



Rain Gardens in Coastal Georgia

A GUIDE FOR RESIDENTS



Marine Extension and
Georgia Sea Grant
UNIVERSITY OF GEORGIA





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FORWARD

This guide was developed by the University of Georgia Marine Extension and Georgia Sea Grant. It is designed to be a resource for residents of coastal Georgia who are interested in protecting and conserving our local water resources through the installation of rain gardens. Throughout the guide, readers will find information about how to design rain gardens, select appropriate plants and maintain these effective stormwater management tools.

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ABOUT

Marine Extension and Georgia Sea Grant

Marine Extension and Georgia Sea Grant is committed to improving the environmental and economic health of coastal Georgia through research, education and outreach. The program's mission is to improve public resource policy, encourage far-sighted economic and fisheries decisions, anticipate vulnerabilities to change and educate citizens to be wise stewards of the coastal environment. For more information about the program, visit: gacoast.uga.edu.

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RAIN GARDEN BASICS

What is a rain garden?

A rain garden is a shallow, landscaped depression that captures, filters and allows stormwater to soak back into the ground. The primary purpose of this **best management practice** is to reduce runoff and allow for groundwater recharge. Rain gardens can be aesthetically pleasing and integrated into the landscape.

They are a simple, cost-effective tool that homeowners, schools, businesses, and municipalities can use to reduce runoff and treat pollutants before they reach our waterways. These practices conserve water and provide pollinator and wildlife habitats. You can promote biodiversity and preserve plant species by using native plant materials in your rain garden. Beyond the aesthetic and ecological benefits, rain gardens encourage environmental stewardship and community pride. When rain gardens are used throughout a neighborhood or community the cost to maintain and upgrade traditional and gray stormwater infrastructure can be reduced and property values may increase.



Rain garden at the UGA Marine Extension and Georgia Sea Grant office in Brunswick, GA.

What is a stormwater best management practice?

Stormwater best management practices or control measures are actions that have been determined to be effective and practicable. They are actions – either physical (structural or vegetative) or behavioral that prevent and reduce pollution. Some examples of best management practices include water conservation, picking up pet waste, street sweeping, rain gardens, and permeable pavement.

The United States Environmental Protection Agency has a list here: <https://bit.ly/3cki5lR>

You can learn about stormwater BMPs in coastal Georgia here: <https://bit.ly/3cJSwem>

FUN FACT

Rain gardens were first introduced in the early 1990s in Prince George's county, Maryland. The original concept was to implement rain gardens on each parcel in a new housing subdivision to eliminate a traditional retention pond. The rain garden system was cost-effective and provided a 75–80% reduction in stormwater runoff during normal rain events (Source: *Low-Impact Development Design Strategies: An Integrated Design Approach*, 1999).

Why are rain gardens important?

Rain gardens differ from other landscaped beds and flower gardens in that they are depressions used to store stormwater runoff for a short period of time. Rain gardens are part of a larger group of stormwater practices known as bioinfiltration practices that can remove **nonpoint source pollutants** from stormwater runoff through physical, chemical and biological processes. Some of these processes include absorption, microbial processes, plant uptake, sedimentation and filtration. By slowing stormwater so that it can infiltrate into the soil, rain gardens enhance sedimentation and filtration.

The vegetation used in rain gardens can reduce or remove dissolved nutrients and pollutants through plant uptake and absorption. Soil microbes are able to breakdown dissolved metals and pollutants that attach to sediment carried by runoff. All of this helps improve the environment.



Figure 1: Benefits of a rain garden

WHAT IS NONPOINT SOURCE POLLUTION?

Nonpoint source pollution comes from many different sources. This type of pollution can be picked up by stormwater runoff moving over and through the ground, as it moves toward a larger waterbody. Nonpoint source pollutants are natural or human-made pollutants which can include excess fertilizer, herbicides, oil, grease, sediment from improperly managed lands, litter or bacteria from septic systems, livestock or pets.

Is my property suitable for a rain garden?

Before investing in a rain garden it is important to consider your property's landscape. Are there opportunities to connect a rain garden in the existing landscape? Can you visualize how stormwater might enter your rain garden? If it rains a lot, is there area that water can overflow without substantial damage to your home or yard? If your property has soggy soils that means you might have a high water table or clay soil material might be present. These conditions are **not** ideal for a rain garden.

If reducing irrigation of the lawn and landscape is your goal, your strategy should involve maximizing the rain garden storage and only using native plants. It is also important to consider your budget before investing in a rain garden. A do-it-yourself rain garden costs an average of **\$4 to \$6 per square foot** to install. These costs vary depending on soil conditions, desired plant species and desired plant size. The cost of the project will increase if you need to hire a landscaper to complete the rain garden.

Thinking about your property in detail and asking these questions are a good first step!

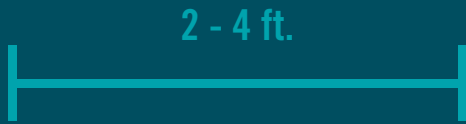
LOCATION

In determining where to place your rain garden, it is best to observe the direction of stormwater runoff during a rain event. An ideal location is an area downslope of the stormwater catchment area, or the impervious area where stormwater tends to originate from such as a driveway or rooftop. Catchment areas are typically impervious surfaces such as rooftops, driveways and patios. Consideration should be given to where and how the stormwater will enter the rain garden, how it will fill up the rain garden, and where it will flow out when the rain garden overflows during a large rain event. It is ideal to direct that overflow to an adjacent landscaped or woody area to lessen the impacts. Do not direct the overflow towards the foundation of your home or your neighbor's property!

It is important to identify site specific information, such as the location of utilities, water or gas lines (myGA811.com) and whether a permit is required. Pay close attention to areas that may already have a drainage problem because these are not suitable locations for a rain garden.

It may be helpful to survey the entire property, taking notes and pictures, to identify the best location within the landscape.

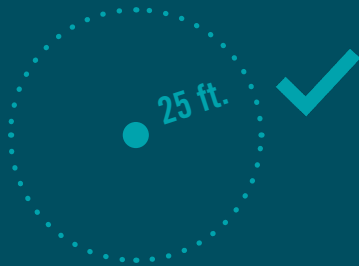
Things to consider when selecting the location of a rain garden:



Locate the rain garden a **minimum of 2 to 4 feet** from the foundation of a building. Avoid placing a rain garden **within 10 feet** of a building with a basement.



Take note of utilities, both overhead and underground. Do not locate a rain garden above underground utilities.



Locate the rain garden outside of a **25-foot buffer** of a septic tank, septic drain field or well head.



Pay attention to trees within your landscape and make sure to stay clear of the **dripline**.



Select locations are generally flat and have **less than a 12% slope**. This is pretty easy on the coast!



Learn more about the type of soil and soil composition you have.*

* To learn more about the soil conditions on a site, you can pick up a soil sample kit and submit it to your local Cooperative Extension office.

Rain gardens are designed to infiltrate water; therefore, good soil drainage is important. Determining how fast the soil drains at the site can be done using an **infiltration** or **percolation test**. A simple percolation test can be completed by using a post-hole digger or auger to dig a hole approximately the same depth as the rain garden (no more than 1 foot). Fill the hole with water and allow it to drain completely. Then place a yardstick or measuring tape in the hole, refill the hole with water, and observe how many inches of water infiltrates by checking the water levels every hour for at least four hours. Ideally, soils will infiltrate completely within 24 hours at a percolation rate of approximately 1.5 inches per hour. If the water does not drain after 48 hours, the site will not be suitable for a rain garden.



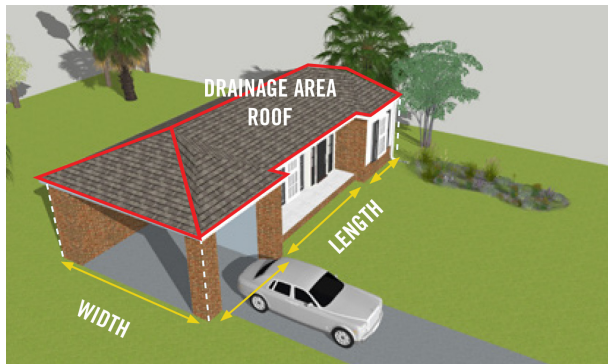
TIPS ON SOIL TYPE

Depending on the results of the soil test, soil amendments may be required, or you may need to consider an alternative site for your rain garden. An ideal soil type for a rain garden is a sandy loam or loamy sand which results in an infiltration rate of one to six inches per hour. The soil should be amended if it is not permeable enough to allow water to drain and filter properly. **A typical soil mixture should contain roughly 60% sand, 20% topsoil and 20% compost.** If sand amendments are needed it is recommended that a clean, washed sand (not mortar sand) be used.

SIZE

The size of your rain garden is dependent on both the catchment or drainage area, and the native soil type. The drainage area determines the amount of stormwater runoff entering the rain garden. Using simple geometric shapes, such as rectangles and squares, make calculating drainage areas easier.

A rooftop with gutters and a downspout is the easiest drainage area scenario to calculate (see figures 2 and 3 on the next page). Using a measuring tape or a set of house plans with dimensions, measure the surface area of the roof that drains to the downspout closest to the desired rain garden location. You calculate the surface area by multiplying the length of the roof times the width. If there are multiple roof surfaces draining into the same downspout, add the areas together to get the total surface area. If a rooftop surface area has more than one downspout, divide the surface area by the number of downspouts. Similarly, you can complete the same surface area calculation if the building has no gutters or downspouts. If this is the case, a shallow ditch lined with stone or a small pipe will need to be installed along the roof's dripline in order to convey stormwater into the rain garden. If the downspout is directly connected to the storm sewer system, it will have to be disconnected and the stormwater will have to be diverted to the rain garden.

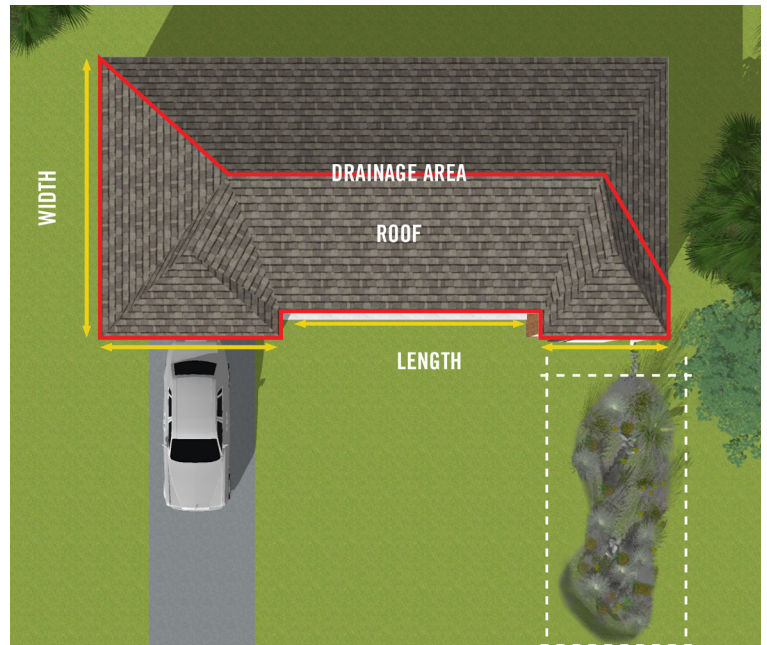


Drainage areas of other impervious surfaces such as driveways, roads, parking lots or patios can also be used; however, the drainage area geometry may be more difficult to define. Observing the drainage during a rain event or noting elevations from a recent land survey can be helpful for calculating the surface area draining to the rain garden.

Keep in mind modifications such as cutting or redirecting downspouts or installing curb cuts may be necessary to divert the stormwater into the rain garden.

Rain garden shapes can vary considerably depending on the site constraints and owner preferences. Shapes include oval, round, oblong and kidney-bean, and they should compliment the layout of the landscape. It is recommended that the longest side of the rain garden is perpendicular to the slope of the property.

The total depth of the rain garden depression includes the rain garden depth, mulch, and any soil amendments. The total depth of the rain garden should be no more than nine inches deep. The depth of a rain garden refers to the storage capacity of the rain garden. Depending on the soil analysis of the native soils the depth of rain garden will vary. The depth of a rain garden typically ranges between 3 to 7 inches.



Figures 2 (left) and 3: Rooftop drainage area



Figure 4: Rain garden cross section detail



Figure 5: Rain garden cross section detail with soil amendments

A rain garden with sandy or loamy native soils should have a rain garden depth of 6 to 7 inches, whereas a clay native soil should have a rain garden depth of three inches and three inches of soil amendments. A 1-to-3 inch layer of mulch (see Mulch Considerations on page 20) can be used to prevent erosion and weed growth.

As discussed earlier, the size of the rain garden is dependent upon the size of the drainage area and soil type. Using the drainage area and native soil texture (clay, silt, sand), refer to the Rain Garden Sizing Table below to determine the appropriate square footage of your garden.

Table 1: Rain Garden Sizing Table

Drainage Area (SQ FT)	Rain Garden Size (SQ FT)		
	CLAY SOIL 3" rain garden depth	SILTY SOIL 4-5" rain garden depth	SANDY SOIL 6-7" rain garden depth
300	100	75	20
400	135	100	20
500	170	125	25
750	250	200	35
1000	335	250	50

Rain gardens are designed to fully capture the runoff volume from a typical rain event; however, if a storm produces more than 1 inch of rainfall in a 24-hour period, consider where there might be overflow in your garden so you can safely divert stormwater.

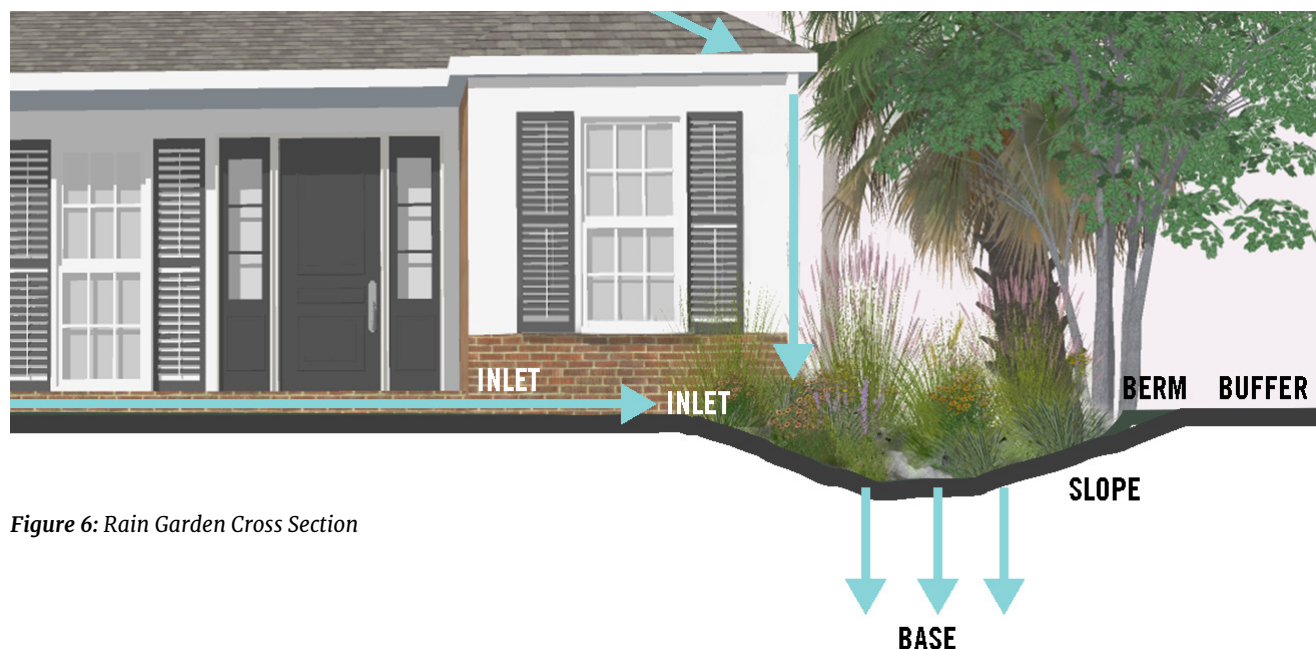


Figure 6: Rain Garden Cross Section

PLANT SELECTION

Choosing the right plant for the right place is the key for a successful rain garden. Plants must be selected to suit the existing site's conditions while considering diversity, size, color, and attraction to wildlife. Selecting the right plants will ensure that your rain garden is functional, environmentally sound, low maintenance, and cost effective while also providing beautiful habitat that is safely enjoyed by insects, birds, pets and people.

The best way to achieve a sustainable rain garden is to select plants that naturally occur in coastal Georgia's ecoregion, namely the southern coastal plain. These locally adapted native plants are well adapted to coastal Georgia's sunlight, moisture, soils, temperatures, precipitation, salts, natural diseases and pests.

Why choose natives?

Native plants are highly recommended for rain gardens because of the wide range of benefits they provide. Landscaping with native plants is a simple, low-maintenance and cost-effective way to mimic natural ecosystems while providing water quality benefits. Native plants develop extensive root systems that can increase a soil's capacity to store water which can lead to significant reductions in stormwater runoff and flooding.

Once established, native plants will flourish with minimal irrigation and no synthetic fertilizers and pesticides (insecticides, herbicides, fungicides). They absorb water more efficiently than turf-style grasses and are typically easier to maintain than exotic ornamental species. Native plants also provide important food, shelter and nesting habitat for native insects, songbirds and other wildlife.



seaside goldenrod (*Solidago sempervirens*)



cardinalflower (*Lobelia cardinalis*)

BENEFITS OF NATIVES IN RAIN GARDENS

Because of their unique characteristics and deep root systems, native plants:

- capture water more efficiently
- contribute to pollutant removal
- are more suitable to the unique rain garden soils
- can withstand alternating periods of drought and ponding

Choose plants that tolerate wet and dry conditions

Rain gardens will be dry most of the time except for brief periods following storms. Therefore, for successful plant establishment, it is important to select hardy native herbaceous (flowering forbs, ferns, grasses, rushes) and woody (shrubs, trees) species that tolerate brief periods of standing water yet thrive between rain events under dry conditions. Individual plant species need to be selected for their appropriate hydric zones of the rain garden based on their moisture tolerances. Refer to [Appendix B](#) for recommendations on coastal Georgia native plant species selection based on hydric zone tolerances, site conditions and plant characteristics.

Other plant selection considerations include the following:

- ◆ Provide good coverage with a diversity of evergreen and deciduous small trees, shrubs, grasses, and herbaceous forbs that are suited for the site's conditions and garden size. Such combinations are more attractive, function more efficiently, provide year-long interest and color, and support a higher diversity of wildlife. Refer to [Appendix B](#) for native plants that have high pollinator, other beneficial insects, songbird and other wildlife value.
- ◆ Strive to have something in bloom throughout the growing season (including early spring to late fall) that support native insects and wildlife.
- ◆ Carefully choose plants with their eventual mature height and width in mind. A range of plant heights provides interest.
- ◆ If the rain garden is near brackish or saltwater, look for plants that can tolerate salt conditions (salt spray, salt soil, salt inundation). Refer to [Appendix B](#) for salt tolerant native plant options.

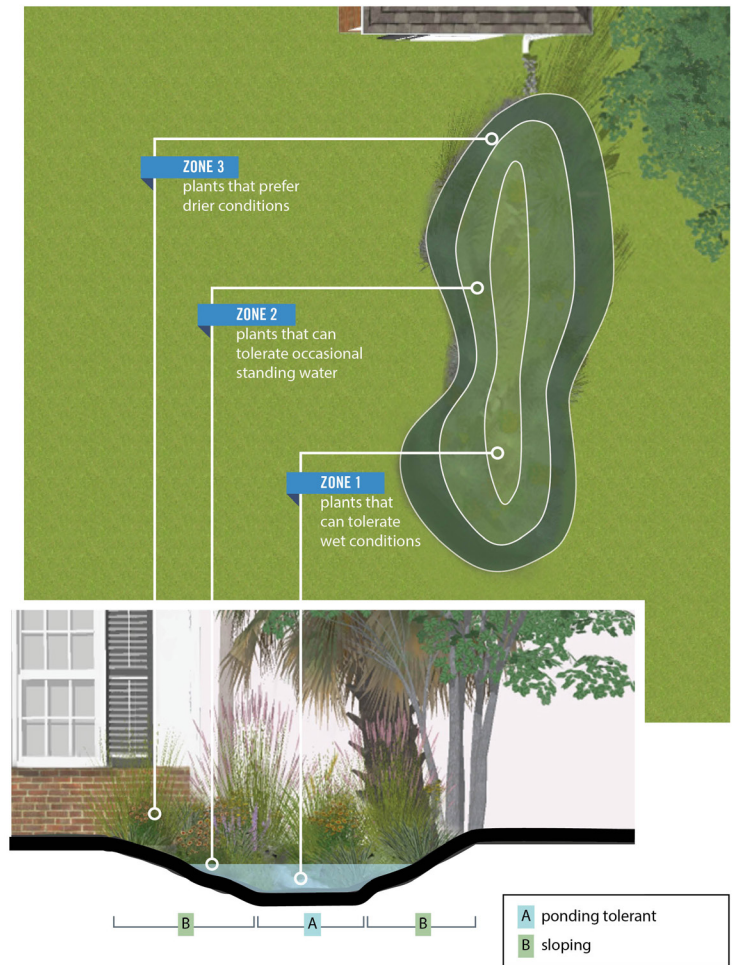


Figure 8: Rain garden hydric zones

PLANT DESIGN

Consider the following tips to ensure a successful rain garden plant design.

- ◆ Create a rain garden design sketch that will indicate the overall garden shape and placement of the selected plant species. Placement and spacing of individual plants should be based on their hydric zone tolerance (Figure 8) and expected mature size. This maintains healthy plants and reduces pruning maintenance.
- ◆ Consider a variety of design themes. By using existing landscape conditions, the design theme helps to aesthetically blend the rain garden area with the surrounding landscape. For a more traditional formal landscape, clump individual species in groups of 3 to 7 or more plants to provide a bold statement of form and color. Make sure to repeat these individual groupings to create repetition and cohesion in planting. Other manicured formal options include the use of plants with shorter heights or a simple design using a few varieties of plants. A more natural look includes species layout being random and natural (think forests and meadows).
- ◆ Place your native plants where their unique textures, colors, and heights will complement one another and help achieve the desired visual impact. Keep in mind that plants in the middle may appear shorter because they are planted in the lower area of the rain garden. Growing tall grasses or shrubs near tall herbaceous flowering plants can provide natural support and eliminate the need for stakes.
- ◆ If the rain garden is near a roadway, driveway or intersection, consider plants that provide a pleasing visual buffer with mature low shrubs and herbaceous plants that will not block a driver's vision.
- ◆ If your rain garden is located under overhead power and utility lines, be sure to comply with maximum height requirements for trees.
- ◆ If there are underground utilities near your rain garden, select plants that will not grow into, break or block pipes.
- ◆ Existing trees and plants already do a great job soaking up stormwater, so preserve existing vegetation around the rain garden as much as possible. Remember, stay clear of the drip line!



blue mistflower
(*Conoclinium coelestinum*)

PLEASE NOTE: Remove any existing non-native invasive plants and do not purchase any invasive plant species that have been identified by the Georgia Exotic Pest Plant Council. The list of Non-native Invasive Plants of Georgia can be found at www.gaeppc.org/list/.

INSTALLATION

Before installing your rain garden it is important to revisit the size (refer to Size section). It may be helpful to look at sketches of the layout made during design process and to outline the shape of your rain garden in the yard prior to construction. It's recommended to use simple geometry (circles, squares, and rectangles) to layout the base or deepest part of the rain garden. Using a string or an extra water hose is a great way to visualize the size and outline the shape within your landscape, providing the flexibility to adjust it. The perimeter of the rain garden can then be shaped outside of the base to match the desired shape (i.e.) kidney-bean shape, without compromising the storage capacity of the rain garden. Once the shape is determined marking paint or stakes can be used to mark the edges of the rain garden during construction.

Regardless of the rain garden depth the rain garden base should remain level. Depending on the slope of the surrounding landscape, varying depths of soil removal may be necessary to achieve the desired rain garden depth.

Before beginning the installation process, it is important to double check for the presence of utilities if you haven't already done so (Refer to Location section). Check the upcoming weather and arrange for all the tools and components necessary to complete the job before you get started.

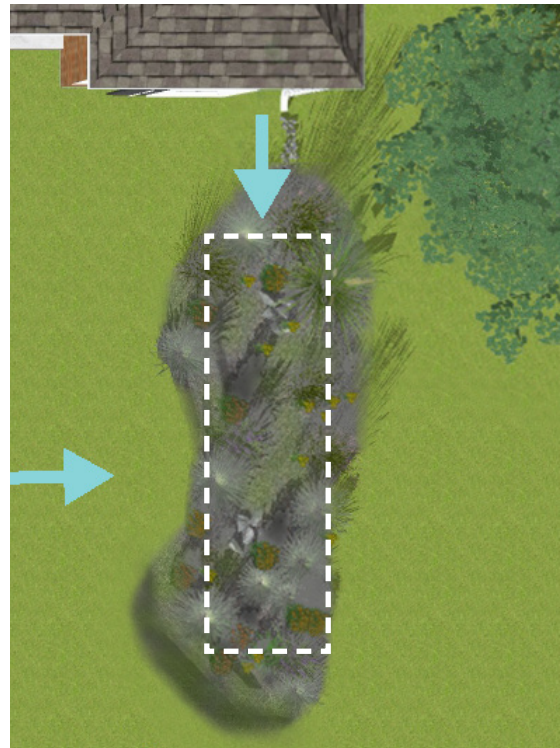


Figure 9: Rain garden layout

DIY RAIN GARDEN MATERIALS:

- RAKES
- SHOVELS
- ROTOTILLER
- WHEELBARROW
- MULCH
- PLANTS
- SOIL AMENDMENTS (if necessary)
- DECORATIVE ELEMENTS (stones, signage, etc.)
- WORK CREW (friends, family, neighbors)



General rain garden installation steps include:

1 **OUTLINE**
the shape

6 **PREPARE**
the overflow

2 **REMOVE**
existing grass
and vegetation

7 **LEVEL**
the rain
garden base

3 **EXCAVATE**
desired elevation, grade,
and depth

8 **PLANT!**

4 **ADD**
soil amendments
(optional)

9 **APPLY**
mulch
(if necessary)

5 **PREPARE**
the berm
(if necessary)

10 **WATER**
the plants

If there is existing vegetation where the rain garden will be located, it will need to be removed. Rain gardens have a smaller footprint and are generally dug by hand; however, if small excavation equipment is used, please be mindful of the surrounding landscape. Limit soil compaction when using equipment by digging from the sides and not tracking over the base of the rain garden. The amount of soil removed during excavation depends on the slope; however, the total depth should not exceed 9 inches.

A portion of the soil that is removed can be used to create the berm on the downhill side of the slope and on the sides to help retain stormwater or direct potential overflow. The berm can be mulched or covered with grass. The remaining soil can be used in other parts of the landscape or disposed of. Prior to leveling the rain garden base, it is good to construct and prepare the berm and overflow.

The bottom of the rain garden can be tilled or raked to improve infiltration. The hole you dig should appear wide and flat. The edges of the rain garden should maintain a gentle slope and meet the existing grade. This means that if the rain garden has a depth of 8 to 9 inches, the sides will slope up into the existing landscape for 2 feet! It is important that the slopes occur outside of the desired size of the rain garden. This is also a good time to double check the infiltration rate of the rain garden by conducting a percolation test (Refer to Location section). It is easier to modify the rain garden with soil amendments prior planting. Use a garden hose to soak and fill a small area of the rain garden. After the area has been soaked, fill with approximately two inches of water and examine the area to make sure that it drains within an hour. Once the rain garden is dug to the proper depth and draining appropriately, planting can begin!



Raking the rain garden base

PLANTING AND ESTABLISHMENT

In general, the following guidelines should be followed to provide optimal plant establishment in coastal Georgia.

Plant spacing, preparation and planting strategy

Once the base of the rain garden is level and draining adequately, lay out plants as planned in the design sketch to confirm the overall planting scheme and placement. Make any necessary adjustments.

Keep the plants moist and in containers until they are planted to prevent drying out before putting in the ground. Avoid soil compaction by minimizing the amount of people in the garden during planting.

Generally, 12-inch spacing is appropriate for most herbaceous forbs though there are variations. Shrubs, small trees, grasses and palms/cycads require much greater spacing depending on the species. For planting, dig a hole twice as wide as the container and deep enough to keep the crown of the plant level with the existing grade. Remove the plants by placing a hand around the plant's base and turn the container upside down. Allow the force of gravity to gently ease the plant out of the container. If the plant won't slide out easily, tap the side of the container to loosen it. Do not expose plant roots any longer than necessary. If plants are root-bound, loosen the roots. Some plants may benefit from making several vertical cuts down the sides of the root ball prior to loosening the roots.



Sizing hole for planting

Place the plant in the desired hole and gently spread the roots out. Flood the planting hole. After the water has soaked in, make sure the plant is still level with the surrounding soil. Fill the hole with existing site soil. Soil amendments (peat moss, fertilizer, etc.) are not recommended and may impact successful root establishment. Tap lightly to remove air pockets. Water the roots of the plants immediately after planting. After it soaks in lightly, repack with soil if necessary. Plant one plant at a time from one side to the other or from the middle out to avoid stepping on plants. Most efficient watering is achieved by watering manually or installing a soaker hose. Place plant labels near each individual grouping to help identify young native plants from non-desirable species during weeding.

Planting times for small trees and shrubs

- Plant in late fall or winter to provide ample time for the plants to become initially established before summer heat and possible drought conditions.
- Plant in early to mid-spring if roots are watered throughout the first and possibly second growing season.
- Avoid planting in late spring and early fall (late May – early October).

Planting times for herbaceous forbs and grasses

- Plant in late fall or spring to provide ample time for the plants to become established before summer heat and possible drought conditions.
- Avoid planting in the summer to early fall (June – early October) and winter.

Establishment

Until they become established, small tree and shrub roots should be watered regularly by rainfall or irrigation throughout the first and possibly second growing season. Herbaceous forb and grass roots should be watered for the first few weeks or months with additional watering as needed throughout the first growing season. Be careful not to overwater because this can cause root rot. Soggy soil also reduces oxygen needed for healthy soil and plants.



Watering for establishment

Mulch Considerations

While traditional mulching provides an important function in rain gardens, a native herbaceous layer or groundcover (grasses, rushes, ferns and flowering forbs) is recommended. A groundcover consisting of a diverse herbaceous mixture of grasses, rushes or ferns incorporated with flowering forbs creates good root competition and normal growth patterns that prevent plants from outgrowing or competing with other species. Providing thick lush ground cover increases opportunities to capture and hold water, reduces the need to weed, and adds to the landscape character and aesthetic appeal. A combination of both ground cover and mulch is another option to consider.

If traditional mulch is preferred, choose mulch prudently and apply it at a depth of 1 to 2 inches around herbaceous forbs and 2 to 3 inches around trees and shrubs to preserve soil moisture, suppress weeds and reduce erosion. Keep mulch away from contact of plant stems and trunks. Some plants winter as rosettes of leaves close to the ground; these rosettes should not be covered with mulch to allow the plant to breathe. Organic mulch (leaves, shredded hardwood mulch, arborist's wood chips mixture of shredded wood and green leaves, pine needles) improves soil texture while conserving moisture. Organic mulch also blocks light which keeps weeds from germinating, lessens erosion and serves as an attractive top dressing for your planting bed. Fallen leaves may contain the unseen eggs and larvae of many overwintering pollinators and other insects, so keep raking to a minimum. If you must bring mulch in, make sure to purchase from a reputable source.

Mulch material to avoid

- Mulches that **float** (ex: Pine bark).
- **Grass clippings** which decompose and provide a source of excess nutrients that can harm streams and wetlands if water flows out of the rain garden and into the storm drain system.
- **Cypress mulch** which requires whole cypress forests to be cut down for mulch demand. These cypress forests contain native bald cypress (*Taxodium distichum*) and pond cypress (*Taxodium ascendens*) which are critical to wetland ecosystems. Their roots filter water and they provide habitat and refuge for wildlife.
- Mulches that contain **shredded material** from old wood pallets, discarded furniture, demolished buildings or lumber scraps.
- **Dyed mulches**, which are usually made up of recycled wood waste, may consist of treated lumber that contains chromium, copper and arsenic. These contaminants can harm the beneficial soil bacteria as well as the insects, earthworms and plants used in your garden.
- **Inorganic mulches** like crushed stone or rock, shredded rubber or plastic sheeting.

Enhancements

Consider enhancing the rain garden by using local or existing stone, ornamental fences, trails, garden benches or additional upland wildflower or grass plantings. Using pavers or stones to create edging around your rain garden can improve access for maintenance and provide separation from the lawn and other landscapes areas. This will help give the new garden an intentional and cohesive look and provide a feeling of neatness that the neighbors and community will appreciate.

MAINTENANCE

Rain gardens are typically low maintenance, but they are not no maintenance! Regular visual inspections of the rain garden should be conducted. This involves looking for erosion, excessive sediment, excessive sediment deposits and dead or diseased vegetation. Inspections should occur after large storm events and during weather extremes. See the Maintenance Inspection Checklist in [Appendix A](#).

Sediment or Debris: The rain garden may accumulate sediment. Use a flat shovel to remove and dispose of any excess sediment, leaves or debris. Areas that typically collect sediment and debris are the inlets, outlets and around the berm.

Ponding: If water ponds in the rain garden for more than 72 hours or 3 days, mosquito briquettes, which can be purchased at any local hardware store, can be used until the ponding problem is addressed.

Plant maintenance: If you have prepared your soil correctly and chosen site-appropriate plants, a rain garden should not need nearly as much care and tending as traditional gardens. Once plants are established the need to water is minimal. Incorporating a light cover of organic materials on top of the soil after planting and possibly on an annual basis should all your plants need added nutrients.

Plant replacement: If plant mortality occurs, dead plants should be removed and replaced with healthy new plants. When replacing, place the new plant in the same location as the old one unless it was improperly placed the first time around. Follow the recommended planting times. Plant as soon as possible after purchase to ensure the best chance of survival. If possible, new plants should be approximately the same size as those that are being replaced. Care should be given to plants to ensure successful growth.

Replenish mulch: As the rain garden matures, maintain the 1-to-3-inch protective layer of mulch and add more as the lower layers decompose. Research has shown that over time, decomposing mulch helps maintain the pollutant-absorbing properties of the soil. Eventually, the plants will mature, and mulch will no longer be needed.

Appendix A. Maintenance Inspection Checklist

Establishment:

- Provide supplemental watering to all plants.*
- Is there standing water 3 days after rain?
- Remove weedy and invasive plants.
- Direct turf cuttings away from the rain garden.

Biannual Inspections:

- Check for and remove excessive sediment.
- Remove any debris or litter.
- Is there standing water 3 days after rain?
- Direct turf cuttings away from the rain garden.
- Provide supplemental watering for trees and shrubs.*
- Prune and replace diseased or dead plants.

Biannual Inspections:

- Are inlets and outlets free of vegetation/sediment?
- Prune and replace diseased or dead plants.
- Check for and remove excessive sediment.
- Remove any debris or litter.
- Remove any old compacted mulch.
- Maintain mulch depth of 3 inches or less.
- Check to make sure vegetation or overflow isn't impeding sidewalks or roads.
- Direct turf cuttings away from the rain garden.
- Provide supplemental watering for trees and shrubs.*

*may also be needed during times of extreme drought

Watering: With proper plant choice to fit local conditions, the garden should require no supplemental irrigation after the initial establishment period, except perhaps during extreme drought. Great care, however, is needed to adequately water and establish trees and shrubs.

Weeding: Weeding may be necessary in the first few months or years as plants become established. Non-chemical methods (hand pulling) is appropriate and preferable. Try to disturb the soil as little as possible to minimize additional weed reseeding. Remove the entire root system by hand of those plants that are confirmed weeds. By the third year and beyond, the native grasses, rushes and wildflowers will begin to mature and will out compete the weeds. Weeding will then only be necessary for invasive or exotic species.

Pruning and other maintenance: Proper plant selection and placement should limit the need for pruning. If determined necessary, pruning should be done sparingly. Prune shrubs or trees to remove dead, dying, crossing, broken or hazardous branches or rejuvenate plants where new growth is more desirable. Pruning of trees and shrubs should occur before bud-break. Pruning of flowering spring shrubs should be performed immediately after the plants have finished blooming. If possible, allow seeds of herbaceous perennials to remain throughout the winter for seed-eating birds. Deadheading native plants (the removal of dead flowers) is not necessary and interferes with natural flowering and growth cycles. In early spring, dead herbaceous perennial stems from the previous season can be cut within a few inches of the ground.



Pruning

Mowing: Mowing rain gardens is not necessary or recommended. However, when mowing near rain gardens, use a mulching blade or point the mower away from the garden.

CELEBRATE AND ENJOY!

Thank you for being a responsible steward of Georgia's coastal resources by installing a rain garden on your property that attracts wildlife, promotes biodiversity and contributes to healthy watersheds. Your garden can be used as a tool to educate others about the importance of managing stormwater runoff and mitigating nonpoint source pollution in Georgia's coastal communities.

Learn more about sustainable land use practices at gacoast.uga.edu/stormwater-management and gacoast.uga.edu/ecoscapes

Appendix A. Maintenance Inspection Checklist

Establishment:

- ◆ Provide supplemental watering to all plants.*
- ◆ Is there standing water 3 days after rain?**
- ◆ Remove weedy and invasive plants.
- ◆ Direct turf cuttings away from the rain garden.

Biannual Inspections:

- ◆ Check for and remove excessive sediment.
- ◆ Remove any debris or litter.
- ◆ Is there standing water 3 days after rain?**
- ◆ Direct turf cuttings away from the rain garden.
- ◆ Provide supplemental watering for trees and shrubs.*
- ◆ Prune and replace diseased or dead plants.

Biannual Inspections:

- ◆ Clear vegetation and sediment from inlets and outlets.
- ◆ Prune and replace diseased or dead plants.
- ◆ Check for and remove excessive sediment.
- ◆ Remove any debris or litter.
- ◆ Remove any old compacted mulch.
- ◆ Maintain mulch depth of 3 inches or less.
- ◆ Check to make sure vegetation or overflow isn't impeding sidewalks or roads.
- ◆ Direct turf cuttings away from the rain garden.
- ◆ Provide supplemental watering for trees and shrubs.*

**may also be needed during times of extreme drought*

*** contact stormwater specialist*

Appendix B. Suggested Native Plants for Coastal Georgia Rain Gardens

The plant list on the following pages includes plants that are native to coastal Georgia. They were selected because of their high suitability for coastal rain gardens and regional availability in the native plant nursery trade. For additional native plant resources, visit gacoast.uga.edu/ecoscapes/.

To establish a successful rain garden, select the right plants to fit your specific site conditions. The suitability of plants for each rain garden will vary depending on rain garden size and how much water the garden will hold, sun exposure and soil conditions, and desired appearance.

The following section defines the terms used in Table A on Page 37:

Hydric Zones: Rain garden hydric zones describe the degree to which an area is inundated by water (see Figure 8 on Page 14). Table A identifies recommended hydric planting zones within the rain garden where the plant will do best (“Y” = yes; “N” = no). The selected zones are based on the plant’s tolerance for water saturation, inundation and dry conditions. While the most common zones for planting are provided, a plant may survive over a broad range of conditions and be found outside of their selected hydric zone. Because hydric conditions in a rain garden may fluctuate in unpredictable ways, the use of plants capable of tolerating wide varieties of hydrologic condition greatly increases a successful planting. The planting zones include:

Bottom zone (1) is the lowest and wettest planting area of the rain garden. The bottom zone requires plants that can tolerate periodic saturated soil and standing and fluctuating water levels for a brief period but can also thrive between rain events under seasonal dry and drought conditions.

Middle zone (2) covers the side slopes and is slightly drier than the bottom zone, but requires plants that can tolerate periodically moist or saturated soils during larger storms for a brief period but can also thrive between rain events under seasonal dry and drought conditions.

Outer zone (3) is the planted area with drier conditions that is the transition zone between the rain garden and the existing landscape. This zone typically requires upland and drought tolerant native plants that prefer dry conditions and support water conservation, provide wildlife habitat, and survive in local climate conditions.

Table A includes native plants for the Outer zone that also meet requirements of the rain garden Bottom zone and/or Middle zone. Suggested plant species selection for the Outer zone can be acquired using the UGA EcoScapes Georgia Coastal Plain Native Plants for Sustainable Landscaping and Wildlife Habitat Search Engine (t.uga.edu/5yT).

Deciduous vs. Evergreen:

Deciduous (D) – foliage that sheds at the end of the growing season.

Evergreen (E) – foliage that remains green and functional through more than one growing season.

Sun Exposure: (“Y” = yes; “N” = no)

Sun - 6 or more hours of direct sunlight a day during the plant’s growing season. Some plants requiring full sun may still do well in part shade environments depending on the quality and duration of the light the plants receive when they are not in the shade.

Partial - 3-6 hours of direct sunlight, in full shade for 2-3 hours during midday, or a site where they receive lightly filtered or dappled light for the entire day (e.g., under an oak tree) during the plant’s growing season.

Shade - less than 3 hours of direct sunlight in morning or a site with heavily dappled sun during the plant’s growing season.

Mature Size:

Mature Height - the approximate mature height of a plant in optimal growing conditions.

Mature Width - the approximate diameter (spread) of a plant’s branching when it has matured.

Salt Tolerance: This column ranks the relative tolerance of a species to demonstrated salt exposure (salt content in soil, salt spray/aerosol, saltwater inundation). The tolerances include N=none; L=low; M=moderate; H=high. If U (unknown) is displayed, no references were found for the species.

National Wetland Indicator Status: A National Wetland Indicator Status (NWIS) reflects the likelihood that a plant occurs in a wetland or upland and can assist in hydric zone placement.

Obligate (OBL) - plants that always occur in standing water or in saturated soils. **Please Note:** Although obligate native plant species were provided on the list, they should be considered with caution. Due to their natural site requirements, many obligate species are not drought tolerant and typically need continuous moist saturated soils to thrive. However, there are exceptions and some of these species exhibit variable adaptations from wet to dry conditions once established.

Facultative (FACW) - plants that nearly always occur in areas of prolonged flooding or require standing water or saturated soils but may, on rare occasions, occur in non-wetlands.

Facultative Upland (FACU) - plants that typically occur in xeric or mesic non-wetland habitats but may frequently occur in standing water or saturated soils.

Upland (UPL) - plants that almost never occur in water or saturated soils.

Plant Characteristics Soil Moisture:

Wet (w) - saturated soils are wet for a significant portion of the growing season except during times of drought.

Moist (m) - moist soils are damp for most of the growing season except during times of drought. They may occasionally be saturated. Some notes are included on flood tolerances, but homeowners should also consult the wetland indicator values for more information.

Dry (d) - drought tolerant plants will do well in areas where water does not remain after a rain and will not require supplemental watering in all but the most extreme drought conditions once established.

GRASSES AND RUSHES

Mary Keim

Andropogon virginicus
broomsedge bluestem
p. 37



Chasmanthium latifolium
Indian woodoats
p. 37



Eragrostis elliotti
field lovegrass
p. 37



Eragrostis spectabilis
purple lovegrass
p. 37



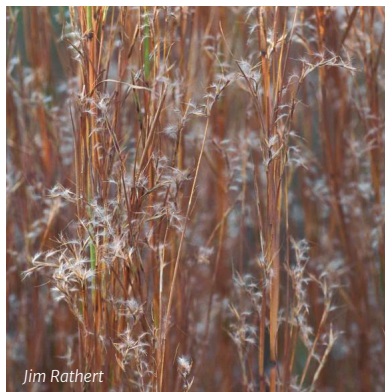
Juncus effusus
common rush
p. 37



Muhlenbergia capillaris
hairawn muhly
p. 37



Panicum virgatum
switchgrass
p. 37



Schizachyrium scoparium
little bluestem
p. 37



Sorghastrum nutans
Indiangrass
p. 38

GRASSES AND RUSHES



Sorghastrum secundum
lopsided Indiangrass
p. 38



Spartina bakeri
sand cordgrass
p. 38



Tridens flavus
purpletop tridens
p. 38



Tripsacum dactyloides
Eastern gamagrass
p. 38

FERNS

Gardening Express

Athyrium filix-femina
common ladyfern
p. 39

D & R Greenway Land Trust

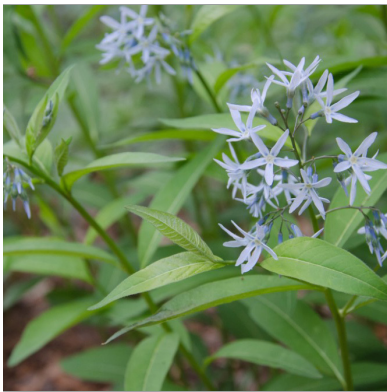
Osmunda cinnamomea
cinnamon fern
p. 39



Native Wildflowers Nursery

Polystichum acrostichoides
Christmas fern
p. 39

HERBACEOUS FORBS/HERBS



Amsonia tabernaemontana
eastern bluestar
p. 39



Asclepias incarnata
swamp milkweed
p. 39



Asclepias perennis
aquatic milkweed
p. 39



Natural Communities Native Plants

Asclepias tuberosa
butterfly milkweed
p. 39



Keren Giovengo

Baptisia alba
white wild indigo
p. 40



Borrichia frutescens
bushy seaside tansy
p. 40



Keren Giovengo

Conoclinium (Eupatorium)
coelestinum
blue mistflower
p. 40



Mail Order Natives

Eryngium aquaticum
rattlesnake master
p. 40



Christopher David Benda

Eryngium yuccifolium
button eryngo
p. 40



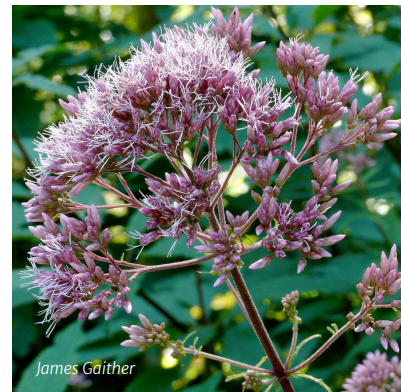
Wild Seed Project Shop

Eupatorium perfoliatum
common boneset
p. 40



Katrina J Houdek

Eupatorium rugosum
(Ageratina altissima)
white snakeroot
p. 41



James Gaither

Eutrochium
(Eupatorium) fistulosum
trumpetweed
p. 41

HERBACEOUS FORBS/HERBS



Helianthus angustifolius
swamp sunflower
p. 41



Heliopsis helianthoides
smooth oxeye
p. 41



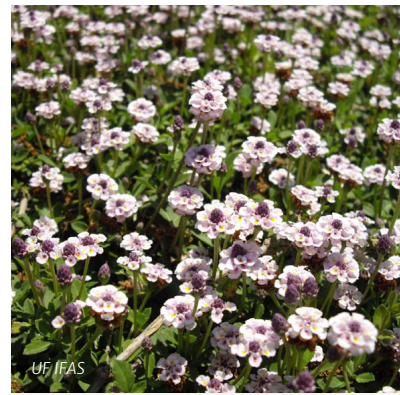
Iris virginica
Virginia iris
p. 41



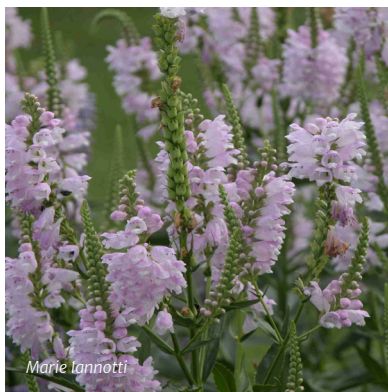
Liatrix spicata
dense blazing star
p. 41



Lobelia cardinalis
cardinalflower
p. 42



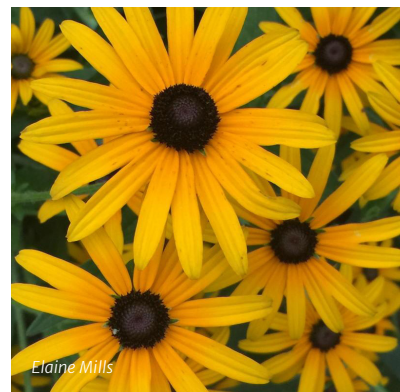
Phyla nodiflora
turkey tangle frogfruit
p. 42



Physostegia virginiana
obedient plant
p. 42



Pycnanthemum flexuosum
Appalachian mountainmint
p. 42



Rudbeckia fulgida
orange coneflower
p. 42

HERBACEOUS FORBS/HERBS



South Jersey Native Plants

Salvia lyrata
lyreleaf sage
p. 42



Keren Giovengo

Sisyrinchium angustifolium
narrowleaf blue-eyed grass
p. 42



Kerry Woods

Solidago rugosa
wrinkleleaf goldenrod
p. 43



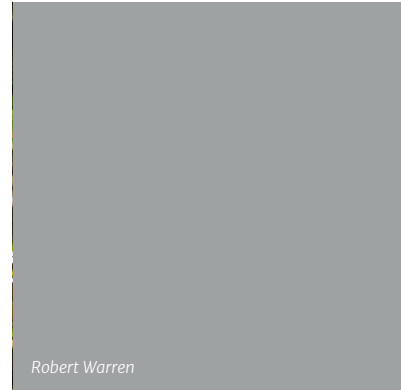
Keren Giovengo

Solidago sempervirens
seaside goldenrod
p. 43



Keren Giovengo

Stokesia laevis
Stoke's aster
p. 43



Robert Warren

Symphyotrichum dumosum
rice button aster
p. 43



Symphyotrichum lateriflorum
**white woodland
aster/calico aster**
p. 43



Keren Giovengo

Tradescantia ohiensis
**bluejacket
(Ohio spiderwort)**
p. 43



Elaine Mills

Vernonia angustifolia
(*Vernonanthura nudiflora*)
tall ironweed
p. 43

PALMS

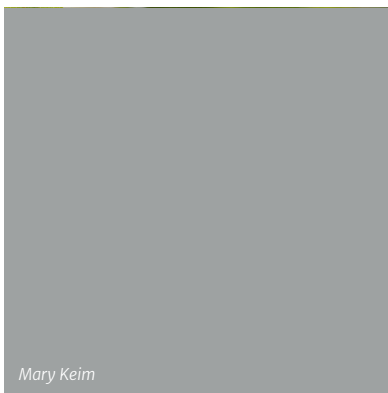


Sabal minor
dwarf palmetto
p. 44



Serenoa repens
saw palmetto
p. 44

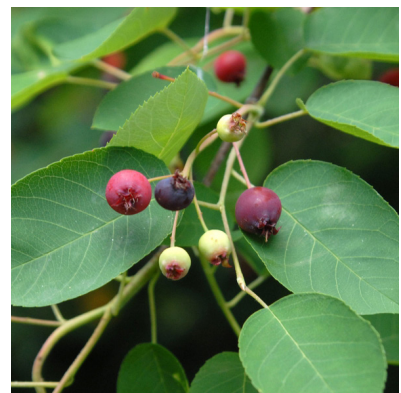
SHRUBS/SMALL TREES



Agarista populifolia
Florida hobblebush
p. 44



Alnus serrulata
hazel alder
p. 44



Amelanchier arborea
common serviceberry
p. 44

SHRUBS/SMALL TREES



Amkha Seed

Amorpha fruticosa
false indigo bush
p. 44



Aralia spinosa
devil's walkingstick
p. 45



Abrahami Grignaffini

Aronia (Photinia) arbutifolia
red chokeberry
p. 45



NC State Extension Gardener Plant Toolbox

Baccharis halimifolia
eastern baccharis
p. 45



Keren Giovengo

Callicarpa americana
American beautyberry
p. 45



Per's Wildflower Pictures

Carpinus caroliniana
American hornbeam
p. 45



Peter Friedman

Cephalanthus occidentalis
common buttonbush
p. 45



Barry Evgatt

Cercis canadensis
eastern redbud
p. 45



The Plant Attraction

Chionanthus virginicus
white fringetree
p. 45

SHRUBS/SMALL TREES



South Jersey Native Plants

Clethra alnifolia
coastal sweetpepperbush
p. 45



Keren Giovengo

Euonymus americanus
bursting-heart
p. 46



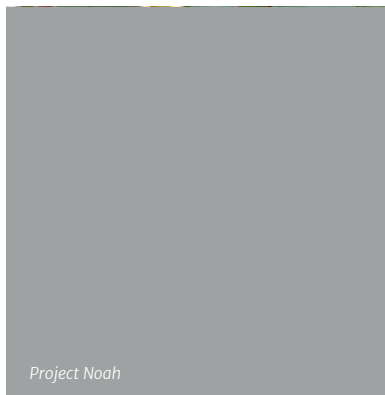
University of New Hampshire Extension

Hamamelis virginiana
American witchhazel
p. 46



Andrew Cannizzaro

Hibiscus moscheutos
crimson-eyed rosemallow
p. 46



Project Noah

Ilex decidua
possumhaw
p. 46



Tennessee Naturescapes

Ilex glabra
inkberry
p. 46



Ilex vomitoria
yaupon
p. 46



Natural Landscapes Nurseries

Itea virginica
Virginia sweetspire
p. 46



Forest and Kim Starr

Morella cerifera
wax myrtle
p. 47

SHRUBS/SMALL TREES



Mt. Cuba Center

Osmanthus americanus
(*Cartrema americana*)
devilwood
p. 47



Tracy Blevins

Rhododendron viscosum
swamp azalea
p. 47



Will Cook

Rosa palustris
swamp rose
p. 47



Keren Giovengo

Sambucus nigra ssp. *canadensis*
American black elderberry
p. 47



Robert Thurman

Vaccinium corymbosum
highbush blueberry
p. 47



White Flower Farm

Viburnum dentatum
southern arrowwood
p. 47



Western North Carolina Botanical Club

Viburnum nudum
possumhaw
p. 47

Table A. Coastal Georgia Rain Garden Native Plant List

GRASSES AND RUSHES														
Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Andropogon virginicus</i> broomsedge bluestem	Y	Y	Y	D	Y	N	N	2-4'	2-3'	YELLOW ORANGE	SUMMER FALL	L-M	FAC	m-d, adaptable to many soils, tolerant of seasonal flooding, drought tolerant, clumping, erect, golden orange fall foliage, pollinators, birds
<i>Chasmanthium latifolium</i> Indian woodoats	N	Y	Y	D	Y	Y	Y	2-4'	2-4'	GREEN	SUMMER FALL	N	FAC	m-d, prefers partial shade, attractive flat drooping seed heads, reseeds, may be aggressive in optimal conditions, groundcover, birds
<i>Eragrostis elliotii</i> field lovegrass	Y	Y	Y	D	Y	N	N	2-3'	2-3'	WHITE	SUMMER FALL	N-L Saltwater L-M Salt aerosol	FACW	m-w, occasionally inundated freshwater or brackish soils, drought tolerant, groundcover, attractive flowers, silvery leaves, perennial that declines after flowering, reseeds, rhizomes, birds
<i>Eragrostis spectabilis</i> purple lovegrass	N	Y	Y	D	Y	N	N	1-2'	1-2'	REDDISH PURPLE	SUMMER FALL	N-L Saltwater L-M Salt aerosol	FACU	m-d, groundcover, drought tolerant, does not tolerate standing water, attractive purple-colored flower/seed heads, blue-gray leaves, perennial declines after flowering, reseeds, rhizomes, birds
<i>Juncus effusus</i> common rush	Y	N	N	E	Y	Y	N	2-4'	2-4'	YELLOW GREEN	SPRING SUMMER	L-M	OBL	w-m, tolerates some drought, inundation and standing water, best in constant moist soils, found in fresh or saltwater wet areas, spreads by rhizomes, erosion control, can be slow to establish, birds, wildlife
<i>Muhlenbergia capillaris</i> hairawn muhly	Y	Y	Y	SEMI to E	Y	Y	N	2-4'	3-4'	PINK PURPLE	SUMMER FALL	L-M Saltwater L-M Salt aerosol	FAC	d-m, tolerates a variety of soil types and moisture conditions, tolerates periodic flooding, moderate-high drought tolerant, but best in moist soils, erosion control, clumping, showy airy flowers, pollinators, birds, wildlife
<i>Panicum virgatum</i> switchgrass	Y	Y	Y	D	Y	N	N	2-6'	2-3'	GREEN BROWN	SUMMER FALL	L-M	FAC	w-d, flooding and drought tolerant, adapted to wide variety of soils and site conditions, erosion control, spreads by rhizomes, pollinators, birds, wildlife
<i>Schizachyrium scoparium</i> little bluestem	N	Y	Y	D	Y	Y	N	2-4'	1.5-2'	PURPLE BRONZE	SUMMER FALL	N-L	FACU	m-d, high drought tolerant, tolerates wide range of soil conditions, tolerates high heat and humidity, does not tolerate flooding salt or brackish water, salt wind may burn leaves, erosion control, spreads by rhizomes, pollinators, birds

GRASSES AND RUSHES (CONTINUED)

Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Sorghastrum nutans</i> Indiangrass	Y	Y	Y	D	Y	Y	N	3-5' (8)	1-2'	YELLOW	SUMMER FALL	N-L	FACU	m-d, tolerant of wide range of soil and water conditions, moderate drought tolerance, erosion control, blue-gray foliage, plume-like seed head, pollinators, birds, wildlife
<i>Sorghastrum secundum</i> lopsided Indiangrass	Y	Y	Y	D	Y	N	N	2-6'	1-2'	YELLOW	SUMMER FALL	L	FACU	m-d, high drought tolerance, typically 2-3' until flower, showy inflorescence, pollinators, birds, wildlife
<i>Spartina bakeri</i> sand cordgrass	Y	Y	Y	E	Y	N	N	3-6'	3-6'	BROWN	SPRING SUMMER FALL	L Saltwater M Salt aerosol	FACW	w-d, mainly inland brackish to freshwater wetlands but also found in dry conditions, tolerant to frequent standing water and occasional flooding but low tolerance to longer flooding by salt or brackish water, tolerant of short periods of drought, erosion control, spreads by rhizomes, defines borders and provides between wet and dry areas
<i>Tridens flavus</i> purpletop tridens	Y	Y	Y	E	Y	Y	N	2-5'	1-3'	YELLOW REDDISH PURPLE	SUMMER FALL	L	FACU	m-d, drought tolerant, leaves up to 2.5' followed by culms up to 6', reddish-purple seedheads, self seeds, pollinators, birds, wildlife
<i>Tripsacum dactyloides</i> Eastern gamagrass	Y	Y	Y	E	Y	Y	N	3-8'	2-6'	PURPLE ORANGE/MAROON	SPRING SUMMER	L	FAC	m, range of soil conditions, grows best on moist soils but does not tolerate standing water for long periods, some drought tolerance, spreads by rhizomes, pollinators, birds

FERNS														
Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Athyrium filix-femina</i> common ladyfern	N	Y	Y	D	N	Y	Y	1-3'	1-3'	N/A	N/A	N	FAC	m-w, groundcover, tolerant of dry conditions when grown in shade, not tolerant of flooding and inundation, also prefers filtered light, light finely textured fronds, not aggressive but can form small dense colonies, avoid placement in windy areas
<i>Osmunda cinnamomea</i> cinnamon fern	Y	Y	N	D	N	Y	Y	2-4' (6)	2-4'	N/A	N/A	N	FACW	m-w, groundcover, adaptable to wide variety of soil and light conditions, prefers dappled sunlight, does well under average garden conditions, may grow dormant with dry soils, cinnamon colored fibers, birds, wildlife
<i>Polystichum acrostichoides</i> Christmas fern	N	Y	Y	E	N	Y	Y	1-3'	1-3'	N/A	N/A	N	FACU	m-d, groundcover, highly adaptable, tolerates some drought, erosion control and bank stabilization, nonaggressive but forms dense neat clumps, dark green, birds, wildlife

HERBACEOUS FORBS/HERBS														
Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Amsonia tabernaemontana</i> eastern bluestar	Y	Y	Y	D	Y	Y	N	2-3'	2-3'	LIGHT BLUE	SPRING SUMMER	N	FACW	m, occasionally wet or dry, drought tolerant, neat compact form, multistemmed clumps, light green elongated leaves, attractive flower and pod-like fruits, pollinators, hummingbirds, LIMITED IN COASTAL DISTRIBUTION
<i>Asclepias incarnata</i> swamp milkweed	Y	Y	N	D	Y	N	N	2-5'	2-3'	PINK PURPLE WHITE	SUMMER	N-L	OBL	w-m, occasionally wet to moderately dry soils, occasional drought tolerant, showy fragrant flowers and attractive seed pods, narrow elongated leaves, pollinators, hummingbirds
<i>Asclepias perennis</i> aquatic milkweed	Y	Y	N	E	Y	Y	N	1.5-2'	0.5-1'	WHITE PINK	SPRING SUMMER	N	OBL	w-m, some drought and shade tolerance, small showy flower head, narrow and short leaves, pollinators
<i>Asclepias tuberosa</i> butterfly milkweed	N	Y	Y	D	Y	Y	N	1-3'	1-3'	ORANGE YELLOW	SPRING SUMMER	L-M Salt aerosol	N/A	m-d, performs well in poor, dry soils, drought tolerant, does not tolerate flooding or saturated soils, showy flowers and fruit pods, deep taproot makes transplanting difficult, pollinators

HERBACEOUS FORBS/HERBS (CONTINUED)

Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Baptisia alba</i> white wild indigo	N	Y	Y	D	Y	Y	N	2-4'	2-4'	WHITE	SPRING	N	FACU	m-d, drought tolerant, dark blue-gray stems, showy flowers and seed pods, slow growth, dies back to ground in winter, not easy to transfer once planted, pollinators, wildlife
<i>Borrichia frutescens</i> bushy seaside tansy	Y	Y	Y	E	Y	N	N	2-3'	2-3'	YELLOW	SPRING SUMMER FALL	M Saltwater H Salt aerosol	OBL	w-d, groundcover, subshrub found in sand dunes, salt and brackish marshes edges, tidal flats, tolerates periodic flooding, drought tolerant, rhizomes form colonies, bank stabilization, showy flowers, fleshy leaves, does not tolerate overwatering, pollinators, birds, wildlife
<i>Conoclinium</i> (<i>Eupatorium</i>) <i>coelestinum</i> blue mistflower	Y	Y	Y	D	Y	Y	N	2-3'	2-3'	BLUE PURPLE	SUMMER FALL	N	FAC	w-m, prefers full sun and moist soils, tolerates occasional flooding, fairly drought tolerant, adapts to typical garden conditions, showy flowers clusters, long bloomer, purple red stems, spreads by rhizomes, can be aggressive, pollinators, birds
<i>Eryngium aquaticum</i> rattlesnake master	Y	Y	N	E	Y	Y	N	1-4'	3-4'	BLUE GREEN WHITE	SUMMER FALL	N	OBL	w-m, tolerates frequent standing water, prefers wet soil but will tolerate dry, somewhat drought tolerant, erosion control, showy blue/gray prickly foliage and, round flower heads, clumping, pollinators, birds
<i>Eryngium yuccifolium</i> button eryngo	N	Y	Y	E	Y	Y	N	3-5'	1-3'	GREENISH WHITE	SPRING SUMMER FALL	N	FAC	m-d, occasionally dry, broad tolerance of soil and moisture conditions, somewhat drought tolerant, fragrant showy round headed flowers, stiff basal gray-green spiky leaves, clumping, difficult to transplant after planting, self seeds, well behaved, pollinators, birds
<i>Eupatorium perfoliatum</i> common boneset	Y	N	N	D	Y	Y	N	2-5'	3-4'	WHITE	SUMMER FALL	N	FACQ	w-m, tolerant to frequent standing water and occasional flooding, prefers constant moist soils but adapts well to average garden conditions, flat-topped clusters of fragrant flowers, long blooming periods, spreads via rhizomes to form small colonies, well behaved, pollinators, birds

HERBACEOUS FORBS/HERBS (CONTINUED)

Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Eupatorium rugosum</i> (<i>Ageratina altissima</i>) white snakeroot	N	Y	Y	D	Y	Y	Y	3-5'	2-4'	WHITE	SUMMER FALL	N	FACU	w-m, drought tolerant, tolerates dry soil but prefers part shade in moist soils, shade tolerance, showy terminal clusters of small flowers, prolonged blooming into late fall, spreads by rhizomes or more aggressively by seed, transplants difficult, clumping, pollinators, birds
<i>Eutrochium (Eupatorium) fistulosum</i> trumpetweed	Y	N	N	D	Y	Y	N	4-7'	2-4'	PINK PURPLE	SUMMER FALL	N	FACW	m, occasionally wet, can withstand occasional flooding, prefers consistently moist soils, large leaf whorls, rhizomes can form small colonies, hollow purple stems, showy fragrant large flowers, clumping, scanty distribution in coastal plain of Georgia, pollinators, birds
<i>Helianthus angustifolius</i> swamp sunflower	Y	Y	Y	D	Y	Y	N	3-8'	3-4'	YELLOW WITH PURPLE DISK	SUMMER FALL	L	FACW	w-m, occasionally wet, drought tolerant, will tolerate part shade but flowers best in full sun, showy daisy-like flowers, pollinators, birds, wildlife
<i>Heliopsis helianthoides</i> smooth oxeye	N	Y	Y	D	Y	Y	N	3-5'	1-3'	YELLOW WITH ORANGE DISK	SUMMER FALL	N	FACU	m-d, tolerates wide range of soil conditions but best in moist soils in full sun, drought tolerant, tolerates some shade, prolific long bloomer, showy flowers, robust and bushy, scanty coastal distribution, clumping, seeder, best in full sun, pollinators, birds
<i>Iris virginica</i> Virginia iris	Y	N	N	E	Y	Y	N	1-3'	1-3'	BLUE PURPLE YELLOW WHITE	SPRING	N	OBL	w-m, grows best in very wet soils in full sun, should not be allowed to dry out in growing season, tolerates having roots under water for protracted periods of time, part shade is preferred, can dry out slightly in shaded location, lovely delicate flower, spreads slowly by rhizomes
<i>Liatis spicata</i> dense blazing star	Y	Y	Y	D	Y	Y	N	2-5'	0.5-1.5'	PURPLE PINK	SUMMER FALL	N	FAC	w-m, remarkably adapted and easy to grow, prefers full sun and moist soil but tolerates part sun and poor soils, better adapted to moist or wet, brief inundation, drought tolerant, showy terminal spikes that bloom from top downward, clumping, basal tuft of grass-like foliage, pollinators, hummingbirds, songbirds

HERBACEOUS FORBS/HERBS (CONTINUED)

Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Lobelia cardinalis</i> cardinalflower	Y	N	N	D	Y	Y	N	2-5'	1-2'	SCARLET RED	SUMMER FALL	N	FACW	w-m, adaptable but soil cannot dry out for extended periods, prefers constant moisture, tolerates brief flooding, appreciates part afternoon shade in hot summer climates, striking red tubular flowers, individual flowers short lived but occur over long bloom period, clumping, pollinators, hummingbirds
<i>Phyla nodiflora</i> turkey tangle frogfruit	Y	Y	Y	E	Y	Y	N	1-6"	1-6"	WHITE PURPLE	SPRING SUMMER FALL	H	FAC	w-d, low growing groundcover, tolerates drought and flooding, heat tolerant, showy flowers, spreads vigorously, can be used as turf substitute in low traffic areas, pollinators
<i>Physostegia virginiana</i> obedient plant	Y	Y	Y	D	Y	Y	N	2-4'	2-3'	PINK PURPLE WHITE ROSE	SUMMER FALL	N	FACW	w-d, occasionally wet, easy to grow, highly adaptable, showy spikes of snapdragon-like flowers, long bloom time, spreads by rhizomes and seeds, can be aggressive in optimal conditions, shallow roots so can easily pulled to control spread if desired, clumping, pollinators, hummingbirds
<i>Pycnanthemum flexuosum</i> Appalachian mountainmint	Y	Y	Y	D	Y	Y	N	2-3'	3-4'	WHITE	SUMMER FALL	N	FACW	w-d, easy to grow, adaptable, tolerant of wet feet but can also handle drought, showy dense button-like flower clusters, profuse bloomer, aromatic foliage and flowers, clumping, non-aggressive, colonize slowly by underground runners, pollinators
<i>Rudbeckia fulgida</i> orange coneflower	Y	Y	Y	E	Y	Y	N	2-3'	1-2'	ORANGE YELLOW (BROWN CONE)	SUMMER FALL	L-N	FAC	m-d, prefer sunny location with moisture, drought tolerant, brief inundation, showy flowers, long bloomer, spreads by rhizomes, clumping, colonizing, pollinators, birds
<i>Salvia lyrata</i> lyreleaf sage	Y	Y	N	E	Y	Y	N	1-2'	0.5-1'	BLUE VIOLET	SPRING SUMMER	L-N	FACU	w-m, tolerates periodic flooding, some drought tolerance, prefers full sun but can tolerate light shade, colonizing, showy flowers, basal leaves, self seeds, pollinators, hummingbirds, birds
<i>Sisyrinchium angustifolium</i> narrowleaf blue-eyed grass	Y	Y	Y	SEMI to E	Y	Y	N	1.5-2'	0.5-1'	BLUE PURPLE	SPRING SUMMER	N	FACW	m, low groundcover, Iris family, tolerates inundation, somewhat drought tolerant, showy flowers, blue/green foliage, clumping, colonizing, pollinators

HERBACEOUS FORBS/HERBS (CONTINUED)

Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Solidago rugosa</i> wrinkleleaf goldenrod	Y	Y	Y	D	Y	Y	N	2-5'	1-3'	YELLOW	SUMMER FALL	U	FAC	w-m, saturated soils and upland, can adopt to drier conditions, showy flower with cascading stems, can develop into dense clumps, colonizing, late season color and bloom, is not responsible for hay fever (ragweed – Ambrosia), pollinators, birds
<i>Solidago sempervirens</i> seaside goldenrod	Y	Y	Y	E	Y	Y	N	2-4' (8)	1-2'	YELLOW	SUMMER FALL	M Saltwater M-H Salt aerosol	FACW	w-d, easy to grow and highly variable to extremes ranging from dry seaside sand dune to wet marshlands, prefers full sun, drought tolerant, performs well in poor soils, showy flowers, glossy green foliage, basal leaves, clumping, does not spread vegetatively but can be aggressive from seed, late season bloomer, pollinators, birds
<i>Stokesia laevis</i> Stoke's aster	Y	Y	N	E	Y	Y	N	1-2'	1-1.5'	BLUE LAVENDER	SPRING SUMMER	N	FAC	w-m, drought tolerant for short periods, prefers full sun, showy flowers, dark green basal leaves, self seeds, important to purchase local ecotype for successful establishment, pollinators
<i>Symphotrichum dumosum</i> rice button aster	Y	Y	Y	D	Y	Y	N	1-3'	1-3'	WHITE PINK PURPLE WITH YELLOW DISK	SUMMER FALL	N	FAC	w-d, adaptable to variety of growing conditions, drought tolerant, sandy open sites and occasionally marsh ground, showy small flower, profuse bloomer, spreads by suckers, late season bloomer, pollinators
<i>Symphotrichum lateriflorum</i> white woodland aster/ calico aster	Y	Y	Y	D	Y	Y	N	2-4'	1-3'	WHITE LAVENDER WITH YELLOW REDDISH PURPLE CENTER	SUMMER FALL	N	FAC	m-d, tolerates periodic flooding, tolerates light shade but best in full sun, drought tolerant, showy small flowers, profuse late season bloomer, low spreading form, pollinators
<i>Tradescantia ohiensis</i> bluejacket (Ohio spiderwort)	Y	Y	Y	E	Y	Y	N	2-3'	1-3'	BLUE PURPLE	SPRING SUMMER FALL	N	FAC	m-d, showy flower clusters, each flower blooms for a day, blue-green grass-like foliage, clumping, foliage tends to decline by late summer, reseeds and can be aggressive in optimal conditions, long bloomer, pollinators
<i>Vernonia angustifolia</i> (<i>Vernonanthura nudiflora</i>) tall ironweed	Y	Y	Y	D	Y	Y	Y	2-4'	2-4'	MAGENTA PURPLE	SUMMER	N	FACU	m-d, drought tolerant, tolerant to wet soil, easy to grow in full sun, showy flowers, spreads by seed, pollinators

PALMS														
Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Sabal minor</i> dwarf palmetto	Y	Y	Y	E	Y	Y	Y	2-8'	3-6'	WHITE YELLOW	SPRING SUMMER	M	FACW	m-d, fan-shaped small shrub, frequent standing water, tolerates shallowly inundated conditions, occasionally dry and wet, drought tolerant, provide plenty of water during establishment; afterwards is hardy through droughts although tips of leaves may turn brown, good accent plant for moist areas, showy and large blue-green leaves, fragrant flowers and blue-black fruit, cold hardy native palm, pollinators, birds, wildlife
<i>Serenoa repens</i> saw palmetto	Y	Y	Y	E	Y	Y	N	3-8' (15)	4-6' (10)	WHITE	SPRING SUMMER	L-M Saltwater L-M Salt aerosol	FACU	m-d, occasionally wet, tolerates short term inundation, drought tolerant, fan-shaped shrub with sharp teeth on stems, hurricane wind resistance, showy flowers and blue-black fruit, slow growth, pollinators, birds, bears, other wildlife

SHRUBS/SMALL TREES														
Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Agarista populifolia</i> Florida hobblebush	Y	Y	Y	E	Y	Y	Y	8-12'	6-8'	WHITE	SPRING SUMMER	N	FACW	m, occasionally wet, prefers partial shade, tolerates sun with adequate moisture, drought tolerant, suckers, erosion control, bank stabilization, showy fragrant flowers, arching form, limited coastal distribution, pollinators, birds
<i>Alnus serrulata</i> hazel alder	Y	N	N	D	Y	Y	N	6-20'	8-15'	BROWN/GOLD RED	WINTER SPRING	N	FACW	m-w, tolerates flooding and mucky soils, low drought tolerance, dioecious, multi-stemmed, suckers, pollinators, birds, wildlife
<i>Amelanchier arborea</i> common serviceberry	N	Y	Y	D	Y	Y	N	10-25'	10-15'	WHITE	SPRING	N	FACU	m, occasionally wet or dry, some drought, multi-stemmed, spreads by suckers, fragrant showy flowers, red-purple edible berries, pollinators, birds, wildlife
<i>Amorpha fruticosa</i> false indigo bush	Y	Y	Y	D	Y	Y	N	6-12'	6-10'	ORANGE VIOLET PURPLE BLUE	SPRING SUMMER	M	FACW	w-d, adaptable to wide range of dry to bog-like soil types and conditions, drought tolerant, bank stabilization, erosion control, spreads aggressively, showy fragrant spiked cluster of flowers, pollinators

SHRUBS/SMALL TREES (CONTINUED)

Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Aralia spinosa</i> devil's walkingstick	Y	Y	Y	D	Y	Y	N	10-15' (30')	6-10'	WHITE	SUMMER	M-H	FAC	m, tolerates seasonal flooding and drought, large leaves, spiny stems, spreads by suckers, shelter from strong winds, compact purple/black clustered fruit, pollinators, birds, wildlife
<i>Aronia (Photinia) arbutifolia</i> red chokeberry	Y	Y	N	D	Y	Y	Y	6-12'	3-6'	WHITE PINK	SPRING	L	FACW	w-d, tolerates wet or dry, low-moderate flooding tolerance, multistemmed, spreads by suckers, red/burgundy edible berries for birds and mammals, pollinators
<i>Baccharis halimifolia</i> eastern baccharis	Y	Y	Y	E	Y	Y	N	5-15'	5-7'	WHITE CREAM	FALL WINTER	M-H	FAC	w-d, dioecious, often multitrunked, drought tolerant, heat tolerant, withstands frequent standing water, white flowers in fall/winter become showy silver-white seedheads, fragrant, pollinators, birds, wildlife
<i>Callicarpa americana</i> American beautyberry	Y	Y	Y	D	Y	Y	N	3-8'	3-8'	PINK WHITE	SPRING SUMMER	N-L	FACU	m-d, occasional flooding and wet soils, drought tolerant, hurricane wind resistance, small delicate flowers, showy purple fall berries, pollinators, birds, wildlife
<i>Carpinus caroliniana</i> American hornbeam	Y	Y	N	D	N	Y	Y	20-35'	15-20'	GREEN	SPRING	L	FAC	m, occasionally wet, tolerates full sun if soil is moist, tolerates irregular inundation, multi-stemmed, can sucker, some drought tolerance, unique bark, high wildlife value, pollinators, birds, wildlife
<i>Cephalanthus occidentalis</i> common buttonbush	Y	Y	N	D	Y	Y	N	3-8'	3-6'	WHITE	SUMMER	L	OBL	m-w, attractive fragrant flower buttons, moist to flooded soil, drought tolerant, butterflies, pollinators, hummingbirds
<i>Cercis canadensis</i> eastern redbud	Y	Y	Y	D	IF SOIL IS MOIST	Y	Y	15-30'	20-25'	PURPLE PINK	SPRING	L	UPL	m-d, tolerates sun if soil is moist, tolerates irregular inundation (low flooding), drought tolerant, attractive spring flowers prior to leafing, pollinators, birds
<i>Chionanthus virginicus</i> white fringetree	Y	Y	Y	D	Y	Y	N	10-20'	8-20'	WHITE	SPRING	L	FACU	m-d, occasionally dry, tolerant of irregular inundation and wet soils, moderate drought tolerance, dioecious, single or multi-stemmed, fragrant, showy flowers, blue fruit, pollinators, birds, wildlife
<i>Clethra alnifolia</i> coastal sweetpepperbush	Y	N	N	D	Y	Y	Y	4-10'	2-6'	WHITE PINK	SUMMER	L-M	FACW	w-m, low drought tolerance, multi-stemmed, terminal spikes with fragrant flowers, late to leaf out in spring, avoid hot dry sites, brown fruits, spreads by suckers, pollinators, hummingbirds

SHRUBS/SMALL TREES (CONTINUED)

Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Euonymus americanus</i> bursting-heart	Y	Y	Y	D	N	Y	Y	3-6'	3-4'	YELLOW GREEN	SUMMER	N	FAC	w-m, subshrub, multistemmed, tolerates both drought and wet soils to a degree, purple with scarlet seed fruits, birds
<i>Hamamelis virginiana</i> American witchhazel	Y	Y	Y	D	Y	Y	N	15-30'	15-25'	YELLOW	FALL WINTER	N	FACU	m-d, tolerates irregular flooding or dry sites, low-moderate drought tolerance, showy fragrant fall/winter flowers, long bloom, multi-stemmed, remove suckers to prevent colonial spread, pollinators birds, wildlife
<i>Hibiscus moscheutos</i> crimson-eyed rosemallow	Y	N	N	D	Y	Y	N	3-7'	2-4'	WHITE PINK WITH RED CENTER	SUMMER FALL	L-M	OBL	w-m, both a forb/herb and subshrub. Commonly associated with wetlands, salt marshes, stream banks, freshwater swamps, adapted to "wet feet" but does well under average garden conditions provided soil is not allowed to dry out for extended periods, best in full sun, considered either a woody perennial or small shrub, showy large flower, multi-stemmed, large gray-green foliage, not drought tolerant, pollinators, hummingbirds
<i>Ilex decidua</i> possumhaw	Y	Y	N	D	Y	Y	N	7-15'	5-12'	WHITE	SPRING	N-L	FACW	m, occasionally dry or wet, tolerates extended flooding, heat tolerant, mostly dioecious, orange/red berries, butterflies, native pollinators, birds, wildlife
<i>Ilex glabra</i> inkberry	Y	Y	N	E	Y	Y	N	4-10'	5-8'	WHITE GREEN	SUMMER	L-M Saltwater L-M Salt aerosol	FACW	w-m, tolerates some flooding, can tolerate wet soils and short periods of drought when established, dioecious, slow growing, spreads by suckers, black fruit on females, butterflies, native bees, birds, wildlife
<i>Ilex vomitoria</i> yaupon	Y	Y	Y	E	Y	Y	Y	8-20'	5-10'	WHITE YELLOW GREEN	SPRING	H	FAC	w-d, dioecious, red fruit on females, spreads by suckers, tolerates flooded conditions for extended periods of time, hurricane wind resistance, butterflies, native bees, birds, mammals
<i>Itea virginica</i> Virginia sweetspire	Y	Y	Y	D	Y	Y	N	3-8'	3-6'	WHITE	SPRING SUMMER	L-N	FACW	w-d, prefers dappled sunlight, tolerates flooding to 6 inches, frequent standing water, occasionally wet, drought tolerant, fragrant tiny flowers, spreads by suckers, pollinators, birds

SHRUBS/SMALL TREES (CONTINUED)

Scientific Name Common Name	Hydric Zone			D or E	Sun Exposure			Mature Size		Bloom Color	Bloom Time	Salt Tolerant	Wetland Indicator	Plant Characteristics
	1	2	3		Sun	Partial	Shade	Height	Width					
<i>Morella cerifera</i> (<i>Myrica cerifera</i>) wax myrtle	Y	Y	Y	E	Y	Y	N	6-15'	8-10'	WHITE GREEN	WINTER SPRING	L-M Saltwater M-H Salt aerosol	FAC	w-d, multitrunked, dioecious, fragrant leaves and berries, blue berries, tolerant of short periods of drought and flooding once established, hurricane wind resistance, pollinators, birds, wildlife
<i>Osmanthus americanus</i> (<i>Cartrema americana</i>) devilwood	Y	Y	Y	E	Y	Y	N	15-20' (35)	10-20'	WHITE	SPRING	L-M Saltwater L-M Salt aerosol	FAC	m-d, occasionally dry, drought tolerant, tolerates infrequent flooding, multitrunked, dioecious, fragrant, blue fruit, pollinators, birds, wildlife
<i>Rhododendron viscosum</i> swamp azalea	Y	N	N	D or E	N	Y	N	2-8'	3-8'	WHITE PINK	SPRING SUMMER	N	OBL	w-m, fragrant, occasionally wet, some drought tolerance, tolerates periodic flooding but will not grow in soils where roots are submerged in water, roots must not be allowed to dry out, prefers dappled light, pollinators, hummingbirds
<i>Rosa palustris</i> swamp rose	Y	N	N	D	Y	Y	N	4-8'	3-6'	PINK	SPRING SUMMER	N	OBL	w-m, subshrub, tolerates some seasonal flooding but will not grow in standing water, prickly red stems, fragrant, red hips, spreads by suckers, can be aggressive in optimal conditions, pollinators, birds, wildlife
<i>Sambucus nigra</i> ssp. <i>canadensis</i> American black elderberry	Y	Y	Y	D	Y	Y	N	6-15'	6-12'	WHITE	SPRING SUMMER FALL	L-M	FACW	w-d, tolerates wide range of soils, multistemmed, resistant to heat and drought, occasionally wet, moderate salt wind tolerance, does not tolerate long-term flooding by salt or brackish water, showy clustered fragrant flowers, edible purple/black drupes, suckers, pollinators, hummingbirds, songbirds, wildlife
<i>Vaccinium corymbosum</i> highbush blueberry	Y	Y	Y	D	Y	Y	N	6-15'	4-8'	WHITE PINK	SPRING	L-M	FACW	w-m, tolerates wet soil, multistemmed, showy flowers, edible purple berries, pollinators, birds, wildlife
<i>Viburnum dentatum</i> southern arrowwood	Y	Y	Y	D	Y	Y	N	5-10'	5-10'	WHITE	SPRING	N	FAC	w-d, tolerates shallow to moderate inundation, multistemmed, edible bluish-black fruit, pollinators, birds, wildlife
<i>Viburnum nudum</i> possumhaw	Y	Y	Y	D	Y	Y	Y	5-18'	4-12'	WHITE	SPRING SUMMER	N	FACW	w-d, occasionally wet, resistant to heat, drought and soil compaction, showy fragrant clustered blooms, showy edible blue-purple--black drupe fruits, pollinators, birds, wildlife

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