

An Aquidneck Island DIY Rain Garden Guide

Based on Aquidneck Island Land Trust's
Spruce Acres Farm Rain Garden



Aquidneck
— Island —
Land Trust

A Watershed Moment for Aquidneck Island

Here on Aquidneck Island, there is no understating the importance of water. From the coastal waters that surround us, to the reservoirs that provide our drinking water, water is a defining characteristic of everyday life for our island community. However, our status as an island makes us much more prone to water quality issues. All of our drinking water reservoirs, and the streams that feed them, are impaired due to pollution. This same pollution can often cause beach closures and threaten wildlife in our coastal waters. Overall, poor water quality negatively impacts our local freshwater and marine ecosystems and harms our local economy through increased costs in treating drinking water, lost tourism, and harm to fishing and aquaculture.

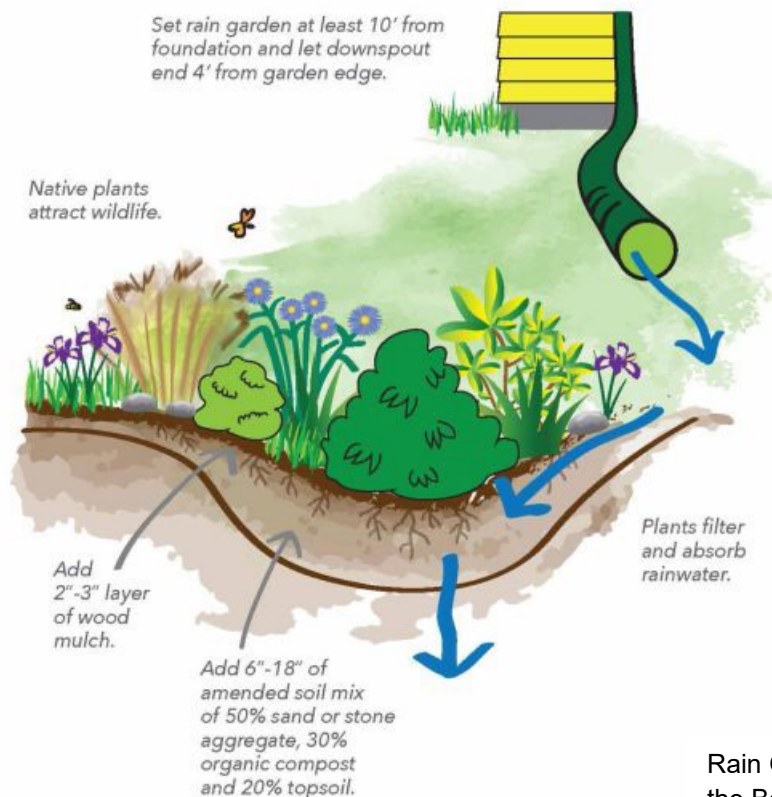
Exactly how have our waters become so polluted? There are a number of factors at play, but they all relate to the health of our watersheds. A **watershed** is an area of land that drains into a specific body of water (for example a pond, reservoir, bay, ocean, etc.). The land use within a water body's watershed directly impacts water quality. After a storm, rain and snowmelt will flow over land or impervious surfaces like streets, rooftops, and parking lots, eventually emptying into streams, lakes, the ocean, or stormwater sewers. We call this **stormwater runoff**. Often times, this runoff will collect pollutants from impervious surfaces – such as fertilizers, pesticides, motor oil, salt, litter, animal waste, etc. - which eventually get washed into our water bodies. More development in a watershed leads to more impervious cover, which in turn leads to more **stormwater runoff pollution**. Unfortunately here on Aquidneck Island, with only so much land available, many of our watersheds are developed. One of the key reasons why Aquidneck Island Land Trust conserves open space from development is to reduce stormwater runoff pollution and naturally keep our waters clean. But there are a number of things individuals can do at home to help in this mission too. One of the best ways is through installing your very own rain garden!



Rain Gardens – The Key to Healthy Watersheds

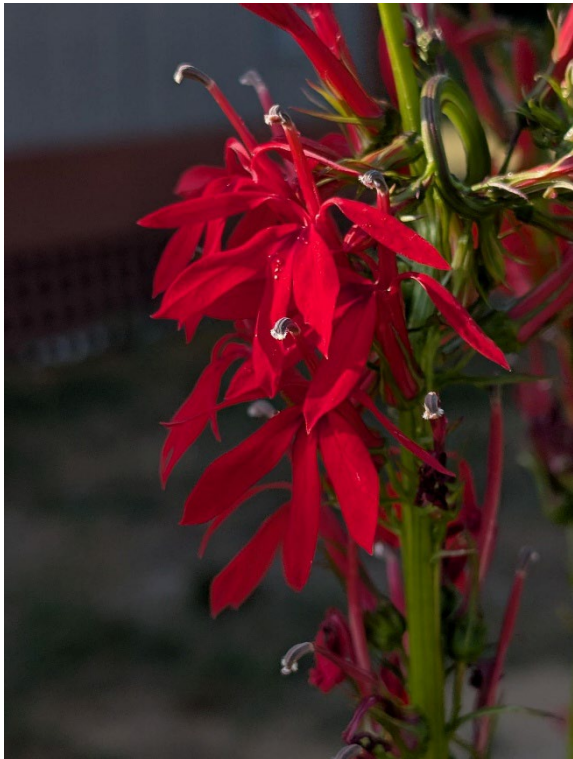
What is a rain garden? A rain garden is a type of garden, often planted within a depression, with the primary purpose of collecting stormwater runoff before it enters surface waters. Stormwater runoff contained by a rain garden is able to naturally infiltrate into the ground, filtering out pollutants and also reducing potential flooding issues downstream. In addition to their water resource value, rain gardens can play an important ecological role through boosting local biodiversity. If planted with native plant species, a rain garden can support a wide variety of wildlife, especially beneficial and pollinating insects. Native plants, being adapted to the local environment, also require very little maintenance in the long run, making your garden self-sustaining. By planting a diversity of native plants, rain gardens can bring a touch of color and scenery to beautify the landscape.

RAIN GARDEN CROSS-SECTION The illustration below shows how a rain garden captures, absorbs and filters rainwater and runoff.



Rain Garden illustration from Save the Bay's Bay-Friendly Living Guide

Rain gardens offer the perfect opportunity for individuals to improve watershed health at home. The more and more people that install their own rain garden, the more we can improve water quality throughout Aquidneck Island. Rain gardens can range in size and complexity. Though some people may prefer to hire landscapers and/or gardeners to install a rain garden at home, a small, simple rain garden can present a relatively straightforward, inexpensive, and fun “Do-It-Yourself” (DIY) opportunity for anyone looking for their next project to work on around the yard. At Aquidneck Island Land Trust, we built our very own “DIY rain garden” at Spruce Acres Farm to showcase just how easy building a rain garden at home can be. Spruce Acres Farm, purchased and protected by the Land Trust in 2017, is a former Christmas tree farm open to the public for recreation featuring trails, a pavilion area, a community garden, and a pollinator garden. Our little rain garden was added to the former tree farm office building and takes in runoff directed out of the gutters from the roof. A rain barrel is also connected to the gutter system of the building to collect rainwater for use on the property, with overflow from the barrel being directed into the garden. Though our rain garden plays an important role in improving water quality and promoting biodiversity, we hope most of all that it can be an educational exhibit for those wanting to learn more about rain gardens.



Cardinal flower (left) and swamp milkweed (right) blooming in the Spruce Acres Farm Rain Garden. Both are examples of vibrant native plant species that are well suited for rain gardens.

How to Build a Rain Garden

Feeling inspired to plant your very own rain garden? Our step-by-step DIY guide, based on the Spruce Acres Rain Garden, can help you out!

Step 1: Choose a Location and Develop a Design

First, you will want to choose the location of your rain garden. This can be beside a building, driveway, or any other large impervious feature that could generate stormwater runoff from your property. The intention will be to direct any runoff from these features into your rain garden.

Determining your location is a very important step in order to ensure the rain garden will be effective and function properly. You will want to put on your “hydrologist hat” and analyze the terrain of your lawn, to see the high points and low points from which runoff will drain through your property. A helpful tip is to observe where stormwater runoff is forming and flowing during a rainstorm. Observe if there are pre-existing wet areas or even standing water after a rainstorm, since that is where the stormwater runoff is naturally collected, making it an ideal spot for a rain garden. Be cognizant of potential flooding issues. If you are installing your rain garden next to a building, it should be at least 10 feet from the foundation to ensure there is no damage from flooding. You will also want to ensure there is a defined inlet (where runoff will be taken in) and outlet (where any runoff can exit the garden in the case of a large storm event).

For our Spruce Acres Rain Garden, we chose an area of lawn next to the office building. Our intention was to direct stormwater runoff from the roof and through the gutters into the rain garden. Given the even terrain of the area, we would have to ensure the depression would be large enough to gather the runoff. We also ensured the depression would be far away enough from the building to keep pooled runoff from the building’s foundation.

When you have determined your location, it can be helpful to draw out the design of your rain garden, keeping in mind the specific size, features, and the number and location of native plants. When determining the dimensions of your rain garden, you will want to factor in a variety of parameters. For our rain garden, we input the surface area of the roof, the type of soil present, and the intended depth of the garden into a **rain garden calculator** provided by the **Three Rivers Rain Garden Alliance**. **The City of**

Newport's Homeowner's Guide to Stormwater Management also goes into detail on rain garden design, including how to calculate rain garden area based on drainage area.



The location we chose for the Spruce Acres Rain Garden, next to the gutter of the office building.

Step 2: Remove the Grass

Next, it's time to tear-up some grass! This will make it much easier to excavate the rain garden depression in later steps. If you plan to install your rain garden in a section of existing lawn, there are a number of ways you can go about removing the sod. Laying down black plastic, a tarp, or cardboard where you intend to place your rain garden is a less laborious method, but will take some time. Smothering the area for 1-3 months (depending on weather) during the summer will prep the ground for a fall planting. There are also a number of tools that can be used to remove sod. For our rain garden, we rented a sod cutter from a local store. Sod-cutting hand tools may also be an option, although could be a very tedious endeavor depending on size of the rain garden and the number of helping-hands.

Removing the sod can also help mark the exact dimensions and footprint of the rain garden.



Aquidneck
Island Land
Trust
TerraCorps
Land
Stewardship
Coordinator
Cole Nunez
uses a sod
cutter to
remove turf
from the
intended rain
garden plot.



The footprint of
the rain garden
plot after sod
removal, now
ready for the
next steps.

Step 3: Dig a Depression

After the sod is removed and the footprint of the garden mapped-out, it's time to start digging. Within the defined plot, you will want to dig-out a gradual depression where the stormwater runoff will collect to a specified depth. In the case of our rain garden, we determined the depth of the depression through the Three Rivers Rain Garden Alliance's rain garden calculator, which suggests a depth of 4-8 inches depending on yard slope. You will also want to make sure that your designated outlet of the rain garden will have a lower depth than the rest of the perimeter of your rain garden. This will prevent flooding issues by allowing runoff out of the rain garden if it becomes overwhelmed from an intense rain event. For the Spruce Acres Farm Rain Garden, we made sure this outlet was on the opposite side of the rain garden inlet and opened into a large section of lawn where flooding would not be an issue.

For this step and the subsequent ones, it may be worth it to call in some help from friends and family. We had a great group of volunteers from Liberty Mutual Insurance assist us with the digging, laying of compost and mulch, and planting, making quick work of an otherwise arduous set of tasks.



Digging out the depression. A big thank you to the volunteers who helped build the rain garden!

Step 4: Plant & Mulch

With the depression dug to the desired depth, the garden plot is now ready to be prepped for planting. For the Spruce Acres Rain Garden, we added a thin layer of compost to provide nutrients for the plantings since the nutrient-rich topsoil had been removed. In some cases, you may want to add 6"-18" of amended soil mix, as described in the **Save the Bay Bay-Friendly Living Guide**, to improve drainage within the rain garden. After adding the compost, native plants were then placed and planted throughout the garden plot. For our garden, we used a variety of native species, noted in the table below:

Scientific Name	Common Name	Location in Rain Garden
<i>Chelone glabra</i>	White Turtlehead	Bottom center
<i>Iris versicolor</i>	Blue Flag Iris	Bottom center
<i>Lobelia cardinalis</i>	Cardinal Flower	Bottom center
<i>Lobelia siphilitica</i>	Great Blue Lobelia	Bottom center
<i>Onoclea sensibilis</i>	Sensitive Fern	Bottom center
<i>Aronia melanocarpa</i>	Black Chokeberry	Middle edge
<i>Asclepias incarnata</i>	Swamp Milkweed	Middle edge
<i>Rosa palustris</i>	Swamp Rose	Middle edge
<i>Schizachyrium scoparium</i>	Little Bluestem	Middle edge
<i>Verbena hastata</i>	Blue Vervain	Middle edge
<i>Vernonia noveboracensis</i>	New York Ironweed	Middle edge
<i>Rosa virginiana</i>	Virginia Rose	Top edge
<i>Vaccinium angustifolium</i>	Low Bush Blueberry	Top edge
<i>Viburnum dentatum</i>	Smooth Arrowwood	Top edge

Be sure to plant according to the moisture requirements and water tolerance of each species: some plants prefer wet soils and do best in the deepest part of the garden (such as white turtlehead), while others are more versatile, preferring moist conditions but tolerating drier conditions (such as New York ironweed). Wondering what plant species to add? Check out our **Rain Garden Plant List** at the end of the guide, based on the **Native Plant Trust Plant Finder**. The plant finder also offers detailed information on each species, including height, spread, light requirements, and soil moisture preferences. To attract maximum biodiversity, plant a wide variety of plant types like we did, including flowers, grasses, ferns, shrubs, and/or trees. Check with local plant nurseries to see what native species may be available!

After planting, before sure to cover the garden with a two-inch layer of mulch to aid in moisture retention. Opt for natural mulches that are not treated or dyed; we used natural wood mulch.



After a thin layer of compost is added over the garden, the native plants are arranged throughout the garden bed. Placing your potted plants before planting can help ensure that plants are evenly spread throughout the garden and are planted in the areas they will thrive best.



After the planting, a 2-inch layer of natural wood mulch is added over the layer of compost to help retain moisture for the plants.

Step 5: Prep the Inlet

The final step is to ensure that stormwater runoff is directed into the rain garden to be taken up by the native plants. Wherever the point of stormwater runoff intake into the garden will be, you will want to lay down large rocks – or riprap – leading down into the depression. This riprap minimizes erosion that could be caused by the flow of runoff into the garden, especially during large rainstorms. For rain gardens connecting to gutter systems of buildings, gutter extensions can help direct runoff directly to the riprap.

For the Spruce Acres Farm Rain Garden, our goal was to have runoff from the office roof drain into the garden. Since our rain barrel is also connected to the gutter system, we wanted to ensure that both runoff from the gutter and the rain barrel overflow was being directed towards the garden. We dug out a channel towards the rain barrel and gutter, and placed riprap into it to reduce erosion. We then added an extension to the gutter and attached a hose to the rain barrel overflow nozzle, to direct all sources of the roof runoff directly into the riprap channel.



Prepping the inlet from the gutter and rain barrel into the rain garden.



The Spruce Acres Rain Garden, now complete!

Step 6: Enjoy and Monitor Your New Rain Garden

And with that, your rain garden is finally ready for action! Be sure to check on it during the next rain event to confirm it is functioning properly. You may have to make some trial-and-error adjustments with each rainstorm. New native plantings will need to be watered frequently when first established, especially depending on weather, but eventually will need no supplemental watering. Long-term maintenance may involve weeding and re-planting any native plants that have died. It can be a learning curve to figure out which species in what parts of the rain gardens are going to do best!

Below is the Spruce Acres Rain Garden during a rain event. Stormwater runoff shed off the roof, filled the rain barrel, with leftover runoff diverted into the rain garden, where it pooled and slowly infiltrated back into the ground.



The Spruce Acres Rain Garden in action!



Participants at a Walk & Talk learn more about rain gardens.

Other Ways You Can Be a Good Watershed Steward

In addition to planting a rain garden, there are many other ways you can help improve watershed health in your community. Some of these include:

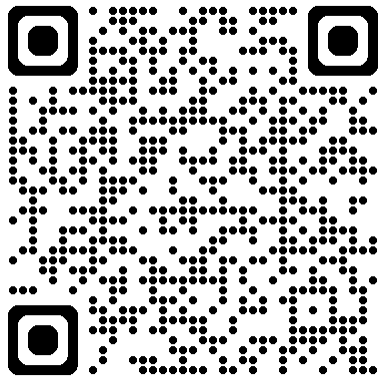
- **Install a rain barrel at home** - these can be hooked up to the gutter system of your house, directing stormwater runoff away from waterbodies and into the barrel for later use around the yard.
- **Reduce pesticide and fertilizer use in your lawn** - fertilizers contribute significantly to the nutrient build-up in our waterways, which can lead to toxic algal blooms.
- **Pick-up after your pets** - it may not seem like a lot, but it can add-up. If you're picking-up after your pets on the trails, you'll be especially appreciated by your local land trust staff!
- **Clean-up litter** - litter that is not properly disposed gets washed into our local waterways and eventually into the ocean.
- **Get your car regularly serviced** - this can prevent automobile fluids from potentially leaking into the environment.
- **Keep your lawn vegetated** - this can reduce the erosion of sediments into waterways. Opt for native plants instead of lawn when possible.



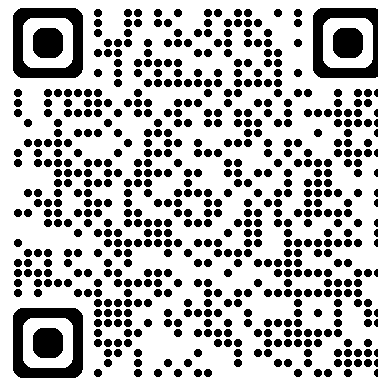
Be Sure to Check out these Additional Resources for more Information:

- The City of Newport's [Homeowner's Guide to Stormwater Management](#) has a practical step-by-step fact sheet on how to build your own rain garden that goes into great detail on determining garden design and specifications. The guide also has a fact sheet for those interested in installing a rain barrel at home.
- We used the Rain Garden Alliance's Garden Calculator when designing the Spruce Acres Farm Rain Garden, available at:
 - raingardenalliance.org/right/calculator

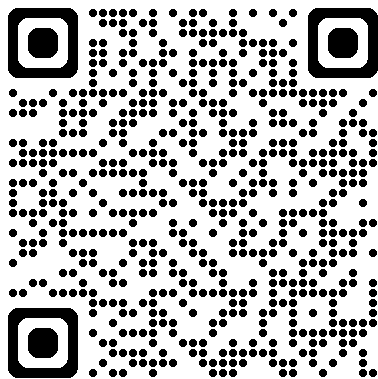
- [Save the Bay's Bay-Friendly Living Guide](#) covers many watershed-friendly practices that you can incorporate into your life, including tips on building a rain garden.
- The [University of Rhode Island RI Native Plant Guide](#) and [Native Plant Trust Plant Finder](#) are both really great tools for selecting appropriate native plants for your rain garden or yard, in addition to providing information on growing habits and requirements. The [Xerces Society](#) also has a number of native plant lists for supporting pollinators.
- For more information on Aquidneck Island's watersheds, read our [Aquidneck Island Watershed FAQ sheet](#) and [Watershed StoryMap](#).



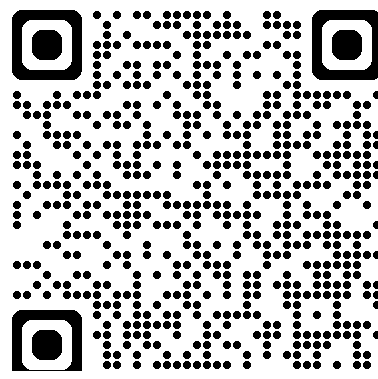
City of Newport
Homeowner's Guide to
Stormwater Management



Save the Bay's Bay-
Friendly Living Guide



URI RI Native Plant Guide



Aquidneck Island Land Trust
Watershed StoryMap



Aquidneck Island
Land Trust

Rain Garden Perennials

Recommendations from the Native Plant Trust plant finder. To explore more options go to

plantfinder.nativeplanttrust.org/Plant-Search



= pollinator friendly



= at Spruce Acres
rain garden

Latin Name

Common Name

Adiantum pedatum

Maidenhair Fern

Ageratin altissima

White Snakeroot

Agrostis perennans

Autumn Bentgrass

Anemone virginiana

Tall Windflower

Angelica atropurpurea

Purple Stemmed Angelica

Aquilegia canadensis



Eastern Red Columbine

Asclepias incarnata



Swamp Milkweed

Athyrium angustum

Lady Fern

Chelone glabra



White Turtlehead

Desmodium canadense

Showy Tick Trefoil

Diervilla lonicera

Bush Honeysuckle

Eragrostis spectabilis

Purple Lovegrass

Eupatorium hyssopifolium

Hyssop Leaved Boneset

Eupatorium perfoliatum



Boneset

Eurybia divaricata



White Wood Aster

Eutrochium maculatum

Spotted Joe-Pye Weed

Eutrochium purpureum

Purple Joe-Pye Weed

Fragaria vesca

Woodland Strawberry

Fragaria virginiana

Wild Strawberry

Gaylussacia baccata

Black Huckleberry

Gentiana clausa

Bottle Gentian

Geranium maculatum

Wild Geranium

Geum fragarioides

Appalachian Barren Strawberry

Helianthus divaricatus

Woodland Sunflower

Heliopsis helianthoides



Sunflower Everlasting

Hibiscus moscheutos

Swamp Rose Mallow

Hylotelephium telephioides

Wild Live Forever

Hypoxis hirsuta

Yellow Star Flower

Iris versicolor



Blue Flag Iris

Juncus effusus

Soft Rush

Lilium philadelphicum

Wood Lily



Eastern Red Columbine
(*Aquilegia canadensis*)



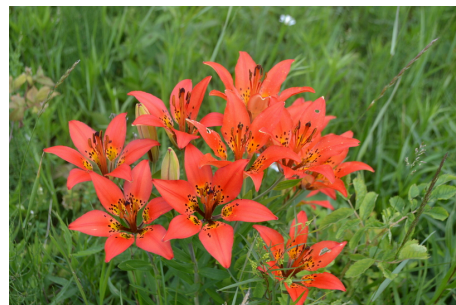
Swamp Milkweed
(*Asclepias incarnata*)



White Wood Aster
(*Eurybia divaricata*)



Bottle Gentian
(*Gentiana clausa*)



Wood Lily
(*Lilium philadelphicum*)



While many plants enjoy full sun exposure, some prefer partial or even full shade to grow. Different plants need different amounts of water to grow as well. Be sure to check out light conditions and plan for varying soil moisture levels in your rain garden before planting!



- Lobelia cardinalis*
- Lobelia siphilitica*
- Lysimachia hybrida*
- Maianthemum canadense*
- Maianthemum racemosum*
- Mimulus rigens*
- Monarda fistulosa*
- Monarda punctata*
- Oenothera fruticosa*
- Packera aurea*
- Packera obovata*
- Penstemon digitalis*
- Pycnanthemum tenuifolium*
- Pycnanthemum virginianum*
- Pycnanthemum incanum*
- Pycnanthemum verticillatum*
- Schizachyrium scoparium*
- Senna hebecarpa*
- Silene caroliniana*
- Sisyrinchium montanum*
- Solidago nemoralis*
- Solidago caesia*
- Solidago flexicaulis*
- Solidago odora*
- Solidago puberula*
- Solidago sempervirens*
- Sorghastrum nutans*
- Symphotrichum cordifolium*
- Symphotrichum laeve*
- Tephrosia virginiana*
- Thalictrum pubescens*
- Tradescantia ohiensis*
- Zizia aurea*

-  **Cardinal Flower**
-  **Blue Lobelia**
- Lowland Yellow-loosetrife**
- Canada Mayflower**
- Feathery False Solomon's-Seal**
-  **Allegheny Monkey-flower**
-  **Wild Bee-balm**
- Spotted Bee Balm**
- Narrow Leaved Evening Primrose**
-  **Golden Groundsel**
- Running Groundsel**
-  **Foxglove Beardtongue**
- Narrowleaf Mountain Mint**
-  **Virginia Mountainmint**
- Hoary Mountain Mint**
- Whorled Mountain Mint**
-  **Little Bluestem**
-  **Wild Senna**
- Wild Pink**
- Blue Eyed Grass**
- Gray Goldenrod**
-  **Blue-Stem Goldenrod**
- Zig-zag Goldenrod**
- Sweet Goldenrod**
- Downy Goldenrod**
- Seaside Goldenrod**
- Yellow Prairie Grass**
- Blue Wood Aster**
-  **Smooth Aster**
- Goats Rue**
- Tall Meadow Rue**
- Ohio Spiderwort**
- Golden Alexander**



Wild Bee-balm
(*Monarda fistulosa*)



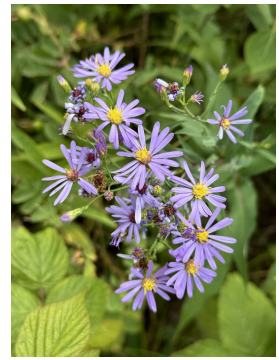
Narrow Leaved Evening Primrose
(*Oenothera fruticosa*)



Wild Pink
(*Silene caroliniana*)



Sweet Goldenrod
(*Solidago odora*)



Smooth Aster
(*Symphotrichum laeve*)





Aquidneck Island
Land Trust

Rain Garden Shrubs

Recommendations from the Native Plant Trust plant finder. To explore more options go to plantfinder.nativeplanttrust.org/Plant-Search



Latin Name

Common Name



= at Spruce Acres
rain garden



= pollinator friendly



= nutritious berries
for birds

Alnus serrulata

Smooth Alder



Smooth Alder
(*Alnus serrulata*)

Amelanchier canadensis



Canada Serviceberry

Amelanchier spicata



Running Serviceberry

Arctostaphylos uva-ursi

Red Bearberry

Aronia arbutifolia

Red Chokeberry

Aronia melanocarpa



Black Chokeberry

Clethra alnifolia

Sweet Pepperbush

Comptonia peregrina

Sweet Fern

Sweet Fern
(*Comptonia peregrina*)



Corylus americana

American Hazelnut

Crataegus crus-galli

Cockspur Hawthorn

Dasiphora floribunda

Shrubby Cincqufoil

Dievilla lonicera

Bush Honeysuckle

Dirca palustris

Leatherwood

Gaylussacia baccata

Black Huckleberry

Gaylussacia frondosa

Blue Huckleberry

Ilex glabra

Inkberry



Winterberry
(*Ilex verticillata*)

Ilex verticillata



Winterberry

Kalmia angustifolia

Sheep Laurel

Lindera benzoin



Spicebush

Lyonia ligustrina

Maleberry

Magnolia virginiana

Sweetbay Magnolia

Myrica gale

Sweetgale

Prunus americana



American Plum

Rhus aromatica



Fragrant Sumac

Rosa carolina

Carolina Rose

Carolina Rose
(*Rosa carolina*)



Rosa palustris

Swamp Rose

Rosa virginiana



Virginia Rose

Rubus odoratus

Flowering Raspberry

Salix sericea




Silky Willow



While many plants enjoy full sun exposure, some prefer partial or even full shade to grow. Be sure to check out light conditions and soil moisture levels in your garden before planting! Plan for the **mature** height of any trees or shrubs.



- Sambucus nigra*
- Spiraea alba*
- Spiraea tomentosa*
- Swida amomum*
- Swida racemosa*
- Vaccinium angustifolium*
- Vaccinium corymbosum*
- Viburnum acerifolium*
- Viburnum lentago*
- Viburnum nudum*
- Viburnum opulus*
- Viburnum prunifolium*

- Black Elderberry**
- White Meadowsweet**
- Steeplebush**
-  **Silky Dogwood**
-  **Gray Dogwood**
-  **Lowbush Blueberry**
-  **Highbush Blueberry**
-  **Maple Leaf Viburnum**
-  **Nanyberry**
- Witherrod**
- Highbush Cranberry**
- Smooth Blackhaw**



Silky Dogwood
(*Swida amomum*)



Gray Dogwood
(*Swida racemosa*)



Highbush Blueberry
(*Vaccinium corymbosum*)



Highbush Cranberry
(*Viburnum opulus*)



Sweetgale (*Myrica gale*)



Smooth Blackhaw
(*Viburnum prunifolium*)



Maple Leaf Viburnum
(*Viburnum acerifolium*)



Spicebush
(*Lindera benzoin*)





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Rain Garden Trees

Recommendations from the Native Plant Trust plant finder. To explore more options go to plantfinder.nativeplanttrust.org/Plant-Search





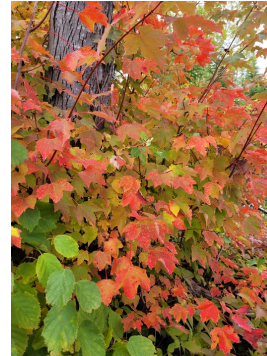
Latin Name

- Acer rubrum*
- Acer spicatum*
- Alnus serrulata*
- Amelanchier arborea*
- Amelanchier canadensis*
- Amelanchier laevis*
- Betula nigra*
- Betula populifolia*
- Crataegus crus-galli*
- Juglans cinerea*
- Magnolia virginiana*
- Ostrya virginiana*
- Populus deltoides*
- Populus tremuloides*
- Prunus americana*
- Prunus pensylvanica*
- Prunus serotina*
- Prunus virginiana*
- Quercus coccinea*
- Quercus muehlenbergii*
- Salix sericea*
- Ulmus americana*

Common Name

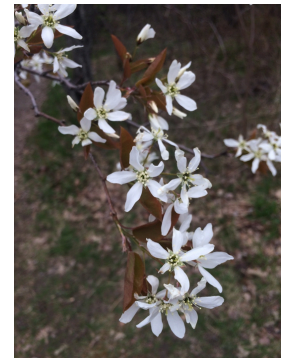
- Red Maple
- Mountain Maple
- Smooth Alder
- Downy Serviceberry 
- Canada Serviceberry 
- Allegheny Serviceberry 
- River Birch
- Gray Birch
- Cockspur Hawthorn
- Butternut
- Sweetbay Magnolia
- Ironwood
- Eastern Cottonwood
- Quaking Aspen
- American Plum 
- Pin Cherry
- Black Cherry
- Chokecherry
- Scarlet Oak
- Chinquapin Oak
- Silky Willow
- American Elm

 = pollinator friendly
 = nutritious berries for birds



Red Maple
(*Acer rubrum*)

Allegheny Serviceberry
(*Amelanchier laevis*)



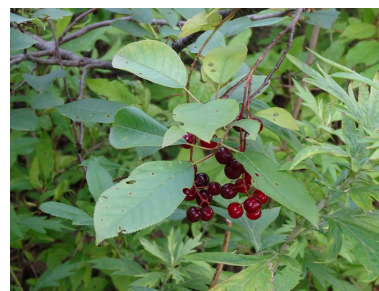
Sweetbay Magnolia
(*Magnolia virginiana*)



American Plum
(*Prunus americana*)



Ironwood
(*Ostrya virginiana*)



Chokecherry
(*Prunus virginiana*)



Scarlet Oak
(*Quercus coccinea*)

While many plants enjoy full sun exposure, some prefer partial or even full shade to grow. Be sure to check out light conditions and soil moisture levels in your garden before planting! Plan for the **mature** height of any trees or shrubs.

