



# Urban Erosion Solutions for Landscapes - Stormwater Best Practices for Homeowners

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3/23/19



**Virginia Cooperative Extension**

Virginia Tech • Virginia State University



# What is Stormwater Runoff?

- Stormwater runoff is rainfall that flows off impervious surfaces and into drainage pipes which eventually empty into streams, rivers, bays, and oceans
- Stormwater carries sediment and other pollutants that *degrade the health of our waterways and communities*

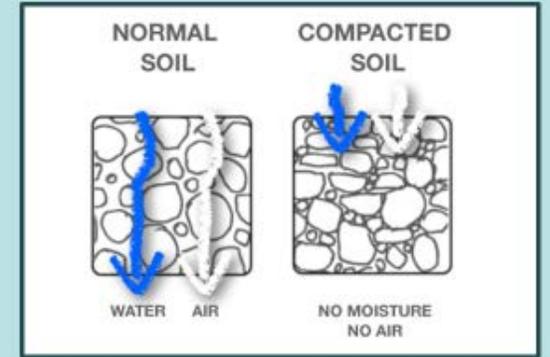
## Factors Affecting Stormwater Run-Off

- Slope & Velocity
- Vegetation: Quantity & Type
- Soil Moisture
- Rate of Infiltration: Type of Soil & Land Use



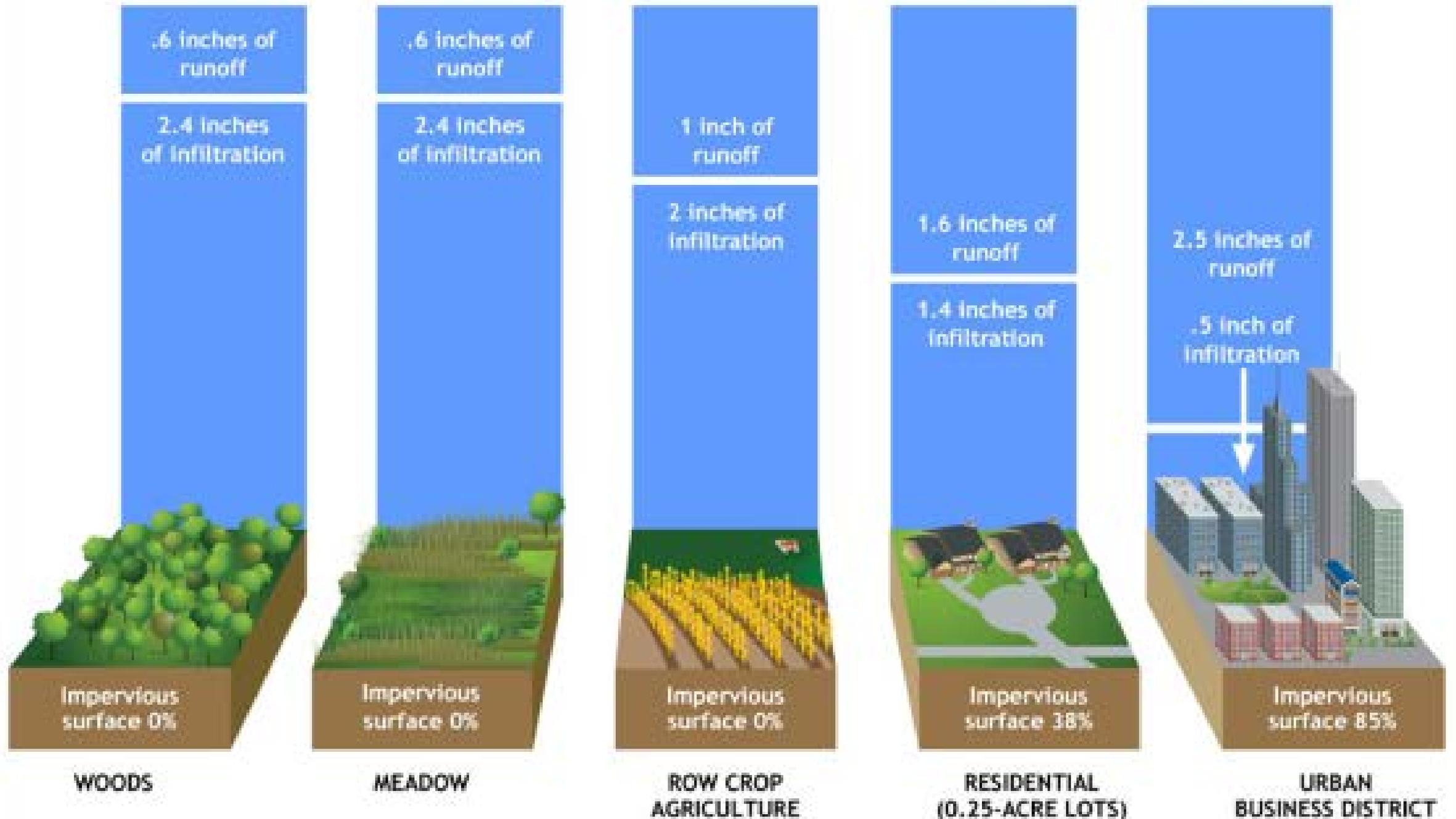


## Compacted Soil is Impervious!



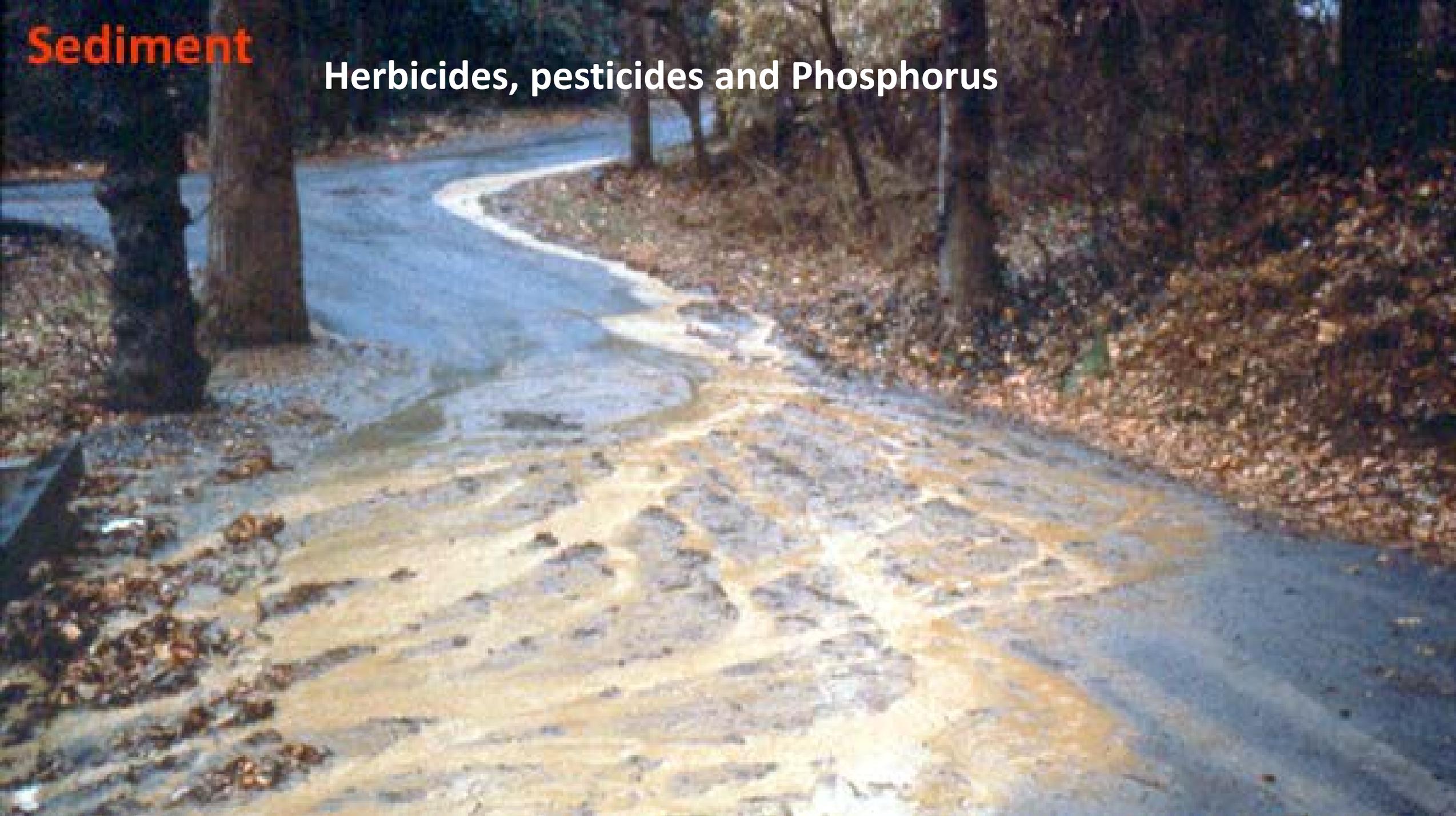
# Impervious Surfaces

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**Sediment**

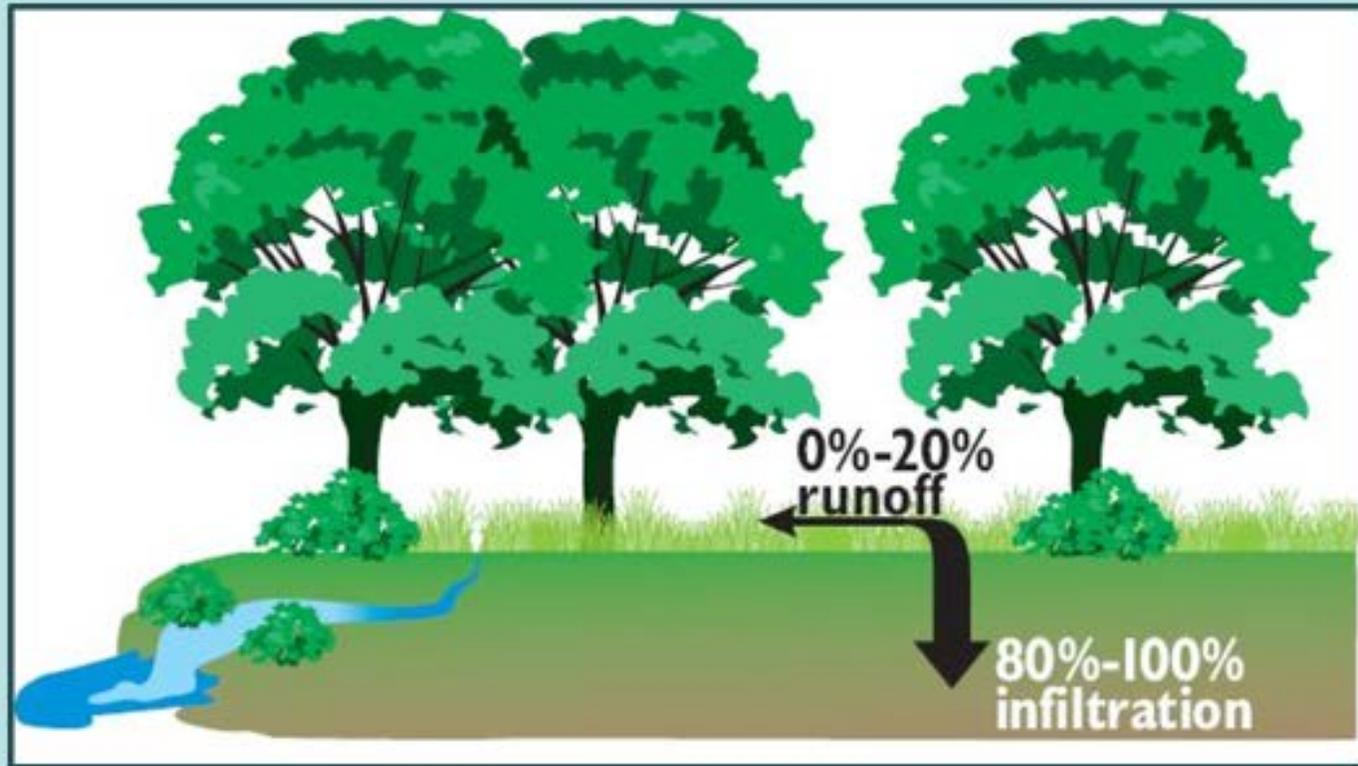
**Herbicides, pesticides and Phosphorus**

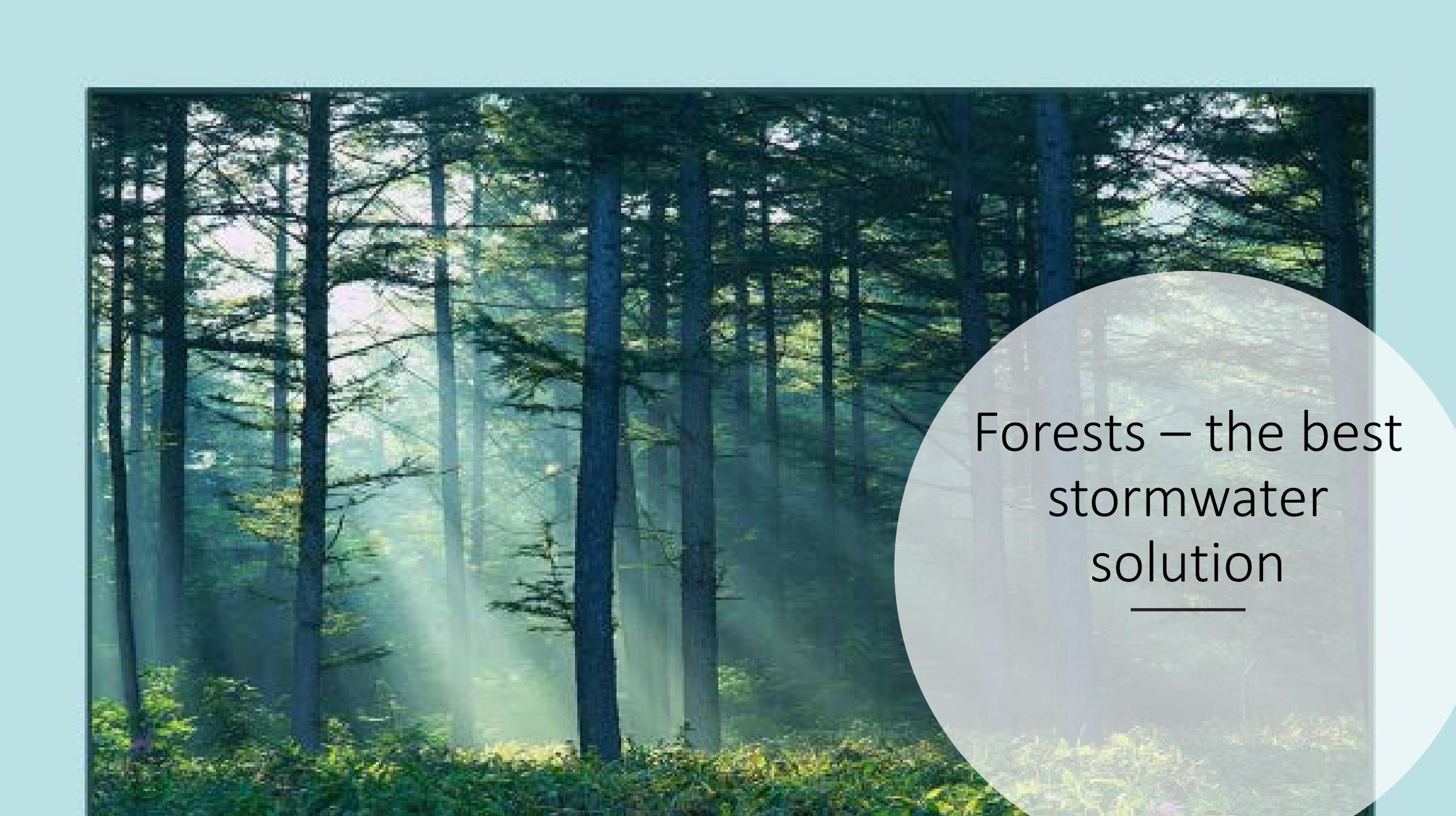




**Severe  
Streambank Erosion**

**Slow It Down  
Spread It Out  
Soak It In**





Forests – the best  
stormwater  
solution

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# **& Low Impact Development**

**The EPA defines low impact development (LID) as “systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat.”**

**Common LIDs include: Rain Barrels/Cisterns, Rain Gardens/Bioretentions, Permeable Pavement, Green Roofs, BayScaping and Impervious Surface Reduction.**



**BayScaping is the utilization of deep-rooted native plants and mulch to replace turf or impermeable surfaces. This stabilizes soils and increases infiltration of stormwater.**



## Riparian Buffers

Vegetated areas along water bodies, such as lakes, streams, rivers, marshes or shoreline, are known as riparian buffers. Most of these buffers are included as Resource Protection Areas (RPAs) under the Chesapeake Bay Act.



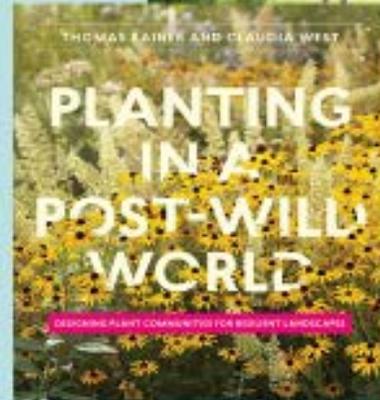
## Resource Protection Areas (RPAs)

RPAs are described as the '*last line of defense*' for the protection of water quality. These buffers stabilize shorelines and stream banks, filter pollutants, reduce volume of stormwater runoff and provide critical habitat for aquatic species and wildlife.



## Plant More Plants!

- Groundcover
  - Reduces runoff
  - Reduces erosion
  - Increases infiltration
- Make it healthy
  - Less fertilizer need
  - Less pesticides use
  - Less yard waste
- Use Mulch, or plants as mulch
  - Retains water
  - Keeps soil temperature more moderate



## Fertilizers

- Use it, if soil test says you need it.
- Calibrate
- Avoid putting on hard surfaces
- Use it at the right time  
(SON for cool season turf)
- Manage pests/weeds
- Healthy turf
- Mow high and mulch with clippings
- Pick the right grass
- Aerate
- Overseed
- Water properly or not at all.



Turf is a high maintenance crop!

## Proper Irrigation

- Adapt your watering schedule to the weather and the season.
- Schedule each individual zone in your irrigation system.
- Calibrate your sprinkler
- Adjust sprinkler heads
- Install a rain shutoff.
- Water at the optimum time - as much as 30% of water to evaporation by watering mid-day.
- Water deeply by saturating root zones and then let the soil dry. Watering too much and too frequently results in shallow roots, weed growth, disease and fungus.



# Appropriate spots for turf grass

- Sunny – at least 6-8 hours
- Well drained, relatively flat to gently sloped, smooth, graded surface
- Relatively large block with curving edges that is easy to maintain
- Where a tough surface for recreation needed
- For safety and a clear line of site
- To preserve or enhance a view
- To maintain an access route

*Lawn grasses are the only species tolerant of daily wear.*

# BEST Lawn program

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## Is Your Grass Out of Control?



### BEST LAWNS STRENGTHENS YOUR GRASS

- \* Grass is a high maintenance plant
- \* To grow grass well you have to understand it's needs
- \* Healthy grass is the best defense against weeds, pests and diseases in your lawn



## BEST Lawns Can Help

### BUILDING ENVIRONMENTALLY SUSTAINABLE TURF

#### The BEST Lawn Program...

- makes the best use of valuable resources:  
**your time and money**
- protects your neighborhood streams, lakes, ponds, and ultimately the Chesapeake Bay

Depending upon the current condition of your lawn, converting to the BEST Lawn will take some time and planning.  
**DON'T DELAY!**



#### When you join BEST Lawns a Master Gardener Volunteer will

- Collect a soil sample
- Measure your total lawn area

#### You will receive

- A BEST Lawn care handbook
- A customized lime & fertilizer plan for your lawn

The BEST Lawn Program will help you learn turf fertilization, maintenance practices and timing that prevent problems

For more assistance with lawn care, contact:

BEST Lawns Program 703-792-4037

# Why we need alternatives to fescues

- Shade
- Difficult to mow (slope, narrow space)
- Less, or no mowing
- Hard to irrigate
- Soil coverage in off-season
- Some groundcover handles storm water better than turf
- More clients are demanding it
- Increase in diversity and number of species of beneficial insects and pollinators
- Ability to select plants adapted to site and climate – turf deals with transition zone
- Enhance beauty and function of landscape
- Gets rid of turf monoculture problems

# Potential drawbacks of no turf/no mow areas:

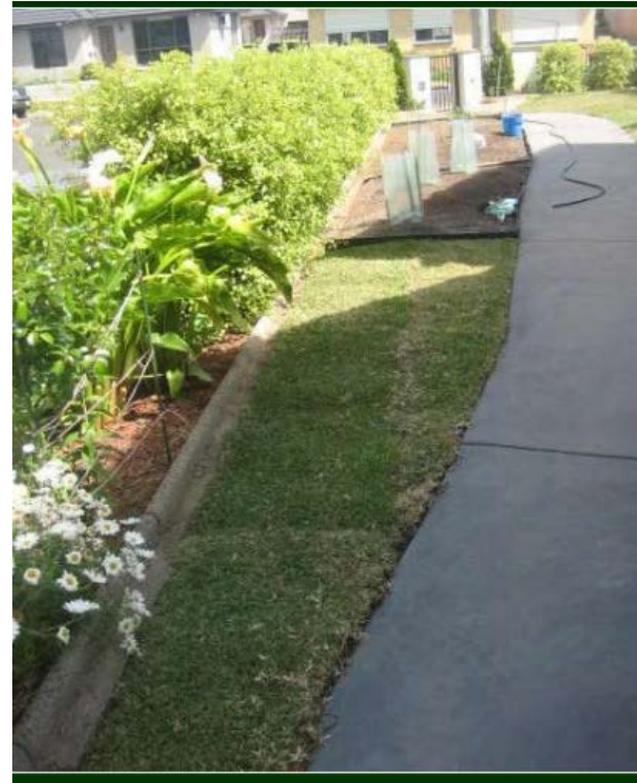
- Not ideal for high-use areas (play areas)
- Require more work and cost initially, but the end benefits will be worth the additional labor.
- New areas need irrigation the first year when there is insufficient rainfall.

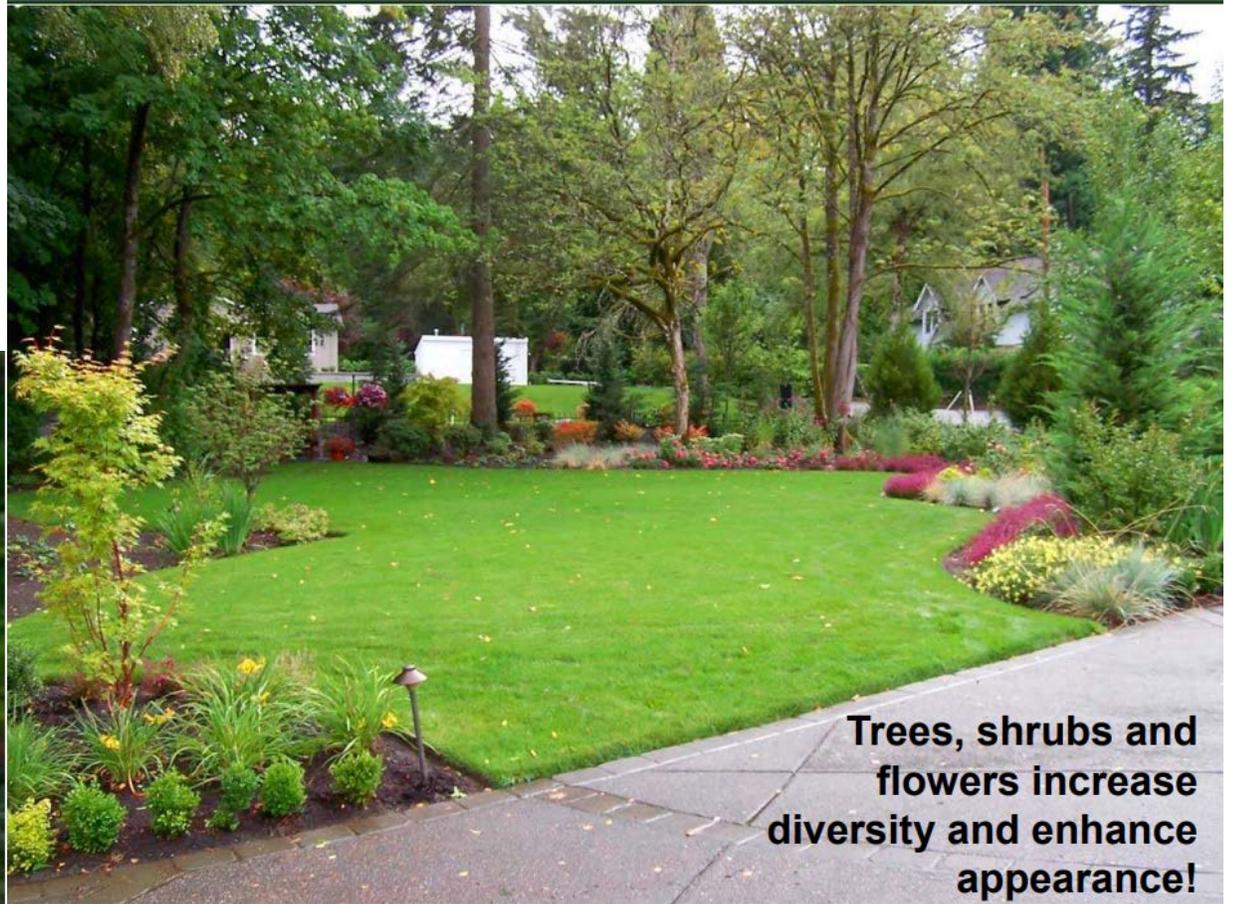


- Require weed removal by hand until plant cover becomes dense enough
- Can look not as aesthetically pleasing at first to homeowners
- Clients may have to sell the idea to their neighbors and homeowners' association.

# Potential spots to reduce turf and consider alternatives

- Wet
- Shady
- Constant, heavy traffic
- Difficult to maintain
- “Hell Strips”
- Tight angles
- Under trees





**And reduce erosion!**



Turf Alternatives: Clovers and microclovers

# Clover or Clover Blend

Clover -> legume -> available nitrogen

Reduces N fertilizer needs by 1/2

Try a tall Fescue- Dutch White or Intermediate Clover Blend

## Mini/Micro-clovers

Lower growing

Less vigorous

Smaller leaves

Less flowers

More expensive



# White Dutch Clover - Pros

- **Durability** — toughest lawn alternatives, easily withstands normal foot traffic.
- **Drought-Resistant** — deep roots, irrigate at establishment
- **Little to No Mowing** — slow growth, rarely needs mowing, 6-12”
- **Pest-Resistant** — Common turf pests won't bother
- **Perennial**, in VA performs like annual under some conditions
- **Creeping habit**; grows in shade
- Performs best w/plenty of lime, potash, calcium and phosphorus
- **Tolerates poor conditions** better than turf, other clovers



# White Dutch Clover - Cons

- May become slippery and matted when wet
- May need to be reseeded annually
- May not be uniform
- Attracts bees 😊
- Wildlife attractive
- Spreads easily and can cover other landscape plants if not bordered.
- HOAs may not allow
- All white clover = monoculture
- Mix of clovers = uneven appearance

# Tall fescue/microclover blend



Research by Mark Carroll, University of Maryland  
Incorporated with 5" LeafGro compost

# Turf Alternatives: Moss



Moss favors compaction, shade, wet, poorly drained humus rich soil

over 12,000  
species



# Moss care and maintenance

- For shady, moist areas
- Moss is not tolerant of heavy foot traffic – add a path
- Transplant patches spring

Press into loosened soil

Keep moist for 3-4 weeks

- Moss slurry:

Mix 2 parts moss, 2 parts water,  
1 part buttermilk in a blender

Spread over soil surface and keep moist until established



# Moss – pros and cons

- **No Mowing**
- **Drought-resistant** — Little to no watering required
- **Variety** — Dozens of different mosses; can be combined for interesting appearance
- **Easy Installation** — Moss spreads quickly
- **Shade-Loving** — Needs cool, shady area
- **Resilience** — Best for areas with limited foot traffic.
- **Must clear leaves and debris**
- **No fertilizing needed**

Sedges – *Carex* sp.



# Sedges

- HOAs may not allow
- Avoid a monoculture and its inherent problems
- Mix of sedges = uneven appearance, many species die back to the ground in winter
- May need occasional mowing
- Not an even surface for playing or entertaining on
- No BMPs developed for this
- Pennsylvania sedge is most commonly mentioned – prefers dry soil



# Sedges (Carex) – wet shade



Carex flacca 'Blue Zinger'  
wet, shady



Carex flaccosperma  
dry or wet shade



Carex albacins wet  
shade



Carex amphibola – wet,  
shady, native

# Sedges – dry to moist



Carex pensylvanica  
Part to full shade  
Dry to medium  
.5-1'

Carex rosea  
Piedmont native  
12"  
Spreads slowly  
Part to full  
shade  
Dry or moist



# Sedges – dry shade



Carex appalachia dry shade



Carex rosea –  
dry shade



Carex eburnia dry shade, rock garden with ferns

# Sedges – wet, sunny



Carex comosa – part  
to full sun, wet



Carex emoryi part  
to full sun, wet

Perennials/Bulbs



# Perennial groundcovers

- Spread but do not grow tall = no mowing
- Perennial evergreen ground covers can choke out weeds and act as mulch. (Thyme)
- Weed/mulch until established.
- Use edge barrier to contain
- Choose species that do NOT dieback to the ground in winter to protect soil
- No fertilizer needed (only with symptoms and soil test)
- Species options for shade/sun
- Can add color/texture/seasonal interest to landscape
- Many are nectar sources for pollinators

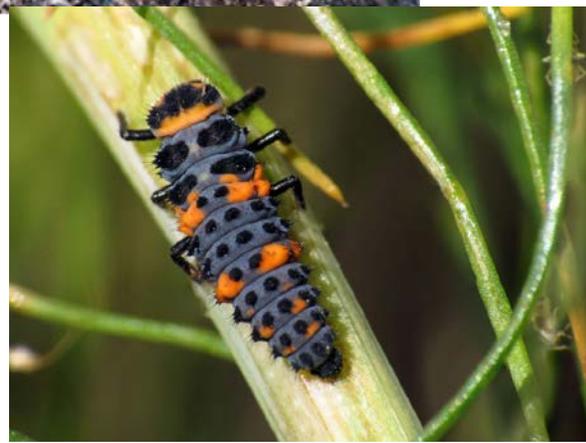
- Most aren't available as seed, or sod (yet...)
- Costly to convert a large area
- Won't tolerate heavy traffic
- "Lawn" chemicals aren't always safe for ground covers
- HOAs may not allow
- Some maintenance necessary





# Yarrow - *Achillea millefolium*

- Native
- Drought resistant
- Spreads
- Shade, sun, wet, dry
- No mow
- Attracts beneficial insects/pollinators



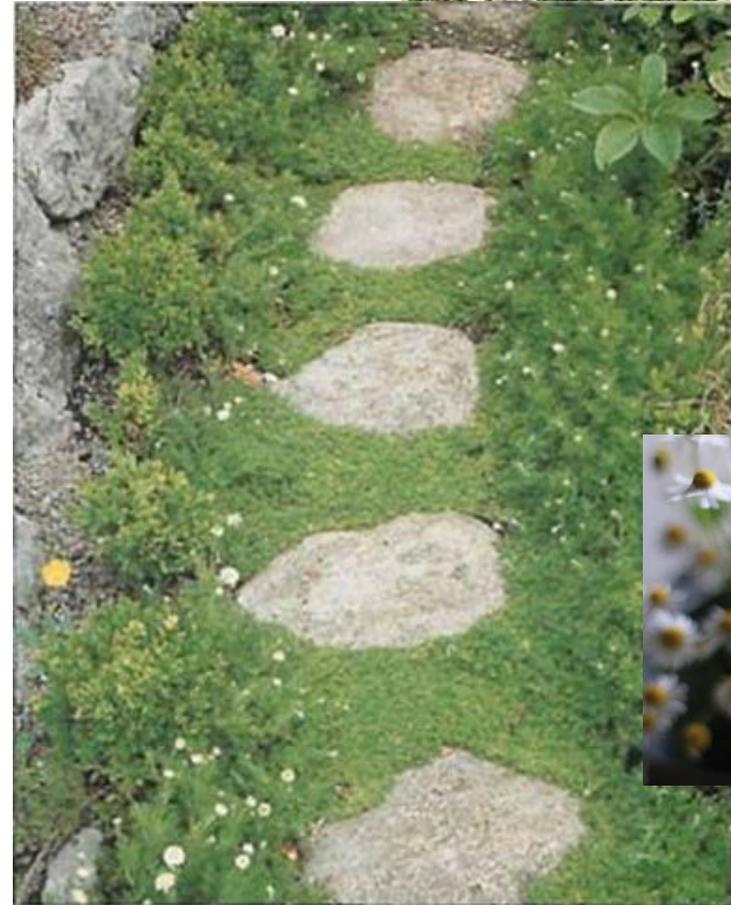
# Violas

- Evergreen
- Important food source for Fritillary butterfly larvae
- Can handle foot traffic



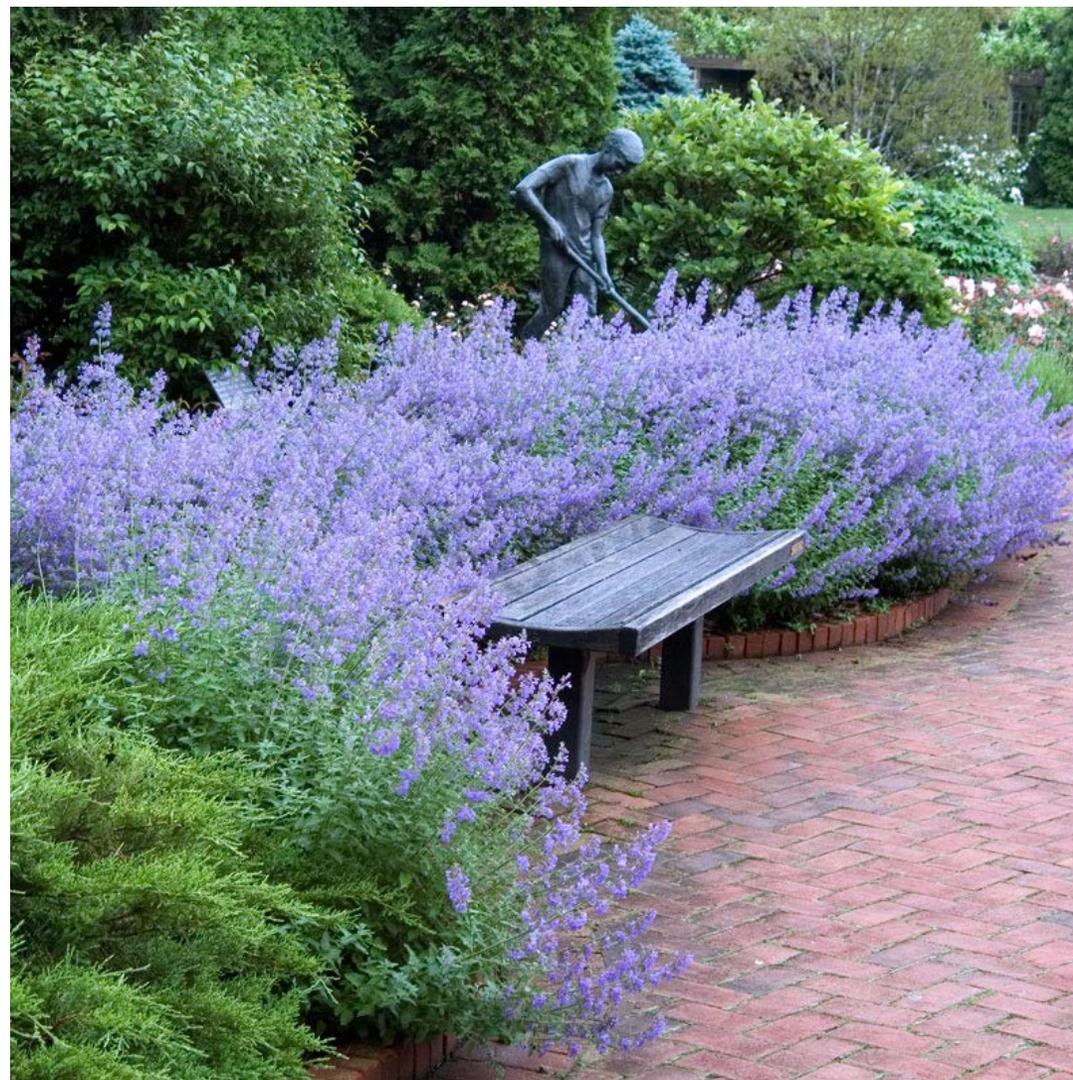
# Anthemmis nobilis (Chamomile)

- Fragrant
- Spreads quickly
- Sun or partial shade (less robust in shady area)
- Little to no Mowing
- Slopes and in hard-to-manage areas.
- Once established, drought tolerant
- Some varieties of chamomile are toxic to animals



# Nepata 'Walkers' low'

- Mint family
- Spreads
- Deer resistant
- Attracts pollinators
- Requires full sun to thrive



# Pennyroyal - Menthe pulegium

- Fragrant
- Mint family, so spreads easily – needs to be contained in the bed
- Low growing
- Handles some foot traffic



# Sedum sp.

- Drought tolerant
- Easy to grow
- Many colors, flowers and foliage
- Most full sun, good drainage



# Potentilla Canadensis – Dwarf cinquefoil

- Low plants that look like wild strawberry, except flowers are yellow, 5 leaves (usually)
- Spreads by runners



# Rosmarinus officinalis prostrates Prostrate rosemary

- Hardy, fast-growing evergreen
- Fragrant
- Ideal for a rock garden or the top of a dry wall or groundcover.
- Well-drained soil
- Full sun.



# Bugleweed (*Ajuga reptans*)

- Readily available
- Spreads
- Prefers shade, can be drought/heat sensitive in full sun
- Flowers in the spring
- Foliage ranges various shades from greens to purples
- Some consider it invasive
- Early nectar source
- Non-native



# Wormwood - *Artemisia absinthium*

- Requires full sun, excellent drainage
- Non-native
- Blooms August-Sept
- Drought tolerant – prefers dry conditions
- Deer resistant
- Fragrant



**Powis Castle**  
**Artemisia**  
*Artemisia 'Powis Castle'*



**Silvermound**  
**Artemisia**  
*Artemisia schmidtiana*



**Absinth**  
**Artemisia**  
*Artemisia absinthium*



**Western mugwort**  
**Artemisia**  
*Artemisia ludoviciana*



**Artemisia**  
**Artemisia 'Powis Castle'**

# Speedwell - *Veronica penduncularis*

- Non-native (Ukraine/Asia)
- Full sun
- Deer resistant
- Spring bloom, then intermittent during summer
- 4-6"
- Bronze in winter



# Woolly Thyme - *Thymus pseudolanuginosus*

- ½ - 1"
- Full sun
- Blooms June-July
- Non-native –Europe
- Drought tolerant
- Deer resistant



# Creeping Red Thyme - *Thymus serpyllum*

- Evergreen, deep bronze in the winter
- Forms mat that can withstand moderate foot traffic
- Drought-Tolerant
- No mow
- Expensive — choose a small area



# Creeping Mazus - *Mazus reptans*

- Full sun to part shade
- Non- native
- Creeping habit



# Antennaria (Pussytoes)

- Evergreen
- Seed or plugs
- Can handle poor/acidic/compacted soil
- Rocky slopes
- Native



# Ornamental Oregano - *Origanum laevigatum*

- 1-2'
- Blooms July-Sept
- Drought resistant
- Prefers dry conditions
- Full sun
- Deer resistant
- Non-native – Turkey, Cyprus



# Blue Star Creeper - *Laurentia fluviatilis*

- Semi evergreen
- 2"
- Blooms late spring-early summer
- Full-partial sun
- Cut back after bloom for re-bloom
- Non-native - Australia



# Plumbago/Leadwort - *Ceratostigma plumbaginoides*

- Non-native – Asia
- 1- 1 ½ ‘
- Full sun to part shade
- Spreads by rhizomes
- Prefers average to dry sites



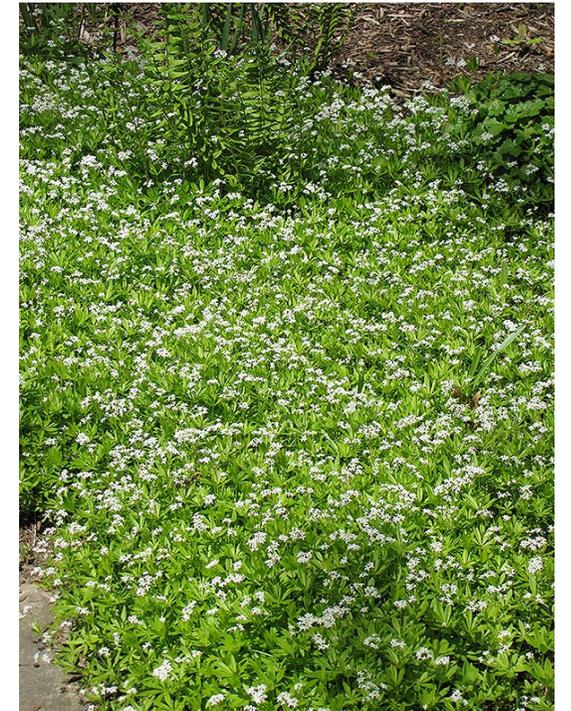
# Coral Bells - Heuchera Americana

- Native to North America
- Blooms June-August
- Drought tolerant
- Shade/part shade/full sun
- 1-1 ½'



# Sweet Woodruff - *Galium odoratum*

- Spreads by rhizomes
- Can be mowed
- Part sun to full shade
- Non-Native
- Drought tolerant
- Fragrant
- 8-12"



# Prairie Dropseed - *Sporobolus heterolepsis*

- 2-3'
- Full sun
- Deer resistant
- Native to North America
- Attracts birds



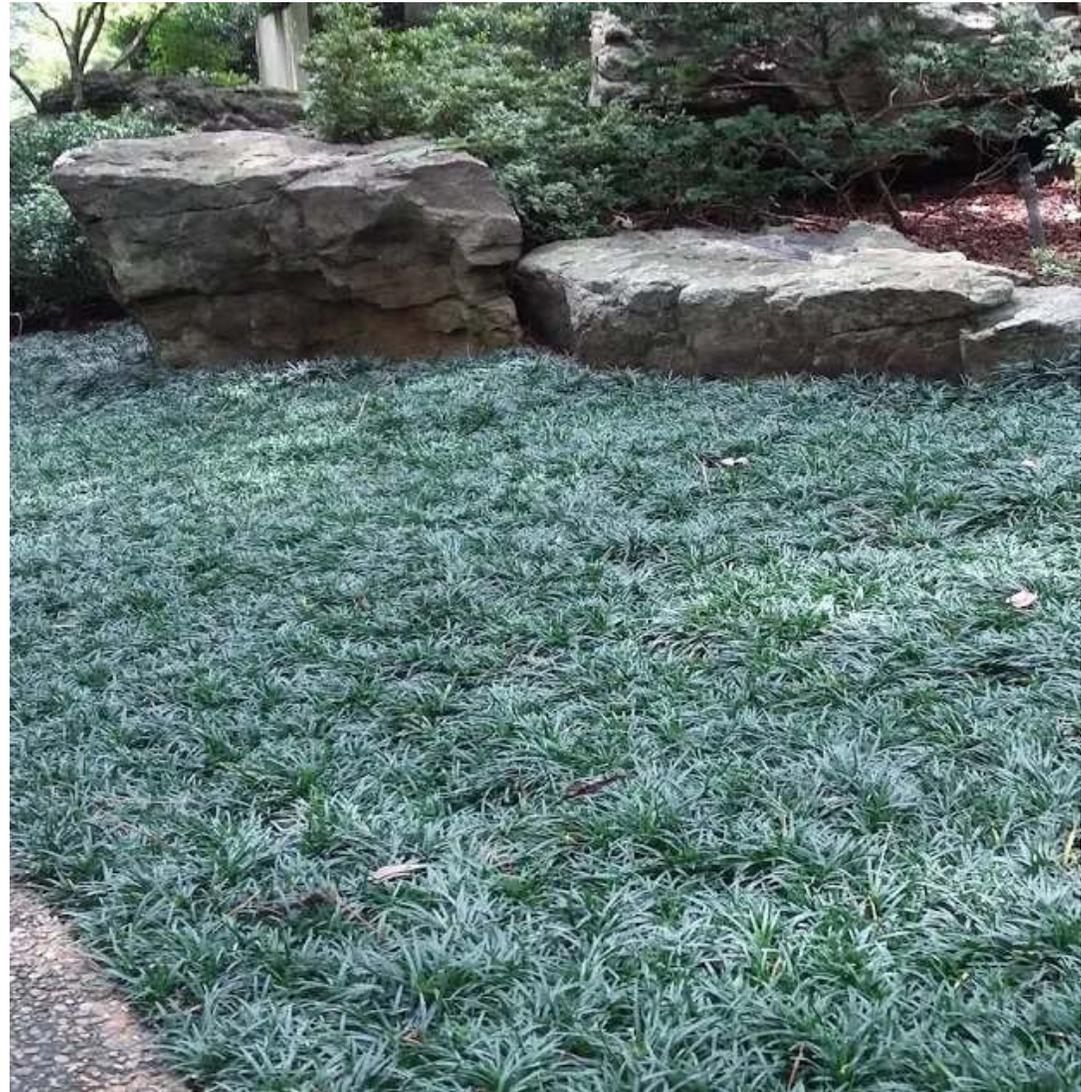
chanticleer r. darke

# Christmas fern – *Polystichum acrostichoides*

- Evergreen
- Native
- Shady, moist area



# Dwarf Mondo Grass



# Shade

Foamflower  
*Tiarella cordifolia*



Green and Gold  
*Chrysogonum*  
*virginianum*

# Geranium machorhizum

- Native to Virginia
- 1-2'
- Full sun – part shade
- Deer resistant
- Attracts butterflies, pollinators



# Sedum ternatum

- A Sedum that likes the shade
- Native
- Slow growing



Creeping red fescue – native grass – no mow,  
dark green, sun or shade



# Hard Fescue

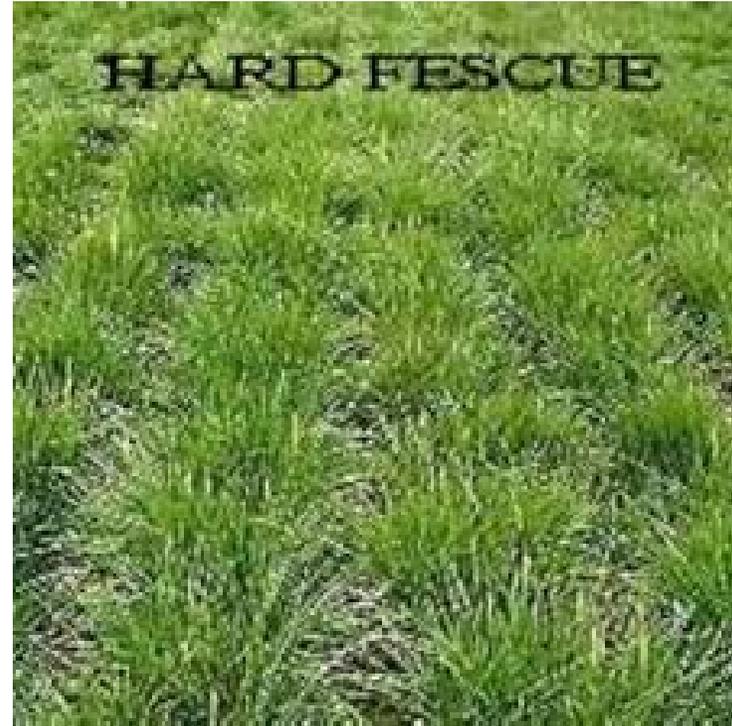
Low input

No mow turf substitute

Non-Native

Shade

Low fertility areas, slopes



# Junipers

- Creeping Juniper
- *Juniperus horizontalis*
- Lowest growing, 1' x 6'
- 'Blue Pacific' is popular
- Very drought tolerant
- Will not do well in wet soils, poor drainage
- Requires full sun



# Tips

- Avoid *Lysimachia* and *Houttuynia cordata*– both very aggressive/invasive
- Any planting for pollinators probably should not be uniform in terms of plant choices, heights, so it would not be lawn-like. Multiple plants a mixed planting, not a monoculture would be ideal.



Problem areas

# Wet area, “seep”

- Poor drainage = disease problems!
- Plant moisture tolerant trees,
- Perennials, sedges & rushes
- River birch
- Willow oak
- Bald cypress



Add a pervious path, gravel, mulch, stepping stones

# Wet Sites

## **Appalachian Sedge** *Carex appalachica*

- 12”, dense mounds
- drought tolerant

## **Cherokee Sedge**, *Carex cherokeensis*

- 12 – 18”
- Prefers moist sites

## **Sweet Flag**, *Acorus* species



# Dry Sites – Native & Ornamental Grasses

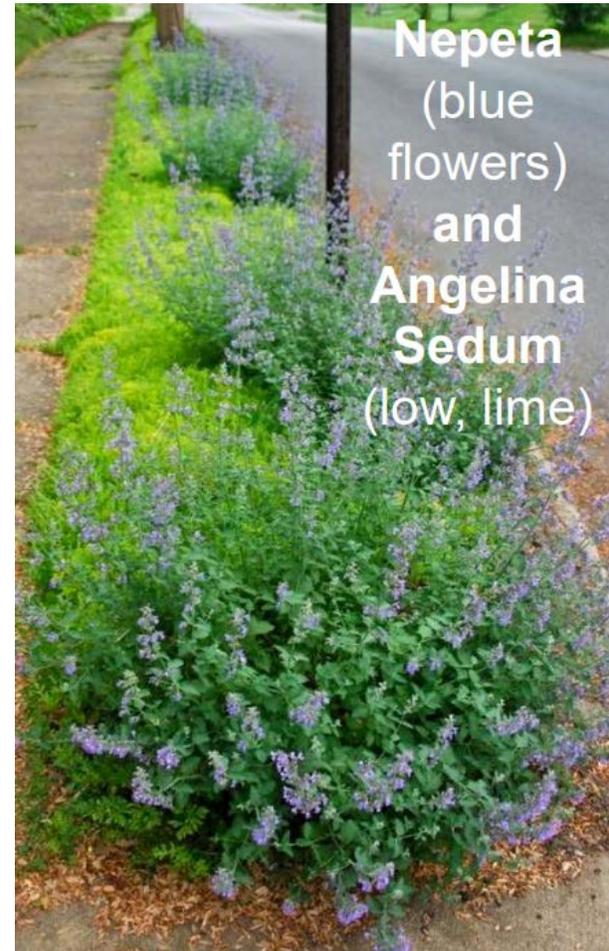
- Do well in sunny, dry areas
- Drought resistant
- Different textures and heights, growing habits.
- Foliage must be cut back once a year, in the early spring before new growth.
- Over 100 native species, none adapted for use as mowed turf
- Some are grown as ornamental grasses
- Deer resistant



Hell Strip, slopes, between trees,  
hard to mow

# “Hell Strip”

- Narrow strips with concentrated traffic
- On steep slopes
- Poorly drained, wet areas
- Plant narrow strips with
- groundcovers and perennials



Add Trees and Shrubs  
– native species  
support  
pollinators/beneficial  
insects/birds

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## Native Tree Alternatives for Suburban Lots



Sourwood *Oxydendrum  
arboreum*



Witchhazel *Hamamelis virginiana*



Red Buckeye *Aesculus pavia*



Redbud *Cercis canadensis*



Sweet Bay Magnolia *Magnolia  
virginiana*



Crabapple *Malus*

# Native Tree/Shrub Alternatives



Fringe tree *Chionanthus virginicus*



Yellow wood *Cladrastis kentukea*



*Magnolia virginiana*



*Carpinus caroliniana*

# More native/shrub tree alternatives



***Calycanthus floridus***



***Ilex verticillata***



***Lindera benzoin***



***Cercis canadensis***

# Smaller Native trees/shrubs



***Clethra  
alnifolia***



***Itea***

***Hamamelis virginiana***



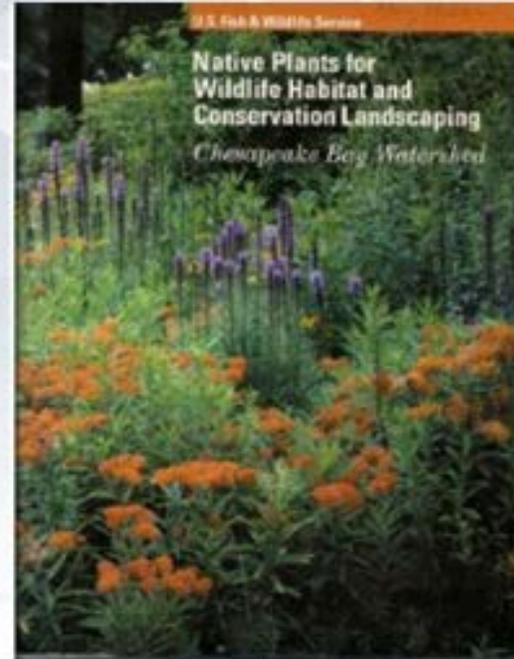
# Native Perennial Alternatives

*Native Plants for Northern Virginia*



U.S. Fish & Wildlife Service

**Native Plants for  
Wildlife Habitat and  
Conservation Landscaping**  
*Chesapeake Bay Watershed*



**PLANT  
MORE  
PLANTS**

Plant NOVA Natives  
<http://www.plantnovanatives.org/>

Mulch between trees where mowing is tough and damage to trees possible



Expand mulched area around trees

- Pine straw
- Shredded bark
- Leaves
- Add or expand beds on perimeter,



# Alternatives for steep slopes native trees/shrubs on areas too steep to mow



St. John's Wort  
(*Hypericum*)











Ring of Responsibility – no turf, no mow zone



# Wildflowers or Meadows

- Sunny or part-sun areas
- Enhances biodiversity by providing shelter, food, and nest sites to birds, butterflies, beneficial insects, and pollinators.
- Often expensive to establish, difficult to maintain, and require occasional mowing.
- Should have about 30-70% native grasses
- Meadows take about three years to reach maturity.
- HOAs may not permit
- Weed control is annual issue
- Avoid meadow mixes that contain annuals which need reseeding.

# Questions?

**Extension Horticulture Help Desk**

**[master\\_gardener@pwcgov.org](mailto:master_gardener@pwcgov.org) 703-792-7747**