

# WHAT'S GOING ON WITH OUR TREES & PARKS?

GREEN SPACE AND XERISCAPING

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## **XERISCAPING**

Sunshine State Standards: SC.G.2.4.2, SC.G.2.4.6

### **Objectives**

Students will understand the value of using appropriate plants for the area.

### **Materials**

Xeriscaping handout, native plants, Schoolyard Ecosystems Book.

### **Background**

Xeriscaping is the planting of plants in an area where they need a minimum of water and care. In areas of drought, xeriscaping can help prevent loss of soil. Plants hold soil together with their roots. So xeriscaping helps prevent soil erosion and destruction of the land.

### **Activity**

Part A: Discussion of urban heat islands and xeriscaping (handouts attached).

Part B: Students will plan and execute a xeriscaped garden for school site.

1. Using skills already learned in a previous activity, students will do a site survey to find best location for garden.
2. Students will lay out plan for plot.
3. Students will determine best location for each plant.
4. Students will acquire native plants.
5. Students will plant and maintain garden.
6. Students will mount signs labeling plants.

Part C: Students will act as docents for younger students.

### **Assessment**

Short-term: Observation of students as docents.

Long-term: Maintenance of garden by students and success of plants in it.

## **Quick Facts**

from the South Florida Waste Management District  
March 12, 2001

# **XERISCAPE: How to Save Water Through Water-smart Landscaping**

Did you know that half of residential water is used for outdoor irrigation? You can cut your outdoor water use substantially with water-conserving plants and use of Xeriscaping principles.

Xeriscape is water conservation through creative landscaping. The term Xeriscaping means water-conserving, drought-tolerant landscaping, or simply the use of the right plant in the right place – with proper maintenance and water-wise watering.

Follow the seven fundamentals of Xeriscape systematically and you'll be well on your way to saving water!

1. **Design your landscape.** Careful planning is crucial to the long-term success of the Xeriscape landscape. You can minimize your initial investment by installing your Xeriscape in phases. First, make a simple site plan drawing of your property. Note slopes, drainage problems and existing plants and trees. Also note shaded and sunny areas. Determine the areas that will be irrigated when you select plants.
2. **Select the right plant for the right area.** Select and group plants according to their water needs to eliminate unnecessary watering. You should have three zones in your site plan:

*Natural zones:* Plants in this area can live on rainfall. They can be native plants or cultivated plants that have adapted to Florida.

*Low water "drought-tolerant" zones:* Plants in these areas can survive mostly on rainfall.

*Moderate or "oasis" water zones:* These areas require regular watering and should be limited as accents in your Xeriscape. Keep these zones functional, such as entryways, turf areas and fruit or vegetable gardens.

3. **Analyze the soil.** Determine the acid and alkaline levels (pH) of your soil before planting. You can mix organic matter such as compost, peat, manure or topsoil into sandy soils for enrichment and to retain moisture.
4. **Have limited turf areas.** Turf is the single largest consumer of water in a landscape. Always look for drought-tolerant turf varieties. Consider mulch as an alternative to turf. Avoid long, narrow turf areas because they are difficult to water efficiently.

5. **Water wisely.** Drought-tolerant plants can survive mostly on rainfall. If watering is necessary, do it only in the early morning, and in accordance with any water restrictions, to reduce evaporation. Remember, Florida Statutes require that all new automatic lawn sprinkler systems must have a rain sensor device or shut-off switch, which overrides the system cycle following adequate rainfall. Water trees, shrubs, flowers and ground covers with low-volume drip or spray heads. These low-volume methods include “soaker hoses” in which water escapes through tiny holes in the hose, Apply the “soaker hose” to the root zone of the plant so that the water does not run off the root area.
6. **Use mulches.** Mulches limit weed growth and retain moisture. Two to three inches of mulch on garden beds and walkways also reduces weed growth and slows erosion. Avoid cypress mulch. Use other organic mulches such as recycled mulch, bark chips, wood shavings or pine straw/needles.
7. **Properly maintain your landscape.** Over-watering increases the risk of plant disease. To encourage deep rooting and more drought-resistance, water plants thoroughly without over-watering.

Fertilize properly: excessive fertilizer promotes fast, but weak growth and actually increases a plant’s water needs, as does over-pruning.

## PLANTS FOR YOUR XERISCAPE

Some people think of a desert scene when they hear “Xeriscape,” but this is not the look of a typical Xeriscape. Some of the “Florida Favorites” you can use for your Xeriscape landscape are listed here. Several of them are lush and tropical looking. They will add to the beauty of your landscape while conserving water.

Consult a nursery professional for information about which plants are appropriate for your region.

### Trees

Bald cypress (*Taxodium distichum*)  
Dahoon holly (*Ilex cassine*)  
Geiger tree (*Cordia sebestena*)  
Gumbo Limbo (*Bursera simaruba*)  
Ironwood (*Krugiodendron ferreum*)  
Live oak (*Quercus virginiana*)  
Magnolia, southern (*Magnolia grandiflora*)  
Magnolia, sweet bay (*Magnolia virginiana*)  
Myrsine (*Rapanea guianensis*)  
Paradise tree (*Simarouba glauca*)  
Pigeon plum (*Coccoloba diversifolia*)  
Red bay (*Persea borbonia*)  
Red maple (*Acer rubrum*)  
Sea grape (*Coccoloba uvifera*)  
Silver buttonwood (*Conocarpus erectus* var. *sericeus*)  
Simpson’s stopper (*Myricanthes fragrans*)  
Slash pine (*Pinus elliotii*)  
Southern red cedar (*Juniperus sillicicola*)  
Trumpet tree (*Tabebuia* spp.)

### Palms and Cycads

Buccaneer or Sargent’s palm (*Pseudophoenix sargentii*)  
Cabbage palm (*Sabal palmetto*)  
Coontie (*Zamia pumila*)  
Paurotis/Everglades palm (*Acoelorrhapha wrightii*)  
Queen sago (*Cycas circinalis*)  
Royal palm (*Roystonea elata*)  
Saw palmetto (*Serenoa repens*)  
Thatch palm (*Thrinax* spp.)

### Annuals/Perennials/Wildflowers

Beach sunflower (*Helianthus debilis*)  
Black-eyes Susan (*Rudbeckia hirta*)  
Blanket flower (*Gaillardia pulchella*)  
Lantana, pineland (*Lantana depressa*)  
Lantana, wild (*Lantana involucrate*)  
Pentas (*Pentas lanceolata*)  
Porter weed (*Stachytarpheta jamaicensis*)  
Sea oxeye daisy (*Borrchia frutescens*)  
Spider lily (*Hymenocallis latifolia*)  
Tickseed (*Coreopsis Leavenworthii*)

### Shrubs

Beautyberry (*Callicarpa americana*)  
Cocoplum (*Chrysobalanus icaco*)  
Coral bean (*Erythrina herbacea*)  
Crinum lily (*Crinum asiaticum*)  
Firebush (*Hamelia patens*)  
Florida privet (*Forestiera segregata*)  
Holly, Stokes dwarf (*Ilex vomitoria*)  
Jamaica caper (*Capparis cyanophallophora*)  
Marlberry (*Ardisia escallonioides*)  
Necklase pod (*Sophora tomentosa*)  
Walter’s viburnum (*Viburnum obovatum*)  
Wax myrtle (*Myrica cerifera*)  
White indigo berry (*Rendia aculeata*)  
White stopper (*Eugenia axillaris*)  
Wild coffee (*Psychotria nervosa*)  
Wild coffee, dwarf (*Psychotria ligustrifolia*)

### Ferns

Boston fern (*Nephrolepis exaltata*)  
Leather fern (*Acrostichum danaeifolium*)  
Swamp fern (*Blechnum serrulatum*)

### Accent Grasses, Vines and Groundcovers

Bougainvillea (*Bougainvillea spectabilis*)  
Coral honeysuckle (*Lonicera sempervirens*)  
Corky-stemmed passion-flower (*Passiflora suberosa*)  
Cordgrass (*Spartina bakeri*)  
Fakahatchee grass (*Tripsacum dactyloides*)  
Florida gama grass (*Tripsacum floridanum*)  
Lantana, trailing (*Lantana montevidensis*)  
Liriope (*Liriope muscari*)  
Mondo grass (*Ophiopogon japonicus*)  
Purple love grass (*Eragrostis spectabilis*)  
Railroad vine (*Ipomoea pes-caprae*)  
Sea oats (*Uniola paniculata*)

For more information, go to [www.sfwmd.gov](http://www.sfwmd.gov).

# **WHAT'S GOING ON WITH OUR TREES & PARKS?**

## **Green Space & Urban Heat Islands**

### **What is Green Space?**

According to the Environmental Protection Agency ([www.epa.gov/kids/](http://www.epa.gov/kids/)), Green Space refers to any area that is created or preserved for the purpose of growing plants. It can be a manicured lawn or a vacant lot full of wildflowers; a public park; a grove of trees. It might be a combination. What grows in Green Space is not as important as the preservation. We are faced with a situation in which our green areas are being systematically destroyed to make way for housing, businesses and roads.

### **Why is this a problem?**

Green plants are the ONLY means of replenishing the air we breathe. And we have reached the point where we cannot afford to lose any more of it. Since the population will continue to grow, making more buildings necessary. We must develop methods of building that destroy as little green space as possible.

### **What is an "urban heat island"?**

As our urban centers expand and green space disappears, our cities become hotter. "Islands" of higher temperatures are created in these areas, while the surrounding neighborhoods and rural farmlands with lots of trees stay cooler.  
(<http://eetd.lbl.gov/heat island/LEARN/>)

### **How do "urban heat islands" develop?**

Dark-colored surfaces, such as those found on pavements and rooftops, absorb solar radiation, converting this energy into heat, which HEATS-UP the air around us. Such changes cause energy, air quality and environmental problems that make our urban areas less comfortable places to live and work.

### **Strategies that can reduce the negative impacts of "urban heat islands"**

- Use drought tolerant deciduous and coniferous trees, shrubs and ground covers.
- Use light -colored (or more reflective) surfaces on buildings, streets, parking lots and rooftops.
- Preserve Green Space.

### **Additional Links:**

EPA Student Center ([www.epa.gov/students](http://www.epa.gov/students))

US Geological Survey's Water Science for Schools ([www.ga.usgs.gov/edu/urbanquality.html](http://www.ga.usgs.gov/edu/urbanquality.html))

Friends of the Earth ([www.foe.org/](http://www.foe.org/))

# **WHAT'S GOING ON WITH OUR TREES & PARKS?**

## **General Planting and Maintenance Guidelines**

### **Planting**

Site factors which influence long-term survivability should be considered: overhead and underground utilities, sidewalks, sign conflicts, traffic visibility, light poles, right-of-way or site improvements, size of planting space/site, etc.

All synthetic or non-biodegradable material such as nylon rope, synthetic wrap, treated burlap, etc. must be removed from the root ball before planting. All biodegradable material should be removed from the upper 1/3 of the root ball. Precautions should be taken to eliminate any material from extending above the soil surface where it can act as a wick and dry the surrounding soil.

If trees are planted with wire baskets around the root ball, it is recommended that the top two tiers of wire be cut and removed after the root ball is set in the planting hole.

The planting hole should be at least 3-5 times the diameter of the root ball (where possible) and the same depth as the root ball.

Position the tree in the center of the planting hole with the top of the root ball even with the surrounding soil surface.

Backfill with soil from the planting site if it is not contaminated. All large rocks should be removed. When the hole is half full, slowly water to saturate the soil and remove air pockets, then continue to fill the hole with soil. It is not recommended that large amounts of organic matter be incorporated into the backfill. Rake the soil evenly around the entire planting area.

Water thoroughly to remove air pockets, secure the soil around the roots and provide nourishment.

### **Mulching**

Mulch an area at least three times the diameter of the root ball to a depth of 2-4" with wood chips, bark mulch, shredded mulch, leaves or pine needles. Keep the mulch several inches away from the tree or palm trunk.

Replenish mulch as it decomposes, maintaining a 2-4" layer over the life of the project.

## **Staking**

Stake only if necessary. For example, if the tree will not stand on its own due to potential vandalism or strong winds.

Use flexible materials such as strapping or commercially available ties that give as the tree diameter increases and as the tree moves. Biodegradable material is recommended. Do not use wire even if wire is inside rubber hose.

Stakes and ties should remain on the trees no longer than one year to avoid girdling.

## **Pruning**

At the time of planting only dead, damaged, rubbing or cross branches or fronds should be removed.

Corrective/structural pruning can begin approximately one year after planting. Do not remove more than 1/3 of the live crown during one growing season.

## **Watering**

Establish a regular watering schedule and follow it. Slow deep watering is recommended.

Additional water may be needed during hot or dry periods.

As tree growth progresses, be sure to water outward (away from the trunk) to the surrounding soil area, this will promote the outward growth and spread the roots.

Various species of trees and/or soil types may require varied degrees of watering. Soil moisture and tree health should be monitored and irrigation adjusted accordingly.

## **Fertilizing**

Begin a fertilization program within the first year of planting. Broadcast fertilizing or fertilizer plugs/stakes are recommended.

Fertilize lightly after the first year using a balanced fertilizer (rates should be based on the size of the tree and any special nutrient requirements).

If micronutrient deficiencies are suspected, have a soil test completed and supplement the fertilization program accordingly.

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## KEY TERMS

1. **Ecosystem:** the community of plants and animals interacting with one another and the environment.
2. **Infrastructure:** The foundation on which economic development is based, including the transportation, communication, electrical and water supply systems of a community, city or nation.
3. **Mega-City:** a city with a population in excess of ten million people.
4. **Pollution:** the contamination of soil, water or the air by the discharge of harmful substances.
5. **Rapid transit system:** mass transportation, which enables people to move farther and faster through a city.
6. **Refugee:** a person who flees usually to another country to escape oppression or persecution.
7. **Sewage:** liquid and solid waste usually carried off in sewers or drains.
8. **Smog:** fog that has become mixed and polluted with smoke.
9. **Sustainability:** the ability to maintain or keep from collapsing.
10. **Toxic:** poisonous, capable of causing injury or death, especially by chemical means.
11. **Urbanization:** growth in the portion of a population living in areas of more than 2,500 people.
12. **Urban head island:** urban areas where there are fewer trees and other natural vegetation to shade buildings, block solar radiation and cool the air.
13. **Urban sprawl:** the unplanned, uncontrolled spreading of urban development into areas adjoining the edge of a city.
14. **Water treatment plant:** facility for the chemical treatment and recycling of water.

## About Rainforests by the numbers

Rainforests cover 2% of the Earth's surface, or 6% of its land mass, yet they house over half the plant and animal species on Earth. They originally covered at least twice that area.

Tropical rainforests are defined primarily by two factors: location (in the tropics) and amount of rainfall they receive. Rainforests receive from 4 to 8 meters of rain a year -- 5 meters of rain falls on the rainforests of Borneo each year, five times as much as on the state of New York. The heavy vegetation blocks the rainfall, and water reaches the forest floor by rolling down branches and trunks or as a fine spray. Another distinctive characteristic is that rainforests have no "seasonality" -- no dry or cold season of slower growth. (Myers, Norman, The Primary Source)

Tropical rainforests are the Earth's oldest living ecosystems. Fossil records show that the forests of Southeast Asia have existed in more or less their present form for 70 to 100 million years. (Myers, Norman, The Primary Source)

### *Tropical rainforests are the Earth's oldest living ecosystems.*

Rainforests are being destroyed at a staggering rate. According to the National Academy of Science, at least 50 million acres a year are lost, an area the size of England, Wales and Scotland combined.

All the primary rainforests in India, Bangladesh, Sri Lanka and Haiti have been destroyed already. The Ivory Coast rainforests have been almost completely logged. The Philippines lost 55% of its forest between 1960 and 1985; Thailand lost 45% of its forest between 1961 and 1985.

Despite the small land area they cover, rainforests are home to about half of the 5 to 10 million plant and animal species on the globe. Rainforests also support 90,000 of the 250,000 identified plant species. Scientists estimate that there are at least 30,000 as yet undiscovered plants, most of which are rainforest species. (Myers, Norman, The Primary Source)

One fourth of the medicines available today owe their existence to plants. Seventy percent of the plants identified by the National Cancer Institute as useful in cancer treatment are found only in the rainforest. Drugs used to treat leukemia, Hodgkin's disease and other cancers come from rainforest plants, as do medicines for heart ailments, hypertension, arthritis and birth control. Yet fewer than 1% of tropical forest species have been thoroughly examined for their chemical compounds. (Myers, Norman, The Primary Source)

### *A typical four square mile patch of rainforest contains as many as 1500 species of flowering plants*

Many of the foods we eat today originated in rainforests: avocado, banana, black pepper, Brazilian nuts, cayenne pepper, cassava/manioc, cashews, chocolate/cocoa, cinnamon, cloves, coconut, coffee, cola, corn/maize, eggplant, fig, ginger, guava, herbal tea ingredients (hibiscus flowers, orange flowers and peel, lemon grass), jalapeño, lemon, orange, papaya, paprika, peanut, pineapple, rice, winter squash, sweet pepper, sugar, tomato, turmeric, vanilla, and Mexican yam. The wild strains still in the rainforests of many of these plants provide genetic

materials essential to fortify our existing agricultural stock. Many other rainforest plants have great promise to become other staple foods. (Caufield, Catherine, In the Rainforest)

While it's true that rainforests produce vast amounts of oxygen through photosynthesis, they consume as much as they produce in the decay of organic matter. Rainforests do affect our atmosphere and climate, but not through supplying the world's oxygen. (Caufield, Catherine, In the Rainforest)

Rainforests play a critical role in the atmosphere in part because they hold vast reserves of carbon in their vegetation. When rainforests are burned, or the trees are cut and left to decay, the carbon is released into the atmosphere as carbon dioxide (CO<sub>2</sub>). This is the second largest factor contributing to the greenhouse effect. (Caufield, Catherine, In the Rainforest)

Four-fifths of the nutrients in the rainforests are in the vegetation. This means that the soils are nutrient-poor and become eroded and unproductive within a few years after the rainforest is cleared.

A typical four square mile patch of rainforest contains as many as 1500 species of flowering plants, 750 species of trees, 125 mammal species, 400 species of birds, 100 of reptiles, 60 of amphibians, and 150 different species of butterflies. In one study, one square meter of leaf litter, when analyzed, turned up 50 species of ants alone. (National Academy of Sciences.)

The tropics are the earth's richest natural reserves. One fifth of all the birds and plants on Earth evolved in the Amazon Basin. (Steinhart, Peter, National Wildlife Federation, Dec./Jan. 1984)

The uneven distribution of wealth and land is one major factor in the destruction of tropical forests. The World Bank estimates that of the 2.5 billion people now living in the tropics one billion exist in absolute poverty. (Raven, Peter H, Bulletin of Atomic Scientists, November 1984.)

For more information about the Rainforests, please see [www.ran.org](http://www.ran.org)