

**LEISURE SERVICES DEPARTMENT  
EXOTIC MANAGEMENT PLAN  
2009**



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### **OVERVIEW OF EXOTIC MANAGEMENT PLAN**

Exotic species control is part of the overall site management and restoration program for the Leisure Services Department (LS). Implementing preventative programs to keep the site free of species that are not yet established there but which are known to be pests elsewhere in the region will be a one of the goals. Setting priorities for the control or elimination of exotic species that have already established, according to their actual and potential impacts on native species and communities, will be focused upon.

An adaptive management strategy will be used to treat exotic species. First, we establish and record the goals for the site. Second, we identify species that block us from reaching these goals and assign them priorities based on the severity of their impacts. Third, we consider methods for controlling them or otherwise diminishing their impacts and, if necessary, re-order priorities based on likely impacts on target and non-target species. Fourth, we develop weed control plans based on this information. Fifth, the plan is implemented, and results of our management actions monitored. Sixth, we evaluate the effectiveness of our methods in light of the site goals (taken from the Land Management Plans), and use this information to modify and improve control priorities, methods and plans. Finally, start the cycle again by establishing new/modified goals.

We set priorities in the hope of minimizing the total, long-term workload. Therefore, we act to prevent new infestations and assign highest priority to existing infestations that are the fastest growing, most disruptive, and affect the most highly valued area(s). We also consider the difficulty of control, giving higher priority to infestations we think we are most likely to control with available technology and resources.

### **BACKGROUND**

The Leisure Services Department was reorganized to the present day structure in 2007 and 2008. Initially, exotic invasive plant control was being conducted at the program level in Natural Lands. As part of the Department and County strategic plan, a formalized plan to control exotics invasive plants was mandated throughout Leisure Services. The following is background information on the two Divisions within LS.

The Greenways and Natural Lands Division encompasses Natural Lands, passive parks, trails and medians. The Recreation and Parks Division includes all active parks. The approach to treating these areas differs greatly and therefore LS will be taking a tiered approach to maintenance control of exotic invasive species.

#### Tier I

Under this category all exotics will be treated to at least a maintenance control level. Natural Lands is the only program under this category.

#### Tier II

Target species of FLEPPC Category I and II will be identified and treated when possible in passive parks and trails.

#### Tier III

Target species will be treated when they hamper activities at the active parks.

Medians are treated under contracted services.

### **INTRODUCTION**

#### Tier I Area

The Natural Lands Program (NLP) began actively managing properties purchased through two County referendums, starting in 1996. The properties total approximately 6,600 acres and encompass a diverse suite of habitats including sandhill, scrub, xeric hammock, scrubby flatwoods, mesic flatwoods, prairie hammock, hydric hammock, wet flatwoods, baygall, floodplain marsh, strand swamp, depression marsh, dome swamp, and flatwoods/prairie lake.

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The NLP is committed to the stewardship of natural lands properties and the conservation of the natural flora and fauna. Management goals are to preserve and protect the existing natural plant communities, facilitate restoration where necessary, and conduct public education programs.

There are many rare and listed plant and animal species, located on NLP properties that depend on good land management practices in order to sustain and/or increase their populations. Removing exotic species from NLP properties is one way to maintain healthy plant and animal communities.

### **Tier II Areas**

There are 40 miles of trails and approximately 1,000 acres of passive parks. These parks and trails are not staffed but are inspected weekly and exotic species are noted. The Division is committed to treating certain FLEPPC Category I & II species in the passive parks and trails, especially noxious vines.

### **Tier III Areas**

There are four active parks. We will take action only when careful consideration indicates leaving the weed unchecked will result in more damage than controlling it with available methods.

### **Justification for Exotic Invasive Treatment/Removal**

Florida is a magnet for many exotic invasive species. Due to the warm, tropical climate, many foreign species thrive here. Most exotic invasive species have proved to be impossible to eradicate and are extremely costly to treat. These exotic invasives displace native species, effecting both ecosystem structure and function (i.e. Melaleuca introduced into swamps in south Florida became monoculture stands that eliminated other native plant species and changed the hydrology of the area, Laroche 1999).

Seminole County Leisure Services properties have at least 32 exotic plant species and at least 5 exotic animal species (excluding feral cats and dogs). This plan only discusses exotic plant species. All of the exotic plant species require treatment and maintenance control (except where indicated above). Any newly discovered exotic plant species should be treated immediately and monitored for any recurrence.

In 1984, the Florida Exotic Pest Plant Council (FLEPPC) was formed to support the management of invasive exotic plants in Florida's natural areas by providing a forum for the exchange of scientific, educational and technical information. FLEPPC compiles a list of exotic plant species (as determined by professional botanists and other research scientists), splitting species into either Category I (they are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives), or Category II (have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species). This plan refers to this list in order to prioritize treatment.

### **Inventory of Exotic Invasive Plant Species that interfere with Management Goals (Top 5)**

#### **Old World and Japanese Climbing Fern (*Lygodium microphyllum* and *japonicum*) Category I**

Old World climbing fern is a non-native vine that is rapidly invading flatwoods, and hardwood and cypress swamps of southern and central Florida, and it is moving north. Since 1993, the area infested in Florida has grown to nearly 210,000 acres. (A related species, Japanese climbing fern - *Lygodium japonicum*- is spreading south into central Florida, from the north.) Old World climbing fern smothers plants, including understory and canopy trees, and it creates thick mats of plant material on the ground. It is flammable and carries fire into the canopy and across wetlands. Japanese climbing fern does not appear to climb as much as *L. microphyllum* in central Florida; however, it does spread on the ground. Land managers and property owners should be vigilant for these weeds. Early detection and elimination can significantly reduce control costs and efforts.

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### **Air Potato (*Dioscorea bulbifera*) Category I**

Air potato is an extremely invasive vine that forms impenetrable mats on native trees and shades out everything underneath. It grows from a deep underground tuber and produces bulbils or “potatoes” that drop to the ground and are capable of producing a plant at any size.

Introduced to America during the African slave trade, Air potato has naturalized from the Panhandle to the southern peninsula of Florida. Unlike the exotic Brazilian Pepper, Cogon Grass, and Tropical Soda Apple, which are limited to certain regions, the Air Potato vine self-propagates throughout most regions quickly engulfing native trees and vegetation. This monocot is easily identifiable with its hand-sized, light-green, heart-shaped leaves and is usually found growing upward, climbing high among the tree canopies, 66 ft. or more in length. Each year, well-established Air potato vines, produces large amounts of aerial potatoes (tubers) which accelerate its spread. Some examples of how these tubers can be dispersed are through human interaction, and by drifting in lakes, rivers, streams, or floodplains. Seminole County has identified the Air Potato on several of its Wilderness Areas and has initiated efforts both chemically and manually to remove this unwanted green monster from our native habitats.

Air potato is found on a number of properties, with very large infestations on Spring Hammock Preserve. The goal is to at least reach maintenance control with this species.

### **Caesar’s Weed (*Urena lobata*) Category II**

This plant is in the same family as hibiscus and is occasionally referred to as hibiscus bur. Leaves are pubescent and it produces a fruit that has Velcro-like properties. The plant is originally from Asia and has invaded into moist tropic and subtropical environments. It colonizes disturbed areas and may become a monoculture in shaded areas.

The goal is to treat new infestations immediately and prevent existing infestations from expanding.

### **Skunk Vine (*Paederia foetida*) Category I**

This species was introduced to the USDA Field Station near Brooksville before 1897. It is native to eastern and southern Asia and is illegal to possess, move or release, in Florida. It is a fast growing vine with wide ranging adaptability. Invades disturbed and undisturbed areas including both xeric and wetland communities. It creates dense canopies and causes damage or death to native vegetation. The leaves are opposite, oval to lance shaped. It flowers late summer and early fall. The plant emits a pungent odor.

The goal is to treat new infestations immediately and prevent existing infestations from expanding.

### **Sword Fern (*Nephrolepis cordifolia*) Category I**

The origin of this species is still uncertain. It forms dense stands in partial or full shade hammock areas, becoming a monoculture. It occurs throughout Florida. There is a native species, *Nephrolepis exaltata*, which can be hard to distinguish from the exotic invasive species.

The goal is to at least reach maintenance control.

**Table I Inventory of Plant Species that Interfere with Management Goals**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Population Status</b>	<b>FLEPPC Category</b>
Air Potato	<i>Dioscorea bulbifera</i>	Increasing	I
Brazilian Pepper	<i>Schinus terebinthifolius</i>	Increasing	I
Caesar’s Weed	<i>Urena lobata</i>	Increasing	II
Camphor Tree	<i>Cinnamomum camphora</i>	Increasing	I

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Castor Bean	<i>Ricinus communis</i>	Stable	II
Chinaberry	<i>Melia azedarach</i>	Stable	II
Chinese Tallow	<i>Sapium sebiferum</i>	Increasing	I
Cogongrass	<i>Imperata cylindrica</i>	Increasing	I
Coral Ardesia	<i>Ardesia crenata</i>	Increasing	I
Creeping Oxeye	<i>Sphagneticola trilobata</i>	Increasing	II
Earleaf Acacia	<i>Acacia auriculiformis</i>	Stable	I
Guineagrass	<i>Panicum maximum</i>	Increasing	II
Heavenly Bamboo	<i>Nandina domestica</i>	Stable	II
Japanese Climbing Fern	<i>Lygodium japonicum</i>	Increasing	I
Old World Climbing Fern	<i>Lygodium microphyllum</i>	Increasing	I
Lantana	<i>Lantana camara</i>	Increasing	I
Mexican Petunia	<i>Ruellia tweediana</i>	Stable	I
Mimosa	<i>Albizia julibrissin</i>	Increasing	I
Napier Grass	<i>Pennisetum purpureum</i>	Increasing	I
Natal Grass	<i>Rhynchelytrum repens</i>	Increasing	I
Paper Mulberry	<i>Broussonetia papyrifera</i>	Increasing	II
Paragrass	<i>Urochloa mutica</i>	Increasing	I
Rosary Pea	<i>Abrus precatorius</i>	Stable	I
Skunk Vine	<i>Paederia foetida</i>	Increasing	I
Surinam Cherry	<i>Eugenia uniflora</i>	Increasing	I
Swordfern	<i>Nephrolepis cordifolia</i>	Increasing	I
Torpedo Grass	<i>Panicum repens</i>	Increasing	I
Tropical Soda Apple	<i>Solanum viarum</i>	Increasing	I
Two-leaf Nightshade	<i>Solanum diphyllum</i>	Increasing	II
Wedelia	<i>Sphagneticola trilobata</i>	Increasing	II
White-flowered Wandering Jew	<i>Tradescantia fluminensis</i>	Increasing	II
Wild Taro	<i>Colocasia esculenta</i>	Increasing	I
Elephant Ear	<i>Xanthosoma sagittifolium</i>	Increasing	II

### **EXOTIC INVASIVE MANAGEMENT PLAN**

#### **General Management Philosophy**

Controlling exotic invasive species is part of the overall management and restoration program in LS. The focus is placed on the desired species and communities, rather than on simply eliminating exotic invasive species. Preventative programs will be implemented to discourage any new exotic invasive species from establishing. This plan will help to set priorities for controlling or eliminating exotic invasive species that are already established, according to their actual and potential impacts on native species and communities.

An adaptive management approach will be used to guide the program. Goals will be established, species that interfere with these goals will be assigned priorities based on their impacts. Methods for maintenance control or elimination will be established. Control plans will be developed based on likely impacts on target and non-target species. The plan will be implemented and results of management actions monitored. Staff will evaluate the effectiveness of the treatment and use this information to modify and improve control priorities, methods and plans. When necessary, goals will be modified or new goals will be established.

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Setting goals will help to minimize the total, long-term workload. Goals include the following; preventing new infestations, assigning high priority to existing infestations that are the fastest growing, ranking the importance of the infested site according to what type of plant community and the condition of the plant community, and finally considering the difficulty of control.

Preventing new infestations falls under the Early Detection Rapid Response (EDRR) method that mentors immediate eradication of any new infestations or new exotic invasive species discovered with long-term monitoring.

### **Setting Priorities**

**Table II Current Extent of Species:** Priorities are assigned to species in order to first, prevent the establishment of new weed species; second, eliminate small, rapidly-growing infestations; third, prevent large infestations from expanding; and fourth, reduce or eliminate large infestations.

<b>Rank</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>Population Status</b>	<b>FLEPPC Category</b>
B	Air Potato	<i>Dioscorea bulbifera</i>	Increasing	I
B	Brazilian Pepper	<i>Schinus terebinthefolius</i>	Increasing	I
B	Caesar's Weed	<i>Urena lobata</i>	Increasing	II
B	Camphor Tree	<i>Cinnamomum camphora</i>	Increasing	I
D	Castor Bean	<i>Ricinus communis</i>	Stable	II
D	Chinaberry	<i>Melia azedarach</i>	Stable	II
D	Chinese Tallow	<i>Sapium sebiferum</i>	Increasing	I
D	Cogongrass	<i>Imperata cylindrica</i>	Increasing	I
D	Coral Ardesia	<i>Ardesia crenata</i>	Increasing	I
B	Creeping Oxeye	<i>Sphagneticola trilobata</i>	Increasing	II
E	Earleaf Acacia	<i>Acacia auriculiformis</i>	Stable	I
D	Guineagrass	<i>Panicum maximum</i>	Increasing	II
E	Heavenly Bamboo	<i>Nandina domestica</i>	Stable	II
D	Japanese Climbing Fern	<i>Lygodium japonicum</i>	Increasing	I
A	Old World Climbing Fern	<i>Lygodium microphyllum</i>	Increasing	I
D	Lantana	<i>Lantana camara</i>	Increasing	I
D	Mexican Petunia	<i>Ruellia tweediana</i>	Stable	I
D	Mimosa	<i>Albizia julibrissin</i>	Increasing	I
E	Napier Grass	<i>Pennisetum purpureum</i>	Increasing	I
E	Natal Grass	<i>Rhynchelytrum repens</i>	Increasing	I
E	Paper Mulberry	<i>Broussonetia papyrifera</i>	Increasing	II
D	Paragrass	<i>Urochloa mutica</i>	Increasing	I
F	Rosary Pea	<i>Abrus precatorius</i>	Stable	I
B	Skunk Vine	<i>Paederia foetida</i>	Increasing	I
D	Surinam Cherry	<i>Eugenia uniflora</i>	Increasing	I
B	Swordfern	<i>Nephrolepis cordifolia</i>	Increasing	I
B	Torpedo Grass	<i>Panicum repens</i>	Increasing	I
D	Tropical Soda Apple	<i>Solanum viarum</i>	Increasing	I
D	Two-leaf Nightshade	<i>Solanum diphyllum</i>	Increasing	II
B	White-flowered	<i>Tradescantia</i>	Increasing	II

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	Wandering Jew	<i>fluminensis</i>		
B	Wild Taro	<i>Colocasia esculenta</i>	Increasing	I
D	Elephant Ear	<i>Xanthosoma sagittifolium</i>	Increasing	II

**A** = Species present as new populations or outliers of larger infestations, especially if they are expanding rapidly.

**B** = Species present in large infestations that continue to expand.

**C** = Species present in large infestations that are not expanding, or stable.

**D** = Species present in small infestations that are increasing.

**E** = Species present in small infestations that are stable or decreasing.

**F** = Species present that are stable.

**Table III Difficulty of Control.**

Rank	Common Name	Scientific Name	Population Status	FLEPPC Category
C	Air Potato	<i>Dioscorea bulbifera</i>	Increasing	I
C	Brazilian Pepper	<i>Schinus terebinthefolius</i>	Increasing	I
D	Caesar's Weed	<i>Urena lobata</i>	Increasing	II
B	Camphor Tree	<i>Cinnamomum camphora</i>	Increasing	I
A	Castor Bean	<i>Ricinus communis</i>	Stable	II
A	Chinaberry	<i>Melia azedarach</i>	Stable	II
A	Chinese Tallow	<i>Sapium sebiferum</i>	Increasing	I
D	Cogongrass	<i>Imperata cylindrica</i>	Increasing	I
C	Coral Ardesia	<i>Ardesia crenata</i>	Increasing	I
D	Creeping Oxeye	<i>Sphagneticola trilobata</i>	Increasing	II
E	Earleaf Acacia	<i>Acacia auriculiformis</i>	Stable	I
E	Guineagrass	<i>Panicum maximum</i>	Increasing	II
A	Heavenly Bamboo	<i>Nandina domestica</i>	Stable	II
C	Japanese Climbing Fern	<i>Lygodium japonicum</i>	Increasing	I
C	Old World Climbing Fern	<i>Lygodium microphyllum</i>	Increasing	I
D	Lantana	<i>Lantana camara</i>	Increasing	I
C	Mexican Petunia	<i>Ruellia tweediana</i>	Stable	I
A	Mimosa	<i>Albizia julibrissin</i>	Increasing	I
A	Napier Grass	<i>Pennisetum purpureum</i>	Increasing	I
D	Natal Grass	<i>Rhynchelytrum repens</i>	Increasing	I
A	Paper Mulberry	<i>Broussonetia papyrifera</i>	Increasing	II
D	Paragrass	<i>Urochloa mutica</i>	Increasing	I
A	Rosary Pea	<i>Abrus precatorius</i>	Stable	I
C	Skunk Vine	<i>Paederia foetida</i>	Increasing	I
A	Surinam Cherry	<i>Eugenia uniflora</i>	Increasing	I
C	Swordfern	<i>Nephrolepis cordifolia</i>	Increasing	I
D	Torpedo Grass	<i>Panicum repens</i>	Increasing	I
C	Tropical Soda Apple	<i>Solanum viarum</i>	Increasing	I



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A	Two-leaf Nightshade	<i>Solanum diphyllum</i>	Increasing	II
C	White-flowered Wandering Jew	<i>Tradescantia fluminensis</i>	Increasing	II
C	Wild Taro	<i>Colocasia esculenta</i>	Increasing	I
D	Elephant Ear	<i>Xanthosoma sagittifolium</i>	Increasing	II

**A** = Species likely to be controlled or eliminated with available technology and resources and which desirable native species will replace with little further input.

**B** = Species likely to be controlled but will not be replaced by desirable natives without an active restoration program requiring substantial resources.

**C** = Species difficult to control with available technology and resources and/or whose control will likely result in substantial damage to other, desirable species.

**D** = Species unlikely to be controlled with available technology and resources.

**E** = Species is not in need of control measures, but should be monitored.

### **Summary of Specific Actions Planned**

The three principal approaches to control of invasive plants in LS are: (1) chemical (2) physical/mechanical, and (3) monitoring. Monitoring will help to quantify results of chemical, physical and mechanical treatment. Long-term success will depend on receiving grants for treatment, dedicating staff time to control measures and evaluating progress.

#### **Herbicides**

Herbicides work through several modes of action, including the inhibition of electron transport, growth regulation through auxin/cytokinin mimicry, amino acid synthesis inhibition, seedling growth inhibition, photosynthesis inhibition, lipid synthesis inhibition, cell membrane disruption, and pigment inhibition. Herbicides can be divided into two categories: selective and non-selective. Selective herbicides affect some types of plants, but not others. For example, some selective herbicides will kill broadleaf weeds, but not affect grasses. These are popular for turf grass areas. Non-selective herbicides can kill any type of plant. They are used to control all vegetation in an area or as spot treatments on deep-rooted plants and those that spread by rhizomes. Herbicides are still the most effective way to treat large infestations.

#### ***Physical/Mechanical Controls***

##### **Hand Pulling**

Hand and mechanical pulling has been around since the dawn of agriculture. It is by far the least invasive method of control for weeds. Studies done by The Nature Conservancy (TNC) have shown that “weeding”, while labor intensive and expensive, can effectively reduce small patches of invasive plants. When used in combination with other control techniques, control can reach up to 100%. This method will be used specifically with volunteers.

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### Mowing

For certain plants, it has been shown that mowing at seed onset reduces the spread, thereby maintaining current invasive plant populations. Although mowing can be an effective mechanism for invasive plant control, it is vital that mowing take place during the optimum life stage of the plant, thereby avoiding the risk of increasing the plant's population. This method has not yet been used, but will be evaluated in the future.

**Table IV Prioritized List.**

<b>Priority</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>Population Status</b>	<b>FLEPPC Category</b>
1	Air Potato	<i>Dioscorea bulbifera</i>	Increasing	I
2	Old World Climbing Fern	<i>Lygodium microphyllum</i>	Increasing	I
3	Japanese Climbing Fern	<i>Lygodium japonicum</i>	Increasing	I
4	Swordfern	<i>Nephrolepis cordifolia</i>	Increasing	I
5	Skunk Vine	<i>Paederia foetida</i>	Increasing	I
6	White-flowered Wandering Jew	<i>Tradescantia fluminensis</i>	Increasing	II
7	Creeping Oxeye	<i>Sphagneticola trilobata</i>	Increasing	II
8	Tropical Soda Apple	<i>Solanum viarum</i>	Increasing	I
9	Cogongrass	<i>Imperata cylindrica</i>	Increasing	I
10	Coral Ardesia	<i>Ardesia crenata</i>	Increasing	I
11	Chinese Tallow	<i>Sapium sebiferum</i>	Increasing	I
12	Camphor Tree	<i>Cinnamomum camphora</i>	Increasing	I
13	Caesar's Weed	<i>Urena lobata</i>	Increasing	II
14	Brazilian Pepper	<i>Schinus terebinthefolius</i>	Increasing	I
15	Lantana	<i>Lantana camara</i>	Increasing	I
16	Mexican Petunia	<i>Ruellia tweediana</i>	Stable	I
17	Two-leaf Nightshade	<i>Solanum diphyllum</i>	Increasing	II
18	Mimosa	<i>Albizia julibrissin</i>	Increasing	I
19	Paper Mulberry	<i>Broussonetia papyrifera</i>	Increasing	II
20	Wild Taro	<i>Colocasia esculenta</i>	Increasing	I
21	Chinaberry	<i>Melia azedarach</i>	Stable	II
22	Natal Grass	<i>Rhynchelytrum repens</i>	Increasing	I
23	Torpedo Grass	<i>Panicum repens</i>	Increasing	I
24	Elephant Ear	<i>Xanthosoma sagittifolium</i>	Increasing	II
25	Surinam Cherry	<i>Eugenia uniflora</i>	Increasing	I
26	Rosary Pea	<i>Abrus precatorius</i>	Stable	I
27	Paragrass	<i>Urochloa mutica</i>	Increasing	I
28	Castor Bean	<i>Ricinus communis</i>	Stable	II
29	Earleaf Acacia	<i>Acacia auriculiformis</i>	Stable	I
30	Guineagrass	<i>Panicum maximum</i>	Increasing	II
31	Heavenly Bamboo	<i>Nandina domestica</i>	Stable	II
32	Napier Grass	<i>Pennisetum purpureum</i>	Increasing	I

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