



Upland Invasive Exotic Plant Management Program

**Fiscal Year 2004-2005
Annual Report**



This report was prepared to provide an annual assessment of the control achieved and the funding necessary to manage non-native (exotic, alien) invasive plants on public conservation land in Florida. The authority of the Department of Environmental Protection as addressed in §369.251, Florida Statutes, extends to the management of all upland invasive exotic plants on all public conservation land, including land owned by federal, state, and local government entities. The Upland Invasive Exotic Plant Management Program involves complex operational and financial interactions between state, federal, and local governments, as well as private sector companies. Therefore, a summary of the entire management program on public conservation land and associated funding contracted or monitored by the Department during the fiscal year 2004-2005 is included in this report.

Executive Summary Bureau of Invasive Plant Management

Over one-and-one-half million acres of Florida's public conservation lands have been invaded by alien (exotic, nonnative, nonindigenous) plants such as melaleuca, Brazilian pepper, Australian pine, and climbing ferns. However, invasive alien plants respect no boundaries and millions of acres of private land are also affected. This ongoing alien invasion has degraded and diminished what remains of Florida's natural areas, affected agricultural production, and reduced outdoor recreation and ecotourism opportunities. The Bureau of Invasive Plant Management (BIPM) is the designated lead agency in Florida responsible for coordinating and funding the statewide control of invasive aquatic and upland plants in public waterways and on public conservation lands. Florida's aquatic plant management program is one of the oldest invasive species control programs in the world, with its beginnings dating back to the early 1900s. With the later addition of the upland invasive plant control program, BIPM oversees the largest and most successful invasive plant management effort of its kind in the United States.

The Upland Invasive Exotic Plant Management Program was established in 1997 to address the need for a statewide coordinated approach to the terrestrial (*vs.* aquatic) invasive exotic plant problem. The "Upland Weed" Program incorporates place-based management concepts, bringing together regionally diverse interests to develop flexible, innovative strategies to address weed management issues at the local level. The Upland Weed section of the bureau funds individual exotic plant removal projects on public conservation lands statewide. Projects are considered for funding based upon recommendations from eleven Regional Invasive Plant Working Groups.

The mission of the Upland Weed Program is to achieve maintenance control of invasive exotic plants like Australian pine (*Casuarina* spp.), melaleuca (*Melaleuca quinquenervia*), Brazilian pepper (*Schinus terebinthifolius*), and Old World climbing fern (*Lygodium microphyllum*) on public conservation lands. These and over one hundred other alien plants have invaded at least 1.5 million acres of Florida's nearly 11 million acres of public conservation lands, affecting an ecotourism economy valued at \$8 billion annually. Once invasive plants become established in native habitats, eradication is difficult, if not impossible, to achieve; therefore, continuous maintenance of invasive nonnative plants is needed to sustain wildlife habitat and recreational opportunities while preserving native plant communities on public conservation lands.

Upland invasive weeds infested approximately 1.65 million acres (or 15%) of public conservation lands statewide in 2005. Over 356,000 (or 22%) of the affected acres are currently under maintenance control. BIPM expended \$8.7 million controlling approximately 76,000 acres of upland weeds on 144 publicly managed areas during FY 2005. Cooperating agencies contributed another \$4.5 million in cash, time and materials, or in-kind services as a match to BIPM funding. Public land managers are responsible for maintenance control of areas initially treated through state funding. BIPM provided herbicide to assist land managers with maintenance control at a cost of \$95,275 for FY 2005.

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Florida's Upland Invasive Exotic Plant Management Program

With its subtropical climate, an island-like topography, and the pressures of a rapidly expanding human population, Florida is especially vulnerable to invasion by non-native (introduced, exotic, alien) species. Florida is listed along with Hawai'i, California, and Louisiana as one of the states with the highest number of non-native species, both plants and animals. The South Florida region alone is home to more introduced plants than any other region within other states. Thirty years ago, a Smithsonian publication described tropical Florida as a “biological cesspool of introduced life.”

While South Florida has been hardest hit by this invasion of alien species, the problem is statewide in scope. Compounding the problems caused by this ongoing invasion is a general lack of awareness about the invasiveness of non-native species introduced into the Florida environment. Florida covers 36 million surface acres, with nearly 11 million acres in public ownership for natural resource protection. Invasive exotic plants have invaded approximately fifteen percent of these public conservation lands, affecting an ecotourism economy valued at nearly \$8 billion annually.

When our state was first named *La Florida*, its profusely blooming foliage was composed of a panoply of colorful native plants. Today, exotic species comprise roughly one-third of Florida's plant life. Many of these newer botanical residents support the economically important agricultural and horticultural industries; however, there are always a few bad apples in any barrel (tropical soda apple, for one). An estimated ten percent of the thousands of non-native plants in Florida are *invasive*, that is, plants that pose a threat to natural systems. Invasive exotic plant species, lacking control by their native diseases and predators, spread explosively and outcompete and replace vital native species on public and private land. The resulting infestations diminish wildlife habitat, decrease recreational resources, and negatively affect the natural health and economy of the state.

Some invaders change the composition, structure, and/or processes of native plant and animal communities. One easily observed example is when the invader forms a dense one-species stand (monoculture) where once there was a rich assembly of native species, resulting in a loss of biodiversity. A number of populations of Florida's rarest plants have been lost in this fashion. Other invaders modify habitat processes, for example, by changing water flow or by increasing fire frequency in habitats not adapted to fire. Once invasive plants become established in native habitats, eradication is difficult, if not impossible, to achieve; therefore, continuous maintenance is needed to sustain wildlife habitat and recreational opportunities while preserving native plant communities.

The 1997 Legislature charged the Bureau of Invasive Plant Management (BIPM) with the task of creating a program to bring invasive exotic upland plant species under maintenance control. A maintenance control program, as defined in Section 369.22, Florida Statutes, is “a method for the control of exotic plants in which control techniques are utilized in a coordinated manner on a continuous basis in order to maintain the plant population at the lowest feasible level.” The Upland Invasive Exotic Plant Management (Uplands) Program was established that same year. To implement its statewide cooperative strategy, the Uplands Program formed Regional Invasive Plant Working Groups (working groups) comprised of federal, state and local government agencies, non-governmental organizations (NGOs), and other interested stakeholders, in 11 areas of the state and encompassing all 67 counties. The Uplands Program funds individual invasive exotic plant control projects on public conservation lands based upon recommendations from the working groups. The Uplands Program melds these regional priorities into an integrated process that provides the needed support infrastructure to conduct an efficient and cost-effective statewide control program.



Florida lies in three climatic zones, tropical, sub-tropical, and temperate, and thus possesses a wide array of natural communities. Unfortunately, invasive exotic plants have found their way into every natural habitat from coastal beach dunes (above left) to interior pine flatwoods (below left). Fortunately, the Upland Invasive Plant Management Program possesses the ability to control invaders wherever they are found (above and below right).



Funding for the Uplands Program is provided through the Invasive Plant Management Trust Fund as set forth in §369.252(4), F.S., which reads: “use funds in the Invasive Plant Control Trust Fund as authorized by the Legislature for carrying out activities under this section on public lands. Twenty percent of the amount credited to the Invasive Plant Control Trust Fund pursuant to §201.15(6) shall be used for the purpose of controlling nonnative, upland, invasive plant species on public lands.” The trust fund provided over \$8.5 million to fund upland weed control projects for fiscal year 2005.

As stated in the DEP Agency Strategic Plan, the long-term program goal is to reduce infestations of upland invasive exotic plants on public lands by twenty-five percent by 2010, based on estimated 1995 levels of 1.5 million acres. The 2001 Upland Invasive Exotic Plant Management Program Strategic Plan set forth specific strategies to implement the program’s long-term goal, including:

- ◆ Implement an integrated program that uses chemical, mechanical, and biocontrol technologies. Modify procedures as appropriate to assure the greatest protection for natural systems;
- ◆ Improve the general public’s awareness of the threat to biodiversity from invasive plants by developing a comprehensive education and outreach program;
- ◆ Inventory and map with GIS the distribution of invasive exotic plant species by the year 2010; and,
- ◆ Research the use of biocontrol agents and provide procedures and facilities for their cultivation, dissemination, and evaluation including monitoring and field assessments by the year 2010.

Melaleuca and Brazilian pepper are two well known weeds in Florida, once covering more than one million acres of public conservation lands. The Florida Exotic Pest Plant Council (FLEPPC) lists 67 exotic plants found on public conservation lands as Category I pest plants and another 60 species as Category II. FLEPPC Category I species are those known to have damaged natural areas, while Category II species are not yet implicated in direct damage to ecosystems. Often, there may be a long lag time (years or decades) before an exotic species shows its true colors. Plants like Old World climbing fern (*Lygodium microphyllum*) and cogon grass (*Imperata cylindrica*) have expanded their range in recent years and are on the verge of overwhelming parks and forests across the state.

BIPM has spent nearly \$40 million to bring over 300,000 acres of upland weeds under maintenance control since the inception of the Uplands Program. In that time, the program has assisted public land managers on 355 federal, state, and county managed areas located in 51 different counties by funding 735 invasive plant control operations treating 90 recognized weed species. The Uplands Program cooperated on projects with 5 federal, 5 state, and 4 regional land managing agencies, 23 counties, 19 cities, 3 universities, and 1 community college. Another 110 projects are expected to be funded during FY 2006. Public land managers are responsible for the continued maintenance control of areas originally treated with bureau funding. BIPM has further assisted land managers by providing herbicide for maintenance control, at a cost of over \$2 million since FY 2001.

The Uplands Program has clearly met the need for a comprehensive plan that incorporates broad and consistent strategies, reduces agency inconsistencies, and takes into account differing agency mandates to achieve the goal of controlling invasive plant species in Florida. The program is not only applicable to and coordinated with state and federal efforts to manage invasive species, but has also been used as a model by other states and countries.

BIPM directs significant staff and monetary resources into the control of invasive exotic plants on land managed by the state and other public agencies. In fiscal year 2005, the Uplands Program expended approximately \$8.5 million for control operations on over 80,000 acres of public conservation land. The following table shows the distribution of funds to federal, state, and local agencies. Some managed areas may have more than one project conducted within their boundaries during the year, while some projects may encompass more than one managed area.

BIPM FY05 Uplands Project Acres and Dollars by Managing Agency

AGENCY	#MGT UNITS	#PROJECTS	TOTAL ACRES	TOTAL DOLLARS
CAMA	2	2	511.50	\$117,675.00
CAMA Assistance ¹	2	2	125.50	\$212,755.53
DOF	9	10	4,514.60	\$436,902.82
DRP	35	32	6,077.14	\$1,988,752.62
DRP Assistance ¹	2	2	260.50	\$56,981.69
FWC	13	16	16,590.30	\$792,127.37
OGT Assistance ¹	1	1	135.00	\$59,940.00
WMD ²	11	5	22,200.00	\$1,752,308.42
DOD	2	3	66.65	\$111,200.91
NPS	3	4	6,243.00	\$579,088.11
USFS	2	2	332.85	\$30,316.78
USFWS	10	7	17,578.00	\$304,055.76
City	9	7	250.02	\$253,796.95
County	56	30	6,389.07	\$1,845,528.80
TOTAL	157	123	81,274.13	\$8,541,430.76

¹Contracts were processed by BIPM, but funding came from the managing agency

²Includes \$1 million melaleuca program

Florida's Ten "Most Unwanted" Invasive Exotic Plants for 2005		
Plant Treated	Acres Controlled in 2005	% of Total Project Acres
melaleuca tree	46,498	67.1
Brazilian pepper	7,830	11.3
cogon grass	4,212	6.1
Old World climbing fern	3,728	5.4
tropical soda apple	1,023	1.5
skunk vine	1,021	1.5
Japanese climbing fern	771	1.1
Caesar's weed	749	1.1
Chinese tallow	667	1.0
Australian pine	436	0.6

Although the Upland Weeds Program treated nearly 100 different invasive species overall at 140 project sites, based upon the total acres treated in all projects statewide in 2005, these 10 were the worst.

The “Pine” That Fell To Earth - Australian Pine

Australian pine (*Casuarina* spp.) is an aggressive invader of coastal habitats in southern Florida. Several species of *Casuarina* were introduced from Australia to Florida during the 1890s. The species are difficult to tell apart, but since they are all invasive exotics, all Australian pines are controlled on public conservation lands. Although commonly called pines in Florida, these plants are actually angiosperms (which produce seed-bearing flowers), not conifers (which produce seed-bearing cones). Other common names include beefwood, ironwood, she-oak, and horsetail tree. A tropical evergreen tree that grows up to 150 feet tall, it is native to Australia, South Pacific islands, and Southeast Asia. Australian pine now occurs throughout south and central Florida, the West Indies, Mexico, and elsewhere in tropical regions outside its native range.



Australian pines that have overrun a (normally tree-less) Florida beach.

Australian pines were widely planted in Florida to form windbreaks around agricultural fields, canals, roads, and houses. Disturbed areas, whether created by humans or nature, are particularly prone to invasions by Australian pine. Australian pines are resistant to salt spray, and can grow close to seawater, allowing them to invade thousands of acres of southeastern and southwestern coastal areas of Florida.

Australian pines threaten native plant communities along Florida beaches by quickly invading beaches where a storm has destroyed existing vegetation, or where human activities such as dredge spoil dumping or development have done the same thing. Australian pines have also invaded tropical hammocks in south Florida and tree islands in the Everglades.

Australian pine outcompetes native vegetation by producing a dense leaf litter beneath them that chemically inhibits other plants from growing (a process called alleopathy).



The shallow root system of the Australian pine makes the tree susceptible to “tipping.”

Because of its shallow root system, Australian pine tends to uproot and topple during high winds and thus poses a significant hazard to nearby homes, powerlines, and storm evacuation routes. This damage was widely seen in 2004 with four hurricanes crossing Florida.



An all too familiar sight in Florida after a hurricane.



Native palms are adapted to hurricanes and seldom topple--unless knocked over by falling Australian pines.



One of the first tasks after a hurricane is opening emergency routes that have been blocked by fallen Australian pines.

In FY05 BIPM spent \$1,429,210 on Australian pine control projects on 5 state parks, removing a total of 197 acres of trees.



Falling 'pine' trees knock down powerlines, causing costly delays in restoring power to storm-affected areas.



Australian pine cohabitating with melaleuca, another highly invasive non-native tree.

The Bureau has a "Weed Alert" for Australian pine available at <http://www.dep.state.fl.us/lands/invaspec/2ndlevpgs/pdfs/AustralianPine.pdf>, or in print by request.

Herbicides, biological controls, manual (hand-pulling), mechanical, and physical controls are used separately or in combination to slow the spread of invasive plants. Herbicides are pesticides designed to kill plants. They are a vital component of most control programs and are used extensively for invasive exotic plant management in Florida. Herbicides are target-specific and are much safer in use than pesticides intended for insects or other animals. Herbicide application methods include:

Foliar. Herbicide is applied to the plant with aerial or ground based equipment. Foliar applications can be either directed or broadcast. Broadcast applications are used when damage to non-target vegetation is a minimal concern or when a selective herbicide is used.

Basal bark. Herbicide is applied directly to the bark around the circumference of the tree up to fifteen inches above the ground. The herbicide is absorbed through the bark.

Girdle (or “hack-and-squirt”). Cuts are made into the cambium around the circumference of the tree. Herbicide is then applied to each cut.

Cut stump. After cutting and removing large trees or brush, herbicide is sprayed or painted onto the cut surface. The herbicide is usually concentrated on the cambium layer on large stumps.

Mechanical removal involves the use of a bulldozer, Brontosaurus mower, Hydroaxe, or other 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 from seeds and root fragments, and re-colonization by other invasive non-native plants. Mechanical removal may not be appropriate in natural areas because of disturbance to soils and non-target vegetation. However, it is the only effective way to quickly remove dense monocultures of species such as Brazilian pepper and Australian pine.

Many plants are prevented from becoming serious weeds in their native range by a complex assortment of diseases, insects, and other herbivorous organisms. When a plant is brought into a new environment with favorable growing conditions, the absence of these regulating species may allow non-native plants to become serious weeds. “Classical” biological control seeks to locate insects from a plant’s native range and import host-specific species to attack and control the plant in regions where it has become a weed. This approach has a proven safety record and has been effective in controlling a number of weeds around the world.

Prescribed burning and water level manipulation are cultural practices that are used in management of pastures, rangeland, and commercial forests, and, in some situations, may be appropriate for vegetation management on natural areas. Some species, such as melaleuca and cogon grass, respond positively to fire, so prescribed burning, if used, must be coupled with another control method.



basal bark application



girdle treatment



Brontosaurus mower



melaleuca weevil

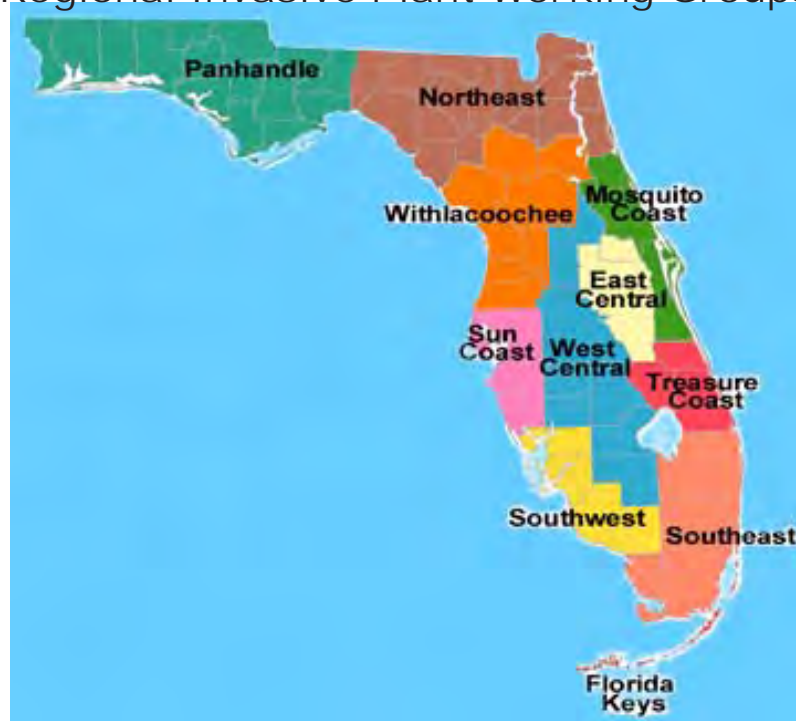
Invasive Plant Control Projects Bureau of Invasive Plant Management

The Regional Invasive Plant Working Group brings together stakeholders in a geographic area for the purpose of combining expertise, energy, and resources to deal with common weed problems. The Bureau relies on the expertise within each working group to set regional control priorities based upon severity and potential threat to existing public conservation lands. This is accomplished by the working group reviewing and ranking control project proposals. The eleven working groups are made up of over 500 members representing federal, state, and local government public conservation land managers, non-governmental organizations, and private landowners across the state. Program liaisons have been designated for each working group to facilitate proposal review and coordination with the state program staff.

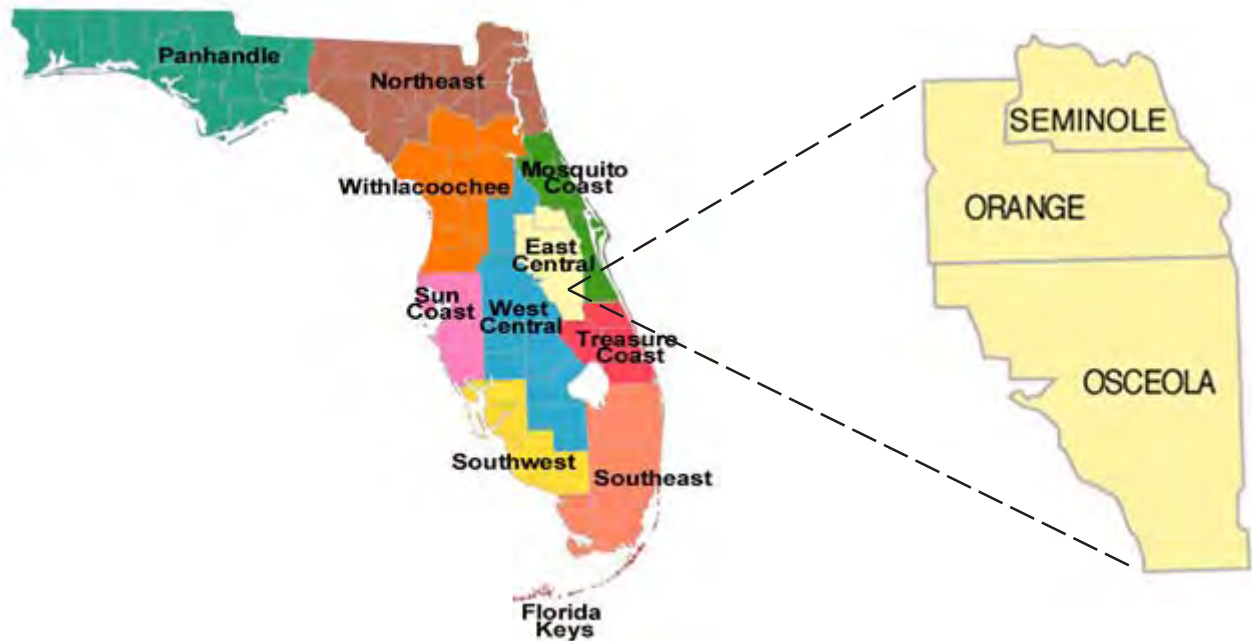
The following project reports are arranged alphabetically by Working Group, then by county. Each report references the PCL (public conservation land) where the work occurred, a file tracking number, the size of the project area, and total Bureau funds expended. When funding from another agency was provided, the amount is noted in the body of the report. Most projects are solely funded by the Bureau. Descriptive information for each project was current as of the date of submission of the proposal by the land manager to a working group. Control data are derived from daily progress reports submitted by the contractor performing the work. The control method(s) is agreed upon by the site manager, contractor, and program staff before work begins.

Each project description also contains a table indicating the plants treated, control methods, and herbicides used. In this table, *herbicide* indicates the brand name of the chemical used, when known. Contractors use various mixtures, depending upon factors such as site/soil conditions, plant densities, proximity to water bodies, or personal experience. When two herbicides are mixed this is indicated with a “+” symbol; e.g., “Rodeo+Escort.” When two different mixes are used to control the same plant on a project, for example Garlon 4 is used in one area and Roundup is used in another, this is indicated with a “/” symbol; e.g., “Roundup/Garlon 4.” There is no one “right” mix for any plant under all conditions. Mention of a brand name does not denote a recommendation for that product.

Regional Invasive Plant Working Groups



East Central Regional Working Group



The East Central Regional Working Group liaison is Gregg Walker, 2849 Babylon Court, Oviedo, Florida 32765, phone: 407-359-0506, e-mail: asligregg@aol.com

Lake Tohopekaliga Fish Management Area

County: Osceola

PCL Size: 18,810 acres

Project ID: EC-041 335 acres \$171,103.53

Project Manager: Florida Fish & Wildlife Conservation Commission

Bruce V. Jagers

601 W. Woodward Avenue, Eustis, Florida 32726

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The “Lake Toho” project area comprised four work sites. The Shingle Creek floodplain site was dominated by mature stands of bald cypress (*Taxodium distichum*) and Chinese tallow; however, Chinese tallow was outcompeting native vegetation at this site. Shingle Creek drains the southwestern Orlando area and is one of the primary water inflows into Lake Toho. Approximately twelve acres of Chinese tallow occurred in the Shingle Creek Floodplain site as dense to moderately dense infestations. An estimated 0.5 acres of the trees were greater than 1.25 feet diameter breast height (DBH).

Paradise Island had established Chinese tallow stands in both shoreline bald cypress/Carolina willow (*Salix caroliniana*) stands as well as in one upland area. Makinson Island had scattered Chinese tallow and a small melaleuca hammock established primarily in shoreline bald cypress/Carolina willow/red maple (*Acer rubrum*) stands. Chinaberry (*Melia azedarach*) grew primarily in upland habitats. Tropical soda apple (*Solanum viarum*) occurred in both shoreline and upland habitats. The southeast shoreline of Lake Toho had scattered Chinese tallow trees established in various native plant communities.

Chinese tallow in the other work sites was scattered or in small groups of trees with each group being 0.25 acres or less. Chinaberry occurred as individuals or in small groves of trees 0.05 acres or less. Melaleuca consisted of one small hammock 0.01 acres in size. Tropical soda apple existed as individual plants in wetland areas and as clumps of dense plants 0.01 acres or less in upland habitats.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	girdle	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Garlon 4
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4



Wildlife also appreciate invasive plant control results.



From Chinese tallow seeds....



....to Chinese tallow seedlings....



Lake Tohopekaliga—green hatching on work sites



....to a Chinese tallow thicket!

Lake Lizzie Nature Preserve

County: Osceola

PCL Size: 880 acres

Project ID: EC-039 880 acres \$100,000

Project Manager: Osceola County Planning Department

Rod Schultz, Public Lands Manager

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Osceola County purchased the Lake Lizzie Nature Preserve (Preserve) with a Florida Communities Trust grant in July 1998. The Preserve consists of approximately 430 acres of uplands and 450 acres of wetlands. Natural communities include freshwater marsh, wet prairie, pine flatwoods, scrubby pine flatwoods, and xeric oak scrub. The wetlands were infested with primrose willow, Brazilian pepper, Caesar's weed, castor bean, and scattered camphor trees. Coverage approached sixty-five percent throughout the affected wetland areas. In the uplands, exotic species included downy rose-myrtle, bahiagrass (*Paspalum notatum*), bladderpod, Brazilian pepper, and dog fennel. Coverage was nearly twenty-five percent throughout the affected upland areas.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal/cut stump	Garlon 4
<i>Colocasia esculenta</i>	wild taro	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Glypro+Escort
<i>Eugenia uniflora</i>	Surinam cherry	Category I	basal/cut stump	Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Glypro+Chopper
<i>Lantana camara</i>	lantana	Category I	cut stump	Garlon 4
<i>Lantana camara</i>	lantana	Category I	foliar	Glypro+Escort
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	basal/cut stump	Garlon 4
<i>Panicum repens</i>	torpedo grass	Category I	foliar	Glypro+Escort
<i>Rhodomyrtus tomentosa</i>	downy rose-myrtle	Category I	basal/cut stump	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	basal	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Glypro+Escort
<i>Eppipremnum pinnatum</i>	pothos	Category II	cut stump	Garlon 4
<i>Ricinus communis</i>	castor bean	Category II	basal/cut stump	Garlon 4
<i>Sansevieria hyacinthoides</i>	bowstring hemp	Category II	cut stump	Garlon 4
<i>Syagrus romanzoffiana</i>	queen palm	Category II	basal/cut stump	Garlon 4
<i>Urena lobata</i>	Caesar's weed	Category II	basal	Garlon 4
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Glypro+Escort
<i>Catharanthus roseus</i>	periwinkle	n/a	hand pull	n/a



Dense downy rose-myrtle (left) and wild taro (right) terrorized land managers.

Shingle Creek Recreational Preserve

County: Osceola

PCL Size: 122 acres

Project ID: EC-045 122 acres \$13,689.49

Project Manager: Osceola County

Rod Schultz, Project Coordinator

1 Courthouse Square, Kissimmee, Florida 34741

Phone: 407-343-3409, Fax: 407-343-3415

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Osceola County and the City of Kissimmee purchased a portion of the Shingle Creek Recreational Preserve with a Florida Communities Trust grant in April 2000. The Preserve, when fully purchased will be approximately 182 acres. The project area comprised approximately 88 acres of County/City land and approximately 34 acres of City land. The project area consisted of approximately 29 acres of upland pasture natural restoration and 93 acres of wetlands. The uplands are best characterized as abandoned pasture turned fallow. The wetlands are riverine bottomland swamp primarily dominated with bald cypress trees.

Shingle Creek's shoreline banks and associated project area within the wetlands contained significant numbers of mature guava trees, Chinese tallow, Brazilian pepper, Caesar's weed, rattlebox, primrose willow, and scattered camphor tree. In the uplands, dominant plant species included bahiagrass, Chinese tallow, bladderpod, soda apple, Brazilian pepper, and dog fennel. This project consisted of maintenance control throughout the prior fiscal year's project area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Aquaneat
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Aquaneat
<i>Psidium guajava</i>	guava	Category I	basal/cut stump	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal/cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Sesbania punicea</i>	rattlebox	Category II	foliar	Aquaneat
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Aquaneat



Three Lakes Wildlife Management Area

County: Osceola

PCL Size: 61,845 acres

Project ID: EC-044 485 acres \$25,545.22

Project Manager: Fish & Wildlife Conservation Commission

Bryan Ames, Biological Scientist II

1231 Prairie Lakes Road, Kenansville, Florida 34739

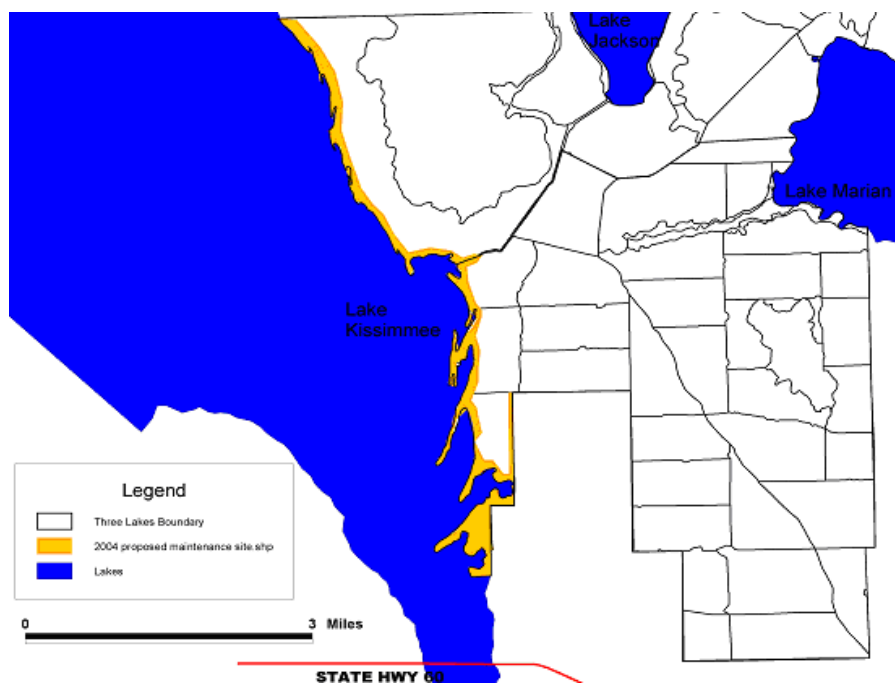
Phone: 407-436-1818, Fax: 407-436-1137

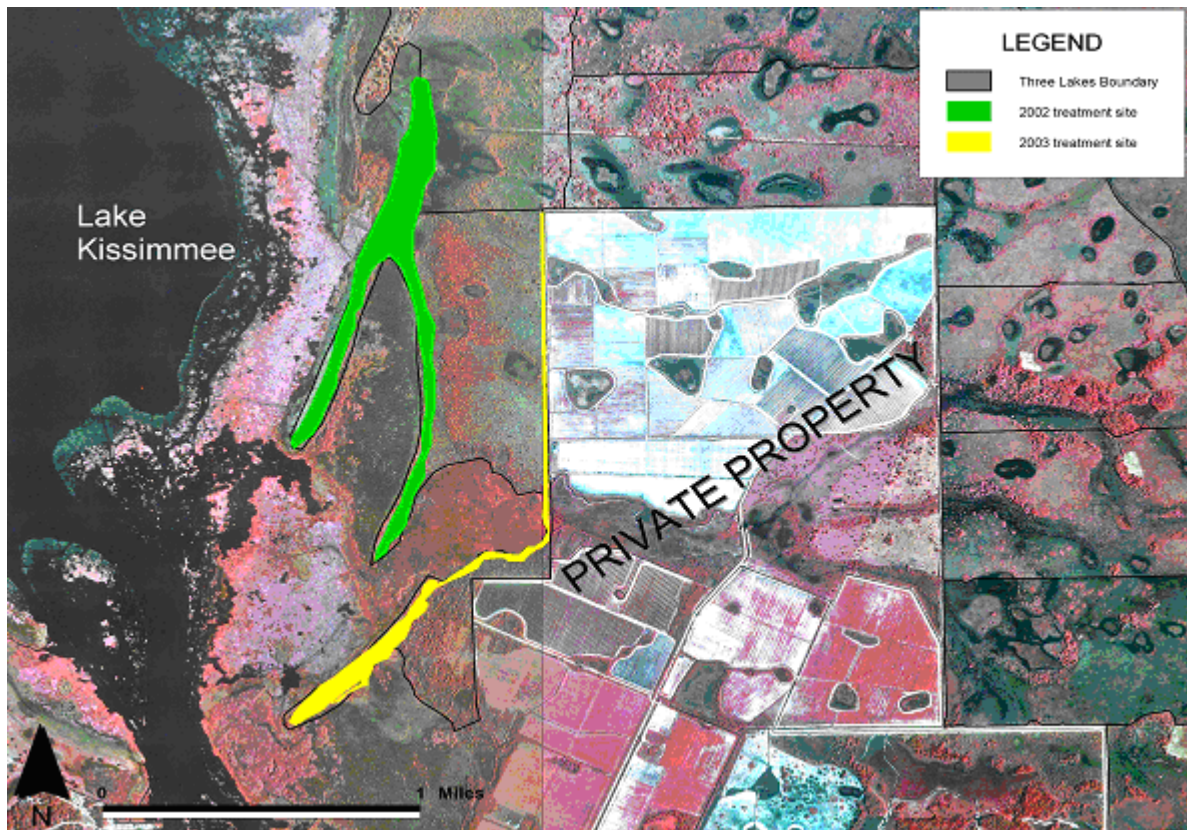
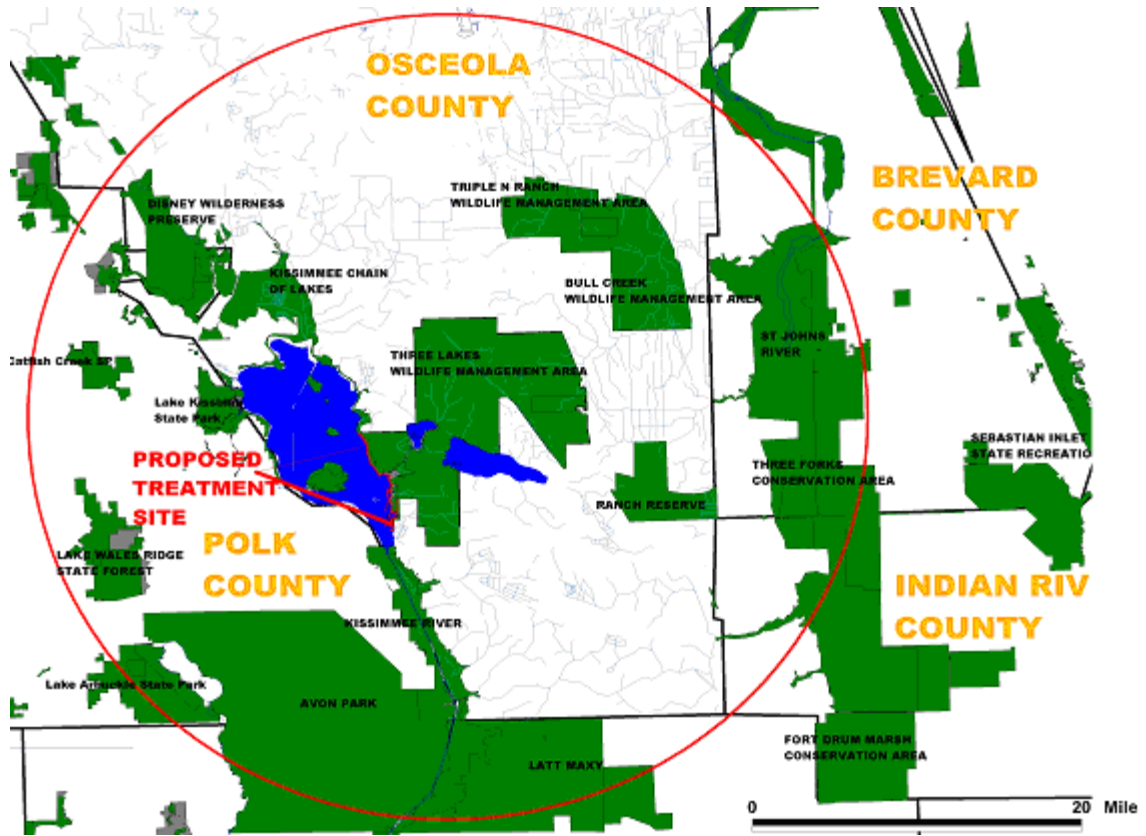
E-mail: bryan.ames@fwc.state.fl.us

Three Lakes Wildlife Management Area is located in southern Osceola County along the eastern shore of Lake Kissimmee, and surrounding portions of Lakes Marian and Jackson. The WMA contains significant acreage of contiguous longleaf pine flatwoods, oak hammocks, cypress strands, and grassy wetlands, as well as over 12,000 acres of the globally imperiled dry prairie natural community. The property also supports one of peninsular Florida’s largest red-cockaded woodpecker (*Picoides borealis*) populations, and a large population of Florida grasshopper sparrows (*Ammodramus savannarum floridanus*). Smaller numbers of Florida scrub jay (*Aphelocoma coerulescens*), Audubon’s crested caracara (*Caracara plancus audubonii*), wood stork (*Mycteria americana*), and other species occur throughout the year. Several protected plants occur on the property, including the state threatened wild coco (*Pteroglossapsis ecristata*) and the state endangered manyflowered grasspink (*Calopogon multiflorus*).

This project consisted of maintenance treatment on Brazilian pepper on two sites previously treated through BIPM funding. Brazilian pepper was mostly scattered in small discontinuous patches of low-density saplings and seedlings in marsh, upland, and shoreline areas of Lake Kissimmee. FWC contributed \$4,700 of in-kind services to the project.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4





Triple N Ranch Wildlife Management Area

County: Osceola

PCL Size: 16,673 acres

Project ID: EC-036 5 acres \$5,012.50

Project Manager: Fish & Wildlife Conservation Commission

Brandon Rutledge, Biological Scientist III

5600 Crabgrass Road, St. Cloud, Florida 34773

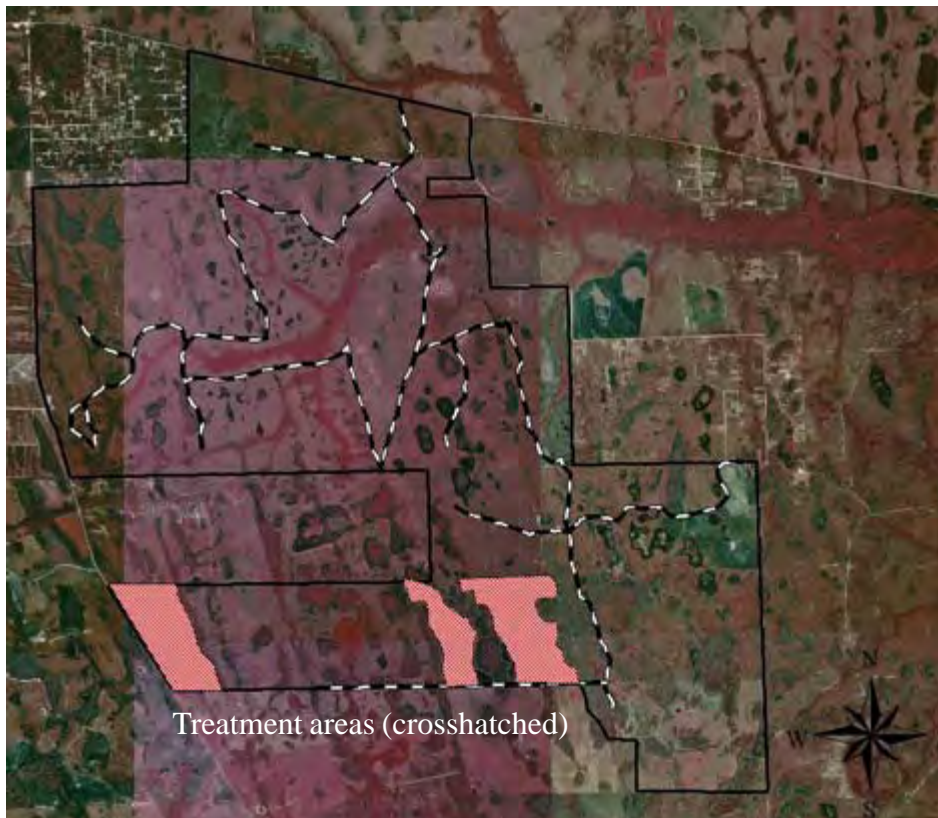
Phone: 407-498-0991, Fax: 407-498-0994

E-mail: brandon.rutledge@fwc.state.fl.us

The Triple N Ranch WMA contains nearly 9,000 acres of mesic pine flatwoods and over 2,000 acres of contiguous cypress swamp, as well as nearly 700 acres of the globally imperiled dry prairie natural community. Other natural communities include wet prairie, depression marsh, xeric oak scrub, hardwood swamp, hardwood hammock, and hydric hammock. Fourteen rare plant species are known or suspected to occur on the WMA, including short-leaved rosemary (*Conradina brevifolia*) and wild coco (*Pteroglossaspis ecristata*).

Cogon grass occurred inside an operational orange grove on the WMA and began to invade nearby mesic flatwoods. Cogon grass outside the grove was limited to small patches that totaled approximately five acres. BIPM provided the herbicide only for this project through its Herbicide Bank.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Aquaneat+Arsenal



Mead Garden

County: Orange

PCL Size: 55 acres

Project ID: EC-042 22 acres \$10,820

Project Manager: City of Winter Park Public Works Department

Tim Egan, Chief of Lakes

401 Park Avenue South, Winter Park, Florida 32789-4386

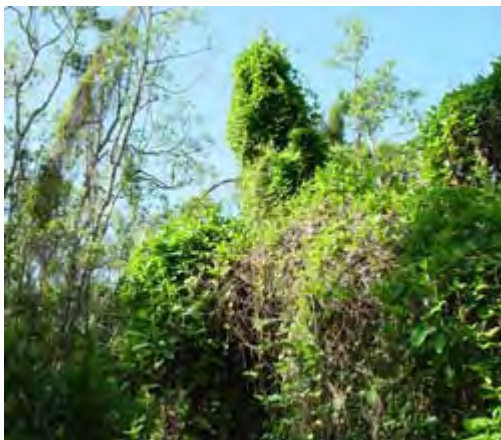
Telephone: 407-599-3599, Fax: 407-599-3417

E-mail: tegan@ci.winter-park.fl.us

Mead Garden was established in 1937 with the donation of several parcels of land that represented several different natural communities between Howell Creek and Denning Drive. Work Progress Administration (WPA) labor and funding built four trails through the park in the late 1930s. Until the early 1970s, a greenhouse containing Dr. Theodore Mead's collection of rare plants was located near the main entrance. Howell Creek, flowing from Lake Sue to Lake Virginia, forms the eastern border of the park. Natural communities represented in Mead Garden include hydric hammock, bay swamp, open meadow, and upland hardwood forest.

Invasive exotic plants, especially air potato, skunk vine, and wild taro invaded the park about 15 years ago and occurred throughout the project area. The infestations were most extensive on the east side along the creek, with a sixty percent cover of invasive plants, and the north side including the bay swamp, with ninety percent coverage. The western and southern sides of the project area were lightly to moderately infested, with a thirty to sixty percent range of coverage primarily along borders of the site. BIPM funded control of the twelve most heavily infested acres. The City provided in-kind services valued at \$10,045 to control ten moderately infested acres adjacent to Howell Creek.

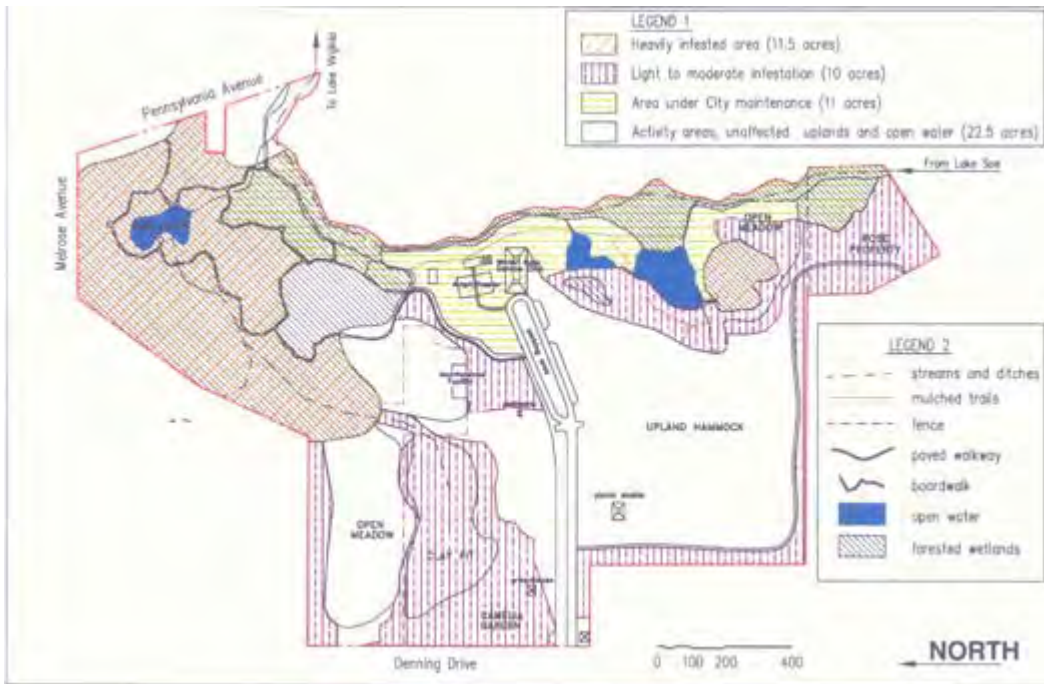
Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Roundup
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Roundup
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Garlon 3A



Exotic vines were overrunning the tree canopy at the Garden....



....while wild taro took over the understory.



Project Map for Mead Garden



Time to weed the Garden!

Lake Lawne

County: Orange

PCL Size: 161 acres

Project ID: EC-043

161 acres

\$25,000

Project Manager: Florida Fish & Wildlife Conservation Commission

Bruce V. Jagers

601 W. Woodward Avenue, Eustis, Florida 32726

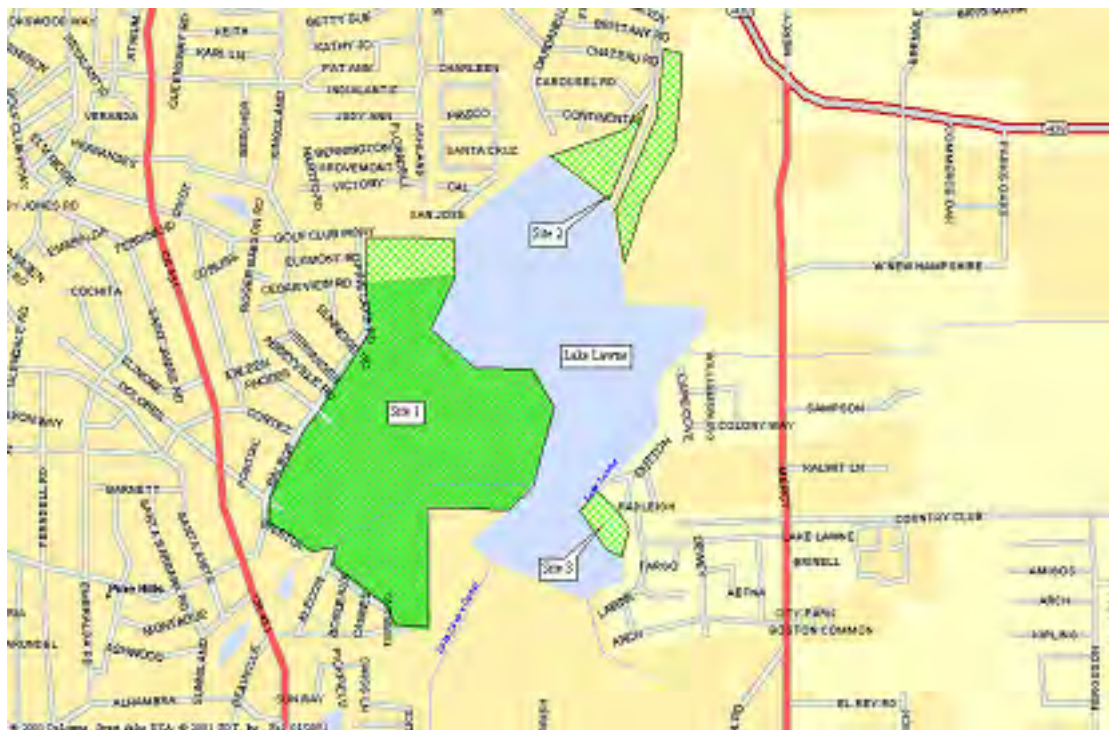
Phone: 352-516-0122, Fax: 352-742-6461

E-mail: bruce.jagers@fwc.state.fl.us

Lake Lawne is a 156-acre water body located near the community of Pine Hills, an older Orlando suburb that was initially developed in the 1950s and 1960s. Barnett Park, an Orange County park adjacent to Lake Lawne, has a boat ramp that provides public access to the lake. Lake Lawne is unique for an urban lake in that a good portion of the shoreline (approximately 60%) is undeveloped or bordered by Orange County or City of Orlando park lands.

The natural community in the project area was historically dominated by red maple (*Acer rubrum*), bald cypress (*Taxodium distichum*), swamp bay (*Persea palustris*), and wax myrtle (*Myrica cerifera*). Homeowners had planted Chinese tallow in their yards adjacent to the lake, so tallow was well established on all three sites in the project area. Brazilian pepper was established on one site only. All infestations were dense to moderately dense.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4



Lake Lawne Work Sites 1-3 with green hatching delineating work areas.

Spring Hammock Preserve

County: Seminole

PCL Size: 1,500 acres

Project ID: EC-037 110 acres \$41,250

Project Manager: Seminole County Natural Lands Program

Gregg Walker, Senior Biologist

1101 East First Street, Sanford, Florida 32771-1468

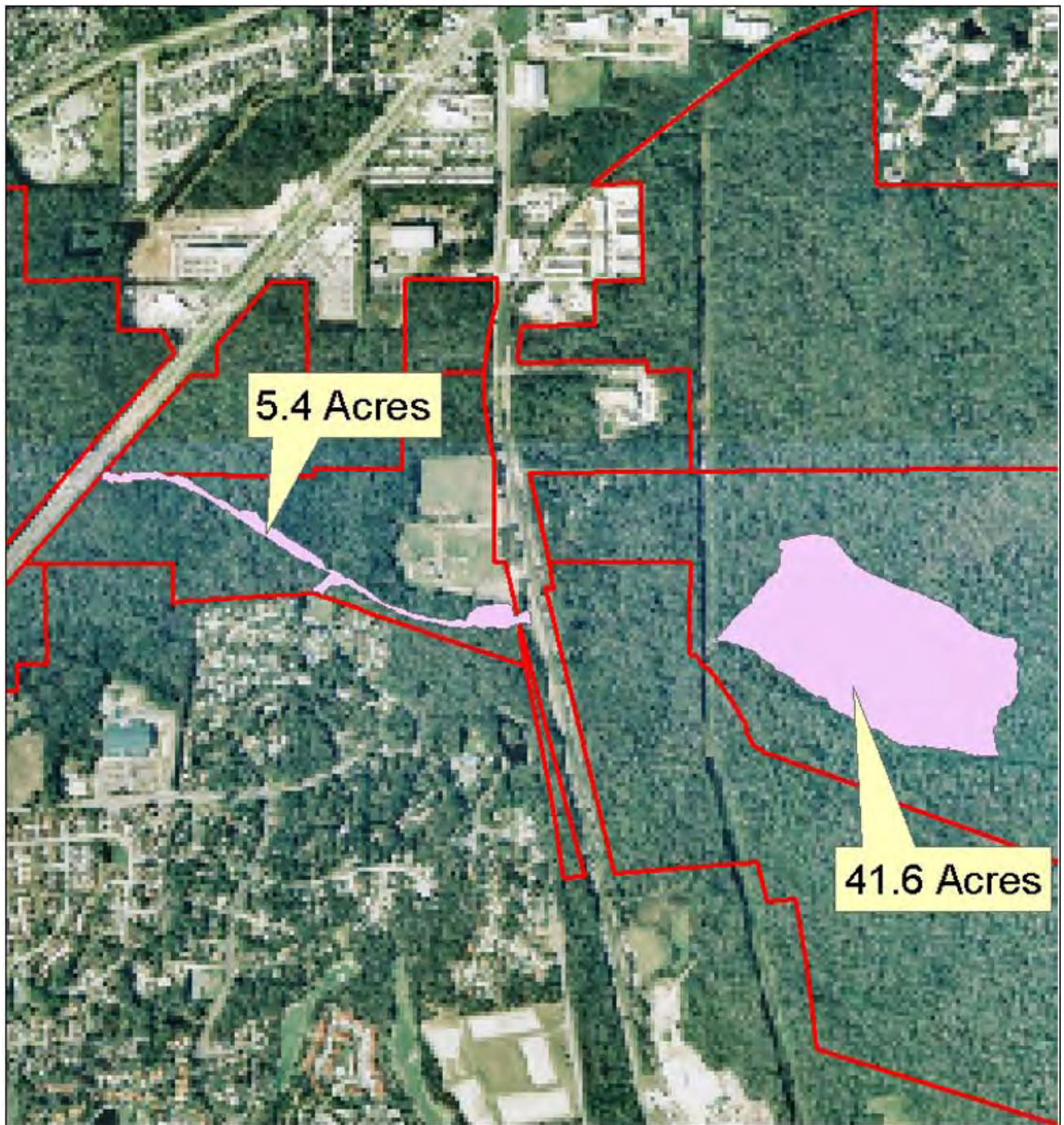
Phone: 407-665-7466, Fax: 407-665-7367

E-mail: gwalker02@seminolecountyfl.gov

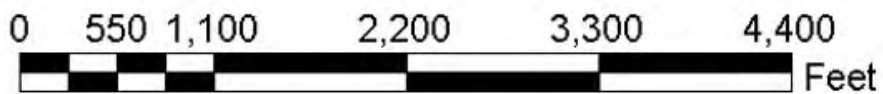
Spring Hammock Preserve is located on the western shore of Lake Jesup. The Preserve encompasses much of the watershed for Soldier Creek, an important tributary to Lake Jesup. The Preserve possesses two threatened natural communities, sandhill and scrub. The Preserve also contains a variety of rare plants, including Florida willow, pygmy fringe tree, royal fern, cinnamon fern, and needle palm.

Adjacent natural conservation lands include the Lake Jesup Wilderness Area and the Lake Jesup Conservation Area. Property acquisition on the Spring Hammock Preserve began in 1927 with the donation of Big Tree Park to Seminole County and acquisitions continued into the 1990s.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Roundup+Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Roundup+Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup+Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Nephrolepis cordifolia</i>	sword fern	Category I	foliar	Roundup+Garlon 4
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Roundup+Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Roundup+Garlon 4
<i>Syngonium podophyllum</i>	arrowhead vine	Category I	foliar	Roundup+Garlon 4
<i>Tradescantia fluminensis</i>	wandering Jew	Category I	foliar	Roundup+Garlon 4
<i>Sphagneticola trilobata</i>	wedelia	Category II	foliar	Roundup+Garlon 4
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Roundup+Garlon 4



**Spring Hammock Preserve
Exotic Plant Infestations**



Lake Lotus Park

County: Seminole

PCL Size: 125 acres

Project ID: EC-040 29 acres \$14,705.75

Project Manager: The City of Altamonte Springs

Angie Woodall, Park Ranger

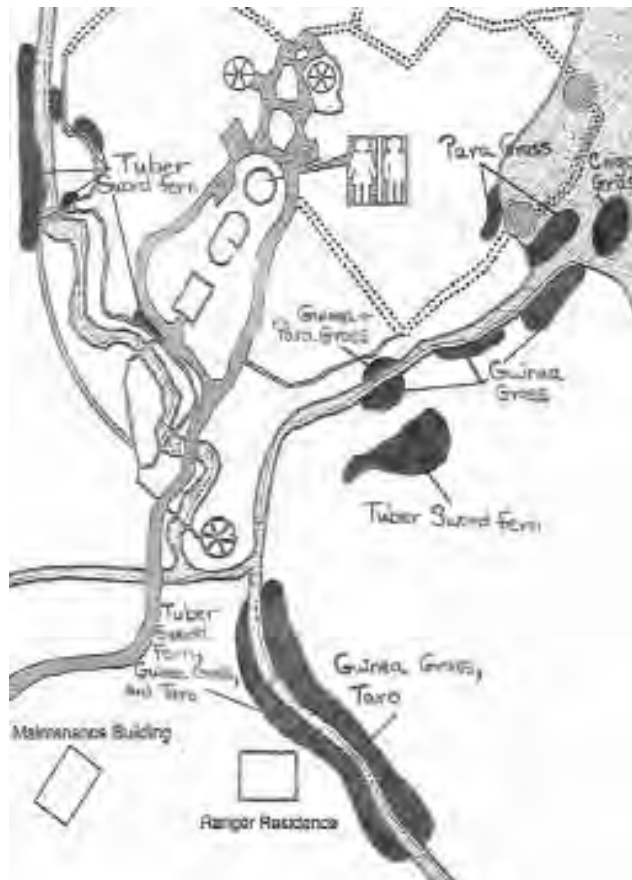
1153 Lake Lotus Park Road, Altamonte Springs, Florida 32714

Phone/Fax: 407-293-8885

E-mail: aewoodall@altamonte.org

Lake Lotus Park encompasses natural habitat ranging from pine scrub to floodplain wetlands. Three sites were targeted for invasive plant control, one each on the east and west bank of the Little Wekiva River, extending to a sandbar in Lake Lotus, and one site in a wetland area near the southwest region of the park. The east bank site included two acres with sixty-seven percent invasive plant coverage. The west bank site covered one acre with sixteen percent coverage. The wetland site comprised two acres with seven percent coverage.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Aquaneat
<i>Nephrolepis cordifolia</i>	sword fern	Category I	foliar	Aquaneat
<i>Pennisetum purpureum</i>	elephant grass	Category I	foliar	Aquaneat
<i>Urochloa mutica</i>	Pará grass	Category I	foliar	Aquaneat
<i>Panicum maximum</i>	Guinea grass	Category II	foliar	Aquaneat



Seminole County Natural Lands

County: Seminole

PCL Size: n/a (*see below*)

Project ID: EC-038 467.5 acres \$4,823.75

Project Manager: Natural Lands Program

Gregg Walker, Senior Biologist

1101 East First Street, Sanford, Florida 32771-1468

Phone: 407-665-7466, Fax: 407-665-7367

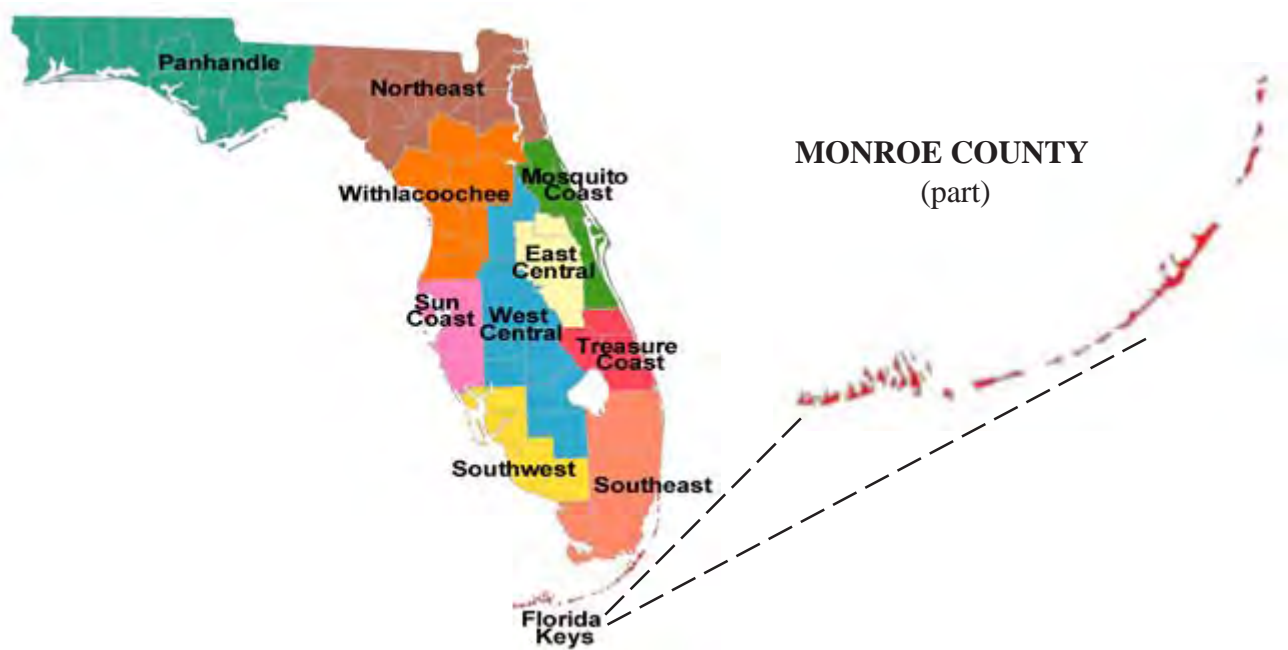
E-mail: gwalker02@seminolecountyfl.gov

Approximately 7,000 acres have been purchased and are under management by the Seminole County Natural Lands Program (NLP). The NLP manages over a dozen different plant communities from open water and hydric hammock to threatened sandhill and scrub communities. County preserves also contain a variety of rare plants, including Florida willow, pygmy fringe tree, royal fern, cinnamon fern, needle palm, spikemoss, and many-flowered grasspink.

With the exception of open water communities, exotics were treated in nearly all of the natural communities. Within land managed by the NLP, an estimated 550 acres (7.5%) were infested with invasive exotic plants. BIPM provided the herbicides only for this project through its Herbicide Bank.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Ardisia crenata</i>	coral ardisia	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Colocasia esculenta</i>	wild taro	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Roundup
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup
<i>Lantana camara</i>	lantana	Category I	basal	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Nephrolepis cordifolia</i>	sword fern	Category I	foliar	Roundup
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Roundup
<i>Ruellia brittoniana</i>	Mexican petunia	Category I	foliar	Roundup
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Roundup
<i>Syngonium podophyllum</i>	arrowhead vine	Category I	foliar	Roundup
<i>Tradescantia fluminensis</i>	wandering Jew	Category I	foliar	Roundup
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Broussonetia papyrifera</i>	paper mulberry	Category II	basal	Garlon 4
<i>Solanum diphyllum</i>	twinleaf nightshade	Category II	foliar	Roundup
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Roundup

Florida Keys Regional Working Group



The Florida Keys Regional Working Group liaison is Alison Higgins, The Nature Conservancy, P.O. Box 420237, Summerland Key, Florida, 33042, phone: 305-745-8402, fax: 305-745-8399, e-mail: ahiggins@tnc.org

Key West Naval Air Station

County: Monroe

PCL Size: 6,323

Project ID: FK-046 18.65 acres \$73,177.76

Project ID: FK-053 45.00 acres \$24,691.15

Project Manager: U.S. Navy

Edward Barham, Natural Resources Manager

Post Office Box 9007, Key West, Florida 33040-9007

Phone: 305-293-2911, Fax: 305-293-2542

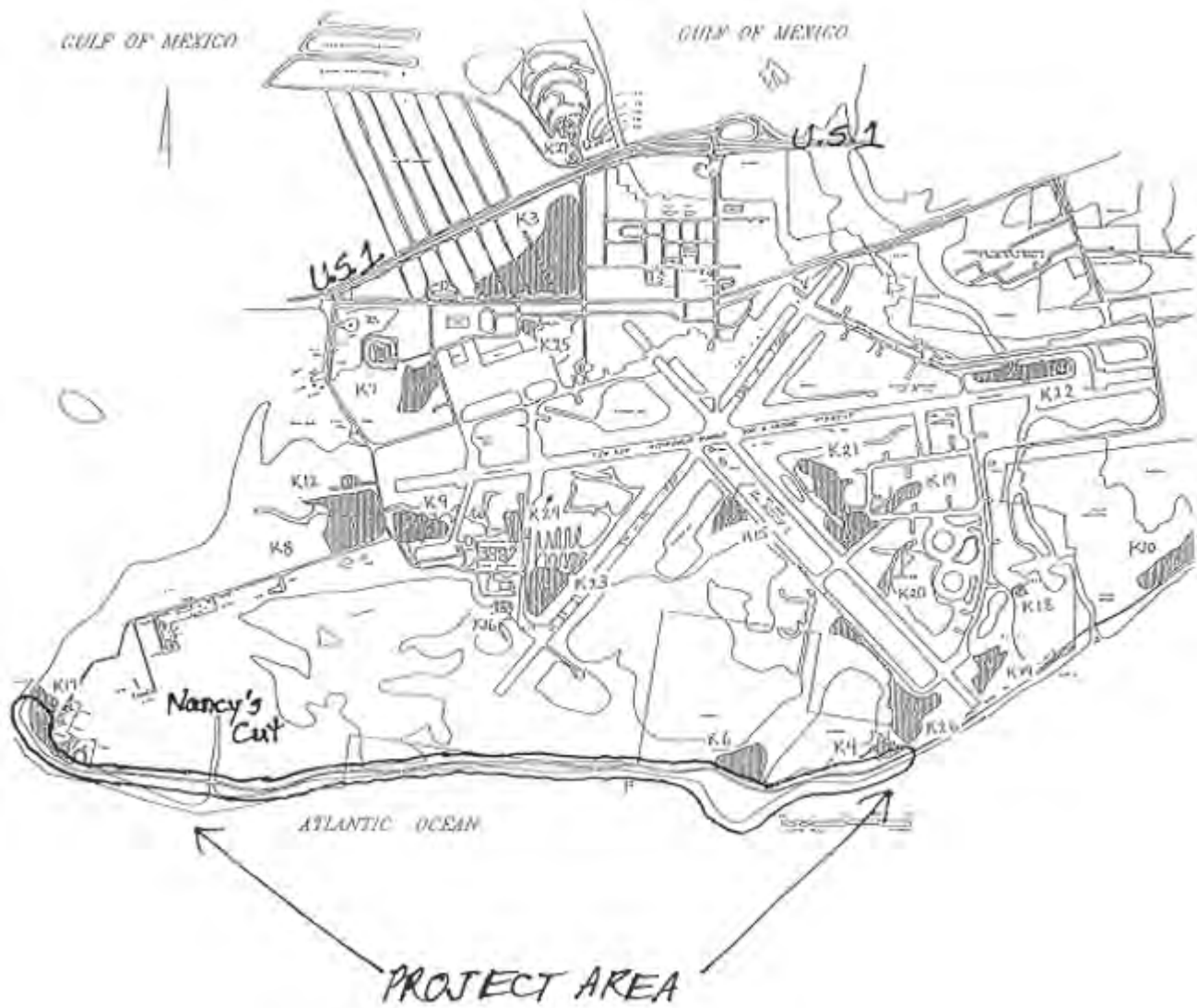
E-mail: barhamed@naskw.navy.mil

Two projects occurred at Key West NAS; one for initial control and one for maintenance control. Initial control conducted on Big Coppitt Key and Geiger Key targeted Australian pine. Big Coppitt Key is a filled, scarified area within the Key West NAS Fish and Wildlife Management Area MU-5. The site is approximately 0.65 acres and is adjacent to mangrove wetlands and open water. Geiger Key is a former “Hawk Missile Site” and comprises approximately 18 acres.

The second project area encompassed a natural beach berm along the Atlantic Ocean located on Key West NAS property on Boca Chica and Geiger Keys. This area is habitat for wildlife, including the endangered Lower Keys marsh rabbit (*Sylvilagus palustris hefneri*). Rapidly expanding populations of invasive exotic plant species infested the beach berm. The two primary invaders were lather leaf and Brazilian pepper. Also present, to a much lesser extent, were Australian pine and seaside mahoe. About 12.4 acres of the project area was west of an old tidal creek called Nancy’s Cut, with the remaining 32.6 acres east of the cut. The exotics were largely concentrated along the berm top and road edges. This project involved maintenance control of the FY03 project area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4
<i>Scaevola sericea</i>	beach naupaka	Category I	cut stump	Garlon 4
<i>Hibiscus tiliaceus</i>	mahoe	Category II	cut stump	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	cut stump	Garlon 4

**Boca Chica Beach Exotics
Project Map**



Florida Keys Refuges Invasive Exotic Plant Control Technicians

County: Monroe

PCL Name	PCL Size (ac)	Project Area (ac)	
National Key Deer Refuge	9,367.94	760	
Great White Heron NWR	192,787.63	983	
Key West NWR	208,308.17	1,434	
Crocodile Lake NWR	6,688.04	1,197	
Florida Keys WEA	2,344.00	1,493	
Project ID: FK-044	Total Project Size:	5,867 acres	\$77,616.00

Project Manager: U.S. Fish and Wildlife Service

William G. Miller

P.O. Box 430510, Big Pine Key, Florida 33043

Phone: 305-872-2239, Fax: 305-872-3675

E-mail: william_g_miller@fws.gov

The Florida Keys National Wildlife Refuges (NWR), including the Key Deer, Great White Heron, Key West, and Crocodile Lake National Wildlife Refuges, and the Florida Keys Wildlife and Environmental Area (WEA) include land on Key Largo, Big Pine Key, No Name Key, the back country islands of the Great White Heron NWR, and several other keys in the Lower Florida Keys. Natural communities within the NWR/WEA include tropical hardwood hammock, pine rocklands, freshwater wetlands, and mangrove swamp. These lands are home to a number of rare plants and animals, five of which occur nowhere else in the world. Rapidly expanding populations of Brazilian pepper, Australian pine, and latherleaf infest the native habitats of the NWR/WEA. This project targeted these three species and other invasive plants on Key Largo, Big Pine, No Name, Big and Little Torch, Summerland, Cudjoe, Sugarloaf, and Boca Chica Keys, and the backcountry islands of the Lower Keys.

Public conservation lands extend throughout the Keys and include individual lots ranging from 5,000 square feet to parcels several hundred acres in size. These properties are owned by the United States of America, State of Florida, South Florida Water Management District, and Monroe County. All lands are publicly owned and managed by the NWR/WEA for conservation of rare plant and animal species, including the Key deer. A team of plant control technicians funded by BIPM performed the work. USFWS provided matching costs for herbicide, vehicles, crew equipment, and mechanical equipment with a total value of \$70,400.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4
<i>Scaevola sericea</i>	beach naupaka	Category I	cut stump	Garlon 4
<i>Hibiscus tiliaceus</i>	mahoe	Category II	cut stump	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	cut stump	Garlon 4

Figure 1. Location of exotic plant control units on Big Pine and No Name Keys.

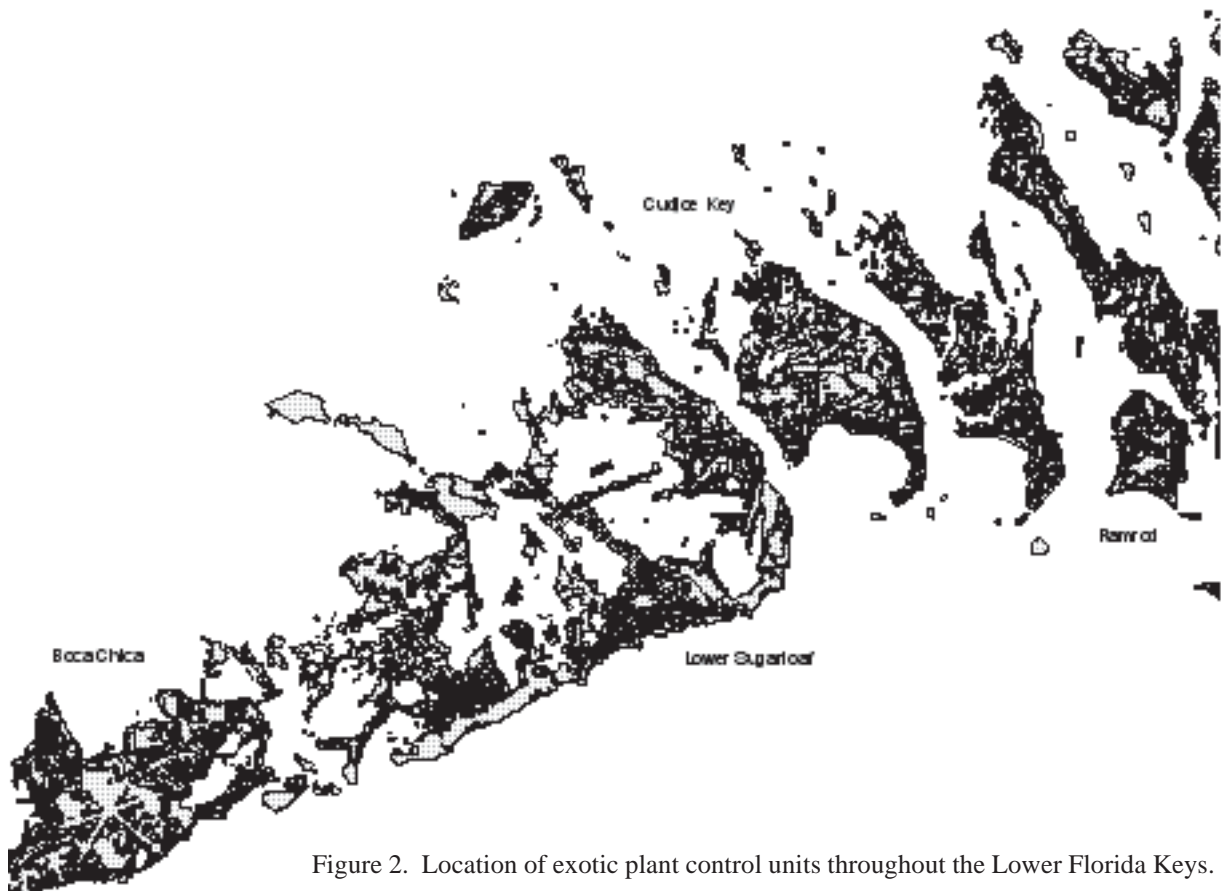
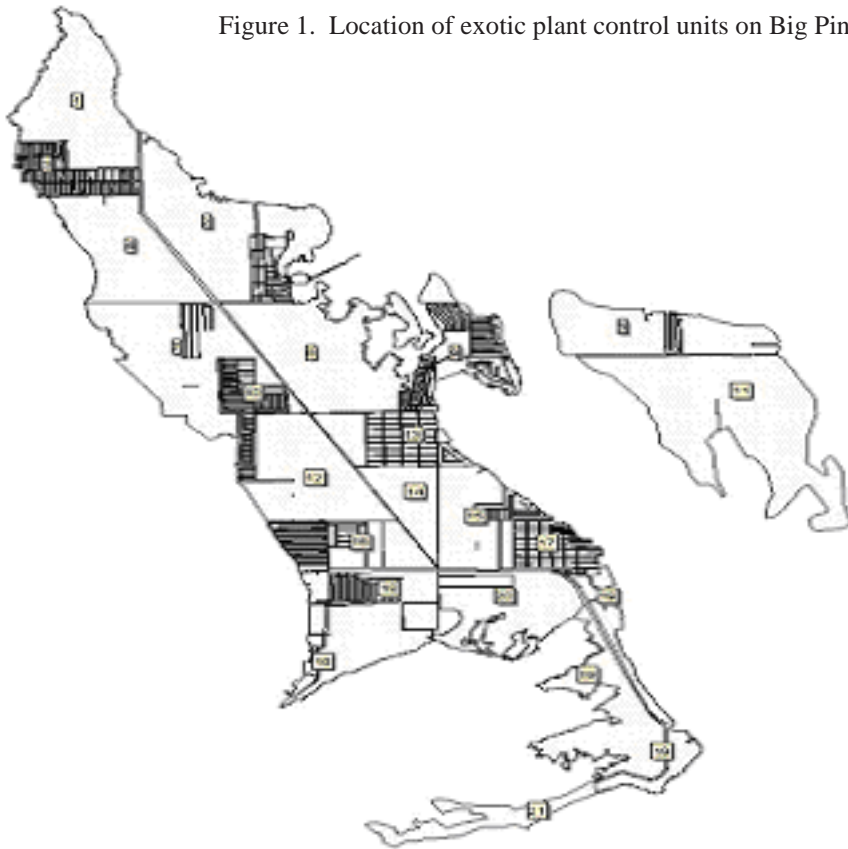


Figure 2. Location of exotic plant control units throughout the Lower Florida Keys.

Key West Tropical Forest and Botanical Garden

County: Monroe

PCL Size: 11 acres

Project ID: FK-049 6.25 acres \$12,600

Project Manager: Key West Botanical Garden Society

Carolann Sharkey, President

PO Box 2436, Key West, Florida 33045

Phone: 305-296-1504, Fax: 305-296-2242

E-mail: kwbgs@bellsouth.net

The Key West Tropical Forest and Botanical Garden on Stock Island is owned by the City of Key West and managed by the Key West Botanical Garden Society, a 501(c)3 non-profit environmental education organization. The Federal Emergency Relief Administration initially set the property aside in 1934. The Society works in partnership with Duke University and several other entities to enhance its conservation and environmental education goals, and receives technical assistance from the U.S. Fish and Wildlife Service regarding those goals and other specific factors such as the federally listed Stock Island tree snail. The Society has contacted adjacent landowners to promote collaboration on invasive plant control.

The project area consisted of three sites predominantly within an upland hardwood hammock. This hammock is the only remaining conservation land that holds the Stock Island tree snail within its native range. The hammock also provides a significant migratory stop for neotropical migrant birds, as well as habitat for many resident birds such as the white-crowned pigeon. Over 20 varieties of butterflies are recorded on the property thus far, and it is home to over 38 state threatened or endangered species of flora and fauna.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia lebbbeck</i>	woman's tongue	Category I	cut stump	Garlon 4
<i>Asparagus densiflorus</i>	Asparagus-fern	Category I	foliar	Glypro
<i>Casuarina equisetifolia</i>	Australian pine	Category I	cut stump	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	cut stump	Garlon 4
<i>Sansevieria hyacinthoides</i>	bowstring hemp	Category II	cut stump	Garlon 4
<i>Stenotaphrum secundatum</i>	St. Augustine grass	n/a	foliar	Glypro

Dagny Johnson Key Largo Hammocks Botanical State Park

County: Monroe

PCL Size: 2,415 acres

Project ID: FK-045 5 acres \$42,500

Project Manager: Florida Park Service (DEP)

Eric Kiefer, Park Manager

P. O. Box 487, Key Largo, Florida 33037

Phone: 305-451-1202, Fax: 305-853-3555

E-mail: eric.kiefer@dep.state.fl.us

Public conservation lands comprise a significant amount of Key Largo. The native vegetation of Key Largo derives primarily from West Indian and Caribbean origin. This project included two sites in John D. Pennekamp Coral Reef State Park. The first site lay in the ecotone between hammock and mangroves near (North) Sound Point on El Radabob Key, and the second site was adjacent to the campground at the park's land base. The Florida Park Service manages the land as part of Dagny Johnson Key Largo Hammock Botanical State Park.

Portia, lather leaf, and Brazilian pepper overran the first site, affecting three imperiled natural communities: coastal rock barren, coastal berm, and rockland hammock. The second site, adjacent to the park's campground, is highly disturbed and consists of two to three acres of dredge spoil over a filled wetland. Mahoe heavily infested the site. Also present in smaller numbers were Queensland umbrella tree, Brazilian pepper, and braceletwood. Water flowing from an artesian well through the site carried mahoe seed capsules into a nearby tidal creek.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Colubrina asiatica</i>	lather leaf	Category I	cut stump	Garlon 3A
<i>Schefflera actinophylla</i>	Queensland umbrella tree	Category I	cut stump	Garlon 3A
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 3A
<i>Thespesia populnea</i>	portia	Category I	cut stump	Garlon 3A
<i>Hibiscus tiliaceus</i>	mahoe	Category II	cut stump	Garlon 3A
<i>Jacquinia arborea</i>	braceletwood	n/a	cut stump	Garlon 3A

Curry Hammock State Park

County: Monroe

PCL Size: 665 acres

Project ID: FK-052 31 acres \$10,525.62

Project Manager: Florida Park Service (DEP)

Steve Eibl, Park Manager

P.O. Box 776, Long Key, Florida 33001

Phone: 305-451-3005, Fax: 305-853-3553

E-mail: steven.eibl@dep.state.fl.us

The project sites were Long Point Key and Fat Deer Key, located within Curry Hammock State Park. Curry Hammock is the largest uninhabited terrestrial parcel between Key Largo and Big Pine Key, and the most complete remaining example of the natural heritage of the Middle Florida Keys. Natural communities in the project area included coastal berm, beach dune, tidal mangrove swamp, and tropical hammock. Brazilian pepper, seaside mahoe, and latherleaf were the primary targets of follow-up work.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4+Stalker
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4+Stalker

Florida Keys State Parks Invasive Exotic Plant Control Technicians

County: Monroe

John Pennekamp Coral Reef SP	PCL Size: 63,643.7 acres
Key Largo Hammocks SP	PCL Size: 2,420.6 acres
Lignumvitae Botanical SP	PCL Size: 10,659.1 acres
Windley Key Geologic SP	PCL Size: 31.9 acres
Indian Key Historic SP	PCL Size: 110.5 acres
Long Key SP	PCL Size: 979.9 acres
Curry Hammock SP	PCL Size: 970.2 acres
Project ID: FK-047	216.82 acres \$62,263

Project Manager: Florida Park Service (DEP)

Eric Kiefer, Park Manager

P.O. Box 487, Key Largo, Florida 33037

Phone: 305-451-1202, Fax: 305-853-3555

E-mail: eric.kiefer@dep.state.fl.us

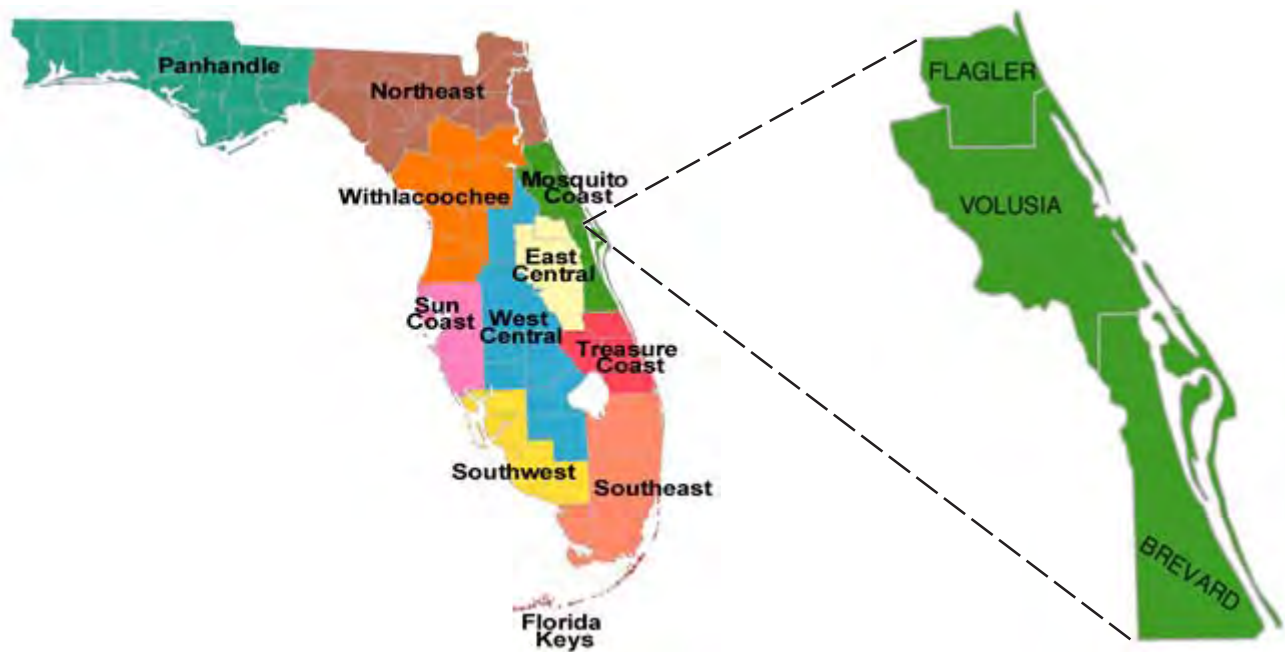
E-mail: james.g.duquesnel@dep.state.fl.us

The Florida Keys State Parks include Dagny R Johnson Key Largo Hammocks (KLHSP), John Pennekamp Coral Reef (JPSP), Lignumvitae Botanical, Windley Key Geologic, Indian Key Historic, Long Key, and Curry Hammock State Parks. Natural communities within the state parks include tropical hardwood hammock, pine rocklands, freshwater wetlands, and mangrove swamp. These lands are home to a number of rare plants and animals, some of which occur nowhere else in the world. Rapidly expanding populations of Brazilian pepper, Australian pine, and latherleaf infested the native habitats of the parks. This project targeted these three species and other invasive plants found on the state parks.

Public conservation lands extend throughout the Keys and include individual lots ranging from 5,000 square feet to parcels several hundred acres in size. Public landowners include the federal government, State of Florida, South Florida Water Management District, and Monroe County. All publicly owned lands are managed for conservation of rare plant and animal species. A team of two plant control technicians funded by BIPM performed the work. The technicians worked primarily at KLHSP and JPSP, while also assisting with maintenance work at the other state parks and on cooperative exotic removal work days with other agencies in the Keys. Treated areas on the parks varied from one-tenth acre to over one hundred acres. FPS provided matching costs for herbicide, vehicles, and crew equipment with a total value of \$10,000.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina</i> spp.	Australian pine	Category I	basal	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4

Mosquito Coast Regional Working Group



The Mosquito Coast Regional Working Group liaison is Chris Koepfel, Brevard County Natural Areas Management, 2725 Judge Fran Jamieson Way, Building A, Viera, Florida 32940, phone: 321-633-2016, fax: 321-633-2029, e-mail: chris.koepfel@brevardcounty.us

Merritt Island National Wildlife Refuge

County: Brevard

PCL Size: 139,174 acres

Project ID: MC-048 8,000 acres \$40,926.26

Project Manager: U.S. Fish and Wildlife Service

Ron Hight, Refuge Manager

P.O. Box 6504, Titusville, Florida 32782

Phone: 321-861-0667, Fax: 321-861-1276

E-mail: ron_hight@fws.gov

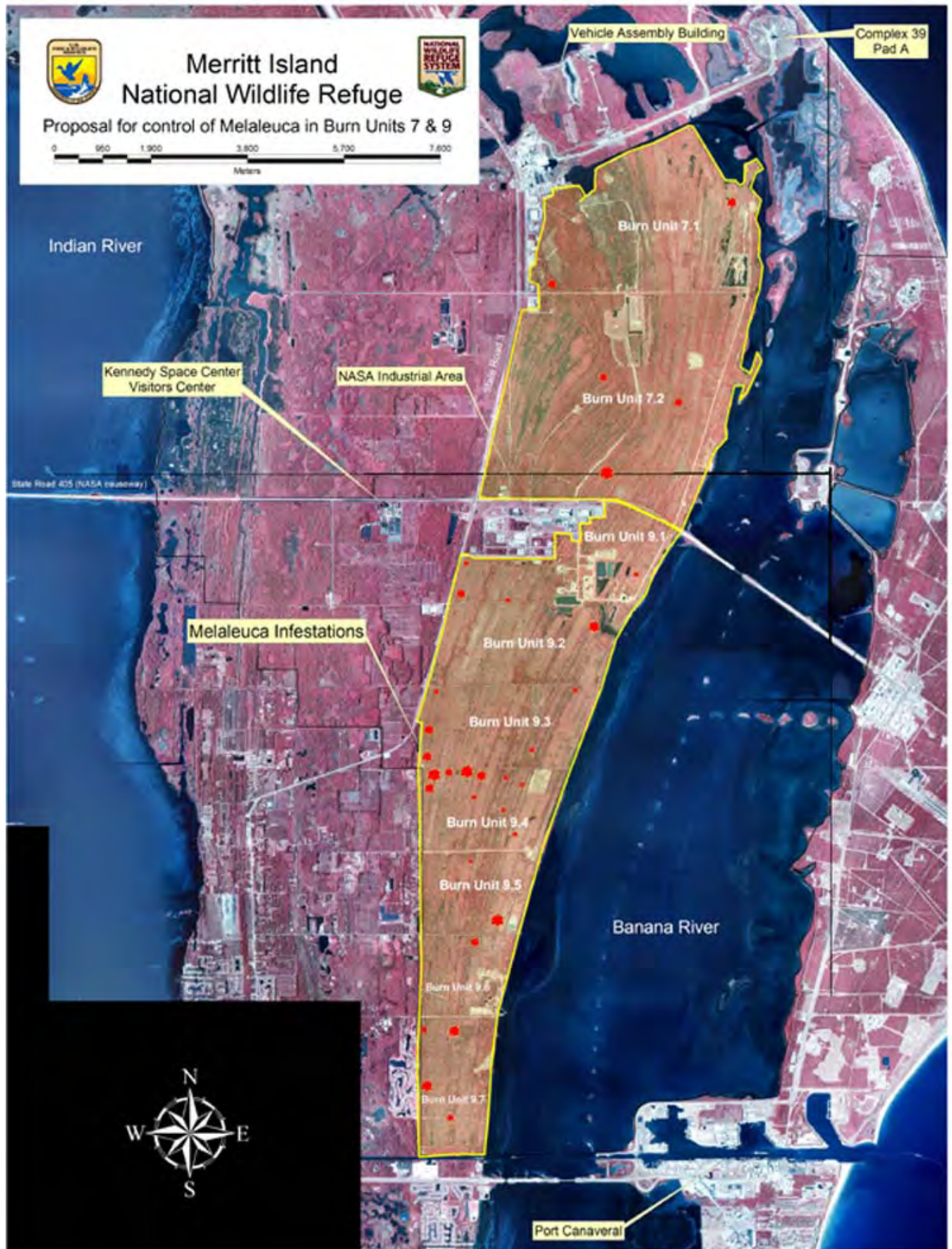
In the early 1960s, NASA began to acquire the land that is now John F. Kennedy Space Center. In 1963, the acquisition was complete and NASA turned those lands not vital to the space program over to the U.S. Fish and Wildlife Service. Today, the Department of the Interior manages the 43-mile long barrier island as Merritt Island National Wildlife Refuge and Canaveral National Seashore. The Refuge is adjacent to the Indian River and Banana Rivers, and Mosquito Lagoon.

Approximately one-half of the refuge consists of brackish estuaries and marshes. The remaining land consists of coastal dunes, scrub oaks, pine forest, pine flatwoods, and palm and oak hammocks. Numerous rare plants and animals live on the refuge. These include seventeen state-endangered plants, such as satinleaf (*Chrysophyllum oliviforme*), crested coralroot (*Hexalectris spicata*), Florida peperomia (*Peperomia obtusifolia*), beach star (*Remirea maritima*), bay cedar (*Suriana maritima*), coastal hoary pea (*Tephrosia angustissima*), and sea lavender (*Tournefortia gnaphalodes*).

Early homesteaders that occupied the land before it became a refuge first introduced melaleuca. They planted the tree as an ornamental, as well as for shade, and it later escaped into the natural wetlands of the area. This project controlled primarily melaleuca scattered within eleven Burn Units totaling 8,000 acres. Melaleuca trees lightly to moderately infested swales that run north to south through the marshes in the Refuge. Most trees were saplings found in small stands.

BIPM also provided herbicide for maintenance control on 1,194 acres treated in the previous fiscal year. Total cost was \$7,385.75 with the herbicide provided by the bureau's Herbicide Bank.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	cut stump	Garlon 4
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal



Archie Carr National Wildlife Refuge

County: Brevard

PCL Size: 162.4 acres

Project ID: MC-054 147.4 acres \$47,201.02

Project Manager: Brevard County Parks & Recreation

Raymond Mojica, EEL Land Manager

5560 North US Highway 1, Melbourne, Florida 32940

Phone: 321-255-4466, Fax: 321-255-4499

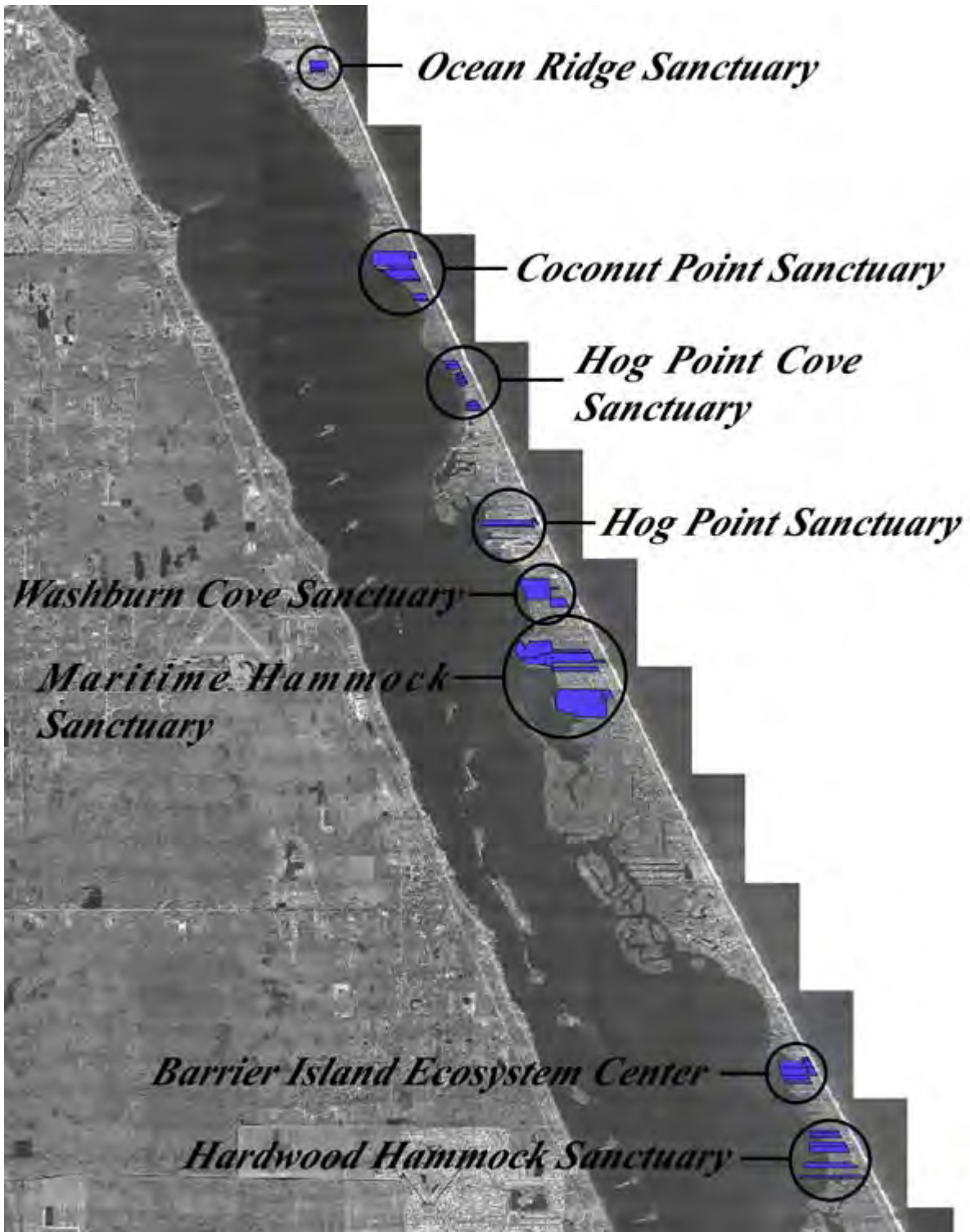
E-mail: rmojica@brevardparks.com

The South Beaches project is a cooperative effort between several partners, including federal, state, and local agencies. The project includes several parcels of publicly owned conservation lands on the South Beaches of Brevard County. All of the property is located within the boundary of the Archie Carr National Wildlife Refuge. The Refuge, designated by Congress in 1990, is recognized as one of the most important areas in the world for nesting loggerhead turtles and the most significant area in North America for nesting green turtles. Natural communities within the project area include coastal strand, maritime hammock, beach dune, and mangrove forest.

This project completed the fifth phase of an aggressive program to remove Brazilian pepper and Australian pine from publicly held lands on the south beaches of Brevard County. The project consisted of controlling Brazilian pepper with an average coverage of thirty percent on four sites: Ocean Ridge Sanctuary, Hog Point Cove Sanctuary, Maritime Hammock Sanctuary, and Hardwood Hammock Sanctuary. In addition to the ground work conducted by crews, a Brontosaurus™ mower removed 14.5 acres of dense Brazilian pepper.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	mechanical	n/a

Archie Carr National Wildlife Refuge



Pine Island Conservation Area

County: Brevard

PCL Size: 879 acres

Project ID: MC-049 190 acres \$238,000

Project Manager: Brevard County Parks & Recreation

D. Scott Taylor, Ph.D., EEL Central Region Land Manager

5560 North US Highway 1, Melbourne, Florida 32940

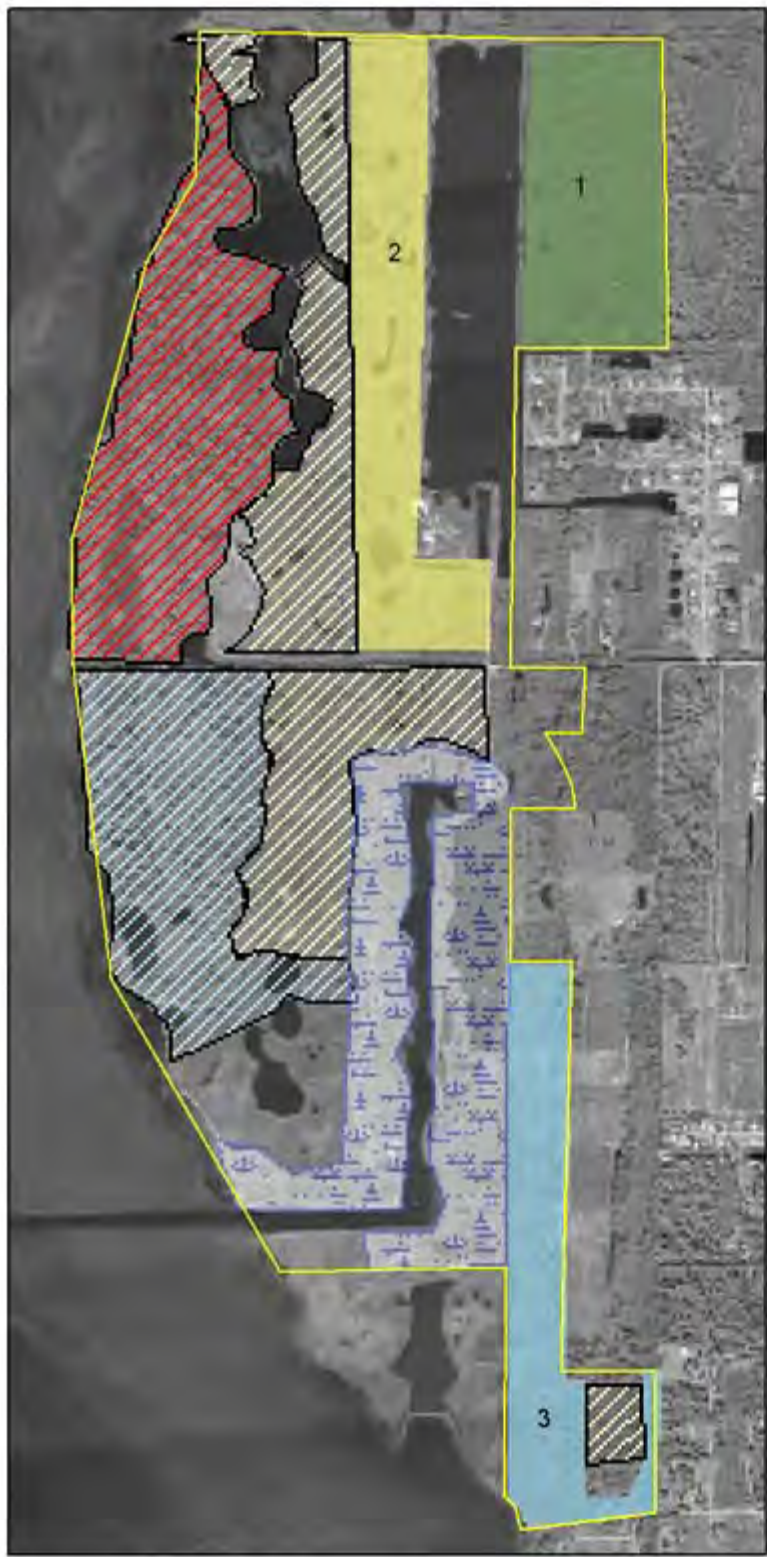
Phone: 321-255-4466, Fax: 321-255-4499

E-mail: staylor@brevardparks.com

The mesic pine flatwoods "island" for which this conservation land is historically named is regionally unique in that large areas grade directly into the Indian River Lagoon and other areas exhibit rapid transitions to isolated freshwater marshes and impounded estuarine marsh and mangrove forest habitats that fringe the Lagoon. Development activities on Pine Island during the 1960s in support of sand mining and mosquito control operations significantly altered the hydrologic regime and structural integrity of the expansive estuarine marsh system historically characterizing this property. Invasive exotic pest plants, primarily Brazilian pepper, exploited the conditions provided by these land disturbances.

This project, the fourth and final phase of ongoing work, targeted removal of Brazilian pepper from primarily hydric hammock and impounded freshwater marsh natural community types located in three management units of the conservation property. Brazilian pepper occurred throughout the project area in varying degrees of coverage, with the majority of the project exhibiting dense coverage.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4

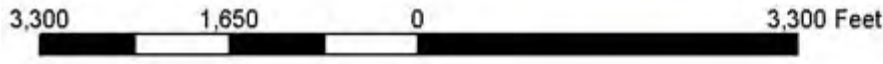


Legend

-  PICA
-  Restoration
-  Phase1
-  Phase2
-  Phase3

Phase 4

- ### Unit
-  1
 -  2
 -  3



Brevard County Lands Maintenance

County: Brevard

PCL Size: *various*

Project ID: MC-052 136 acres \$50,000

Project Manager: Brevard County Parks & Recreation

Raymond Mojica, EEL Land Manager

5560 North US Highway 1, Melbourne, Florida 32940

Phone: 321-255-4466, Fax: 321-255-4499

E-mail: rmojica@brevardparks.com

Numerous agencies within Brevard County have utilized funds from the DEP Bureau of Invasive Plant Management (BIPM) to treat invasive exotic plants on conservation lands over the past 5 years. These agencies, including several departments of the Brevard County Government and the Sebastian Inlet State Park, have treated several hundred acres within two primary target areas. The two target areas are properties within the Archie Carr National Wildlife Refuge and several properties located on North Merritt Island including the Pine Island Conservation Area, the Kabboord Sanctuary, and Kings Park/Sykes Creek. These projects received initial treatment under thirteen different BIPM Task Assignments.

Approximately sixty percent of the proposed acreage of this project is within the boundaries of the Archie Carr National Wildlife Refuge. The Refuge is a globally significant sea turtle nesting habitat. The beach dune, coastal strand, salt marsh and maritime hammock communities found on the sites are considered imperiled and vulnerable to extinction within Florida.

Running adjacent to the Refuge, the Indian River Lagoon, an "Estuary of National Significance," is North America's most diverse estuary. The Lagoon is located on the Atlantic Flyway, an important waterfowl migratory route. Seagrass beds and mangrove forest located at the shoreline are nursery areas for juvenile fish and other estuarine species.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4

Thousand Islands Conservation Area

County: Brevard

PCL Size: 550 acres

Project ID: MC-055 31 acres \$64,850

Project Manager: Cocoa Beach Stormwater Utility

Joanie Regan, Stormwater Manager

1600 Minutemen Causeway, Cocoa Beach, Florida 32931

Phone: 321-868-3292, Fax: 321-868-3379

E-mail: jregan@cityofcocoa beach.com

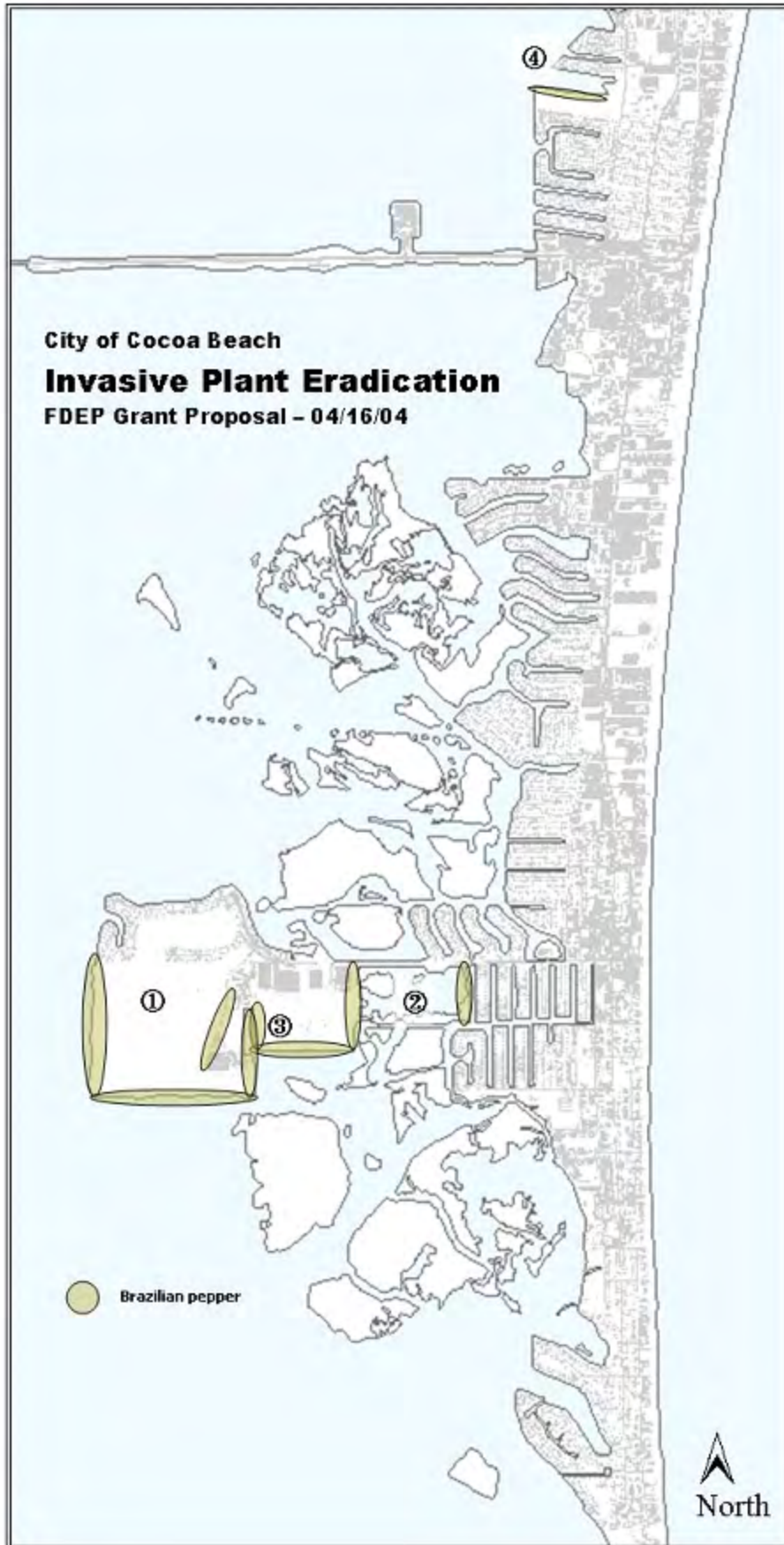
The project area lies within the Thousand Islands, a 550-acre tract of submerged lands, mangrove forest, and approximately 30 acres of uplands created by dredge spoil. Maritime hammock and salt marsh were the dominant natural communities before the wetlands were filled around 1960. The current habitat comprises disturbed uplands, predominantly Brazilian pepper monoculture, with a thin density of native species such as buttonwood (*Conocarpus erecta*), red cedar (*Juniperus virginiana*), wax myrtle (*Myrica cerifera*), and Florida privet (*Forestiera segregata*). A fringe of mangrove lies along the shoreline. The site is contiguous with the Indian River Lagoon—a National Estuary Program area and an Outstanding Florida Water—and is part of the Banana River Aquatic Preserve.

Brazilian pepper dominated the project area, with small areas of Australian pine and lead tree. Some older pepper stands had trunks one to two feet thick, but most trees were young or regrowth clusters with average trunk sizes of three to four inches. Density was consistent throughout the project area at an estimated 60 stems per 100 square feet. A Brontosaurus™ mower was used to clear some areas of Australian pine.

The Maritime Hammock Preserve, a 5.4-acre parcel recently purchased by the City, was also included in the project area. The property is planned as a habitat preserve and stormwater treatment area to improve water quality in the Banana River Aquatic Preserve. The parcel, previously cleared at some time in the past, included zones of natural canopy mixed with Brazilian pepper. Brazilian pepper covered just less than one acre of the parcel.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina</i> spp.	Australian pine	Category I	basal	Tahoe 4
<i>Eugenia uniflora</i>	Surinam cherry	Category I	foliar	Arsenal+glyphosate
<i>Leucaena leucocephala</i>	lead tree	Category I	basal	Tahoe 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Tahoe 4
<i>Panicum maximum</i>	Guinea grass	Category II	foliar	Arsenal+glyphosate
<i>Wedelia trilobata</i>	wedelia	Category II	foliar	Arsenal+glyphosate

Thousand Islands Conservation Area



Indian River Lagoon Preserve State Park

County: Brevard

PCL Size: 870 acres

Project ID: MC-051 10 acres \$58,900

Project ID: MC-056 9.3 acres \$95,400

Project Manager: Florida Park Service (DEP)

Ron Johns, Park Manager

9700 South A1A, Melbourne Beach, Florida 32951

Phone: 321-984-4853, Fax: 321-984-4854

E-mail: ronald.n.johns@dep.state.fl.us

Indian River Lagoon Preserve is situated on an Atlantic coast barrier island. Natural communities include maritime hammock, beach dune, and mangrove forest. These projects targeted Australian pine for removal along 1.2 miles of the eastern park boundary.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	mechanical	n/a
<i>Casuarina equisetifolia</i>	Australian pine	Category I	cut stump	Garlon 4

Lake Monroe Conservation Area

County: Volusia, Seminole

PCL Size: 7,390 acres

Project ID: MC-050 114 acres \$5,495

Project Manager: St Johns River Water Management District

Randal S. Snyder, Invasive Plant Program Supervisor

PO Box 1429, 4049 Reid Street, Palatka, Florida 32178

Phone: 321-409-2168, Fax: 386-329-4310

E-mail: rsnyder@sjrwmd.com

The Lake Monroe Conservation Area contains ninety percent of the floodplain of Lake Monroe. Wetlands make up ninety-four percent of the conservation area and provide protection of water quality for more than three miles of Lake Monroe and St. Johns River shoreline. The area ranges from recently planted longleaf pine along Reed Ellis Road to a small strip of palmetto oak hammocks, before the elevation quickly drops into a cypress dominated swamp. Beyond the cypress strand lies a drainage slough predominantly populated with buttonbush, swamp hibiscus, *Sagittaria*, *Spartina*, and sawgrass. Between the slough and the river shoreline are scattered small islands of red maple, cabbage palm, cypress, and wax myrtle lying among marshes of maidencane, *Eleocharis*, and the dominant species, *Spartina bakeri*.

The project area encompassed the western portion of the property, known as the Kratzert Tract. This tract is a 114-acre cabbage palm island hammock that lies within a *Spartina* marsh. Chinese tallow occurred with varying degree of coverage throughout the project area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4



Freshly cut tallow stumps waiting for their Garlon.



Photo #1 - before



Photo #2 - after



Pepper Sweep '05

County: Volusia

Doris Leeper Spruce Creek Preserve

PCL Size: 915 acres

Canaveral National Seashore

PCL Size: 57,661.69 acres

Project ID: MC-047 118 acres \$54,985.64

Project Manager: East Volusia Mosquito Control District

David Farr

801 South Street, New Smyrna Beach, Florida 32168

Phone: 386-424-2920, Fax: 386-424-2924

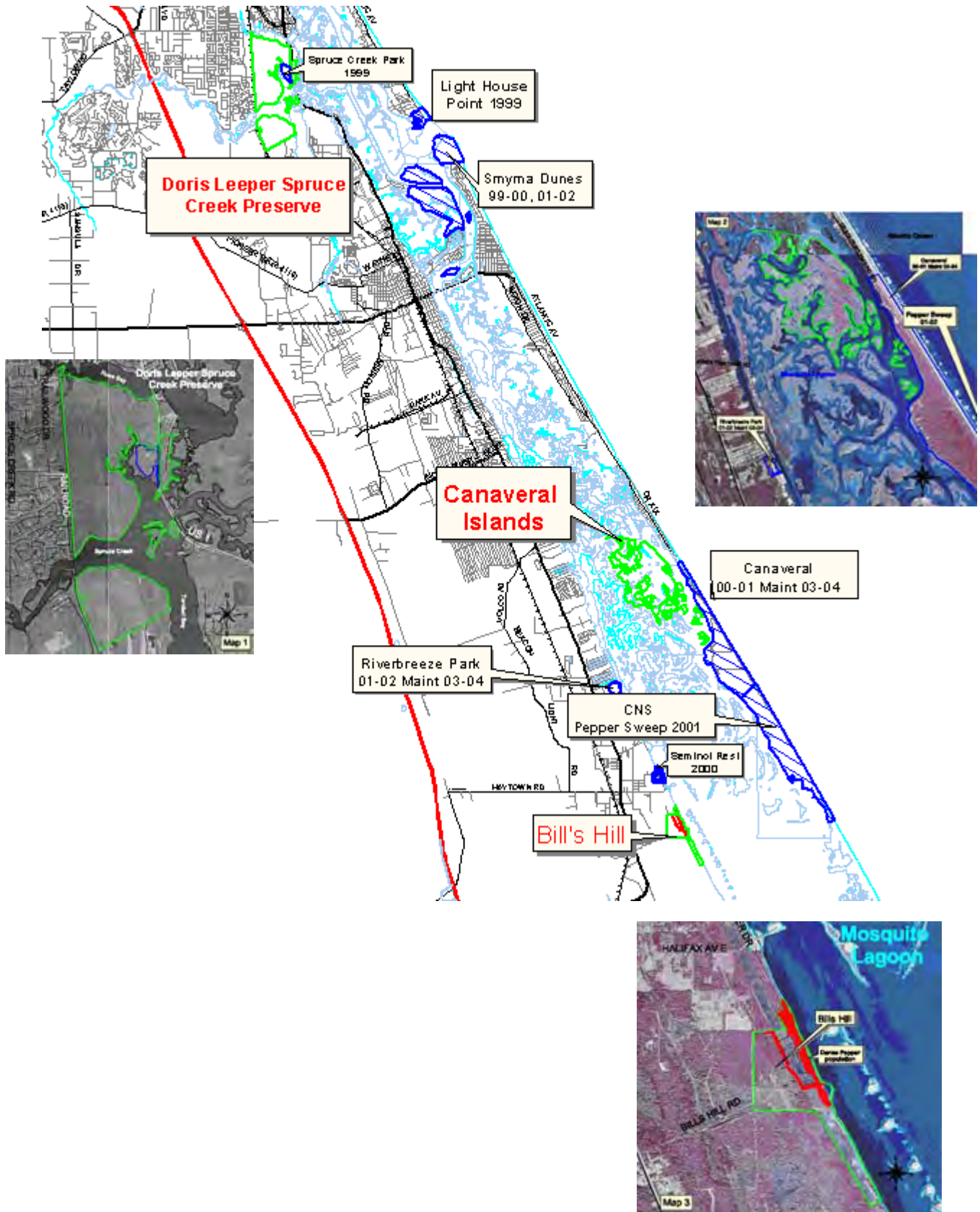
E-mail: dfarr@co.volusia.fl.us

This project encompassed one federal property, Canaveral National Seashore, and one county property, Doris Leeper Spruce Creek Preserve. Much of the project area consists of cabbage palm and live oak hammocks interspersed amidst tidal salt marsh and fringing mangrove forest. Spruce Creek Preserve contained approximately 0.75 acres of Australian pine and 45 acres of Brazilian pepper that were located mainly along the tree line in the marsh area. Some dense stands of pepper also grew along a canal in the area by Turnbull Bay. The County provided \$40,000 in matching funds for a total project cost of \$94,985.64

The project area also included two sites within the boundaries of the Canaveral National Seashore. The CNS Islands site is approximately 810 acres in size and contained approximately 35 acres of sparse to densely populated pepper. A large portion of this site consists of marsh areas with sparsely distributed stands of pepper that sat on small islands, some as small as a few square feet in size. Most of the dense pepper communities were located on the larger island known as Shipyard Island. Bill's Hill, a 175-acre site, is located on the western portion of Mosquito Lagoon and contained approximately 35 acres of pepper. Most of the pepper was located in the northeast portion of the site in an area between Mosquito Lagoon to the east and the marsh area/impoundment to the west. There were also dense stands along the west side of the marsh area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal, cut stump	Garlon 4

Pepper Sweep '05



Pepper Sweep Maintenance

County: Volusia

Smyrna Dunes Park

PCL Size: 250 acres

North Peninsula State Park

PCL Size: 522.26 acres

Canaveral National Seashore

PCL Size: 57,661.69 acres

Project ID: MC-053 260.0 acres \$38,952.44

Project ID: MC-024 114.5 acres \$13,898.50

Project Manager: East Volusia Mosquito Control District

David Farr

801 South Street, New Smyrna Beach, Florida 32168

Phone: 386-424-2920, Fax: 386-424-2924

E-mail: dfarr@co.volusia.fl.us

The first project encompassed a county park, a state park, and a federal park; Smyrna Dunes Park, North Peninsula State Park, and Canaveral National Seashore, respectively. Natural communities found on these conservation areas include coastal dune, coastal strand, maritime hammock, coastal strand, oak scrub, live oak hammock, mangrove swamp, and tidal marsh. These parks were the subject of initial control work under four previous “Pepper Sweeps” (2000-2004). Volusia County provided in-kind contributions valued at \$3,500 to this project.

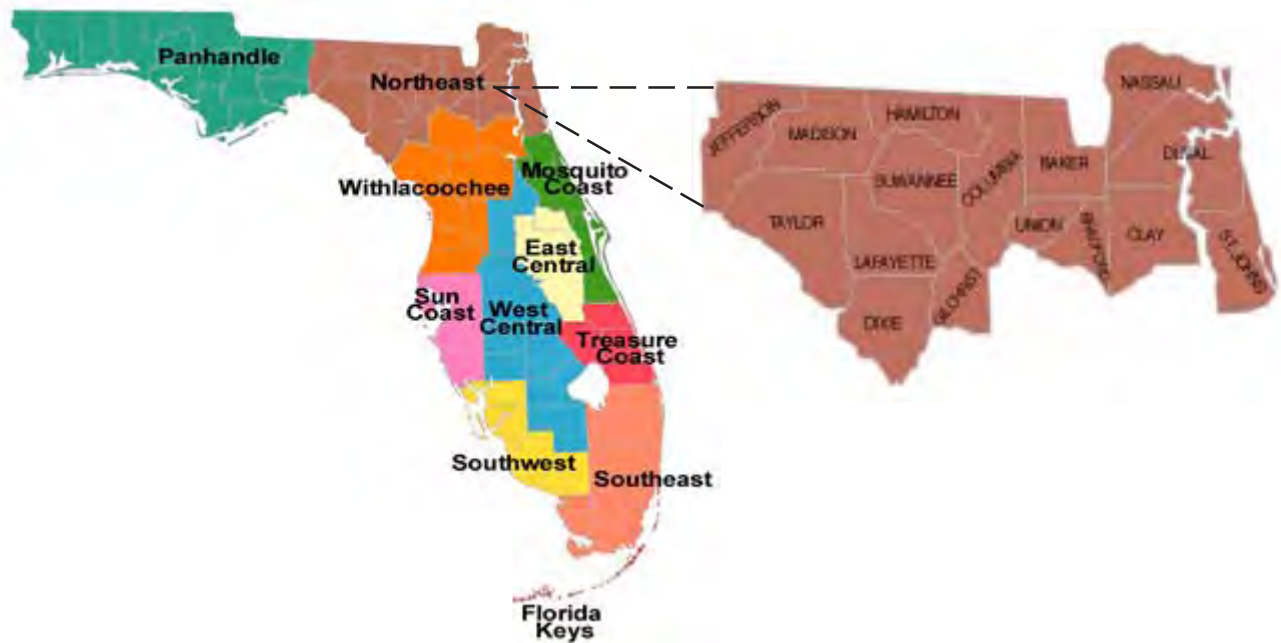
The second project was a continuation of maintenance control on the above three parks as well as Bulow Creek State Park and four other county parks. BIPM provided the herbicide only for this project through its Herbicide Bank.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal, cut stump	Garlon 4



The pepper trees may be dead and brown, but a healthy seed bank means a few years of watchful maintenance to come.

Northeast Regional Working Group



The Northeast Regional Working Group liaison is Stefanie M. Nagid, Suwannee River Water Management District, 9225 CR 49, Live Oak, Florida 32060, phone: 386-362-1001, fax: 386-362-1056, e-mail: nagid_s@srwmd.state.fl.us

Upper Alapaha River and Santa Fe Swamp Conservation Areas

County: Alachua, Hamilton

Upper Alapaha River Conservation Area

PCL Size: 2,216 acres

Santa Fe Swamp Conservation Area

PCL Size: 7,264.59 acres

Project ID: NE-019 480 acres \$15,313.42

Project Manager: Suwannee River Water Management District

Stefanie Nagid

9225 CR 49, Live Oak, Florida 32060






Phone: 386-362-1001, Fax: 386-362-1056

E-mail: nagid_s@srwmd.state.fl.us

The Leonhardt Tract is located in Hamilton County on the Alapaha River, which forms the western boundary of the tract, and is included in the Upper Alapaha River Conservation Area. The tract is approximately 380 acres of mostly uplands and floodplain forest. Scattered exotics occurred throughout the property boundary and along the fence line and dirt roads that separate the tract from private land and I-75. A narrow strip of land connecting the tract to a public road was infested with moderate densities of Chinaberry and light densities of Japanese honeysuckle. Light densities of Chinaberry were present along with occasional honeysuckle along the northern boundary of the tract. A large patch of exotic bamboo occurred in the southwest corner of the tract. The interior of the tract had scattered patches of Japanese climbing fern that occurred mainly in sinkhole areas.

The 1,555-acre Lake Alto Tract is located in northern Alachua County and is a part of the Santa Fe Swamp Conservation Area. Lying in the headwaters of the Santa Fe River, the tract consists of mostly floodplain swamp with some mesic flatwoods. The site is bordered by private lands on most of the north, east, and south sides with floodplain swamp, mesic flatwoods, and pine plantation making up most of the bordering lands. The northeast and northwest corners had light densities of Chinese tallow and other exotics. A railroad corridor along the western boundary had sporadic infestations of Japanese climbing fern, Japanese honeysuckle, and camphor tree along its entire length, with encroachment further into the tract in a few areas. Chinaberry and tropical soda apple also occurred in the previously disturbed interior portions of the tract.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Razor+Patriot
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Bambusa</i> spp.	bamboo	n/a	cut stump	Garlon 4

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-  S:2004exoticl_line.shp
-  S:2004exoticl_poly.shp
-  L:tracta
-  Oryzops



Invasive exotic plants (in blue) on the Lake Alto (top) and Leonhardt (bottom) Tracts

Railways, powerlines, and other linear corridors are common avenues for the spread of invasive exotic species. A number of exotics (plants and animals) prefer the “edges” along corridors, where they can expand quickly and profusely.

When working on long linear sites, an ATV (top) comes in very handy. Contractors often adapt a 50-gallon tank and pump sprayer to an ATV, allowing for a greater range of treatment than a 5-gallon backpack sprayer.

Many common herbicide mixes include a dye that aids in identifying plants that have been treated (bottom), thus preventing overspraying and waste of herbicides.



Big Bend Wildlife Management Area

County: Taylor

PCL Size: 14,600 acres

Project ID: NE-023 3 acres \$4,467.97

Project Manager: Fish & Wildlife Conservation Commission

Nuria Sancho

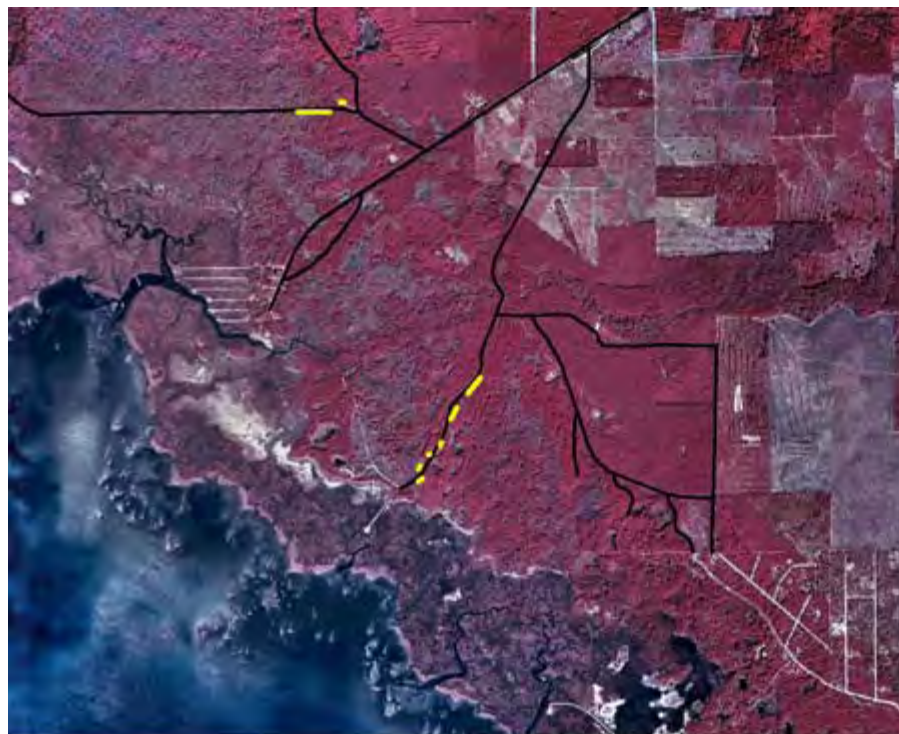
663 Plantation Road, Perry, Florida 32348

Office: 850-838-9016, Fax: 850-838-1305

E-mail: nuria.sancho@fwc.state.fl.us

The Big Bend Wildlife Management Area is comprised of several individual units: Jena, Tide Swamp, Spring Creek, Hickory Mound, and Snipe Island. The project area was in the Spring Creek Unit. Natural communities within the project area include mesic flatwoods, mesic-hydric hammocks, and upland hardwoods. Trees in the two affected sites were within confined areas, but were spreading rapidly. Treatment sites were on Mule Wallow and Strickland Bridge Roads along the sides of the roads or a few yards away from the road in some places.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Razor+Patriot
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4





Chinese tallow is often found invading wetlands like this creek (left), but the tree can easily invade uplands such as this pine flatwoods (right).



This tallow tree holds several pink egg masses deposited by the exotic South American apple snail (*Pomacea canaliculata*), portending a potential “invasional meltdown,” in which invaders create ecosystem changes that hasten other invasions in a positive feedback cycle.

Jennings State Forest

County: Clay

PCL Size: 23,995 acres

Project ID: NE-022 29.1 acres \$5,800

Project ID: NE-024 29.1 acres \$4,350

Project Manager: Florida Division of Forestry (FDACS)

Billy Wilbanks

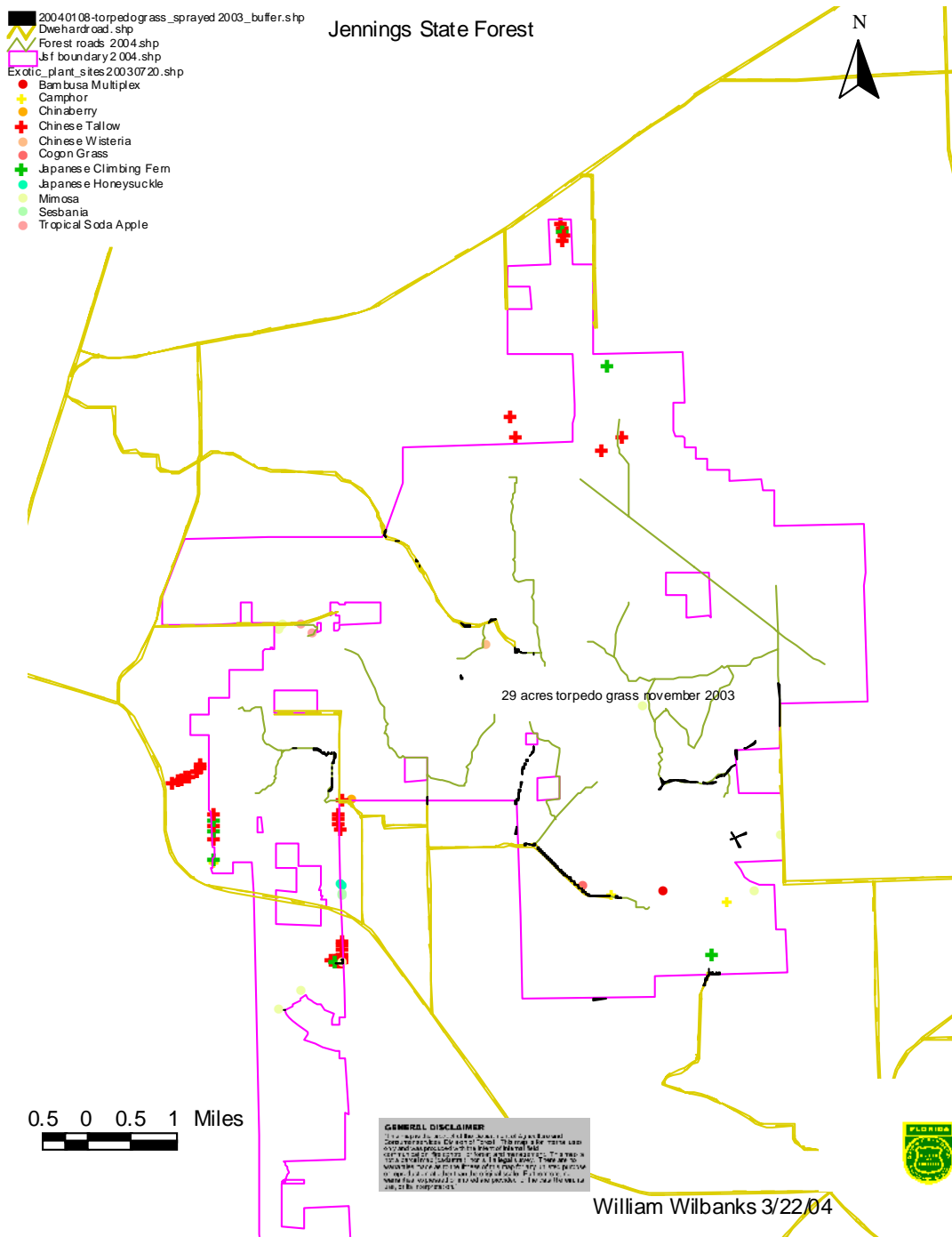
1337 Long Horn Road, Middleburg, Florida 32068

Phone: 904-291-5530, Fax: 904-291-5537

E-mail: wilbanw@doacs.state.fl.us

Jennings State Forest is a large expanse of sandhill and pine flatwoods that contains rare and endangered plants such as Bartram's Ixia. The control areas were in the Clay Hill, Longbranch, and Old Jennings tracts. The twelve roadside treatment sites contained a mixture of native vegetation with torpedo grass and climbing fern starting to invade. Forest staff sprayed all areas, comprising 29 acres in total, with Aquamaster in Fall 2003. This in-kind treatment cost \$3,363. At the start of the project, torpedo grass covered about ten to fifty percent of the treatment areas. Four sites also contained climbing fern covering a combined area of one-tenth of an acre. A re-treatment was later conducted on the same area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup
<i>Panicum repens</i>	torpedo grass	Category I	foliar	Roundup



Tree Hill Nature Center

County: Duval

PCL Size: 50.3 acres

Project ID: NE-017 13 acres \$678.25

Project Manager: Tree Hill, Inc.

Lucille G. Cortese, Executive Director

7152 Lone Star Road, Jacksonville, Florida 32211

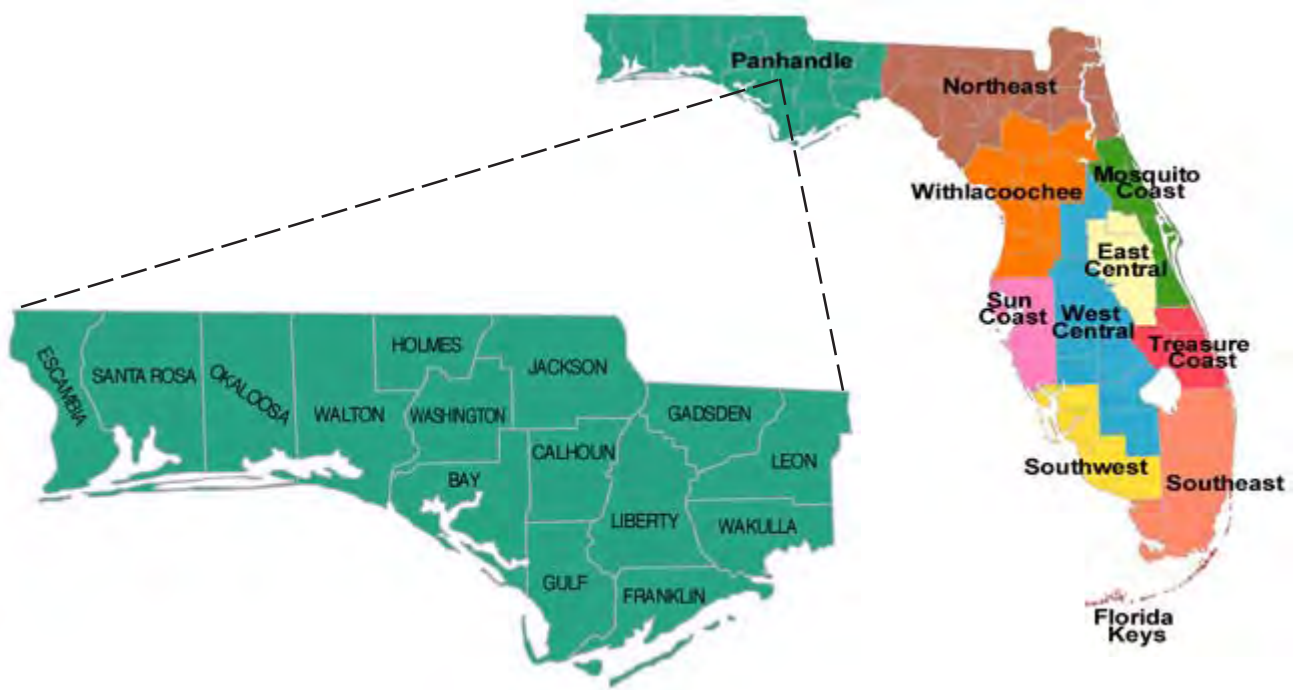
Phone: 904-724-4646, Fax: 904-724-9132

E-mail: treehill@bellsouth.net (www.treehill.org)

Tree Hill Nature Center, located in the heart of metropolitan Duval County, remains the only wilderness preserve and environmental education center serving the Jacksonville community. The Preserve consists of a variety of habitats over a small area, including riverine-mixed hardwood forest, hydric hammock, and mesic hammock. Past clear-cutting, removal of topsoil, and planting of non-native species had disturbed approximately seventy percent of the land. Air-potato invaded much of the tract (ninety-five percent of the infestation was air-potato) with a few other invasive plant species scattered throughout the project area. Exotic plant coverage varied between ten to seventy percent. This project was a follow-up treatment of the area initially controlled in the previous fiscal year. BIPM provided the herbicide only for this project through its Herbicide Bank.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Ardisia crenata</i>	coral ardisia	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Dioscorea alata</i>	winged yam	Category I	foliar	Rodeo+Escort
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Rodeo+Escort
<i>Ligustrum</i> spp.	privet	Category I	basal	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Nandina domestica</i>	nandina	Category I	basal	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Broussonetia papyrifera</i>	paper mulberry	Category II	basal	Garlon 4
<i>Elaeagnus pungens</i>	silverthorn	Category II	basal	Garlon 4

Panhandle Regional Working Group



The Panhandle Regional Working Group liaison is J.J. Bachant, The Nature Conservancy, 4025 Hwy 178, Jay, Florida 32565, phone: 850-675-2884, fax: 850-675-5759, e-mail: jbachant@tnc.org

Tate's Hell State Forest

County: Franklin

PCL Size: 198,436 acres

Project ID: PH-034 75 acres \$17,999.25

Project Manager: Division of Forestry (FDACS)

Justin Wilson

290 Airport Road, Carrabelle, Florida 32322

Phone: 850-697-3734 x116, Fax: 850-697-2892

E-mail: wilsonj1@doacs.state.fl.us

Tate's Hell State Forest is nearly 200,000 acres of mixed flatwoods, savannas, cypress strands, and coastal scrub. There are twenty-one animal and twenty-four plant species with listed status that occur on the forest. Two significant wetland plant communities were threatened by torpedo grass infestations. The dwarf cypress stands, also known as bonsai or hat-rack cypress, are one of the unique features of the area. Many of the trees are more than 300 years old, but they grow to a height of only six feet. In some areas, more than 200 species of plants can be found in a one square meter area. Wet savannas are one of the most biologically diverse plant communities in the world. Thick wiregrass and pitcher plants dominate these areas, which in spring and fall are full of a wide variety of wildflowers.

This project consisted of two phases. The target species for the first phase was torpedo grass that occurred along the roads and road shoulders in the central and southern parts of the Forest. Torpedo grass was found on twelve forest roads equaling approximately thirty linear miles of road, with an average infestation width of twenty feet. The average percent coverage for all infestations was fifty to seventy-five percent.

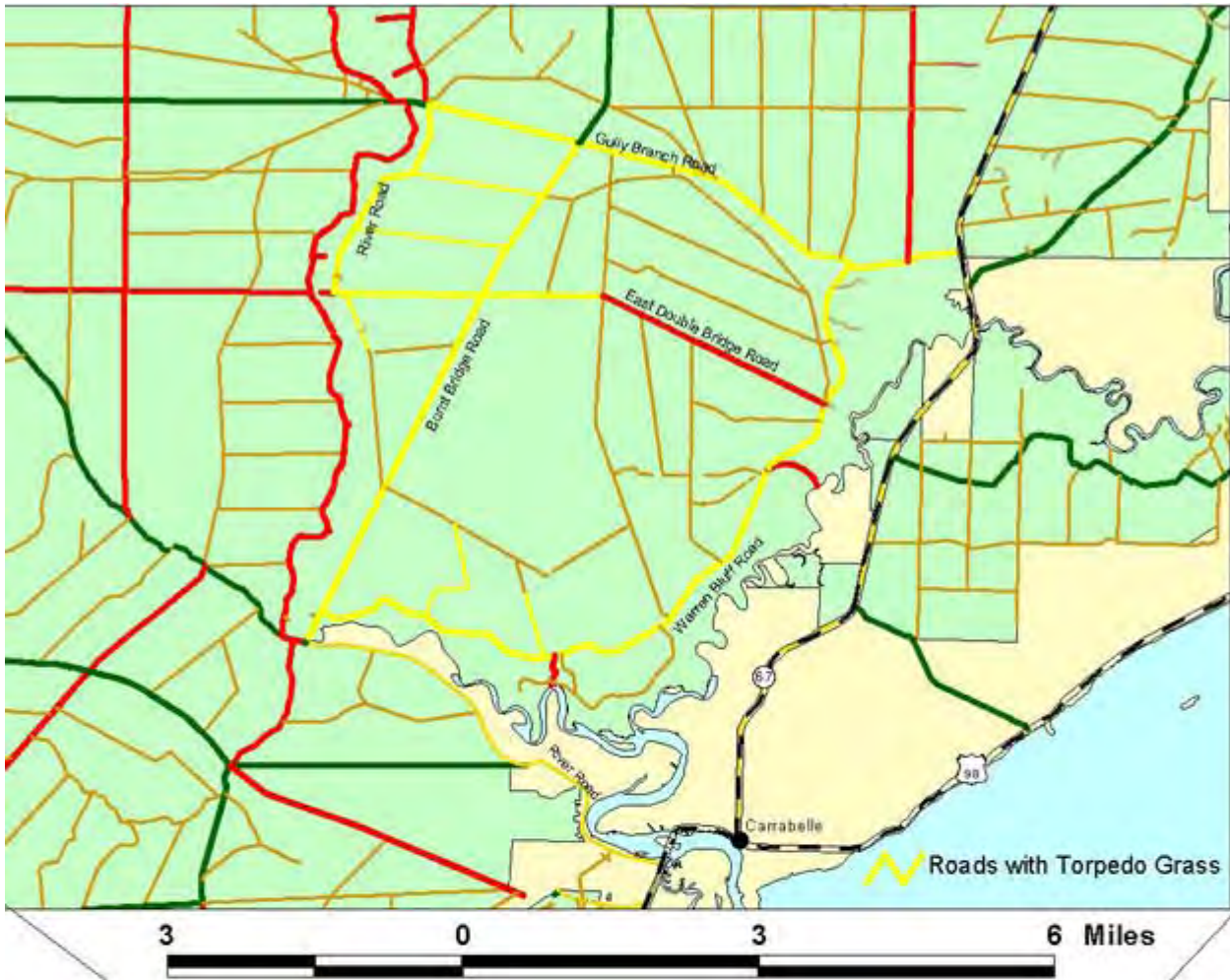
The target species for the second project phase included nine species found to occur along roads and road shoulders, and within stands of timber throughout the Forest. The annual budget for herbicide treatment of invasive exotics on the Forest is approximately \$2,000. The Bureau provided herbicide only for this phase of the project through its Herbicide Bank.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Panicum repens</i>	torpedo grass	Category I	foliar	Rodeo



A glyphosate herbicide torpedoed this roadside invasive grass.

Tate's Hell State Forest



Three Rivers State Park

County: Jackson

PCL Size: 686 acres

Project ID: PH-032 374.16 acres \$8,008

Project Manager: Florida Park Service (DEP)

Michael Hensley, Park Manager

7908 Three Rivers Park Road, Sneads, Florida 32460

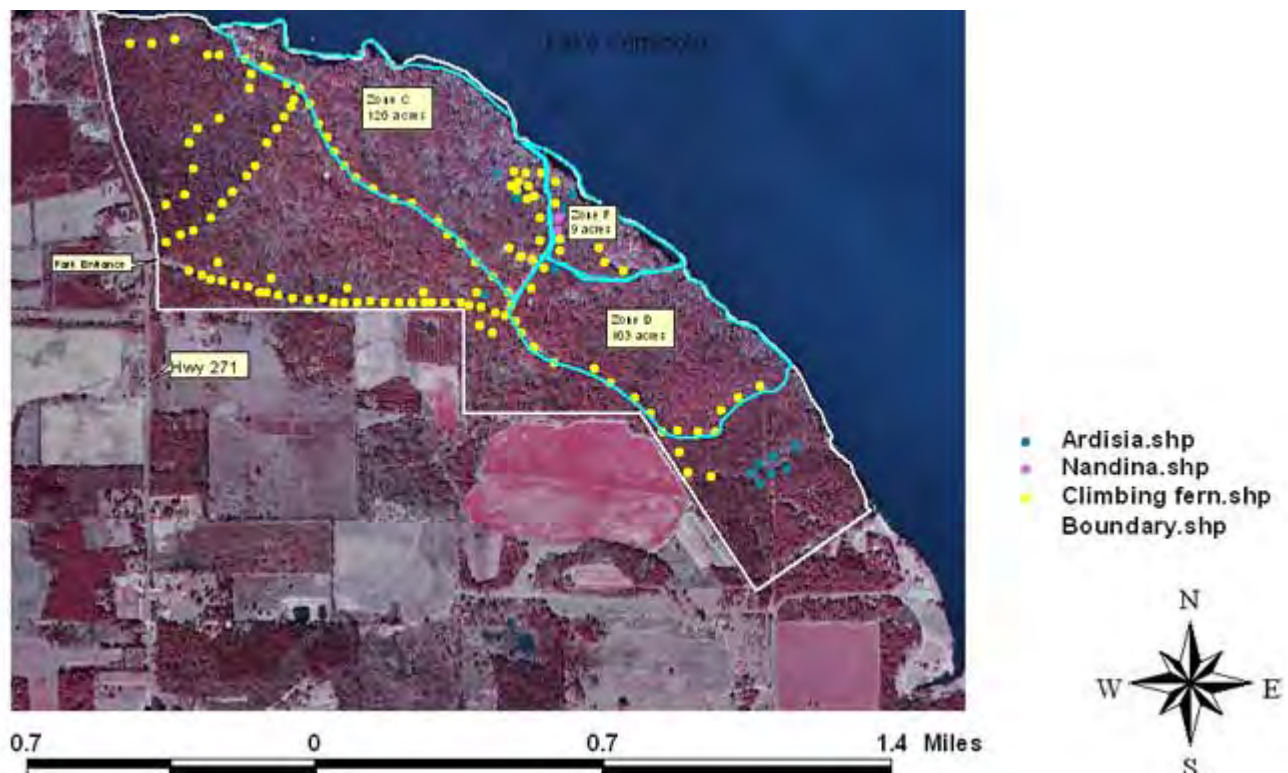
Phone: 850-482-9006

E-mail: michael.hensley@dep.state.fl.us

Three Rivers State Park is located on Lake Seminole, an artificial lake created by the building of the Jim Woodruff Lock and Dam in 1957. Upland pine forest, upland mixed forest, and upland hardwood forest are the primary natural communities that make up the park.

Climbing fern was primarily restricted to roadsides and mowed areas, where its coverage was over sixty percent, but the fern was migrating into undisturbed interior areas. The heavy infestation of climbing fern caused concern due to its threat to the federally endangered pinkroot (*Spigelia gentianoides*). Other endangered plants in the park include Barbara's button (*Marshallia obovata*), Florida milkweed (*Matelea floridana*), Baldwin's milkweed (*Matelea baldwiniana*), and bay star vine (*Schisandra coccinea*). Infestations of nandina and ardisia were concentrated within a few management zones of the park.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Ardisia crenata</i>	coral ardisia	Category I	foliar	Glypro+Escort
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Glypro+Escort
<i>Nandina domestica</i>	heavenly bamboo	Category I	foliar	Glypro+Escort





Japanese climbing fern, much like its southern cousin Old World climbing fern, creeps across the ground in a thick mat...



...and then climbs up into the trees. Climbing ferns can act as a fire ladder, carrying low burning ground fires up into the canopy of trees, where fire would otherwise not reach.

St. Marks National Wildlife Refuge

County: Jefferson, Taylor

PCL Size: 67,562 acres

Project ID: PH-038 267 acres \$24,147.46

Project Manager: US Fish and Wildlife Service

Michael Keys

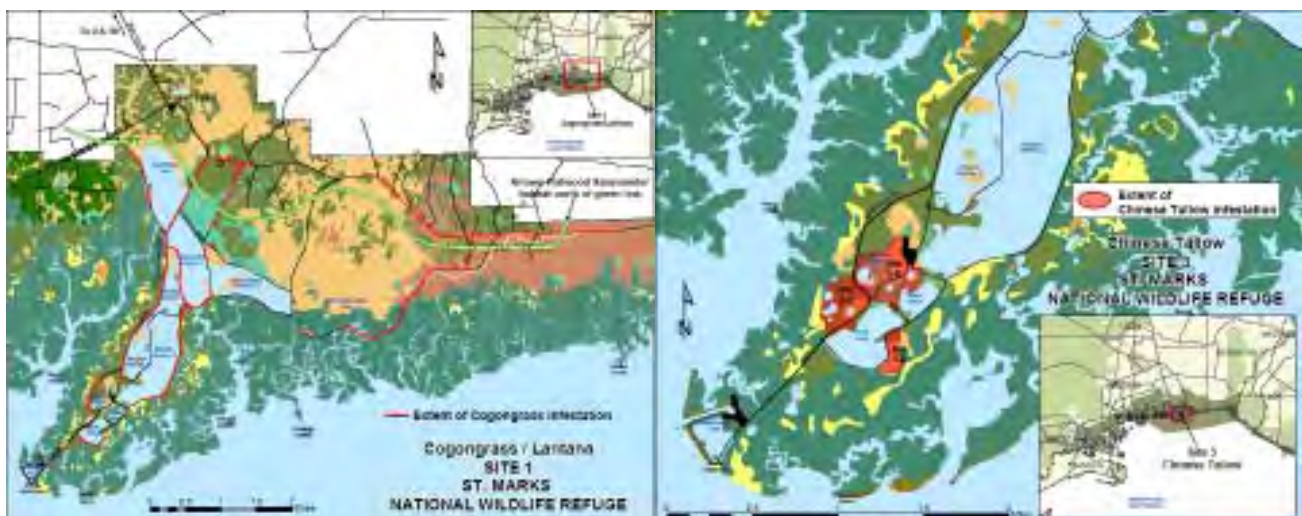
P. O. Box 68, St. Marks, Florida 32355

Phone: 850-925-6121, Fax: 850-925-6930

E-mail: michael_keys@fws.gov

St. Marks NWR is the largest National Wildlife Refuge in Florida under fee-title ownership by the U.S. Fish and Wildlife Service. Natural areas include estuarine tidal marsh, coastal hammock, mesic flatwoods, wet flatwoods, bottomland forest, and dome swamp. The refuge has extensive artificial impoundments that are managed for waterfowl, but are used by many other bird species as well. This project involved maintenance control of exotics on four sites with exotics coverage ranging from five to twenty percent, as well as a one-acre site that was ninety percent cogon grass.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Colocasia esculenta</i>	wild taro	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Roundup
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Razor+Chopper
<i>Lantana camara</i>	lantana	Category I	foliar	Razor+Chopper
<i>Lantana camara</i>	lantana	Category I	basal	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Razor+Chopper
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal	Garlon 4



Maps of the two larger areas of infestation

Maclay Gardens State Park

County: Leon

PCL Size: 1,779.15 acres

Project ID: PH-036 41 acres \$7,890.60

Project Manager: Florida Park Service

Beth Weidner, Park Manager

3540 Thomasville Road, Tallahassee, FL 32308

Phone: 850-487-4556, Fax: 850-487-8808

E-mail: beth.weidner@dep.state.fl.us



Maclay Gardens is located on US Highway 319 in Tallahassee. The majority of the park consists of secondary growth upland mixed forest, interspersed with steep ravines and slope forests that exhibit high plant diversity and harbor a number of rare species. Slope forest canopy species such as magnolia, beech, and white oak are still present, even in the most severely infested portions of the project area. Several listed species have been planted in the park including Chapman's rhododendron (*Rhododendron chapmanii*), Florida flame azalea (*Rhododendron austrinum*), and Ashe's magnolia (*Magnolia ashei*). Naturally occurring listed species include trout lily (*Erythronium umbilicatum*), heartleaf (*Hexastylis arifolia*), Florida yew (*Taxus floridana*), and Florida torreya (*Torreya taxifolia*).

This project was a retreatment of the area originally designated as Zone B. Before initial removal efforts in 2002, monotypic stands of ardisia, nandina, Chinese tallow, and camphor trees were abundant. The level of reinfestation was high, infesting over sixty percent of the zone, despite prior treatment. The Florida Park Service contributed \$5,500 in matching funds for a total project cost of \$13,390.60

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Ardisia crenata</i>	coral ardisia	Category I	basal	Garlon 4
<i>Ardisia crenata</i>	coral ardisia	Category I	foliar	Garlon 3A
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Ligustrum lucidum</i>	glossy privet	Category I	basal	Garlon 4
<i>Lonicera japonica</i>	Japanese honeysuckle	Category I	foliar	Escort+Roundup
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Escort+Roundup
<i>Nandina domestica</i>	heavenly bamboo	Category I	foliar	Roundup
<i>Solanum viarum</i>	tropical soda apple	Category I	basal	Garlon 4
<i>Aleurites fordii</i>	tung oil tree	Category II	basal	Garlon 4
<i>Elaeagnus pungens</i>	silverthorn	Category II	basal	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	foliar	Roundup
<i>Podocarpus</i> spp.	podocarpus	n/a	basal	Garlon 4

Leon County Greenways

County: Leon

J.R. Alford Greenway

PCL Size: 880 acres

Miccosukee Canopy Road Greenway

PCL Size: 503 acres

Project ID: PH-039 36 acres \$4,000

Project Manager: Leon County Parks and Recreation

Paul Cozzie, Director

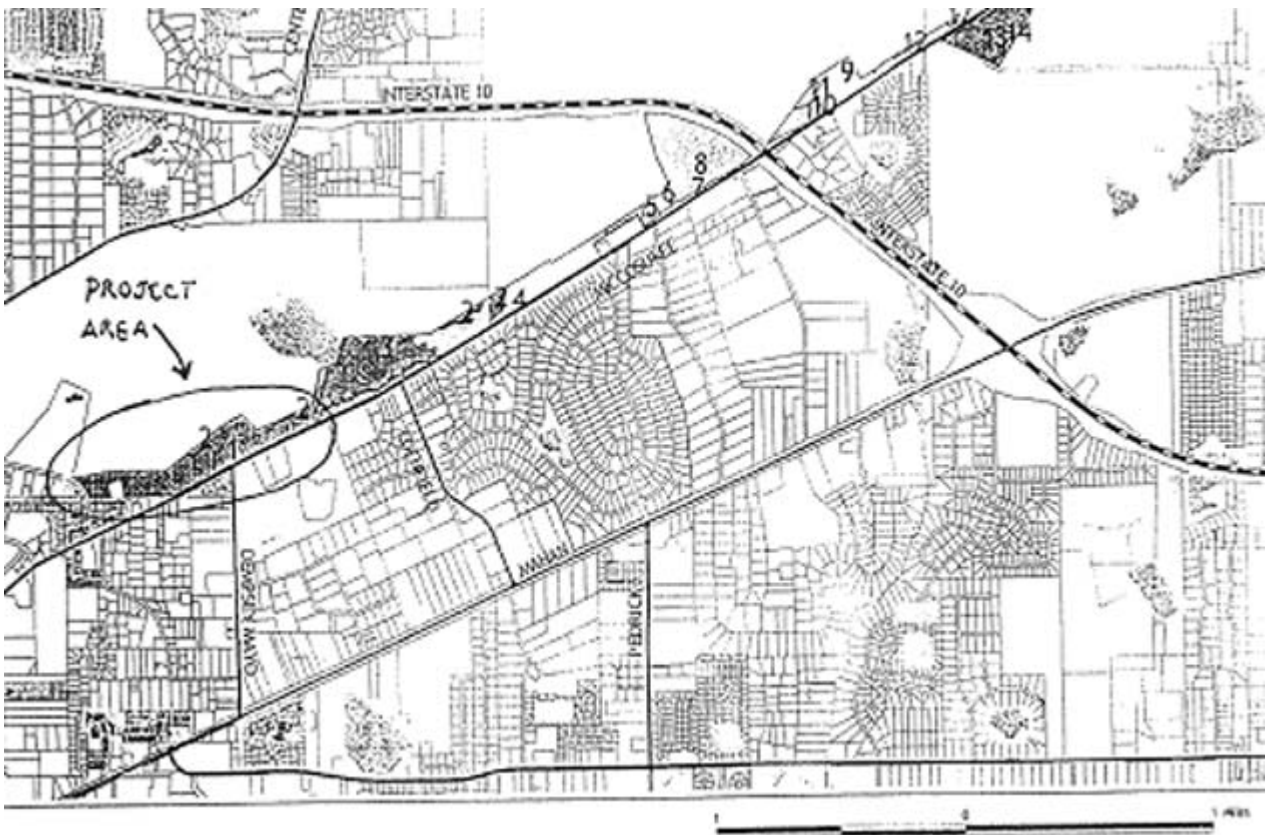
2280 Miccosukee Road, Tallahassee, Florida 32308

Phone: 850-488-0221, Fax: 850-487-3072

E-mail: cozziep@mail.co.leon.fl.us

Miccosukee Canopy Road Greenway is located in eastern Leon County and encompasses a 6.4-mile linear park along this scenic route. The J.R. Alford Greenway, also located in eastern Leon County, encompasses a peninsula that extends into Lake Lafayette. Leon County Parks and Recreation manages both properties under agreement with the Office of Greenways and Trails (DEP). Natural communities on the sites include upland hardwood forest, upland mixed forest, pine forest, oak savanna, basin swamp, and floodplain forest. The project targeted kudzu for initial treatment on 17.5 acres and maintenance treatment on 18.5 acres.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Pueraria montana</i>	kudzu	Category I	foliar	Roundup+Escort



Apalachicola National Forest

County: Liberty, Gulf

PCL Size: 569,804 acres

Project ID: PH-040 228 acres \$22,468.69

Project Manager: U.S. Forest Service (USDA)

Kimberly Bittle

P.O. Box 579, Bristol, Florida 32321

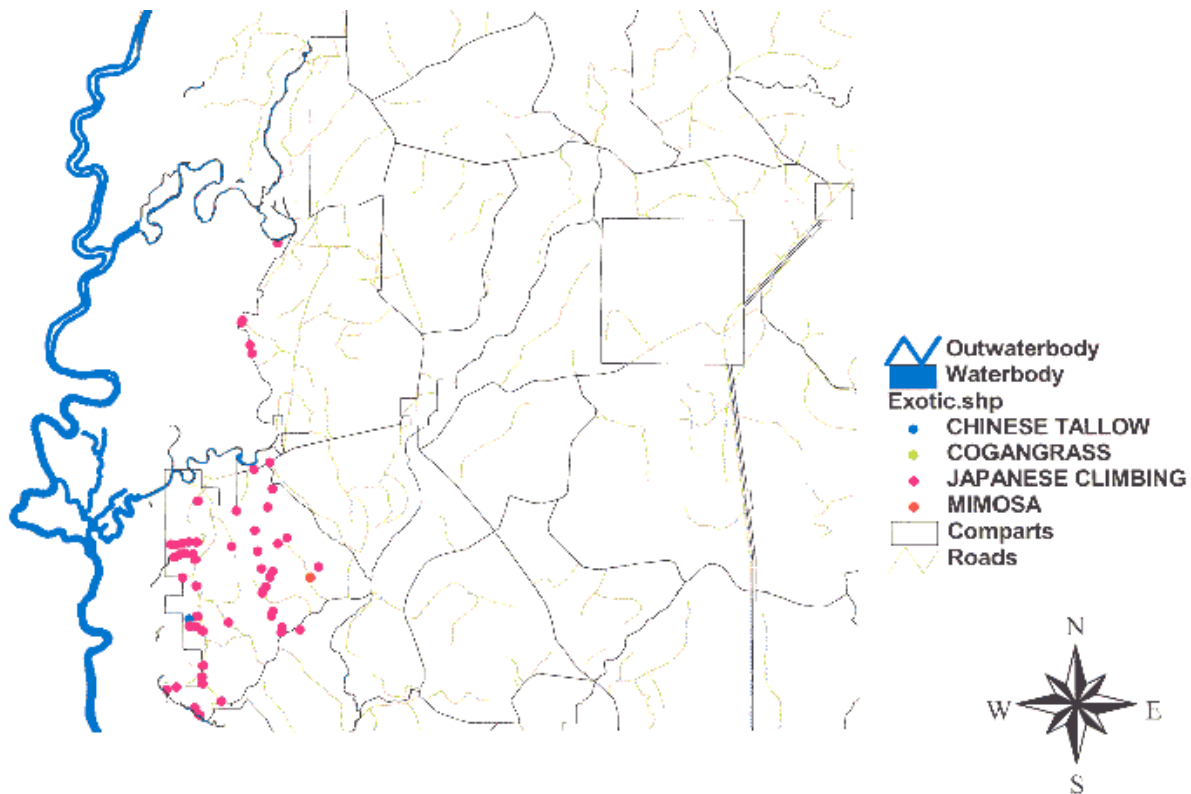
Phone: 850-926-3561 x6501, Fax: 850-926-1904

E-mail: kbittle@fs.fed.us

This project targeted Japanese climbing fern in different units of the National Forest. The project site was in the area of the Florida River Island Tract on the west side of Compartments 73, 74, and 96. Japanese climbing fern in the National Forest occurs predominately in bottomland hardwoods (floodplain edge), slope forests, and adjacent pine flatwoods. The vertical distribution ranges from plants a few feet tall to those overtopping the subcanopy and canopy.

In the project area, climbing fern varied in density from relatively continuous coverage along the floodplain boundary and slope forests to small isolated patches scattered across several acres of mesic pine flatwoods. Several fern populations were associated with disturbance events; for example, one along a riverbank affected by heavy foot traffic from a boat landing/recreational area (White Oak Hunt Camp), and others in pine plantations or adjacent to a recently logged area. Most sites were in areas accessible by roads.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Aquaneat



Grayton Beach State Park

County: Walton

PCL Size: 2,227 acres

Project ID: PH-035 15 acres \$5,000

Project Manager: Florida Park Service (DEP)

Dale Shingler, Park Manager

357 Main Park Road, Santa Rosa Beach, Florida 32459

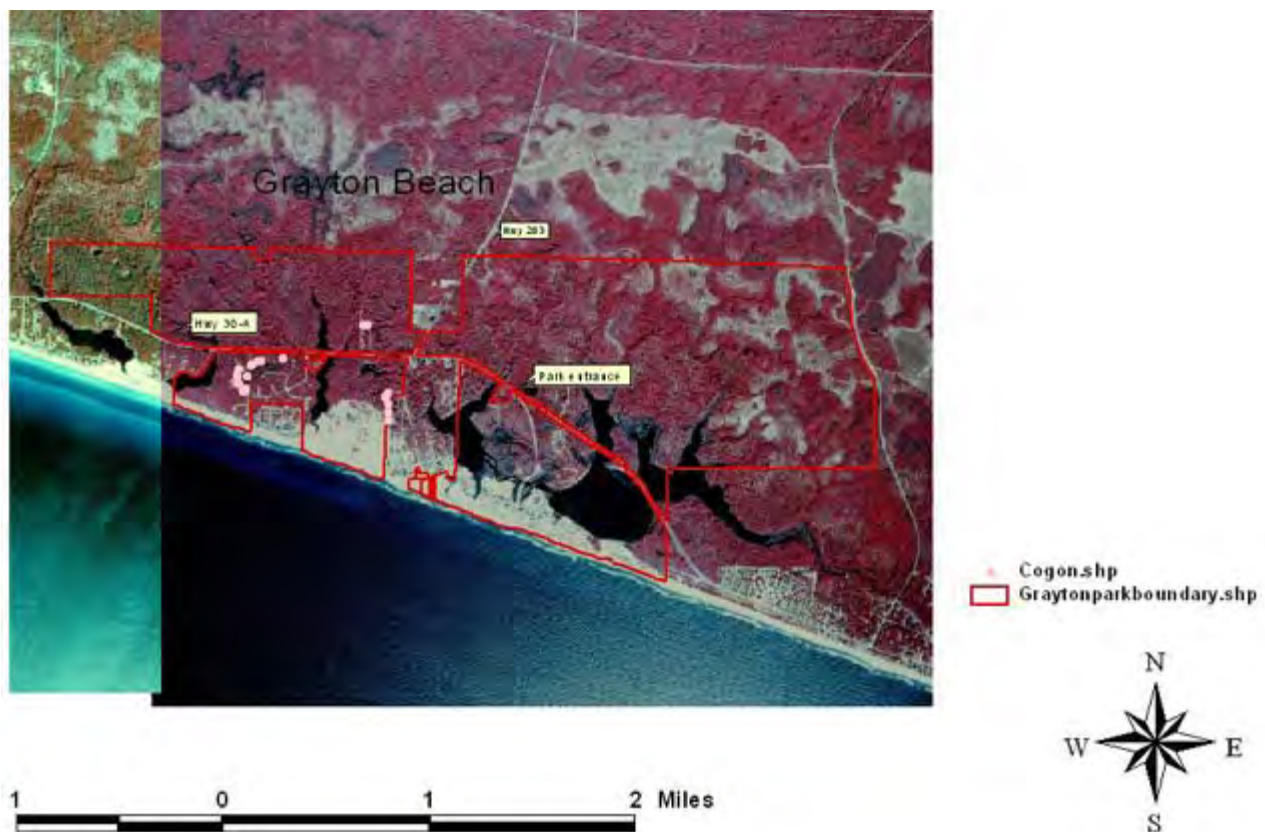
Phone: 850-231-4210

E-mail: dale.shingler@dep.state.fl.us

Grayton Beach State Park is comprised of beach dune, coastal scrub, scrubby flatwoods, sandhill, seepage slope, baygall, depression marsh, dome swamp, wet flatwoods, estuarine tidal marsh, and coastal dune lakes. Listed species found on the park include the state endangered Cruise's golden aster (*Chrysopsis gossypina* ssp. *Cruiseana*) and state threatened large-leaved jointweed (*Polygonella macrophylla*).

Patches of cogon grass totaling 0.5 acre were found on the park and treated in 2002. Recent surveys found cogon grass infestations expanded to encompass approximately 15 acres. The level of infestation of cogon grass was moderate, with seven patches of more than 0.25 acres consisting of a monoculture.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Glypro+Arsenal



Blackwater River State Forest

County: Okaloosa, Santa Rosa

PCL Size: 189,594 acres

Project ID: PH-033 183 acres \$56,700

Project Manager: Florida Division of Forestry (DACS)

Tom Cathey, Senior Forester

11650 Munson Highway, Milton, Florida 32570

Phone: 850-957-6140, Fax: 850-957-6143

E-mail: cathey@doacs.state.fl.us

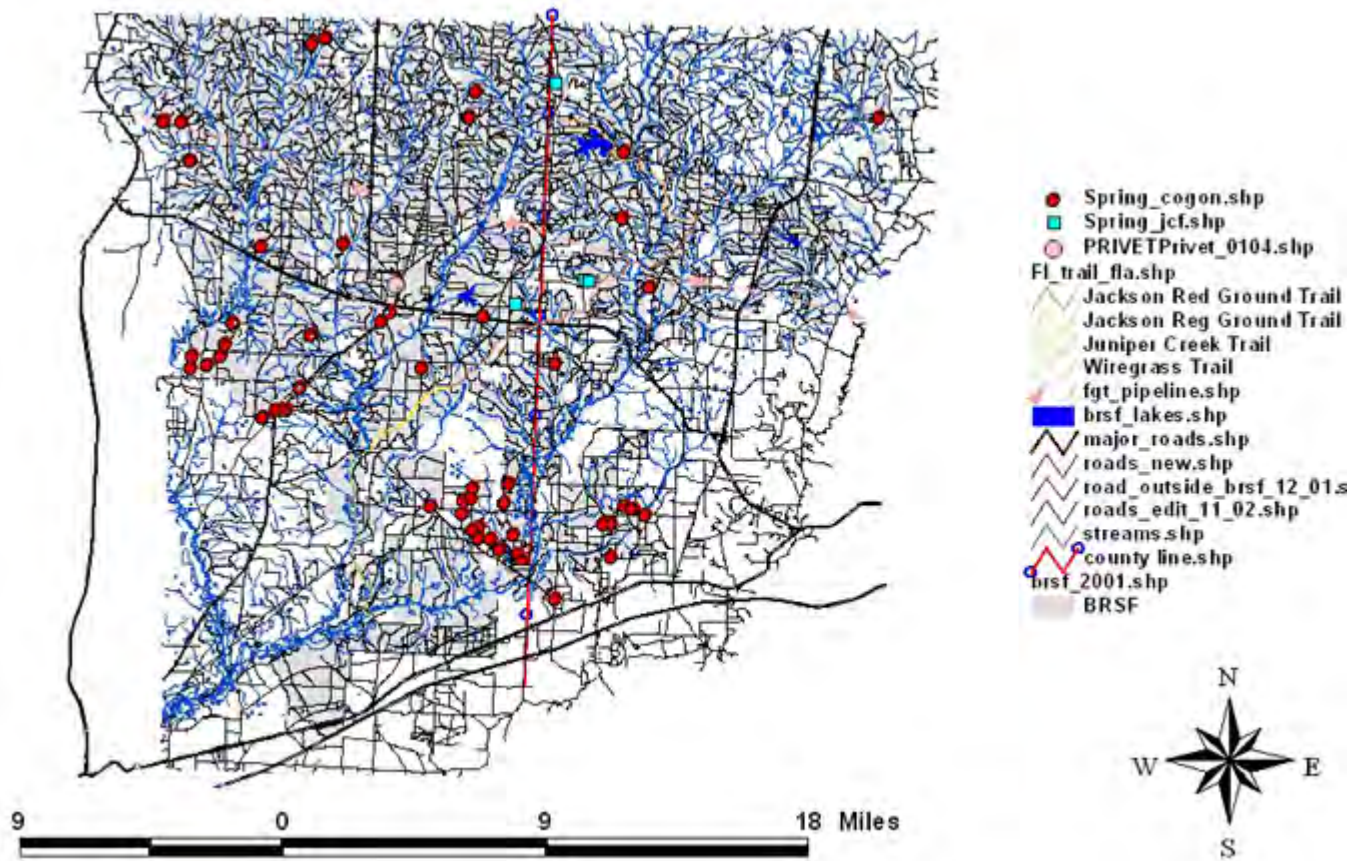
Named for the Blackwater River, which runs through the forest for approximately 30 miles, the Blackwater River State Forest (BRSF) is the second largest state forest in Florida. The Blackwater River is one of the last remaining shifting sand bottom streams still in its natural state for almost its entire length. The DOF acquired the BRSF in 1955 from the US Forest Service. The Forest encompasses twelve natural communities, with five that are considered imperiled in the state: sandhills, slope forests, seepage slopes, blackwater streams, and spring-run streams. The primary listed species under management is the red-cockaded woodpecker (RCW). The Forest maintains a significant population of RCW and management activities on the forest, including invasive plant control, are directed around maintenance and enhancement of this population.

Current management emphasis is on cogon grass, which DOF believes to be the leading threat to natural ecosystems. DOF has periodically treated the worst known infestations since the mid-1990s. During 2002 through 2004, BIPM contractors treated 126 cogon grass sites, in addition to treating Japanese climbing fern, Chinese privet, kudzu, Chinese tallow, mimosa, and wisteria.

This project included both an initial treatment on 90 acres and maintenance control on 93 acres. Eighty-five cogon grass sites occupying a total of approximately 16 acres were treated in the spring of 2005. Infestations ranged in size from less than 100 square feet to one acre with an average coverage of ninety percent. This completed the initial treatment for all known cogon grass infestations on the Forest. Initial treatment of Japanese climbing fern focused on the two largest known sites, which totaled 62 acres with fifty percent coverage. Small, isolated lygodium sites were treated by in-house staff. Maintenance control consisted of re-treating cogon grass and other invasive species on 60 sites. Infestations ranged in size from 7 to 55 acres with coverage of five to thirty percent.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Razor
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Razor+Escort

Blackwater River State Forest



A GIS map shows the location of cogon grass (red dots), Japanese climbing fern (blue squares), and Chinese privet (pink dots) within the project area.

Eglin Air Force Base

County: Okaloosa, Walton

PCL Size: 463,448 acres

Project ID: PH-031 3 acres \$13,332

Project Manager: Eglin AFB Natural Resources

Dennis D. Teague, Endangered Species Biologist

Jackson Guard, 107 Hwy 85 N, Niceville, Florida 32578

Phone: 850-882-4164 x316, Fax: 850-882-5321

E-mail: dennis.teague@eglin.af.mil

Eglin Air Force Base is the largest forested military reservation in the United States. In addition to a large expanse of sandhill, there are 34 other natural communities present, including the most significant array of steephead seepage streams under a single ownership in Florida. There is a suite of rare and sensitive plants in this area that benefit from removal of invasive exotic species, including 67 rare plants and 36 federally or state listed animal species. The USAF provided in-kind services by treating all cogon grass within the project area.

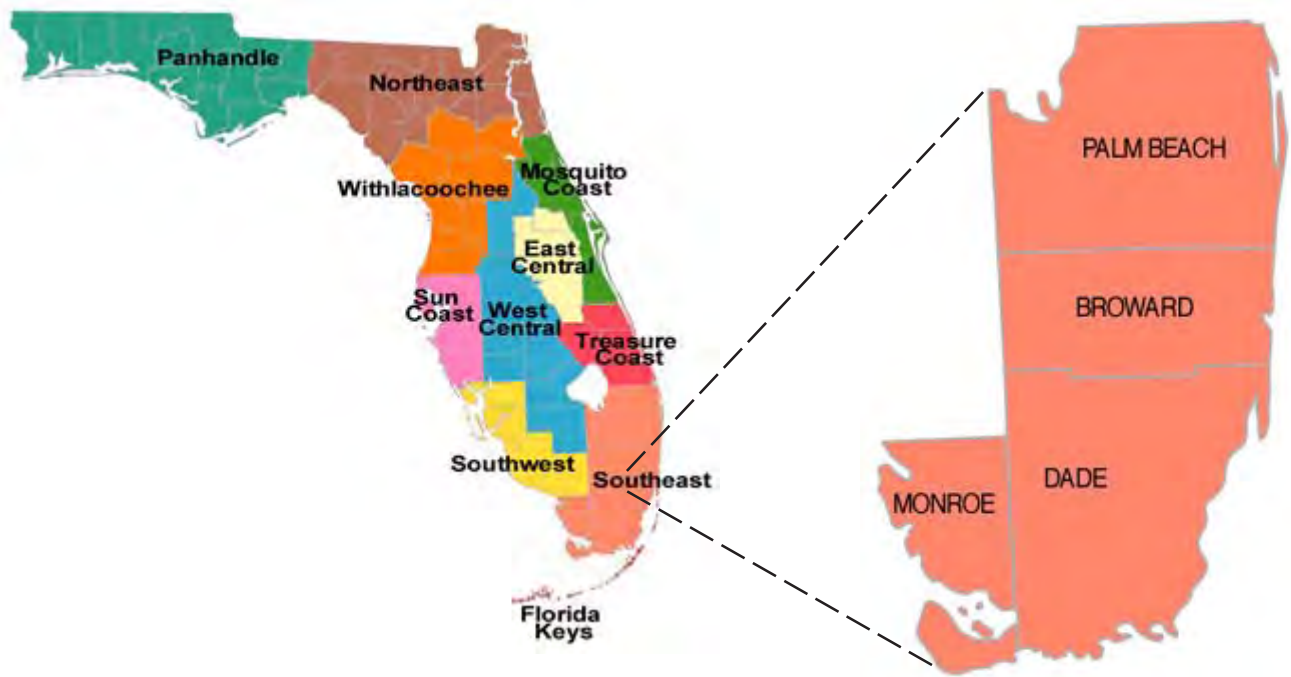
Brier Creek consists of an extensive, excellent quality mosaic of seepage slope, upland pine forest, mesic flatwoods, and baygall. The largest and best examples of seepage slope communities on Eglin occur within the Brier Creek area. These nearly treeless, herb dominated communities are home to nearly two hundred occurrences of 17 rare plant species. Upland pine forests occur on elevated areas and merge down slope with mesic flatwoods and seepage slopes. Both the upland pine forests and the mesic flatwoods are dominated by an overstory of mature longleaf pine and an extensive groundcover of wiregrass.

Rare plants on the seepage slopes include naked stem panic grass, sweet pitcher-plant, white-top pitcher plant, Chapman's butterwort, Harper's yellow eyed grass, Drummond's yellow-eyed grass, southern red lily, panhandle lily, bog-button, yellow fringeless orchid, snakeroot aster, and spoon-flower. Toothed savory, pineland hoary pea, and hairy wild indigo occur in the upland pine forests and mesic flatwoods.

Japanese climbing fern was the primary target with 38 occurrences totaling approximately 3 acres across the parcel. Other species that required control were Chinese tallow (1 occurrence), Japanese honeysuckle (14 occurrences), torpedo grass (9 occurrences), mimosa (5 occurrences), and Chinese wisteria (3 occurrences).

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Lantana camara</i>	lantana	Category I	basal	Garlon 4
<i>Lonicera japonica</i>	Japanese honeysuckle	Category I	basal	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Razor+Escort
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal/girdle	Garlon 4

Southeast Regional Working Group



The Southeast Regional Working Group liaison is Joe Maguire, Miami-Dade Parks and Recreation, 22200 S.W. 137th Avenue, Miami, Florida 33170, phone: 305-257-0933, fax: 305-257-1086, e-mail: J57@miamidade.gov

John U. Lloyd State Park

County: Broward

PCL Size: 311 acres

Project ID: SE-079 16 acres \$43,300

Project ID: SE-083 33 acres \$275,300

Project Manager: Florida Park Service (DEP)

Sid Leve, Park Manager

6503 N. Ocean Drive, Dania, Florida 33004

Phone: 954-924-3859, Fax: 954-923-2904

E-mail: sidney.leve@dep.state.fl.us

John U. Lloyd State Park is a linear park running north to south along the southeastern coast of Florida. The tropical hardwood hammock community of the park was heavily invaded by exotics, primarily Australian pine. The first project focused on the mechanical removal of Australian pine in preparation for replanting native species on the site. This project completed work begun on the 16 acres in the previous fiscal year. The second project targeted other Australian pine, many of which were damaged during the hurricanes and presented a safety risk.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina</i> spp.	Australian pine	Category I	cut stump/mechanical	Garlon 4

John U Lloyd Beach State Park project area



Hugh Taylor Birch State Park

County: Broward

PCL Size: 175.24 acres

Project ID: SE-082 16.8 acres \$296,000

Project Manager: Florida Park Service (DEP)

Jim Gibson, Park Manager

3109 East Sunrise Boulevard, Ft. Lauderdale, Florida 33304

Phone: 954-468-2791, Fax: 954-762-3737

E-mail: james.gibson@dep.state.fl.us

Hugh Taylor Birch State Park completed two major mitigation projects that affected almost 55 acres of the park. One of the main goals of these projects was to remove invasive plants and replant native vegetation. Rare hammock species that exist in the park include Simpson's stopper (*Myrcianthes fragrans*), mahogany (*Swietenia mahagoni*), and leathery prickly ash (*Zanthoxylum coriaceum*). Golden leather fern (*Acrostichum aureum*) occurs in areas threatened by invasives. A sandy open area in the park also contains the federally listed beach jacquemontia (*Jacquemontia reclinata*).

This control project targeted four areas and removed the last remaining infestations of Australian pine from the park. Matching funds were used to remove some invasives and replant areas that were heavily infested by mature Australian pines.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina</i> spp.	Australian pine	Category I	cut stump/mechanical	Garlon 4



Australian pines do not stand up well against hurricanes.

Model Lands Basin

County: Miami-Dade

PCL Size: 13,463 acres

Project ID: SE-076 200 acres \$200,000

Project Manager: Miami-Dade County EEL

Gwen Burzycki, Project Supervisor

33 SW 2 Avenue, Suite 400, Miami, Florida 33130

Phone: 305-372-6569, Fax: 305-372-6479

E-mail: burzyg@miamidade.gov

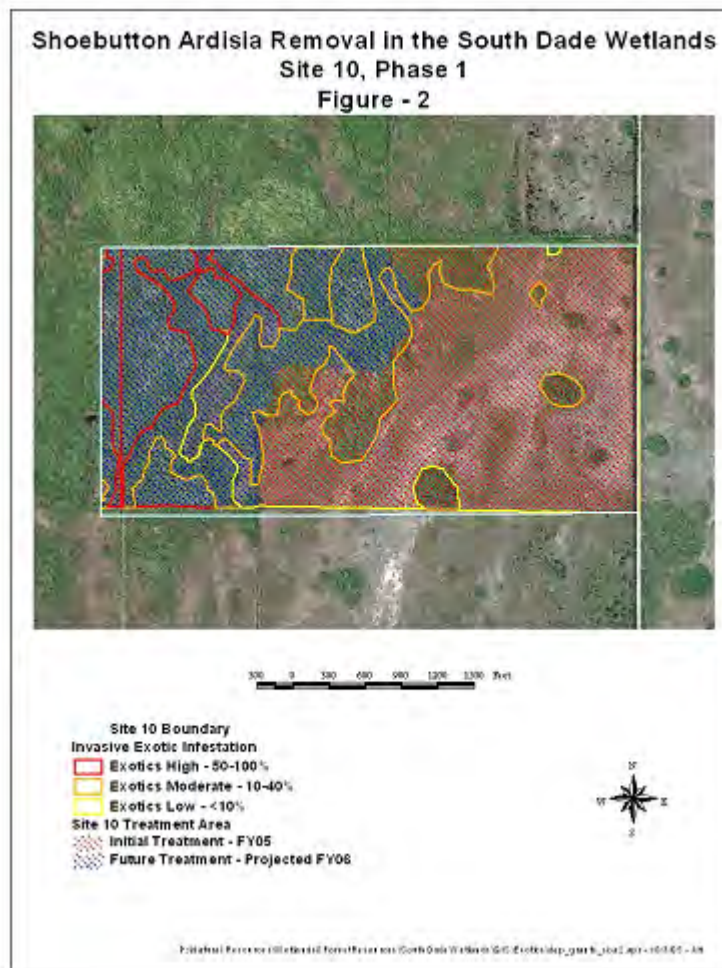
The Model Lands/South Dade Wetlands Project consists of approximately 48,000 acres of mixed forested transitional wetlands, freshwater marshes, and coastal wetlands that connect Everglades National Park and the Southern Glades Wildlife and Environmental Area with Biscayne National Park. BIPM funded previous phases of this project in FY02 and FY04. This project used crews from the Miami-Dade County Park and Recreation Department Natural Areas Management Division to manually treat exotics in the low to moderately infested portion of the specified property. The county provided \$60,000 in matching funds for a total project cost of \$260,000.



The project site is composed of a mixture of sawgrass prairie, bayhead tree islands, and forested transitional wetlands. Shoebuttan ardisia was the most significant invasive species on this site. The infestation ranged from absent in the sawgrass wetlands to the east to nearly one hundred percent cover in the understory in an irregular area on the western side of the unit. Approximately 150 acres, or forty-five percent of the site, had moderate to heavy densities of this invasive plant species. Other exotics noted included Brazilian pepper scattered in the canopy of the forested wetlands, Australian pine in scattered clumps in the sawgrass, and Burma reed along the western bounding roadway.

High water early in the year prevented crews from completing all scheduled treatment of the area, however, 188 acres were treated, with the remaining area scheduled for treatment during FY06 (Figure 2). Thirty acres of moderately infested forested wetlands and 158 acres of sawgrass prairie impacted with scattered Australian pine were treated during FY05.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Ardisia elliptica</i>	shoebuttan ardisia	Category I	cut stump	Garlon 3A
<i>Casuarina</i> spp.	Australian pine	Category I	basal bark	Garlon 4
<i>Casuarina</i> spp.	Australian pine	Category I	cut stump	Garlon 3A
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 3A
<i>Melaleuca quinquenervia</i>	Melaleuca	Category I	hand pull	n/a



Dallas Hazelton and Romeo Morua of the Miami-Dade Park and Recreation Department survey the edge of Site 10 on May 20, 2005. Funding has been obtained to continue the treatment during 2006.

Model Lands Basin



Site 10, December 13, 2004. Australian pines in sawgrass prairie show evidence of recent herbicide treatment.



Site 10, May 20, 2005. Australian pines in sawgrass prairie have died.



Site 10, December 13, 2004. Forested wetlands on the western side of the tract typically have a dense understory due to a heavy infestation of shoebutton ardisia (*Ardisia elliptica*).



Site 10, May 20, 2005. Both canopy and understory of forested wetlands are more open after treatment for all invasive exotic species. With continued follow-up treatments, native species such as bog hemp (*Boehmeria cylindrica*), Southern shield fern (*Thelypteris kunthii*), and leather fern (*Acrostichum danaeifolium*) will rapidly colonize the understory.

Matheson Hammock Park

County: Miami-Dade

PCL Size: 630 acres

Project ID: SE-074 19.7 acres \$188,800

Project Manager: Miami-Dade Park and Recreation Department

Jane G. Dozier, Environmental Resource Project Supervisor

22200 SW 137 Avenue, Miami, Florida 33170

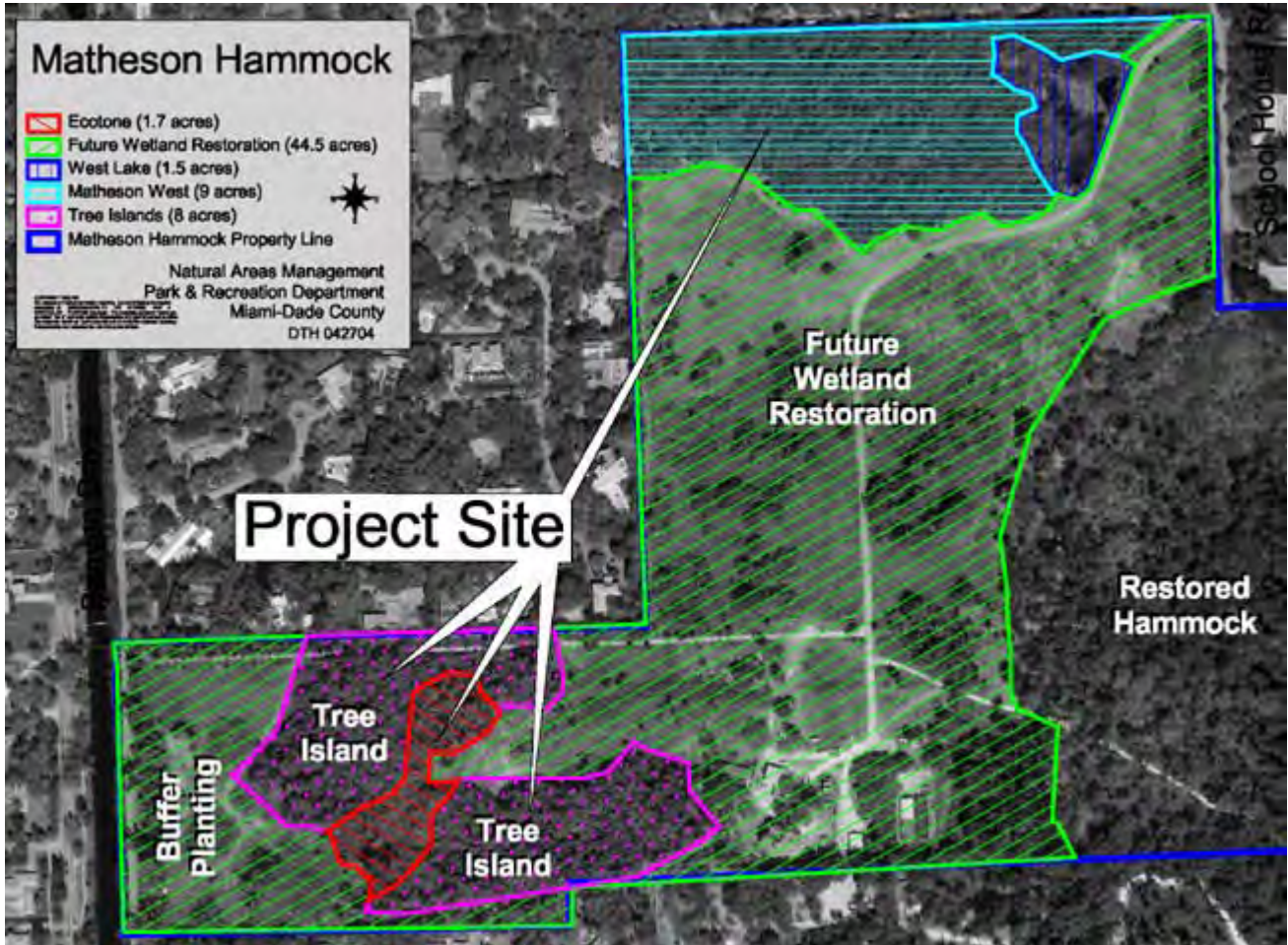
Phone: 305-257-0933 x243, Fax: 305-257-1086

E-mail: dozierj@miami-dade.gov

Matheson Hammock Park contains 65 acres of tropical hardwood hammock and transitional oak hammock, as well as 329 acres of marsh, mangrove, and shallow water marine communities. The project encompassed two 4-acre tree islands and the 1.7-acre intermediate ecotone located in the southwestern section of the park; an area historically called “Matheson Nursery.” The tree islands are characterized by deeply eroded outcroppings of limestone with typical hammock soils, surrounded by lowland areas.

The most problematic invasive exotic plants included sewer vine, Queensland umbrella tree, and shoebutt ardisia. Since 1991, the county has expended approximately \$1,493,555 and restored over 55 acres of Matheson’s largest area of tropical hardwood hammock. Natural Areas Management staff conducted all control treatments, contributing \$39,569 as in-kind match of time and materials.

Plants Treated	Common Name	EPPC Rank	Treatment	Herbicide
<i>Abrus precatorius</i>	rosary pea	Category I	cut stump	Garlon 4
<i>Albizia lebeck</i>	woman’s tongue	Category I	cut stump	Garlon 4
<i>Ardisia elliptica</i>	shoebutt ardisia	Category I	cut stump	Garlon 4
<i>Bauhinia variegata</i>	orchid tree	Category I	cut stump	Garlon 4
<i>Bischofia javanica</i>	bishopwood	Category I	cut stump	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	cut stump	Garlon 4
<i>Eugenia uniflora</i>	Surinam cherry	Category I	cut stump	Garlon 4
<i>Jasminum dichotomum</i>	Gold Coast jasmine	Category I	cut stump	Garlon 4
<i>Jasminum fluminense</i>	Brazilian jasmine	Category I	cut stump	Garlon 4
<i>Manilkara zapota</i>	sapodilla	Category I	cut stump	Garlon 4
<i>Neyraudia reynaudiana</i>	Burma reed	Category I	cut stump	Garlon 4
<i>Paederia cruddasiana</i>	sewer vine	Category I	cut stump	Garlon 4
<i>Schefflera actinophylla</i>	Queensland umbrella tree	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4
<i>Tradescantia fluminensis</i>	white-flowered wandering Jew	Category I	cut stump	Garlon 4
<i>Tradescantia spathacea</i>	oyster plant	Category I	cut stump	Garlon 4
<i>Adenanthera pavonina</i>	red sandalwood	Category II	cut stump	Garlon 4
<i>Epipremnum pinnatum</i>	pothos	Category II	cut stump	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	cut stump	Garlon 4
<i>Ptychosperma elegans</i>	solitary palm	Category II	cut stump	Garlon 4
<i>Sansevieria hyacinthoides</i>	bowstring hemp	Category II	cut stump	Garlon 4
<i>Syngonium podophyllum</i>	arrowhead vine	Category II	cut stump	Garlon 4
<i>Terminalia catappa</i>	tropical almond	Category II	cut stump	Garlon 4
<i>Alpinia speciosa</i>	shell ginger	n/a	cut stump	Garlon 4
<i>Carica papaya</i>	papaya	n/a	cut stump	Garlon 4
<i>Carissa macrocarpa</i>	Natal plum	n/a	cut stump	Garlon 4
<i>Mangifera indica</i>	mango	n/a	cut stump	Garlon 4
<i>Premna odorata</i>	fragrant premna	n/a	cut stump	Garlon 4



Deering Estate at Cutler

County: Miami-Dade

PCL Size: 352 acres

Project ID: SE-078 25 acres \$50,000

Project Manager: Miami-Dade Park and Recreation

Jane G. Dozier, Environmental Resource Project Supervisor

22200 SW 137 Avenue, Miami, Florida 33170

Phone: 305-257-0933 x243, Fax: 305-257-1086

E-mail: doziej@miamidadegov

The Deering Estate at Cutler is a State and County-owned property located at the edge of Biscayne Bay. The 25-acre project site, known as Deering West, is physically separated from the rest of the Deering Estate by 72nd Avenue. Deering West historically contained a mix of habitat types, including pine rockland, mesic hammock, hydric hammock, and prairie. Deering West comprises approximately 19 acres of hammock, 6 acres of pineland, and 3.9 acres of remnant slough that divide the property in two. Eight species of native bromeliad (*Tillandsia* spp.) are found in the upper canopy and at least six orchid species, including green-spurred orchid (*Habenaria odontopetala*), also occur in the hammock.

The dominant exotic plants in the hammock areas of Deering West were jasmine, air-potato, Brazilian pepper, bishopwood, Queensland umbrella tree, and pockets of mother-in-law's tongue. The pine rockland areas in Deering West are in good condition, with the primary exotics being air-potato and scattered jasmine. This project provided for maintenance control of the entire site. Miami-Dade Natural Areas Management personnel conducted all control treatments for this project. The county provided \$42,130 in matching funds for this project.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Abrus precatorius</i>	rosary pea	Category I	cut stump	Garlon 4
<i>Albizia lebeck</i>	woman's tongue	Category I	cut stump	Garlon 4
<i>Ardisia elliptica</i>	shoebutton ardisia	Category I	cut stump	Garlon 4
<i>Bauhinia variegata</i>	orchid tree	Category I	cut stump	Garlon 4
<i>Bischofia javanica</i>	bishopwood	Category I	cut stump	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	cut stump	Garlon 4
<i>Eugenia uniflora</i>	Surinam cherry	Category I	cut stump	Garlon 4
<i>Jasminum dichotomum</i>	Gold Coast jasmine	Category I	cut stump	Garlon 4
<i>Jasminum fluminense</i>	Brazilian jasmine	Category I	cut stump	Garlon 4
<i>Manilkara zapota</i>	sapodilla	Category I	cut stump	Garlon 4
<i>Neyraudia reynaudiana</i>	Burma reed	Category I	cut stump	Garlon 4
<i>Schefflera actinophylla</i>	Queensland umbrella tree	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4
<i>Tectaria incisa</i>	incised halberd fern	Category I	cut stump	Garlon 4
<i>Tradescantia spathacea</i>	oyster plant	Category I	cut stump	Garlon 4
<i>Adenantha pavonina</i>	red sandalwood	Category II	cut stump	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	cut stump	Garlon 4
<i>Ptychosperma elegans</i>	solitary palm	Category II	cut stump	Garlon 4
<i>Sansevieria hyacinthoides</i>	bowstring hemp	Category II	cut stump	Garlon 4
<i>Syngonium podophyllum</i>	arrowhead vine	Category II	cut stump	Garlon 4
<i>Terminalia catappa</i>	tropical almond	Category II	cut stump	Garlon 4



Loxahatchee Slough Natural Area

County: Palm Beach

PCL Size: 11,000 acres

Project ID: SE-077 497 acres \$200,000

Project Manager: Palm Beach County

Mark Romagosa

3323 Belvedere Road, Bld 502, West Palm Beach, Florida 33406

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E-mail: mromagos@co.palm-beach.fl.us

Loxahatchee Slough Natural Area, managed by Palm Beach County Department of Environmental Resources Management, is located in northern Palm Beach County. The Slough is an integral property for the greenways between Jonathan Dickinson State Park, J.W. Corbett Wildlife Management Area, and the City of West Palm Beach Water Catchment Area. The uplands are predominately composed of mesic and wet flatwoods. Many depression marshes and sloughs are scattered throughout the project site.

Water flows from this site under the Beeline Highway, through the Loxahatchee Slough and eventually drains into the Florida's only Federally listed Wild and Scenic River—the Loxahatchee River. Cypress dome swamps are scattered throughout the site. There are at least three reptile, nine bird, and twenty-eight plant species recorded at Loxahatchee Slough Natural Area that are listed as rare or endangered.

Melaleuca and Old World climbing fern were scattered in cypress domes and freshwater marshes and bay swamps throughout the project area. Brazilian pepper and Australian pine were present mainly along the perimeter of the site adjacent to the Eastpointe Country Club residential area to the east, and along the southern perimeter berm adjacent to Old Marsh Golf Club. Downy rose-myrtle was lightly scattered throughout the uplands. Palm Beach County provided \$269,474.04 in matching funds and \$8,620.05 in in-kind services for this project.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Acacia auriculiformis</i>	earleaf acacia	Category I	basal/cut stump	Garlon 4+Stalker
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Gypro
<i>Rhodomyrtus tomentosa</i>	downy rose-myrtle	Category I	basal/cut stump	Garlon 4+Stalker



Loxahatchee Slough Natural Area
 Southeastern Flatwoods/
 Marsh Mosaic Project

Loxahatchee Slough Natural Area

Downy rose-myrtle (right) can be an attractive plant—in a garden—but it has no place in Florida’s natural areas. Many ornamental exotics found invading conservation lands are either garden escapees or the result of people improperly dumping garden wastes.



Presently vying to be the most widespread of Florida’s 127 invasive exotic plants, Old World climbing fern (left), was given a helping hand by four hurricanes in 2004, which may have spread its spores over the entire southern half of the state.

Cypress Creek Slough Natural Area

County: Palm Beach

PCL Size: 599 acres

Project ID: SE-073 599 acres \$200,000

Project Manager: Palm Beach County

Harper Carroll

3323 Belvedere Road, Bld 502, West Palm Beach, Florida 33406-1548

Phone: 561-233-2561, Fax: 561-233-2414

E-mail: hcaroll@co.palm-beach.fl.us

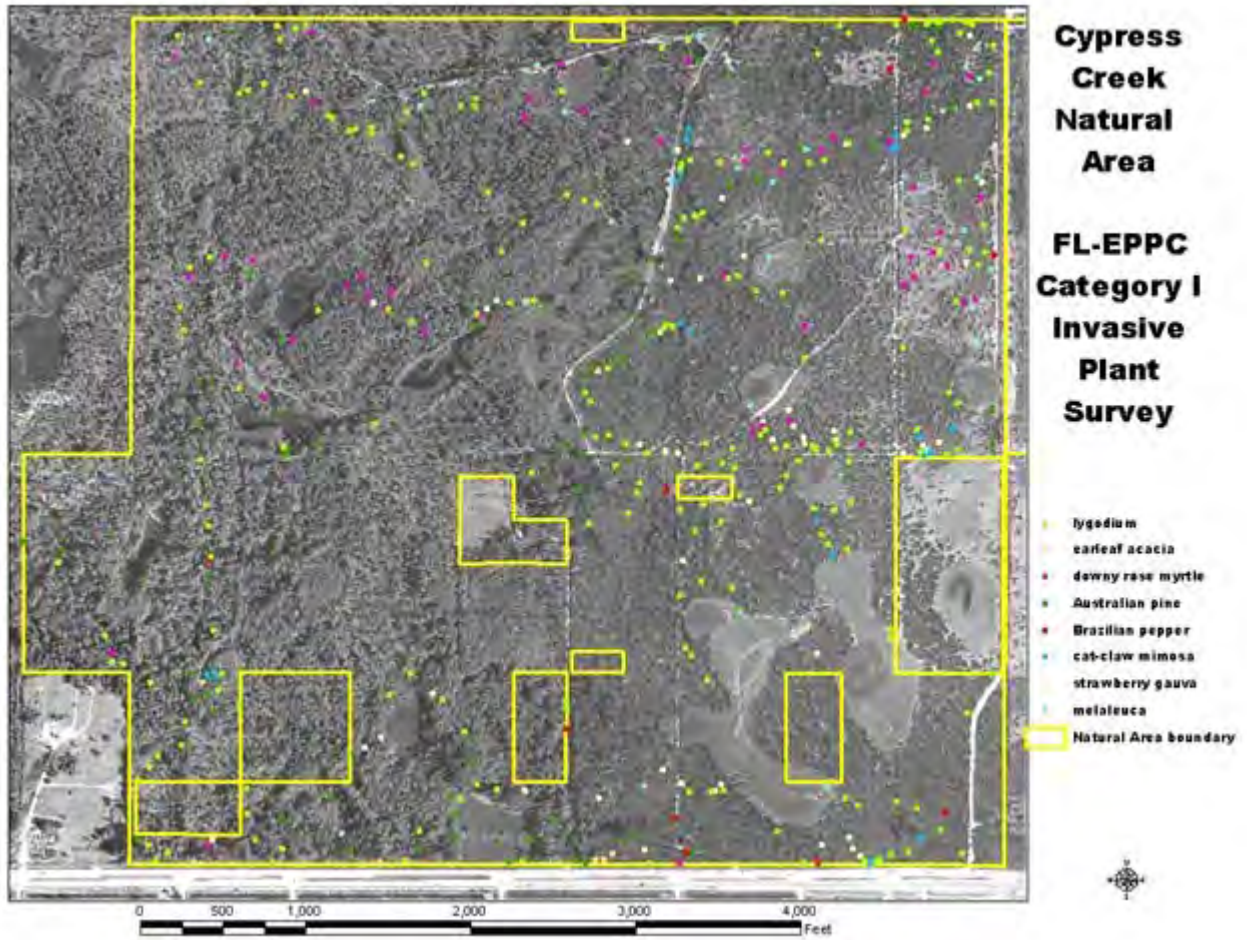
The Cypress Creek Natural Area is a mosaic of primarily wetland and mesic plant communities. The natural communities present include strand swamp, wet prairie, depression marsh, dome swamp, wet flatwoods, mesic flatwoods, and hydric hammock. Mature slash pines with a sparse to thick understory of saw palmetto and gallberry dominate the mesic flatwoods. An overstory of slash pine, pond cypress, and cabbage palm, with a groundcover of native grasses and wildflowers characterize the wet flatwoods.

The strand and dome swamps consist of pond cypresses with numerous epiphytic bromeliads and a groundcover of primarily ferns. Wet prairies and depression marsh are mostly treeless wetlands with a sparse to dense groundcover of grasses, sedges, and herbs. The hydric hammock community has an overstory of mature laurel oak, cabbage palm, and red maple, with a sparse understory of wild coffee and beautyberry, and a groundcover mostly of ferns.

Old World climbing fern grew scattered throughout every community on site, but most significantly in the strand and dome swamp and wet flatwoods. Brazilian pepper and strawberry (a.k.a. cattley) guava were present in areas farmed during the 1920s to 1950s. Fruit trees and other incidental non-native species were also found in the former farmlands. Australian pine grew along several old roads and ditch banks. Melaleuca was scattered in light amounts throughout the site, forming only a few small monocultures.

Palm Beach County provided \$316,000 in matching funds for a total project cost of \$516,000.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Abrus precatorius</i>	rosary pea	Category I	basal	Garlon 4+Stalker
<i>Casuarina</i> spp.	Australian pine	Category I	basal	Garlon 4+Stalker
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Glypro
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
<i>Psidium cattleianum</i>	strawberry guava	Category I	basal	Garlon 4+Stalker
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4+Stalker
<i>Passiflora biflora</i>	passion vine	Category II	foliar	Glypro
<i>Bambusa vulgaris</i>	common bamboo	n/a	cut stump	Garlon 4+Stalker
<i>Mangifera indica</i>	mango	n/a	basal	Garlon 4+Stalker
<i>Citrus limon</i>	lemon	n/a	basal	Garlon 4+Stalker



Cypress Creek Slough Natural Area



Larger melaleuca trees (left) are girdled, while smaller saplings (right) are cut down and the stumps treated ('cut stump' treatment).



The end result is much closer to a natural south Florida pine flatwoods, a preferable alternative to a melaleuca monoculture.

J.W. Corbett Wildlife Management Area

County: Palm Beach

PCL Size: 60,228 acres

Project ID: SE-056 2,200 acres \$42,600

Project ID: SE-075 867 acres \$175,000

Project Manager: Fish and Wildlife Conservation Commission

James R. Schuette, Biological Administrator I

8535 Northlake Boulevard, West Palm Beach, Florida 33412

Phone: 561-624-6989, Fax: 561-624-6988

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The J.W. Corbett Wildlife Management Area is located in northwestern Palm Beach County and borders the John and Susan H. Dupuis Wildlife and Environmental Area and the John C. and Mariana Jones Hungryland Wildlife and Environmental Area. Natural communities comprise primarily mesic and wet flatwoods interspersed with depression marshes and wet prairies.

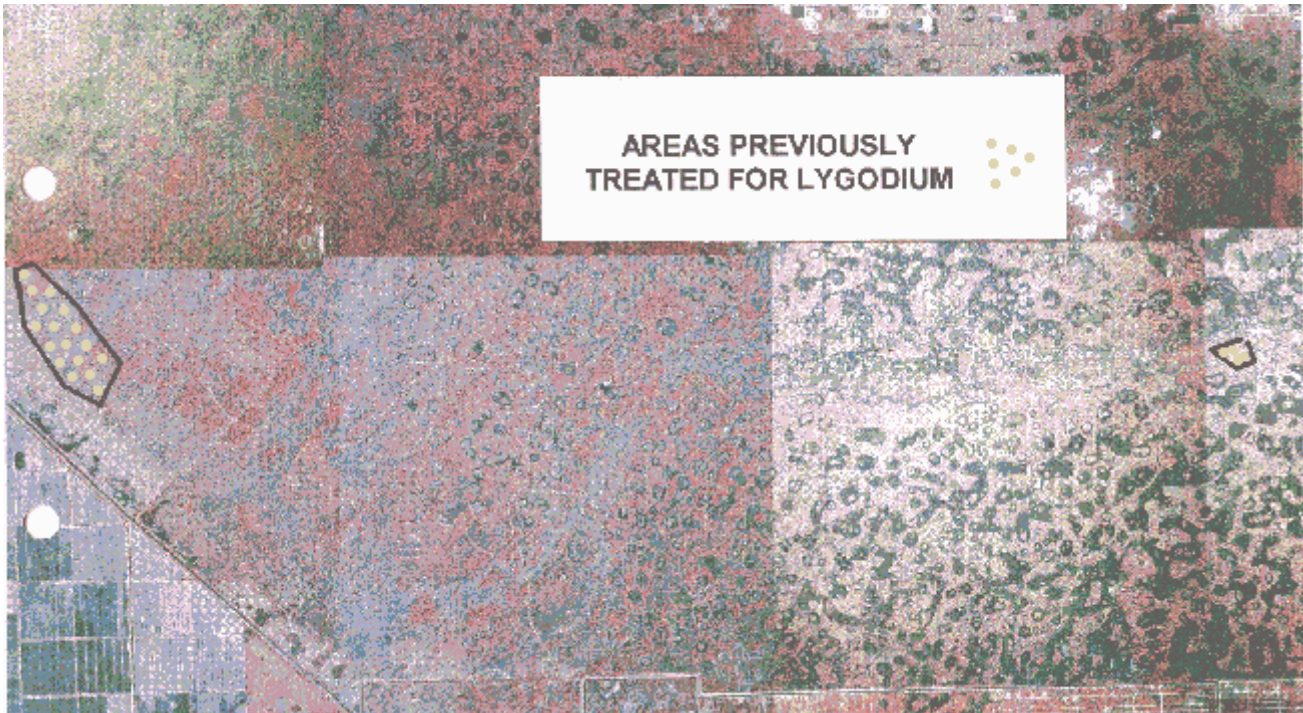
Old World climbing fern (“lygodium”) was located in the southwestern portion of Corbett WMA along the northern edge of the L-8 Marsh. Coverage was estimated at ten to thirty percent over a 2,000-acre area, covering cypress, sawgrass, and some deciduous trees and shrubs. This area had been treated both aerially and from the ground over the past five years.

A second area was located in the eastern portion of the Corbett area, near the Everglades Youth Conservation Camp and the Hungryland Boardwalk. This area had been treated several times over the past five years using ground crews. Lygodium coverage was estimated at ten to thirty percent over a 200-acre area, with growth mainly covering cypress and willow.

The first project (SE-056) provided maintenance control of lygodium in both of the previously treated areas. The second project (SE-075) targeted lygodium in an untreated tract also located in the southwestern corner of Corbett next to Dupuis. This is part of an ongoing project to control lygodium in the WMA. FWC funded a matching \$265,000 contract for lygodium control, in addition to providing an in-kind match of \$1,600 in time and materials.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Glyfos Xtra
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4

J.W. Corbett Wildlife Management Area



Lygodium treatment is not a one-time deal. Maintenance is required to prevent a treated site (below) from returning to an infested state (*see next page*).

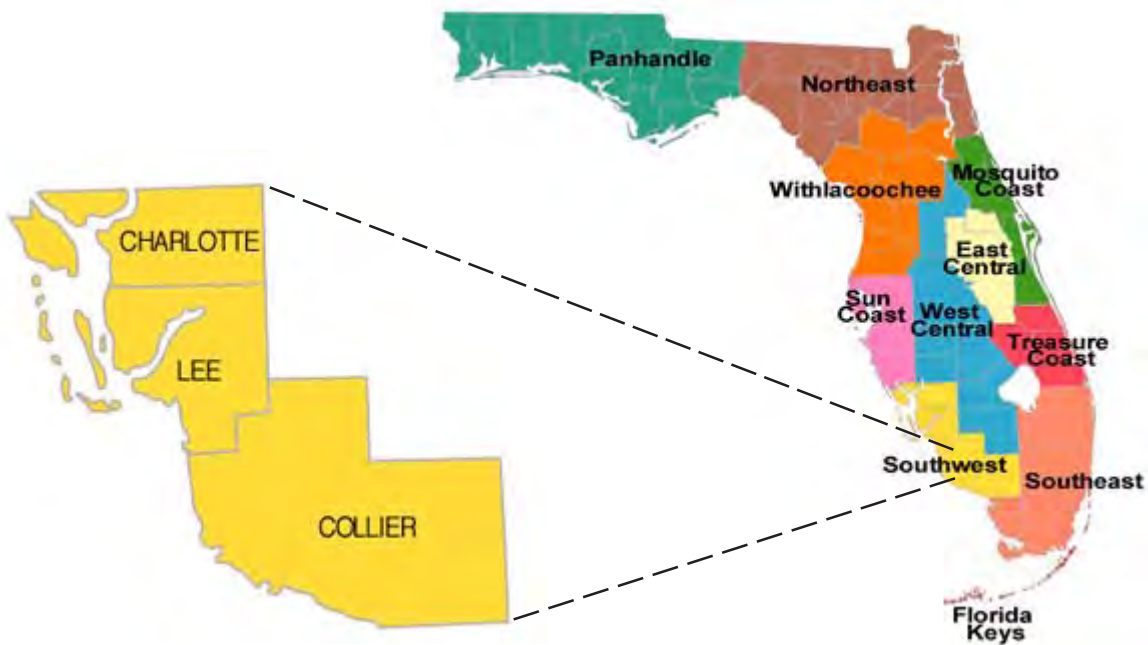


J.W. Corbett Wildlife Management Area



Old World climbing fern, as the name implies, climbs up and over everything in its path. Because it is a fern and reproduces through millions of wind-dispersed microscopic spores, *Lygodium microphyllum* may soon be recognized as the ‘new kudzu’ in Florida.

Southwest Regional Working Group



The Southwest Regional Working Group liaison is Roger Clark, Lee County Parks and Recreation, 3410 Palm Beach Boulevard, Ft. Myers, Florida 33916, phone: 239-338-3343, fax: 239-338-3333, e-mail: roger@leegov.com

Charlotte Harbor Preserve State Park

County: Charlotte, Lee

PCL Size: 43,614 acres

Project ID: SW-063	500 acres	\$112,500
Project ID: MR-008	55.5 acres	\$99,455.53

Project Manager: Florida Park Service (DEP)

John Aspiolea, Assistant Park Manager

12301 Burnt Store Road, Punta Gorda, Florida 33955

Phone: 941-575-5861, Fax: 941-575-5863

Email: john.aspiolea@dep.state.fl.us

The first project (SW-063) completed initial control of cogon grass on the Punta Gorda management unit of Charlotte Harbor Preserve State Park. The project site is a mixture of pine flatwoods, hardwood hammocks, and isolated wetlands, grading into coastal wetlands and mangroves. A network of drainage ditches divides the uplands. This ditching affected the hydrology of many of the wetlands, creating conditions ripe for exotic plant invasion. Melaleuca, Brazilian pepper, climbing fern, shoebutton ardisia, downy rose-myrtle, and West African orchid also infested the site.

The project area contained just over 500 acres of flatwoods and hammocks invaded by cogon grass. Cogon grass also invaded some of the spoil banks along the ditches. In a few locations, cogon grass formed a dense monoculture, but for the most part the plant occurred as scattered clumps or individual sprigs throughout the flatwoods. BIPM funded this project in its entirety.

The second project (MR-008) was on the Cape Coral management unit, which consists of wetlands at the mouth of the Caloosahatchee River and the shoreline of Matlacha Pass. Spreader waterways in Cape Coral were designed to capture excess water from the canals and allow the water to sheet flow into the adjacent wetlands. These wetlands are part of the Park and include high marsh, salt flats, coastal berm, and mangroves. Seaside mahoe, Brazilian pepper, and Australian pine encroached into coastal berms along the shorelines of Matlacha Pass and the mouth of the Caloosahatchee River, as well as on coastal islands in Matlacha Pass within the Park.

This project included a second work site at Yucca Pen, a large slough system north of Cape Coral. When drainage from the slough approaches Charlotte Harbor near Burnt Store Road, the sheet flow becomes channelized into Yucca Pen Creek and several unnamed creeks that pass through the Park. Seaside mahoe and Brazilian pepper were controlled in these watersheds and along the shoreline of Charlotte Harbor. The Florida Park Service fully funded this project.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4

Charlotte Harbor State Buffer Preserve



Examples of cogon grass infestation at CHPSP



Dense cogon grass patch at Charlotte Harbor Preserve State Park



Sparse cogon grass infestation at Charlotte Harbor Preserve State Park

Barrier Island GEOpark

County: Charlotte

Don Pedro Island State Park

PCL Size: 229 acres

Stump Pass Beach State Park

PCL Size: 231 acres

Project ID: RP-035 250.5 acres \$50,000

Project Manager: Florida Park Service (DEP)

Reggie Norman, Park Manager

880 Belcher Road, P. O. Box 1150, Boca Grande, Florida 33921

Phone: 941-964-0375, Fax: 941-964-1154

E-mail: reginald.norman@dep.state.fl.us

Acquisition of Don Pedro Island State Park began in 1985 under the Land Acquisition Trust Fund (LATF) program. The natural communities of Don Pedro include marine tidal swamp, mesic flatwoods, and coastal strand. The state acquired Stump Pass Beach State Park in 1971 through the LATF and the federal Land and Water Conservation Fund. The natural communities of Stump Pass consist primarily of maritime hammock and estuarine tidal swamp. The rest of the property is beach dune, coastal strand, and marine unconsolidated substrate. This project was paid for entirely through Florida Park Service funding.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal/girdle	Garlon 4
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4



Fakahatchee Strand Preserve State Park

County: Collier

PCL Size: 70,376 acres

Project ID: SW-060 2,401 acres \$65,380

Project Manager: Florida Park Service (DEP)

Mike Owen

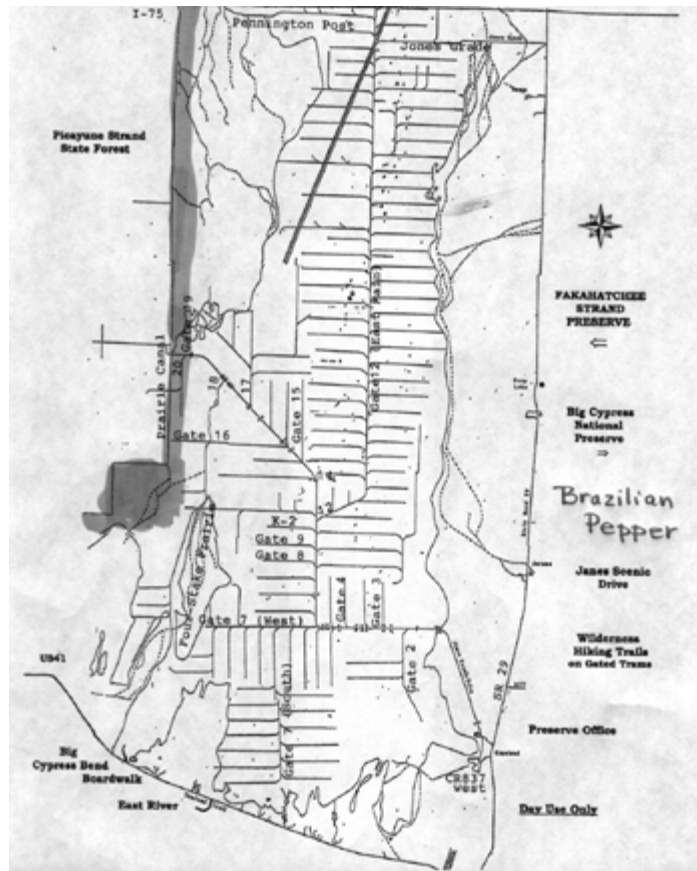
PO Box 548, Copeland, Florida 34137

Phone: 239-695-2886, Fax: 239-695-4947

Email: mike.owen@dep.state.fl.us

The project site was primarily located on the west side of the preserve where natural communities include pine flatwoods, rockland hammock, prairie hammock, cypress swamp, and marl prairie. Brazilian pepper was located in Section 24 in the recently acquired southwest portion of the preserve, which was an abandoned goat and pig farm and former migrant camp, and in the northern half of Section 26 south of Prairie Canal. The filling of the northern four miles of Prairie Canal facilitated access for control of Brazilian pepper in this area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	foliar	Roundup+Amm. Sulfate



Collier-Seminole State Park

County: Collier

PCL Size: 7,271 acres

Project ID: SW-059 10.5 acres \$2,945

Project Manager: Florida Park Service (DEP)

Joe Howard, Park Manager

20200 Tamiami Trail East, Naples, Florida 34114

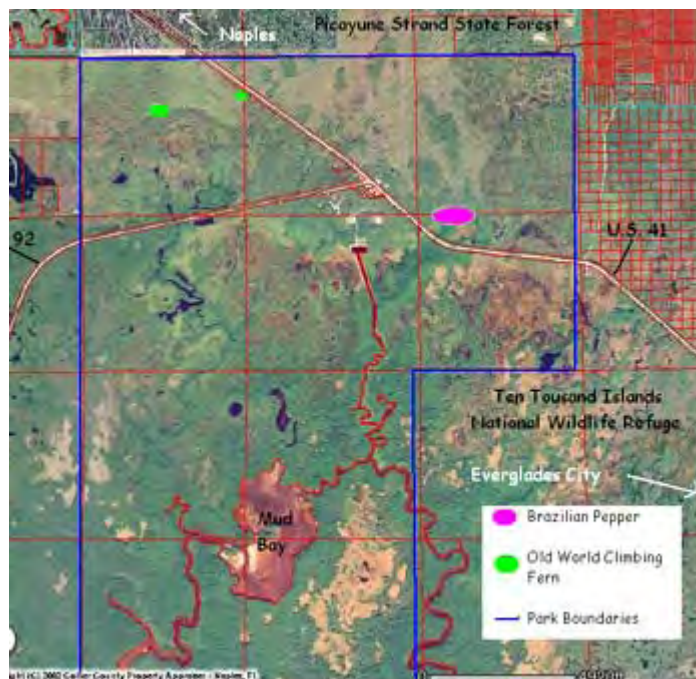
Phone: 239-394-3397, Fax: 239-394-5113

E-mail: joe.howard@dep.state.fl.us

Collier-Seminole State Park features a wealth of vegetation and wildlife that is typical of the Everglades region of Florida. A tropical hammock dominated by trees that are characteristic of coastal forests of the West Indies and Yucatan is a special feature of the park. Also, the rare Florida royal palm is a common species here. Natural communities of the park include extensive mangrove swamp, as well as cypress swamp, hydric hammock salt marsh, and mesic pine flatwoods.

This project primarily targeted Old World climbing fern on nine acres of mesic pine flatwoods. A smaller flatwoods site was treated for melaleuca. BIPM provided the herbicide only for this project through its Herbicide Bank.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Rodeo
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal



Picayune Strand State Forest

County: Collier

PCL Size: 65,436 acres

Project ID: SW-062 637 acres \$80,000

Project Manager: Division of Forestry (FDACS)

Sonja Durrwachter, Forestry Supervisor II

2121 52nd Ave SE, Naples, Florida 34117

Phone: 941-348-7557, Fax: 941-348-7559

Email: durrwas@doacs.state.fl.us

Picayune Strand State Forest is comprised of two adjacent Conservation and Recreation Lands (CARL) purchases, South Golden Gate Estates (SGGE) to the east and Belle Meade to the west. The forest is bordered to the east by Fakahatchee State Preserve and to the south by Collier-Seminole State Park and Ten Thousand Islands National Wildlife Refuge. The forest encompasses a wide variety of habitats, including cypress sloughs, pine flatwoods, hammocks, and grass prairies. The project area was the Belle Meade tract in an area previously treated by the lacing method in 2002.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/mechanical	Garlon 4

Florida Panther National Wildlife Refuge

County: Collier

PCL Size: 26,529 acres

Project ID: SW-061 200 acres \$106,158.54

Project Manager: U.S. Fish and Wildlife Service

Dennis Giardina

13233 State Road 29 S, Immokalee, Florida 34142

Phone: 239-657-7637 x 29

Email: dennis_giardina@fws.gov

This project controlled scattered infestations of Old World climbing fern, *Lygodium microphyllum* (lygodium), on the Florida Panther National Wildlife Refuge (Refuge). Cypress forest and mixed swamp communities comprised the majority of the affected habitat. Much of the treatment area was impacted by canal digging and railroad tram building related to timber extraction during the middle of the previous century.

The project area lay in the southeast corner of the Refuge. Contractors worked from outlying infestations towards the densest infestations in several separate areas. Outlier lygodium infestations were identified by Refuge staff in the field and on maps. The Refuge also provided staff time and vehicles as an in-kind match worth \$10,000.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Aquaneat+Escort

Ten Thousand Islands

County: Collier

PCL Size: 8,630 acres

Project ID: SW-064 2,000 acres \$40,000.00

Project ID: SW-065 400 acres \$40,311.80

Project Manager: Office of Coastal and Aquatic Managed Areas (DEP)

Pamela Keyes, Resource Management Specialist

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Phone: 941-417-6310, Fax: 941-417-6315

Email: pamela.keyes@dep.state.fl.us

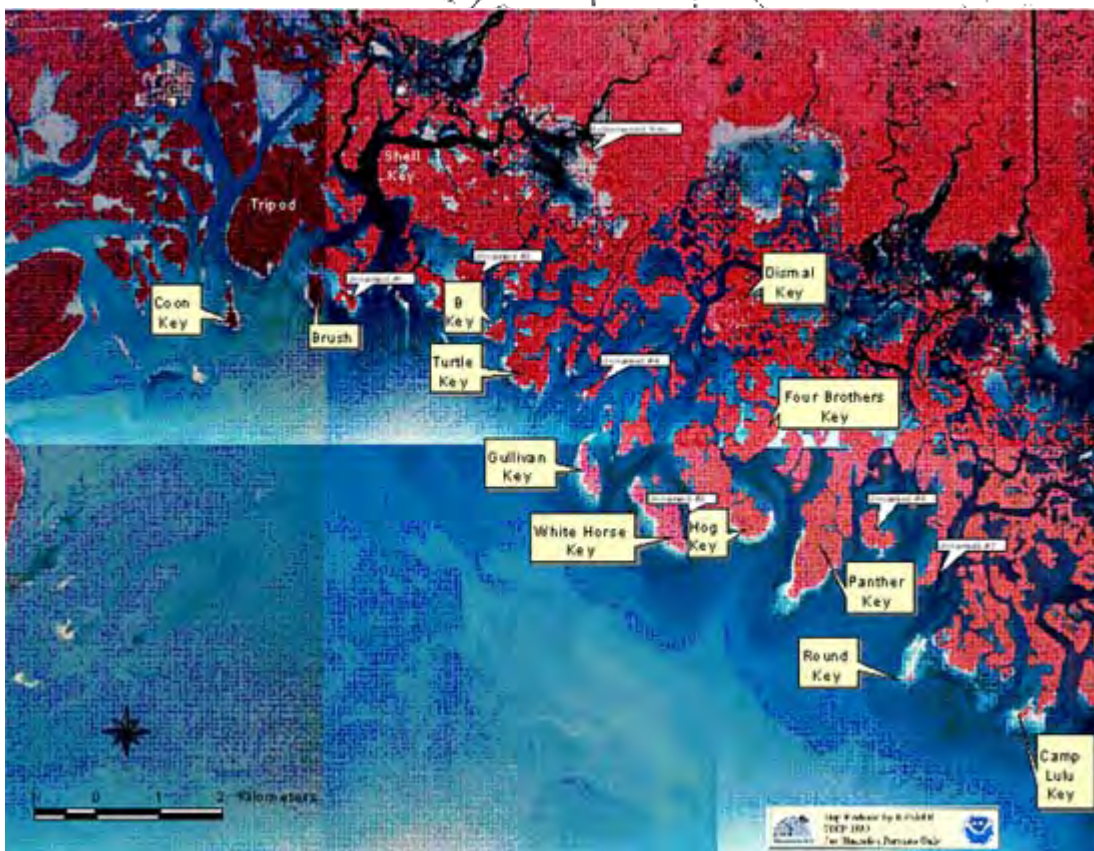
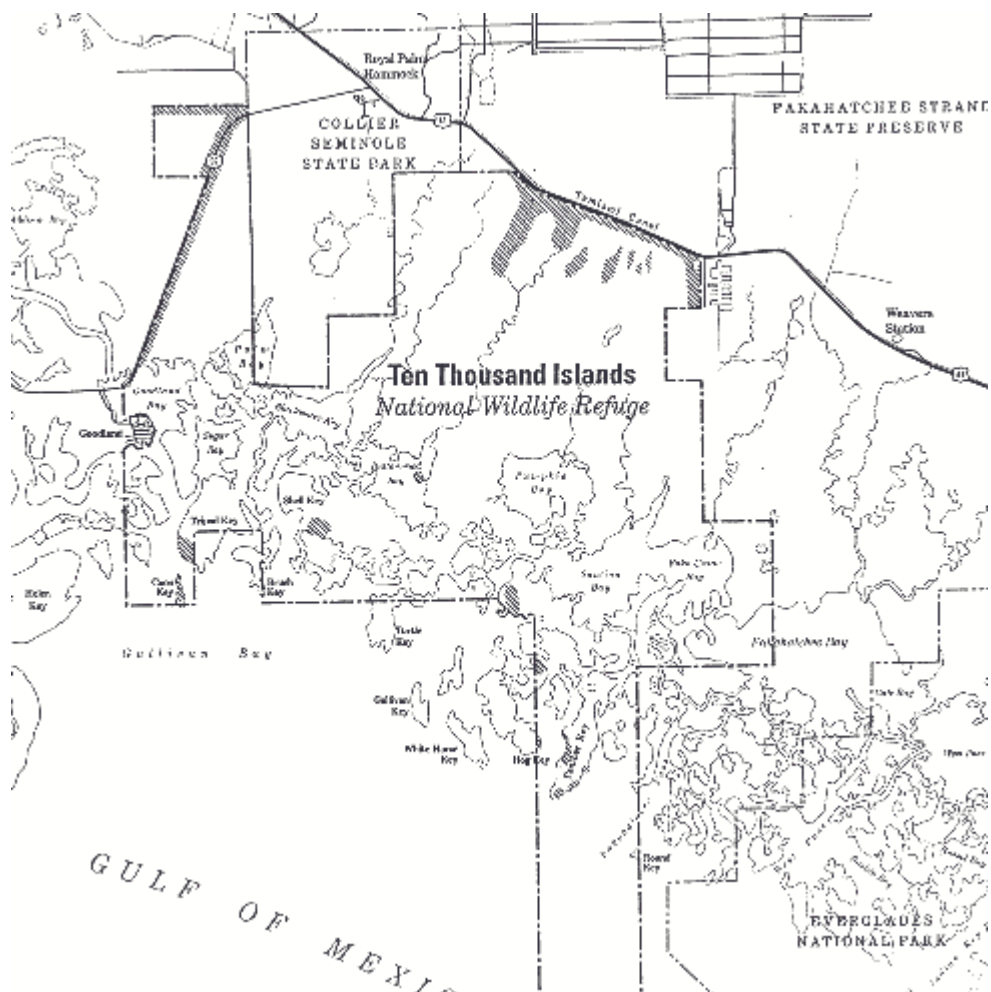


The Ten Thousands Islands are approximately 8,630 acres with 6,200 acres designated as a National Wildlife Refuge (managed by the US Fish and Wildlife Service) and 2,430 acres designated as a state Aquatic Preserve. Native communities that comprise the Ten Thousand Islands include beach, dune, mangrove forests, costal strand, tropical hardwood hammocks, sea grass beds, and oyster reefs.

The first project provided initial control of Brazilian pepper in brackish wetlands of the Ten Thousand Islands National Wildlife Refuge. The project site was a 2,000-acre wetland area where mangrove forest transitions into a largely open mixed wetland. This unique zone is comprised of five percent tropical hardwood hammocks, thirty-five percent mangroves, and sixty percent emergent marsh. Brazilian pepper encroached throughout the area and was especially concentrated around the tropical hammocks and high marsh.

The second project targeted all Category I and II invasive plants on twenty-three islands within the Ten Thousand Islands for maintenance control. Past initial treatment and maintenance control funded by BIPM, along with work by volunteers and staff, occurred on Shell Key, Tripod Key, Coon Key, Dismal Key Four Brothers Key, Hog Key, Camp LuLu, Whitehorse Key, Panther Key, Gullivan Key, Round Key, Brush Island, Turtle Key, Faka-Union Canal, Buttonwood Key ‘B’ Key, Unnamed Island #1, Unnamed Island #2, Unnamed Island #4, Unnamed Island #5, Unnamed Island #6, Unnamed Island #7 and Fakahatchee Island.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Colubrina asiatica</i>	latherleaf	Category I	basal	Garlon 4
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Chopper
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Hibiscus tiliaceus</i>	mahoe	Category II	basal	Garlon 4
<i>Kalanchoe pinnata</i>	life plant	Category II	foliar	Ranger Pro



Rookery Bay National Estuarine Research Reserve

County: Collier

PCL Size: 110,000 acres

Project ID: MR-009 70 acres \$113,300

Project Manager: Office of Coastal and Aquatic Managed Areas (DEP)

Keith Laakkonen, Resource Management Coordinator

300 Tower Road, Naples, Florida 34113

Phone: 239-417-6310 x212, Fax: 239-417-6315

E-mail: keith.laakkonen@dep.state.fl.us

Rookery Bay NERR is located ten miles southeast of Naples, Florida. The Reserve has a northern boundary at Gordon Pass and a southern boundary at Camp LuLu Key in the Ten Thousand Islands. Rare and endangered plants occurring in the Reserve area include barbed wire cactus, satinleaf, wild cotton, bay cedar, common wild pine, giant wild pine, and many-flowered grass pink.

The project site is south of Henderson Creek adjacent to SR 951 (Collier Boulevard). Henderson Creek is a major source of freshwater flow into Rookery Bay. The Henderson Creek Restoration project requires the removal and control of all invasive plant species. The target zones comprise pine flatwoods and high coastal marsh with fringing mangrove forest along tidally influenced Henderson Creek.

The project area consisted of three different zones. Zone 1, a 5-acre site located directly next to a mangrove restoration site, was heavily infested with Brazilian pepper, earleaf acacia and wedelia. Zone 2, an approximately 24-acre site, was heavily infested with downy rose-myrtle, some melaleuca, thick Brazilian pepper along the mangrove ecotone, and lygodium. Zone 3, an approximately 21-acre site, was heavily infested with downy rose-myrtle, air-potato, earleaf acacia, and Brazilian pepper.

Additionally, maintenance control was conducted on the 20-acre Krantz parcel, which was previously heavily infested with downy rose-myrtle and melaleuca. This parcel received initial control in 2004. All control work was contracted through CAMA funding.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Acacia auriculiformis</i>	earleaf acacia	Category I	basal	Garlon 4
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Roundup+Amm. Sulfate
<i>Rhodomyrtus tomentosa</i>	downy rose-myrtle	Category I	foliar	Roundup+Amm. Sulfate
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Roundup+Amm. Sulfate

Sanibel Island/Bowman's Beach Park

County: Lee

PCL Size: 170 acres

Project ID: SW-069 68.5 acres \$131,200

Project Manager: City of Sanibel Department of Natural Resources

Robert Loflin, Ph.D., Natural Resources Director

800 Dunlop Road, Sanibel, Florida 33957

Phone: 239-472-3700, Fax: 239-472-3065

E-mail: Rob.Loflin@mysanibel.com

The passage of Hurricane Charley forever changed the landscape of Sanibel Island. The high winds associated with the storm left much of the island vegetation damaged or destroyed. Bowman's Beach lost thousands of Australian pines as a result of the hurricane season. In addition, numerous boardwalks, the fitness trail, picnic tables, and parking lots were heavily damaged.

This project assisted the City in removal of trees from the park. The City of Sanibel and Lee County provided matching funds of \$80,000 and \$180,000 respectively, for removal and treatment work for a total project cost of \$391,200. The City also received assistance from FEMA and USFWS. In all, Australian pines were removed from 370 acres of Sanibel Island.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	mechanical	n/a



Somewhere under these trees is a house. The invasive Australian pine threatens both people and nature.

Sanibel Island/Bowman's Beach Park



Australian pines grow over 100 feet tall and have a dense hard wood. This requires specialized (and expensive) heavy equipment to topple and cut the trees, which then...

must be carried off for disposal...



by burning...

or by chipping.



Prairie Pines Preserve

County: Lee

PCL Size: 2,709 acres

Project ID: SW-067 149 acres \$153,000

Project Manager: Lee County Parks and Recreation

Anik L. Smith, Land Stewardship Supervisor

3410 Palm Beach Boulevard, Fort Myers, Florida 33916

Phone: 239-461-7455, Fax: 239-461-7460

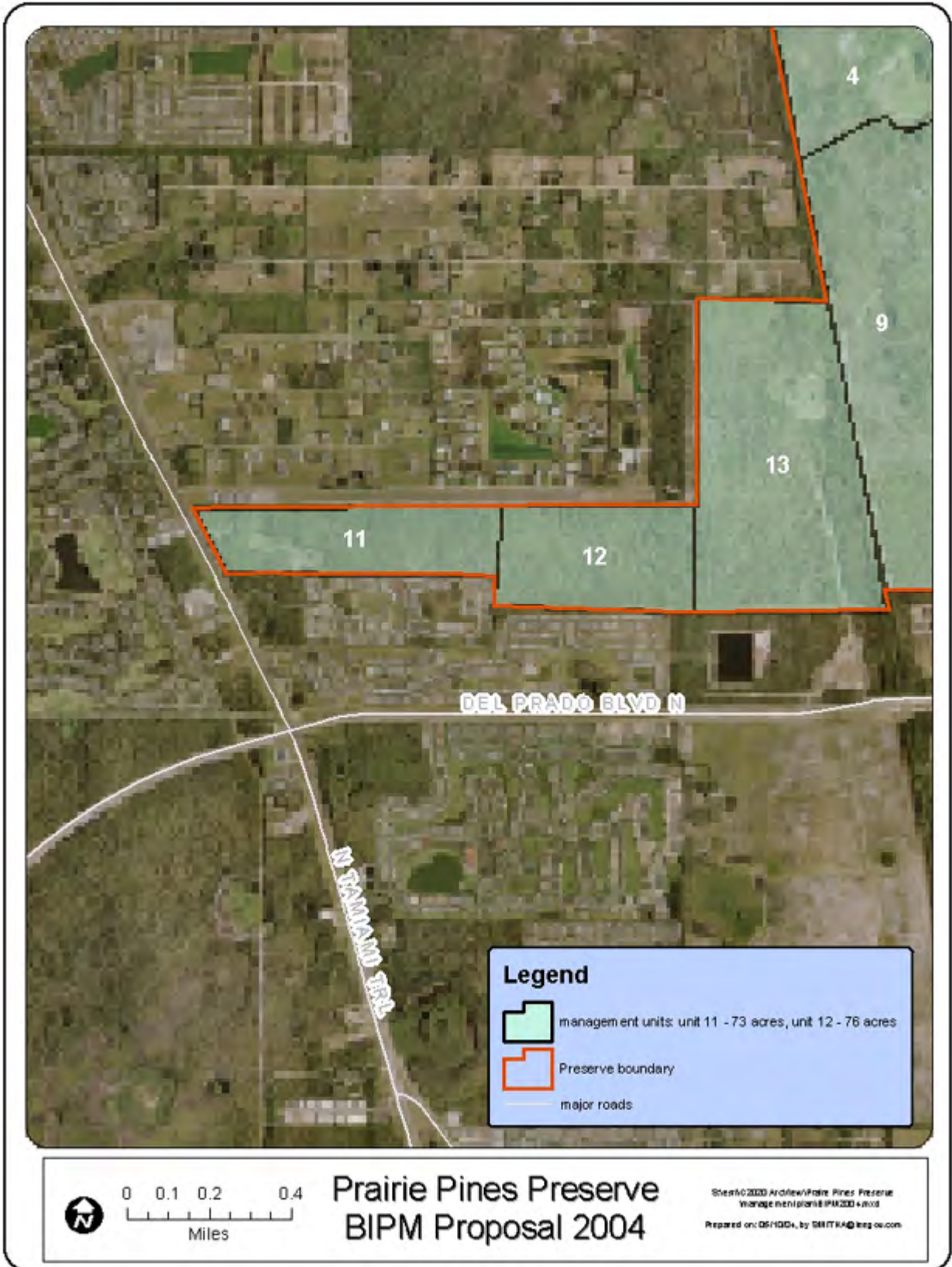
E-mail: smitha@leegov.com

Prairie Pines Preserve is the largest preserve owned and managed by Lee County. The preserve encompasses diverse native plant communities that provide habitat for several listed animals and seven listed plant species. Over four hundred species of native plants are documented on the preserve. Lee County Parks and Recreation provided \$481,980 in matching funds for this project.

The county divided the preserve into nineteen management units to make management and restoration projects easier. Units 11 and 12 were the first two units targeted for invasive exotic plant control since they are the location of the preserve entrance and most of the public use facilities such as trailhead, parking, and overlook. Management Unit 11 is 73 acres of primarily mesic pine flatwoods, prairie hammock and depression marsh. The mesic flatwoods were infested by melaleuca with twenty-five to fifty percent coverage. The depression marsh was ringed by a melaleuca monoculture that was beginning to invade the center of the marsh. Torpedo grass formed approximately twenty-five percent of the ground cover within the marsh. The prairie hammock was infested by Brazilian pepper with coverage of fifty to seventy-five percent. Management Unit 12 is 76 acres of mesic and wet pine flatwoods with twenty-five to fifty percent coverage of melaleuca. Downy rose-myrtle occurred at a relatively low density of less than five percent throughout the mesic and wet flatwoods of both management units.

A Brontosaurus mower was used in the mesic and wet flatwoods to mulch melaleuca down to grade. A combination of biological and chemical control will be used for maintenance control of resprouts. Both the melaleuca snout weevil and psyllid already occur at the preserve and quickly attack fresh growth. Melaleuca within the depression marsh was cut with chainsaws, felled trees stacked, and stumps treated with an appropriate chemical mixture.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	mechanical	Garlon 3A
<i>Panicum repens</i>	torpedo grass	Category I	foliar	Rodeo
<i>Rhodomyrtus tomentosa</i>	downy rose-myrtle	Category I	mechanical	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	mechanical	Garlon 4



Prairie Pines Preserve



Before and after pictures taken about two months apart show how melaleuca dominates the landscape.

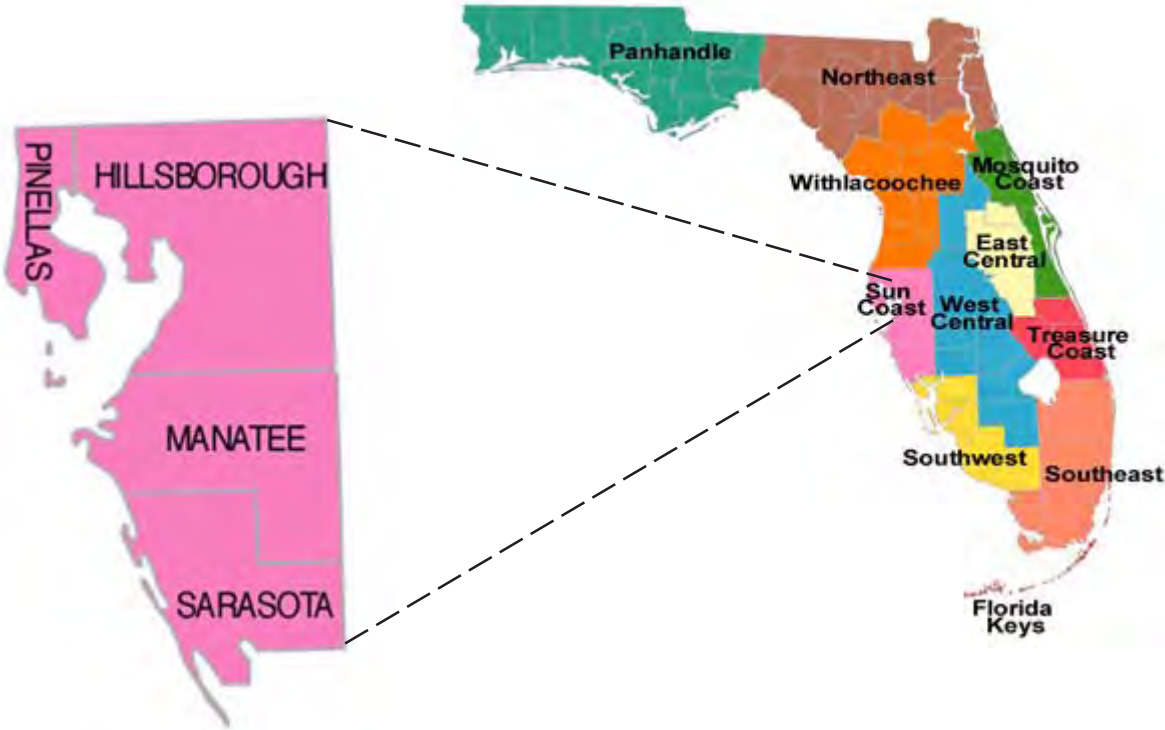


If the natural community was wiped out by the melaleuca, restoration work will include replanting of native species.



Downy rose-myrtle, while not quite as bad as melaleuca, will also overwhelm native species. After removal of the invasive species, this native pine flatwoods looks just about right.

Sun Coast Regional Working Group



The Sun Coast Regional Working Group liaison is Debbie Chayet, Pinellas County Parks Department, 631 Chestnut Street, Clearwater, Florida 33756, phone: 727-464-3347, fax: 727-464-3379, e-mail: dchayet@co.pinellas.fl.us

Upper Tampa Bay Park

County: Hillsborough

PCL Size: 650 acres

Project ID: SC-059 70 acres \$6,600

Project Manager: Hillsborough County Parks, Recreation, and Conservation Department

Skip Denham, Senior Manager

8003 Double Branch Road, Tampa, Florida 33635

Phone: 813-855-1765, Fax: 813-854-4376

E-mail: denhaml@hillsboroughcounty.org

Upper Tampa Bay Park is a regional park adjacent to the 1,549-acre Bower Tract Preserve, which was a FY04 BIPM project area. Upper Tampa Bay Park is located directly on Old Tampa Bay and Mobbly Bay and Double Branch Creek flows through the site. Natural communities within the project area include pine flatwoods, salt barrens, salt marsh, and oak hammock. Control operations targeted heavy pockets of Brazilian pepper, as well as scattered Chinese tallow and melaleuca.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4



Bullfrog Creek

County: Hillsborough

Bullfrog Creek Mitigation Park Wildlife and Environmental Area

PCL Size: 833 acres

Bullfrog Creek Scrub

PCL Size: 787 acres

Project ID: SC-062 108.5 acres \$59,407.77

Project Manager: Florida Fish and Wildlife Conservation Commission

Shane Belson

1601 Scotty's Road, Kissimmee, Florida 34744

Phone: 407-846-5300 x1003, Fax: 407-846-5310

E-mail: shane.belson@fwc.state.fl.us

Hillsborough County acquired Bullfrog Creek Mitigation Park Wildlife and Environmental Area (BCMP) and Bullfrog Creek Scrub (BCS) in 1995. Hillsborough County Parks, Recreation, and Conservation Department, Conservation Services Section, manages Bullfrog Creek Scrub. The Florida Fish and Wildlife Conservation Commission (FWC) manages Bullfrog Creek Mitigation Park as a Wildlife and Environmental Area. Natural communities found at BCMP and BCS include dry prairie, pine flatwoods, sand pine scrub, xeric oak hammock, cypress swamp, hardwood swamp, and freshwater marsh. Bullfrog Creek flows from east to west through the project site, entering at the east boundary of BCS and exiting at the north boundary of BCMP. The endangered Florida golden aster (*Chrysopsis floridana*) occurs on both BCMP and BCS.

Brazilian pepper occupied 85 acres in light to moderate density at BCMP, primarily in the Bullfrog Creek floodplain and surrounding hammocks and along the property perimeter in pasture, ditch, and fence line areas. Brazilian pepper occurred on 15 acres in light to moderate density at BCS on woodland/pasture edges, in hammocks, and along ditches and old fence lines. Cogon grass at BCMP and BCS was limited to 3 acres of small infestations along roads, firelines, and fence lines, and scattered in pastures. Tropical soda apple grew on 1.5 acres of BCS in scattered pasture locations. Chinese tallow occurred on 1 acre near Bullfrog Creek in the center of BCS. Japanese climbing fern and lead tree mixed together on 3 acres at the north boundary of BCMP.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Cupaniopsis anacardioides</i>	carrotwood	Category I	basal	Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Razor+Chopper+Patriot
<i>Lantana camara</i>	lantana	Category I	cut stump	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category I	cut stump	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Razor+Chopper+Patriot
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Razor+Chopper+Patriot
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4

Alafia River Corridor Preserve

County: Hillsborough

PCL Size: 4,047 acres

Project ID: SC-064 1,005 acres \$50,000

Project Manager: Hillsborough County Parks, Recreation, and Conservation

Richard Sullivan, Environmental Scientist

3709 Gulf City Road, Ruskin, Florida 33579

Phone: 813-671-7754, Fax: 813-671-7758

E-mail: sullivanj@hillsboroughcounty.org

The preserve is located on the north prong of the Alafia River from Alderman's Ford Park to the Polk County Line, and the south prong of the Alafia River, southeast of Alderman's Ford Park. Habitats found within the site include pine flatwoods, dry prairie, hardwood hammock, and riverine swamp hardwood forest.

The project addressed maintenance control of skunk vine that occurred in scattered areas of the 1,005-acre Knight Parcel. This work continued an ongoing partnership effort by the Southwest Florida Water Management District Surface Water Improvement and Management Program, the Florida Department of Environmental Protection, and the Hillsborough County Environmental Protection Commission.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Glypro+Escort



McKay Creek Greenway

County: Pinellas

PCL Size: 88 acres

Project ID: SC-058 144 acres \$30,204.52

Project Manager: Pinellas County Park Department

Deborah J. Chayet, Park Horticulturist

631 Chestnut Street, Clearwater, Florida 33756

Phone: 727-464-5111, Fax: 727-464-3379

E-mail: dchayet@co.pinellas.fl.us

The McKay Creek Greenway is a four-mile corridor of contiguous conservation land along McKay Creek in central Pinellas County. The Greenway includes large parklands, conservation lands, and other county-owned properties. The Greenway is home to over twenty-four listed species of which four are federally listed, including the endangered *Chrysopsis floridana* (Florida golden aster) and *Drosera intermedia* (sundew).

Light to moderate infestations of invasive plants covered approximately 55 acres of the project site, with some areas infested by more than one species. Three small localized pockets of cogon grass covered less than ½ acre. Japanese climbing fern infested approximately 3½ acres at a light density. Brazilian pepper occurred densely along the northern sides of the creek and scattered at light densities along the site perimeters. Scattered camphor trees occurred at a light density over a broad area.

Pinellas County provided matching in-kind services of labor and herbicides valued at \$58,141.04

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina</i> spp.	Australian pine	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Cupaniopsis anacardioides</i>	carrotwood	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Razor+Patriot
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Razor+Patriot
<i>Lantana camara</i>	lantana	Category I	basal	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Razor+Patriot
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Razor+Patriot
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Nephrolepis cordifolia</i>	Boston fern	Category I	foliar	Razor+Patriot
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	basal	Garlon 4
<i>Ricinus communis</i>	castor bean	Category II	basal	Garlon 4

McKay Creek Greenway



- | | | |
|---|---------------------------------|------------------------|
|  | <i>Casuarina equisetifolia</i> | Australian Pine |
|  | <i>Cinnamomum camphora</i> | Camphor Tree |
|  | <i>Dioscorea bulbifera</i> | Air Potato |
|  | <i>Imperata cylindrica</i> | Cogon Grass |
|  | <i>Lantana camara</i> | Lantana |
|  | <i>Lygodium japonicum</i> | Japanese Climbing Fern |
|  | <i>Melaleuca quinquenervia</i> | Punk Tree |
|  | <i>Melia azedarach</i> | Chinaberry |
|  | <i>Nephrolepis cordifolia</i> | Boston Fern |
|  | <i>Schinus terebinthifolius</i> | Brazilian Pepper |
|  | <i>Syzygium cumiri</i> | Java Plum |

Lake Seminole Park

County: Pinellas

PCL Size: 255 acres

Project ID: SC-066 97 acres \$12,000

Project Manager: Pinellas County Park Department

Deborah J. Chayet, Grants Specialist

631 Chestnut Street, Clearwater, Florida 33756

Phone: 727-464-5111, Fax: 727-464-3379

Email: dchayet@co.pinellas.fl.us

Lake Seminole Park is located in central Pinellas County and provides passive recreation for over one million visitors each year. Natural communities in the park include pine flatwoods, bayheads, and wetlands transitioning into mesic hammock. Also present are small areas of mangroves near the southern border of the park. The priority of the original project was Brazilian pepper, with five control sites totaling 96 acres. *Lygodium* occurred on less than an acre, with a few camphor trees scattered in the project area. This project completed work initiated in the previous fiscal year.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Glypro+Escort



A park rescued from invaders.

Lemon Bay Preserve

County: Sarasota

PCL Size: 165 acres

Project ID: SC-057 56.5 acres \$33,041.50

Project Manager: Sarasota County Natural Resources

Nancy Edmondson, Environmental Specialist

2817 Cattlemen Road, Sarasota, Florida 34232

Phone: 941-861-6260, Fax: 941-861-6266

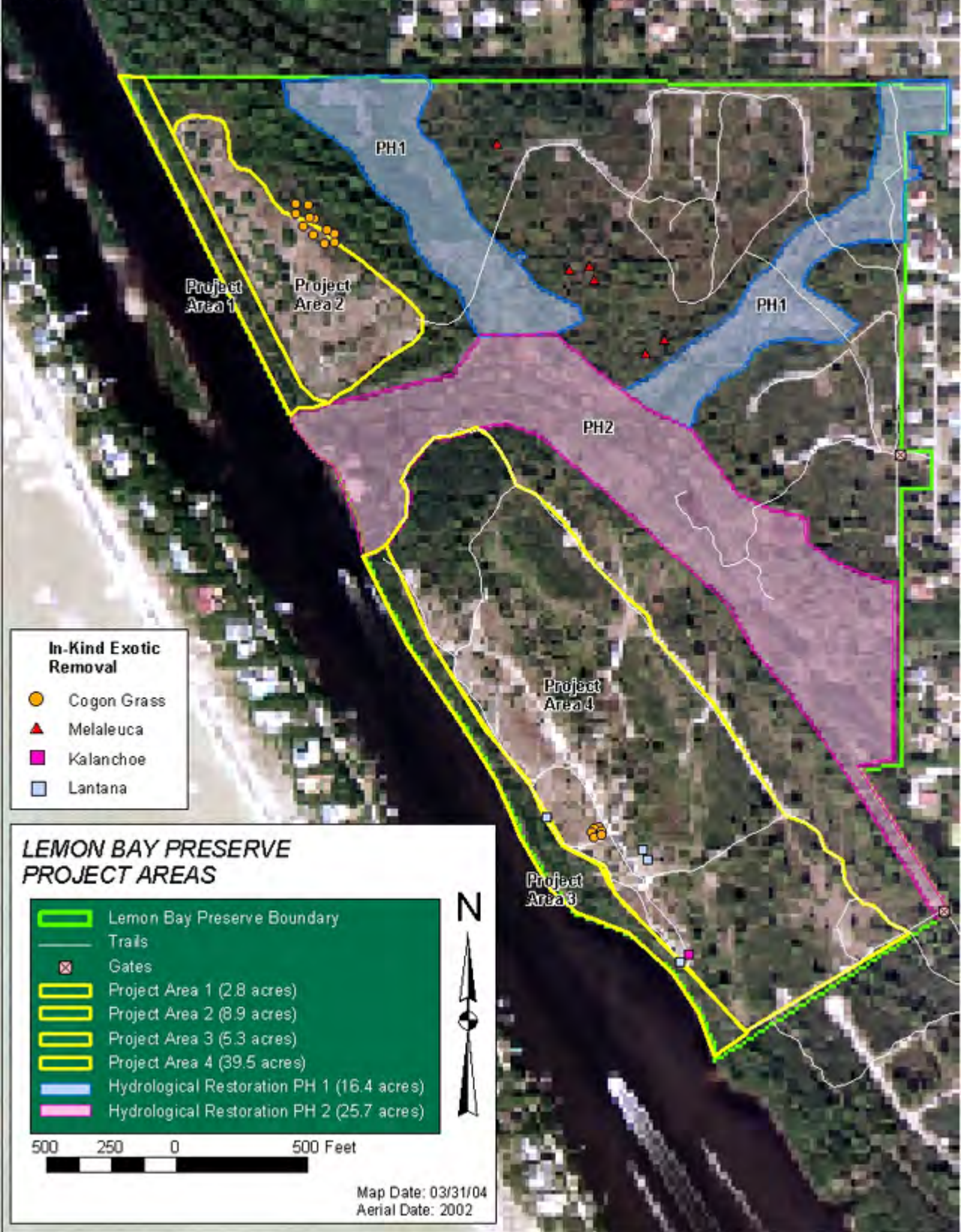
E-mail: nedmonds@scgov.net

Sarasota County owns 765 acres along the shores of the Lemon Bay Aquatic Preserve in upper Lemon Bay. A long range county goal is to eradicate Brazilian pepper, Australian pine, carrotwood, and melaleuca from coastal areas adjacent to Lemon Bay. Initial efforts to control woody nuisance species began in 1998 with a project funded by DEP and matching funds from Sarasota County and other agencies to address Brazilian pepper at Caspersen Beach Park. This effort continued through subsequent phases of work at Caspersen Beach Park (113 acres), initial Brazilian pepper control at Shamrock Park and Nature Center (83 acres), and persistent volunteer follow-up efforts from the American Littoral Society (>1,600 hours over a four-year period) and Venice Area Beautification, Inc. (>2000 hours in two years for exotic plant control and replanting with native plants). In 2000, a project funded by SWFWMD and Sarasota County addressed the removal of exotic vegetation, primarily Brazilian pepper, Australian pine, and melaleuca in tidal marsh, mangrove swamp, and transitional areas on Lemon Bay Preserve.

Lemon Bay Preserve contains coastal oak scrub, scrubby flatwoods, pine flatwoods, mixed cabbage palm hammock, mangrove swamps, tidal marsh, and palmetto prairie, of which coastal oak scrub and palmetto prairie are habitats imperiled in Florida due to rarity. Ruderal areas in the preserve are a result of the dredging of the Gulf Intracoastal Waterway (ICW) in the 1960s. Although the site contained Brazilian pepper scattered throughout the property, this project targeted Brazilian pepper invading the mangrove fringe along approximately 0.85 mile of Lemon Bay and the adjacent areas impacted by dredging and filling. The property has undergone extensive scrub restoration including timber thinning, roller chopping, prescribed burns, exotic plant control, and most recently (November 2003 – March 2004), a hydrologic restoration project. Nearly 16 acres of Brazilian pepper, air-potato (*Dioscorea bulbifera*) and other exotics including lantana (*Lantana camara*), lead tree (*Leucaena leucocephala*), and wedelia (*Wedelia trilobata*) were removed during the course of the hydrologic restoration project.

A match provided by Sarasota County included funds allocated for Phase II of the Hydrologic Restoration Project to remove Brazilian pepper and other woody exotics from an additional 45 acres, as well as controlling cogon grass, lantana, kalanchoe, and melaleuca (less than 5 acres) that existed within the project area. Total matching funds equaled \$107,000. The county also provided in-kind services of time and materials worth \$9,669.81

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4



Myakka River State Park

County: Sarasota, Manatee

PCL Size: 37,199 acres

Project ID: SC-063 10 acres \$6,715.50

Project ID: RP-036 10 acres \$6,981.69

Project Manager: Florida Park Service (DEP)

Diana Donaghy, Park Biologist

13207 State Road 72, Sarasota, Florida 34241

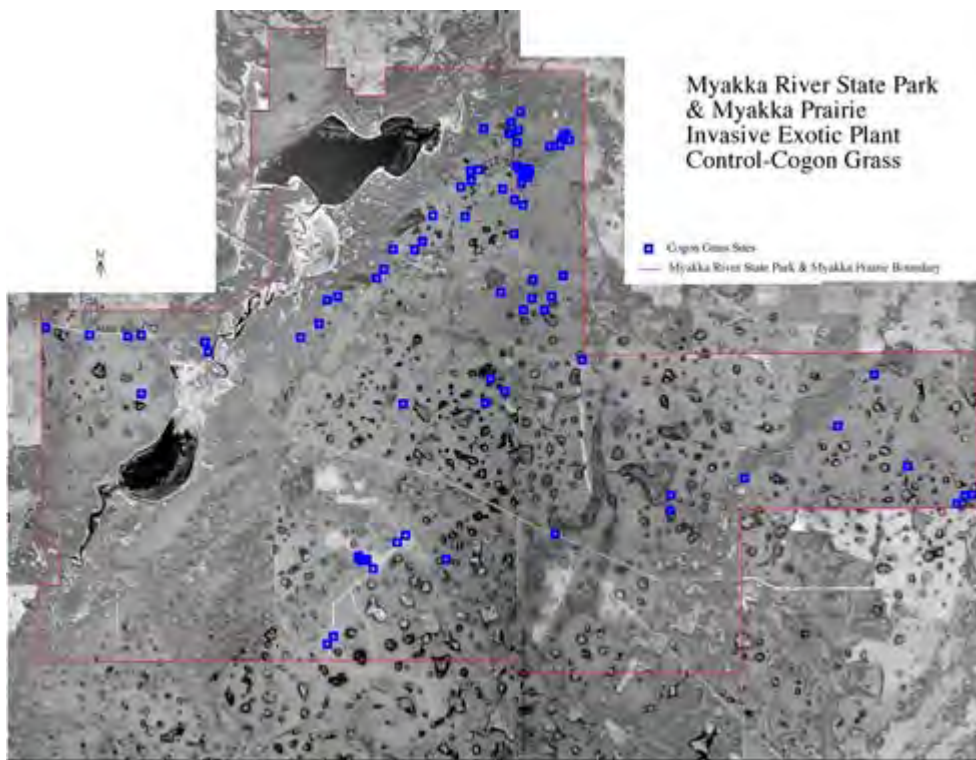
Phone: 941-361-6512

E-mail: diana.donaghy@dep.state.fl.us

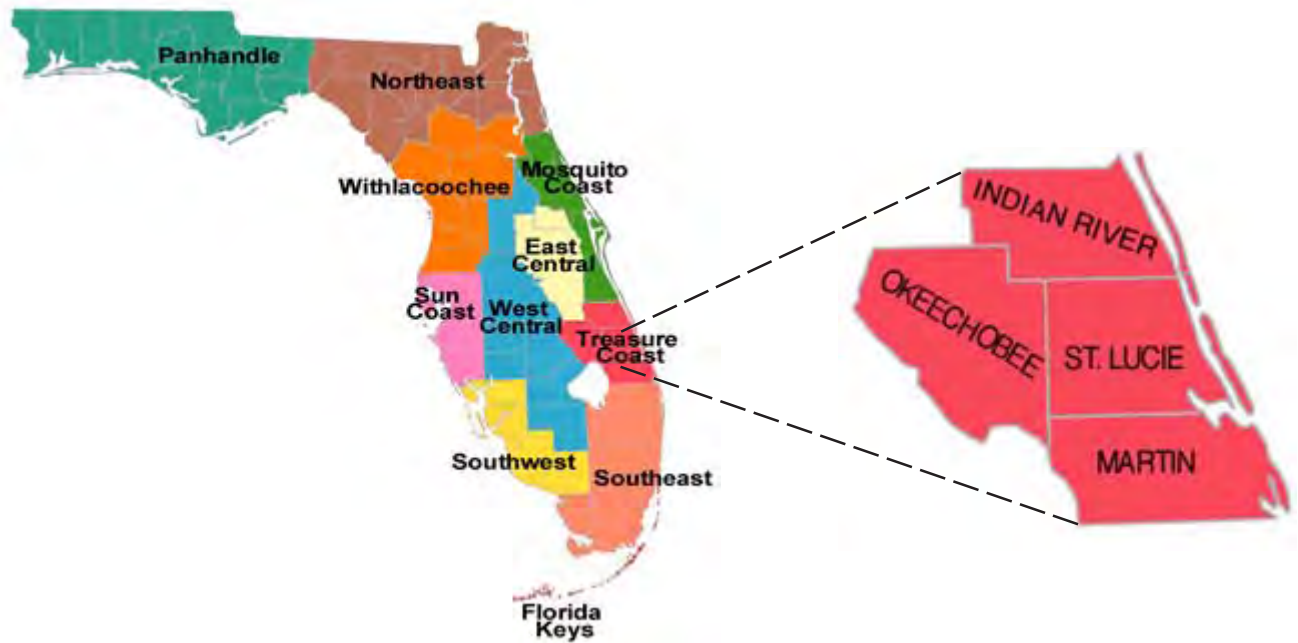
Myakka River State Park is comprised of dry prairie, hydric and mesic hammocks, mesic flatwoods, and scrubby flatwoods. Ninety-two cogon grass sites, totaling approximately six acres, were identified and treated in 2003. Cogon grass was eradicated on two of the original six acres of infestation. This project targeted the previous remaining acres for retreatment, as well as several acres of recently discovered infestations. These sites ranged from ten to seventy-five percent cogon grass cover. A few sites within the project were monocultures of cogon grass, while others were a mixture of cogon grass, palmetto, native grasses, forbs, and shrubs. The infestations occurred in dry prairie, both hammock types, and mesic flatwoods.

The Florida Park Service (FPS) contributed an in-kind match of \$13,187.32 in time and materials. FPS also funded a concurrent project (RP-036) that targeted West Indian marsh grass. This project was funded entirely with FPS funds.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Arsenal+Roundup
<i>Hymenachne amplexicaulis</i>	West Indian marsh grass	Category I	foliar	Arsenal+Roundup



Treasure Coast Regional Working Group



The Treasure Coast Regional Working Group liaison is Jackie Smith, DEP Bureau of Invasive Plant Management, 9737 Gumbo Limbo Lane, Jensen Beach, Florida 34957, phone: 561-722-2479, fax: 561-791-4722, e-mail: jackie.c.smith@dep.state.fl.us

Jonathan Dickinson State Park

County: Martin

PCL Size: 11,480 acres

Project ID: TC-059 887 acres \$206,850.03

Project ID: TC-066 385.5 acres \$139,796.68

Project ID: TC-067 5 acres \$24,750.00

Project Manager: Florida Park Service (DEP)

Philip Myers, District Biologist

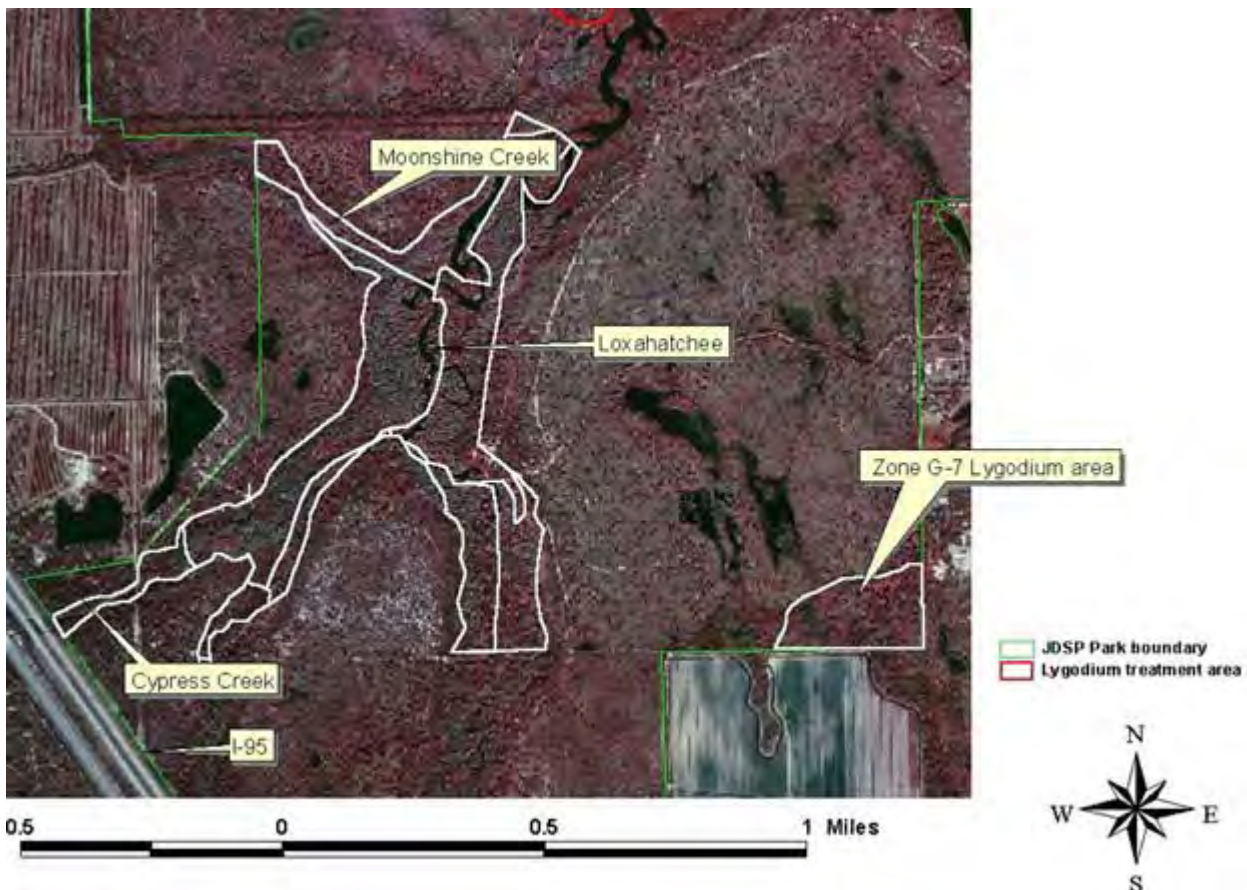
13798 SE Federal Highway, Hobe Sound, Florida 33455

Phone: 772-546-0900, Fax: 772-223-2591

E-mail: philip.myers@dep.state.fl.us

A large part of the effort at Jonathan Dickinson State Park is directed at removing Old World climbing fern (*Lygodium*) from the tributaries of the Loxahatchee River located in the northwest section of the park. The Loxahatchee River is recognized as a National Wild and Scenic River and is home to numerous endangered plant and animal species. Natural communities in the project area included mostly pine flatwoods and cypress sloughs, with some wet prairies.

The first project (TC-059) encompassed eight defined burn units near the northwestern boundary of JDSP. This project was the third and final phase of a three-year control effort and included both initial control on 571 acres and maintenance control on 316 acres. *Lygodium* was treated in the Kitching Creek floodplain and other cypress wetland areas, where it had coverage of thirty to forty percent.



Jonathan Dickinson State Park



These pictures from the JDSP NW section show the dramatic results of controlling lygodium.



Jonathan Dickinson State Park

The second project (TC-066) consisted of maintenance control on lygodium and also included 41.25 acres of treatment on the adjacent Seabranche Preserve State Park (*see next entry*). Lygodium was re-treated in the floodplain swamp of the Loxahatchee River tributaries, Cypress and Moonshine Creeks. The natural communities in this area are mostly floodplain swamp, pine flatwoods, scrub, and scrubby flatwoods. Much of the upriver area has been treated for Lygodium over several years and this work is ongoing. Through its Herbicide Bank, BIPM provided \$7,891.50 of herbicides to JDSP to support staff control operations on the park.



The third project conducted at JDSP (TC-067) was a separate operation to mechanically remove Australian pine trees knocked down by recent hurricanes. From 1942 to 1944 the United States Army owned and operated Camp Murphy in what is now known as Jonathan Dickinson State Park. Specifically, the Pine Grove Campground was the hospital area of the base. Because Camp Murphy was a secret radar training base military officials planted vegetation to hide the buildings. The buildings were moved off site after Camp Murphy closed in 1944 and Australian pines have grown on the 'Pine Grove Campsite' ever since.

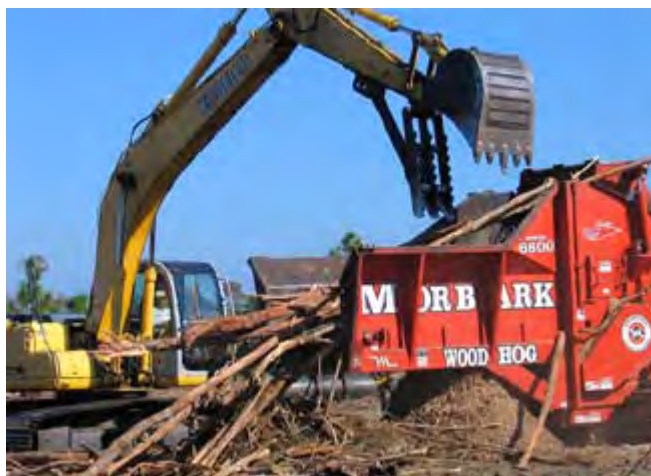


Jonathan Dickinson State Park

In September 2004 two hurricanes passed directly over the park with 100 mph or better sustained winds. Severe damage was done to the Australian pines in Pine Grove Campground making it necessary to remove the trees from the campground. Trees were cut with chainsaws and heavy equipment. Volunteers and park staff spent innumerable hours removing remaining stumps, burning debris, redistributing mulch, and planting native plants in the campground.



A whole tree chipper



Mulch ado about nothing



Target Plants

Casuarina spp.

Lygodium microphyllum

Schinus terebinthifolius

Common Name

Australian pine

Old World climbing fern

Brazilian pepper

FLEPPC Rank

Category I

Category I

Category I

Treatment

mechanical

foliar

girdle

Herbicide

n/a

Glypro+Escort

Garlon 4+Stalker

Seabranh Preserve State Park

County: Martin

PCL Size: 919 acres

Project ID: TC-066 41.25 acres (\$139,796.68)

Project Manager: Florida Park Service (DEP)

Philip Myers, District Biologist

13798 SE Federal Highway, Hobe Sound, Florida 33455

Phone: 772-546-0900, Fax: 772-223-2591

E-mail: philip.myers@dep.state.fl.us

This project re-treated *Lygodium* in Seabranh Preserve State Park and was included in the cost of the maintenance work conducted at Jonathan Dickinson State Park. The project area encompasses a baygall seepage wetland, which during most of the year does not have standing water, but has wet soils. Baygall swamp is a rare habitat in south Florida and this example is of high quality.

Numerous rare and endangered species inhabit Seabranh, including 22 plants and 29 animals. Several rare species live specifically in the baygall, including the endangered vanilla orchid (*Vanilla mexicana*). *Lygodium* patches of various sizes were scattered throughout the project area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Glypro+Escort



Map showing Seabranh Park boundary (green) and treatment area (yellow)

Old World climbing fern was first found established in Martin County in 1965. The fern today infests over 200,000 acres in southern Florida.



Foliar application of a metsulfuron methyl (e.g. Escort, Patriot) and glyphosate (e.g. Roundup, Glypro) herbicide mixture has proven effective for controlling this invasive fern. The first biological control agent for lygodium was approved for release in 2004.

St. Lucie Inlet Preserve State Park

County: Martin

PCL Size: 4,835 acres

Project ID: SE(TC)-084 73.5 acres \$701,960

Project Manager: Florida Park Service (DEP)

Philip Myers, Park Biologist

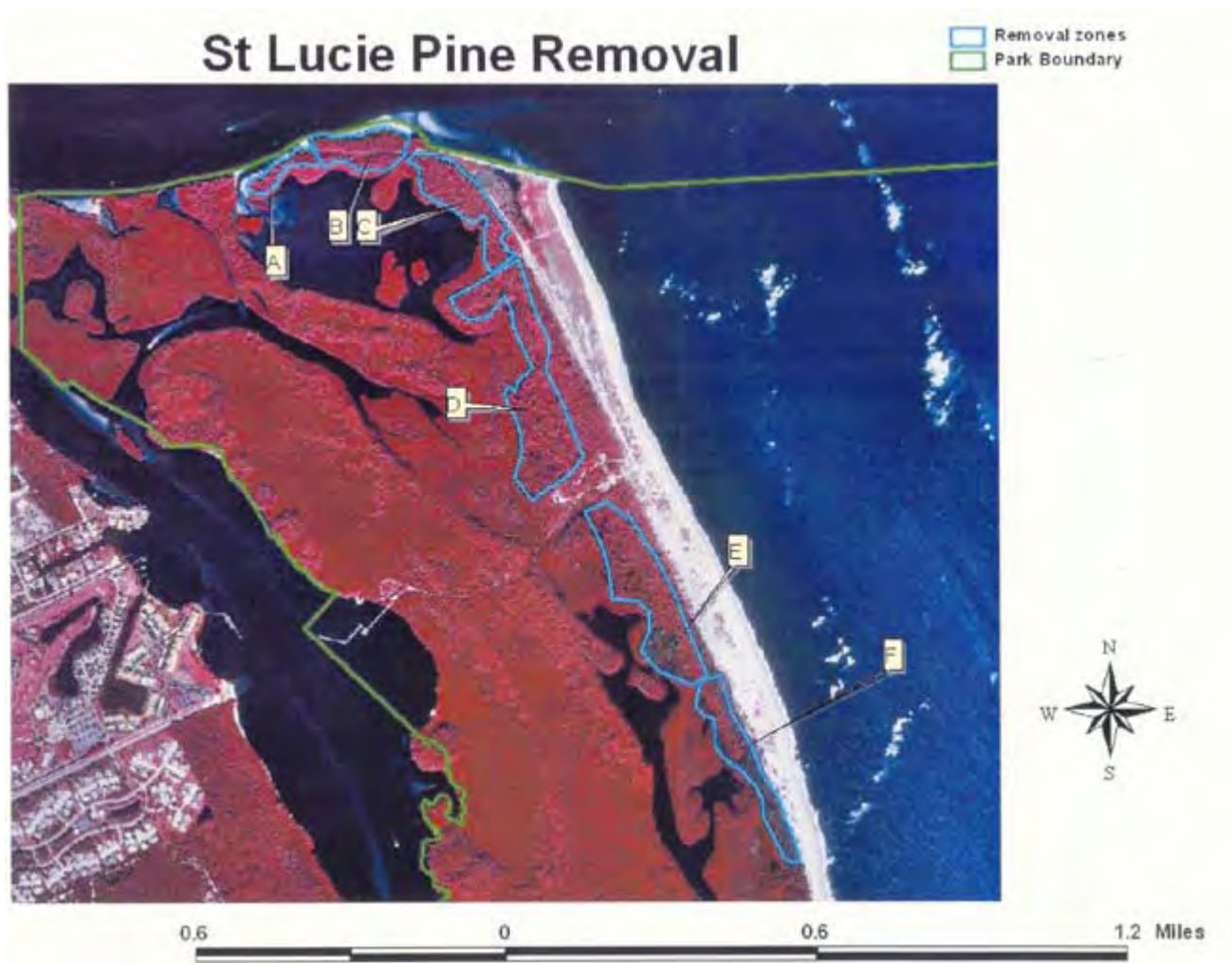
13798 SE Federal Highway, Hobe Sound, Florida 33455

Phone: 561-546-0900, Fax: 561-223-2591

E-mail: philip.myers@dep.state.fl.us

St. Lucie Inlet Preserve State Park comprises 900 acres of the north end of Jupiter Island plus 3,900 acres of adjacent submerged lands. The park encompasses 2.7 miles of Atlantic beach and an Anastasia Formation rock reef. Natural communities include mangrove forests and hammocks of live oaks, cabbage palms, paradise trees, and wild limes. During the summer months, the island is an important nesting area for loggerhead, leatherback, and green sea turtles. This project focused on the mechanical removal of Australian pine and Brazilian pepper within six designated work areas.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina</i> spp.	Australian pine	Category I	mechanical/cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	mechanical/cut stump	Garlon 4



Hungryland Wildlife and Environmental Area

County: Martin, Palm Beach

PCL Size: 10,294 acres

Project ID: TC-061 140 acres \$4,800

Project ID: TC-064 240 acres \$4,400

Project ID: TC-068 0 acres \$482

Project Manager: Florida Fish and Wildlife Conservation Commission

Beth Morford, Biological Scientist III

8535 Northlake Boulevard, West Palm Beach, Florida 33412

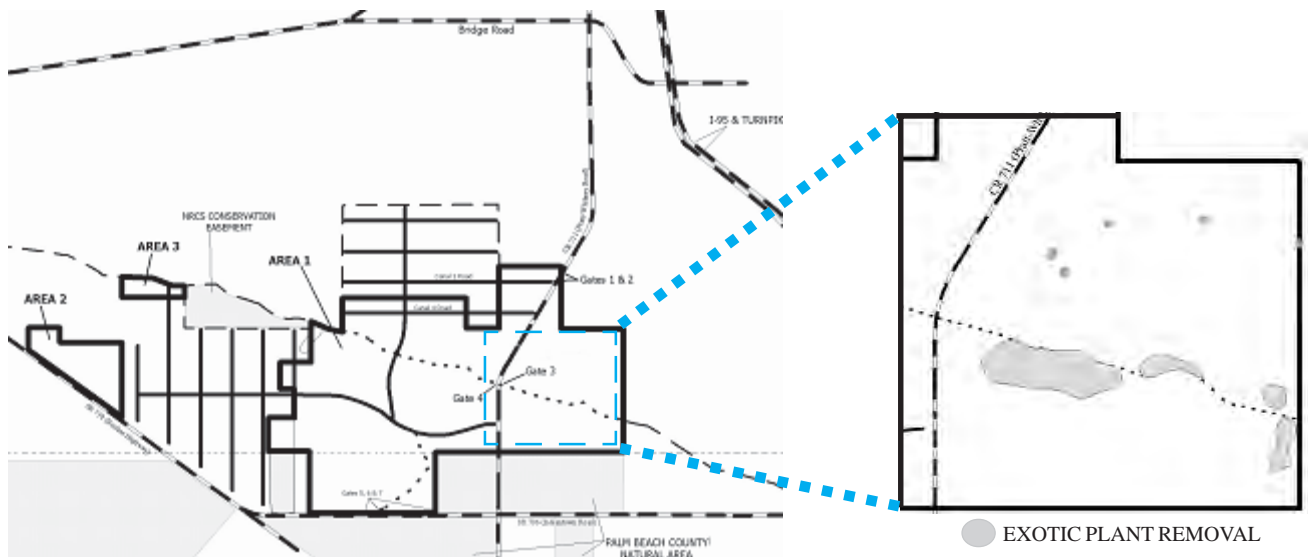
Phone: 561-625-5122, ext. 142, Fax: 561-625-5129

E-mail: beth.morford@fwc.state.fl.us

Hungryland Wildlife and Environmental Area (HWEA) crosses from southern Martin County into northern Palm Beach County. The natural communities of HWEA are comprised primarily of mesic and wet flatwoods, interspersed with depression marshes and wet prairies. The South Florida Water Management District and DEP purchased this property as part of the Pal-Mar CARL/SOR project. *Florida Conservation Lands 2001* describes HWEA (i.e., Pal Mar) as “one of the highest quality pine flatwoods in south Florida.”

Three disjunct parcels separated by private lands make up the HWEA. A combination of aerial and ground surveys identified approximately 950 acres infested by melaleuca, Brazilian pepper, lygodium, and Australian pine. Additional funds were expended for equipment cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Aquastar
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	girdle	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4



Hungryland Wildlife and Environmental Area



Old World climbing fern (*Lygodium microphyllum*) has surpassed all other species as the worst invasive plant in Florida. The four hurricanes in 2004 dispersed spores of this fern across millions of acres of the Everglades and southern Florida. Aerial application of herbicide is effective, as pictured on this page; unfortunately, the plant is difficult to detect until it has overgrown the tree canopy and a great deal of damage has already been done to native plant communities.



Savannas Preserve State Park

County: St. Lucie County

PCL Size: 5,227 acres

Project ID: TC-069 249 acres \$28,000

Project Manager: Florida Park Service (DEP)

Dan Griffin, Park Manager

9551 Gumbo Limbo Lane, Jensen Beach, Florida 34957

Phone: 772-340-7530, Fax: 772-873-6467

E-mail: daniel.griffin@dep.state.fl.us

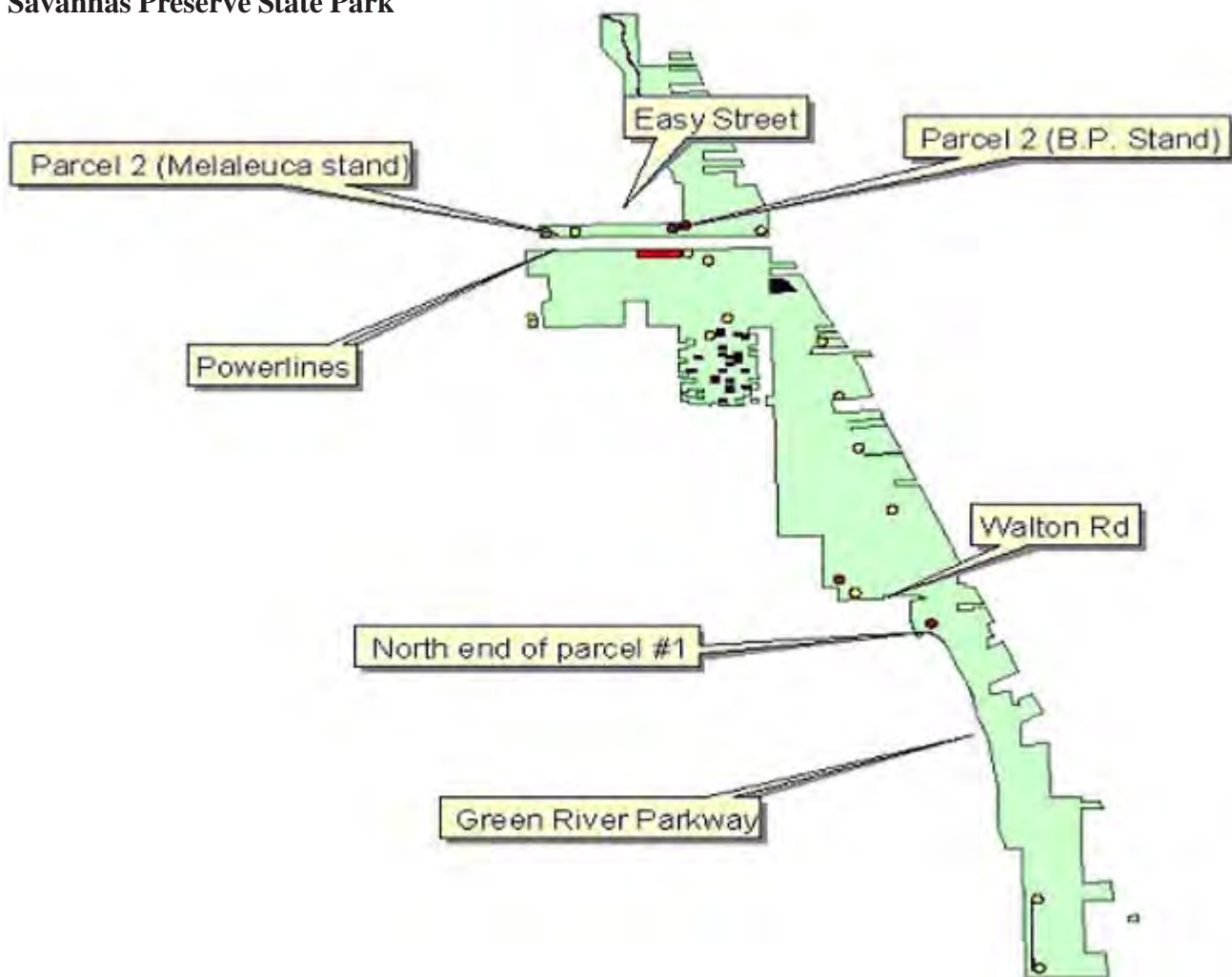
Savannas Preserve State Park stretches over ten miles of high quality natural areas managed for the primary purpose of natural resource conservation. The Savannas is the largest, most ecologically intact stretch of freshwater basin marsh in southeast Florida. The project consisted of two parcels within the Park. Park staff provided an in-kind match of labor and herbicides equal to \$5,000.

The first target site (Parcel #1) is located along the eastern park boundary beginning at Macquillen road and continuing North along the park boundary fringe to the power line easement. Parcel #1 consists of approximately 61 acres of mesic pine flatwoods and wet prairie with scattered depression marshes. The second target site (Parcel #2) is located along Green River Parkway beginning at Walton road and continuing south to the North end of the adjacent reservoir. Parcel #2 consists of approximately 188 acres of mesic pine flatwoods, wet prairie, and basin marsh.

Lygodium, melaleuca, and Brazilian pepper were the dominant invasive species throughout the project area, with the heaviest concentrations found within depression marshes and upland fringes. Estimated infestation for the entire site was ten percent coverage of melaleuca, ten percent coverage of lygodium (with the heaviest infestation along the East side of the canal bank on Parcel #2), and fifteen percent coverage of Brazilian pepper.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	Glypro+Escort
<i>Albizia lebeck</i>	woman's tongue	Category I	cut stump	Arsenal
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Glypro+Escort
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Glypro+Escort
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Triadica sebifera</i>	Chinese tallow	Category I	cut stump	Arsenal
<i>Sphagneticola trilobata</i>	wedelia	Category II	foliar	Glypro+Escort

Savannas Preserve State Park



Brazilian pepper on Parcel 2 gets “the treatment.”

Savannas Recreation Area

County: St. Lucie County

PCL Size: 550 acres

Project ID: TC-060 36.5 acres \$24,850

Project Manager: St. Lucie County Parks and Recreation

Summer Ivey Platt, Savannas Recreation Supervisor III

2300 Virginia Avenue, Ft. Pierce, Florida 34982-5652

Phone: 772-464-7855, Fax: 772-464-1765

E-mail: summeri@co.st-lucie.fl.us

The Savannas Recreation Area is a mosaic of freshwater marshes, wet prairies, and pine flatwoods. The Atlantic Coastal Ridge borders the eastern edge of the marsh system. The Savannas Reserve State Park is located immediately south of the Recreation Area and comprises another 5,116-acres of diverse ecosystems. The Savannas ecosystem represents the best remaining segment of Florida's East Coast Savannas, including extensive freshwater marshes and wet prairie systems. In the past few years, melaleuca and Australian pines began encroaching into the Savannas. Invasive non-native plants primarily infested disturbed areas along the western canal and western property line.

Australian pine, Brazilian pepper, and melaleuca were the primary target species. Australian pine and Brazilian pepper were removed with a Brontosaurus mower and by cut stump treatment. Australian pine occurred in large areas along the western canal and also as a few trees on islands within the Savannas wetland system, altogether totaling 7.6 acres. Australian pine coverage equaled approximately ninety percent with some slash pine and cabbage palms interspersed. Melaleuca occurred on approximately 7.2 acres within the site, primarily along the canal, and comprised ninety percent of the cover with some native wetland hibiscus and other species intermixed.

County staff provided an in-kind match by removing Brazilian pepper and other invasive species in the 8.7-acre area along the road.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	cut stump	Garlon 4
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4



North Fork of the St. Lucie River

County: St. Lucie County

PCL Size: 47.9 acres

Project ID: TC-063 11.5 acres \$13,935.19

Project Manager: St. Lucie County Parks and Recreation

Steven Fousek, Environmental Lands Specialist

2300 Virginia Avenue, Ft. Pierce, Florida 34982-5652

Phone: 772-462-2525, Fax: 772-462-1684

E-mail: stevef@stlucieco.gov

St. Lucie County's North Fork of the St. Lucie River site lies adjacent to the North Fork of the St. Lucie River Aquatic Preserve on the east side of the river. Natural communities present on the site include hydric hammock, floodplain forest, floodplain swamp, mesic flatwoods, and depression marsh. The rare hand fern (*Ophioglossum palmatum*) has been found on the site. Although highly dependant on water tables and rainfall, the site is approximately fifty percent uplands and fifty percent wetlands for much of the year. The four hurricanes in 2004 caused most of the site to be underwater, preventing completion of the project. The remaining work will be finished in fiscal year 2006.

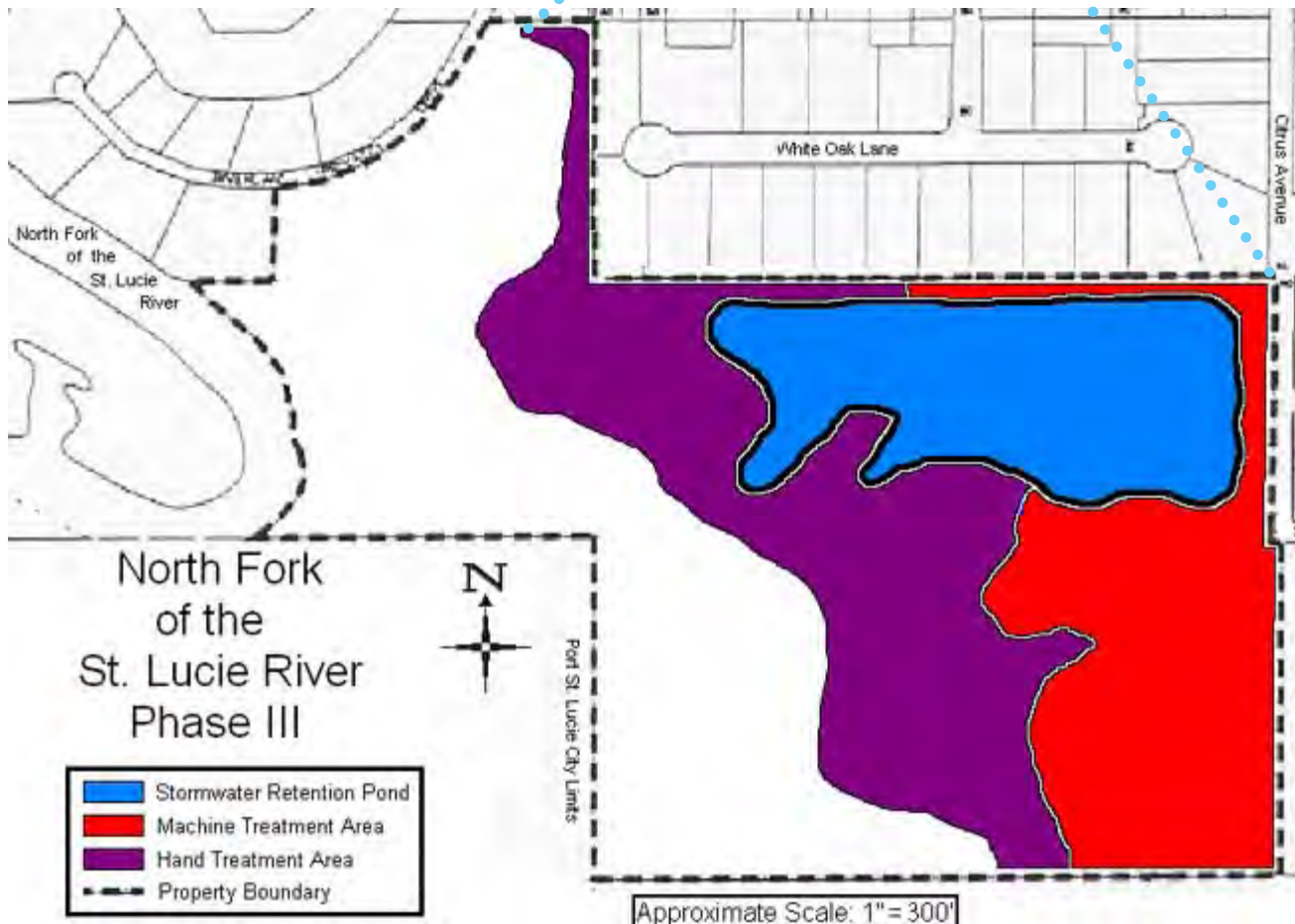
Approximately twenty-three acres of the site contained Old World climbing fern, shoebutt on ardisia, strawberry guava, and Brazilian pepper. Old World climbing fern occurred in low to medium density pockets in the transition areas between hydric hammock and floodplain forest, but overall had the least coverage of the invasive plants on the site. Shoebutt on ardisia primarily invaded hydric hammock, with the plant most often found scattered and within thicker stands of strawberry guava. Strawberry guava grew in many of the same locations as shoebutt on ardisia, but was more prevalent within mesic flatwoods. Guava formed thick stands in several areas of the site.

Brazilian pepper was the most widespread and numerous invasive plant on the site. The greatest concentrations occurred on the east side of the site in the area of a former citrus grove. The beds of the old grove are still prevalent and Brazilian pepper growth prevented native vegetation from returning. Brazilian pepper also spread to other previously disturbed areas of the site.

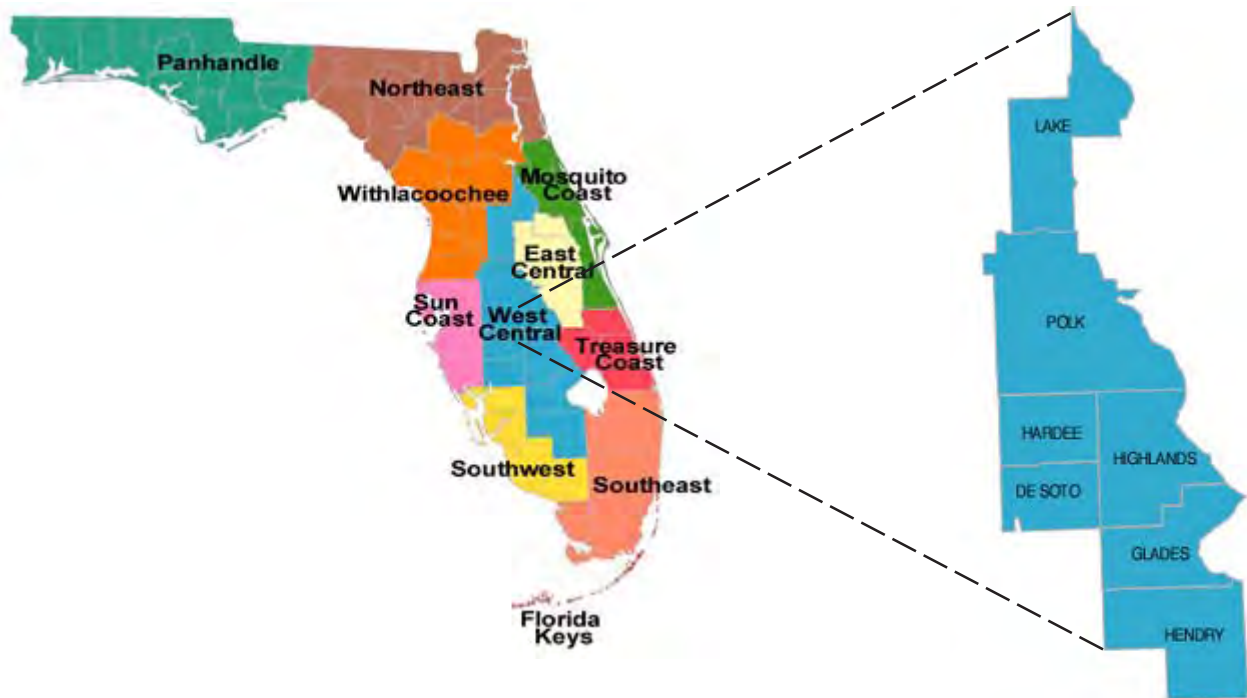
Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Ardisia elliptica</i>	shoebutt on ardisia	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Razor+Escort
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Razor+Escort
<i>Psidium cattleianum</i>	strawberry guava	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4



Lygodium weaves its leaves over everything, including other invasive species such as Brazilian pepper!



West Central Regional Working Group



The West Central Regional Working Group liaison is Scott Penfield, Avon Park Air Force Range, OLA, DET 1347 OG/CEVN, 29 South Boulevard, Avon Park AFR, Florida 33825-5700, phone: 863-452-4119 x317, fax: 863-452-4161, e-mail: ronald.penfield@avonpark.macdill.af.mil

Fisheating Creek Wildlife Management Area

County: Glades

PCL Size: 18,272 acres

Project ID: WC-032 2,651 acres \$163,480

Project Manager: Florida Fish and Wildlife Conservation Commission

Grant Steelman, Wildlife Biologist

3010 Banana Grove Road, Moore Haven, Florida 33471

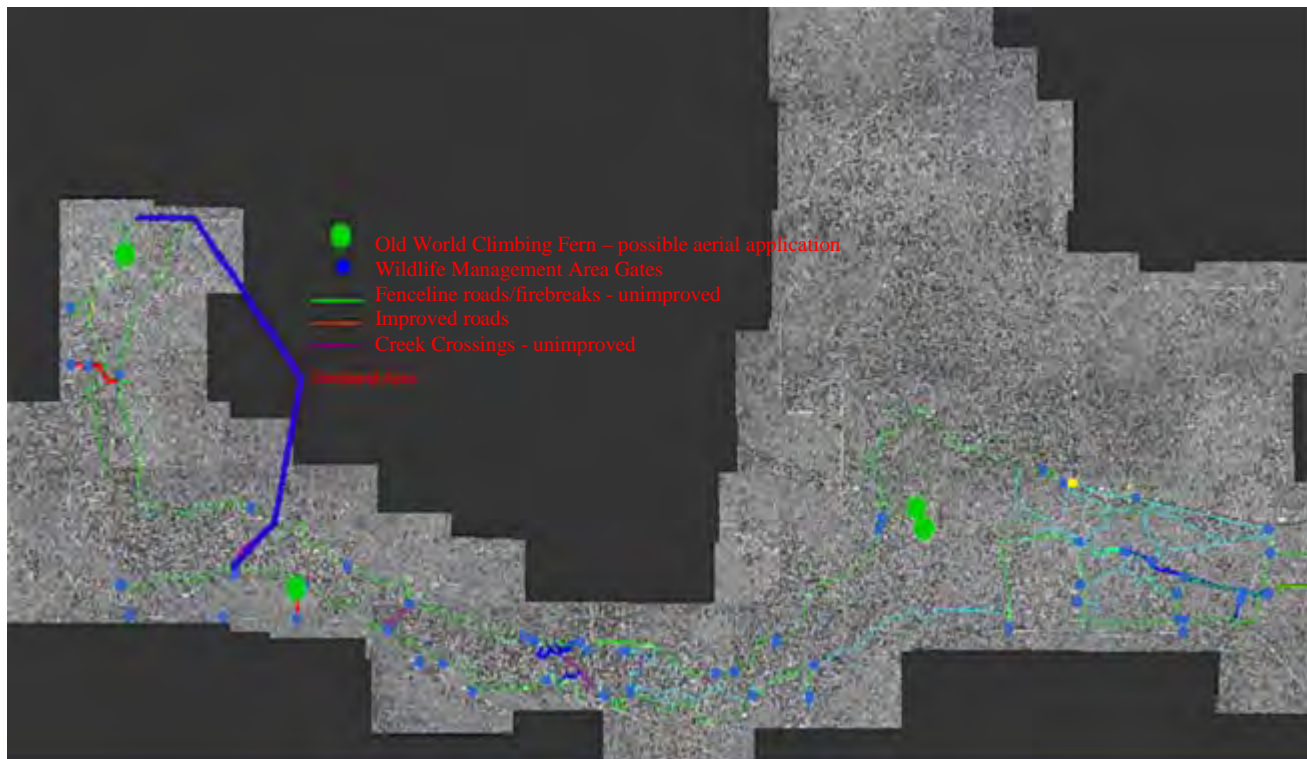
Phone: 863-946-1194, Fax: 863-946-1087

E-mail: grant.steelman@myfwc.com

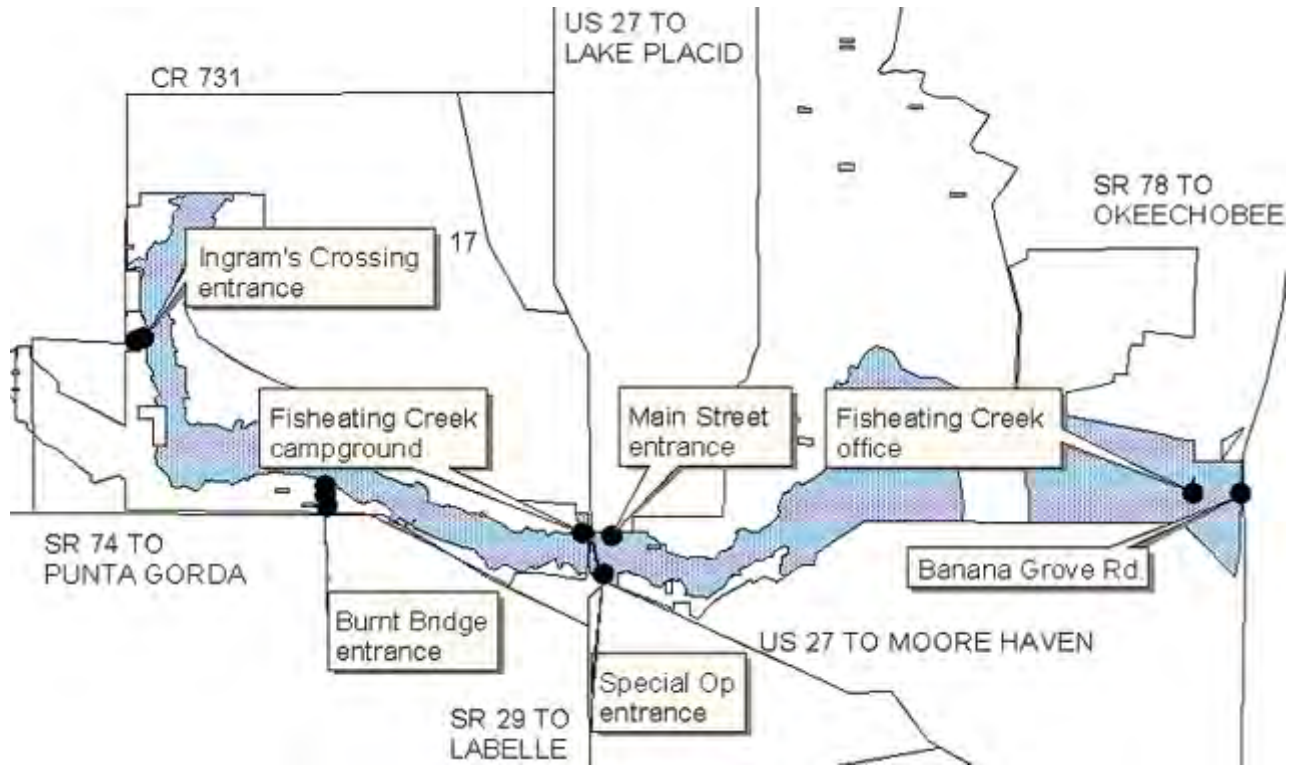
Fisheating Creek is the only undammed tributary to Lake Okeechobee. Natural communities in the WMA include cypress swamp, bottomland forest, freshwater marsh, dry prairie, prairie hammock, and hydric hammock. Dense patches of wetland nightshade inhibit and out-compete native vegetation in the cypress swamp understory.

This project targeted wetland nightshade and Old World climbing fern during Phase I and all Category II exotics during Phase II throughout the 20.3-mile Fisheating Creek channel, from the Highlands-Glades county line to US 27. Wetland nightshade and Old World climbing fern averaged a combined cover of forty percent of the entire project area, including patches of one hundred percent cover ranging in size from one acre to fifty acres.

This project entered the second phase of a three-phase project treating all Category I exotics over the WMA. In addition, contractors targeted all other invasive species found within the project area of the Fisheating Creek corridor. The FWC provided a matching cost-share for the project of \$150,000 during 2002-2003 FY, \$50,000 during the 2003-2004 FY, and \$196,000 during the 2004-2005 FY.



Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar/aerial	Rodeo+Escort
<i>Psidium guajava</i>	guava	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Solanum tampicense</i>	wetland nightshade	Category I	foliar	2,4-D



Wetland nightshade growing profusely at Six-Mile Crossing before treatment.



Old World climbing fern (the brown amidst the gray) menaces all of south Florida.



Spirit-of-the-Wild Wildlife Management Area

County: Hendry

PCL Size: 7,500 acres

Project ID: WC-034 3,540 acres \$49,463.89

Project Manager: Florida Fish and Wildlife Conservation Commission

George W. Poole, Biologist III

100 CR 832, Felda, Florida 33930

Phone: 863-612-0775, Fax: 863-612-0780

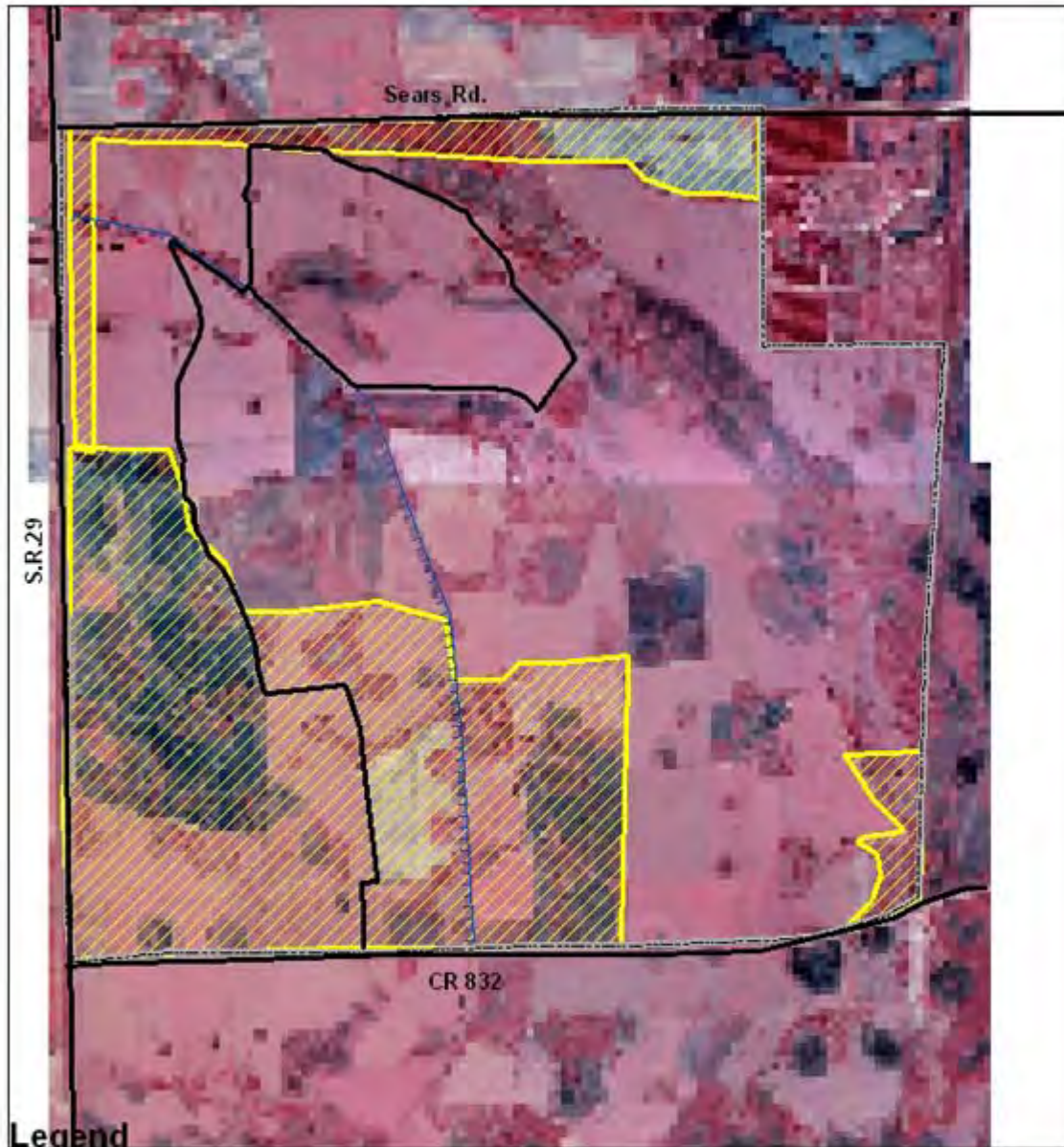
E-mail: george.poole@fwc.state.fl.us

The project area comprises approximately thirty percent depressional wetlands, sixty percent improved pasture, and ten percent mesic flatwoods, hydric flatwoods, and hydric hammocks. Agriculture and cattle operations were the historical use of the property. Brazilian pepper and tropical soda apple occurred throughout the site, although generally not in the depressional wetlands. Tropical soda apple grew primarily in small patches in improved pastures. Brazilian pepper was scattered throughout, but occurred mostly along ditches and along the boundary fence. Some small hammocks possessed an understory of Brazilian pepper seedlings. Concentrations of target species varied considerably, although no solid infestations were larger than one acre.

A second project at Spirit-of-the-Wild targeted small patches of cogon grass that were scattered throughout the management area. BIPM provided the herbicide only for this project through its Herbicide Bank. FWC provided \$30,000 in matching funds for control work at the WMA.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4

Spirit-of-the-Wild WMA Hendry County, Florida



Legend

- SOW Boundary
- ||||| Roberts canal
- Main access road
- ▨ Exotics treatment Area
- SR 29
- SEARS RD
- CR 832

Okaloacoochee Slough State Forest & WMA

County: Hendry, Collier

Okaloacoochee Slough State Forest

PCL Size: 32,039 acres

Okaloacoochee Slough Wildlife Management Area

PCL Size: 2,923.45

Project ID: WC-033 3,000 acres \$138,206.34

Project ID: WC-039 5,000 acres \$17,483.09

Project Manager: Division of Forestry (FDACS)

Kevin Podkowka, Senior Forester

PO Box 712, Felda, Florida 33930

Phone: 863-612-0776, Fax: 863-612-0780

E-mail: podkowk@doacs.state.fl.us

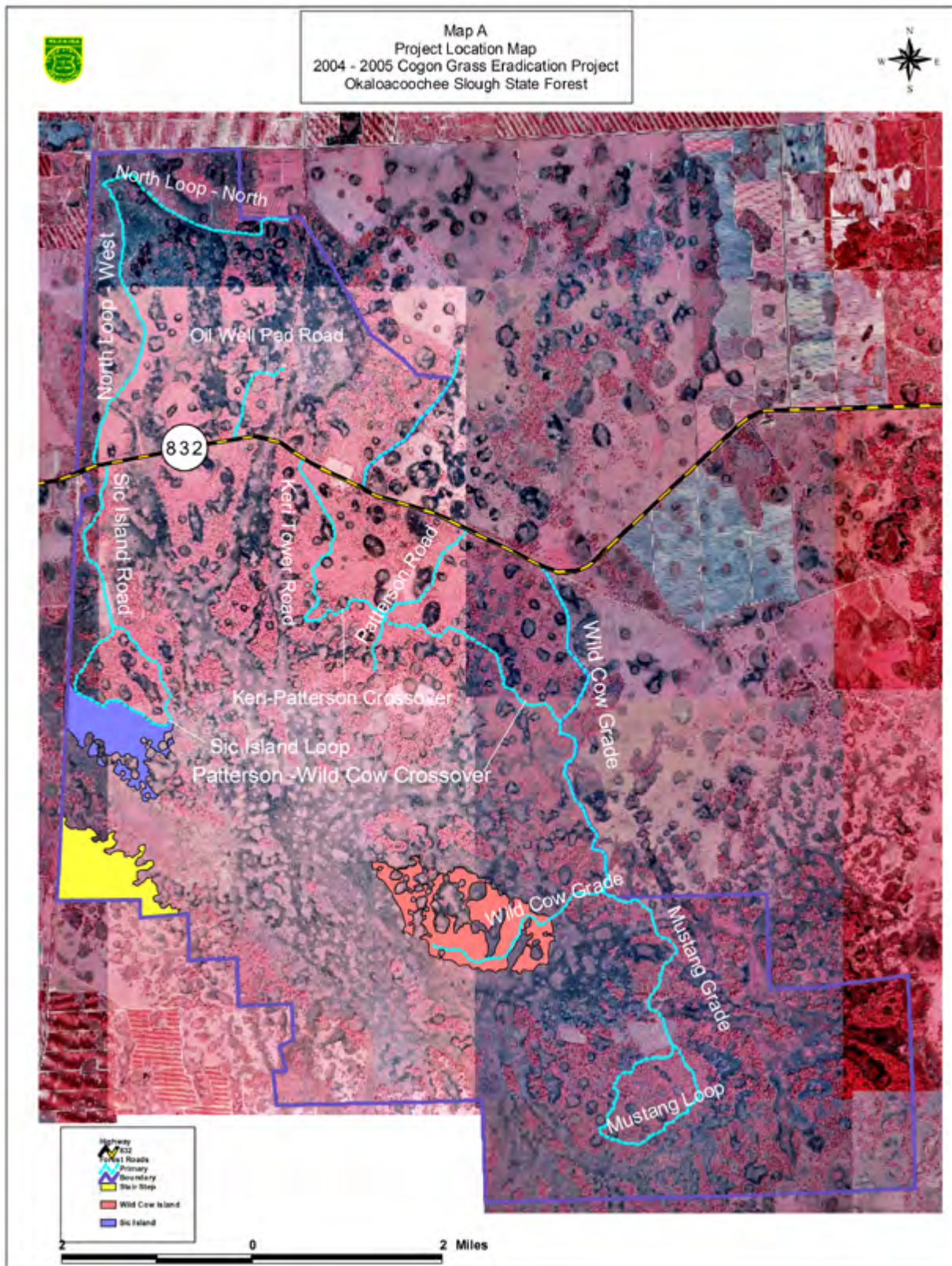
The 'OK' Slough State Forest is generally hydric in nature, with approximately 12,000 acres of mesic flatwoods and oak-cabbage palm hammocks persisting on the driest sites. The remaining two-thirds of the forest is made up of approximately 20,000 acres of a variety of plant native communities such as dome swamp, swale, depression marsh, and hardwood swamp, and approximately 2,500 acres of abandoned pasture and old fields. Timber, agriculture, and cattle operations comprised the historic use of the property. The property is jointly managed by the Division of Forestry and the Fish and Wildlife Conservation Commission.

All of OK Slough has been treated for some exotic plant species in the past. This project targeted cogon grass in the most infested areas. Cogon grass has been found throughout the forest; however, the highest rates of infestation occurred on Wild Cow Island, along the southern portions of Sic Island, the northwestern portion of the "stair step" and along many of the roads and trails.

The second project consisted of maintenance treatment on two areas. The first area included 3,000 acres where all FLEPPC Category I and II exotic species were treated. The dominant exotic species were Brazilian pepper and cogon grass, which occurred throughout the area except not generally in the depressional wetlands. The second area had originally been treated for Brazilian pepper, guava, and rosary pea in all areas dry enough to contain Brazilian pepper. This covered 2,000 acres within a 19,000-acre management unit.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	Garlon 4
<i>Hymenachne amplexicaulis</i>	West Indian marsh grass	Category I	foliar	Roundup+Amm. Sulfate
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Rodeo+Arsenal
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
<i>Psidium guajava</i>	guava	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Roundup+Amm. Sulfate
<i>Urochloa mutica</i>	Pará grass	Category I	foliar	Roundup+Amm. Sulfate

Okaloacoochee Slough State Forest & WMA



Okaloacoochee Slough State Forest & WMA



In March (above) the cogon grass was profusely blooming. In June, after treatment (below), the cogon grass was not looking good—the picture much more preferred by land managers.



Highlands Hammock State Park

County: Highlands

PCL Size: 9,244 acres

Project ID: WC-040 7.75 acres \$7,013.29

Project Manager: Florida Park Service (DEP)

Peter Anderson, Park Manager

5931 Hammock Road, Sebring, Florida 33872

Phone: 863-386-6099, Fax: 863-386-6095

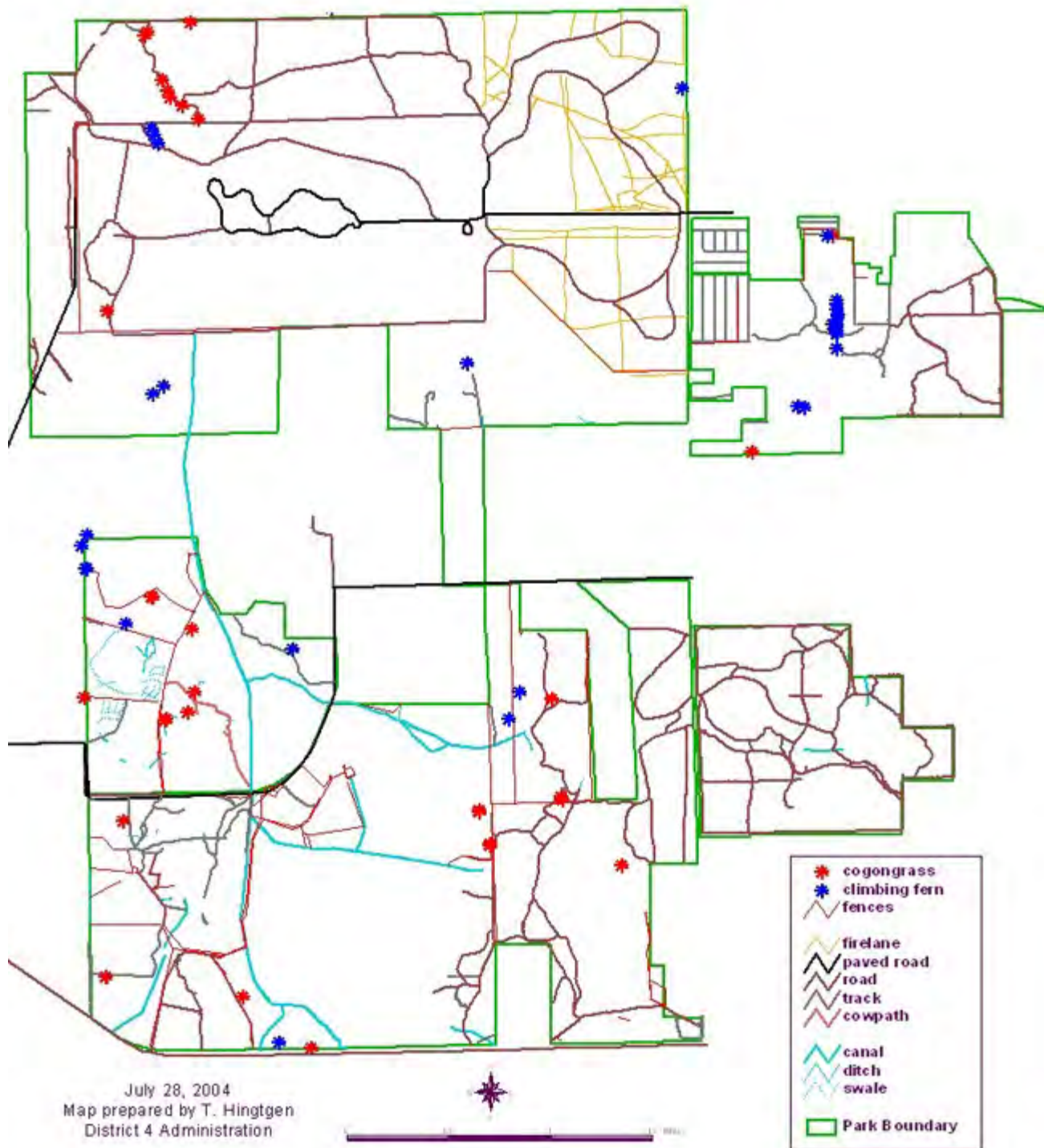
E-mail: peter.anderson@dep.state.fl.us

Highlands Hammock State Park is unique for its hardwood hammock that is one of the few remaining large virgin hammocks in Florida. Other natural communities include floodplain swamp, marsh, baygall, flatwoods, scrub, and cutthroat seeps. Originally purchased by a group of private citizens, the Park was dedicated for public use in 1931. The Civilian Conservation Corps developed the park and the Park Service later assumed management in 1935 of one of Florida's first State Parks.

The project area included two treatment sites. Both sites have cutthroat grass (*Panicum abscissum*), a species that is state listed as endangered. Both sites also harbor the southernmost populations in the United States of hooded pitcher-plant (*Sarracenia minor*).

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Roundup+Escort

Highlands Hammock State Park Exotic Plants (Roads, Fences, and Canals from Base Map)



Seminole State Forest

County: Lake

PCL Size: 26,231 acres

Project ID: WC-055 153 acres \$44,575

Project Manager: Division of Forestry (DOACS)

Joe Bishop, Forestry Supervisor II

Lake Forestry Station

9610 County Road 44, Leesburg, Florida 34788

Phone: 352-360-6677, Fax: 352-315-4488

E-mail: bishopj@doacs.state.fl.us

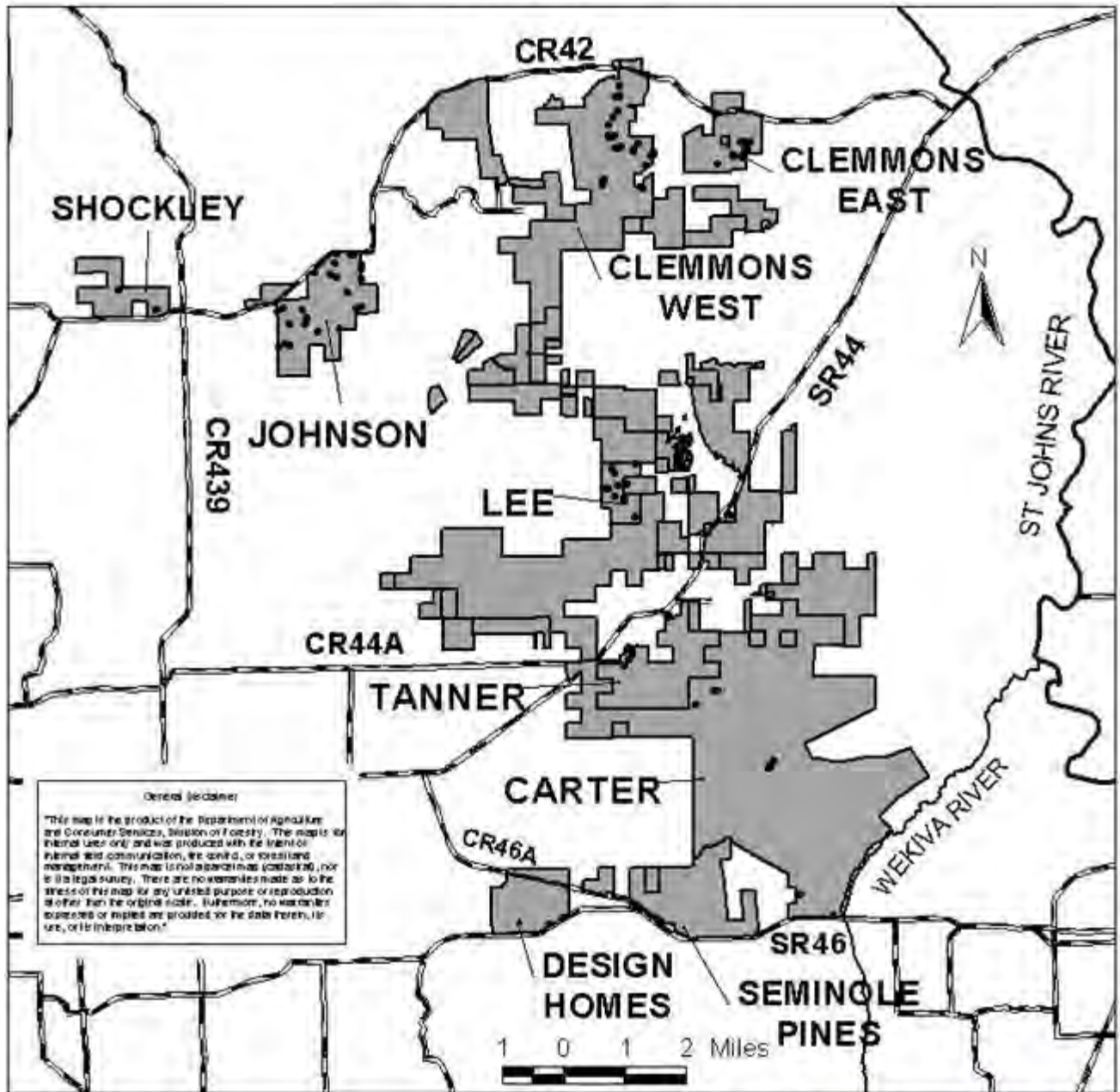
Seminole State Forest is bordered to the north by the Ocala National Forest and extends south into the Wekiva River Basin. Natural communities within the project area include sandhill, scrub, flatwoods, and bottomland forest. Twenty-five animal and seven plant species with listed status occur on the Forest.

Due to past grazing on portions of the site, disturbed areas within the project area include former pasture and old fields, in addition to an old spoil site. The target locations are found throughout the Forest and are identified on nine different parcels. Several of the parcels are undergoing restoration efforts, including mitigation tree plantings.

DOF provided time and materials worth \$2,936.02 as an in-kind match for this project.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	basal	Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup+Arsenal
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Garlon 4
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Ricinus communis</i>	castor bean	Category II	foliar	Garlon 4

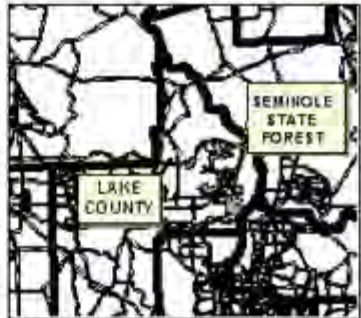
SEMINOLE STATE FOREST
TARGET LOCATIONS FOR
EXOTIC SPECIES TREATMENT



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LEGEND

- SEMINOLE STATE FOREST PARCELS
- EXOTICS




MAP CREATED BY JOE BISHOP
05/04/04

Lake Wales Ridge GEOpark

County: Polk

Catfish Creek Preserve State Park

PCL Size: 8,077.61 acres

Lake Wales Ridge State Forest

PCL Size: 26,487.61

Project ID: WC-035 280 acres \$26,401.36

Project Manager: Florida Park Service (DEP)

Erik Egensteiner, Park Biologist

14248 Camp Mack Road, Lake Wales, Florida 33898

Phone: 863-696-1112, Fax: 863-696-2656

E-mail: erik.egensteiner@dep.state.fl.us

This project controlled cogon grass (*Imperata cylindrica*) in the project area at the Rolling Meadows tract of Allen David Broussard Catfish Creek Preserve State Park and controlled cogon grass, Japanese climbing fern (*Lygodium japonicum*), and Old World climbing fern (*Lygodium microphyllum*) in the project area at the Prairie tract of the Lake Wales Ridge State Forest.

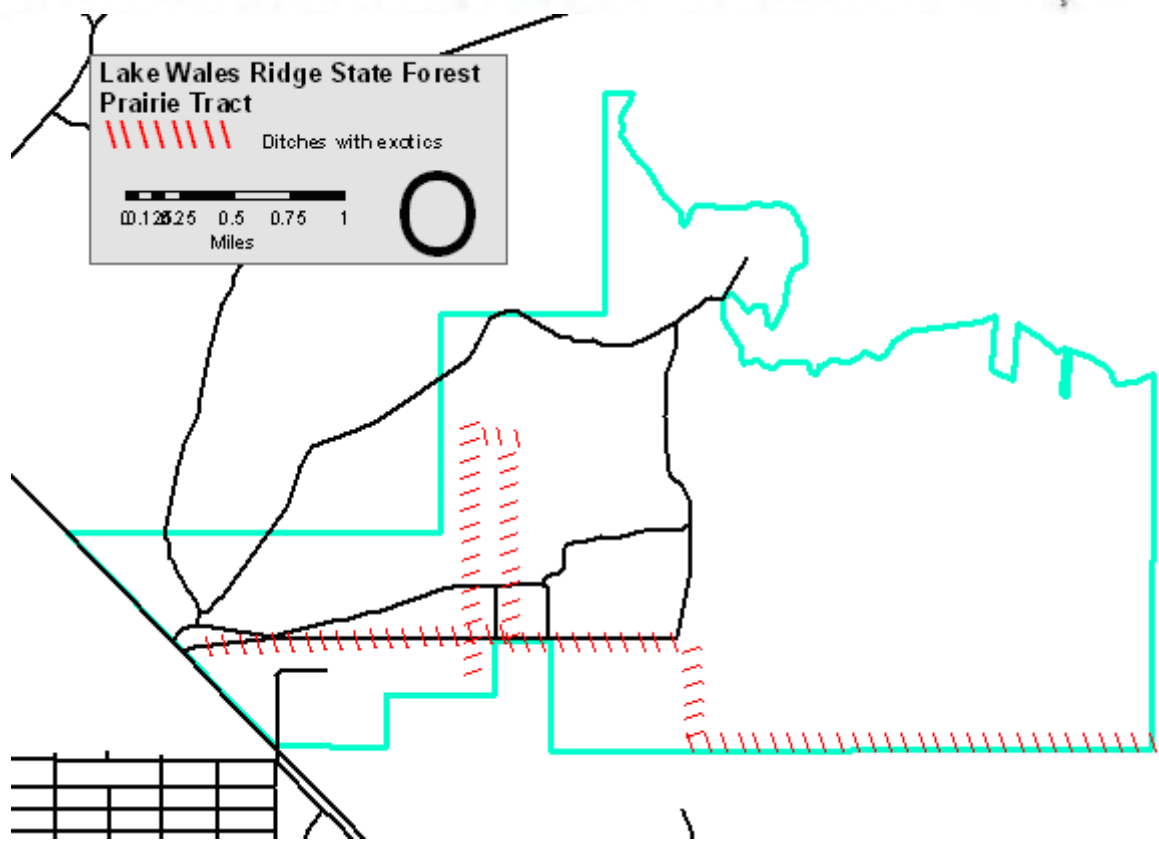
Catfish Creek Preserve State Park is located in Polk County, northeast of the town of Lake Wales. The Rolling Meadows tract, a newly acquired part of the preserve, is located just west of Lake Kissimmee State Park. The Rolling Meadows tract is approximately 3,800 acres. It includes ruderal areas consisting of pasture and sod farm areas, hydric hammock, mesic and wet flatwoods, floodplain marsh, numerous depression marshes, and baygall. The targeted exotic plants occurred in a 260-acre pasture area.

The Prairie tract of the Lake Wales Ridge State Forest is located in Polk County, east of the town of Lake Wales. This newly acquired parcel is approximately 4,875 acres. The area treated comprised approximately 20 acres on roadsides, ditch banks, and in an orange grove located within an area of mostly wet/dry prairie.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia lebbek</i>	woman's tongue	Category I	cut stump	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	cut stump	Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Glypro+Arsenal
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Glypro+Arsenal
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Glypro+Arsenal
<i>Psidium guajava</i>	guava	Category I	cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Glypro+Arsenal
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Glypro+Arsenal



ALLEN DAVID BROUSSARD CATFISH CREEK PRESERVE STATE PARK



Hilochee Wildlife Management Area

County: Polk

PCL Size: 6,100 acres

Project ID: WC-036 20 acres \$22,909

Project Manager: Fish and Wildlife Conservation Commission

Cyndi A. Gates, Area Biologist

12932 CR 474, Clermont, Florida 34711

Phone: 352-241-8501, Fax: 352-242-4478

E-mail: cyndi.gates@fwc.state.fl.us

The Osprey Unit of Hilochee WMA is located in northeastern Polk County. The property extends along both sides of Interstate 4 from County Road 557 east nearly to U.S. Highway 27. Important habitat features include cypress strands and bottomland hardwood forests. Cutthroat grass (*Panicum abscissum*) occurs on the site. The area rates very high as a “biodiversity hot spot” (seven or more focal species) with very high species richness.

The project site consists of improved pasture, abandoned citrus groves, pine flatwoods, cypress swamp, and freshwater marsh. Sand mining, land clearing, and improved pasture have affected parts of the site. Cattle grazing occurred on most of the site up until January 2002. Tropical soda apple (TSA) infested approximately 600 acres of improved pasture and associated oak hammocks with 20-60 plants per acre on average. Cogon grass infested approximately 40 acres of citrus grove and roadways in patches that ranged in size from <0.1 acres to 4 acres.

Numerous other exotic plant species occur at the Osprey Unit, including Brazilian pepper (*Schinus terebinthifolius*), earleaf acacia (*Acacia auriculiformis*), Chinese tallow (*Sapium sebiferum*), air-potato (*Dioscorea* spp.), Japanese climbing fern (*Lygodium japonicum*), Chinaberry (*Melia azedarach*), lantana (*Lantana camara*), wild taro (*Colocasia esculenta*), and torpedo grass (*Panicum repens*), and are being mapped as infestations are located.

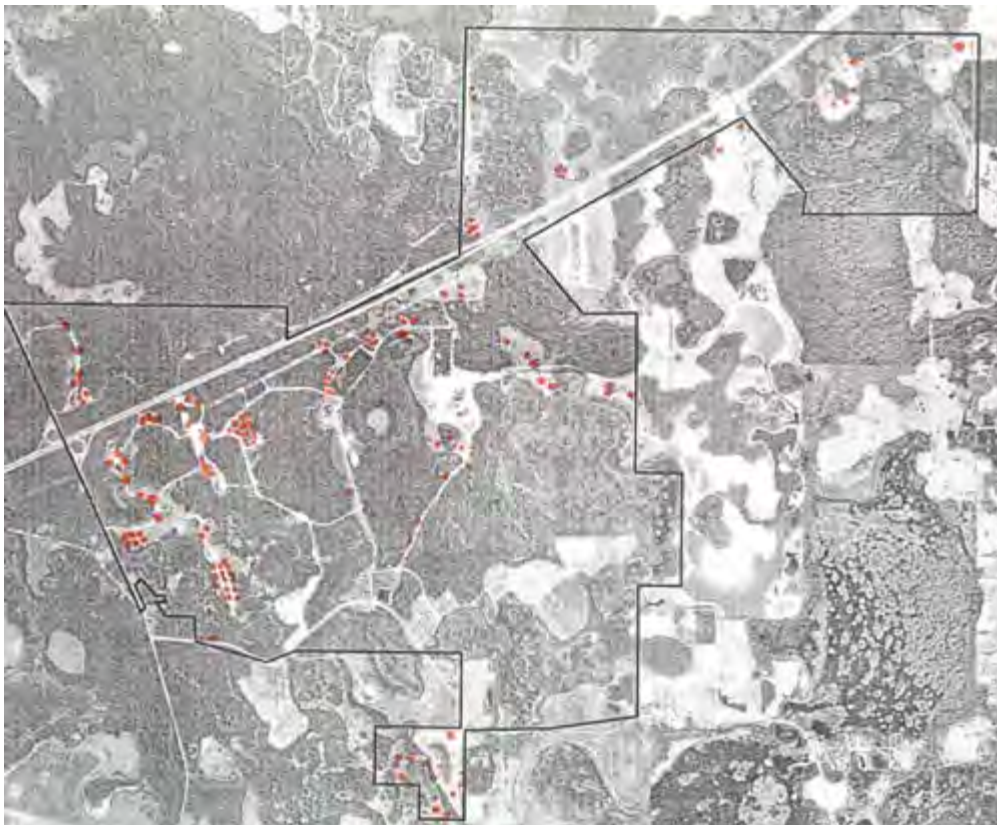
The Bureau funded a control project for 17 acres of cogon grass on the site in FY03. In Fall 2002 and Spring 2003, FWC staff treated TSA plants scattered over approximately 200 acres. Re-treatment efforts were also conducted; however, a large seed bank remains. In addition, FWC staff treated cogon grass on approximately 10 acres. The Bureau provided a portion of the herbicide necessary to conduct these efforts.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Razor+Chopper
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Razor+Chopper

Hilochee Wildlife Management Area



These maps of Hilochee WMA show infestations of cogon grass (above) and tropical soda apple (below). Note how the two species overlap in several areas.



Tenoroc Fish Management Area

County: Polk

PCL Size: 7,332 acres

Project ID: WC-037 8.3 acres \$25,430

Project Manager: Florida Fish and Wildlife Conservation Commission

Danon J. Moxley

3829 Tenoroc Mine Road, Lakeland, Florida 33805

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The Tenoroc Fish Management Area (Tenoroc) was a phosphate mine until the mid-1970s. The Hydrilla Lake tract is 141.1 acres in size; consisting of a 48.8-acre lake surrounded by 92.3 acres of reclaimed land. A band of Brazilian pepper intermixed with native plants surrounded the entire lake shoreline (2.4 miles). Chinese tallow also grew in small pockets along the shoreline. This vegetative band ranged from 20 to 30 feet in width, covering approximately 8.3 acres.

The FWC has a cooperative agreement with the Florida Division of Forestry (DOF) to help manage Tenoroc's uplands. The DOF developed a long-term reforestation plan for Tenoroc that includes planting a variety of native plants after the removal of invasive exotic species. Native species to be used along the shoreline include red maple (*Acer rubrum trilobum*), Dahoon holly (*Ilex cassine*), water oak (*Quercus nigra* and *Q. virginiana*), water hickory (*Carya aquatica*), bald cypress (*Taxodium distichum*) and wax myrtle (*Myrica cerifera*).

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 3A
<i>Triadica sebifera</i>	Chinese tallow	Category I	cut stump	Garlon 3A



Tenoroc Fish Management Area



A wall of Brazilian pepper obscured Hydrilla Lake and interfered with pine seedling recruitment.

Removing invasive species is often the first step to restoring conservation lands in Florida.



Lake Wales Ridge Wildlife and Environmental Area

County: Polk

PCL Size: 13,259 acres

Project ID: WC-041 166 acres \$55,000

Project Manager: Fish and Wildlife Conservation Commission

Michael McMillian, Biological Scientist III

1630 Virginia Avenue, Lake Placid, Florida 33852

Phone: 863-699-3740, Fax: 863-699-3741

E-mail: mike.mcmillian@fwc.state.fl.us



The Mountain Lake Cutoff (Stuart) property is 185 acres of former ancient dune scrub. The scrub community supports several species of threatened and endangered plants and is home to the Florida scrub jay. Three federally listed threatened plant species are reported to occur on the Mountain Lake Cutoff site.

The project site is bordered by US 27 to the west, Mountain Lake Cutoff Road on the north, and Alternate US 27 on the east. A portion of the site still contains scrub habitat; however, approximately fifty percent of the site was overrun with exotics. The most extensive infestation occurred on the eastern side of the site bordering Alt US 27, where exotic plant coverage was an estimated sixty percent. Exotic coverage on the remaining areas of the site was estimated at thirty percent along the southern portion of the site, five to ten percent on the western side, three percent on the northern side, and twenty-five percent in the center portion of the site, which contains an old citrus grove.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	Glypro
<i>Abrus precatorius</i>	rosary pea	Category I	cut stump	Garlon 4
<i>Albizia julibrissin</i>	mimosa	Category I	cut stump	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	cut stump	Garlon 4
<i>Eugenia uniflora</i>	Surinam cherry	Category I	basal	Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Glypro+Chopper
<i>Lantana camara</i>	lantana	Category I	basal	Garlon 4
<i>Ligustrum sinense</i>	Chinese privet	Category I	basal	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Passiflora biflora</i>	passion vine	Category II	basal	Garlon 4

Circle B Bar Reserve

County: Polk

PCL Size: 1,267 acres

Project ID: WC-042 345 acres \$34,560

Project Manager: Polk County Natural Resources Division

Gaye Sharpe, Environmental Lands Coordinator

4177 Ben Durrance Road, Bartow, Florida 33830

Phone: 863-534-7377 x203, Fax: 863-534-7374

E-mail: gayesharpe@polk-county.net

The Circle B Bar Reserve, located on the northwest shore of Lake Hancock, was a cattle ranch before public acquisition. The site consists of several vegetation communities such as cypress domes, wet prairie, mixed wetland hardwoods, bay swamp, live oak hammock, upland hardwood forest, and improved pasture. Two state-listed plant species, butterfly orchid (commercially exploited) and giant air plant (endangered), are found in the oak hammocks on the site.

With the removal of the cattle in 2002, there was a tremendous increase in some of the invasive species populations, such as cogon grass and Chinese tallow. Overall, the invasive exotic plants were widely dispersed in densities ranging from ten to ninety percent, with concentrations along the roadway, lake and swamp shoreline, and along the manmade berm. This project provided ground based maintenance control of primarily tropical soda apple and Caesar’s weed within the area treated during FY 2004.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Rodeo+Garlon 4
<i>Urena lobata</i>	Caesar’s weed	Category II	foliar	Rodeo+Garlon 4



Kissimmee River Valley

County: Polk, Osceola, Okeechobee, Highlands, Glades

PCL Size: 36,879 acres

Project ID: WC-065 1,400 acres \$49,500

Project Manager: South Florida Water Management District

Jeff McLemore

205 N. Parrott Avenue, Okeechobee, Florida 34972-2916

Phone: 800-250-4200 x3022, Fax: 863-462-5269

Email: jmclemo@sfwmd.gov

The project area encompasses district-owned lands in the Kissimmee River Valley between Lake Kissimmee and Lake Okeechobee. Old World climbing fern (“lygodium”) in the project area was initially treated in 2003. Natural communities consist of mostly (90%) broad-leaved marsh, in addition to hardwood shrub, and live oak/palmetto hammock. The lands were purchased within the last 15 years to restore the Kissimmee River and its floodplain for improved water quality, increased water storage, and to reverse the degradation of the riverine habitat that occurred due to the channelization of the river.

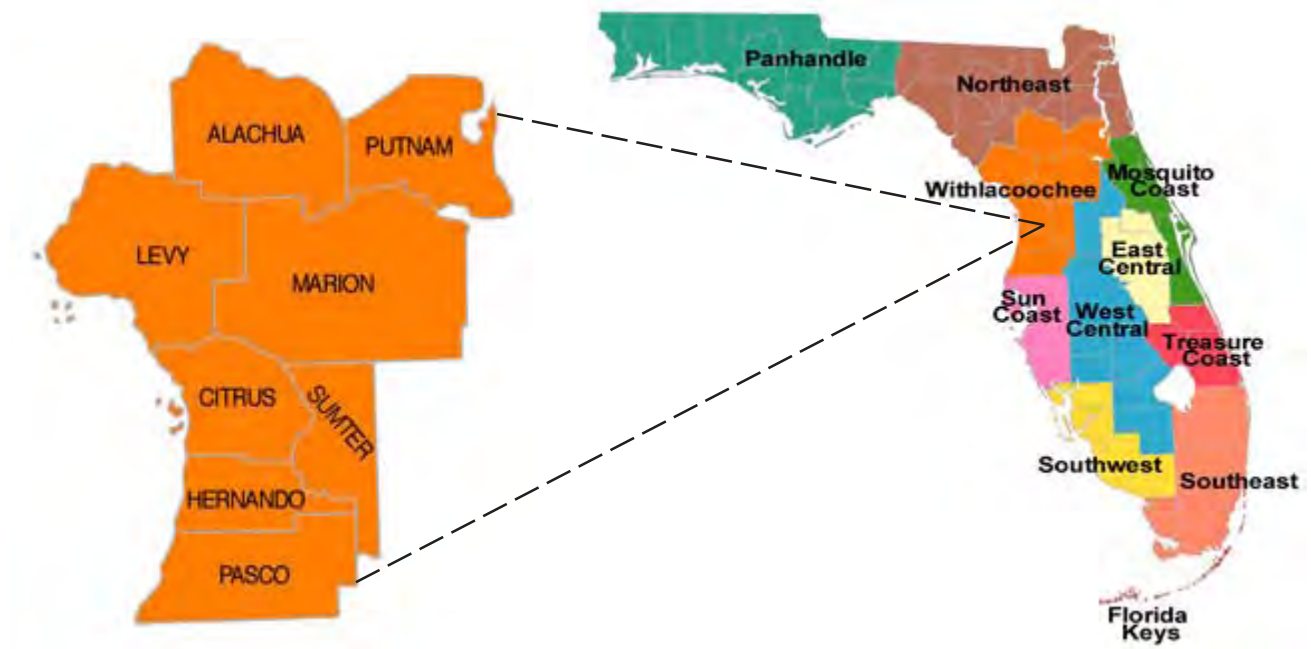
Aquatic glyphosate is used for aerial and ground crew treatments of lygodium since most of the sites where the fern grows contain standing water at least part of the year. Lygodium infests primarily the floodplain marshes and adjacent hardwood shrub and hammock areas along the river. Most of the project area was treated by helicopter, with the remainder treated by ground crews. Contractors conducted the majority of the control effort, although district technicians also treat lygodium on the ground.

Helicopter application of glyphosate is quite accurate and is aided by the use of an agricultural-type GPS unit on board. Ground crews use backpack sprayers to treat lygodium on the ground after any vines leading to the canopy have been cut with machetes. Care is taken to aeri ally treat sites with trees (cypress and maple) during the dormant season to spare the trees any ill effects. Ground crews then return to treat any missed areas.

The re-treatment sites are located in Pools A, B, C, D, and E. The original infestation was very dense both on the ground and in the shrub and canopy layers and was on the verge of completely covering much of the 1,400-acre area. The Vegetation Management Division and other state and federal agencies have been very encouraged by the success this program has had in the past two years controlling lygodium. This success is believed to be a result of the restored section of the river (Pool C) floodplain holding water during the wet season, thus preventing the re-establishment of lygodium. Also, the district is not conducting controlled burns in areas of lygodium infestation and this is believed to further hamper the spread of spores.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	aerial/foliar	Aquastar

Withlacoochee Regional Working Group



The Withlacoochee Regional Working Group liaison is Andrea VanLoan, FDACS Division of Forestry, P.O. Box 147100, Gainesville, Florida 32614, phone: 352-372-3505, fax: 352-334-0737, e-mail: vanloaa@doacs.state.fl.us

Hogtown Basin

County: Alachua

PCL: Cofrin Nature Park PCL Size: 30

PCL: Hogtown Creek Woods PCL Size: 23

PCL: Natural Area Teaching Lab PCL Size: 46

Project ID: WR-052 80.27 acres \$18,942.95

Project Manager: University of Florida

Erick D. Smith, Urban Forester

P.O. Box 117700, Gainesville, Florida 32611-7700

Phone: 352-392-7722

E-mail: edsmith@ufl.edu

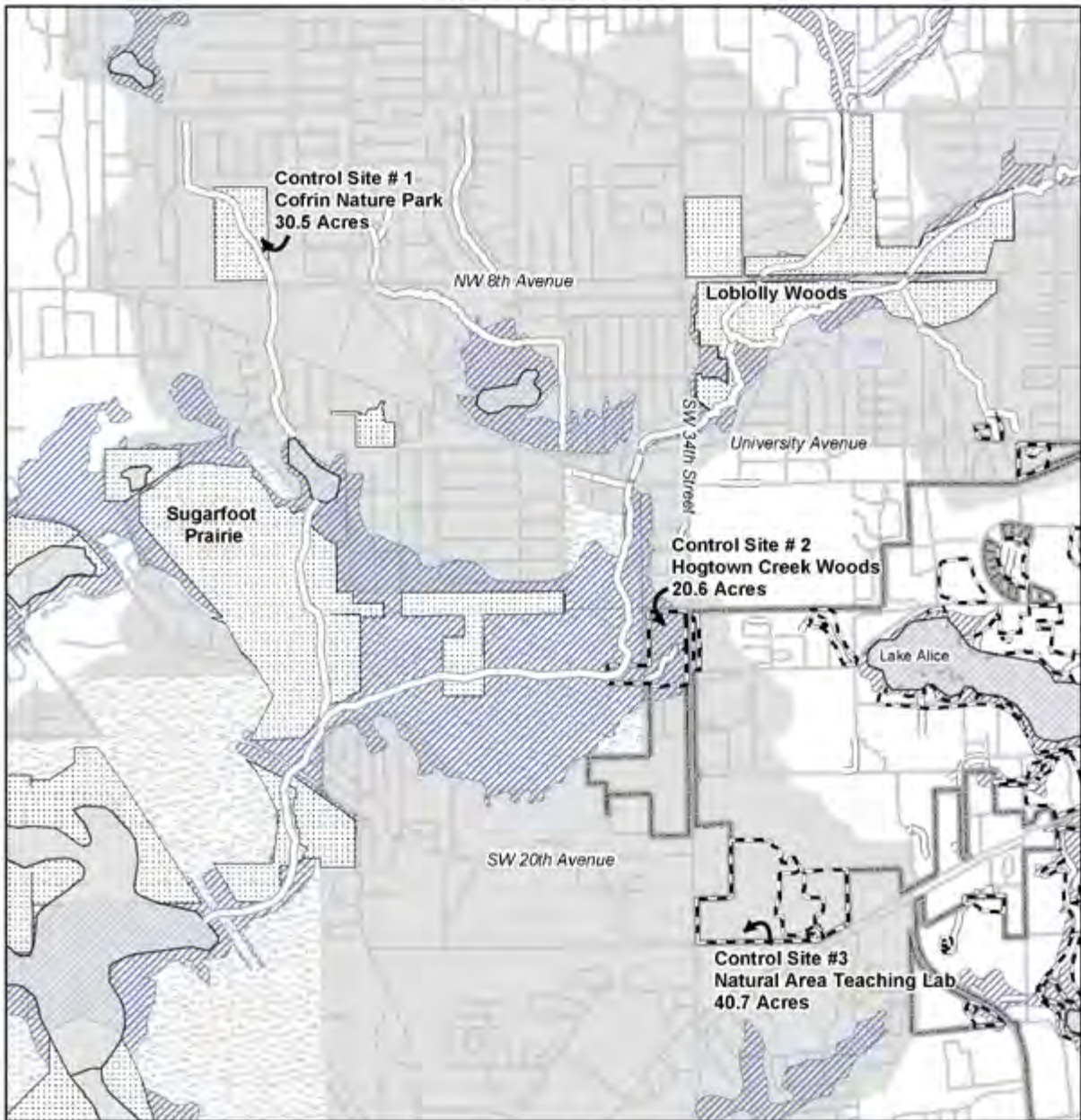
The goal of this project was to control invasive species in three conservation areas in western Gainesville. Cofrin Nature Park is approximately 30 acres and contains seepage stream and upland mixed forest. The Hogtown Creek Woods Conservation Area is a 23-acre parcel owned by the State of Florida and managed by the University of Florida. Natural communities are comprised of floodplain forest, upland mixed forest, and bottomland forest. The University of Florida Natural Area Teaching Laboratory is a 46-acre tract owned by the State of Florida and managed by the University of Florida. The tract has significant samples of ecosystems characteristic of uplands in north peninsular Florida, including mesic upland hardwood forest, upland pine forest, and sinkhole lake.

Rare plant species identified in the project area include the state threatened southern lady fern (*Athyrium filix-femina*) and cardinal flower (*Lobelia cardinalis*), and two state endangered species, poppy-mallow (*Callirhoe papaver*) and Florida milkvine (*Matelea floridana*).

City of Gainesville Nature Operations Division staff conducted herbicide treatment at Cofrin Nature Park as an in-kind match. Matching funds totaled \$15,194.50. In-kind contributions of time and materials provided by the City of Gainesville and the University of Florida totaled \$24,856.03.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Ardisia crenata</i>	coral ardisia	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Roundup
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup
<i>Ligustrum lucidum</i>	glossy privet	Category I	basal	Garlon 4
<i>Lonicera japonica</i>	Japanese honeysuckle	Category I	foliar	Roundup+Garlon 3A
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup
<i>Macfadyena unguis-cati</i>	cat's-claw vine	Category I	foliar	Roundup
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Roundup
<i>Tradescantia fluminensis</i>	wandering Jew	Category I	foliar	Roundup
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	basal	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	foliar	Roundup
<i>Hedera helix</i>	English ivy	n/a	foliar	Roundup+Garlon 3A

Hogtown Basin (COG Cofrin Park and UF Properties) Invasive Plant Removal Project
Project Location Map

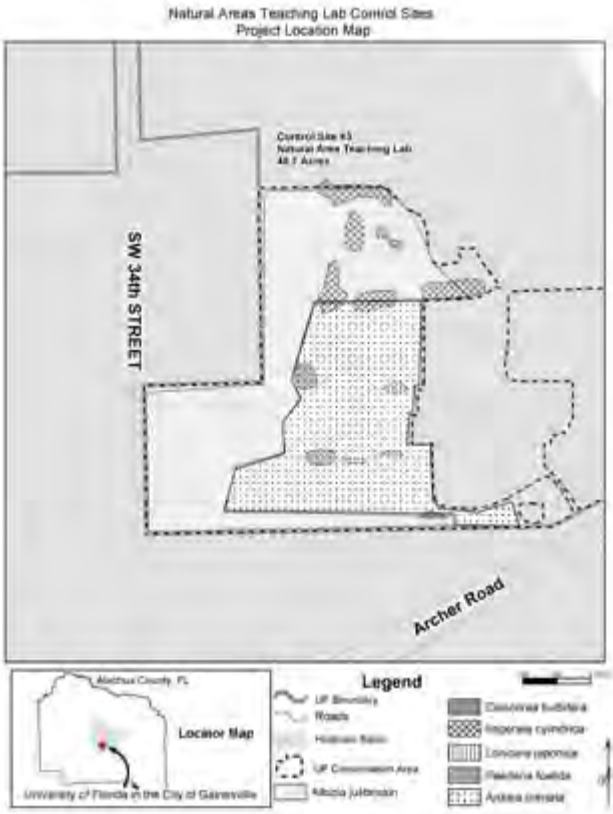
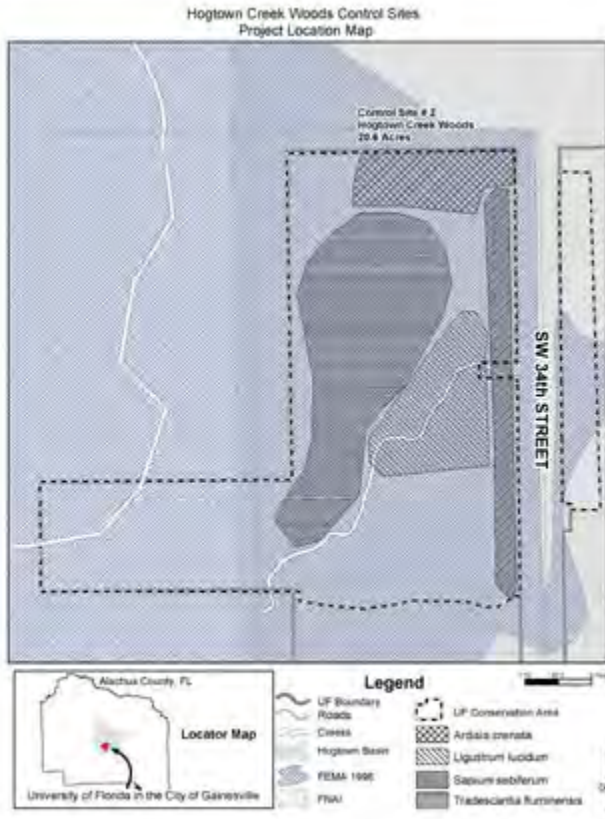
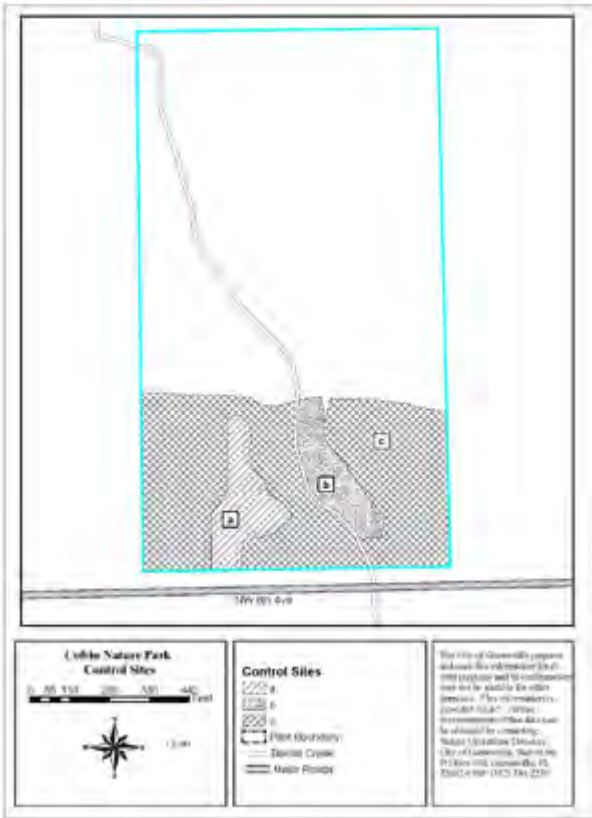


Legend

- City of Gainesville Parks
- UF Conservation Area
- UF Boundary
- Roads
- Creeks
- Hogtown Basin
- FEMA 1996
- FNAI Hogtown Prairie
- Water Bodies

1 500 750 0 Feet





Withlacoochee State Forest

County: Hernando

PCL Size: 155,270 acres

Project ID: WR-053 266 acres \$16,290

Project ID: WR-059 30.4 acres \$4,560

Project Manager: Division of Forestry (DACS)

Vincent Morris

15019 Broad Street, Brooksville, Florida 34601

Phone: 352-754-6777 x125, Fax: 352-754-6751

E-mail: morrisv@doacs.state.fl.us

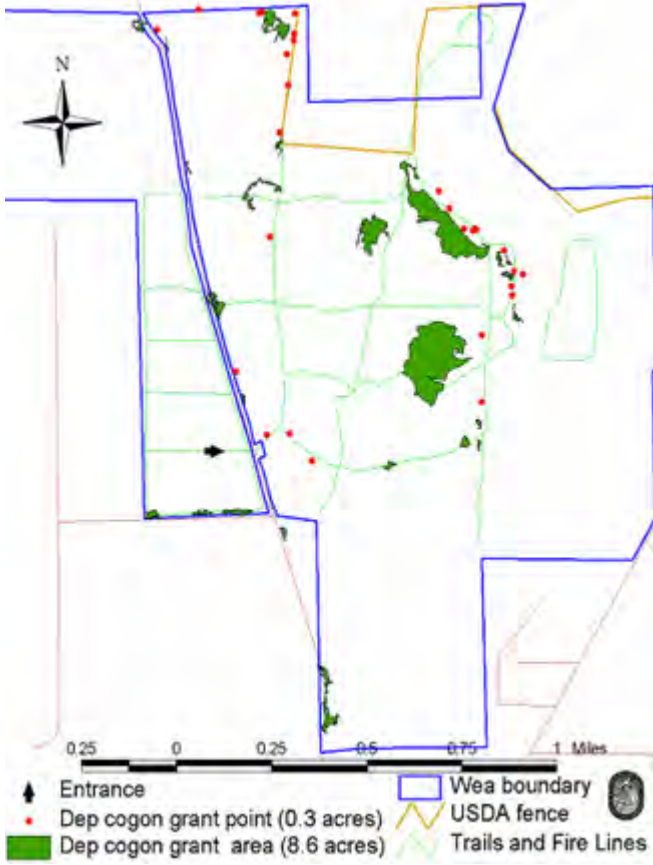
The first project involved the re-treatment of 32 acres of cogon grass on the Headquarters Tract of the Withlacoochee State Forest, and 16 acres on Chinsegut Wildlife Environmental Area (CWEA). The total acreage of cogon grass on the Forest is over 252 acres. The habitat of the Headquarters Tract includes sandhill, xeric hammock, upland mixed forest, and wet prairie. The CWEA consists of two parcels, the Big Pine Tract (420 acres) and the Chinsegut Nature Center (408 acres). Sandhill, xeric hammock, upland mixed forest, basin marsh, and depression marsh are the predominant natural communities of the CWEA. The Big Pine Tract, believed to be the second-largest stand of contiguous old-growth longleaf pine in Florida, has many longleaf pines that are over 200 years old. Cogon grass occurred on both tracts mainly along firebreaks and disturbed areas, although in some areas it extended well into the natural communities.

In-house matching treatment included the balance of the Headquarters, Citrus, and Croom Tracts; approximately 218 acres at a cost of \$32,700. Fish and Wildlife Conservation Commission in-kind match included \$816 of treatment. The Native Plant Society has assisted with the exotic plant removal on CWEA. Currently a volunteer training program is underway that will train volunteers to assist with exotic invasive plant removal on a regular basis.

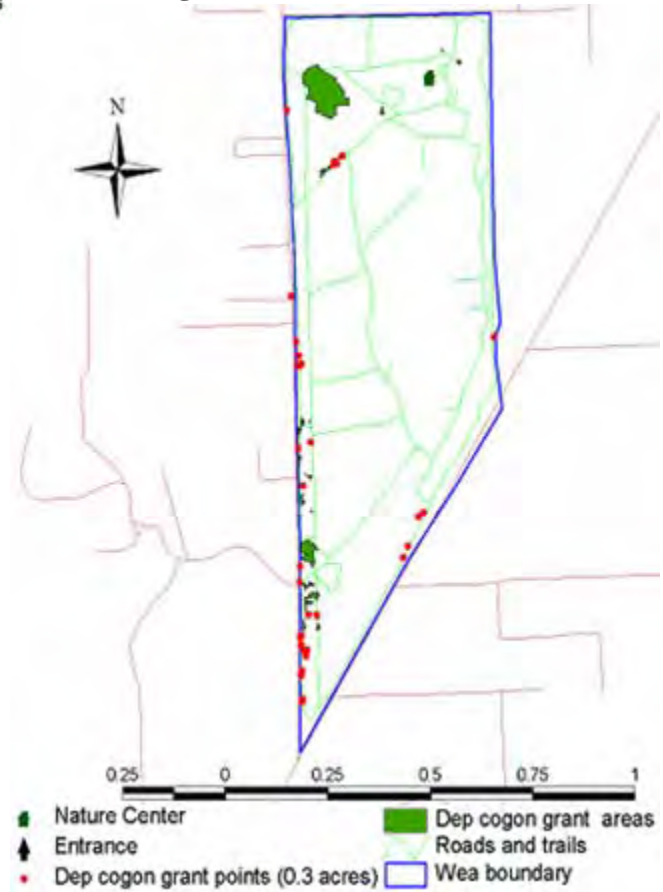
The goal of the second project was to re-treat six infestations of cogon grass in the northern portion of the Croom Tract located in an area of frequently burned sandhill on the South Brooksville Ridge. Four were located in flat sandhill, and two were located in historic mines (Leader Pits). BIPM contractors treated the infestations in the previous fiscal year. One of the infestations lay within the foraging range of an active cluster of red-cockaded woodpeckers. In fact, burning and woodpecker management have led to the discovery of interior cogon grass infestations that had remained undiscovered.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup+Arsenal

Chinsegut WEA Big Pine Tract



Chinsegut WEA Nature Center Tract



Chinsegut Hill Conference Center

County: Hernando

PCL Size: 112 acres

Project ID: WR-056 112 acres \$68,422.23

Project Manager: University of South Florida

Todd Zeiller

22495 Chinsegut Hill Road, Brooksville, Florida 34601

Phone: 813-974-0889

E-mail: tzeiller@admin.usf.edu

The Chinsegut Hill Property is listed on the National Register of Historic Places. This designation and USF ownership provides protection for the property and structures for restoration, education, and conservation. The property is managed for the long-term restoration and protection of the natural communities, primarily upland mixed hardwood forest and Lake Lindsey, a clastic upland lake.

Air-potato was the dominant invasive, occurring over the entire property with an average cover of fifty percent. White-flowered wandering Jew was present as a monoculture on twelve acres. Cogon grass appeared on fifty-two acres with a sixty percent cover. Other exotic species occurred as smaller patches or were scattered throughout the property with coverages from one to ten percent.

Matching/in-kind contributions from USF totaled \$2,500. Additional in-kind contributions were provided by Progress Energy.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Ardisia crenata</i>	coral ardisia	Category I	basal/foliar	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Glypro+Arsenal
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Glypro+Arsenal
<i>Melia azedarach</i>	Chinaberry	Category I	cut stump	Garlon 4
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Rodeo
<i>Tradescantia fluminensis</i>	wandering Jew	Category I	foliar	Rodeo
<i>Triadica sebifera</i>	Chinese tallow	Category I	cut stump	Garlon 4

Waccasassa Bay Preserve State Park

County: Levy

PCL Size: 32,500 acres

Project ID: WR-058 96 acres \$4,292.19

Project Manager: Florida Park Service (DEP)

Jeff DiMaggio

P.O. Box 187, Cedar Key, Florida

Phone: 352-543-5567, Fax: 352-543-6315

E-mail: jeffrey.dimaggio@dep.state.fl.us



Waccasassa Bay Preserve State Park is located within the once vast Gulf Hammock. The bulk of Gulf Hammock, known as one of the largest hydric hammocks in the state (approximately 100,000 acres), is largely owned by timber companies. Waccasassa Bay Preserve is the only portion of Gulf Hammock that is under public ownership. Gulf Hammock and Waccasassa Bay Preserve host a variety of rare plants and animals; at least 16 listed or tracked plant species and at least 28 listed or tracked animal species. Cogon grass in the hydric hammock threatens the rare corkwood, pinewoods dainties, and Florida pinkroot.

Cogon grass was initially found on sites that were logged in 1997 to control an outbreak of the southern pine beetle and was presumably introduced on logging equipment. This project continued maintenance operations on cogon grass treated in previous years.

Target Plants

Imperata cylindrica

Common Name

cogon grass

FLEPPC Rank

Category I

Treatment

foliar

Herbicide

glyphosate



Ocala National Forest

County: Marion, Lake

PCL Size: 383,573 acres

Project ID: WR-057 104.85 acres \$7,848.09

Project Manager: US Forest Service (USDA)

Laura Lowery, Wildlife Biologist

17147 East Hwy 40, Silver Springs, Florida 34488

Phone: 352-625-2520, x2528, Fax: 352-625-7556

E-mail: llowery@fs.fed.us

Ocala National Forest comprises a variety of natural communities such as sand pine scrub, scrub oak, longleaf pine/wiregrass/turkey oak, xeric hammock, pine flatwoods, floodplains, hardwood swamps, and bayheads. Federally listed species on the Forest include the endangered *Polygala lewtonii* (Lewton's polygala) and *Nolina brittoniana* (Britton's beargrass), and the threatened *Bonamia grandiflora* (Florida bonamia), *Eriogonum longifolium* var. *gnaphalifolium* (scrub buckwheat), and *Clitoria fragrans* (scrub pigeon-wings).

Since the initial establishment of cogon grass in the Forest in the late 1970s, this invasive plant has steadily spread along county road rights-of-way through the Forest, infesting adjacent forested areas and private in-holdings. Seed dispersion via wind and animal fur has enabled cogon grass to become established in remote parts of the Forest and along powerline rights-of-way. There were approximately 130 known cogon grass sites on the Forest, with sites varying from one-tenth to ten-acre monocultures, to sporadic sprigs or bunches intermixed with native vegetation across ten acres.

The Forest Service provided an in-kind match of \$26,847 in time and materials.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Glyphosate VMF

Marjorie Harris Carr Cross Florida Greenway

County: Marion

PCL Size: 81,290 acres

Project ID: WR-060 135 acres \$59,940

Project Manager: Office of Greenways and Trails (DEP)

Adele Mills

200 Buckman Lock Road, Palatka, Florida 32177

Phone: 386-312-2273, Fax: 386-236-7121

E-mail: adele.mills@dep.state.fl.us

The Cross Florida Greenway evolved from a proposed shipping canal to a proposed barge canal to a realized state recreation and conservation area. The Greenway is a 110-mile linear park that crosses four counties. Thirty-six invasive exotic species occur in multiple infestations along the length of the Greenway. All work for this project was conducted in Marion County. This project was entirely paid for with OGT funds.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	glyphosate
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	glyphosate+Arsenal
<i>Lantana camara</i>	lantana	Category I	foliar	glyphosate
<i>Lonicera japonica</i>	Japanese honeysuckle	Category I	foliar	glyphosate
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	glyphosate
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Nephrolepis</i> spp.	Sword fern	Category I	foliar	glyphosate
<i>Paederia foetida</i>	skunk vine	Category I	foliar	glyphosate
<i>Panicum repens</i>	torpedo grass	Category I	foliar	glyphosate
<i>Triadica sebifera</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Pteris vittata</i>	Chinese brake fern	Category II	foliar	glyphosate

Melaleuca Program Bureau of Invasive Plant Management

Melaleuca was brought to Florida in the early 1900s as an ornamental tree. Its fast-growing nature led to it being planted extensively as wind breaks and fence rows. The U.S. Army Corps of Engineers originally introduced melaleuca to Lake Okeechobee in the late 1930s, planting trees on low-lying islands immediately lakeward of the levee to protect the levee system from storm generated wind and wave erosion. From these limited plantings, melaleuca spread into many thousands of acres of marsh within the lake.

During the 1980s and early 1990s, the South Florida Water Management District (SFWMD) was the primary source of funding for melaleuca control on public lands. In 1993, the Florida Legislature authorized an annual appropriation of \$1 million to the Department of Environmental Protection (DEP) for the specific purpose of melaleuca control. The Bureau of Invasive Plant Management (BIPM) initiated a cost-sharing program with this \$1 million, which the District matches dollar for dollar. This partnership, referred to by BIPM as the Melaleuca Program, has resulted in over \$20 million of melaleuca control to date. BIPM has expanded upon the contractual arrangement with SFWMD to provide melaleuca control on non-district lands, as well as control of other invasive plant species on public conservation lands in south Florida. At the current level of funding, melaleuca could be eliminated from the Everglades Water Conservation Areas and Lake Okeechobee within the next ten years.

Melaleuca Management—Melaleuca became a target of invasive plant control in the 1980s. Initial work was done on Everglades National Park (ENP), Big Cypress National Preserve (BCNP), Lake Okeechobee (Lake O), and the Water Conservation Areas (WCA), including the Loxahatchee National Wildlife Refuge (LOX). The National Park Service (NPS) treated 90,717 acres of melaleuca on ENP during 1986 to 1998 and 71,000 acres on BCNP from 1984 to 1997. The U.S. Fish and Wildlife Service treated 8,095 acres of melaleuca on LOX (a.k.a. WCA 1) prior to 1987 and 6,755 acres from 1987 to 1998. The South Florida Water Management (SFWMD) assisted with these early efforts, as well as treating Lake O and the WCAs.

The SFWMD pioneered the aerial treatment of melaleuca by helicopter in the 1990s. During 1994 to 1998, the District aerially treated 3,813 acres of Lake O, 1,643 acres of WCAs ('95-'97), and 1,322 acres of the Pennsuco Mitigation Area ('98 only). On areas that are aerially treated, ground crews are used for follow-up and maintenance control. With aerial treatment, large areas can be treated for relatively little cost; the primary factors being helicopter time and amount of herbicide used. In 2002, the SFWMD aerially treated 5,460 acres of melaleuca at an average cost per acre of \$125. Ground control, on the other hand, can cost three to ten times more than aerial treatment, depending upon the size and density of the trees, ease of access to the site, and labor and machinery costs. In 2002, the SFWMD treated 7,285 acres of low density melaleuca with ground crews at an average per acre cost of \$300.

In 1993, the SFWMD estimated there were 252,008 acres of melaleuca within its boundaries (melaleuca also occurs outside the District). Of these total acres, fifty-two percent were on public lands and forty-eight percent on private lands. In 2002, the estimated acreage was 154,423 acres, of which only twenty-two percent was on public lands—a decrease of 97,071 acres through Florida's dedicated funding for melaleuca control.

State and District efforts to control melaleuca, along with those of other governmental agencies and private groups, are containing its spread within the Everglades WCA and the marsh of Lake Okeechobee. Initial treatment of melaleuca has been completed in WCA 2A, 3A, and 3B, north and south of Alligator Alley. These areas are now under "maintenance control." Today, the melaleuca infestation is no longer increasing; in many areas it is being reduced.

Management Strategy—To be effective, the integrated management of melaleuca requires a combination of control techniques; chemical, mechanical, and biological. The melaleuca snout beetle (*Oxyops vitiosa*) was released in WCA-3B near Holiday Park in Ft. Lauderdale in April 1997. The insect spread and, along with additional releases, is now successfully established within melaleuca populations throughout South Florida. A second insect, a sap-sucking psyllid (*Boreioglycaspis melaleucae*), was released in November 2002 and has also become well established. These two control agents have been observed to severely curtail flowering and new growth of melaleuca in areas within their ranges.

Effective melaleuca management requires knowledge of its biology. The reproductive potential of melaleuca is tremendous. A mature tree may retain millions of seeds, all of which may be released from their protective capsules following a stressful event such as desiccation, fire, frost, physical damage, or herbicide application. Once released, fifteen to twenty percent of the seeds will germinate. These new trees take approximately two years to mature and produce viable seeds. Follow-up treatment within the second year after the initial treatment is essential to eliminate new seedlings before they can produce viable seeds. Under ideal conditions, melaleuca can be eliminated from an area within two years. The first phase of control targets all existing trees and seedlings in a given area. Using navigational equipment, crews return to the same site to remove any seedlings resulting from the control activities of the previous year. The District's control operations consist of three phases:

Phase I. This phase focuses on the elimination of all mature trees and seedlings present in an area.

Phase II. Previously treated sites are revisited for follow-up treatment to control trees previously missed and remove seedlings that may have resulted from control activities of the preceding year.

Phase III. This phase entails the long-term management of melaleuca: surveillance and inspection of previously treated sites to monitor the effectiveness of the melaleuca control program and maintain reinfestation levels as low as possible.

The goal of the current melaleuca management program is to contain melaleuca on all District land and to maintain infestation levels as low as possible while minimizing impacts to non-target vegetation. The melaleuca management strategy is based on the quarantine strategy, where the least infested areas (outliers) are addressed first, in order to stop the progression of the existing population. Frill-and-girdle application of an herbicide solution (25% Arsenal®, 25% Rodeo® and 50% water) is the primary method used to kill mature trees. Aerial application has become essential as control operations are directed to large areas of melaleuca monocultures. Acceptable results have been obtained using 3 quarts of Rodeo® and 3 quarts of Arsenal® with 4 quarts of methylated seed-oil surfactant in 20 gallons total volume per acre, in large-scale applications.

Regardless of the control method used, a comprehensive data collection and evaluation plan is essential for the success of melaleuca management initiatives. Record keeping is invaluable for making future management decisions. Data collection in the District's program includes: longitude and latitude coordinates at each treatment site, date and time of control, type of control method, type of herbicide and amount, method of application, number of trees and seedlings or hectares treated at each site, and labor and equipment hours. The data are used to produce maps of treatment progress and to keep track of individual melaleuca control sites.

Program Expenditures—BIPM provided funding of \$1,682,000 for melaleuca control in the 2005 fiscal year. Of this total, \$929,000 went to maintenance control operations on 2,000 acres of Lake Okeechobee and the WCAs. The remaining \$753,000 was used for aerial and ground control of melaleuca on 18,206 acres of other public conservation lands, including Everglades National Park, Picayune Strand State Forest, and Milton E. Thompson Park in Miami-Dade County.



Dead melaleuca after an aerial herbicide treatment.

The Florida Exotic Plant Management Team Partnership

National Park Service (NPS) units in Florida have been actively controlling invasive exotic plants since the 1960s. In 2000, NPS established four Exotic Plant Management Teams (EPMT) to control invasive exotic plants on federal conservation lands. The EPMT are modeled after the “strike teams” used by the U.S. Forest Service to fight forest wildfires. Each highly trained, mobile strike force of plant management specialists stands ready to assist the national parks in the control of invasive exotic plants. The EPMT were created through the NPS Natural Resource Challenge. The Florida Exotic Plant Management Team (FLEPMT) is a partnership between the NPS and the Florida Department of Environmental Protection, Bureau of Invasive Plant Management (BIPM). Through this partnership, BIPM matches each Challenge dollar spent to control exotic plants in Florida’s eleven National Park units. While other EPMT rely on in-house crews, the efforts in Florida reflect the flexibility of the EPMT concept. Exotic plant control work in Florida is conducted under contractual agreement with private companies, allowing for reduced cost and increased efficiency, resulting in “*More Protection, Less Process.*”

Since its establishment in FY 2000, the FLEPMT has provided for the initial treatment of invasive plants on over 75,000 acres. Funding for control operations was provided by the Natural Resource Challenge and matched by BIPM. All control projects have been successful at controlling invasive plants and have also been very cost effective. Invasive plant control projects have been undertaken at Big Cypress NP, Biscayne NP, Canaveral NS, DeSoto NM, Dry Tortugas NP, Everglades NP, Fort Matanzas NM, and Gulf Islands NS. On four of these NPS units (Desoto NM, Dry Tortugas NP, Gulf Islands NS, and Fort Matanzas NM), initial treatment of all of the most invasive plant species has been completed. Significant strides have been made in the other parks receiving funding.

In FY 2005, the FLEPMT expanded its efforts to reign in the uncontrolled expansion of invasive plants, while maintaining a primary focus on initial treatment of invasive plants in Florida NPS areas. Four projects were selected for full funding by BIPM in FY05 at a cost of \$579,088 and totaling nearly 67,000 acres. Big Cypress NP received funds for two projects to control Brazilian pepper, Old World climbing fern, and other invasive species. Biscayne National Park and Canaveral National Seashore also received BIPM funding for control operations. The FLEPMT conducted several projects in Everglades NP, Big Cypress NP, Gulf Islands NS, and Timucuan Ecological and Historic Preserve, with FY05 NPS matching funds totaling \$336,570.

The continued success of the EPMT concept relies upon building public and private partnerships to efficiently prevent, control, and manage damaging exotic species now and into the future. Exotic weeds recognize no boundaries and cooperative efforts are critical to addressing invasive species and protecting public natural areas. The Florida Partnership EPMT is involved with over 100 federal, state, regional, and local cooperators, and is broadening its participation to others, including outside of Florida. The Florida EPMT partnered with the University of Florida (UF) in addressing invasive plant problems in the U.S. Virgin Islands.

More information can be found at the NPS EPMT web site: <http://www.nature.nps.gov/epmt>

The FEPMT liaison is Mr. Tony Pernas, Exotic Plant Management Specialist, National Park Service, 40001 SR 9336, Homestead, Florida 33034, phone: 305-242-7846, e-mail: tony_pernas@nps.gov

Canaveral National Seashore

County: Brevard, Volusia

PCL Size: 57,662 acres

Project ID: NP-037 1,745 acres \$108,697

Project Manager: National Park Service

John Stiner, Chief of Resource Management

308 Julia Street, Titusville, Florida 32796

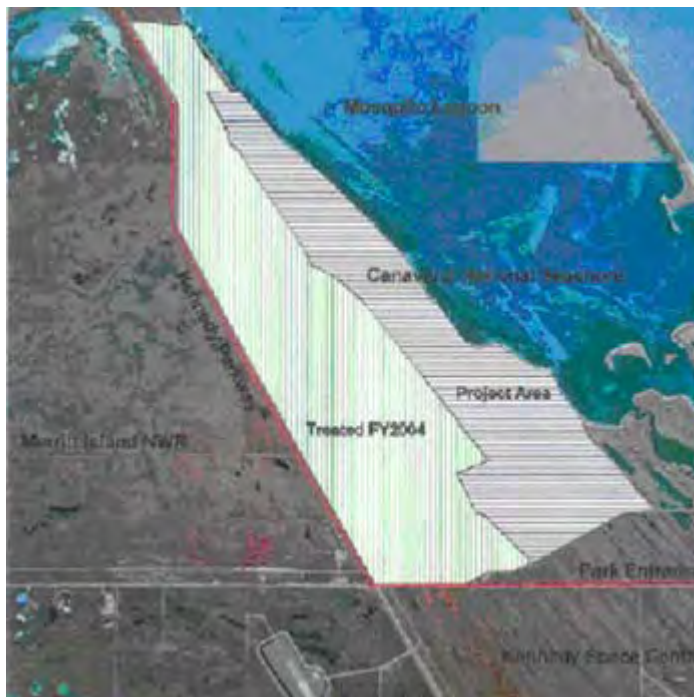
Phone: 321-267-1110, Fax: 321-264-2906

E-mail: john_stiner@nps.gov

The project area is located in the southwest corner of Canaveral National Seashore (CANA). Merritt Island National Wildlife Refuge and CANA jointly manage the site. The western half of this tract was treated in FY04 and the fringe along Mosquito Lagoon in FY03. The current project treated the remaining area in-between, as well as re-treating any resprouts along Mosquito Lagoon.

The project area consists of upland areas of oak scrub and subtropical hammock along the western half of the tract, grading east into a ridge and swale system in which seasonal flooding, perennially wet marshes, and swamps predominate. Brazilian pepper occurred in slightly elevated areas adjacent to the wetlands with a fifteen to sixty-five percent cover. Upland areas provide nesting habitat for the federally-protected Florida scrub jay (*Aphelocoma coerulescens coerulescens*) and Eastern indigo snake (*Drymarchon coraisis couperi*). The endangered wood stork (*Mycteria americana*) and many other species of wading birds feed in the wetlands.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4+Stalker



Big Cypress National Preserve

County: Collier, Miami-Dade

PCL Size: 729,000 acres

Project ID: NP-035 60,540.5 acres \$42,797.57

Project ID: NP-036 1,000 acres \$243,320

Project Manager: National Park Service

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Two projects were conducted at Big Cypress National Preserve (BICY). The first targeted melaleuca in the Loop and Corndance Units of BICY and was a continuation of work not completed in the previous fiscal year. The eastern portion of the Loop Unit is mostly dwarf cypress habitat with extensive areas of prairie, while the western area is predominately cypress strand (Gator Hook Swamp). Pine islands and hardwood hammocks punctuate the entire Loop Unit. Dwarf cypress swamp and marl prairie dominate the southern area of the Corndance Unit, while the northern area is predominantly pinelands and tropical hardwood hammocks. Melaleuca treatment included ground crews using a combination of hand pulling seedlings and cut stump treatment of larger stems, as well as aerial application by helicopter.

The second BICY project targeted Brazilian pepper in the "Addition Lands" north of I-75. This part of BICY is more elevated than the southern area, and therefore is more mesic. Biological communities in this area are more commonly pine and palmetto flatwoods, or hardwood and sabal palm hammocks with hydric communities common throughout. Substrates are mostly sandy and often scarified.

Hydrological changes and recreational activities have altered much of the mesic area. The degree of alteration varies from relatively minor change in rangeland to severe alteration in intensively farmed areas. Disturbance of the mesic communities allowed many non-native plants to become established, of which the most significant was Brazilian pepper. Nearly monocultural stands developed in areas with much disturbance, and even areas with less disturbance had significant populations of this plant. Other invasive species were minor occurrences in the project area.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	basal	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	basal	Garlon 4
<i>Syzygium cumini</i>	Java plum	Category I	basal	Garlon 4

Biscayne National Park

County: Miami-Dade

PCL Size: 172,924 acres

Project ID: NP-038 3,498 acres \$184,273.54

Project Manager: National Park Service

Todd Kellison

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The terrestrial areas of Biscayne National Park (BISC) consist of a mainland fringe and approximately forty-two islands or keys. The mainland fringe ranges from subtidal to intertidal from its eastern to central portions and is above the reach of the tides at the western margin (the park boundary). The mainland fringe is primarily red mangrove at its eastern margin, and grades to a red mangrove/buttonwood transitional community towards the western boundary. Where tidal intrusion does not reach the western boundary, the park contains high densities of Brazilian pepper and Australian pine. Black Point Park and Homestead Bayfront Park, which border the mainland fringe, also contain natural areas with high densities of Brazilian pepper, Australian pine, seaside mahoe, Burma reed, and other invasive exotic plants.

On the BISC keys, most of the larger islands, including Elliott Key, have a mangrove fringe with a subtropical hardwood hammock in the interior. The hammock is composed of the typical subtropical hardwood species found in South Florida, such as poisonwood (*Metopium toxiferum*), milbark (*Drypetes diversifolia*), pigeon plum (*Coccoloba diversifolia*), sea grape (*Coccoloba uvifera*), and torchwood (*Amyris elemifera*). Additionally, a number of state-listed threatened and endangered plants occur, including West Indian Mahogany (*Swietenia mahogani*), satin leaf (*Chrysophyllum oliviforme*), silver palm (*Coccothrinax argentata*), red stopper (*Eugenia rhombea*), and joewood (*Jacquinia keyensis*). The federally endangered Schaus swallowtail butterfly (*Heraclides aristodemus ponceanus*) relies on the torchwood and the wild lime tree (*Zanthoxylum fagara*) as host plants for adults to lay their eggs on and for juveniles as a food source. Numerous invasive exotic plants, including Brazilian pepper, lather leaf, and Australian pine are negatively impacting the growth, distribution and ecology of these and other native plants and animals. The entirety of Elliott Key has been treated for exotics since 2000. The dominant aggressive exotic plants were targeted for re-treatment on approximately 1,200 acres of Elliott Key.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	cut stump	Garlon 4+Stalker
<i>Colubrina asiatica</i>	lather leaf	Category I	cut stump	Garlon 3A+Stalker
<i>Manilkara zapota</i>	sapodilla	Category I	cut stump	Garlon 4
<i>Neyraudia reynaudiana</i>	Burma reed	Category I	foliar	Glypro
<i>Scaevola sericea</i>	beach naupaka	Category I	cut stump	Garlon 4+Stalker
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4+Stalker
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4
<i>Hibiscus tiliaceus</i>	mahoe	Category II	cut stump	Garlon 4+Stalker
<i>Leucaena leucocephala</i>	lead tree	Category II	cut stump	Garlon 4+Stalker
<i>Sansevieria hyacinthoides</i>	bowstring hemp	Category II	cut stump	Garlon 4

Biscayne National Park



**Biscayne National Park
Exotics Maintenance Control**

Re-Treatment Area

Biscayne National Park



Before...

...during...



...and after invasive plant control operations.

Herbicide Bank Report Bureau of Invasive Plant Management

Herbicide was ordered for maintenance control purposes for those projects in the Upland Exotic Plant Management Program where initial control work was completed in Fiscal Year 2003-2004 or earlier. Herbicide was also ordered for initial control projects where land managers chose to do exotic removal in-house and requested only herbicide funding through the Uplands Program.

Calculation of the amount of herbicide ordered for projects was based on twenty-five or fifty percent of the original use summaries. Twenty-five percent of original usage was calculated for treatments including trees and/or shrubs, while fifty percent of original usage was given when treatment included vines and/or grasses. The amount of adjuvant and surfactant ordered for treatment was based on the herbicide ordered; e.g., Garlon 4 was ordered in 2.5-gallon jugs and Diluent Blue in 11.25-gallon drums, equaling an eighteen percent mix. Upon request, amounts of herbicide were ordered based on a lower percentage of mixture, usually ten percent. Surfactant was ordered based upon label recommendations.

The type of herbicide ordered was based on the daily project reports completed by the contractors. Generally, the herbicide ordered for re-treatment was the same as that initially applied by the contractor. Different herbicides were ordered only on request and when the need seemed evident, such as a high non-target kill. For requests of herbicides different from the original treatment, amount ordered was based on equal cost.

In the 2005 fiscal year the Herbicide Bank ordered a total of 1,255.38 gallons of herbicide, adjuvant, and surfactant. The Herbicide Bank provided assistance to 25 management units for initial or maintenance control projects at a total cost of \$95,537.08. Below is a summary of costs and acres treated at each managed area.

PROJECT NAME	\$AMT	AC	PROJECT NAME	\$AMT	AC
Triple N WMA	\$5,012.50	5.00	Sawgrass Lake	\$3,218.65	85.00
various Seminole Co. parks	\$4,823.75	467.50	Little Manatee River SP	\$5,283.25	0.61
various Keys state parks	\$5,562.00	216.82	Caladesi Island SP	\$4,006.00	11.42
various Volusia Co. parks	\$13,898.50	114.50	HT Birch SP	\$155.70	5.67
Merritt Island NWR	\$7,385.75	1,194.00	Collier-Seminole SP	\$2,945.00	10.50
Tree Hill Nature Center	\$678.25	13.00	Jonathan Dickinson SP	\$7,891.50	n/a
Tate's Hell SF	\$1,124.25	75.00	Fisheating Creek WMA	\$720.00	n/a
Robinson Preserve	\$1,001.50	49.00	Spirit of the Wild WMA	\$160.00	n/a
Lake Seminole Park	\$995.20	97.00	Silver River SP	\$1,280.00	259.46
Rocky Creek Coastal Preserve	\$11,286.40	150.00	Cofrin Nature Park	\$1,071.13	30.00
Hillsborough River SP	\$2,300.00	44.50	Withlacochee SF	\$3,540.00	n/a
Egmont Key NWR	\$7,821.75	50.00	Salt Springs SP	\$3,098.75	93.40
Terra Ceia Preserve SP	\$277.25	1.00	TOTAL	\$95,537.08	2,973.38

Uplands Operations Summary Bureau of Invasive Plant Management

Uplands Operations Summary 1997-2005

Acres Controlled, Cost/Acre, and Cost Range include all contractual control operations.

Operational data derived only from projects where contractors submitted Daily Progress Reports.

2004-2005					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	68,141	\$89.17	\$4-\$17,169	4.28	0.24
Vines	9,536	\$103.78	\$19-\$1,783	4.88	0.19
Shrubs-Grasses	8,604	\$121.12	\$50-\$6,071	3.03	0.19
TOTALS	86,281	x = \$93.97	\$4-\$17,169	x = 4.14	x = 0.22

2003-2004					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	81,209	\$63	\$4 - \$33,300	4.09	0.31
Vines	5,080	\$200	\$23 - \$11,856	13.27	0.75
Shrubs-Grasses	10,884	\$79	\$9 - \$8,352	1.54	0.1
TOTALS	96,992	\$141	\$4 - \$33,300	3.75	0.26

2002-2003					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	16,036	\$329	\$36 - \$19,678	9.20	0.68
Vines	3,776	\$318	\$150 - \$7,577	21.36	1.60
Shrubs-Grasses	3,040	\$237	\$23 - \$1,480	21.88	1.55
TOTALS	22,852	\$315	\$23 - \$19,678	13.72	1.01

2001-2002					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	17,521	\$350	\$93 - \$21,667	21.91	0.99
Vines	1,776	\$408	\$234 - \$12,997	14.40	0.80
Shrubs-Grasses	3,092	\$187	\$19 - \$3,158	8.39	0.26
TOTALS	22,389	\$322	\$19 - \$21,667	17.73	0.80

2000-2001					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	11,503	\$228	\$17 - \$4,918	4.91	0.30
Vines	985	\$472	\$98 - \$5,082	7.05	0.16
Shrubs-Grasses	494	\$534	\$35 - \$1,786	13.98	1.07
TOTALS	12,982	\$258	\$17 - \$5,082	5.39	0.31

1999-2000					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	1,964	\$727	\$60 - \$5,576	18.75	1.14
Vines	744	\$675	\$344 - \$5,186	13.67	1.15
Shrubs-Grasses	390	\$808	\$517 - \$2,256	13.81	1.44
TOTALS	3,098	\$725	\$60 - \$5,576	16.42	1.19

1998-1999					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	1,677	\$489	\$32 - \$2,696	18.01	1.03
Vines	804	\$354	\$149 - \$1,832	15.41	0.42
Shrubs-Grasses	597	\$154	\$54 - \$730	7.66	0.55
TOTALS	3,078	\$389	\$32 - \$2,696	15.32	0.78

1997-1998					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees (only)	1,112	\$486	\$422 - \$1,167	25.25	0.39