



Upland Invasive Exotic Plant Management Program

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 lands in Florida. The authority of the Department of Environmental Protection (department) as addressed in §369.251, Florida Statutes, extends to the management of all upland invasive exotic plants on all public conservation lands, including land owned by federal, state, and local government entities. The Upland Invasive Exotic Plant Management Program on Florida's public lands 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 lands and associated funding contracted or monitored by the department during Fiscal Year 2001-2002 is included in this report.

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Over 1 million acres of Florida's conservation lands have been invaded by alien (non-native, exotic) 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. 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.

Upland Invasive Exotic Plant Management Program

In 1997, a program was established under §369.252, Florida Statutes, within the then Bureau of Aquatic Plant Management to address the need for a statewide coordinated approach to the upland invasive exotic plant problem. The Upland Invasive Exotic Plant Management 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; thus providing *more protection*, with *less process*. The Uplands Program section of the bureau funds individual exotic plant removal projects on public conservation lands statewide. Projects are considered for funding based upon recommendations from Regional Invasive Plant Working Groups.

The mission of the Upland 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*). These and over one hundred other alien plants have invaded at least 1 million acres of Florida's 8.5 million acres of public conservation lands, affecting an ecotourism economy valued at over \$7.8 billion annually. Once invasive plants become established in native habitats, eradication is difficult, if not impossible, to achieve; therefore, continuous maintenance of invasive non-native plants is needed to sustain wildlife habitat and recreational opportunities while preserving native plant communities on public conservation lands.

Upland invasive weeds infested approximately 15% of public conservation lands statewide in 2002 and are currently under maintenance control on 43,000 acres. About \$6 million were spent controlling 20,000 acres of upland weeds on 106 publicly managed areas during FY 01-02. Public land managers are responsible for maintenance control of areas initially treated through bureau funding. The bureau provided herbicide to assist land managers with maintenance control at a cost of \$201,493 for FY 01-02.



Alien invasive species are not just the stuff of science fiction. (*The Day of the Triffids*, ©1963, Allied Artists Pictures Corporation)

Florida's Upland Invasive Exotic Plant Management Program Five Years of Preserving the "Real Florida"

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 (exotic, alien) species. Coupled with this threat is a lack of awareness by citizens and tourists alike about the invasiveness of alien plants introduced into the Florida environment.

Invasive exotic plant species, lacking control by their native diseases and predators, spread explosively and may outcompete and replace vital native species on public and private land. Nearly one-third of the plants found growing naturally in Florida's environment are introduced non-native species. While only a small percentage (approximately 10%) of these plants have become a problem, the resulting infestations have diminished wildlife habitat, decreased recreational resources, and negatively affected the natural health and economy of the state. Once invasive plants become established in native habitats, eradication is difficult, if not impossible, to achieve; therefore, continuous maintenance of invasive exotic plants is needed to sustain wildlife habitat and recreational opportunities while preserving native plant communities on public conservation lands.

The major direct effect of exotic plant invaders on Florida's ecosystems is the adverse alteration of native habitats. Such invaders change the composition, structure, and/or processes of native plant and animal communities, often with significant ripple effects throughout the larger system. Most easily observed are the obvious examples of displacement: 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 the natural flow or percolation of water or by increasing the chance of fires in habitats not adapted to fire. Some exotic species have both effects.

Florida encompasses approximately 36 million surface acres, with approximately 8.5 million acres in public ownership owned and managed for natural resource protection. Invasive exotic plants have invaded approximately 15% of these public conservation lands, affecting an ecotourism economy valued at over \$7.8 billion annually.

Recognizing the ecological and economic threat of invasive exotic plants, the 1993 Legislature charged the Florida Department of Environmental Protection (DEP) with establishing a program to control invasive exotic plants on public conservation lands (§369.252, Florida Statutes). In DEP, the Bureau of Invasive Plant Management (BIPM) is the designated lead agency responsible for coordinating and funding the statewide control of invasive exotic plants. Florida's aquatic plant management program is one of the oldest invasive species removal programs in the world, with its beginnings dating back to the early 1900s. In 1994, the bureau published An Assessment of Invasive Non-Indigenous Species in Florida's Public Lands, which documented the severity of the problems caused by these invaders and provided information on the spread of invasive exotic plants across the state.

The 1997 Legislature charged BIPM further with the task of creating a program to bring invasive exotic upland plant species under maintenance control. A maintenance control program, as defined in §369.22, F.S., 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." Meeting this charge required a statewide cooperative program that would coordinate upland invasive exotic plant management activities. This coordinated effort would be directed toward halting the introduction and spread of invasive exotic plants, removing existing populations of pest plants, and assisting in restoring native plant communities.

In 1997, a program under §369.252, F.S., was established within the bureau to address the need for a statewide coordinated approach to the upland invasive exotic plant problem. The Upland Invasive Exotic Plant Management Program incorporates ecosystem management concepts involving “place-based management,” bringing together regionally diverse interests to develop flexible, innovative strategies to address local upland invasive exotic plant management issues. The Uplands Program section funds individual invasive exotic plant removal projects on public conservation lands throughout the state. Project consideration is based upon the recommendations from Regional Invasive Plant Working Groups. BIPM established a statewide network of eleven Working Groups comprised of federal, state, and local government conservation land managers and non-governmental organizations to have an active role in selecting projects for upland invasive exotic plant management at the local level. BIPM also established service contracts with regional invasive plant control contractors with an established fee schedule to help all Florida governmental entities streamline the process of obtaining plant removal services.

As addressed in the DEP 2000-2005 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 Upland Invasive Exotic Plant Management Program Strategic Plan (September, 2001) sets forth specific strategies to implement the program’s long-term goal. These strategies include:

- Ö Implement an integrated control program that uses chemical, mechanical, and biological control technologies. Modify implementation procedures as appropriate to specific public lands to assure the greatest protection for natural systems;
- Ö Improve the general public’s awareness, sensitivity, and responsiveness to the values of natural systems and the threat of loss of biological diversity from invasive plants, by developing and promoting a comprehensive educational program;
- Ö Inventory and map the distribution of invasive exotic plant species through use of a Geographic Information System database by the year 2010; and,
- Ö Research the introduction and use of appropriate biological control 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 of Florida’s well known weeds, once covering more than one million acres of public conservation lands. The Florida Exotic Pest Plant Council lists another 67 exotic plants found on public conservation lands as Category I pest plants; species documented as causing ecological damage to terrestrial ecosystems. Another 56 species are emerging as an increasing threat and are included in control projects funded by the Uplands Program. Funding has historically been insufficient to address every problem weed; therefore, plants like Japanese climbing fern (*Lygodium japonicum*) and air-potato (*Dioscorea bulbifera*) have had an opportunity to expand their range over previous decades. Like melaleuca in the mid-1990s, these and other plants are on the verge of overwhelming parks and forests across the state.

Over \$14 million were spent bringing 43,000 acres of upland weeds under maintenance control during the first five years of the program. In these five years, the program has assisted public land managers on 298 federal, state, and county managed areas. Public land managers are responsible for maintenance control of areas treated with bureau funding. The bureau has assisted managers by providing herbicide for maintenance control, at a cost of \$1,620,572 since beginning this service in FY 2000-2001.

Florida's Ten "Most Unwanted" Invasive Exotic Plants for 2002		
Plant Treated	Acres Controlled to Date	% of Total Project Acres
Melaleuca	14,145	42.7
Brazilian pepper	8,034	24.2
Lygodium spp.	2,616	7.9
Chinese tallow	2,574	7.8
Australian pine	2,005	6.0
Ardisia spp.	1,070	3.2
Cogon grass	770	2.3
Chinaberry	537	1.6
Air-potato	435	1.3
Caesar's weed	426	1.3

Table 1. The worst of the lot, based upon cumulative acres treated to date by the Upland Invasive Exotic Plant Management Program.

NOTES

A note on organization of this report

Working groups are listed alphabetically, followed by counties in alphabetical order, with projects in each county presented in no particular order, other than the projects with the best available information are presented first. Much of the information for this report is obtained from each project's sponsor/manager, which accounts for the variance in quantity and quality of the information presented.

A note on herbicide mixes

Each project description contains a table indicating the plants treated, control method(s), and herbicide(s) used. In this table, "Herbicide" indicates the brand name of the chemical used. No indication is given of the percent mix or the other constituents used such as basal oil, surfactant, etc. Contractors use various preferred mixes for treating invasive exotic plants, depending upon factors such as site/soil conditions, plant densities, proximity to water bodies, or personal experience. In the table, where two herbicides are used in a mix, this is indicated with a "+" sign; e.g., "Rodeo+Escort." Where 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 "/" sign; e.g., "Roundup/Garlon 4." There is no one "right" mix for any plant under all conditions. The control method is typically agreed upon by the site manager, contractor, and program staff before work begins. All applications must comply with the label instructions and rates—the label is the law. The use of a specific product on a project does not constitute an endorsement of that product by the BIPM or the land managing agency.

Exotic Control Projects

Funding for the Upland Invasive Exotic Plant Management Program is provided through the Invasive Plant Management Trust Fund as set forth in Section 369.252(4), Florida Statutes, 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 \$6 million to fund upland control projects for Fiscal Year 2001-2002.

The Cooperative Regional Invasive Plant Working Group (working group) brings together stakeholders in a geographic area for the purpose of combining expertise, energy, and resources to deal with common weed problems. It provides an open forum for expressing the concerns of citizens, landowners, and managers, and provides an effective mechanism to address those concerns. 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 bureau has established 11 working groups encompassing all of Florida’s 67 counties. The 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.

Descriptive information presented for each of the following projects was current as of the date of submission to a working group. Control data is derived from daily progress reports submitted by the contractor performing the work.



East Central Regional Working Group

Wekiva Basin Invasive Exotic Plant Control

County: Orange, Lake, Seminole

PCL: Wekiva Basin GEOPark

PCL Size: 43,000 acres

Project Manager: Florida Park Service (DEP)

John Fillyaw, Park Manager

1800 Wekiwa Circle, Apopka, Florida 32712

Phone: 407-884-2006, Fax: 407-884-2039

E-mail: john.fillyaw@dep.state.fl.us

Project ID: EC-009

Project Size: 1,700 acres

Fiscal Year 01/02

Project Cost: \$7,945.66

The Wekiva Basin GEOPark lies along the Wekiva River and harbors Florida black bear, Florida sandhill crane, wood storks, and other rare species. The property is divided into three main units known as Wekiwa Springs State Park, Rock Springs Run State Reserve, and Lower Wekiva River State Preserve. This project supplied herbicide and other supplies to control exotic plants within the GEOPark and included a temporary staff position to treat invasive plants on various sites throughout the park.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal/girdle/cut stump	Garlon 4
			foliar	Roundup/Garlon 3A
			hand pull	n/a
<i>Lantana camara</i>	lantana	Category I	foliar	Garlon 3A
			hand pull	n/a
<i>Melia azedarach</i>	Chinaberry	Category I	basal/girdle	Garlon 4
			hand pull	n/a
<i>Sapium sebiferum</i>	Chinese tallow	Category I	cut stump	Garlon 4
			hand pull	n/a
<i>Dioscorea bulbifera</i>	air-potato	Category I	basal bark	Garlon 4
			foliar	Roundup+/Garlon 3A
<i>Nephrolepis cordifolia</i>	sword fern	Category I	foliar	Roundup/Garlon 3A
			hand pull	n/a
<i>Ardisia crenata</i>	coral ardisia	Category I	foliar	Garlon 4
			hand pull	n/a
<i>Albizia julibrissin</i>	mimosa	Category I	girdle	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup/Garlon 3A
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Roundup/Garlon 3A
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup/Garlon 3A
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Roundup
<i>Urochloa mutica</i>	Pará grass	Category I	foliar	Roundup
<i>Rhynchelytrum repens</i>	Natal grass	Category II	foliar	Roundup
<i>Alternanthera philoxeroides</i>	alligator weed	Category II	foliar	Roundup
<i>Sorghum halepense</i>	Johnson grass	n/a	foliar	Roundup
<i>Ludwigia peruviana</i>	primrose-willow	n/a	foliar	Roundup
<i>Paspalum notatum</i>	bahiagrass	n/a	foliar	Roundup/Garlon 3A
<i>Stenotaphrum</i> spp.	St. Augustine grass	n/a	foliar	Roundup
<i>Podocarpus macrophyllus</i>	yew plumpine	n/a	hand pull	n/a
<i>Citrus</i> spp.	citrus	n/a	hand pull	n/a



An understory of coral ardisia before and after treatment with 20% Garlon 4.



This camphor tree could not escape a frill-and-girdle treatment with 20% Garlon 4.



Chinese tallow, awaiting its fate at the hands of the exotic control technician.

Rock Springs Run Invasive Exotic Plant Control

County: Lake

PCL: Rock Springs Run State Reserve

PCL Size: 13,859 acres

Project Manager: Florida Park Service (DEP)
 John Fillyaw, Park Manager
 1800 Wekiwa Circle, Apopka, Florida 32712
 Phone: 407-884-2006, Fax: 407-884-2039
 E-mail: john.fillyaw@dep.state.fl.us

Project ID: EC-007

Project Size: 1,700 acres

Fiscal Year 01/02

Project Cost: \$33,578.32

Rock Springs Run State Reserve is a unit of the Wekiva Basin GEOPark and lies along the Wekiva River. The Reserve harbors Florida black bear, Florida sandhill crane, wood storks, swallow-tailed kites, and Southeastern American kestrel. The project site is the 1,700-acre STS tract. Much of this site is former pasture with interspersed bayheads, depression marshes, and xeric oak hammocks, along with 175 acres of hardwood swamp along the river. Target species are scattered throughout the pasture in varying densities.

This was a cost-share project with the Florida Park Service contributing \$5,000 toward the project cost.


Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor-tree	Category I	basal/girdle	Garlon 4
<i>Lantana camara</i>	lantana	Category I	basal bark	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal bark	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal bark	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar/poodle	Garlon 4
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	Roundup
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Roundup
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup
<i>Lantana camara</i>	lantana	Category I	foliar	Roundup
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Roundup



Cogon grass after a foliar treatment with Roundup 3%.



**Wekiva Basin GEOpark
Map A**

 -- STS Tract

0.6 0 0.6 1.2 Miles



Langford and Dickson Parks Invasive Exotic Plant Control

County: Orange

PCL: Langford Park

PCL Size: 21.95 acres

PCL: Dickson Azalea Park

PCL Size: 3.40 acres

Project Manager: City of Orlando

Nancy Caskey, Landscape Project Coordinator
 400 S. Orange Avenue, Orlando, Florida 32801
 Phone: 407-246-3645, Fax: 407-246-2892
 E-mail: nancy.caskey@ci.orlando.fl.us

Project ID: EC-016

Project Size: 25.35 acres

Fiscal Year: 01/02

Project Cost: \$39,348.24

Lanford Park contains disturbed Hydric Hammock and serves as a reconstructed urban wetland model in areas where development has altered hydrology. The primary purpose of the park and community center is to provide environmental education and support passive recreation. Visitors enjoy a beautiful canopy, raised boardwalks, and created wetland-type areas. The wetland areas are in need of renovation because of encroachment by invasive plants.

Dickson Azalea Park was originally hydric hammock, but it is now largely an area noted for its historic landscaping. This park is primarily an historic resource-based park and is in the process of renovation to restore its historic landscaping. Its walkways are natural in feeling, lined with beautiful boulder walls and stairs. A thick, diverse tree canopy shades the park and the leaf drop is used to mulch the plantings and pathways.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor tree	Category I	cut stump	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	cut stump	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	cut stump	Garlon 4
<i>Dioscorea bulbifera</i>	air potato	Category I	foliar	Rodeo
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Rodeo
<i>Pennisetum purpureum</i>	elephant grass	Category I	foliar	Rodeo
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Rodeo
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Rodeo
<i>Enterolobium cyclocarpum</i>	ear-pod tree	n/a	cut stump	Garlon 4

Dickson Azalea Park



Langford Park

Dickson Azalea: project area extends the entire length of the park- CLOSE PARK.



Langford: project area is primarily in two outlines areas. CLOSE AREAS during tree removal.

Three Lakes Invasive Exotic Plant Control

County: Osceola

PCL: Three Lakes Wildlife Management Area

PCL Size: 61,845 acres

Project Manager: Florida Fish and Wildlife Conservation Commission

Steve Glass, District Wildlife Biologist

1231 Prairie Lakes Road, Kenansville, Florida 34739

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

E-mail: glasss@fwc.state.fl.us

Project ID: EC-008

Project Size: 426 acres

Fiscal Year 01/02

Project Cost: \$62,469.61

Three Lakes Wildlife Management Area (TLWMA) is located in southern Osceola County along the eastern shore of Lake Kissimmee, and surrounding portions of Lakes Marian and Jackson. It lies west of U.S. Highway 441, north of State Road 60 and is roughly 25 miles southeast of St. Cloud. The Florida Fish and Wildlife Conservation Commission (FWC) is the lead management agency, with Division of Forestry (DOF) cooperating. TLWMA is a Type I management area and public hunting is allowed during the fall and winter. The original area was purchased in 1974 under the Environmentally Endangered Lands (EEL) Program, with additional purchases following. The habitats on TLWMA consist of native prairie and flatwoods with interspersed wetlands and hammocks. TLWMA has roughly 30 miles of highway frontage, 17 miles of lakeshore, and 40 miles of private property boundary.

Cogon grass is the most widely distributed exotic plant on TLWMA, with estimates of 300-500 different patches covering roughly 10-20 acres. Most of the Cogon grass is found along property boundaries, roadsides, and in some of the interior disturbed sites; few of the patches are larger than ½-acre. A current estimate of the Brazilian pepper infestation is 40-60 acres. Most of the Brazilian pepper is scattered along shorelines in small discontinuous patches. Melaleuca is limited to two different interior wetland sites that total 1-2 acres. Tropical soda apple, air-potato, and Chinese tallow tree are all limited in abundance but are found within some disturbed areas. All of these species combined cover less than 1 acre.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Garlon 3A

Florida Keys Regional Working Group

Layton Nature Trail Invasive Exotic Plant Control

PCL: Long Key State Park

Project Manager: Florida Park Service (DEP)
 Catherine Close, Park Manager
 PO Box 776, Long Key, Florida 33001
 Phone: 305-664-4815, Fax: 305-664-2629
 E-mail: longkey@reefnet.com

Project ID: FK-019

Fiscal Year 01/02

County: Monroe

PCL Size: 965 acres

Project Size: 27 acres

Project Cost: \$14,875

The 965 acres that make up Long Key were acquired by the state between 1961 and 1973. The vegetation is primarily of the West Indian and Caribbean origin. Two areas were targeted within the park:

Area 1 - Layton Nature Trail: A West Indies hammock of approximately 16 acres that was surrounded with a moderate infestation of Brazilian pepper, lead tree, lather leaf, and a very light infestation of Australian pine.

Area 2 - North side of Layton Lakes: A transition zone of approximately 11 acres along the north side of Long Key Lakes that had a heavy to moderate infestation of Brazilian pepper, and a light to moderate infestation of lead tree.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal bark	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	basal	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	basal bark	Garlon 4
			cut stump	



Atwood Addition Invasive Exotic Plant Control

County: Monroe

PCL: Indian Key Historic State Park

PCL Size: 110.49 acres

Project Manager: Florida Park Service (DEP)

Pat Wells

PO Box 1052, Islamorada, Florida 33036

Phone: 305-451-8679

E-mail: patwells@terranova.com

Project ID: FK-020

Project Size: 6.5 acres

Fiscal Year 01/02

Project Cost: \$14,527

Indian Key State Historic Site is located on Upper Matecumbe Key within the city of Islamorada. The project area is within the “Atwood Addition” and consists of two parcels with a combined acreage of approximately 6½ acres. Old Dixie Highway bisects the site.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal bark	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 3A
<i>Scaevola sericea</i>	beach naupaka	Category I	cut stump	Garlon 3A
<i>Tradescantia spathacea</i>	oyster plant	Category I	hand pull	n/a
<i>Leucaena leucocephala</i>	lead tree	Category II	basal bark	Garlon 4
<i>Agave sisalana</i>	sisal hemp	Category II	hand pull	n/a
<i>Oeceoclades maculata</i>	ground orchid	Category II	hand pull	n/a
<i>Sansevieria hyacinthoides</i>	bowstring hemp	Category II	hand pull	n/a
<i>Kalanchoe daigremontiana</i>	life plant	n/a	hand pull	n/a
<i>Pedilanthus tithymaloides</i> *	Devil’s backbone	n/a	hand pull	n/a

*exotic subspecies escaped from cultivation

Key Deer Refuge Invasive Exotic Plant Control Technician

County: Monroe

PCL: National Key Deer Refuge

PCL Size: 8,649 acres

Project Manager: U.S. Fish and Wildlife Service

Phil Frank and Roel Lopez

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

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

E-mail: phil_frank@fws.gov

Project ID: FK-014

Project Size: 8,649 acres

Fiscal Year 01/02

Project Cost: \$26,224.80

The National Key Deer Refuge includes habitat critical to survival of the endangered key deer. Natural communities include tropical hardwood hammock, pine rocklands, freshwater wetlands, and mangrove swamp. The refuge is home to a number of rare plants and animals, five of which are found nowhere else in the world. This project consists of treatment of Australian pine and Brazilian pepper throughout the lands managed by USFWS on Big Pine Key and No Name Key. The project involves the use of one to two employees from the Florida Keys Environmental Trust Restoration Fund as exotic plant control technicians to control exotic plants on the refuge or other public conservation lands in the Florida Keys from October 15, 2001 through June 15, 2002. The refuge provides all necessary training, equipment, and vehicles for the technicians. The technicians work closely with the biological staff of the refuge to prioritize infested sites, and keep a daily record of all exotics control activities.

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

Mosquito Coast Regional Working Group

Merritt Island Invasive Exotic Plant Control Projects

County: Brevard

PCL: Merritt Island National Wildlife Refuge

PCL Size: 139,174 acres

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

Project ID: MC-025

Project Size: 2,429 acres

Fiscal Year 01/02

Project Cost: \$28,175.44

In the early 1960s, NASA began to acquire the land east of Titusville 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 43-mile long barrier island is managed by the Department of the Interior as Merritt Island National Wildlife Refuge and Canaveral National Seashore. The refuge is adjacent to the Indian 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 are found on the refuge. These include seventeen state-endangered plants, such as satinleaf (*Chrysophyllum oliviforme*), crested coralroot (*Hexaletris spicata*), Florida peperomia (*Peperomia obtusifolia*), beach star (*Remirea maritima*), bay cedar (*Suriana maritima*), coastal hoary pea (*Tephrosia angustissima*), and sea lavender (*Tournefortia gnaphalodes*).

Three projects were conducted on the refuge in FY01/02. This first project was primarily directed at melaleuca control. Melaleuca was initially introduced to the refuge by early homesteaders that occupied the land before it became a refuge. Like other exotics, it was planted as an ornamental, for shade, or as a wind barrier, and it escaped into the natural wetlands of the area. Melaleuca trees were scattered throughout the project area, with the majority lightly infesting swales that run north and south through the marshes.

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

Project ID: MC-016

Project Size: 100 acres

Fiscal Year 01/02

Project Cost: \$245,940.00

A second project was directed specifically at controlling Brazilian pepper. Early settlers brought it to Florida to cultivate as an ornamental plant. This project controlled Brazilian pepper along approximately 41 miles of dike roads in the Moore Creek and the Jack Davis Impoundments.

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

Project ID: MC-017

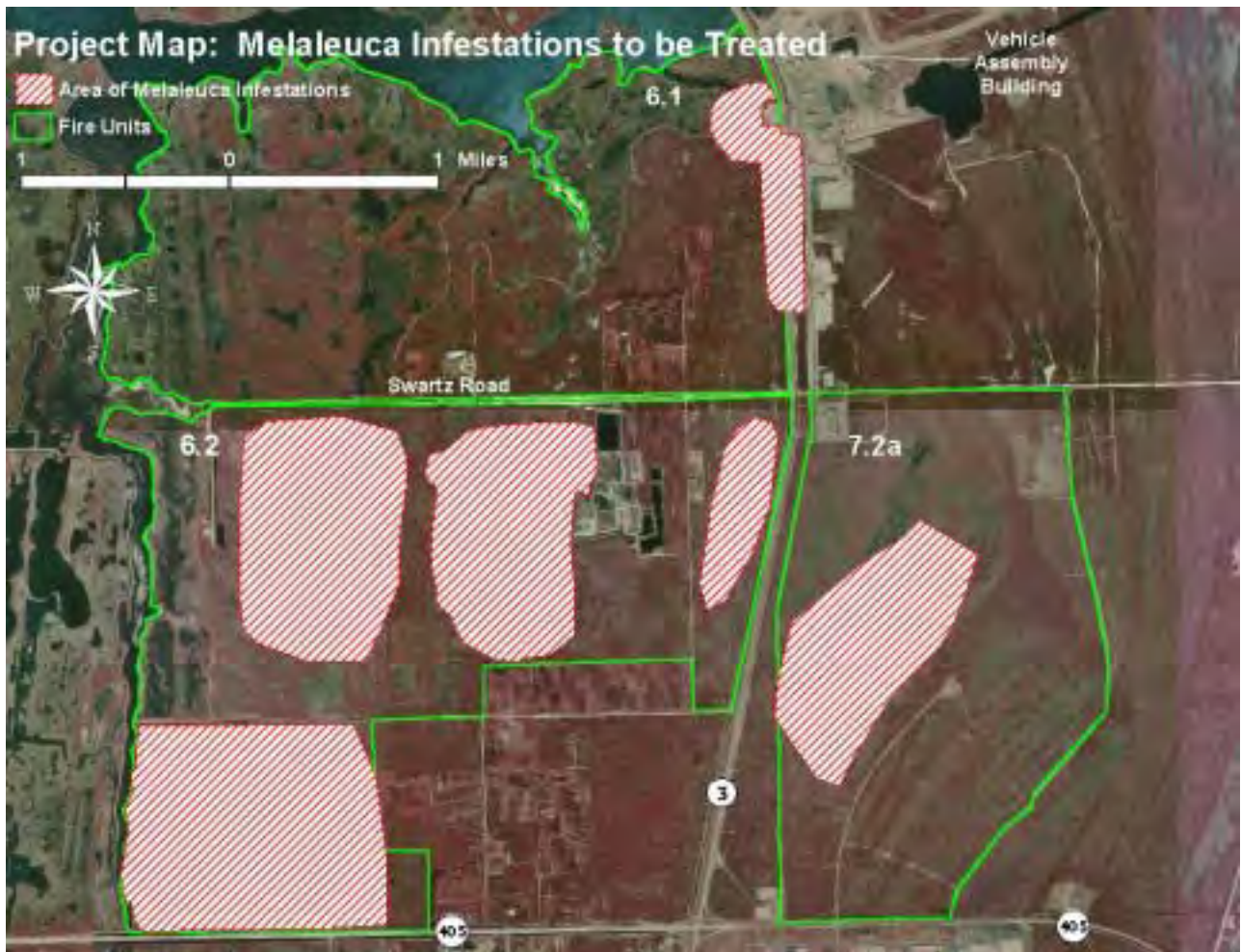
Project Size: 109 acres

Fiscal Year 01/02

Project Cost: \$174,236.88

This third project primarily controlled Australian pine, with other species including bamboo, eucalyptus, and other exotics found north of the NASA security area on the refuge.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal/girdle/cut stump/foliar	Garlon 4
			hand pull	n/a
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4/Arsenal
<i>Albizia julibrissin</i>	mimosa	Category I	basal/girdle	Garlon 4
<i>Eucalyptus</i> spp.	eucalyptus	n/a	basal/cut stump/girdle	Garlon 4
<i>Bambusa</i> spp.	bamboo	n/a	cut stump	Garlon 4/Roundup







Melaleuca lurking in the woods.

Not fish bones—toppled melaleuca trunks.





A dike road almost swallowed by Brazilian pepper.

The heavy equipment rolls in...





Don't get carried away, Mr. Pepper-tree. *Oops, too late!*



...and the way is clear!



An army of Australian pine advances on NASA!



Fortunately, killing exotics is not rocket science.

Pine Island Phase II Invasive Exotic Plant Control

County: Brevard

PCL: Pine Island Conservation Area

PCL Size: 879 acres

Project Manager: Brevard County Parks & Recreation

Scott Taylor, EEL Central Region Land Manager

2725 Judge Fran Jamieson Way, Bldg. B, Viera, Florida 32940

Phone: 321-633-2046, Fax: 321-633-2198

E-mail: staylor@brevardparks.com

Project ID: MC-019

Project Size: 65 acres

Fiscal Year 01/02

Project Cost: \$43,872.68

The 879± acre Pine Island Conservation Area (PICA) is located on North Merritt Island. The Merritt Island National Wildlife Refuge adjoins the north boundary of the PICA. The PICA was jointly purchased by the Brevard County and the St. Johns River Water Management District in 1996. The 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 are fringing the Indian River Lagoon and embedded open water natural ponds and channels. Development activities on the PICA 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. These land disturbances provided conditions that were exploited by invasive exotic pest plants, primarily Brazilian pepper, which is estimated to cover as much as 250 acres of the conservation area.

This proposal targets removal of mainly Brazilian pepper and melaleuca from 65± acres of Indian River Lagoon shoreline, native mesic pine flatwoods, hydric hammock, fringing estuarine marsh, and mangrove forest natural community types located in the southwest quadrant of the conservation property. Brazilian pepper is found throughout most of the project area with the exception of the central core of the pine flatwoods. The densest concentrations of Brazilian pepper occur along the Indian River Lagoon shoreline and within the transitional and wet habitat types: hydric hammock, fringing estuarine marsh, and mangrove forest. Melaleuca is found primarily on a raised hammock embedded within the salt marsh community. A site assessment determined that approximately 35 acres of Brazilian pepper and 0.25 acre of melaleuca occur within the project area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4
			girdle/cut stump	Arsenal
			hand pull	n/a
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal



Brazilian pepper forms dense thickets (left). The fruits (above) are readily eaten by birds and widely dispersed.

**PINE ISLAND CONSERVATION AREA
EXOTIC INVASIVE PLANT TREATMENT AREAS**



LEGEND

% Exotic Plant Coverage

-  - 80%
-  - 50%
-  - 20%

Treatment Method -
Basal Bark

<u>Mgt. Units</u>	<u>Acres</u>
1	1.90
2	4.10
3	13.70
4	24.10
5	7.80
6	48.20

Satellite Beach Invasive Exotic Plant Control

County: Brevard

PCL: Satellite Beach Oceanfront Wildlife and Habitat Preservation Site

PCL Size: 18.3 acres

Project Manager: City of Satellite Beach Recreation Department
 Tiffany Farrell, Environmental Education Coordinator
 1089 South Patrick Drive, Satellite Beach, Florida 32937
 Phone: 321-773-6458, Fax: 321-777-5207
 E-mail: recreation@satellitebeach.org

Project ID: MC-020

Project Size: 18.3 acres

Fiscal Year 01/02

Project Cost: \$12,785.01

The Satellite Beach site was acquired through the Florida Communities Trust. This site is composed of two tracts of undeveloped land separated by a 100-foot wide parking area comprising Hightower Beach Park. The two tracts encompass 18.3 acres with a total ocean frontage of 2,840 feet. The park is owned by Brevard County and is jointly managed by the County and the City. Natural communities consist of Beach Dune, Coastal Grassland, and Coastal Strand.

The beach dune of the northern tract contains a significant patch of beach star (*Cyperus maritima*), shown in the *Atlas of Florida Vascular Plants* to be present in only five counties, with Brevard not being one of them. Smaller sections of coastal mock vervain (*Glandularia maritima*) exist in several locations. Both of these plant species are listed as endangered by the state. Additionally, the state threatened shell-mound pricklypear cactus (*Opuntia stricta*) is present in small patches. The beach along this site is an important sea turtle nesting site, and is the longest stretch of undisturbed beach between the Archie Carr Wildlife Refuge to the south and Canaveral National Seashore to the north. This project controlled Brazilian pepper and other exotic plants, which were scattered throughout the site.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal, cut stump	Garlon 4
<i>Sansevieria trifasciata</i>	snake plant	n/a	cut stump	Garlon 4
<i>Carissa macrocarpa</i>	natal plum	n/a	cut stump	Garlon 4
<i>Kalanchoe daigremontiana</i>	life plant	n/a	foliar, hand pull	Roundup

**18.3 Acre
City, County, and State
Conservation Tract in
Brevard County, Florida**



Patrick Drive



SR A1A

Hightower Park

Exotic Species

-  Brazilian Pepper
-  Natal Plum
-  Kalanchoe
-  Snake Plant

Endangered Species

-  Beach Star
-  Project Boundary

0 200 400 600 800 1000 Feet



South Beaches Phase IV Invasive Exotic Plant Control

PCL: Archie Carr National Wildlife Refuge

Project Manager: Brevard County Parks & Recreation

Ray Mojica, Land Manager

5560 North US Highway 1, Melbourne, Florida 32940

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

E-mail: rmojica@brevardparks.com

Project ID: MC-022

Fiscal Year 01/02

County: Brevard

PCL Size: 162.4 acres

Project Size: 69.04 acres

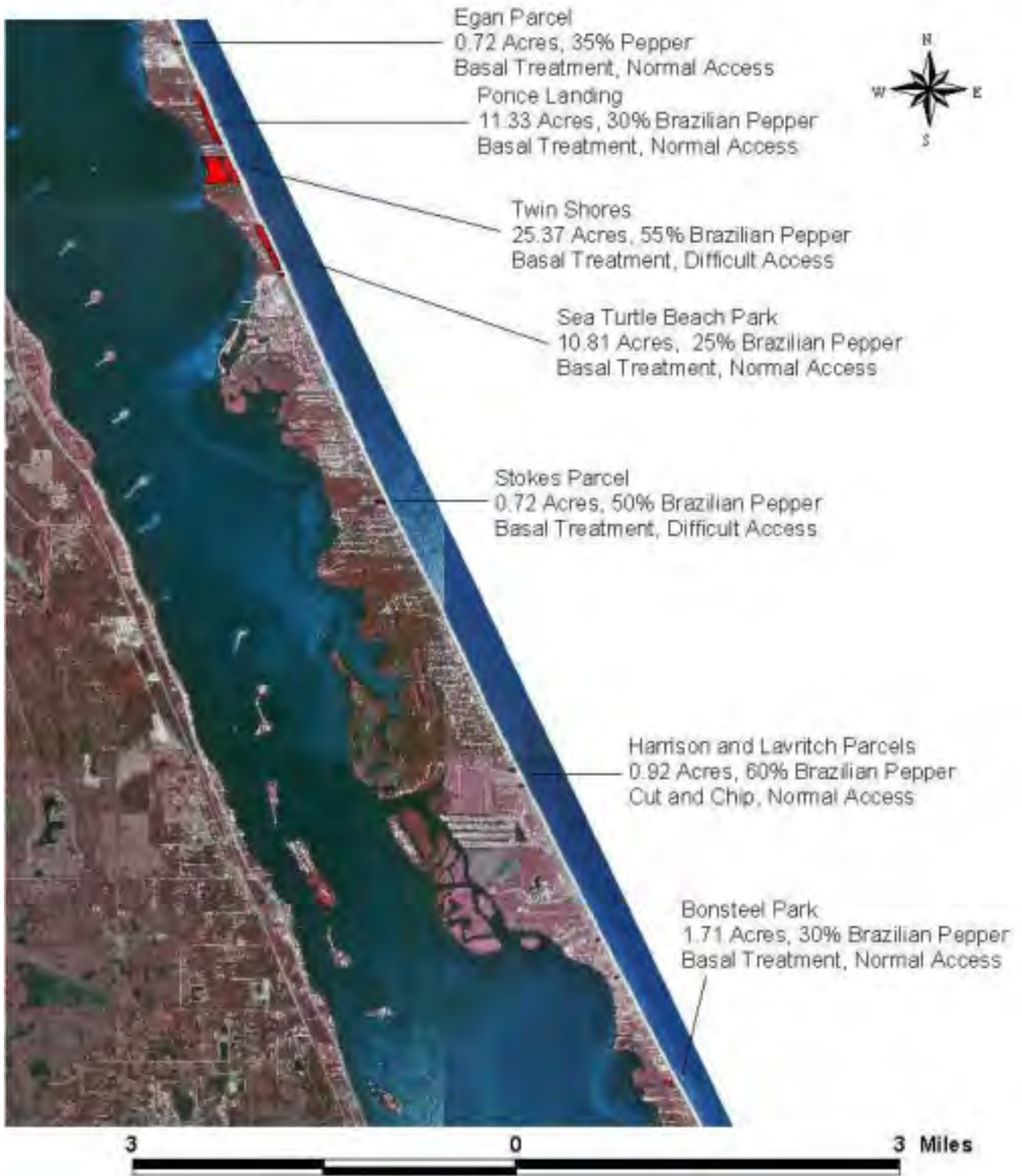
Project Cost: \$48,367.50

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 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 is the fourth phase of an aggressive program to remove Brazilian pepper and Australian pine from publicly held lands on the south beaches of Brevard County. The Environmentally Endangered Lands Program, a department within the Parks and Recreation Department, submitted the previous three phases. This proposal called for the removal of Brazilian pepper with an average coverage of 43% on three parcels of land.

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

Brevard County Parks and Recreation Save Our Coast Sites



Sykes Creek Phase III Invasive Exotic Plant Control

County: Brevard

PCL: Sykes Creek Headwaters Mitigation Area

PCL Size: 500 acres

Project Manager: Brevard County Parks & Recreation

Scott Taylor, EEL Central Region Land Manager

2725 Judge Fran Jamieson Way, Bldg. B, Viera, Florida 32940

Phone: 321-633-2046, Fax: 321-633-2198

E-mail: staylor@brevardparks.com

Project ID: MC-026

Project Size: 38.8 acres

Fiscal Year 01/02

Project Cost: \$45,356.04

This is the final step in the ongoing effort to remove invasive, exotic plants from the Sykes Creek Headwaters Mitigation Area. The area to be addressed in this project is the remaining 38.8 acres of the 188 acres of the SCHMA that require treatment. The entire Sykes Creek Headwaters Mitigation Area (SCHMA) includes two large land tracts (referred to as Phase I and II) on Merritt Island. Phase II (the southern tract) includes approximately 300 acres of salt marsh that are bordered by mosquito control impoundment dykes. The natural communities in Phase II include a mixture of bottomland forests, hydric hammocks, depression and tidal marshes and disturbed uplands. Both phases (I and II) are connected together through large culverts placed under Hall Road. Additionally, Phase II communicates with the Indian River Lagoon via culverts to the Barge Canal. Both Phase I and II comprise portions of what was once the original headwaters of Sykes Creek and are adjacent to the Merritt Island National Wildlife Refuge (MINWR) and included within the Indian River Blueway CARL project.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
			girdle	Arsenal
			hand pull	n/a
<i>Casuarina equisetifolia</i>	Australian pine	Category I	girdle	Garlon 4

Operation Pepper Sweep Invasive Exotic Plant Control

County: Volusia

PCL: *see below*

PCL Size: various

Project Manager: Volusia County Public Works

David Farr

123 W. Indiana Avenue, Deland, Florida 32720

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

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

Project ID: MC-024

Project Size: 3,681 acres

Fiscal Year 01/02

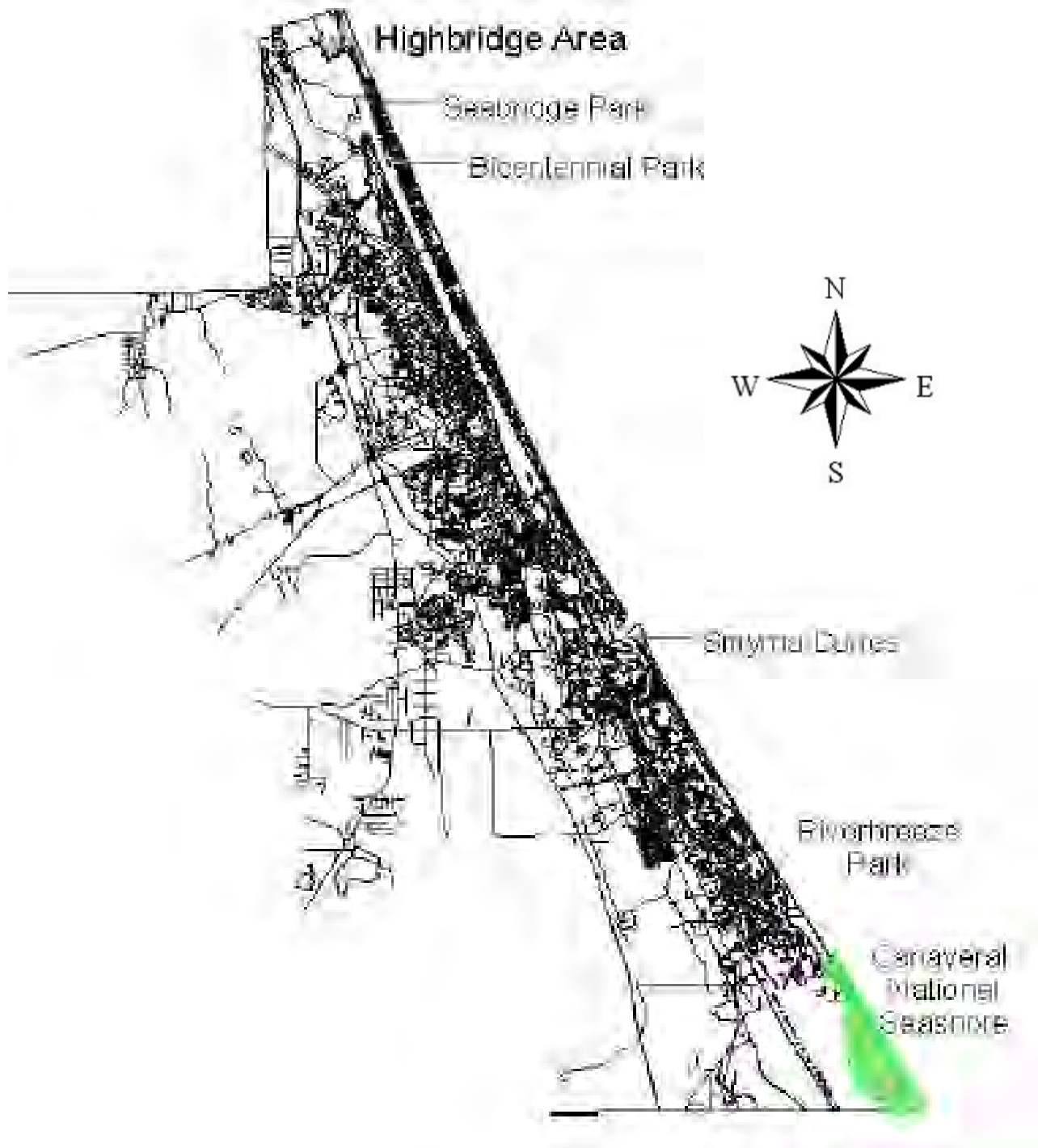
Project Cost: \$98,578.64

This project encompasses several federal, state, and county conservation lands: Canaveral National Seashore, Bulow Creek and North Peninsula State Parks, and Highbridge, Seabridge, Bicentennial, Riverbreeze, and Smyrna Dunes County Parks. The Mound Grove property was acquired for conservation purposes in 1985 and added to Bulow Creek State Park, which presently contains 5,117 acres. Bulow Creek State Park is managed as part of Tomoka Basin Geopark. After the citrus groves were abandoned in the mid-1900s, the uplands at Mound Grove reverted to Upland Mixed Forest. Brazilian pepper is locally common, particularly in the hammock-marsh transition area on the east side of Mound Grove and along the right-of-way on the north side of the Highbridge Road. Other natural communities include Estuarine Tidal Marsh and Shell Mound, which support populations of locally rare subtropical plants such as wild coffee (*Psychotria nervosa*), soapberry (*Sapindus marginatus*), and snowberry (*Chiococca alba*). The tidal marshes and wetland-upland transition zone at Mound Grove are important habitats for wetland dependent species.

The natural communities of Canaveral National Seashore and other conservation lands in the project include Coastal Dune, Coastal Strand, Oak Scrub, Hardwood Hammock, Maritime Hammock, Mangrove Swamp, Salt Marsh, and Freshwater Marsh. Brazilian pepper totals about 114.5 acres in sparse to dense stands throughout the project area. The County provided in-kind contributions of \$48,906.70 for this project.

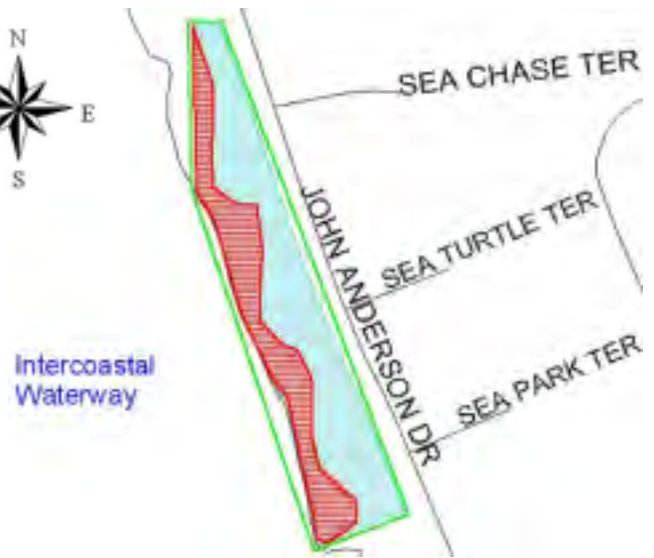
Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal, cut stump	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	basal bark	Garlon 4
<i>Paederia foetida</i>	skunk vine	Category I	basal bark	Garlon 4

Total Project Area

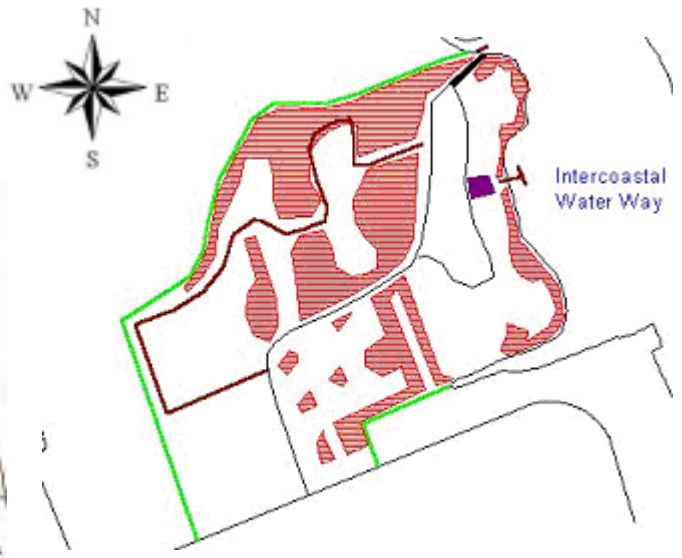




Highbridge Park and surrounding conservation lands. Areas in red are exotic plant control areas.

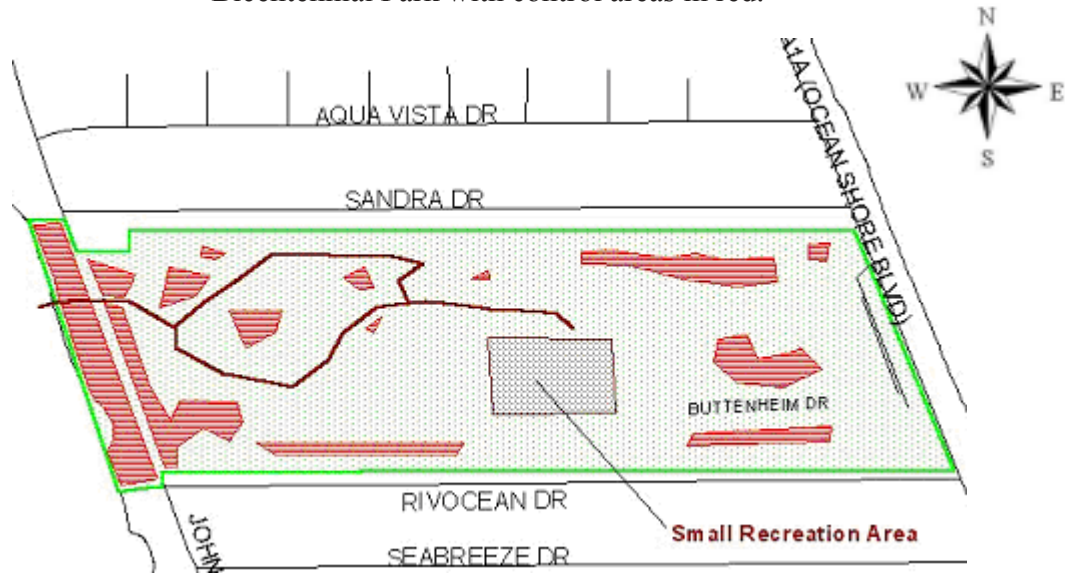


Seabridge Park and control area.



Smyrna Dunes (left) and Riverbreeze Park (right) with control areas in red.

Bicentennial Park with control areas in red.



Canaveral National Seashore (outlined in green) with exotic control areas (in red).



Canaveral National Seashore Invasive Exotic Plant Control

County: Volusia

PCL: Canaveral National Seashore

PCL Size: 57,661.69 acres

Project Manager: Volusia County Public Works

David Farr

123 W. Indiana Avenue, Deland, Florida 32720

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

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

Project ID: MC-023

Project Size: 995 acres

Fiscal Year 01/02

Project Cost: \$37,777.39

Canaveral National Seashore (CNS) is located in southeast Volusia County and northeast Brevard County. The property is situated on a long barrier island adjacent to the Mosquito Lagoon, an Outstanding Florida Water. Natural communities within the project area include coastal dune, coastal strand, oak scrub, mangrove forest, salt marsh, and palm and oak hammocks. This project will control Brazilian pepper, Australian pine, and cogon grass found scattered across the project area. Brazilian pepper totals about 25 acres in stands ranging from 0.25 acres to 4 acres in size, as well as scattered single trees. Australian pine occurs in three stands totaling 1.1 acres. About 1.5 acres of cogon grass occurs along an access road.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal, cut stump	Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Rodeo
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal, cut stump	Garlon 4



- Barrier Island-South
- Barrier Island-North
- Canaveral NS
- South Barrier Island
- South Mosquito Lagoon

Northeast Regional Working Group

O'Leno and River Rise Invasive Exotic Plant Control

County: Alachua

PCL: O'Leno State Park
River Rise Preserve State Park

PCL Size: 1,741.16 acres
4,473.05 acres

Project Manager: Florida Park Service (DEP)
Dale Kendrick, Park Manager
Rt 2, Box 1010, High Springs, Florida 32643-9319
Phone: 386-454-4201/454-1853, Fax: 386-454-2565
E-mail: dale.kendrick@dep.state.fl.us

Project ID: NE-009

Project Size: 12.8 acres

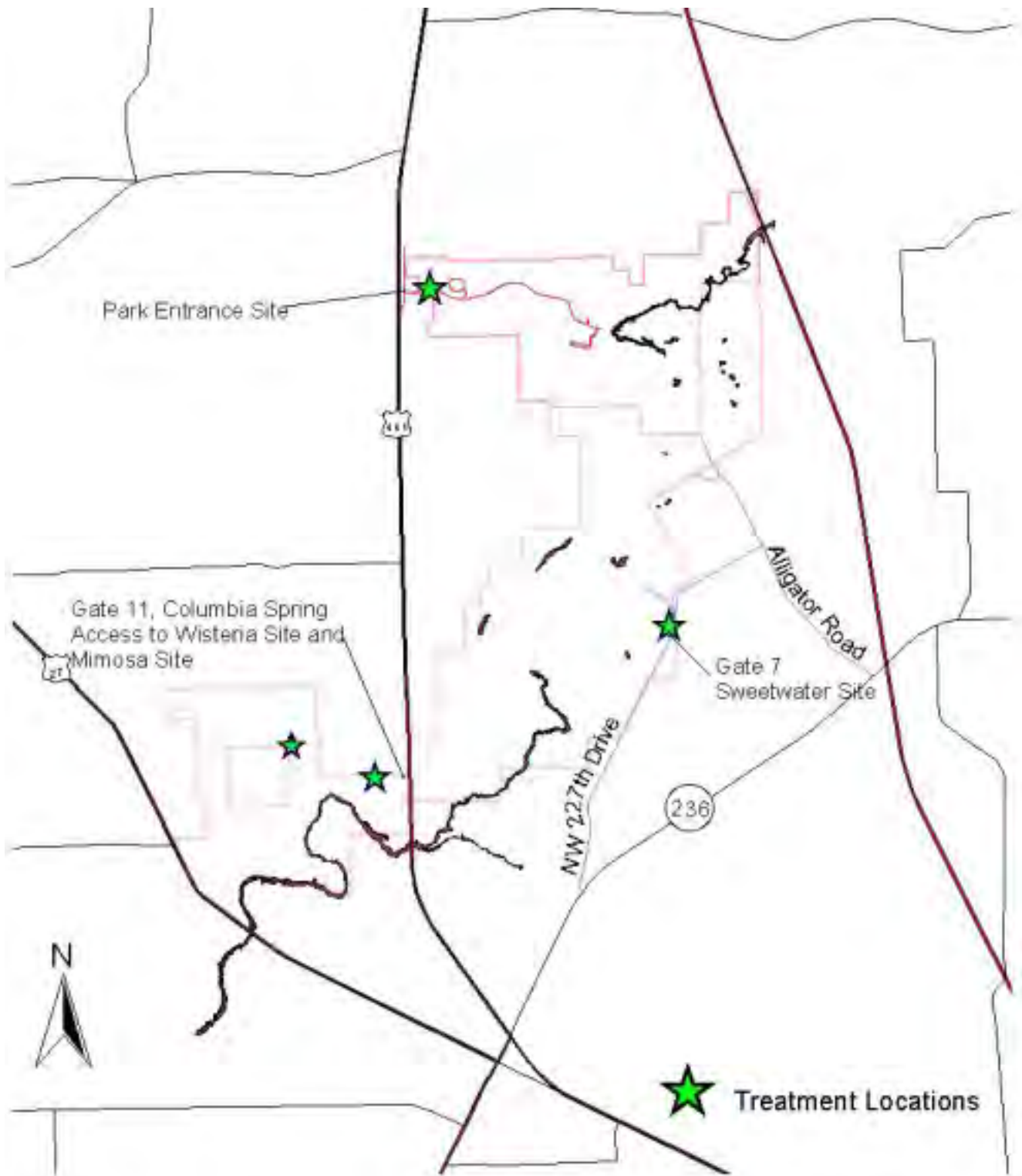
Fiscal Year 01/02

Project Cost: \$6,274.17

O'Leno State Park and River Rise Preserve State Park are owned by the State of Florida and are effectively managed as one unit by the Division of Recreation and Parks. Together the parks cover over 6,200 acres. The parks are located north of High Springs and can be accessed from US Highway 441. Japanese climbing fern occurred along the north side of the park entrance drive and spread into the adjacent upland pine natural area, covering approximately 1 acre. Percent cover was 10-15% along the roadway, decreasing as distance from roadway increased. At this site, camphor and chinaberry were interspersed with climbing fern. Camphor extended into the surrounding upland pine area over an additional 5 acres, but was very scattered. Another site was a 2-acre infestation consisting of climbing fern only. Percent cover was 10-15% along the roadway, again decreasing as distance from roadway increased. The treatment area extended along NW 227th Drive where it bisects parklands. Wisteria occurred at an adjacent former home site and spread into high quality sandhill. Percent cover at the center of the infestation was 80% (for 0.5 acres) and decreased to less than 5% near the edges of the infestation. Total infestation was 3.3 acres. The last infestation consisted of mimosa and Chinaberry that was most severe along a fence line and extended into sandhill. Individuals were scattered over 1.5 acres.

This was a cost-share project with the Florida Park Service contributing \$1,750 of the total project cost.

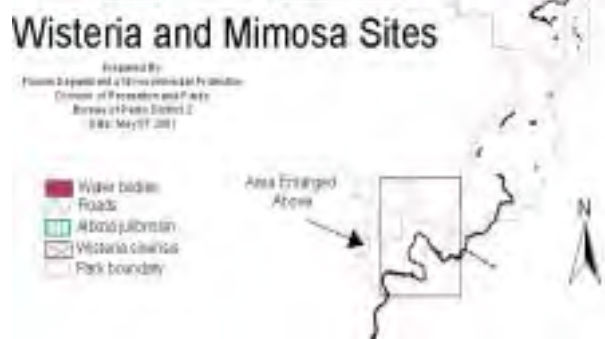
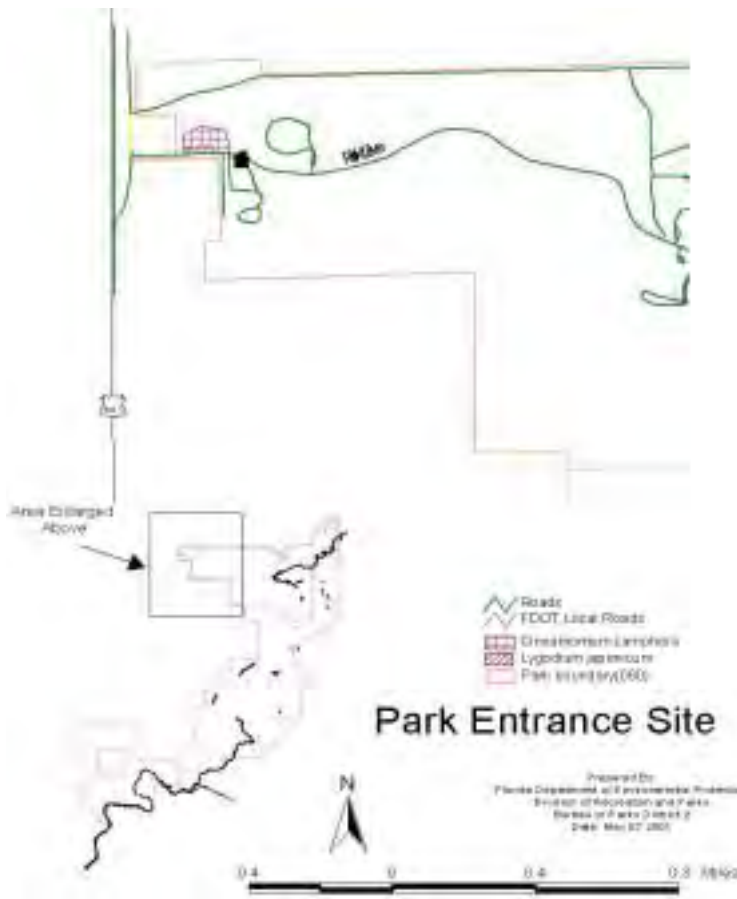
Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal/cut stem	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	cut stem	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	cut stem	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup+Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal/cut stem	Garlon 4



General Site Locations

O'Leno State Park River Rise Preserve State Park

Prepared By:
 Florida Department of Environmental Protection
 Division of Recreation and Parks
 Bureau of Parks District 2
 Date: May 07 2001



Jennings State Forest Invasive Exotic Plant Control

County: Clay

PCL: Jennings State Forest

PCL Size: 20,623 acres

Project Manager: Division of Forestry (DACs)

Charlie Pedersen

1337 Long Horn Road, Middleburg, Florida 32068

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

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

Project ID: NE-011

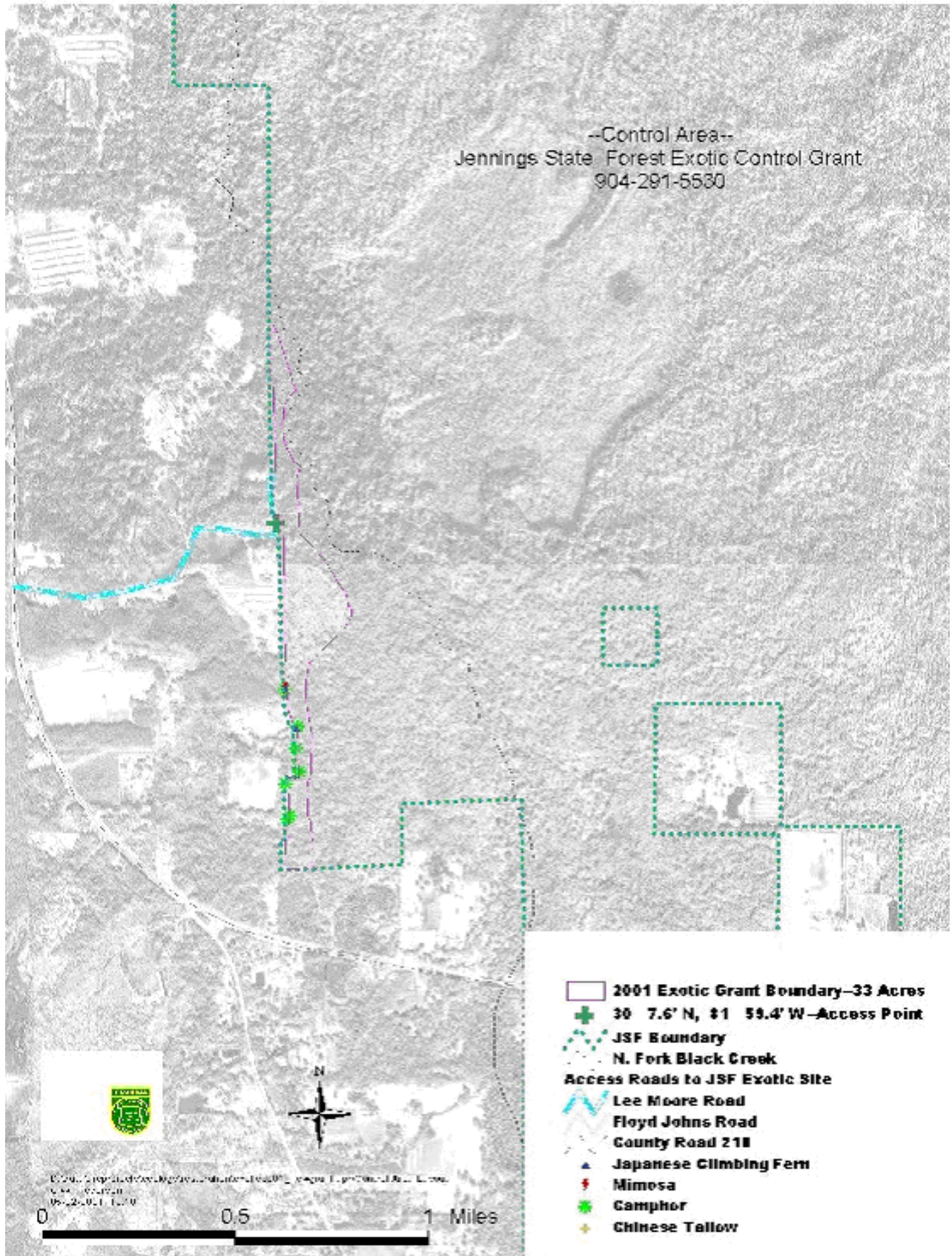
Project Size: 33 acres

Fiscal Year 01/02

Project Cost: \$9,487.19

The control area is in the Jennings State Forest Clay Hill tract, compartment 1. This compartment contains the bottomland swamps along the North Fork of Black Creek, an Outstanding Florida Water, and associated uplands from County Road 218 north and east to Powell Ford Road. The control area is owned by the St. Johns River Water Management District and managed by the Division of Forestry. The site contains dominant camphor trees as well as a quarter mile of fence line where numerous camphor seedlings grow. One quarter-acre site is a monotypic stand of camphor. Chinese tallow and mimosa are scattered along the fence line. Japanese climbing fern is just beginning to invade the site.

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>Ligustrum</i> spp.	privet	Category I	basal	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal	Garlon 4
			foliar	Roundup+Garlon 4
<i>Lonicera japonica</i>	Japanese honeysuckle	Category I	foliar	Roundup+Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup+Garlon 4



Castaway Island Invasive Exotic Plant Control

County: Duval

PCL: Castaway Island Preserve

PCL Size: 309 acres

Project Manager: City of Jacksonville

Mark Middlebrook, Office of the Mayor

117 West Duval Street, Suite 400, Jacksonville, FL 32202

Phone: 904-630-1217, Fax: 904-630-2391

E-mail: markm@coj.net

Project ID: NE-013

Project Size: 35 acres

Fiscal Year 01/02

Project Cost: \$9,522.45

The Castaway Island Preserve is located in the eastern portion of Duval County. Castaway Island Preserve is 309 acres in size and consists mainly of salt marsh and scrub-shrub habitats. There is a 35-acre area of mesic flatwoods and upland mixed forest in the southwestern portion of the property. Of the 35 acres of uplands on site, about 15 acres were used as a trailer park until 1974; since that time, the parcel has been abandoned. Approximately one-third of the salt marshes on the property were ditched in the mid-1900s for mosquito control purposes. The remainder of the property has been essentially undisturbed. The area of exotic invasive plant infestation is the 35-acre upland site, with invasive plants scattered throughout the site. The estimated coverage of exotics is 10% for this upland area, with a slightly higher density occurring in the abandoned trailer park area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal bark	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	poodle cut	Garlon 4
<i>Dioscorea alata</i>	winged yam	Category I	poodle cut	Garlon 4
<i>Ligustrum sinense</i>	Chinese privet	Category I	basal bark	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal bark	Garlon 4
<i>Nandina domestica</i>	heavenly bamboo	Category I	basal bark	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal bark	Garlon 4
<i>Lonicera japonica</i>	Japanese honeysuckle	Category I	cut stump/foiar	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal/cut stump	Garlon 4

Suwannee River Invasive Exotic Plant Control

County: Suwannee, Hamilton, Madison

PCL: Suwannee River State Park and SRWMD Lands

PCL Size: 6,301 acres

Project Manager: Florida Park Service

Steve Yoczik, Park Manager

20185 County Road 132, Live Oak, Florida 32060

Phone: 904-362-2746, Fax: 904-362-1614

E-mail: stephen.yoczik@dep.state.fl.us

Project ID: NE-014

Project Size: 7.5 acres

Fiscal Year 01/02

Project Cost: \$28,606.31

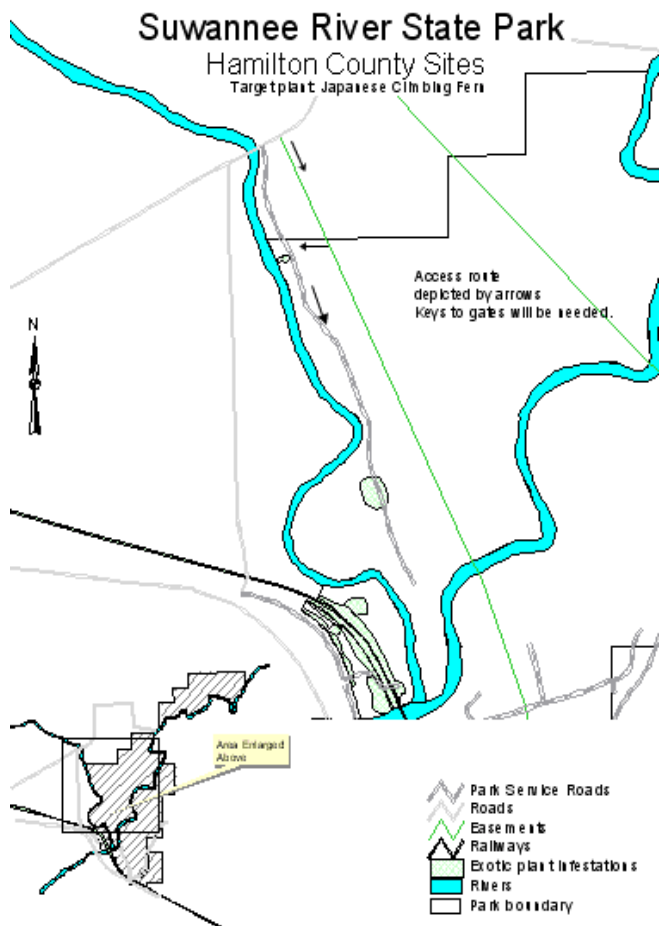
This project primarily controlled Japanese climbing fern on uplands and along the adjacent river banks at Suwannee River State Park and on Twin Rivers State Forest on the Withlacoochee, and Upper Suwannee Rivers. Japanese honeysuckle and Chinaberry were also controlled on Suwannee River State Park properties. The upland and riverine portions of this proposal are separated into two distinct scopes of work. The Twin Rivers State Forest portion comprises eight tracts covering 4,445 acres in Hamilton and Madison Counties. Japanese climbing fern occurs on the river bluffs of all of these tracts and at several locations inland. The predominant natural communities are Sandhill and Upland Mixed Forest. In addition, there are Bottomland Forest, Floodplain Forest, Sinkhole, and Bluff communities present that provide ideal conditions for the establishment and perpetuation of Japanese climbing fern. Japanese climbing fern is the most widespread and well-established invasive exotic in this area, although there are patches of Chinaberry and mimosa along the roadsides.

The Suwannee River State Park portion includes lands surrounding the confluence of the Suwannee and Withlacoochee Rivers. Park property extends up the Suwannee River for about six miles above the confluence with the Withlacoochee River and also extends up the Withlacoochee River, primarily along the east bank, for approximately two miles. For much of that distance, the Twin Rivers tract is across the river. In all, the park has 1,856 acres comprised of numerous natural communities including sandhill, upland pine, floodplain forest, bottomland forest, sinkholes and rivers and streams. Much of the park has been in the state park system since the 1930s. Climbing fern occurs along river banks throughout the park. Material from populations upstream frequently becomes established in the disturbance-prone bluff environment of the river. The largest and densest populations are on the outside curves of the river, where it is often the predominate ground cover. These bluff populations also provide parent material for establishment of additional downstream populations, further spreading this aggressive invasive species.

There are about 17 miles of river frontage along the TRSF and about 5 acres of Japanese climbing fern along these river bluffs. There is approximately 8 miles of river frontage along the State Park, with approximately 2 acres of infestation. A less than ½-acre of cogon grass, which is on the northern bank of the river in the northernmost section of the park, was also treated.

Suwannee River State Park funded the treatment of climbing fern occurring on the CSX right-of-way at a cost of \$3,500. Suwannee River WMD contributed \$3,000, for a total cost-share of \$6,500 toward the project cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Rodeo/Roundup+Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup+Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal bark	Garlon 4
<i>Aleurites fordii</i>	tung oil tree	Category II	basal bark	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal bark	Garlon 4





The banks of the Suwannee River (top) are overrun with Japanese climbing fern (left).

The fertile fronds, ripe with spores (closeup above), are easily identified.

Twin Rivers Invasive Exotic Plant Control

County: Hamilton, Madison, Suwannee

PCL: Twin Rivers State Forest

PCL Size: 14,775 acres

Project Manager: Division of Forestry (DACs)

Brad Ellis, Forester

7620 133rd Road, Live Oak, Florida 32060

Phone: 386-208-1462, FAX: 386-208-1465

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

Project ID: NE-010

Project Size: 7.07 acres

Fiscal Year 01/02

Project Cost: \$32,020.66

The Twin Rivers State Forest is located along the Withlacoochee and Suwannee Rivers in western Hamilton County, eastern Madison County, and northwest Suwannee County. The Forest is comprised of fourteen noncontiguous tracts within the Withlacoochee River Basin and Middle Suwannee River Basin. The project site extends from the Sullivan tract in northeast Madison County to the Anderson Springs tract in northwest Suwannee County. The Forest features natural community types including: Bottomland Forest, Floodplain Forest, Hydric Hammock, Shrub Wetland, Floodplain Swamp, Wetlands, Upland Mixed Forest, Mixed Hardwood and Pine, and Sandhill.

Several scattered Chinese wisteria, entailing 0.01 acres, are located on the South Ellaville tract at the "Florida Trail" sheltered picnic area on the Suwannee River. A larger infestation, about two acres in size, is located on the Anderson Springs tract at River Road and the tract's southern most access road. Japanese climbing fern is found most extensively along the banks of the Withlacoochee River, intermittently all the way from the Georgia/Florida state line to the rivers confluence with the Suwannee River. A river survey has not yet been conducted for the portion of the Forest adjoining the Suwannee River, but one infestation has been identified from an informal tract inspection. Some additional Japanese climbing fern sites have been identified on upland sites in the Forest. A total of 80 individual Japanese climbing fern sites have been located on Forest property on the banks of the Withlacoochee River, equaling 5.05 acres. Sites range in size from less than 0.001 acre to greater than 0.1 acre in size. Accessibility of the sites ranges from moderately accessible and treatable (by boat), to difficult to treat (due primarily to sharply sloping riverbanks). A total of seven individual Japanese climbing fern sites have been located on upland sites in the Forest, totaling .01 acres. Sites range in size from individual plants to 100 square feet in size.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal bark	Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup+Arsenal
<i>Lonicera japonica</i>	Japanese honeysuckle	Category I	foliar	Roundup+Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Rodeo
			foliar	Roundup+Garlon 4
<i>Aleurites fordii</i>	tung oil tree	Category II	basal bark	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal bark	Garlon 4
			foliar	Roundup+Garlon 4

Panhandle Regional Working Group

Florida Caverns Invasive Exotic Plant Control

PCL: Florida Caverns State Park

Project Manager: Florida Park Service
 Mark Ludlow, Park Biologist
 3345 Caverns Road, Marianna, Florida 32446
 Phone: 850-482-9289, Fax: 850-482-9114
 E-mail: mark.ludlow@dep.state.fl.us

Project ID: PH-015

Fiscal Year 01/02

County: Jackson

PCL Size: 1,279.25 acres

Project Size: 52 acres

Project Cost: \$18,034.59

Florida Caverns State Park is located off Highway 166, about three miles north of Marianna, in Jackson County. The majority of the park is Chipola River floodplain forest and upland mixed forest. Approximately 30 acres in the old federal fish hatchery area on the west side of the park were disturbed in the 1930s for hatchery ponds. The ponds, abandoned in the mid-1940s, were re-colonized by native hardwoods mixed with exotic shrubs and trees. Chinese privet was the most abundant exotic plant on the site with numerous small seedlings adjacent to the staff residence buildings.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal bark	Garlon 4
<i>Nandina domestica</i>	heavenly bamboo	Category I	basal bark	Garlon 4
<i>Ligustrum sinense</i>	Chinese privet	Category I	basal bark	Garlon 4
<i>Elaeagnus pungens</i>	silverthorn	Category II	basal bark	Garlon 4



Backpack sprayers are commonly used by applicators.



Especially in dense 'jungle' conditions.

Maclay Gardens Invasive Exotic Plant Control

County: Leon

PCL: Maclay Gardens State Park

PCL Size: 1,779.15 acres

Project Manager: Florida Park Service

Beth Weidner, Park Manager

3540 Thomasville Road, Tallahassee, FL 32304

Phone: 850-487- 4115, FAX: 850- 487- 8808

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

Project ID: PH-013

Project Size: 200 acres

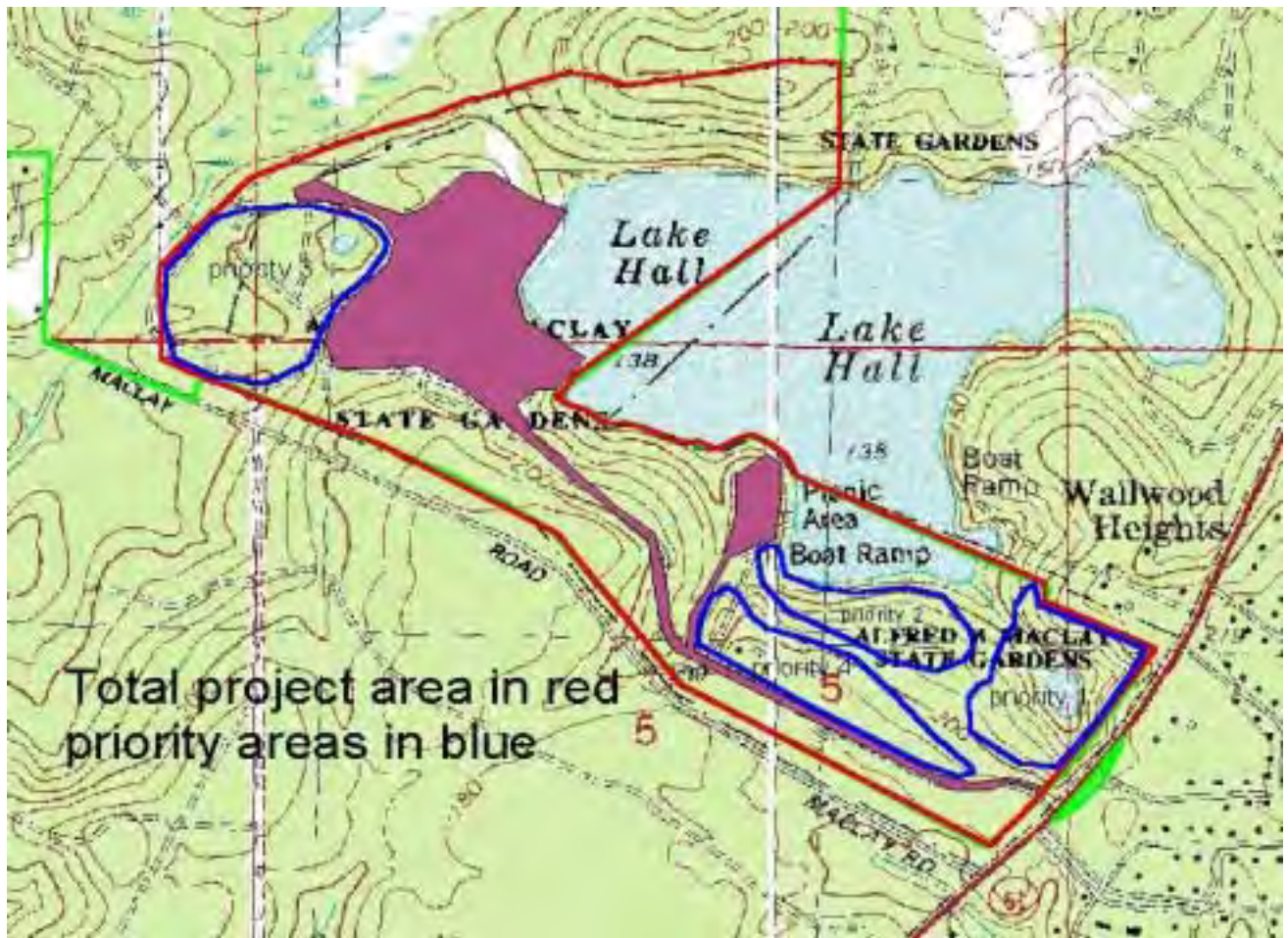
Fiscal Year 01/02

Project Cost: \$133,551.08

Maclay Gardens State Park 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. Coral ardisia was the most widely spread exotic species throughout the project area, with stem counts generally exceeding 1,000 stems per acre, and prioritized sections near the park's sinkholes having stem counts approaching 10,000 stems per acre. Additionally, nandina, Chinese tallow, and camphor tree were abundant throughout the project area, particularly around the sinkholes. Slope forest canopy species such as magnolia, beech, and white oak were still present, even in the most severely infested portions of the project area.

This was a cost-share project with Florida Park Service contributing \$16,943.37 toward the project cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Albizia julibrissin</i>	mimosa	Category I	girdle	Garlon 4
			foliar	Roundup+Garlon 4
<i>Ardisia crenata</i>	coral ardisia	Category I	basal/girdle/foiar	Garlon 4
			girdle/foiar	Roundup+Garlon 4
			foiar	Garlon 3A
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal/girdle	Garlon 4
			girdle	Roundup+Garlon 4
<i>Lantana camara</i>	lantana	Category I	girdle	Garlon 4
			girdle	Roundup+Garlon 4
<i>Ligustrum lucidum</i>	glossy privet	Category I	basal/girdle	Garlon 4
			foiar	Roundup
<i>Lonicera japonica</i>	Japanese honeysuckle	Category I	foiar	Garlon 4
			foiar	Roundup+Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foiar	Garlon 4
			foiar	Roundup+Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal/girdle	Garlon 4
			girdle	Roundup+Garlon 4
<i>Nandina domestica</i>	heavenly bamboo	Category I	basal/girdle	Garlon 4
			girdle	Roundup+Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	girdle	Roundup+Garlon 4
<i>Aleurites fordii</i>	tung oil tree	Category II	girdle	Roundup+/Garlon 4
<i>Elaeagnus pungens</i>	silverthorn	Category II	basal/girdle	Garlon 4
			girdle	Roundup+Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	girdle	Garlon 4
			girdle	Roundup+Garlon 4
<i>Bambusa spp.</i>	bamboo	n/a	girdle/cut stump	Garlon 4
			girdle	Roundup+Garlon 4



Coral ardisia before and after foliar treatment with 2% Roundup + 0.5% Garlon 4. A 2% Garlon 4 mix was also effective. Unfortunately, herbicide does not affect the berries.



There is nothing divine about heavenly bamboo, a serious invader of natural areas.



This nandina was frill-and-girdled with 18% Garlon 4 in oil to minimize non-target damage.

Lake Talquin Invasive Exotic Plant Control

County: Leon, Gadsden

PCL: Lake Talquin State Forest

PCL Size: 16,327 acres

Project Manager: Division of Forestry (DACS)

Thomas Haxby

865 Geddie Road, Tallahassee, Florida 32304

Phone: 850-414-1136, Fax: 850-922-2107

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

Project ID: PH-014

Project Size: 35 acres

Fiscal Year 01/02

Project Cost: \$52,132.40

The Lake Talquin State Forest (LTSF) comprises ten large tracts and eleven small tracts of land located west of Tallahassee in Gadsden, Leon, and Liberty Counties and bordering Lake Talquin and the Ochlockonee River. In 1977, the Florida Power Corporation donated 11,698 acres to the State. Historic human use has made discernable impacts on much of these lands. Native Americans, as evidenced by the many archeological sites, inhabited the forest and early European settlers cleared the land for agriculture. From the 1950s to the early 1970s, much of the forest was leased for timber or cattle operations. From the time of the timber and cattle leases to the initial transfer of the property to the State in 1977, natural fire regimes were disrupted. These prior uses of the property created areas of disturbance that along with intentional introductions (home sites prior to 1977) are the main sources of exotic species occurrence. Uplands within the unit are primarily pine plantation, with the exotics mostly occurring along the plantation edges. Natural communities include steephead ravines and slope forest. Invasive species occur in widespread populations that cumulatively affect several acres. The recently identified Chinese tallow infestation is of the greatest concern due to its potential for invading the state lands adjacent to the Ochlockonee River and Lake Talquin. Before the discovery of this infestation, no populations of Chinese tallow had been identified on LTSF.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup/Garlon 4
			pooodle	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	foliar	Roundup/Garlon 4
			basal	Garlon 4
<i>Ligustrum sinense</i>	Chinese privet	Category I	foliar	Roundup/Garlon 4
			basal	Garlon 4
<i>Lantana camara</i>	lantana	Category I	foliar	Roundup/Garlon 4
			girdle	Garlon 4
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Roundup/Garlon 4
<i>Pueraria montana</i>	kudzu	Category I	foliar	Roundup/Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Arsenal/Roundup
<i>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal	Garlon 4
<i>Nandina domestica</i>	nandina	Category I	basal/girdle	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal/girdle	Garlon 4

Eglin AFB Invasive Exotic Plant Control

County: Okaloosa

PCL: Eglin Air Force Base

PCL Size: 463,448 acres

Site Manager: Eglin AFB Natural Resources

Dennis Teague, Endangered Species Biologist
 Jackson Guard, 107 Hwy. 85 N, Niceville, Florida 32578
 Phone: 850-882-4164, Fax: 850-882-5321
 E-mail: teagued@eglin.af.mil

Project ID: PH-012

Project Size: 120 acres

Fiscal Year 01/02

Project Cost: \$41,593.38

Eglin Air Force Base is the largest forested military reservation in the United States. In addition to a large expanse of sandhill, there are thirty-four other natural communities present, including the most significant array of steephead seepage streams under a single ownership in Florida. The primary target invasive species are Chinese tallow, Chinese privet, Chinaberry, mimosa, Japanese climbing fern, Chinese wisteria, and camphor tree. The project area consists of five control sites, two that are funded by BIPM at \$44,800 and three that are funded by USAF at \$15,000. The USAF is also providing in-kind services by treating approximately 2 acres of cogon grass at 5 sites within the Eglin Main Base parcel, approximately 0.5 acre of cogon grass (*Imperata cylindrica*) within the FIM Road parcel, approximately 0.1 acre cogon grass at the Turkey Creek parcel, approximately 0.5 acre cogon grass and torpedo grass (*Panicum repens*) at the Barrier Island parcel, and approximately 0.1 acre cogon grass and torpedo grass at the East Bay Flatwoods parcel.

Eglin Main Base Parcel (~25 acres). The natural community types most impacted by invasive species are mesic flatwoods and creek systems. Some of the treatment areas border on high quality natural areas. These border areas have established invasive species infestations that threaten the natural areas. Mesic flatwoods are fire-maintained, open canopied pine forests with little or no woody midstory and a dense ground cover of grasses, forbs, and low scrubs. This community occurs on relatively flat and moderately to poorly drained terrain. West of the Cobb's dove field the area is higher and classified as scrub with a sand pine, longleaf, and oak mix. The area along the bay is coastal maritime hammock.

Eglin Turkey Creek Parcel (~20 acres). The southwestern portion of this site is on the transition zone of a sandhill, bay gall, flood plain forest, and seepage stream natural community type. Sandhills are characterized by a forest of widely spaced pine trees with a sparse understory of deciduous oaks and fairly dense groundcover of grasses and herbs on rolling hills of sand. Floodplain forests occur on the lower terraces of creek systems and seepage streams.

Eglin FIM Road Parcel (~60 acres). This habitat type is mesic flatwoods. Mesic flatwoods are fire-maintained, open canopied pine forests with little or no woody midstory and a dense ground cover of grasses, forbs, and low scrubs. This community occurs on relatively flat and moderately to poorly drained terrain. This area has developed some midstory component because of fire exclusion.

Eglin Barrier Island Parcel (~3 acres). This parcel is located in interdunal coastal swale barrier island habitat. Eglin has 17 miles of high quality barrier island habitat.

Eglin East Bay Flatwoods Parcel (~12 acres). This habitat type is high quality flatwoods. Mesic flatwoods are fire-maintained, open canopied pine forests with little or no woody midstory and a dense ground cover of grasses, forbs, and low scrubs. This community occurs on relatively flat and moderately to poorly drained terrain. This area is interspersed with depression marshes and dome swamps.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	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>Albizia julibrissin</i>	mimosa	Category I	basal	Garlon 4
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	poodle	Garlon 4
			foliar	Roundup+Garlon 4
<i>Aleurites fordii</i>	tung oil tree	Category II	basal	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	girdle	Garlon 4



Barrier Island



East Bay Flatwoods



Eglin Main Base



FIM Road



Turkey Creek



Thousands of Chinese tallow trees were treated with a basal bark application of 18% Garlon 4 in JLB oil.





Many exotics, like this cogon grass and others behind it, are initially found on the *edge* of natural areas. If not treated, they spread inward, displacing native species.



Southeast Regional Working Group

Fern Forest Invasive Exotic Plant Control

County: Broward

PCL: Fern Forest Nature Center

PCL Size: 243.44 acres

Project Manager: Broward County

Carol Morgenstern, Natural Areas Supervisor
1000 NW 38 Street, Oakland Park, Florida 33309
Phone: 954-938-0615, Fax: 954-938-0625
E-mail: cmorgenstern@broward.org

Project ID: SE-012

Project Size: 56 acres

Fiscal Year 01/02

Project Cost: \$51,063.30

The Fern Forest Nature Center, owned and managed by Broward County, is located in the City of Coconut Creek. Fern Forest was acquired in 1978 with funds from a \$73 million county bond issue for purchase and development of land for parks. Fern Forest, originally known as Cypress Creek, contains cypress swamps, bottomland hardwood forests, tropical hardwood hammocks, wetlands and prairies; making it one of the most ecologically unique and valuable natural sites in south Florida. Fern Forest consists of the historic flow-way of Cypress Creek, and surrounding associated communities. The site contains 28 listed species and 34 species of ferns. Fern Forest Nature Center operates as a passive recreational facility, as well as offering a wide variety of nature programs and special events for groups from school-aged children to adults. Annually, the park averages 134,000 visitors—5,000 of which are environmental students—and hosts an average of 14 special events; making it one of the most visited natural areas in Broward County.

The western boundary of the site is an area of tropical hardwood hammock that serves as a buffer between the historic Cypress Creek bed and the urban area. This buffer protects the interior portions of the site where most of the fern species and listed species are found. This area, although retaining its native characteristics, had become increasingly infested with exotic plant species. Although bishofia, Brazilian pepper, and other exotics were invading the area, air-potato was the main invader into the area. The focus of this project was to treat all invasive exotic species during the time of year when the air potato is in a dormant stage. Follow-up treatment was performed by Broward County to remove all air potato bulbils while still in the dormant stage, once the area had been opened up from other exotic species removal. Broward County provided \$31,449.63 of in-kind cost and materials for this project.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Rodeo
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Bischofia javanica</i>	bishopwood	Category I	basal	Garlon 4
<i>Schefflera actinophylla</i>	Queensland umbrella tree	Category I	basal	Garlon 4
<i>Epipremnum pinnatum</i>	golden pothos	Category II	foliar	Rodeo



Before treatment (9/20/01) and after treatment (11/29/01) of site.



Fern Forest is surrounded by urban development.



If not caught early, air-potato will blanket a site with suffocating vegetation. After removal of the vines, the site must be monitored for sprouting from the buried tubers.



Hugh Taylor Birch Invasive Exotic Plant Control

PCL: Hugh Taylor Birch State Park

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

Project ID: SE-022, SE-034

Fiscal Year 01/02

County: Broward

PCL Size: 175.24 acres

Project Size: 36 acres

Project Cost: \$304,822.50

Hugh Taylor Birch State Park is currently undergoing two major mitigation projects that will affect almost 50 acres of the park. One of the main goals of these projects is to remove exotics 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*). There are also areas where the golden leather fern (*Acrostichum aureum*) is associated with exotics. A sandy open area in the park also contains the federally listed beach jacquemontia (*Jacquemontia reclinata*).

This control project was designed to remove the last remaining infestations of exotics from the Park. Three major project areas were identified; area one is Long Lake, area two is the southwest corner of the park covering approximately 10.25 acres, and area three is between the park road and a small tidal creek that will be enlarged under an airport mitigation plan. Long Lake is an artificial linear freshwater lake created in the 1940s when Bonnet Slough was dredged. A small island (~2 acres) in the lake was almost completely covered by Australian pines. The perimeter of Long Lake, roughly 10 acres, had numerous Australian pines but is also bordered by a mature hardwood hammock. Area two, the southwest corner of the Park, has several exotic species, but the main problem was a large stand of mature Australian pines. Matching funds were used to help remove some exotics from here and replant areas that were heavily infested by mature pines. Carrotwood (*Cupaniopsis anacardioides*) is also becoming a problem in this area. Area three, a linear strip running north-south, had a 10% cover of Australian pines that were clustered in pockets. The rest of the area has a mature hardwood hammock.

The control operation was broken into two tasks; the first being cutting down the trees, with the second being removal of stumps and logs from the park. The second task was a cost-share with the Florida Park Service contributing \$10,000.

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

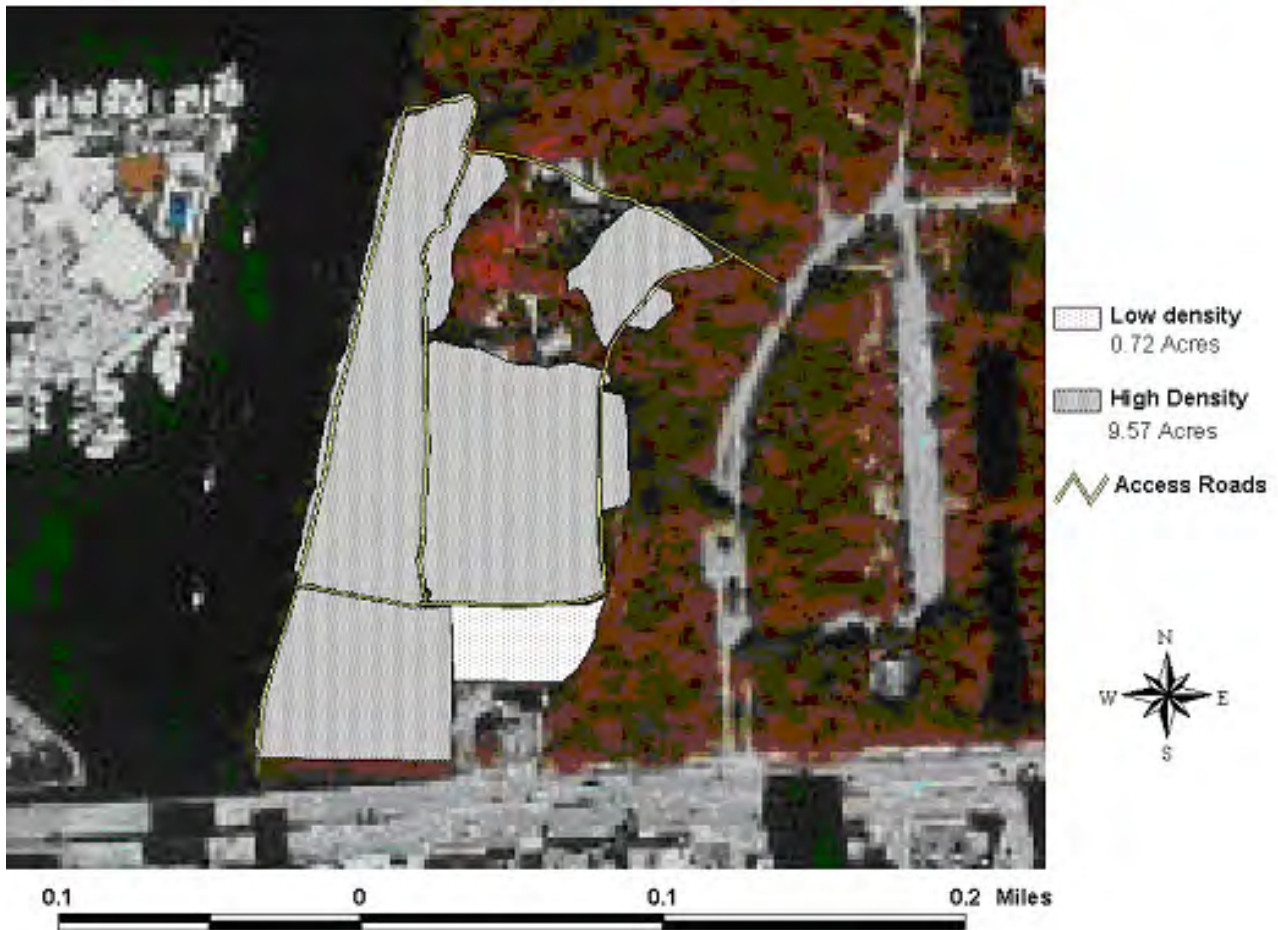


Australian pines form dense monoculture stands. The thick mat of needles chemically inhibit other plants from growing.



Bureau staff visit complex projects for review and consultation.

Hugh Taylor Birch State Park - Exotic Removal Project



South Dade Wetlands Invasive Exotic Plant Control

County: Miami-Dade

PCL: South Dade Wetlands

PCL Size: 12,527 acres

Project Manager: Miami-Dade County

Gwen Burzycki, Environmental Resource Project Supervisor
 33 Southwest 2 Avenue, Suite 400, Miami, Florida 33130-1540
 Phone: 305-372-6569, Fax: 305-372-6479
 E-mail: burzyg@miamidade.gov

Project ID: SE-026

Project Size: 172 acres

Fiscal Year 01/02

Project Cost: \$176,877

The South Dade Wetlands is the EEL Program's largest acquisition project and consists of approximately 48,000 acres of mixed forested transitional wetlands, freshwater marshes, and coastal wetlands. The project is adjacent to the state-owned and managed Southern Glades Wildlife and Environmental Area (SGWEA). Together, the South Dade Wetlands and the SGWEA connect Everglades National Park and Biscayne National Park. Vegetative cover types include sawgrass prairie, native forested wetlands, mangrove scrub, cattail prairie, and exotics dominated wetlands. Approximately 20% of the total area was once farmed. These former agricultural areas are often where exotic vegetation now dominates. It has been observed that shoebutton ardisia, generally thought to be an invader of upland habitats, is capable of colonizing rapidly within transitional wetland habitats, specifically, tree islands, forested wetlands, and disturbed areas, such as those former agricultural lands with a Brazilian pepper canopy.

The project area is divided into three sites, with treatment limited to a portion of two of the sites due to heavier than projected infestation and seasonal access limitations. Site 1 is composed of forested transitional wetlands and sawgrass prairie. The shoebuttan ardisia, as well as other exotics, occur primarily along the slope of the roadway and within the forested wetland areas. Density of shoebuttan ardisia and Australian pine ranges from approximately 6-15% within these forested areas. Site 2 comprises two contiguous tracts largely composed of forested transitional wetlands and more densely infested with shoebuttan ardisia, with some areas containing as much as 100% coverage of exotics. Site 3 is composed of two contiguous properties with a mixture of sawgrass prairie and forested transitional wetlands. The northern property has more forested wetlands, and a higher density of exotics, while the southern property is more open, with sawgrass prairie and tree islands. Shoebuttan ardisia infestation ranges from densities of 1-30%. Other exotics noted along the roadway included Brazilian pepper and Burma reed at densities of 16-30% and 1-5%, respectively. The total acreage treated for the three sites, 172 acres, exceeded initial projections for what could be accomplished in a season.

Miami-Dade County provided \$88,438 of the total project cost.

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

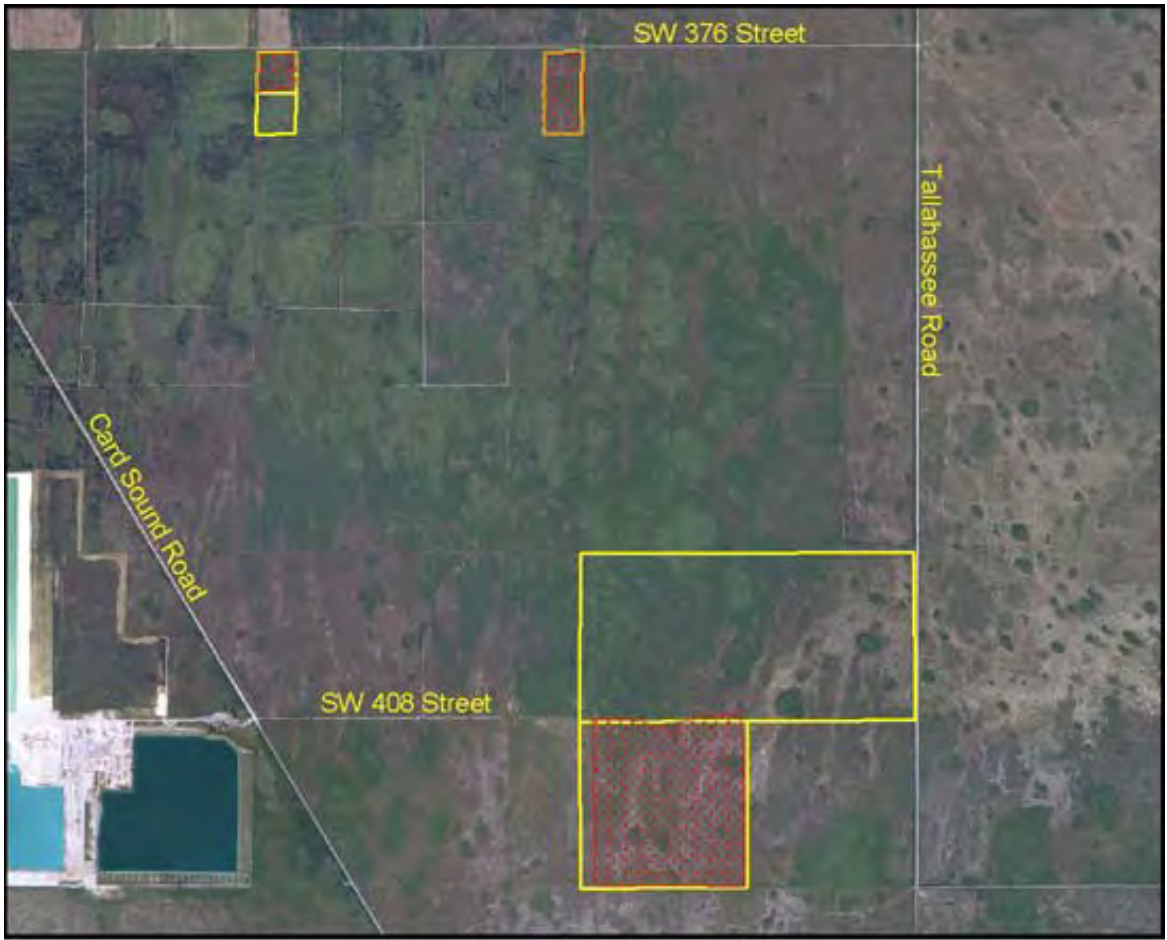
Other invasive exotic plant species found in minor quantities and treated with either Garlon 3A cut stump or Garlon 4 basal bark included: *Bischofia javanica* (bishopwood), *Jasminum* sp. (jasmine), *Leucaena leucocephala* (lead tree), *Albizia lebbek* (woman's tongue), and *Schefflera actinophylla* (Queensland umbrella tree).

South Dade Wetlands Shoebutton Ardisia Herbicide Effectiveness Monitoring Project
Site 1, Plot Set-up, February 5, 2002, Plot E15



South Dade Wetlands Shoebutton Ardisia Herbicide Effectiveness Monitoring Project
Site 1, Immediately after Garlon 3A cut stump treatment, March 28, 2002, plot E15





MIAMI-DADE COUNTY SHOEBUTTON ARDISIA REMOVAL PROJECT



Whispering Pines Invasive Exotic Plant Control

PCL: Whispering Pines Hammock Preserve

Project Manager: Miami-Dade County

Linda McDonald Demotropolis

22200 SW 137th Avenue, Goulds, Florida 33128

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

E-mail: LindaM@miamidade.gov

Project ID: SE-021

Fiscal Year 01/02

County: Miami-Dade

PCL Size: 5.4 acres

Project Size: 2.5 acres

Project Cost: \$32,443

Whispering Pines Hammock Preserve is a 5.4-acre preserve surrounded by single family residential development. The project site is the 2.5-acre rockland hammock along the western side of the preserve. Before development, the area was known as the South Cutler Island and consisted of many small hardwood hammock forests. The hammocks were surrounded by pinelands and transverse glades, or prairies, that connected the Black Creek glade with the Cutler glade. These glades drained freshwater from the Everglades into Biscayne Bay through low spots in the elevated limestone ridge (Miami Rock Ridge) that parallels the coast. In the 1950s, the glades were excavated to make flood control canals. A review of 1938 aerial photographs shows that the Whispering Pines Hammock Preserve was located on the eastern edge of a glade that ran along the western side of the Miami Rock Ridge. The deeply eroded limestone substrate on the west side of the preserve attests to the volume of water that flowed through the area in the past.

The preserve consists of rockland hammock, pine rocklands, and the natural ecotone between these two forests. The ecotonal area between the pinelands and hammock as well as two sides of the pineland are overrun with Brazilian pepper. The entire hammock has been colonized by invasive exotic plants including air-potato (*Dioscorea bulbifera*), Queensland umbrella tree (*Schefflera actinophylla*), Gold Coast jasmine (*Jasminum dichotomum*), arrowhead vine (*Syngonium podophyllum*), and the incised halberd fern (*Tectaria incisa*). Landscape debris dumped into the hammock from neighboring yards has introduced populations of invasive exotic groundcovers such as wedelia (*Wedelia trilobata*) and oyster plant (*Tradescantia spathacea*).

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Dioscorea bulbifera</i>	air-potato	Category I	hand pull (dig)	n/a
<i>Tradescantia fluminensis</i>	white-flowered wandering jew	Category I	hand pull	n/a
<i>Syngonium podophyllum</i>	arrowhead vine	Category I	hand pull	n/a
			foliar	Roundup
<i>Wedelia trilobata</i>	wedelia	Category II	foliar	Roundup

Volunteers are vital to the success of control efforts on local parks and natural areas.



Lucille Hammock Invasive Exotic Plant Control

County: Miami-Dade

PCL: Lucille Hammock

PCL Size: 20.76 acres

Project Manager: Miami-Dade County

Michael Spinelli

33 SW 2nd Avenue, Suite 400, Miami, Florida 33130-1540

Phone: 305-372-6586, Fax: 305-372-6479

E-mail: spineM@co.miami-dade.fl.us

Project ID: SE-020

Project Size: 19 acres

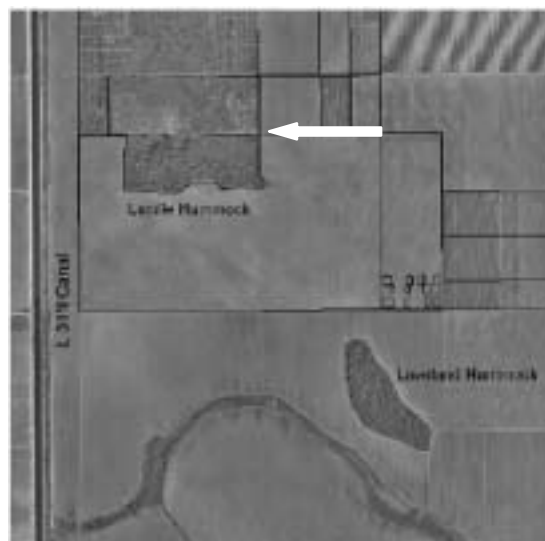
Fiscal Year 01/02

Project Cost: \$65,610

Lucille Hammock contains 3.5 acres of rocky glades and 14.5 acres of mesic tropical rockland hammock. The site is bordered on all sides by agricultural lands. The short hydroperiod rocky glades are dominated by muhly grass and sawgrass and have a typical hydroperiod of 1-6 months. The southeastern edge of the hammock is very wet, contains southern coastal willows, and has a longer hydroperiod than the rocky glades area. This is currently the only county-owned site that contains hardwood hammock, rocky glades prairie, and willow wetland depression marsh. Historical records list *Anemia wrightii* (Wright's pine fern) and *Selaginella eatonii* (pygmy spikemoss) as present at this site. In addition, the Institute for Regional Conservation lists the following state-listed endangered and threatened species as present on this site: *Angadenia berteroi* (pineland-allamanda), *Byrsonima lucida* (locustberry), *Ilex krugiana* (Krug's holly), *Pteris bahamensis* (Bahama ladder brake), *Selaginella armata* var. *eatonii* (Eaton's spike-moss), *Solanum verbascifolium* (Mullein nightshade), *Tetrazygia bicolor* (West Indian lilac), *Thelypteris augescens* (Abrupt-tip maiden fern) and *Trema lamarckianum* (West-Indian trema). There have also been separate reports of *Bletia purpurea* (Pine pink) and *Jacquemontia pentanthos* (blue-flowering vine) on this site.

The Environmentally Endangered Lands Program Trust Fund provided \$44,810 of the total project cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
			cut stump	Garlon 3A
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal bark	Garlon 4
			cut stump	Garlon 3A
<i>Neyraudia reynaudiana</i>	cane grass	Category I	mechanical	n/a
<i>Leucaena leucocephala</i>	lead tree	Category II	basal bark	Garlon 4



Pine Rocklands Invasive Exotic Plant Control

County: Miami-Dade

PCL: Pine Rocklands Conservation Area

PCL Size: 8.78 acres

Project Manager: Miami-Dade Community College
Mayra Nieves, Program Coordinator
11011 SW 104 Street, L-143, Miami, Florida 33176
Phone: 305-237-0975, Fax: 305-237-0550
E-mail: mnieves@mdcc.edu

Project ID: SE-031

Project Size: 1.8 acres

Fiscal Year 01/02

Project Cost: \$24,864

The Environmental Center is owned by Miami-Dade Community College. The 8.8-acre facility is located on the western end of the campus perimeter road. The 1.8-acre project site is situated within the pine rocklands on the southern end of the Environmental Center. The natural communities that make up the native areas in the Environmental Center’s Educational Preserve are: Everglades Marsh, Everglades Slough, Swamp Forest, Cypress Swamp, Scrub Cypress, Wet Prairie, Hydric Hammock, Pine Flatwoods, Pine Rocklands, Rockland Hammock, Beach Dune, and Maritime Forest. The Pine Rocklands is the most heavily invaded community. Burma reed covers an estimated 50% and the exotic hardwoods average 50-100% density in the infested area.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4
<i>Schefflera actinophylla</i>	Queensland umbrella tree	Category I	cut stump	Garlon 4
<i>Neyraudia reynaudiana</i>	Burma reed	Category I	cut stump	Garlon 4



“Know your enemy.”

Cape Florida Invasive Exotic Plant Control

County: Miami-Dade

PCL: Bill Baggs Cape Florida State Park

PCL Size: 432 acres

Project Manager: Florida Park Service (DEP)

Elizabeth Golden, Park Biologist

1200 South Crandon Boulevard, Key Biscayne, Florida 33149

Phone: 305-361-8779, Fax: 305-365-0003

E-mail: capefla@gate.net

Project ID: SE-018

Project Size: 27 acres

Fiscal Year 01/02

Project Cost: \$32,927.83

Bill Baggs Cape Florida State Park lies on the southern tip of Key Biscayne. The project site is a 27-acre area of the park that was historically coastal strand merging into beach dune. Beach naupaka, day jessamine, shrub verbena, and lather leaf lightly to moderately infested 19.5 acres. Brazilian-pepper, schefflera, and Surinam-cherry also occurred in low numbers. The remaining 7.5 acres are located along the project site's eastern edge, where it merges into beach dune. Beach naupaka, day jessamine, and lather leaf heavily infested these acres. Coverage by Category I exotic species was estimated to be 70%-80%. Park staff and volunteers focused their efforts in the less heavily impacted 19.5-acre portion of the site. The contractor was used in the remaining 7.5 acres of heavy infestation.

The park has fifty-two endangered, threatened, or rare species recorded within its boundaries. Although not found within the project site, these seven protected plant species are found in the adjacent beach dune community: sea lavender (*Argusia gnaphalodes*), beachstar (*Cyperus pedunculatus*), beach creeper (*Ernodea littoralis*), beach clustervine (*Jacquemontia reclinata*), burrowing four-o'clock (*Okenia hypogaea*), inkberry (*Scaevola plumieri*), and bay cedar (*Suriana maritima*).

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal bark	Garlon 4+Stalker
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4+Stalker
<i>Scaevola sericea</i>	beach naupaka	Category I	basal bark	Garlon 4+Stalker
<i>Cestrum diurnum</i>	day jessamine	Category I	basal bark	Garlon 4+Stalker
<i>Colubrina asiatica</i>	lather leaf	Category I	basal bark	Garlon 4+Stalker
<i>Lantana camara</i>	shrub verbena	Category I	basal bark	Garlon 4+Stalker
<i>Schefflera actinophylla</i>	schefflera	Category I	basal bark	Garlon 4+Stalker
<i>Eugenia uniflora</i>	Surinam cherry	Category I	basal bark	Garlon 4+Stalker

Oleta River Invasive Exotic Plant Control

County: Miami-Dade

PCL: Oleta River State Park

PCL Size: 1,033 acres

Project Manager: Florida Park Service (DEP)

Jon Robinson, Park Manager

3400 N.E. 163rd Street, North Miami, Florida 33160

Phone: 305-919-1844, Fax: 305-919-1845

E-mail: jon.robinson@dep.state.fl.us

Project ID: SE-033

Project Size: 14 acres

Fiscal Year 00/01

Project Cost: \$17,800

Bordering the north shore of Biscayne Bay, Oleta River State Park encompasses the mouth of its namesake, as well as hundreds of acres of mangroves and tidal swamp. The project area is along the south boundary of the park. It is a peninsula bounded by water on the south, east and west sides. This project involved the removal of existing stumps within the control site and general cleanup.

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

Loxahatchee Slough Invasive Exotic Plant Control

PCL: Loxahatchee Slough Natural Area

Project Manager: Palm Beach County

Kraig Krum, Environmental Analyst

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

Phone: 561-233-2527, Fax: 561-233-2414

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

Project ID: SE-019, SE-032

Fiscal Year 01/02

County: Palm Beach

PCL Size: 11,000 acres

Project Size: 1,570 acres

Project Cost: \$125,745.75

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.

The concentrations of exotic plants occurred in areas of wet flatwoods where some kind of disturbance had occurred. The southernmost part of the site as well as along the main interior trail had been impacted the most by several species including melaleuca, old world climbing fern, Brazilian pepper, Java plum and Australian pine (~100 acres). Melaleuca and Old World climbing fern were scattered in wet flatwoods, cypress domes, and depression marshes throughout the site (~200 acres). Downy rose-myrtle was found scattered in the mesic pine flatwoods. Brazilian pepper and Australian pine were present primarily around the perimeters of the property and along the main interior trail.

A separate operation was conducted on this property for an aerial treatment of 270 acres of melaleuca through the South Florida Water Management District Melaleuca Program; a cooperative effort with the Bureau.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Rodeo/Roundup ¹
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	girdle/aerial	Arsenal ²
<i>Casuarina</i> spp.	Australian pine	Category I	girdle	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	girdle	Garlon 4
<i>Syzygium cumini</i>	Java plum	Category I	girdle	Garlon 4



A foliar application of Escort to treat climbing fern.

¹ Some *Lygodium* was treated with a mixture of Rodeo and small amounts of Escort and 2,4-D.

² Some melaleuca seedlings were foliar treated with Stalker, Rodeo, or Arsenal.



Treated melaleuca along a canal.

Australian pines after a frill-and-girdle treatment with Garlon 4.



Pond Cypress Invasive Exotic Plant Control

PCL: Pond Cypress Natural Area

Project Manager: Palm Beach County

Michael Cheek

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

Phone: 561-233-2475, Fax: 561-233-2414

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

Project ID: SE-028

Fiscal Year 01/02

County: Palm Beach

PCL Size: 1,538 acres

Project Size: 438 acres

Project Cost: \$100,000

The Pond Cypress Natural Area (f.k.a. Fox Natural Area), managed by Palm Beach County Environmental Resources Management, is located in central Palm Beach County. The Pond Cypress Natural Area consists of a mosaic of high quality mesic and wet pine flatwoods, wetlands, and other native vegetative communities. This area is the western edge of the historic Loxahatchee Slough drainage basin. There are five rare plants on the site that are listed as state threatened or endangered: wild coco (*Eulophia alta*), Catesby's lily (*Lilium catesbaei*), common wild pine (*Tillandsia fasciculata*), twisted and banded air plant (*Tillandsia flexuosa*), and giant wild pine (*Tillandsia utriculata*).

The project area consisted mostly of pine flatwoods with infestations of melaleuca monocultures in the sloughs, depression marshes and cypress wetlands. The remainder of the site contained medium to light infestations of melaleuca in the wetlands. Exotic plant infestations targeted for treatment included the following:

- a) approximately 233 acres of dense melaleuca infestation (mature, sapling or seedling monocultures and highly infested pine flatwoods/wetlands);
- b) approximately 61 acres of pine flatwoods/wetlands with moderate melaleuca infestation;
- c) approximately 90 acres of pine flatwoods/wetlands with light melaleuca infestation;
- d) approximately 54 acres of cypress wetlands/depression marshes requiring minimal treatment; and,
- e) very light Brazilian pepper, climbing fern, and Australian pine infestations, which were limited to adjacent areas along the perimeter berms and may be present as scattered individuals within the interior.

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
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4+Stalker

Contractors were confronted with a solid wall of melaleuca trees.



Pond Cypress Natural Area Project Boundary





Arsenal is applied to the cut stumps with spray bottles.

A dye is used (below) to ensure every stump is treated.



This pine flatwoods now has a fighting chance.



Juno Dunes Invasive Exotic Plant Control

County: Palm Beach

PCL: Juno Dunes Natural Area

PCL Size: 582 acres

Project Manager: Palm Beach County DERM

Brenda Hovde

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

Phone: 561-233-2400, Fax: 561-233-2414

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

Project ID: SE-029

Project Size: 105 acres

Fiscal Year 01/02

Project Cost: \$250,000

Juno Dunes Natural Area consists of coastal hammock, oak scrub, sand pine scrub, pine flatwoods, and mangrove estuaries. With 300 acres of Atlantic Ridge coastal scrub habitat, this site contains the largest remaining scrub tract in Palm Beach County. There are 20 rare plant species recorded at Juno Dunes Natural Area, including burrowing four o'clock, Curtiss' milkweed and the four-petal paw-paw. One of the rare animal species found here, the red widow spider, is so little understood that its current status is unknown. The site is located in northeastern Palm Beach County and is bordered on the west by the Intracoastal Waterway and continues east to the Atlantic Ocean. This land was purchased in December of 1995 with money from the county's \$100 million bond referendum, with matching funds from the state's CARL acquisition program.

Exotic plant coverage for this site was estimated at 196 acres (34%), but in-house programs reduced this to 105 acres (18%). Most of the exotics infestation (90%) consisted of Brazilian pepper and Australian pine that threaten to overrun some of the disturbed areas. Much of the project area had been mosquito-ditched in the past. The methods of control employed by the county so far have included cut stump treatment using chainsaws and arsenal for melaleuca, cut stump and basal bark treatments of Brazilian pepper using Garlon 4, and the use of a brush mower to remove approximately eight acres of Brazilian pepper from the coastal hammock section. This project was a cost-share with BIPM contributing \$100,000 and the county contributing \$150,000 of the project cost.

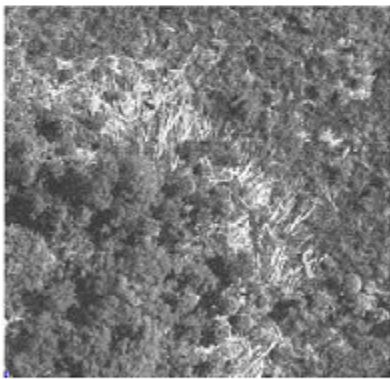
Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal bark	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Cupaniopsis anacardioides</i>	carrotwood	Category I	basal bark	Garlon 4
<i>Scaevola sericea</i>	beach naupaka	Category I	basal bark	Garlon 4
<i>Schefflera actinophylla</i>	schefflera	Category I	basal bark	Garlon 4
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Rodeo
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	RoundUp
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	RoundUp
<i>Tradescantia fluminensis</i>	oyster plant	Category I	hand pull	n/a
<i>Sansevieria hyacinthoides</i>	shoestring hemp	Category II	hand pull	n/a
<i>Wedelia trilobata</i>	wedelia	Category II	foliar	RoundUp
<i>Passiflora foetida</i>	stinking passion-flower	Category II	foliar	RoundUp
<i>Momordica charantia</i>	balsampear	n/a	foliar	RoundUp
<i>Vitis rotundifolia</i>	muscadine grape vine	n/a	foliar	RoundUp
<i>Stentaphrum secundatum</i>	St. Augustine grass	n/a	foliar	RoundUp

Juno Dunes Natural Area DEP Invasive Exotic Grant 01/02 Before and After images

Results from exotic vegetation treatments are evident when comparing the before and after aerial images.

Note the tall Australian pines in Unit 11 and the Brazilian pepper in Unit 10.

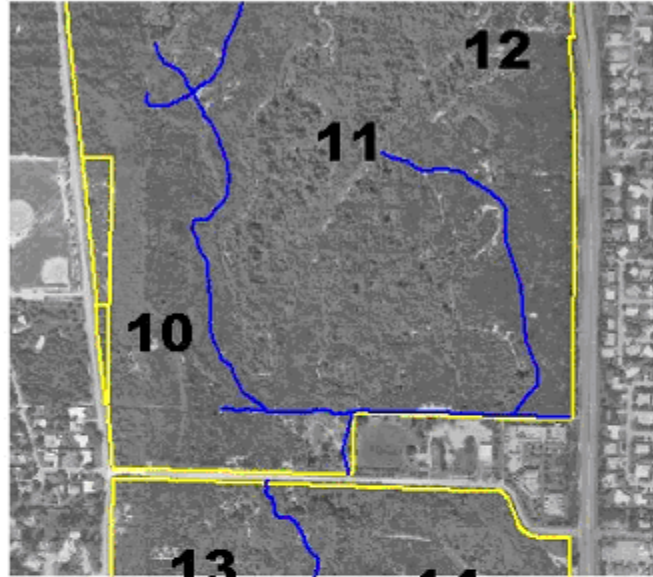
Now note the down and treated vegetation. Higher magnification reveals dead biomass on ground.



500 0 500 1000 Feet

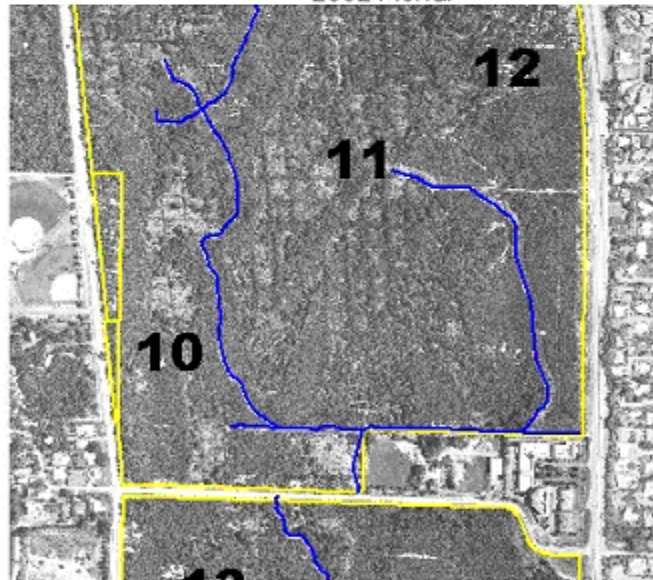


1997 Aerial



500 0 500 1000 1500 2000 Feet

2002 Aerial



 Management roads
 Natural Area boundary



Treated *Melaleuca quinquinervia* in depressional marsh at Juno Dunes.



Dead *Lygodium microphyllum* and *Schinus terebinthifolius* in ecotone between oak scrub and mangrove swamp.

North Jupiter Flatwoods Invasive Exotic Plant Control

County: Palm Beach

PCL: North Jupiter Flatwoods Natural Area

PCL Size: 130.9 acres

Project Manager: Palm Beach County DERM

Kraig Krum, Environmental Analyst

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

Phone: 561-233-2527, Fax: 561-233-2414

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

Project ID: SE-024

Project Size: 118.7 acres

Fiscal Year 01/02

Project Cost: \$250,000

North Jupiter Flatwoods Natural Area is located in northern Palm Beach County, immediately south of the Martin County line about a half mile east of Interstate 95. The North Jupiter Flatwoods is composed predominately of mesic and wet flatwoods. Several small depression marshes are scattered throughout the project site. Five areas of cypress dome swamp are scattered throughout the site.

The concentrations of melaleuca (approximately 30 acres) occurred in areas of wet flatwoods, or on the perimeter of dome swamps. Old World climbing fern was present in wet flatwoods and dome swamps (approximately 60 acres) throughout the site. Downy rose-myrtle was found scattered (approximately 75 acres) at varying densities throughout the mesic pine flatwoods. Brazilian pepper and earleaf acacia were present mainly around the perimeters of the property. While most of the site had been affected by these invasive exotic species to some degree, there is still a significant amount of mature native species to provide for natural revegetation once the exotic species were treated. There are five rare plants on the site that are listed as state threatened or endangered: wild coco (*Eulophia alta*), Catesby's lily (*Lilium catesbaei*), common wild pine (*Tillandsia fasciculata*), twisted and banded air plant (*Tillandsia flexuosa*), and giant wild pine (*Tillandsia utriculata*).

This project was a cost-share with BIPM contributing \$100,000 and the county contributing \$150,000 of the project cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Rodeo/Roundup
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
			hand pull	n/a
			mechanical	n/a
<i>Psidium cattleianum</i>	strawberry guava	Category I	basal/cut stump	Garlon 4/Stalker
<i>Rhodomyrtus tomentosa</i>	downy rose-myrtle	Category I	basal/cut stump	Garlon 4/Stalker
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4/Stalker
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	Roundup
<i>Acacia auriculiformis</i>	earleaf acacia	Category I	basal/cut stump	Garlon 4/Stalker
<i>Panicum repens</i>	torpedo grass	Category I	foliar	Roundup
<i>Ruellia brittoniana</i>	Mexican ruellia	Category I	foliar	Roundup
<i>Syzygium cumini</i>	java plum	Category I	basal/cut stump	Garlon 4/Stalker
<i>Passiflora foetida</i>	stinking passion vine	Category I	foliar	Garlon 4
<i>Wedelia trilobata</i>	wedelia	Category I	foliar	Garlon 4
<i>Panicum maximum</i>	guinea grass	N/A	foliar	Roundup
<i>Momordica charantia</i>	balsam pear	N/A	foliar	Roundup



Downy rose myrtle infestation prior to treatment.



Mechanical removal of selected monocultures of melaleuca allowed grounds crews better access to the center of the site.



Aerial photograph showing melaleuca treatments by ground crews.

Southwest Regional Working Group

Florida Panther Invasive Exotic Plant Control

PCL: Florida Panther National Wildlife Refuge
 Project Manager: U.S. Fish and Wildlife Service
 Jim Krakowski, Refuge Manager
 3860 Tollgate Blvd., Suite 300, Naples, Florida 34114
 Phone: 941-353-8442, Ext 27, Fax: 941-353-8640
 E-mail: jim_krakowski@fws.gov

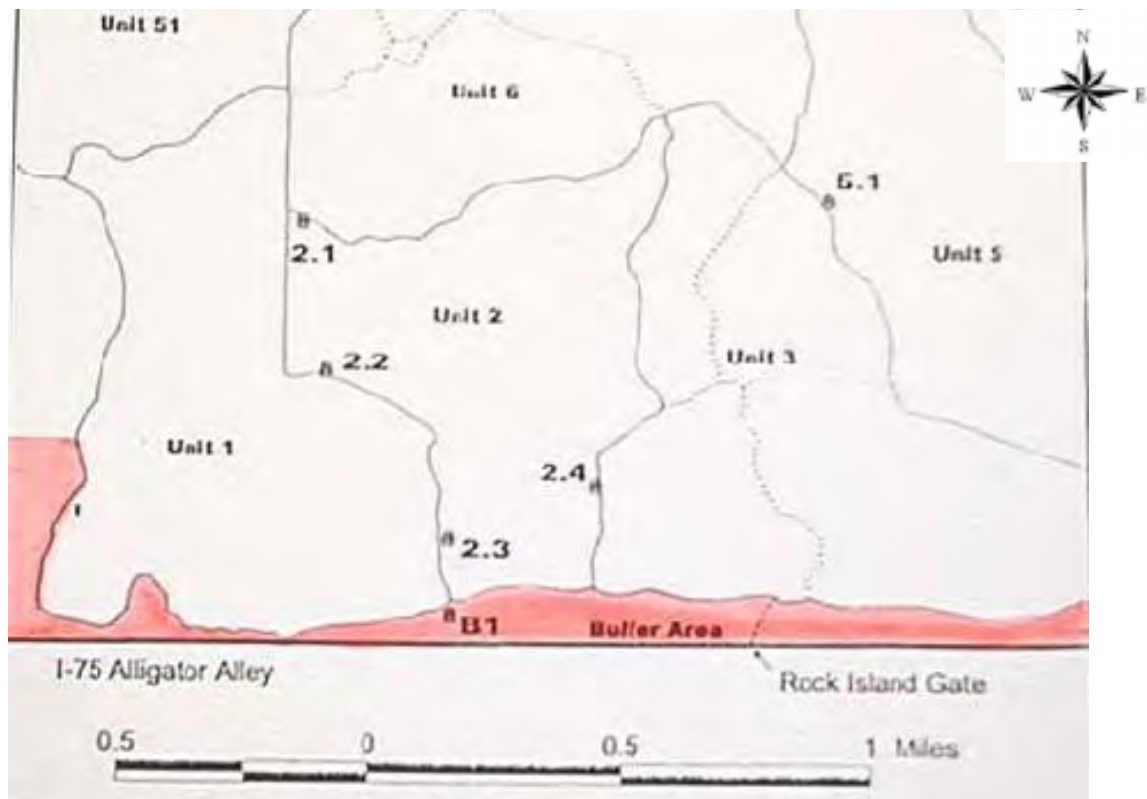
County: Collier
 PCL Size: 26,529 acres

Project ID: SW-017, SW-026
 Fiscal Year 01/02

Project Size: 1,000 acres
 Project Cost: \$53,332.46

Florida Panther National Wildlife Refuge is located 20 miles east of Naples on the north side of Interstate 75. The southeast corner of the refuge is the intersection of SR 29 and I-75. Two projects were conducted on the Refuge. The first site ran parallel to the north side of I-75 with the treatment area starting on the north side of the interstate canal and extending approximately 300 yards. The Florida Department of Transportation owns a small portion of the treatment area. The project site contains mixed habitat types including pine flatwoods, hardwood hammock, cypress swamp, and wet sawgrass prairie. This project controlled Brazilian pepper that had encroached into the area, with the greatest infestations closer to the interstate canal. The second site was in the northwest corner of the Refuge, in an area known as Spoonbill Corner. This project was for removal of a 100-acre monoculture of Brazilian pepper using a Gyro-Trac brushcutter tractor.

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



Buffer area (in red) between the Refuge and I-75.



The Brazilian pepper in the Buffer Area was treated with a basal bark application of Garlon 4.

In dense growth of Brazilian pepper (below left), mechanical removal by brushcutter (right) or other heavy equipment may be a cost-effective method of control. Once freed from the onslaught of non-native invaders (below right), natural restoration can proceed.



Rookery Bay Invasive Exotic Plant Control

County: Collier

PCL: Rookery Bay National Estuarine Research Reserve

PCL Size: 110,000 acres

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

Judy Haner, Resource Management Coordinator

300 Tower Road, Naples, Florida 34113

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

Email: judy.haner@dep.state.fl.us

Project ID: SW-022

Project Size: 1,479.5 acres

Fiscal Year 01/02

Project Cost: \$50,300.00

Rookery Bay NERR is located in Collier County ten miles southeast of Naples, with a northern boundary at Gordon Pass and a southern boundary at Camp LuLu Key in the Ten Thousand Islands. The 35,000-acre Ten Thousand Islands National Wildlife Refuge is located approximately twenty miles southeast of Naples and overlays a significant portion of the Cape Romano-Ten Thousand Islands State Aquatic Preserve. The project site comprised six islands in the Ten Thousand Island section of the NERR. The islands consist of beach, dune, mangrove forests, and coastal strand communities. A number of endangered plants occur on the Ten Thousand Islands, including golden leather fern (*Acrostichum aureum*), hand fern (*Ophioglossum palmatum*), Curtiss' milkweed (*Asclepias curtissii*), pinweed (*Lechea cernua*), nodding pinweed (*Lechea cernua*), satinleaf (*Chrysophyllum olivaeforme*), several endangered "air plants" or wild pines (*Tillandsia fasciculata*), (*T. flexuosa*), (*T. utriculata*), (*T. pruinosa*), and the thatch palm (*Thrinax morrisii*), once believed extinct but found on Key Island in January of 1998.

The Ten Thousand Islands area is co-managed by the NERR and the US Fish and Wildlife Service. Much of the land is state owned, but FWS has ownership of several islands, including Tripod Key, Shell Key, Dismal Key, and Panther Key. Panther Key is 208 acres and the southern portions were 6% infested with Australian pines, Brazilian pepper, sea side mahoe, and lather leaf. Camp Lulu is 25 acres with 24% infestation. Its southeast coastline was lined with long, dense assemblages of lather leaf and a small stand of Australian pine was located on the southern tip of the island. The inner man-made trails on Camp Lulu contained small to medium sized Brazilian pepper and seaside mahoe. Shell Key is approximately 677 acres with 7% infestation. Dismal Key is 472 acres with 14% infestation. Four Brothers Key is 95 acres with 1% infestation of Brazilian pepper and lather leaf. Round Key is 2.5 acres with 80% infestation of Brazilian pepper, Australian pine, and lather leaf.

BIPM funds were used to complete the initial control of Brush Key, Shell Key, Panther Key, Four Brother's Key, Round Key, Dismal Key, Camp Lulu, and the Faka Union Canal. Funds from the NERR's Ten Thousand Island Grant were used for the initial control and maintenance of Coon Key, Tripod Key, Cape Romano, Hog Key, Turtle Key, Gullivan Key, and Whitehorse Key. The total of federal grant funds spent was \$74,000 for initial treatments and \$11,700 for maintenance. Presently, the initial treatment and maintenance has been completed for the Ten Thousand Islands.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4
<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>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4
<i>Kalanchoe daigremontiana</i>	life plant	n/a	foliar	Rodeo/Roundup

Faka Union Canal Invasive Exotic Plant Control

PCL: Rookery Bay National Estuarine Research Reserve

Project ID: SW-020

Fiscal Year 01/02

County: Collier

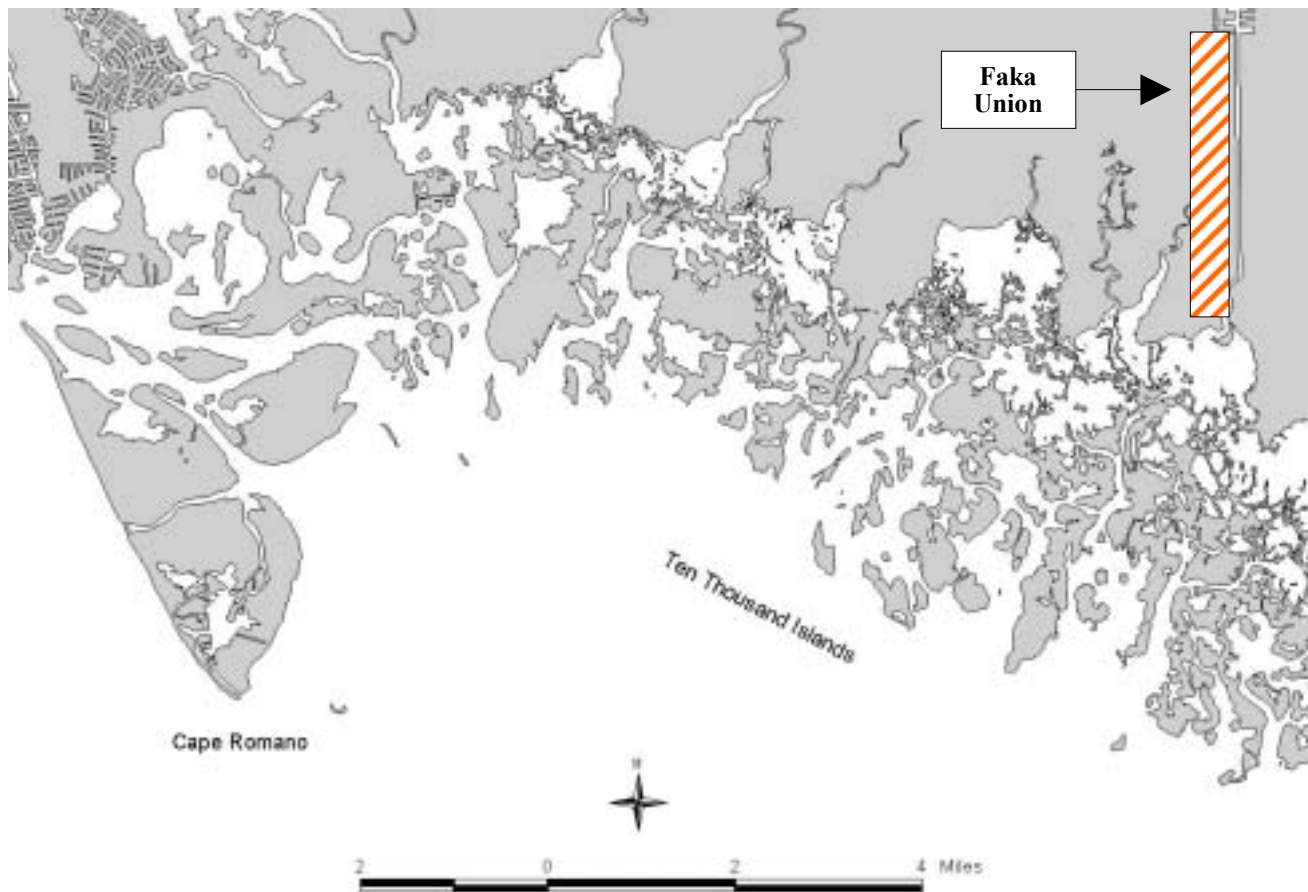
PCL Size: 110,000 acres

Project Size: 90 acres

Project Cost: \$66,200.90

Fakahatchee Strand Preserve State Park extends east and north of the Ten Thousand Islands NWR and also overlays a portion of the Aquatic Preserve along and east of the Faka Union Canal. The project site was located along the Faka Union Canal north of the Ten Thousand Island section of the Reserve on lands managed by Rookery Bay NERR, Fakahatchee Strand Preserve SP, and Ten Thousand Island NWR. The Faka Union Canal will be completed in early FY03.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/girdle/cut stump	Garlon 4
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal/girdle	Garlon 4
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Rodeo+Escort
<i>Leucaena leucocephala</i>	lead tree	Category II	basal	Garlon 4
<i>Sansevieria trifasciata</i>	mother-in-law's tongue	n/a	cut stump	Garlon 4



The Ten Thousand Islands area of Rookery Bay National Estuarine Research Reserve. The Faka Union Canal project area is highlighted in red.



Australian pines on Brush Key (top).
No Australian pines on Brush Key
(bottom) after control operations.

While some people complain of the loss of shade on a beach from removing this invasive exotic tree, the benefits to natural coastal ecosystems far outweigh any personal inconvenience.



Picayune Strand Invasive Exotic Plant Control

PCL: Picayune Strand State Forest
 Project Manager: Division of Forestry (FDACS)
 Sonja Durrwachter
 710 Randall Boulevard, Naples, Florida 34120
 Phone: 941-348-7557, Fax: 941-352-4212
 Email: Durrwas@doacs.state.fl.us

County: Collier
 PCL Size: 65,436 acres

Project ID: SW-019
 Fiscal Year 01/02

Project Size: 669 acres
 Project Cost: \$40,000

The project area is within the Belle Meade Tract, which is a part of the Picayune Strand State Forest. The area has known populations of Florida panther, Florida black bear, and Big Cypress fox squirrel. The area to be treated consists of abandoned farm fields that have been inactive for at least fifteen years. At the time they were abandoned, the cross-ditches used for irrigation of row crops were left in place and have become infested with Brazilian pepper. There are also perimeter ditches and berms around the boundaries of each field. A low volume foliar application, or “lacing,” of Arsenal with methylated seed oil as a surfactant was used to treat the Brazilian pepper. A technical representative from BASF Corporation assisted in calibration and training for the lacing method.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	lacing	Arsenal/Plateau





Brazilian pepper before (above) and after (below) lacing with Arsenal.



Charlotte Harbor Flatwoods Invasive Exotic Plant Control

County: Lee

PCL: Conservation 2020 Preserve, Site #107

PCL Size: 66 acres

Project Manager: Lee County Parks and Recreation

Anik L. Smith, Biologist

3410 Palm Beach Boulevard, Fort Myers, Florida 33916

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

E-mail: smitha@leegov.com

Project ID: SW-025

Project Size: 66 acres

Fiscal Year 01/02

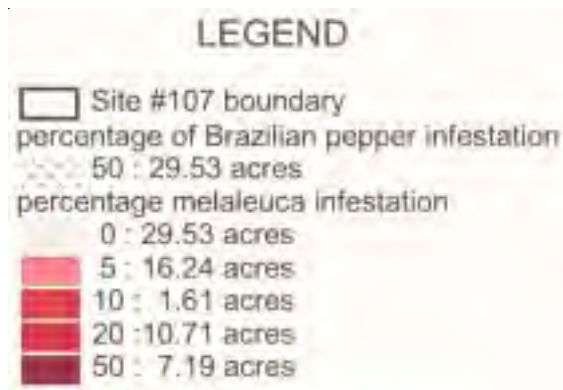
Project Cost: \$107,000

This project controlled melaleuca and Brazilian pepper on a Conservation 2020 preserve located east of Burnt Store Road in northwestern Lee County. The preserve is known as site #107, located in Section 5 Township 43 South and Range 23 East. The entire 66-acre site is within the 18,708-acre CARL project boundary for the Charlotte Harbor Flatwoods Preserve. This site is part of the largest remaining tract of intact pine flatwoods in southwest Florida. These flatwoods are used by red-cockaded woodpeckers, bald eagles, and Florida panthers.

The project was subdivided into seven areas. The 10-acre area 1 is a pine flatwoods succeeding into a hardwood community, with a melaleuca infestation between 25-50%. The 2.2-acre area 2 is an oak hammock with melaleuca infestation at 10%. The 22-acre area 3 is a pine/oak hammock with a heavy understory of Brazilian pepper. The 3.2-acre area 4 is fairly open prairie with melaleuca coverage between 25-50%. The 7.5 and 8.2-acre areas 5 and 6, respectively, are hydric pine flatwoods with melaleuca coverage less than 10%. The 12.9-acre area 7 is mesic pine flatwoods with melaleuca coverage between 20-40%.

This was a cost-share project with Lee County Parks and Recreation contributing \$27,000 toward the project cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
			foliar	Arsenal+Rodeo
			mechanical ¹	n/a
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
			mechanical ¹	n/a
			foliar (regrowth)	Plateau
<i>Rhodomyrtus tomentosa</i>	downy rose-myrtle	Category I	basal bark	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	basal bark	Garlon 4



¹ trees were mowed with a Brontosaurus (see photo)



The powerful cutting head of the Brontosaurus reduces entire trees to mulch.



When seen from the air, the completed project starkly contrasts with adjacent untreated properties.



Dense thickets of Brazilian pepper crowd out the native understory, reducing habitat for wildlife and limiting access for recreation.

All that's left of the pepper is a carpet of mulch, which doesn't look all that 'natural' ...



but six months later, native groundcover is returning with a vengeance.



Inner Key Invasive Exotic Plant Control

County: Lee

PCL: Lovers Key State Park

PCL Size: 1,616 acres

Project Manager: Florida Park Service (DEP)

Paul Rice, Park Manager

8700 Estero Boulevard, Fort Myers Beach, Florida 33931

Phone: 941-463-4588, Fax: 941-463-8851

E-mail: paul.rice@dep.state.fl.us

Project ID: SW-015

Project Size: 20 acres

Fiscal Year 01/02

Project Cost: \$44,352.92

Lovers Key State Park is located between Bonita Beach and Ft. Myers Beach. The park consists primarily of four islands contained between New Pass to the south and Big Carlos Pass to the North. The park entrance and most of the facilities are located on Black Island. The project site is on Inner Key, which is west of Black Island and connected by a 75-foot concrete bridge. The project goal was to finish the removal of Australian pine and Brazilian pepper on Inner Key in an effort to complete the restoration of this barrier island, and eliminate the possible exotic seed source that continues to infest Lovers Key Island, one of the parks primary resources.

Inner Key is a 52-acre barrier island consisting of disturbed coastal strand community fringed by a marine tidal swamp. The tidal waters surrounding the island have been designated as Outstanding Florida Waters and are also designated as an aquatic preserve. These waters are under the jurisdiction and management of the Estero Bay Aquatic Preserve. The southern 14 acres of Inner Key have been cleared of invasive exotics and this is the second year of retreatment and restoration. The project area is within the 38-acre northern portion of Inner Key. The endangered bay cedar (*Suriana maritima*) and the threatened species beach creeper (*Ernodea littoralis*), inkberry (*Scaveola plumieri*), Atlantic loggerhead (*Caretta caretta*), and least tern (*Sterna antillarum*) may be found within or near the project area. Mangrove swamp and other native vegetation make up 18 acres of this area.

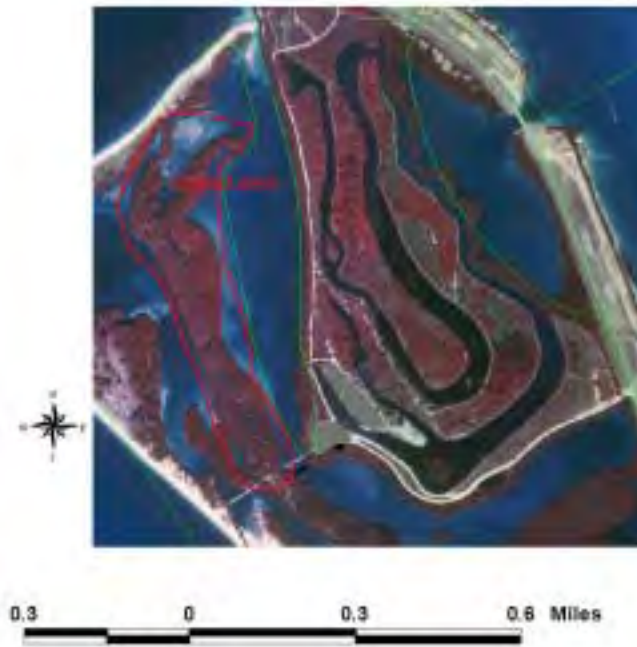
Exotic infestation was concentrated along the center portion of the island. The predominate trees (85%) were Australian pine, which varied in size from 12-16” diameter on the southern end of the project area to 24-28” diameter in the center and northern portions of the area. The remaining 15% of exotic infestation was mature Brazilian pepper. Initial treatment was performed in November 2001 with a follow up in March of 2002. One of the five piles of debris had been burned as of April 2002. Lack of funding and drought conditions stopped the project as of May 2002. Funds were provided in FY 02/03 to complete the remaining burning.

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



A line of dead pine—treated Australian pine on Lover’s Key.

Lovers Key Inner Key Exotic Removal Project



Entrance to Inner Key project area (May 02)



Looking north from the tram road at southern end of the project, with debris pile (May 02)

Four Mile Cove Invasive Exotic Plant Control

PCL: Four Mile Cove Ecological Preserve

Project Manager: Cape Coral Parks & Recreation Department

Rick Schill, Forestry Supervisor

P.O. Box 150027, Cape Coral, Florida 33915-0027

Phone: 941-574-0427, Fax: 941-574-0822

E-mail: rschill@capecoral.net

Project ID: SW-018

Fiscal Year 01/02

County: Lee

PCL Size: 365 acres

Project Size: 20 acres

Project Cost: \$17,759.37

Four Mile Cove Ecological Preserve is located in Cape Coral, on the Caloosahatchee River. The Preserve consists of approximately 340 acres of wetlands and 25 acres of uplands. In the 1960s, the land was a spoil site used for the development of the city. Various native and exotic plants have colonized the site since that time and it has evolved into a fledgling upland plant community that is now the home of a gopher tortoise colony with associated diamondback rattlesnakes and indigo snakes. Since 1996, approximately 100 acres of exotic removal has occurred and continues to occur in the adjacent wetland area within the preserve. Exotics occurred throughout 20 acres of the uplands with approximately 50 plants per acre. The dominant exotics were Napier grass and Brazilian pepper. The City contributed an additional \$5,170 in equipment and herbicide for this project.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Pennisetum purpureum</i>	Napier grass	Category I	foliar	Roundup
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal	Garlon 4
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal	Garlon 4
<i>Cupaniopsis anacardioides</i>	carrotwood	Category I	basal	Garlon 4



Six Mile Cypress Invasive Exotic Plant Control

County: Lee

PCL: Six Mile Cypress Slough Preserve

PCL Size: 2,089.51 acres

Project Manager: Lee County Parks and Recreation
 Sarah B. Jamieson, Land Stewardship Coordinator
 3410 Palm Beach Boulevard, Fort Myers, Florida 33916
 Phone: 239-461-7454, Fax: 239-461-7460
 E-mail: sjamieson@leegov.com

Project ID: SW-024

Project Size: 500 acres

Fiscal Year 01/02

Project Cost: \$101,243.43

Six Mile Cypress Slough averages 1,500 feet wide and consists of cypress swamp interspersed with numerous open ponds. Pine flatwoods, wet prairies, and hardwood stands fringe the slough. This project focused on a portion of the Six Mile Cypress Slough Preserve located between S.R. 82 and Daniel's Parkway. The target species were primarily located along edges of plant communities and within transitional areas, in scattered clumps or as individual plants. An estimated 221 acres of the project area was treated.

Lee County Parks and Recreation provided \$36,243.40 of the total project cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
			cut stump	Arsenal
<i>Syzygium cumini</i>	Java plum	Category I	cut stump	Arsenal
<i>Senna pendula</i>	climbing cassia	Category I	basal bark	Garlon 4
<i>Ficus microcarpa</i>	laurel fig	Category I	basal bark	Garlon 4
<i>Urochloa mutica</i>	Pará grass	Category I	foliar	Roundup
<i>Eichhornia crassipes</i>	water hyacinth	Category I	foliar	Weedar 64
<i>Solanum tampicense</i>	wetland nightshade	Category I	foliar	Garlon 4
<i>Sesbania punicea</i>	rattlebox	Category II	foliar	Garlon 4



Suncoast Regional Working Group

Hillsborough River Invasive Exotic Plant Control

PCL: Hillsborough River State Park

Project Manager: Florida Park Service (DEP)

Robert Wilhelm, Park Manager

15402 US 301 North, Thonotosassa, Florida 33592

Phone: 813-987-6870, Fax: 813-987-6773

E-mail: HRGP1@juno.com

Project ID: SC-016, SC-025

Fiscal Year 01/02

County: Hillsborough

PCL Size: 3,383 acres

Project Size: 186 acres

Project Cost: \$41,400

Hillsborough River State Park is a part of the Heritage Rivers GEOpark complex and is located in northern Hillsborough County about seven miles south of the town of Zephyrhills. The Park is one of Florida's earliest parks, created in the original Civil Conservation Corps (CCC) era, 1934. The park features both natural and cultural or historic resources. The Hillsborough River flows over a limestone outcrop to create rapids; a hammock of live oak, sabal palm, magnolia and hickory trees border the river. Cypress swamps, pine flatwoods, and marshes make up the most of the remaining acreage. As for historical resources, Fort Foster (now reconstructed on its original site) guarded a bridge crossing the Hillsborough River, which was part of the Fort King Military Road in 1836 during the Second Seminole Indian War. The Fort was a crucial supply depot. The park contains the area in which Major Francis Dade crossed the Hillsborough River en route to a defeat by the Seminoles.

This project involved treatment of 110 acres, followed by a treatment of 111 acres, of which 36 acres overlapped with the first area (i.e., a re-treatment).

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Roundup
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Roundup



Skunk vine carpets the ground and forms a dense tangle among trees (left).



Once the skunk vine is removed (right), and maintenance control established, the native groundcover can recover, often quite quickly.

Alafia River Invasive Exotic Plant Control

PCL: Alafia River State Park

Project Manager: Florida Park Service (DEP)
Robert Wilhelm, Park Manager
15402 US 301 North, Thonotosassa, Florida 33592
Phone: 813-987-6870, Fax: 813-987-6773
E-mail: HRGP1@juno.com

Project ID: SC-017, SC-026

Fiscal Year 01/02

County: Hillsborough

PCL Size: 6,345 acres

Project Size: 260 acres

Project Cost: \$49,500

Alafia River State Park is part of the Heritage Rivers GEOPark complex and is located in southeastern Hillsborough County about thirty miles southeast of the town of Tampa. Prior to its donation to the state, the property was a phosphate mine called Lonesome Mine, named after the nearby community of Fort Lonesome, which was itself named after a frontier outpost of the US Army that occupied the site during the Third Seminole War. The land includes part of the Alafia River Corridor Save Our Rivers Project designed to protect the 100-year floodplain of the river.

Cogon grass arrived in the early to mid-1970s during mining then later restoration efforts and has rapidly spread in several areas of the park. Cogon grass must be eliminated in order to revegetate reclaimed uplands with local native plants. If left unchecked, this exotic perennial weed threatens not only park habitat but adjacent public and private lands as well. This project involved a treatment on a 110-acre area and a 150-acre area.

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



A thick patch of cogon grass that has gone to seed (left).



The weeds looks dead (right), but a second treatment will be needed to control the profuse regrowth that will sprout within a few months.

Frog Creek Invasive Exotic Plant Control

County: Manatee

PCL: Terra Ceia State Buffer Preserve

PCL Size: 1424.08 acres

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

Lee Hughes, Park Service Specialist

3804 Coconut Palm Avenue, Tampa, Florida 33619

Phone: (813) 744-6100 x429, SC 512-1042, Fax: (813) 744-6090

E-mail: lee.hughes@dep.state.fl.us

Project ID: SC-013

Project Size: 17 acres

Fiscal Year 01/02

Project Cost: \$21,873.05

Frog Creek is a blackwater stream that runs through the Terra Ceia State Buffer Preserve (TCBP) and empties into Terra Ceia Bay. The project area is an approximately 1-mile stretch of the creek. The area to be treated was approximately 17 acres in size and consisted of a mix of native vegetation and Brazilian pepper. A fairly abrupt vegetative change occurs on the creek, which shifts from upland hammock to mangroves. The upland hammock consists primarily of live oak and cabbage palm, but also includes southern red cedar. The hammock area had a considerable amount of Brazilian pepper. The density of infestation on the south side of the creek was approximately 50%; the north side was 90%. The average diameter of pepper trees was estimated at 6", with the largest being 10".

In addition to clearing the littoral zone to allow growth of native species, eradicating the pepper also alleviated navigational and flushing problems experienced on the creek. In some areas, the pepper took up one-half of the width of the creek. Water hyacinths that were treated further upstream were breaking up and getting caught in the pepper, making parts of the creek impassable. The SWFWMD has begun a large-scale restoration project within the TCBP, which will continue for approximately five years. The restoration project will not directly affect the creek project area, but it will eventually help to increase the number of visitors the TCBP receives.

This project also encompassed a portion of a hiking trail project that will provide better public access to Frog Creek, and create more areas for bank fishing. The trail is located on the south side of the creek and will extend along the creek for approximately one mile. TCBP staff cleared "windows" within the treated area to provide access to the creek bank, which was restricted in some areas by the Brazilian pepper. Staff has been successful in eradicating large areas of exotic vegetation using Americorps and organized volunteer groups. SWFWMD will clear Australian pines from other portions of the hiking trail and the trail parking area. USFWS staff and Americorps have to date put in over 200 hours on clearing the hiking trail of exotics. The combined land management budget for FY 00-01, including salaries and equipment, was over \$100,000.

The state endangered prickly apple (*Cereus gracilis*), Tampa vervain (*Glandularia tampensis*), wild cotton (*Gossypium hirsutum*), and hand fern (*Ophioglossum palmatum*), and the federally endangered Florida golden aster (*Chrysopsis floridana*) are found on TCPB. The federally listed peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), wood stork (*Mycteria americana*) and Eastern indigo snake (*Drymarchon corais couperi*) have also been observed at the preserve.

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



The scenic beauty of Frog Creek was marred by intruding Brazilian pepper trees.



Brazilian pepper lined both shores of the creek, capturing floating islands of water-hyacinth that blocked navigational access (above). In some areas, Brazilian pepper had become the dominant vegetation (right).



Duette Park Invasive Exotic Plant Control

County: Manatee

PCL: Duette Regional Park

PCL Size: 24,000 acres

Project Manager: Manatee County

Danny Smith, Conservation Lands Division Manager
 2649 Rawls Road, Duette, Florida 33834
 Phone: 941-776-2295, Fax: 941-721-6898
 E-mail: danny.smith@co.manatee.fl.us

Project ID: SC-024

Project Size: 70 acres

Fiscal Year 01/02

Project Cost: \$15,750

Duette Park is located in northeastern Manatee County in the eastern portion of the Lake Manatee watershed. The property is managed by the Conservation Lands Management Division of Manatee County. Land uses such as citrus production and vegetable farming were abandoned upon purchase of the property. Current land uses include silviculture, passive recreation, wildlife and ecosystem management, and well field operations. Cogon grass primarily occurred in the areas previously utilized for vegetable production. The importance of this park is its many undisturbed prairies, scrub, and flatwoods. This project not only protected these natural communities from invasion, but will lead to the restoration of the invaded areas. There are fourteen natural communities found in the Park, including Dry Prairie, Pine Flatwoods, Xeric Oak Scrub, Sand Pine Scrub, Sandhill, Hardwood Swamp, Hardwood Hammock, and Cypress Swamp.

Manatee County had \$100,000 dedicated for the current and prior fiscal year to exotics removal on this park.

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

A. L. Anderson Park Invasive Exotic Plant Control

County: Pinellas

PCL: A. L. Anderson Park

PCL Size: 128 acres

Project Manager: Pinellas County Park Department

Mike Zubler, Park Supervisor
 1095 Tookes Road, Tarpon Springs, Florida 34689
 Phone: 727-943-4085, Fax: 727-943-4087
 E-mail: mzubler@co.pinellas.fl.us

Project ID: SC-021

Project Size: 33.5 acres

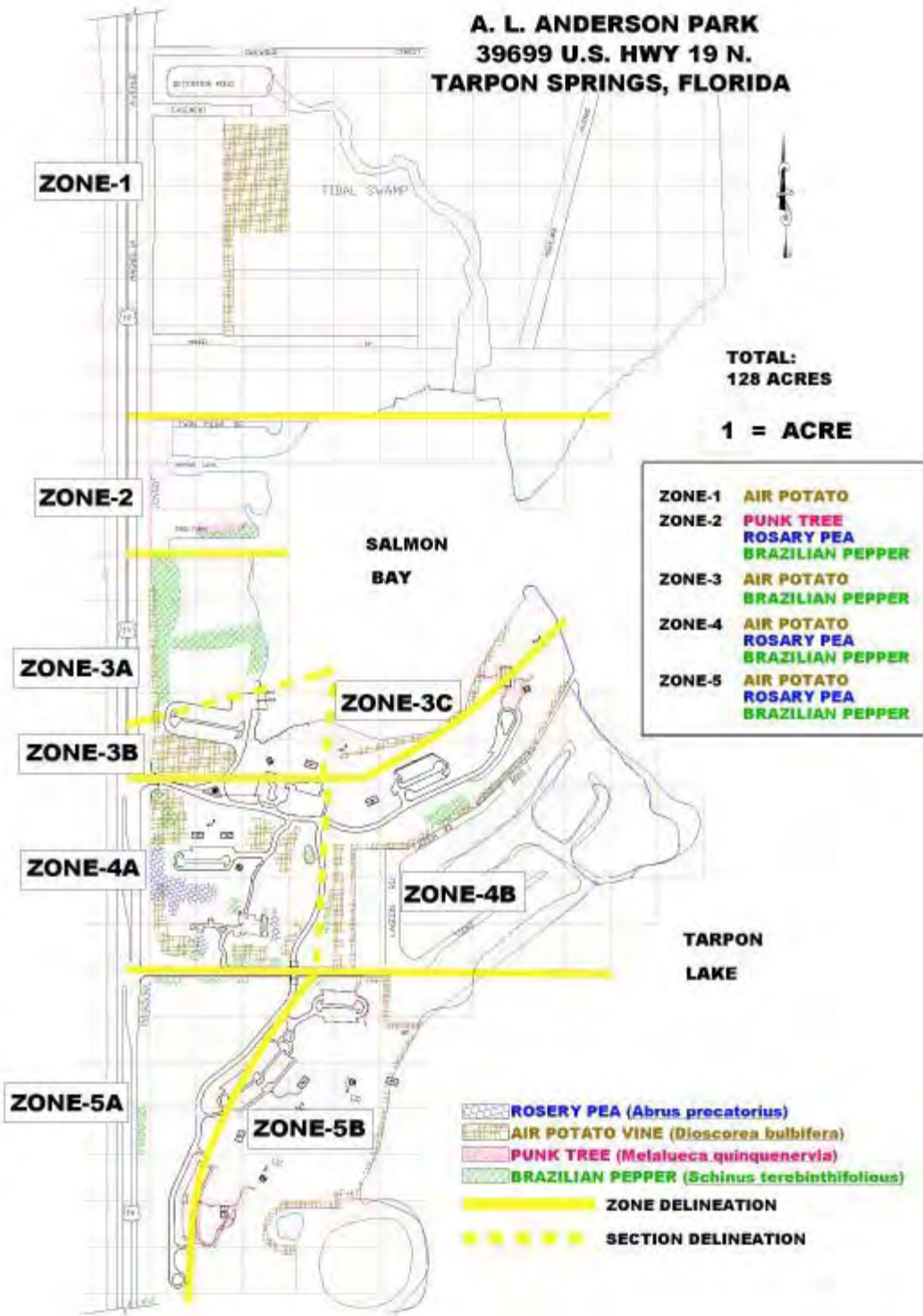
Fiscal Year 01/02

Project Cost: \$32,674.13

A. L. Anderson Park is a 128-acre tract of parkland used for passive recreation. Of the total acreage, approximately 33½ acres of upland and wetland transition areas are infested with air-potato, Brazilian pepper, punk tree, and rosary pea of varying densities ranging from moderate to severe infestation. Additionally, small pockets of natural vegetation throughout the more heavily used area of the park are succumbing to air-potato infestation.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal bark	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal bark	Garlon 4
<i>Schefflera actinophylla</i>	schefflera	Category I	basal bark	Garlon 4
<i>Psidium cattleianum</i>	strawberry guava	Category I	basal bark	Garlon 4
<i>Nandina domestica</i>	heavenly bamboo	Category I	cut stump	Garlon 4
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	cut stump	Arsenal/Garlon 4
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Rodeo
<i>Abrus precatorius</i>	rosary pea	Category I	hack-and-squirt	Rodeo
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	hack-and-squirt	Rodeo
<i>Dioscorea bulbifera</i>	air-potato	Category I	basal/cut stump	Rodeo
			foliar	Rodeo/Garlon 4

**A. L. ANDERSON PARK
39699 U.S. HWY 19 N.
TARPON SPRINGS, FLORIDA**



Lemon Bay Park Invasive Exotic Plant Control

PCL: Lemon Bay Park

Project Manager: Sarasota County Parks and Recreation
Kathi Rader-Gibson, Park Naturalist
3900 Shamrock Drive, Venice, Florida 34293
Phone: 941-474-3065, Fax: 941-474-2741
E-mail: krgibson@co.sarasota.fl.us

Project ID: SC-023

Fiscal Year 01/02

County: Sarasota

PCL Size: 205 acres

Project Size: 205 acres

Project Cost: \$12,052.67

Lemon Bay Park and Environmental Center encompasses pine flatwoods, mangrove estuary, and freshwater swamp. The park is contiguous with the Lemon Bay State Aquatic Preserve and shares approximately one mile of shoreline.

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



Treasure Coast Regional Working Group

Hobe Sound Invasive Exotic Plant Control

PCL: Hobe Sound National Wildlife Refuge

Project Manager: U.S. Fish and Wildlife Service

Margo Stahl, Refuge Manager

13640 SE Federal Highway, Hobe Sound, Florida 33455

Phone: 561-546-6141, Fax: 561-545-7572

E-mail: Margo_Stahl@fws.gov

Project ID: TC-025

Fiscal Year 01/02

County: Martin

PCL Size: 980 acres

Project Size: 120 acres

Project Cost: \$79,867.96

Hobe Sound National Wildlife Refuge is comprised of two separate and distinct tracts of land: the 232-acre mainland tract located between US Highway 1 and the Indian River Lagoon, and the 735-acre island tract located at the north end of North Beach Access Road on Jupiter Island. Within the past two years, large scale exotic treatment has begun to occur on the north end of Jupiter Island. With joint funding from the USFWS and Florida Park Service, Australian pines along the St. Lucie Inlet State Preserve dunes were treated. With funding through the Treasure Coast Upland Invasive Plant Working Group, many exotics along the fore- and mid-dune of the refuge have been treated and/or removed. Although much work has been done, there are still large areas of the island infested or that have become re-infested with invasive exotics. Along the Indian River Lagoon there are still large monotypic stands of Australian pines, some reaching heights of over 30 meters, which are found on the spoil islands created many years ago.

This project addressed invasive exotics only on the Jupiter Island tract north of the beach parking lot of the refuge. The project area ran from the northern boundary of the refuge and St. Lucie Inlet State Preserve south to the beach parking lot of the refuge, approximately 3.3 miles. The project area covered approximately 120 acres of low to moderate infestation of mainly Australian pine and Brazilian pepper with scattered lather leaf, mahoe, beach naupaka, climbing cassia, and others. The primary target, Australian pine, was scattered in small clumps and as individual trees from the top of the beach dune toward the ICW approximately 350 feet and covered approximately 10% of this refuge beach.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/girdle/cut stump	Garlon 4
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal/cut stump/hand pull	Garlon 4
<i>Senna pendula</i>	climbing cassia	Category I	cut stump/hand pull	Garlon 4
<i>Scaevola sericea</i>	beach naupaka	Category I	cut stump	Garlon 4
<i>Urochloa mutica</i>	Pará grass	Category I	foliar	Rodeo
<i>Sansevieria hyacinthoides</i>	bowstring hemp	Category II	cut stump	Garlon 4



Dense mats of scaevola were a problem, in addition to Brazilian pepper and Australian pine (in background).



Some projects are better described in miles than acres.



A Gyro-Trac brush cutter (center) wreaks havoc on the woody wall of invasive plants.

Savannas Invasive Exotic Plant Control

PCL: Savannas Preserve State Park

Project Manager: Florida Park Service (DEP)

Dan Griffen, Park Manager

13798 SE Federal Highway, Hobe Sound, Florida 33455

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

E-mail: dan.griffen@dep.state.fl.us

Project ID: TC-024

Fiscal Year 01/02

County: Martin, St. Lucie

PCL Size: 5,116 acres

Project Size: 3,000 acres

Project Cost: \$49,984.62

Savannas Preserve State Park contains extensive areas of a pristine marsh system that includes several different natural community types: basin marsh, sawgrass dominant basin marsh, depression marsh, wet prairie, and marsh lake. The marsh system runs north to south through the length of the park, between scrub on the east and mesic flatwoods on the west. This extensive marsh system is an important natural area because it encompasses the largest and ecologically most intact stretch of Florida's east coast savannas.

Prior control work had been conducted on the park, but follow-up work was needed to remove the remaining melaleuca, Brazilian pepper, Australian pine, and other invasive plants. Melaleuca was by far the largest problem and occurred as numerous small trees scattered throughout the marsh or in small clumps no bigger than a tenth of an acre. Brazilian pepper was small in number. A small stand of Australian pine occurred on a small spit of land extending into the southern end of the marsh. The South Florida Water Management District administered this project under an existing agreement with DEP.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	girdle, cut stump hand pull	Arsenal/+Rodeo n/a
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	girdle	Garlon 4+Stalker
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Rodeo





Melaleuca was controlled at various sites on the park.



Kissimmee Prairie Invasive Exotic Plant Control

County: Okeechobee

PCL: Kissimmee Prairie Preserve State Park

PCL Size: 46,452 acres

Project Manager: Florida Park Service (DEP)

Parks Small, Park Manager

33104 NW 192nd Avenue, Okeechobee, Florida 34972

Phone: 941-462-5360, Fax: 941-467-6962

E-mail: kisspres@okeechobee.com

Project ID: TC-021

Project Size: 200 acres

Fiscal Year 01/02

Project Cost: \$22,588.75

Kissimmee Prairie Preserve State Park is located in the northwest corner of Okeechobee County. The property borders on 9 miles of the Kissimmee River. Kissimmee Prairie consists of 46,000 acres of high quality natural areas managed to protect the largest remaining tract of dry prairie habitat east of the Kissimmee River. Dry prairie is endemic to Florida and is listed as a globally and state imperiled natural community by the Florida Natural Areas Inventory. Dry prairie covers approximately 19,000 acres of the property. There are many endemic, listed species that depend on the dry prairie community. These species include the federally endangered Florida grasshopper sparrow, the federally threatened crested caracara and Florida scrub-jay, and the state threatened hooded pitcher plant.

Cogon grass was scattered throughout the dry prairie/wet prairie matrix. The patches varied in size, with the largest patches occurring near the river. Due to the size and inaccessibility of much of the property, a systematic ground search would have been very difficult; therefore, the most effective way to locate and treat cogon grass was by using a helicopter. The South Florida Water Management District administered this project under an existing agreement with DEP.

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

Queens Island Invasive Exotic Plant Control

County: St. Lucie

PCL: Queens Island Park

PCL Size: 288 acres

Project Manager: St. Lucie Public Works Department

Anna Smith, Ecosystems Manager

2300 Virginia Avenue, Ft. Pierce, Florida 34982

Phone: 561-462-1685; Fax: 561-462-1684

E-mail: annas@stlucieco.gov

Project ID: TC-023

Project Size: 8 acres

Fiscal Year 01/02

Project Cost: \$8,677.12

Queens Island Park was purchased through the USFWS National Coastal Wetland Restoration Act and the CARL, Save Our Rivers, and county Environmentally Sensitive Lands programs. The park supports 210 acres of mangrove swamp (some impounded), 70 acres of maritime hammock, and 8 acres of coastal strand/beach dune habitats. The native vegetation found on site includes the following species: sea oats (*Uniola paniculata*) seagrape (*Coccoloba uvifera*), cabbage palm (*Sabal palmetto*), saw palmetto (*Serenoa repens*), gumbo limbo (*Bursera simaruba*), pigeon plum (*Coccoloba laurifolia*), torchwood (*Amyris elemifera*), and limber caper (*Capparis flexuosa*). In the fall of 1999 and spring 2000, the county removed all of the pepper along a dike. This project controlled Brazilian pepper and Australian pine in the coastal strand and dune habitats. The estimated aerial coverage by exotics throughout the site ranged from 25-45%.

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

Walton Scrub Invasive Exotic Plant Control

County: St. Lucie

PCL: Walton Scrub

PCL Size: 33 acres

Project Manager: St. Lucie County

Steven Fousek, Environmental Lands Specialist
 2300 Virginia Avenue, Ft. Pierce, Florida 34954-0760
 Phone: 561-462-1513, Fax: 561-462-1940
 E-mail: stevef@stlucieco.gov

Project ID: TC-026

Project Size: 9 acres

Fiscal Year 01/02

Project Cost: \$24,087.72

Walton Scrub is located in Port St. Lucie and is adjacent to the Indian River Lagoon Aquatic Preserve and Savannas State Park. Walton Scrub consists primarily of Scrub and Maritime Hammock communities. The majority of exotics had become established within the Maritime Hammock community, affecting native plants including the endangered satinleaf (*Chrysophyllum oliviforme*) and fragrant prickly cactus (*Cereus eriophorus*). Several of these endangered plants are located within the proposed treatment area. Surinam cherry and bowstring hemp were the dominant exotic species on the site. *Sansevieria* was extremely dense within the project area, consisting of a monotypic understory in many areas (~150,000 stems/acre). *Eugenia* in many areas was dominant in the shrub layer, with densities ranging from 400-2,000 stems per acre.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Eugenia uniflora</i>	Surinam cherry	Category I	basal bark	Garlon 4
<i>Sansevieria hyacinthoides</i>	bowstring hemp	Category II	cut stump	Garlon 4

Environmental Learning Center Invasive Exotic Plant Control

County: St. Lucie

PCL: Environmental Learning Center

PCL Size: 220 acres

Project Manager: St. Lucie County

Steven Fousek, Environmental Lands Specialist
 2300 Virginia Avenue, Ft. Pierce, Florida 34954-0760
 Phone: 561-462-1513, Fax: 561-462-1940
 E-mail: stevef@stlucieco.gov

Project ID: TC-031

Project Size: 35 acres

Fiscal Year 01/02

Project Cost: \$31,874.48

The Environmental Learning Center is located in Port St. Lucie. The Center is adjacent to the North Fork St. Lucie River, an Aquatic Preserve, and Scitturo's Island, a Save Our Rivers/CARL/St. Lucie County acquisition project. The site was acquired in 1996 with the assistance of South Florida Water Management District and St. Lucie County's Environmentally Sensitive Lands Program. The site consists primarily of Mesic Flatwoods and Floodplain Forest communities. Exotics had primarily established within the Floodplain Forest community, affecting native plant associations. The endangered hand fern (*Cheiroglossa palmata*) is located on the site and within the control area.

Exotics infested approximately 35 acres of the site. Shoebuttan ardisia was extremely dense within the project, consisting of a large portion of the understory in many areas (~40,000 stems/acre in some instances). Guava in many areas occupied the area between the Floodplain Forest and Mesic Flatwoods, and was dominant in the shrub layer with densities ranging up to 2,000 stems per acre.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Psidium guajava</i>	guava	Category I	basal/cut stump	Garlon 4
<i>Ardisia elliptica</i>	shoebuttan ardisia	Category I	basal/cut stump	Garlon 4

Ten Mile Creek Invasive Exotic Plant Control

County: St. Lucie

PCL: North Fork Saint Lucie River State Buffer Preserve

PCL Size: 987 acres

Project Manager: Southeast Florida Aquatic Preserves (DEP)

Jeff Beal, Environmental Specialist II

9737 Gumbo Limbo Lane, Jensen Beach, Florida 34957

Phone: 561-873-6590, Fax: 561-873-6599

E-mail: jeffbeal@hotmail.com

Project ID: TC-028, TC-029

Project Size: 156 acres

Fiscal Year 01/02

Project Cost: \$160,623.39

The project area is part of the North Fork St. Lucie River State Buffer Preserve, which comprises a natural river corridor along a 12-mile stretch of river. The two project sites comprise three complete tracts plus three parcels that are connected to one another and which lie in St. Lucie County between Five Mile and Ten Mile Creeks. This land was purchased under the Save Our Rivers Program by the South Florida Water Management District and is co-owned and managed by the Florida Department of Environmental Protection. The total project area is approximately 156 acres, of which approximately 77 acres are Hydric Hammock/Floodplain Forest, 29 acres are overgrown Mesic Flatwoods, and 50 acres are disturbed pasturelands. Rare species present include giant leather fern (*Acrostichum danaeifolium*), red wild pine (*Tillandsia fasciculata*), and green wild pine (*Tillandsia utriculata*), and possibly hand fern (*Cheiroglossa palmata*).

The banks of Five Mile and Ten Mile Creeks have spoil piled from 2 to 12 feet high along their lengths and were heavily infested with Brazilian pepper, especially along Five Mile Creek. Pepper was also scattered throughout the remaining areas in light to occasionally moderate infestations with a total infested area of approximately 33 acres. Caesar's weed appeared in light to heavy infestations throughout much of the area, especially along the spoil banks with a total infested area of approximately 23 acres. Rosary pea occurred in light to moderate infestations throughout the area, especially along the railroad easement, and accounted for another 7 acres. Shoebutton ardisia was scattered in light infestations throughout the floodplain, as was strawberry guava, which together infested approximately 7 acres total. Tropical soda apple was scattered in moderate amounts throughout the pasturelands of two tracts and accounted for about 3 acres.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4
<i>Psidium cattleianum</i>	strawberry guava	Category I	basal/cut stump	Garlon 4
<i>Ardisia elliptica</i>	shoebuttan ardisia	Category I	basal bark	Garlon 4
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	Rodeo
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Rodeo
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Rodeo
<i>Senna pendula</i>	climbing cassia	Category I	hand pull	n/a
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Rodeo

The following two projects were also conducted at the North Fork St. Lucie Buffer Preserve.

Idabelle Island Invasive Exotic Plant Control

County: St. Lucie

Project ID: TC-022

Project Size: 23 acres

Fiscal Year 01/02

Project Cost: \$20,670.95

This project targeted Brazilian pepper, shoebuttan ardisia, Caesar's weed, and rosary pea on Idabelle Island (also known as Scituro's Island) in the North Fork St. Lucie River. The treatment site is a 23-acre island composed of hydric hammock and floodplain forest. There is a spoil bank along the main river channel that ranges from two to eight feet in height. All target species were found scattered throughout the project area. Rosary pea and Caesar's weed were found in moderate infestations over about 9 acres. Brazilian pepper and ardisia were found in light concentrations on about 2 acres.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Ardisia elliptica</i>	shoebuttan ardisia	Category I	basal bark	Garlon 4
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	G4; Rodeo; Roundup
<i>Lygodium microphyllum</i>	Old World climbing fern	Category I	foliar	Rodeo
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Garlon 4; Roundup
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	G4; Rodeo; Roundup
<i>Wedelia trilobata</i>	wedelia	Category II	foliar	Rodeo; Roundup

North Fork Prima Vista Invasive Exotic Plant Control

County: St. Lucie

Project ID: TC-027

Project Size: 160 acres

Fiscal Year 01/02

Project Cost: \$47,950.16

This project includes those lands from the original NFSLRSPB purchase that lie from Prima Vista Boulevard north for 2 miles. The treatment sites are composed of several adjacent parcels, some of which are separated by river channels, along both sides of the North Fork St. Lucie River, including two islands. Hydric hammock accounts for approximately 45% of the area, mesic flatwoods 30%, and floodplain forest 25%. There is a spoil bank, ranging from 2 to 12 feet high, along approximately 60% of the main river channel.

Targeted species were scattered throughout the project area with spoil banks being the most heavily infested by some species. Brazilian pepper and shoebuttan ardisia occurred in light to moderate and occasionally heavy concentrations, rosary pea and Caesar's weed were found in light to moderate infestations, and strawberry guava was found in light concentrations. Brazilian pepper covered approximately 35 acres, rosary pea 18 acres, ardisia 8 acres, Caesar's weed 6 acres, and strawberry guava 2 acres.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump/hand pull	Garlon 4
<i>Psidium cattleianum</i>	strawberry guava	Category I	basal/cut stump	Garlon 4
<i>Ardisia elliptica</i>	shoebuttan ardisia	Category I	cut stump	Garlon 4
<i>Abrus precatorius</i>	rosary pea	Category I	foliar	Rodeo
<i>Dioscorea bulbifera</i>	air-potato	Category I	cut stump	Rodeo
<i>Eugenia uniflora</i>	Surinam cherry	Category I	cut stump	Garlon 4
<i>Urena lobata</i>	Caesar's weed	Category II	foliar	Rodeo

West Central Regional Working Group

Avon Park Invasive Exotic Plant Control

PCL: Avon Park Air Force Range

Project Manager: Department of Defense, U. S. Air Force
 Steve Orzell, OLA, DET 1, 347 OG/CEVN
 29 South Blvd, Avon Park Air Force Range, Florida 33825-5700
 Phone: 941-452-4119 Ext 317, Fax: 941-452-4161
 E-mail: steve.orzell@avonpark.macdill.af.mil

County: Highlands, Polk

PCL Size: 106,110 acres

Project ID: WC-006

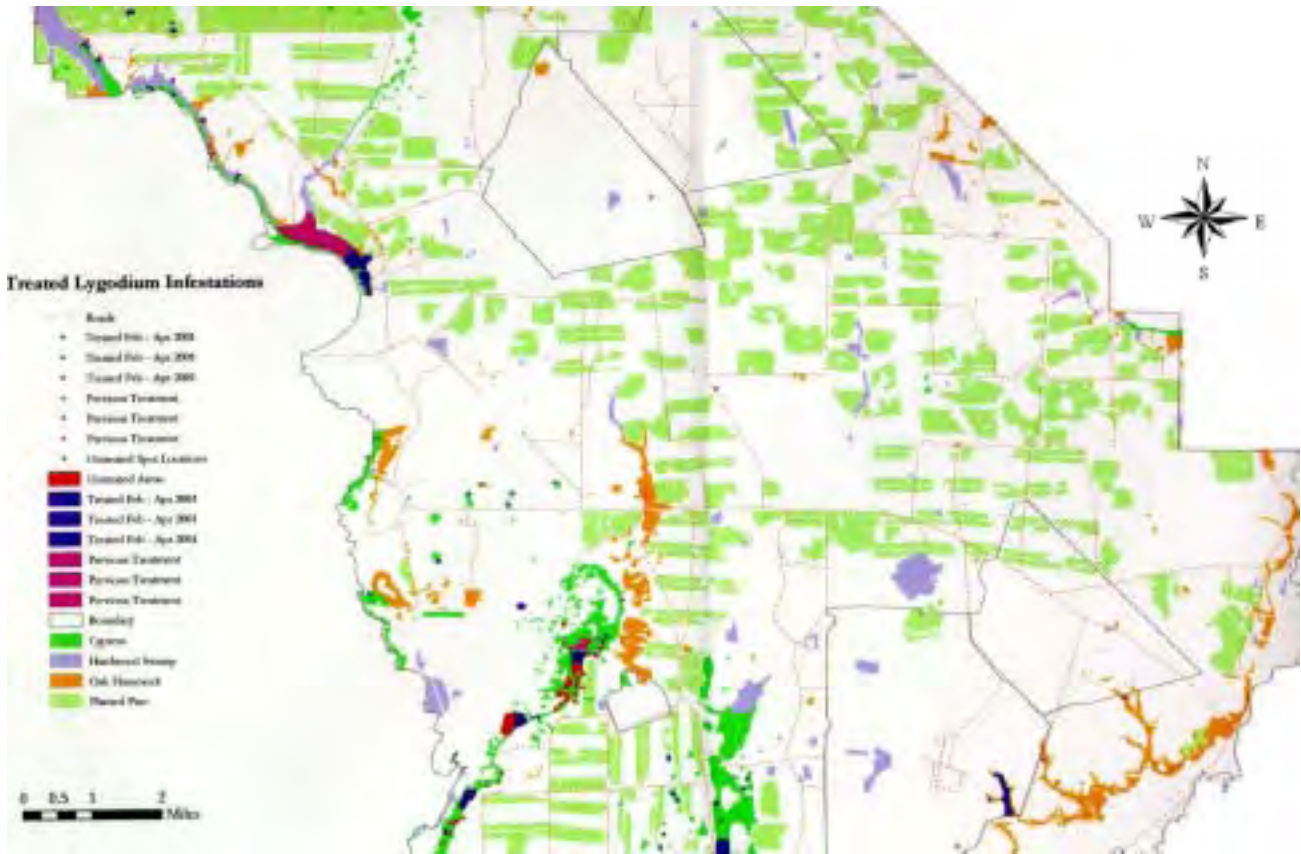
Project Size: 1,400 acres

Fiscal Year 01/02

Project Cost: \$46,911.64

Avon Park Air Force Range (APAFR) is perhaps the largest parcel of natural land in the Greater Arbuckle Ecosystem. Its numerous natural communities include the rare Scrub, Dry Prairie, and Cutthroat Grass Seeps. The APAFR supports an amazing array of rare plants and animals, including twelve animals and two plants that are listed as federally endangered or threatened species. Controlling invasive exotics provides a cornerstone in preventing the spread of exotics into adjacent or nearby conservation areas such as Kissimmee Prairie State Preserve, Kissimmee River WMD properties, Lake Wales Ridge State Forest, and Lake Arbuckle State Park, among others. This project controlled Japanese climbing fern and Old World climbing fern that infested approximately 30% of the cypress and hardwood swamps (~1,400 acres) at APAFR. The South Florida Water Management District administered this project under an existing agreement with DEP.

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





The climbing ferns (*Lygodium* spp.) are a severe threat to natural communities throughout Florida. While many trees are adapted to low ground fires, the fern creates a “fire ladder” (left) that allows flames to reach the canopy.

The ferns quickly resprout (right) from millions of spores and have been found contaminating commercially available pine straw.



Retreatment is necessary maintenance after initial control efforts. Many exotic plant invaders can be eradicated in a few years with vigilant care. Climbing ferns, on the other hand, can be dispersed as spores for miles by wind, or coast-to-coast, as occurred with Hurricane Andrew.



Highlands Hammock Dianella Lily Invasive Exotic Plant Control

County: Highlands

PCL: Highlands Hammock State Park

PCL Size: 8,140 acres

Project Manager: Florida Park Service
 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

Project ID: WC-013

Project Size: 14 acres

Fiscal Year 01/02

Project Cost: \$14,000

Highlands Hammock State Park is located four miles west of Sebring along the Lake Wales Ridge. Natural communities in the park include Sand Pine Scrub, Pine Flatwoods, Scrubby Flatwoods, Cypress Swamp, Bayhead, Freshwater Marsh, and old growth Hardwood Hammock. The Florida scrub-jay resides on the property. This project controlled infestations of Dianella lily and coral ardisia in the park. The infestations were located near the campground, in the picnic area, and along the loop drive, and were spreading through the park at the edge of the flatwoods, hammocks, and bayheads.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Ardisia crenata</i>	coral ardisia	Category I	basal bark	Garlon 4
<i>Dianella caerulea</i>	Dianella lily	n/a	foliar	Rodeo

Kissimmee River Floodplain Invasive Exotic Plant Control

County: Osceola, Okeechobee

PCL: Lower Kissimmee River Valley

PCL Size: 80,000 acres

Project Manager: South Florida Water Management District
 Jeff McLemore, Land Manager
 P.O. Box 2033, Okeechobee, Florida 34973-2033
 Phone: 1-800-250-4200, x3022, Fax: 863-462-5269
 E-mail: jmclemo@sfwmd.gov

Project ID: WC-008

Project Size: 5,000 acres

Fiscal Year 01/02

Project Cost: \$100,000

The Kissimmee River Floodplain, managed by the South Florida Water Management District, lies between Lake Kissimmee and Lake Okeechobee on either side of the C-38 canal or the restored Kissimmee River, depending on the location in the river corridor. District-owned land encompasses approximately 80,000 acres. The Kissimmee River floodplain is divided into five *pools* that are defined by locks on the C-38 canal. One of these locks, the B locks, was removed but the pool names remain useful for area designation. The areas of the floodplain and adjacent uplands affected by Old World climbing fern (*Lygodium microphyllum*) include broadleaf marsh, woody shrub, wetland hardwood, wax myrtle, and cypress community types. These areas are not easily accessible from the ground or by airboat, so aerial spraying from a helicopter was used.

In Pool A, the most northern pool, a point of *Lygodium* exists approximately two miles south of State Highway 60 on an island within the canal. In Pool C, *Lygodium* infests approximately 740 acres of floodplain with coverage from 30% to 90%. Approximately 300 acres of the infested area is still privately owned. The District was seeking permission to treat this area and has been pursuing acquisition of the land. Pool D contains approximately 200 acres of *Lygodium* infestation with coverage ranging from 40% to 80%. Pool E contains approximately 850 acres of affected land with coverage approaching 90% in all but about five acres of land in this pool.

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

Tenoroc Invasive Exotic Plant Control

PCL: Tenoroc Fish Management Area

Project Manager: Fish and Wildlife Conservation Commission

David Eggeman

620 South Meridian Street, Tallahassee, Florida 32399-1600

Phone: 850-488-4068, Fax: 850-413-0381

E-mail: eggemad@gfc.state.fl.us

Project ID: WC-011

Fiscal Year 01/02

County: Polk

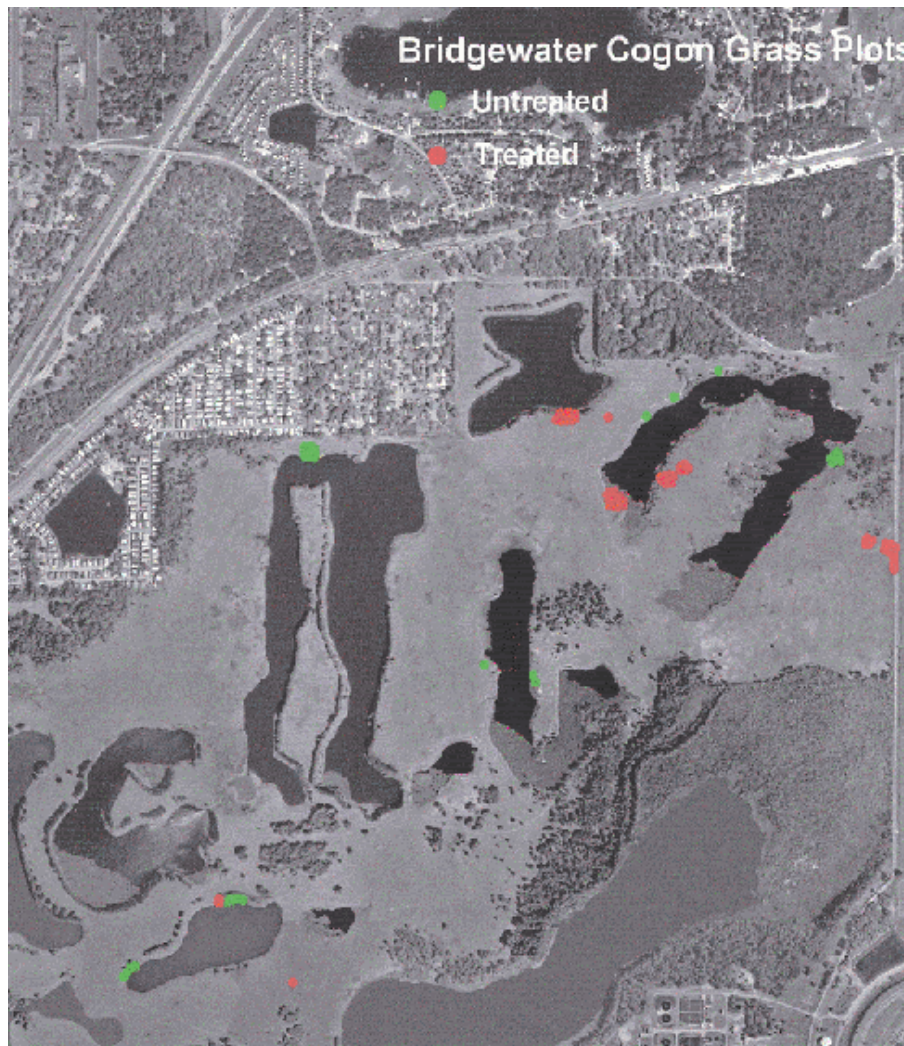
PCL Size: 7,348 acres

Project Size: 968 acres

Project Cost: \$34,964.70

The Tenoroc Fish Management Area (TFMA) is located two miles northeast of Lakeland. TFMA consists of reclaimed phosphate mining lands from the 1970s that are now used for fishing and other recreation. This project involved the recently purchased 968-acre Bridgewater tract. The primary target was cogon grass, which along with other exotics was scattered across the site. Estimated total coverage was less than 1%.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup
<i>Solanum viarum</i>	tropical soda apple	Category I	foliar	Roundup
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Garlon 4
<i>Sapium sebiferum</i>	Chinese tallow	Category I	cut stump	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	cut stump	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	cut stump	Garlon 4





A dense growth of cogon grass (left) is difficult to treat. The mass of older stems can prevent herbicide from reaching the newer shoots.

Removing the thick thatch by prescribed fire (right) or mowing increases the effectiveness of control efforts.



When the new growth appears in a few months (cogon grass is well adapted to fire), it will be much easier to treat.

Withlacoochee River Working Group

San Felasco Invasive Exotic Plant Control

PCL: San Felasco Hammock Preserve State Park
 Project Manager: Florida Park Service (DEP)
 Randy Brown, Park Manager
 4732 Millhopper Road, Gainesville, Florida 32653
 Phone: 386-462-7905, Fax: 386-462-7297
 E-mail: randall.e.brown@dep.state.fl.us

County: Alachua
 PCL Size: 6,926 acres

Project ID: WR-026

Project Size: 500 acres

Fiscal Year 01/02

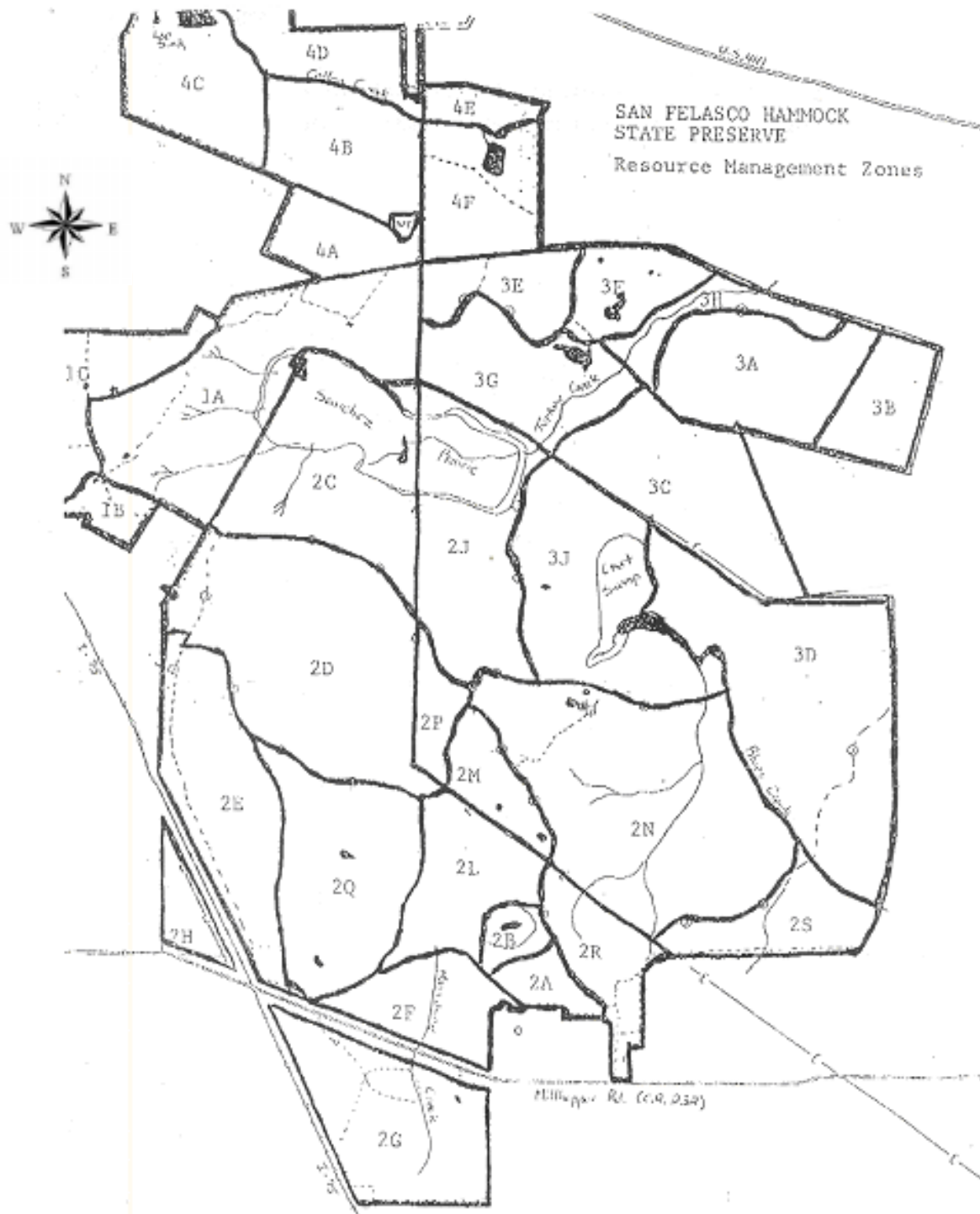
Project Cost: \$16,975.48

San Felasco Hammock Preserve State Park is located northwest of Gainesville along Millhopper Road (CR 232). This project encompassed two major areas; portions of the Moonshine Creek and Blues Creek watersheds, and the northern quadrant of the Preserve north of Sanchez Prairie. Since the original park acquisition in 1974, there have been several additions to the Preserve. This proposal lies within an 809-acre parcel purchased in 1994. This parcel was the headquarters for a dairy operation during the 1950s and later the site of an extensive tung oil orchard. Many of the tung oil trees have persisted, especially those along the slopes of the many relatively undisturbed sinkholes and ravines in the area. This species continues to be the most widespread of the exotics described for this project, covering approximately 450 acres in total. It has steadily invaded the northern slopes of Sanchez Prairie over the years, and the potential for continued spread into and through the prairie lowlands is very high. The stand density varies from low at outlying spots to very high in locations close to the old orchard operation.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melia azedarach</i>	Chinaberry	Category I	basal bark	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal bark	Garlon 4
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
<i>Aleurites fordii</i>	tung oil tree	Category II	basal/hand pull	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal bark	Garlon 4
<i>Ricinus communis</i>	castor bean	Category II	basal bark	Garlon 4
<i>Citrus</i> spp.	citrus	n/a	basal bark	Garlon 4
<i>Lagerstroemia indica</i>	crape-myrtle	n/a	basal bark	Garlon 4



A basal bark herbicide treatment is quick and effective in dense stands of exotic trees.



Many management areas are divided into “zones,” which can help in treating and tracking exotics.

Paynes Prairie Invasive Exotic Plant Control

PCL: Paynes Prairie Preserve State Park
 Project Manager: Florida Park Service (DEP)
 James Weimer, Preserve Biologist
 Route 2, Box 41, Micanopy, Florida 32667
 Phone: 352-466-8081, Fax: 352-466-4297
 E-mail: jim.weimer@dep.state.fl.us

County: Alachua
 PCL Size: 20,945 acres

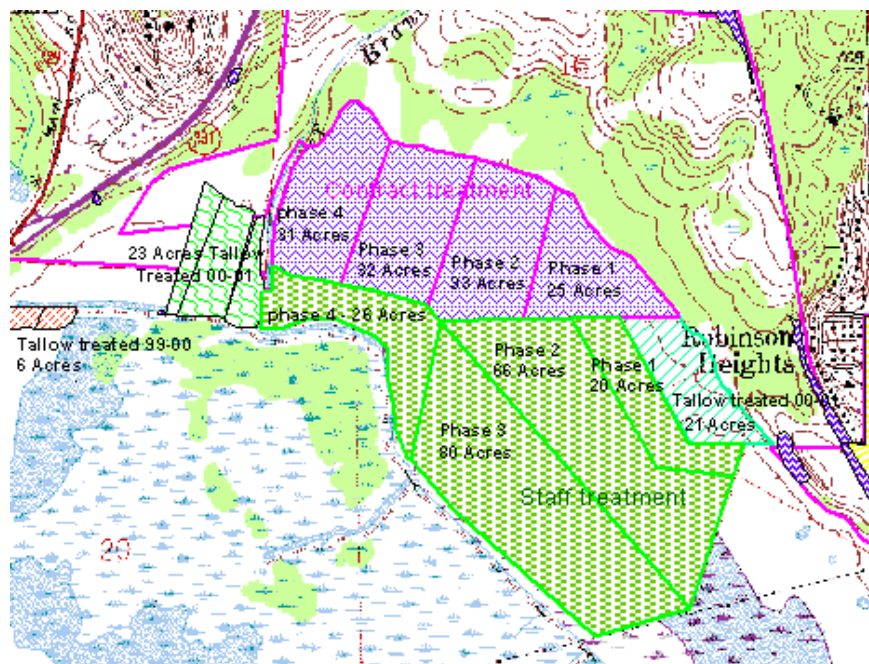
Project ID: WR-021
 Fiscal Year 01/02

Project Size: 45 acres
 Project Cost: \$10,104.26

Paynes Prairie Preserve State Park is located immediately south of Gainesville. The park is listed as an Outstanding Florida Water, a National Natural Landmark, and a Priority Wetland Species Use Area. The park has a national reputation for the abundance and diversity of its plants and animals. With its large size, the park is the central piece in the Orange Creek Corridor of public lands, which stretches over forty miles, extending from the Santa Fe River in the north to the Ocklawaha River to the southeast.

This project targeted Chinese tallow. The total project size is 312 acres; however, the project was divided into four phases with one phase proposed for each of the next four years. Each year the project site will be divided into two parcels. One parcel will be treated by a contractor and the other will be treated by park staff as an in-kind contribution. The total project is divided into 120 acres to be contracted and 192 acres to be treated by staff. Phase I, treated this year, included 25 acres under contract and 20 acres treated by staff. Most of the project area was covered with a practically impenetrable thicket of small trees, shrubs, briars, and vines that virtually precluded normal access. To facilitate contractor access and to initiate restoration of the site, staff used heavy equipment (chopper and tree cutter) to cut paths through the project site. These paths were laid out in grid and maps of the grid provided to the contractor. Paths will be suitable for foot traffic but will be too rough for use by vehicles. After treatment of exotics, the site will receive additional chopping and a prescribed burn to facilitate community restoration. As the site is opened up by exotics control, wetter spots along drainage channels are expected to be invaded by wild taro (*Colocasia esculenta*). Wild taro is a Category I invasive exotic and will be treated by staff as needed. Prior experience with wet prairie restoration indicates that the soil seed bank will prove adequate to restore native vegetation and a revegetation program will not be necessary.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal	Garlon 4
			foliar	Garlon 4
<i>Cinnamomum camphora</i>	camphor-tree	Category I	basal	Garlon 4



Loblolly Woods Phase II Invasive Exotic Plant Control

County: Alachua
 PCL Size: 130 acres

PCL: Loblolly Woods

Project Manager: City of Gainesville Recreation and Parks
 Denise Sauerbrey
 1024 NE 14th Street, Building A, Gainesville, Florida 32602
 Phone: 352-334-2231, Fax: 352-334-2234
 E-mail: sauerbreyd@gru.net

Project ID: WR-023

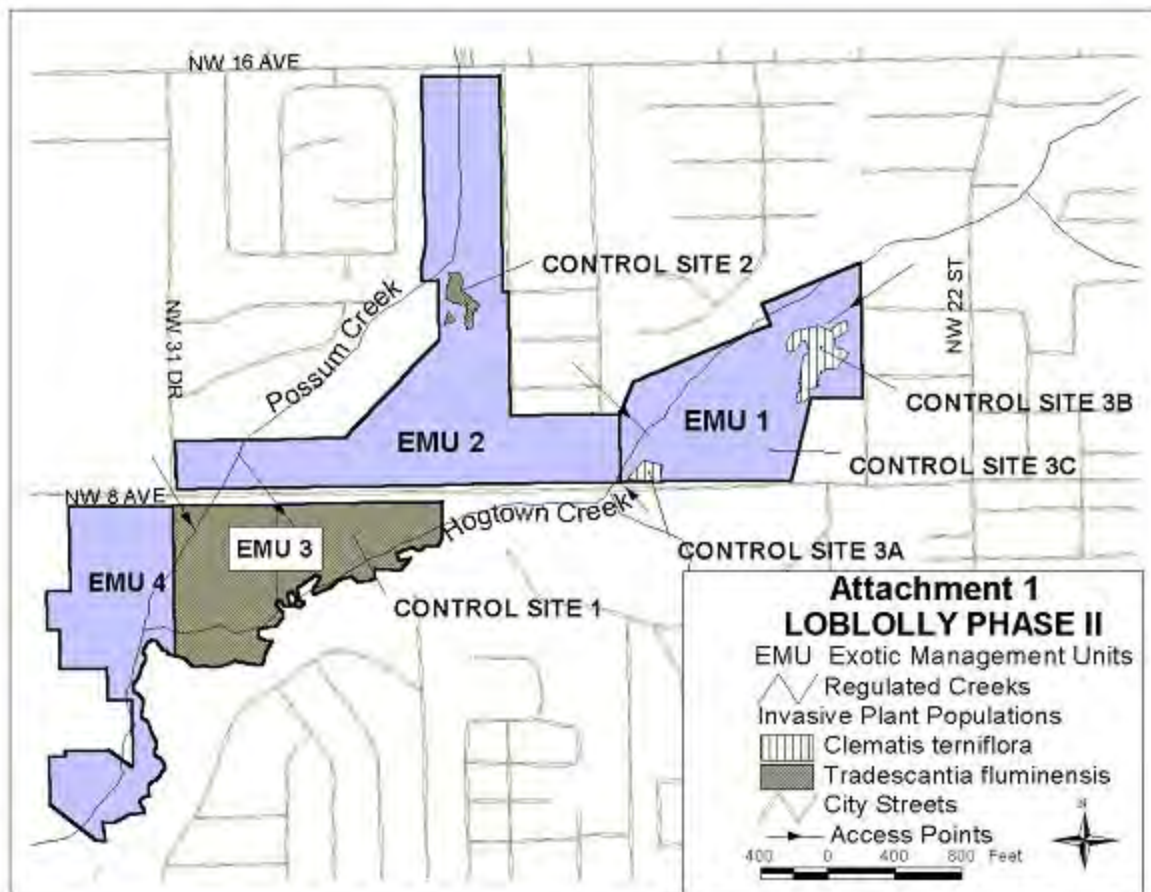
Project Size: 55.75 acres

Fiscal Year 01/02

Project Cost: \$24,419.91

The primary goal of this project was to control emerging populations of small-leaf spiderwort and sweet autumn virginsbower. The secondary goal of this project was to prevent the spread of these species to new sites within the Hogtown Creek watershed. Loblolly Woods is contiguous with over 600 acres of additional greenway properties. These and other city properties have direct connections to Alachua County's conservation property at Kanapaha Prairie. Phase I of this project addressed the treatment of eleven exotic species occurring at varying densities within Loblolly Woods. The City of Gainesville manages Loblolly Woods to protect and restore natural communities, maintain the floodplains, provide passive recreation outdoors, and to serve as a connection to other conservation properties that comprise the Hogtown Creek Greenway. Loblolly Woods contains Seepage Stream, Floodplain Forest, Upland Mixed Forest, and Bottomland Forest natural communities.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Tradescantia fluminensis</i>	small-leaf spiderwort	Category I	foliar	Roundup+Scythe
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Garlon 4/Roundup+Scythe
<i>Clematis terniflora</i>	sweet autumn virginsbower	n/a	foliar	Garlon 4



Hernando County Brazilian Pepper Invasive Exotic Plant Control

County: Hernando

PCL: (see below)

PCL Size: various

Project Manager: Hernando County Mosquito/Aquatic Weed Control

Dr. Guangye Hu, Manager

201 West Martin Luther King Jr. Blvd., Brooksville, Florida 34601

Phone: (352) 754-4061, Fax: (352) 754-4066

Project ID: WR-022

Project Size: 60 acres

Fiscal Year 01/02

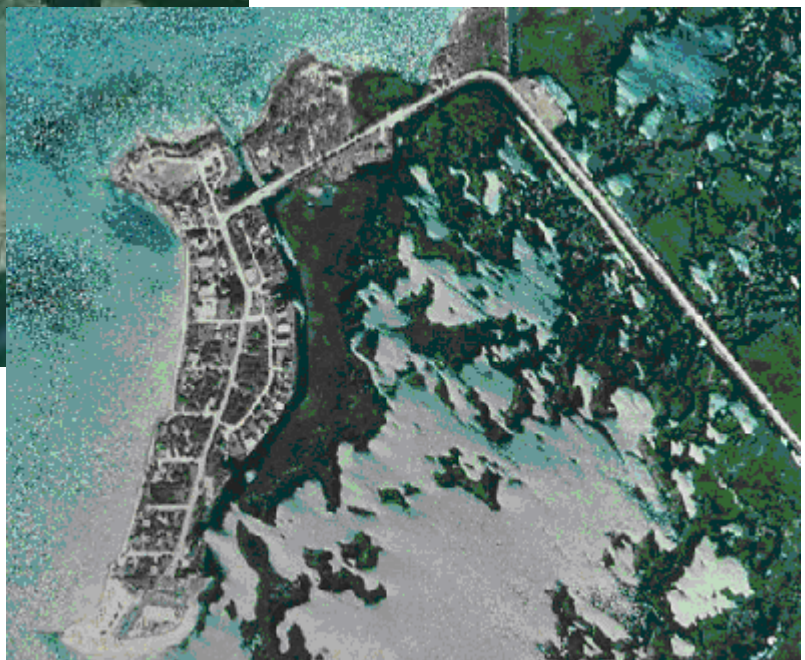
Project Cost: \$31,977.19

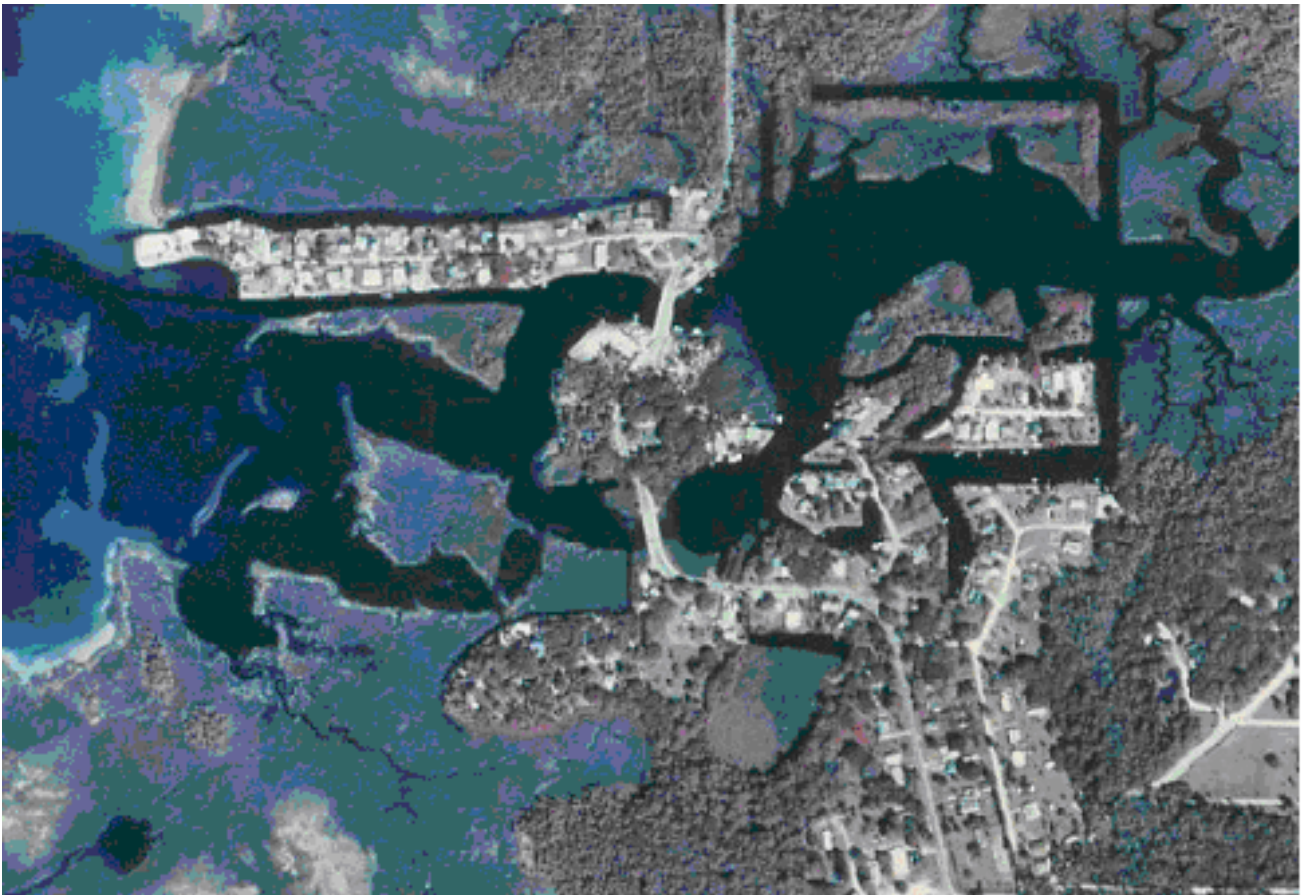
Ninety-five percent of all lands west of Highway 19 in Hernando County are held for conservation purposes. This control effort focused on public lands flanking county roads and adjacent waterways, and coastal spoil banks west of Highway 19. Preliminary assessments indicate that Brazilian pepper has not spread east of Highway 19. County lands are contiguous with state and federal conservation lands around Hernando Beach, Weeki-Wachee Preserve, Chassahowitzka National Wildlife Refuge, Aripeka, and Bayport. Brazilian pepper was targeted in the following areas: Pine Island (McKethan) Park, Bayport Park, Hernando Beach Park, Jenkins Creek Park, Hernando Beach boat ramp, and spoil islands. The treatment areas included spoil islands and a 100-foot swath along each side of trails, driveways, rivers, creeks, and parking lots. Hernando County has adopted an ordinance to ensure long-term control of Brazilian pepper. The control of this species relies on the ordinance and enforcement, plus the ability of the county to attract new partners to assist with the costs of the phases of this proposal.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/hand pull	Garlon 4
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal bark	Garlon 4
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Roundup
<i>Koelreuteria elegans</i>	flamegold tree	Category II	basal bark	Garlon 4



The Bayport (left) and Pine Island (below) sites. Airboats were required to reach the canal banks and many small islands in this project





The Aripeka project area. Both public and private lands are affected by a Hernando County ordinance that requires the removal of Brazilian pepper from all properties within the county.



Contractor crews landed on the islands and defeated the invading Brazilian pepper (left) and Australian pine (right).



Skunk vine is a serious problem in southwest Florida. It smothers understory vegetation and has a putrid odor. This exotic invader is a real stinker!



The sun has set for the last time on these Australian pines.

Goethe State Forest Invasive Exotic Plant Control

County: Alachua, Levy

PCL: Goethe State Forest

PCL Size: 45,212 acres

Project Manager: Division of Forestry (DACs)
 Elizabeth Zimmerman
 8250 SE CR 336, Dunnellon, Florida 34431
 Phone: 352-447-2202, Fax: 352-447-1358
 E-mail: zimmer@doacs.state.fl.us

Project ID: WR-027

Project Size: 49.7 acres

Fiscal Year 01/02

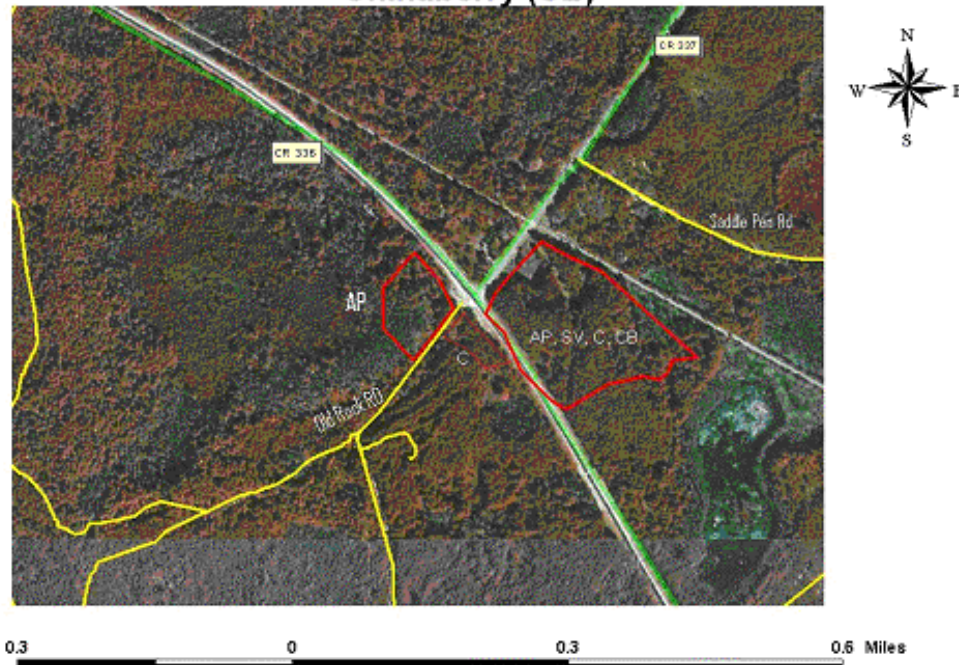
Project Cost: \$6,459.60

Goethe State Forest has more than fifteen different natural communities, including Sandhill, Mesic Flatwoods, Hydric Hammock, Scrubby Flatwoods, Wet Flatwoods, Dome Swamp, and Basin Swamp. The forest may contain the largest tract of contiguous, old-growth, longleaf pine flatwoods in the state. This extensive old-growth flatwoods has one of the largest red-cockaded woodpecker populations in Florida. Other rare animal species found on the forest include the Florida black bear, gopher tortoise, Sherman's fox squirrel, and bald eagle. Rare plants include the hooded pitcher plant, greenfly orchid, and coontie.

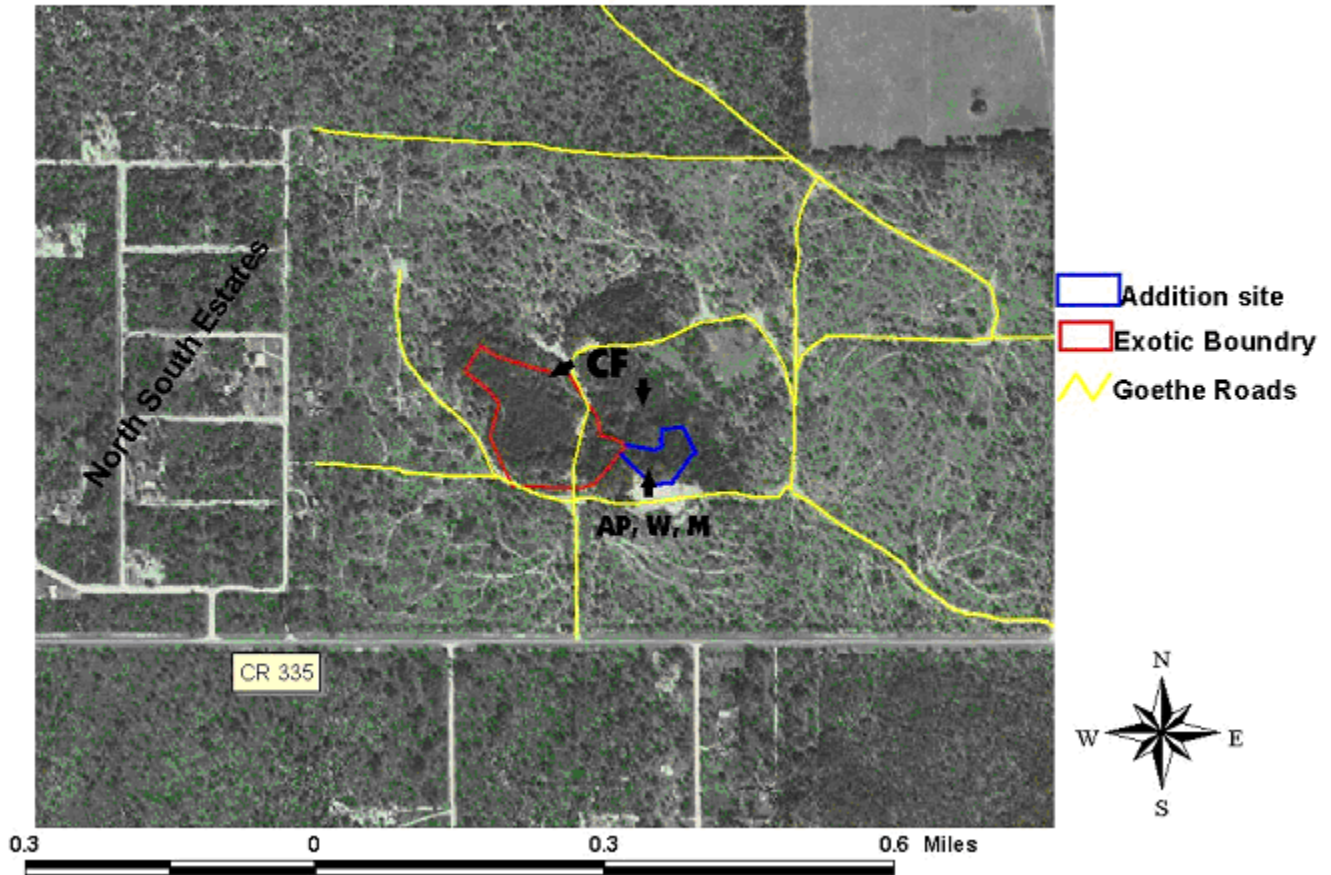
This project is divided into three exotic control areas: New Acquisition North (NAN), New Acquisition South (NAS), and Watermelon Pond East (WPE). Camphor tree, Chinaberry, and skunk vine were found within 31 acres total of NAN with 18%, 18%, and 8% cover, respectively. Camphor tree and air-potato occupied 10 acres of NAS with 20% and 30% cover, respectively. Japanese climbing fern occurred in WPE over 8.7 acres with a 45% cover.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal bark	Garlon 4
<i>Ligustrum</i> spp.	privet	Category I	basal bark	Garlon 4
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
			foliar	Roundup
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Roundup
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	foliar	Roundup

Project site -- Air Potato (AP), Skunkvine, (SV), Camphor (C), Chinaberry (CB)



WPE: Japanese Climbing Fern (CF), Air Potato (AP), Wisteria (W), Mimosa (M).



Project maps for New Acquisition (previous page) and Watermelon Pond (above) areas of Goethe Forest.



Posting an informative sign at control sites helps educate the public about invasive species. The Bureau has a limited number of signs (left) that it makes available to project managers. These aluminum signs are durable and can be passed on to another project after completion.



Invasive adventive (exotic) vines are a problem throughout the state. In the north, air-potato (above) and Japanese climbing fern (right) are two of the worst invaders.



These two sites were treated for *Lygodium japonicum* and some initial die-off is evident. *L. japonicum* and its southern relative *L. microphyllum*, Old World climbing fern, are recognized as severe threats to Florida's natural areas.



Scott Springs Invasive Exotic Plant Control

PCL: Scott Springs/Celebrate 2000 Community Park
 Project Manager: City of Ocala Recreation and Parks
 Elizabeth C. Houck, Landscape Architect
 P.O. Box 38, Ocala, Florida 34478
 Phone: 352-629-8521, Fax: 352-629-8208
 E-mail: LCole@ocalafl.org

County: Marion
 PCL Size: 22 acres

Project ID: WR-024

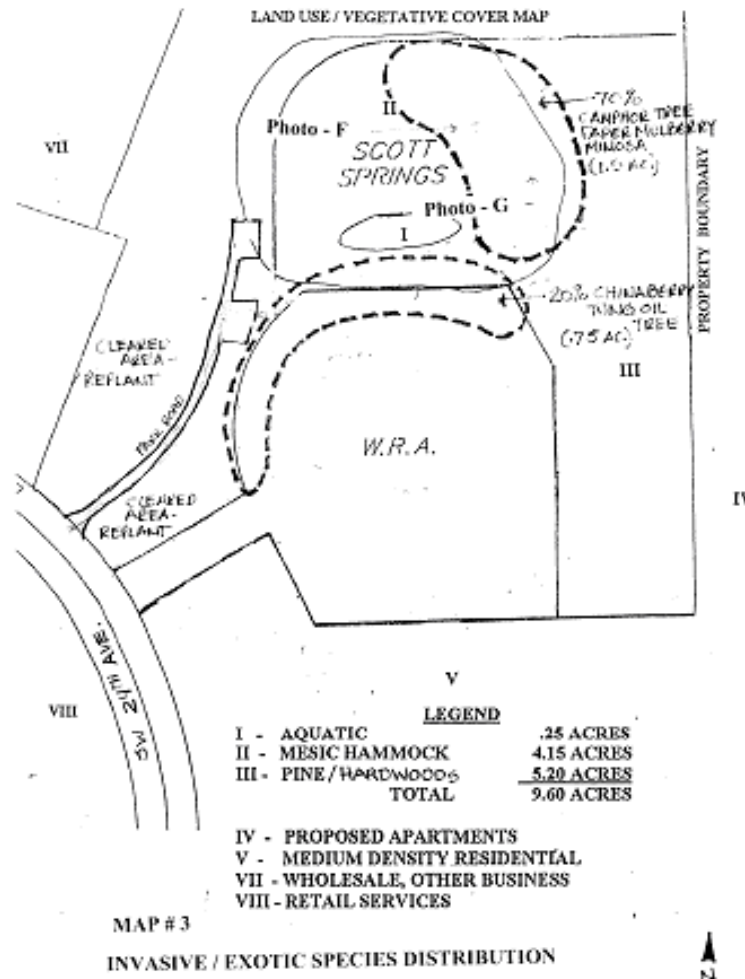
Project Size: 7 acres

Fiscal Year 01/02

Project Cost: \$6,722.48

Scott Spring/Celebrate 2000 Community Park is a 9.6-acre natural “sink” that lies amidst a 22-acre parcel of land. The site has several unique geological features including above-ground and underwater caves. Most of the invasive exotics were found in the 4.15-acre mesic hammock surrounding the sink. This area has been disturbed over the years due to artifact hunters digging throughout. Exotic plant coverage was estimated at 70%, northeast of the sink. The remainder of the preserved property is a pine upland area, (approximately 5.20 acres). This area is well drained, with rock outcrops and sinkholes occurring. The D.R.A. (Drainage Retention Area) is a dry pond supporting many vegetative pioneer species including salt bush, red cedar, pine, and hackberry. Exotic plant coverage was estimated at 20% around the drainage area boundaries.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melia azedarach</i>	Chinaberry	Category I	basal bark	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal bark	Garlon 4
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
<i>Ligustrum spp.</i>	privet	Category I	basal bark	Garlon 4
<i>Broussonetia papyrifera</i>	paper mulberry	Category II	basal bark	Garlon 4





Boardwalks and trails lead through a “jungle” of paper mulberry.



The springs area (above) is central to the park. Here native plants (right) grow from out of the steep limestone walls.

Fort King Invasive Exotic Plant Control

County: Marion

PCL: Fort King Property

PCL Size: 37 acres

Project Manager: City of Ocala Recreation and Parks

Elizabeth C. Houck, Landscape Architect

P.O. Box 38, Ocala, Florida 34478

Phone: 352-629-8521, Fax: 352-629-8208

E-mail: LCole@ocalafl.org

Project ID: WR-028

Project Size: 37 acres

Fiscal Year 01/02

Project Cost: \$21,572.49

The Fort King property in east Ocala is comprised predominately of Upland Mesic Hardwood Hammock and much of the exotics were found in this natural community. An Aquatic Marsh at the southeast corner of the property includes a spring-fed pond, approximately 50 feet in diameter, which outfalls to a small creek traveling north. The creek floodplain was dominated by coral ardisia. An area of planted pine west of the homestead contains approximately 10% of invasive species. These are mostly concentrated adjacent to a neighboring residential property. A small area (approximately 3.5 acres) of the property was cleared due to the Southern pine beetle infestation that hit Marion County in 1997 and subsequently has become host to several invasive species. The area around the house and entry off East Fort King Street is sod under planted pines and contained approximately 5% of the invasive species.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Ardisia crenata</i>	coral ardisia	Category I	basal/foliar	Garlon 4
<i>Cinnamomum camphora</i>	camphor tree	Category I	basal bark	Garlon 4
<i>Nephrolepis cordifolia</i>	sword fern	Category I	basal bark	Garlon 4
<i>Ligustrum</i> spp.	privet	Category I	basal bark	Garlon 4
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
			foliar	Roundup/Garlon 4
<i>Broussonetia papyrifera</i>	paper mulberry	Category II	basal bark	Garlon 4
			foliar	Roundup
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal bark	Garlon 4
			foliar	Roundup
<i>Koelreuteria elegans</i>	golden raintree	Category II	basal bark	Garlon 4



Coral ardisia (left) was the primary target species, while air-potato (above) remains to be treated.

Silver River Cogon Grass Invasive Exotic Plant Control

County: Marion

PCL: Silver River State Park

PCL Size: 4,230 acres

Site Manager: Florida Park Service (DEP)
Bob LaMont, Park Manager
1425 NE 58th Avenue, Ocala, Florida 34470
Phone: 352-236-7152, Fax: 352-236-7150
E-mail: sl-river@atlantic.net

Project ID: WR-025, WR-030

Project Size: 75 acres

Fiscal Year 01/02

Project Cost: \$20,975

Silver River State Park is located in Ocala, adjoining the Silver Springs attraction. Silver River is a first magnitude spring-fed stream that flows into the Ocklawaha River. The park encompasses the river and over fourteen natural community types. Cogon grass occurs throughout the Pine Flatwoods and is invading the high quality, endangered Sandhill. Cogon grass occurs in various concentrations, from relatively continuous coverage to small patches, in areas accessible by roads. Portions of the flatwoods community do not presently have cogon grass, but the potential for cogon grass to spread into the unaffected flatwoods areas is extremely high. This project worked to contain the further spread of cogon grass into the park's flatwoods.

This was a cost-share project with the Florida Park Service contributing \$5,000 toward the project cost. A re-treatment was also conducted on the project area treated in the previous fiscal year.

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

**SILVER RIVER STATE PARK
Marion County, Florida
Fall 2001 Cogongrass Treatment Areas**



Rainbow Springs Phase II Invasive Exotic Plant Control

County: Marion

PCL: Rainbow Springs State Park

PCL Size: 1,038 acres

Site Manager: Florida Park Service (DEP)

David Jowers, Park Manager

19158 SW 81st Place Road, Dunnellon, Florida 34432

Phone: 352-489-8503, Fax: 352-465-7855

E-mail: david.jowers@dep.state.fl.us

Project ID: WR-029

Project Size: 16.75 acres

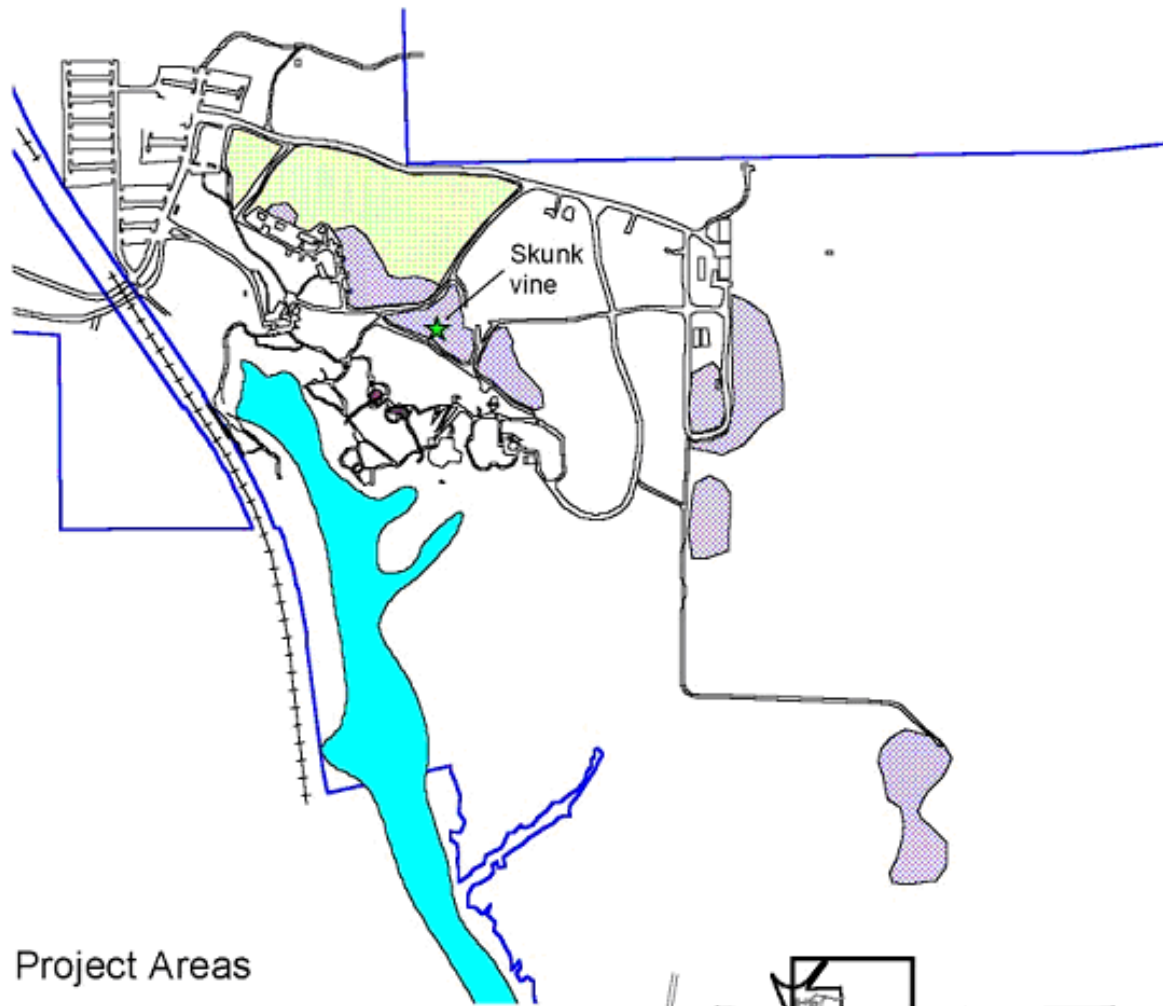
Fiscal Year 01/02

Project Cost: \$31,367.94






Rainbow Springs is a first-magnitude spring with an average discharge of 491 million gallons per day. The state park was established with the purchase of a former private attraction built around the spring pool and headsprings. The spring run is also managed by the state as the 4,000-acre Rainbow River State Aquatic Preserve. The former attraction included ornamental gardens, which went untended for nearly twenty years before the state's purchase and are the source of most of the exotic plant invasions. The natural communities of the park include Hydric Hammock, Pine Flatwoods, Sandhill, Upland Mixed Forest, and Basin Swamp. Disturbed areas, in addition to the gardens, include shallow phosphate mining pits from the late 1800s. The Rainbow Springs Phase II project was primarily directed at treatment of air potato.

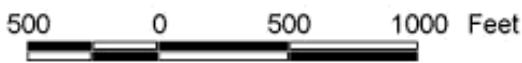
This was a cost-share project with Florida Park Service contributing \$6,274 toward the project cost.

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>Melia azedarach</i>	Chinaberry	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	Roundup
<i>Colocasia esculenta</i>	wild taro	Category I	foliar	Roundup
<i>Paederia foetida</i>	skunk vine	Category I	foliar	Roundup
<i>Ardisia crenata</i>	coral ardisia	Category I	basal/foliar	Garlon 4
			hand pull	n/a
<i>Broussonetia papyrifera</i>	paper mulberry	Category II	basal	Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal	Garlon 4
<i>Elaeagnus pungens</i>	silverthorn	Category II	basal	Garlon 4
<i>Podocarpus macrophyllus</i>	yew plumpine	n/a	basal	Garlon 4



Project Areas

-  Potato vine and woody exotics
-  Woody exotic plants
-  Rainbow River
-  Park boundary
-  Facilities



Rainbow Springs State Park Phase II Project Areas

Ravine Gardens Invasive Exotic Plant Control

County: Putnam

PCL: Ravine Gardens State Park

PCL Size: 146.42 acres

Project Manager: Florida Park Service (DEP)

Bob Rundle, Park Manager

P.O. Box 1096, Palatka, Florida 32177

Phone: 904-329-3721, Fax: 904-329-3718

E-mail: ravine@gbso.net

Project ID: WR-017

Project Size: 6 acres

Fiscal Year 01/02

Project Cost: \$24,990.74

Ravine State Gardens contains three steephead ravines totaling approximately 53 acres. Air-potato was located primarily along the slopes of the ravine with an approximate 30% coverage. Camphor-tree and coral ardisia were scattered throughout the ravine with an estimated coverage of less than 5%. The bottom of the ravine downstream of the seeps had over one acre of bamboo (*Bambusa* spp.) removed within the last two years. In addition to the three Category I species listed above, cat's-claw vine (*Macfadyena unguis-cati*) invaded in small patches along the upper ravine slopes. Since no Current Control Technologies exist for this species, it was omitted from the proposal, but park staff proposed to remove this species from the area concurrently. The goal of the project was to control air-potato (*Dioscorea bulbifera*), camphor-tree (*Cinnamomum camphora*), and coral ardisia (*Ardisia crenata*) located within the western end of Ravine 1A.

This was a cost-share project with the Florida Park Service contributing \$5,000 toward the project cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Dioscorea bulbifera</i>	air-potato	Category I	foliar	Rodeo
			hand pull	n/a
<i>Ardisia crenata</i>	coral ardisia	Category I	basal	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal	Garlon 4
<i>Cinnamomum camphora</i>	camphor-tree	Category I	basal	Garlon 4
<i>Elaeagnus pungens</i>	silverthorn	Category II	basal	Garlon 4
<i>Podocarpus macrophyllus</i>	yew plumpine	n/a	basal	Garlon 4



National Park Service Working Group

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 NPS' Natural Resource Challenge. The Florida Exotic Plant Management Team (FLEPMT) is a partnership between the NPS and Florida's Department of Environmental Protection, Bureau of Invasive Plant Management (BIPM). The intent of this partnership is for BIPM to match each Challenge dollar spent by NPS in Florida's eleven National Park units. In practice, the two agencies divide up the projects, with the overall costs coming very near to a 50%-50% cost-share. 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—"More Protection, Less Process."

The FLEPMT has completed its third year. Since its establishment in FY 2000, the FLEPMT has provided for the initial treatment of invasive plants on over 9,000 acres. Funding for the control has been provided by the NPS (Natural Resource Challenge) and is matched by BIPM (FY 2000 - FY 2002-NPS: \$1.265M, BIPM: \$1.175M). All control projects have been successful at controlling invasive plants and have also been very cost effective. Through the use of BIPM private contractors, the cost per acre for control projects has been approximately \$600.

Invasive plant control projects were 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 addition to the success in treating invasive plants, the biggest success has been in developing partnerships with surrounding landowners and public education:

- In Gulf Islands NS, the park through a successful public education campaign was able to remove Chinese tallow trees from adjacent properties (including a military base) that were the seed source for infestations within the park.
- In Biscayne NP, park staff working with adjacent landowners assisted in establishing a memorandum of agreement (Miami-Dade County, South Florida Water Management District, Fairchild Tropical Garden, The Nature Conservancy). This agreement, administered by the NPS Southeast Regional Office, works towards achieving an exotic plant management plan for the entire South Biscayne Bay ecosystem.
- In Canaveral NS, an interagency exotic plant control program is working on controlling exotic plants. Agencies include Volusia County and Merritt Island National Wildlife Refuge.

In FY 2003, the FLEPMT is expanding 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. In Florida, eleven projects are selected for funding in FY 2003, totaling over 3,400 acres (NPS \$475K, BIPM \$672K):

- In Big Cypress NP, the FLEPMT will provide funds to assist in completing the initial treatment of melaleuca. This is the culmination of an 18-year project (melaleuca control in BICY was once thought impossible, with 186 square miles infested).
- Everglades NP will receive funds to assist in the initial treatment of *Melaleuca* and *Casuarina*. These FLEPMT funds in addition to the over \$2.5M in funds provided by Miami-Dade County, the United States Army Corp of Engineers and South Florida Water Management District (SFWMD) should provide enough funds to complete the initial treatment. In addition, Everglades NP will receive funds to expand past FLEPMT treatments in the Flamingo and Gulf Coast Districts, and to continue the treatment of Old World climbing fern. An agreement with SFWMD allows District contractors to treat exotic weeds within Everglades NP.
- Timucuan EHP will receive funds to treat Chinese tallow on acquisition property.
- Biscayne NP will receive funds to complete the initial treatment of coastal barrier islands, and funds to start on mainland control projects.
- Canaveral NS will expand its Brazilian pepper treatments.

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.

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

Canaveral National Seashore Invasive Exotic Plant Control

County: Brevard, Volusia

PCL: Canaveral National Seashore

PCL Size: 57,662 acres

Project Manager: National Park Service

John Stiner

308 Julia Street, Titusville, Florida 32796

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

E-mail: john_stiner@nps.gov

Project ID: NP-014, 024

Project Size: 2,039 acres

Fiscal Year 01/02

Project Cost: \$308,263.79

Canaveral National Seashore is located in southeast Volusia County and northeast Brevard County. The property is situated on a long barrier island adjacent to the Mosquito Lagoon, an Outstanding Florida Water. On the east side, a single dune ridge averaging 12 feet in height and running parallel to an undeveloped sandy beach is covered with typical dune vegetation such as sea oats (*Uniola paniculata*) and beach grass (*Panicum amarum*). The landward side of the dune consists of coastal strand vegetation including saw palmetto (*Serenoa repens*), sea grape (*Coccoloba uvifera*), and other shrub species. The west shore of the barrier island is comprised of impounded salt marsh, a fringe of mangroves, and scattered cabbage palm (*Sabal palmetto*) and live oak (*Quercus virginiana*) hammocks. Several dikes extend into the water and swale areas. Slightly elevated areas contain cabbage palm and live oak hammocks.

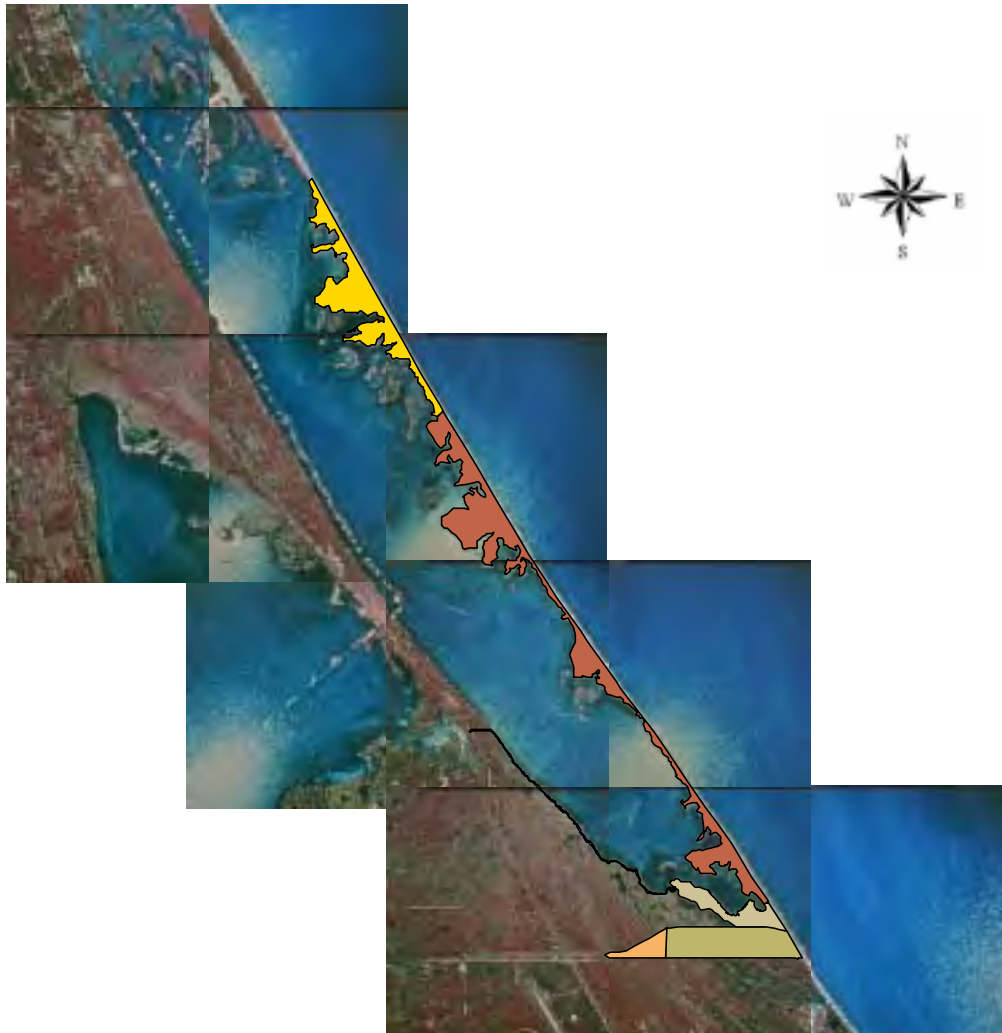
The project areas were located in the southern barrier island portion of the Seashore, extending a distance of 12 miles from the south boundary of the park to the Brevard County line. The western half of the island is jointly managed by the Seashore and the adjacent Merritt Island National Wildlife Refuge. The two agencies are working together to restore wetlands and eliminate Brazilian pepper and Australian pine from the Park and Refuge. This portion of the barrier island ranges from 100 yards to one-half mile in width. Brazilian pepper occurs primarily along the dikes and lagoon shoreline and ranges from 15% to 100% cover. Australian pine is concentrated in a few specific, upland areas with approximately 5% cover.

NPS provided \$236,750 of the project cost as a cost-share match to this project and work funded elsewhere on NPS units by BIPM.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
			hand pull	n/a
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal, girdle	Garlon 4
			girdle	Arsenal



Brazilian pepper control (left) and the return of the natives (right).



- Barrier Island, North (1,009 acres)
- Barrier Island, South (2,117 acres)
- South Mosquito Lagoon (475 acres)
- South Barrier Island (192 acres)
- Canaveral NS (884 acres)

Big Cypress Southwest Invasive Exotic Plant Control

County: Collier, Monroe

PCL: Big Cypress National Preserve

PCL Size: 729,000 acres

Project Manager: National Park Service

William A. Snyder

HCR 61 Box10, Ochopee, Florida 34141

Phone: 941-695-4111 x44, Fax: 941-695-3493

E-mail: bill_snyder@nps.gov

Project ID: NP-017, 021

Project Size: 153.6 acres

Fiscal Year 01/02

Project Cost: \$128,361.51

The area to be treated is along both the north and south sides of US 41 and along the east side of SR 29 within Big Cypress National Preserve. The native vegetation along the highway includes saline prairies, mixed hardwood cypress strands, pinelands, and seasonally hydrated graminoid prairies. There are two general areas where Brazilian pepper is present. First, there is the margin separating the canal and the natural areas adjacent to the canal along the north side of the road. Along that margin, there is an intermittent hedge of pepper. Second, on the south side, there are a series of small spoil piles stretching along the entire length of the highway. Pepper dominates these spoil piles. Lead tree occurs in two small patches (<1 acre) along US 41.

The project area is home to several federally endangered species, including the Florida panther (*Felis concolor coryi*), wood stork (*Mycteria americana*), and red-cockaded woodpecker (*Picoides borealis*). Florida panthers and red-cockaded woodpeckers partly depend upon upland communities during their life histories. Uplands that have received some form of disturbance (e.g., drainage) are areas in which Brazilian pepper often becomes successfully established. Removing exotic seed sources helps to preserve the integrity of these communities.

This was a cost-share project with NPS providing \$64,000 of the project cost.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Leucaena leucocephala</i>	lead tree	Category II	basal bark	Garlon 4



Aerial view of the two highways forming the southwest boundary of Big Cypress NP.



Setting up photo-points for a project assists in tracking the success of treatments.



The difference between pre-treatment (top photos) and post-treatment (bottom photos) would be difficult to miss.



Gulf Islands Invasive Exotic Plant Control

County: Escambia

PCL: Gulf Islands National Seashore

PCL Size: 66,549 acres

Project Manager: National Park Service

Riley Hoggard

1801 Gulf Breeze Parkway, Gulf Breeze, Florida 32561

Phone: 850-934-2617, Fax: 850-934-2653

E-mail: riley_hoggard@nps.gov

Project ID: NP-026

Project Size: 860 acres

Fiscal Year 01/02

Project Cost: \$67,337.90

The Pensacola Naval Air Station (NAS) occupies 5,800 acres of coastal and upland habitat adjacent to a portion of the 150-mile National Seashore. Although NAS is an active training facility, much of the base property is undeveloped and natural. Fort Barrancas Historic Zone, a 64-acre NPS parcel, is located within NAS. The Perdido Key backcountry area of the park is located directly across Big Lagoon. Chinese tallow infestations range from sparse (10%) in the coastal strand to moderate (30%) in isolated wetlands, drainage ditches, and along Bayou Grande.

This was a cost-share project with NPS providing \$27,450 of the project cost.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Sapium sebiferum</i>	Chinese tallow	Category I	basal bark	Garlon 4
<i>Ligustrum lucidum</i>	glossy privet	Category I	basal bark	Garlon 4
<i>Lantana camara</i>	lantana	Category I	basal bark	Garlon 4
<i>Albizia julibrissin</i>	mimosa	Category I	basal bark	Garlon 4
<i>Melia azedarach</i>	Chinaberry	Category I	basal bark	Garlon 4
<i>Nandina domestica</i>	heavenly bamboo	Category I	basal bark	Garlon 4
<i>Imperata cylindrica</i>	cogon grass	Category I	foliar	Roundup+Arsenal
<i>Lygodium japonicum</i>	Japanese climbing fern	Category I	foliar	Roundup+Garlon 4
<i>Wisteria sinensis</i>	Chinese wisteria	Category II	basal/cut stem	Garlon 4



Saline Glades Invasive Exotic Plant Control

PCL: Everglades National Park
 Site Manager: National Park Service
 Tony Pernas
 40001 SR 9336, Homestead, Florida 33034
 Phone: 305-242-7846, Fax: 305-242-7836
 E-mail: tony_pernas@nps.gov

County: Miami-Dade
 PCL Size: 1,507,850 acres

Project ID: NP-007
 Fiscal Year 01/02

Project Size: 4,694 acres
 Project Cost: \$86,286.95

The Southeast Saline Everglades are a unique natural community of southern Florida. A combination of local rainfall, upstream water, and tidal influx from Florida Bay or Biscayne Bay affects the hydrology of this community. The marshes and swamps of the saline Everglades contain a dense network of small tree islands. These tree islands typically have mangroves and buttonwood forming the tree island perimeters. The interior of these tree islands can contain a diverse array of tree species, including *Salix*, *Taxodium*, *Annona*, *Metopium*, *Eugenia axillaris*, *Coccoloba diversifolia*, *Calyptranthes pallens*, *Eugenia foetida*, *Lycium carolinianum*, *Jacquinia keyensis*, and *Randia aculeata*.

The entire project cost was provided by BIPM as a cost-share to NPS funding on other projects.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Melaleuca quinquenervia</i>	melaleuca	Category I	aerial/cut stump	Arsenal
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	cut stump	Arsenal



Everglades/Big Cypress *Lygodium* Invasive Exotic Plant Control

County: Miami-Dade, Collier

PCL: Everglades National Park
PCL: Big Cypress National PreservePCL Size: 1,507,850 acres
PCL Size: 729,000 acresSite Manager: National Park Service
Tony Pernas (ENP)
40001 SR 9336, Homestead, Florida 33034
Phone: 305-242-7846, Fax: 305-242-7836
E-mail: tony_pernas@nps.govWilliam A. Snyder (BCNP)
HCR 61 Box10, Ochopee, Florida 34141
Phone: 941-695-4111 x44, Fax: 941-695-3493
E-mail: bill_snyder@nps.gov

Project ID: NP-023

Project Size: 233 acres

Fiscal Year 01/02

Project Cost: \$26,662

In Everglades National Park, Old World climbing fern (*Lygodium microphyllum*) is rapidly colonizing scrub habitat in the coastal marsh communities from Cape Sable to Everglades City. This rapidly spreading exotic pest plant has the potential to rapidly and severely alter the Park's native flora. *Lygodium* readily invades most of south Florida's native plant communities, growing over trees and shrubs and smothering entire plant communities. In the Loxahatchee National Wildlife Refuge, *Lygodium* now occurs on practically every tree island. Many of the tree islands are so badly infested that they are lost as a natural area. *Lygodium* also alters natural fire behavior. Huge skirts of old fronds enclose trees and serve as ladder fuels to carry fire into canopies. Trees that may normally survive ground fires are killed when fire is brought into the canopy. *Lygodium*, a difficult plant to treat, requires several treatments to bring it to a maintenance level. In June of 2001, a BIPM project funded the treatment of 200 acres (sites 1-3, see map). However, approximately 200 acres remain to be treated.

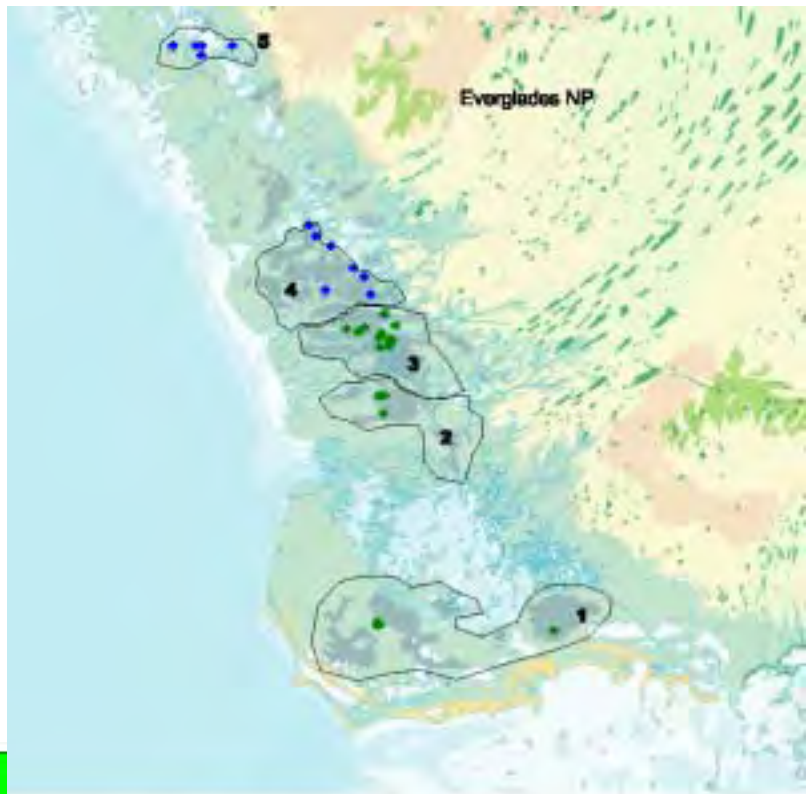
In Big Cypress National Preserve, the proposed area to be treated is North of 1-75, just south of the Hendry County line. Pinelands and scattered cypress domes and strands dominate this area. The area was historically farmed and cattle grazing was common. Some areas were cleared and filled for supporting various agricultural endeavors. The area is surrounded by the Seminole Indian Reservation to the north and the remainder of Big Cypress National Preserve to the South. Since the early 1990s, no *Lygodium* has been detected in the Preserve from aerial reconnaissance. However, a small (10-acre) patch was recently discovered on an abandoned agricultural field.

Overall, climbing fern occurs in the project area with a 10-100% cover. It was aerielly treated by helicopter using a foliar application of herbicide. This project was a 50%-50% cost-share, with the National Park Service contributing \$12,600.

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



Old World climbing fern showing the effect of aerial treatment.

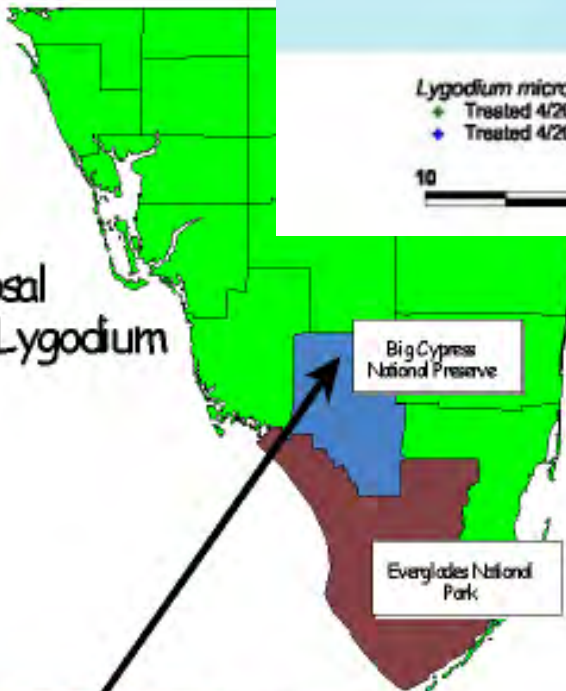


Lygodium microphyllum
 + Treated 4/2000 and 6/2001
 * Treated 4/2000

10 0 10 20 Miles



FY 02
 EPMT Proposal
 Big Cypress Lygodium



Flamingo Invasive Exotic Plant Control

PCL: Everglades National Park

Project Manager: National Park Service
 Tony Terry, Flamingo Ranger District
 40001 SR 9336, Homestead, Florida 33034
 Phone: 941-695-3096, Fax: 941-695-3854
 E-mail: tony_terry@nps.gov

County: Miami-Dade, Monroe

PCL Size: 1,507,850 acres

Project ID: NP-011

Project Size: 321 acres

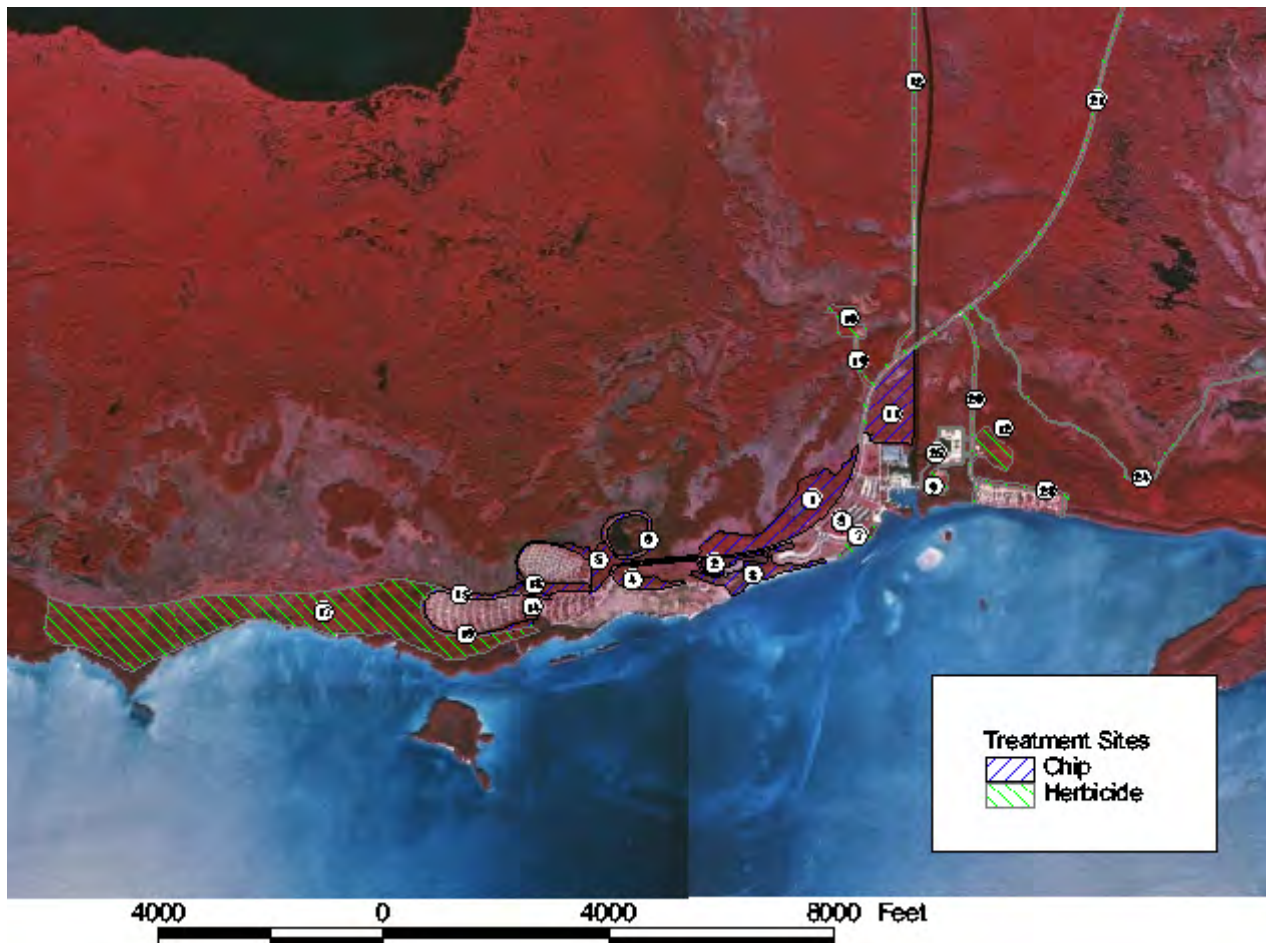
Fiscal Year 01/02

Project Cost: \$99,605.31

Exotic pest plants heavily affect the Flamingo district of Everglades National Park. Monocultures of Brazilian pepper and lather leaf greet the millions of visitors to Flamingo each year. Campgrounds that twenty years ago provided visitors with open vistas of mangrove scrub, buttonwood forests, and coastal prairies now provide visitors a view of Brazilian pepper forests. One of the most threatened plant communities in Everglades NP is the buttonwood forest. Buttonwood forests are found nowhere else in the world and are home to many endangered plant species. Brazilian pepper is displacing buttonwood forests in south Florida at an alarming rate, including over 50 acres displaced in Flamingo alone. Hiking trails and roads within the Flamingo area are serving as exotic plant corridors, facilitating the spread of exotics such as Brazilian pepper. These exotic species, once established along corridors, provide seed sources for expansion into adjacent natural areas such as buttonwood forests.

This was a cost-share project with NPS providing \$10,000 of the total project cost.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	basal bark	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	basal bark	Garlon 4



Gulf Coast Invasive Exotic Plant Control

PCL: Everglades National Park

Project Manager: National Park Service
 Tom Iandimarino, Gulf Coast Ranger Station
 815 South Copeland, Everglades City, Florida 34139
 Phone: 941-695-4217, Fax: 941-695-3621
 E-mail: tom_iandimarino@nps.gov

Project ID: NP-025

Fiscal Year 01/02

County: Miami-Dade, Monroe

PCL Size: 1,507,850 acres

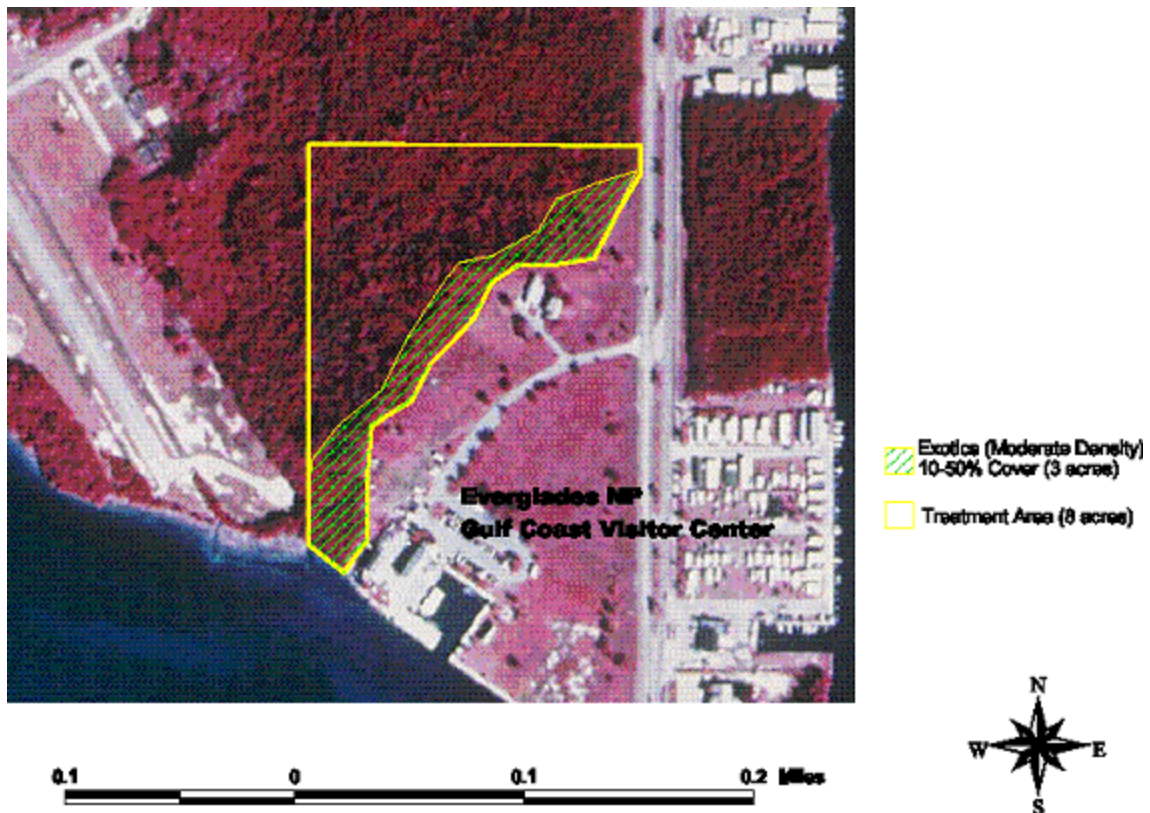
Project Size: 874 acres

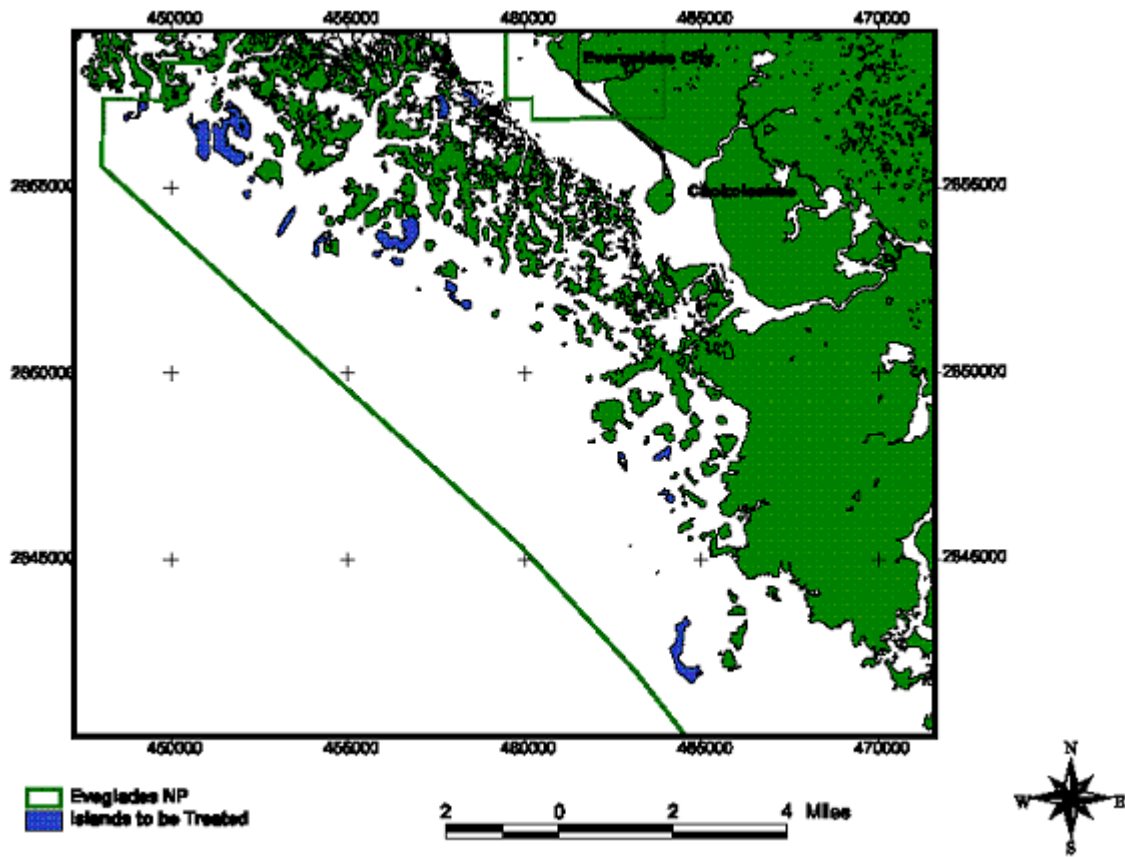
Project Cost: \$91,973.14

Exotic plants have heavily affected the Gulf Coast District of Everglades National Park. Several exotic pest plants including Brazilian pepper, lather leaf, and Australian pine are displacing native plant habitats in sensitive coastal island and mangrove ecosystems. The main exotic pest plant species in the Gulf Coast District area are Brazilian pepper, lather leaf, seaside mahoe, and beach naupaka. Exotic species (primarily seaside mahoe) have invaded buttonwood/mangrove forests around the visitors' center. The total area of this project site is approximately 8 acres; 3 acres are moderately infested. This project also includes the first phase of a two-year eradication effort to rid the exterior barrier islands within the Gulf Coast District of exotic pest species. The first effort will involve all barrier islands north of Pavilion Key, including Tiger, Picnic, Indian, Kingston, Jack Daniels (both Lynchburg and Black Label Keys), Jewell, Turtle, Rabbit, and Pavilion Keys. These islands total approximately 866 acres and have an average exotics cover of 5%.

This was a cost-share project with NPS providing \$59,332 of the total project cost.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	basal bark	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	basal bark	Garlon 4
<i>Scaevola sericea</i>	beach naupaka	Category I	basal bark	Garlon 4





Controlling seaside mahoe in ENP.



Before (top), during (center), and after (bottom) control of bowstring (or shoestring) hemp plants.

South Biscayne Barrier Islands Invasive Exotic Plant Control

County: Miami-Dade, Monroe

PCL: Biscayne National Park

PCL Size: 172,924 acres

Project Manager: National Park Service

Toby Obenauer

9700 SW 328th Street, Homestead, Florida 33033

Phone: (305) 230-1144, Fax: (305) 230-1190

E-mail: Toby_Obenauer@nps.gov

Project ID: NP-022

Project Size: 2,888 acres

Fiscal Year 01/02

Project Cost: \$176,707.91

The barrier islands in south Biscayne Bay have interiors dominated by hardwood hammock species, with an outer mangrove fringe. The project area includes Porgy, Old Rhodes, Totten, and Rubicon Keys, and the southern portion of Elliott Key. Areas invaded by exotic vegetation are dispersed throughout the islands, with heavy concentrations along the shores and in disturbed areas. These islands also host a number of state threatened and endangered species, including West Indian mahogany (*Swietenia mahogani*), satinleaf (*Chrysophyllum oliviforme*), silver palm (*Coccothrinax argentata*), and red stopper (*Eugenia rhombea*). Also present are joewood (*Jacquinia keyensis*) and sea lavender (*Argusia gnaphalodes*), the latter listed as threatened. Federally listed species that utilize these islands include the threatened eastern indigo snake (*Drymarchon corais couperi*) and the endangered Schaus swallowtail butterfly (*Heracles aristodemus ponceanus*). These species may be negatively affected by the presence of invasive exotics.

Invasive exotic plants primarily in the coastal area include lather leaf, Brazilian pepper, Hawaiian half-flower or beach naupaka, bowstring hemp, and seaside mahoe. The primarily interior exotic species are sapodilla, sisal hemp or century plant (*Agave sisalana*), and Burma reed (*Neyraudia reynaudiana*). The average cover of exotics over the entire project area is less than 10%.

This was a cost-share project with NPS providing \$87,780 of the total project cost.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark/girdle	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4
<i>Manilkara zapota</i>	sapodilla	Category I	basal bark/girdle	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	basal bark	Garlon 4
<i>Scaevola sericea</i>	beach naupaka	Category I	cut stump	Garlon 4



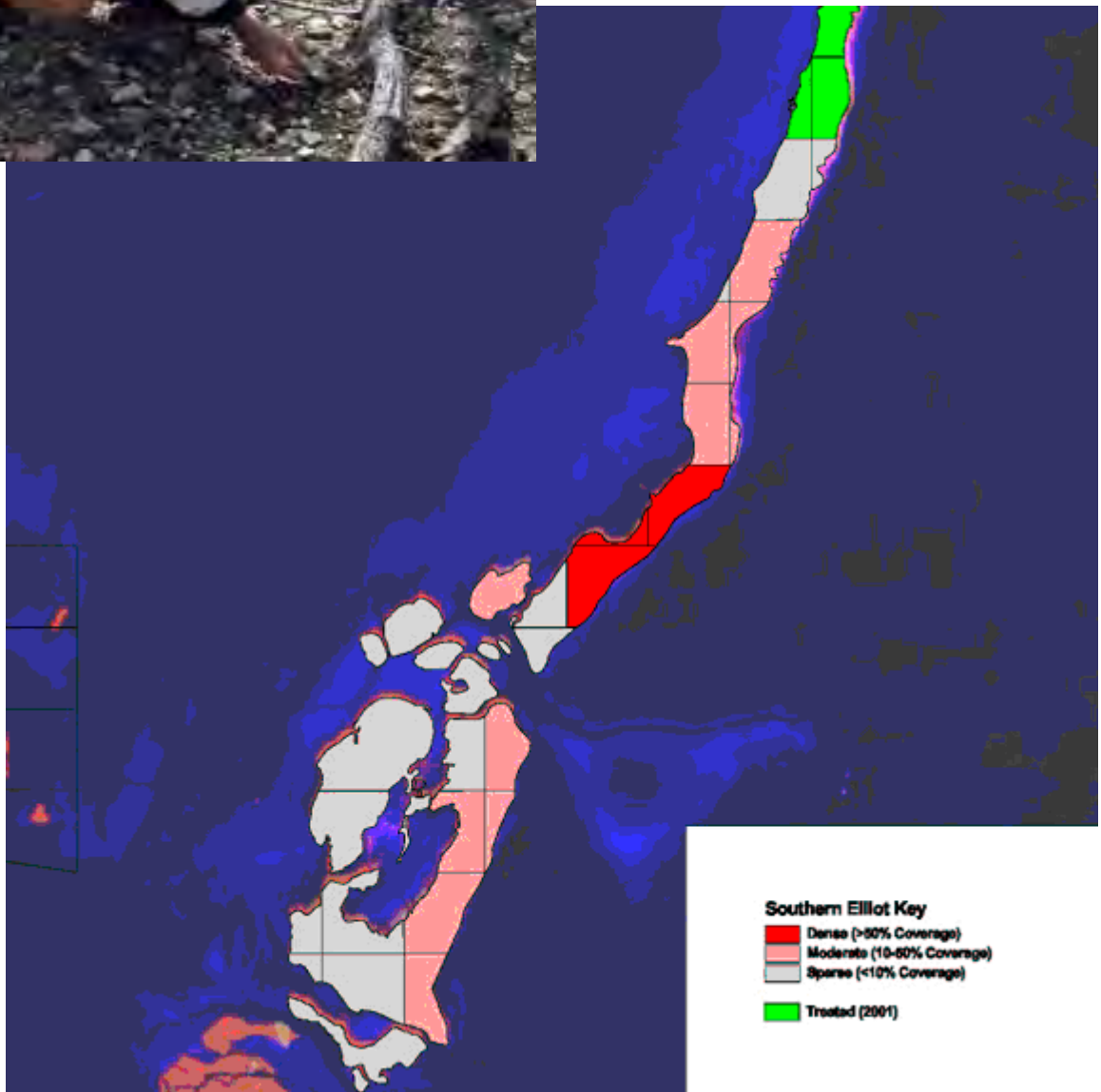
Hacking through a lather leaf thicket.



Applying herbicide to the cut stumps of seaside mahoe.



Mangrove seedlings sprouted after the dense mahoe was removed.



Elliot Key Invasive Exotic Plant Control

County: Miami-Dade, Monroe

PCL: Biscayne National Park

PCL Size: 172,924 acres

Project Manager: National Park Service

Toby Obenauer

9700 SW 328th Street, Homestead, Florida 33033

Phone: (305) 230-1144, Fax: (305) 230-1190

E-mail: Toby_Obenauer@nps.gov

Project ID: NP-012

Project Size: 181 acres

Fiscal Year 01/02

Project Cost: \$18,805.40

Elliot Key is dominated by hardwood hammock species, with an outer mangrove fringe. Areas invaded by exotic vegetation are dispersed throughout the island, with heavy concentrations along the shore and in disturbed areas. There is a maintained trail, Spite Highway, running north to south through the center of the island. The center of the island has two, east-west interpretive trails. Mangroves protect the shoreline from storms and hurricanes. The rest of the island is comprised of dense hammock species that are nearly impenetrable. Elliott Key also hosts a number of state threatened and endangered species including West Indian mahogany (*Swietenia mahogani*), satinleaf (*Chrysophyllum oliviforme*), silver palm (*Coccothrinax argentata*), and red stopper (*Eugenia rhombea*). Also present are joewood (*Jacquinia keyensis*) and sea lavender (*Argusia gnaphalodes*), which is listed as threatened. Federally listed threatened or endangered species that utilize this island include, respectively, the eastern indigo snake (*Drymarchon corais couperi*) and the Schaus swallowtail butterfly (*Heraclides aristodemus ponceanus*). These species may be negatively affected by the presence of invasive exotics on Elliott Key.

Invasive exotic plants primarily in the coastal area include lather leaf, Brazilian pepper, Hawaiian half-flower or beach naupaka, bowstring hemp, and seaside mahoe. The primarily interior exotic species are sapodilla, sisal hemp or century plant (*Agave sisalana*), and Burma reed (*Neyraudia reynaudiana*). The island is divided into a map grid with a buffer area of the most concentrated stands of exotics. This area encompasses a 50-meter coastal fringe and a 10-meter buffer along the sides of Spite Highway. An additional one-acre stand of scattered *Neyraudia reynaudiana* is located in one of the previously treated areas.

Plants Treated	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark/girdle	Garlon 4
<i>Thespesia populnea</i>	seaside mahoe	Category I	cut stump	Garlon 4
<i>Manilkara zapota</i>	sapodilla	Category I	basal bark/girdle	Garlon 4
<i>Colubrina asiatica</i>	lather leaf	Category I	basal bark	Garlon 4
<i>Scaevola sericea</i>	beach naupaka	Category I	cut stump	Garlon 4

Fort Matanzas Invasive Exotic Plant Control

PCL: Fort Matanzas National Monument

Project Manager: National Park Service

Dave Parker

8635 A1A South, St. Augustine, Florida 32080

Phone: 904-471-0116, Fax: 904-471-7605

E-mail: dave_parker@nps.gov

Project ID: NP-027

Fiscal Year 01/02

County: St. Johns

PCL Size: 300.11 acres

Project Size: 298 acres

Project Cost: \$2,500

Fort Matanzas National Monument represents an island of preservation amidst encroaching development along the northeast Florida coast. Monument lands were not severely infested with exotic plants, but if unchecked exotics could have become a serious problem. Monument lands support several rare species including the Anastasia Island beach mouse, the indigo snake, wood stork, and nesting sea turtles. The spread of exotic plants would have further threatened the survival of these species. The primary concern was Brazilian pepper on Rattlesnake Island. On the north end of the island, large individual plants existed for several years, despite sporadic treatments by Monument personnel. Numerous young plants were also found in the area. The area of Brazilian pepper infestation encompassed approximately 5 acres with a 5% cover. On Anastasia Island, there were scattered patches of lantana, asparagus fern, and sword fern totaling less than one acre.

NPS provided the entire project cost as a cost-share match to other BIPM funded projects.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal bark	Garlon 4
<i>Lantana camara</i>	lantana	Category I	basal bark	Garlon 4
<i>Nephrolepis cordifolia</i>	sword fern	Category I	foliar	Roundup
<i>Asparagus densiflorus</i>	asparagus-fern	Category I	foliar	Roundup





The nefarious *Nephrolepis* (sword or “Boston” fern) has been foiled at this site.



An informative sign, such as this one available from BIPM, informs the public of this fern’s fate.

Other state agencies and other divisions within DEP receive funding to conduct land management activities, which may include exotic species control, on properties where they are designated as the manager by the Board of Trustees. The Bureau provides free assistance to these agencies by offering the use of its established contract procedures and contractors to perform exotics control projects, thus avoiding a duplication of effort. The Bureau handles all of the processing of these projects except for the actual release of funds, which are disbursed by the managing agency.

In FY02, ten state park projects were funded in part by the DEP Division of Recreation and Parks (Florida Park Service) as cost-shares with BIPM. Three projects were wholly fund by DRP with BIPM overseeing the contractual arrangements on behalf of DRP. These three projects are discussed below. The other eleven projects are discussed under their respective working groups. The total of DRP funds expended through the Uplands Program for invasive plant control was \$222,088.85.

Hugh Taylor Birch Invasive Exotic Plant Control

County: Broward

PCL: Hugh Taylor Birch State Park

PCL Size: 175.24 acres

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

Project ID: RP-020

Project Size: 10.25 acres

Fiscal Year 01/02

Project Cost: \$82,200

The park is a barrier island located along the Intracoastal Waterway. Natural communities include Beach, Maritime Hammock, and Mangrove Swamp. The project consists of removing primarily Australian pine from a former spoil area in the southwest corner of the park. Distinct boundaries (e.g., Intracoastal Waterway, roadways, and fences) delineate the outer boundary of the east, south and west sides. With the exception of the ditch adjacent to park housing, the remainder of the area is upland habitat that consists of spoil material. Within the project site, exotic vegetation that has been recently cut will be selectively cleared and cut to ground level.

This project was one of three undertaken at the park (*see also* SE-022, 034). The Friends of Florida State Parks contributed \$60,000 of the total project cost.

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

Barrier Island Invasive Exotic Plant Control

PCL: Barrier Island GEO Park

Project Manager: Florida Park Service (DEP)

Reggie Norman, Park Manager

880 Belcher Rd. P.O. Box 1150, Boca Grande, Florida 32921

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

E-mail: bigppm@gl3c.com

Project ID: RP-021

Fiscal Year 01/02

County: Charlotte

PCL Size: 460 acres

Project Size: 37 acres

Project Cost: \$53,200

Don Pedro Island and Whidden Key are barrier islands within this park. Natural communities in addition to Beach and Dune include Coastal Strand and Maritime Hammock. The project consists of removing Brazilian pepper and Australian pine from Don Pedro Island and Whidden Key. This project is Phase III in a continuing exotic removal project. BIPM contributed an additional \$2,200 toward the total project cost.

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



Fort Pierce Inlet Invasive Exotic Plant Control

County: St. Lucie

PCL: Fort Pierce Inlet State Park

PCL Size: 1,141 acres

Project Manager: Florida Park Service (DEP)

Perry Smith, Park Manager

905 Shorewinds Drive, Ft. Pierce, Florida 34949

Phone: 561-468-4007, Fax: 561-460-3646

E-mail: perry.j.smith@dep.state.fl.us

Project ID: RP-022

Project Size: 100 acres

Fiscal Year 01/02

Project Cost: \$77,059.88

Fort Pierce Inlet State Park is located on a barrier island. The project area runs along A1A to the north, Atlantic Beach Boulevard to the east, and into the mosquito impoundment to the south. The project area is comprised of old spoil area and mosquito impoundments. Brazilian pepper is heavy and Australian pine is moderate to heavy along the mosquito impoundment and moderate inside the impoundment. Control of exotics in this area will help reduce seed source for these plants and assist in controlling these invasive plants on North Hutchinson Island. The Florida Park Service also manages two other parcels on the island and this project assists in controlling the spread of these plants into those areas.

This project was funded entirely with Florida Park Service moneys.

Target Plants	Common Name	FLEPPC Rank	Treatment	Herbicide
<i>Casuarina equisetifolia</i>	Australian pine	Category I	basal/girdle/cut stump	Garlon 4
<i>Schinus terebinthifolius</i>	Brazilian pepper	Category I	basal/cut stump	Garlon 4
<i>Eugenia uniflora</i>	Surinam cherry	Category I	basal	Garlon 4
<i>Cupaniopsis anacardioides</i>	carrotwood	Category I	basal	Garlon 4



After clearing most BP and AP



Recovery after removal/treatment



The “Herbicide Bank” was established by the Upland Invasive Exotic Plant Management Program to assist land managers in maintenance control of exotics on lands that were part of a previously funded project. The Uplands Program supplies the herbicide for re-treatment, while the manager provides the labor, time, and any other materials required. An Access database was created to organize and keep track of all the Herbicide Bank information, including amounts ordered and costs. Herbicide may also be provided for initial control projects where the managing agency chooses to do exotic removal in-house and requests only herbicide funding from the Uplands Program.

Depending upon the type of plant, re-treatment is typically needed one to two years after the initial control work is completed. Herbicide was ordered in FY 2001-2002 for re-treatment of projects that were completed in FY 2000-2001. Calculations for the amount of herbicide ordered for projects is based upon 25% or 50% of the original use summaries. Twenty-five percent of original usage is given where initial treatment included trees and/or shrubs, while fifty percent of original usage is given where treatment included vines and/or grasses.

The amounts of surfactant ordered for re-treatment are based upon the herbicide ordered. In most cases the herbicide ordered was Garlon 4 and thus the amount of surfactant ordered was based on a 22% ratio of herbicide to surfactant. Garlon was ordered in 2.5-gallon jugs and surfactant (Diluent Blue) in 11.25-gallon drums. Upon request, amounts of herbicide and surfactant were ordered based upon a lower percentage of mixture, usually 10%. For herbicides other than Garlon 4, surfactant ordered was based upon label recommendations.

The type of herbicide ordered was also based upon the project summaries given by the contractors. Generally, the herbicide ordered for re-treatment was the same as that originally applied by the contractor. Different herbicides are ordered only upon request. For requests of herbicides different from the original treatment, amount ordered was based upon an equal cost.

The following is a summary of the herbicide bank results for FY 2001-2002:

Total Gallons of Herbicide Ordered	6,320 gallons
Total Money Spent on Herbicide Bank Projects	\$201,492.60
Total Herbicide Bank Maintenance Projects	39 projects
Total Herbicide Bank Project Acres	7,658.38 acres

Melaleuca Management—The South Florida Water Management District has been actively engaged in controlling nuisance vegetation in the Everglades Protection Area (EPA) since the canal and levees were constructed in the early 1950s. In 1972, the Florida Conservation Foundation published in its monthly newsletter several paragraphs regarding the invasion of three exotic trees in Florida: melaleuca, Australian pine and Brazilian pepper. In 1975, two public interagency workshops sponsored by the Florida Game and Fresh Water Fish Commission were held to determine ways to control melaleuca in south Florida. A continuation of these workshops led to the formation of the Exotic Pest Plant Council in 1984, and the Melaleuca Task force in 1990. Subsequently, the District initiated a major melaleuca control program in the Everglades Conservation Areas. Melaleuca continues to be the primary target of the District’s exotic plant control operation within the EPA.

District efforts to control melaleuca, along with those of other governmental agencies and private groups, are containing its spread within the Everglades Water Conservation Areas (WCAs) and the marsh of Lake Okeechobee. Melaleuca has been completely cleared from Water Conservation Areas 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; however, biological control methods are not completely available for melaleuca. The melaleuca snout beetle (*Oxyops vitiosa*) was released in WCA-3B near Holiday Park in Ft. Lauderdale in April 1997. This insect is currently spreading and is successfully establishing itself within melaleuca populations in South Florida. A second insect, a sap-sucking psyllid (*Boreioglycaspis melaleucae*), was released in November 2002. One more Australian insect will be released in the near future.

District efforts in developing melaleuca control methods have concentrated on herbicidal control and the limited use of mechanical and physical control methodologies. The District first implemented melaleuca control strategies, developed by the MTF, in the southeast corner of WCA-3B in November 1990. The strategy for managing melaleuca is modified, as control methodologies are developed, to improve efficacy and cost effectiveness. The frill-and-girdle method, in which the bark around the circumference of each tree is completely removed to expose the cambium for application of the herbicide solution, is the primary tool used in the least infested areas. Aerial application is the most economical method for large melaleuca monocultures. The District has been actively involved in the investigation of control methods for mature and seedling trees. Research needs to continue to improve control methods at reduced costs.



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, 15-20% 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. However, the cut/stump application of herbicide is also very effective, but remaining stumps may create a navigation hazard for airboat traffic when the marsh is wet. This type of application is used only on trees with base stem diameter of less than three inches. Melaleuca seedlings in mixed communities are usually hand-pulled in an effort to minimize the impact of herbicides on non-target vegetation. Seedlings are left hanging on remaining vegetation or put in a pile to reduce the potential for regrowth.

Until recently, aerial applications of tebuthiuron, hexazinone, triclopyr, imazapyr, and combinations of imazapyr and glyphosate have been used on an experimental basis only. This type of application is becoming essential as control operations are closing in on 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, in large-scale application.

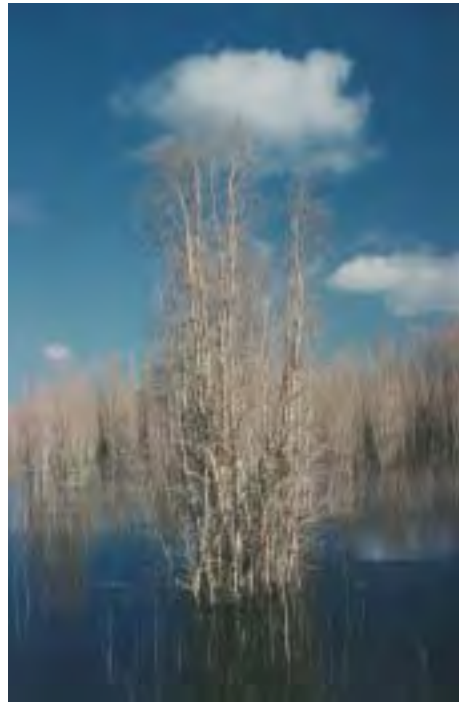
Regardless of the control method used, a comprehensive data collection and evaluation plan is essential for the success of melaleuca management initiatives. Record keeping is invaluable for making future management decisions. Data collection in the District's program includes: longitude and latitude 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. This data is used to produce maps of treatment progress and to keep track of individual melaleuca control sites.

Water Conservation Areas—Melaleuca occurred throughout all the WCAs, with degrees of infestation ranging from ten to greater than twelve thousand trees per hectare. The trees in WCA-2A were widely scattered compared to light to moderate infestation in WCA-3A and 3B. The infestation level in WCA-2B was severe, with nearly 30% of the area containing solid forest and individual tree. Depending on accessibility and helicopter, airboats, and/or all-terrain vehicles are used to transport crews and supplies. Once on site, crews perform melaleuca girdle or cut/stump method of herbicide application. Each crew may consist of three to eight people, depending on the density of the melaleuca infestation at the site being treated.

The melaleuca control project began at the southeast corner of WCA-3B in November of 1990 and proceeded northward through WCA-3B, 3A, north and south. Work continued in WCA-2B during FY 02 with 1,000 acres treated by aerial application. Crews are also treating light infestations of Brazilian pepper, Australian pine, Java plum, and earleaf acacia along all the canal banks and levees within the WCAs.

Lake Okeechobee—The U.S. Army Corps of Engineers originally introduced melaleuca to Lake Okeechobee in the late 1930s. These trees were planted on low-lying islands immediately lakeward of the levee to protect the levee and wave erosion. From these limited plantings, melaleuca spread into many thousands of hectares of marsh within the lake. There were two main areas of melaleuca infestation in Lake Okeechobee. The first area included the levee and marsh zone near the original planting sites. These sites were characterized by large, mature, extremely dense monocultures. The second area included the shallow marsh region of the lake, where trees spread lakeward. Melaleuca infestations in the outer marsh typically consisted of outliers and small groups of trees (heads) of varying ages. The lake has been divided into seven management sections, each with varying degrees of infestation.

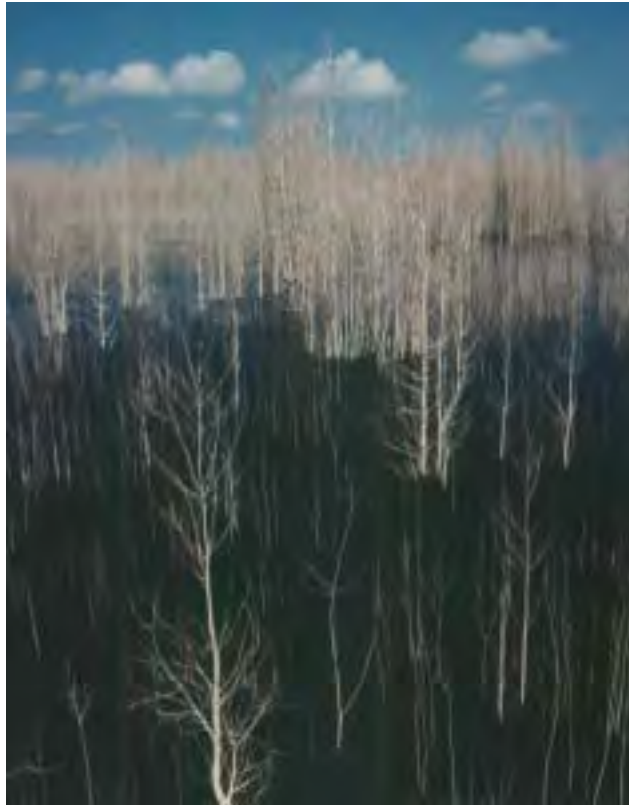
Melaleuca control operations on Lake Okeechobee began in August 1993. The goal of the melaleuca management program on Lake Okeechobee is to first contain, then progressively reduce, populations within the littoral zone. Phase I work has been completed throughout the marsh. Crews are currently sweeping through all the previously treated areas to treat regrowth and remove any recurring seedlings. In FY 02, 1,000 acres of melaleuca monoculture in the Lake were treated by aerial application.



Mitigation areas—Mitigation funds are used to acquire and enhance lands within the Pennsuco project located in Dade County and Cell 17/18 in Broward County. The benefits of utilizing these areas for mitigation include eradication of exotic vegetation to ensure the enhancement, preservation, and maintenance of these wetland systems. The eradication of melaleuca is the only wetland enhancement activity that is planned for these areas. The control program consists of ground based herbicide application and aerial application in the dense monocultures. In FY 02, 500 acres in Pennsuco and 250 acres in Cell 17/18 were treated by aerial application.

Melaleuca control in the mitigation areas will continue as the District buys more land for mitigation purposes. The use of prescribed burning will facilitate seedling control and hopefully reduce the need for Phase II control, as well as help to maintain a mosaic of vegetation types within the enhanced sawgrass community.

Funding—The District’s is derived from several years, over \$22 million has District to fight melaleuca. Approximately \$13 million come from sources other District *ad valorem* taxes. Outside sources have and Light mitigation funds Improvement and (SWIM), the U.S. Army (USACE), and the Environmental Protection USACE funds are available Okeechobee only. However, 1996, and the FP&L support. Fortunately, the USACE and support the program. The Plant Management has had with the District since 1994. provides \$1 million for the District matches dollar availability of funds is success of the melaleuca



melaleuca control funding sources. In the past twelve been budgeted by the *i n f e s t a t i o n s* . (58%) of this amount has than District resources; provided the balance. included the Florida Power (FP&L), the Surface Water Management fund Corps of Engineers Department of (DEP). SWIM and for work in Lake SWIM funding was lost in ceased in 1994. DEP have continued to DEP Bureau of Invasive a cost-sharing program. Each year, the Bureau melaleuca control, which for dollar. Continued essential for the continued management program. At

the current level of funding, melaleuca could be eliminated from the Everglades Water Conservation Areas and the marshes of Lake Okeechobee within the next ten years.

The District continues to support, at \$150,000 per year, the U. S. Department of Agriculture research for biocontrol of melaleuca. The District is also providing \$60,000 to the Everglades National Park and \$75,000 to the Loxahatchee Wildlife Refuge, each year, for their melaleuca control programs.

Conclusion—The operational and experimental work accomplished to date demonstrates that melaleuca can be effectively and consistently controlled using an integrated management approach. The ultimate control of melaleuca throughout the District will depend primarily on the future availability of funds. The magnitude of the threat of melaleuca and the cost of current control efforts are enormous. However, at the current rate of treatment, melaleuca should be under maintenance control in the WCAs and in Lake Okeechobee within the next ten years.

The elimination of melaleuca from the Everglades, Lake Okeechobee, and other District managed lands may cause a temporary disruption of the native flora; however, any sign of disturbance caused by control treatments usually vanishes within one to two years. This temporary adversity is an acceptable event in ridding these natural areas of an invasive exotic pest plant. Only through melaleuca eradication can we insure the sustainability of these treasured wildlands.

Uplands Operations Summary Bureau of Invasive Plant Management

Uplands Operations Summary for 1997-2002
 (Acres Controlled, Cost/Acre And Cost Range Includes All Projects.
 Operational Data Only From Projects That Submitted Complete Daily Progress Reports.)

2001-2002					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	17520.80	\$350.16	\$93-\$21667	21.91	0.99
Vines	1775.57	\$408.19	\$234-\$12997	14.40	0.80
Shrubs-Grasses	3092.00	\$187.40	\$19-\$3158	8.39	0.26
TOTALS	22388.37	\$332.28	\$19-\$21667	17.73	0.80

2000-2001					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	11503	\$228	\$17-\$4918	4.91	0.30
Vines	985	\$472	\$98-\$5082	7.05	0.16
Shrubs-Grasses	494	\$534	\$35-\$1786	13.98	1.07
TOTALS	12982	\$258	\$17-\$5082	5.39	0.31

1999-2000					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	1964	\$727	\$60-\$5576	18.75	1.14
Vines	744	\$675	\$344-\$5186	13.67	1.15
Shrubs-Grasses	390	\$808	\$517-\$2256	13.81	1.44
TOTALS	3098	\$725	\$60-\$5576	16.42	1.19

1998-1999					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	1677	\$489	\$32-\$2696	18.01	1.03
Vines	804	\$354	\$149-\$1832	15.41	0.42
Shrubs-Grasses	597	\$154	\$54-\$730	7.66	0.55
TOTALS	3078	\$389	\$32-\$2696	15.32	0.78

1997-1998					
	Acres Controlled	Cost/Acre	Cost Range	Hours/Acre	Gal Product/Acre
Trees	1112	\$486	\$422-\$1167	25.25	0.39

The Bureau of Invasive Plant Management coordinates research, education, and outreach activities in both the Uplands and Aquatic Weeds programs. The strategic plan for the Uplands program lists several goals that pertain to these activities, including (a) promote operational research that addresses conservation land management needs, (b) integrate current control technologies into public land management plans and activities, (c) inventory and map invasive exotic plant infestations, (d) develop an integrated assessment and monitoring program to track infestations and monitor control efforts, (e) implement a comprehensive educational program to improve public awareness, and (f) expand education and outreach efforts.

Research has been a priority of BIPM for decades. Areas needing further study include the ecological processes of invasive exotic plant invasion and establishment, especially in native ecosystems; the vulnerability to invasion of individual vegetation types and habitats; changes to site diversity and other effects of invasion; alternative treatment methods; and the economic consequences of plant invasions. Also, methods are needed for predicting which new species in Florida are likely to become invasive and should be immediately restricted and controlled. Research on biological controls for invasive exotic plants is a necessary part of any long-term planning to bring invasive exotic plants under maintenance control, and to meet the challenges of cost-effective invasive exotic plant management on public lands.

BIPM has been a strong supporter of control methodology research, including biological control, since the Bureau's establishment in 1970. From 1970 to 1995, BIPM administered nearly \$8.5 million allocated by the Legislature for research to support science-based invasives management in Florida's aquatic ecosystems, with a strong emphasis on biocontrol. From 1988 through 1995, the annual legislative allocation for invasive plant management research was approximately \$200,000. In 1996-97, an additional \$150,000 was allocated for biocontrol. Since that time, approximately \$200,000 of the total annual allocation of \$350,000 has been spent on biocontrol.

With the establishment of the Uplands program in 1997, the need for scientific data and control methodology expanded to many more invasive species. BIPM has supported melaleuca biocontrol research since 1994, Brazilian pepper biocontrol since 1999, and Old World climbing fern biocontrol since 2000. In 2002, BIPM initiated collaborative support with the Southwest Florida Water Management District for biocontrol research on skunk vine. BIPM has also funded short-term biocontrol projects on wetland nightshade and tropical soda apple. During its 30+ years as the lead agency for invasive plant management in Florida, BIPM has contracted for over 120 completed research projects. A summary of research conducted during FY 2001-2002 (both Aquatics and Uplands) appears in Appendix I.

The priorities for research are reviewed annually through a bureau-wide review and ranking process of proposed projects. BIPM also seeks and obtains input from resource managers and researchers in other agencies on a recurring basis. BIPM has often stretched the limited available dollars through cost-sharing agreements with other agencies. BIPM's approach, plus a commitment to science-based policy and place-based adaptive management, has resulted in a research program considered to be "cutting-edge" in this country and elsewhere.

Melaleuca Biocontrol

Explorations for potential biocontrol agents from Australia resulted in the collection of >450 arthropods associated with melaleuca. Among the most promising candidates, the melaleuca snout beetle (*Oxyops vitiosa*) was the first agent selected for testing. This weevil was found to be sufficiently host specific for release and in 1997 it was introduced at 13 locations in south Florida. Today, millions of the weevils occupy melaleuca stands in the Everglades and throughout south Florida, cutting seed production by up to 50%.

In 2002, a second beneficial insect from Australia was added to the melaleuca assault force. The melaleuca psyllid (*Boreioglycaspis melaleucae*) is a sap-sucking insect (pictured below), about the size of a gnat. While the melaleuca snout beetle feeds on young foliage produced on both saplings and older, mature trees, the psyllid feeds on the tree's sap, severely damaging seedlings. Another difference is that the weevil is restricted to dry habitats, while the psyllid can attack melaleuca anywhere.



Left: Adult melaleuca psyllid female (*Boreioglycaspis melaleucae*). Image Number K7873-7, ARS Photo Library. Photo by Sue Wineriter.
Right: feathery coating on leaves indicating psyllid activity.



Secretary of the Interior Gale Norton participated in the first psyllid release into Everglades National Park.

Lygodium Biocontrol

Exploration for biocontrol agents for *Lygodium microphyllum* is underway in Australia and Southeast Asia, with twenty-two candidates collected thus far. Preliminary host range testing of two moths *Cataclysta camptozonale* (Pyrilidae) and *Neomusotima conspurcatalis* (Pyrilidae) has been completed. These insects were shipped to the University of Florida/ARS quarantine in Gainesville for final host range testing. A third pyralid moth species from New Caledonia has been discovered and is now in culture in Brisbane quarantine facilities. Preliminary host range testing for the New Caledonian species is underway. A fourth pyralid species, a stem borer, is under development in Thailand. The eriophyid mite, *Floracarus perrepae*, has been collected from throughout the range of *L. microphyllum* in Australia and Asia. The mite causes leaf curling and stunts new growth. High populations of the mite are associated with secondary diseases and eventual defoliation. Field studies in Brisbane show that the mite causes a significant impact on biomass production, reducing growth by more than 50%. Exploration for additional agents is continuing in Australia, China, New Caledonia, India, Indonesia, Malaysia, Palau, Singapore, and Thailand.



Left: Researchers have pinned their hopes on these three leaf defoliating moths. Center: A leafmining beetle has been collected from *L. microphyllum* in Singapore. Right: A leaf-curling mite has been collected on *L. microphyllum* from Australia and SE Asia. Mite feeding is associated with foliar disease which leads to defoliation. Pictures - USDA/ARS.

Brazilian Pepper Biocontrol

Currently, there are no biological controls that have been released in the United States for Brazilian pepper. Over two hundred insects have been identified that feed on Brazilian pepper in its native land; however, in order for them to be considered as possible biological control agents, scientists must prove that they are specific to Brazilian pepper. Effective biological control agents must also be able to reproduce after introduction into the United States. University of Florida scientists have identified two insect species which may prove to be effective biocontrol agents, a sawfly and a thrips. The sawfly causes defoliation and the thrips feeds on new shoots. Research is continuing on these species.



Sawfly larvae (*Heteroperreyia hubrichi*) feed on a pepper leaf. Photo: Stephen D. Hight, USDA ARS, www.invasive.org



Adult meristem-sucking thrip (*Pseudophilothrips ichini*). Photo: James P. Cuda, University of Florida, www.invasive.org

Skunk Vine Biocontrol

Currently, there are no biocontrol agents for skunk vine (*Paederia foetida*) available for release in the United States. BIPM entered into a cost-share agreement with the Southwest Florida Water Management District to initiate biocontrol studies for this Noxious Weed. USDA/ARS researchers are currently conducting overseas exploration for potential insect agents, with an initial focus on flea beetles (Chrysomelidae). Research is continuing on these species.



Alligatorweed flea beetle adults and larvae devouring leaves and stems. Initial research is looking at other flea beetles as potential biocontrol for skunk vine. Photo: Gary Buckingham, USDA ARS, www.forestryimages.org

Education and Outreach

While research is a significant activity of the bureau, increased effort is being directed towards education and outreach. BIPM maintains a web page—<http://www.dep.state.fl.us/lands/invaspec/index.htm>. This site contains information and links for both the Aquatic Weeds and Upland Weeds programs. BIPM occasionally publishes educational material, such as its “Weed Alert” flyers, which are available online or by request. Two new weed alerts, on melaleuca and Brazilian pepper, were produced in FY02. The bureau also assisted in the production of a new UF Extension publication, “Natural Area Weeds: Chinese Tallow.” This brochure offers information on the ecological impact of Chinese tallow and how homeowners can help prevent its spread. BIPM is revising a bibliography of publications available from the bureau and this list will be posted on the web page.

BIPM also has an agreement with the University of Florida Center for Aquatic and Invasive Plants to maintain the Aquatic, Wetland, and Invasive Plant Information Retrieval System (APIRS), the world’s largest information resource of its kind. The APIRS—<http://aquat1.ifas.ufl.edu/database.html>—contains more than 53,000 citations. Another partner is the Florida Exotic Plant Pest Council—<http://www.fleppc.org/>—a non-profit organization that educates land managers and the public about the threat of invasive exotics.

APPENDIX I

Contracted Research, FY 01-02

Bureau of Invasive Plant Management

Florida Atlantic University

Dispersal, reproduction, and physiological ecology of two invasive non-indigenous fern species, *Lygodium microphyllum* and *Lygodium japonicum* (John Volin, principal investigator, \$20,397, 3rd of 3-yr study): This work, a cost-share project with South Florida Water Management District, provided information on sexual reproduction of the two invasive climbing ferns in Florida and linked their reproductive traits to the plants' dispersal potential and adaptability to new habitats. The news was not good—these plants have unusually adaptive reproduction and dispersal abilities and are highly competitive in comparison to certain native vines. The finding that the ferns' abundant production of wind-blown spores tends to peak in the fall season will help resource managers set timing of their control efforts.

University of Florida

An evaluation of the life-histories of invading populations of *Ardisia crenata* in north Florida to improve our understanding of their invasive impacts and management (Alison Fox and Kaoru Kitajima, principal investigators, \$13,107, 2nd of 2-yr study): This work produced useful information about the production and fate of seeds and seedlings of this exotic species where it has escaped into Florida natural areas, with results suggesting that it does best in moist, shady habitats.

Classical biological control of Brazilian peppertree, *Schinus terebinthifolius* (Anacardiaceae), in Florida (James Cuda, principal investigator, \$126,088, 3rd of 5-yr study): This work included ongoing research and preparation for release of insect biocontrol agents, with focus on a thrip species, *Pseudophilothrips ichini*, a leafroller moth, *Episimus utilis*, and a sawfly, *Heteroperreya hubrichi*.

Determination of the scope and physiological basis for fluridone tolerant hydrilla in Florida (Greg MacDonald and William Haller, principal investigators, \$72, 282, 2nd of 3-yr study): This work involved continued testing for likely causes of field-observed differences in hydrilla response to the primary chemical-control agent used in Florida, with an eventual goal of determining the scope of the problem and providing recommendations for improved management strategies.

Development of screening protocols for evaluating the potential invasiveness of new ornamental species to the Florida landscape (Sandra Wilson, principal investigator, \$24,090, 2nd yr): This work tested a newly established protocol for short-time evaluation of seed germination rates as one factor in determining the potential invasiveness of non-native plants being cultivated in Florida. Twenty-three species underwent review in terms of their seed ecology.

Field trials of a bioherbicide for torpedo grass (*Panicum repens*) (R. Charudattan and S. Chandramohan, principal investigators, \$12,600, 1st of 2-yr study): This work established field trials in Okeechobee, in cooperation with resource managers of the South Florida Water Management District, for testing the control efficacy of three native fungi species when applied as a mixture to the invasive torpedo grass.

Tracking the introduction and spread of populations of wetland nightshade using molecular markers (Maria Gallo-Meagher and Alison Fox, principal investigators, \$11,981, 1st of 2-yr study): This work initiated DNA analysis of surveyed populations of the Noxious Weed *Solanum tampicense* to determine genetic variation among populations infesting Florida waterways and wetlands, to help evaluate the frequency and source of introductions into Florida as background for predicting its further spread here.

USDA-Agricultural Research Service

Biological control of skunk vine (*Paederia foetida* L.), Plan of Work FY02 (Robert Pemberton and Paul Pratt, principal investigators, \$40,000, 1st of 7-yr study): This work, a cost-share project with the Southwest Florida Water Management District, initiated the necessary overseas exploration for potential insect biocontrol agents specific to the Asian skunk vine, a highly invasive Noxious Weed in Florida.

Host range testing in quarantine of potential insect agents for biological control of Old World climbing fern, *Lygodium microphyllum* (Gary Buckingham and Robert Pemberton, principal investigators, \$30,000, 2nd yr): This work in Gainesville continued testing of potential agents—in particular a pyralid moth (*Cataclysta* aff. sp.) and the “sister” moth (*Neomusotima conspurcatalis*)—for specificity to the invasive climbing fern, with promising results for both. The test series for the pyralid moth are nearly completed, and it appears to present no risk to other ferns in Florida.

Host range testing of candidate biological control agents of *Lygodium microphyllum* in Australia (Robert Pemberton and John Goolsby, principal investigators, \$30,000, 1st of 5-yr study): This overseas work included portions of ongoing surveys for potential agents in *Lygodium*'s native range—over 20 insect herbivores of the fern have been collected so far—and continuation of initial host-specificity testing of a leaf-curling mite (*Floracarus* sp. nov.), which is so far showing excellent potential as a biocontrol agent.

Research on biocontrol of invasive weeds: 1) Mass production and release of *Lophyrotoma zonalis* and/or *Boreioglycaspis melaleucae*, new agents for *Melaleuca quinquenervia* and 2) *Melaleuca quinquenervia* chemotypes and their acceptability to *Oxyops vitiosa* biocontrol (Greg Wheeler, principal investigator, \$60,000, 1st year): This work in Ft. Lauderdale contributed to the official field release in Florida (Spring 2002) of a second biocontrol agent for melaleuca, a sap-sucking psyllid (plant louse), *B. melaleucae*. Work under the second objective determined that two chemotype forms of melaleuca occur in Florida, with the already established biocontrol agent, the *Oxyops* weevil, appearing to live and reproduce less well on the chemotype producing high levels of the terpenoid viridiflorol.