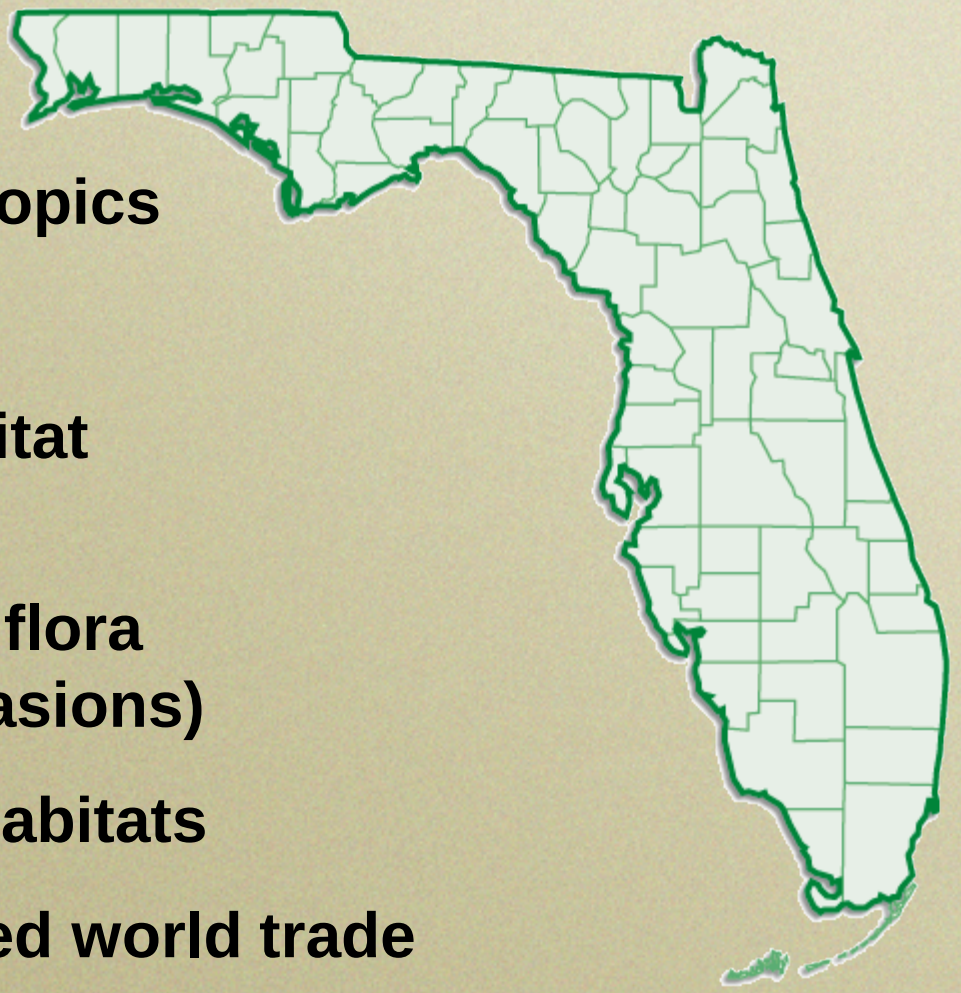
10 Critical Keys to Success Learned from Florida's Aquatic and Wetland Invasive Plant Management Program

1970-12

Don C. Schmitz
Research and Outreach Program Manager

Why is Florida being invaded?



- Climate similar to Neotropics
- Disturbed landscapes
- Most of Florida is a habitat island
- Naturally impoverished flora and fauna (prone to invasions)
- Abundance of aquatic habitats
- Port of Miami – increased world trade

Pathways into Florida

- **Escaped & released captive wildlife**
- **Tourists**
- **Fish farms & aquatic plant nurseries**
- **Ballast water**
- **Cultural introductions**
- **Contaminates**

Florida Background

- Large ornamental plant industry
- > 1,100 plant species introduced into Florida; 124 are considered invasive
- Several invasive plant spp. have affected ~1.9 million acres

CRITICAL KEY 1

Designate a lead state or provincial agency who is responsible for IPM

Avoid “What is everybody's business is nobody’s business.”

The Florida Fish and Wildlife Conservation Commission is designated by the Florida Legislature as the lead agency for...

Coordinating and funding two statewide control programs on PCLs & waterways for:

- **Invasive aquatic and wetland plants**
- **Upland invasive plants**

Lead Agency:

- **Statewide goals, plans**
- **Statewide priority fund distribution**
- **Reduce administrative costs**
- **Coordinate management operations**
- **Coordinate inventories**
- **Avoid duplication / neglect**
- **<u>Some one is responsible</u>**

CRITICAL KEY 2

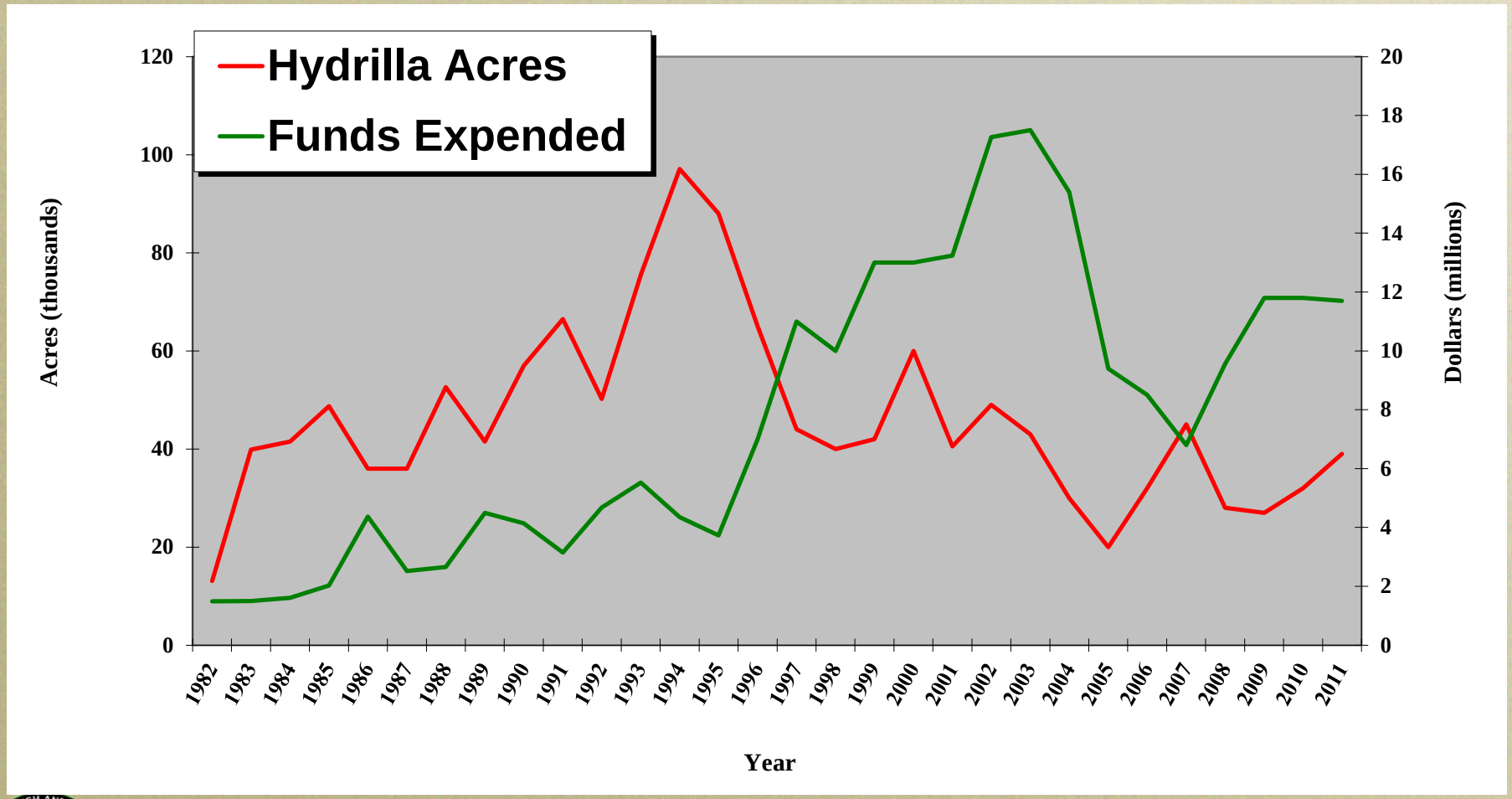
IPM Funding is the key to success

Funds spent for FWC invasive plant management in Florida in 2010-11:

Aquatic plant management	**$23 million**
Upland plant management	**$6 million**

The Aquatic Plant Management Program was established in 1970

Funding vs. Management



Define your overall IPM goal:

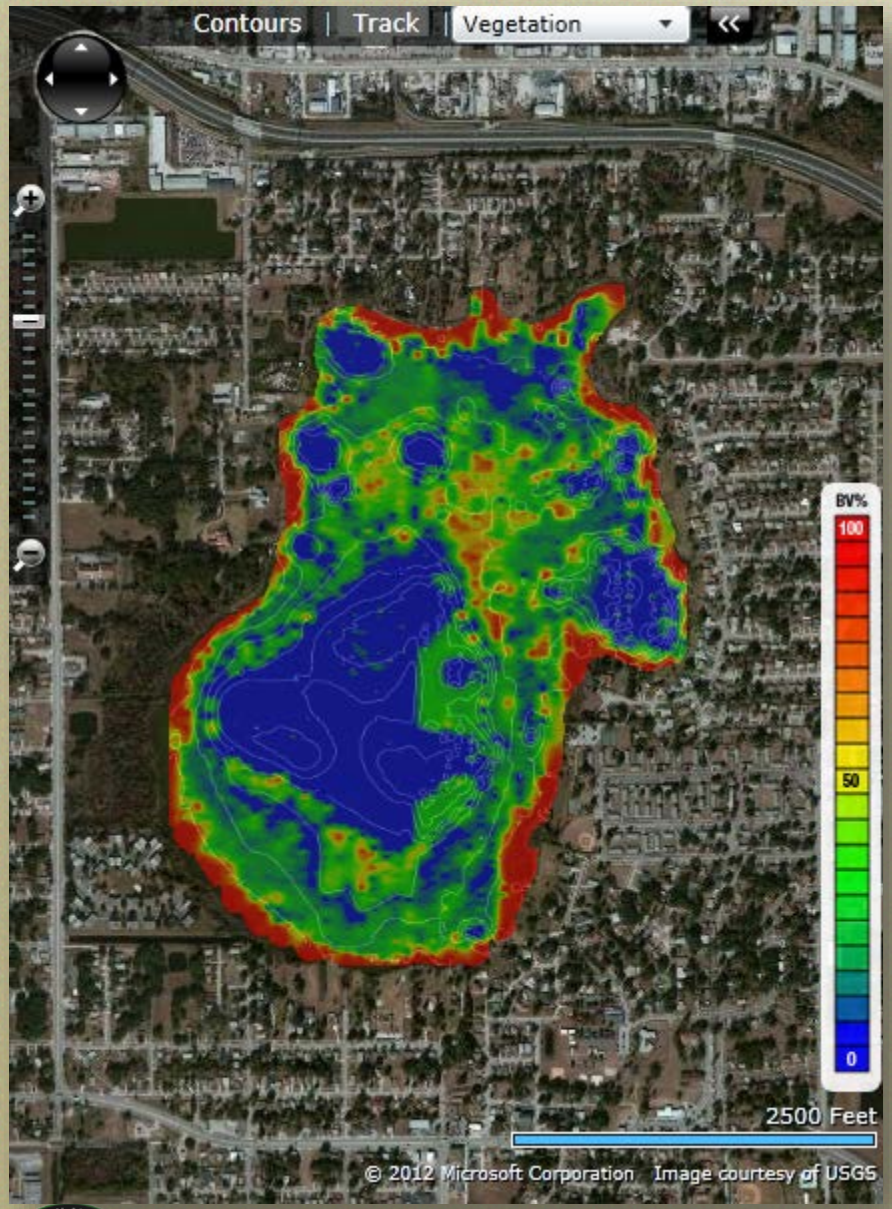
Maintenance control:

- ***Lowers ecological impacts***
- ***Lowers the amount of herbicides used***
- ***Lowers cost to the taxpayers***

CRITICAL KEY 3

Identify the problem

(A problem poorly defined is rarely solved)



Identify the Problem:

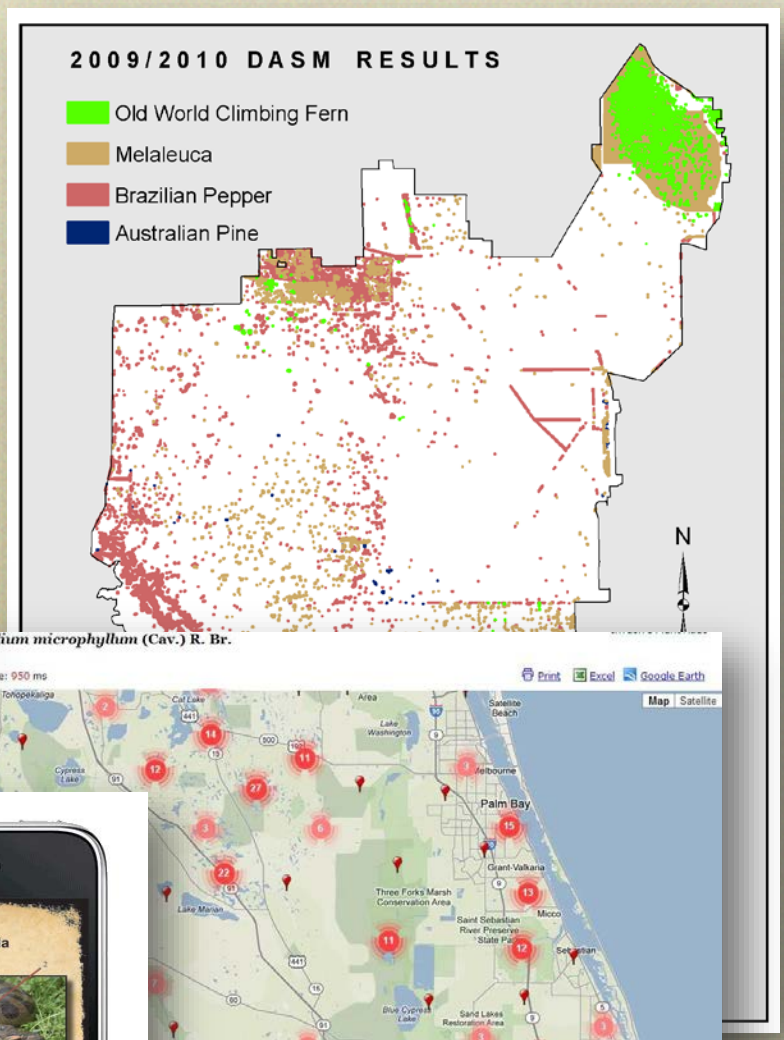
Survey and inventory plant populations

FWC Surveys aquatic plants in approx. 450 public waterways covering 1.25 million acres.

Identify the problem:

Aerial Surveys –

On-site ground survey and inventory



EDD MapS
Early Detection & Distribution Mapping System

EPPC
Florida Exotic Pest Plant Council
Established 1984

Florida Invasive Species Partnership

- Web-based mapping
- Documents the distribution
- Identifies "leading edge“ ranges
- Early Detection and Rapid Response implementation

IveGot1 app for iphone

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

~ 30 Non-Native Aquatic Plant Species (2011)

Species	Waterways
Alternanthera philoxeroides	357
Panicum repens	356
Colocasia esculenta	263
Salvinia minima	251
Eichhornia crassipes	218
Urochloa mutica (Brachiaria mutica)	206
Hydrilla verticillata	187
Pistia stratiotes	165

Florida waterways surveyed – 460 (1.25 million acres)

CRITICAL KEY 3

Prevent and Rapidly Respond to New Invasions

It doesn't take much to start a costly biological invasion.

Six small newspaper wrapped bundles of Sri Lanka (Ceylon) hydrilla sent to Tampa, Florida in 1950 or 1951.

(Staged photo - not the original bundles)

***Hydrilla verticillata* canopy**

Invasive Aquatic Plants

Salvinia molesta – Lake Laurie, 3 miles NW of Quincy, Gadsden County

The floating red root floater (*Phyllanthus fluitans*)

CRITICAL KEY 4

Prioritize species for management causing the most harm

Greatest Ecological Impacts of Invasive Species in Florida:

- **Species that <u>modify</u> habitats**

- **Species that produce <u>novel habitats</u> (*all are modifiers*)**

Invasive Upland Plants

Cogon grass

❖ **Modifier**

- Novel habitat
- Modifier

The floating Water hyacinth

- Novel habitat
- Modifier

The floating water lettuce

Invasive wetland Plants

- **Novel habitat**
- **Modifier**

Melaleuca head in a formerly treeless mulhy grass prairie, East Everglades

Invasive Plants

Melaleuca forest understory – devoid of plant diversity

- **Novel habitat**
- **Modifier**

Hydrilla verticillata

Establish Overall Management Funding Priorities -

- **Floating plants (hyacinth/lettuce)**
- **New hydrilla infestations and new plant species that show signs of invasiveness**
- **Plants blocking access and navigation**
- **Protect critical wildlife habitat areas or imperiled species**
- **Target highly invasive and disruptive plant species (canopy producers, forest makers, modifiers)**

CRITICAL KEY 5

Local participation and ownership of the issue is critical to success –

Establish regional management working groups

Coordination & Collaboration

Southwest Florida Water Management District

NATIONAL PARK SERVICE

BROWARD COUNTY FLORIDA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

OSCEOLA COUNTY FLORIDA

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

U.S. FISH & WILDLIFE SERVICE

Imperial POLK COUNTY

APHIS

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

MIAMI-DADE COUNTY

FLORIDA DEPARTMENT OF AGRICULTURE DIVISION OF FORESTRY

USDA

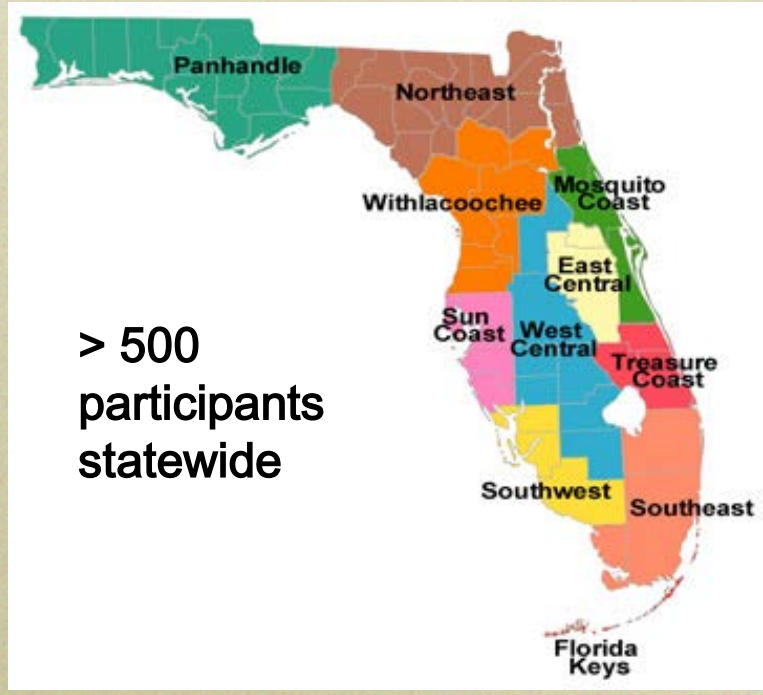
FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

Upland Plant Program

FLORIDA'S REGIONAL MANAGEMENT WORKING GROUPS:

- **Establishes local control priorities**
- **Develops local management plans**
- **Assists with local surveillance of invasive plant populations**
- **Helps raise local public awareness about invasive plants**

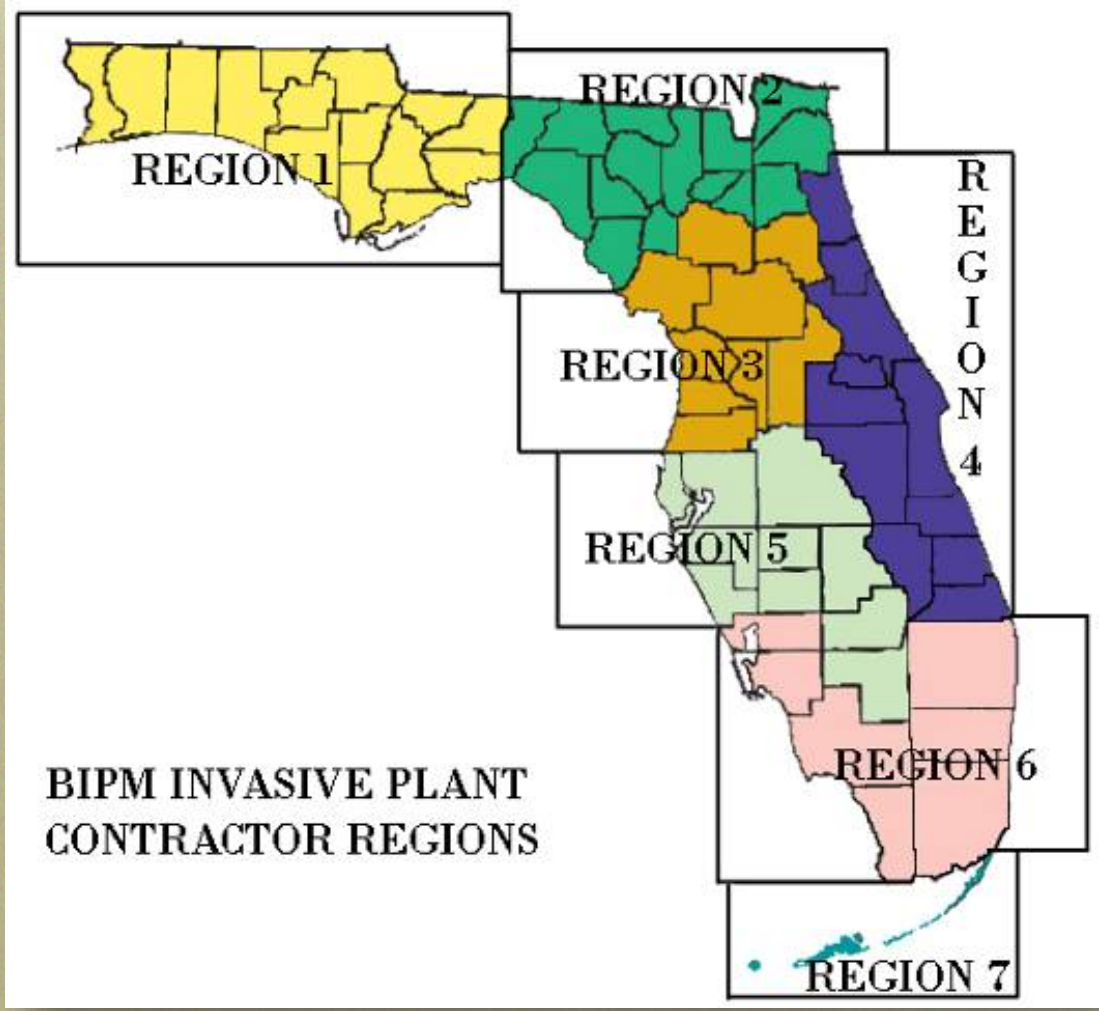
"Local people solving local problems"



> 500 participants statewide

Assist Project Site Managers by Establishing:

- IPM Contractors and specific regions (using private vegetation control companies)
- Licensed applicators
- Local site manager oversight of the contractors



Establish a Herbicide Bank for:

- Site Maintenance of previous management projects
- Statewide bid contract to reduce herbicide costs
- $500,000±/year
- $5.5M spent, 185 K total treated acres

CRITICAL KEY 6

You can’t forget about private lands

Florida Invasive Species Partnership

Think Locally, Act Neighborly

Invasive exotic species know no boundaries!

Florida Invasive Species Partnership

Invasive species know no boundaries - neither do we

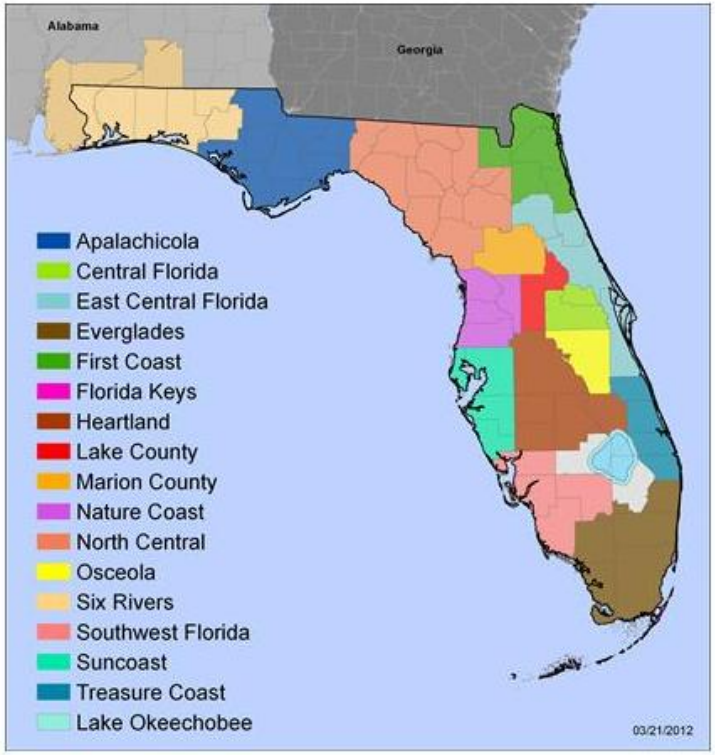
Public and private land managers in Florida agree that invasive non-native species are a statewide problem with high ecological and economic costs. The Florida Invasive Species Partnership (FISP) is a collaboration of federal, state and local agencies along with non-government organizations, all with a stake in managing invasive non-native species in Florida. Because species can spread beyond fence lines, our goal is to connect private landowners and public land managers with invasive species expertise and assistance programs across boundaries. All stakeholders, both public and private, can benefit from collaborative efforts to reduce the threat. FISP increases communication, coordination and the sharing of resources to protect Florida's natural landscape.

FISP:

- Encourages voluntary partnerships, such as Cooperative Invasive Species Management Areas
- Provides information and contacts on incentive programs for private landowners
- Connects to tools and resources
- Enables the reporting and mapping of invasive species

Cooperative Invasive Species Management Areas

CISMAs are an alliance of stakeholders addressing invasive species management in geographic regions



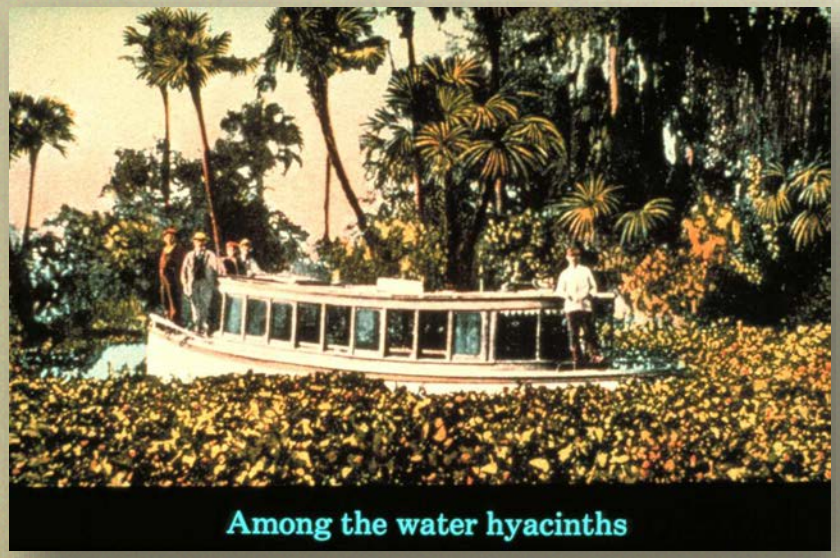
Does it work?

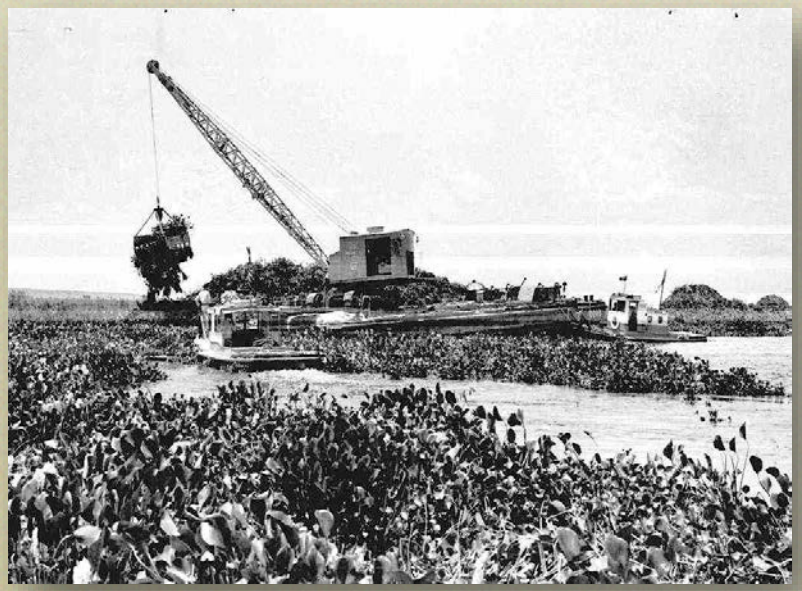
Water hyacinth in FL

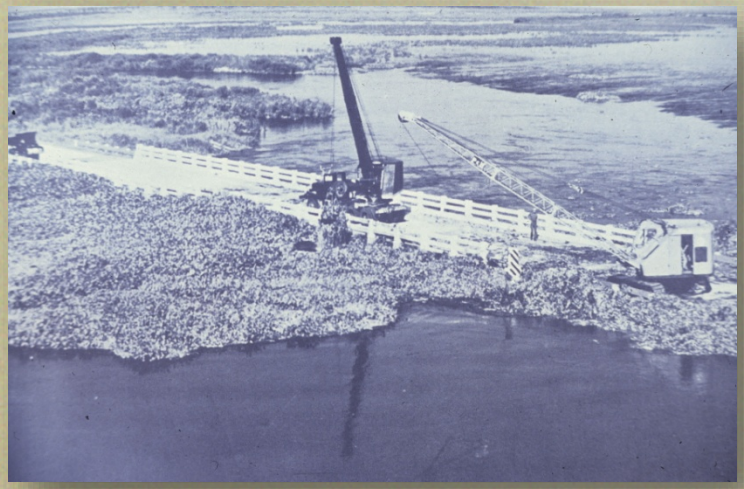
Mrs. W. F. Fuller brought water hyacinths home from New Orleans in two tin pails and placed the plants in her fish pond located on the banks of the St. Johns River, near Palatka, 1884.

When the plant choked her pond, she thinned out the plants and placed the extras in the water at her boat landing on the St. John's River.

Anonymous. 1896. Clogged by hyacinths: navigation on the St. John's, Florida, seriously obstructed. The New York Sun, September 20,1896.

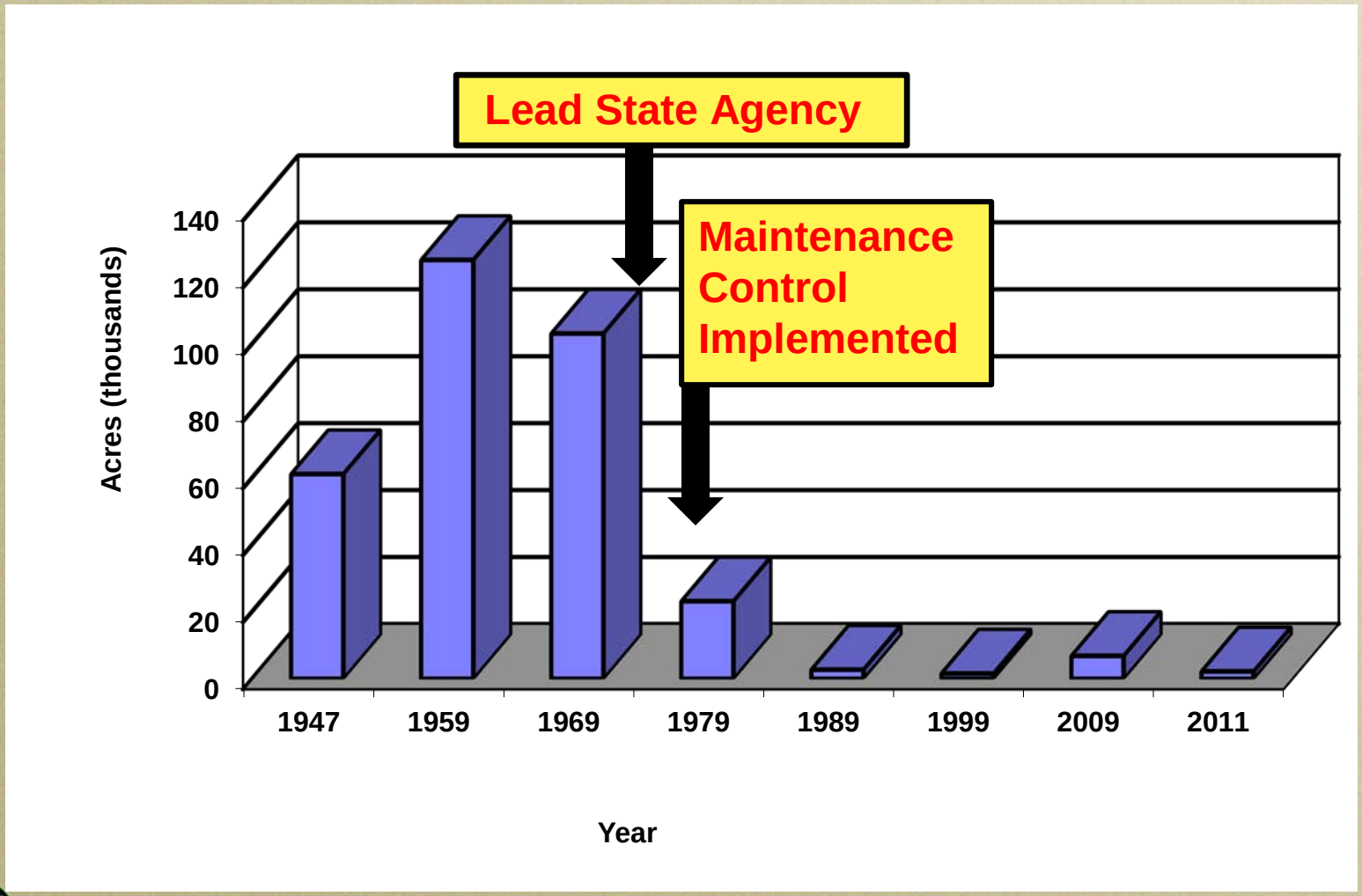






Florida has been managing floating South American water hyacinths since 1899

Water hyacinth populations in Florida over time



10-Year Program Results

MELALEUCA

1997 – 2007 <u>165,000</u> acres of trees controlled (70% of total acres)

BRAZILIAN PEPPER

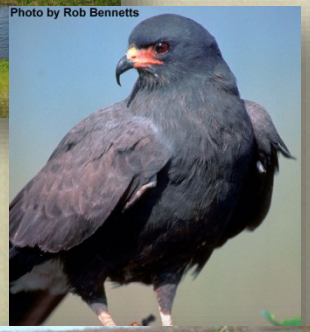
1997 – 2007 <u>56,000</u> Acres controlled (25% of total acres on public land)

CRITICAL KEY 7

Invasive plant control efforts must balance competing management interests

Shared Uses and Competing Interests in Hydrilla Management

- Fishermen
- Duck hunters
- Endangered species habitat
- Lake homeowners access
- Recreational users
- Flood and mosquito control
- Potable water supply
- Navigation
- Power generation



CRITICAL KEY 8

You must develop regional invasive species research infrastructure

FWC Research Funding Program

1970-2011 **$22,901,559**

Funded **202 projects**

Invasive Plant Management Research

1970s

- Water hyacinth utilization studies
- Aquatic plant harvesters and drawdowns
- Hydrilla and water hyacinth physiology
- Grass carp studies
- Remote sensing and surveillance techniques
- Biocontrol of water hyacinth

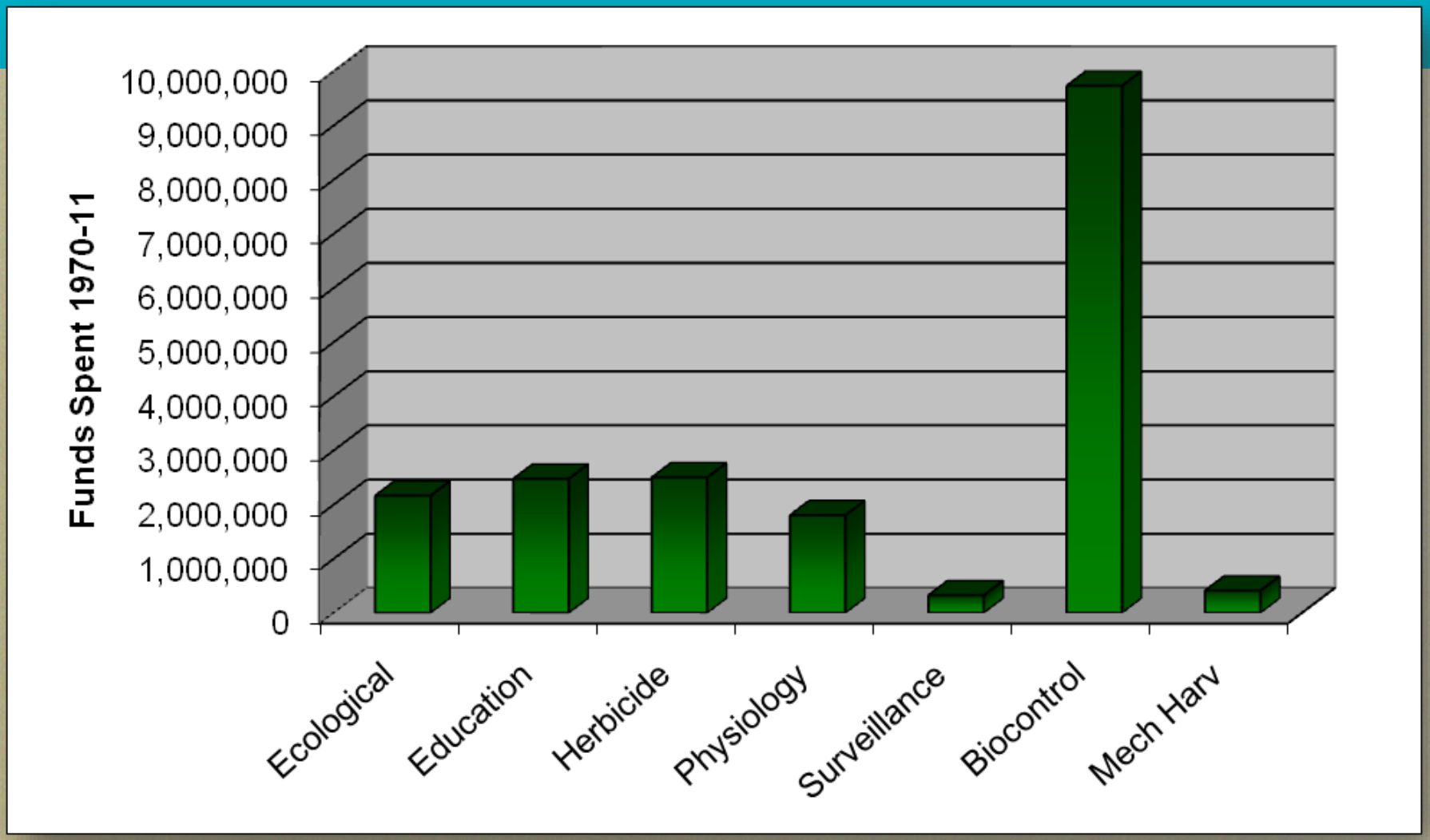
Total Spent - $5.2 million

2000-10

- Biocontrol of climbing fern, B. pepper, C. tallow, air potato, water hyacinth, skunk vine, hydrilla
- Resistance – New herbicides
- Algae studies
- Risk assessments & screening
- Expanded outreach effort

Total Spent - $11.5 million

Research Funds Spent by Category 1970-2011



CRITICAL KEY 9

Biocontrols can help!

Funded Biocontrol Research 1970-12

- 12 plant species targeted for biocontrol research
- 942 insects/pathogens discovered and evaluated
- 82 insects/pathogens screened
- 22 insects/pathogens released
- 15 insects in quarantine
- 3 insects may be released in 2014-15

Palatka, Florida

USDA-ARS released a new biocontrol insect in March 2010 targeting water hyacinth

Megamelus scutellaris **(a plant hopper) nymphs & adults feeding creates a choke point between the leaf and petiole**

Melaleuca, a fire adapted species – fire results in a

massive, synchronous seed **release (freezes, herbicide treatment, also cause massive seed release)**

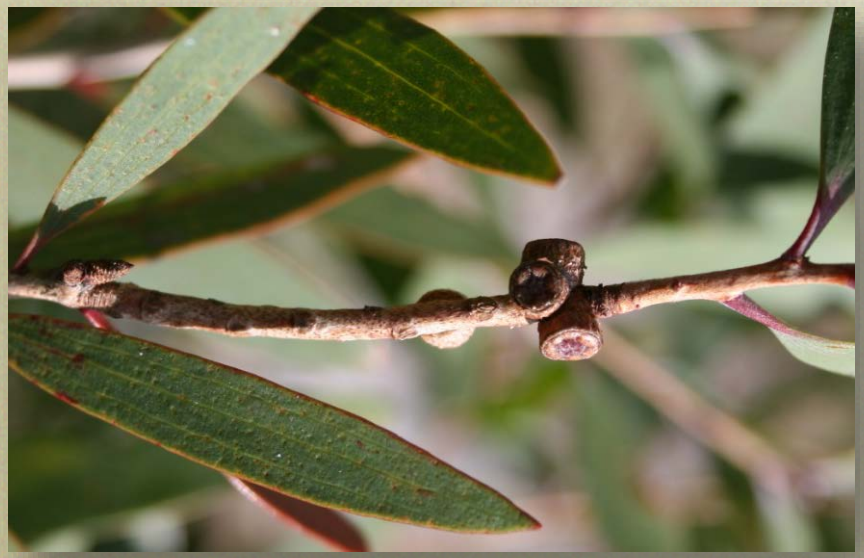
No biocontrol agents

Biocontrol agents

Pest excluded melaleuca vs non-treated tree (trees are the same age)

Released biocontrol agents have reduced melaleuca's reproductive ability by over 90%.

No biocontrol, seed capsule production

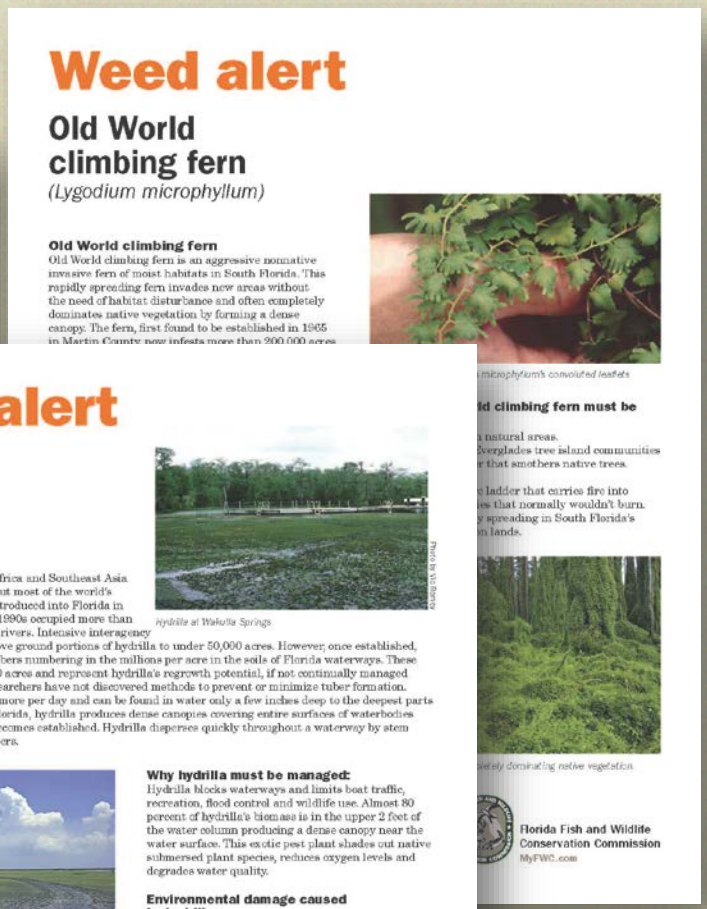


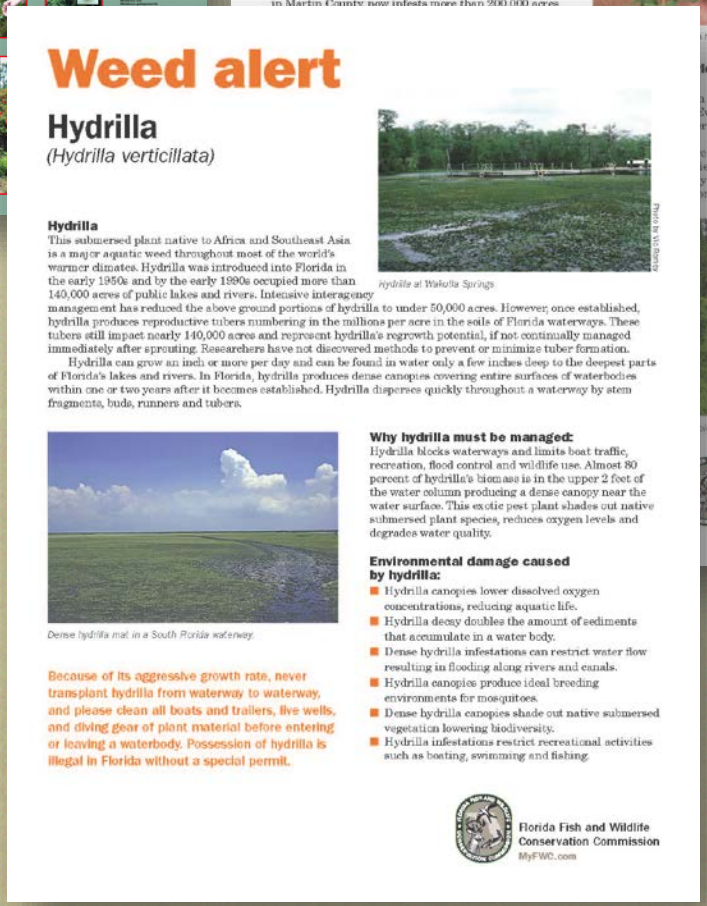
Biocontrol, lack of seed capsule production

CRITICAL KEY 10

Outreach has to be generational

FWC Outreach





FWC Research and Outreach Reviews

FWC- UF IFAS Biannual Research Review

Invasive Plant Management Section
Research Program Newsletter
Division of Habitat and Species Conservation

FEBRUARY 13, 2009 VOLUME 1, NUMBER 1

Why a new newsletter? During the past 400 years, Florida's natural areas have been invaded with mostly tropical and subtropical non-native plants and these invasions increased during the twentieth century with the rise of the ornamental plant industry and through unintentional contaminants of imported commodities. Recognizing that research is the basis of environmentally and economically sound invasive plant management programs, the State of Florida, through the Florida Department of Natural Resources and later the Department of Environmental Protection, began funding invasive plant research in 1970. The Florida Fish and Wildlife Conservation Commission (FWC) now has the responsibility to manage invasive plant species on public conservation lands and waterways as of July 2008.

Dr. Bill Overholt conducting biocontrol research at UF's Ft. Pierce Quarantine facility

FWC photo

During its 39 years, Florida's invasive plant management program has contracted for over 190 research projects at a cost of $19.8 million. These research projects have led to better management techniques and insights into invasive plant control in Florida. However, cutting edge research takes time to filter down to the resource manager's level and this research newsletter hopes to help bridge the information gap between research scientists and resource managers in Florida.

And this research newsletter has become even more relevant because, until recently, resource managers relied upon instate scientific meetings to learn about the latest research news and information from our contracted scientists. But with travel restrictions because of the poor economy, many of Florida's resource managers will not be able to attend these scientific meetings this year.

1970-2009 State Funded IPH Research Projects

Aquatic plants $13,383,518

Upland plants $5,135,403

Aquatic & Upland study combos $2,374,905

FWC photo

FWC's Invasive Plant Management Section, along with the Division of Habitat and Species Conservation, hope that you will find this new research newsletter, published at least twice a year, to be informative and easy to read. Research information will be presented in easily digestible bite size bits about current FWC funded research projects by plant species/taxa. **Note:** ***This Research Newsletter presents preliminary data. Please do not cite.***

Aquatic Plant Research

Algae

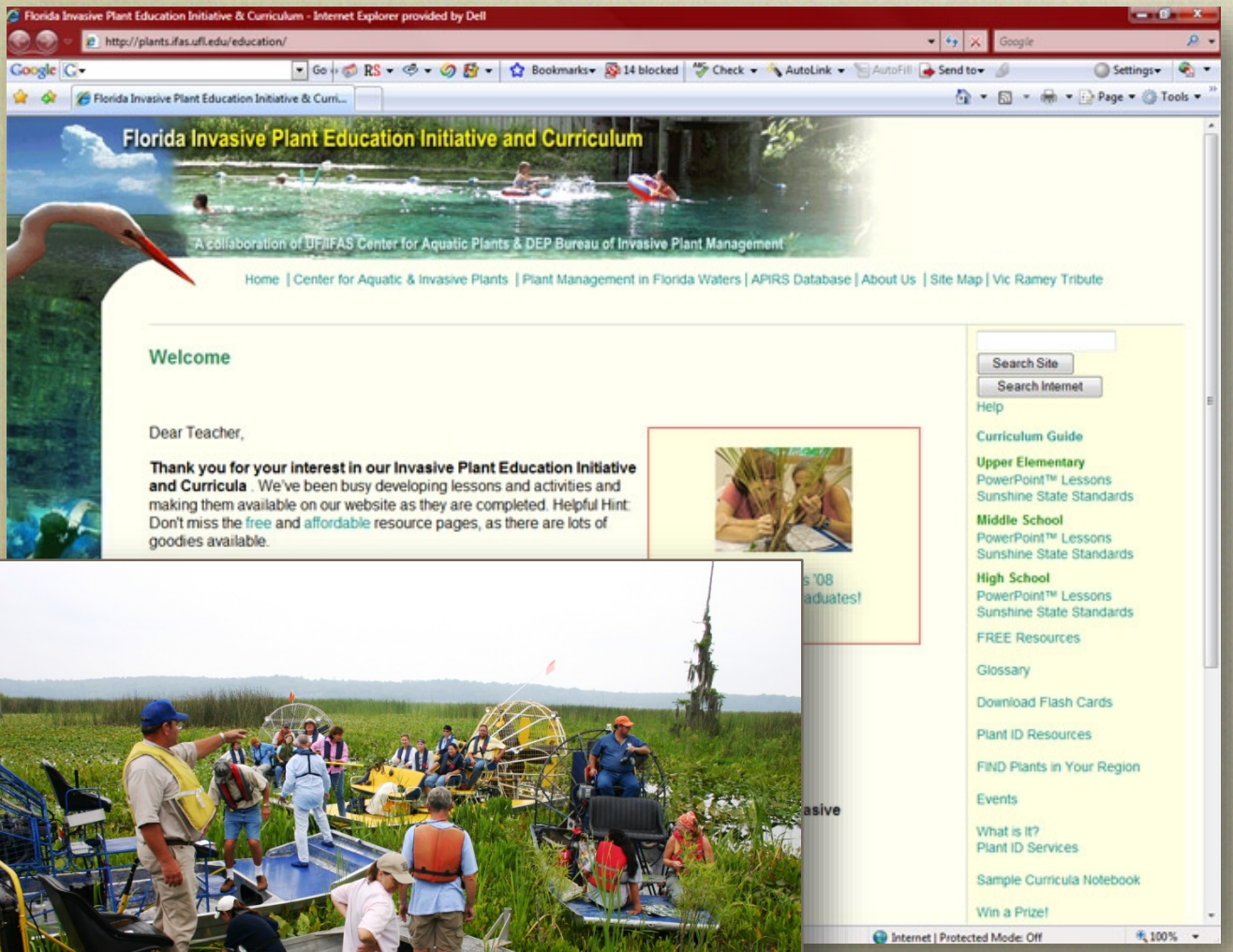
Scientists in St. Petersburg working for FWC are conducting research on the **interaction of physical, chemical, and biological factors** that likely '**trigger**' the occurrence and seasonal proliferation of toxic **cyanobacterial blooms** within Lake Eustis, Florida. They are also surveying representative fish species in the lake's food web to determine if presumptive *Cylindrospermopsis* toxins (e.g. cylindrospermopsin, saxitoxin) are present in their tissues. Preliminary results indicate temporal differences in the phytoplankton assemblage. So far, blooms of cyanophytes have been observed throughout the sampling period. Early results suggest that the lake is a cyanophyte

1

- **FWC hosts research reviews**
- **Tracks IPM research in SE**
- **Publishes annual newsletter**

FWC Outreach – Funds Education Initiative UF- CAIP

- "3 Day Plant Camps" for Science teachers or "Teach the teachers"
- Provides student lessons, activities, materials
- Covers plant & animal invasive species



FWC Outreach - Plant Management in Florida Waters Website (UF CAIP)

- Encyclopedic guide to plant management in Florida water-ways
- Info about developing management plans
- Covers more than 400 topics
- Written for public

Invasive animal species

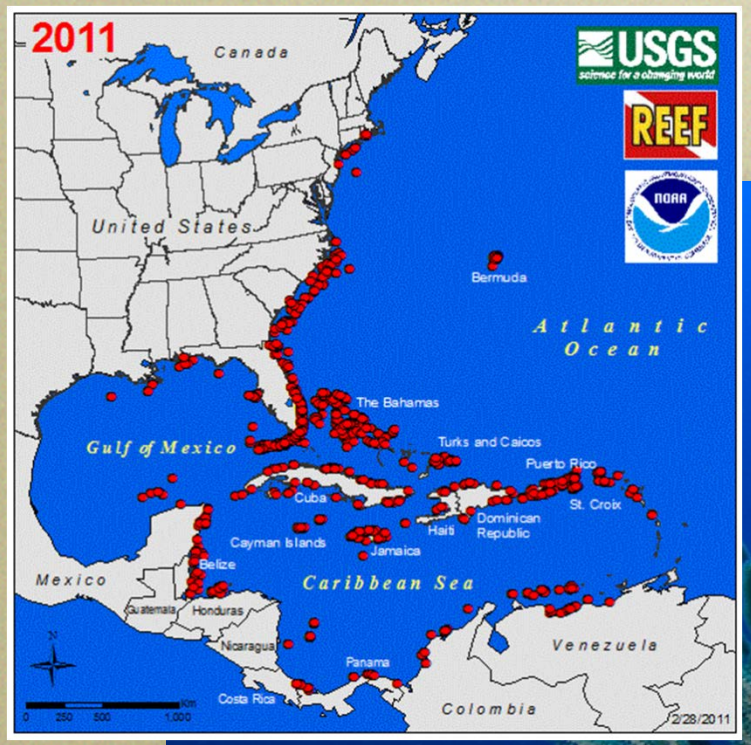
(The Big Three)

Tegus

Pythons

- **Modifiers**

Lionfish



❖ **Modifier**

http://plants.ifas.ufl.edu/manage/