



Florida
**Green Local Government
Designation**



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LANDSCAPE MAINTENANCE

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ABOUT THE FLORIDA GREEN LOCAL GOVERNMENT DESIGNATION

The Florida Green Local Government Designation is intended to be a standard for evaluating and rating the environmental and sustainability performance of local governments within the state. The overall designation organizes criteria in terms of individual government functions typically centralized within a department. The designation then focuses on improving the environmental performance of these functions through a number of techniques and mediums (energy, water, air, land, waste). Primary techniques include recommendations for what the local government can do in-house to **lead by example** within the community, **controls and incentives** that can be enacted to foster green practices within the community, and **education** within the community, including internal staff. In addition to providing a rating system, it is believed that this standard will serve as a valuable resource for enlightening local governments and exposing them to options that they may not have considered before or have not implemented fully.

For more information about the Green Local Government Designation please visit us online at <http://www.floridagreenbuilding.org/> .

OVERVIEW OF THIS DOCUMENT

This module is not intended to provide a detailed explanation of basic job functions. Readers of this document should already be familiar with basic landscaping maintenance procedures. This module is intended to highlight common landscape maintenance operations that often have the potential to demonstrate sustainable practices that go beyond basic compliance. Throughout this module, short descriptions of options are provided for consideration. Along with these short descriptions, the location of additional resources have been provided to allow more detailed research prior to implementing options. In addition, available case studies have been cited to demonstrate “real world” application of techniques.

DISCLAIMER

The information contained in this document is believed to be accurate and reliable and is intended to provide options available for improvement of operations. However, the application of this information is at each local government’s discretion. This module is not intended to be a compliance manual. Landscape maintenance managers are advised to work with their local and state environmental regulatory agencies to determine relevant rules and regulations, and how to remain in compliance within their own regions.

Any products or services mentioned in this document are provided only as example references and are not to be considered an endorsement or a comprehensive list of vendors available. Local governments are encouraged to research all available vendors and evaluate their performance based on relevant criteria such as costs, regulatory compliance, reliability, reviews from past customers, etc.

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TABLE OF CONTENTS

SECTION I - LEAD BY EXAMPLE.....	3
A. PLAN USING NATURE FOR SITE LAYOUT AND PREPARATION	4
1. Identify and work with existing features.....	4
2. Preserving existing desirable trees	5
3. Identify and plan for environmental characteristics	5
4. Draw a site plan.....	6
5. Identify and incorporate functional needs.....	6
6. Identify and incorporate aesthetic desires.....	6
7. Use low-maintenance ground-cover instead of turf.....	6
8. Group plants by common environmental and maintenance needs	6
9. Removal of invasive species	7
10. It's not just the plants.....	7
B. RIGHT PLANT – RIGHT PLACE.....	8
1. Select environmentally compatible and native plants	8
2. Vary plant material to encourage bio-diversity	8
3. Ensure utility and hardscape clearance	8
4. Ensure adequate spacing.....	9
5. Plant for shading and energy conservation	9
6. Avoid invasive species	9
7. Select appropriate turf grasses.....	10
C. XERISCAPING AND WATER CONSERVING IRRIGATION SYSTEMS	11
1. Right plant - Right place	11
2. Use xeriscaping and native plants.....	12
3. Design the irrigation system to match the landscape.....	12
4. Use irrigation timers and sensors	12
5. Use drip or micro-irrigation	12
6. Perform periodic maintenance.....	13
7. Evaluate rain water collection systems	13
8. Evaluate reclaimed or gray water use	13
D. MULCH AND COMPOST	14
1. Apply mulch properly	14
2. Use organic mulch whenever practical.....	14
3. Evaluate use of inorganic mulching materials	15
4. Consider composting and the use of compost	15
E. FERTILIZERS	16
1. Right plant - Right place	16
2. Fertilize to achieve a targeted objective	16
3. Apply fertilizers appropriately	16
4. Consider exclusively using organic fertilizers.....	17
5. Capture run-off for reuse	17
F. HERBICIDES, INSECTICIDES, AND INTEGRATED PEST MANAGEMENT	18
1. Right plant - right place.....	18
2. Cultural, biological, and genetic components of IPM	19
3. Analysis and record keeping	19
4. Evaluate alternatives before resorting to chemicals.....	19
5. Transport barriers as a chemical alternative	19
6. Manual controls as a chemical alternative	20
7. Mechanical controls as a chemical alternative	20
8. Mulch as a chemical alternative	20
9. Species rotation as a chemical alternative	20
10. Biological controls as a chemical alternative.....	20
11. Fire as a chemical alternative.....	21
12. Use chemicals to achieve a targeted objective	21

13. Apply chemicals appropriately	21
14. Proper storage	22
15. Capture of run-off for reuse	22
G. PROPER PRUNING, TRIMMING AND MOWING TECHNIQUES.....	23
1. Right plant - right place.....	23
2. Plant properly.....	23
3. Proper pruning and trimming	23
4. Proper mowing.....	24
5. Properly dispose of all landscape waste	24
6. Reducing non-road emissions	25
H. PROPER STORAGE, HANDLING, AND DISPOSAL OF LANDSCAPING CHEMICALS	26
1. Inventory management.....	26
2. Selecting a site and construction of facilities.....	27
3. Storage containers / secondary containment	27
4. Mixing	27
5. Waste recycling / disposal	28
6. Container recycling / disposal.....	28
7. Plan and prepare for spills and other emergencies.....	28
I. GREEN ROOFS	29
1. Intensive or extensive.....	30
2. Waterproofing	30
3. Soil.....	30
4. Plant Life.....	30
5. Maintenance	30
J. OUTDOOR ACCESSORIES	31
1. Paths and walkways	31
2. Recycled-content and renewable-resource construction materials.....	32
3. Recycled plastic lumber.....	33
4. Certified forest lumber	33
5. Avoid CCA lumber	33
6. Outdoor lighting	34
SECTION II - CONTROLS AND INCENTIVES	35
A. ENACT A LANDSCAPE ORDINANCE FOR PROTECTION OF WATER QUALITY AND QUANTITY...	36
B. ENACT AN ORDINANCE TO PRESERVE EXISTING CANOPY	38
C. IMPLEMENT A RIGHT-OF-WAY OR STREET TREE PLANTING PROGRAM	40
1. Prepare a plan	40
2. Special considerations for street trees	40
3. Selecting a qualified arborist	41
4. Potential funding sources	41
5. Educate citizens on tree canopy issues	42
D. ENACT LOCAL ORDINANCES FOR XERISCAPING AND PROPER IRRIGATION	43
1. Xeriscaping	43
2. Proper irrigation system design and installation.....	43
3. Water conserving irrigation equipment.....	44
4. Reclaimed or gray water resources.....	44
5. Water use restrictions.....	44
SECTION III - EDUCATION	47
A. LOCAL TREE PLANTING CAMPAIGN	48
1. The National Arbor Day Foundation.....	48
2. Local government tree distribution program.....	48
B. STORMWATER RUNOFF REDUCTION CAMPAIGN	51
C. EDUCATE THE COMMUNITY ABOUT INVASIVE EXOTIC PLANTS AND REGULATIONS	52



SECTION I - LEAD BY EXAMPLE

Local governments have an opportunity to *lead by example* and demonstrate to the members of their community the viability and benefits of various environmental practices and technologies. In particular, landscapes and the outdoor environment are very visible aspects of operations that are seen daily and are usually widely dispersed geographically. In effect, they are advertisements for local government in action.

Landscaping can be found in a variety of formats including:

- Adorning a variety of office buildings
- Parks and other recreational areas
- Sports fields and golf courses
- Public right-of-ways including swales and street medians
- Public housing
- Other publicly owned or operated property

The design, construction, and maintenance of landscaping can represent a significant expenditure to most local governments. These expenditures represent an opportunity for a local government to demonstrate the importance of environmental protection within their community as well as realize favorable economic returns at the same time. Even if some or all of the landscape maintenance responsibility is outsourced, local governments still have the opportunity (and responsibility) to include environmental criteria within contract specifications.

A summary of many of the benefits associated with trees and proper landscaping can be found at the end of this document *The Benefits to a Community of Proper Landscaping*.

The following general methodology was used in developing this module and should be applied when reviewing your own specific operations:

1. Minimize the need for future maintenance by creating a self-sustaining landscape with the right plants in the right place
2. Perform maintenance in an environmentally–friendly manner
 - a. Less input materials (water, fertilizer, pesticide)
 - b. Safer / less toxic materials (fertilizer, pesticides, herbicides)
 - c. Using proper timing
 - d. Using proper technique
3. Evaluate financial performance over life-cycle

Many of the items identified in this document can fit within the larger “plan-do-check-act” framework of an environmental management system (EMS). An EMS is a set of management processes and procedures that allows an organization to analyze, control and reduce the environmental impact of its activities, products and services, as well as operate with greater efficiency and control. Local governments are encouraged to implement their own EMS.



A. PLAN USING NATURE FOR SITE LAYOUT AND PREPARATION

Landscape design is an important aspect of any site, whether the property is being newly developed or is simply being revitalized. A good landscape design can increase the appeal and enhance the functionality of a site. Proper landscape design is the successful combination of a number of factors including:

- appearance and aesthetics
- functional features
- ease of maintenance
- life-cycle cost considerations

The landscape design process should not be viewed as the last step in a construction or redevelopment project, but should be an integral part from the beginning. Desirable landscape features may actually guide the location and orientation of buildings and transit paths.

Resources

- 🔗 University of Florida IFAS Cooperative Extension can help you design a Florida friendly landscape: <http://extension.ifas.ufl.edu/>
- 🔗 Basic Principles of Landscape Design at <http://edis.ifas.ufl.edu/MG086>
- 🔗 Establishing your Florida lawn <http://edis.ifas.ufl.edu/LH013>
- 🔗 40 photographs of landscapes in north, central and south Florida with additional landscapes designs <http://it.ifas.ufl.edu/landscapeselector/intro.html>
- 🔗 Plan twice...plant once: <http://coop.co.pinellas.fl.us/TimeTweb/2000/nov/novchris.htm>

1. Identify and work with existing features

The “traditional” site preparation methods of clear-cutting, flattening, and filling, are not sustainable and should be avoided. Surveying the existing features of a property will help define some of the restrictions of the landscape design, as well as identify potential resources that can be incorporated within the design. There is great value in identifying the existing and historical natural features of a landscape, and working with those features to shape a landscape that is in harmony with nature. These features may include:

- a. Lakes, depressions, and wetlands or other water bodies or retention areas
- b. Site contours and boundaries, especially those affecting stormwater flow. Working with a site’s natural directions for stormwater flow will take less effort than radically altering it. Even if the directions of stormwater flow may be altered within a site, the flows at boundaries must be considered.
- c. Trees and other historical or existing plants on a property. These may provide guidance as to which native species will thrive within a given environment and require minimal maintenance. These species can then be incorporated within the landscape design.
- d. Existing built hardscape features including buildings, roadways, sidewalks, and utilities, etc. In some instances these built features can be relocated to facilitate a specific landscape design. In most instances however, particularly due to economic constraints, the landscaping layout must be adapted. This can affect the location for plants and the type of plant material selected based on anticipated size, both above and below ground.



Resources

- ☞ Sunshine State One Call of Florida (SSOCOF) : to assist with the prevention of damage to underground facilities, call before you dig 1-800-432-4770 or <http://www.callsunshine.com/>

2. Preserving existing desirable trees

Trees may be desirable because of their species, size, age, etc. and may also be protected by local regulations. These trees should be incorporated into the site layout and efforts made to preserve them during any construction phases. Protecting trees involves protecting the visible parts of the trees, as well as the root system at least within the dripline of the tree. Barriers may be as simple as warning signs and tape, or may require temporary fencing.

If the site layout cannot be designed to incorporate these trees, then relocation may be a secondary option. Mature trees improve the appearance of property and provide a aesthetic feature that can not be duplicated by young trees. Because of the expense associated with relocation, as well as varying success rates, incorporating desirable trees into the initial design is the preferred option.

Contrary to the perceptions of many, trees growing in many urban areas seldom develop tap roots. In fact, most roots are located within the top 12 inches of soil because this is where aeration, nutrients and moisture are abundant. The feeder roots grow just below the surface of the soil or mulch, or among the lawn and shrub roots. About 50 percent of the tree root system grows beyond the canopy, and the tips of the roots are three times as far from the trunk as the canopy. Due to the extent and shallowness of the roots, much of the root system is frequently removed from existing trees during construction of a home or other building. This causes decline and tree death in the years following construction. The best treatment for trees damaged by construction is irrigation. Heavy fertilizing may make the problem worse by forcing undesirable top growth, which cannot be supported by the reduced root system.

3. Identify and plan for environmental characteristics

Some environmental characteristics will vary between geographic regions (e.g. temperature ranges in North vs. South Florida) and some characteristics, such as soil type and related geology, may actually vary between different areas on the same parcel of property. Characteristics to identify include:

- a. Soil type and related geology (e.g. pH, nutrients, top soil depth, drainage, etc.)
- b. Annual variations in temperature ranges
- c. Total annual and seasonal variations in rainfall
- d. Amount of sunlight or shading

Although landscape material should be selected that is compatible with the existing site characteristics, there may be extreme instances when this is not possible. An example is property that was previously filled with poor material and compacted. In these cases, tilling, the addition of quality top soil, and/or the direct addition of nutrients may be required to help return the site to its earlier natural state and establish the landscape.

Resources

- ☞ University of Florida IFAS - Extension Soil Testing Laboratory (ESTL) Analytical procedures and Training Manual <http://edis.ifas.ufl.edu/SS312>
- ☞ University of Florida IFAS - Soil testing and interpretation for Florida turf-grasses <http://edis.ifas.ufl.edu/SS317>



University of Florida IFAS - Florida Yards and Neighborhoods - Creating your Florida yard: <http://hort.ifas.ufl.edu/fyn/create1.htm>

LEAD BY EXAMPLE

4. Draw a site plan

Effective landscape design is part art and part science. Drawings or sketches can be powerful tools in visualizing how elements will fit and function together. Mistakes that are made on paper are easy to correct before supplies have been purchased and ideas have begun to be implemented on site.

Adding features in layers on a plan can be an effective method to build up a virtual representation of a site. This can begin with less variable aspects (e.g. boundaries) and build from there. These layers can then be used to guide specific features (e.g. irrigation installation) and to encourage grouping plants with similar needs.

5. Identify and incorporate functional needs

Functional spaces for customer activities and related needs is a primary design criteria to incorporated into a good landscape design. Functional needs can include space for:

- a. buildings and similar structures.
- b. transit paths for vehicles and pedestrians.
- c. space for recreational activity areas (including sports fields).
- d. outdoor extensions of indoor areas.
- e. shaded areas for leisure or building energy conservation.
- f. noise reduction buffers.
- g. visual buffers.
- h. security features (e.g. limiting or encouraging visibility).
- i. stormwater retention and management areas (including wetlands preservation).
- j. habitat preservation (especially threatened or endangered species).

6. Identify and incorporate aesthetic desires

Aesthetic desires can be incorporated once functional needs have been considered. In some instances there will be very specific requirements and in others it will be entirely left up to the landscape designer. Aesthetic desires will often drive:

- a. the specific shapes of plant beds.
- b. specific plant material chosen (branches, leaves, and flowers) on the basis of shape, size, and colors.
- c. density of plants.
- d. habitats to encourage wildlife (e.g. butterflies, birds, etc.).

7. Use low-maintenance ground-cover instead of turf

Determine how much grass or turf area you really need for functional uses including children, pets and recreation. Once the minimum turf areas have been established, select low-maintenance ground-covers, shrubs, and other plant materials for the other areas. Mulch can be used to “fill-in” the remaining spaces.

8. Group plants by common environmental and maintenance needs

Plants should be selected and grouped in areas that are compatible with the site’s environmental characteristics. In the cases where additional maintenance will be required, plants should be grouped with common maintenance requirements. For



example, if irrigation is necessary, then all plants in a group should require roughly the same amount of irrigation.

Grouping plants does not mean restricting each area to a single species. There will be many plant species with similar environmental and maintenance needs. A diverse collection of species can be visually appealing as well as provide a more durable landscape that is buffered from adverse factors that target a specific species.

9. Removal of invasive species

Some species of exotic (non-native) plants are highly invasive and should be removed. Invasive exotic plants can aggressively take over a natural habitat, altering the ecology of an area and crowding out native plants and animals. This results in areas that are less diverse, and that have fewer feeding and cover opportunities for wildlife. Lack of diversity weakens the ability of an area to withstand and recover from adverse impacts. Examples of invasive species found throughout Florida include Australian pine, air-potato, Brazilian pepper, and melaleuca.

- a. Existing invasive plants can be removed by manual methods.
Manual removal is very time-consuming but often a major component of effective invasive plant control. Seedlings and small saplings can be pulled from the ground, but even small seedlings of some plants have tenacious roots that will prevent extraction or cause them to break at the root collar. Plants that break off at the ground will often sprout again, and even small root fragments left in the ground may re-sprout. Therefore, repeated hand-pulling or treating with herbicide applications is often necessary.
- b. Existing invasive plants can be removed by mechanical methods.
Mechanical removal involves the use of bulldozers, or specialized logging equipment to remove woody plants. Intense follow-up with other control methods is essential after the use of heavy equipment because disturbance of the soil creates favorable conditions for regrowth of seeds and root fragments, and recolonization by invasive non-native plants.
- c. Invasive plant material should be collected and disposed of properly.
Removal of uprooted plant material is important. Stems and branches of certain species (e.g. melaleuca) that are laid on the ground can sprout roots, and attached seeds can germinate.

Resources

- 🔗 Florida Exotic Pest Plant Council: <http://www.fleppc.org/>
- 🔗 University of Florida Center for Aquatic and Invasive Plants
<http://plants.ifas.ufl.edu/>
- 🔗 University of Florida IFAS Publication SP 242, Control of Non-native Plants in Natural Areas of Florida: <http://edis.ifas.ufl.edu/WG209>

10. It's not just the plants

Landscape managers are often viewed as caretakers of the outdoor environment. As a result, landscape design can incorporate and influence many features beyond the selection and placement of plant material. See *Section I.J Outdoor Accessories*.



B. RIGHT PLANT – RIGHT PLACE

Good landscape design depends on one basic concept -- the right plant in the right place. Careful planning and site evaluation are the first steps in applying this concept. Establishing the right plant in the right place saves time, money, and labor by decreasing future use of fertilizers, pesticides, and water, as well as minimizing pruning and other maintenance requirements.

Plant selection is typically the last step in the design process. Once plant form, texture, color and size have been visualized, it is time to select a plant species. Plants are selected on the basis of these criteria, as well as compatibility with the site characteristics, functional performance, plant architecture, and availability. Knowledge of these factors allows the designer to choose proper plant species and materials to create the desired landscape.



1. Select environmentally compatible and native plants

A number of environmental factors can influence the performance of plants and ease of maintenance including:

- Soil
- Sunlight
- Moisture
- Competing plants and other pests

One of the primary advantages of native plants is that they have evolved and adapted to survive under local environmental conditions. In addition, native plants are a compatible part of the local ecosystem.

2. Vary plant material to encourage bio-diversity

Variation in plant material will not only enhance the appearance of landscaping but will also help to ensure that adverse conditions do not equally impact the entire landscape. Different plants will have differing tolerances to various stresses such as pests, droughts, floods, windstorms, etc. There is probably no single plant that offers all of the desired resistances, so diversity helps to buffer the overall system.

3. Ensure utility and hardscape clearance

Always consider the ultimate mature size of a tree when planning your landscape design. Small, immature trees planted today can grow into big problems in the future. Failure to plan can lead to damage of utility conveyances and other hardscape features, can require excessive pruning and maintenance requirements, and can result in trees that grow poorly.

As a general rule, trees that will grow to a maximum height of less than 20 feet can be planted below or very close to overhead utility lines. Trees that top out at 30 feet should be planted at least 20 feet from all surrounding utility lines. Large trees (taller than 30 feet when mature) should be planted at least 30 feet from all surrounding utility lines.



In addition to above ground clearance, trees should be placed at sufficient distance from underground utilities so that their roots don't interfere with buried cables and pipes. Tree roots can also impact hardscape surfaces such as sidewalks and building foundations.

Resources

- ☞ Sunshine State One Call of Florida (SSOCOF) : to assist with the prevention of damage to underground facilities, call before you dig 1-800-432-4770 or <http://www.callsunshine.com/>

4. Ensure adequate spacing

One of the most common mistakes when establishing a new landscape is crowding plants too closely together. While this initially gives the appearance of a fuller landscape, this can lead to poor performance and appearance when plants grow to maturity. It is important to learn what the expected growth area is for the plants being used and adjust the spacing accordingly.

If immature plants are placed closely together for immediate appearance concerns, they should be selectively relocated to reduce the density once the plants become mature.

5. Plant for shading and energy conservation

Although landscaping is typically outside the building envelope, it can have a passive impact on energy costs of buildings. By providing shade during summer, an energy conserving landscape can help to reduce cooling costs. Although less applicable in Florida, landscaping can be used as a windbreak for cold winter winds to help reduce heating costs.

In Florida, use deciduous trees or shrubs on southern exposures to provide cooling shade during summer and to allow the sun to passively heat the building in the winter. Secondary exposures that should be shaded are west and east sides. In addition to shading walls, trees and shrubs should be used to shade air conditioner compressors. Evergreens planted on the north side of buildings can serve as a windbreak for cold winter winds.

As part of a passive, energy-saving landscape, ground covers can provide a surprising amount of energy savings during Florida's 5 to 7 months of high temperatures. Hardscape surfaces such as sidewalks, driveways and open patio's, contribute substantially to summer heat loads. Although turfgrass is a better energy-saving landscape than pavement, it can be expensive to maintain. Ground covers may only require a fraction of the upkeep and are frequently more adaptable to a wider range of environmental conditions. Many woody and herbaceous plants fulfill this role.

Resources

- ☞ American Forests: <http://www.americanforests.org/>
- ☞ Florida Solar Energy Center: <http://www.fsec.ucf.edu/>
- ☞ Florida Power and Light (FPL) – Plant the Right Tree in the Right Place http://www.fpl.com/home/trees/contents/right_tree_right_place.shtml
- ☞ Energy conserving ground covers for Pinellas County - <http://coop.co.pinellas.fl.us/fyn/publications/K-GRCOVE.htm>

6. Avoid invasive species

Some species of exotic (non-native) plants are highly invasive and should be removed. Invasive exotic plants can aggressively take over a natural habitat, altering the ecology of an area and crowding out native plants and animals. This results in areas that are less diverse, and that have fewer feeding and cover opportunities for wildlife. Lack of



diversity weakens the ability of an area to withstand and recover from adverse impacts. It is advisable to check local ordinances for species that are illegal to plant in your municipality.

For more information see Section I.A.9 Removal of invasive species

Resources

- 🔗 Florida Exotic Pest Plant Council: <http://www.fleppc.org/>
- 🔗 University of Florida Center for Aquatic and Invasive Plants
<http://plants.ifas.ufl.edu/>
- 🔗 University of Florida IFAS Publication SP 242, Control of Non-native Plants in Natural Areas of Florida: <http://edis.ifas.ufl.edu/WG209>

7. Select appropriate turf grasses

Because many of the grasses used in Florida vary widely in their adaptation, it is important to choose the proper grass for a particular environment. Avoid using the cost of installment and establishment as the major reason for choosing a grass. One of the key considerations when selecting a turf grass is the ability of a species to withstand relevant environmental stresses.

- a. Drought tolerance is a measure of how well the turf will survive extended dry periods without irrigation or rainfall. For example, Bahiagrass (*Paspalum notatum*) and Centipedegrass (*Eremochloa ophiuroides*) have good drought tolerance, while St. Augustinegrass (*Stenotaphrum secundatum*) does not.
- b. In many coastal areas, turf can be subjected to salt stress from irrigation water, saltwater intrusion, or salt spray from the ocean. Most grasses will not grow well in this type of environment, but Seashore Paspalum (*Paspalum vaginatum*) thrives in a salt-affected site.
- c. Although shade from trees or buildings is common in most landscapes, turf grasses vary widely in their shade tolerance. Both St. Augustinegrass and Zoysiagrass (*Zoysia* spp.) have good shade tolerance compared to other warm-season grasses.
- d. Wear tolerance is a measure of how well a grass continues to grow after being walked or played upon, and can determine whether or not a grass will be able to survive in an area of moderate traffic. Seashore Paspalum, Zoysiagrass, and Bermudagrass (*Cynodon* spp.) all have good wear tolerance.

Resources

- 🔗 University of Florida IFAS: http://edis.ifas.ufl.edu/TOPIC_Turfgrasses and <http://edis.ifas.ufl.edu/LH005>



C. XERISCAPING AND WATER CONSERVING IRRIGATION SYSTEMS

While natural rainfall is the best source of water for plants in a landscape, irrigation may be required to supplement this rainfall. Irrigation system design is a complex issue and should be handled by a trained professional. The successfully designed irrigation system should be flexible enough to adequately water plants under various environmental conditions and also adapt to water needs as the plants grow. In addition, irrigation systems must be designed using site-specific information for optimal efficiency.



The seven principles of Xeriscape Landscaping are very similar to the items that have been discussed throughout this document. These principles are:

- a) Plan and design.
- b) Obtain a soil analysis.
- c) Choose proper plants.
- d) Use turf wisely.
- e) Irrigate efficiently.
- f) Use mulches.
- g) Perform proper maintenance.

Resources

- ☞ University of Florida IFAS: http://edis.ifas.ufl.edu/TOPIIC_Irrigation
- ☞ South Florida Water Management District: <http://www.sfwmd.gov/org/exo/broward/c11bmp/irrigmgt.html>
- ☞ Mobile Irrigation System Lab:
SouthWest Florida Water Management District: <http://www.swfwmd.state.fl.us/watercon/agriculture/agmobile.htm>
South Florida Water Management District: <http://www.sfwmd.gov/org/wsd/wsconservation/mobilirrigation.html>
- ☞ Center for Irrigation Technology : <http://cati.csufresno.edu/cit/>
- ☞ Irrigation Association <http://www.irrigation.org/>
- ☞ American Society of Irrigation Consultants: <http://www.asic.org/>
- ☞ Irrigation Training and Research Center (ITRC) <http://www.itrc.org/>
- ☞ Landscape & Irrigation Journal <http://www.greenmediaonline.com/li/>

1. Right plant - Right place

Some maintenance actions can be avoided or minimized by selecting the appropriate plant material for a location. See *Section I.B Right Plant – Right Place*



2. Use xeriscaping and native plants

Native plant materials are usually well adapted to the typical rainfall within a geographic region. By selecting drought-tolerant plants, that are preferably native as well, landscapers can minimize the need for supplemental irrigation systems.

3. Design the irrigation system to match the landscape

Traditional irrigation system designs are often either inadequate or wasteful. The design of the landscape should be used to determine the design and layout of a custom irrigation system.

a. Zones

Once the design practice of grouping plants with similar water needs together in zones has been followed, it's easier to tailor the irrigation system to match the needs within that zone.

b. Soil permeability

To prevent irrigation runoff, the irrigation system's application rate should not exceed the ability of the soil to absorb and retain water.

c. Adaptability

A good irrigation system should be easily modified to adapt to changing needs (e.g. as plants mature).

d. Don't irrigate non-planted areas

Irrigation systems should be designed so that areas that do not need water are not accidentally irrigated. This includes adjacent impermeable (hardscape) surfaces such as roads and sidewalks. In the case of sprinkler systems, directional heads can help to minimize water waste.

e. Coverage and spacing uniformity

To ensure optimum uniformity, permanent irrigation systems such as sprinklers and spray jets should be spaced according to manufacturer's recommendations. This will determine the amount of overlap needed to maintain uniform coverage. After the system is constructed and operating, periodic "catch can" uniformity tests should be performed and any necessary adjustments made.

4. Use irrigation timers and sensors

The time and volume of irrigation can determine its effectiveness.

a. Time of day

Irrigation is best performed in the early morning (or possibly evening). Watering in the hot sun causes increased evaporation and can sometimes damage plants. In some instances, watering in the late evening is not advised, as it allows water to stay on plants, increasing fungus and disease problems.

b. Use rain gauges and shut-off controllers

Rainfall can be an unpredictable event. To minimize the occurrence of over-watering, irrigation systems should be installed with rain gauges/sensors and automatic shut-off devices.

c. Increase duration, decrease frequency

Particularly for turf, an irrigation schedule that is less frequent but thoroughly "soaks" the ground can encourage plants to sink deeper roots and increase their drought tolerance.

5. Use drip or micro-irrigation

Irrigation systems operate most efficiently if they don't wet the foliage of the plants. Plants generally do not use the water applied to the foliage and it is lost to evaporation.



Based on this, the most efficient and effective irrigation systems apply water directly to the mulch and soil, as in the case of micro-irrigation systems (e.g. drip or trickle).

Drip irrigation can greatly improve the efficient use of water. A well designed drip irrigation system or subsurface drip irrigation system will lose practically no water to runoff, deep percolation, or evaporation. Fertilizers that are added can be used more efficiently since only the root zone is irrigated. Where insecticides are labeled for application through drip irrigation, less insecticide may be required to control pests. Drip products are well suited for narrow strip plantings, such as along hedge rows or in commercial landscaped or garden areas where wind drift of water from sprayers would be a problem.

Resources

- 🔗 University of Florida IFAS Fact Sheet AE-254- Microirrigation in the landscape
- <http://coop.co.pinellas.fl.us/fyn/publications/ae076.html>

6. Perform periodic maintenance

Because irrigation systems are exposed to a number of factors in the outdoor environment and natural systems are dynamic, the periodic adjustment and maintenance of irrigation systems are crucial. At a minimum this can include:

- seasonal adjustments to flow rates.
- sprinkler head adjustment or replacement.
- clearing obstacles or repositioning irrigation system.

7. Evaluate rain water collection systems

Rain water collection systems, including cisterns and rain barrels that collect rain from roof drain downspouts, can serve as a supplemental source for irrigation water. Some local governments might have laws that do not allow use of collected rain water, therefore it is advisable to check local regulations before implementation.

8. Evaluate reclaimed or gray water use

To further reduce water consumption, consider using alternative sources of irrigation water, such as reclaimed water or gray water. Studies show that more than 50 percent of the drinking water used in Florida is used for watering lawns and landscapes. Using reclaimed water offers an additional method for conserving drinking water supplies.

Reclaimed water is the final product of a multiple-stage advanced wastewater treatment program. Some nitrogen and phosphorous elements that work as fertilizers, however, are retained in the reclaimed water. This makes reclaimed water an ideal solution for irrigation purposes.

Although definitions vary, “gray water” generally refers to wastewater collected separately from a sewage flow. It usually originates from a clothes washer, bathtub, shower, and sink, but does not include wastewater from a kitchen sink, dishwasher, or toilet.

Some local governments might have laws that do not allow use of gray water, or reclaimed water, so it is advisable to check local regulations before implementation.

Resources

- 🔗 Florida Department of Environmental Protection:
<http://www.dep.state.fl.us/water/reuse/>
- 🔗 South Tampa Area Reclaimed (STAR) project:
http://www.tampagov.net/dept_water/starproject/



D. MULCH AND COMPOST

Mulch, particularly organic mulch, benefits landscapes and their plants in a multitude of ways. These benefits can include:

- providing of an aesthetically pleasing ground cover.
- retaining soil moisture, thereby reducing irrigation requirements.
- moderating soil temperatures.
- suppressing the growth of weeds.
- improving the organic content, fertility and structure of soil over time.
- reducing the need for mowing and weed trimming in mulched areas (and reduction in potential damage to plants by landscape equipment).
- minimal maintenance requirements beyond the regular addition of material a couple of times each year.



Resources

- 🔗 University of Florida, Environmental Horticulture Department - Planting trees in landscapes - mulching: <http://hort.ifas.ufl.edu/woody/planting/mulching.htm>
- 🔗 University of Florida IFAS - Publication ENH 103, Mulches for the Landscape: <http://edis.ifas.ufl.edu/MG251>

1. Apply mulch properly

Because mulch provides an aesthetically pleasing ground cover, in many instances it can be used liberally in beds, around trees, and in other landscaped areas. It should be used to supplement the plants within a landscape, such as trees and shrubs, but not be used as a replacement for them.

Mulch should be applied 2 – 3 inches deep around plants, and in the case of trees, should extend to the drip line. The coarser the mulch, the denser the layer that can be used. Mulch such as pine bark can be 3 – 4 inches deep. Mulch should not be mounded around the trunk of trees and shrubs, or applied in a layer that is too thick, because it can be detrimental to the plant in numerous ways: 1) Holding water meant for the roots, 2) Causing oxygen starvation, 3) Causing stem and root diseases, 4) Causing death of the bark 5) Preventing “hardening off” for winter, 6) Leading to vole and other rodent damage to trunk, 7) Keeping the root ball too wet, and 8) repelling water if the mulch dries out too much. Therefore, it is preferable to leave open space near the plant base and over the root ball or only apply a thin cosmetic layer in these places.


2. Use organic mulch whenever practical

Organic mulch can provide all of the physical benefits typically associated with mulch, as well as acting as a source of nutrients as they decay. Sources of organic mulch include landscape waste, pine bark, wood chips, straw, etc.



- a. Landscaping waste, including trimmed branches that have been chipped, pine needles, and even leaves, can be used as mulch material. However, be sure that this landscape waste doesn't include invasive plant species, as mulching may actually serve to spread this invasive or pest plant material.
- b. Mulch made from recycled wood materials can be an effective way to conserve virgin wood materials but should be used cautiously. Wood waste sometimes includes wood that has been treated with chromated copper arsenate (CCA). This CCA treated wood should not be mulched and must be disposed of properly as it has been shown to leach toxic materials. Before purchasing mulch, determine the source of the material and confirm that it is toxic-free.
- c. Although a source of organic mulch, the use of cypress mulch should be avoided. In an effort to protect the species the sale of cypress mulch may be illegal in some regions. In addition, its performance as a mulch may be less desirable due to fungal growth and matting.

Resources:

 Florida Department of Environmental Protection - CCA Treated Wood:
http://www.dep.state.fl.us/waste/categories/solid_waste/pages/IWDR.htm

3. Evaluate use of inorganic mulching materials

Non-organic mulches, such as rubber or lava rock, generally do not add nutrients to the soil because they do not decompose like the organic mulches. Therefore they are generally less desirable than organic mulches. However, synthetic mulches may have applications where organic mulches might blow or wash away. Inorganic mulches, such as stone or gravel, can be used but only in small amounts. The weight of the stones and the heat they will hold may actually be harmful to your plants.



In addition, the use of porous woven ground cloth as an underlay can further help to suppress weed growth. However, this should not be necessary for organic mulches when applied and replenished in sufficient thickness.

4. Consider composting and the use of compost

Compost is an organic product that has undergone a period of decay. Compost may come from a variety of sources such as vegetative material, sewage sludge, cottonseed meal, peat, etc. When nutrients are contained in adequate supply, compost may be marketed as an organic fertilizer. If vegetative material is used, it is important to make sure all the seeds have sprouted prior to use.

Material may be composted within a bin, or in a pile. The entire composting process can take from 6 weeks to 2 years. Hot composting times will be much less than cold composting. The primary factors determining the length of the process include: how often the pile is turned; what materials were used in the pile; the condition of the materials; the amount of moisture; the amount of aeration; the presence/absence of insulation around the pile; and size of the pile.

Resources:

 Florida Department of Environmental Protection:
http://www.dep.state.fl.us/waste/categories/solid_waste/pages/composting.htm
 Master Composter Training: <http://www.mastercomposter.com/>



E. FERTILIZERS

The term "fertilizer" generally means any substance that contains one or more recognized plant nutrients. Although plants in the wild are able to obtain the needed nutrients from their surroundings, fertilizer may be used within a landscape setting to achieve one or more clearly defined objectives. These specific objectives include:

- establishing newly planted trees and shrubs.
- increasing shoot growth, root growth, flowering, or fruiting.
- enhancing foliage color and plant appearance.
- correcting or preventing nutrient deficiencies.



Resources

- 🔗 University of Florida IFAS- Fertilization Recommendations for Landscape Plants: <http://edis.ifas.ufl.edu/EP114>
- 🔗 University of Florida IFAS Circular CIR-1262 -Selected Fertilizers Used in Turfgrass Fertilization: <http://edis.ifas.ufl.edu/SS318>
- 🔗 University of Florida IFAS Publication SL-3 -The Florida Fertilizer Label,: <http://edis.ifas.ufl.edu/SS170>
- 🔗 University of Florida IFAS Publication SL-60, Plant Nutrients and Fertilizers for the Non-Farmer: <http://edis.ifas.ufl.edu/MG090>
- 🔗 University of Florida IFAS - Fertilizer Recommendations for Landscape Plants: http://edis.ifas.ufl.edu/BODY_EP114

1. Right plant - Right place

Some maintenance actions can be avoided or minimized by selecting the appropriate plant material for a location. See Section I.B. Right Plant – Right Place

2. Fertilize to achieve a targeted objective

Plants that have been selected based on their compatibility with native soils will often require little or no extra fertilization. Soil and/or foliar nutrient analysis should be used to determine if any need exists for specific nutrients.

If fertilizers become necessary to achieve an objective, they should be selected, timed, and applied to maximize their use by the plants and to minimize adverse environmental impacts. For example, because of ambient levels in Florida, fertilizers with lower phosphorus content can often be used. Another example is the use of fertilizers, with iron (such as ferrous sulfate or chelated iron) instead of nitrogen, for turfgrass during the Summer months.

3. Apply fertilizers appropriately

- a. Use the minimum recommended

When using fertilizers, remember that more is definitely not better! Be sure to read and exactly follow safety and application instructions on labels. Improper application,



especially overuse, can be unsafe, increase contamination of stormwater runoff, and damage plant tissue.

- b. Distribute evenly
The use of uniform spreaders to ensure a more equal distribution of fertilizers is recommended.
- c. Stay away from boundaries
Always leave a “Ring of Responsibility” around or along the shore ways of canals, lakes, or waterways. This avoids fertilizing too close to a body of water. Similar practices should be followed for sidewalks and roadways. Install deflector shields on fertilizer spreaders to prevent the fertilizer from landing in the water.
- d. Time application appropriately
Fertilizers should be applied during the times of year when plants will be able to uptake the available nutrients with sufficient moisture.

4. Consider exclusively using organic fertilizers

Organic fertilizers fall into two main categories: natural organics and synthetic organics. Natural organics are products such as manures, dried blood, bone meal, sludge, or other plant or animal products. Where feasible, (natural) organic fertilizers should be used in preference to chemical fertilizers, however this will be moderated by economics and practicality. Examples of natural fertilizers include:

- a. Organic Nitrogen (N) fertilizers (e.g., manures and biosolids) are popular for lawns and gardens because of their "slow release" and long-lasting properties. However, the relatively low concentration of N in organic materials means several tons per acre are required to supply sufficient N for commercial applications. The economics of transporting and storing these bulky materials are a major hindrance and the odor can also be a disadvantage.
- b. Compost is a good option because it also provides a nutrient source for both the turf and the microbial population, improves nutrient uptake through greater cation exchange capacity, and reduces leaching. Compost may be added to the soil prior to planting or may be top-dressed over existing lawns.
- c. Another source of natural organic matter for soils is humic material. These products are similar to compost because they are also comprised of decomposed organic matter, but they generally have been decomposing for thousands of years and may come from deposits of peat, lignite, coal, or marine algae. These all contain humic acids in addition to carbon and nitrogen. Application of humic substances can provide benefits beyond those offered by compost. In addition to supplying nutrients, increasing soil nutrient availability, and improving soil structure, humates have been shown to enhance photosynthesis, protein synthesis, root functioning, and seed germination. They are especially beneficial in soils that are low in organic matter, such as sandy Florida soils.

5. Capture run-off for reuse

Because run-off from areas treated with pesticides or fertilizers may contain elevated levels of these materials, the opportunities for capture, storage, and reuse of this run-off should be explored. This may include retention areas located downslope that are used as sources for irrigation.



F. HERBICIDES, INSECTICIDES, AND INTEGRATED PEST MANAGEMENT

A pesticide is any substance or mixture of substances used to prevent, destroy, repel, or mitigate any pest. The types of pests can include other plants, referred to as weeds or fungi, can include microorganisms like bacteria and viruses, and can also include nematodes, insects, rodents, and other animals.

Integrated Pest Management (IPM) is the coordinated use of pest and environmental information with available pest control methods to prevent unacceptable levels of pest damage. This pest management is performed by the most economical means and with the least possible hazard to people, property, and the environment.



It is common practice to immediately resort to chemical combatants for these pests, but chemical pesticides such as herbicides, fungicides, and insecticides are only one set of tools available in an effective IPM program, and often are not the best. The development and implementation of an effective IPM program can minimize the volume and toxicity of pesticides applied, as well as the potential for contaminated run-off. Pesticides can harm the environment, but an Integrated Pest Management (IPM) plan can help to minimize the potentially harmful effects of pesticides.

One particular type of pest control is often contrary to the other goals of landscape management. Plants that are growing in undesired locations are generally referred to as “weeds”. These weeds compete with desired plants for space, water, light and nutrients and can also harbor undesired insects and diseases. However, landscape management generally works to create an environment that encourages the growth of plants. This selective encouragement of plant growth can often be a problem.

Resources:

- 🔗 UF IFAS Integrated Pest Management: <http://ipm.ifas.ufl.edu/>
- 🔗 UF IFAS - Insects, Plant Diseases, Pesticides, and Weeds (including Integrated Pest Management): [http://edis.ifas.ufl.edu/TOPIC_Insects, Plant Diseases, Pesticides, and Weeds](http://edis.ifas.ufl.edu/TOPIC_Insects,_Plant_Diseases,_Pesticides,_and_Weeds)

1. Right plant - right place

Many maintenance actions can be avoided or minimized by selecting the appropriate plant material for a location.

For example, right plant – right place is one the cheapest and most effective forms of weed control. Weeds compete with desired plants for space, light, moisture, nutrients, and carbon dioxide. Usually the plant, which starts first and is growing under ideal conditions, will have the competitive advantage. Factors such as planting date, spacing, seeding rate, planting depth, soil moisture, soil fertility, and soil pH have an influence on the competitive advantage of the desired plant over weeds. Selecting plants that will



thrive in the available environment, will allow them to grow rapidly and, through shading, reduce many of the weeds that would compete for other resources.

2. Cultural, biological, and genetic components of IPM

The three basic components of IPM are cultural, biological, and genetic.

- a. Cultural component of IPM
Keep the landscape healthy through proper selection, establishment, and management of plants. Responsible and proper mowing/pruning, fertilization, and irrigation keep the landscape healthier, stronger, and less vulnerable to pests.
- b. Biological component of IPM
Provide natural enemies to the pests rather than using chemicals. Parasites, predators, pathogens, and pollinators can all fight pests in a natural, safe manner. Either purchase and release pest fighters and/or modify the landscape to bring the natural enemies to the area.
- c. Genetic component of IPM
Using pest resistant plants helps to ward off pests and also leaves the pests weaker and more vulnerable to their enemies. Learning the types of pest resistant plants, and using them, means less pesticides and healthier plants.

3. Analysis and record keeping

Pest monitoring is an integral component of IPM. Keeping records and histories of pests can help to develop an understanding of how to best control the pests. When combined with knowledge of the life cycle of pests, and the optimal conditions of both, managers can attack problems earlier and with safer and easier methods.

After choosing and carrying out the proper action(s), record the result of whether or not the pest population shrunk or expired, as well as if the method proved economical, and minimized environmental and human risks. This history can be used to optimize future actions.

4. Evaluate alternatives before resorting to chemicals

Chemicals pesticides such as herbicides and insecticides should only be used as a last resort. Assuming that pests are still a problem after selecting the right plant for the right place, physical or biological controls should be evaluated prior to chemical.

5. Transport barriers as a chemical alternative

- a. Clean source material
Strive to start with weed free materials. This can include sources of seeds and juvenile plants, as well as top soil, organic fertilizers, and compost.
- b. Reduce the transfer of weeds from adjacent areas.
This method will require an analysis of the transportation routes for weeds. Although it is difficult to prevent weed seed from blowing into an area or being carried by birds, or water, if weeds can be stopped from producing seeds in these adjacent areas, it will reduce the amount that they are spread. This may mean expanding the area in which weeds are to be controlled.
- c. Clean equipment
Other inadvertent weed sources can include the equipment that is being used for landscape maintenance. It is important to clean equipment when moving from one area to the next.

**6. Manual controls as a chemical alternative**

Mechanical weed control by manual removal can be effective if the entire structure is removed and disposed of properly. However this method is often too labor intensive for many large scale landscaping operations to rely upon solely.

7. Mechanical controls as a chemical alternative**a. Burial**

Mechanical weed control by burial is most effective on annual weeds in which all the growing points can be buried. Burial is usually less effective on perennial weeds which have underground stems and roots and are capable of regrowth from these underground storage organs.

b. Deep cultivation

Mechanical weed control by deep cultivation may actually have undesired effects such as drying out the soil surface, bringing weed seed to the surface, and disturbing the root system of desired plants. Other methods should be explored first.

c. Mowing

Mechanical weed control by mowing is usually most effective on tall growing annuals, but is not as effective on short growing plants or perennials. The growth habit of the plant usually indicates how effective mowing will be. Since grasses grow from basal meristems, mowing is not usually an effective method of controlling these weeds. Perennial weeds, which regrow from underground storage organs, require frequent and usually long term mowing for control. This is because the leaf area must be continually removed so that the underground plant parts are starved and not allowed to regenerate any carbohydrates for storage. Annual weeds are usually mowed to prevent seed production and to allow the desired plants a better competitive advantage.

8. Mulch as a chemical alternative

Mulching can be an effective form of weed control if applied and replenished properly. Mulch serves to deprive juvenile weeds of sunlight. As mulch decays, it actually can provide an environment suitable for weeds, so the maintenance of a sufficiently thick layer of "fresh" mulch is essential.

9. Species rotation as a chemical alternative

In the case of annual plantings, the rotation of plant species can help to reduce the growth of weed species that are tolerant and favored by the cultural practices and herbicides used for a specific plant.

10. Biological controls as a chemical alternative

The best way to combat an insect pest may be another living creature. Many insects and related arthropods perform functions that are directly or indirectly beneficial to humans. They pollinate plants, contribute to the decay of organic matter and the cycling of soil nutrients, and attack other insects and mites that are considered to be pests. Only a very small percentage of over one-million known species of insects are pests. Although all the remaining non-pest species might be considered beneficial because they play important roles in the environment, the beneficial insects and mites used in pest management are natural enemies of pest species. A natural enemy may be a predator, a parasitoid, or a competitor.

Although targeted biological weed control has had limited practical applications, the interaction of weed control and the control of organisms such as fungi, nematodes, and insects can be very important within an integrated program. These other organisms may in fact be helping to control the weeds that would otherwise be a problem.

**11. Fire as a chemical alternative**

Fire as a method of weed control will have limited practical applications for most landscape operations. Fire is an old method of weed control and in certain instances can be used to selectively favor certain species over others. Controlled burning can be useful to remove weeds from ditch banks, roadsides, and other waste areas.

Fire has been used for many years to favor the growth of pine seedlings over hardwoods. Special training and equipment for flaming is available. Fire is usually more effective on annual weeds than on perennial weeds and usually does not kill weed seeds in the soil.

12. Use chemicals to achieve a targeted objective

Selection of a pesticide should be based on knowledge of a clearly identified pest to be controlled, the existing population of the pest, length of time control is desired, and landscape plants involved.

a. Insecticides

When pesticide use is necessary, use more selective, less toxic chemicals like microbial insecticide and insect growth regulators.

b. Herbicides

Herbicides are a group of chemical compounds that control plant growth and development by interrupting some metabolic pathway or by contact action. Chemical weed control with herbicides can reduce greatly the cost of weed control. Estimates are that annual herbicide costs may be one-tenth that of hand labor for weeding. Plant response to these chemicals depends largely on concentration of the chemical applied.

Herbicides may be selective or nonselective through chemical characteristics or rate adjustment. Selective herbicides kill some plants with little or no effect on other plants. Nonselective herbicides are toxic to most plants. Herbicide screening research identifies the selective rate range of these chemicals to find compounds that are not toxic to crop plants but that control many weed plants.

Some herbicides will kill only the plant tissue with which they come in contact, while others are absorbed by the plant and transported within the plant to other plant parts. Contact herbicides may kill the foliage of perennial plants but regrowth from the roots is likely. Translocated or systemic herbicides should affect the entire plant.

13. Apply chemicals appropriately

As with the selection of the pesticide, the best application method will often depend on a clear identification of the infestation and objectives that are desired. Chemicals may be applied by broadcast, band, directed, or spot treatment.

a. Use the minimum recommended.

When using pesticides, remember that more is definitely not better! Be sure to read and follow safety and application instructions on labels exactly. Improper application, especially overuse, can be unsafe, increase contamination of stormwater runoff, and sometimes damage plants.

This can often be in conflict with broadcast applications. As the name implies, broadcast applications cover the entire area. These treatments, while requiring the largest amount of chemical and highest cost per acre, usually result in best weed control.

Spot treatments are used for weeds which are localized in certain areas but are not



widespread over the entire area. When only isolated areas of weeds are present, this is the cheapest and best method to control and prevent their spread to other areas.

- b. Use the safest application method
Herbicides are formulated as wettable powders (W or WP), dry flowables (DF), water dispersible granules (WDG), solutions (L or S), granular (G) or emulsifiable concentrates (E or EC). If given the choice, select DF or WDG formulations over WP formulations because DFs and WDGs are safer for the applicator due to the reduced inhalation hazards associated with these formulations.
- c. Distribute evenly
Application equipment should be used in an appropriate manner to ensure the even distribution of pesticide material.
- d. Stay away from boundaries.
Always leave a "Ring of Responsibility" around or along the shoreways of canals, lakes, or waterways. This avoids fertilizing too close to a body of water. Similar practices should be followed for sidewalks and roadways.
- e. Timed appropriately
Herbicides can be administered preplant, preemergence, and postemergence.

14. Proper storage

See Section I.H. Proper Storage, Handling, and Disposal of Landscaping Chemicals

15. Capture of run-off for reuse

Because run-off from areas treated with pesticides or fertilizers may contain elevated levels of these materials, the opportunities for capture, storage, and reuse of this run-off should be explored. This may include retention areas located downslope that are used as sources for irrigation.



G. PROPER PRUNING, TRIMMING AND MOWING TECHNIQUES

Within a managed landscape setting, vegetation will often need to be pruned, trimmed, and mowed in order to ensure the desired pattern of growth and to maintain appearance. Some of the reasons for performing this type of maintenance includes:

- Reduce the risk of plant structural failure.
- Provide clearance.
- Reduce shade and wind resistance.
- Maintain plant health.
- Influence flower or fruit production.
- Improve a view.
- Improve aesthetics.

1. Right plant - right place

Some maintenance actions can be avoided or minimized by selecting the appropriate plant material for a location. Ensuring the plants will be of a suitable size and shape when mature, can help to reduce the amount of artificial resizing or shaping maintenance that will be required. In addition, selecting plants that can be clustered in a compatible manner, will help to reduce the need for maintenance actions to curtail undesired dominance by one of the constituent species.

2. Plant properly

To allow for proper root growth into the landscape soil, the top of the root ball should be positioned even with, or slightly above, the soil surface, but never deeper. There is no need to add organic matter or fertilizer to the backfill soil around the root ball. As previously mentioned, it is important to mulch the planted area, as long as sufficient open space is left around the trunk and directly over the root ball. This will help to conserve soil moisture and aid establishment.

3. Proper pruning and trimming

Proper pruning and trimming is both an art and a science. Although there are several guidelines that can be followed, it requires adequate training, skill, and experience to envision the desired shape and determine the best cuts to achieve that shape.

Some general guidelines are:

- a. A tree should be evaluated from a few angles prior to pruning to determine what is necessary to achieve the desired end result.
- b. Whatever goals are set, select the best-spaced and positioned permanent branches and remove or shorten the others. Never top a tree, but instead strategically prune it to keep the natural shape.
- c. Smaller decayed branches and dead leaves can hinder the tree's growth and should be removed first.
- d. Since new growth comes from the buds (little lump in the branch) cuts should be close, but not too close, to a bud. These cuts should be made at a slight angle.
- e. A branch should never be cut flush with the trunk of a tree and the trunk itself should never be cut because these actions can cause extensive trunk decay.



- f. Do not attempt to trim any vegetation growing on or near any overhead power lines unless specifically qualified to do this type of work. Only specially-trained line clearing professionals should work around power lines.
- g. There are strict laws governing the pruning of Mangroves in Florida. Refer to and carefully follow the 1996 Mangrove Trimming and Preservation Act when pruning Mangroves.

Resources

- ✎ University of Florida, Environmental Horticulture Department - Planting trees in landscapes: <http://hort.ifas.ufl.edu/woody/pruning/>
- ✎ Pruning Shade Trees in the Landscape, at <http://hort.ifas.ufl.edu/woody/pruning/home%20page.htm>
- ✎ Florida Department of Environmental Protection – Mangrove Coordination: <http://www.dep.state.fl.us/water/wetlands/mangroves/mangrove.htm>
- ✎ Florida Power and Light: <http://www.fpl.com/home/trees/contents/index.shtml>

4. Proper mowing

Proper mowing technique helps create healthy, dense turf with strong roots to stifle weeds, limit storm-water runoff, and better absorb nutrients and water.

- a. Mower blades should be sharpened regularly in order to ensure a clean cut.
- b. Never cut more than one-third of the height in a single mowing.
- c. Use the highest acceptable mowing height for the grasses being grown. This height will vary with species. A grass that spreads horizontally can usually be mowed shorter than an upright-growing, bunching grass. Grasses with narrow blades can generally be mowed closer than grasses with wide blades.
- d. Mow in a different direction every time the lawn is cut. This prevents wear patterns, reduces the grain (grass laying over in the same direction), and reduces the possibility of scalping.
- e. Vertical cutting/mowing can be used to reduce thatch.
- f. Clippings contain nutrients and therefore it is preferable to recycle them back into the lawn. Mulching mowers are the easiest and most efficient way of doing this, since it doesn't require any additional steps or handling of the clippings. If not directly reused, the clippings should be composted or used as mulch elsewhere.

Resources

- ✎ UF IFAS – Lawn Mowing: http://edis.ifas.ufl.edu/TOPI_C_Lawn_Mowing
- ✎ A list of optimum mowing heights for different kinds of grass on page 26, at http://www.dep.state.fl.us/water/nonpoint/docs/nonpoint/BMP_Book_final.pdf#page=26

5. Properly dispose of all landscape waste

Improper disposal of plant waste, including but not limited to grass clippings, leaves, and entire landscape plants, can pollute water bodies and spread invasive pest plants.

These clippings should never be swept or blown into streets or directly into stormdrains as they may clog these drains and act as pollutants when they end up in stormwater systems and water bodies.



Resources

- 🔗 US Environmental Protection Agency – Non-Point Source Pollution:
<http://www.epa.gov/nps/>
- 🔗 UF IFAS Cooperative Extension Service –find an agent who can provide information about plant waste disposal sites in your area:
<http://www.ifas.ufl.edu/extension/ces.htm>

6. Reducing non-road emissions

Landscaping crews often utilize a variety of small engine equipments on a regular basis, including leaf blowers, chain saws, lawn mowers, and weed trimmers.

- a. Evaluate switching to the electric versions of equipment where practical.
- b. Regularly maintain equipment to ensure that it is operating optimally.
- c. The EPA recently released a plan to enact new standards for non-road diesel emissions, which include many of the tools used in landscaping such as lawnmowers, leaf blowers, and chainsaws. These new regulations are designed to help significantly improve the air quality in the United States by decreasing the quantity of pollutants released by non-road diesel equipment.

Small Engine Emission Standards (for lawnmowers etc.) require that all equipment produced after September 1, 1997, meet the new emissions standards that the EPA has set for allowable exhaust levels for hydrocarbons, carbon monoxide and Nox. This applies to small engines of 25 horsepower or less.

- Make sure that all newly purchased equipment contains a certificate of conformity from the EPA on either the equipment or the engine itself.
- Equipment manufactured before 1997 should be aggressively retired so that all equipment meets the new emissions standards.
- When maintaining small engine equipment such as tractors or riding mowers, it is advisable to follow the applicable guidelines in the Florida Green Local Government module for “Fleet Management and Vehicle Maintenance”

Resources

- 🔗 EPA proposal for new standards regarding non-road diesel emissions at:
<http://www.epa.gov/air/off-road/index.html>



H. PROPER STORAGE, HANDLING, AND DISPOSAL OF LANDSCAPING CHEMICALS

The proper storage, handling, and disposal of fertilizers, pesticides, and related materials is important to protect human health and the environment. The safe handling of these materials requires the allocation of proper equipment and facilities, and the use best management practices.

Properly designed facilities promote storage, handling and disposal practices that enhance worker safety and minimize the risk of point source contamination. Although the storage requirements for fertilizers are often less restrictive than those for pesticides, it is a good practice to treat all of these materials with great care. For more information about using fertilizers and pesticides please see *Section I.E. Fertilizers* and *Section I.F. Herbicides, Insecticides, and Integrated Pest Management*.



Resources

- 🔗 US Environmental Protection Agency – Pesticides - Storage and Disposal : <http://www.epa.gov/pesticides/regulating/storage.htm>
- 🔗 Florida Department of Environmental Protection – Operation Cleansweep for Pesticides - <http://www.dep.state.fl.us/waste/categories/cleansweep-pesticides/>
- 🔗 University of Florida IFAS – Storm-Damaged Agrichemical Facilities: http://edis.ifas.ufl.edu/scripts/htmlgen.exe?document_pi007
- 🔗 Clemson University Pesticide Information Program – Pesticide Storage: <http://entweb.clemson.edu/pesticid/saftyed/storage.htm>

1. Inventory management

Effective purchasing practices can help reduce the amount of work required for other aspects of handling these materials.

- a. Determine what is needed to do the job.
Measure the sizes of the areas that require these materials and purchase accordingly. Keep records of purchases to facilitate future tracking, planning, and purchasing, based on historic usage rates.
- b. Buy only what you need.
Although purchasing in bulk quantities that are greater than your needs may seem like a bargain, handling and disposal charges can quickly outweigh any savings.
- c. Practice first-in first-out (FIFO) inventory handling procedures.
Mark materials with a purchase and/or expiration date. The older materials, those closest to their expiration date, should be used first.



- d. Contract to reuse containers.
Establish contracts with suppliers that enable the return of empty containers.

2. Selecting a site and construction of facilities

The location and construction of storage facilities can help to make the handling of these materials easier and also reduce the impacts of accidental spills or leaks.

- a. Store fertilizers and pesticides separately (preferably separate facilities).
- b. Site facilities down-slope and away from any wells, storm drains, ponds, other fast transmission routes to surface or ground water. This includes considering the location of these features on adjacent properties.
- c. Elevate facilities to minimize the potential for flooding.
- d. Clearly label facilities with warning signs.
- e. Secure facilities and only allow restricted access.
- f. Locate a retention area down-slope of storage facilities so that spills or water from fire suppression can be collected and handled properly.
- g. These materials, especially fertilizers, should be stored in a concrete building with a flame-resistant roof.
- h. Worker convenience facilities: first-aid and training areas, restrooms, shower(s), and laundry facilities should be available to workers.
- i. Determine which, if any, materials are sensitive to temperature extremes (hot or cold) store them in a controlled temperature environment.

3. Storage containers / secondary containment

One of the simplest ways of improving storage of these materials is to keep them dry and out of the way of activities that might knock over a container or rip open a bag. If a spill does occur, an impermeable floor (such as concrete) should virtually eliminate any seepage of these into the ground.

- a. These materials should be kept in original containers with clearly legible labels
- b. Clearly label storage areas for these materials.
- c. In order to contain any minor leaks, storage shelves for liquid materials should be constructed of steel or some other impermeable material (rather than wood), and should also have lips.
- d. Store similar materials above each other. If different materials must be stored above each other then it is preferable to store dry materials above liquids. A tear in a dry material bag is less likely to contaminate a liquid container below, than a liquid leak is to likely to contaminate a bag of dry materials below.
- e. Keep lighter materials on higher shelves. The easier materials are to handle, the less likely it is that there will be an accident.
- f. Store materials, especially dry goods in bags, off of the ground. Storage options include pallets or shelves.
- g. Provide secondary containment that is able to hold at least 110% of the volume of the largest vessel stored within an area,. This can be done with spill containment pallets, sealed concrete berms and floors, or some similar method.

4. Mixing

Mixing operations are often performed in, or adjacent to, storage facilities.



- a. Ensure that water supply equipment is provided with backflow prevention to prevent contamination of source water supply.
- b. Ensure that secondary containment is provided for mixing areas. Preferably multiple rinse/secondary containment areas can be provided so that rinse water from different materials will be segregated.
- c. Rinse water collected in containment areas should be used when mixing the next batch. Rinse water from the last batch can be applied directly to properly identified application areas.

5. Waste recycling / disposal

After all of the above procedures have been utilized to minimize wastes, there still may be occasions when small volumes of waste are generated.

- a. The best way to dispose of small amounts of excess fertilizers or pesticides is to use them - apply them - according to the directions on the label.
- b. Most pesticides can be disposed of as hazardous waste through a permitted waste hauler.

6. Container recycling / disposal

- a. Empty pesticide containers should be pressure rinsed or triple rinsed as soon as possible. It is usually easier to rinse these containers properly before any residue dries.
- b. Empty containers should be returned to suppliers when possible. In fact, specifications for container return should be included in purchasing contracts.
- c. If you are part of a pesticide container recycling program, it is important to further condition the empty plastic pesticide containers, after rinsing them out, to maintain the quality of the recycled plastic. This includes removing labels and sleeves, removing all caps and handles that are not made of high density polyethylene (HDPE), and cleaning the exterior of containers. **Note:** keep sodium chlorate containers separate since sodium chlorate may cause a fire if mixed with certain chemicals.
- d. If you are not a part of a pesticide recycling program, all containers should be punctured after rinsing (as described above), and thrown away, to ensure they are not re-used.

7. Plan and prepare for spills and other emergencies

Prepare in advance for emergencies. Spill containment and handling supplies should be purchased and kept ready. Responsibilities should be assigned to primary and alternate delegates on staff. Provisions should be made for communication with emergency responders as well as environmental agencies (e.g. State Warning Point). Remember to identify the location of and transportation routes to medical facilities.

Resources

- 📞 Florida State Warning Point - Emergencies Only: 1-800-320-0519 or 1-850-413-9911; Non-Emergencies: 1-850-413-9900
- 📞 US EPA - Emergencies <http://www.epa.gov/oswer/emergencies.htm>



I. GREEN ROOFS

Green roof development involves the creation of "contained" green space on top of a human-made structure. This green space could be below, at or above grade, but in all cases the plants are not planted in the "ground". A green roof system is an extension of the existing roof, which involves a special water proof and root repellent membrane, a drainage system, filter cloth, a lightweight growing medium and plants. Green roof systems may be modular, with drainage layers, filter cloth, growing media and plants already prepared in movable, interlocking grids, or, each component of the system may be installed separately.



Constructing and maintaining a green roof is relatively easy and can help to offset many of the problems created by excessive urban development. The benefits of green roofs include:

- Aesthetics and a more natural appearance.
- Reduction of the "urban heat island" phenomenon.
- Reduction of stormwater runoff volume. (Estimates are that 3-5 inches of soil or growing medium absorbs 75% of rain events that are one-half inch or less.)
- Reduction of stormwater runoff contamination through natural filtration.
- Cleaning of the air by catching dust particles and other pollutants, which eventually wash into the soil and are filtered out of the environment.
- Other typical plant benefits such as oxygen production.

Expenditures for green roofs are often offset over the lifecycle by the increased protection of the roof and the extension of the roof's lifespan. Vegetation can extend the life of a roof because less solar energy reaches the roof substrate, limiting damage from UV radiation as well as daily temperature fluctuations, which cause repeated contraction and expansion. In addition, taking into account future summertime energy savings at the time of purchase brings the price of a green roof closer to that of a traditional roof. Depending on local construction codes, it may also be possible to construct it without storm water infrastructure investments.

Green Roofs in Florida

Although green roofs are already abundant in Pennsylvania, Chicago, and the Washington D.C./Virginia area, and Europe has built green roofs for decades, there is little information pertaining to how well green roofs will work in Florida. Florida projects include one completed green roof located at the Shadow Wood Preserve in Ft. Myers and a green roof in the planning phase at the University of Central Florida. The Florida Department of Environmental Protection (DEP) helped to fund both of these projects due to the research capabilities of the sites.

**1. Intensive or extensive**

There are two main distinctions of green roofs: intensive and extensive. Intensive green roofs contain their own irrigation and drainage systems and are intended as parks, which people can access. Intensive green roofs can add 80 to 150 pounds per square foot (lbs/sf) to the roof and require a lot of maintenance. Extensive green roofs are built more to benefit the environment and can vary from 1 to 5 inches of soil and add a mere 15 to 50 (lbs/sq.ft.). They are accessible only for occasional maintenance.

2. Waterproofing

There are several products used for waterproofing and root protection, including reinforced PVC, rubber membrane (EPDM), and thermoplastic polyolifins (TPOs). PVC is common due to its efficiency and relatively cheap cost in preventing leakage and penetration of roots into the roof. EPDM does not protect against leaks as well as PVC because the seams in EPDM need tape or other adhesives to bond them together. TPOs may contain bromides, which can cause the material to fail in the long-term.

When dealing with asphalt based roofs, high-density polyethylene (HDPE) can be used to prevent organisms from using the asphalt as food.

3. Soil

Organic soil works best and if the roof is built on a new building, then the topsoil removed to build the structure makes a convenient source. Expanded slate or clay mixed in to the soil can help it retain more moisture. The lowest allowable weight for a green roof should not fall below 15 (lbs/sq.ft.) in order to withstand the wind.

4. Plant Life

The plants are the most important part of the roof. Choosing the right plants could mean the difference between success and failure. Make sure to choose native plants that can handle adverse conditions. These plants will have to endure extreme sun exposure, little soil, and high winds. *See Section I.B. Right Plant – Right Place.*

5. Maintenance

Green roofs will need irrigation for about the first six months to help the plants establish their roots, but maintenance becomes minimal after establishment. An occasional weeding or fertilizing should suffice for a smaller roof. Drip irrigation on a larger roof may make establishment easier and can help the plants during droughts.

Resources

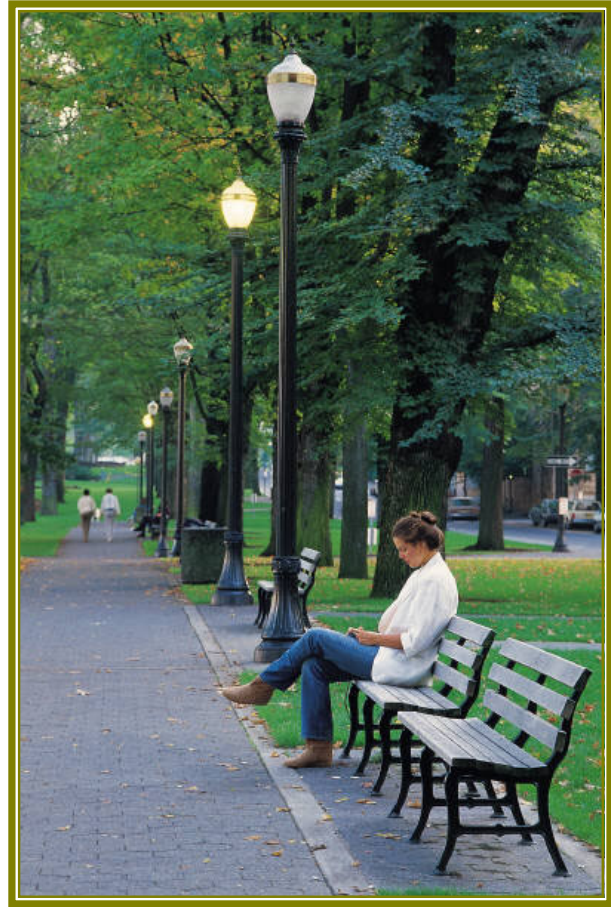
- 🔗 US Environmental Protection Agency - Heat Island Effect: <http://www.epa.gov/heatisland/strategies/greenroofs.html>
- 🔗 Green Roofs for Healthy Cities (GRHC): <http://www.greenroofs.org/>
- 🔗 Environmental Design and Construction magazine – “Green Roofs: Stormwater Management From the Top Down” : http://www.edcmag.com/CDA/ArticleInformation/features/BNP_Features_Ite m/0,4120,18769,00.html
- 🔗 Roofscapes Inc. is a leading builder of green roofs in North America, including the first in Florida, <http://www.roofmeadow.com/>



J. OUTDOOR ACCESSORIES

"Landscaping" typically includes any vegetation, mulches, and irrigation systems on a site, but it can also include other components, such as decorative paving, fences, lighting, and outdoor furniture. Outdoor "furniture" can include a wide variety of amenities including decks with built-in seating, park tables and benches, jungle gyms, swings, monkey bars, etc.

Many of these outdoor accessories are available in environmentally-friendly forms including being manufactured with recycled content, from renewable resources, or from other alternative wood sources. The variety of products and their price range is wide, with initial purchase costs that may be higher or lower than their non-recycled counterparts. However, cost should be evaluated over a life-cycle. Operation/maintenance costs are typically lower for recycled content items because they can often withstand more abuse while retaining their appearance. Since they are more durable they need to be replaced less often.



LEAD BY EXAMPLE

Resources

- 🔗 Florida Green Building Coalition – Building Green: <http://www.floridagreenbuilding.org/bldggreen.htm>
- 🔗 EPA 2004 Buy-Recycled Series: Landscaping Products: <http://www.epa.gov/epaoswer/non-hw/procure/pdf/landscape.pdf>
- 🔗 EPA 2004 Buy-Recycled Series – Other Products: <http://www.epa.gov/epaoswer/non-hw/procure/factshts.htm>
- 🔗 Florida Directory of Recycled Products Vendors at http://www.dep.state.fl.us/waste/quick_topics/publications/shw/recycling/Recycled_Product_Dirctory.pdf

1. Paths and walkways

Paths and walkways may simply be marked or worn areas in the landscape, or they may be covered with material such as mulch, pebbles, gravel, porous pavers, wooden boardwalks, etc. These porous materials should be used in preference to impervious concrete or asphalt.

A variety of materials that allow water to flow through into the ground can be used for driveways, sidewalks and walkways, contributing to greater water percolation and reducing run-off. In some cases these materials may even cost less to install than



typical paving materials. Below are some examples of these materials, in order from most porous to least porous, along with approximate prices:

1. Recycled mulch costs approximately \$0.16-0.40 per square foot.
 - It requires occasional replenishing.
 - Cypress mulch not recommended because harvest depletes wetlands.
2. Washed shell costs approximately \$0.30 per square foot.
 - It eventually compacts and hardens.
 - It needs periodic additions and may alter soil pH.
3. Gravel costs approximately \$ 1.33 per square foot.
4. Pervious concrete costs approximately \$ 2.50 per square foot.
5. Shell rock (limestone) costs approximately \$0.94 per square foot.
 - It hardens.
 - It is prone to erosion.
 - It may alter soil pH.
 - DOT-approved shell costs \$0.25 per square foot. It may alter soil pH.
6. Concrete costs approximately \$ 1.50 per square foot
7. Asphalt costs approximately \$ 1.17 per square foot

Resources:

- 🔗 UF, IFAS Extension, Florida Yards Program, Learn-By-Mail Course, Principle 8 - Stormwater Runoff at http://volusia.org/extension_service/FYN/Principle%208.pdf
- 🔗 Volusia County Government at http://volusia.org/extension_service/fyhcre2.htm#RUNOFF

2. Recycled-content and renewable-resource construction materials

Choosing to purchase recycled content does not limit one's choices. Construction materials and outdoor accessories are available with recycled content. Construction project managers are learning that recycled-content and renewable resources construction products are cost effective, reliable, easy to obtain, and environmentally friendly. Many high-quality construction products, including drywall, paving, beams, and insulation, are available with recycled content. Other construction products with recycled content are cement, concrete, patio blocks, floor tiles for heavy duty/commercial use, shower and restroom dividers/partitions, latex paint, and roofing materials. Examples of renewable resource materials include bamboo or natural cork wood flooring, casework and countertops made from bio-composite materials such as straw, and even all-natural linoleum flooring.

Florida house: A Sustainable Prototype for Tomorrow (Sarasota)

Products made from recycled materials are used extensively, with a preference for locally produced items. The outdoor decks are made from a composite of recycled plastic and wood fiber. The outdoor furniture is made from 100 percent recycled plastic. So is the carpet, which is used sparingly to keep down dust levels. All of the porch tiles are made from 70 recycled automotive glass. And the porch railing and Galvalume roof are made from recycled



aluminum. Resource-conserving products like bamboo flooring and natural linoleum are also featured.
<http://sustainable.state.fl.us/fdi/fsc/news/local/9903/fh-sara1.htm>)

3. Recycled plastic lumber

Recycled plastic lumber is a specific example of a recycled-content material that has found many outdoor applications. This “lumber” is made from post-consumer and post-industrial waste, including soda and milk bottles, plastic grocery bags, etc. The environmental benefits of using plastic lumber include reducing the burden on landfills and reducing the number of trees cut down.

Like natural wood, plastic wood is subject to expansion and contraction with heat; however, the magnitude of expansion may be much greater than with natural wood and varies from product to product. Most recycled wood products can be cut and shaped with traditional wood working tools, but many manufacturers recommend the use of special fasteners in construction. Since most plastic lumber does not have the same bearing strength as natural wood, it is crucial that manufacturers specifications regarding the distance between supports be followed very carefully.

In addition, plastic lumber doesn’t rot when exposed to moisture and therefore never requires waterproofing or similar maintenance when used outdoors. It doesn’t warp, splinter, or crack, and it resists insects such as termites. Over time, plastic lumber saves on labor, materials, and equipment because it lasts longer than wood and requires less frequent replacement.

Plastic lumber also can be used for a variety of applications including joists, pilings, fencing, traffic barriers, fendering systems, railings, docks, railroad ties, and outdoor furniture such as picnic tables. Plastic lumber in some cases can be more expensive initially than traditional alternatives.

Resources

- 🔗 National Park Service - Recycled/Plastic Wood Products:
<http://www.nps.gov/sustain/spop/wood.html>
- 🔗 Progressive Engineer:
<http://www.progressiveengineer.com/PEWebBackissues2004/PEWeb%2051%20Jun%2004-2/51comp.htm>

4. Certified forest lumber

If recycled content substitutes are not available, wood should come from a forest where wildlife and habitats are protected. Today there is a way to tell whether wood is from that kind of forest: the Forest Stewardship Council (FSC) label. FSC visits forests to see if they are managed well. Forests that meet the standard can use the FSC label on their wood.

Resources

- 🔗 Certified Forest Products Council - FSC wood : <http://www.certifiedwood.org/>

5. Avoid CCA lumber

Chromated Copper Arsenate (CCA) is an insecticide and preservative that gives treated wood the distinctive green color that is so common on decks, walkways and outdoor furniture. It has long been considered the standard for effectiveness, durability and safety. CCA is a chemical mixture consisting of three pesticidal compounds (arsenic, chromium, and copper) registered for wood preservative uses. Wood that is treated with CCA has proven to be effective in combating termites and ground rot. However, recent



research findings concerning this wood preservative have indicated that there are potentially much higher risks for exposure to arsenic than have been previously thought, and the exposure risk in playgrounds and picnic areas may be greatest for the population most at risk--young children.

As of December 31, 2003, EPA has dictated that CCA can no longer be used to treat wood that will be used in virtually all-residential settings. Landscapers should ensure that CCA treated lumber is not used in new construction, and that CCA treated lumber is managed properly, and not mulched, at its end of life.

Resources

- Florida Department of Environmental Protection - CCA Treated Wood: http://www.dep.state.fl.us/waste/categories/solid_waste/pages/IWDR.htm

6. Outdoor lighting

Outdoor lighting is used for safety, security and also to highlight decorative features.. When shopping for outdoor lights, you will find a variety of products, from low-voltage pathway lighting to motion-detector controlled floodlights.

- Select energy-efficient lights that are suited to the specific application. This can range from the high-efficacy of low-pressure sodium lamps to the better color rendering of energy-efficient metal halide HID lights.
- Use outdoor lights controlled by a photocell unit or timers so they will turn off during the day.
- The use of solar energy for exterior lighting is another excellent opportunity for commercial buildings in Florida, offering up to 100% reduction in energy used for exterior lighting. Applications are many including parking lots, entrances, walkways, and security lighting. In most installations, a small solar photovoltaic panel is installed for each light fixture, which charges a battery during daylight hours. Sensors or timers activate the light at nightfall, which operates off of the battery power. Critical applications such as security lighting may be installed with an electric backup.
- Turn off decorative outdoor gas lamps.

Resources

- US Environmental Protection Agency and the US Department of Energy - Energy Star: <http://www.energystar.gov/>



SECTION II - CONTROLS AND INCENTIVES

Landscape codes, enacted in many parts of Florida, have encouraged better landscape care practices throughout the state, while alerting people to the important responsibility they have to protect the environment. Other control methods, such as incentive programs, encourage people to use new and safer technology than they might otherwise lack the motivation to use.

Maintaining existing canopy through protective efforts, and then expanding it by planting trees is an attractive strategy both for saving money through energy efficiency and for improving the quality of life in urban areas. Urban summers are hot and getting hotter. Data collected over the last century clearly show an increase in inner cities' temperatures since buildings and pavement began replacing agricultural land near urban areas.

This trend may be costing local governments money, because temperature increases in urban areas dramatically impact cooling costs. In cities with populations of more than 100,000, peak utility cooling demand increases 1.5% to 2% for every 0.6 degrees C (1 degree F) the temperature rises. Urban temperatures across the United States have risen an average of 1.1 degrees to 2.2 degrees C (2 degrees to 4 degrees F) in the last 40 years, which means your city is probably paying a premium to keep cool in the summer.



A. ENACT A LANDSCAPE ORDINANCE FOR PROTECTION OF WATER QUALITY AND QUANTITY

The Florida Department of Environmental Protection has helped to develop a thorough example of a local Landscape Code with the intention of improving water quality and quantity. Green Local Governments should enact a local ordinance like this, while encouraging and enforcing better landscape practices throughout the community. Below is a short excerpt from the model Landscape Code:

Excerpts from FDEP Model Landscape Code

1. TITLE

AN ORDINANCE OF THE (CITY/COUNTY OF) AMENDING OR REPLACING ORDINANCE NO.(s) _ _ OF THE GENERAL LANDSCAPE REGULATIONS BY REQUIRING FLORIDA FRIENDLY LANDSCAPE PRACTICES AND IRRIGATION SYSTEMS; BY PROVIDING FOR CONSISTENCY WITH STATE LAW AND THE (CITY/COUNTY OF) COMPREHENSIVE PLAN; PROVIDING FOR PURPOSE AND INTENT; PROVIDING FOR DEFINITIONS; PROVIDING FOR AMENDMENT OF EXISTING REGULATIONS; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; PROVIDING FOR CODIFICATION; PROVIDING FOR ENFORCEMENT AND PROVIDING AN EFFECTIVE DATE.

2. FINDINGS OF FACT

WHEREAS, the Local Government Comprehensive Planning and Land Development Regulation Act, Chapter 163, Florida Statutes, (F.S.), provides for comprehensive plan implementation through the enactment of certain ordinances; and WHEREAS, pursuant to Sections 125.568, 166.048, and 373.185, F.S., local governments should consider the adoption of water-efficient Landscape Standards and further Section 376.62, F.S., regulates the installation of rain sensor devices on automatic lawn sprinkler systems; and

WHEREAS, the Florida Watershed Restoration Act of 1999 and the NPDES municipal stormwater permitting program require local governments to reduce pollutant loads discharged from their stormwater management systems to better protect and restore surface and ground waters; and

WHEREAS, the (City/County of ____) recognizes the need for the protection of water as a natural resource through the application of Florida Friendly landscape practices; and

WHEREAS, a Florida Friendly landscape promotes the conservation of water by the use of site adapted plants and efficient watering methods which generally results in a long-term reduction of irrigation, fertilizer, and pesticide requirements, costs, energy, and maintenance; and

WHEREAS, a Florida Friendly landscape encourages a reduction of total energy expenditures such as water pumping and treatment, manufacture and shipping of fertilizers, insecticide, and other gardening chemicals, operation and maintenance of mowers, edgers, blowers and other combustion based yard equipment, as well as labor; and



WHEREAS, community-wide Florida Friendly landscape efforts are designed to save significant amounts of water to preserve local water supplies such that cumulative benefits may reduce or postpone the need for community potable water supply expansion; and

WHEREAS, The Florida Legislature enacted Florida Statutes, Chapter 481, Part II and the Board of Landscape Architecture adopted Rule 61-G-10 Florida Administrative Code, which defines and regulates the practice of landscape architecture to protect the public health, safety, and welfare.

NOW, THEREFORE, BE IT ORDAINED BY THE GOVERNING BODY OF THE (CITY/COUNTY OF _____), FLORIDA, as follows:

...

6. PURPOSE AND INTENT

The purpose of these regulations is to establish minimum standards for the development, installation, and maintenance of landscape areas without inhibiting creative landscape design, construction and management

Specific Best Management Practices (BMPs) have been developed that include water conservation measures, the preservation of natural vegetation where applicable, and appropriate plant selection and location. Best management Practices have also been developed for the use of fertilizers, pesticides and appropriate maintenance practices such as proper pruning techniques, mowing, mulching and composting. Implementation of BMPs will aid in improving environmental quality and the aesthetic appearance of public, commercial, industrial, and residential areas.

These guidelines and landscape practices are established to help communities, developers, builders, contractors, businesses and homeowners be partners in improving and protecting Florida's environment.

...

Resources

- 🔗 Florida Department of Environmental Protection - Guidelines For Model Ordinance Language For Protection Of Water Quality And Quantity Using Florida Friendly Lawns And Landscape:
<http://www.dep.state.fl.us/water/nonpoint/docs/nonpoint/gimdlord.pdf>
- 🔗 Orange County Code Chapter 24 - "Landscaping, Buffering and Open Space."
<http://library.municode.com/gateway.dll/FL1/florida1/3179/3318?f=templates&n=default.htm>
- 🔗 Miami-Dade County - ORDINANCE UPDATING CHAPTER 18A-LANDSCAPE CODE:
<http://www.miamidade.gov/govaction/matter.asp?matter=974077&file=false&yearFolder=Y1997>
- 🔗 University of Florida IFAS collection of Sarasota landscaping ordinances:
<http://sarasota.extension.ufl.edu/WEL/ord/docs/ord.htm>



B. ENACT AN ORDINANCE TO PRESERVE EXISTING CANOPY

Preservation of existing canopy within a community is an important component of maintaining landscape spaces throughout the community. Trees are a unique part of the landscape as most species require several years to reach maturity and thus are not easily replaced.

Local governments should enact legislation to preserve these mature trees within their community. This may include requiring transplantation instead of destruction, or requiring replacement with compensating canopy elsewhere.

Excerpts from Miami-Dade County Code - Chapter 24 Article III -TREE PRESERVATION AND PROTECTION

Sec. 24-60. Permits for tree removal and relocation, improperly issued permits, violation of permit conditions, exemptions from tree removal permits; mortgagee exemption from liability.

(1) It shall be unlawful for any person, unless otherwise permitted by the terms of this article, to do tree removal work or to effectively destroy any tree, or to effectively destroy any understory in a natural forest community, without first obtaining a permit from the Department.

(2) No municipal or County official shall issue a tree removal permit that does not comply with the provisions of this article. Any such permit shall be void.

(3) It shall be unlawful for any person to violate or not comply with any of the conditions of a Miami-Dade County tree removal permit.

(4) The following activities are exempt from tree removal permits:

...

Sec. 24-60.4. Replacement requirements for tree removal.

(I) Tree replacement requirements. As a condition of the issuance of a tree removal permit, the permittee shall be required to replace trees that are authorized to be removed under the provisions of this article. The number of trees and number of species of trees required for replacement shall be determined according to the procedures contained herein. When the replacement canopy area exceeds ten thousand (10,000) square feet, replacement shall be described in a landscape replacement plan which shall meet the minimum requirements of Section 24-60.4(III), and no tree removal permit shall be issued until said plan has been approved by the Department, except as provided in Section 24-60.4(IV).

...

Sec. 24-60.6. Tree relocation standards.

The relocation of any tree that is subject to the provisions of this article shall be consistent with the following minimum standards:

(A) Trees other than palms:

1. Tree roots shall be severed in such a manner as to provide a root ball which is sufficient to ensure survival of the tree when relocated. A sufficiently-



sized planting hole shall be provided at the relocation site to ensure successful regrowth.

2. After root severing, adequate time shall be allowed prior to replanting to ensure survival of the tree(s). After root severing and prior to relocation, tree(s) shall be watered a minimum of twice weekly. After relocation, tree(s) shall be watered a minimum of twice weekly until the tree(s) are established.

3. During removal and transportation of the tree, the root ball and vegetative portions of the tree shall be protected from damage from wind or injury.

4. Any tree that dies or becomes nonviable within one (1) year of relocation shall be replaced according to the standards set forth in Section 24-60.4(II).

(B) Palms:

1. A ball of earth at least one (1) foot from the base of the tree shall be moved with the tree.

2. Fronds shall be securely tied around the bud prior to relocation and shall remain securely tied around the bud during the entire relocation process and for a minimum of one (1) week after relocation.

3. The bud shall be protected from damage or injury during relocation.

4. Any palm that dies or becomes nonviable within one (1) year of relocation shall be replaced according to the standards set forth in Section 24-60.4(II).

(Ord. No. 88-95, § 12, 10-4-88; Ord. No. 89-6, § 1, 1-17-89; Ord. No. 89-8, § 14, 2-21-89; Ord. No. 97-3, § 6, 1-14-97)

...

Sec. 24-60.8. Tree trust fund and Tree Forest Resources Advisory Committee.

(I) Creation of the tree trust fund. There is hereby created a tree trust fund, the purpose of which is to acquire, protect and maintain natural forest communities in Miami-Dade County and to plant trees on public property.

(II) Creation of the Tree and Forest Resources Advisory Committee. The Tree and Forest Resources Advisory Committee is hereby established for the purpose of providing the Board of County Commissioners with recommendations regarding the tree trust fund, and recommendations to the DERM regarding the establishment of Departmental policies relating to Ordinance Number 89-8.

(Miami-Dade County Code - Chapter 24 Article III -TREE PRESERVATION AND PROTECTION:

<http://library.municode.com/gateway.dll/FL1/florida1/10879/11166/11169?f=temp/ates&fn=default.htm>)



C. IMPLEMENT A RIGHT-OF-WAY OR STREET TREE PLANTING PROGRAM

Local governments have an opportunity to increase the canopy within a community by the implementation of a effective street tree and landscape planting program. Below are some important consideration when implementing such a program.

Resources:

- 🔗 UF IFAS, Restoring the Urban Forest Ecosystem at <http://edis.ifas.ufl.edu/pdf/files/fr/fr06500.pdf> and <http://edis.ifas.ufl.edu/pdf/files/FR/FR07400.pdf>
- 🔗 UF IFAS, Tomorrow's energy today for Cities and Counties: Cooling our cities at <http://edis.ifas.ufl.edu/EH274>
- 🔗 UF IFAS, Community Tree Care at <http://edis.ifas.ufl.edu/MG249>
- 🔗 Montgomery Street trees <http://www.montgomerycountymd.gov/hwytml.asp?url=/content/dpwt/operations/highway/tree.asp>
- 🔗 Miami-Dade County Street Tree Master Plan Proposal: <http://www.miamidade.gov/govaction/matter.asp?matter=042206&file=true&yearFolder=Y2004>
- 🔗 FDOT Highway Landscape Guide: <http://www.dot.state.fl.us/emo/beauty/landscap.pdf>

1. Prepare a plan

A tree inventory and management plan will help determine the number, condition, age, potential planting spaces and other information about your trees. It is important to have this information to enable the management of the urban forest rather than reaction to problems after they have occurred. Haphazard planting and maintenance is a poor use of limited resources.

2. Special considerations for street trees

The other sections of this document provide information about planning and maintaining a healthy landscape. However, there are some specific issues that apply to the urban settings of street trees.

a. Selection and diversity

While selecting from species that are compatible with the intended environment, local governments should strive for diversity of tree species throughout the city. An accepted rule recommends no more than 20 percent of the trees should be from the same genus (for example oak) and no more than, 10 percent from the same species (for example live oak). This diversity helps to buffer the landscape from hazards that may disproportionately impact a particular species.

Strive for diversity on a city-wide perspective; but do not plant a large variety of different trees on the same street. Instead, plant one section of the city (several blocks) with one species, and another with a different one. This allows the development of neighborhoods, which will have an identity - the trees.

Planting of hardwood shade trees should be emphasized for canopy restoration while planting of palms should be reduced and used as accent plants in public plantings. While palms are aesthetically pleasing and look "tropical," they do not



provide the same environmental benefits as hardwood shade trees. As emphasized earlier in this booklet, invasive plants should be avoided.

b. **Planting**

Avoid planting large-maturing trees in areas less than 20 X 20 feet unless soil drainage is excellent. This small area will dwarf the tree so it will never reach its natural size. In a parking lot, trees grow much better when grouped together in several large planting islands rather than when planted in numerous small islands distributed over the site. Allow at least 400 square feet of soil space for each tree. Also see Section I.B. Right Plant – Right Place.

c. **Maintenance**

During droughts, established trees in restricted soil spaces (such as street trees) require more irrigation than those in open areas where root systems can develop their normal spread. Trees in these and many other urban situations are irrigated best with a micro-irrigation system, which reduces runoff by applying water at a slow rate.

3. Selecting a qualified arborist

Arboriculture is the care of trees and shrubs, particularly in urban settings. An arborist is a professional who cares for trees and other woody plants by pruning, fertilizing, monitoring for insects and diseases, consulting on tree related issues, and occasionally planting, transplanting, and removing trees. Below are several tips for selecting an arborist:

- a. Avoid arborists who routinely top trees.
- b. Have more than one arborist review the job and submit a written bid, specifying work to be done. Ask for and check local references.
- c. Beware of an arborist who wants to remove a living tree. Removal of live trees is sometimes needed, but should be the last resort.
- d. Determine if the arborist is a member of a reputable industry organization such as the International Society of Arboriculture or the National Arborist Association. Membership does not guarantee quality, but lack of membership may be an indication of the person's professionalism, or lack thereof.
- e. Ask for and verify certification of current personal and property liability insurance and workman's compensation.
- f. Low price is not necessarily an indication of a poor quality arborist. However, the better arborists tend to be more expensive because of more specialized equipment, more professional help and insurance costs.

Resources

- 🔗 Tree Care Industry Association (TCIA): <http://www.natlarb.com/>
- 🔗 International Society of Arboriculture: <http://www.isa-arbor.com/>

4. Potential funding sources

Potential funding sources for your local street tree planting program include banking of mitigation fees, bonds, special taxing districts, or even establishing a “green utility” fee. The Florida Legislature (FL Statutes, 369.255) authorized counties and municipalities with populations exceeding 500,000 and 200,000 respectively, to collect fees on a voluntary basis for the proper management of greenspace areas.

**Excerpt from F.S. 369.255 Green utility ordinances for funding greenspace management and exotic plant control.**

In addition to any other funding mechanisms legally available to counties and municipalities to control invasive, nonindigenous aquatic or upland plants and manage urban forest resources, a county or municipality may create one or more green utilities or adopt fees sufficient to plan, restore, and manage urban forest resources, greenways, forest preserves, wetlands, and other aquatic zones and create a stewardship grant program for private natural areas. Counties or municipalities may create, alone or in cooperation with other counties or municipalities pursuant to the Florida Interlocal Cooperation Act, s. 163.01, one or more greenspace management districts to fund the planning, management, operation, and administration of a greenspace management program. The fees shall be collected on a voluntary basis as set forth by the county or municipality and calculated to generate sufficient funds to plan, manage, operate, and administer a greenspace management program.

http://www.flsenate.gov/statutes/index.cfm?mode=View%20Statutes&SubMenu=1&App_mode=Display_Statute&Search_String=&URL=CH0369/Sec255.HTM

5. Educate citizens on tree canopy issues

A successful tree program requires the involvement of residents, business owners, government officials, construction contractors, engineers, developers, landscape architects, landscape maintenance companies and employees, neighborhood associations, community planners, and tree care service contractors and employees - in other words, the entire community. Local governments should develop a public education and outreach campaign to support their right-of-way landscaping efforts.



D. ENACT LOCAL ORDINANCES FOR XERISCAPING AND PROPER IRRIGATION

The volume of water uses for irrigation is very dependant on proper landscaping design and maintenance. Many regions of Florida experience water shortages throughout some or all of the year and are therefore very concerned about the volume of water used for irrigation. Local governments should enact legislation to ensure landscaping and irrigation systems are appropriate for the current and projected available water supply.

1. Xeriscaping

Xeriscaping, or water efficient landscaping, is an effective way to reduce demands on limited water supplies and ensure that a lesser amount of water is required for landscaping. Xeriscape plants are usually native and naturally drought tolerant. These plants will often require little or no irrigation and should therefore be encouraged.

Resources

- 🔗 The Florida Senate statute on Xeriscape Ordinances at http://www.flsenate.gov/statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0373/Sec185.HTM
- 🔗 University of Florida IFAS: http://edis.ifas.ufl.edu/TOPIIC_Irrigation

2. Proper irrigation system design and installation

If irrigation will be required, then the irrigation system should be properly designed, installed, and maintained in order to ensure the most efficient use of irrigation water possible. Irrigation system design is a complex issue and should be handled by a trained professional.

Excerpts from The Irrigation Association has proposed language:

As used in this act:

"Board" means the Landscape Irrigation Contractors Examining Board established pursuant to section 3 of this act.

"Landscape irrigation contracting" means the construction, repair, maintenance, improvement and alteration of any portion of a landscape irrigation system, including required wiring within that system and connections to the required power supply and the installation and connection to a public or private water supply system under the terms and conditions of a contract.

...

No person shall engage in the business of landscape irrigation contracting without securing from the board a landscape irrigation contractor certificate in accordance with the provisions of this act: except the officers, employees, and duly authorized representatives of the United States, the State, or any political subdivision thereof performing work on the property of the [political] public entity; vendors of landscape irrigation components, materials, or equipment who perform only such functions as delivery, rendering of advice or assistance in the installation or normal warranty service or exchange of defective or damaged



goods; contractors engaged in the design, fabrication, installation or constructions of irrigation apparatus, or irrigation equipment of any type which is to be used solely for agricultural purposes in the production of harvestable and saleable vegetative or animal products; and persons engaged in landscape irrigation contracting solely as an employee of a landscape irrigation contractor, are exempt from the requirement of a certificate imposed by this act.

(http://www.irrigation.org/gov/default.aspx?pg=Regulation_of_Irrigation_Contractors.htm&id=115)

3. **Water conserving irrigation equipment**

Beyond xeriscaping and a well-designed irrigation system, local governments may require the incorporation of specific design features. This may include micro-irrigation designs or the use of control devices such as timers and rain gauges.

Sarasota County Water Efficient Landscape Ordinance

The water efficiency ordinance focuses on irrigation system efficiency and limiting plants requiring the most supplemental irrigation. This applies to new construction and extensive remodeling. Grass and flowers are limited to 50 percent or less of the irrigated area. Separate irrigation zones are required for grass and tree/shrub/groundcover beds. Low volume micro-irrigation is required for plant beds. No plant root balls or spray irrigation is permitted under roof overhangs. No grass should be planted in strips narrower than four feet except next to contiguous properties.

(<http://www.co.sarasota.fl.us/Content/Content.aspx?C7A6C692B2=A5969E&D4C7CF=C7A6C691ADA2A5A69A957999A3A7A29597789D94A7AD9799829BA893C3B0>)

Automatic shut-off device ordinance

Sarasota County Ordinance No. 2000-15 requires all automatic lawn sprinkler systems to have an automatic rain sensor device or switch installed and in operating order. This device stops the system from operating when it is raining. Failure to have a functional automatic rain sensor device or switch is enforceable by Sarasota County Code Enforcement Officers and can result in a civil penalty of up to \$500.

(<http://www.co.sarasota.fl.us/Content/Content.aspx?C7A6C692B2=A899>)

4. **Reclaimed or gray water resources**

State and local regulations may impact the ability of members of your community to utilize reclaimed and/or gray water for irrigation purposes. These regulations should be reviewed and where appropriate adjusted to encourage the managed reuse of these water resources. See Section I.C.8. *Evaluate reclaimed or gray water*

5. **Water use restrictions**

Many of the regional water management districts within Florida implement regulations regarding the use of water for irrigation. The restrictions imposed will often depend upon the current and anticipated water supply status, and are implemented in phases



accordingly. As shown in the sample excerpts provided below, some of these restrictions may in fact be enforced throughout the entire year.

Resources

- ☞ Contact information for the regional Water Management Districts
<http://www.dep.state.fl.us/secretary/watman/>
- ☞ South Florida Water Management District - Regulation:
<http://www.sfwmd.gov/org/reg/wupermit.htm>

Excerpts from the South Florida Water Management District - 40E-24 Mandatory Year-Round Landscape Irrigation Measures For Lee, Collier And Charlotte Counties:

(4) In addition to the specific measures enumerated below, all wasteful and unnecessary water use as defined in Rule 40E-24.101(10), F.A.C., is prohibited.

(5) The following requirements or exceptions shall apply to all users unless specified otherwise herein:

(a) Landscape irrigation shall be prohibited daily between the hours of 10:00 a.m. and 4:00 p.m., except as otherwise provided herein.

(b) Even addresses as defined in Rule 40E-24.101(4), F.A.C., may accomplish necessary landscape irrigation only on Tuesday, and/or Thursday and/or Sunday.

(c) Odd addresses as defined in Rule 40E-24.101(7), F.A.C., and rights-of-way or other locations without an address may accomplish necessary landscape irrigation only on Monday, and/or Wednesday and/or Saturday.

(d) Landscape irrigation systems may be operated during restricted days and/or times for cleaning and maintenance purposes with an attendant on site in the area being tested. Landscape irrigation systems may routinely be operated for such purposes no more than once per week, and the run time for any one test should not exceed 10 minutes.

(e) Landscape irrigation for the purpose of watering in insecticides, fungicides and herbicides, where such watering-in is required by the manufacturer, or by federal, state or local law, shall be allowed under the following conditions:

1. Such watering-in shall be limited to one application in the absence of specific alternative instructions from the manufacturer; and

2. Such watering-in shall be accomplished during normally allowable watering days and times unless a professional licensed applicator has posted a temporary pesticide sign containing the date of application and the date(s) of needed watering-in activity.

(f) Any plant material may be watered using low-volume hand watering methods without regard to the watering days or times allowed pursuant to this section.

Specific authority 373.044, 373.113, 373.171, FS. Law Implemented 373.042, 373.0421, 373.171, 373.223 FS. History – New 6-12-03. 40E-24.301 Local Government Option



(1) Local governments that wish to enforce alternative landscape irrigation measures, shall be considered to be in substantial compliance with this rule upon the enactment of an ordinance establishing landscape irrigation measures which achieve water conservation and which allow no more cumulative time for landscape irrigation than section 40E-201(5). Such ordinance shall provide for variance procedures that do not diminish the effectiveness of the measures.

(<http://www.sfwmd.gov/org/wsd/wateruse/yearrndlndscape.htm>)



SECTION III - EDUCATION

Education and training are possibly the most important factors that contribute to the successful implementation of any program, and are especially valuable in the “greening” of local governments and the communities that they represent. Educational efforts can focus on a variety of groups including:

- Local government landscape maintenance staff.
- Businesses and other government agencies within the community that maintain landscaping.
- Businesses within the community that perform landscape maintenance work for individual customers, as well as members of the community that perform this work for themselves. These may include commercial landscape and interiorscape personnel, landscape architects & designers, arborists, and sports turfgrass managers.
- Members of the community who are customers of local businesses that perform landscape maintenance work.

Landscape managers for local governments will often be able to directly impact the first of these groups. The other sectors of the community are often educated through other functional groups within a local government including environmental agencies or a designated local government arborist.



A. LOCAL TREE PLANTING CAMPAIGN

Local campaigns to plant trees within a community can be an effective method for increasing the tree canopy and also educating members of the community about the benefits of trees and how to properly care for them. Included below are some examples of these programs.



1. The National Arbor Day Foundation

The mission of The National Arbor Day Foundation is to inspire people to plant, nurture, and celebrate trees.

- a. National Arbor Day is the last Friday in April, but many states observe Arbor Day on different dates according to their best tree-planting times. In Florida it is generally celebrated the third Friday in January.
- b. Tree City USA, sponsored by The National Arbor Day Foundation in cooperation with the USDA Forest Service and the National Association of State Foresters, provides direction, technical assistance, public attention, and national recognition for urban and community forestry programs in thousands of towns and cities.

Resources

- 🔗 National Arbor Day Foundation: <http://www.arborday.org/>
- 🔗 Florida Division of Forestry: <http://www.fl-dof.com/>

2. Local government tree distribution program

Miami-Dade County Adopt-A-Tree Program

A 1996 tree cover analysis by a non-profit group, American Forests, showed that Miami-Dade's tree canopy coverage averaged 10% (some areas only had 1-2% tree cover), which is far less than the 30% average of other municipal areas. Several years after the analysis, approximately 600,000 additional trees were removed by the State's citrus canker eradication program. Alarmed by this additional loss of shade trees, the County's environmental department (DERM) petitioned the State Department of Agriculture for money to begin restoring the community's tree canopy.

The Adopt-a-Tree program was developed through a collaboration of community groups, agricultural interests, and government agencies seeking to replenish the community's diminishing tree canopy. The program is currently funded through a \$6 million grant from the State, as well as in-kind contributions from local partners. The program strives to restore the canopy in Miami-Dade County and foster a heightened awareness of the value of shade trees.



Over 50,000 trees were distributed for planting during the first three years of the Adopt-a-Tree Program. More importantly, the Program has educated a large segment of the local population about how to care for their specific trees and the importance of trees in general.

Some general aspects of the Adopt-a-Tree Program include:

- Each year, over a half a dozen adoption events are hosted in different areas of the County. The events are timed to coincide with the optimal growing period (April - November).
- Participants that meet the following conditions can receive two free trees per year:

Participants must own or live in a single-family or duplex residential property in Miami-Dade County.

Participants must provide photo ID so that their home ownership status can be verified.

Renters of single family or duplex residential property can adopt trees for the owner if they have written permission and a copy of photo ID from the property owner.

Residents of apartments/condos/trailer parks are NOT eligible.

- There are typically four types of trees available at each event. A mix of large and small (at maturity) non-citrus fruit and ornamental shade trees are provided.
- Over 30 species have been selected for use in the program. Some popular non-native tree species were included to boost interest in the program and to motivate participants to plant and care for their trees.
- All of the trees provided by the program must be good shade trees at maturity. For this reason, no palm species are utilized.
- Participants must go through a registration process that tracks the number of trees adopted per property.
- Participants must go through a short education process about how to plant and care for trees in general, as well as requirements for the specific trees being adopted.

Some advice for establishing your own local program include:

- Scale your program to match available resources. Funding sources can include grants, court settlements, local appropriations, developer fees, etc.
- A scientifically valid assessment or analysis of your community's canopy coverage is essential.
- Make your plan a flexible one from the start, so that elements can be added or subtracted based on implementation experiences.
- Partners are key. DERM teamed up with over 14 partners to develop the details of its plan. These partners provide ongoing logistical and technical support as the program changes over time. DERM also relies on volunteer assistance from groups like the Girl Scouts and Boy Scouts at its tree adoption events.



- *Garner community support. DERM consulted with the Florida Nursery Growers Association in order to incorporate the needs of this local business association. DERM also made sure that its proposal was compatible with the local utility company's "Right Tree in the Right Place" program.*

Resources

- 📄 Miami-Dade County Adopt-a-Tree: <http://www.miamidade.gov/derm/adoptatree/>
- 📄 American Forests: <http://www.americanforests.org/>



B. STORMWATER RUNOFF REDUCTION CAMPAIGN

Non-point source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These pollutants include excess fertilizers, herbicides, and insecticides from residential areas.

Landscape design is an effective method to passively control stormwater runoff and help to reduce flooding and stormwater pollution. Green spaces in general provide permeable surfaces that help stormwater percolate down on a property and reduce the volume that must be handled through drainage systems. This can help to reduce construction and maintenance costs for these drainage structures. Design features including retention areas such as contoured swales and rain gardens can help to increase the percolation and “holding capacity” for a site.

Resources

- 🔗 US Environmental Protection Agency – Polluted Runoff: <http://www.epa.gov/nps/> ; <http://www.epa.gov/owow/nps/outreach.html>
- 🔗 University of Florida, IFAS Extension, at <http://extension.ifas.ufl.edu/>
- 🔗 University of Florida, IFAS document AEC 361, Principles of Effective Extension Educational Programs, at <http://edis.ifas.ufl.edu/WC042>



C. EDUCATE THE COMMUNITY ABOUT INVASIVE EXOTIC PLANTS AND REGULATIONS

Non-native, invasive plants pose a large challenge to the native habitat in Florida. Some species of exotic (non-native) plants are highly invasive and should be removed. Invasive exotic plants aggressively take over natural habitat, altering the natural ecology of an area and crowding out native plants and animals. This results in areas that are less hardy because they are less diverse. These areas also will have fewer feeding and cover opportunities for wildlife.

Although local government agencies appear to be preempted by F.S. Chapter 581 (see below) from developing new regulations governing the sale and distribution of invasive species by local nurseries, they can assist the State by working cooperatively to educate the community about the damage that these plants can cause, and informing local businesses what their responsibilities are under the State regulations.

Excerpts From F.S. CHAPTER 581 PLANT INDUSTRY

581.011 Definitions

(10) "Department" means the Department of Agriculture and Consumer Services of the state or its authorized representative.

...

581.035 Preemption of regulatory authority over nurseries.

It is the intent of the Legislature to eliminate duplication of regulatory authority over nurseries. Notwithstanding any other law to the contrary, the authority to regulate, inspect, and permit:

- (1) Nursery owners, plant brokers, and stock dealers; and*
- (2) Nurseries, nursery stock, plants, and plant products, including any aquatic plant as defined in s. 369.22 which is grown in a nursery,*
is preempted to the department.

http://www.flsenate.gov/Statutes/index.cfm?App_mode=Display_Statute&URL=Ch0581/ch0581.htm

Resources

- 🔗 Florida Exotic Pest Plant Council (FEPPC) <http://www.fleppc.org/>
- 🔗 Florida Department of Agriculture and Consumer Services:
<http://www.doacs.state.fl.us/pi/>
- 🔗 Florida Department of Environmental Protection – Invasive Plant Management:
<http://www.dep.state.fl.us/lands/invaspec/>
- 🔗 More information on invasive plants in Florida
<http://aquat1.ifas.ufl.edu/invasive.html>

THE BENEFITS TO A COMMUNITY OF PROPER LANDSCAPING

When it is done properly, landscaping is intrinsically beneficial to the environment. Below is a brief description of some of the benefits associated with an effective self-sustaining landscape design, with particular emphasis on the benefits of trees.

a. **Appearance**

Improving the aesthetic appearance of commercial, industrial, and residential development through the use of plant material, thereby complementing urban development and redevelopment by protecting and increasing property values within the community.

b. **Noise Reduction**

Some researchers estimate that belts of trees 31-meters (100-feet) wide and 14-meters (45-feet) high can reduce high-way noise by almost 50%. Evidence also suggests that people find noise less annoying when the source is obscured by vegetation.

c. **Stormwater Management**

Trees can reduce the cost of managing stormwater runoff. A properly designed landscape can reduce the volume of stormwater run-off by encouraging the retention and percolation of stormwater on-site. In addition, an effective landscape design can reduce the contamination of stormwater runoff through natural filtration.

d. **Erosion Control**

Erosion from stormwater or wind is an important concern. This erosion can result in the removal of fertile topsoils, lead to contamination of stormwater, and result in the dwindling of important buffers such as sand dunes. Vegetation can help to maintain this material on site.

e. **Air Quality Improvement**

Landscape plants help to "clean" the air by catching dust particles and other pollutants, which eventually wash into the soil and are filtered out of the environment. Shade trees further help to minimize air pollution by reducing the energy used for cooling and the associated emissions. They also absorb carbon dioxide (the main "greenhouse effect" gas) and produce oxygen.

f. **Energy Conservation**

With urban development, expansive areas are covered with paved and dark colored surfaces like roofs, roads, and parking lots. These surfaces absorb, rather than reflect, the sun's heat, causing the surface and ambient air temperatures to rise throughout the day, resulting in the "urban heat island" effect. Through the evapotranspiration process, plants use heat energy from their surroundings when evaporating water. Therefore, through the daily dew and evaporation cycle, plants on vertical and horizontal surfaces are able to help cool cities during hot summer months.

g. **Public Relations Benefits**

A healthy urban forest enhances citizens' and visitors' perceptions of your community's environment. This is particularly important for the large population of tourists who visit the state each year and contribute to our economy.

h. **Provides Wildlife Habitat**

Landscape plants can provide a variety of habitats for wildlife. This wildlife can range from butterflies to winter migratory species, that are an important of a healthy ecology.

Landscaping Resources

- 🔗 University of Florida - Institute of Food and Agricultural Sciences (IFAS): <http://www.ifas.ufl.edu/>
- 🔗 Florida Division of Forestry: <http://www.fl-dof.com/>
- 🔗 US Environmental Protection Agency – Heat Island Effect : <http://www.epa.gov/heatisland/>
- 🔗 American Forests (Global ReLeaf): <http://www.americanforests.org/>
- 🔗 International Council for Local Environmental Initiatives (ICLEI): <http://www.iclei.org/> and <http://www.hotcities.org/>
- 🔗 Sunshine State One Call Of Florida: <http://www.callsunshine.com/>

Industry Association Resources

- 🔗 Tree Care Industry Association (TCIA): <http://www.natlarb.com/>
- 🔗 International Society of Arboriculture: <http://www.isa-arbor.com/>

Environmental Management Resources

- 🔗 US EPA: <http://www.epa.gov/region4/> and <http://www.epa.gov/nps/>
- 🔗 US EPA Office of Enforcement and Compliance Assistance – Profile of Local Government Operations: <http://www.epa.gov/oeca/resources/publications/assistance/sectors/notebooks/>
- 🔗 Florida Department of Environmental Protection: <http://www.dep.state.fl.us/> and <http://www.dep.state.fl.us/waste/>
- 🔗 Local Government Environmental Assistance Network: <http://www.lgean.org/>
- 🔗 Public Entity EMS Resource Center: <http://www.peercenter.net/>
- 🔗 Occupational Safety & Health Administration (Florida branch): <http://www.osha.gov/oshdir/fl.html>
- 🔗 University of Florida Center for Training, Research, and Education for Environmental Occupations: <http://www.treeo.ufl.edu/>

LANDSCAPE MAINTENANCE

For more information visit us online at floridagreenbuilding.org