

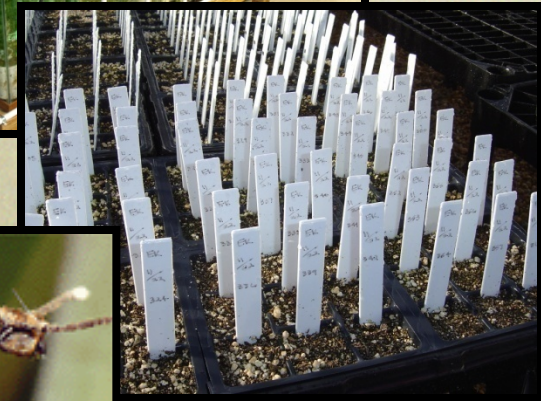
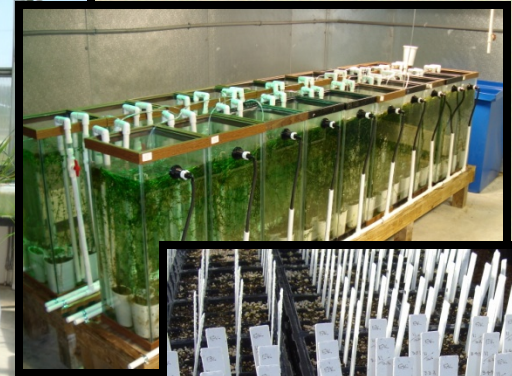
Research and Outreach, the foundation of good invasive plant management in Florida

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*Florida Fish and Wildlife Conservation
Commission, Tallahassee, Florida*



FWC Funded Research and Outreach Program - Invasive Aquatic and Upland Plants



Research and Outreach

1970-2015

\$28,207,386

Funded

252 projects



Invasive Plant Management Research

1970s

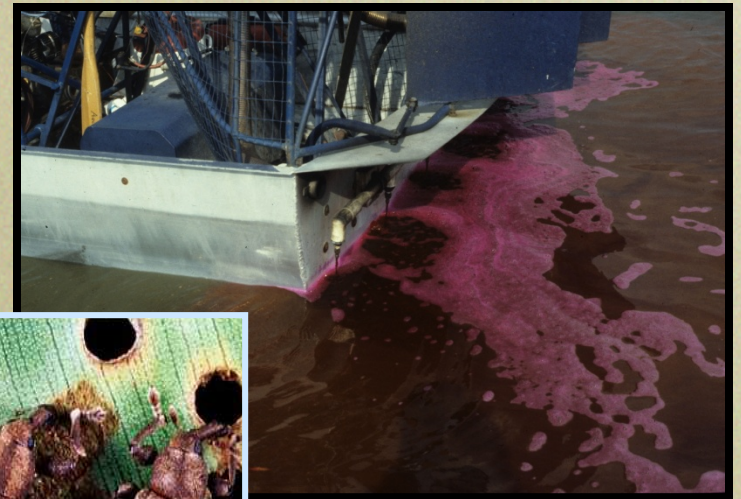
- Water hyacinth utilization studies
- Aquatic plant harvesters and drawdowns
- Hydrilla and water hyacinth physiology
- Grass carp studies
- Remote sensing and surveillance techniques
- Biocontrol of water hyacinth



Invasive Plant Management Research

1980s

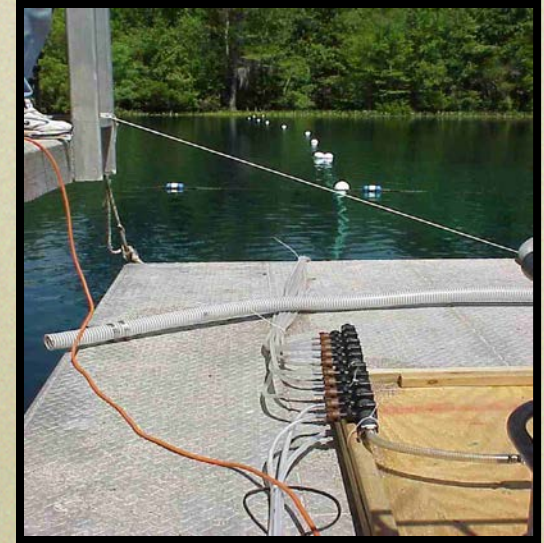
- Algae studies
- Aquatic plants and fisheries
- Biocontrol of hydrilla and water hyacinth
- Herbicide dissipation studies
- Aquatic Plant Information Retrieval System – UF-IFAS



Invasive Plant Management Research

1990s

- Herbicide use in flowing waters
- Herbicide studies for melaleuca and Brazilian pepper control
- Melaleuca biocontrol
- Expansion of APIRS to include upland plants
- CAIP website – Plant ID & plant management info



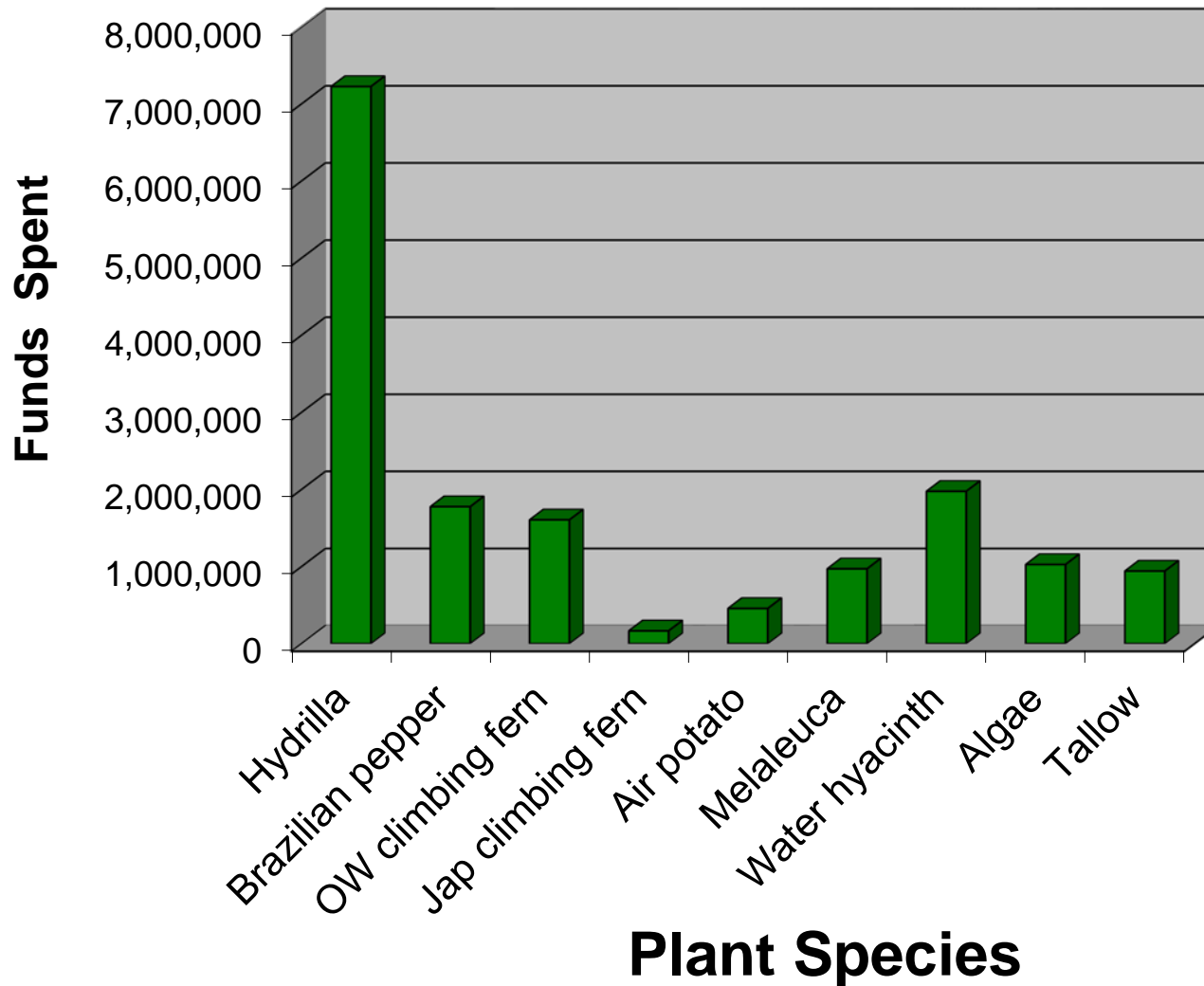
Invasive Plant Management Research

2000-10

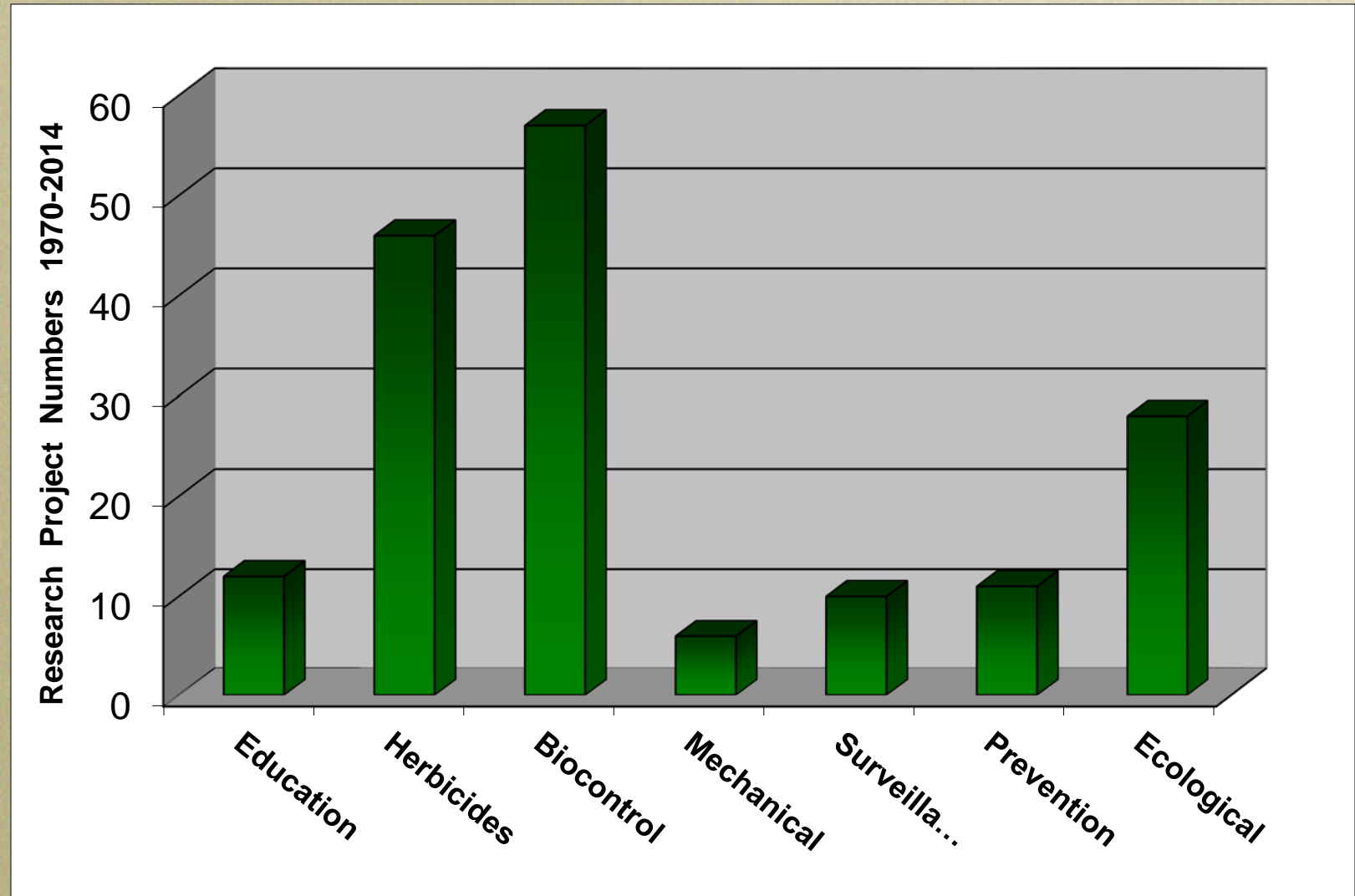
- Biocontrol of climbing fern, B. pepper, C. tallow, air potato, water hyacinth, skunk vine, hydrilla
- Herbicide screenings for Aquatics (hydrilla)
- Algae studies
- Risk assessments & screening
- Expanded outreach effort



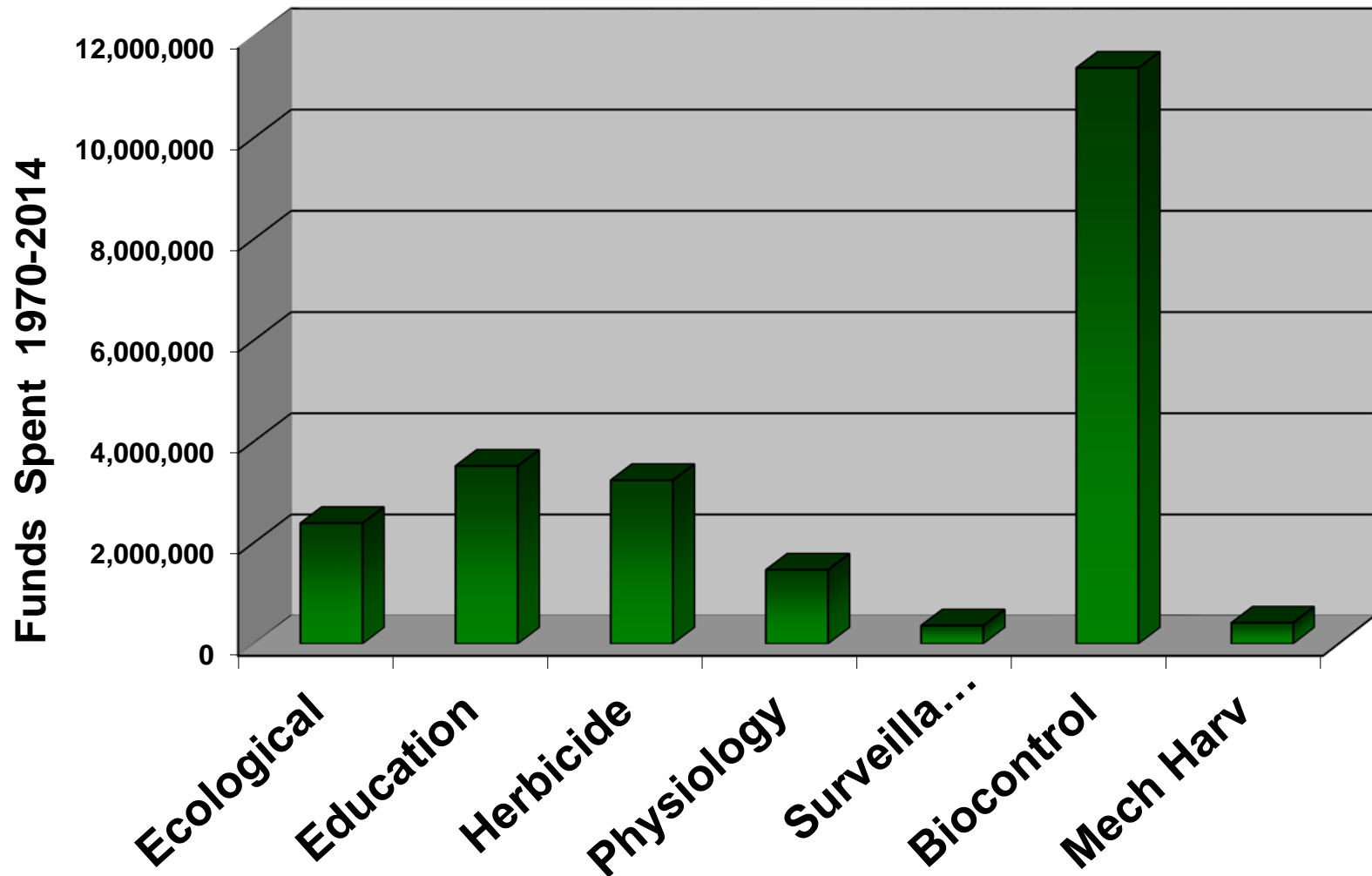
Research Funds Spent by Species 1970-2014



Number of Research Projects by Category 1970-2014



Total Funds Spent by Category 1970-2014



1964-2014 Biological Control Releases: 23

Air potato	<u>1 species released</u>
Alligator weed	<u>3 spp. Released*</u>
Hydrilla	<u>4 spp. Released</u>
Salvinia (com., giant)	<u>2 spp. released</u>
Melaleuca	<u>4 spp. released</u>
Old World Climbing fern	<u>3 spp. released</u>
Water hyacinth	<u>4 spp. released</u>
Water lettuce	<u>2 spp. released</u>

Insects being evaluated for release aimed at:

Brazilian pepper
Chinese tallow
Air potato

Downy rose myrtle
Cogon grass
Old World climbing fern



* U.S. Army Corps of Engineers funded biological control research

Biological Control Insect Truisms

- **Host specificity is essential**
- **Biocontrols will suppress populations but will not eradicate them**
- **Often multiple biocontrol species agents are needed to suppress a highly invasive plant species**
- **Assessment and development is a long-term research commitment**
- **When successful, biocontrol provides long-term, sustainable suppression of weed populations**

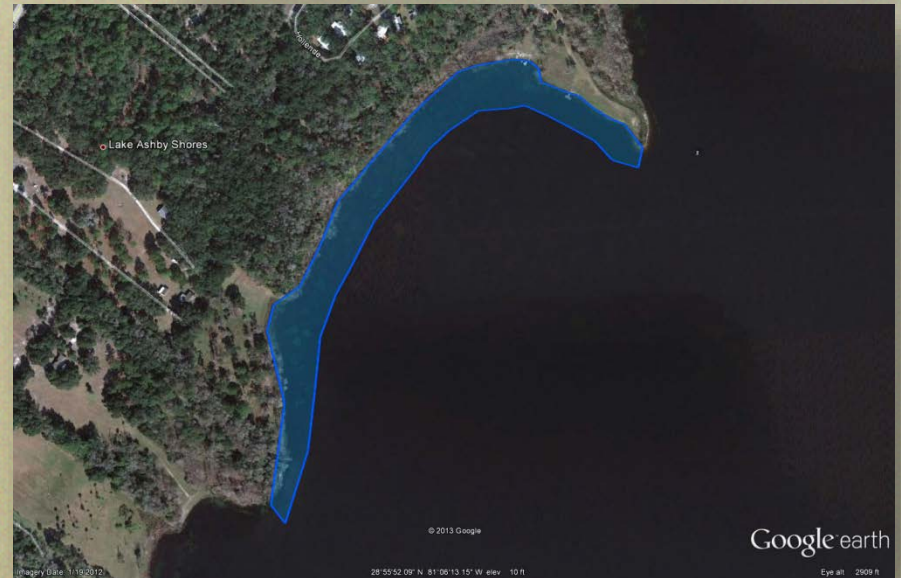


Aquatic Use Herbicides Registered Since 2002

Herbicide	Application Site	Year Registered	Mode of Action
Copper	Submersed	1950s	Undefined
2,4-D	Sub., Emergent, Floating	1959	Auxin mimic
Endothall	Submersed	1960	Serine/threonine phosphatase inhibitor
Diquat	Sub., Emergent, Floating	1962	Photosystem I inhibitor
Glyphosate	Emergent	1977	Enzyme inhibitor
Fluridone	Submersed	1986	Enzyme inhibitor
Triclopyr	Submersed, Emergent	2002	Auxin mimic
Imazapyr	Emergent	2003	Enzyme inhibitor - ALS
Carfentrazone	Sub., Emergent, Floating	2004	Enzyme inhibitor - PPO
Penoxsulam	Submersed, Floating	2007	Enzyme inhibitor - ALS
Imazamox	Sub., Emergent, Floating	2008	Enzyme inhibitor - ALS
Flumioxazin	Sub., Emergent, Floating	2011	Enzyme inhibitor - PPO
Bispyribac	Submersed, Floating	2012	Enzyme inhibitor - ALS
Topramezone	Submersed	2013	Enzyme inhibitor - HPPD

Field testing for using newly labeled aquatic herbicides

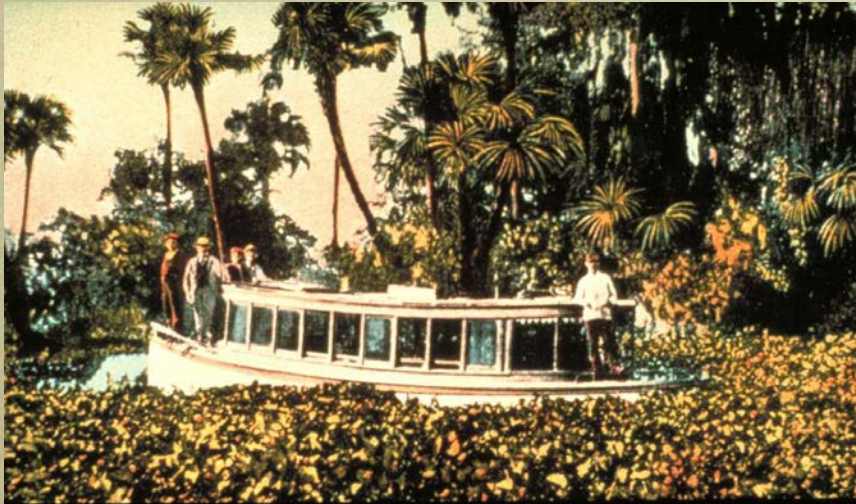
1. Start out in small ponds
 2. Small lakes (250-500 acres)
 3. Small areas of large systems, shoreline strips
 4. Fully operational, large scale treatments
- (3-5 year process)



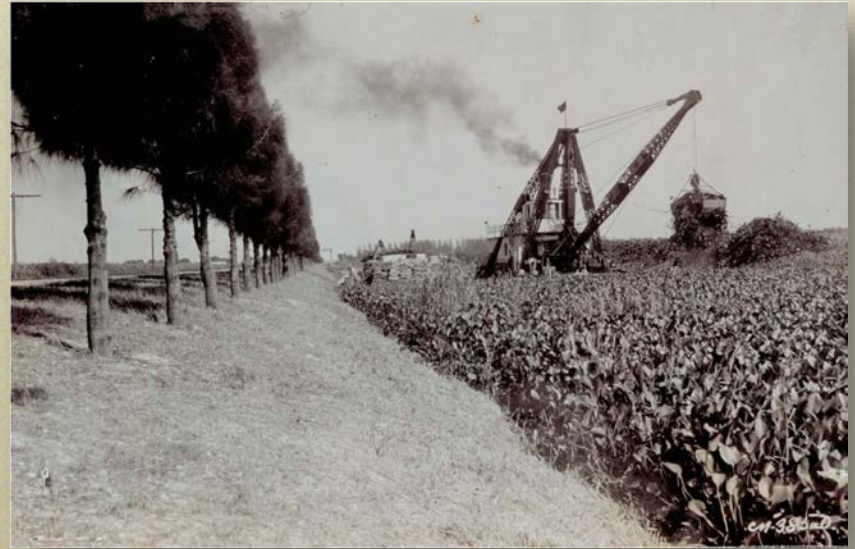
Herbicide Truisms

1. **Important to be cost-effective on the target plant!**
2. **Even more important to be selective!**
3. **Not all herbicides are created equal (see 1 and 2)**





Among the water hyacinths



Now, only a few
remember the
way it once was
in Florida



FWC – Fund Education Initiative UF- CAIP

- “3 Day Plant Camps” for Science teachers
- Student lessons, activities, materials



Florida Invasive Plant Education
Initiative & Curriculum

UF UNIVERSITY OF
FLORIDA
IFAS Extension
Center for Aquatic
and Invasive Plants

Lakeville

A Natural Resource Management Activity



ators with the information and resources needed to teach students about
ral areas and neighborhoods. Our ultimate goal is for today's youth to
ards.

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

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



The screenshot shows the homepage of the "Plant Management in Florida Waters" website. The header features a large purple flower image on the left, the title "Plant Management in Florida Waters" in the center, and the logos for the University of Florida and the Florida Fish and Wildlife Conservation Commission on the right. Below the header is a navigation bar with a "Home" button and a search box. The main content area is divided into five numbered sections: 1. Why Manage Plants?, 2. Overview of FL Waters, 3. Control Methods, 4. Developing Mgmt Plans, and 5. Research & Education. The first section, "Why Manage Plants?", is expanded, showing a paragraph about aquatic plants and their impact on Florida's ecosystems. To the right of the text is a large image of a body of water with a fence and ladders, labeled "Before". Below the main content area are two smaller sections: "1 Why Manage Plants?" and "2 Overview of Florida Waters". The "1 Why Manage Plants?" section includes a sub-section titled "NPDES" with a question mark icon and a brief explanation of what NPDES means.

Plant Management in Florida Waters
An Integrated Approach

UF UNIVERSITY of FLORIDA
IFAS Extension
Center for Aquatic and Invasive Plants

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

LOGOUT GLOSSARY Search GO

Home

- 1 Why Manage Plants?
- 2 Overview of FL Waters
- 3 Control Methods
- 4 Developing Mgmt Plans
- 5 Research & Education

AQUATIC PLANTS play an integral role in Florida's healthy aquatic ecosystems, but occasionally some of the vegetation, especially non-native plants, interferes with the use and function of these natural resources.

This website will help to explain why and how aquatic plants are managed in Florida waters. These five sections will guide you through the many factors considered by FWC biologists when developing aquatic plant management plans for Florida waters. Our priority is to manage invasive plants while also conserving and enhancing our unique aquatic habitats and wildlife communities.

Before

1 2

- 1 Why Manage Plants?
Learn about the ecology of plants in Florida waters and the impacts of invasive plants.
- 2 Overview of Florida Waters

NPDES ?
NPDES - What does it mean and why is it seen throughout this website?

Outreach Truisms

- **Craft a clear message**
- **Employ various/current (Social Media) communication tools**
- **Dedicated outreach personnel**
- **IPM Outreach has to be generational**
- **Incorporate message into school curricula**



FWC Call for pre-proposals FY 16-17

January 2016



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and Wildlife
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MyFWC.com

Call for Research and Outreach Pre-Proposals Related to Invasive Plant Management in Florida

for Fiscal Year 2015-2016

Deadline for Pre-Proposal Submission is March 23, 2015



Effective management of invasive non-native plants on Florida's public lands and waterways requires science-based policy and methodology. The Florida Fish and Wildlife Conservation Commission's Invasive Plant Management Section (FWC-IPM Section) annually provides funds to scientific researchers in support of the Section's aquatic and upland plant management programs. Funded projects may vary from basic life-history studies of invasive species to improving invasive plant control methodologies. Outreach is also important to educate the public, policy-makers, and the media about why invasive plant management is important in Florida. Funded projects in outreach may range from public surveys and economic impacts to developing statewide teacher curriculum.

Areas of particular current interest include, but are not limited to, the following:

- Determine triclopyr ester selectivity in wetland areas.
- Develop more effective treatment methods for Japanese climbing fern (*Lygodium japonicum*).
- Determine invasive plant management strategy for upland environments – specifically determine maintenance intervals for various invasive vines, ferns, and grasses.
- Develop an effective skunk vine (*Paederia foetida*) treatment method and strategy.
- Develop an education strategy and materials aimed at private land owners adjacent to conservation lands about best management practices for upland invasive plants.
- Develop selective aerial treatment methods for Brazilian pepper (*Schinus terebinthifolius*) to avoid or limit damage to native mangrove and button bush.
- Risk assessment for the management of Caesar weed (*Urena lobata*).
- Biocontrol research on West Indian marshgrass (*Hymenachne amplexicaulis*) and earleaf acacia (*Acacia auriculiformis*).
- Develop effective treatment methods for crested floating heart (*Nymphoides cristata*).
- Develop effective treatment methods for controlling *Ludwigia grandiflora* and *hexapetala* and West Indian marshgrass (*Hymenachne amplexicaulis*).

Application

Pre-proposals should be no more than two or three pages in length; single-spaced typed, and should contain the following elements:

Date, Project Title, & Contact Information – Be sure to include the name(s) of the investigator(s) or applicant(s), the affiliation, address, phone, cell, fax numbers, and email.

Need for Research/Outreach – Relate the proposed work to invasive plant management in Florida and set forth one or more specific objectives. Please list these research/outreach objectives in bullet format within the text of your Need for Research/Outreach. Extensive references to background literature are not necessary. Invasive species targeted in the project should be among those listed as Category I or II by



Questions?

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