Integrated Pest Management Plan
for the
University of Central Florida Landscape

INTRODUCTION

Pests are populations of living organism (animals, plants, or microorganism) *that damage or interfere with desirable plants or aesthetics, or impact human or ecosystem health.*

Integrated Pest Management (IPM) is an approach that establishes a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks.

The University of Central Florida's (UCF) Department of Landscape and Natural Resources has adopted this Integrated Pest Management Plan for the grounds managed by UCF. The plan outlines procedures to be followed to reduce pest infestations by evaluating the biological features contributing to an infestation, thus improving ecosystem health. The plan is designed to comply with policies and regulations published by the Florida Department of Agriculture.

The plan addresses a four-tiered approach: prevention strategies; monitoring for pest; taking action when appropriate (action thresholds); and identification of appropriate controls. Objectives of this IPM plan include:

- Elimination of significant threats caused by pests
- Prevention of loss or damage of plant material by pests.
- Protection of environmental quality.

This IPM plan will be stored in the office of the IPM Coordinator.

IPM COORDINATOR

The Landscape and Natural Resources Assistant Director or designee shall be the IPM Coordinator and be responsible to implement the IPM plan and to coordinate pest management-related communications between administrators, staff, and public.

The IPM Coordinator shall designate an employee to serve as the IPM Site Coordinator for the UCF landscape.

IPM COMMITTEE

The Department of Landscape and Natural Resources (LNR) will maintain an IPM committee with responsibility for annual review of the IPM program, serving as a liaison for LNR staff, and for assisting the IPM Site Coordinator in resolving pest-related issues. The committee will address IPM issues as needed, and will meet at least annually to update the overall plan. Minutes will be taken of committee meetings and kept on file by the IPM Coordinator. Membership will include representation from each landscape zone, and be comprised of "line employees" who have shown strong leadership skills in the Department.

POSTING OF PESTICIDE APPLICATIONS

LNR pest control technicians shall provide notification in accordance with law, including posting a pest application flag in the area of treatment to avoid human exposure. Best Management Practices will be used to avoid discharge into storm water and overspray onto hardscape.

RECORD KEEPING

Records of monitoring and treatment needs, along with spray logs (see Appendix A), will be maintained by the IPM Site Coordinator.

The chemical and fertilizer storage areas will be inspected weekly by employees to ensure organization, proper labeling, and cleanliness. Pads and or secondary containment devices will be used on shelves to prevent corrosion and spill prevention.

Chemical and fertilizer reports will be updated annually following the requirements of Environmental Health and Safety.

Spray licensure can be validated online at http://app1.flaes.org/ceu/PersonSearch.asp.

TRAINING

All LNR staff will be provided with training on this IPM program at hire and during annual update training. Training will include the rationale for the IPM program and specific elements including use of the pest-sighting board, identification, and updates to plan.

Additionally, designated staff including the IPM Coordinator, IPM Site Coordinators and those who conduct regular inspections will receive advanced training on identifying pest infestations and pest-conducive conditions. This training will improve the ability to oversee and comply with LNR's IPM plan.

GENERAL IPM STRATEGIES

Pest management strategies may include education, exclusion, sanitation, maintenance, biological and mechanical controls, and pest-appropriate pesticides and herbicides (see Appendix E).

An Integrated Pest Management decision shall consist of the following steps:

1. Identify pest species.
2. Estimate pest populations and compare to established action thresholds.
3. Select the appropriate management tactics based on current on-site information.
4. Assess effectiveness of pest management.
5. Keep appropriate records.

Decisions concerning whether or not pesticides should be applied in a given situation will be based on a review of all available options. Efforts will be made to avoid the use of pesticides by selection of pest-resistant plant materials, and appropriate horticultural practices.

When it is determined that a pesticide must be used in order to meet pest management objectives, the least-hazardous material, adequate for the job, will be chosen.

LNR's IPM consists of a process to balance the use of cultural, biological, and chemical procedures that are environmentally compatible and economically feasible to reduce pest populations to tolerable levels. *Prevention* strategies are used to reduce pest infestations from nurseries, and inappropriate stressors caused by biological features. *Monitoring* involves regular checking of an area, early detection and proper identification of pests, and identification of the

effectiveness of biological control agents. *Assessment* involves determining the potential for pest populations to reach an economic threshold or an intolerable level. Appropriate *action* involves using the beneficial aspects of integrated pest management to prevent loss or damage. Proper identification of a pest is important because certain management practices will control only one species or the other. Correct identification enables us to manage the real source of the problem and avoid treating only the symptoms.

All Pesticide Applicators must have a "Limited Lawn and Ornamental" license, governed by Florida Statute 482. Only authorized pesticide handlers or supervisors should be in the mixing and loading area. All handlers should be wearing proper personal protective equipment (PPE). No other persons, and no animals, should be present. Spills need to be reported immediately to Environmental Health and Safety for guidance on clean up procedures.

In the event that a contractor is needed to help remove identified and unwanted pests, they must abide by LNR's IPM plan, or request an exemption. Additionally, new plant installations and horticultural practices performed by contractors must also follow the strategies presented in this plan.

LNR STAFF ROLES

LNR administration will provide support to assist the IPM Site Coordinator in maintaining an IPM program that relies on minimal pesticide or herbicide use. Such support will include efforts to promptly address any structural, horticultural, or sanitation changes recommended by the coordinator to reduce or prevent pest problems.

All LNR staff are expected to scout and report pest infestations to the IPM Site Coordinator. The IPM Site Coordinator, along with spray technician staff, will determine treatment based on established action thresholds, and will record action taken on the IPM board. Appendix B documents the work-flow process expected for successful IPM compliance.

PREVENTION

Prevention strategies are used to reduce the chance of pest infestations. LNR will use these best management practices to reduce pest infestation chances:

1. New Plant Material/Installation Practices
    a. Right plant, right place
    b. Understand soil PH/ nutrient availability and plant appropriately per findings
    c. Inspection of nursery stock upon arrival to campus to ensure no pest and good plant quality
    d. Plant selection will take biological factors into consideration including soil pH, exposure to light, and tolerance to conditions (right plant/right place)
    e. Inspection worksheets will be completed for new plant material (Appendix C) to reduce pest infestations from nursery stock.
2. Mowing
    a. Mowers will use alternative patterns to reduce compaction and ruts caused by repetitive mowing patterns.
    b. Mowers will avoid mowing over turf pest, if easily identified, and will report concerns immediately so appropriate action can be taken. This will reduce the spreading of nuisance pest.
2. Horticultural Practices
    a. Staff will sanitize equipment between beds, or after use in an area with an identified pest.

b. Staff are encouraged to remain on hardscape while driving between work stations to avoid unwanted soil compaction and plant stress.
c. Along walkways, staff should evaluate beds and hand pull weeds prior to requesting pre or post emergent use. Exceptions to this rule are when beds are overly infested, or infested with highly invasive species such as torpedo grass or skunk vine.
d. Mulch beds properly to reduce weeds
e. Prune and trim ornamentals properly to avoid excess trimming and stress to plant material

3. Fertilizing
    a. Fertilizing will occur at least three (3) times a year, and will take existing soil chemistry into account when possible. Appendix D documents fertilizing schedule and N-P-K recommendations for each application.

Appendix A – Infestation Report Form; Spray Log

Appendix B - IPM work-flow

Appendix C – New tree inspection forms

Appendix D – Fertilizing SOP

Appendix E – Pest Identification, Thresholds, and Actions

Appendix F – Level 1 Map

IPM FIELD INFESTATION REPORT FORM

Site	Date	Weed (W) Insect (I) Disease (D)	ID	Threshold %	Treatment	Location
Turf						
Trees						
Beds						
Misc.						

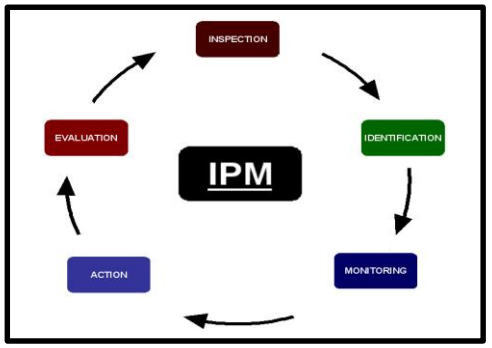
UCF Spray Log

Date	Chemical	Area	Pest	Rate	Amount Product	Amount Used	Wind Speed	Temp	Hrs Spent

IPM Workflow Management Example (LNR IPM Committee)

Pest knowledge/Database
Spray techs
Tree Team
Grounds personnel

Scouting/Monitoring
Reporting



Spray Team
Diagnose Problems
(evaluation)

Select corrective action(s) based on:

- **IPM Guidelines**
- **Pest knowledge**
- **Historical Data**
- **Pest life cycles**
- **Problem Diagnosis**
- **Factors favoring pest development**
- **Predetermined pest threshold**

Take appropriate corrective action/treatment

Evaluate and record results for future management decisions/ build database

Plant Material Inspection Sheet

Arrival	Project	Date:	
Name of Contractor:			
Contractor Using Proper Lifting Equipment?		Y	N
Trees Transported Properly?		Y	N
#'s Inspected:			
Comments:			
All Trees Pass Inspection?		Y	N
Rejection Explaination:			

Tag #	Matches Tag #? Y/N	Photo #

On Site Inspection	Project:			Date:	
Tree #'s Damaged During Transport:					
Reason For Damage/Rejection:					
Pre-Dig Checklist Completed:		Y	N	All Trees Planted at Proper Grade?	Y	N
Irragation Available?		Y	N	Zone Supervisor Notified?	Y	N
Rectification Action Taken:					

Plant Material Inspection Sheet

Post Install Inspection	Project:	Date:	
Irrigation connected with bubbler or emitter?		Y	N
Trees Staked? (>45gal)		Y	N
Separate Clock?		Y	N
All Trees Planted at Proper Grade?		Y	N

Comments:

Tag #	Photo#

LNR Standard Operating Procedure
For <u>Pesticides, Herbicides and Fertilizers</u>

I. Knowledge –

a. This SOP is in addition to LNR's Integrated Pest Management Plan. Familiarity with this plan is essential to this SOP.
b. Integrated Pest Management:
    i. The University of Central Florida's Integrated Pest Management consists of a process to balance the use of cultural, biological, and chemical procedures that are environmentally compatible and economically feasible to reduce pest populations to tolerable levels. Monitoring involves regular checking of an area, early detection and proper identification of pests, and identification of the effectiveness of biological control agents. Assessment involves determining the potential for pest populations to reach an economic threshold or an intolerable level. Appropriate action involves using the beneficial aspects of integrated pest management to prevent loss or damage. Proper identification of a pest is important because certain management practices will control only one species or the other. Correct identification enables us to manage the real source of the problem and avoid treating only the symptoms.
c. Pesticides, Herbicides, and Fertilizer Applications:
    i. Applicators must mix, apply, and clean tanks per label instructions.

II. Safety –

All Pesticide Applicators must have a 482 license. Only authorized pesticide handlers or supervisors should be in the mixing and loading area. All handlers should be wearing proper personal protective equipment (PPE). No other persons, and no animals, should be present. Spills need to be reported immediately to Environmental Health and Safety for guidance on clean up procedures.

III. Proper Outcome –

Turf and beds have good fertility, are not showing signs of nutrient stress or disorders, and have little weeds and pest.

IV. Steps for mixing

a. Read mixing instructions for product used.
b. Ensure proper PPE is being used during mixing.
c. Begin by filling the spray tank 1/3 to 1/2 full with clean water. NEVER put the chemical in first and then add the required quantity of chemical, then top with water. Start the agitator and continue agitating while filling the tanks.
d. Measure accurately. Don't guess. Small errors in measuring can cause large errors in application rates. Mix only the amount you plan to use immediately.

e. Rinse product containers as soon as they are empty. When residues dry they are difficult to remove. Triple rinse containers which held liquids and single rinse bags.
f. Rinse measuring cups and mixing equipment. Pour all rinse water into your sprayer.
g. Replace container caps and close bags. Return them to the storage area.
h. Wash your gloved hands before getting onto the Gator, as your hands and forearms will have received the most exposure.

V. **Application Schedules and Products Used**

a. **Application Schedules:** The table below outlines the schedules for pesticide, herbicide, and fertilizers:
b. Turf applications include all irrigated turf. These applications will not be completed around pond buffers and non-irrigated turf, such as the frontages.

Beds	**Turf**
Spring (March, May)	
Targeted post-emergent herbicide on weeds.	Broadcast post-emergent mixed with pre-emergent herbicide.
Apply a pre-emergent herbicide and water in to activate (if needed).	March: Apply "complete" granular fertilizer (all species)
Check all plants for mites and insects and spray accordingly.	May: Apply slow release nitrogen and iron fertilizer (all species)
March: Apply granular fertilizer	
SUMMER (June)	
Targeted post-emergent herbicide on weeds.	Targeted post-emergent herbicide on weeds.
Apply a pre-emergent herbicide and water in to activate (if needed).	Broadcast pre-emergent herbicide.
Check all plants for pest and fungus, and spray accordingly.	Check turf for pest and fungus, and spray accordingly.
	Apply "complete" granular fertilizer (only Bermuda species)
FALL (September)	
Targeted post-emergent herbicide on weeds.	Targeted post-emergent herbicide on weeds.
Apply a pre-emergent herbicide and water in to activate (if needed).	Broadcast pre-emergent herbicide.
Check all plants for pest and fungus, and spray accordingly.	Check turf for pest and fungus, and spray accordingly.
Apply granular fertilizer	Apply "complete" granular fertilizer (all species)
WINTER (December)	
Targeted post-emergent herbicide on weeds.	Targeted post-emergent herbicide on weeds.

Apply a pre-emergent herbicide and water in to activate (if needed).	Broadcast pre-emergent herbicide.
Check all plants for pest and fungus, and spray accordingly.	Check turf for pest and fungus, and spray accordingly.

a. **Fertilizer Details:** The table below outlines the schedules and products for fertilizers:

Beds	Turf	Palm Trees
SPRING (March)		
8-2-12 + 4% Mg, with micronutrients (up to 2 pounds/1000 square feet);	70% Synthetic 16-0-8/minors/ 40% Non-synthetic sludge filler/ 0.38% pre-emergent; (300lbs/acre);	Palm Fertilizer: 8-2-12 + 4% Mg, with micronutrients, Synthetic (0.5 to 1 pound to 1inch trunk dia.)
SUMMER (June)		
None	Non-synthetic Sludge filler (300lbs/acre) Synthetic /Liquid Fertilizer: 50% SRN 18-3-6/ 6% Fe (Bermuda; up to 2 galons/50gal/water)	Palm Fertilizer: 8-2-12 + 4% Mg, with micronutrients, Synthetic (0.5 to 1 pound to 1inch trunk dia.)
FALL (September)		
8-2-12 + 4% Mg, with micronutrients (up to 2 pounds/1000 square feet)	70% Synthetic 16-0-8/minors/ 40% Non-synthetic sludge filler/ 0.38% pre-emergent; (250lbs./acre);	Palm Fertilizer: 8-2-12 + 4% Mg, with micronutrients, Synthetic (0.5 to 1 pound to 1inch trunk dia.)
WINTER (December)		
None	None	None

b. Products Used

i. Pre-emergent herbicides commonly used in landscape beds.

Trade Name	Active Ingredients	Comments
Barricade 65 DG, or Regalkade 0.5G	prodiamine	Fairly broad spectrum weed control including annual grasses, spurge, chickweed, henbit, oxalis and others. Granule (Regalkade G) is much safer than the spray (Barricade). Only a few bedding plants are on the label.

Pendulum 2G	pendimethalin	Fairly broad spectrum weed control including annual grasses, spurge, chickweed, henbit, oxalis and others. Granular formulation much safer than spray. Safe on many herbaceous ornamentals. Avoid using within the drip line of trees.
Surflan, XL	oryzalin, oryzalin + benefin	Broad spectrum weed control. Injurious to many bedding plants. The granular formulation (XL) is much safer than the spray. Avoid using within the drip line of trees.

ii. Post-Emergent Herbicides commonly used in landscape beds.

Trade Name	**Active Ingredients**	**Comments**
Fusilade II	fluazifop-P	This is a post-emergent herbicide for annual grass and perennial weed control.
Lontrel	clopyralid	This post-emergent herbicide controls certain broadleaf weeds in turf and ornamentals grasses in nurseries and landscapes.
Image	imazaquin	This product is a pre-emergent or post-emergent herbicide for annual grasses, broadleaf weeds, and sedges. Avoid using within the drip line of trees.

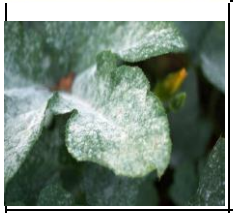
iii. **Insecticides commonly used in landscape beds.**

Sevin 80wsp	Carbary	This broad-spectrum insecticide kills as a contact and stomach poison. Carbaryl is used to manage armyworms, leaf-feeding beetles, caterpillars, centipedes, cutworms, loopers, millipedes, pillbugs and sowbugs.
Safari 20 Sg	Dinotefuran	Safari Insecticide, a super-systemic insecticide with quick uptake and knockdown, controls a broad spectrum of ferocious and invasive pests.
Orthene Turf& Ornamental	Acephate	organophosphate: It is labeled for many insects in greenhouses and nurseries, including fire ants
Tempo Sc Ultra	Cyfluthrin	pyrethroid ester: This is broadly labeled for insects in greenhouses, nurseries, and landscapes.

iv. **Fungicide commonly used in landscape beds.**

Daconil Ultrex	chlorothalonil	This fungicide controls powdery mildew, black spot, and rust, to name a few. Great for use on ornamentals, fruits, and vegetables.
Fore or Protect, Pentathlon	mancozeb	This fungicide is widely used in the ornamental industry. It is labeled for use on numerous crops and pathogen species.
Heritage	azoxystrobin	This product is labeled for greenhouse, nursery, and landscape for downy mildew, fungal leaf spots, powdery mildew, root rots, and rust control on annual, perennial, bedding, and flowering potted plants as well as woody ornamentals.

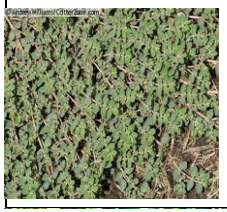
Image of Pest	Name	Key Identification	Biological Conditions	Threshold (when to treat)	Treatment Options		
					Bio- Control	Chemical	Organic
	Amillaria	The top of the infected tree slows down in growth, dieback occurs on the branches and roots rot. Trees may appear to die quickly. White fans of fungal growth are found when the bark is peeled off the infected tree trunks near the soil line. Conifers have abundant resin flow from the trunk at the soil line.	Wet	When identified	using antagonistic fungi to preemptively colonize or to eliminate Armillaria species in the wood.	Fumigants, such as chloropicrin, carbon disulphide, and methyl bromide are sometimes used in orchard crops to help eradicate inoculum from soil,	
	Dollar Spot	Broadleaf, round silver dollar shaped leaves with scalloped edges with the stem in the middle of the leaf	Wet	Level 1 =whenever weeds approach 10 percent in any 100 square foot area Level 2 = whenever weeds approach 15 percent in any 100 square foot area	Reduce water and promote turf growth.	Fore Daconil	M-Pede Fertilize
	Frizzle Top	the leaves will become yellow and tips fall off. The entire frond is eventually affected and will distort and curl. In some species the leaf tips fall off and leave the plant looking scorched	Dry	Drench Mg Immediately			Mg drench 3 times per year
	Gandoderma	White conch at base of Palm	Mesic Medronical Damage	Immediately	Remove		
	Ganoderma Zonatum	General decline, wilting and discoloration of leaves - Bacidocarp formation - Internal rot	Wet Unknown	Once bacidorcarp forms palm should be removed	Remove Palm. Do not replant at same site: spores in soil or fumigate soil.		

	Laurel Wilt Fungus: Raffaelea Lauricola	Wilted stems and leaves - Dark streaking in wood - Discoloration	Mesic		No treatment, some preventive options, like sanitation, trap-out attract and kill macro-infusion with fungicide		
	Mushroom/Toadstool	The fleshy spore - bearing fruiting body of fungus, typically produced above ground or on its food.	Wet (Damp and Humid Region)	If it is too dry they loose water and desiccate. If it is too wet and humid they choke off	Reduce Water, Fertilize, Removal, Most lawn mushrooms do not harm your lawn nor cause any damage. They are simply, and quietly, decomposing organic matter and releasing nutrients that are then available for plant growth back into the soil		
	Powdery Mildew	Fungi Kingdom (Hyphae-Conidia) White powdery look on leaves. Requires a microscope for specific Identification.	Powdery mildew thrives in temperatures between 60 and 80 degrees. Dry, shady conditions are ideal, as are areas with poor air circulation	Level 1 as soon as spotted. As soon as needed to improve aesthetics	milk/water (1-10) ratio Contact fungicide (Neem oil)		Organic Neem oil is a broad-spectrum fungicide
	Rhizoctonia Fungus (Brown Patch)	Gray purplish bordered ring "Frogeye" appearance - Appearance: white mycelium early A.M. tan to brown lesions on leaf blades.	Extended periods of high humidity and temperature	First sign of symptoms		Daconil Fore	M-Pede
	Take All Patch	Yellowish leaves, thinning turf, 3'-20' patches dead and dying roots, black.	Wet Moderate Temperature Spring, Winter, Fall	Immediately	Rubigan, vertical thin, proper drainage, soil aeration		Organic Neem oil
		Insects					

	Fire Ants	Three body parts with two elbowed antennae and six legs	Mesic	Highly trafficked areas with more than 1 active mound Low traffic areas with more than 15 mounds per acre	**Phorid Flies**	Orthene Fire Ant Killer	•4 cups water •4 cups alcohol •2 cups liquid dish soap
	Aphids	Also known as plant lice. Small sap sucking insects - look for cluster of little bugs on new growth and flower buds as well as on the curled and twisted leaves.	Mesic	250/per plant	**LaceBugs**	acephate-- bifenthrin-- beta-cyfluthrin estenvalerate-- permethrin-- lambda-cyhalothrin	**Dishwashing Detergent**
	Azalea Worm	The partly grown larva (caterpillar) is approximately 10 mm long and reddish to brownish black with white and yellow stripes. The mature caterpillar is about 50 mm long and black with eight near-white, longitudinal, broken stripes; the head and legs are mahogany red	Mesic	10/per plant	caterpillars can be removed by hand	acephate-- bifenthrin-- beta-cyfluthrin estenvalerate-- permethrin-- lambda-cyhalothrin	Horticultural oil Organicide Azatrol
	Armyworms, Cutworms	Mature larvae reach 1-1/2 to 2.0 inches in length. Larvae are a dull yellow to gray with stripes running lengthwise along the body	Mesic	5/sq.yd	Bacillus thuringiensis	acephate-- bifenthrin-- beta-cyfluthrin estenvalerate-- permethrin-- lambda-cyhalothrin	Horticultural oil Organicide Azatrol
	Chinch Bug	Tiny pest with a triangular head and bright red eyes. Adult chinch bugs have a black and white pattern on the back in the shape of an X and are about the size of a sesame seed (1/5"long). Expanded areas of dead or stunted grass surrounded by a halo of yellowing dying grass is an indication of chinch bugs. Sometimes confused with drought - large numbers of the insect is the best evidence of chinch bugs.	Dry	Level 1 Areas: 15-20 chinch bugs sq./ft. Visual thresholds: more than 10 individuals found in a 60-second search of 1 sq./ft. and 20-30 sq./ft. in a detailed search.	Biological Controls (natural enemies other insects) Insecticides and good cultural practices.	acephate-- bifenthrin-- beta-cyfluthrin estenvalerate-- permethrin-- lambda-cyhalothrin	Horticultural oil Organicide Azatrol
	Cottony Cushion Scale	Females - Rusty-red with black legs and antennae with an elongated, fluted white cottony egg sac. Males - Slender, reddish-purple with two blue metallic wings	Warm Unknown	During Crawler Stage		Zylam Safari Imidicloprid	Horticultural oil Organicide Azatrol

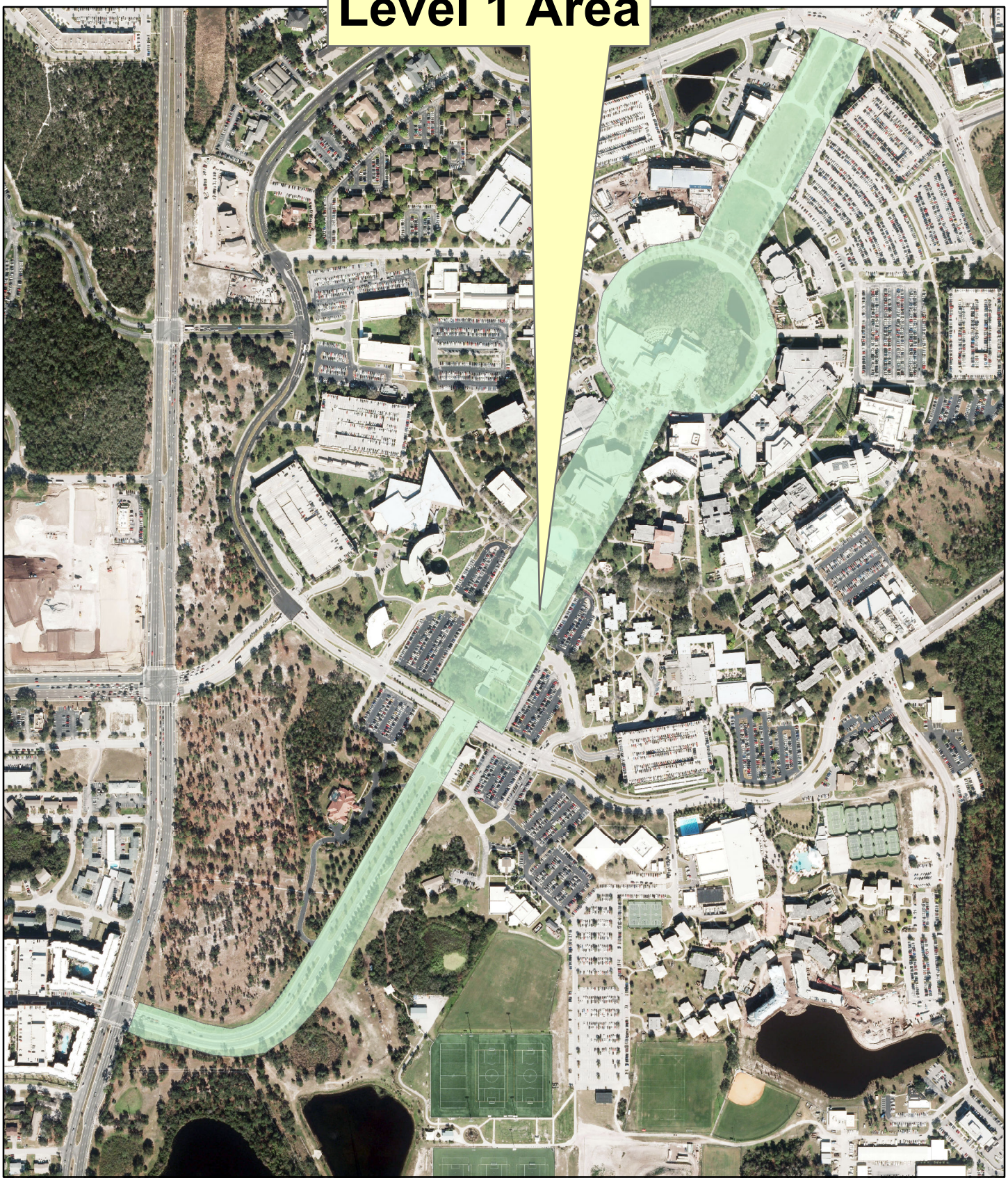
	Asian Cylad Scale	Female - Oval waxy covering. Male Elongated armored covering -Snowy look on the entire plant	Mesic	Immediately	Systemic insecticides - Combination Horticultural oil and systemic-merit	Zylam Safari Imidicloprid	Horticultural oil Organicide Azatrol
	Hunting BillBug "Zoysia BillBug"	6-11 MM in length weevil-like with short, broad, recurved snout. Gray to Black on pronotum	Mesic (impacted by drought)	When white grubs (larvae) are found in soil. When adults found using "pitfall traps".if an average of ten billbugs is found per square foot, apply an insecticide.	Bio control products	Insecticides: Talstar, Deltagard, Merit, Arena, Meridian, Aloft and Allectus.	M-Pede
	Lace Bugs	Body is 1/8" to 1'4" long, flattened, square shaped - Lace like wings folded over - brown/black young/spines young	Mesic Moderate Temperature	Once an infestation is noticed, however, it is recommended that lace bugs be controlled for the health and visual appearance of the plant/tree.	move plant - contact insecticides- no lasting damage - promote health plants.	Zylam Safari Imidicloprid	Horticultural oil Organicide Azatrol
	Mealybugs	Most adult female mealybugs are wingless, soft-bodied, grayish insects about 0.05 to 0.2 inch long.	Mesic	Greater than or equal to 10% infestation in entire bed	Wasp Mealy Bug Destroyer	Safari Acephate Merit	. On ornamentals, insecticidal soap, narrow-range oil
	Molecricket	The common name is derived from the insect's molelike appearance and underground habits. The mole cricket has forelegs modified for shovelling, a cylindrical body, a pointed head, and a velvety coat of hairlike setae. It burrows into moist soil to depths of 15 to 20 cm (6 to 8 inches).	Mesic	**5 per sq. yard**	The Larra Wasp	Insecticides: Talstar, Deltagard, Merit, Arena, Meridian, Aloft and Allectus.	
	Sod Webworm	Young pupae are approximately ½ inch long, pale yellow, and eventually turn brown prior to adult emergence	Eggs hatch in about 7 days during hot weather and larvae feed for another 4-7 weeks.	15 per sq. yard	Bio control products	Insecticides: Talstar, Deltagard, Merit, Arena, Meridian, Aloft and Allectus.	

	White Fly (Florida)	Egg spirals on the underside of leaves - Presence of heavy white waxy material - presence of honeydew around the whitefly infested area - Black sooty mold formation - leaf damage and early leaf drop.	Unknown	Level 1 areas Less than 5% infestation. Level 2 areas - 5% or more infestation	Biological Controls (natural enemies other insects) Insecticides as a last resort, this could kill natural enemies of the whitefly. Early detection - high pressure water application to wash leaves.	Insecticides: Talstar, Deltagard, Merit, Arena, Meridian, Aloft and Allectus.	Horticultural oil Organicide Azatrol
		Weeds					
	Air Potato	Heart Shaped leaves, all leaf veins arise from leaf base. Alternate leaves.	Wet	Immediately remove and dispose of all plant parts	Air Potato Beetles	Round-up and Garlon	Scythe
	Balsam Apple	This herbaceous, tendril-bearing vine grows to 5 m. It bears simple, alternate leaves 4–12 cm across, with three to seven deeply separated lobes. Each plant bears separate yellow male and female flowers.	Dry	Immediately	manual weeding	Round-up and Garlon	Scythe
	Clover	3 leaves - flowers/balls with spiklets pink, white or yellow	Mesic Well Drained	Level 1 greater than or equal to 5%. Level 2 greater than or equal to 10%	Pre-emergent, promote healthy grass growth.	Chemical control: Atrazine, 3 Way, Imazaquin Speedzone	
	Dollar Weed	Broadleaf, round silver dollar shaped leaves with scalloped edges with the stem in the middle of the leaf	Wet	Level 1 =whenever weeds approach 10 percent in any 100 square foot area Level 2 = whenever weeds approach 15 percent in any 100 square foot area	Reduce water and promote turf growth	Chemical control: Atrazine, 3 Way, Imazaquin Lontrel	

	Florida Betony	A perennial weed that has a square stem with opposite leaves. Flowers are usually pink and have the classic mint-like structure	Mesic A Winter Weed	Level 1 =whenever weeds approach 5 percent in any 100 square foot area Level 2 = whenever weeds approach 10 percent in any 100 square foot area	manual weeding	2,4-D + MCPP + dicamba	
	Goose Grass	Dark green, coarse grass, usually flat. Most notable: lower leaf stems are white near the base	Goosegrass does well in dry, compacted soil	Because goosegrass and its seedheads are low and often escape mowing, you will want to remove them before they get too well established	Mechanical or manual removal is not recommended due to rapid reproduction of weed.	Dismiss Revovler Illoxan	Salt
	Matchweed	Matt forming perennial weed with opposing leaves on harry branching stems -Flowers are purple or white and flower heads resemble the head of a match - Long wiry stems.	Wet	Level 1 =whenever weeds approach 10 percent in any 100 square foot area Level 2 = whenever weeds approach 15 percent in any 100 square foot area		Blindside 2-4-D Speedzone	Scythe
	Mistletoe	Leafy mistletoes have green stems with thick leaves that are nearly oval in shape. Plants often develop a rounded form up to 2 feet or more in diameter. The small, sticky, whitish berries are produced from October to December. Evergreen clumps of mistletoe are readily observed on deciduous trees in winter when leaves are off the trees.	Mesic	Anytime	Remove 12" back along tree limb	Kocide	
	Nutsedge	Waxy, light green or yellow-green leaves •Leaves have a very distinctive mid-rib •Upright, triangular stems	Wet	Level 1 =whenever weeds approach 5 percent in any 100 square foot area Level 2 = whenever weeds approach 10 percent in any 100 square foot area	Shading Hand Pulling	Manor Prosedge Basagran	
	Spurge	The leaves will be oval shaped and has a red spot in their center (which is why this spurge is called spotted spurge). The flowers on the plant will be small and pink. The entire plant has a hairy appearance.	Mesic (impacted by drought)	Level 1 =whenever weeds approach 5 percent in any 100 square foot area Level 2 = whenever weeds approach 10 percent in any 100 square foot area	As almost always the best method for controlling spurge weeds is preventative maintenance.	Blindside 2-4-D Speedzone	

	Skunk vine (Florida)	A perennial twining vine that grows from woody root stock - leave and stems have a disagreeable odor especially when crushed.	Unknown	Level 1 and Level 2 areas - immediate treatment	manual weeding	Round-up and Garlon	Scythe

Level 1 Area



UCF
LANDSCAPE & NATURAL RESOURCES

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