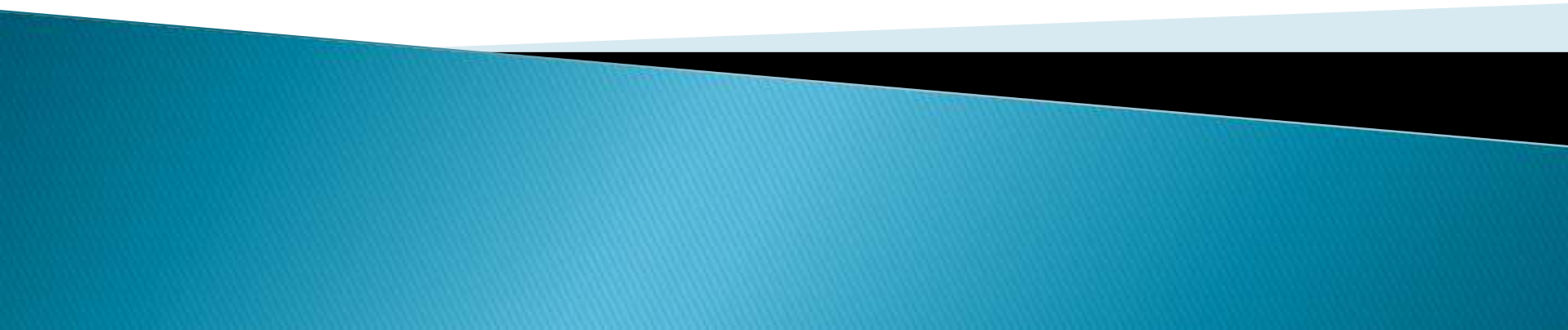


Rain Gardens

Sustainable Landscaping

Dan Brellis



Dan Brellis

- ▶ Alliance for the Chesapeake Bay
- ▶ Chesapeake Conservation Landscaping Council



allianceforthebay.org



chesapeakelandscape.org

Stormwater

<http://vimeo.com/23640933>

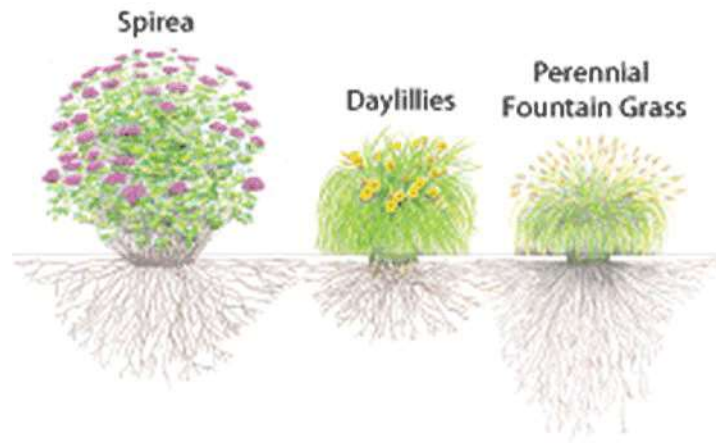
Native Species

- ▶ Fertilizing is not necessary
- ▶ Tolerant of local climate and water conditions
- ▶ Attract wildlife
- ▶ Deep root systems



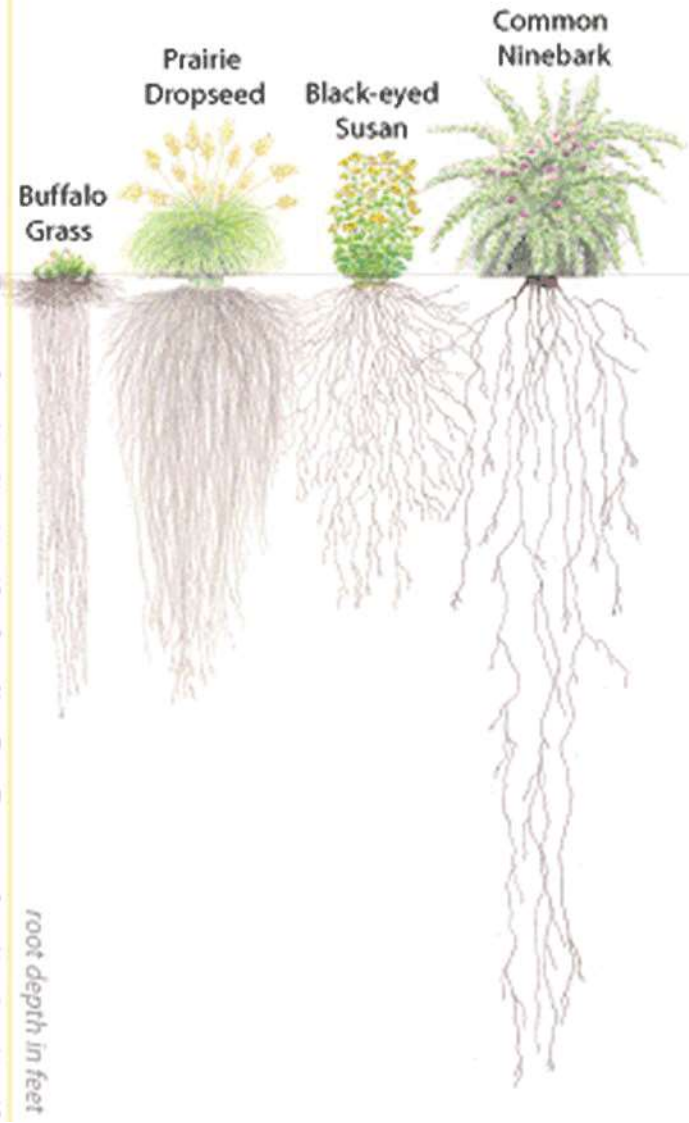
Iris versicolor

Non-Natives



Fescue
Turf

Natives



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
root depth in feet

Illustration from <http://marc.org/>

Rain Garden

- ▶ Planted depression
- ▶ Collects water runoff from roofs, driveways
- ▶ Allows water to absorb into soil
- ▶ Stormwater filtration and containment
- ▶ Rain garden \neq pond



Components



Hypericum densiflorum

Plants



Soils



Cover

Components

Plants

Soils

Cover

- ▶ Native Plants
- ▶ Wetland edge vegetation
- ▶ Sun, partial sun, shade
- ▶ Contribute to native wildlife
- ▶ Aesthetically pleasing



Spiraea tomentosa

Components

Plants

Soils

Cover

- ▶ Loose soils
- ▶ Offer filtration
- ▶ Allow easy root growth
- ▶ Amend soils if necessary
 - 50–60% sand
 - 20–30% topsoil (no clay)
 - 20–30% compost



Components

Plants

Soils

Cover

- ▶ Offers erosion control
- ▶ Traps moisture keeping soil moist
- ▶ Moderates soil temperature
- ▶ Gravel or Mulch
- ▶ Large stones for reinforcement during storms

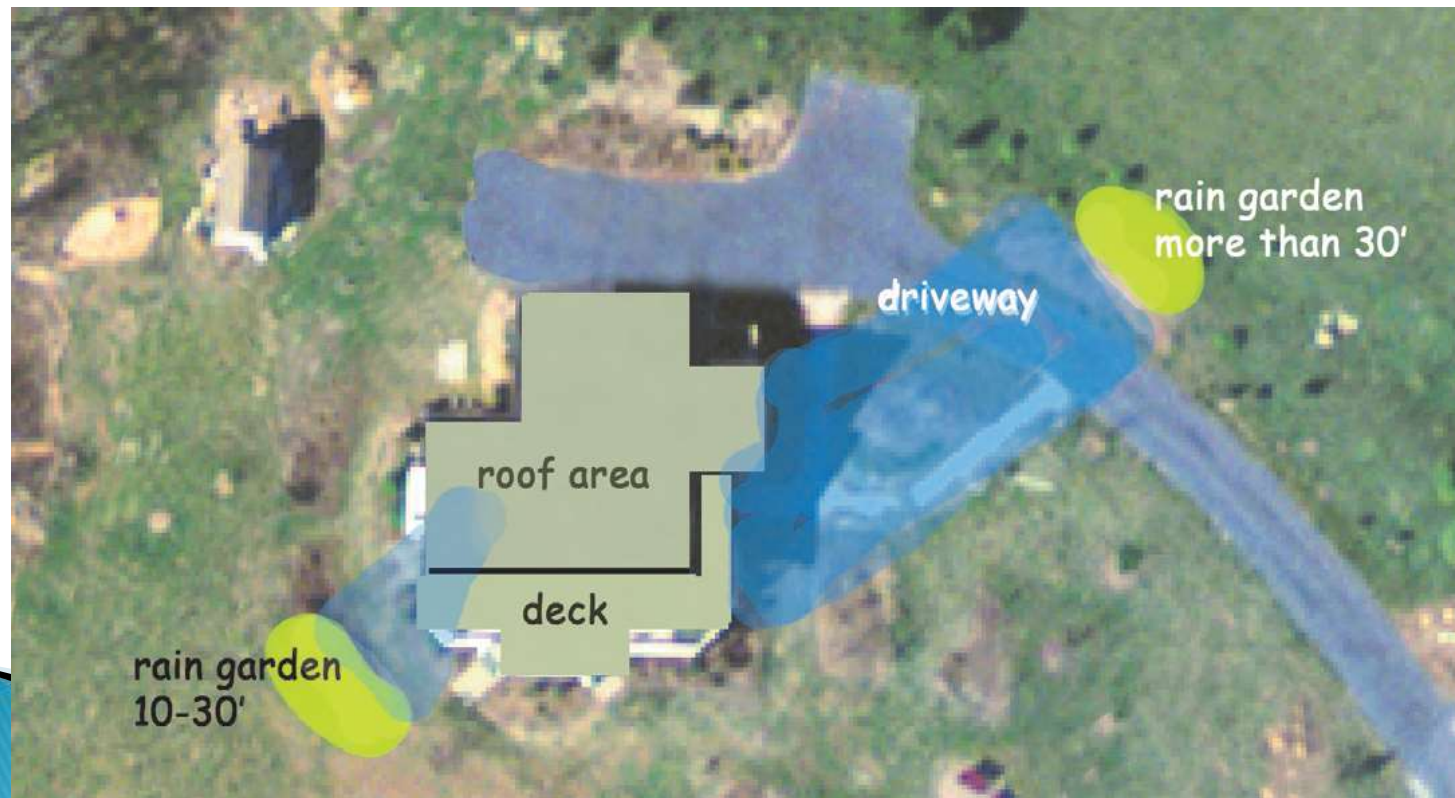


Planning

Location

Dimensions

- ▶ Plan for aesthetics
- ▶ Account for sunlight
- ▶ 10 – 30 feet down slope from ‘water source’



Planning

- ▶ Shape
- ▶ Drainage area
- ▶ Garden depth
- ▶ Garden area
- ▶ Width and length

Location

Dimensions



Dimensions

Drainage

Depth

Area

- ▶ Encompasses all inputs of water
 - Impervious surface area
 - Ground level surface
- ▶ Calculate drainage area
- ▶ Roof Drainage Area (RDA)
 - length x width x percentage
 - $RDA = 40' \times 60' \times 25\% = 600 \text{ ft}^2$

Dimensions

Drainage

Depth

Area

- ▶ Slope implies depth
- ▶ Determine slope
 - Change in height
 - Distance
- ▶ Increase depth per inch for cover layer
- ▶ More sloping sites, remove or add soil to level base

$$\text{Slope \%} = (\text{height/length}) \times 100$$

$$\text{Slope \%} = (9''/180'') \times 100$$

$$\text{Slope \%} = 0.05 \times 100$$

$$\text{Slope \%} = 5\%$$

Slope	Depth
$m < 5\%$	5" deep
$5\% < m < 7\%$	6–7" deep
$7\% < m < 12\%$	~8" deep

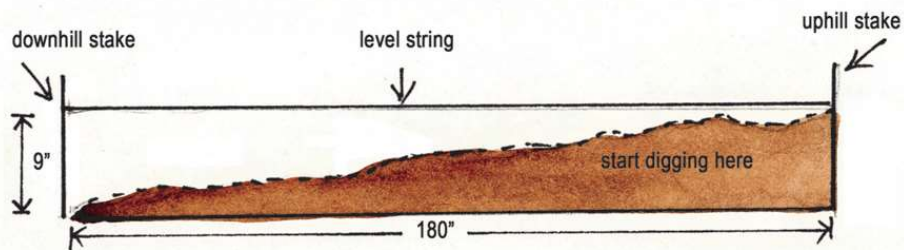
Dimensions

Drainage

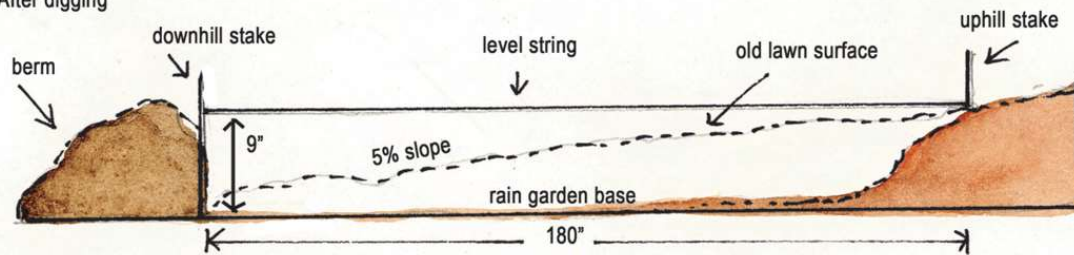
Depth

Area

Before digging



After digging



Dimensions

Drainage

Depth

Area

- ▶ Summarize previous calculations
- ▶ Determine 'size factor'

Distance:		Less than 30 feet			More than 30 feet
	Depth				
Soil type	5"	6-7"	8"	All depths	
Sand	0.19	0.15	0.08	0.03	
Silt	0.34	0.25	0.16	0.06	
Clay	0.43	0.32	0.20	0.10	

- ▶ Rain Garden Area = Drainage area x size factor

Dimensions

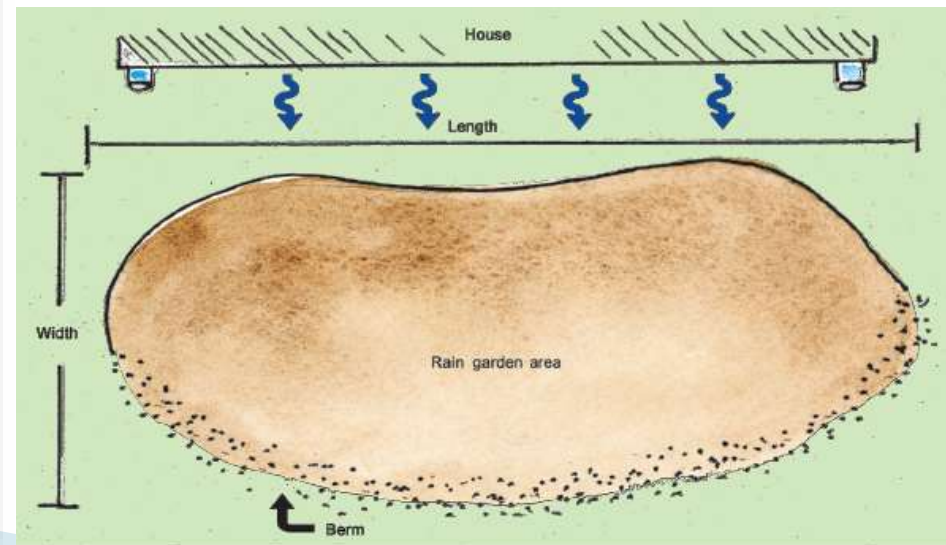
1. Rain garden's distance from impervious surface(s): 10 to 30'
2. Soil type: sand
3. Shape: Kidney bean
- 4a. Drainage area: 600 ft²
- 4b. Depth equals 6 to 7" (table 1, page 10). The size factor is 0.15 (table 2 below).
- 4c. Rain garden area
 $\text{= drainage area} \times \text{size factor}$
 $\text{= } 600 \text{ ft}^2 \times 0.15$
 $\text{= } 90 \text{ ft}^2$
- 4d. Width= Rain garden area/length
 $\text{Width} = 90 \text{ ft}^2 / 15 \text{ ft}$
 $\text{Width} = 6 \text{ ft}$

Drainage


Depth

Area

Distance:	Less than 30 feet			More than 30 feet
	Depth			
Soil type	5"	6-7"	8"	All depths
Sand	0.19	0.15	0.08	0.03
Silt	0.34	0.25	0.16	0.06
Clay	0.43	0.32	0.20	0.10



Construction

- ▶ Safety with underground utilities
 - ▶ Build and plant in late spring
 - ▶ Capture runoff
 - ▶ Outline rain garden shape
 - ▶ Remove grass
 - ▶ Construct berm if necessary
 - ▶ Dig rain garden basin
 - ▶ Amend soil mixture
- 

Capture Runoff




Vegetated swale

Downspout extension



Construction


- ▶ Safety with underground utilities
 - ▶ Build and plant in late spring
 - ▶ Capture runoff
 - ▶ Outline rain garden shape
 - ▶ Remove grass
 - ▶ Construct berm if necessary
 - ▶ Dig rain garden basin
 - ▶ Amend soil mixture
- 

Berm

- ▶ Help retain water on steep slope
- ▶ Low mound, top level with uphill side
- ▶ Use excavated soil from rain garden
- ▶ Vegetated or compacted and mulched

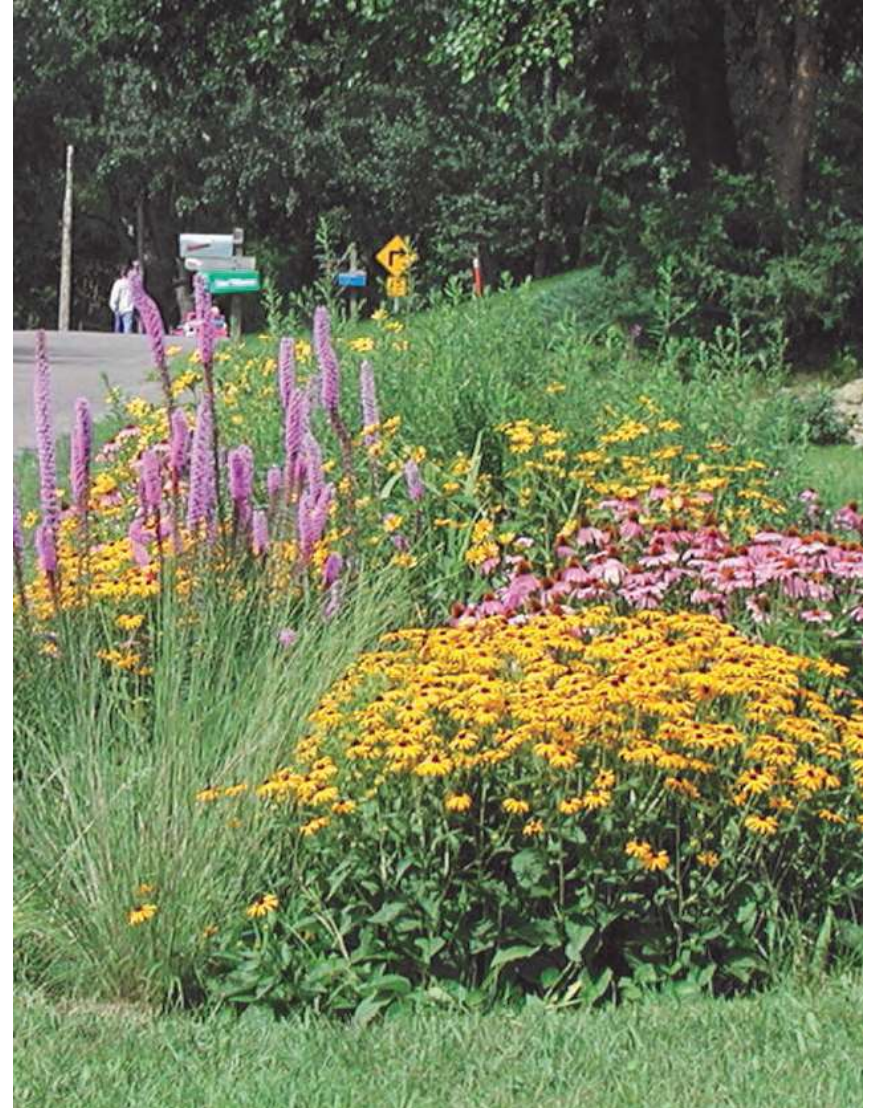


Construction

- ▶ Safety with underground utilities
 - ▶ Build and plant in late spring
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 - ▶ Dig rain garden basin
 - ▶ Amend soil mixture
- 

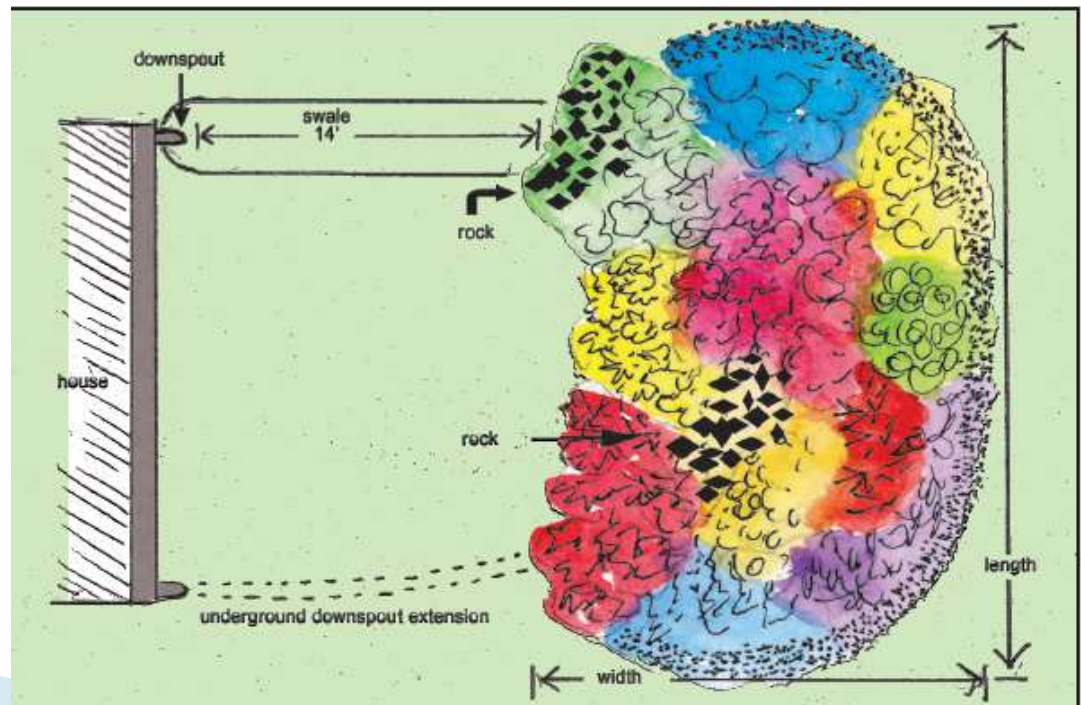
Plant Selection

- ▶ Online Resources
- ▶ Cluster
- ▶ Well-established roots
- ▶ Bloom times
- ▶ Height, color, texture
- ▶ Sun, part sun, shade



Sketch Design

- ▶ Sample designs available online
- ▶ Overlap mature plants
- ▶ Compliment colors and textures
- ▶ Consider height



Planting

- ▶ Layout plants while still in pots
 - ▶ Plant from middle outward
 - ▶ Dig holes to appropriate sizes
 - ▶ Loosen roots before burying
 - ▶ Label clusters
-
- ▶ Apply larger stones to reduce erosion
 - ▶ Top with mulch or gravel

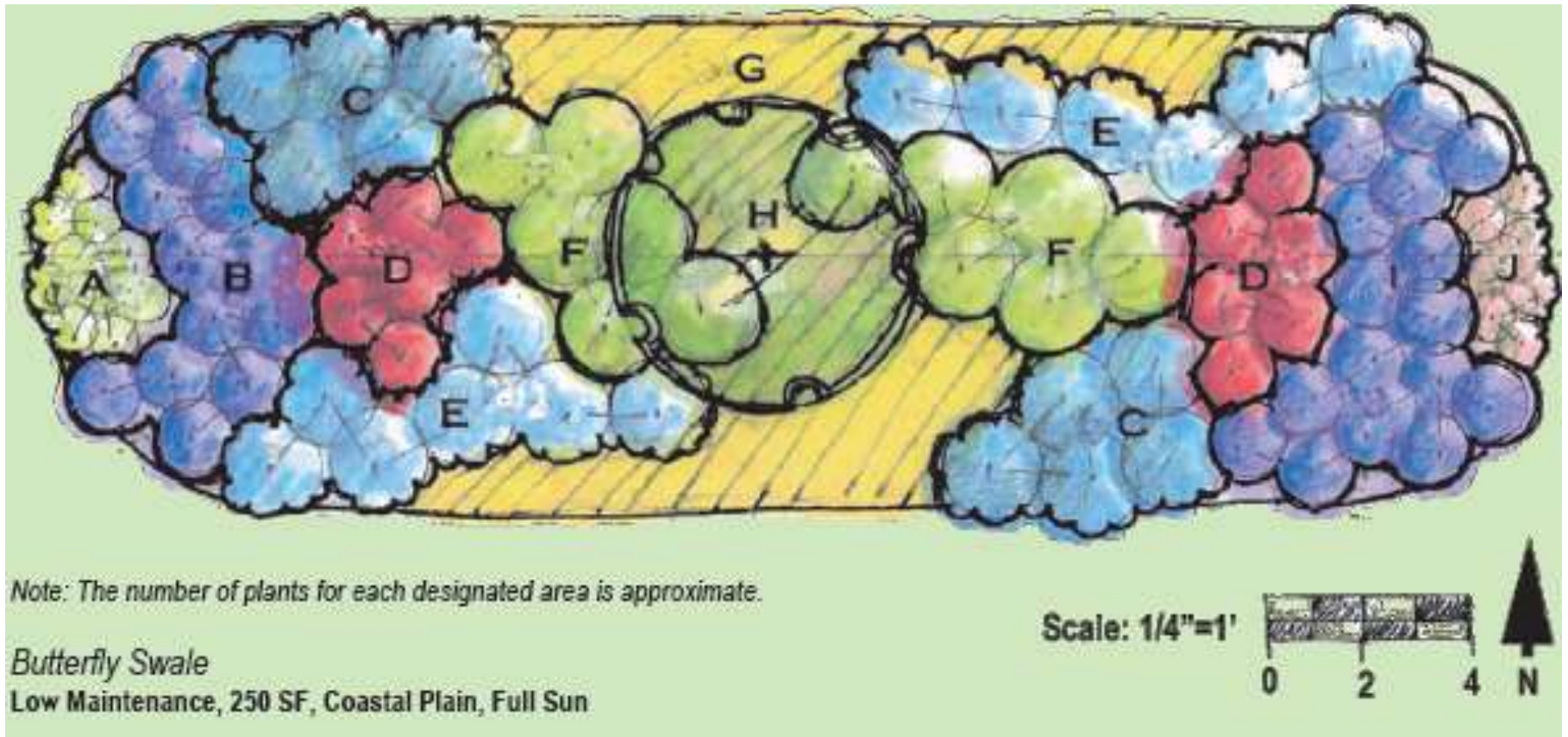
Maintenance

- ▶ Maintenance is necessary until gardens become established
- ▶ Immediate watering
- ▶ Frequent watering
- ▶ Weeding
- ▶ Deadheading



Lobelia cardinalis

Templates



Resources

- ▶ <http://www.aacounty.org/DPW/Highways/RainGarden.cfm> (ITEM 5 has resources for installation)
 - ▶ <http://www.cwp.org/your-watershed-101/what-you-can-do.html>
 - ▶ <http://www.dnr.state.wi.us/runoff/rg/>
 - ▶ <http://www.nativeplantcenter.net/>
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