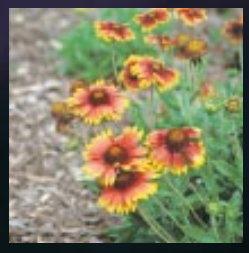
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

South Florida Edition

WATERWISE

South Florida Landscapes





Landscaping to Promote Water Conservation
Using the Principles of Xeriscape™

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Before You Dig...Check Your Temp

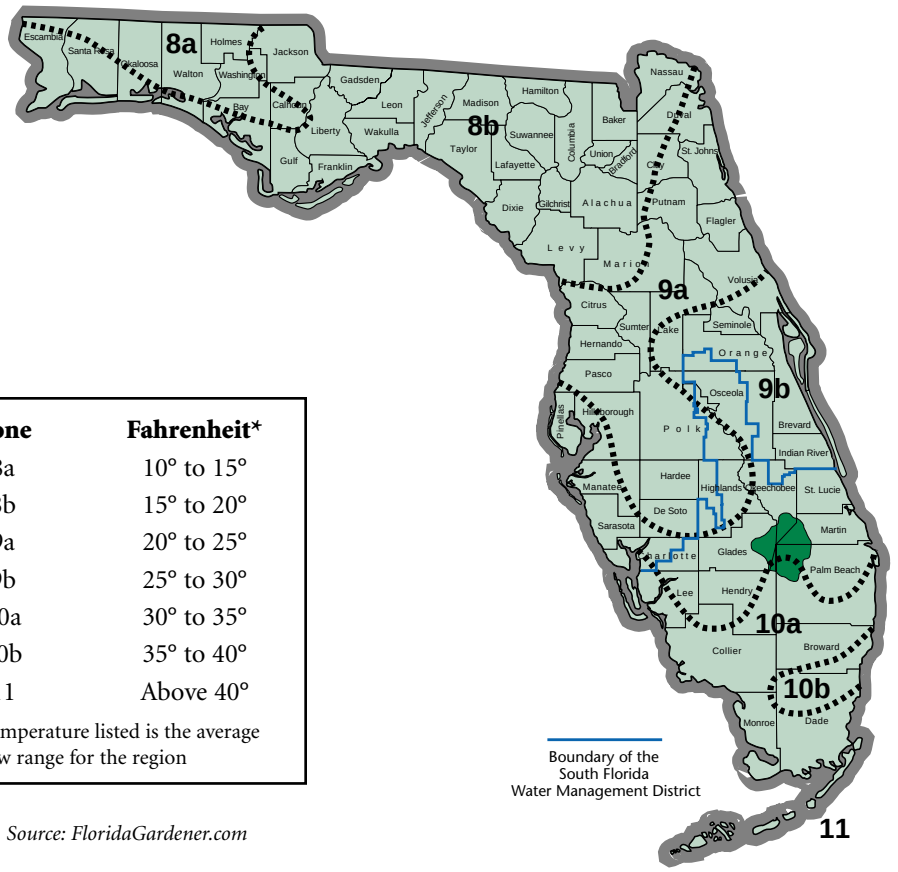
Before beginning any waterwise landscape, one of the most important considerations in determining what plants you can grow in your yard or garden is whether or not they will survive the climate and temperature in your area. Plant hardiness zones are a general guide to help you know which plants will grow where you live because plants can vary in the temperature extremes they can endure.

The U.S. Department of Agriculture Plant Hardiness Zone Map is the standard measure of plant hardiness throughout the United States. In South Florida, there are seven delineations between temperature zones ranging from 9a (20 to 25° F) to 11 (40° F and up).

Keep in mind that plant hardiness zones are only a general guide. Other conditions influence whether a plant will survive in your garden or yard. You must also consider soil types, rainfall, daytime temperatures, day length, wind, humidity and heat. Within your own yard, block and county, there are microclimates that affect how plants grow. One part of your yard may be hotter, colder, wetter, drier, shadier or sunnier; therefore, certain plants may do better in one spot than another.

Starting on page 18, you will find easy-to-read plant lists that will help you determine what plants will thrive in your yard or garden. The lists include the Florida temperature hardiness zone range, watering needs, salt tolerance, light range, plant type, size, growth rate and helpful comments from plant experts. South Florida landscapes are more than just queen palm trees and impatiens. You can select from dozens of beautiful waterwise trees, shrubs, flowers, vines, and groundcover suitable for South Florida. Get creative and enjoy your waterwise landscape!

Plant Hardiness Zones for Florida



Zone	Fahrenheit*
8a	10° to 15°
8b	15° to 20°
9a	20° to 25°
9b	25° to 30°
10a	30° to 35°
10b	35° to 40°
11	Above 40°

* Temperature listed is the average low range for the region

Source: FloridaGardener.com

W A T E R W I S E

South Florida Landscapes

Landscaping to Promote Water Conservation Using the Principles of Xeriscape™

from the South Florida Water Management District

Contents

Introduction

Florida is surrounded on three sides by water and its interior is filled with wetlands, thousands of lakes, and many rivers and streams. With all this water around, many people may not realize the need to **conserve** water. Despite Florida's apparent watery bounty, not all of that water is available for drinking or other uses by humans. In addition, Florida's weather is fickle — long periods of wet weather may be followed by long periods of dry weather. The state's leaders recognize the need to conserve water as a means to ensure the continued availability of this vital resource for everyone from year to year.

Preserving and protecting Florida's water resources is a main focus of the state's five water management districts. This guide is brought to you by the South Florida Water Management District in order to help you work with nature in our region's unique environment to establish a landscape that conserves water resources and protects water quality. Through use of the Xeriscape landscaping principles, everyone can help conserve resources.

Achieving a natural, healthy balance in your landscape starts by putting the right plant in the right place. Matching plants to conditions that exist in your area helps them thrive, once established, with little or no irrigation or chemicals. The seven principles of Xeriscape are explained in this guide. Scientific or other special terms appear in bold. These terms are listed in the glossary at the end of this guide and are defined in the context in which they are used in this guide. A comprehensive plant list is included to help you choose the best plants for your landscape. Resources and references for more specific information about gardening techniques are listed at the back of the guide.

Through this guide, we hope you'll find that when you work with nature, nature will work for you. And you'll be doing your part to ensure that our natural resources can be enjoyed today and by future generations.

What Is Xeriscape Landscaping?

Xeriscape is quality landscaping that conserves water and protects the environment. Xeriscape landscaping is based on seven basic principles that can be successfully applied anywhere.

The main objective of Xeriscape is to establish and maintain a healthy landscape by matching the right plants with existing site conditions so that the use of additional resources, such as water, fertilizer, pesticides and labor, is minimized. In addition to helping conserve water resources, Xeriscape landscaping practices reduce the amount of pollutants reaching water bodies because fewer yard chemicals are used. Fertilizers and pesticides can contaminate water bodies when they are washed out of the yard with the rain, in **stormwater runoff**.

The term Xeriscape and the concept of Xeriscape were first developed in the southwestern United States during droughts in the early 1980s. Residents of the West learned that one way to save water was to develop landscapes with plants that occur naturally in the existing conditions, rather than perpetually trying to change the conditions. In Florida, Xeriscape landscaping can be as lush as Florida itself — Xeriscape is rocks and cactus only where they naturally occur.

The best time to establish a drought-tolerant Xeriscape landscape for your home or commercial property is long before a drought. Once established, the right plant in the right place will be highly self-sufficient, needing little help to survive nature's

extremes. Healthy, well-placed plants with deep, established root systems will need less help to survive a drought.

Conserving our water supply and reducing water pollution have become important issues in our growing communities. In many Florida homes, as much as half of household water is used outdoors, mostly for lawn and garden irrigation. Despite Florida's humid climate and abundant surface water bodies, water shortages do occur here. Demand can overtake supply, and regional droughts force Floridians to practice water conservation as a way of life.

The Seven Steps of Xeriscape

The seven simple steps of Xeriscape landscaping have been used by landscape professionals for years. Here is an overview of the seven principles; details of each principle are given in the following pages.

1. PLAN AND DESIGN — Make a sketch of the landscape site. Base the plan on site conditions, existing vegetation and **topography** — the natural features of the land. Assess the area's growing conditions and think through intended uses of the landscape. Landscapes are dynamic, so include elements of growth, time and change in your plan.

2. OBTAIN A SOIL ANALYSIS — Determine the soil composition, from sandy to clay, and test for the pH of the soil — its level of acidity or alkalinity. This information will help you decide which plants are best suited to the conditions of your yard.

3. CHOOSE PROPER PLANTS — When choosing new plants, match each spot in your landscape with plants that thrive in the specific conditions of that spot. Look for plants known to be resistant to disease and pests. Consider each plant's mature height and width, its need for sun, shade, soil and water, and its tolerance to salt or temperature. To find your plant temperature hardiness zone, please refer to the map on the inside front cover. Preserve as many existing trees and shrubs as possible, if they're healthy and if the root systems are not significantly impacted by construction. Appropriately placed Native vegetation will remain healthy with minimal supplemental irrigation and care once established.

4. USE TURF WISELY — Grass is often a yard's largest water user, but it can still play a role in a water-conserving landscape. Plan **practical turf areas** where turf is most functional in the landscape plan, such as where children or pets will play, or for erosion control. In other areas, consider more water-thrifty alternatives such as groundcovers or mulched walkways.

5. IRRIGATE EFFICIENTLY — Group plants based on their water needs. Put moisture-loving plants in moist areas and plants that prefer well-drained sites in drier areas. Group together plants that may need irrigation so that water is only used in limited areas. Irrigate only when plants need water or when rain is inadequate. Use the right irrigation system, proper sprinkler head and spacing for each area.

6. USE MULCH — Mulch helps hold moisture in the soil, moderate temperature, slowly release nutrients, reduce weed growth and slow erosion. Spread mulch 2 to 4 inches thick, around shrubs and trees and on flower beds, but be sure to keep mulch from coming into direct contact with plant stems.

7. PERFORM PROPER MAINTENANCE — Keep plants healthy. Too much water and fertilizer promote weak growth, as well as increase pruning and mowing requirements. Remove weeds by hand before they get established and crowd out the plants you want. Watch for pests and make sure they're truly a problem before waging war, then do it organically whenever possible.

Plan and Design – Step 1

Whether you are developing a new Xeriscape landscape or renovating an existing landscape, proper planning and design are important. Think about the various areas of your landscape in terms of how they should be developed for different uses and how much space you should allot to each area.

As you plan each area, consider several different arrangements. For example, is a fence, wall or hedge more appropriate for screening and/or security? How much space is needed for active recreation, a garden or for patio entertaining? Only after these decisions are made should you begin thinking about what plants to use.

BEGIN WITH A BASE MAP

A base map is a plan of your property drawn to scale on graph paper showing the location of the house, its orientation to the sun, other structures on the site, unusual features and existing vegetation. Accuracy in the base map will help you determine if your site will accommodate all of your plans. Later, it will help determine the quantity of any construction materials and plants needed.

Next, lay a sheet of tracing paper over the base map and label it "Site Analysis." Use arrows to indicate the direction of desirable views you want to emphasize and any undesirable views you want to screen. Use arrows to indicate the drainage patterns of the property, including any low spots or eroded areas. Make plans to correct potential drainage problems before planting. This may require re-grading, bringing in additional soil, building retaining walls or shaping terraces. Any changes in the existing landscape should be subtle so that the natural character of the landscape is retained.

PLAN FOR DIFFERENT USE AREAS

To begin your Xeriscape plan, overlay the base map of your property and site analysis sheet with another piece of tracing paper. On this sheet indicate the public, private and service areas of your landscape. See *figure 1*. Consider how these areas will be developed based on space requirements for each activity.

The public area is the highly visible area that most visitors see, such as the entry to the home. In a traditional landscape, this area typically receives the most care, including the most water. Therefore, the careful design of this area is important for water conservation. It is possible to design this area to require minimal water and maintenance without sacrificing quality or appearance.

The private area of the landscape, usually the backyard, is where most outdoor activity occurs. It is generally the family gathering area. It may also include a vegetable garden or fruit trees. The landscape in this area needs to be functional, attractive and durable, but it also should be designed to require less water than the public area of the landscape.

The service area is the working or utility area of the landscape, an area usually screened from view and containing such items as garbage cans, outdoor equipment, air-conditioning units or doghouse. In terms of routine maintenance, this area would be designed to require the least care and water of the three areas.

ESTABLISH WATER-USE ZONES

In addition to dividing the landscape into use areas, a Xeriscape plan further divides the landscape into three water-use zones: high or **oasis** (regular watering), moderate or drought-tolerant (occasional watering) and low or natural (rainfall watering). See *figure 2.* There may be several of these zones within an individual landscape. High water-use zones, or oasis zones, are highly visible, high maintenance areas of the landscape, such as the area around the patio where plants are watered regularly in the absence of rainfall. In the moderate water-use zones, established plants are watered only when they wilt or show other symptoms of moisture stress.

In the low water-use zones, plants are watered by natural rainfall and would not be irrigated. For greatest water conservation, design as much of your landscape as possible into low water-use zones. Most

people are surprised to learn that the majority of our woody ornamental trees and shrubs, turfgrasses, some herbaceous perennials and even some annuals grow well in low water-use zones where they need no irrigation once they are established.

Expect a slight loss of quality during extended dry periods, but don't be alarmed. Many plants will literally shut down during drought and cease growing. Bahia grass will go dormant and turn brown during drought, then bounce back with the first rains. Learning to accept this "less than perfect" appearance during dry periods is one of the most difficult concepts to overcome in any landscape.

One exception to the water zone rule is newly planted ornamental plants and turfgrasses. These plants require regular irrigation during the establishment period (30 to 60 days) regardless of their intended water-use zone.

Now, add a new overlay of tracing paper to the base map and sketch your desired water-use zones. The landscape is beginning to take shape and you can visualize the form of the various beds, but construction materials and plants have not yet been identified.

DEVELOP A MASTER PLAN

Once you have settled on a design scheme and a water management arrangement, give form and definition to the various spaces in your plan. With the identification of planting spaces as well as edging materials, groundcovers and paving, the Master Plan begins to take form. This is a plan showing the final product of your efforts. Straight lines or smooth flowing curves are best—tight curves or unnecessary bends can be maintenance problems. Use right angles or gentle curves, and avoid acute angles that are difficult to maintain and irrigate. Remember that

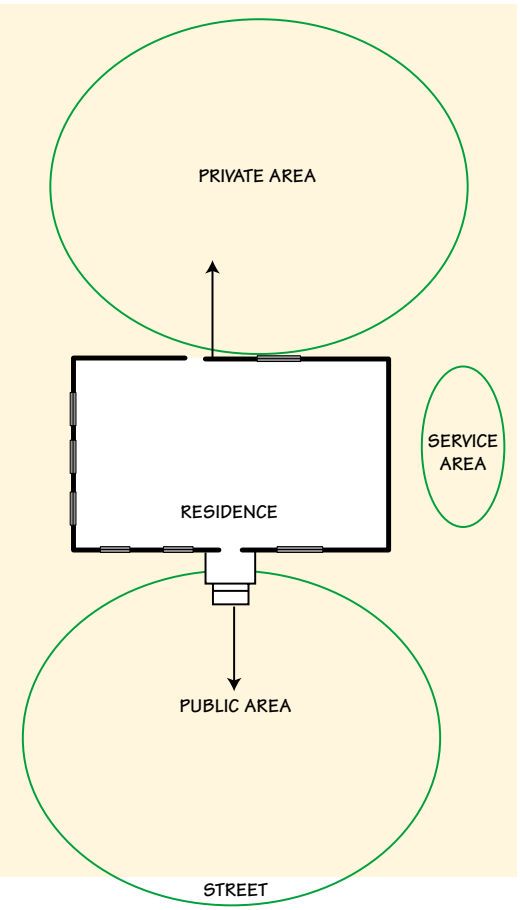


Figure 1 The basic use area of a typical residential lot

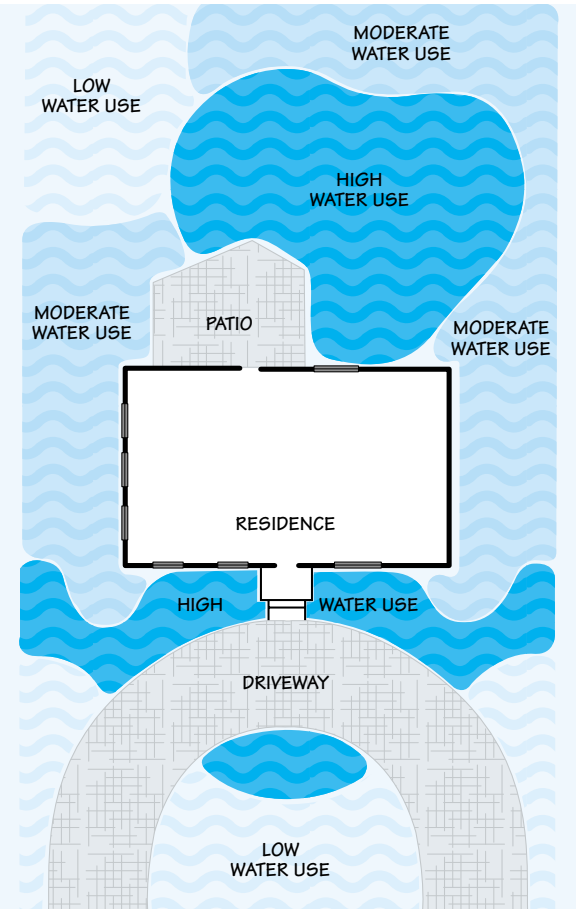


Figure 2 Diagram of water use zones of property

simplicity in the design will ensure easy maintenance and water-use efficiency. A prototype Master Plan is shown in *figure 3.*

FIT PLANTS TO THE DESIGN

Once you achieve the style and overall effect you desire, it is time to select plants to fill the assigned spaces. It is very important to select plants that complement and accent the good features of the architecture and construction materials rather than overpower them.

Group plantings to conform to the shape of plant beds. Avoid rigid or formal, geometric plantings as much as possible.

Place plants at the proper spacing in the landscape to ensure easy maintenance and more efficient use of water. It is extremely important to space plants far enough apart so they can achieve their mature size without being crowded.

Select plants that have sizes and forms that conform to their location without having to be sheared or frequently pruned to keep them in bounds.

Choose plants with the same shapes and ultimate sizes as the space you want them to fill.

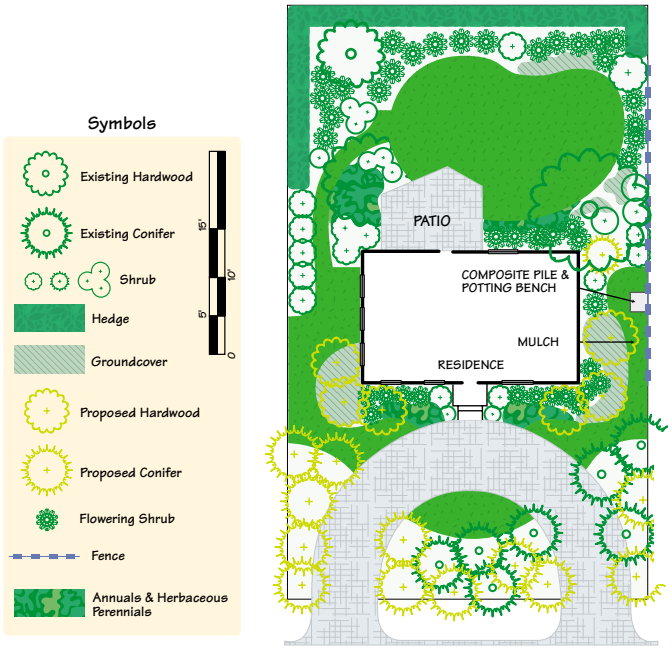


Figure 3 Master Plan for incorporating Xeriscape principles. Note how the character of this landscape is very similar to that of a traditional landscape.

Obtain a Soil Analysis – Step 2

INSPECT YOUR SOIL

A thorough analysis of both the physical and chemical characteristics of the soil is important when developing a waterwise landscape. Each soil has its own unique structure and texture, drainage pattern, pH, nutrient content and need for amendments and fertilizer. To complicate matters, there may be several different soil types within an individual landscape, or the soil may consist of fill dirt brought onto the site. Soils are seldom perfect, and most of them can be improved in some way to ensure best plant growth.

SOIL ANALYSIS SAVES GUESSWORK

Before landscaping, take a soil sample to your County Cooperative Extension Service for testing.

DON'T ADD ORGANIC MATTER TO THE PLANTING HOLE FOR TREES AND SHRUBS

For years, we have added organic matter like peat moss, animal manure or compost to the planting hole to enrich the soil, to conserve moisture and to improve plant growth. But recent research shows no benefit from amending the planting hole. In fact, organic matter added to individual planting holes in soil acts like a sponge in a bathtub, holding excess moisture around plant roots after irrigation or rainfall. Waterlogged soils that suffocate plant roots are a leading cause of plant death. Even in well-drained sandy soils, organic matter encourages the roots of plants to stay within the hole instead of growing out to explore the native soil.

When planting individual trees and shrubs, dig a large planting hole at least two times wider than the root ball of the plant. See *figure 4.* Research at the University of Florida shows that plants transplanted into a large planting hole get established more quickly and develop a significantly larger root system than those in a small hole no larger than the root ball. A large, extensive root mass improves the plant's ability to absorb moisture from the soil and helps the plant survive drought.

Next, make certain the top of the root ball is level or slightly above the soil surface, then backfill with

the same soil removed from the hole. Do not add amendments to the hole. Simply backfill with the native soil after removing stones, sticks and other debris. Tamp the soil lightly to eliminate air pockets. Water thoroughly, and then add an organic mulch to conserve moisture.

When planting a group of shrubs, cultivate the soil throughout the area as deeply as possible. Cultivation changes the structure of the native soil and provides a good environment for growth.

Improve the structure of poor soils

Certain native soils such as dense, poorly drained clays silts have such poor structure that plant growth suffers unless they are improved. Poorly drained soils can be improved in several ways. Sometimes deep cultivation will break apart a hard layer of soil (hardpan) several inches below the soil surface and improve drainage.

On the other hand, sandy soils that tend to dry out rapidly and hold little moisture will benefit from organic matter such as aged animal manure or compost incorporated uniformly throughout the planting bed. This is particularly helpful when plants requiring water, such as annuals, are to be grown. However, instead of adding the organic matter to the planting hole, apply 3 to 6 inches on the soil surface and incorporate it into the soil using a rotary tiller.

When selecting plants for a Xeriscape landscape, keep in mind this important fact: It is not the plants we select that save water, but our ability to locate them in the landscape appropriately and to manage them properly that determines their water needs.

Any ornamental plant or turfgrass presently on the market can be used in a Xeriscape-type landscape. In fact, you may be surprised to learn just how many plants can thrive without any supplemental water once they are established. The key is to identify the water needs of the plant you select, then group it in the landscape with other plants having similar needs for water. By doing this, supplemental irrigation can be applied most efficiently to those plants that require it. The result is maximum water conservation.

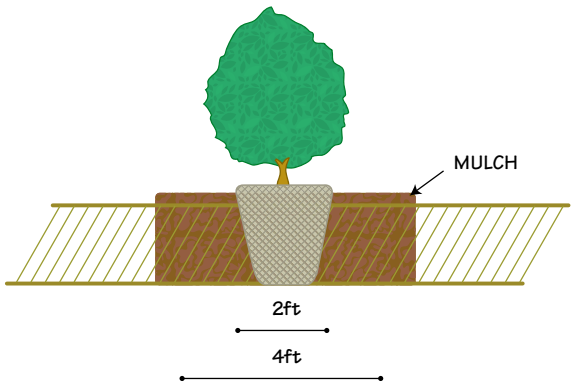


Figure 4 Diagram of properly planted shrub. Proper planting is the key to healthy root growth and drought tolerance of trees and shrubs.

Also, design turf in practical shapes that can be efficiently irrigated and maintained. The shape of a turf area has a direct impact on water use and waste. Long, narrow strips of turf are hard to water efficiently. Turf areas of the same size that are square or rounded are practical. As irrigated space is reduced, water savings increase.

Choose Proper Plants – Step 3

Choose plants that can survive on normal rainfall in your area or that require minimal irrigation. Existing native plant communities are an example of the "right plant in the right place." There are also non-native plants cultivated specifically for Florida conditions that are water-efficient and resistant to disease and pests. However, there are also some plants that do too well because they don't have any natural balances in the Florida environment, and they become highly invasive. These plants have *no* place in a Xeriscape landscape.

And remember, the success of your Xeriscape landscape depends as much on where you locate plants as on what plants you use. Plant it smart!

Learn each plant's

- Mature size (height and width)
- Sun and shade requirements
- Soil needs
- Water needs
- Salt and cold tolerances

Match these factors with your soil and climatic conditions.

DO YOU NEED SALT-TOLERANT PLANTS?

Many areas in Florida have salt prevalent in the air and the water. This is particularly true near the coast and salt marshes. Salt can even find its way into wells. Exposure to salt may severely damage or kill some plants so if necessary, choose plants that can tolerate such exposure. Salt is alkaline, so a plant's tolerance for salt indicates its tolerance to alkalinity.

Where does this salt originate? Homes near the beach experience salt spray, with stiff winds blowing fine particles of salt and sand onto plants. Different plants can take varying degrees of this salt exposure. Some can't tolerate it at all.

Irrigation water may also be salty, or **saline**. In some areas, the water taken from the ground is naturally high in salt. Other areas suffer from saltwater intrusion, where salt water moves underground into freshwater aquifers due to overpumping of the aquifer. If the salinity level in irrigation water is too high, the water can kill plants. Also, be aware that some household water treatment systems add salt to the water to remove iron or other minerals. Don't use this water for plants.

Use this guide and consult a plant specialist to determine if a plant is salt-tolerant. If you suspect salt problems, have your water tested for salt content.

The diverse South Florida landscape includes various plant communities. Different plant communities often converge gradually in what are called **ecotones** — regions where one ecosystem blends into another. Sometimes pockets of one community are surrounded by another.

Observing the differences in ecotones can help determine differences in home landscapes and guide plant selection for microclimates throughout the landscape.

FLORIDA'S PLANT COMMUNITIES

Coastal Uplands

Beach dune systems — Alkaline to neutral soils of coarse sand and shell; well drained, with some salt content. Sea oats, sea grapes and dune sunflowers are a few examples of beach dune plants.

Coastal scrub

Maritime forests — Soil pH moderately alkaline to neutral; sandy with some shell. Gumbo limbo, bay and oak trees are found in maritime forests.

Pine Flatwoods

The most common plant community in Florida. Acidic, sandy soil with a hardpan layer 1–3 feet below. Slash pines, gallberry and grasses are common in pine flatwoods.

Sandhills

High pinelands of open longleaf pine with wiregrass, shrubs or turkey oaks.

Hardwood Forests

Hardwood forests occur in patches in temperate areas of Florida. The soils are acidic and sandy.

Upland mixed forests — Occur throughout Florida's northern panhandle region on upland clay soils. Magnolia, beech, oak and maple trees are found here.

Upland mesic hardwood forests — Oak-hickory to pine-oak-hickory; range through central to west-central Florida on rich upland soils and clay hills. Sweetbay, holly and oaks are common in this community.

Forests of Abundant Cabbage Palms

Sand over **marl**; flat hammocks of cabbage palms and live oaks; rarely flooded.

Rocklands

The uplands of southern peninsular Florida and the Keys with diverse tropical trees and plants.

PINE ROCKLANDS — Porous limestone with sandy **humus** and marl; good drainage. Pine and palmettos dominate with numerous rare plants.

TROPICAL HARDWOOD HAMMOCKS — Alkaline limestone with moist humus. A range of **understory** plants and a diverse canopy including bromeliads, orchids and ferns.

Prairies

DRY PRAIRIES — Similar to pine flatwoods without the pine overstory; dry prairies occur in central to west central Florida. Scrub oaks, saw palmetto and wiregrass are common in dry prairies.

WET PRAIRIES — Herbaceous plants dominate with sparse woody species; often inundated. Sawgrass, slash pines and wax myrtle are found in wet prairies.

Scrub

Includes Florida's rarest plants and animals. Soils sandy, infertile and well-drained. Sand pine, oaks and rosemary can be found in scrub areas.

SCRUB CYPRESS — South Florida community with thin marl soils over limestone; scrub pond cypress with grasses and sedges.

Cypress Swamp Forests

Inundated most of the year, with epiphytes growing in the cypress canopy, and ferns and aquatic plants growing among cypress knees below.

Wetland Forests

SWAMP FOREST — Usually inundated stands of cypress, maples, hickory and ash.

HYDRIC HAMMOCK — Occasionally flooded with evergreens, maples, water oaks, elms and palms.

Coastal Saline Wetlands

COASTAL SALTWATER MARSHES — Grasses and rushes dominate; mostly north and west.

MANGROVE SWAMPS — Central and southern coasts with heavy muck created by leaf litter and alternate flooding and draining. Mangroves, buttonwood and sea oxeye daisy thrive in mangrove swamps.

WHAT TO PLANT

Plant lists should be generated for the different areas of the landscape based on growing conditions and desired characteristics.

Plantings should be placed with consideration for changes which will take place over time. In natural plant communities, these changes are called succession. **Succession** is the evolution of plants starting out, maturing, being replaced by other plants and eventually developing to a climax, or a balanced, mature ecosystem.

In most landscapes, succession is halted by deliberate maintenance practices. Yet plants tend to strive toward succession. By planning for each plant's mature state, a dynamic landscape can be planned to include natural changes.

When plants are first put into a landscape, the area should look unfinished as the landscape must be given space and time to grow. Plan to replace sun-loving plants with shade-tolerant plants as the larger elements in the landscape, such as trees and shrubs, grow and create shade.

Many so-called shrub species are actually 20-foot multi-trunked trees. Select plant species that will mature to a height and width that will fit the location.

Cypress swamp

If you want a shrub that only grows 2–4 feet tall, find a dwarf variety or use ornamental bunch grasses or flowering perennials like pentas and scarlet milkweed.

PLANTING FOR EFFICIENT WATER USE

Group plants in appropriate conditions according to their water needs. If plant placement is done correctly, once plants are established little to no supplemental irrigation will be necessary.

However, when plantings need supplemental watering, choose the right irrigation heads. Turf areas and planting beds should always be in separate irrigation zones. This separation allows for different irrigation schedules and different irrigation heads, such as pop-ups for turf, or drip heads for individual specimen plants such as shrubs or perennials.

NATURAL ZONE — In this area, place plants that have adapted to the wet and dry extremes of Florida's climate so that regular watering (once plants are established) won't be necessary, except during prolonged drought.

DROUGHT-TOLERANT ZONE — In this area, place plants that can survive extended periods of time without rain or supplemental irrigation.

OASIS ZONE — In the **oasis** zone, usually a small area, colorful ornamental plants may be chosen that may require extra water or care.

Plants native to Florida can play a very dependable role in the landscape. Many of Florida's plants have evolved through periods of extreme wet and then dry weather, so they survive through drought and don't get root rot standing in water. They have also developed defenses to the diseases, fungi and insects found in Florida. Many tolerate the high winds that occur during tropical storms and hurricanes.

Strive to establish a yard that is largely sustained by existing conditions, then if specialty plantings such as vegetables or roses are desired, a more labor- and resource-intensive planting bed can be created in one or two areas.

Remember, the overriding guidance should be to put the right plant in the right place.

Use Turf Wisely – Step 4

Grass can be a practical part of your landscape in the right place, for example, in a play area for children. Follow these simple tips for a healthy lawn and to reduce maintenance:

• ADD ORGANIC MATTER. This improves water retention of the soil and turf health.

• GO LIGHT ON THE FERTILIZER. Fertilization stimulates growth and increases water needs. If you do fertilize, use a slow-release nitrogen product. These products won't be washed away like liquid or fast-release fertilizers, which can contaminate waterways through stormwater or irrigation runoff.

• LEAVE SHORT GRASS CLIPPINGS WHERE THEY FALL WHEN YOU MOW. This reduces the lawn's need for both water and fertilizer. However, remove thick patches of clippings, which will decay and kill the grass.

• RISE TO NEW HEIGHTS. That is, raise the height of your lawn mower blades to the highest setting. When you mow the grass, remove no more than one-third of the leaf blade. Cutting grass shorter than this may stress the grass and may also decrease the depth to which roots will grow, increasing the need for water. Most St. Augustine grass and bahia grass varieties should not be mowed below 3 inches in height.

• KEEP A SHARP CUTTING EDGE. When lawn mower blades are sharp, they give a clean cut. Grass torn and shredded by dull blades suffers stress, requiring more water.

• CONSIDER ALTERNATIVES TO GRASS. Grass can be a useful plant. Use grass in areas where children or pets play, or for erosion control. In low-use areas, consider drought-tolerant plant beds, groundcovers, mulch, walkways or other alternatives that require little or no water.

Irrigate Efficiently – Step 5

PROPER DESIGN IS IMPORTANT. The installation of an efficient sprinkler system begins with good design. The system must be capable of applying water uniformly over the desired area with a minimum of over-spray into adjacent areas.

CHECK THE APPLICATION RATE OF YOUR SPRINKLER SYSTEM. Application rate is the rate at which a sprinkler system applies water to the soil surface, measured in inches per hours (in/hr). If application rates exceed the absorption capacity of the soil, then runoff occurs. Problems with runoff are more likely to occur in clay soils that have a low intake capacity.

Rotary sprinklers usually have application rates of 0.25 to 0.50 inches per hour and rarely cause runoff. Spray heads, on the other hand, typically have application rates between 1 and 2 inches per hour and may cause runoff on heavy soils, especially where slopes are greater than 10 percent. If runoff occurs, turn the system off for an hour or two to let the water soak in, and then apply the remainder of the water.

Determine the application rate of a sprinkler system by placing three or four rain gauges or empty tuna cans at random on an irrigated area for a predetermined length of time (usually one hour). By knowing the application rates of your sprinkler system, you will know how long to operate the system to apply a given amount of water and will avoid wasting water. Average water level within the gauges or tuna cans is a measure of the output of the system (in/hr). Repeat this procedure in each sprinkler zone, particularly if different types of sprinklers are used on different zones.

ADJUST SPRINKLER HEADS AS NEEDED. Improper adjustment of sprinkler heads not only wastes water but also may damage buildings or cause accidents if the water is allowed to spray onto buildings, public streets or sidewalks. Carefully adjust the radius and arc of part-circle sprinklers to prevent undesirable over-spray. Check the system several times during the year to ensure proper adjustment.

OPERATE SPRINKLERS BETWEEN 4 P.M. AND 10 A.M. Time of application affects water-use efficiency. The best time to irrigate with sprinklers is between 4 p.m. and 10 a.m. since the least amounts of sunlight and evaporation occur during these hours.

GUIDELINES FOR IRRIGATING THE LANDSCAPE

AN AUTOMATIC CONTROLLER CAN HELP TO SAVE WATER. An automatic controller attached to the irrigation system turns the system on and off and controls the water flow through the various zones according to a pre-set time clock. It allows you to set the length of time each zone operates as well as the days of the week and time of day the system operates.

However, an automatic controller does not relieve you of the need to closely monitor its operation. Controllers should be re-programmed frequently during the growing season because water needs change from week to week.

A rainfall sensor or rain switch attached to the controller detects rainfall and prevents the irrigation system from operating if significant rainfall has occurred. Another type of sensor measures soil moisture and overrides the system when soil moisture is adequate. Sensors are especially useful if the system cannot be monitored and adjusted regularly.

Mulched beds conserve soil moisture and add design interest to this bed of viburnum and crown of thorns.

There are many different types of controllers on the market. Make sure you get one with the features you need. When managed properly, an automatic controller can pay for itself in reduced water usage, cost and labor.

HANDWATERING IS NOT JUST FOR NEWLY PLANTED ORNAMENTAL PLANTS. It is also an effective and efficient way of applying water to selected plants that show signs of stress during dry periods. The direct application of water to the base of the plant, provided it is applied slowly enough to be absorbed by the soil, uses less water and is more efficient than sprinkler irrigation.

KNOW WHEN AND HOW TO IRRIGATE TURFGRASS. Turf under water stress will appear a dull bluish green color, the leaf blades will roll inward, and footprints will remain on the grass after walking over an area.

Under optimum growing conditions (high water-use zone), turfgrasses use 1 to 1 1/2 inches of water per week during hot, dry weather. It is usually best to divide this amount into two applications per week applying 1/2 to 3/4 inch each time. Never apply more than 1/2 to 3/4 inch at a time as this will likely result in runoff or deep percolation below the root zone. In the winter season when temperatures are cooler, it is usually adequate to irrigate only once per week or less.

NEVER WATER GRASS DAILY EXCEPT DURING ESTABLISHMENT. Daily irrigation with a small amount of water encourages a shallow root system and reduced drought tolerance as shown in *figure 5*. Since roots generally grow where the soil is moist, a shallow root system also prevents efficient uptake of plant nutrients. Shallow, frequent irrigation increases evaporative water loss from the soil.

Use Mulch – Step 6

Mulching is one of the most beneficial landscape practices. Mulches conserve moisture by preventing evaporative water loss from the soil surface and reducing the need for supplemental irrigation during periods of limited rainfall. By maintaining an even moisture supply in the soil, mulches prevent fluctuations in soil moisture that can damage roots.

Mulches also prevent crusting of the soil surface and allow water to penetrate readily to plant roots. They insulate the roots of plants from summer heat and winter cold and help control weeds that compete with plants for moisture. By serving as a barrier between the plant and soil, mulches help discourage soil-borne diseases that stress plants and cause them to have a higher demand for water.

Islands of mulch beds designed to blend with the landscape are an economical way to retrofit an existing landscape by reducing water needs and maintenance requirements. Aside from occasional weed control and topdressing with additional mulch, unplanted mulched areas require no water and little routine maintenance.

Pine straw, melaleuca mulch, recycled yard waste and shredded hardwood mulch or chips are some of the best mulches for a waterwise landscape. These fine-textured mulches hold moisture in the soil better than course-textured mulches like large-nugget pine bark. They also are non-matting and allow water, nutrients and oxygen to freely penetrate to plant roots.

Inorganic mulches, on the other hand, such as rock, gravel and marble absorb and re-radiate heat

from the sun and increase water loss from plants and soil. *Table 1* compares commonly used mulches on the market today. Cypress mulch is not recommended in order to protect natural cypress wetlands.

Apply approximately 3 inches of mulch under ornamental plants in the landscape. Avoid applying too much mulch because it encourages shallow roots that are easily damaged by excessive cold, heat or drought.

Where possible, extend the mulched area two to three times beyond the canopy spread of ornamental trees and shrubs. Research shows that the roots of ornamental plants grow far beyond the canopy spread, so it is important to mulch as large an area as practical.

Once mulch is in place, use your hand to pull it back 2 to 3 inches away from the trunk of trees and shrubs. Keeping mulch away from the trunk will help prevent wood rotting diseases.

During periods of limited rainfall, make certain sufficient mulch is maintained beneath plants. If watering restrictions prevent you from irrigating, mulches will help conserve the soil's remaining moisture.

Newspapers placed under organic mulches improve water conservation in the soil and provide effective recycling. Place them on the soil surface under organic mulch at planting time.

Perform Proper Maintenance – Step 7

A Xeriscape landscape is a low-maintenance landscape. By working smarter, not harder, in the landscape, you'll save time, energy and water without sacrificing the beauty of the environment.

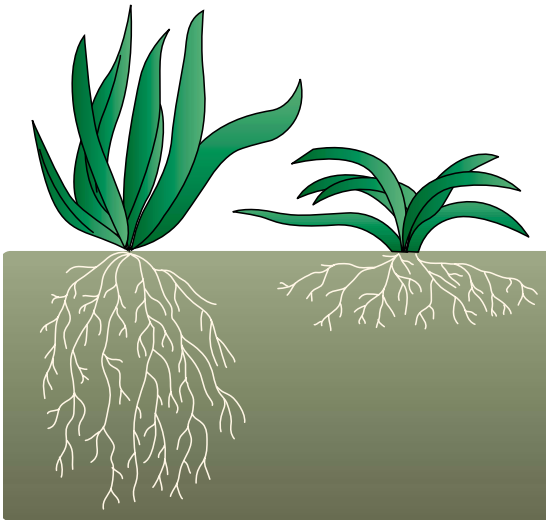


Figure 5 The healthy, deep-rooted grass on the left results from proper irrigation. The weak, shallow-rooted grass on the right results from light, frequent irrigation.

FERTILIZE LESS AND USE SLOW-RELEASE FERTILIZERS.

Many common commercial fertilizers are known by their analysis number, such as 16-4-8, 10-10-10 or 6-6-6. A complete fertilizer contains nitrogen, phosphorus and potassium. The numbers indicate the percentage of each of these nutrients. A 16-4-8 grade, for example, contains 16 percent nitrogen, 4 percent available phosphorus, and 8 percent soluble potassium. Purchase a fertilizer with nitrogen in slow-release form. Slow-release type fertilizers last longer by releasing nutrients gradually, in some cases for an entire season with one application. Also, they do not leach from the soil or wash away in runoff as readily as all-purpose fertilizers.

COMMONLY USED MULCHES

MULCH	SOURCE	DURABILITY	SUBSIDENCE	HIGH IN NUTRIENTS	MAINTAINS PH	MAINTAINS COLOR
eucalyptus	plantations	poor	good	poor	good	poor
melaleuca	degraded wetlands	good	good	poor	good	good
pine bark	by-product	good	good	poor	good	fair
pine straw	pine plantations	good	poor	fair	poor	poor
recycled	various	good	fair	good	good	good
cypress	Not recommended in order to protect natural cypress wetlands.					

Table 1 Attributes of suggested mulches

Always check the application rate on the label. The label usually suggests an application rate for optimum growth. This application rate is ideal for newly planted ornamental plants and turfgrasses to encourage healthy new growth and plant establishment. However, once plants are established, the recommended application rate of fertilizer can be reduced without sacrificing quality or appearance. This reduction in application rate is particularly important before and during dry periods. A good rule of thumb on established plants is to cut in half the rate recommended on the package.

Leaving grass clippings on turfgrass at each mowing supplies the grass with recycled nutrients and reduces the need for supplemental fertilizer. This does not promote thatch (a spongy condition of the turf). Thatch results from an accumulation of grass stems, shoots and roots, not clippings. By leaving cuttings on your lawn, as much as one-third of the nutrients applied to your lawn can be recycled.

TURFGRASS	MOWING HEIGHT (inches)
Centipede	1 to 1.5
Bermuda	1 to 2
Hybrid Bermuda	0.5 to 1.5
St. Augustine	2 to 3

Table 2 Mowing heights for turfgrasses

PROPER MOWING SAVES WATER. Mow at the recommended height (*table 2*). Keep blade sharp and mow often enough so that no more than one-third of the leaf blade is removed at each mowing. Research shows that raising the mower blade during dry weather and cutting the grass higher encourages deeper rooting, increases turf survival during drought and reduces water demand.

Avoid scalping and stressing the grass and make certain mower blade is sharp at all times.

PRUNING. If a plant is placed in the right location and given enough room to mature, pruning should be minimal. Prune to retain the natural shape, or structure, of trees and shrubs and to promote or maintain strong structure. Less pruning is usually better because pruning is stressful to a tree or shrub, which causes it to require more water. Also, pruning at the wrong time of the year can stress plants.

Your County Cooperative Extension Service has information on how and when to make proper pruning cuts for each type of plant.

Plants NOT Recommended for Landscaping

The problem with invasive, exotic plants is that they spread from managed landscapes into Florida's natural areas. These plants crowd out native plants and stress the habitats that support Florida's threatened and endangered species of plants and animals. Melaleuca, Brazilian peppertree, water hyacinth and kudzu are well known pests that cost the state millions of dollars annually to control. Not as well known are some ornamental plants that also spread into Florida's waterways, parks and natural areas.

This guide includes a list of plants not recommended for landscaping because they have shown their abilities to invade natural areas. The list is maintained by the Florida Exotic Pest Plant Council (FLEPPC), an organization comprised of professional botanists, environmental scientists, park rangers and land managers. The list is updated every two years based on observations and documented records of pest plants' spread and reproduction in Florida's natural areas. It is posted at the FLEPPC web site (www.fleppc.org). Some of the plants on the FLEPPC list are prohibited from possession, sale or cultivation by federal, state or local laws.

The South Florida Water Management District, along with other agencies, battles invasive plants in waters and lands managed for the protection of public resources. The District encourages the public to learn about the problems posed by these plants and use this knowledge to wisely choose landscape plants. The District does not recommend the use of invasive plants for landscaping.

ARE ALL NON-NATIVE PLANTS BAD FOR OUR ENVIRONMENT?

No. In fact, most non-native plants used in our Florida landscapes do not spread into the environment. While more than 10,000 non-native plants are estimated to have been purposely or accidentally brought into Florida, only 1,200 have survived outside cultivation. And, of those, only 63 species are currently thought to be invading and disrupting native plant communities. This is less than one percent of all introduced plants.

SO WHICH PLANTS ARE OK?

Some of the plants on the FLEPPC list are still commercially available. Some are already prohibited from propagation by federal or state laws, and others are under review and may or may not be prohibited in the future. Talk to your local extension agent and conduct your own research in making your decisions.

The nursery industry offers alternative plants and non-invasive varieties of some of the species known to spread into natural areas. Availability of these plants is noted in this plant guide where applicable and known.

COULD SOME PLANTS CAUSE PROBLEMS FOR NATURAL AREAS IN THE FUTURE?

Only extensive research should guide legal prohibition of any plant. Consideration may include both ecological and economic impacts. The fact that some plants may become invasive only in certain habitats or regions adds to the complexity of this issue. Consensus regarding the invasiveness of plants produced by Florida's nursery growers is sought through ongoing dialogues between the plant industry, regulators, academia and natural areas managers.

Information on distribution of plants found in Florida may be found at the University of South Florida Center for Systematic Botany web site—http://www.plantatlas.usf.edu/. Because plant distributions and our understanding of their impacts may change over time, the information in the above web site and the FLEPPC most invasive plants list are updated periodically. The information provided here was updated in 2003. Be sure to check for the most current information.

Florida Exotic Pest Plant Council 2003 List of Category I (Most Invasive) Species

Scientific Name	Common Name	Government List	Regional Distribution
Abrus precatorius	rosary pea		C, S
Acacia auriculiformis	earleaf acacia		S
Albizia julibrissin	mimosa, silk tree		N, C
Albizia lebbeck	woman's tongue		C, S
Ardisia crenata (= *A. crenulata*)	coral ardisia		N, C
Ardisia elliptica (= *A. humilis*)	shoebutton ardisia		S
Asparagus densiflorus	asparagus-fern		C, S
Bauhinia variegata	orchid tree		C, S
Bischofia javanica	bischofia		C, S
Calophyllum antillanum (= *C. calaba; C. inophyllum* misapplied)	santa maria, mastwood, Alexandrian laurel		S
Casuarina equisetifolia	Australian pine	P	N, C, S
Casuarina glauca	suckering Australian pine	P	C, S
Cinnamomum camphora	camphor-tree		N, C, S
Colocasia esculenta	wild taro		N, C, S
Colubrina asiatica	lather leaf		S
Cupaniopsis anacardioides	carrotwood	N	C, S
Dioscorea alata	winged yam	N	N, C, S
Dioscorea bulbifera	air-potato	N	N, C, S
Eichhornia crassipes	water-hyacinth	P	N, C, S
Eugenia uniflora	Surinam cherry		C, S
Ficus microcarpa (*F. nitida* and *F. retusa* var. *nitida* misapplied)	laurel fig		C, S
Hydrilla verticillata	hydrilla	P, U	N, C, S
Hygrophila polysperma	green hygro	P, U	N, C, S
Hymenachne amplexicaulis	West Indian marsh grass		C, S
Imperata cylindrica (*I. brasiliensis* misapplied)	cogon grass	N, U	N, C, S
Ipomoea aquatica	waterspinach	P, U	C, S
Jasminum dichotomum	Gold Coast jasmine		C, S
Jasminum fluminense	Brazilian jasmine		C, S
Lantana camara	lantana, shrub verbena		N, C, S
Ligustrum lucidum	glossy privet		N, C
Ligustrum sinense	Chinese privet, hedge privet		N, C, S
Lonicera japonica	Japanese honeysuckle		N, C, S
Lygodium japonicum	Japanese climbing fern	N	N, C, S
Lygodium microphyllum	Old World climbing fern	N	C, S
Macfadyena unguis-cati	cat's claw vine		N, C, S
Manilkara zapota	sapodilla		S
Melaleuca quinquenervia	melaleuca, paper bark	P, N, U	C, S
Melia azedarach	Chinaberry		N, C, S
Mimosa pigra	catclaw mimosa	P, N, U	C, S
Nandina domestica	nandina, heavenly bamboo		N, C
Nephrolepis cordifolia	sword fern		N, C, S
Nephrolepis multiflora	Asian sword fern		C, S
Neyraudia reynaudiana	Burma reed; cane grass	N	S
Paederia cruddasiana	sewer vine, onion vine	N	S
Paederia foetida	skunk vine	N	N, C, S
Panicum repens	torpedo grass		N, C, S

Florida Exotic Pest Plant Council 2003 List of Category I (Most Invasive) Species

Scientific Name	Common Name	Government List	Regional Distribution
Pennisetum purpureum	Napier grass		C, S
Pistia stratiotes	water lettuce	P	N, C, S
Psidium cattleianum (P. littorale)	strawberry guava		C, S
Psidium guajava	guava		C, S
Pueraria montana (= *P. lobata)*	kudzu	N, U	N, C, S
Rhodomyrtus tomentosa	downy rose-myrtle	N	C, S
Rhoeo spathacea (see *Tradescantia spathacea*)			
Ruellia brittoniana	Mexican petunia		N, C, S
Sapium sebiferum	popcorn tree, Chinese tallow tree	N	N, C, S
Scaevola sericea (= *Scaevola taccada* var. *sericea, S. frutescens)*	scaevola, half-flower, beach naupaka		C, S
Schefflera actinophylla (= *Brassaia actinophylla*)	schefflera, Queensland umbrella tree		C, S
Schinus terebinthifolius	Brazilian pepper	P, N	N, C, S
Senna pendula (= *Cassia coluteoides)*	climbing cassia, Christmas cassia, Christmas senna		C, S
Solanum tampicense (= *S. houstonii*)	wetland night shade, aquatic soda apple	N, U	C, S
Solanum viarum	tropical soda apple	N, U	N, C, S
Syngonium podophyllum	arrowhead vine		C, S
Syzygium cumini	jambolan, Java plum		C, S
Tectaria incisa	incised halberd fern		S
Thespesia populnea	seaside mahoe		C, S
Tradescantia fluminensis	white-flowered wandering jew		N, C
Tradescantia spathacea (= *Rhoeo spathacea, Rhoeo discolor*)	oyster plant		S
Urochloa mutica (= *Brachiaria mutica*)	Pará grass		C, S

ABBREVIATIONS USED:

Government list:
P=Prohibited by Fla. DEP
N=Noxious weed list of Florida Dept. of Agriculture and Consumer Services
U=Noxious weed list of U.S. Dept. of Agriculture

Distribution:
N = North Florida
C = Central Florida
S = South Florida

PLANT IT SMART

Incorporating non-invasive plants and Xeriscape principles into your landscape is easy and doesn't require a large investment. By following these recommendations, you can soon turn your yard into a thriving, waterwise landscape. But, most importantly, you can help protect our environment today—and for generations to come—by conserving our most valuable resource, water, and using plants that encourage rather than threaten natural Florida.

On the following pages, you'll find lists, photos and descriptions of dozens of indigenous trees, shrubs, groundcovers including flowers and grasses, and vines that can be used in your waterwise Florida landscape. Please do not plant non-indigenous, invasive plants such as Australian pine, melaleuca or water hyacinth. When non-indigenous and invasive plants escape they become biological invaders wreaking havoc on the environment. The environmental and economic harm caused by exotics is staggering, especially in South Florida where our tropical environment encourages plants to quickly disperse into new areas. As a result, our natural areas suffer from encroaching invasive plants that not only drive out native plants and animals, but can also affect water flow in the Everglades and the regional canal system.