



# **Green Building Workshop Series Eco-City Alexandria Initiative**

## **Workshop 3 Green Landscaping For You and the Chesapeake Bay**

**May 7, 2011**

**9:00 am – 12:30 pm**

**Cora Kelly School**

**Alexandria, Virginia**





## Our Speakers Today

- **Claudia Hamblin-Katnik**, Ph.D., Watershed Program Administrator, Office of Environmental Quality, City of Alexandria
- **Lauren Wheeler**, LEED AP, M.A., Landscape Design, ISA Certified Arborist
- **Kristen Buhls**, Extension Agent, Virginia Cooperative Extension
- **Sandra Leibowitz**, LEED AP, Principal, Sustainable Design Consulting, LLC





# Workshop Overview

1. Background of Eco-City Alexandria Program
2. Challenges to the Chesapeake Bay
3. Designing your landscape to save water and energy and protect the Bay
4. How to construct rain gardens in Alexandria
5. Using native plants in your garden
6. Local information and resources
7. Q&A with presenters





# Green Building Workshop Series

*Next Workshops, Save the Dates NOW!*

Green + Historic Properties = The Best of Both - **June 4, 2011**

Renewable Energy Systems and Green Power - **September 24, 2011**

Green Operations for Retail, Restaurants, and Small Offices - **TBD**

*Workshop series funded by EECEBG.*





# Eco-City Alexandria

## Eco-City Charter Principles

- Land Use and Open Space
    - Water Resources
      - Air Quality
      - Transportation
        - Energy
      - Building Green
        - Solid Waste
    - Environmental Health
  - Emerging Threats & Climate Change
    - Implementation
- 
- **Environmental Action Plan**





# Energy Efficiency and Conservation Block Grant Projects

- Energy Conservation (Green Building Phase II)
  - Energy Audits and Energy Efficiency Retrofits for City Buildings
    - Green Fleet
    - Green Jobs Training
    - Green Loans
  - LED Traffic Signals/LED Street Lights
- Renewable Energy Installation at City Facility






# Challenges to the Chesapeake Bay

**Claudia Hamblin-Katnik, Ph.D**  
Watershed Program Administrator  
Office of Environmental Quality  
City of Alexandria



# What is a Watershed?

A watershed is the total land area that drains water into a given river, lake, estuary or other body of water. A watershed can be quite large (e.g., the Chesapeake Bay watershed) or small (e.g., the watershed of a local stream). More than 64,000 square miles of land drain into the Chesapeake Bay and its rivers.








# Why Study Watersheds?

Water is the unifying force of all life

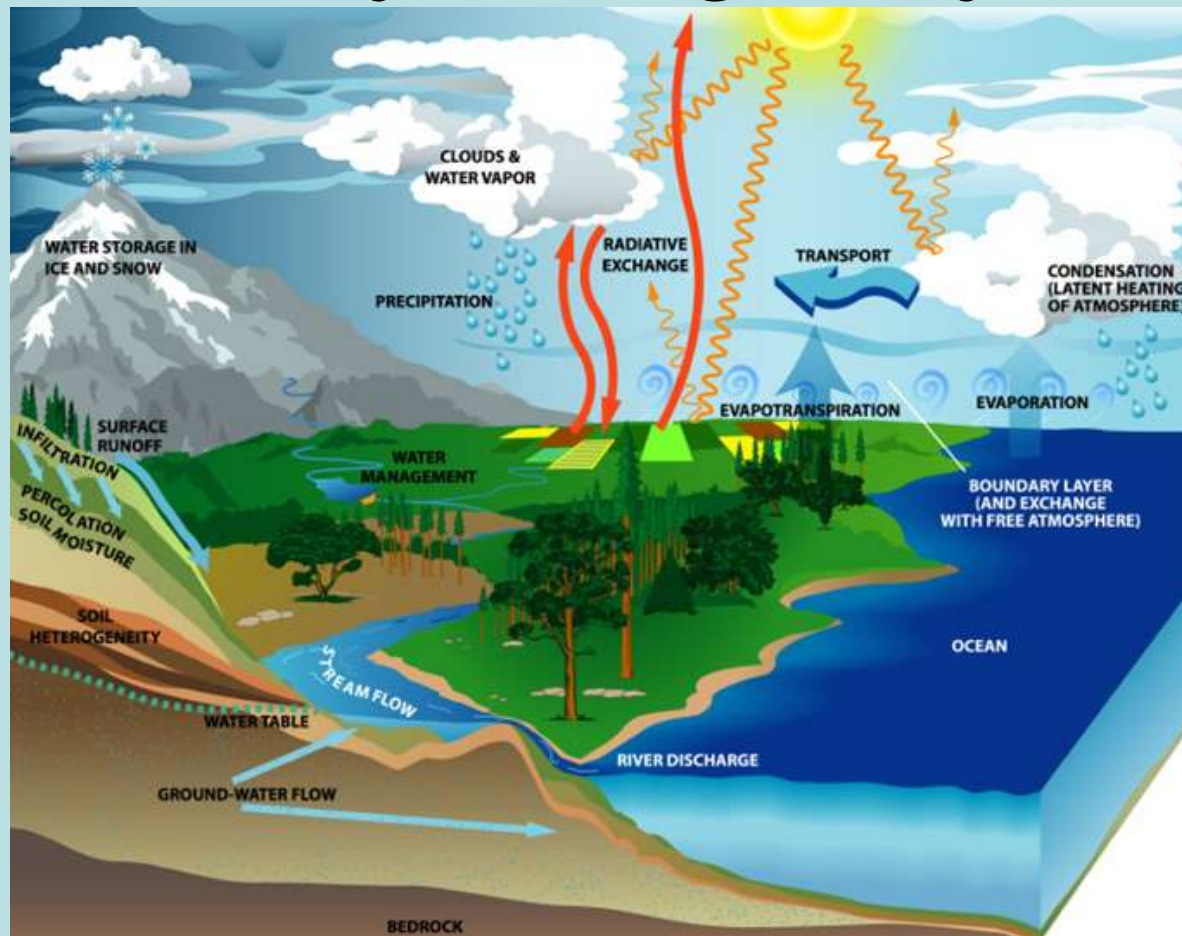
The land over which it flows contributes to the health of all who consume or live in water.

Waterways connect the lives and actions of people, animals

Freshwater terrestrial watersheds feed oceans, which then seed clouds to refresh terrestrial waterways. Water is a cycle.



# The Hydrologic Cycle



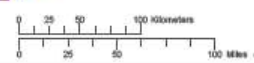
# Chesapeake Bay Watershed



- Chesapeake Bay Watershed
- State Boundary
- Chesapeake Bay



Data Sources: Chesapeake Bay Program  
For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net)  
Disclaimer: [www.chesapeakebay.net/formofuse.htm](http://www.chesapeakebay.net/formofuse.htm)

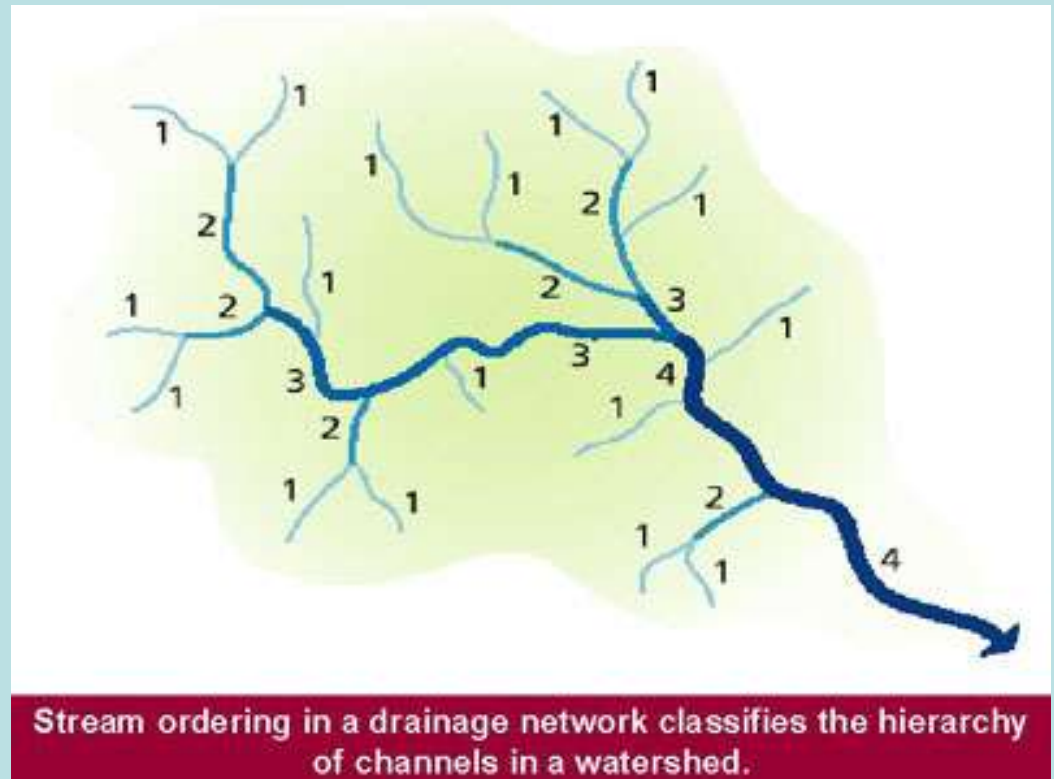


Created by EA, 1/24/06

UTM Zone 18N, NAD 83

# Stream Ordering System

- We can define where we are at in the longitudinal drainage network by determining stream orders
- The rules for stream ordering are fairly simple:
  - Headwater streams are order 1
  - Stream order increases by 1 when two streams of the same order come together.



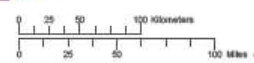
# Chesapeake Bay Watershed



- Chesapeake Bay Watershed
- State Boundary
- Chesapeake Bay



Data Sources: Chesapeake Bay Program  
For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net)  
Disclaimer: [www.chesapeakebay.net/formofuse.htm](http://www.chesapeakebay.net/formofuse.htm)



Created by EA, 1/24/06

UTM Zone 18N, NAD 83










## Hydrologic Unit Boundaries - HUC 8

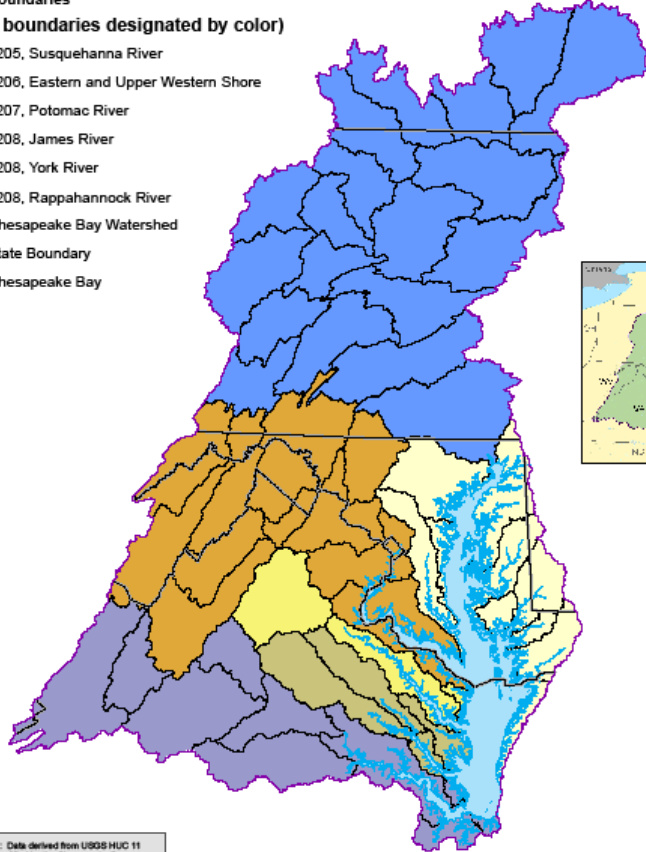
Chesapeake Bay Watershed



### HUC 8 Boundaries

(HUC 4 boundaries designated by color)

-  0205, Susquehanna River
-  0206, Eastern and Upper Western Shore
-  0207, Potomac River
-  0208, James River
-  0208, York River
-  0208, Rappahannock River
-  Chesapeake Bay Watershed
-  State Boundary
-  Chesapeake Bay



Data Sources: Data derived from USGS HUC 11 divisions as modified by the Chesapeake Bay Program.  
For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net)  
Disclaimer: [www.chesapeakebay.net/informtoaware.htm](http://www.chesapeakebay.net/informtoaware.htm)



Created by EA, 2/5/08

UTM Zone 18N, NAD 83

## Hydrologic Unit Boundaries - HUC 11

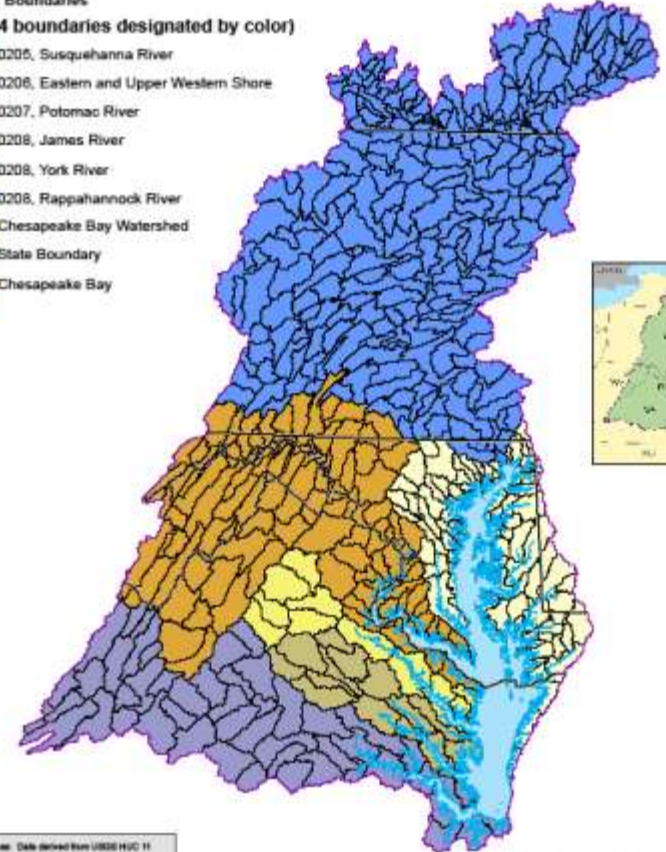
Chesapeake Bay Watershed



### HUC 11 Boundaries

(HUC 4 boundaries designated by color)

-  0205, Susquehanna River
-  0206, Eastern and Upper Western Shore
-  0207, Potomac River
-  0208, James River
-  0208, York River
-  0208, Rappahannock River
-  Chesapeake Bay Watershed
-  State Boundary
-  Chesapeake Bay



Data Sources: Data derived from USGS HUC 11 divisions as modified by the Chesapeake Bay Program.  
For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net)  
Disclaimer: [www.chesapeakebay.net/informtoaware.htm](http://www.chesapeakebay.net/informtoaware.htm)



Created by EA, 2/5/08

UTM Zone 18N, NAD 83

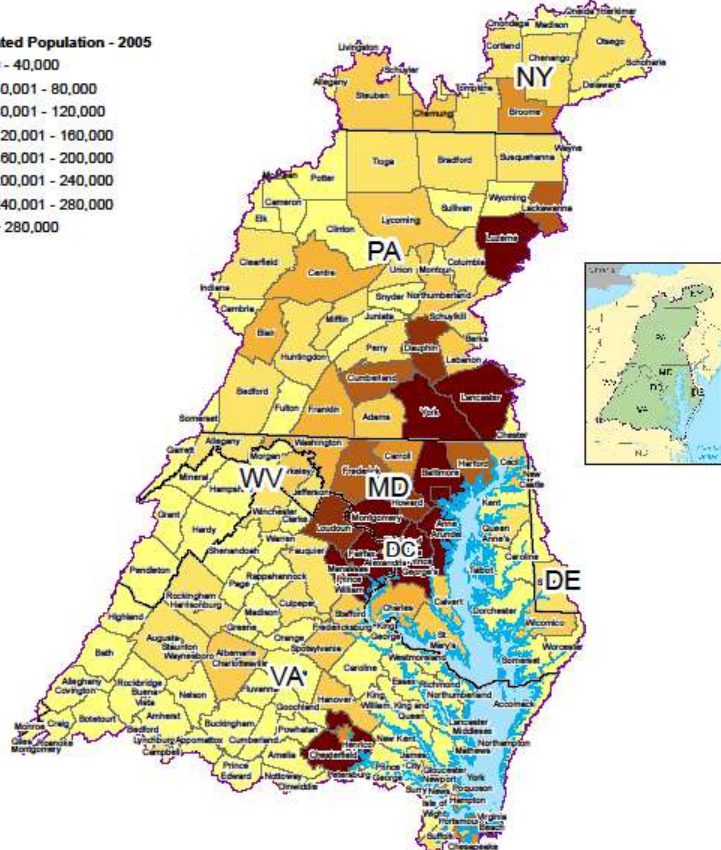
# Population (2005)

Chesapeake Bay Watershed Counties

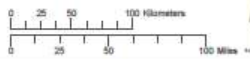


## Estimated Population - 2005

- 0 - 40,000
- 40,001 - 80,000
- 80,001 - 120,000
- 120,001 - 160,000
- 160,001 - 200,000
- 200,001 - 240,000
- 240,001 - 280,000
- > 280,000



Data Sources: US Census  
 For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net)  
 Disclaimer: [www.chesapeakebay.net/enr/arcuse.htm](http://www.chesapeakebay.net/enr/arcuse.htm)



UTM Zone 18N, NAD 83

Created by JW, 2/13/08

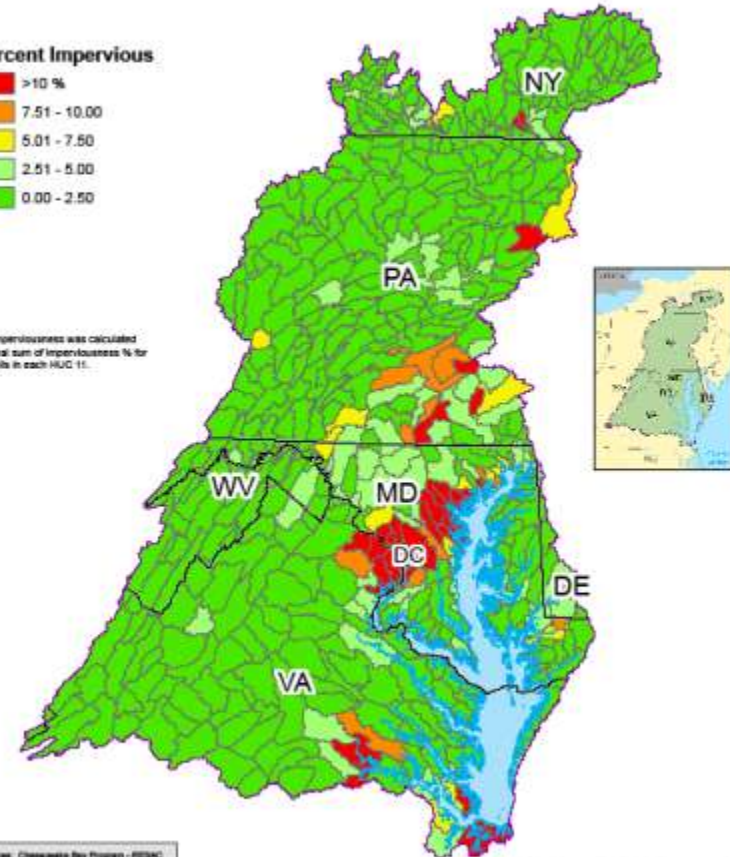
# Impervious Surfaces - 2000

Chesapeake Bay Watershed



## Percent Impervious

- >10 %
- 7.51 - 10.00
- 5.01 - 7.50
- 2.51 - 5.00
- 0.00 - 2.50



Percent imperviousness was calculated as the zonal sum of imperviousness % for all 30m cells in each HUC 11.

Data Sources: Chesapeake Bay Program - RESRC  
 Impervious Surface Cover 2000  
 For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net)  
 Disclaimer: [www.chesapeakebay.net/enr/arcuse.htm](http://www.chesapeakebay.net/enr/arcuse.htm)



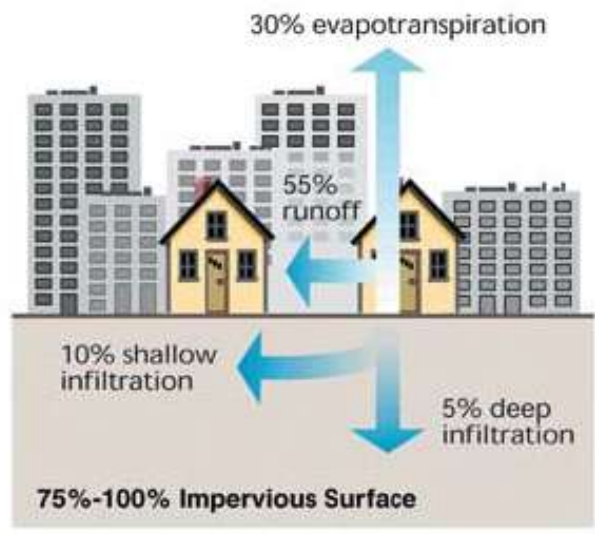
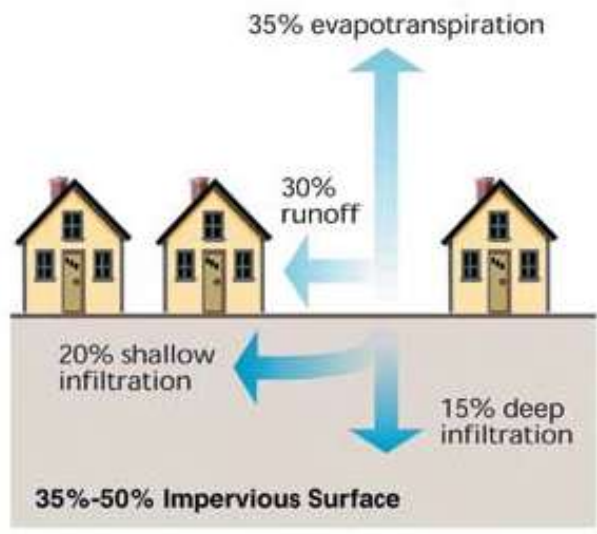
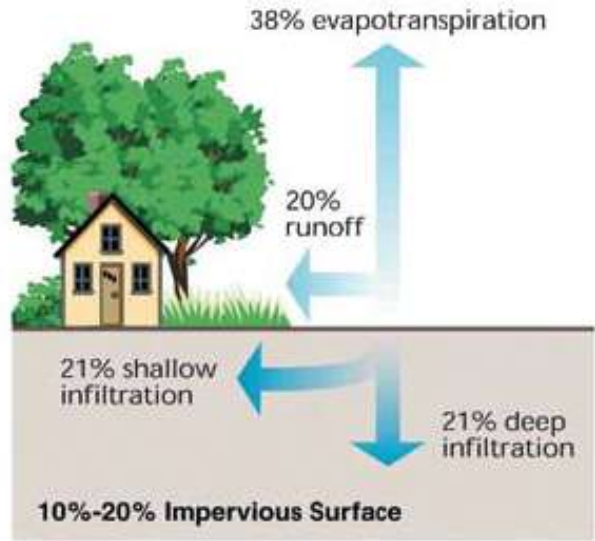
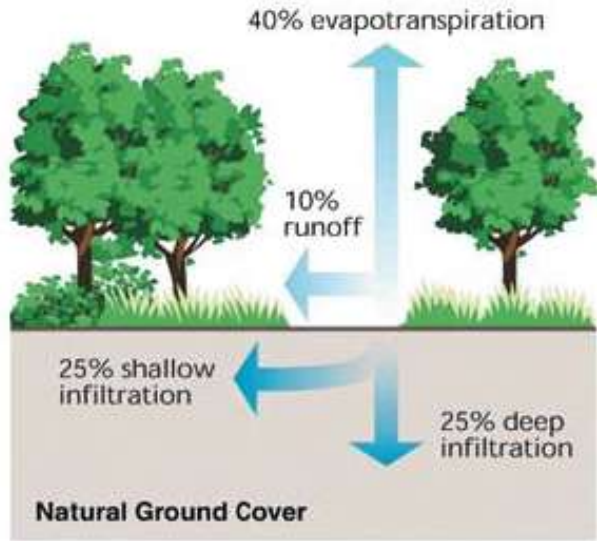
UTM Zone 18N, NAD 83

Created by JW, 1/30/08

Too much Information? – Brains  
being sucked out? Just you wait!







# Projected Population (2030)

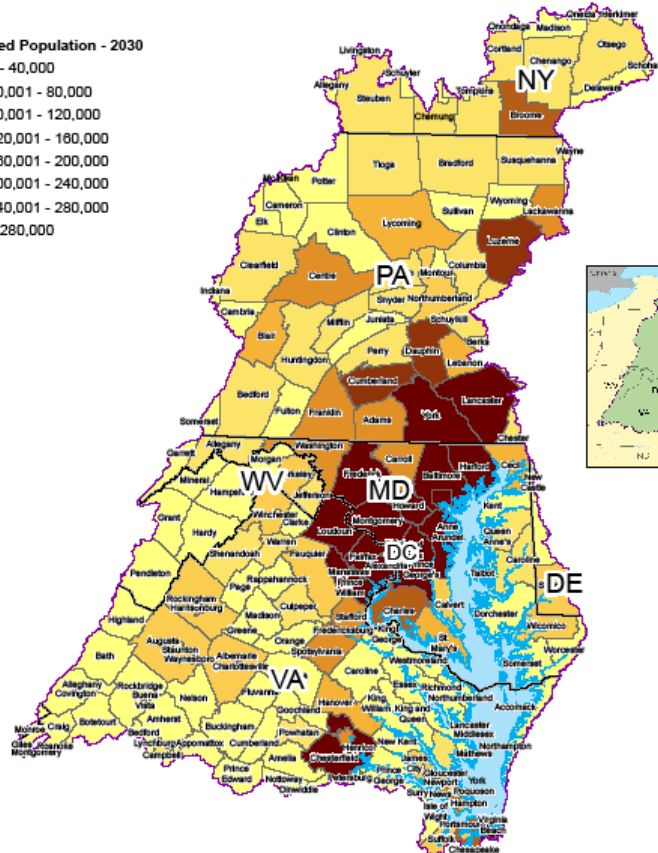
Chesapeake Bay Watershed Counties



Chesapeake Bay Program  
& Partnership

## Projected Population - 2030

- 0 - 40,000
- 40,001 - 80,000
- 80,001 - 120,000
- 120,001 - 180,000
- 180,001 - 200,000
- 200,001 - 240,000
- 240,001 - 280,000
- > 280,000



Data Sources: US Census.  
For more information, visit [www.chesapeakebay.net](http://www.chesapeakebay.net)  
Disclaimer: [www.chesapeakebay.net/terms\\_of\\_use.htm](http://www.chesapeakebay.net/terms_of_use.htm)



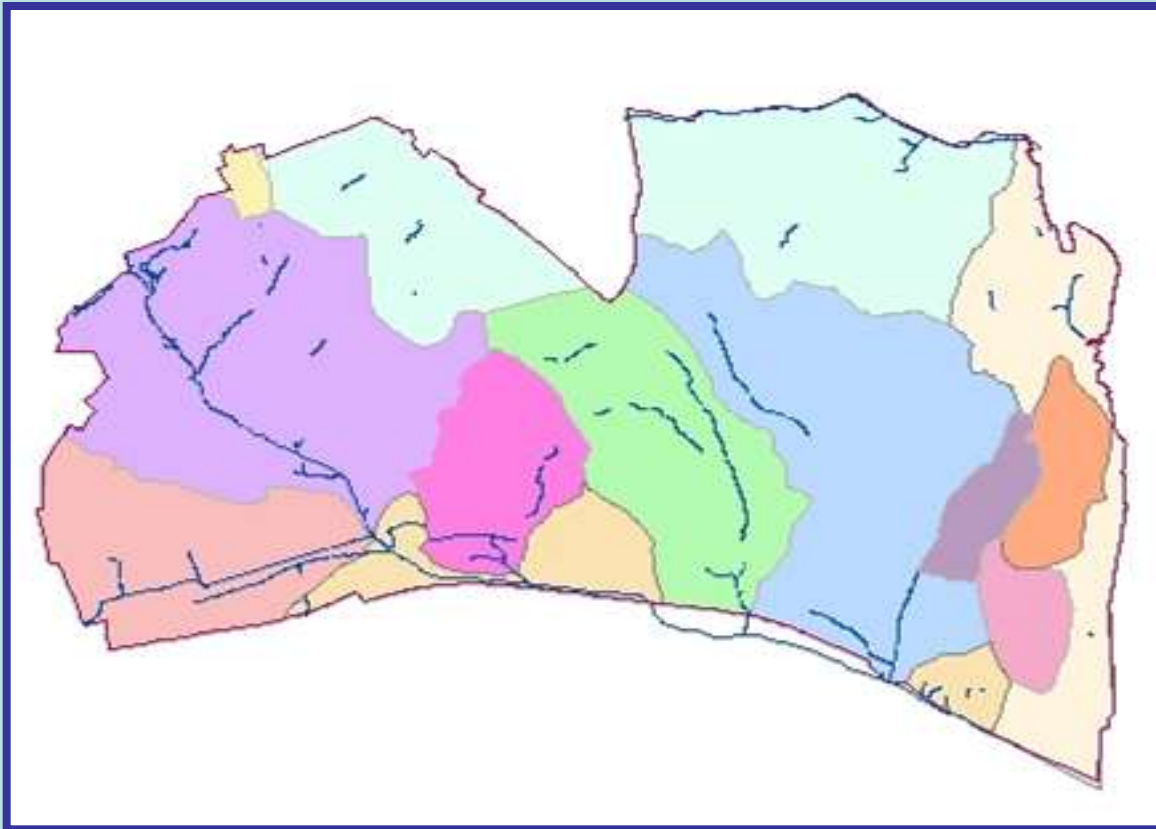
Created by JW, 2/13/08

UTM Zone 18N, NAD 83

I didn't know that!

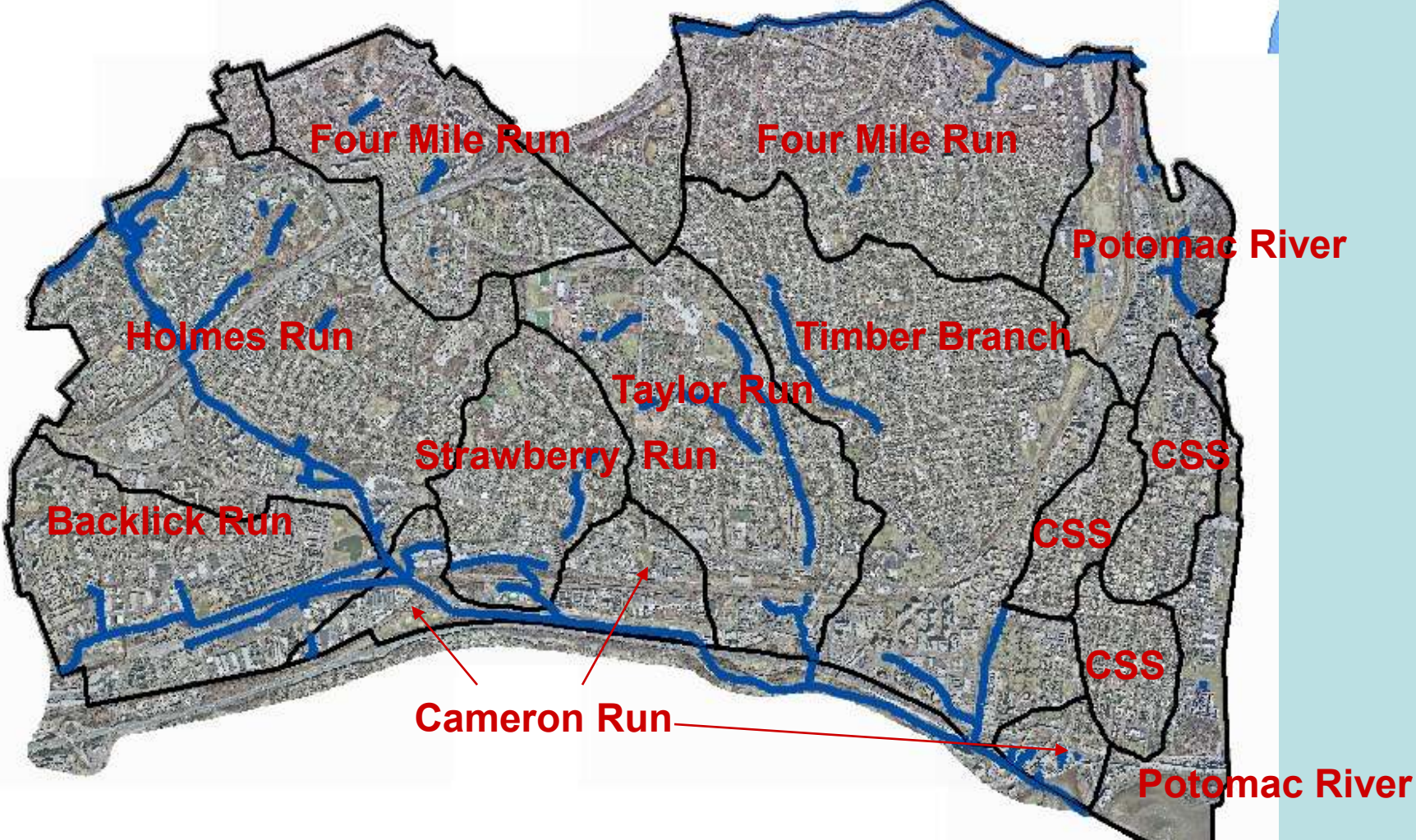


# City of Alexandria



- Home to >140,000 people
- Area = 15.75 mi<sup>2</sup>
- 30 ft. above sea level
- ~25 miles of streams drain to the Potomac
- 12 watersheds
- 41% of the City is covered with impervious surface
- 185 miles of storm sewer

# Alexandria Watersheds





[http://mddnr.chesapeakebay.net/NASAIMagery/EyesintheSky\\_archive.cfm#picview](http://mddnr.chesapeakebay.net/NASAIMagery/EyesintheSky_archive.cfm#picview)



# So What Does This Mean?





# It Means...

- Nutrient Enrichment
    - Algal blooms
      - Biomass die-off
        - Decreased Oxygen
  - Increased Sediment (suspended solids)
    - Turbidity
      - Low light penetration
        - Lower photosynthesis
        - Lower Oxygen
- Toxins
  - Genetic mutations
    - Death





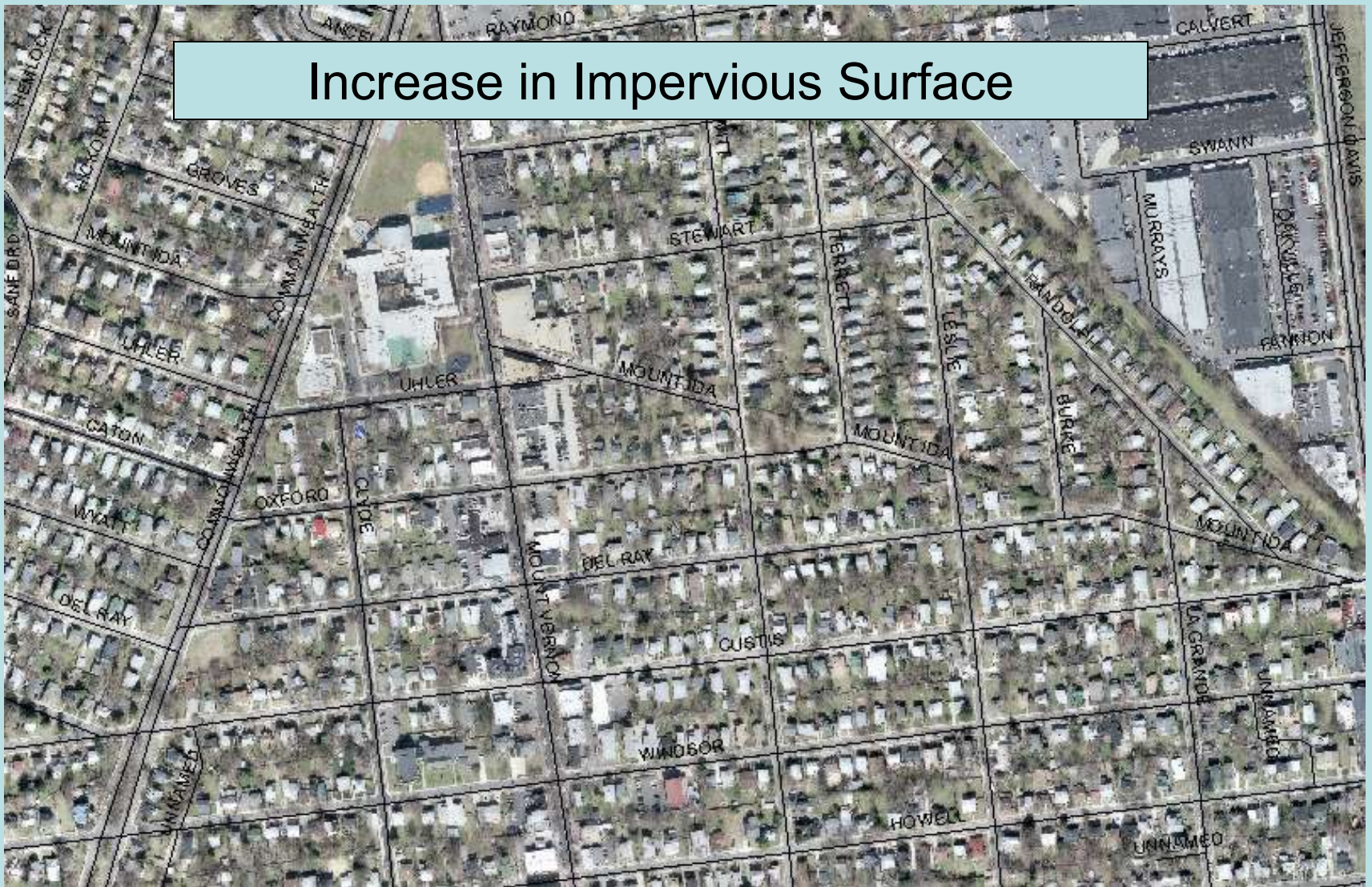


And the Point Is?





# Increase in Impervious Surface





Our Urban Area is  
over  
41%  
Impervious





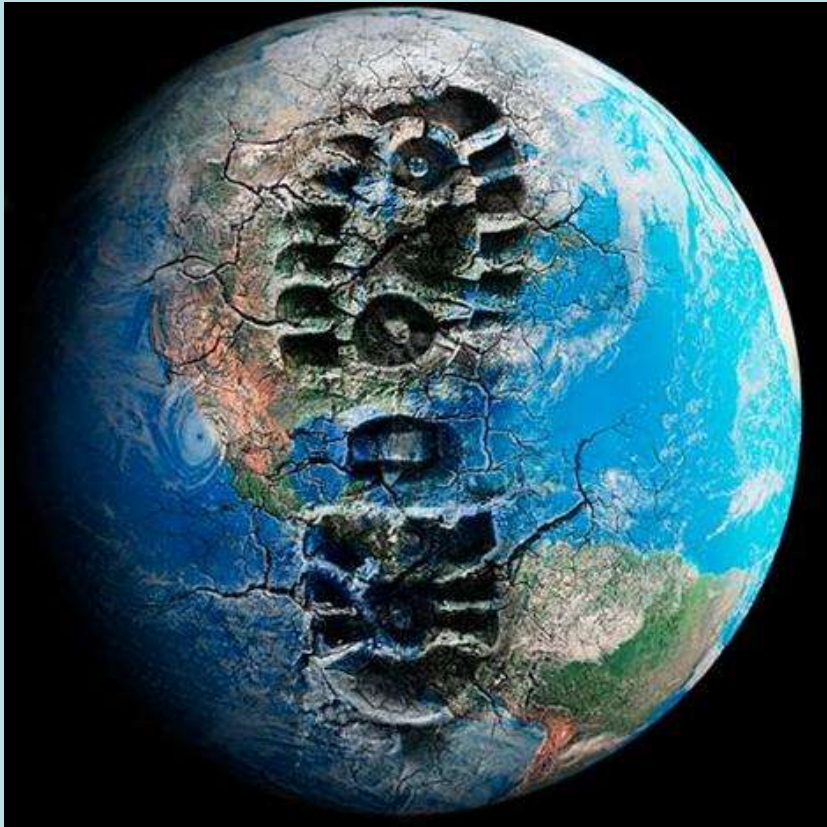
Behind Victory Center



# We are All in the Same Boat







## Reduce your footprint

- Change your outlook – value Sustainability
- Decrease impervious surface
- Improve your soil
- Landscape with native plants
- Use less water, reuse water
- Reduce the use of fertilizer
- Demand less snow response

Take personal actions to reduce volume and velocity of stormwater







# Green Landscaping For You and the Chesapeake Bay

Lauren Wheeler, M.A. Landscape Design  
Natural Resources Design, Inc.



# Objectives

To provide sustainable design options for our homes that are beautiful and ecologically sound



- What is Conservation Landscaping?
- CCLC 8 Principles
- Sustainable Solutions
  - Water
  - Native Plants
  - Soil
  - Wildlife Habitat



Perfect Landscape...right?





# Conservation Landscaping

Respects  
resources

- Water
- Soil
- Existing plant communities
- Native plants
- Wildlife habitat





Chesapeake Conservation Landscaping Council's  
**8 Essential Elements of  
Conservation Landscape**







# A conservation landscape ....

1. Benefits the environment and to function well for human use.
  - Does your landscape provide dual functions for the environment and humans?
2. Removes invasive plants and prevent their spread.
  - Does your home landscape have any invasive plants in it? If so, do you have a reasonable invasive management plan?
3. Uses native plants appropriate for the site.
  - What percentage of your garden's plants are native? Are they native to the Mid-Atlantic region?
4. Conserves water and promotes good water quality.
  - How do you manage stormwater on your property? Are your downspouts disconnected? Do you have a cistern? A rain garden? Infiltration areas?





5. Provides wildlife habitat.
  - Do you have sources of food (native plants), shelter, nesting sites, water?
6. Promotes good air quality and is not a source of air pollution.
  - How much lawn do you have? Do you mow it with a gas mower? How can you improve air quality in your landscape?
7. Promotes healthy soils, compost on site, amend disturbed soils.
  - Do you compost your yard waste? How do you actively improve your soils?
8. Works with nature to be more sustainable with less input.
  - On a scale from 1-10 how sustainable is your garden? Do you take advantage of “free” resources - water, native plants, soils?



**1. A conservation landscape:**  
is designed to benefit the environment and  
to function well for human use;



# Chevy Chase Community Center

Friends of Rock Creek Environment – DDOE RiverSmart Program



## Existing Design – Cross Sidewalk











2. Remove invasive plants & prevent their spread.



# Invasive Plants in the Landscape

## “The Hit List”



( no native plants... so what?)

- English Ivy
- Burning Bush
  - Barberry
  - Nandina
- Japanese Maple
  - Miscanthus
  - Pennisetum





### 3. Use Native Plants

Appropriate for the site





# Plant communities

- plants grow together with symbiotic relationships





Look for plant combinations  
found in nature

*Helenium autumnale* &  
*Lobelia siphilitica*





Designed landscape  
using plant  
combinations  
found in nature





- Feeds 28 species of birds and supports 517 species of lepidoptera

# Tree Canopy

## White Oak





# Groundcovers

- Erosion control
- Minimizes maintenance







4. conserves water and promotes good water quality;



# Storing and Reuse of Rainwater

## Rain barrels & cisterns



# Rainwater Harvesting



# Storing & Infiltration Rainwater via Pervious Surfaces



# RiverSmart Home



before



# RiverSmart Home



# Walkways



# Patios







## Rain Gardens

Rain gardens traditionally designed as a single isolated bed. Design it better to be integrated into the entire landscape.





# Simple rain gardens





# Rain gardens



Rain Garden is integrated into the design



5. Provide wildlife habitat.



Nineteen species of plants have co-evolved with hummingbirds including cardinal flower and columbine



# Complexity over simplicity

## Wildlife Needs:

- Water source
- Food
- Nesting sites
- Shelter



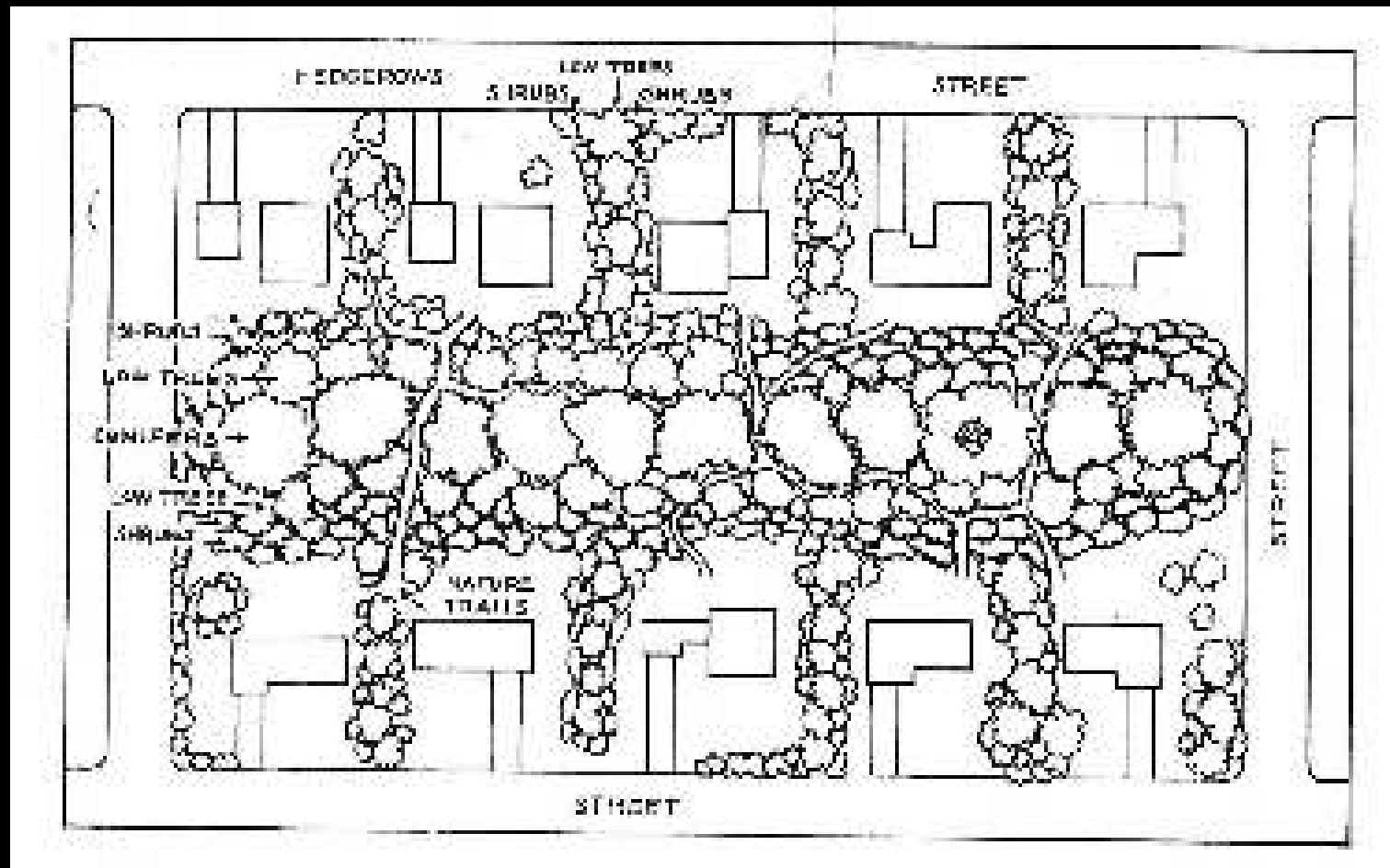
# Mimic natural systems:

- Variety of berries, fruits, seeds
- Succession of food sources
- Migration and available food source intrinsically timed
- Fallen leaves provide insect habitat which in turn provides bird food during drought.





# Suburban Greenways



6. promotes good air quality and is not a source of air pollution





7. promotes healthy soils,  
compost on site,  
amend disturbed soils



# Trees & Soil



# Avoid Compaction



Poor construction practice



Tree preservation plan  
Mulch, protective fencing, plywood





8. works with nature  
to be more sustainable  
with less input.





# Mount Vernon Residence



**Front of House**



**Back of House**

English ivy, lawn, liriop  
and woodland trees





1st & 2nd year



# Vegetated Swale



# Natural Resources Design, Inc.



Before



# Natural Resources Design, Inc



After





Natural Resources  
Design, Inc.





Natural Resources Design, Inc.





## Urban garden

- Impervious surfaces
- Extensive lawn
- Non-native plants





- Pervious concrete driveway and walkway
- pervious "stone lawn"
- rain garden
- all native plants







Michael Thilgen, RLA  
Four Dimensions





Michael Thilgen, RLA  
Four Dimensions



Michael Thilgen, RLA  
Four Dimensions







# Your conservation landscape ....

1. **Benefits the environment and to function well for human use.**
  - Create beautiful gardens that also enhance the ecological value of your garden.
2. **Removes invasive plants and prevent their spread.**
  - Phase in the removal of all invasive plants on your property.
3. **Uses native plants appropriate for the site.**
  - Increase the percentage of native plants.
4. **Conserves water and promotes good water quality.**
  - Water is life; manage it as a valuable resource.
5. **Provides wildlife habitat.**
  - Plant native plants! Design shelter, nesting sites, water into your landscape.
6. **Promotes good air quality and is not a source of air pollution.**
  - Decrease lawn, increase biomass (plants).
7. **Promotes healthy soils, compost on site, amend disturbed soils.**
  - Compost
8. **Works with nature to be more sustainable with less input.**
  - How can you make your garden sustainable?





**Being a thoughtful and informed gardener plays an important role in restoration. What we do in our home landscapes mirrors our actions in the community landscape and is reflective of how we perceive our relationship to larger natural world.**

**Leslie Jones Sauer**





# Rain Gardens

What is a Rain Garden?



- 1.) A garden that stores and filters rain water.
- 2.) A landscape tool to improve water quality and reduce runoff

# Rain Gardens







# Benefits

- Less lawn, less maintenance
- Habitat
- Catch and filter runoff – reduce erosion
- Improve water quality
- Replenish groundwater supplies
- Aesthetically pleasing landscape feature
- Keeps water off sidewalks and driveway



# Infiltration Testing



- Hole 12 inches deep
- Stake or ruler embedded in hole
- Saturate ground around hole, then add water to highest mark \*\*NOTE TIME
- Monitor hole every 2 hours determining how long it takes to empty
- Divide water depth by how long it takes to drain. Ex:  $8 \text{ in} / 10 \text{ hours} = .8$

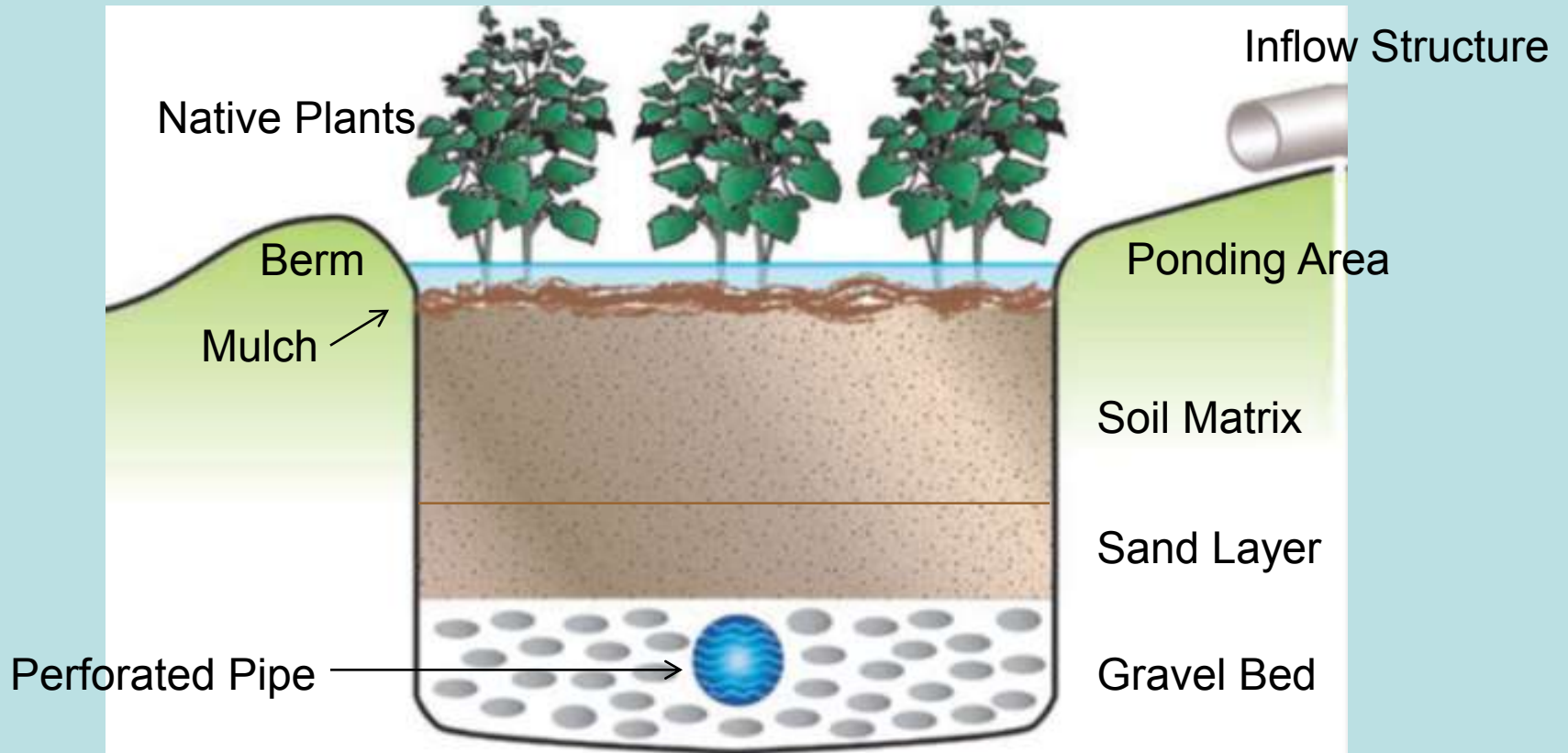


# Infiltration Rate

- If your infiltration rate is 1.0 or more, you have excellent drainage
- If the rate is between 0.5-0.9, the soil is well draining enough for a rain garden.
- If it is less than 0.5, then the soil is poor draining and you need an underdrain.



# Underdrains





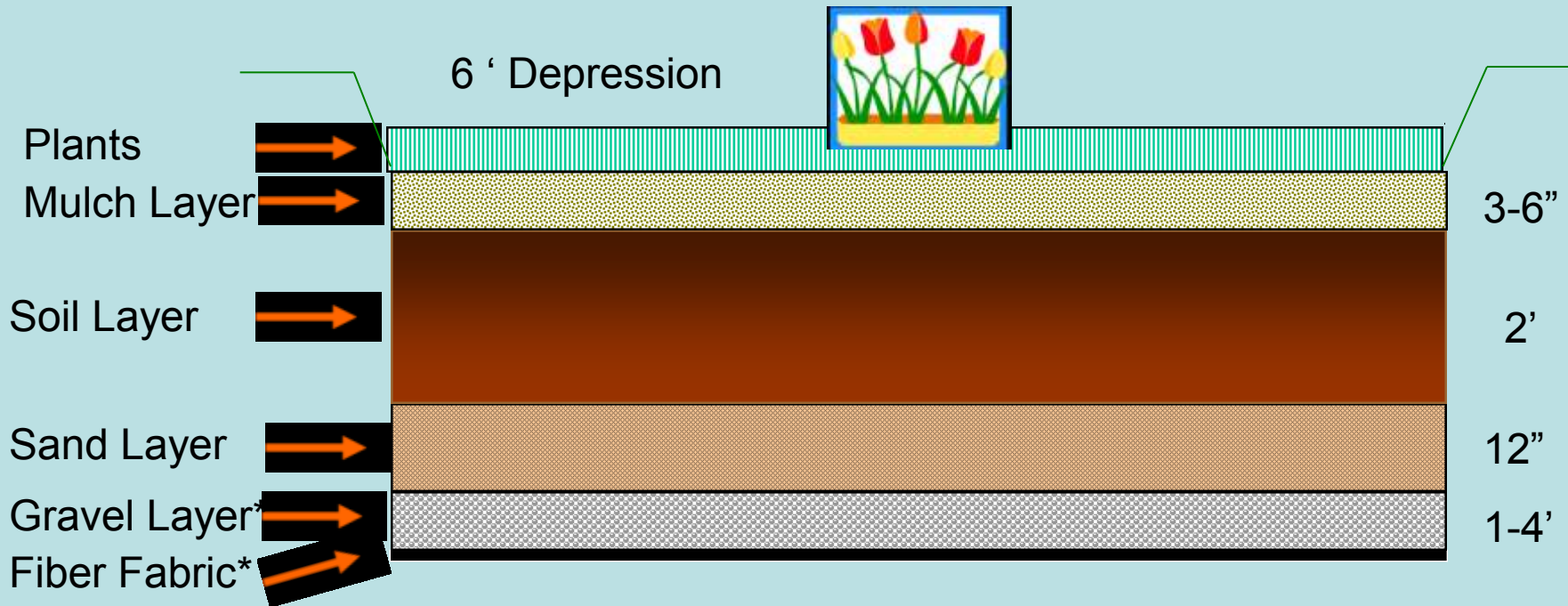
# Design and Construction

- Things to consider:
  - Size (~150 ft<sup>2</sup>)
  - Drainage area (5-7%)
  - Amount and velocity of runoff
  - Topography
  - Soil type (may need deeper layers)
  - Light exposure
  - Call before you dig!




$$(B/A) \times 100 = \text{Slope}$$

# Basic Layers of a Rain Garden



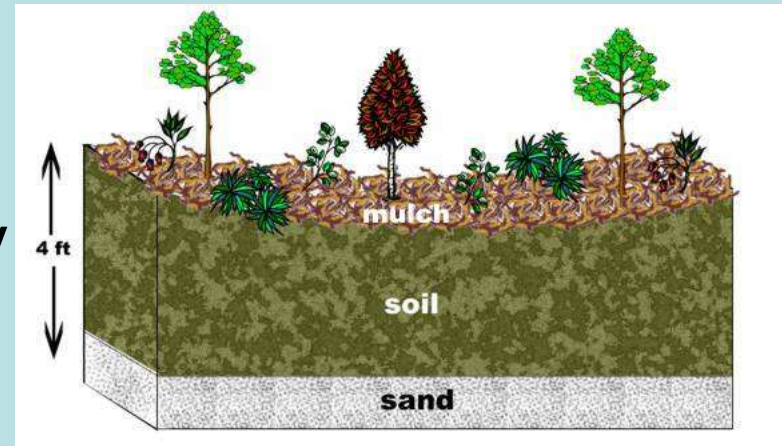


# Ponding Area

- Water storage area
  - 4-6 inch depression (allows for evaporation/infiltration)
  - Dig down on angle to effectively catch water
  - Excavated material can be used for a berm
  - 3 day rule
- 

# Sand and Soil Layers

- Bottom sand layer (12")
- Good soil mix (2')
  - Compost or leaf mulch (20%)
  - Topsoil (30%)
  - Sandy soil mix (50%)
- Important to have little clay
- Water absorption and nutrients for plants



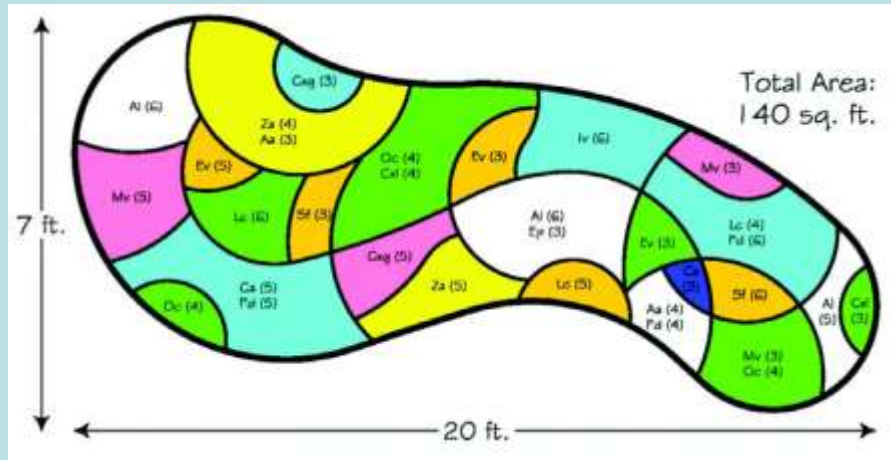
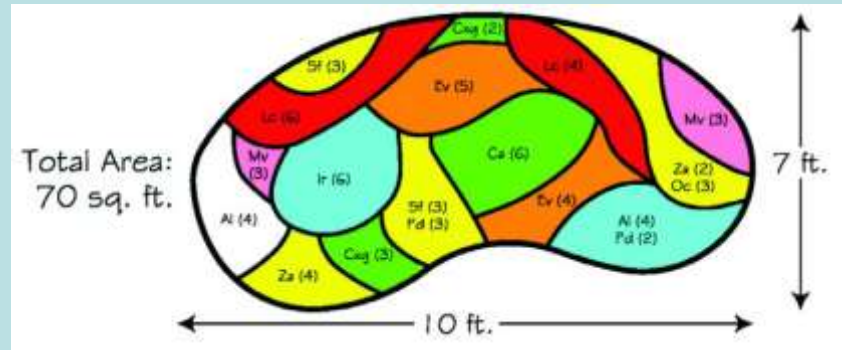
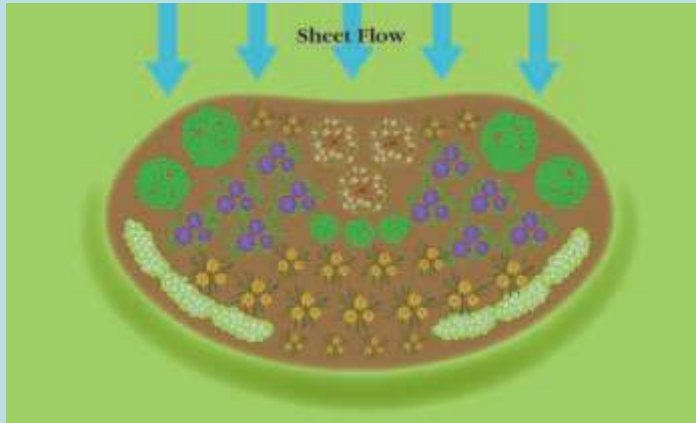


# Mulch Layer

- Acts like sponge
- Filters chemicals
- Hardwood mulch
  - Resistant to washout
  - Larger surface area
- Sufficient Layer (3")



# Plant Layout



# Plants

- Time to get creative!
- Many choices - perennials, trees, shrubs
- Plant natives
- Flood and drought tolerant
  - Native riparian species work well
  - More flood tolerant species toward middle
- Habitat value – food and shelter
  - Butterflies, hummingbirds, frogs & toads, dragonflies, and songbirds



# Plants



# Arlington County Rain Garden Constructed by HOA Members



Before



During Construction



Raingarden (during storm event)



Raingarden (next day)



Rain Garden in Councilman Krupicka's Yard



Grass-pave in Councilman Krupicka's Yard



# Issues and Maintenance

- Like all gardens, rain gardens need to be maintained (mulch & plant replacement, pruning)
- Standing or stagnant water
- Mosquitoes – (3 day rule)
- Wrong location
- Wrong plants



# And a Word about Mosquitos

Eliminate sources of standing water

- Flower Pots, Watering cans, bird baths, pet dishes
- Gutters, Corrugated plastic drain pipes
- Low spots, sags in tarps

Use Larvicides (BT) or make a rain garden!




Mosquito Larvae  
Aquatic larval stages can be found in many sources of standing water.





# Other Ways to Reduce Runoff

- Porous Paver
  - Permeable Pavers
  - Porous Concrete
  - Porous Asphalt
- 

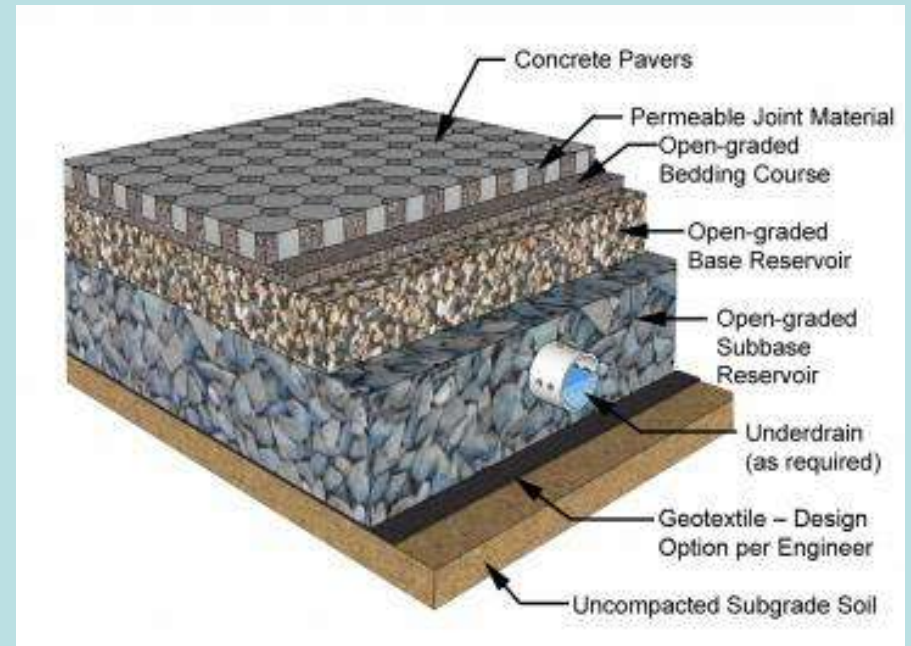


# Porous pavers



# Permeable pavers

## Interlocking pavers



# Porous Concrete



# Rain Garden

Design and Construction



A Northern Virginia Homeowner's Guide

[http://www.aacounty.org/DPW/Highways/Resources/Raingarden/RG\\_FAIRFAX%20CO.pdf](http://www.aacounty.org/DPW/Highways/Resources/Raingarden/RG_FAIRFAX%20CO.pdf)



<http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/documents/rgmanual.pdf>

U.S. Fish & Wildlife Service

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



<http://www.nps.gov/plants/pubs/chesapeake/>



## Rain Gardens *Technical Guide*

*A landscape tool  
to improve water quality*



Virginia Department of Forestry  
[www.dof.virginia.gov](http://www.dof.virginia.gov)

[http://www.dof.virginia.gov/mgt/resources/pub-Rain-Garden-Tech-Guide\\_2008-05.pdf](http://www.dof.virginia.gov/mgt/resources/pub-Rain-Garden-Tech-Guide_2008-05.pdf)



Thanks for the opportunity to introduce you  
to Rain Gardens!

Claudia Hamblin-Katnik  
703 746-4068

[Claudia.Hamblin-Katnik@Alexandriava.gov](mailto:Claudia.Hamblin-Katnik@Alexandriava.gov)





Green Building Workshop Series: Workshop 3

Eco-City Alexandria Workshop 3  
Green Landscaping  
For You and the Chesapeake Bay

# Using Native Plants in the Landscape

Kirsten Conrad Buhls, Extension Agent  
Arlington County Office





# Not all plants are created equal



- Unless we restore native plants to our suburban ecosystem the future of biodiversity in Alexandria is dim





# What are invasive exotic non-native plants?

- Plants from other countries?
- All plants with aggressive growth habits?
- Plants with names you can't pronounce?

Exotic vs non-native vs indigenous vs native





# What makes them aggressive?

- Production of many seeds
- Rapid germination and accelerated growth
- Allelopathic chemical toxins that impede other plant's growth
- Long-lived seeds creating a persistent seed bank
- Vegetative spread by creeping roots and stems





## Are all exotic plants potentially invasive?

- Only 1 out of 100 exotics have the characteristics to make them invasive.
- Less than 10 percent of introduced plants have evolved into invasive pests.





# How did they get introduced?

On purpose and by accident

- Use in gardening and landscaping (Bradford Pears)
- Erosion control (Kudzu)
- Forage/Wildlife Food (Autumn Olive)
- Imported indirectly (M-A-M)
- Aquatic introductions-Aquarium plant-parrots feather





# Official Approval?

- Public buildings
- Roadside right of ways
- Nursery sales






# Why are they a problem?

- Create a monoculture
- Loss of “Sense of Place”
- Green blindness
- Invasive plants require enormous amounts of time, labor and money to control or eliminate.



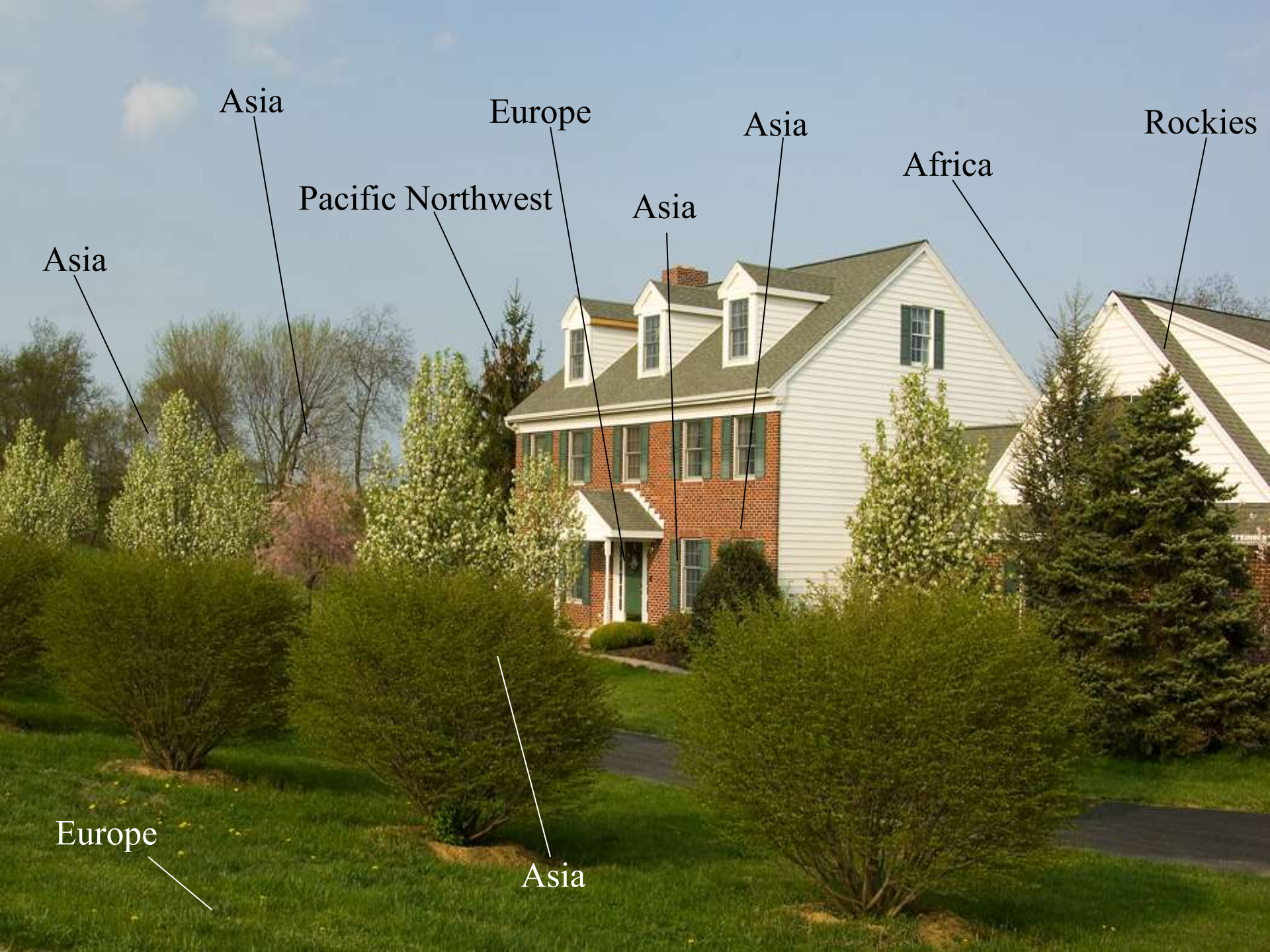


# What are some of the most problematic invasive exotics in Virginia?

- Honeysuckle sp.
- Autumn olive
- Privet
- Multiflora rose
- Oriental bittersweet
- Japanese stiltgrass
- Burning bush
- English ivy
- Kudzu
- Lesser Celandine
- Purple loosestrife
- Garlic mustard
- Japanese knotweed
- Bradford pear
- Japanese barberry
- Wisteria
- Mile-a-minute weed
- Mahonia
- Bamboo
- Climbing Euonymous
- Periwinkle
- Porcelainberry







Asia

Europe

Asia

Rockies

Pacific Northwest

Asia

Africa

Asia

Europe

Asia

# Ground Covers and Forbs



Purple loosestrife infesting a native marsh.

Photo: Randy Westbrooks, U.S. Geological Survey, Bugwood.org



**Stilt Grass**

*Microstegium  
vimineum*



**Garlic Mustard**

*(Alliaria petiolata)*

**Invasive  
Examples**





English Ivy  
(*Hedera helix*)



Lesser Celandine  
*Ranunculus ficaria*

Invasive  
Examples



Periwinkle *Vinca minor*

Japanese  
Knotweed  
*Polygonum  
cuspidatum*





Pussy Toes (*Antennaria* sp.) DRY!



Milkweed  
(*Asclepias* sp.)

Native Plants



Goldenrod  
(*Solidago*  
*Sempervirens*)



What's wrong with this garden?



St. John's Wort, Gaura, Monarda, several Echinacea, Salvias, Yarrow, Helianthis, but...

Thanks to: Master Gardener Joan Arsenault



*Sedum ternatum* (sedum)

Native  
Ground  
Covers

*Dog violet Viola conspersa*



© 2002 Janet Novak



*Silene caroliniana*  
‘Short and Sweet’



*Partridge berry*  
*Mitchella repens*



# Instead of English Ivy?



*Yucca*  
(*Yucca filamentosa*)



*Wild Geranium*  
(*Geranium maculatum*)



Wild (or Spotted) Geranium (*Geranium maculatum*)  
Copyright 2009, Sandy Mavis, [herbal-howto-guide.com](http://herbal-howto-guide.com)

*Wild Ginger*  
*Foamflower*  
*Tiarella sp*





Native Landscaping  
Courtesy of Marian Lawler



# Native Groundcovers - Shade



*Phlox sp.*



Mayapple

*Podophyllum peltatum*



Coral Bells

(*Heuchera americana*)



**FERNS!**  
*Asplenium*  
*Dryopteris*  
*Polystichum*



**Jack-in-the-pulpit**





Shade Landscaping  
with Native Plants



Porcelain Berry

*Ampelopsis brevipedunculata*



Bittersweet

# Invasive Vines



Kudzu



Mile a Minute

*Persicaria perfoliata*





Japanese Honeysuckle  
(*Lonicera japonica*)



Tennessee - EPPC



**Invasive  
Vines**



Exotic Wisterias  
(*Wisteria floribunda* –  
Japanese)  
(*Wisteria sinensis* -  
Chinese)



# Native Vines

**Virgin's Bower**



**Trumpet  
Honeysuckle**



**Virginia Creeper**



*Wisteria frutescens*



Native Wisteria



cv. Amethyst Falls

cv. Longwood Purple





Burning Bush



Bush  
Honeysuckle



Multiflora  
Rose

**Non-Native  
SHRUBS!**





Chinese Privet



Japanese Barberry

Autumn Olive



**Non-  
Native  
Shrubs**





# Native Shrubs

Spicebush



American Winterberry



Highbush/Lowbush Blueberry



American Beautyberry





# Native Shrubs

**Arrowwood Viburnum**

**Pinxterbloom Azalea**





## Native Shrub



Staghorn Sumac (*Rhus typhina*)



Red Chokeberry

## Native Shrubs



Highbush Blueberry





*Southern Bayberry*  
(*Morella caroliniensis*)



*Mountain Laurel (Kalmia latifolia)*

## Native Shrubs

*Sweet  
Pepperbush*  
(*Clethra alnifolia*)





Mimosa



Paulownia



**NON-NATIVE  
TREES**



# Bradford Pear

Non-Native



# Native Trees



Sweetbay  
Magnolia



Sassafras

American Plum







*Phlox*, various *Asters*, *Liatris*, blanket flower- *Gaillardia*, *Coreopsis*, *Solidago*, *Panicum virgatum* and, of course, *Magnolia virginiana*. There's also some Prairie Coneflower (*Ratibida*) The fine stuff behind the *Liatris* is *Amsonia hubrichtii*. Garden/photo: J. Arsenault



# Paw Paw

*Asimina triloba*

**Native tree**





# Black Gum

*Nyssa sylvatica*

Natives



# Red Maple



*Amelanchier canadensis*  
**Service Berry**



White Oak



Natives



Red Oak



# Native Trees



Flowering Dogwood



Iron wood, Blue Beech  
*Carpinus caroliniana*





Redbud *Cercis canadensis*



## Natives

Fringetree  
*Chionanthus virginicus*





Eastern Red Cedar

\*American Holly



# Evergreen Replacements for Bamboo





Hessells  
Hairstreak

**Natives**



Atlantic White Cedar  
*Chamaecyparis thyoides*







## Natives



*Eastern Arborvitae (Thuja occidentalis)*  
*Green Giant*  
*Emerald Green*  
*Little Giant*  
*Golden Globe*  
*'Fastigiata'*  
*'Filiformis'*  
*Danica*  
*DeGroots Spire*  
*Black Cedar etc.*

*Eastern Hemlock -'Lewis' (Tsuga canadensis)*





**Natives**



*Pinus strobus*  
White Pine

White Pine  
P.s. 'Fastigiata'



*Taxodium distichum*  
Bald Cypress



# Bamboo or Breeding?

'Rubicon'



Temple's Upright'

'Bowhall'



# Questions?

**Kristen Buhls**

**Extension Agent**

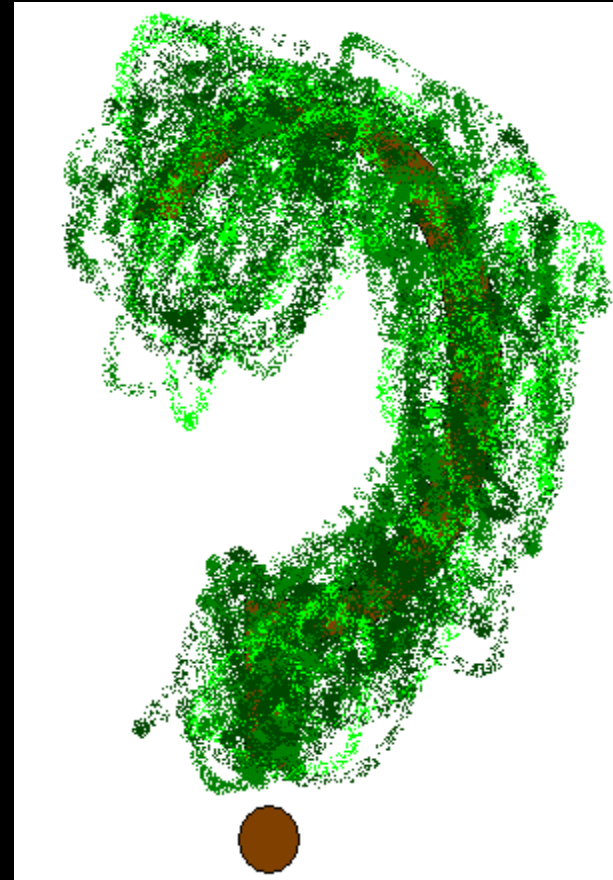
**Agriculture and Natural  
Resources**

**Horticulture**

**Virginia Cooperative  
Extension**

**703-228-6523**

**[kbuhls@vt.edu](mailto:kbuhls@vt.edu)**





## Resources from Workshop 3: Green Landscaping for You and the Chesapeake Bay

Rain Gardens: Design and Construction

[http://www.aacounty.org/DPW/Highways/Resources/Raingarden/RG\\_FAIRFAX%20CO.pdf](http://www.aacounty.org/DPW/Highways/Resources/Raingarden/RG_FAIRFAX%20CO.pdf)

Rain Gardens: A How to Manual for Homeowner

<http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/documents/rgmanual.pdf>

Native Plants for Wildlife Habitats and Conservation Landscaping

<http://www.nps.gov/plants/pubs/chesapeake>

Rain Gardens: Technical Guide

[http://www.dof.virginia.gov/mgt/resources/pub-Rain-Garden-Tech-Guide\\_2008-05.pdf](http://www.dof.virginia.gov/mgt/resources/pub-Rain-Garden-Tech-Guide_2008-05.pdf)

**FIND OUT MORE AT ALEXANDRIA'S GREEN BUILDING RESOURCE CENTER  
(<http://www.alexandriava.gov/gbrc>)**





## Helpful Websites for Workshop 3: Green Landscaping for You and the Chesapeake Bay

[www.alexandriava.gov/Environment](http://www.alexandriava.gov/Environment)

[www.alexandriava.gov/Planning](http://www.alexandriava.gov/Planning)

[www.offices.ext.vt.edu/arlington](http://www.offices.ext.vt.edu/arlington)

[www.dcr.virginia.gov](http://www.dcr.virginia.gov)

[www.deq.virginia.gov](http://www.deq.virginia.gov)

[www.alliancechesbay.org](http://www.alliancechesbay.org)

[www.cwp.org](http://www.cwp.org)

[www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org)

[www.greenroofs.org](http://www.greenroofs.org)

[www.vnps.org](http://www.vnps.org)

[www.smartbuildingdirectory.org](http://www.smartbuildingdirectory.org)

**FIND OUT MORE AT ALEXANDRIA'S GREEN BUILDING RESOURCE  
CENTER (<http://www.alexandriava.gov/gbrc>)**

