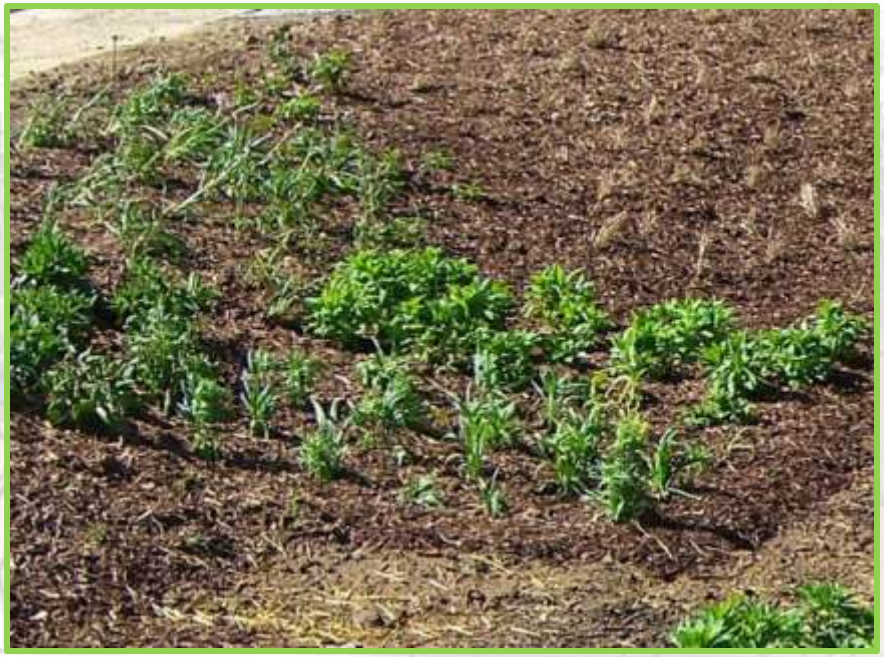
- Maintenance for bioretention gardens is normally the responsibility of the owner
- A professional should be consulted periodically
- Regular inspection is necessary
- **PATIENCE IS REQUIRED!!!!**

Weeds Will Grow

- Weeds (invasive plants) are inevitable
- Hard to discern from native plants in early stages
- Don’t let weeds go to seed
- Fewer weeds as garden matures

The First Year

- Water young plants regularly – but don't overwater (less water later in season)
- Don't fertilize
- Native plants are often slow to grow during the first year
- Don't overmulch



Second Year and Beyond

- Mow dead vegetation early in spring (burn is better)
- Monitor for weeds/invasive plants
- Remove dead plants, thin existing stands if necessary
- Inspect for sediment accumulation, clean sediment traps (as often as necessary)
- Repair damage
- Water only if conditions are very dry

"Traditional concrete stormwater structures function best the first day after construction. For plant-based stormwater systems, the first day after installation is the worst for function."

Dr. Stacy Hutchinson

Kansas State University