# Residential Low Impact Landscaping Workshop

Project Partners:
Providence District Supervisor's Office
Fairfax County Department of Public Works and Environmental Services
Northern Virginia Soil and Water Conservation District
Northern Virginia Regional Commission
Angler Environmental

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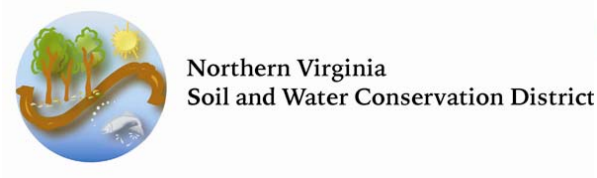





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# Stormwater Story

While Webster's New Millennium Dictionary describes stormwater as "an abnormal amount of surface water due to heavy rain or snowstorm," stormwater can be a valuable resource, if properly managed.

Rainfall and snow melt keep gardens green, streams and rivers full, and wells from running dry. However, stormwater problems can occur when there is too much of a good thing, or when excessive pollution and changes in land use prevent natural infiltration and filtering processes from taking place.

## Stormwater Challenges

Once rain reaches the ground, what happens next depends largely on land cover type. Rain falling in a forest is slowed, filtered, and absorbed as it makes its way into the ground or to the nearest stream, river, or reservoir. In contrast, hard, impervious surfaces such as roof tops and roads send stormwater rushing to the nearest ditch, culvert, storm drain, and stream.

This stormwater picks up pollutants, such as heavy metals, gas, oil, nutrients, and sediment, along the way. Uncontrolled stormwater erodes stream banks, causes flooding, and carries nutrients and sediment downstream. An excess of nutrients contributes to the expansion of oxygen-depleted "dead zones" in local waterways, the Potomac River, and the Chesapeake Bay.

## Stormwater Solutions

To improve the quality and reduce the quantity of stormwater runoff before it enters natural waterways, and solve drainage problems on private or public property, residents can employ a variety of best management practices.

Commercial or municipal best management practices or BMPs include structural facilities, such as ponds, bioretention areas, and underground vaults, and non-structural practices such as street-sweeping and educational efforts.

At the residential level, structural and non-structural options also exist. Rain gardens, rain barrels, cisterns and permeable drive and walkways are examples of structural BMPs. Conserving or replanting tree and shrub areas, improving soil, limiting use of lawn chemicals and homeowner education are non-structural examples.

The ultimate goal of BMPs at both the residential and municipal scale is to reduce the impact of development on our water resources. Employing these practices at the residential level often also mitigates drainage concerns, beautifies the landscape and addresses common landscape problems.

## A Short History of Stormwater "Solutions"*

Over time, the approaches to managing stormwater have adapted to a variety of different challenges. The techniques used to control stormwater evolved from ditches and pipes that remove water quickly and reduce flooding to an intricate system of practices that retain water and improve its quality.

Pre-1900s - Run It All in Ditches
Everything (stormwater, kitchen waste, wastewater) drained to the nearest stream.

Early-1900s - Run It All in Pipes
All waste efficiently got to the stream through the same pipe. But, downstream neighbors became ill due to upstream-generated waste. It was then recognized that sewage and stormwater require different levels of water quality treatment.

From 1940s - Run It in Separate Stormwater Pipes
A system of catch basins and pipes was developed to get stormwater to the nearest stream.

Early-1970s - Keep It from Stormwater Pipes
Stormwater was detained in ponds. This approach worked in theory but not in practice, as too many detention ponds releasing water at a controlled rate at the same time caused downstream flooding and an increase in the frequency and duration of runoff events.

1970-80s - Well, Just Don't Cause Flooding
Stormwater Master Plans were developed. However, very few plans were actually completed as designed, and stormwater runoff was identified as a major pollution source.

Late-1980s - Oh, and Don't Pollute Either
Best Management Practices or ways to improve the quality of stormwater runoff were implemented. However, the lack of good data on BMP efficiency or comprehensive monitoring programs were problematic.

Early-1990s - It's the Ecology
Use of biological criteria and bioassessment protocols became a common parameter for determining the type of stormwater management practice. But there were still questions about which parameters actually contribute to solutions to runoff problems.

Late-1990s - Water is Water is Watershed
Planning was conducted according to where the water flows, a watershed approach. However, people didn't relate to watersheds, and the watershed approach may be too large in scale to have an impact at the site level or to be meaningful to residents, which is where political change begins.

Present - Green and Bear It
A range of approaches is considered to address basic issues and institutional practices associated with the way in which land is used or developed: green infrastructure, conservation development, low impact development (LID), better site design, etc. This paradigm returns to small-scale distributed approaches that will succeed if supported and enforced by local governments.

Future - A Vision of Comprehensive Stormwater Management
Mimicking pre-development runoff characteristics will become increasingly important as regulations continue to encourage using watershed planning for expanded nutrient control and streambank preservation. Monitoring the effectiveness of green technologies at improving the quality and decreasing the quantity of stormwater runoff leads to improved designs and performance criteria. Stormwater is viewed as a resource as opposed to a waste product.

* Adapted from Land and Water, May-June 2004, Andy Reese of Amec Earth and Environmental

# Landscaping for Stormwater Management

Prior to development, a mosaic of forests and meadows made up Virginia's landscape. These environments, particularly forests, are very efficient at controlling runoff.

In a forest, trees and shrubs intercept falling rain. Trunks and stems convey water to the ground where it is taken up by plant roots or filtered through the leaf litter and soil to become groundwater. Pollutants in runoff are used often and stored by trees and shrubs. Pollutants may attach to soil particles where they can be broken down by microbes.

Even in developed areas, soil, trees, shrubs and other plants are resources that can help manage runoff and address drainage problems. Theses resources can be harnessed by adopting a conservation landscaping approach.

## Conservation Landscaping

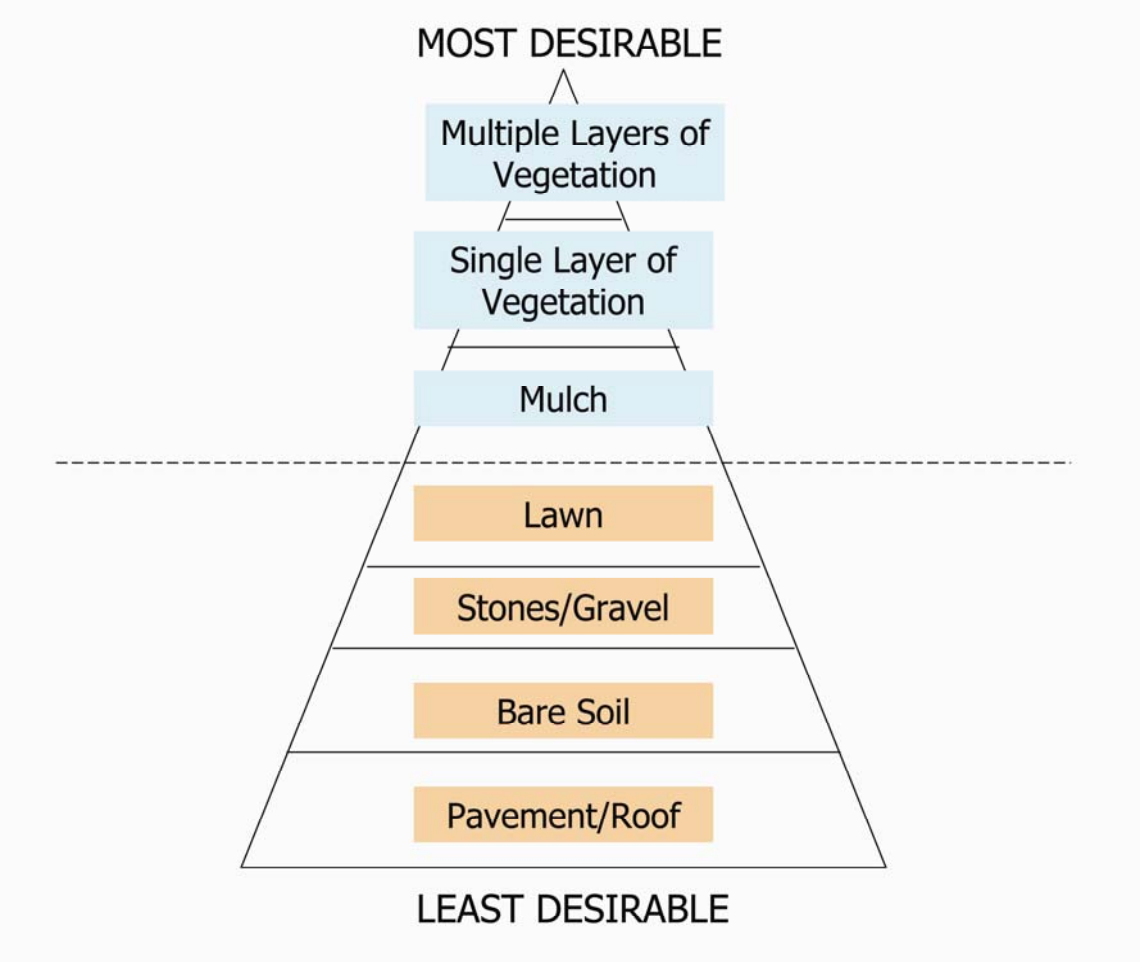
According to the Chesapeake Conservation Landscaping Council, a coalition of individuals and organizations working to promote sustainable landscapes in the Chesapeake Bay watershed, a conservation landscape displays eight essential elements.

A conservation landscape:
1. is designed to benefit the environment and to function well for human use;
2. contains locally native plants that are appropriate for site conditions;
3. has an ongoing management process to remove existing invasive plants, and to manage the property to prevent future alien plant invasions;
4. provides wildlife habitat;
5. promotes good air quality and is not a source of air pollution;
6. conserves water and promotes good water quality;
7. promotes healthy soils, composts plant waste on site, and amends disturbed soils to encourage native plant communities;
8. works with nature to be more sustainable with less input.

The conservation landscaping approach recognizes the interconnectedness of our ecological systems. Working to control stormwater runoff and improve water quality often benefits wildlife, improves air quality, promotes healthy soils, requires less time and money and is more sustainable.

## The Surface Hierarchy Pyramid

All landscape surfaces are not created equal. From a water quality perspective in fact, landscape surfaces can be ranked by their ability to filter or absorb stormwater runoff. As depicted in the surface hierarchy illustration below, a mulched bed that contains trees, shrubs and perennials will absorb and filter much more runoff, for example, than lawn. To start using landscape resources to solve runoff and drainage problems, examine the surfaces present on your property. Replace lawn with flower beds or mulched areas, plant trees, or replace paved walkways with pervious surfaces like mulch or gravel.



## Low Impact Development (LID)

Low impact development (LID) is one of the suite of approaches that make up modern stormwater management. LID works with nature to manage runoff as close to the source as possible and does not depend on large-scale stormwater control practices.

Where possible, LID conserves natural cover and ecological function. Where conservation is not possible, LID recreates or mimics natural processes through the use of small, dispersed stormwater control practices such as rain gardens and bioretention, permeable pavement and others. The goal of LID is to create a landscape where stormwater runoff occurs at the rate and with the volume that would have occurred prior to development.

## Selecting Residential LID Practices

When selecting the stormwater control practices, there are several things to consider:

Identifying the Problem
- What is the source of the stormwater?
- What can be controlled reasonably?

Considering Your Site
- Where is space available in the landscape?
- What changes are you willing to make?

Level of Effort/Ease of Installation
- How much time would you like to invest?
- Will you need heavy equipment for digging?
- How to dispose of excess soil and material?

Cost
- How much money would you like to invest?

Understanding the benefits, challenges, and limitations of each practice can help a homeowner to decide which practice or practices to construct.

# Description of Practices

## Rain Barrels/Cisterns

Rain barrels or cisterns can be connected to downspouts to store stormwater runoff from roofs. The water stored by either a rain barrel or a cistern can be re-used around the home.

Stormwater Management Mechanisms:

- Reduces stormwater runoff
- For small frequently-occurring storms, can decrease the peak discharge
- Improves water quality by allowing gradual infiltration of water through the soil.

Additional Environmental Benefits:

- Recharges groundwater
- Conserves water
- Provides unsoftened water for plants and home use.

Ease of Implementation: Easy to install or build. Rain barrels and attachment kits can be purchased on-line or at local government distribution events. If you are handy, you can make your own rain barrel from a used barrel. Cisterns can be more complex as they can be installed either above or below-ground and are larger in size.

Cost: $50-200+ for a rain barrel; several hundred to several thousand dollars for a cistern depending on the size and type

Ease of Maintenance: Low maintenance.

Maintenance Considerations:

- Water in rain barrels should be used between storms or allowed to drain slowly from the rain barrel.
- Check screens and openings to limit breeding mosquitoes
- Check connections periodically and after large storms
- Small parts (spigot, overflow hose, etc.) may occasionally need to be replaced
- Occasional washing may be required to manage algae growth; and
- Disconnection is recommended in winter in freeze-thaw areas.

Notes:

## Landscaping/Reforestation

Adding landscape beds filled with native perennials, shrubs and trees can help control stormwater. Reforestation, or the recreation of a forest ecosystem, provides the greatest stormwater benefits.

Stormwater Management Mechanisms:

- Reduces stormwater runoff
- Reduces erosion
- Improves pollutant removal and reduces pollutant sources
- Improves ecosystem structure for managing stormwater.

Additional Environmental Benefits:

- Move land-use towards pre-development conditions
- Improves groundwater recharge
- Reduces water use
- Improves wildlife habitat
- Improves air quality.

Ease of Implementation: Depends on the complexity of the landscape design. Projects may take a few hours to several days or even several seasons to complete, but can be done in stages to spread out time requirements and cost.

Cost: Varies with the complexity of the project and the source of materials. Mulch or compost can often be obtained for free from municipal sources. Purchasing native plants at fall or spring plant sales is also a good way to save money.

Ease of Maintenance: Most native plant landscapes are relatively low maintenance. They tend to be pest and disease-free relative to conventional landscapes and often thrive without the addition of fertilizers or pesticides. Decreasing lawn will decrease time required for mowing and chemical applications. However, maintenance needs will vary with the complexity of the project.

Maintenance Considerations:

- Watering may be required, particularly in the first few years following installation and during periods of drought
- Weeding will be necessary particularly in the first few years following installation
- Invasion by non-native exotics should be monitored and prevented
- Mulching can help improve soil health and limit weed growth
- Pruning of trees and shrubs or deadheading of perennials may be needed depending on species and location in the landscape; and
- Replacement of diseased or dying vegetation or reseeding may be required.

Notes:

## Soil Amendment

A soil amendment is any material added to soil to improve its water retention, drainage, infiltration and structure. Soil amendments add organic matter and nutrients to the soil, which stimulates plant growth. Compost can be used as a soil amendment or can be added to the surface of the soil as a mulch. This "compost blanket" will retain water and improve water quality.

Stormwater Management Mechanisms:

- Increases soil water retention
- Reduces the volume of stormwater runoff
- Filters pollutants as water flows through the amended soil
- Compost blankets reduce erosion.

Additional Environmental Benefits:

- Organic soil amendments can add nutrients to the soil, which stimulate plant growth
- Reduces need for application of fertilizers.

Ease of Implementation: Easy; may require rental of a rototiller or other equipment to work the amendment into the soil.

Cost: $15-25 per cubic yard for the amendment depending on whether delivery is needed. Plants will be an additional expense.

Ease of Maintenance: Low maintenance.

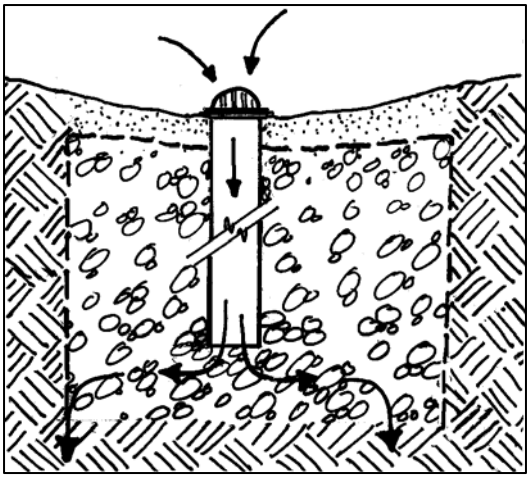
Maintenance Considerations:

- Aeration or deep tilling may be required if plants fail or water ponds where the soil has been amended
- Replacement or renewal of compost mulch may be needed.

Notes:

## Filtering Practices

The structural practices in this category are desirable because they can be installed under existing lawn or hardscape features such as walkways. Each practice includes a gravel storage area. Water captured by the structure is stored in the void spaces between the gravel or crushed stone and either percolates slowly into the ground or outflows via an underdrain. Practices that fall into this category include dry wells, infiltration trenches, and french drains among others.



Stormwater Management Mechanisms:

- Reduces the volume of stormwater runoff
- Decreases the peak discharge rate
- Can disconnect impervious surfaces
- May filter pollutants if water is allowed to percolate into the soil.

Additional Environmental Benefits:

- Recharges groundwater.

Ease of Implementation: Moderate. Excavation is required to install these practices. Excavation for small or shallow structures may be accomplished by hand. Excavation for large or deep structures may require rental of a bobcat or mechanical excavator.

Cost: $30-50 per cubic yard. Costs include gravel, labor or equipment for excavation, removal of excavated soil if required. For dry wells, an additional $100-500 may be required for the concrete casing depending on size and type.

Ease of Maintenance: Moderate

Maintenance Considerations:

- Structures should be inspected after major storms
- Organic debris and trash should be regularly removed from structures
- If water ponds on the surface or the facility fails to drain within 72 hours, the structure may need to be overhauled. This could involve removing, washing and replacing the gravel or crushed stone, replacing filter fabric, or aerating or replacing topsoil.

Notes:

## Rain Gardens

Rain gardens are landscaped areas in shallow depressions that capture and temporarily pond stormwater. Plants, mulch and the rain garden soil filter pollutants as stormwater slowly infiltrates into the ground.

Stormwater Management Mechanisms:

- Reduces pollutant loads
- Retains and detains stormwater runoff
- Can disconnect impervious surfaces.

Additional Environmental Benefits:

- Recharges groundwater
- Increases native vegetation cover
- Provides wildlife habitat and
- May improve air quality.

Ease of Implementation: Moderate. Hiring an excavator or bobcat can facilitate excavation if necessary. Hiring a rototiller can help with preparing the soil.

Cost: $5-45 per square foot. Costs include plants, soil, gravel and mulch. Hiring of labor or equipment and purchase of specialty plants leads to costs on the upper end of this range. Mulch can sometimes be obtained for free from municipal sources and plants can be purchased at low cost during spring and fall plant sales.

Ease of Maintenance: Moderate

Maintenance Considerations:

- Watering, particularly in the first few years following installation and during periods of drought
- Weeding, particularly in the first few years until vegetation grows and fills in
- Invasion by non-native exotics should be monitored and prevented
- Pruning of trees and shrubs or deadheading of perennials may be needed depending on species and location in the landscape
- Mulch needs replacement annually
- Replacement of diseased or dying vegetation or reseeding may be required
- Where rain garden collects road runoff, periodic debris or sediment removal may be needed
- If water ponds on the surface or the facility fails to drain within 72 hours, the structure may need to be overhauled. An underdrain may need to be installed or soil may need to be aerated and amended.

Notes:

## Pervious Pavement

Pervious pavement allows water to flow through to the underlying soil or into underground storage facilities. They are used in place of traditional asphalt, concrete and other impervious surfaces. Pervious pavements include pervious concrete, pervious asphalt and pervious concrete paver blocks.


Stormwater Management Mechanisms:

- Reduces impervious surface area
- Disconnect impervious surfaces
- Retains or detains stormwater
- Filters pollutants from runoff if water is allowed to percolate into the soil.

Additional Environmental Benefits:

- Recharges groundwater
- Reduces erosion.

Ease of Implementation: Easy; usually installed by a qualified contractor.

Cost: Approximately $10 per square foot for pervious asphalt or concrete; $10-15 per square foot for interlocking pavers

Ease of Maintenance: Typically low maintenance in residential settings.

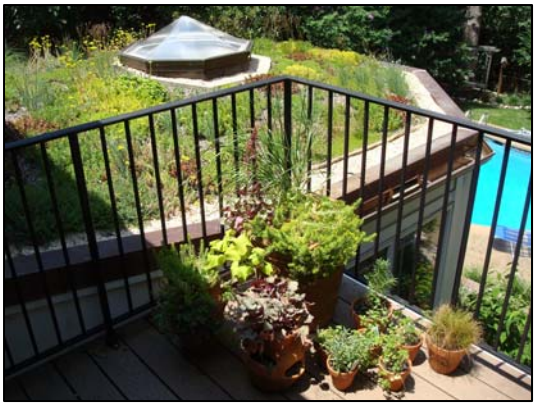
Maintenance Considerations:

- Organic debris or sediment can clog pavers; blow or rake organic debris promptly and do not apply sand or kitty litter during winter icing
- Weeding is occasionally needed in low traffic areas
- Blocks may need to be reset due to settling (interlocking pavers)
- Cracks may need repair (pervious asphalt or concrete).

Notes:

## Green Rooftops

A green roof replaces a traditional roof with a multi-layered system that has vegetation at the surface.



Stormwater Management Mechanisms:

- Reduces impervious surface area
- Detains stormwater
- Reduces peak discharge
- Filters pollutants.

Additional Environmental Benefits:

- Provide reductions in energy use
- Decreases thermal pollution in local water bodies
- Adds wildlife habitat
- Improves air quality.

Ease of Implementation: Difficult. Residential green roofs are still few and far between in the Washington, D.C. area, so finding experienced contractors can take time and effort. But, it can be done!

Cost: $30-45 per square foot.

Ease of Maintenance: Low maintenance

Maintenance Considerations:

- Weeding, typically 1 to 2 times annually
- Inspect for leaks and proper drainage from gutters
- May need supplemental watering during initial establishment
- Soil or plant replacement.

Notes:

# Maintenance Troubleshooting Guide

## Sediment Removal

*Impact on Facility Performance*

Sediment can include dirt, leaves and litter and well as eroded soil or road sand. These materials may clog or limit infiltration in the facility and restrict its ability to remove pollutants, including suspended solids, by capturing sediment. Timely removal of sediment will improve infiltration rates, water quality and help prevent clogging and flooding.

| Type of Facility This Applies To | Remove Sediment When |
|---|---|
| Vegetated<br>Green Roofs, Rain Gardens | • Sediment depth is damaging or killing vegetation; or,<br>• Sediment is preventing the facility from draining in the time designed (usually 48 - 72 hours). |
| Infiltration<br>Permeable Paving (Grasscrete, permeable pavers, gravel), Filtering Practices | • Sediment is preventing the facility from draining in the time required (usually 48 hours). |

*What to Do*

For small facilities, sediment can be removed by hand. Large facilities and underground facilities will need to be cleaned with heavy equipment by trained professionals. For example, a vacuum truck may need to be used for confined spaces.

Remove sediment during dry months when it is easiest to remove because it weighs less and creates fewer secondary environmental impacts, such as wet sediment running off the property.

Vegetated Facilities:

- Use rakes and shovels to dig out accumulated sediment.
- Avoid damage to existing vegetation. If sediment is deep, some plants may need to be removed to excavate sediment.
- Reseed, replant, and mulch disturbed area to prevent erosion.
- Excavate sand and gravel and clean or replace.

Infiltration Facilities:

- Infiltration trenches: Excavate sand or gravel and clean or replace.
- Permeable paving materials: Remove accumulated sediment from the surface with a dry broom, vacuum system, or other hand tools. A vacuum truck or street sweeping equipment may also be used, with professional assistance.

*How to Reduce Sediment Accumulation in the Facility*

- Minimize external sources of sediment, such as eroding soil upstream or upslope of the facility.
- Sweep surrounding paved areas on the property regularly.

## Vegetation Management

*Importance to Facility Performance*

Plants play an important role in stormwater facilities. They absorb water, improve infiltration rates of soil, prevent erosion by stabilizing soil, cool water and capture pollutants. Plants create habitat for birds and other wildlife and provide aesthetic value to a property. Proper maintenance of vegetation improves the appearance and performance of the facility.

| Type of Facility | Facility Needs Maintenance When |
|---|---|
| Vegetated<br>Green Roofs, Rain Gardens | • Areas of exposed, bare soil<br>• Vegetation is buried by sediment<br>• Vegetation appears unhealthy or has died<br>• Nuisance and invasive plants are present<br>• Vegetation is compromising the facility's structure by blocking inlets or outlets, or roots are intruding into the component of the facility<br>• Dropped leaves and other debris are contributing to sediment accumulation or are blocking inlets or outlets. |

*What to Do*

Maintenance activities can be easily incorporated into existing landscape maintenance contracts or into a normal maintenance routine. Vegetation can be maintained with a formal or more natural appearance depending on personal preference.

General maintenance:

- Remove dropped leaves, dead plants, grass and other plant clippings. Plant debris adds nutrient pollution as it breaks down and can clog facility piping and reduce infiltration
- Avoid using fertilizers, herbicides, or pesticides in the facility. These products add to the pollution problems the facilities are designed to remedy
- Use mulch to inhibit weed growth, retain moisture, and add nutrients. Replenish when needed. Ensure mulch does not inhibit water flow
- Irrigate all new plantings as needed for the first two years.

Caring for desired vegetation:

- Plant in late fall or early spring so plant roots can establish during the cool, rainy seasons, before summer
- Amend and aerate compacted soils before replanting by adding compost to increase nutrients and enhance soil texture
- Protect young plantings from herbivory from deer and waterfowl.

Mowing:

- Grass facilities are designed for routine mowing. Mow at least twice a year
- Grass should be mowed to keep it 4 - 9 inches tall. Grass that is at least 4 inches tall captures more pollutants and is hardier.

Nuisance and unwanted vegetation:

- Remove nuisance and invasive vegetation, such as English Ivy, before it goes to seed in the spring. Conduct additional weeding in the fall
- Immediately remove vegetation that is clogging or impeding flow into the facility
- Remove potentially large and deep-rooted trees or bushes when they might impede the flow path or compromise facility structures
- Provide erosion control on any soil exposed by vegetation removal.

## Pollution You Can See or Smell

*Importance to Facility Performance*

Stormwater facilities often collect a variety of trash and debris. Trash and debris, especially floating debris, can clog pipes or gravel. It can also cause odors through decay or by collecting spilled or dumped materials. Stormwater facilities are designed to help prevent pollutants from entering rivers and streams. Any visible water quality pollutants may wash out of the facility spreading the pollution problem.

| Type of Facility | Facility Needs Maintenance When |
|---|---|
| All Types of Facilities | Any unusual or unpleasant smells from sources such as:<br>• Natural plant decay<br>• Dying plants trapped under sediment<br>• A spill or a leak (e.g., gasoline or sewage). |

*What to Do*

Check monthly for trash and debris and look for opportunities to minimize the pollutant source.

- Regularly remove trash and plant debris
- Remove accumulated sediment (see "Sediment Removal" in this guidebook)
- Make sure inlets and outlets are not clogged
- Identify the source of trash, debris, or pollutant, such as a spill, leak, or illicit discharge
- If there is evidence of a spill or leak, call 9-1-1. Use trained professionals for any cleanup or remediation.

## Ponding Water

*Importance to Facility Performance*

Most facilities are designed to drain in a certain amount of time. This varies from two to 48 hours depending on the type of facility. Ponding water is usually a sign that the facility's filter or outlet is clogged or it is not infiltrating properly.

| Type of Facility | Facility Needs Maintenance When |
|---|---|
| Vegetated<br>Green Roofs, Rain Gardens<br><br>Infiltration<br>Permeable Paving Materials, Filtering Practices (i.e. infiltration trenches or dry wells) | • Clogging of overflows or outlets with debris, trash, or other obstructions<br>• Fine sediments filtering into the soil or other filtration media (like sand or gravel) that can prevent proper infiltration<br>• Water that has remained ponded for more than 72 hours. |

*What to Do*

- For surface facilities, first try raking the top few inches of soil to break up clogged sections and restore water flow
- Clean out overflows and outlets with hand tools, if possible. Difficult or hard to access blockages may require professional contractors
- Identify sources of sediment and debris and prevent them from entering the facility
- If applicable, make sure the facility has adequate vegetation. Vegetation absorbs water and roots help keep soil loose so it can infiltrate water
- Make sure there is a sufficient amount of mulch in vegetated facilities. This will also help to absorb excess water.

Adapted from *Maintaining Stormwater Systems, A Guidebook for Private Owners and Operators,* Northern Virginia Regional Commission, January 2007.

# Plants for Bioretention (Rain Gardens)

Reprinted with permission from Ann English – LID Center

| Botanic Name | Common Name | Ht X Spd | Color/ season of interest | Cultural zone - A (Aquatic), Em (Emergent), E (Edge) |
|---|---|---|---|---|
| PERENNIALS, GRASSES & BULBS | | | | |
| Amsonia hubrechtii | Bluestar flower | 3' X 2' | Blue, late spring (yellow fall foliage) | E |
| Andropogon glomeratus | Bushy broomgrass | 2' X2' | Fluffy tan | Em, E |
| Andropogon virginicus | Broomsedge | 2' X 2' | Upright, rosy tan clumps | E |
| Aruncus diocius | Goat's beard | 3' X 3' | White, summer | E |
| Asclepias incarnata 'Ice Ballet' | Swamp milkweed | 3' X 2' | White, summer *monarch plant | Em |
| Asclepias tuberosa | Butterfly weed | 12-24" X 24" | Bright orange, Summer, *monarch plant | E, Em |
| Aster novae-angliae | New England Aster | 3' X 3' | Blue/lt. purple, Fall | E |
| Baptisia alba | Rattlebox | 3' X 3' | White, late spring | E |
| Baptisia australis | False indigo | 3' X 3' | Blue, early summer | E |
| Boltonia asteroides | Boltonia | 3' X 3' | White, summer | E |
| Carex 'Variegata' | Variegated sedge | 6-8" X 12" | Creamy white stripe on foliage, evergreen, no flower | Em |
| Chasmanthium latifolium | Upland sea oats | 2-3' X 3' | Green clumps, winter tan | Em, E |
| Eupatorium fistulosum | Joe-pye weed | 8' X 3' | Lavender-mauve flowers, late summer, butterfly and hummingbird attractor | Em, E |
| Helianthus angustifolia | Swamp sunflower | 10' X 2' | Bright yellow, tall late summer | A,Em |
| Hemerocalis spp. | Daylily | varies | color and bloom time vary | Em |
| Hibiscus coccineus | Swamp hibiscus (AKA Texas Star) | 8-10' X 4' | Scarlet, mid to late summer | A, Em |
| Hibiscus moschuetus | Marshmallow | 3' X 2' | Pink or white summer | A,Em |
| Iris ensata 'Rikki Pikki' | Japanese Iris | 24" X 12" | White, late spring; other cultivars have other colors | Em, E |
| Iris fulva | Copper iris | 18" X 12" | Rusty orange, late Spring; One of the LA iris parents | Em |
| Iris hexagona | Dixie iris | 36" X 12" | Lavender, late spring, one of the LA iris parents | Em |
| Iris louisiana hybrids | Louisiana iris | 36" X 12" | color varies | A, Em |
| Iris pseudacorus | Yellow flag iris | 36" X 36" | Bright yellow, late Spring, can be aggressive, use in areas that get regular maintenance/ surveillance | A, Em |
| Iris siberica | Siberian iris | 18" X 12" | Blue , mid-spring | Em |
| Iris siberica 'alba' | Siberian iris | 18" X 12" | White, mid-spring | Em |
| Iris versicolor | Swamp Blue Flag | 24" X 12" | Blue, late spring | Em |
| Iris virginiana | Blue flag iris | 24" X 12" | Blue, late Spring | A, Em |
| Juncus effusus | Soft Rush | 3' X 3' | Evergreen clump | A, Em |
| Juncus spiralis | Ponytail Grass | 2' X 2' | Evergreen clump | A, Em |
| Liriope muscari 'Big Blue' | Big Blue Liriope | 12" X 12" | Blue, summer | Em, E |
| Mertensia virginica | Virginia Bluebells | 12" X 12" | Blue, Spring emphemeral | Em, E |
| Narcissus 'Ice Wings' | White daffodil | 12" X 3" | White, early spring | Em, E |

| Botanic Name | Common Name | Ht X Spd | Color/ season of interest | Cultural zone - A (Aquatic), Em (Emergent), E (Edge) |
|---|---|---|---|---|
| PERENNIALS, GRASSES & BULBS | | | | |
| Narcissus 'Thalia' | White daffodil | 12" | White , early spring | Em, E |
| Osmunda cinnamomea | Cinnamon Fern | 3' X 3' | Upright deciduous green | Em |
| Panicum virgatum 'Prairie skies' | Switch Grass | 6-8' X 4' | Upright light blue green, winter tan | Em, E |
| Pennisetum alopecuroides | Fountain Grass | 2' X 3' | Clumping grass with fuzzy seed heads | Em, E |
| Phalaris arundinacea | Ribbon Grass | 2' X 2' | Good for wet swales | Em, E |
| Pycnanthemum virginianum | Virginia Mountain Mint | 3' X 3' | White with whitish leaves | E |
| Rudbeckia hirta | Blackeyed susan | 2' X 2' | Yellow summer daisy like flowers | E |
| Scirpus validus | Softstem Bulrush | 3' X 3' | clumping grass | A, Em |
| Thalictrum aquilegifolium | Meadowrue | 3 1/2' X 2' | White, late spring | E |
| Thelypteris kunthii | Southern Shield Fern | 3' X 3' | Upright deciduous green | E |
| Vernonia gigantea | Ironweed | 5' X 2' | Upright, bright purple late summer flowers, butterfly and hummingbird attractor | Em, E |
| Veronicastrum virginicum | Culver's Root | 3' X 3' | White , Summer | E |
| SHRUBS | | | | |
| Aesculus pavia | Red Buckeye | 6' X 6' | Red Spring flower, *hummingbird attractor, yellow fall color | E |
| Aesculus sylvatica | Painted buckeye | 10' X10' | Yellow Spring Flower, hummingbird attractor, yellow fall color | E |
| Aronia arbutifolia | Red Chokeberry | 20' X 8' | White Flower, Red fruit | Em, E |
| Calycanthus florida | Sweetshrub | 4-6' X 6' | Maroon Flower (unless 'Athens' cultivar which is yellow), fragrant, yellow fall color | E |
| Cephalanthus occidentalis | Buttonbush | 10' X 12' | White summer flower, yellow fall color | A, Em, E |
| Clethra alnifolia 'Hummingbird' or 'Ruby Spice' | Summersweet | varies | White or pink summer flower, yellow fall color | Em, E |
| Clethra alnifolia '16 Candles' | Summersweet | 3' X 5' | White, bottlebrush, upright, summer (yellow fall color) | Em, E |
| Cornus amomum | Silky dogwood | 10' X 8' | White flower, maroon twig | Em, E |
| Cornus sericea | Redtwig dogwood | 4' X 4' | White, late spring, (red winter twig) | Em, E |
| Fothergilla gardenii | Fothergilla | varies | White fuzzy flower, late spring, orange-red fall color | E |
| Hamamelis virginicus | Witch hazel | 12' X 12' | Bright yellow, winter flower | Em, E |
| Ilex decidua | Possumhaw | varies | Red fruit, needs male and female ; 5:1 F:M ratio | Em, E |
| Ilex verticillata | Decid. Holly (need male and female) | varies | Red Fruit (white flower, inconspicuous), needs male, 5:1 F:M ratio | A, Em, E |
| Illicium parviflorum | Anisetree | 15' X 8' | White, evergreen | E |
| Itea virginica | Virginia sweetspire | varies | White late spring, maroon fall color and winter twig | Em, E |
| Itea virginica 'Little Henry' | Virginia sweetspire (dwarf) | 2' X 3' | White, summer , (red winter twig) | Em, E |

| Botanic Name | Common Name | Ht X Spd | Color/ season of interest | Cultural zone - A (Aquatic), Em (Emergent), E (Edge) |
|---|---|---|---|---|
| Lindera benzoin | Spicebush | 8' x 12' | White, summer, *Spicebush swallowtail larval food, yellow fall color | Em, E |
| Myrica cerifera | Wax Myrtle | varies | Evergreen | Em, E |
| Myrica pennsylvanica | Bayberry | varies | Evergreen | E |
| Rhododendron viscosum | Swamp Azalea | 6' X 3' | White, fragrant flowers, late Spring | A, Em, E |
| Sambucus canadensis | Elderberry | 12' X 10' | White, early summer flowers | A, Em, E |
| Vaccinium angustifolium | Late lowbush blueberry | 2' X 3' | White, late spring, blue summer fruit | E |
| Vaccinium ashei | Rabbiteye blueberry | 4-10' X 4-10' | White flowers, blue summer fruit, red fall color; multiple cultivars needed for reliable fruit | A, Em, E |
| Viburnum bracteatum | Bracted viburnum | 8' X 6' | White late spring flower, dark fruit, glossy foliage | Em, E |
| Vaccinium corymbosum | Highbush blueberry | 4' X 4' | White, late spring, blue summer fruit | A, Em, E |
| Viburnum dentatum | Arrowwood | 8' X 4' | White, summer | Em, E |
| Viburnum nudum 'Winterthur' | Smooth Winterrod | 8' X 5' | White late spring | E |
| TREES | | | | |
| Acer barbatum | So. Sugar Maple | 25' X 15' | Red orange fall color | E |
| Acer rubrum 'Autumn Blaze' | Red Maple | varies | Red fall color | E |
| Amelanchier canadensis | Serviceberry | 20' X15' | White flowers, red fall color | E |
| Amelanchier laevigata | Serviceberry | 15' X 10' | White spring, red fall color | E |
| Betula nigra 'Dura-Heat', 'Heritage' | River Birch | 40' X25' | Exfoliating bark, wildlife tree | E |
| Carpinus caroliniana | Hornbeam | 20' X 30' | Wildlife tree, interesting winter bark | E |
| Carya cordiformus | Bitternut Hickory | 20' X 60' | Wildlife tree, yellow fall color | E, Em |
| Catalpa bignoides | Catalpa | 35'X25' | Wildlife Tree | E |
| Celtis laevigata | Sugarberry | 40' X 60' | Interesting bark, upright vase form | E, Em |
| Chaemacyparis thyoides | Atlantic White Cedar | 30'X15' | Evergreen, needs to start life in a wet spot | A, Em, E |
| Liriodendron tulipifera | Tulip Poplar | 50'X 20' | Yellow /orange Flowers, yellow fall color | Em, E |
| Magnolia virginiana | Sweetbay | 20' X 12' | White, Summer | E |
| Magnolia virginiana | Sweet Bay Magnolia | 20' X10' | White Late Spring | E, Em |
| Nyssa aquatica | Water tupelo | 40' X 30' | Yellow Fall color | A, Em, E |
| Nyssa sylvatica | Black Gum (for dry soils surrounding a Bioretention area) | 30' X 60' | Red fall color | E |
| Nyssa sylvatica var. biflora | Swamp Gum (this one will grow in the wet areas) | 30' X 60' | Red fall color | A, Em |
| Platanus occidentalis | Sycamore | 40' X 60' | Wildlife Tree, dramatic winter bark | Em, E |
| Quercus bicolor | Swamp white Oak | 60' X 60' | Canopy tree | Em, E |
| Quercus palustris | Pin Oak | 30' X 40' | Upright regular form | Em, E |
| Taxodium ascendens | Pond cypress | 45' X 20' | Yellow Fall color | A, Em, E |
| Taxodium distichum | Bald cypress | 45' X 25' | Orange Fall color | A, Em, E |