



# **Wrightsville Beach Stormwater Design Manual**

**Part II – Homeowner’s Manual  
Wrightsville Beach Stormwater Services**



**July 2007**

# Acknowledgment

This design manual was developed by

**Steve Dellies**  
**Stormwater Manager**  
**Town of Wrightsville Beach**

This manual would not have been possible without the assistance and use of materials provided by the following individuals and organizations:

**Jennifer D. Butler**, Wilmington Stormwater Services, City of Wilmington

**Charlotte Glen**, NC Cooperative Extension, Pender County Center

**Diana Rashash**, NC Cooperative Extension, Onslow County Center

**Clemson University Website**

**New Hanover County Website**

**NC Clean Water Website**

Their assistance in producing this manual is greatly appreciated!

*This document was produced with funds provided by the National Oceanic and Atmospheric Administration through a grant to the Coastal Nonpoint Source Program administered jointly by the N.C. Department of Environment and Natural Resources divisions of Coastal Management and Water Quality (Award # S06123)*

## Table of Contents

Section 1 – Introduction.....	1
Section 2 – Household Environmental Hazards .....	5
Section 3 – Household Recycling.....	9
Recycling.....	9
Recyclable Items.....	9
Recycling Facts:.....	9
Where to Recycle.....	11
Section 4 – Vehicle Care.....	14
Vehicle Maintenance .....	14
Vehicle Washing.....	14
Drive less .....	14
Section 5 – Lawn And Garden Care .....	15
Lawn Care.....	15
Lawn Care Tips.....	16
Irrigating .....	17
Use of Fertilizers.....	19
Use of Pesticides.....	21
Ways to Help Eliminate Garden Weeds .....	22
Landscaping.....	23
Appendix A - Recommended Landscape Plants.....	A-1
Recommended Plants for New Hanover County Landscapes .....	A-1
Groundcovers.....	A-4
Annuals .....	A-6
Perennials.....	A-9
Small Shrubs – 2’ To 4’ Tall.....	A-16
Medium Shrubs – 4’ To 8’ Tall .....	A-18
Large Shrubs – Over 8’ Tall .....	A-21
Small Trees – 10’ To 30’ Tall.....	A-23
Large Trees – Over 30’ Tall.....	A-26
Hardy Palms.....	A-28
Ornamental Grasses .....	A-30
Turf Grasses .....	A-31
Vines .....	A-33
Salt Tolerant Plants.....	A-35
Groundcovers.....	A-38
Salt Tolerant Annuals .....	A-39
Perennials.....	A-40
Shrubs .....	A-43
Small Trees, 10’ – 30’ Tall .....	A-46
Large trees, over 30’ .....	A-48
Palms.....	A-49

Ornamental Grasses .....	A-50
Turf Grasses .....	A-51
Vines .....	A-52
Appendix B – Rain Barrel.....	B-1
Appendix C – How to Build a Rain Garden .....	C-1
Appendix D – Glossary.....	D-1

## Section 1 – Introduction

**Reason for Implementing the Program.** The Wrightsville Beach Stormwater Program has been implemented to meet the requirements of the Town’s Stormwater Permit which was issued through the State of North Carolina Department of Environment and Natural Resources (DENR), Division of Water Quality (DWQ). This permit is required under both State and Federal law.

**Purpose of the Program.** The most important purpose of the stormwater program is to assist in maintaining and improving the quality of the water surrounding the Town. This is accomplished primarily by treating stormwater runoff.

### Stormwater Runoff.

Stormwater runoff occurs when rain water flows over the ground, rather than soaking into the ground. Rain water normally follows one of four paths:

1. It soaks into porous ground surfaces and becomes part of the groundwater, which feeds streams and wetlands and supplies much of our drinking water;
2. It remains in waterbodies or topsoil and eventually evaporates;
3. It is absorbed by vegetation and then transpires (evaporates from the plant tissues);  
or
4. It forms streams and rivers that eventually empty to the ocean.



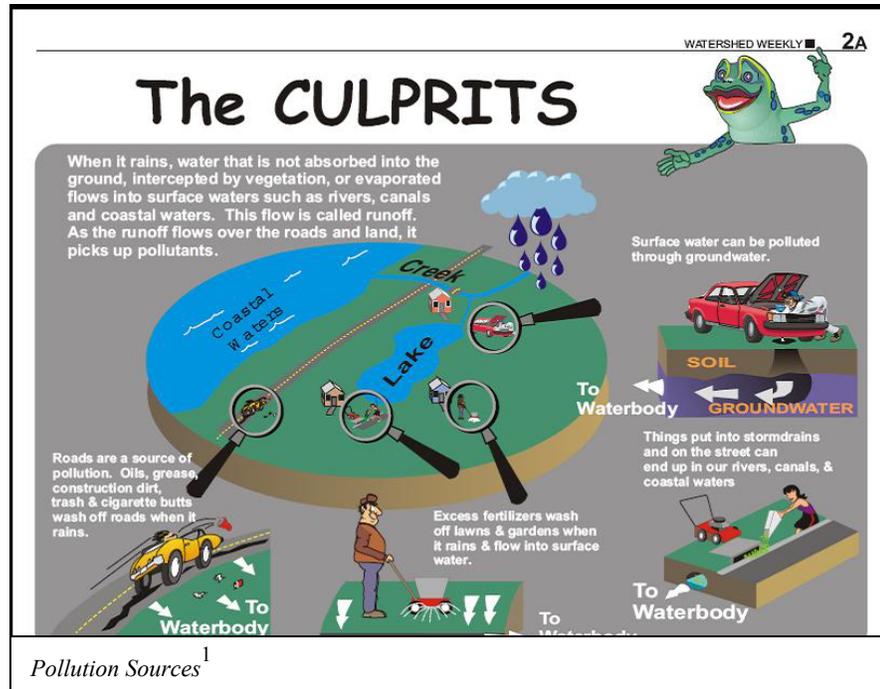
When rain is prevented from infiltrating the ground, it becomes an unfiltered water flow that reaches the channels, streams, sounds and the ocean by means of flowing across impervious surfaces. These surfaces include roads, parking lots, driveways, and roofs.

Runoff can have adverse effects on the quality of local waterways because the runoff mixes with and carries sediments, debris, chemicals, pet wastes, road salts, and other pollutants.

Sediments can make water cloudy, destroy fish habitat, and carry nutrients that cause algae blooms and extreme growth in aquatic plants. Animal wastes carried along in the runoff contains pathogens that cause disease. Debris such as plastic bags, six-pack rings, bottles and cigarette butts can choke or

disable ducks, fish, turtles, and birds. Lawn chemicals can be washed into surrounding bodies of water resulting in elevated levels of nitrogen and phosphorus. This increase in nitrogen and phosphorus causes excess plant growth. In addition to the negative effects on water quality, severe runoff can also cause soil erosion and property loss. Controlling runoff pollutants at the source is vital to keeping our water clean. It is the intent of this manual to provide easy to implement ways for homeowners to help reduce stormwater runoff and pollution.<sup>1</sup>

**Watershed.** A watershed is the surrounding land area that drains into a stream or river. Watersheds contain the homes, neighborhoods,



Pollution Sources<sup>1</sup>



<sup>1</sup> City of Brunswick, Ga Stormwater Management. Retrieved June 1, 2007 from: <http://images.google.com/imgres?imgurl=http://www.brunswickga.org/pw/images/Culprits.jpg&imgrefurl=http://www.brunswickga.org/pw/StormwaterManagement.htm&h=631&w=818&sz=81&hl=en&start=5&tbid=hNIITIZdvFYtM:&tbnh=111&tbnw=144&prev=/images%3Fq%3Dstormwater%2Brunoff%26gbv%3D2%26ndsp%3D21%26svnum%3D10%26hl%3Den%26sa%3DN>

cities, forests and farmland. The map at the right shows the watersheds that affect the water quality in the Wrightsville Beach area. More detailed maps of these watersheds can be viewed through the City of Wilmington Stormwater Services' website.<sup>2</sup>

**Water Quantity Concerns.** An essential part of stormwater management is attempting to prevent water from leaving individual properties, or at least slowing its flow as much as possible. Many home lawns are sloped to encourage water to run off onto neighboring property or streets. The stormwater program is intended to help minimize runoff caused by the increase in impervious surface area by requiring property owners to retain the additional water in a stormwater system, or Best Management Practice (BMP).

**Impervious Surface.** Impervious surfaces are hard surfaces, such as sidewalks, streets, driveways and rooftops, that don't allow water to seep into the ground. Water that does not soak into the ground becomes runoff and travels to the nearest body of water. As the amount of impervious surfaces increases, more runoff is created and less water is able to sink in, or "infiltrate," into the ground. Infiltration is very important because shallow groundwater recharge of the coastal waterways sustains their flow through dry weather, which helps preserve aquatic life. Water that travels slowly through the ground also gets filtered by natural processes before it reaches the water body.

Water that travels too quickly to creeks and streams can pick up and carry a lot more sediment and other pollutants. It also hits channels and streams in a rush, which worsens erosion and flooding.

**Storm Drains.** Storm drains (like those found along curbs) do not go to wastewater treatment plants. Water entering storm drains flows untreated into streams, channels, wetlands, sounds and ocean. On its way to our waterways, stormwater picks up and carries numerous types of pollutants. Many of these pollutants can cause health and environmental problems, even in very small amounts. Stormwater runoff can contain a variety of pollutants and come from many sources that are difficult to identify. Thus, it is called non-point source pollution.



**Types of Pollution.** In our area, sediment is the number-one pollutant. Sediment comes from anywhere soil is disturbed and is allowed to enter waterways. When suspended in the water, it clouds water and suffocates aquatic life. When it settles out of water, it destroys habitats for aquatic populations by smothering shellfish areas and reducing water depths.

---

<sup>2</sup> City of Wilmington Stormwater Services web site:  
<http://www.ci.wilmington.nc.us/watershed/tabid/97/Default.aspx>

Another form of pollution is fertilizers used around the home. Fertilizers contain nitrogen and phosphorus, which promote algae growth. Excess algae growth, or “blooms”, produce oxygen during the day; however, they consume oxygen during the night. This lack of oxygen is one of the primary causes of fish kills in some North Carolina rivers.

Other pollutants include bacteria, parasites and metals. While pesticides and metals are toxic to fish and other aquatic life, bacteria can make nearby lakes and bays unsafe for recreational use and have caused many waters to be closed to shellfish harvesting.

### **WAYS TO HELP CONTROL STORMWATER POLLUTION**

---

- Stabilize areas of bare soil with vegetation as soon as possible after grading.
- Plant more trees and shrubs - they capture and hold a lot of rain before it reaches the ground. Wherever possible, keep existing trees and bushes and plant more.
- Direct the stormwater runoff over lawns whenever possible.
- Collect roof water with a rain barrel. Use the collected water for the garden.
- Clean up pet wastes. Runoff can carry wastes into lakes and streams. The best method to dispose of pet waste is to bury it at least 5 inches below the surface. Waste can also be disposed of by collecting it in a plastic bag and placing the bag in the trash. (However, this method contributes to the amount of plastics in the area landfills.) In-ground pet waste composters are also commercially available.



Report pollution in storm drains. If you see suds, oil sheen, grease or excess sediment in a storm drain, call the Stormwater Manager or the Public Works Department at 256-7935

## Section 2 – Household Environmental Hazards

People do not realize that many common products used around the home contain ingredients that can pose a threat to human health or the environment if not handled properly. For example, vapors from items such as paint thinner and solvents can be hazardous to breathe. Motor oil and pesticides, if disposed of on the ground, can adversely impact nearby surface and ground water. Even everyday personal care products like nail polish and remover, spot removers, moth balls, shoe polish, and some medicines produce potentially hazardous wastes when leftovers are discarded.

Unlike most forms of hazardous waste, household wastes are not regulated by law. However, since they often contain the same chemicals as industrial hazardous waste, care must be exercised when handling these products. Most chemicals likely to cause environmental problems are regulated by federal law, but it's difficult to keep track of the small quantities used by homeowners. We all need to do our part to minimize the impact of the use and disposal of hazardous household products. Some cleanup or disposal practices may seem safe, but even old habits should be examined for potential risks.



**Household Hazardous Items.** Household hazardous waste items include such things as: non-empty aerosol cans, solvent-based cleaners, acetone, batteries, household drain cleaners, acids/bases, batteries, floor care products, antifreeze, fungicides, hair removers, auto starter fluid, furniture polishes, nail polishes and removers, automobile repair products, insect sprays, oven cleaners, brake fluid/motor oils/trans. fluid, mercury thermometers, car batteries, mercury thermostats, car waxes, metal polish (solvent-based), contact cement, mothballs, driveway sealers, pesticides, fiberglass epoxy, pool chemicals, gasoline and other fuels, rat poisons, glue (solvent based), shoe polishes, lighter fluid, spot removers, paint (all types), strippers, thinners, weed killers, parts cleaner, photo chemicals, shellac/stains/turpentine/varnish, and wood filler/wood preservatives

New Hanover County accepts some hazardous household waste at their WASTEC facility (see map below). (The County also conducts an annual household hazardous waste collection day, normally in the fall.) It is recommended to call them in advance (910-798-4411) to ensure they accept specific items for disposal. To prepare these items for disposal, each item should be kept in its original container. If the item is not in its original container, the item must be labeled. When preparing items for disposal, never mix two household chemicals in the same container. To transport these items, put the containers in a cardboard box lined with newspaper to prevent the materials from spilling into the vehicle.

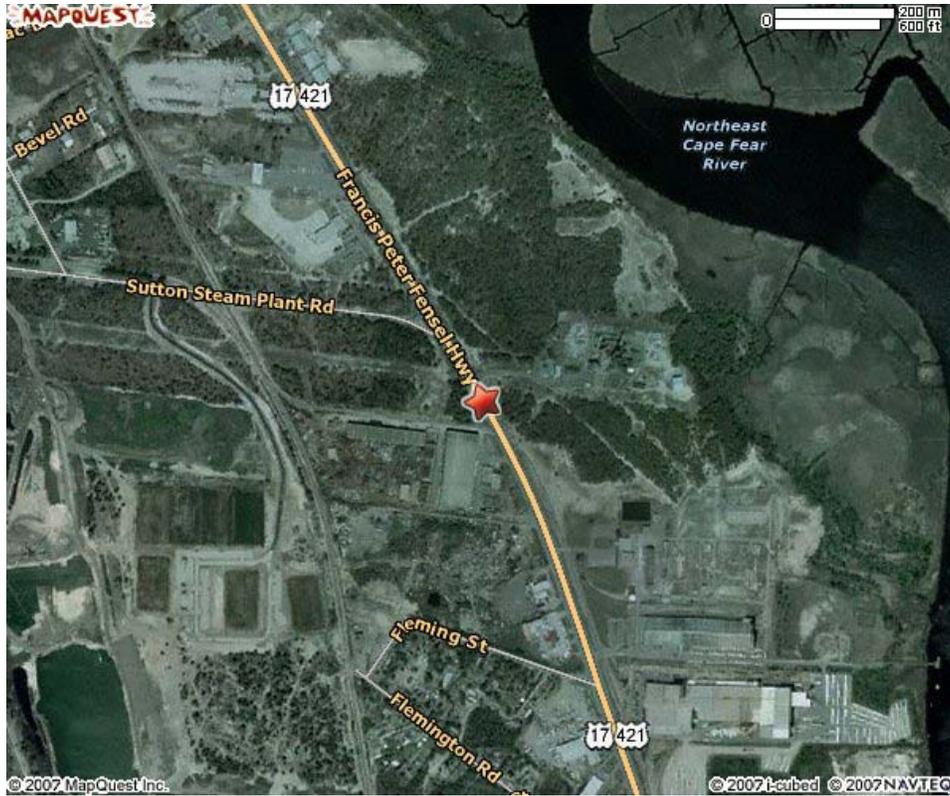
**Other Trash Items.** In addition to the above hazardous items, there are other items around the house that contribute to pollution. Some items include:

- **Drywall/Concrete.** Dispose of drywall, concrete, and mortar in the trash. Do not rinse concrete or mortar into storm drains or ditches. Project debris should be swept up and bagged like garbage.
- **Pet Waste.** Pick up pet waste and dispose of it in the trash or bury it. Pet wastes contribute nutrients, parasites, and bacteria to stormwater runoff.
- **Cooking Oil/Grease.** Take used cooking oil and grease to a household hazardous waste collection site or dispose of it with trash. Do not pour oil or grease down the sink, toilet, or into a storm drain.

### **Directions To New Hanover County WASTEC Facility**



**Directions from New Hanover County** - Follow US421 N for approximately 3 miles beyond the Cape Fear River after crossing either the Isabel S Holmes Bridge or the Cape Fear Memorial Bridge. The New Hanover County Environmental Management WASTEC is located on the right.



WASTEC Map

## WAYS TO HELP PROTECT THE ENVIRONMENT

---

### Avoid:

- Dumping oils, paints, pesticides or any other household chemicals on the ground, on roads or down storm sewers.
- Dumping products in a wetland, stream or any other body of water
- Washing chemicals off the driveway with a hose.
- Sharing any leftover cleaning products with a neighbor.

### Do:

- Reduce or eliminate the use of these chemicals whenever possible; consider using non-hazardous alternatives.
- Check to see if WASTEC will accept the material (910) 798-4411.
- Find out New Hanover County is planning their next hazardous waste collection event.

- Beware of terms on labels that are vague and possibly misleading. The Federal Trade Commission has provided manufacturers with guidelines about terms such as "ozone safe" or "environmental friendly", but the use of such terms is not regulated on a product except pesticides.
- If you need more information about a product than is provided by the label, you may want to request a Material Safety Data Sheet (MSDS) from the manufacturer or consult a Poison Control Center. Most manufacturers provide a phone number on their product label and are willing to answer questions by phone.
- If you're not sure whether a particular household waste is a hazardous or if you need other information, contact New Hanover County Department of Environmental Management (798-4400), the New Hanover County Environmental Health Department (798-6667) or county NC Cooperative Extension office.



Report pollution in storm drains. If you see suds, oil sheen, grease or excess sediment in a storm drain, call the Stormwater Manager or the Public Works Department at 256-7935

## Section 3 – Household Recycling

---

### RECYCLING.

---

Recycling is the process of taking a product or material at the end of its useful life and turning it into a usable raw material to make another product. By recycling, fewer items end up in the local landfills and waterways.

### RECYCLABLE ITEMS.

---

Items that can be recycled include:

- Aluminum beverage containers
- Brochures- junk mail-paper bags
- Cardboard boxes {must flatten}
- Catalogues {less than 2” thick}
- Cereal & food boxes
- File folders
- Glass bottles & jars
- HDPE plastics which are identified with #2 on the container bottom
- Magazines
- Newspaper
- PETE plastics which are identified with #1 on the container bottom
- Phone books- soft cover books
- White – colored & computer paper



### RECYCLING FACTS:

---

#### **Paper (all grades, including newspaper, cardboard and office paper)<sup>3</sup>:**

- Recycling one ton (2,000 lbs.) of paper can save: 17 trees; 6,953 gallons of water; 463 gallons of oil; 587 pounds of air pollution; 3.06 cubic yards of landfill space and 4,077 Kilowatt hours of energy.
- 80% of U.S. papermakers use some recovered fiber in manufacturing, and nearly 200 mills use ONLY recovered paper for their fiber.
- The average American uses 650 lbs. of paper per year.
- 100 million tons of wood could be saved each year if all that paper was actually recycled!

---

<sup>3</sup> Sources: American Forest & Paper Association, Inc.; Institute Of Scrap Recycling Industries; Massachusetts Institute Of Technology; Weyerhaeuser

#### Plastic<sup>4</sup>:

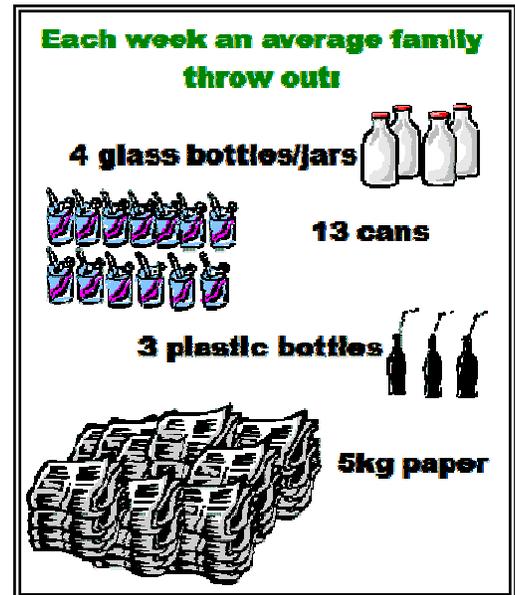
- Americans go through 2.5 million plastic bottles every hour.
- Since 1978, the weight of a soda bottle has been reduced by 29%.
- Recycling a ton of PET saves 7.4 cubic yards of landfill space.
- Half of all polyester carpet manufactured in the US is made from recycled soda bottles.
- Recycled plastic is also made into plastic lumber, clothing, flower pots, insulation for sleeping bags & ski jackets, car bumpers and more.

#### Aluminum<sup>5</sup>:

- 100% of all beverage cans are made from aluminum. Aluminum cans made their first appearance in America in 1953.
- We use about 392 cans per person per year.
- Aluminum cans typically have a recycled aluminum content of about 55%.
- 62.8 billion or 63.5 % of aluminum cans are recycled annually.
- Recycling aluminum saves about 95% of the energy it would take to produce aluminum from its original source, bauxite.
- Recycling one aluminum can saves enough electricity to run a TV for three hours.
- Aluminum recycling is so efficient that it can take as few as 60 days for a can to be collected, melted down and made into a new can sitting on a grocery store shelf.
- Recycled aluminum is made into cans, pie pans, house siding, small appliances, lawn furniture; in fact , almost everything aluminum.

#### Steel<sup>6</sup>:

- The average American uses 142 steel cans annually.
- The steel packaging recycled in 2000 would yield enough steel to build 185,000 steel framed homes - the equivalent number of homes in Wyoming.
- Recycling just one car saves 2,500 pounds of iron ore, 1,400 pounds of coal and 120 pounds of limestone.
- 95% of scrap automobiles were recycled in 2000 in the US, at a rate of 25 cars every minute.
- Through recycling each year, the steel industry saves enough energy to power 18 million homes - one-fifth of the households in the US.
- Recycled steel is made into steel cans, building materials, tools - in fact, almost everything steel.



<sup>4</sup> Sources: American Plastics Council, Environmental Defense, NAPCOR

<sup>5</sup> Sources: The Aluminum Association, Inc.; National Soft Drink Association

<sup>6</sup> Sources: Steel Recycling Institute; Environmental Protection Agency

## WHERE TO RECYCLE.

---

Recyclable products can be deposited at the Town's recycling center located in front of Town Hall.



---

## IN THE COUNTY<sup>7</sup>

### Recyclable Items Accepted

- Newspaper
- Rechargeable Household Batteries
- Cardboard
- Glass Food & Beverage Bottles
- Aluminum Cans
- Plastic Bottles (#1 PETE & #2 HDPE plastics)
- Mixed Paper (see description below under City of Wilmington)

---

<sup>7</sup> Information in this section was obtained from the New Hanover County website on June 25, 2007 at: <http://www.nhcgov.com/AgnAndDpt/ENVM/Pages/Recycling.aspx>

## **Drop-Off Locations For New Hanover County**

- Market Street/Highway 17 at Blair School Road
- Castle Hayne Road/117 behind Hardees
- Murrayville Road & North College at Lowes Foods
- Moose Lodge 343 - 1 mile north of Monkey Junction on Carolina Beach Road
- NHC WASTE: 3002 Highway 421 North
- NHC Landfill: 5210 Highway 421 North (Mon - Fri 7 am - 5 pm, Sat 8 am - 11:45 am)

## **Drop Off Locations For Other Items**

### **Appliances, Automotive Batteries, Motor Oil, Antifreeze, Tires, Corrugated Cardboard, Household Batteries, Paint, Metal, Drywall, & Wood**

New Hanover County Landfill 5210 US Highway 421 North 910/798-4451

### **Aluminum Cans, Aluminum Foil, Newspaper, Brass, Scrap Aluminum, Copper (3 grades), & Baled Cardboard, Radiators**

Cape Fear Recyclers 728 Surry Street 763-7805

### **Electronic Waste (computers, televisions)**

Southeast Response & Remediation 4920 US Hwy 421 North 763-6274

Household Hazardous Waste Collection Days - call County at 910/798-4400 for details

### **Cell Phones**

Cape Fear River Watch 617 Surry Street 762-5606

Visit [www.call2recycle.org](http://www.call2recycle.org).

### **Waste Oil & Vehicle Batteries**

Advance Auto Parts 5335 Market Street, Wilm., NC 28405 799-2288

Advance Auto Parts 2318 Carolina Beach Rd, Wilm., NC 28401 762-5080

Advance Auto Parts 11 S. Kerr Avenue, Wilmington, NC 28403 392-9861

Advance Auto Parts 208 Village Road, Leland, NC 28451 371-0113

Advance Auto Parts 5206 Carolina Beach Rd, Wilm., NC 28401 799-1932

\*Auto Zone 5208 Market Street, Wilmington, NC 28405 392-9244

\*Auto Zone 2348 Carolina Beach Rd, Wilm., NC 28401 251-1700

\*(Auto Zone will only accept used batteries from customers who purchase batteries from them.)

Office Paper (no gloss), Corrugated Cardboard, Aluminum, & Plastic

\*May also pick-up office paper for a fee.

Coastal Enterprises 1214 Kidder Dr, Wilmington, NC 28401 763-3424

### **Yard Waste (the following companies accept yard waste for a fee)**

- Diversified Biomass 793-1460 (606 Sunnyvale Dr., Wilmington, NC)
- Big Cypress 392-1099 (1336 Lt. Congleton Rd., Wilmington, NC)

- Blue Horizon 343-9696 (2829 North Kerr Ave., Wilmington, NC)
- Wilmington Materials 763-4569 (Sutton Steam Plant Rd., Wilmington, NC)

**Construction Materials, Furniture, Housewares, & Toys**

\*Accepts Only UNOPENED, UNUSED Paint

Habitat Home Store 1515 S. Front St., Wilmington, NC 28401 762-4744

**Toner & Ink Jet Cartridges**

Cartridge World of Wilmington, 4512 Oleander Drive, Wilmington, NC 28403, 784-9534

**Bicycles in Good Condition (to be refurbished for charitable redistribution.)**

Two-Wheeler Dealer 4408 Wrightsville Ave., Wilmington, NC 28403 799-6444

## SECTION 4 – VEHICLE CARE

---

Motor vehicles are a major source of pollution for the area waters. Antifreeze and oil from cars accumulate on driveways and road surfaces, which is then washed into the surrounding water bodies during rainfall events. Personal car care habits can also affect water quality. Fortunately, there are many things that can be done to prevent automobiles from being a source of water pollution.

### VEHICLE MAINTENANCE

---

- Routinely check vehicles for leaks and keep them tuned up.
- Never pour automobile fluids down a storm drain or onto the ground.
- Don't leave chemicals or fluids out in the open or where they can get wet.
- Contain fluid spills with rags or kitty litter.
- Dispose of spills and used fluids at hazardous waste collection sites.
- Used oil and oil filters can be recycled at local hazardous waste collection sites and many auto parts stores for free. Antifreeze can be disposed of at the New Hanover County Landfill.



### VEHICLE WASHING

---

- Wash vehicles only when needed and never during a water shortage.
- Take vehicles to a commercial wash where the water is recycled, reused, and/or treated.
- When washing vehicles at home, use a hose with a shutoff nozzle and use detergents sparingly. Wash on a lawn or where the runoff goes to a vegetated area. Use biodegradable, phosphate-free detergents.



### DRIVE LESS

---

- Join a carpool, walk, use public transportation, or ride a bike. Cars give off exhaust, particles, and fluids that become water pollutants when they reach waterways.

## Section 5 – Lawn And Garden Care

There are a number of simple, everyday things that homeowners can do in the yard which can help reduce the amount of stormwater pollution that enters our waters. Many of these activities will also aid in reducing air pollution and assist with water conservation. Some general outdoor home maintenance measures include:

- Sweeping up yard debris from the driveway instead of hosing it down.
- Picking up litter around the yard to prevent it from entering into the storm drains.
- Draining swimming pools only when chlorine levels are low or undetectable by a swimming pool test kit.
- Directing water from your home's downspouts to vegetated areas, or collecting rainwater in a rain barrel. (See Appendix X for instructions on making a rain barrel)



In addition to these general rule, the following paragraphs provide more extensive ideas on ways to reduce stormwater pollution when working in the yard or garden.

### Lawn Care

It is possible to have low-maintenance lawn without losing the well kept appearance of your home. Good management practices can benefit the environment and save the homeowner time and money. It will be easier to keep your lawn healthy if the type of grass is suited to local growing conditions, which include rainfall amount, temperature, soil type and available height. Contact your local Cooperative Extension office or use the references in the appendix for a list of recommended grasses for your region.



In general:

- Don't leave grass clippings or other yard waste along curbs or ditches.
- Do not blow or sweep debris into streets or storm drains

- Don't over-water your lawn. Water during the cooler times of day to minimize evaporation. Turn off automatic sprinklers for a couple of days if it rains. (See the Irrigation section below)
- Test soils before fertilizing lawns. The NC Dept. of Agriculture and Consumer Services will test soil samples for free. (See the Use of Fertilizer section below)

## LAWN CARE TIPS

**Cut your grass to the proper height.** One of the easiest ways to help reduce stormwater pollution is by mowing the lawn to the proper height. This may seem odd, but mowing the lawn to the recommended height can help reduce weeds, resulting in a reduction in the need to use herbicides. Use the following table as a guide for the proper mowing heights for these common types of lawns:

Lawn Type	Mower Setting (inches)	Mow at or before height (inches)
Common Bermuda	1"	1.5"
Hybrid Bermuda	1"	1.5"
Zoysia	1"	1.5"
Carpet grass	1.5"	2"
Centipede grass	1.5"	2"
St. Augustine	3"	4"
Tall Fescue	3"	4"

### *Grass Mowing Heights*

When mowing the lawn, a good rule of thumb is to remove no more than one-third of the grass height at any one mowing. As an example, if you are maintaining your centipede lawn at 1.5 inches, mow the lawn when it is about 2 inches high. Cutting off more than one-third at one time can stop the roots from growing which increases the need to irrigate during dry summers to sustain the lawn.

Also, following the one-third rule will assist in "recycling" the grass clippings.

**"Recycle" grass clippings.** Rather than collecting the grass clippings, they can be "recycled" as mulch. Recycling of grass clippings can be a key component of a lawn care plan to produce a healthy lawn with the added savings in time, energy and money. Recycling the clippings also benefits the community and environment by keeping this products out of the local landfills.

Grass clippings left on the lawn supply natural fertilizer such that only minimal additional fertilizer is needed to keep the lawn green and healthy. Grass clippings contain about 4 percent nitrogen, 0.5 to 1 percent phosphorous, 2 to 3 percent potassium

and smaller amounts of other essential plant nutrients. Therefore, grass clippings are basically a 4:1:3 fertilizer!

**Use a sharp blade.** Prior to mowing, ensure the lawn mower blades are sharp. Sharp lawn mower blades cut the grass cleanly, which helps the grass to heal rapidly. Dull blades tear and bruise the leaves and wounds grass plants. This results in weakening of the plant, making them less able to ward off invading weeds or to recover from disease and insect attacks.

**Aerate Your Lawn Regularly.** Physically removing cores of soil and leaving holes in the lawn is called core aeration. Aeration loosens compacted soil and improves your lawn's growing conditions by making air, water and nutrients available to the grass roots. It also creates ideal conditions for the growth of earthworms and microorganisms which break down clippings and thatch.

The grass type will determine whether to aerate in the fall or in the summer. Lawns composed of cool-season grasses, such as Kentucky Bluegrass and Tall Fescue are best aerated in the fall, when there is less heat stress and danger of invasion by weedy annuals. Allow at least four weeks of good growing weather to help the plants recover. Warm-season grasses, such as Zoysia, Centipede, Carpet grass, St. Augustine and Bermuda, are best aerated in late spring and summer, when they are actively growing. With either type of grass, choose a day when temperatures are mild and soil is moderately moist, which makes the soil easier to penetrate. Avoid aerating a wet soil, as it is messy and leads to further compaction of the soil. If the soil sticks to your shoes or if the core sample you take sticks to your probe, you should wait until it dries out some before starting the job.<sup>8</sup>

## IRRIGATING

**Plants.** Because most plants can tolerate at least short dry periods, irrigating should be timed to meet the biological needs of plants. Watering slowly and deeply helps develop deep roots which can result in less frequent irrigating. The plants that seem to benefit most from shallow watering are the ones you don't want - WEEDS. A drip-irrigation system is an effective means of irrigation since it delivers low volumes of water over an extended period of time.

Overwatering wastes water and can injure certain plants. Plants can absorb only so much water. Placing several containers with 1 inch marks under your sprinkler will help you gauge how much water your lawn or garden is getting. Also, when watering, ensure the spray heads are directed toward the area intended to be irrigated. Spray heads have a tendency to moving over time due to the movement of the soil and by contact with animals and humans.



<sup>8</sup> Excerpted from *Southern Lawns: Best Management Practices for the Selection, Establishment and Maintenance of Southern Lawngrasses*, EC 707, 2003

**Lawns.** Watering lawns during the growing season to keep that nice, green look has become more popular than ever. However, unless the water is being delivered from a recovery system, such as a rain barrel, this can become a costly endeavor. In addition, with water quantity issues now arising more often, this non-essential use of water may end up being prohibited. Watering will increase the need for mowing, can substantially increase the water bill and may stimulate disease outbreaks and weed growth.

Lawns do not necessarily need to be watered during long, dry and hot periods. Although brown in color, warm-season grasses, such as Centipede, Bermuda, St. Augustine or Zoysia grass will normally remain alive and resume growth when conditions become more favorable. However, cool-season grasses, such as Tall or Red Fescue may be severely injured or killed if not watered.

If the homeowner elects to water the lawn, the following techniques may be helpful in determining when a lawn needs water:

- **Color Test:** When water has been unavailable for an extended period of time, the soil will exhibit a bluish-gray color.
- **Footprinting:** Footprints will appear in a lawn when the grass plants have low levels of water in their tissues. By walking across the lawn, the grass can be observed for footprints. If footprints remain for an extended period, the lawn should be watered to prevent the grass from turning brown and becoming dormant.
- **Screwdriver Test:** Press a screwdriver or similar tool into the lawn. If the soil is very dry, it will be difficult to push the screwdriver into the ground. Use the test to confirm the results of the footprint method to help judge when you should water your lawn.
- **Leaf check:** During dry periods, grass leaves respond by wilting, rolling, or folding. These symptoms are signs that you need to water your lawn to prevent it from becoming dormant.

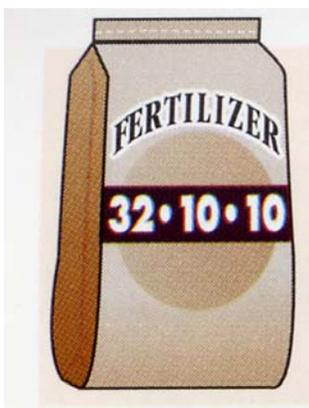
If lawn irrigation is used, water deeply to develop grass plants with deep extensive root systems. Water early in the morning for efficient water use and to discourage the development and spread of diseases.

During the driest part of our year, from April through September, plants and soil lose about 1.5 inches of water every 7 days. Therefore, lawns will require about 1 inch of water every 5 to 7 days. The amount of water varies depending on soil type, turf grass growth and rainfall. Sandier soils require more frequent irrigation than do heavy soils. Apply .5 inch of water on coarse, sandy soil and 1 inch of water on heavy or finer textured soil.

Most hose sprinklers apply .25 to .33 inches of water per hour, so they would need to run about 4 hours in one spot. If water runs off the lawn before 1 inch is applied, turn the sprinkler off, let the water soak in for about an hour and then continue watering.

## USE OF FERTILIZERS

---



On average, homeowners use ten times more chemical fertilizers and pesticides per acre than farmers use on farmland<sup>9</sup>. Many of these chemicals end up in the stormwater runoff and pollute our estuaries. Once released, some chemicals can be absorbed into the environment without any harmful effects, but others have lasting effects. If enough of toxic chemical accumulates within an organism, it can destroy the ability to reproduce, damage the nervous system, or impair the function of internal organs. Therefore, homeowners should only apply fertilizers when absolutely necessary and when available, should use organic types of fertilizers.

**Soil Testing.** Before applying fertilizers, homeowners should identify the type and amount necessary to treat an identified problem. Adding fertilizer without first testing the soil is like taking medicine without knowing if it is needed. The soil already has some of the nutrients needed for good plant growth, such as nitrogen, phosphorous and potassium. It's important to find out how much of each nutrient is present. This can be accomplished through soil testing. If hiring a lawn care service, make sure they test the soil before applying fertilizer.

Testing involves taking small samples from several places in the yard and garden. The soil is analyzed, and a lab report is provided which identifies the amounts of each nutrient in each sample. Because of soil differences, some parts of the homeowner's property may need regular application of fertilizers, while other areas may need few or no applications. Soil testing should be conducted every three years.

One soil sample should be collected for each area of interest (i.e. one for the lawn, one for the garden or one for the ornamental beds). Each area of interest should contain a sample comprised of soil collected and combined from twelve or more locations within the area of interest. Each sample should be approximately the same size.

To take a sample, use a soil auger or shovel to collect soil from the surface to a depth of 3 inches. Place all of the samples in a clean bucket and mix thoroughly. Fill a clean, 1 pint bag or a soil sample box (available from your local Cooperative Extension office) with the mixed soil. Label and number the box or bag and then take the labeled sample to your local Cooperative Extension office for processing.

**When to fertilize.** Once it is determined that fertilizing is necessary, the next step will be to determine when to apply the fertilizer. Applying fertilizer at the wrong time or in the wrong amount may make the soil condition worse and may even increase insect and disease problems. Excess fertilizer which is applied is likely to wash away before the grass takes it up. This fertilizer will then end up in the stormwater runoff and contribute to unwanted plant and algae growth in nearby water bodies. Nitrogen and other

---

<sup>9</sup> Clemson University

chemicals can also seep downward and enter groundwater used for drinking, especially in sandy soils.

Lawn fertilizers should only be applied in accordance with the manufacturer’s specifications and when the weather is favorable (rain is not expected for 24 hours). After the fertilizer is applied, keep children and pets away from the treated areas for at least 24 hours. Collect or sweep excess fertilizer off of walkways and driveways back onto the lawn. Non-chemical fertilizers (such as compost and fish meal) and other soil amendments should be applied based on your lawn's actual needs.

Use the table below to determine the appropriate fertilizer application times for your lawn grass

Lawn Type	Application time
Bermuda Grass	May, June, July, August
Carpet Grass	May, August
Centipede Grass	May, August <sup>4</sup>
St Augustine Grass	May, June, July, August
Zoyasia Grass	May, July, August
Fescue, Blue Grass <sup>5</sup>	January, September
Ryegrass <sup>5,6</sup>	November, December, February

- 1 The kind of fertilizer you use should be based on current soil test recommendations. Without a soil test report, use a complete, balanced (N-P-K) fertilizer.
2. Use a Nitrogen fertilizer which contains at least one-half of the total amount of nitrogen in a slow-release form.
3. On warm-season turf grass, the first fertilizer application should be made 2 to 3 weeks after the lawn turns green
4. Fertilize centipede using a low phosphorous, high potassium fertilizer. An additional fertilizer in late June may enhance centipede performance in sandy soils.
5. For late fall and winter applications, use a fertilizer source containing quick-release nitrogen or slow release nitrogen in the form isobutylidene diurea (ibdu). The nitrogen release is independent of microbial activity; therefore, lbdu nitrogen is released more readily during cool weather when compared to other slow release sources.
6. When applying a fertilizer to warm-season lawns overseeded with ryegrass, the warm-season grass should be dormant before fertilizing.

**Amount of fertilizer.** Fertilizers should always be applied in accordance with the manufacturer’s specifications. Applying too much fertilizer can be harmful to the lawn or garden and may contribute to water contamination through runoff or leaching of nutrients.

The kind of fertilizer you use should be based on current soil test recommendations. In general, Centipede and Carpet grass are low-maintenance lawn grasses which do not tolerate excessive use of fertilizer, especially nitrogen.

For slow, even, sustained growth, consider using slow-release fertilizers. These products release nitrogen slowly over a long period of time, up to several months, which results in

gradual, steady growth. Slow-release materials include natural fertilizers, such as manures or composted sewage sludge. Synthetic slow-release fertilizers include UF (urea formaldehyde), SCU (sulfur-coated-urea), IBDU (isobutylidene diurea), and methylen urea. These slow release fertilizers are also good choices for areas where the potential for runoff is very high, such as on slopes, compacted soil or sparsely covered lawns. Since the nutrients are released slowly, the potential for runoff and water contamination is lessened.

If a fertilizer contains a slow release nitrogen source, it will be listed on the label. For urea formaldehyde-based fertilizers, the portion of the nitrogen that is slow-release is listed on the fertilizer bag as Water Insoluble Nitrogen (Win). If Win is not listed on the label, you should assume that all nitrogen in the fertilizer is in the quick-release form. As an example, this fertilizer label shows that it has 5.5% Water Insoluble Nitrogen (Win):

The total percentage of nitrogen that is insoluble is determined by:

$$\% \text{ of total nitrogen that is Win} = \frac{\% \text{WIN} \times 100}{\% \text{ total}}$$

Or in this example:  
 $5.5 \times 100 / 16 = 34\%$  is WIN

Guaranteed Analysis	
Total Nitrogen .....	16%
8.5% Ammoniacal Nitrogen	
2.00% Nitrate Nitrogen	
5.5% Water Insoluble Nitrogen (WIN)	
Available Phosphate Acid (P205).....	4%
Soluble Potash (K20) .....	8%

Because the WIN is less than half of the total amount of nitrogen in this example, this is a quick-release fertilizer.

## USE OF PESTICIDES

Pest prevention is often simpler (and cheaper) than pest removal. Planting disease resistant grasses and plants and maintaining their health is one of the simplest ways of minimizing pest problems. Many plant problems are not caused by insects or disease but are related to temperature extremes, water extremes, damage caused by lawn mowers or over use of chemicals. Therefore, homeowners should grow plants which are suited to the planting site. In maintaining the plants, do not let them become too wet, too dry or too shaded. Diversity should be used in the garden design to minimize the visible damage caused by any pests that do enter the garden. It is also important to encourage the natural predators of pest insects to hunt in your garden. Beneficial insects such as the common ladybug, birds, frogs and lizards can be an excellent means of pest control. You can make a garden hospitable for these natural allies by keeping a water source nearby for them and by not eliminating the entire bug



population with a pesticide. Also, grow plants with small blossoms, like sweet alyssum and dill, which attract predatory insects who feed on the flowers' nectar.

If pest still manage to invade the yard, the most environmentally friendly way to remove them is by hand, recognizing that this method does not appeal to most homeowners. When you have no other choice, try to find non-toxic or low-toxic chemicals such as insecticidal soaps. Follow directions carefully, and mix only the amount you need.

Pesticides, if properly used, can pose only a minimal risk to the environment. With that said, it is important to note that pesticides have been found to pollute virtually every lake, river and stream in the United States.<sup>10</sup> Pesticide use also decreases biodiversity in the soil resulting in lower soil quality and lower water retention.<sup>11</sup> So pesticides should always be used as a last resort and in strict compliance with the manufacturer's directions for application. The key to safe pesticide use is accomplishing research prior to starting any treatment.

The first step is to correctly identify the pest requiring removal and understand its life cycle before choosing appropriate control measures. It is important to know when and where pesticides may be needed to control problems. Once the type of pest is positively known, select chemicals that are the least toxic or that break down quickly into less harmful substances. The NC Cooperative Extension office can help in this process. Before applying any chemicals, read the label carefully and follow the directions for application rates and methods. Use pesticides sparingly and locally to control specific pest problems. Avoid general, catch all pesticide applications. **Never spray pesticides or fertilizers near ditches, channels, or in storm drains.** Spray on cool, windless days.

## WAYS TO HELP ELIMINATE GARDEN WEEDS



**Ground Cover.** Retain the natural ground cover whenever possible. If unable to retain the natural cover, it is possible to protect the soil and reduce erosion by planting ground cover vegetation or using wood chip mulch or landscape fabric. A thick layer of mulch keeps light from reaching weeds. As with lawns, choose plants that are suited to this area and resistant to insects and diseases. Avoid landscaping plastic. Large plastic sheets used to prevent erosion or weeds create as much runoff as paved streets. Use perforated landscaping fabrics on level areas.

<sup>10</sup> United State Geological Survey (USGS), 2007. Circular 1291, retrieved June 13, 2007 from: <http://pubs.usgs.gov/circ/2005/1291/>

<sup>11</sup> Johnston, A. E. (1986). "Soil organic-matter, effects on soils and crops". *Soil Use Management* 2: 97-105.

Organic mulches—straw, grass clippings, leaves, shredded bark—nourish the soil as they decompose. They are fairly effective weed barriers. For even better weed protection, use several sheets of newspaper, Kraft paper (the paper used to make grocery bags) or cardboard under these mulches.

### **Hoeing**

Annual weeds die when you sever the stems from the roots just below the soil surface. With a sharp hoe, you cut the weeds easily. An oscillating or a swan neck hoe normally does a better job removing weeds than a straight hoe.



To hoe a garden without cultivating a backache, hold the hoe as you would a broom—that is, with your thumbs pointing up. Skim the sharp sides of the hoe blade through the top inch of the soil.

### **Solarization**

The sun can help get rid of persistent weeds by leaving the bed fallow for six weeks in the summer. Start in late spring or early summer by pulling, hoeing or raking out as many weeds as possible from the garden bed. Then, moisten the soil and cover it with clear plastic, weighting or burying the edges. Leave the plastic in place for 6 weeks. The sun will kill weeds that would otherwise sprout.

### **Corn Gluten Meal**

Spread corn gluten meal over the area early in the season to suppress the growth of weed seeds where they're growing. Corn gluten meal, a by-product of corn processing often used to feed livestock, inhibits the germination of seeds. It is important to note that once the weeds have gone beyond the sprout stage, corn gluten will not affect them. Also, corn gluten does not discriminate between wanted and unwanted seeds you want to sprout and those you don't want, so avoid using corn gluten meal where and when you've sown seeds. It works best in established lawns and perennial beds.<sup>12</sup>

## **LANDSCAPING**

A properly maintained home landscape can help reduce soil erosion and increase water retention and soil fertility. Poor maintenance, either through neglect or excessive chemical use, can lead to soil problems, polluted runoff and unsafe well water.

- Consider landscaping alternatives to grass lawns that offer more environmental benefits.
- Use mulch instead of herbicides. Mulch naturally prevents weeds and absorbs water.

---

<sup>12</sup> Retrieved June 5, 2007 from the Organic Gardening website:  
<http://organicgardening.com/feature/0,7518,s1-2-11-200,00.html>

- Select drought-resistant and native plants and grasses. Native plants require less water, fertilizers, and pesticides.
- Create a “rain garden” to collect and treat runoff before it leaves your property.
- Leave vegetated and wooded areas in their natural state, especially along streams and ditches.

**Grow Drought-Tolerant Plants.** One of the best ways to protect and conserve our local bodies of water is to use plants that are drought tolerant and that are adapted to this area. Drought tolerant, or low water use plants, can survive, once they are established, even during times of little rainfall. The reduction in irrigation means there is less chance that nitrates and pesticides will be carried into groundwater.

Xeriscaping is a landscape plan that conserves water by using plants specifically adapted to tolerate long periods of drought. (These plants are known as Xerophytes.) A xeriscape will require little or no additional watering. Many xeriscape plants may be native species. Refer to the recommended plant list in Appendix A.

## Appendix A - Recommended Landscape Plants<sup>13</sup>

### RECOMMENDED PLANTS FOR NEW HANOVER COUNTY LANDSCAPES

*Compiled by Charlotte Glen, Urban Horticulture Agent, NC Cooperative Extension*

The following tables of plants recommended for landscape use in the New Hanover County area are available from NHC Cooperative Extension: Annuals, Perennials, Groundcovers, Ornamental Grasses, Small Shrubs (2-4'), Medium Shrubs (4-8'), Large Shrubs (> 8'), Small Trees (10-30'), Large Trees (> 30'), Vines, and Turfgrasses. All plants listed are hardy to Zone 8a (minimum winter temp. of 10 – 15 degrees), perform well in local climate conditions, are relatively easy to grow, and should be available at local nurseries and garden centers. Common names are listed first, though plants are arranged in alphabetical order by scientific name.

Several information codes are common to the lists and are explained as follows:

#### **Native Plants\***

A plant native to SE USA implies a plant endemic to the Southeastern portion of the United States, from Virginia to Eastern Texas.

#### **Water Use Zones**

Water Use Zones indicate the water needs of various plants and correspond to the following NCCE publications:

- *Water Wise Use in Landscaping*  
[http://www.bae.ncsu.edu/bae/programs/extension/publicat/wqwm/ag508\\_1.html](http://www.bae.ncsu.edu/bae/programs/extension/publicat/wqwm/ag508_1.html)
- *How to Plan and Design a Water Wise Use Landscape*  
[http://www.bae.ncsu.edu/bae/programs/extension/publicat/wqwm/ag508\\_2.html](http://www.bae.ncsu.edu/bae/programs/extension/publicat/wqwm/ag508_2.html)

Irrigation requirements can be reduced by grouping plants that have similar water needs together.

#### **Drought Tolerant Plants**

Extremely drought tolerant plants are marked with an underline. When planted in their preferred soil type, these plants are able to withstand extended periods of drought, 4-6 weeks, without supplemental irrigation once established. Most trees and shrubs take two to three seasons to become fully established. Perennials, grasses and groundcovers usually require one to two seasons to become established.

---

<sup>13</sup> *All plant information in this Appendix was graciously provided by Charlotte Glen, Urban Horticulture Agent, NC Cooperative Extension.*

**Colors:**

W=white, Y=yellow, O=orange, B=blue, Pu=purple, P=pink, R=red, L=lavender

**Mature Size**

Mature sizes of all plants are given as height x width, though many may take several years to reach these dimensions. Mature size can vary depending on growing conditions.

**Recommended Varieties**

For many plants, recommended varieties are given. These are selections of that plant that either perform better in our area or are more suitable to landscape use than the plain species. Plant varieties, also known as cultivars, are listed enclosed in single quotes.

**Exposure**

Exposure refers to the amount of sunlight a site receives as follows:

- **Full sun** indicates a site that receives at least 8hrs of direct sun each day.
- **Light Shade** indicates a site that is shaded less than half of the day by a light high shade such as that cast by pine trees.
- **Part Shade** indicates a site that is shaded for half the day by a dense shade such as that cast by buildings or shade trees.
- **Full Shade** indicates a site that is in shade all day.

**Soil**

Soil refers to soil condition at the site as follows:

- **Wet** indicates a site that stays moist most of the time and receives periodic flooding.
- **Moist** indicates a site that is moist most of the time with brief (less than 12hrs) periods of standing water.
- **Well Drained** indicates a site where water drains from the surface and rarely stands.
- **Xeric** indicates a site that is extremely dry and sandy with very little ability to hold water.

**FOR MORE INFORMATION:****WEBSITE**

For more detailed information about each plant and to see images, visit the **Plant Fact Sheets** on the **NC Cooperative Extension Consumer Horticulture website**:

<http://www.ces.ncsu.edu/depts/hort/consumer/index.html>

**VISIT THE ARBORETUM**

To see many of these plants growing in a landscape setting, visit the **NHC Arboretum**, part of the NHC Cooperative Extension program. The Arboretum is located at 6206 Oleander Drive and is open seven days a week during daylight hours, free. To find out more, visit <http://www.gardeningnhc.org/> or call 452-6393.

### **PLANT INFORMATION CLINIC**

If you have questions about plant selection and maintenance, lawn care, vegetable gardening or plant pest problems, call or visit the NHC Cooperative Extension **Plant Information Clinic**. The Plant Clinic is open from 9am to 3pm, Monday through Friday and is staffed by trained Master Gardener volunteers and Extension Horticulture Agents. Call direct at 452-6382 or stop by during operating hours. The **NHC Cooperative Extension Center** is open 8am to 5pm, Monday - Friday and is located at 6206 Oleander Drive, phone 452-6393.

## Groundcovers

### For Shade

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height (in)	Type of Plant	Growth Rate	Exposure	Soil Conditions
Carpet Bugle	<i>Ajuga reptans</i>	1,2		4-8	Evergreen Perennial	Moderate	Part to Full Shade	Moist to Well Drained
Pussytoes*	<i>Antennaria plantaginifolia</i>	1,2,3		4-8	Evergreen Perennial	Moderate	Light to Full Shade	Well Drained
Japanese Ardisia	<i>Ardisia japonica</i>	1,2		4-8	Evergreen Perennial	Moderate	Part to Full Shade	Well Drained
Japanese Painted Fern	<i>Athyrium nipponicum</i>	1,2		12-18	Herbaceous Fern	Moderate	Light to Full Shade	Moist to Well Drained
Green and Gold*	<i>Chrysogonum virginianum</i>	1,2		6-8	Semi-Evergreen Perennial	Moderate	Light to Part Shade	Moist to Well Drained
Holly Fern	<i>Cyrtomium falcatum</i>	1,2,3		24 - 30	Evergreen Fern	Moderate	Part to Full Shade	Well Drained
Autumn Fern	<i>Dryopteris erythrosa</i>	1,2		18 - 24	Evergreen Fern	Moderate	Part to Full Shade	Moist to Well Drained
Dwarf Gardenia	<i>Gardenia jasminoides</i> 'Radicans'	1,2		12-24	Evergreen Shrub	Moderate	Light to Part Shade	Well Drained
Algerian Ivy	<i>Hedera canariensis</i>	1,2,3		12	Evergreen Vine	Moderate to Fast	Light to Full Shade	Well Drained
English Ivy	<i>Hedera helix</i>	1,2,3		6-12	Evergreen Vine	Slow to Moderate	Part to Full Shade	Well Drained
American Alumroot*	<i>Heuchera americana</i>	1,2,3	Many Available	6-12	Semi-Evergreen Perennial	Moderate	Light to Part Shade	Well Drained
Hosta	<i>Hosta</i> species and hybrids	1,2,3	Many Available	12-24	Herbaceous Perennial	Moderate	Part to Full Shade	Well Drained
Liriope	<i>Liriope muscarii</i>	1,2,3	Many Available	12-18	Evergreen Perennial	Moderate	Light to Full Shade	Moist to Well Drained
Spreading Liriope	<i>Liriope spicata</i>	1,2,3		8-15	Evergreen Perennial	Moderate	Light to Full Shade	Moist to Well Drained
Creeping Jenny	<i>Lysimachia nummularia</i>	1,2	'Aurea'	2	Semi-Evergreen Perennial	Fast	Light to Full Shade	Moist to Well Drained
Mondograss	<i>Ophiopogon japonicus</i>	1,2		6-10	Evergreen Perennial	Slow to Moderate	Part to Full Shade	Well Drained
Christmas Fern*	<i>Polystichum acrostichoides</i>	1,2		12-18	Evergreen Fern	Moderate	Part to Full Shade	Moist to Well Drained
Creeping Raspberry	<i>Rubus calycinioides</i>	1,2		6-12	Evergreen Shrub	Moderate	Light to Part Shade	Well Drained
Sweetbox	<i>Sarcococca hookeriana</i> var. <i>humilis</i>	1,2		36	Evergreen Shrub	Moderate	Light to Full Shade	Well Drained
Strawberry Begonia	<i>Saxifraga stolonifera</i>	1,2		12	Evergreen Perennial	Fast	Light to Full Shade	Moist to Well Drained
Asiatic or Star Jasmine	<i>Trachelospermum asiaticum</i>	1,2,3		6-8	Evergreen Vine	Fast to Moderate	Light to Part Shade	Well Drained
Common Periwinkle	<i>Vinca minor</i>	1,2,3		5-6	Evergreen Vine	Fast	Light to Full Shade	Well Drained

## For Sun

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height (in)	Type of Plant	Growth Rate	Exposure	Soil Conditions
<u>Beach Wormwood*</u>	<i>Artemisia stelleriana</i>	2,3	'Silver Brocade'	6 – 12	Evergreen Perennial	Moderate	Full Sun	Well Drained to Xeric
<u>Hardy Ice Plant</u>	<i>Delosperma cooperi</i> , <i>Delosperma nubigenum</i>	2,3		4-6	Semi-Evergreen Perennial	Moderate	Full Sun	Well Drained to Xeric
<u>Cheddar Pinks</u> , <u>Dianthus</u>	<i>Dianthus gratianopolitanus</i> and hybrids of this species	2,3	'Bath's Pink' 'Firewitch' 'Greystone'	4-8	Evergreen Perennial	Moderate	Full Sun	Well Drained
<u>Weeping Love Grass</u>	<i>Eragrostis curvula</i>	2,3		24 – 36	Clumping Grass	Moderate	Full Sun	Well Drained to Xeric
<u>Daylily</u>	<i>Hemerocallis</i> hybrids	1,2,3	Many Available	18 – 48	Herbaceous Perennial	Moderate	Full Sun to Part Shade	Moist to Well Drained
Atlantic St. John's Wort*	<i>Hypericum reductum</i>	2,3		8 – 12	Semi-Evergreen Shrub	Moderate	Full Sun	Well Drained to Xeric
<u>Candytuft</u>	<i>Iberis sempervirens</i>	1,2,3		6 – 8	Evergreen Perennial	Moderate	Full Sun to Light Shade	Well Drained
<u>Shore Juniper</u>	<i>Juniperus conferta</i>	2,3	'Blue Pacific'	12-18	Evergreen Conifer	Fast	Full Sun	Well Drained to Xeric
<u>Creeping Juniper*</u>	<i>Juniperus horizontalis</i>	2,3	'Bar Harbor'	10-12	Evergreen Conifer	Moderate	Full Sun	Well Drained to Xeric
<u>Andorra Juniper</u>	<i>Juniperus horizontalis</i> 'Plumosa'	2,3		24	Evergreen Conifer	Moderate	Full Sun	Well Drained to Xeric
<u>Blue Rug Juniper</u>	<i>Juniperus horizontalis</i> 'Wiltonii'	2,3		4-6	Evergreen Conifer	Moderate	Full Sun	Well Drained to Xeric
<u>Dwarf Nandina</u>	<i>Nandina domestica</i>	1,2,3	'Harbor Belle'	24-36	Evergreen Shrub	Moderate	Full Sun	Well Drained
<u>Moss Phlox or Thrift*</u>	<i>Phlox subulata</i>	1,2,3	Many	4-6	Evergreen Perennial	Moderate	Full Sun to Light Shade	Well Drained
<u>Orange Coneflower*</u>	<i>Rudbeckia fulgida</i>	1,2,3	'Goldsturm'	24 – 30	Semi-Evergreen Perennial	Moderate	Full Sun to Part Shade	Moist to Well Drained
Stonecrops	<i>Sedum reflexum</i>	1,2,3	'Blue Spruce'	4-6	Evergreen Perennial	Moderate	Full Sun to Part Shade	Well Drained
<u>Woolly Stemodia*</u>	<i>Stemodia tomentosa</i>	1,2,3		4 – 6	Evergreen Perennial	Moderate	Full Sun	Well Drained
<u>Prostrate Germander</u>	<i>Teucrium chamaedrys</i>	1,2,3	'Prostratum'	6-8	Evergreen Perennial	Moderate	Full Sun	Well Drained

## Annuals

All annuals grow best in a well-prepared soil with good drainage. Cool season annuals should be planted from October through mid-November. Warm season annuals are best planted from mid-April through May.

### COOL SEASON ANNUALS

Common Name	Botanical Name	Water Use Zone	Height (in)	Color	Exposure
Snapdragon	<i>Antirrhinum majus</i>	1,2	8-36	All but B	Sun
English Daisy	<i>Bellis perennis</i>	1,2	6-12	P, R, W	Sun to Pt. Shade
Swiss Chard	<i>Beta vulgaris</i>	1,2	24	Foliage	Sun
Ornamental Cabbage and Kale	<i>Brassica oleracea</i>	1,2	12-24	Foliage	Sun
'Giant Red' Mustard	<i>Brassica</i> species 'Giant Red'	1,2	18	Foliage	Sun
Calendula	<i>Calendula officinalis</i>	1,2	12-24	Y,O	Sun
Bachelor's Buttons	<i>Centaurea cyanus</i>	1,2	12-30	B, W, P	Sun
Cardoon	<i>Cynara cardunculus</i>	1,2,3	36	Foliage	Sun
Chinese Forget-me-not	<i>Cynoglossum amabile</i>	1,2	12	B	Sun to Pt. Shade
Delphinium	<i>Delphinium x elatum</i>	1,2	36-48	W, B, Pu, L, P	Sun to Pt. Shade
Sweet Williams	<i>Dianthus barbatus</i>	1,2	12-24	R, P, W	Sun to Pt. Shade
China Pinks	<i>Dianthus chinensis</i>	1,2	8-12	R, P, W	Sun
Foxglove	<i>Digitalis purpurea</i>	1,2	12-60	All but B	Sun to Pt. Shade
Wallflower	<i>Erysimum cheiri</i>	1,2	12	All but B	Sun to Pt. Shade
<u>California Poppy</u>	<i>Eschscholzia californica</i>	1,2,3	12-24	All but B	Sun
Dame's Rocket	<i>Hesperis matronalis</i>	1,2	36	Pu, W	Sun to Pt. Shade
Annual Candytuft	<i>Iberis umbellata</i>	1,2	12	P, Pu, L, W	Sun
Sweet Alyssum	<i>Lobularia maritima</i>	1,2	6	W,P,L	Sun to Pt. Shade
Stock	<i>M Matthiola incana</i>	1,2	12-15	W, P, R, Pu	Sun
Forget-me-nots	<i>Myosotis sylvatica</i>	1,2	12	B	Sun to Pt. Shade
Parsley	<i>Petroselinum crispum</i>	1,2	12	Foliage	Sun
<u>Dusty Miller</u>	<i>Senecio cineraria</i>	1,2,3	6-12	Foliage	Sun
Pansy	<i>Viola x wittrockiana</i>	1,2	6	All	Sun to Pt. Shade

## WARM SEASON ANNUALS

### For Shade

Common Name	Botanical Name	Water Use Zone	Height (in)	Color	Exposure
'Dragonwing' Begonia	<i>Begonia x 'Dragonwing'</i>	1, 2	15	R, P	Sun to Shade
<u>Wax Begonia</u>	<i>Begonia x semperflorens</i>	1, 2, 3	6-12	W, P, R	Sun to Shade
Caladium	<i>Caladium bicolor</i>	1	12-36	Foliage	Pt. Shade to shade
Coleus	<i>Solenostemon scutellarioides</i>	1, 2	24-36	Foliage	Sun to Shade
Polka Dot Plant	<i>Hypoestes phyllostachya</i>	1, 2	15-24	Foliage	Pt. Shade to Shade
New Guinea Impatiens	<i>Impatiens hawkeri</i>	1	12-36	O, R, P	Pt. Shade to Shade
Impatiens	<i>Impatiens wallerana</i>	1	12-36	All but B	Pt. Shade to Shade
Yellow Shrimp Plant	<i>Pachystachys lutea</i>	1, 2	24-30	Y	Pt. Shade to Shade
Wishbone Flower	<i>Torenia fournieri</i>	1, 2	12	W, B, Pu, P	Pt. Shade to Shade

### For Sun

Common Name	Botanical Name	Water Use Zone	Height (in)	Color	Exposure
Ageratum	<i>Ageratum houstonianum</i>	1, 2	8-24	W, B, Pu	Sun to Pt. Shade
'Purple Knight' Alternanthera	<i>Alternanthera dentate 'Purple Knight'</i>	1, 2	24-30	Foliage	Sun to Pt. Shade
Joseph's Coat	<i>Alternanthera ficoidea</i>	1, 2	8-12	Foliage	Sun to Pt. Shade
Angelonia	<i>Angelonia angustifolia</i>	1, 2	24-36	W, Pu, P	Sun to Pt. Shade
Tropical Milkweed	<i>Asclepias curassavica</i>	1, 2	36-48	O, R, Y	Sun
<u>Asparagus Fern</u>	<i>Asparagus densiflorus</i>	1, 2, 3	18-24	Foliage	Sun to Pt. Shade
<u>Wax Begonia</u>	<i>Begonia semperflorens</i>	1, 2, 3	12	R, W, P	Sun to Shade
Dragonwing Begonia	<i>Begonia a 'Dragonwing'</i>	1, 2	15	R, P	Sun to Shade
<u>Million Bells</u>	<i>Calibrachoa x hybrida</i>	1, 2, 3	6-12	All but B	Sun
<u>Ornamental Pepper</u>	<i>Capiscum annum</i>	1, 2, 3	12-18	Fruit	Sun
<u>Madagascar Periwinkle</u>	<i>Catharanthus roseus</i>	1, 2, 3	6-18	W, P, L, Pu	Sun
<u>Cockscomb</u>	<i>Celosia cristata</i>	1, 2, 3	6-30	All but B	Sun
<u>Spider Plant</u>	<i>Cleome hasslerana</i>	1, 2, 3	24-48	W, P, L	Sun
Cosmos	<i>Cosmos bipinnatus</i>	1, 2, 3	18-48	P, R, W	Sun to Pt. Shade
<u>Mexican Heather</u>	<i>Cuphea hyssopifolia</i>	1, 2, 3	12	Pu	Sun to Lt. Shade
<u>Mexican Cigar Plant</u>	<i>Cuphea ignea</i>	1, 2	12	R	Sun
<u>Blue Daze</u>	<i>Evolvulus pilosus</i>	1, 2, 3	6-8	B	Sun
<u>Blanket Flower</u>	<i>Gaillardia pulchella</i>	1, 2, 3	12-30	Y, O, R	Sun
<u>Globe Amaranth</u>	<i>Gomphrena globosa</i>	1, 2, 3	8-24	W, P, L, Pu	Sun

Common Name	Botanical Name	Water Use Zone	Height (in)	Color	Exposure
Ornamental Sweet Potato	<i>Ipomoea batatas</i>	1, 2	12	Foliage	Sun to Pt. Shade
<u>Lantana</u>	<i>Lantana camara</i>	1, 2, 3	12-36	Y, O, P, R	Sun
<u>Trailing Lantana</u>	<i>Lantana montevidensis</i>	1, 2, 3	12	L, W	Sun
<u>Melampodium</u>	<i>Melampodium paludosum</i>	1, 2, 3	18-30	Y	Sun to Pt. Shade
Cat's Whiskers	<i>Orthosiphon stamineus</i>	1, 2	24	Pu, W	Sun to Lt. Shade
<u>Red Fountain Grass</u>	<i>Pennisetum setaceum 'Rubrum'</i>	1, 2, 3	24	Pu, W	Sun to Lt. Shade
<u>Pentas</u>	<i>Pentas lanceolata</i>	1,2,3	12-24	R,P,W,L	Sun to Lt. Shade
Petunia	<i>Petunia x hybrida</i>	1,2	6-12	All	Sun to Pt. Shade
<u>Cuban Oregano</u>	<i>Plectranthus amboinicus</i>	1,2	24 - 30	Foliage	Sun
<u>Silver Plectranthus</u>	<i>Plectranthus argenteus</i>	1,2	24	Foliage	Sun
'Mona Lavender' Plectranthus	<i>Plectranthus x 'Mona Lavender'</i>	1,2	24	L	Sun to Lt. Shade
<u>Moss Rose</u>	<i>Portulaca grandiflora</i>	1,2,3	4-6	All but B, Pu	Sun
<u>Purslane</u>	<i>Portulaca oleracea</i>	1,2,3	6	All but B, Pu	Sun
<u>Texas Sage</u>	<i>Salvia coccinea</i>	1,2,3	18 - 24	R,P,W	Sun to Lt. Shade
<u>Mealycup Sage</u>	<i>Salvia farinacea</i>	1,2,3	12-24	B,W	Sun to Lt. Shade
Scarlet Sage	<i>Salvia splendens</i>	1,2,3	12-18	R,W,O,Pu	Sun to Pt. Shade
<u>Fan Flower</u>	<i>Scaevola aemula</i>	1,2	8	W,Pu	Sun to Lt. Shade
Sun Coleus	<i>Solenostemon scutellarioides</i>	1,2	24 - 36	Foliage	Sun to Shade
Persian Shield	<i>Strobilanthes dyerianus</i>	1,2	24	Foliage	Sun to Pt. Shade
Marigold	<i>Tagetes erecta, Tagetes patula</i>	1,2	12-30	Y, R, O	Sun
<u>Mexican Sunflower</u>	<i>Tithonia rotundifolia</i>	1,2,3	36 - 48	O,Y	Sun
Verbena	<i>Verbena x hybrida</i>	1,2	6-12	All but Y	Sun to Lt. Shade
'Profusion' Zinnia	<i>Zinnia elegans</i>	1,2	12	W,O,P,R	Sun
<u>Creeping Zinnia</u>	<i>Zinnia linearis</i>	1,2,3	12-18	Y, O, W	Sun

## Perennials

### For Shade

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height	Color	Time of Bloom	Exposure	Soil
Bear's Breeches	<i>Acanthus</i> species and hybrids	1,2	'Summer Beauty'	3 – 4 ft	Pu	Summer	Light to Part Shade	Moist to Well Drained
Carpet Bugle	<i>Ajuga reptans</i>	1,2		4 – 8 in	B,W,Pu	Spring	Light to Full Shade	Moist to Well Drained
Eastern Columbine*	<i>Aquilegia canadensis</i>	1,2,3		2-3 ft	R/Y	Spring	Light to Part Shade	Well Drained
Italian Arum	<i>Arum italicum</i>	1,2	'Pictum'	1 – 2 ft	Foliage	Winter	Light to Full Shade	Moist to Well Drained
<u>Cast Iron Plant</u>	<i>Aspidistra elatior</i>	1,2,3		2 – 3 ft	Foliage	Evergreen	Part to Full Shade	Well Drained
Japanese Painted Fern	<i>Athyrium nipponicum</i>	1,2		18 in	Foliage		Light to Full Shade	Moist to Well Drained
Hardy Begonia	<i>Begonia grandis</i>	1,2		15 in	P	Summer	Light to Full Shade	Well Drained
Hardy Orchid	<i>Bletilla striata</i>	1,2		8 - 12 in	P,W	Spring	Light to Part Shade	Well Drained
Green and Gold*	<i>Chrysogonum virginianum</i>	1,2		8 – 12 in	Y	Spring	Light to Full Shade	Moist to Well Drained
Holly Fern	<i>Cyrtomium falcatum</i>	1,2,3		18 – 24 in	Foliage	Evergreen	Part to Full Shade	Well Drained
Autumn Fern	<i>Dryopteris erythrosa</i>	1,2		18 – 24 in	Foliage	Evergreen	Part to Full Shade	Well Drained
Southern Shield Fern*	<i>Dryopteris ludoviciana</i>	1,2		3 ft	Foliage		Part to Full Shade	Moist to Well Drained
Fairy Wings	<i>Epimedium x versicolor</i>	1,2		12 in	Y	Spring	Light to Full Shade	Well Drained
<u>Robb's Spurge</u>	<i>Euphorbia robbiae</i>	1,2,3		12 – 24 in	Y	Spring	Light to Part Shade	Well Drained
Lenten Rose	<i>Helleborus x hybridus</i>	1,2		12-15 in	W,P,L	Winter/Spring	Part to Full Shade	Well Drained
American Alumroot*	<i>Heuchera americana</i>	1,2,3	Many Available	8 – 12 in	W,P,R	Spring	Light to Full Shade	Well Drained
Hosta	<i>Hosta species and hybrids</i>	1,2,3		1-3 ft	Foliage	Spring/ Summer	Part to Full Shade	Well Drained
Leopard Plant	<i>Ligularia tussilaginea</i>	1,2		18 – 24 in	Y	Fall	Part to Full Shade	Moist to Well Drained

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height	Color	Time of Bloom	Exposure	Soil
Creeping Jenny	<i>Lysimachia nummularia</i>	1,2	'Aurea'	2 in	Foliage	Evergreen	Light to Full Shade	Moist to Well Drained
Woodland Phlox*	<i>Phlox divaricata</i>	1,2		8 – 12 in	B,W,L	Spring	Light to Part Shade	Moist to Well Drained
Variiegated Solomon's Seal	<i>Polygonatum odoratum</i> 'Variegatum'	1,2,3		18 – 24 in	W	Spring	Light to Full Shade	Moist to Well Drained
Christmas Fern*	<i>Polystichum acrostichiodes</i>	1,2		12 – 18 in	Foliage	Evergreen	Part to Full Shade	Moist to Well Drained
Tassel Fern	<i>Polystichum polyblepharum</i>	1,2		18 in	Foliage	Evergreen	Part to Full Shade	Moist to Well Drained
<u>Sacred Lily</u>	<i>Rhodea japonica</i>	1,2,3		12 – 24 in	Foliage	Evergreen	Light to Full Shade	Well Drained
Strawberry Begonia	<i>Saxifraga stolonifera</i>	1,2		12 in	W	Spring	Light to Full Shade	Moist to Well Drained
Arborvitae Fern	<i>Selaginella braunii</i>	1,2		12 in	Foliage	Evergreen	Part to Full Shade	Moist to Well Drained
Indian Pink*	<i>Spigelia marilandica</i>	1,2		12 – 18 in	R/Y	Spring	Light to Part Shade	Well Drained
Foam Flower*	<i>Tiarella</i> hybrids	1,2		12 in	W	Spring	Light to Part Shade	Well Drained
Toad Lily	<i>Tricyrtis formosana</i>	1,2		12 – 24 in	W/Pu/L	Fall	Light to Part Shade	Moist to Well Drained

## For Sun

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height	Color	Time of Bloom	Exposure	Soil
<u>Yarrow</u>	<i>Achillea millefolium</i>	1,2,3		2 - 3 ft	W,P,Y,O	Summer	Sun	Well Drained to Xeric
<u>Anise Hyssop</u>	<i>Agastache foeniculum</i>	1,2,3	'Blue Fortune'	2 - 3 ft	B	Summer	Sun	Well Drained
<u>Arkansas Blue Star*</u>	<i>Amsonia hubrichtii</i>	1,2,3		3 - 4 ft	B	Spring	Sun	Well Drained
Blue Star*	<i>Amsonia tabernaemontana</i>	1,2,3		3 - 4 ft	B	Spring	Sun to Part Shade	Moist to Well Drained
<u>Texas Firecracker*</u>	<i>Anisananthus wrightii</i>	2,3		3 - 4 ft	R	Summer, Fall	Sun	Well Drained
<u>'Powis Castle' Artemisia</u>	<i>Artemisia</i> x 'Powis Castle'	2,3		2 - 3 ft	Foliage	Evergreen	Sun	Well Drained to Xeric
<u>Butterfly Weed*</u>	<i>Asclepias tuberosa</i>	1,2,3		1-2 ft	O,Y	Summer	Sun	Well Drained to Xeric
<u>Swamp Milkweed*</u>	<i>Asclepias incarnata</i>	1,2	'Cinderella' 'Ice Ballet'	3 ft	W,P	Summer	Sun to Part Shade	Moist to Well Drained
<u>Heath Aster*</u>	<i>Aster ericoides</i>	1,2,3	'Monte Cassino' 'Pink Star'	2 - 4 ft	W,P	Fall	Sun	Well Drained to Xeric
Smooth Aster*	<i>Aster laevis</i>	1,2	'Bluebird'	3 ft	B	Summer	Sun to Light Shade	Moist to Well Drained
New England Aster*	<i>Aster novae-angliae</i>	1,2	'Purple Dome'	18 in	P	Fall	Sun	Well Drained
Aromatic Aster*	<i>Aster oblongifolius</i>	1,2,3	'Fanny' 'October Skies'	2 - 4 ft	B,P	Fall	Sun	Well Drained
Tartarian Aster	<i>Aster tartaricus</i>	1,2	'Jin Dai'	3 - 4 ft	L	Fall	Sun	Moist to Well Drained
False Wild Indigo*	<i>Baptisia australis</i> <i>Baptisia alba</i> <i>Baptisia sphaerocarpa</i> <i>Baptisia hybrids</i>	1,2,3	'Carolina Moonlight' 'Purple Smoke'	2 - 3ft	B,W,Y,L	Spring	Sun/Partial Shade	Moist to Well Drained
White Boltonia*	<i>Boltonia asteroides</i>	1,2	'Snowbank'	4 ft	W	Fall	Sun	Moist to Well Drained
<u>Wine Cups, Poppy Mallow*</u>	<i>Callirhoe involucrata</i>	2,3		1 ft	P	Spring	Sun	Well Drained to Xeric
Canna Lily	<i>Canna hybrids</i>	1,2	Many Available	2 - 6 ft	P,R,O,Y	Summer	Sun to Part Shade	Moist to Well Drained
<u>Leadwort</u>	<i>Ceratostigma plumbaginoides</i>	1,2,3		12 in	B	Fall	Sun to Part Shade	Moist to Well Drained

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height	Color	Time of Bloom	Exposure	Soil
<u>Turtlehead*</u>	<i>Chelone glabra</i> <i>Chelone obliqua</i>	1,2		2 – 3 ft	W,P	Fall	Sun to Part Shade	Moist to Well Drained
<u>Shasta Daisy</u>	<i>Chrysanthemum x superbum</i>	1,2	‘May Queen’ ‘Becky’	2 – 3 ft	W	Summer	Sun to Part Shade	Moist to Well Drained
<u>Mouse Ear Coreopsis*</u>	<i>Coreopsis auriculata</i>	1,2	‘Nana’	1 – 2 ft	Y	Spring	Sun to Part Shade	Moist to Well Drained
<u>Tickseed, Coreopsis*</u>	<i>Coreopsis grandiflora</i> <i>Coreopsis lanceolata</i>	1,2		1-3 ft	Y	Spring, Summer	Sun to Part Shade	Moist to Well Drained
<u>Threadleaf Coreopsis*</u>	<i>Coreopsis verticillata</i>	1,2,3	‘Golden Showers’ ‘Zagreb’	1 - 2 ft	Y	Summer	Sun	Well Drained
<u>Crinum Lily</u>	<i>Crinum</i> species and hybrids	1,2,3		2 – 4 ft	W,P	Summer	Sun to Part Shade	Moist to Well Drained
<u>Hardy Ice Plant</u>	<i>Delosperma cooperi</i> <i>Delosperma nubigenum</i>	2,3		6 in	P,Y	Spring	Sun	Well Drained to Xeric
<u>Cheddar Pinks, Dianthus</u>	<i>Dianthus gratianopolitanus</i>	1,2,3	‘Bath’s Pink’ ‘Firewitch’ ‘Greystone’	8 – 12 in	W,P	Spring	Sun	Well Drained to Xeric
<u>Hummingbird Plant</u>	<i>Dicliptera suberecta</i>	1,2,3		12 – 18 in	O	Summer	Sun	Well Drained
<u>Purple Coneflower*</u>	<i>Echinacea purpurea</i>	1,2,3	‘Bravado’ ‘Kim’s Knee High’ ‘White Swan’ ‘Magnus’	3-5 ft	P,W	Summer	Sun/Partial Shade	Well Drained
<u>Joe Pye Weed*</u>	<i>Eupatorium fistulosum</i> <i>Eupatorium dubium</i> <i>Eupatorium maculatum</i>	1,2		4 – 6 ft	P	Fall	Sun to Light Shade	Moist to Well Drained
<u>Blanket Flower, Gaillardia</u>	<i>Gaillardia x grandiflora</i>	1,2,3	‘Goblin’ ‘Fanfare’	1 - 2 ft	Y,R,O	Summer/Fall	Sun	Well Drained to Xeric
<u>Gaura*</u>	<i>Gaura lindheimeri</i>	2,3	‘So White’ ‘Pink Cloud’	2 – 3 ft	W,P	Summer	Sun	Well Drained to Xeric
<u>Bloody Cranesbill</u>	<i>Geranium sanguineum</i>	2,3		12 in	P, W	Summer	Sun	Well Drained
<u>Gerber Daisy</u>	<i>Gerbera jamesonii</i>	1,2		1 ft	P,R,O,Y,W	Spring - Summer	Sun to Part Shade	Well Drained
<u>Mexican Firebush</u>	<i>Hamelia patens</i>	2,3		3 – 4 ft	R	Summer	Sun	Well Drained to Xeric

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height	Color	Time of Bloom	Exposure	Soil
Hardy Ginger Lily	<i>Hedychium</i> species and hybrids	1,2		4 – 6 ft.	W,Y,O,	Summer - Fall	Sun to Part Shade	Moist to Well Drained
Swamp Sunflower*	<i>Helianthus angustifolius</i>	1,2		6 ft	Y	Fall	Sun to Light Shade	Moist to Well Drained
‘Lemon Queen’ Perennial Sunflower	<i>Helianthus</i> x ‘Lemon Queen’	1,2		4 – 5 ft	Y	Summer	Sun to Light Shade	Moist to Well Drained
False Sunflower*	<i>Heliopsis helianthoides</i>	1,2	‘Summer Sun’ ‘Ballerina’	2 – 4 ft	Y	Summer	Sun to Part Shade	Moist to Well Drained
<u>Daylily</u>	<i>Heemerocallis</i> species and hybrids	1,2,3	Many Available	1-4 ft	Y,O,R,W,P	Summer	Sun/Partial Shade	Moist to Well Drained
<u>Red False Aloe</u>	<i>Hesperaloe parviflora</i>	2,3		3 – 4 ft	R	Summer	Sun	Well Drained to Xeric
<u>Hardy Hibiscus*</u>	<i>Hibiscus moscheutos</i> <i>Hibiscus coccineus</i> <i>Hibiscus hybrids</i>	1,2	‘Anne Arundel’ ‘Blue River II’ ‘Moy Grande’	4 – 5 ft	R,P,W	Summer	Sun to Light Shade	Moist to Well Drained
Confederate Rose	<i>Hibiscus mutabilis</i>	1,2		5 – 6 ft	P	Fall	Sun to Light Shade	Moist to Well Drained
St. Joseph’s Lily, Hardy Amaryllis	<i>Hippeastrum x johnsonii</i>	1,2,3		15 in	R	Spring	Sun to Part Shade	Well Drained
<u>Evergreen Candytuft</u>	<i>Iberis sempervirens</i>	1,2,3		12 in	W	Spring	Sun to Part Shade	Well Drained
Japanese Iris	<i>Iris ensata</i>	1,2		3 ft	Pu,L,W	Spring	Sun to Part Shade	Moist
Bearded Iris	<i>Iris</i> hybrids	1,2,3		3 ft	P,O,Y,W,L,Pu,	Spring	Sun to Light Shade	Well Drained
Siberian Iris	<i>Iris sibirica</i>	1,2		2-4 ft	W,Y, B, Pu, L	Spring	Sun to Part Shade	Moist to Well Drained
Japanese Aster	<i>Kalimeris pinnatifida</i>	1,2,3		2 ft	W	Summer	Sun to Light Shade	Well Drained
<u>Red Hot Poker</u>	<i>Kniphofia</i> species and hybrids	1,2,3		2-4 ft	R,O,Y	Summer	Sun	Well Drained
Seashore Mallow*	<i>Kosteletzkya virginica</i>	1,2		4 – 5 ft	P,W	Summer	Sun to Par Shade	Moist to Well Drained
Lantana	<i>Lantana camara</i> <i>Lantana montevidensis</i> <i>Lantana hybrids</i>	2,3	‘Miss Huff’ ‘Tangerine’ ‘New Gold’ ‘Radiation’	2 – 4 ft	W,L,P,Y,O,R	Summer to Fall	Sun	Well Drained to Xeric
Asiatic and Oriental Lilies	<i>Lilium</i> hybrids	1,2	Many Available	2 – 4 ft	W,R,O,P,Y	Summer	Sun to Part Shade	Well Drained

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height	Color	Time of Bloom	Exposure	Soil
Cardinal Flower*	<i>Lobelia cardinalis</i>	1,2		3 ft	R	Fall	Sun to Part Shade	Moist to Well Drained
<u>Sleeping Hibiscus</u> , <u>Turk's Cap</u>	<i>Malvaviscus drummondii</i>	1,2,3		3 – 4 ft	R	Summer	Sun to Light Shade	Well Drained
Patrinia	<i>Patrinia scabiosifolia</i>	1,2		4 – 5 ft	Y	Fall	Sun to Part Shade	Moist to Well Drained
<u>Russian Sage</u>	<i>Perovskia</i> species and hybrids	1,2,3		3 – 4 ft	L	Summer	Sun	Well Drained
<u>Garden Phlox*</u>	<i>Phlox paniculata</i>	1,2	'Robert Poore' 'David' 'Laura'	3 – 4 ft	W,P,L	Summer	Sun to Part Shade	Moist to Well Drained
<u>Moss Pinks</u> , <u>Thrift*</u>	<i>Phlox subulata</i>	1,2,3	Many Available	6 – 12 in	W,P,L,B	Spring	Sun to Light Shade	Well Drained
<u>Rudbeckia</u> , <u>Orange Coneflower*</u>	<i>Rudbeckia fulgida</i>	1,2,3	'Goldsturm'	3 ft	Y	Summer	Sun to Part Shade	Moist to Well Drained
Green Headed Coneflower*	<i>Rudbeckia laciniata</i>	1,2		3 – 4 ft	Y	Summer	Sun to Part Shade	Moist to Well Drained
<u>Dwarf Mexican Petunia</u>	<i>Ruellia brittoniana</i> 'Katie'	1,2,3		6 in	W,P,Pu	Summer	Sun to Light Shade	Well Drained
<u>Autumn Sage</u>	<i>Salvia greggii</i> <i>Salvia microphylla</i> and hybrids	1,2,3		2 – 4 ft	R,P,W,Pu	Spring and Fall	Sun to Light Shade	Well Drained
Anise Sage	<i>Salvia guaranitica</i>	1,2	'Black and Blue'	3 – 4 ft	B,Pu	Summer	Sun to Part Shade	Moist to Well Drained
<u>Mexican Bush Sage</u>	<i>Salvia leucantha</i>	1,2,3	'San Carlos Festival'	3 – 5 ft	Pu	Fall	Sun	Well Drained
'Indigo Spires' Sage	<i>Salvia</i> x 'Indigo Spires'	1,2,3		3 – 4 ft	B	Summer	Sun to Part Shade	Well Drained
<u>Pincushion Flower</u>	<i>Scabiosa columbaria</i>	1,2,3	'Butterfly Blue' 'Pink Mist'	18 in	B,P	Spring	Sun to Light Shade	Well Drained
<u>Sedum</u>	<i>Sedum</i> hybrids	1,2,3	'Matrona' 'Autumn Fire'	2 – 3 ft	P, R	Fall	Sun to Light Shade	Well Drained
<u>Stonecrops</u>	<i>Sedum reflexum</i> <i>Sedum album</i> <i>Sedum tetractinum</i>	2,3	'Blue Spruce' 'Murale'	6 – 8 in	W,Y	Spring	Sun	Well Drained to Xeric
<u>Hen and Chicks</u>	<i>Sempervivum tectorum</i>	2,3		6 – 12 in	Y	Spring	Sun	Well Drained to Xeric
Purple Heart	<i>Setcreasea pallida</i>	1,2,3		12 – 15 in	Pu	Summer	Sun to Light Shade	Well Drained
'Fireworks' Goldenrod*	<i>Solidago rugosa</i> 'Fireworks'	1,2,3		1-3 ft	Y	Fall	Sun to Part Shade	Moist to Well Drained

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height	Color	Time of Bloom	Exposure	Soil
<u>Lamb's Ear</u>	<i>Stachys byzantina</i>	2,3	'Helene Von Stein'	2 ft	Foliage	Evergreen	Sun to Light Shade	Well Drained
Stokes Aster*	<i>Stokesia laevis</i>	1,2	Several Available	1 –2 ft	B, L, W, Y	Summer	Sun to Part Shade	Moist to Well Drained
Carolina Lupine*	<i>Thermopsis caroliniana</i>	1,2		3 – 4 ft	Y	Spring	Sun to Part Shade	Moist to Well Drained
Verbena*	<i>Verbena canadensis</i>	1,2,3	'Homestead Purple' 'Snowflurry'	8 – 12 in	W,B,L,P	Spring and Summer	Sun to Light Shade	Moist to Well Drained
Creeping Veronica	<i>Veronica peduncularis</i>	1,2	'Georgia Blue'	8 in	B	Spring	Sun to Part Shade	Well Drained
Speedwell	<i>Veronica spicata</i>	1,2	'Sunny Border Blue'	2 ft	B,W,P	Spring	Sun to Part Shade	Well Drained
Rain Lily	<i>Zephyranthes</i> species and hybrids	1,2	Several Available	1 ft	W,Y,P	Summer and Fall	Sun to Part Shade	Moist to Well Drained

## Small Shrubs – 2' To 4' Tall

### EVERGREEN SHRUBS

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread (ft.)	Ornamental Characteristics	Soil	Exposure
'Rose Creek' Abelia	<i>Abelia x 'Rose Creek'</i>	1,2,3		2-3 x 2-3	Clusters of small white bell-shaped flowers summer and fall	Well Drained	Sun
Dwarf Aucuba	<i>Aucuba japonica</i>	1,2,3	'Nana'	3-4 x 2-3	Large, evergreen leaves	Well Drained	Part to Full Shade
Poet's Laurel	<i>Danae racemosa</i>	1,2,3		2-4 x 3-5	Graceful habit and handsome foliage. Slow growing	Well Drained	Part to Full Shade
Creeping Gardenia	<i>Gardenia radicans</i>	1,2		2-3 x 3-4	Fragrant white flowers in summer	Well Drained	Sun to Part Shade
Chinese Holly	<i>Ilex cornuta</i>	1,2,3	'Carissa' 'Rotunda'	3-4 x 4-5	Very tough. Glossy dark green foliage	Well Drained	Sun to Light Shade
Dwarf Yaupon Holly*	<i>Ilex vomitoria</i>	1,2,3	'Bordeaux' 'Schillings' 'Nana'	3-4 x 4-5	Extremely tough. Small leaves, fine texture	Well Drained to Xeric	Sun to Part Shade
Winter Jasmine	<i>Jasminum nudiflorum</i>	1,2,3		3-4 x 3-4	Yellow flowers in early spring	Well Drained	Sun to Part Shade
Chinese Juniper	<i>Juniperus chinensis</i>	2,3	'Old Gold' 'Gold Lace'	2-4 x 5-6	Many varieties have golden foliage, others have bluish needles	Well Drained to Xeric	Sun
Dwarf Nandina	<i>Nandina domestica</i>	1,2,3	'Firepower' 'Moon Bay' 'Gulf Stream' 'Harbor Dwarf'	2-3 x 2-3	All but 'Firepower' eventually produce red berries. Attractive foliage, red in winter	Well Drained	Sun to Part Shade
Dwarf Pittosporum	<i>Pittosporum tobira</i>	1,2,3	'Wheeler's Dwarf' 'Cream de Mint' 'Mojo'	3-4 x 4-5	Attractive foliage, 'Cream de Mint' is variegated	Well Drained to Xeric	Sun to Part Shade
Indian Hawthorne	<i>Raphiolepis indica</i>	1,2,3	'Olivia' 'Eleanor Taber' 'Indian Princess' 'Gulf Green'	2-4 x 4-5	White or Pink flowers in May. These varieties have good resistance to leaf spot disease	Well Drained	Sun
Azaleas	Rhododendron hybrids	1,2	Satsuki Varieties 'Gumpo' Varieties	2-3 x 3-4	Later flowering than most Azaleas	Well Drained	Light to Part Shade
'Conoy' Viburnum	<i>Viburnum x utile</i> 'Conoy'	1,2		3-5 x 5-8	Fragrant white flowers in spring	Well Drained	Sun to Part Shade
Adam's Needle Yucca*	<i>Yucca filamentosa</i>	1,2,3	'Color Guard' 'Garland Gold' 'Bright Edge'	2-4 x 2-4	Interesting texture, all of these varieties have gold variegation	Well Drained to Xeric	Sun

## DECIDUOUS SHRUBS

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread (ft.)	Ornamental Characteristics	Soil	Exposure
<u>Japanese Barberry</u>	<i>Berberis thunbergii</i>	1,2,3	'Crimson Pygmy'	2-3 x 3-4	Crimson foliage throughout growing season	Well Drained	Sun to Light Shade
<u>virginia Sweetspire*</u>	<i>Clethra alnifolia</i>	1,2	'Hummingbird' 'Sixteen Candles' 'White Doves'	2-3 x 4-6	Fragrant white flowers in mid-summer, yellow fall color	Moist to Well Drained	Sun to Part Shade
Dwarf Fothergilla*	<i>Fothergilla gardenii</i>	1,2		3-4 x 3-4	White flowers in spring, nice fall color	Moist to Well Drained	Sun to Part Shade
'Pia' Hydrangea	<i>Hydrangea macrophylla</i> 'Pia'	1,2		2-3 x 2-3	Pink or blue mophead flowers in summer	Well Drained	Sun to Part Shade
Virginia Sweetspire*	<i>Itea virginica</i>	1,2,3	'Little Henry' 'Merlot'	3-4 x 3-5	White flowers in spring, good autumn color	Moist to Well Drained	Sun/Shade
Japanese Spirea	<i>Spirea japonica</i> <i>Spirea x bumalda</i>	1,2,3	'Anthony Waterer' 'Goldflame' 'Shirobana' 'Gold Mound'	2-4 x 2-4	Pink flowers in summer. Some varieties have golden foliage	Well Drained	Sun to Light Shade
<u>'Snowmound' Spirea</u>	<i>Spirea nipponica</i> 'Snowmound'	1,2,3		3-5 x 4-5	White flowers in spring, bluish foliage	Well Drained	Sun to Light Shade

## Medium Shrubs – 4' To 8' Tall

### EVERGREEN SHRUBS

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread (ft.)	Ornamental Characteristics	Soil	Exposure
<u>Abelia</u>	<i>Abelia x grandiflora</i>	1,2,3		4-8 x 4-6	Small white flowers in summer and fall, attracts butterflies	Well Drained	Sun to Part Shade
Japanese Aucuba	<i>Aucuba japonica</i>	1,2		5-8 x 4-6	Large, thick leaves. Some varieties spotted in gold	Well Drained	Part to Full Shade
Wintergreen Barberry	<i>Berberis julianae</i>	1,2,3		6-8 x 6-8	Yellow flowers in spring, leaves turn bronze to burgundy in winter	Well Drained	Sun
<u>Bottlebrush</u>	<i>Callistemon rigidus</i>	1,2,3	'Woodlander's Hardy'	5-6 x 5-6	Unusual red flowers in spring	Well Drained	Sun
<u>Japanese Camellia</u>	<i>Camellia japonica</i>	1,2	Many Available		Red, Pink, White or Rose flowers in winter and early spring	Well Drained	Light to Part Shade
<u>Sasanqua Camellia</u>	<i>Camellia sasanqua</i>	1,2	Many Available		Red, White, Pink or Rose flowers in fall and winter	Well Drained	Light to Part Shade
Dwarf Hinoki Cypress	<i>Chamaecyparis obtusa</i> 'Nana Gracilis'	1,2		4-6 x 3-4	Unusual foliage texture, often seen in Japanese Gardens	Well Drained	Sun to Part Shade
<u>Mediterranean Fan Palm</u>	<i>Chamaerops humilis</i>	1,2,3		5-6 x 5-6	Beautiful texture, very slow growing	Well Drained	Sun to Light Shade
<u>King Sago</u>	<i>Cycas revoluta</i>	1,2		4-8 x 6	Unique textural effect, both are slow growing palm like plants	Well Drained	Sun to Part Shade
<u>Emporer Sago</u>	<i>Cycas taitungensis</i>	1,2		4-6 x 10			
Fatsia	<i>Fatsia japonica</i>	1,2		6-8 x 6-8	Large, glossy lobed leaves give a tropical effect	Well Drained	Part to Full Shade
<u>Pineapple Guava</u>	<i>Feijoa sellowiana</i>	1,2,3		6-10 x 5-8	Pink and crimson flowers in spring, gray foliage	Well Drained	Sun
Gardenia	<i>Gardenia jasminoides</i>	1,2	Several Available	4-8 x 4-8	Extremely fragrant white flowers in summer, glossy green leaves	Well Drained	Sun to Light Shade
Chinese Holly	<i>Ilex cornuta</i>	1,2,3	'Dwarf Burford'	5-7 x 6-8	Glossy green leaves, red berries in fall and winter	Well Drained	Sun to Light Shade
Inkerry Holly*	<i>Ilex glabra</i>	1,2,3	'Shamrock'	5-8 x 5-8	Small, dark green leaves, similar to boxwood	Moist to Well Drained	Sun to Light Shade
<u>Chinese Juniper</u>	<i>Juniperus chinensis</i>	2,3	'Sea Green'	4-6 x 6-8	Fountain like, arching branches, mint green foliage	Well Drained to Xeric	Sun

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread (ft.)	Ornamental Characteristics	Soil	Exposure
Japanese Privet	<i>Ligustrum japonicum</i>	1,2,3	'Recurvifolium' 'East Bay' 'Lake Tresca'	5-6 x 4-6	Tough evergreen shrub, dark green glossy foliage	Well Drained	Sun to Light Shade
Loropetalum	<i>Loropetalum chinense</i>	1,2	'Ruby' 'Burgundy'	4-6 x 4-6 6-8 x 6-8	Hot pink fringy flowers in spring, burgundy foliage throughout the season	Well Drained	Sun to Light Shade
<u>Leatherleaf Mahonia</u>	<i>Mahonia bealei</i>	1,2,3		6-8 x 3-4	Upright shrub with coarse spiny leaves. Very shade tolerant	Well Drained	Part to Full Shade
Banana Shrub	<i>Michelia figo</i>	1,2,3		6-8 x 6-8	Glossy dark green leaves. Small cream colored, banana scented flowers in spring	Well Drained	Sun to Part Shade
<u>Nandina Heavenly Bamboo</u>	<i>Nandina domestica</i>	1,2,3		5-8 x 3-4	Graceful foliage, large clusters of red berries in fall	Well Drained	Sun to Part Shade
<u>Oleander</u>	<i>Nerium oleander</i>	1,2,3	Several Available	6-10 x 4-8	Red, white, pink or salmon flowers in summer. All parts of this plant are poisonous	Well Drained to Xeric	Sun
<u>Pittosporum</u>	<i>Pittosporum tobira</i>	1,2,3	'Louisiana Compact' 'Variegata'	6-8 x 6-8	Small white fragrant flowers in spring	Well Drained to Xeric	Sun to Part Shade
<u>Firethorn</u>	<i>Pyracantha coccinea</i>						
<u>Pyracantha</u>	<i>Pyracantha koidzumii</i>	1,2,3	Many Available	6-10 x 4-8	Clusters of red or orange berries in fall and winter	Well Drained	Sun to Light Shade
Needle Palm	<i>Rhapidophyllum hystrix</i>	1,2,3		5-10 x 5-10	Slow growing, hardy palm	Well Drained	Sun to Part Shade
Azaleas - Southern Indica Varieties	<i>Rhododendron</i>	1,2	'Formosa' 'G.G.Gerbing' 'George Tabor'	6-8 x 6-8	Large growing, tough azaleas with white, magenta or pink flowers	Well Drained	Light to Part Shade
<u>Rosemary</u>	<i>Rosmarinus officinalis</i>	2,3		3-6 x 3-6	Blue flowers in spring, culinary herb	Well Drained to Xeric	Sun
Dwarf Palmetto*	<i>Sabal minor</i>	1,2,3		4-6 x 4-6	Hardy, shrub like palm	Moist to Well Drained	Sun to Part Shade
<u>Sandwanka Viburnum</u>	<i>Viburnum suspensum</i>	1,2,3		4-8 x 4-8	Leathery, dark green foliage. White flowers in spring	Well Drained to Xeric	Sun
<u>Tinus Viburnum Laurustinus</u>	<i>Viburnum tinus</i>	1,2	'Eve Price' 'Compactum' 'Spring Bouquet'	5-7 x 5-7	Dark green foliage, pink flower buds open to white in spring	Well Drained	Sun to Part Shade

## DECIDUOUS SHRUBS

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread (ft.)	Ornamental Characteristics	Soil	Exposure
'Brilliant' Chokeberry*	<i>Aronia arbutifolia</i> 'Brilliantissima'	1,2,3		6-8 x 6-8	White flowers in early spring, red berries persist all winter, excellent fall color	Moist to Well Drained	Sun to Light Shade
Butterfly Bush	<i>Buddleia davidii</i>	1,2,3	Many Available	4-8 x 4-6	White, Purple, Lavender, Rose, or yellow flowers in summer. Extremely fragrant, attracts lots of butterflies	Well Drained	Sun to Light Shade
American Beautyberry*	<i>Callicarpa americana</i>	1,2,3		4-6 x 4-6	Vibrant purple berries in fall, attracts songbirds	Moist to Well Drained	Sun to Part Shade
Sweetshrub, Carolina Allspice*	<i>Calycanthus floridus</i>	1,2,3	'Michael Lindsey'	6-8 x 6-8	Very fragrant maroon flowers in late spring	Moist to Well Drained	Sun to Part Shade
Clethra, Sweet Pepperbush*	<i>Clethra alnifolia</i>	1,2,3	'Ruby Spice' 'Chattanooga'	4-8 x 3-6	Extremely fragrant white or pink in summer. Yellow fall color	Moist to Well Drained	Sun to Part Shade
Dwarf Burning Bush	<i>Euonymus alatus</i> 'Compactus'	1,2,3		6-8 x 6-8	Excellent red fall color	Well Drained	Sun
Bigleaf Hydrangea	<i>Hydrangea macrophylla</i>	1,2	Many Varieties Available	4-6 x 4-8	Large clusters of pink or blue flowers in summer. Flower color will vary depending on soil pH	Well Drained	Light to Part Shade
Oakleaf Hydrangea*	<i>Hydrangea quercifolia</i>	1,2	'Alice'	6-8 x 6-8	Large panicles of white flowers in summer, excellent fall color	Moist to Well Drained	Sun to Part Shade
Virginia Sweetspire, Itea*	<i>Itea virginiana</i>	1,2,3	'Henry's Garnet'	4-6 x 4-8	White flowers in spring. Excellent fall color	Moist to Well Drained	Sun to Part Shade
Japanese Kerria	<i>Kerria japonica</i>	1,2		4-6 x 4-6	Bright yellow flowers in springs, green stems in winter	Well Drained	Light to Full Shade
Double Reeves Spirea	<i>Spirea cantoniensis</i> 'Lanceata'	1,2,3		4-6 x 4-6	Abundant white flowers in early spring	Well Drained	Sun
Vanhoutte Spirea	<i>Spirea x vanhouttei</i>	1,2,3		6-8 x 8-10	Abundant white flowers in early spring	Well Drained	Sun
Possumhaw Viburnum*	<i>Viburnum nudum</i>	1,2	'Winterthur'	6-8 x 6-8	White flowers in spring followed by pink and blue berries in fall. Good fall color	Moist to Well Drained	Sun to Part Shade
'Mohawk' Viburnum	<i>Viburnum x burkwoodii</i> 'Mohawk'	1,2		6-8 x 6-8	Red buds open to pink blossoms, very fragrant	Well Drained	Sun to Part Shade
Weigela	<i>Weigela florida</i>	1,2	'Wine and Roses'	4-6 x 4-6	Cherry pink flowers in spring, purple foliage all season	Well Drained	Sun to Light Shade

\*Indicates a plant native to SE USA

## Large Shrubs – Over 8’ Tall

### EVERGREEN SHRUBS

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread (ft)	Ornamental Characteristics	Soil	Exposure
Hedge Bamboo	<i>Bambusa multiplex</i>	1,2,3		15-20 x 6-10	Clump forming bamboo, interesting textural and vertical effect	Well Drained	Light to Part Shade
Pindo Palm,	<i>Butia capitata</i>	1,2,3		10-15 x 10-15	Bluish palm with long arching leaves	Well Drained	Sun
Elaeagnus	<i>Elaeagnus pungens</i> <i>Elaeagnus x ebbingii</i>	2,3		10-15 x 10-15	Very tough, rapidly growing shrubs, tolerant of salt spray	Well Drained to Xeric	Sun to Part Shade
Chinese Holly	<i>Ilex cornuta</i>	1,2,3	‘Burford’ ‘Fineline’ ‘Needlepoint’	8-15 x 6-12	Dark green glossy leaves, red berries in fall and winter	Well Drained	Sun to Light Shade
Yaupon Holly*	<i>Ilex vomitoria</i>	1,2,3		8-15 x 6-10	Translucent red or orange berries in fall and winter	Moist to Xeric	Sun to Part Shade
‘Nellie Stevens’ Holly	<i>Ilex x ‘Nellie R. Stevens’</i>	1,2,3		15-25 x 10-15	Red Berries in Fall/Winter	Moist to Well Drained	Sun to Part Shade
Anise Tree*	<i>Illicium parviflorum</i>	1,2,3		8-12 x 6-10	Large, olive green leaves. Vigorous, evergreen shrub	Moist to Well Drained	Sun to Part Shade
Chinese Juniper	<i>Juniperus chinensis</i>	2,3	‘Spartan’ ‘Hetzii Columnaris’	12-20 x 3-6	Upright, columnar shrubs with bright green needles	Well Drained to Xeric	Sun
Hollywood Juniper	<i>Juniperus chinensis</i> ‘Kaizuka’ also known as ‘Torulosa’	2,3		15-25 x 8-15	Branches grow in upright twisting pattern, resulting in architectural, Japanese effect	Well Drained to Xeric	Sun
Loropetalum	<i>Loropetalum chinensis</i>	1,2	‘Zhuzhou Fuchsia’	10-15 x 8-12	Hot pink fringy flower in early spring, maroon-purple foliage	Well Drained	Sun to Light Shade
Southern Waxmyrtle*	<i>Myrica cerifera</i>	1,2,3		8-15 x 8-15	Tough, fast growing shrub with olive green foliage	Moist to Xeric	Sun to Part Shade
Tea Olive, Osmanthus	<i>Osmanthus fragrans</i> <i>Osmanthus x fortunei</i>	1,2,3		10-15 x 10-15	Dark green foliage, exceptionally sweetly scented white flowers in fall	Well Drained	Sun to Part Shade
Chinese Podocarpus	<i>Podocarpus macrophyllus</i> var. <i>maki</i>	1,2		10-15 x 4-6	Dark green, narrow foliage, upright habit	Well Drained	Sun to Part Shade
‘Majestic Beauty’ Indian Hawthorn	<i>Rhaphiolepis umbellata</i> ‘Majestic Beauty’	1,2,3		8-10 x 8-10	Clusters of pink flowers in early summer	Well Drained	Sun

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread (ft)	Ornamental Characteristics	Soil	Exposure
Cleyera	<i>Ternstroemia gymnanthera</i>	1,2		8-12 x 5-6	Very dark green, shiny leaves, upright shrub	Well Drained	Sun to Full Shade
'Emerald' Arborvitae*	<i>Thuja occidentalis</i> 'Emerald'	1,2,3		10-15 x 3-4	Bright emerald green foliage held in vertical sprays, holds color in winter	Moist to Well Drained	Sun
'Chindo' Viburnum	<i>Viburnum awabuki</i> 'Chindo'	1,2,3		10-15 x 6-8	Dark green, glossy leaves, upright habit	Well Drained	Sun to Part Shade

### DECIDUOUS SHRUBS

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread (ft)	Ornamental Characteristics	Soil	Exposure
Flowering Quince	<i>Chaenomeles speciosa</i>	1,2,3		6-10 x 6-10	Early spring flowers in shades of red, pink, orange and white. Dwarf varieties are available	Well Drained	Sun to Light Shade
Forsythia	<i>Forsythia x intermedia</i>	1,2,3	'Lynwood Gold'	8-12 x 8-12	Bright yellow flowers in early spring	Well Drained	Sun to Light Shade
Rose of Sharon	<i>Hibiscus syriacus</i>	1,2,3	'Aphrodite', 'Diana', 'Helene', 'Minerva'	8-12 x 6-10	White, purple, or pink flowers in summer	Well Drained	Sun
Winterberry*	<i>Ilex decidua</i>	1,2	'Winter Red'	6-10 x 6-10	Branches covered in red berries in fall	Moist to Well Drained	Sun to Light Shade
Chinese Snowball Bush	<i>Viburnum macrocephalum</i>	1,2,3		12-15 x 10-15	Large, globe shaped clusters of white flowers in spring	Well Drained	Sun to Light Shade
Doublefile Viburnum	<i>Viburnum plicatum</i> var. <i>tomentosum</i>	1,2,3	'Shasta' 'Mariesii'	8-10 x 8-10	Horizontal branches covered with white flowers in spring	Well Drained	Sun to Part Shade

## Small Trees – 10’ To 30’ Tall

### EVERGREEN TREES

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Flowers/Fruit/Fall Color	Height/Spread (ft)	Growth Rate	Soil	Exposure
Loquat	<i>Eriobotrya japonica</i>	1,2,3		Fragrant White Flowers in Fall. Edible Fruit in Spring	15-20/15-20	Medium	Well Drained	Sun to Light Shade
Lusterleaf Holly	<i>Ilex latifolia</i>	1,2,3		Red Berries in Fall/Winter	20-25/15-20	Medium	Well Drained	Sun to Part Shade
American Holly*	<i>Ilex opaca</i>	1,2,3		Red Berries in Fall/Winter	20-30/15-20	Slow	Moist to Well Drained	Sun to Part Shade
Yaupon*	<i>Ilex vomitoria</i>	1,2,3	‘Hoskin’s Shadow’ ‘Kathy Ann’ ‘Katherine’	Red, Orange, or Yellow Berries in Fall/Winter	15-20/10-15	Medium to Fast	Moist to Xeric	Sun to Light Shade
Topel Holly*	<i>Ilex x attenuata</i>	1,2,3	‘Savannah’ ‘Fosters’ ‘Greenleaf’	Red Berries in Fall/Winter	20-30/10-15	Medium	Moist to Well Drained	Sun to Part Shade
‘Nellie Stevens’ Holly	<i>Ilex x ‘Nellie R. Stevens’</i>	1,2,3		Red Berries in Fall/Winter	15-25/10-15	Medium	Moist to Well Drained	Sun to Part Shade
‘Little Gem’ Magnolia*	<i>Magnolia grandiflora</i> ‘Little Gem’	1,2,3		Fragrant White Flowers in Summer	20-25/10-15	Slow to Medium	Moist to Well Drained	Sun to Part Shade
Sweet Bay*	<i>Magnolia virginiana</i>	1,2		Fragrant White Flowers in Spring	20-30/10-20	Medium to Fast	Moist to Well Drained	Sun to Part Shade
Waxmyrtle*	<i>Myrica cerifera</i>	1,2,3		Blue-Black Berries on Female Plants in Winter	10-20/10-20	Fast	Moist to Xeric	Sun to Light Shade
Carolina Cherrylaurel*	<i>Prunus caroliniana</i>	1,2,3		White Flowers in Spring	20-30/15-20	Fast	Well Drained to Xeric	Sun to Light Shade
Anise Tree*	<i>Illicium parviflorum</i>	1,2,3		Insignificant Flowers in Spring	10-15/10-15	Fast	Moist to Well Drained	Sun to Part Shade
Palmetto Palm*	<i>Sabal palmetto</i>	1,2,3		White Flowers in Summer	10-30/10-15	Slow	Moist to Well Drained	Sun to Part Shade

## DECIDUOUS TREES

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Flowers/Fruit/Fall Color	Height/Spread (ft)	Growth Rate	Soil	Exposure
Southern Sugar Maple*	<i>Acer barbatum</i>	1,2,3		Yellow and Orange Fall Color	20-25/15-20	Medium	Moist to Well Drained	Sun to Light Shade
Trident Maple	<i>Acer buergerianum</i>	1,2,3		Yellow, Orange and Red Fall Color	20-25/10-15	Medium	Well Drained	Sun
Japanese Maple	<i>Acer palmatum</i>	1,2	Many Available	Red Fall Color	15-25/10-20	Slow	Well Drained	Sun to Part Shade
Red Buckeye*	<i>Aesculus pavia</i>	1,2		Red flowers in Spring	10-20/10-15	Slow	Moist to Well Drained	Sun to Part Shade
Serviceberry*	<i>Amelanchier arborea</i>	1,2	'Autumn Brilliance'	White flowers in Spring, Orange Fall Color	20-25/10-15	Medium	Moist to Well Drained	Sun to Part Shade
Pawpaw*	<i>Asimina triloba</i>	1,2		Edible Fruit in Fall	15-20/10-15	Medium	Moist to Well Drained	Sun to Part Shade
Ironwood*	<i>Carpinus caroliniana</i>	1,2		Interesting Bark	20-30/15-25	Slow	Wet to Well Drained	Sun to Part Shade
Redbud*	<i>Cercis canadensis</i>	1,2,3	'Forest Pansy' 'Royal White' 'Oklahoma'	Purple or White Flowers in Spring	20-30/20-25	Medium	Moist to Well Drained	Sun to Part Shade
Chinese Fringetree	<i>Chionanthus retusus</i>	1,2,3		White Flowers in Spring	15-25/15-25	Slow	Well Drained	Sun to Part Shade
Fringe Tree*	<i>Chionanthus virginicus</i>	1,2		White Flowers in Spring	10-20/15-20	Slow to Medium	Moist to Well Drained	Sun to Part Shade
Flowering Dogwood*	<i>Cornus florida</i>	1,2	'Cloud 9' 'Cherokee Princess'	White Flowers in Spring, Burgundy Autumn Color	15-25/10-20	Slow to Medium	Moist to Well Drained	Sun to Part Shade
Kousa Dogwood	<i>Cornus kousa</i>	1,2		White Flowers in Spring	20-30/20-30	Slow to Medium	Well Drained	Sun to Light Shade
Washington Hawthorn*	<i>Crataegus phaenopyrum</i>	1,2,3		White Flowers in Spring, Red Fruit in Fall, Thorny	25-30/20-25	Medium	Moist to Well Drained	Sun to Light Shade
Carolina Silverbell*	<i>Halesia tetraptera</i>	1,2,3		White Flowers in Spring	20-30/15-20	Medium	Moist to Well Drained	Sun to Part Shade
Possumhaw*	<i>Ilex decidua</i>	1,2,3	'Warren's Red' 'Council Fire'	Red berries in Fall and Winter	15-20/10-15	Medium	Moist to Well Drained	Sun to Part Shade
Crape Myrtle	<i>Lagerstroemia hybrids</i>	1,2,3	Many Available—Hybrid varieties are preferable	Flowers in summer, color depending on variety.	15-30/10-25 Depending on Variety	Fast	Well Drained	Sun
Star Magnolia	<i>Magnolia stellata</i>	1,2,3		White or Pink Flowers in Spring	15-20/10-15	Slow	Well Drained	Sun to Light Shade

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Flowers/Fruit/Fall Color	Height/Spread (ft)	Growth Rate	Soil	Exposure
Saucer Magnolia	<i>Magnolia x soulangiana</i>	1,2,3		Pink Flowers in Spring	20-30/15-25	Medium	Well Drained	Sun to Light Shade
Sourwood*	<i>Oxydendrum arboreum</i>	1,2,3		White Flowers in Summer, Red Fall Color	25-30/15-20	Slow	Well Drained	Sun to Part Shade
'Okame' Cherry 'Dreamcatcher' Cherry	<i>Prunus campanulata hybrids</i>	1,2,3		Pink Flowers in Spring	20-30/15-20	Medium	Well Drained	Sun to Light Shade
Japanese Flowering Apricot	<i>Prunus mume</i>	1,2		Pink, Red, or White Flowers in Winter	15-25/15-25	Medium	Well Drained	Sun to Light Shade
Japanese Flowering Cherry	<i>Prunus serrulata</i>	1,2	'Kwanzan'	Pink Flowers in Spring	20-30/20-30	Medium	Well Drained	Sun to Light Shade
Higan Cherry	<i>Prunus subhirtella</i>	1,2	'Autumnalis'	Pink Flowers in Spring and Fall	20-30/15-25	Medium	Well Drained	Sun to Light Shade
Yoshino Cherry	<i>Prunus x yedoensis</i>	1,2		Light Pink Flowers in Spring	15-25/15-25	Medium	Well Drained	Sun to Light Shade
Japanese Snowbell	<i>Styrax japonicus</i>	1,2	'Emerald Pagoda' 'Pink Chimes'	W or P Flowers in Spring	20-30/20-30	Medium	Well Drained	Sun to Part Shade
Blackhaw Viburnum*	<i>Viburnum prunifolium</i>	1,2		White Flowers in Spring, Edible Black Fruit in Fall	10-20/10-15	Medium	Moist to Well Drained	Sun to Part Shade
Chastetree	<i>Vitex agnus-castus</i>	1,2,3		Pink, or Lavender-Blue Flowers in Summer	15-20/10-15	Medium	Well Drained	Sun

## Large Trees – Over 30' Tall

### EVERGREEN TREES

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Ornamental Features	Height x Spread (ft)	Growth Rate	Soil	Exposure
Deodar Cedar	<i>Cedrus deodora</i>	1,2,3		Grayish to Bluish Needles, Interesting Texture and Form	50-70 x 50-70	Medium	Well Drained	Sun
Atlantic White Cedar*	<i>Chamaecyparis thyoides</i>	1,2,3		Evergreen Needles	40-60 x 10-20	Medium	Moist to Well Drained	Sun
Japanese Cedar	<i>Cryptomeria japonica</i>	1,2,3	'Yoshino' 'Radicans'	Interesting Texture	40-60 x 20-30	Medium	Moist to Well Drained	Sun
<u>Eastern Red Cedar*</u>	<i>Juniperus virginiana</i>	2,3		Extremely Tough	30-50 x 10-20	Medium	Well Drained to Xeric	Sun
<u>Southern Magnolia*</u>	<i>Magnolia grandiflora</i>	1,2	'Alta', 'Hasse', 'D.D. Blanchard', 'Claudia Wannamaker'	Large, Fragrant W Flowers in Summer	60-80 x 30-50	Slow to Medium	Well Drained	Sun to Part Shade
<u>Longleaf Pine*</u>	<i>Pinus palustris</i>	1,2,3		Long Needles, Large Pinecones	50-60 x 15-20	Medium	Well Drained	Sun
Loblolly Pine*	<i>Pinus taeda</i>	1,2,3		Fast Growth	60-90 x 20-30	Fast	Moist to Well Drained	Sun
Laurel Oak*	<i>Quercus hemisphaerica</i>	1,2,3	'Darlington'	Small Leaves, Fine Texture	40-60 x 30-40	Medium	Well Drained	Sun
<u>Live Oak*</u>	<i>Quercus virginiana</i>	1,2,3		Wide Spreading, Drooping Branches	60-80 x 60-80	Medium	Well Drained to Xeric	Sun

## DECIDUOUS TREES

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Ornamental Features	Height x Spread (ft)	Growth Rate	Soil	Exposure
Red Maple*	<i>Acer rubrum</i>	1,2	'October Glory' 'Red Sunset'	O to R Fall Color	40-50 x 25-35	Medium	Moist to Well Drained	Sun to Light Shade
River Birch*	<i>Betula nigra</i>	1,2,3	'Heritage' 'Dura-heat'	White Bark	40-70 x 40-60	Fast	Moist to Well Drained	Sun
					60-80 x 50-70	Medium to Fast	Moist to Well Drained	Sun
<u>Sugarberry*</u>	<i>Celtis laevigata</i>	1,2,3		Smooth Gray Bark	60-80 x 50-70	Medium to Fast	Moist to Well Drained	Sun
American Beech*	<i>Fagus grandifolia</i>	1,2,3		Smooth Gray Bark, Tan Leaves in Winter	50-70 x 40-60	Slow	Well Drained	Sun
<u>Green Ash*</u>	<i>Fraxinus pennsylvanica</i>	1,2,3		Y Fall Color	50-60 x 40-50	Fast	Moist to Well Drained	Sun
<u>Ginkgo, Maidenhair Tree</u>	<i>Ginkgo biloba</i>	1,2,3	'Autumn Gold'	Y Fall Color	50-70 x 30-40	Slow	Well Drained	Sun
<u>Japanese Crape Myrtle</u>	<i>Lagerstroemia fauriei</i>	1,2,3	'Fantasy' 'Townhouse'	Dramatic Cinnamon Bark, Small W Flowers in Summer	30-40 x 25-35	Medium	Well Drained	Sun
Dawn Redwood	<i>Metasequoia glyptostroboides</i>	1,2		Ferny Foliage, Rusty Fall Color	60-100 x 20-25	Fast	Moist to Well Drained	Sun
Black Gum*	<i>Nyssa sylvatica</i>	1,2,3		R Fall Color	30-50 x 20-30	Slow to Medium	Moist to Well Drained	Sun
<u>Water Oak*</u>	<i>Quercus nigra</i>	1,2,3		Very Tough	50-80 x 30-60	Medium to Fast	Moist to Well Drained	Sun
<u>Water Oak*</u>	<i>Quercus nigra</i>	1,2,3		Very Tough	50-80 x 30-60	Medium to Fast	Moist to Well Drained	Sun
Nuttall Oak*	<i>Quercus nutallii</i>	1,2,3		R Fall Color	40-60 x 30-50	Medium	Moist to Well Drained	Sun
<u>Willow Oak*</u>	<i>Quercus phellos</i>	1,2,3		Dark Green Foliage, Fine Texture	80-100 x 40-50	Medium	Moist to Well Drained	Sun
Pondcypress*	<i>Taxodium ascendens</i>	1,2,3		Unusual Texture	60-80 x 15-20	Medium	Moist to Well Drained	Sun
Baldcypress*	<i>Taxodium distichum</i>	1,2,3		Lacey Foliage	50-70 x 20-30	Medium	Wet to Well Drained	Sun
<u>Lacebark Elm</u>	<i>Ulmus parvifolia</i>	1,2,3	'Bosque', 'Allee', 'Athena'	Bark Flakes in Patterns Exposing White, Brown, Green	40-50 x 30-40	Fast	Well Drained	Sun

## Hardy Palms<sup>14</sup>

### **Windmill Palm – *Trachycarpus fortunei***

An easy to grow palm tree forming a single slender trunk covered with burlap like fibers. Growing at a moderate rate, this palm can reach 20' or more in our area. The most cold tolerant tree forming palm, hardy to -5°F, with leaf damage beginning around 5°F. Native to central and eastern China.

### **Palmetto, Cabbage Palm – *Sabal palmetto***

Native from Bald Head Island, NC, down the coastline through Florida and the Bahamas, this tree trunk forming palm is hardy to 0°F with damage occurring at 10°F. This adaptable palm can reach 10' to 20' tall in our area, growing at a slow to moderate rate while forming massive trunks.



### **Jelly Palm, Pindo Palm – *Butia capitata***

The only feather palm commonly grown in the Southeast, Pindo palm produces gray-green to blue-green fronds that extend 6'-8' long. Growing at a slow rate, this palm can form massive trunks 10' high or taller. Hardy to 5°F with damage occurring at 15°F. Native to Uruguay and southern Brazil.

### **Needle Palm – *Rhapidophyllum hystrix***

A slow growing, understory palm forming dense clumps 5'-8' high and wide, whose crown is protected by numerous sharp needles, hence the common name. A rare SE native found growing on river flood plains from SC to Mississippi. This palm is hardy to at least -10°F and one of the easiest palms to grow in the Southeast, as long as a site with adequate moisture is provided. Best in light shade.

### **Dwarf Palmetto – *Sabal minor***

A shrub-like palm native from NC to Texas, and common in our area on flood plains. Slowly grows to form 4'-5' tall and wide clumps and may eventually form a short trunk. Prefers a moist sunny location. Hardy to -5°F with leaf damage beginning around 5°F. Very difficult to transplant when established due to extremely deep roots. Easily grown from seed.

### **Mediterranean Fan Palm – *Chamaerops humilis***

A small, clump forming palm with stiff leaves and spiny stems, native to rocky, coastal areas of the Western Mediterranean. In our area this palm will grow slowly to 5' tall and wide, requiring

<sup>14</sup> **The Palm Reader: A Manual for Growing Palms Outdoors in the Southeast.** Available online at: <http://www.ces.uga.edu/Agriculture/horticulture/Palmreader.html>. Prepared By: Charlotte Glen, Urban Horticulture Agent – Arboretum Coordinator, NC Cooperative Extension – NHC Center

good drainage and is very drought tolerant once established. Hardy to around 5°F, damage may begin at 15°F.

### **Saw Palmetto, Scrub Palm – *Serenoa repens***

Native throughout Florida and along the coast up to SC, the trunks of this low, spreading palm creep along the ground, rooting and branching as they grow. Prefers good drainage and is drought tolerant. Hardy to 0°F with damage occurring at 10° to 15°F. Silver and blue leaf forms are less hardy. Resembles Dwarf Palmetto in appearance but has spiny leaf stems.

### **Sago Palms – *Cycas* species**

Sago's are not actually true palms, but rather are ancient gymnosperms that have grown on earth since the days of the dinosaurs. Two species of Sago Palms are commonly grown in our area, King Sago (*Cycas revoluta*) and Emperor Sago (*Cycas taitungensis*). Both are slow growing, with foliage damage occurring around 15°F. King Sago can eventually reach 4'-8' tall and 6' wide, while Emperor Sago's grow 4'-6' tall and up to 10' wide.



© Jardin Mundani ©

## Ornamental Grasses

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Height x Spread	Soil	Exposure
Feather Reed Grass	<i>Calamagrostis brachytricha</i>	1,2,3		4' x 3'	Moist to Well Drained	Sun to Pt. Shade
Japanese Sedge	<i>Carex morrowii</i>	1,2	'Goldband' 'Variegata'	1' x 1' 1' x 1'	Moist to Well Drained	Lt. Shade to Shade
Weeping Japanese Sedge	<i>Carex oshimensis</i>	1,2	'Evergold'	1' x 2'	Moist to Well Drained	Lt. Shade to Shade
Chinese Sedge	<i>Carex phyllocephala</i>	1,2	'Sparkler'	2' x 2'	Moist to Well Drained	Lt. Shade to Shade
River Oats*	<i>Chasmanthum latifolium</i>	1,2,3		4' x 2'	Wet to Well Drained	Sun to Shade
Pampas Grass	<i>Cortaderia selloeana</i>	1,2,3		8' x 6'	Moist to Well Drained	Sun
<u>Blue Love Grass*</u>	<i>Eragrostis elliottii</i>	2,3		3' x 3'	Well Drained	Sun
Maiden Grass	<i>Miscanthus sinensis</i>	1,2,3	Many. Available, in many sizes	4'-8' x 3'-4'	Moist to Well Drained	Sun to Lt. Shade
<u>Muhly Grass*</u>	<i>Muhlenbergia capillaris</i>	2,3		3' x 3'	Well Drained to Xeric	Sun
<u>Blue Muhly Grass</u>	<i>Muhlenbergia lindheimeri</i>			5' x 3'	Well Drained to Xeric	Sun
<u>Panic Grass*</u>	<i>Panicum virgatum</i>	1,2,3	'Cloud Nine'	8' x 5'	Moist to Well Drained	Sun to Lt. Shade
			'Northwind'	5' x 3'		
			'Shenandoah'	4' x 2'		
<u>Fountain Grass</u>	<i>Pennisetum alopecuroides</i>	1,2,3	'Hameln' 'Cassian'	3' x 2'	Moist to Well Drained	Sun to Lt. Shade
<u>Tall Fountain Grass</u>	<i>Pennisetum orientale</i>	1,2,3	'Tall Tails'	6' x 4'	Moist to Well Drained	Sun
			'Karley Rose'	3' x 3'		
<u>Indian Grass*</u>	<i>Sorghastrum nutans</i>	1,2,3		6' x 3'	Moist to Well Drained	Sun

## Turf Grasses

All of the grasses listed below are warm season growers. Warm season grasses are well adapted to areas with hot summers and mild winters. They actively grow during spring, summer and fall and are dormant during winter. The best time to sow seed for these grasses is from spring to early summer (March/April – July). Plugs, springs and sod of these grasses establish best when planted in spring or summer (March – July).

Common Name	Botanical Name	Water Use Zone	Recommended Varieties	Shade Tolerance	Propagation	Rate of Establishment	Fertilizer (lbs of Nitrogen/1,000 sq. ft./yr)	Mowing Frequency	Mowing Height
Centipede	<i>Eremochloa ophiuroides</i>	1,2,3	Common 'TifBlair'	Moderate	Seed for common, Plugs, Sod for both	Slow	0.5	Low	1"
St. Augustine	<i>Stenotaphrum secundatum</i>	1,2	'Raleigh' 'Mercedes' 'Palmetto'	Very Good	Plugs, Sod	Moderate	2 to 3	Medium-High	2" to 3"
Zoysia	<i>Zoysia hybrids</i>	1,2,3	'Emerald' 'Meyer' 'El Toro' 'Zenith' 'Crowne' 'Empire' 'GN-Z'	Good	Only 'Zenith' can be grown from seed. All other varieties must be established by sprigs, plugs, or sod.	Very Slow to Moderate depending on variety	2 to 4 depending on variety	Low-Medium	0.75" to 1.5" depending on variety
Common Bermuda	<i>Cynodon dactylon</i>	1,2,3	'Princess' 'Jack Pot'	Very Poor	Seed. Springs, Plugs, Sod	Fast	4.5	Medium-High	1.0" to 1.5"
Hybrid Bermuda	<i>Cynodon dactylon hybrids</i>	1,2,3	'Tifway' 'TifSport' 'Vamont' 'GN-1' 'Celebration' 'Tifton-10'	Very Poor	Spring, Plugs, Sod	Moderate	5 to 6	Very High	0.75" to 1.5"

### FOR MORE INFORMATION . . . .

For complete information on turf selection and maintenance, refer to the following NC Cooperative Extension publications, available from the NHC Cooperative Extension Plant Information Clinic and online:

**NCSU Turf Files website**—Extensive information on all aspects of lawn establishment and maintenance

<http://www.turffiles.ncsu.edu/>

- **Carolina Lawns** <http://www.turffiles.ncsu.edu/pubs/management/ag69.html>
- **Organic Lawn Care** <http://www.turffiles.ncsu.edu/PUBS/MANAGEMENT/LAWNS2.PDF>

- **Turf Maintenance Calendars** – season by season guide to caring for each type of turfgrass

**Bermudagrass** <http://www.turffiles.ncsu.edu/pubs/management/ag431.html>

**Centipedegrass** <http://www.turffiles.ncsu.edu/pubs/management/ag381.html>

**St. Augustinegrass** <http://www.turffiles.ncsu.edu/PUBS/MANAGEMENT/AG-540.PDF>

**Zoysiagrass** <http://www.turffiles.ncsu.edu/pubs/management/ag432.html>

## Vines

### Climbing Type

Refers to the way a vine climbs and effects the type of support structure needed as follows:

- **Tendrils** – Tendrils are short curly stems that wrap around narrow structures like wire or bamboo. These vines need a support structure with small diameter elements and do very well on chain link fences or wires.
- **Clinging** – Clinging vines produce short root-like growths that act like adhesive pads. They easily climb trees, walls and wood fences with little assistance.
- **Twining** – Twining vines climb by wrapping their stems around and through their support structure. They grow well on lattice, chain link fence, or any structure they can weave through, but usually need a little help getting started.
- **Scrambler** – Scrambling vines produce long, supple stems that can be woven through the same type of support structures as twining vines. They generally need to be trained to climb up and through their support structure.

### EVERGREEN

Common Name	Botanical Name	Water Use Zone	Height	Flower Color/Time of Bloom	Climbing Type	Soil	Exposure
Evergreen Clematis	<i>Clematis armandii</i>	1,2	20'	White/Spring	Tendrils	Well Drained	Sun to Pt. Shade
Climbing Fig	<i>Ficus pumila</i>	1,2	30'+	Grown for Foliage	Clinging	Well Drained	Sun to Shade
Carolina Jessamine*	<i>Gelsemium sempervirens</i>	1,2,3	10'-20'	Yellow/Spring	Twining	Moist to Well Drained	Sun to Pt. Shade
English Ivy	<i>Hedera helix</i>	1,2,3	50'+	Grown for Foliage	Clinging	Well Drained	Sun to Shade
Coral Honeysuckle*	<i>Lonicera sempervirens</i>	1,2,3	10'-20'	Orange-Red-Yellow/Spring	Twining	Moist to Well Drained	Sun to Pt. Shade
Goldflame Honeysuckle	<i>Lonicera heckrottii</i> x	1,2	10'-20'	Pink/Spring	Twining	Moist to Well Drained	Sun to Lt. Shade
Confederate Jasmine	<i>Trachelospermum jasminoides</i>	1,2,3	15'	White/Summer	Twining	Well Drained	Sun
Evergreen Wisteria	<i>Millettia reticulata</i>	1,2	10'+	Purple/Summer	Twining	Well Drained	Sun
Fatshedera	X <i>Fatshedera lizei</i>	1,2	8'	Grown for Foliage	Scrambler	Moist to Well Drained	Pt. Shade to Shade
Greenbriar*	<i>Smilax laurifolia</i> <i>Smilax smallii</i>	1,2	15'+	Grown for Foliage	Scrambler	Moist to Well Drained	Sun to Shade

## DECIDUOUS

Common Name	Botanical Name	Water Use Zone	Height	Flower Color/Time of Bloom	Climbing Type	Soil	Exposure
Climbing Aster*	<i>Aster</i>	1,2	10'	Lavender-Pink/Fall	Scrambler	Moist to Well Drained	Sun to Lt. Shade
Fiveleaf Akebia	<i>Akebia quinata</i>	1,2,3	30'+	Purple/summer	Twining	Well Drained	Sun to Pt. Shade
Cross Vine*	<i>Bignonia capreolata</i> 'Tangerine Beauty'	1,2	30'+	Orange/Spring	Tendrils and Clinging	Moist to Well Drained	Sun to Lt. Shade
Large Flowered Clematis	<i>Clematis</i> hybrids	1,2	10'	Purple, pink, white/Spring	Tendrils	Well Drained	Sun to Pt. Shade
Climbing Hydrangea*	<i>Decumaria barbara</i>	1,2	20'	White/Summer	Clinging	Moist to Well Drained	Lt. Shade to Shade
Virginia Creeper*	<i>Parthenocissus quinquefolia</i>	1,2,3	30'+	Grown for foliage	Tendrils and Clinging	Moist to Well Drained	Sun to Shade
Boston Ivy	<i>Parthenocissus tricuspidata</i>	1,2,3	30'+	Grown for foliage	Tendrils and Clinging	Well Drained	Sun to Shade
Passionflower	<i>Passiflora x alato-caerulea</i> <i>Passiflora x 'Incence'</i>	1,2	10'+	Purple/Summer	Tendrils	Well Drained	Sun to Lt. Shade
Lady Banks' Rose	<i>Rosa banksiae</i> 'Lutea'	1,2,3	20'	Yellow/Spring	Scrambler	Well Drained	Sun to Lt. Shade
Climbing Rose	<i>Rosa species</i>	1,2	10'	Many colors/Spring	Sprambler	Well Drained	Sun to Lt. Shade
Japanese Hydrangea Vine	<i>Schizophragma hydrangeoides</i>	1,2	20'-30'	White/Summer	Clinging	Well Drained	Pt. Shade to Shade
American Wisteria*	<i>Wisteria frutescens</i>	1,2,3	20'-30'	Lilac/Spring	Twining	Moist to Well Drained	Sun

## Salt Tolerant Plants

---

### Coastal Challenges

Plants growing at the beach are subjected to environmental conditions much different than those planted further inland. Factors such as blowing sand, poor soils, high temperatures, and excessive drainage all influence how well plants perform in coastal landscapes, though the most significant effect on growth is salt spray. Most plants will not tolerate salt accumulating on their foliage, making plant selection for beachfront landscapes particularly challenging.



### Salt Spray

Salt spray is created when waves break on the beach, throwing tiny droplets of salty water into the air. On-shore breezes blow this salt laden air landward where it comes in contact with plant foliage. The amount of salt spray plants receive varies depending on their proximity to the beachfront, creating different vegetation zones as one gets further away from the beachfront. The most salt-tolerant species survive in the frontal dune area. As distance away from the ocean increases, the level of salt spray decreases, allowing plants with less salt tolerance to survive.

### Natural Protection

The impact of salt spray on plants can be lessened by physically blocking salt laden winds. This occurs naturally in the maritime forest, where beachfront plants protect landward species by creating a layer of foliage that blocks salt spray. It is easy to see this effect on the ocean side of maritime forest plants, which are “sheared” by salt spray, causing them to grow at a slant away from the oceanfront. Removal of this “shear zone” during construction opens holes that allow salt spray to blow through, damaging plants that were previously protected.

### Manmade Protection

Buildings, fences and other structures that block salt laden winds also allow plants with less salt tolerance to grow landward of a structure. Homes near the ocean will have two distinct micro-environments based on salt spray. The side of the house facing the ocean will require landscape plants with high salt tolerance. The landscape area on the landward side that is protected from salt spray may be planted with species having little or no salt tolerance depending upon the degree they are protected from blowing winds. Frequent overhead irrigation rinses salt accumulations off plant foliage, reducing the impact to less salt-tolerant species.

### Landscaping at the Beach

The following plant lists have been compiled to assist homeowners and landscape professionals to choose appropriate plants for coastal landscapes. The lists are divided by

plant type (trees, shrubs, vines, groundcovers, etc.) and three levels of salt tolerance (high, moderate, slight) and have been compiled from the references listed on the last page as well as personal observation.

Properties within at least one-eighth of a mile of the oceanfront should be landscaped with plants known to have some level of salt tolerance. Properties along or near brackish water estuaries should also be landscaped with plants possessing some degree of salt tolerance, though not necessarily as high as those on the oceanfront. During hurricanes and coastal storms, salt laden winds extend further inland than normal. This causes damage to plants that are not salt tolerant, though they generally recover following the storm event.

Other factors to take into consideration when choosing plants for coastal landscapes include soil pH, which can be determined by sending a soil sample to the NC Department of Agriculture (boxes, forms and instructions are available from your local Cooperative Extension office); sun and wind exposure; and soil type. Incorporating composted organic matter into the soil will greatly increase the soil's ability to hold moisture and improve plant growth. Applying two to four inches of mulch will also help plant growth by reducing soil temperature and conserving moisture. Organic mulches such as pine straw or shredded bark mulches decompose over time, adding to the organic matter content of the soil.

#### **Dune Preservation and Vegetation Restoration:**

Preservation of the natural dune system and its native vegetation is critical to protecting both natural and manmade coastal landscapes. More information about the natural dune system and restoring its vegetation is available online as follows:

- *Restoration and Management of Coastal Dune Vegetation*, from the NCSU Soil Science Department: [http://www.soil.ncsu.edu/lockers/Broome\\_S/ram.html](http://www.soil.ncsu.edu/lockers/Broome_S/ram.html)
- *The Dune Book*, by David Nash and Spencer Rogers, available from NC Sea Grant at: [http://www.ncseagrant.org/files/dune\\_booklet.pdf](http://www.ncseagrant.org/files/dune_booklet.pdf)

### **KEY TO PLANT LISTS**

---

#### **Highly Salt Tolerant**

Plants tolerant of the direct salt spray such as that received along dunes and immediately adjacent to the oceanfront.

#### **Moderately Salt Tolerant**

Plants tolerant of moderate levels of salt spray, such as that received in landscapes adjacent to the beach front, but which are sheltered by other plants, structures or natural dunes.

#### **Slightly Salt Tolerant**

Plants with the lowest level of tolerance to salt spray. These plants should be used only in

areas receiving some protection from direct salt spray, either from a building or other vegetation. In areas that are completely sheltered, plants with no known salt tolerance can be grown.

### **Underlined Plants**

Plants that are extremely tolerant of growing in sandy, poor soils and display extreme drought tolerance once established.

### **\*Native**

Plants that are native to the coastal plains of the southeast USA, ranging from New Jersey south along the Atlantic Seaboard through Florida and along the Gulf Coast to East Texas.

### **‘Cultivar Names’**

Cultivar names are written in single quotes. Cultivars, or varieties, are plants that have been selected because they display desirable characteristics such as larger flowers, different color foliage, more compact growth, etc. Cultivars are propagated vegetatively (cuttings, division, tissue culture) so they are genetically identical to each other.

### **Evergreen/Deciduous**

E or D refers to whether a plant is evergreen (retains its foliage all year) or deciduous (sheds its foliage each fall and grows new leaves in spring).

### **Exposure**

Refers to the amount of sunlight a site receives as follows:

- **Full sun** indicates a site that receives at least 8hrs of direct sun each day.
- **Light Shade** indicates a site that is shaded less than half of the day by a light high shade such as that cast by pines.
- **Part Shade** indicates a site that is shaded for half the day by a dense shade like that cast by buildings or shade trees.
- **Full Shade** indicates a site that is in shade all day.

### **Soil**

Refers to soil condition at the site as follows:

- **Wet** indicates a site that stays moist most of the time and receives periodic flooding.
- **Moist** indicates a site that is moist most of the time with brief (less than 12hrs) periods of standing water.
- **Well Drained** indicates a site where water drains from the surface and rarely stands.
- **Xeric** indicates a site that is extremely dry and sandy with very little ability to hold water.

## Groundcovers

### HIGHLY SALT TOLERANT

Common Name	Botanical Name	Height	Exposure	Soil Conditions
Winter Creeper	<i>Euonymus fortunei</i>	6"-2'	Full Sun to Full Shade	Well Drained
'Blue Pacific' Juniper	<i>Juniperus conferta</i> 'Blue Pacific'	12"-18"	Full Sun	Well Drained to Xeric
Spreading Liriope	<i>Liriope spicata</i>	12"	Full Sun to Full Shade	Moist to Well Drained
Mondograss	<i>Ophiopogon japonicus</i>	6"-10"	Part to Full Shade	Well Drained
Creeping Rosemary	<i>Rosmarinus officinalis</i> 'Prostratus'	12"-18"	Full Sun	Well Drained to Xeric
Golden Stonecrop	<i>Sedum acre</i>	4"- 6"	Full Sun to Light Shade	Well Drained

### MODERATELY SALT TOLERANT

Common Name	Botanical Name	Height	Exposure	Soil Conditions
Beach Wormwood*	<i>Artemisia stelleriana</i>	6"- 12"	Full Sun	Well Drained to Xeric
Silver and Gold	<i>Chrysanthemum pacificum</i>	12"-18"	Full Sun	Well Drained
Algerian Ivy	<i>Hedera canariensis</i>	12"	Light to Full Shade	Well Drained
English Ivy	<i>Hedera helix</i>	6"-12"	Part to Full Shade	Well Drained
Creeping Juniper*	<i>Juniperus horizontalis</i>	10"-12"	Full Sun	Well Drained to Xeric
Liriope	<i>Liriope muscarii</i>	12"- 18"	Light to Full Shade	Moist to Well Drained
Star Jasmine	<i>Trachelospermum asiaticum</i>	6"-8"	Light to Part Shade	Well Drained

### SLIGHTLY SALT TOLERANT

Common Name	Botanical Name	Height	Exposure	Soil Conditions
Cast Iron Plant	<i>Aspidistra elatior</i>	3'	Part to Full Shade	Well Drained
Beach St. John's Wort*	<i>Hypericum reductum</i>	12"	Full Sun	Well Drained to Xeric
Periwinkle, Vinca	<i>Vinca minor</i>	6"	Light to Full Shade	Moist to Well Drained

## Salt Tolerant Annuals

Most annuals do not tolerate salt spray but the following have proven to tolerant moderate levels. Most are perennials in warmer climates but are usually killed by the average winter temperatures in this area and so are best grown as annuals. In addition to those listed below, Allamanda, Bouganvilla and Mandevilla vines all tolerate moderate levels of salt spray, though are not hardy in this climate (USDA Hardiness zone 8a).

<b>Common Name</b>	<b>Scientific Name</b>
Baby Sun Rose	<i>Aptenia cordifolia</i>
Blue Daze	<i>Evolvulus glomeratus</i>
Joseph's Coat	<i>Alternanthera ficoidea</i>
Vinca, Periwinkle	<i>Catharanthus roseus</i>
Pentas	<i>Pentas lanceolata</i>
Moss Rose	<i>Portulaca grandiflora</i>
Coleus	<i>Solenostemon</i> hybrids

## Drought Tolerant Annuals

The following annuals do not have any known salt spray tolerance but do grow well even in sandy, poor soils and are therefore recommended for planting in coastal gardens in sheltered sites.

<b>Common Name</b>	<b>Scientific Name</b>
Wheat Celosia	<i>Celosia spicata</i>
Globe Amaranth	<i>Gomphrena globosa</i>
Melampodium	<i>Melampodium padulosum</i>
Porterweed	<i>Stachytarpheta jamaicensis</i>
Mealycup Sage*	<i>Salvia farinacea</i>
Mexican Sunflower	<i>Tithonia rotundifolia</i>
Narrow Leaf Zinnia	<i>Zinnia angustifolia</i>

## Perennials

### HIGHLY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft.)	Exposure	Soil
<u>Blanket Flower</u> Gaillardia*	<i>Gaillardia pulchella</i>	1-2 x 1-2	Sun	Well Drained to Xeric
<u>Daylily</u>	<i>Heemerocallis</i> species and hybrids	1-4 x 1-4	Sun/Partial Shade	Moist to Well Drained
<u>Lantana</u>	<i>Lantana camara</i> <i>Lantana montevidensis</i>	2-4 x 3-6	Sun	Well Drained to Xeric
<u>Prickly Pear Cactus*</u>	<i>Opuntia compressa</i>	1-2 x 2-3	Sun	Well Drained to Xeric
<u>Lavender Cotton</u>	<i>Santolina chamaecyparissus</i>	1-2 x 2	Sun	Well Drained
<u>Seaside Goldenrod*</u>	<i>Solidago sempervirens</i>	4-6 x 3-4	Sun	Well Drained to Xeric

### MODERATELY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft.)	Exposure	Soil
<u>Fern Leaf Yarrow</u>	<i>Achillea filipendulina</i>	3-4 x 2-3	Sun	Well Drained
<u>Common Yarrow</u>	<i>Achillea millefolium</i>	2-3 x 3	Sun	Well Drained to Xeric
<u>Agapanthus</u>	<i>Agapanthus africanus</i>	2-4 x 2	Sun to Part Shade	Well Drained
<u>Sea Thrift</u>	<i>Armeria maritima</i>	1 x 1	Sun to Part Shade	Well Drained
<u>Butterfly Weed*</u>	<i>Asclepias tuberosa</i>	2-3 x 2-3	Sun	Well Drained to Xeric
<u>Asparagus Fern</u>	<i>Asparagus densiflorus</i> 'Sprengeri'	2-3 x 2-3	Sun to Part Shade	Well Drained
<u>Crinum Lily</u>	<i>Crinum</i> species and hybrids	2-4 x 2-4	Sun to Part Shade	Moist to Well Drained
<u>Mexican Heather</u>	<i>Cuphea hyssopifolia</i>	1 x 2	Sun	Well Drained
<u>Hardy Ice Plant</u>	<i>Delosperma cooperi</i> <i>Delosperma nubigenum</i>	6" x 1-2	Sun	Well Drained to Xeric
<u>Cheddar Pinks, Dianthus</u>	<i>Dianthus gratianopolitanus</i>	6"-1 x 1-2	Sun	Well Drained to Xeric
<u>Hummingbird Plant</u>	<i>Dicliptera suberecta</i>	1-2 x 3-4	Sun	Well Drained
<u>Firebush*</u>	<i>Hamelia patens</i>	3-5 x 3-4	Sun	Well Drained
<u>Hardy Ginger Lily</u>	<i>Hedychium</i> species and hybrids	4-6 x 3-5	Sun to Part Shade	Moist to Well Drained
<u>Candytuft</u>	<i>Iberis sempervirens</i>	6"-1 x 2-3	Sun	Well Drained
<u>Red False Aloe</u>	<i>Hesperaloe parviflora</i>	3-4 x 2-4	Sun	Well Drained to Xeric
<u>Turk's Cap*</u>	<i>Malvaviscus drummondii</i>	3-4 x 3-4	Sun	Well Drained
<u>Nippon Daisy</u>	<i>Nipponanthemum nipponicum</i>	2-3 x 2-3	Sun	Well Drained
<u>Seashore Mallow*</u>	<i>Kosteletzkya virginica</i>	4-6 x 3-4	Sun to Part Shade	Moist to Well Drained

Common Name	Botanical Name	Height x Spread (ft.)	Exposure	Soil
<u>Firecracker Plant</u>	<i>Russelia equisetiformis</i>	3-4 x 3-4	Sun	Well Drained
Purple Heart	<i>Setcreasea pallida</i>	1 x 2	Sun to Light Shade	Well Drained
<u>Hen and Chicks</u>	<i>Sempervivum tectorum</i>	6"-1 x 1	Sun	Well Drained to Xeric
<u>Society Garlic</u>	<i>Tulbughia violacea</i>	1 x 1	Sun	Well Drained

### SLIGHTLY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft.)	Exposure	Soil
Angel's Trumpets	<i>Brugmansia</i>	4-6 x 4-6	Sun to Part Shade	Well Drained
Canna Lily	<i>Canna</i> hybrids	4-8 x 2-6	Sun to Part Shade	Moist to Well Drained
Holly Fern	<i>Cyrtomium falcatum</i>	1-2 x 1-2	Part Shade to Shade	Moist to Well Drained
Golden Dewdrop	<i>Duranta erecta</i>	3-5 x 3-5	Sun to Part Shade	Well Drained
Purple Coneflower*	<i>Echinacea purpurea</i>	3-5 x 2-4	Sun to Part Shade	Well Drained
Hardy Hibiscus*	<i>Hibiscus moscheutos</i> <i>Hibiscus coccineus</i> <i>Hibiscus</i> hybrids	4-6 x 4-6	Sun to Light Shade	Moist to Well Drained
Hosta	<i>Hosta</i> species and hybrids	1-3 x 1-3	Part to Full Shade	Well Drained
<u>Red Hot Poker</u>	<i>Kniphofia</i> species and hybrids	2-4 x 1-3	Sun	Well Drained
Daffodil	<i>Narcissus</i>	1 x 1	Sun to Part Shade	Well Drained
Leadwort, Blue jasmine	<i>Plumbago auriculata</i>	3-4 x 3-4	Sun	Well Drained
Dwarf Mexican Petunia	<i>Ruellia brittoniana</i> 'Katie'	6" x 1	Sun to Light Shade	Well Drained
Autumn Sage*	<i>Salvia greggii</i> <i>Salvia microphylla</i>	2-4 x 2-4	Sun to Light Shade	Well Drained
Princess Flower	<i>Tibouchina urvilleana</i>	3-5 x 3-5	Sun to Light Shade	Well Drained
<u>Common Thyme</u>	<i>Thymus vulgaris</i>	1 x 1	Sun	Well Drained
Verbena*	<i>Verbena canadensis</i>	1 x 2-3	Sun to Light Shade	Moist to Well Drained

## Drought Tolerant Perennials

The following drought tolerant perennials perform well in sandy, poor soils. Though they are not known to tolerate salt spray, they are recommended for coastal gardens when planted in sites sheltered from salt spray.

<b>Common Name</b>	<b>Scientific Name</b>
'Blue Fortune' Hyssop	<i>Agastache</i> x 'Blue Fortune'
Arkansas Blue Star*	<i>Amsonia hubrichtii</i>
Texas Firecracker*	<i>Anisacanthus wrightii</i>
'Powis Castle' Artemisia	Artemisia x 'Powis Castle'
False Wild Indigo*	<i>Baptisia</i> species and hybrids
Wine Cups*	<i>Callirhoe involucrata</i>
Threadleaf Coreopsis*	<i>Coreopsis verticillata</i>
Gaura*	<i>Gaura lindheimeri</i>
Russian Sage	<i>Perovskia</i> hybrids
Moss Pinks*	<i>Phlox subulata</i>
'Goldsturm' Rudbeckia*	<i>Rudbeckia fulgida</i> 'Goldsturm'
Mexican Bush Sage	<i>Salvia leucantha</i>
'Indigo Spires' Salvia	<i>Salvia</i> x 'Indigo Spires'
Stonecrops	<i>Sedum</i> species
Lamb's Ear	<i>Stachys byzantina</i>

## Shrubs

### HIGHLY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
Century Plant	<i>Agave americana</i>	5-7 x 8-12	E	Well Drained to Xeric	Sun
Elaeagnus	<i>Elaeagnus pungens</i> <i>Elaeagnus x ebbingii</i>	10-15 x 10-15	E	Well Drained to Xeric	Sun to Part Shade
<u>Dwarf Yaupon</u> <u>Holly*</u>	<i>Ilex vomitoria</i> 'Nana', 'Bordeaux', 'Schilling's'	3-4 x 4-5	E	Well Drained to Xeric	Sun to Part Shade
<u>Oleander</u>	<i>Nerium oleander</i>	6-10 x 4-8	E	Well Drained to Xeric	Sun
New Zealand Flax	<i>Phormium tenax</i>	4-6 x 4-6	E	Well Drained	Sun
<u>Pittosporum</u>	<i>Pittosporum tobira</i>	6-8 x 6-8	E	Well Drained to Xeric	Sun to Part Shade
<u>Dwarf Pittosporum</u>	<i>Pittosporum tobira</i> 'Wheeler's Dwarf', 'Mojo', 'Cream de Mint'	3-4 x 3-5	E	Well Drained to Xeric	Sun to Part Shade
<u>'Majestic Beauty'</u> <u>Indian Hawthorn</u>	<i>Rhaphiolepis umbellata</i> 'Majestic Beauty'	8-10 x 8-10	E	Well Drained	Sun
<u>Rugosa Rose</u>	<i>Rosa rugosa</i>	3-5 x 4-6	D	Well Drained	Sun
<u>Rosemary</u>	<i>Rosmarinus officinalis</i>	3-6 x 3-6	E	Well Drained to Xeric	Sun
<u>Butcher's Broom</u>	<i>Ruscus aculeatus</i>	2-3 x 2-3	E	Well Drained	Part Shade to Shade
<u>Sandwanka</u> <u>Viburnum</u>	<i>Viburnum suspensum</i>	4-8 x 4-8	E	Well Drained to Xeric	Sun
<u>Yucca*</u>	<i>Yucca gloriosa</i> <i>Yucca aloifolia</i>	6-8 x 4-8	E	Well Drained to Xeric	Sun

### MODERATELY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
Japanese Aucuba	<i>Aucuba japonica</i>	5-8 x 4-6	E	Well Drained	Part to Full Shade
Dwarf Aucuba	<i>Aucuba japonica</i> 'Nana'	3-4 x 2-3	E	Well Drained	Part to Full Shade
Hedge Bamboo	<i>Bambusa multiplex</i>	15-20 x 6-10	E	Well Drained	Light to Part Shade
Wintergreen Barberry	<i>Berberis julianae</i>	6-8 x 6-8	E	Well Drained	Sun
<u>Bottlebrush</u>	<i>Callistemon rigidus</i>	5-6 x 5-6	E	Well Drained	Sun
Flowering Quince	<i>Chaenomeles speciosa</i>	6-10 x 6-10	D	Well Drained	Sun to Light Shade
Sweet Pepperbush, Clethra*	<i>Clethra alnifolia</i>	4-8 x 3-6	D	Moist to Well Drained	Sun to Part Shade

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
Dwarf Sweet Pepperbush, Clethra*	<i>Clethra alnifolia</i> 'Hummingbird', 'White Doves', 'Sixteen Candles'	2-3 x 4-6	D	Moist to Well Drained	Sun to Part Shade
Fragrant Daphne	<i>Daphne odora</i>	2-3 x 2-3	E	Well Drained	Part Shade
Japanese Euonymus	<i>Euonymus japonicus</i>	4-10 x 3-6	E	Well Drained	Sun to Shade
Fatsia	<i>Fatsia japonica</i>	6-8 x 6-8	E	Well Drained	Part to Full Shade
Pineapple Guava	<i>Feijoa sellowiana</i>	6-10 x 5-8	E	Well Drained	Sun
Forsythia	<i>Forsythia x intermedia</i>	8-12 x 8-12	D	Well Drained	Sun to Light Shade
Rose of Sharon	<i>Hibiscus syriacus</i>	8-12 x 6-10	D	Well Drained	Sun
Bigleaf Hydrangea	<i>Hydrangea macrophylla</i> Many varieties available	4-6 x 4-8	D	Well Drained	Light to Part Shade
'Carissa' Holly	<i>Ilex cornuta</i> 'Carissa'	3-4 x 4-5	E	Well Drained	Sun to Part Shade
'Rotunda' Holly	<i>Ilex cornuta</i> 'Rotunda'	3-4 x 4-5	E	Well Drained	Sun to Part Shade
'Needlepoint' Holly	<i>Ilex cornuta</i> 'Needlepoint'	8-15 x 6-12	E	Well Drained	Sun to Light Shade
Inkerry Holly*	<i>Ilex glabra</i>	5-8 x 5-8	E	Moist to Well Drained	Sun to Light Shade
Chinese Juniper	<i>Juniperus chinensis</i> Many varieties available	2-12 x 4-8 depending on variety	E	Well Drained to Xeric	Sun
Texas Sage	<i>Leucophyllum frutescens</i>	4-6 x 4-6	E	Well Drained	Sun
Japanese Privet	<i>Ligustrum japonicum</i>	6-12 x 5-10	E	Well Drained	Sun to Light Shade
Leatherleaf Mahonia	<i>Mahonia bealei</i>	6-8 x 3-4	E	Well Drained	Part to Full Shade
Firethorn, Pyracantha	<i>Pyracantha coccinea</i>	6-10 x 4-8	E	Well Drained	Sun to Light Shade
Indian Hawthorne	<i>Rhaphiolepis indica</i>	2-4 x 3-5	E	Well Drained	Sun
Azaleas - Southern Indica Varieties	<i>Rhododendron</i> 'Formosa', 'G.G. Gerbing', 'George Tabor'	6-8 x 6-8	E	Well Drained	Light to Part Shade
Satsuki Azaleas	<i>Rhododendron</i> Satsuki Varieties, 'Gumpo' Series	2-3 x 3-4	E	Well Drained	Light to Part Shade
Stinking Viburnum	<i>Viburnum odoratissimum</i>	8-15 x 6-12	E	Well Drained	Sun to Part Shade
Adam's Needle Yucca*	<i>Yucca filamentosa</i>	2-4 x 2-4	E	Well Drained to Xeric	Sun

### SLIGHTLY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
Abelia	<i>Abelia x grandiflora</i>	4-8 x 4-6	E	Well Drained	Sun to Part Shade
'Brilliant' Chokeberry*	<i>Aronia arbutifolia</i> 'Brilliantissima'	6-8 x 6-8	D	Moist to Well Drained	Sun to Light Shade
Japanese Barberry	<i>Berberis thunbergii</i>	2-3 x 3-4	D	Well Drained	Sun to Light Shade
Butterfly Bush	<i>Buddleia davidii</i>	4-8 x 4-6	D	Well Drained	Sun to Light Shade
American Beautyberry*	<i>Callicarpa americana</i>	4-6 x 4-6	D	Moist to Well Drained	Sun to Part Shade
Japanese Camellia	<i>Camellia japonica</i> Many varieties available	6-12 x 4-8	E	Well Drained	Light to Part Shade
Sasanqua Camellia	<i>Camellia sasanqua</i>	6-10 x 4-8	E	Well Drained	Light to Part Shade
Gardenia	<i>Gardenia jasminoides</i>	4-8 x 4-8	E	Well Drained	Sun to Light Shade
Winterberry*	<i>Ilex verticillata</i>	6-10 x 6-10	D	Moist to Well Drained	Sun to Light Shade
Banana Shrub	<i>Michelia figo</i>	6-8 x 6-8	E	Well Drained	Sun to Part Shade
<u>Nandina Heavenly Bamboo</u>	<i>Nandina domestica</i>	5-8 x 3-4	E	Well Drained	Sun to Part Shade
Dwarf Nandina	<i>Nandina domestica</i> 'Firepower', 'Moon Bay', 'Harbor Belle'	2-4 x 1-3	E	Well Drained	Sun to Part Shade
Tea Olive, Osmanthus	<i>Osmanthus fragrans</i> <i>Osmanthus x fortunei</i>	10-15 x 10-15	E	Well Drained	Sun to Part Shade
<u>Double Reeves Spirea</u>	<i>Spirea cantoniensis</i> 'Lanceata'	4-6 x 4-6	D	Well Drained	Sun
Cleyera	<i>Ternstroemia gymnanthera</i>	8-12 x 5-6	E	Well Drained	Sun to Full Shade
Walter's Viburnum*	<i>Viburnum obovatum</i>	4-12 x 4-10	E	Moist to Well Drained	Sun
Tinus Viburnum, Laurustinus	<i>Viburnum tinus</i>	5-7 x 5-7	E	Well Drained	Sun to Part Shade
Weigela	<i>Weigela florida</i>	4-6 x 4-6	D	Well Drained	Sun to Light Shade

## Small Trees, 10' – 30' Tall

### HIGHLY SALT WATER TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
<u>Yaupon*</u>	<i>Ilex vomitoria</i>	15-20 x 10-15	E	Moist to Xeric	Sun to Light Shade
<u>Waxmyrtle*</u>	<i>Myrica cerifera</i>	10-20 x 10-20	E	Moist to Xeric	Sun to Light Shade
<u>Devilwood*</u>	<i>Osmanthus americanus</i>	15-25 x 10-20	E	Moist to Well Drained	Sun to Light Shade
<u>Redbay*</u>	<i>Persea borbonia</i>	20-30 x 15-25	E	Moist to Xeric	Sun to Light Shade
<u>Japanese Black Pine</u>	<i>Pinus thunbergii</i>	20-40 x 15-25	E	Well Drained to Xeric	Sun
<u>Chinese Podocarpus</u>	<i>Podocarpus macrophyllus</i> 'Maki'	20-30 x 10-15	E	Well Drained	Sun to Part Shade
<u>Sand Live Oak*</u>	<i>Quercus geminata</i>	20-30 x 30-40	E	Well Drained to Xeric	Sun

### MODERATELY SALT WATER TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
<u>Trident Maple</u>	<i>Acer buergerianum</i>	20-25 x 10-15	D	Well Drained	Sun
<u>Arizona Cypress</u>	<i>Cupressus arizonica</i>	10-30 x 8-20	E	Well Drained	Sun
<u>Italian Cypress</u>	<i>Cupressus sempervirens</i>	20-30 x 4-8	E	Well Drained	Sun
<u>Loquat</u>	<i>Eriobotrya japonica</i>	15-20 x 15-20	E	Well Drained	Sun to Light Shade
<u>Eucalyptus</u>	<i>Eucalyptus cinerea</i>	15-30 x 10-20	E	Well Drained	Sun
<u>Dahoon Holly*</u>	<i>Ilex cassine</i>	20-30 x 8-15	E	Moist to Well Drained	Sun
<u>Myrtle Leaf Holly*</u>	<i>Ilex cassine</i> variety <i>myrtifolia</i>	10-20 x 8-12	E	Well Drained	Sun
<u>American Holly*</u>	<i>Ilex opaca</i>	20-30 x 15-20	E	Moist to Well Drained	Sun to Part Shade
<u>Foster's Holly*</u>	<i>Ilex x attenuata</i> 'Fosters'	20-30 x 10-15	E	Moist to Well Drained	Sun to Part Shade
<u>'Nellie Stevens' Holly</u>	<i>Ilex x 'Nellie R. Stevens'</i>	15-25 x 10-15	E	Moist to Well Drained	Sun to Part Shade
<u>Hollywood Juniper</u>	<i>Juniperus chinensis</i> 'Kaizuka' also known as 'Torulosa'	15-25 x 8-15	E	Well Drained to Xeric	Sun
<u>Crape Myrtle</u>	<i>Lagerstroemia hybrids</i> – many varieties available	15-30 x 10-25 Depending on Variety	D	Well Drained	Sun

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
'Little Gem' Magnolia*	<i>Magnolia grandiflora</i> 'Little Gem'	20-25 x 10-15	E	Moist to Well Drained	Sun to Part Shade
Sweet Bay*	<i>Magnolia virginiana</i>	20-30 x 10-20	Semi-E	Moist to Well Drained	Sun to Part Shade
Sourwood*	<i>Oxydendrum arboreum</i>	25-30 x 15-20	D	Well Drained	Sun to Part Shade
<u>Carolina Cherrylaurel*</u>	<i>Prunus caroliniana</i>	20-30 x 15-20	E	Well Drained to Xeric	Sun to Light Shade
Japanese Snowbell	<i>Styrax japonicus</i>	20-30 x 20-30	D	Well Drained	Sun to Part Shade
<u>Tamarix</u>	<i>Tamarix ramosissima</i>	10-20 x 8-12	D	Well Drained to Xeric	Sun
<u>Chastetree</u>	<i>Vitex agnus-castus</i>	15-20 x 10-15	D	Well Drained	Sun

## Large trees, over 30'

### HIGHLY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
<u>Thornless Honeylocust*</u>	<i>Gleditsia triacanthos</i>	40-60 x 20-40	D	Well Drained	Sun
<u>Eastern Red Cedar*</u>	<i>Juniperus virginiana</i>	30-50 x 10-20	E	Well Drained to Xeric	Sun
<u>Southern Magnolia*</u>	<i>Magnolia grandiflora</i>	60-80 x 30-50	E	Well Drained	Sun to Part Shade
<u>Willow Oak*</u>	<i>Quercus phellos</i>	80-100 x 40-50	D	Moist to Well Drained	Sun
<u>Live Oak*</u>	<i>Quercus virginiana</i>	60-80 x 60-80	E	Well Drained to Xeric	Sun

### MODERATELY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
<u>River Birch*</u>	<i>Betula nigra</i>	40-70 x 40-60	D	Moist to Well Drained	Sun
<u>Atlas Cedar</u>	<i>Cedrus atlantica</i>	40-60 x 30-40	E	Well Drained	Sun
<u>Deodar Cedar</u>	<i>Cedrus deodora</i>	50-70 x 50-70	E	Well Drained	Sun
<u>Sugarberry*</u>	<i>Celtis laevigata</i>	60-80 x 50-70	D	Moist to Well Drained	Sun
<u>Ginkgo, Maidenhair Tree</u>	<i>Ginkgo biloba</i>	50-70 x 30-40	D	Well Drained	Sun
<u>Black Gum*</u>	<i>Nyssa sylvatica</i>	30-50 x 20-30	D	Moist to Well Drained	Sun
<u>Laurel Oak*</u>	<i>Quercus hemisphaerica</i>	40-60 x 30-40	E	Moist to Well Drained	Sun
<u>Water Oak*</u>	<i>Quercus nigra</i>	50-80 x 30-60	D	Moist to Well Drained	Sun
<u>Shumard Oak*</u>	<i>Quercus shumardii</i>	40-60 x 40-60	D	Moist to Well Drained	Sun
<u>Black Locust*</u>	<i>Robinia pseudoacacia</i>	30-50 x 20-35	D	Moist to Xeric	Sun
<u>Lacebark Elm</u>	<i>Ulmus parvifolia</i>	40-50 x 30-40	D	Well Drained	Sun

### SLIGHTLY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
<u>Japanese Cedar</u>	<i>Cryptomeria japonica</i>	40-60 x 20-30	E	Moist to Well Drained	Sun
<u>American Beech*</u>	<i>Fagus grandifolia</i>	50-70 x 40-60	D	Well Drained	Sun
<u>Baldcypress*</u>	<i>Taxodium distichum</i>	50-70 x 20-30	D	Wet to Well Drained	Sun

## Palms

### HIGHLY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Soil	Exposure
Dwarf Palmetto*	<i>Sabal minor</i>	4-6 x 4-6	Moist to Well Drained	Sun to Part Shade
<u>Cabbage Palm, Palmetto*</u>	<i>Sabal palmetto</i>	10-20 x 10-15	Well Drained	Sun
<u>Saw Palmetto*</u>	<i>Serenoa repens</i>	3-5 x 4-8	Moist to Well Drained	Sun to Part Shade

### MODERATELY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Soil	Exposure
<u>Pindo Palm, Jelly Palm</u>	<i>Butia capitata</i>	10-15 x 10-15	Well Drained	Sun
<u>Mediterranean Fan Palm</u>	<i>Chamaerops humilis</i>	5-6 x 5-6	Well Drained	Sun to Light Shade
King Sago	<i>Cycas revoluta</i>	4-8 x 6	Well Drained	Sun to Part Shade
Emporer Sago	<i>Cycas taitungensis</i>	4-6 x 10	Well Drained	Sun to Part Shade
Needle Palm*	<i>Rhapidophyllum hystrix</i>	5-10 x 5-10	Well Drained	Sun to Part Shade
Chinese Windmill Palm	<i>Trachycarpus fortunei</i>	10-20 x 6-12	Well Drained	Sun to Part Shade

## Ornamental Grasses

### HIGHLY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Exposure
Pampas Grass	<i>Cortaderia selloana</i>	8' x 6'	Moist to Well Drained	Full Sun
Lyme Grass	<i>Leymus arenarius</i>	2' x 4'	Well Drained to Xeric	Full Sun
Maiden Grass	<i>Miscanthus sinensis</i>	4'-8' x 3'-6'	Moist to Well Drained	Full Sun
Muhly Grass*	<i>Muhlenbergia capillaris</i>	3' x 3'	Well Drained to Xeric	Full Sun
Bitter Panicum*	<i>Panicum amarum</i>	3' x 2'	Well Drained to Xeric	Full Sun
Sand Cordgrass*	<i>Spartina bakeri</i>	3' x 3'	Well Drained	Full Sun

### MODERATELY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Exposure
Panic Grass*	<i>Panicum virgatum</i>	4'-8' x 2'-4'	Moist to Well Drained	Full Sun
Fountain Grass	<i>Pennisetum alopecuroides</i>	3' x 2'	Moist to Well Drained	Full Sun

## Turf Grasses

Common Name	Salt Tolerance	Drought Tolerance	Shade Tolerance	Maintenance Level	Fertilizer Requirements	Wear Tolerance
Centipede	Slight – high soil pH often a problem for centipede in coastal sites	Moderate	Poor	Low	Very Low	Good
St. Augustine	Moderate	Low	Very Good	Low - Moderate	Moderate	Good
Zoysia	High	High	Good	Moderate	Moderate	Excellent
Common Bermuda	High	High	Very Poor	High	High	Excellent
Hybrid Bermuda	High	High	Very Poor	Very High	Very High	Excellent
Seashore Paspalum	Very High – tolerates irrigation w/ saline water	Moderate	Poor	Moderate	Moderate	Good

## Vines

### MODERATELY SALT TOLERANT

Common Name	Botanical Name	Height x Spread (ft)	Evergreen/Deciduous	Soil	Exposure
Climbing Fig	<i>Ficus pumila</i>	30'+	E	Well Drained	Sun to Shade
<u>Carolina Jessamine*</u>	<i>Gelsemium sempervirens</i>	10'-20'	E	Moist to Well Drained	Sun to Pt. Shade
English Ivy	<i>Hedera helix</i>	50'+	E	Well Drained	Sun to Shade
Coral Honeysuckle*	<i>Lonicera sempervirens</i>	10'-20'	E	Moist to Well Drained	Sun to Pt. Shade
Goldflame Honeysuckle	<i>Lonicera x heckrottii</i>	10'-20'	E	Moist to Well Drained	Sun to Lt. Shade
<u>Virginia Creeper*</u>	<i>Parthenocissus quinquefolia</i>	30'+	D	Moist to Well Drained	Sun to Shade
Lady Banks' Rose	<i>Rosa banksiase</i> 'Lutea'	20'	D	Well Drained	Sun to Lt. Shade
<u>Confederate Jasmine</u>	<i>Trachelospermum jasminoides</i>	15'	E	Well Drained	Sun
Fatshedera	X <i>Fatschedera lizei</i>	8'	E	Moist to Well Drained	Pt. Shade to Shade

## Appendix B – Rain Barrel

### Instructions

Steps 1-3 below explain how to build and install your rain barrel. The supplies listed below can be found at most home improvement and hardware stores. The 55-gallon drums can be purchased from Arizona Barrels for \$15 at the following website: [http://www.arizonabarrels.com/55\\_gallon\\_closed\\_top\\_blue\\_plastic\\_barrels\\_drums.html](http://www.arizonabarrels.com/55_gallon_closed_top_blue_plastic_barrels_drums.html)

#### STEP 1. Cut Holes in Barrel

 Cut lower drain hole. Measure about 1 inch above the bottom of the barrel where the barrel side begins to rise toward the top. Using a 3/4" bit (or hole saw), drill a hole through the barrel.

 Cut upper drain hole. Mark the upper drain hole according to where you want the overflow to be located in relationship to the lower drain. Use a 1-5/8" hole saw to cut out the overflow hole.



Cut top hole for atrium grate (filter). Using the atrium grate as a template for size, mark a circle at the center of the top of the drum (locating the rainwater inlet in the center of the barrel lets you pivot the barrel without moving the downspout). Drill a 1/2" hole inside of the marked circle. Use a router, jigsaw or coping saw to cut until the hole is large enough to accommodate the atrium grate, which filters out large debris. Don't make the hole too big – you want the flange of the atrium grate to fit securely on the top of the barrel without falling in.



 Cut notch to hold hose. Using a 1/2" bit or hole saw, cut out a notch at the top of the barrel rim (aligned so that it is above the lower drain hole). The notch should be large enough so that the end of the hose with the adapter will firmly snap into place.

#### STEP 2. Set Up Barrel and Modify Downspout

 Set up barrel. Since water will only flow from the garden hose when the hose is below the barrel, place the barrel on high ground or up on cinder blocks or a sturdy wooden crate underneath your downspout.



Modify your downspout. Cut your existing downspout using a saw so that the end can be placed over the top of your rain barrel. Use a 3" vinyl downspout elbow to connect the two downspout pieces (or use a downspout adapter and a piece of corrugated plastic pipe). Trim the end of the downspout if necessary.

#### STEP 3. Assemble Parts

 Attach garden hose to lower drain hole. Screw in the 1/2" PVC male adapter to the lower drain hole. The hard PVC threads cut matching grooves into the soft plastic of the

barrel. Unscrew the 1/2" PVC male adapter from the hole. Wrap threads tightly with Teflon tape (optional). Coat the threads of the coupler with waterproof sealant (optional). Screw the coated adapter back into the hole and let it sit and dry for 24 hours (optional). Attach 5' garden hose to the PVC male adapter. Attach the 3/4" x 1/2" PVC male adapter to the other end of the hose (this can be readily adapted to fit a standard garden hose).



 Attach drain hose to upper drain hole. Put the 1-1/4" male threaded coupling inside the barrel with the threads through the hole. From the outside, screw the 1-1/4" female barbed fitting onto the threaded coupling. Use silicone on the threads (optional). Attach 5' section of drain hose to upper fitting.

Place atrium grate and screen in top hole. Using PVC glue, secure a piece of fine mesh window screen inside or outside of the atrium grate to filter out debris and control mosquitoes (optional). Place the atrium grate into the hole (basket down).



Position the downspout. Position the end of your downspout so it drains onto the atrium grate on the rain barrel.

### SUPPLIES

- One 55-gallon drum
- One 5' section vinyl garden hose (3/4" OD x 5/8" ID)
- One 4" diameter atrium grate (basket used in garden ponds and pool skimmers)
- One 1/2" PVC male adapter
- One 3/4" x 1/2" PVC male adapter
- One 5' section of drain hose, drain line, or sump pump line (1-1/4")
- One 1-1/4" female barbed fitting and one 1-1/4" male threaded coupling
- One vinyl gutter elbow
- Drill (or a hole saw)
- Router, jig saw or coping saw
- Measuring tape

#### Optional

- Waterproof sealant (silicone caulk, PVC glue)
- Teflon tape
- Fiberglass window screen material or mosquito netting
- Cinder blocks or wooden crate

## Appendix C – How to Build a Rain Garden

### Instructions

Follow the three steps below to install a rain garden. Required materials include: plants for the garden; a hose, rope or string; a level; a shovel or spade; humus or other soil amendments (optional); a measuring tape; and a downspout extension (also optional).

### Step 1: Size and Locate your Rain Garden

First, measure the footprint of your house and determine how much rooftop area drains to the downspout being used for the garden (for gutters with a downspout at each end, assume that half the water goes to each downspout). Be sure to measure the house footprint only; do not take the roof slope into account. The surface area of the rain garden should be between 20% and 30% of the roof area that will drain into the rain garden. Lay out the boundary of the garden with a rope.

#### Rain garden sizing example:

30' x 30' (900 ft<sup>2</sup>) house area;

1/4 of this area drains to one downspout or  $(900/4)\text{ft}^2 = 225 \text{ft}^2$

20% of 225ft<sup>2</sup> = 45 ft<sup>2</sup>

30% of 225ft<sup>2</sup> = 67.5ft<sup>2</sup>

The rain garden area should be between 45 and 67.5 square feet, depending on soil type (use 20% for sandier soils).

#### Other Considerations:

- The garden should not be within 10 feet of the house foundation
- Maintain a minimum 1% slope from the lawn down to the rain garden. (A shallow ditch can also be created to ensure the water flows from roof to the garden, or use a downspout extension to direct the flow into the garden).
- Gardens should be located at least 25 feet from a septic system drainfield
- Gardens should not be placed within 25 feet of a well head
- Make sure to avoid underground utility lines
- The best location for the garden will be in partial to full sun
- Rain gardens should be constructed where the water table is at least 2' below the surface of the soil. If you hit the water table when constructing your rain garden, consider turning it into a wetland garden.

### Step 2: Dig the Rain Garden

To enable the rain garden to hold several inches of water during a storm, dig a hole 3- 4 inches deep across the entire surface of the garden. If the soil lacks organic material, dig the hole 5-6 inches deep, and add 2-3 inches of humus or other organic material. Ensure the bottom is level. Next, test how the garden will hold water during a storm by letting water flow into the rain garden from a hose placed at the downspout. Based on this test,

make any necessary adjustments (e.g., create a berm on the lower side of the garden using the diggings, or use downspout extension or shallow ditch to direct the water into the garden).

### **Step 3: Add Plants to the Rain Garden**

Choose drought-tolerant plants that won't require much watering, but make sure they can withstand wet soils for up to 24 hours. Also take into account how much sun the garden receives. It's often helpful to draw out a planting plan before you start, and mark planting areas within the garden with string. After planting, weeding may be required until the plants become more established. There may also be a need to periodically prune some of the plants to let others grow. In the winter, leave dead or dormant plants standing and them cut back in the spring. The garden may need a bit more maintenance than a lawn in the beginning, but in the long run it will be easier to care for and provide many added benefits!



## Appendix D – Glossary

ANNUAL PLANT – A plant that completes its entire life cycle in a single growing season.

BEST MANAGEMENT PRACTICES (BMPs) – Techniques designed to reduce the impact of stormwater runoff. These can be structural or non-structural features designed to protect water quality, protect downstream areas from flooding, or both.

DECIDUOUS PLANT – A plant that sheds or loses its foliage throughout the year.

EVERGREEN PLANT – A plant that remains green and retains its foliage throughout the year.

IMPERVIOUS SURFACE – Any surface that water cannot penetrate.

NATIVE PLANT – A plant that is adapted to the weather, temperature and soil conditions of a region. Native plants require less (if any) fertilizers, pesticides and irrigation and tend to be disease and draught tolerant.

NON-POINT SOURCE POLLUTION - Pollution from many different sources that is carried by the stormwater runoff into local waterways.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) – A provision of the Clean Water Act that prohibits discharge of pollutants into waters of the United States unless a special permit is issued by the EPA, through the State or other delegated agency.

PERENNIAL PLANT – A plant that grows and persists for more than one year.

PERVIOUS MATERIAL – Pervious materials allow water to soak into the surface by virtue of their porous nature or by “void” spaces in the material.

PESTICIDE - "Any substance or mixture of substances intended for preventing, destroying, repelling, or lessening the damage of any pest".<sup>15</sup>

PRE-DEVELOPMENT CONDITION - The pre-development condition is the condition of the site prior to the currently proposed development.

TOTAL SUSPENDED SOLIDS (TSS) - Particles suspended in stormwater runoff which typically originates from erosion of construction sites or build-up on impervious surfaces during dry periods. When deposited in receiving water, these sediments may limit light penetration or upset aquatic reproductive processes. Other pollutants often become attached to suspended solids and are carried in stormwater run-off; therefore, a suspended solids measurement is often used as a primary indicator of stormwater pollution<sup>16</sup>.

XEROPHYTES - Plants specifically adapted to tolerate long periods of drought.

---

<sup>15</sup> **What is a Pesticide?** (US EPA definitions) retrieved June 13, 2007

<sup>16</sup> Akan, A.O, Houghtalen, R.J., Urban Hydrology, Hydraulics, and Stormwater Quality, 2003, John Wiley & Sons, Inc., Hoboken, NJ.

XERISCAPING - A landscape plan that conserves water by using drought resistant plants.