Invasive Plant Education Initiative: A Recipe in the Making

Presenter: Amy Richard
UF/IFAS Center for Aquatic and Invasive Plants

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Center for Aquatic and Invasive Plants

Center for Aquatic and Invasive Plants (CAIP)

Established in 1978 by the Florida legislature.

Goal: To develop environmentally sound techniques for the management of aquatic and natural area weed species and to coordinate aquatic plant research activities within the State of Florida.

1. **Research**
2. **Teaching**
3. **Extension** (outreach)

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Center for Aquatic and Invasive Plants

Who do we serve?

- aquatic and invasive plant researchers:
  - academic
  - industry
  - graduate students
  - agency managers
- natural resource / field personnel
- county Extension agents
- park biologists
- teachers
- students of all ages
- general public

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Aquatic, Wetland and Invasive

Plants

Information

Retrieval

System

- Since 1980
- More than 71,000 annotated records of scientific literature

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

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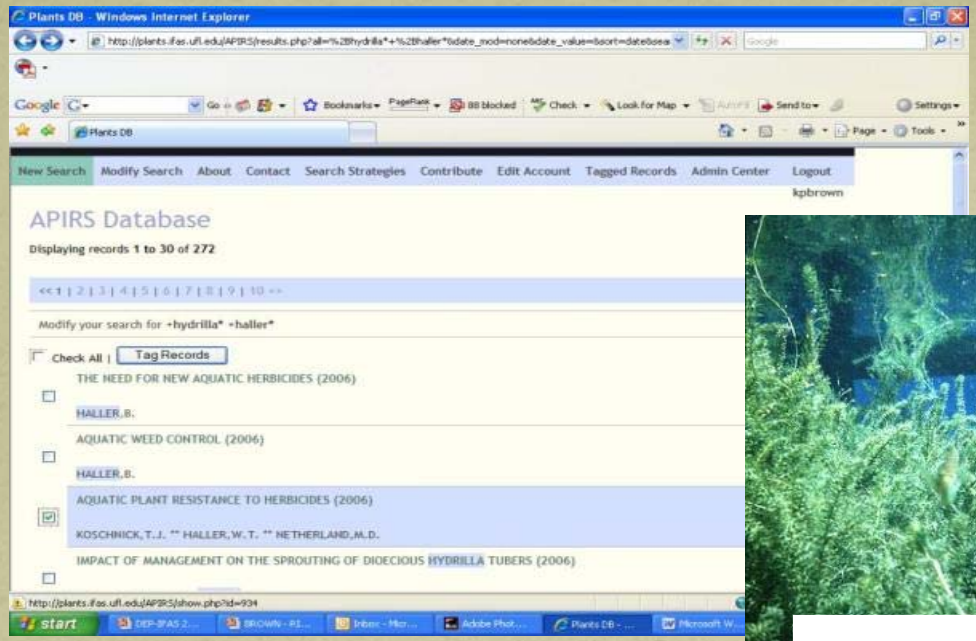

- aquatic plants
- wetland plants
- salt marsh plants
- invasive upland plants

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Subjects include:

- biological control (6,360*)
- chemical control (8,782*)
- mechanical control (2,418*)
- Government control (4,448*)
- utilization
- distribution
- biology
- ecology of aquatic plants,

  and more …

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*Annotated citations

http://plants.ifas.ufl.edu ~ primary CAIP website (since 1995)

New and improved!

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Center for Aquatic and Invasive Plants

- Over 600 pages completely revised & updated
- New data-driven infrastructure
- 102 Plant ID Videos now online
- Enhanced navigation, delivery & appearance
- *Invasive Species Management Plans for Florida* added to 42 plant information pages
- Educational products, photographs and information on 500 plant species and much, much more

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Includes development and maintenance of primary website, plus three supplementary portals:

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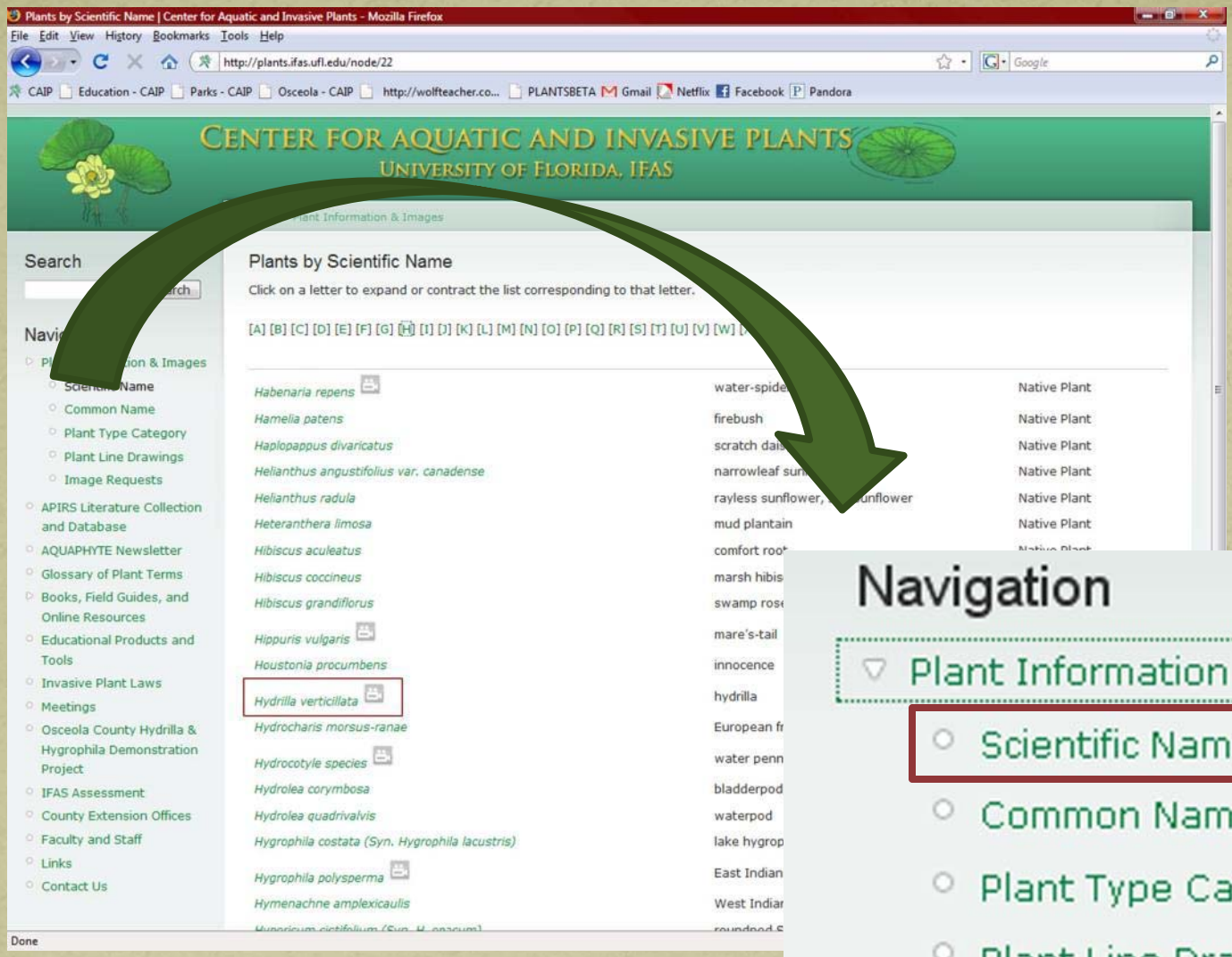

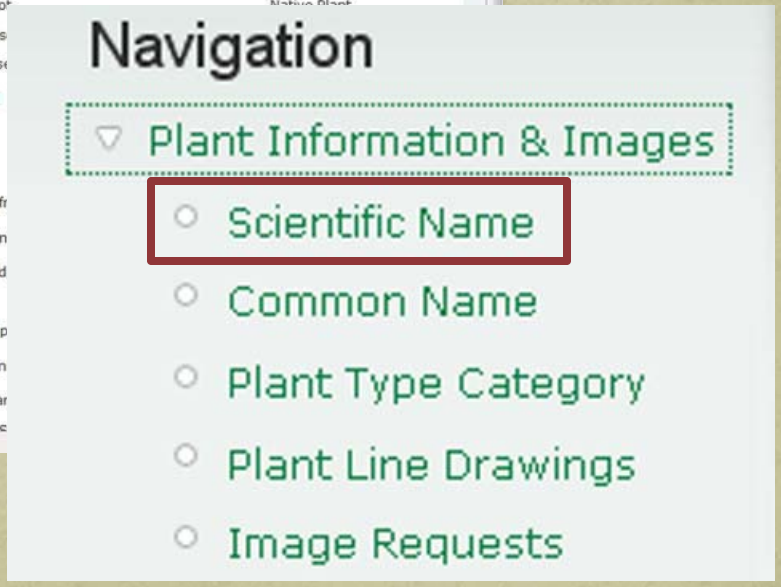

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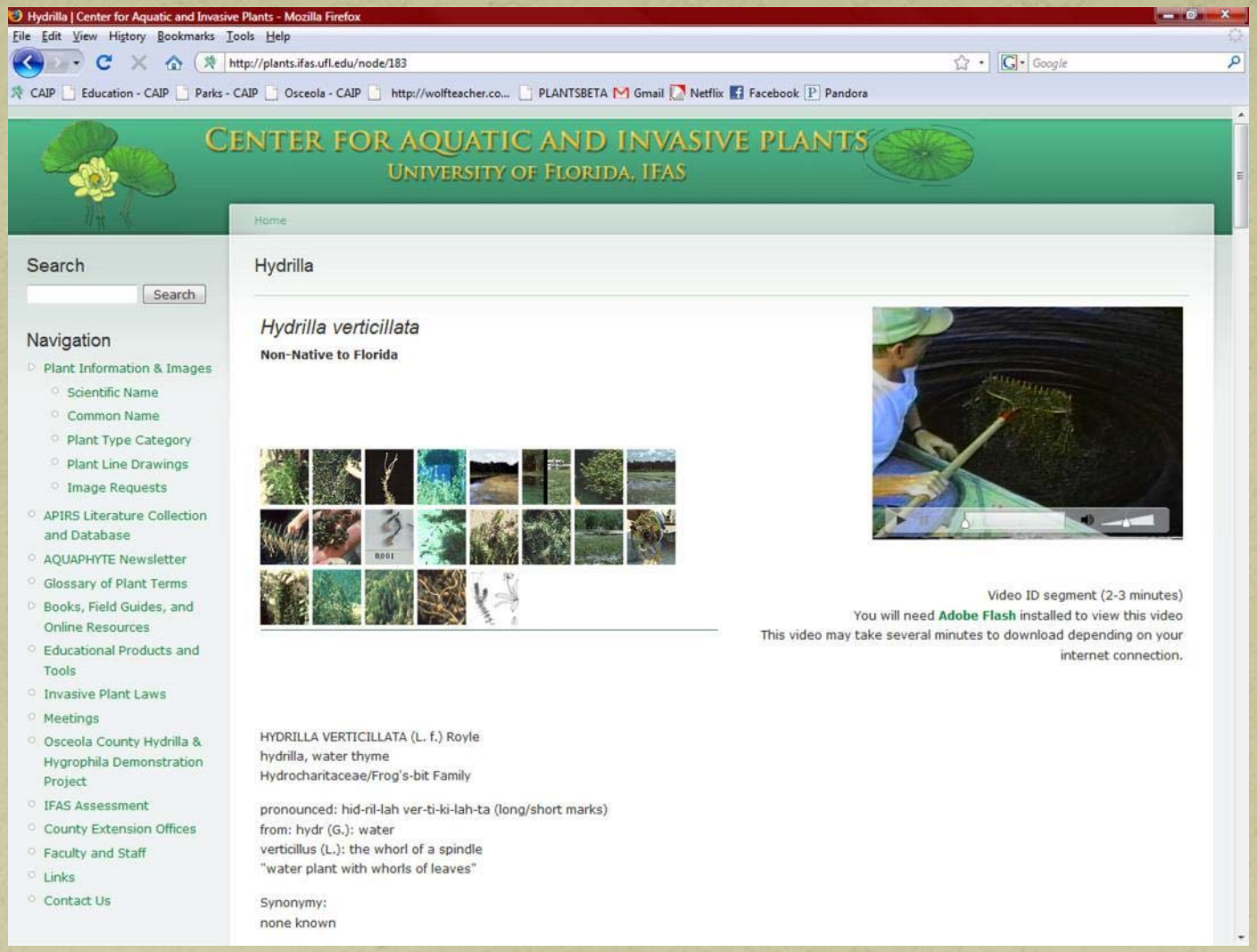

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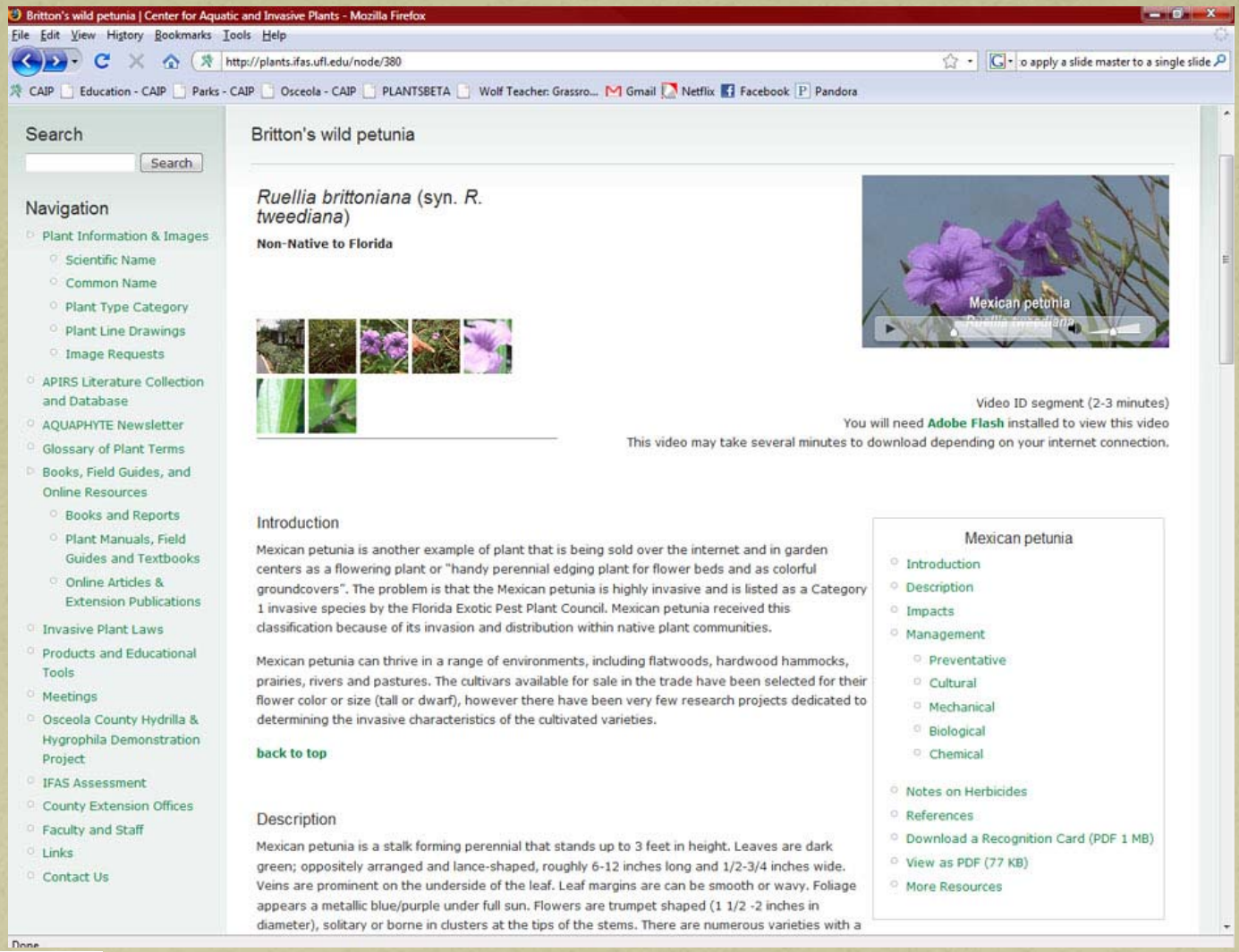

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Images:

- approximately 500 plant species — photos and illustrations
- widely used by other agencies and groups world-wide

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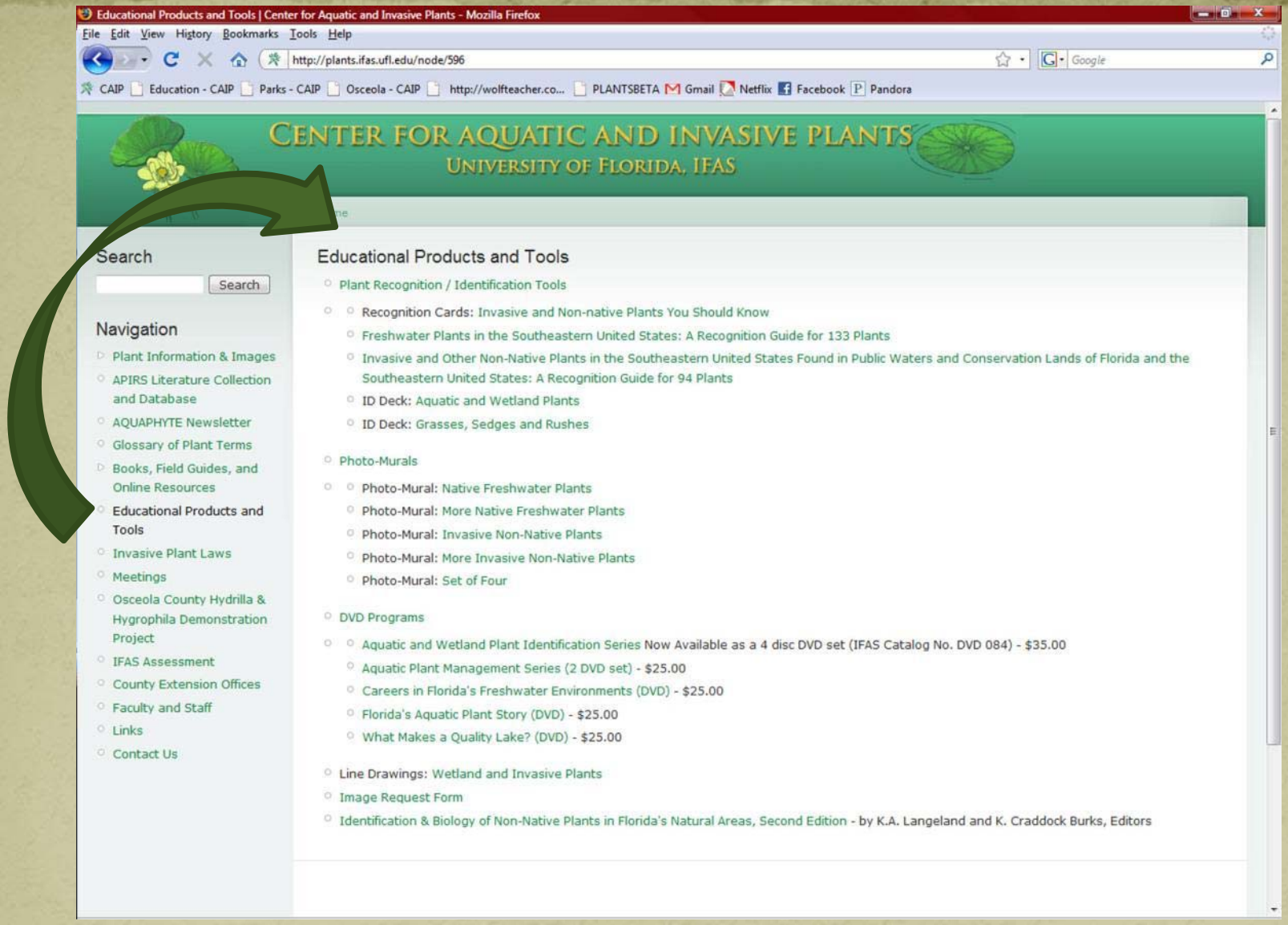

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Photomurals with ‘Teaching Points’

- *Native Freshwater Plants (Part 1 and 2)*
- *Invasive Non-Native Plants (Part 1 and 2)*

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Laminated “pocket posters”

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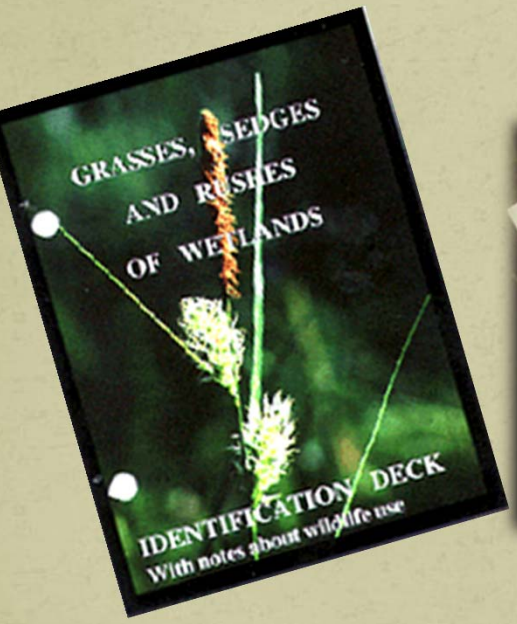
UF/IFAS Center for Aquatic and Invasive Plants 2009

Plant ID (field guides)

- Recognition Cards & Flash Cards
- Aquatic Plant Identification Deck
- Grasses, Sedges and Rushes of Wetlands



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20 educational video programs

(since 1990):

Now in DVD format; may be borrowed or purchased

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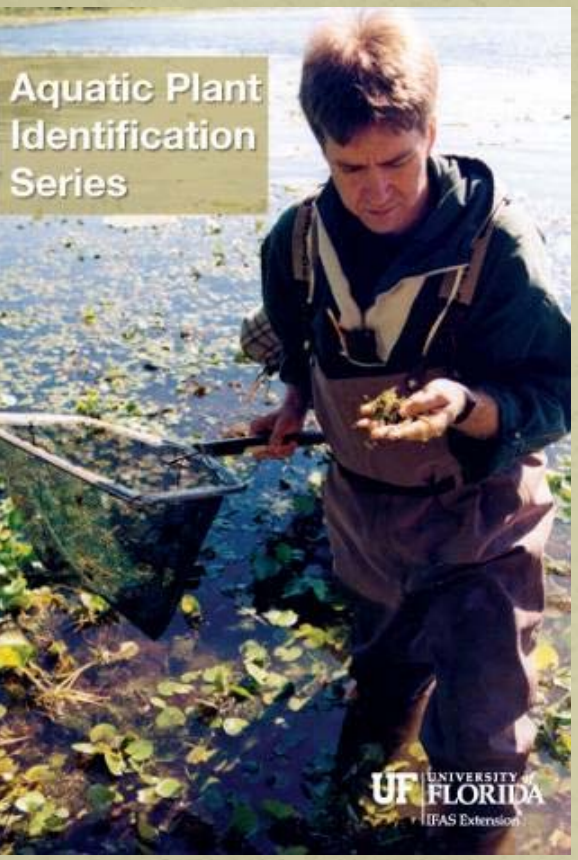

Plant ID Series ~ 4 DVDs

- Floating and floating-leaved Plants
- Emersed Plants
- Submersed Plants
- Grasses, Sedges and Rushes

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Upland Invasive Plant Identification Videos

Six produced in 2008 for CAIP website:

Chinese tallow, cogon grass, coral ardisia,
Mexican petunia, Old World climbing fern, skunk vine

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Since 2004 ~

a guide to plant management in Florida waters

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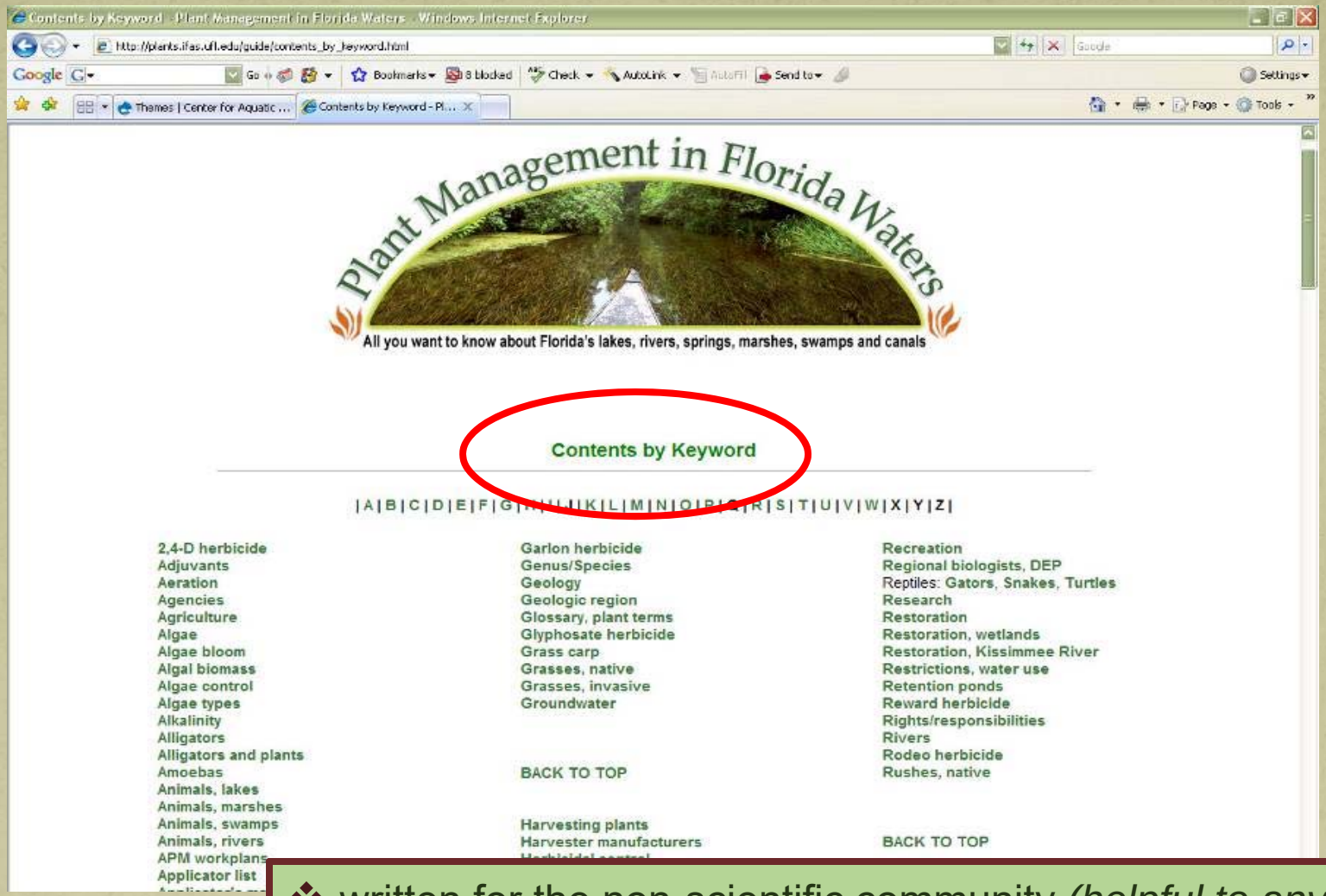

- written for the non-scientific community *(helpful to anyone)*

- accurate and trusted source of information
- covers more than 400 major/minor subjects

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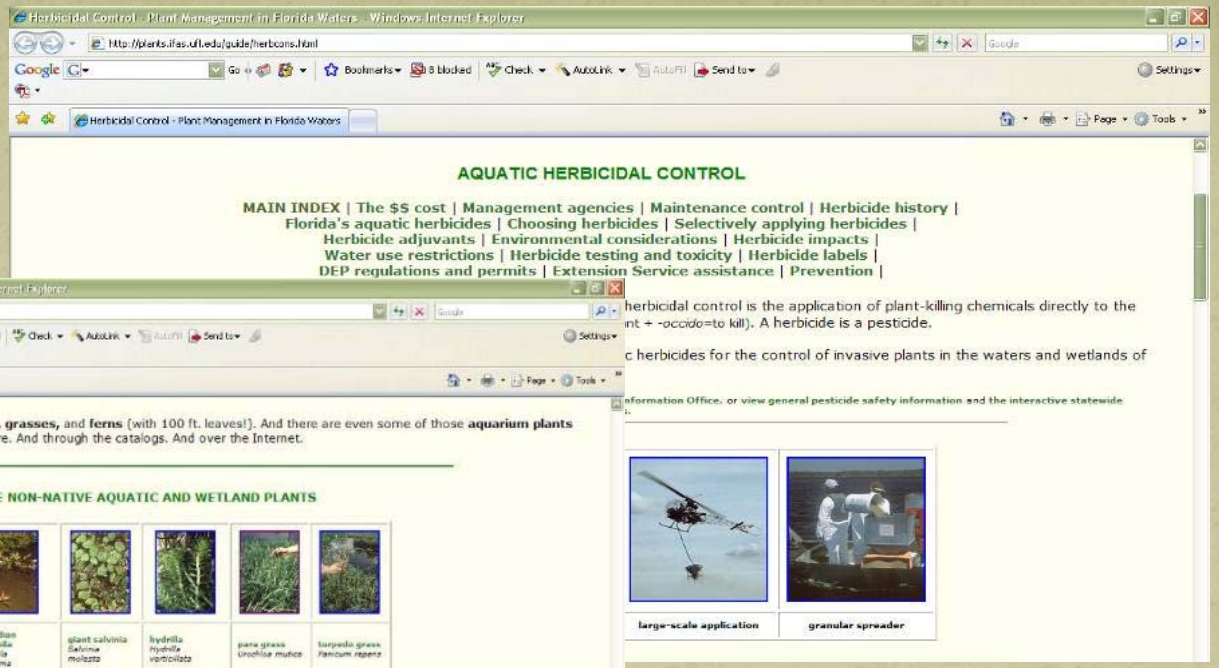
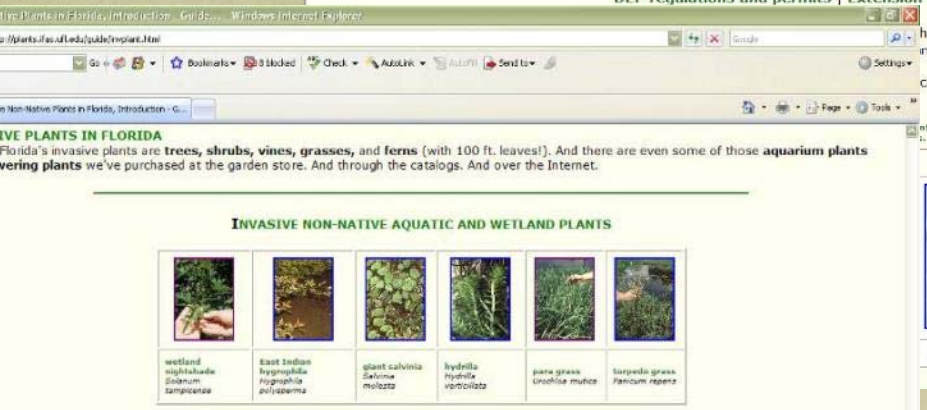
opics:





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Florida wildlife

Plant Management in Florida Waters

All you want to know about Florida's lakes, rivers, springs, marshes, swamps and canals

FRESHWATER BIRDS

MAIN INDEX | Types of water birds |
| Plants and water birds | | Water bird list | Bird diseases | Species richness |

many wetlands and miles of coastline, Florida is a bird watcher's paradise. Most of these wild birds aren't hunted, so many of ave grown accustomed to being around people. Indeed, some have adapted enough to survive and even prosper in some local while living among 16 million Floridians. People from around the world, **ecotourist birdwatchers,** come to spot our birds, each year g more than $1 billion to do so.

he day, most water birds search for food, usually fish, but also snails, and other small aquatic animals. Many birds also look for certain plants, n leaves, stems and seeds. The **waders** stalk the shallows, constantly into the mud with their long beaks. The **divers** prowl underwater for econds at a time. The **paddlers** move about on the surface, sticking ads into the water to spot food. The **aquatic birds of the air** soar d, sometimes fighting over fish, their huge nests encumbering many

Plant Management in Florida Waters

All you want to know about Florida's lakes, rivers, springs, marshes, swamps and canals

FRESHWATER FISH

EX | Aquatic plants and fish | Aquatic plant management and fish |
Commercial fishing | Recreational fishing | Fish watching |
ing licenses | Game fish | Anadromous fish | Protected fish |
ve fish | Pollution and fish | Fish kills | Report wildlife violations

imate and wide range of diverse aquatic ecosystems results in

Plant Management in Florida Waters

All you want to know about Florida's lakes, rivers, springs, marshes, swamps and canals

FLORIDA ALLIGATORS

MAIN INDEX | Habitat | Diet | Behavior | Nesting |
Use of aquatic plants | Juveniles | Danger | Safety tips |
Conservation | Harvest permits | Gator look-alikes |

Commonly found lurking along grassy banks or peering from beneath Florida's freshwaters, the American alligator, *Alligato* state's most recognizable native denizen. The massive crocodilian is the largest of all contemporary reptiles (including its local croc black to grey body can weigh 500 pounds and grow more than 18 feet long.

This 150 million-year-old relic from the Age of Dinosaurs acquired international acclaim in the sever observed by Spanish explorers who referred to the species as *el lagarto*, the lizard. Over the centu the alligator, namely the yellow and black skin on its belly and the meat of its tail, led the prolific re mid nineteenth century. Through endangered species legislation (the alligator was listed as endange enforcement against illegal poaching, alligator populations in the southeastern U.S. slowly rebounde threatened, and in 1987 was re-classified as "threatened due to similarity of appearance" to the A became Florida's official state reptile that year. Today, the American alligator is a common reminde serves as a symbol for the state's freshwater habitats.

HABITAT

When left alone by humans, alligators thrive in Florida's natural and even its artificial fresh waterwa reptiles are restricted to wetlands in the southeastern United States and are primarily found in Flori Louisiana. However, they also inhabit parts of Texas and Alabama. In Florida, alligators most comm basins and large lakes in central and south Florida, yet they also inhabit most of our lakes, rivers, n even be found in brackish environments throughout the state.

Plant Management in Florida Waters

All you want to know about Florida's lakes, rivers, springs, marshes, swamps and canals

Chinese Grass Carp

(Ctenopharyngodon idella)

MAIN INDEX | Grass carp and habitat management | Physical characteristics |
Grass carp in Florida | Grass carp diet | Caveats | How many is too many? |
How to remove grass carp | Training grass carp | Useful links |

Chinese grass carp are herbivorous (plant eating) fish that have been purposely introduced into many Florida lakes and ponds as a way of controlling aggressive aquatic weed growth. For many, grass carp and aquatic weeds seem like a match made in heaven: the fish are relatively inexpensive and they have a ravenous appetite for problem plants - especially hydrilla. No lumbering harvesters needed, no expensive chemicals; just stock the lake with a few dozen hungry carp and let them do their thing. Right?

Keep Reading
Anyone considering stocking grass carp into their lake or pond should peruse these pages and related links before taking the "plunge;" while they are an effective and affordable solution for many lakes, grass carp are not a panacea for all plant infestations. Under certain circumstances, they can create their own set of problems.

Physical Characteristics
Most folks are surprised to learn that grass carp are members of the minnow family as they certainly don't fit the typical minnow profile; these fish grow to an average of 15-20 pounds and 20-35 inches in length. In larger lakes, with plenty of plants to eat, they can grow up to 50-60 pounds and exceed 50 inches in length. In Florida, the largest reported

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

Used by:

- homeowners
- managers and field personnel who refer concerned citizens to the 'guide' with free webcards
- **NOW**…teachers and students

"Please, take a handful! Keep them in your truck, shirt pocket, wallet …"

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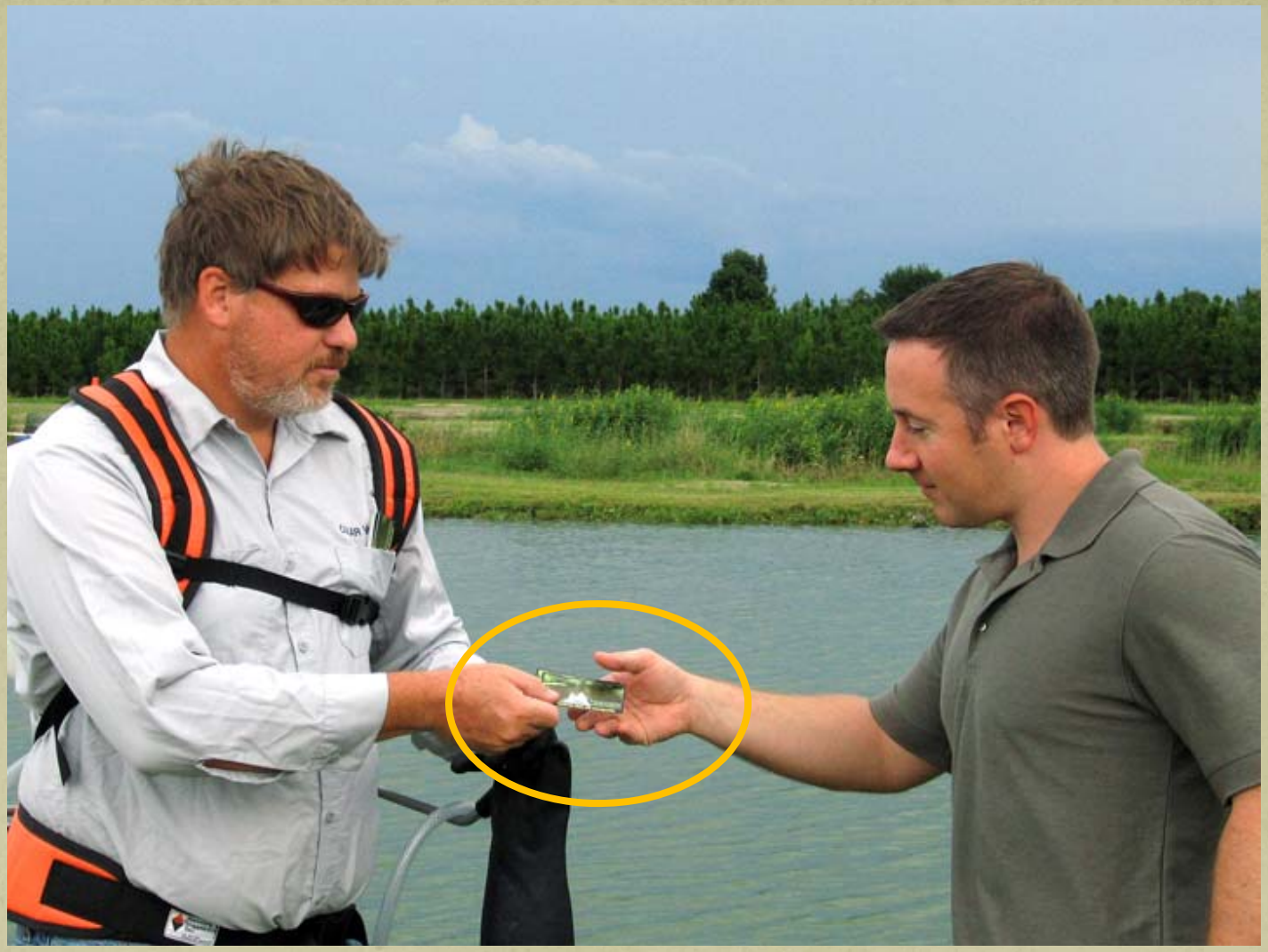

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General Outreach ~

Is it enough?

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Education Initiative and Curriculum

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

In 2005, launched an education program about native, non-native and invasive plants for use by science teachers and other educators (language arts, social studies, park rangers, etc.)

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Goals

- **Capture** the attention of educators, their students and eventually their parents;
- **Inform** them of challenges & costs associated with invasive plants in Florida *(and around the world);*
- **Provide** useful information on how they can help.
- **Change behavior?**

Year 1: Introduced subject to teachers

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Year 2:

Asked them what they needed to teach this subject and then began developing it.

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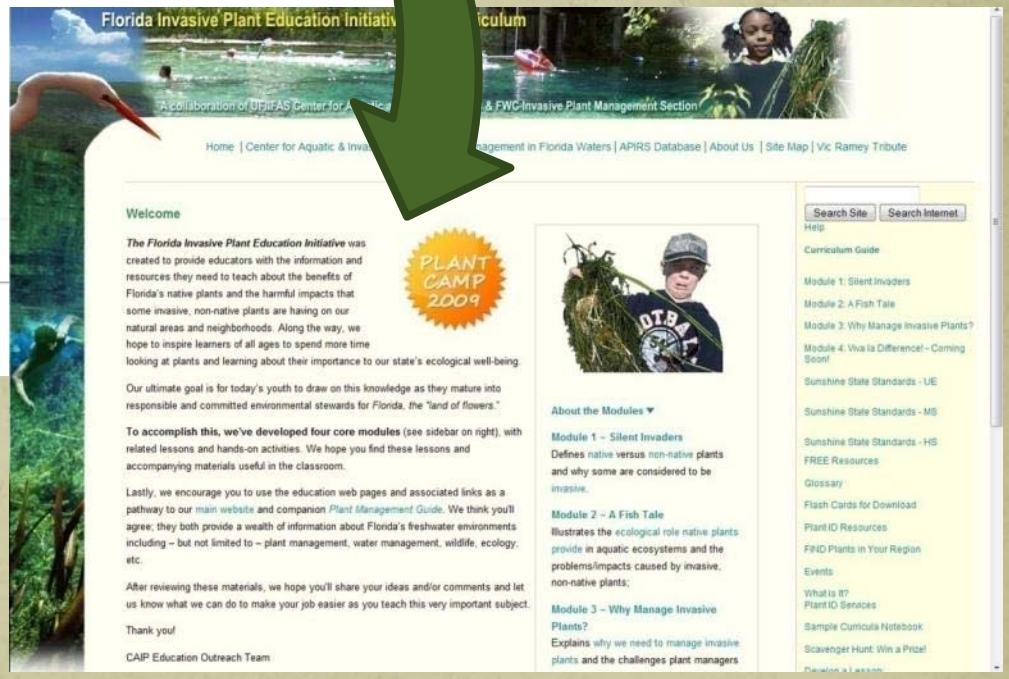
Created website for easy access to materials



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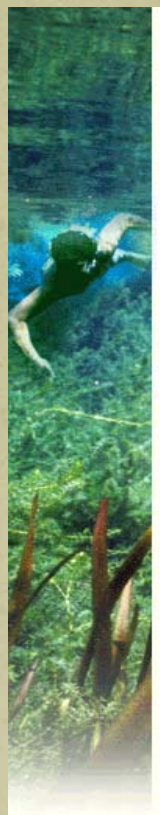
Highlights!



Free Education Resources for Teachers

For Teachers who are interested in invasive aquatic plants in Florida. These resources are products of the University of Florida unless otherwise stated.

General Resources | **PDF Files** | **Items to Order** | **Affordable Resources**

General Resources (links)

A Glossary of Flower Parts - (254 KB jpeg image)

A Glossary of Leaf Shapes - (1.6 MB jpeg image)

Aquatic Plant Problem? Contact your DEP Regional Biologist

Assorted Photos of native and invasive plants in Florida and the U.S.

Biological Invasions: A Growing Threat - An article from *Issues in Science and Technology*

176 Botanical drawings of native and invasive plants in Florida

Center for Precollegiate Education and Training offers educational programs for teachers and students

Crossword puzzles about aquatic plant management **Upper Elem.** | **Middle** | **High**

Extension publications about invasive plants and their management

Flash Cards: Invasive and Non-native Plants You Should Know

Florida Invasive Species:

- **Water Hyacinth** DEP Flash movie (requires downloadable Macromedia Flash player)
- **Lygodium** DEP Flash movie (requires downloadable Macromedia Flash player)
- **Hydrilla** DEP Flash movie (requires downloadable Macromedia Flash player)

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Highlights!

PDF Files

A bunch of **Weed Alerts** from the **Department of Environmental Protection** -
See weed alert lessons designed for the classroom

A four page flyer of "Teaching Points" about native and non-native plants, questions and answers made by and for teachers - (PDF 357 MB)

A Glossary of Flower Parts - (PDF 1.6 MB)

A Glossary of Leaf Shapes - (PDF 2.14 MB)

Activity book: Understanding Invasive Aquatic Weeds, for students of all ages. Information and activities; in a 16-page booklet covering 5 aquatic plants that are invasive regionally and throughout the country. - (PDF 3.5 MB). Also available in quantity for free: http://www.apms.org/activity.htm

- This booklet is also available in quantity from the **Aquatic Plant Management Society**

Activity book: The Underwater Forests of Lakes and Rivers - Information about native and invasive aquatic plants with activities suitable for upper elementary. (PDF 7.3 MB)

Botany Handbook for Florida - Learn and understand scientific names of plants with clear illustrations and concise definitions. (PDF 4.44 MB)

Careers in Florida's Freshwater Environments booklet - (PDF 3 MB)

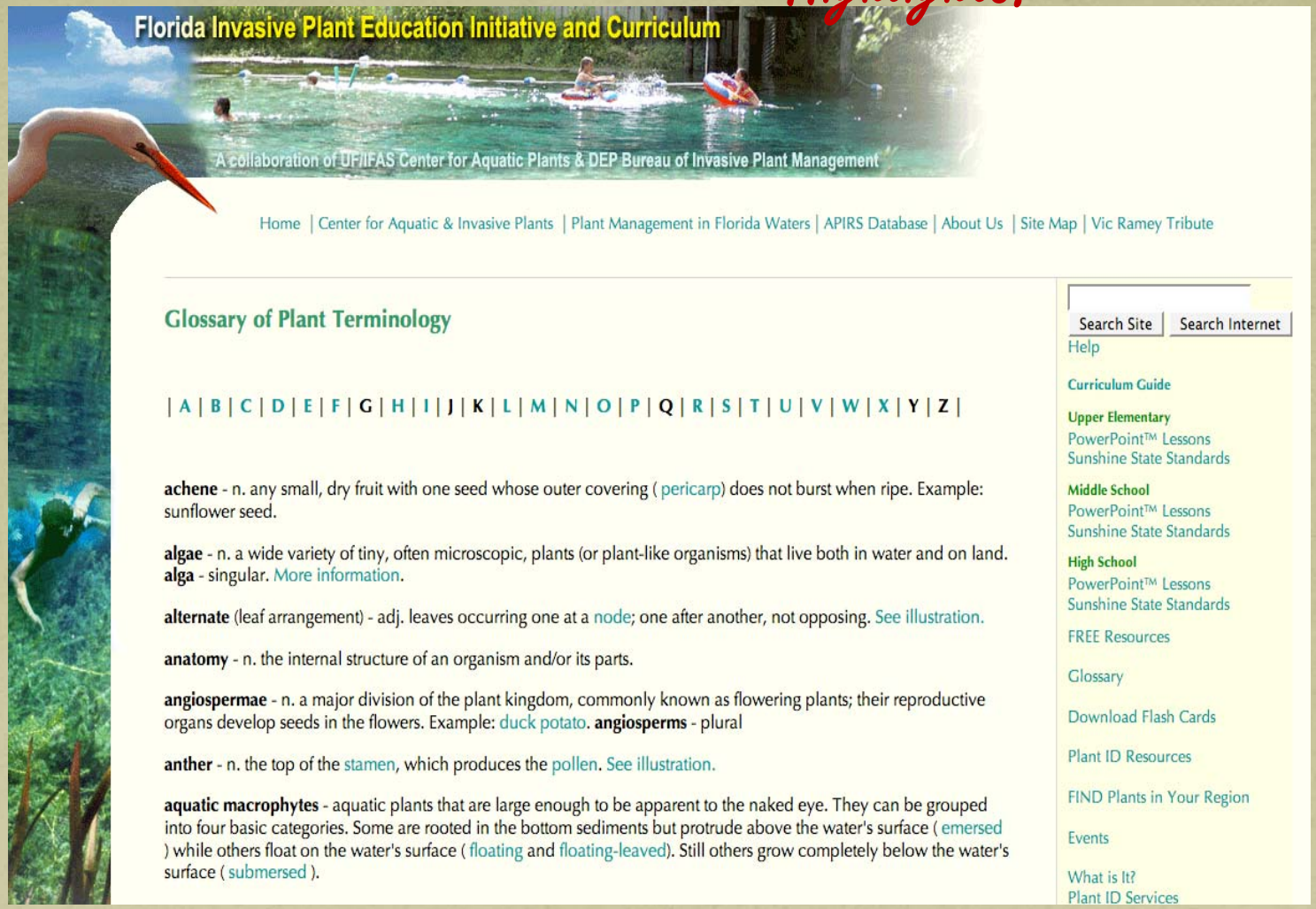
- **Careers in Florida's Freshwater Environments** DVD program about environmental occupations in Florida, for elementary and middle school students

Effects of Grass Carp on Aquatic Vegetation in Lake Conway, Florida - (PDF 58.95 KB)

UF/IFAS Information Bulletins :

- **Help Protect Florida's Natural Areas from Non-native Invasive Plants (Circular 1204)** (PDF 1,624 KB)
- **Brazilian Pepper-tree Control (Circular SS-AGR-17)** (PDF 344 KB)
- **Natural Area Weeds: Air Potato (*Dioscorea bulbifera*) (Circular SS AGR 164)** (PDF 411 KB)
- **Natural Area Weeds: Chinese Tallow (*Sapium sebiferum*) (Circular SS-AGR-45)** (PDF 372)
- **Natural Area Weeds: Distinguishing Native & Non-native "Boston Ferns" & "Sword Ferns" (Nephrolepis spp.) (Circular SS-AGR-22)** (PDF 1,621 KB)
- **Natural Area Weeds: Skunkvine (*Paederia foetida*) (Circular SS-AGR-80)** (PDF 3,659 KB)

Highlights!



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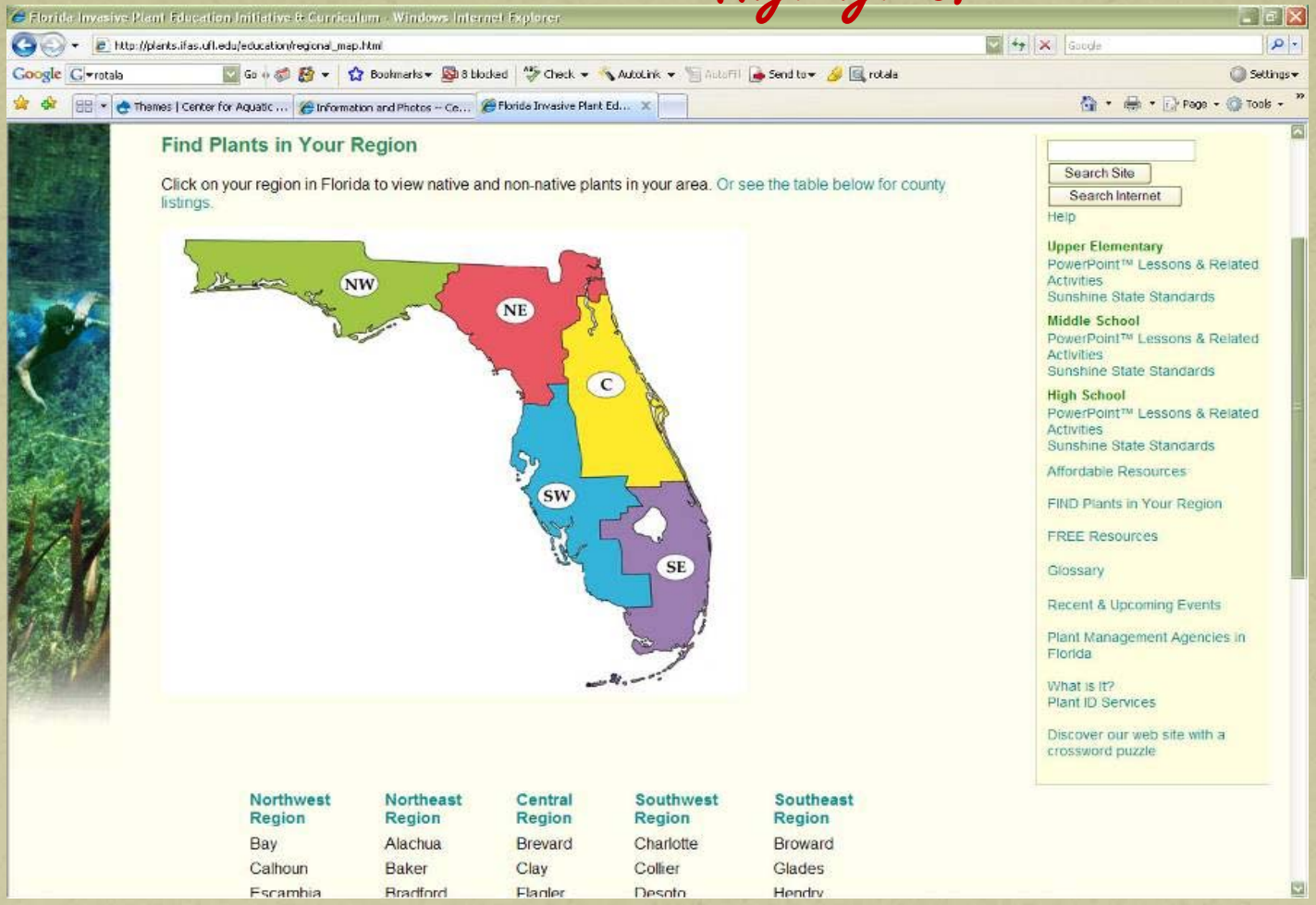

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Highlights!

Flash Cards:
Invasive and Non-native Plants You Should Know

COMPLETE SET
Download individual flash cards (PDF - average file size, 500 KB) or purchase the set.

P = Prohibited. Some of the plants featured in this card deck are officially prohibited by federal or state law.

Cover / Introduction / Reference Section (PDF - 1 MB) includes the following:

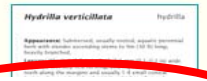
- Plants by Scientific Name
- Plants by Common Name
- Flower Parts
- Stems
- Roots
- Leaf Shapes
- Leaf Bases & Attachments
- Leaf Arrangements
- Habit
- Glossary of Plant & Flower Parts
- Bibliography

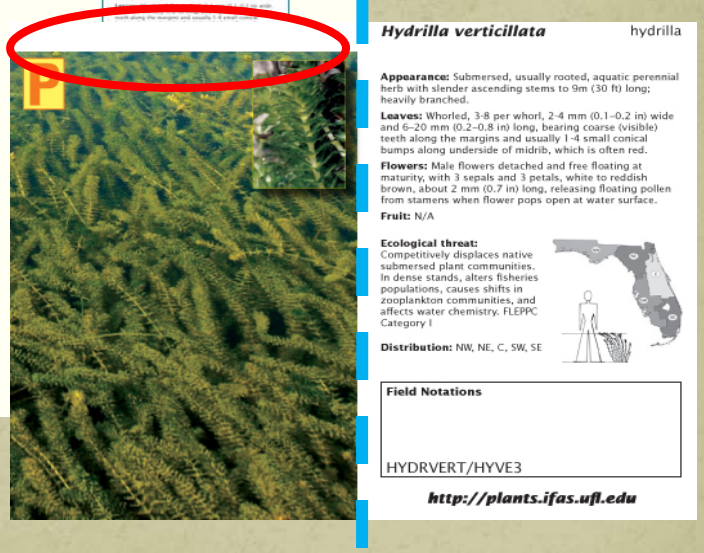
by Common name **by Scientific name**

Flash Cards: (PDF - average file size, 500 KB)

- air-potato
- alligator weed
- asparagus fern
- Australian pine
- bishopwood
- bowstring hemp
- Brazilian jasmine
- Brazilian pepper

- *Abrus precatorius*
- *Acacia auriculiformis*
- *Albizia julibrissin*
- *Albizia lebbeck*
- *Aleurites fordii*
- *Alternanthera philoxeroides*
- *Ardisia crenata*
- *Ardisia elliptica*





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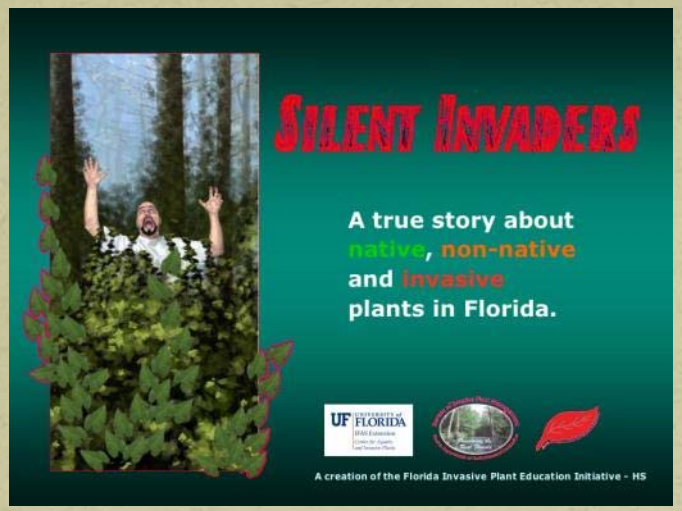
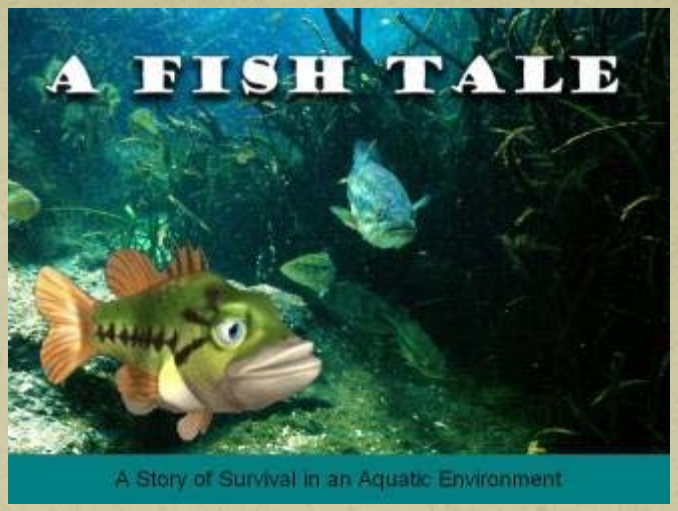
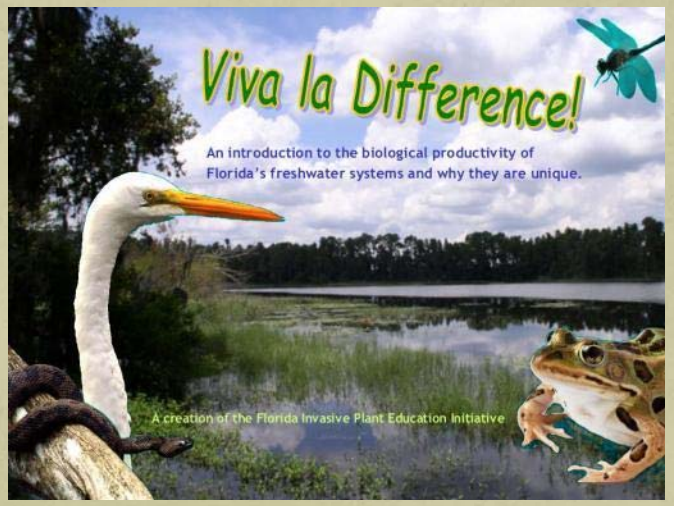
Top request: PowerPoint™ Presentations







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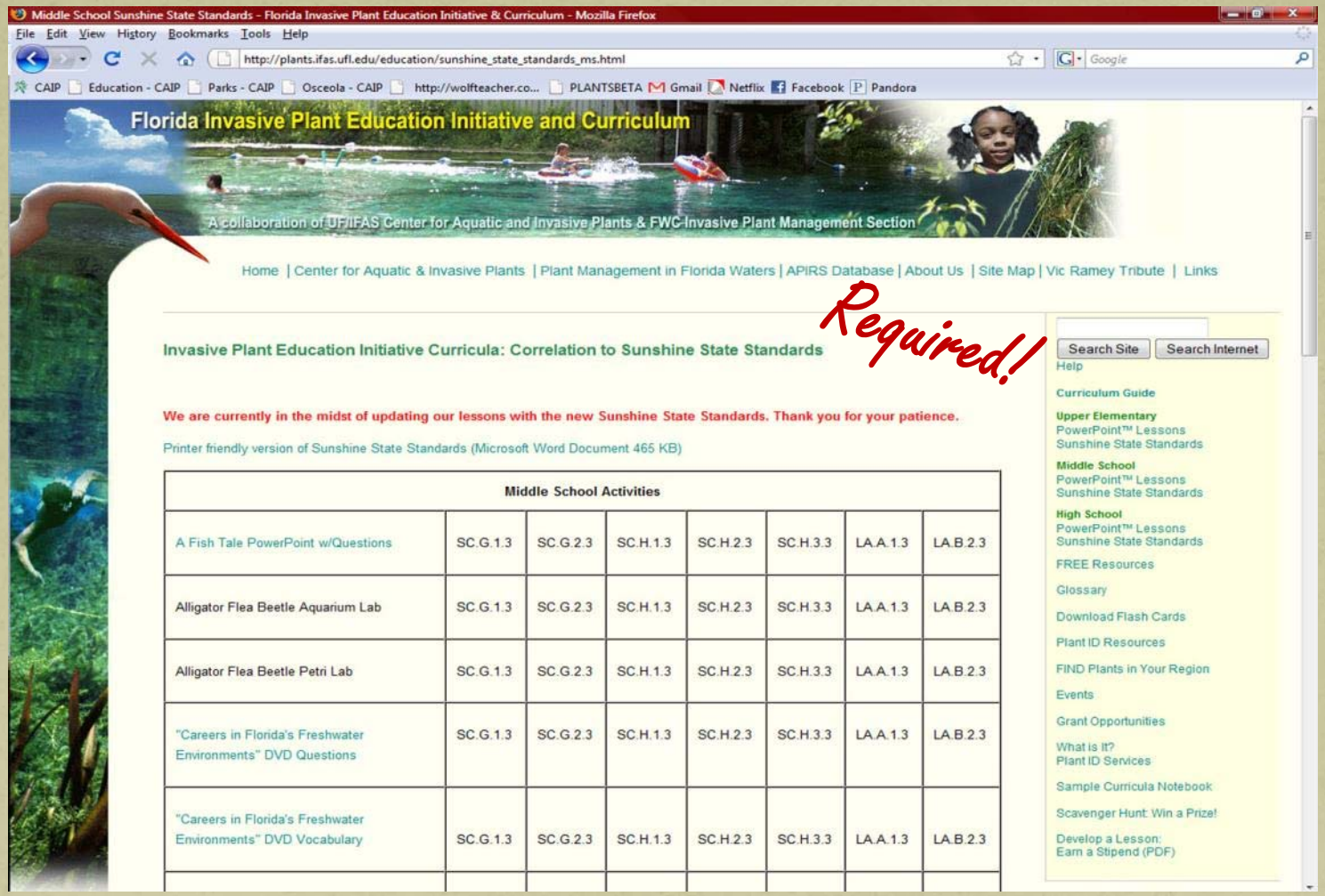
All lessons correlate to Sunshine State Standards



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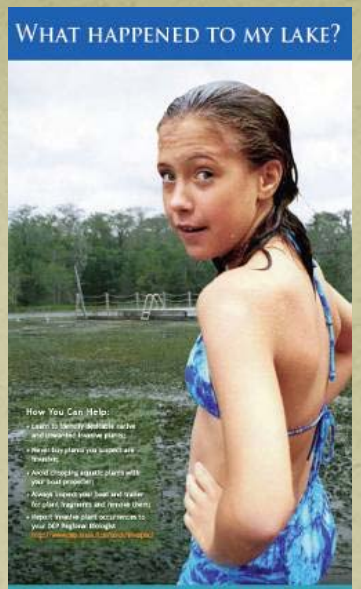
Gathered or created materials…



t's not just about producing materials.

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A Recipe in the Making:

- ❑ humor versus fear
- ❑ give educators a chance to contribute
- ❑ regular communication
- ❑ make materials that can be adapted
- ❑ be as generous as possible
- ❑ cooperate with others
- ❑ annual workshops

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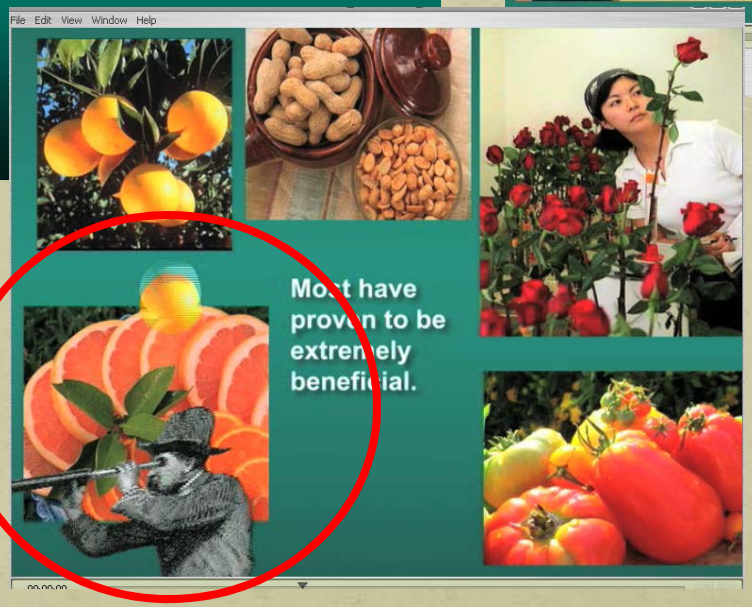
❑ humor versus fear



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Feral Hog

Feral Cat

Gambian Rat

Coyote

Cuban tree frog

cane toad

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LOTS of material here…

❑ give teachers a chance to contribute

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❑ regular communication

Reply | Reply to All | Forward | Move | Delete | Junk | Close

e: Bingo

endy Norton [nortonw@osceola.k12.fl.us]

ou forwarded this message on 11/9/2007 1:00 PM.

nt: Friday, November 09, 2007 12:14 PM
RICHARD,AMY N

ave to tell you my low level 7th graders had a ball with the bingo today they were screaming and yelling it was an amazing teaching moment.

st Regards,

endy Norton-
AR Discovery Educator
ience Lab Teacher
llalago Academy

eply to All | Forward | Move | Delete | Junk | Close

al plants

ton [nortonw@osceola.k12.fl.us]

November 06, 2007 6:32 PM
,AMY N

Aquatic Plant story today the worksheet had the kids engaged the whole time. thanks,

ry Educator
eacher
demy
Hill Road
34746

From: Solomon, Coni - Ft King Middle School [Coni.Solomon@marion.k12.fl.us] Sent: Tue 10/14/2008 8:44 PM
To: RICHARD,AMY N
Cc:
Subject: RE: FCAT and "guiding" questions for SILENT INVADERS

Amy,

I took a quick look at the demo site and it looks great! Y'all are doing a super job of listening to our feedback (unusual in the educational field:-)

Here are a few responses to your questions:
1. Five sections look good and are easy for navigation. One question: There isn't a section for tiles 4-19. Is it considered vocabulary development? Or Introduction to Non-Native Species?

2. I checked out the middle school link and like the guiding questions. Esp good for either using as a Powerpoint, general review or, for ESE/Special area kids, it can be duplicated for them to follow along with their own "hard copy." For some students, it is required by law through their IEP to give them their own materials (as an accommodation).

3. The words aren't hard-and-fast FCAT words, but they are subject specific and appear to meet the needs of the lesson. Sometimes too many words at a time is just too much for the kids to absorb. For the elementary level, it is a good introduction to the Vocab., for middle it is a good reinforcement (some new words/some already introduced words). Check with high school teachers for their input as to the appropriateness for them. I'm clueless on that one.

4. There probably will need to be varying levels of FCAT questions as upper elementary questions would and should be vastly different from high school questions. You could use the same types of questions – just "amp up" the question to meet the need of the higher academic levels.

Hope this is helpful. Have a great day!

Coni Solomon
Ft. King Middle School
Coni.Solomon@marion.k12.fl.us

Teamwork is simply individual efforts melded together to achieve excellence.

Re: A Fish Tale quick question

Nancy Palmer [nancy_palmer@scps.k12.fl.us]

Extra line breaks in this message were removed.

Sent: Wed 11/12/2008 10:10 AM
To: RICHARD,AMY N

Hey Amy,

Yes, I think it would helpful to have definitions for key words. It would take any guesswork out of the definitions if they were already there.

Thank you!!!
Nancy

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❑ materials easily adapt to other regions

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❑ be as generous as possible

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enter for Aquatic and Invasive Plants 2009

❑ cooperate with others

Project WILD!

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Current Programs

INVASIVE SPECIES MONITORING, Fall 2008

Overview

Maine 7th and 8th grade students will apply their knowledge and skills to the scientific study of invasive aquatic species. Using *Vital Signs* innovative computing tools and research equipment, teams of students will report species observations and habitat data to a ready and responsive community of scientists. Scientists will use these student-collected data to inform their own statewide research efforts.

The hands-on study of invasive species reinforces a number of state and national science and technology learning standards. It challenges students to work collaboratively with their peers, connect with their local communities, and steward natural resources.

Content Focus:Invasive Species

Invasive species pose a serious threat to biodiversity worldwide, causing extinction or displacement of native species, degrading wildlife habitat, impairing recreational use of waterways, and reducing shell/finfish resources. Early detection and rapid removal are critical to the management and protection of our aquatic environments, but Maine has perhaps only a dozen scientists dedicated to monitoring the states 6,000 lakes, 32,000 miles of rivers and streams, and 5,000 miles of coastline. Vital Signs will enable 32,000 7th and 8th grade students to collect rigorous scientific data to significantly enhance existing monitoring efforts.

Universal Access: 7th and 8th Grade Students in Maine

Vital Signs will be universally accessible to all Maine students in grades 7 and 8. The Maine Learning Technology Initiative (MLTI) has equipped each student in this grade cohort with a personal laptop computer and high speed Internet access. A partnership with MLTI offers *Vital Signs* an extraordinary opportunity to connect 32,000 students, 400 teachers, and a number of invasive species researchers in statewide scientific study.

Program Development

See what we're up to:

- VS 2008 Development Blog

Student Research Experience

Students use the scientific process to investigate local habitats for invasive species:
-Observations are made in the field
-Research questions are selected
-Hypotheses drive field investigations
-Software and authentic tools guide data collection
-Database, interactive maps & graphs assist analysis
-Products are shared with online community of students, teachers, scientists

Program Impacts

"The magnitude of this involvement promises to build a heightened level of school-age awareness and a meaningful body of scientific knowledge that is essential for biologists and resource managers committed to addressing invasive species issues" Commissioner David Littell, Maine Department of Environmental Protection

Professional Development

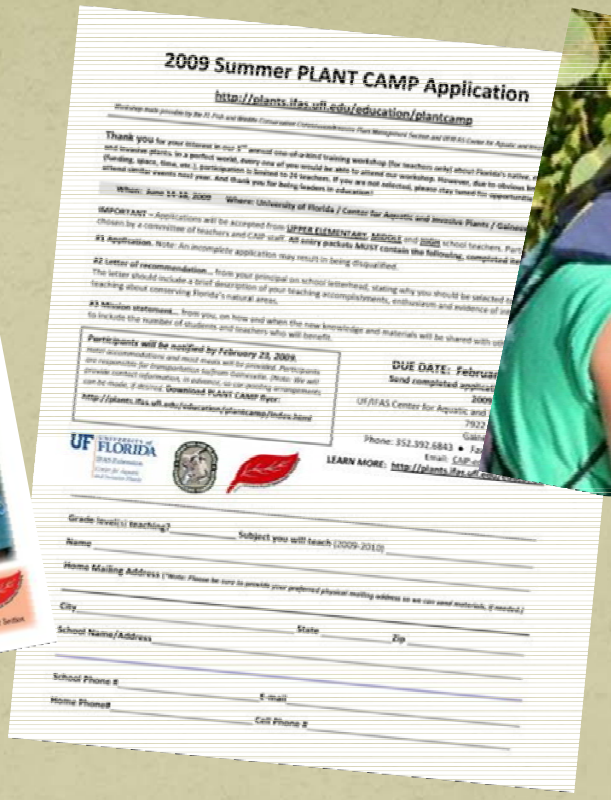
Vital Signs Teacher Institute, August 2008

- VS Institute 2008 blog
- VS Institute 2008 wiki

Aquatic Invaders in Maine Summer Institute, June 2007

- AIM blog
- AIM wiki

❑ annual workshops



❖**Create infrastructure** to support annual in-service workshops and continuing education for teachers.

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PLANT CAMP Goals

❖**Create excitement and interest** among teachers who will pass it along to students and also assist with curriculum development.

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Welcome Session

Day 1 — Upland Plants

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Day 2 — Why Manage Invasive Plants?

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Day 3 — Aquatic Plants and Water Quality

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ay 4 — Curricula Development & Graduation

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Teacher Comments

"Now I understand how important it is to stay ahead of invasive plants."

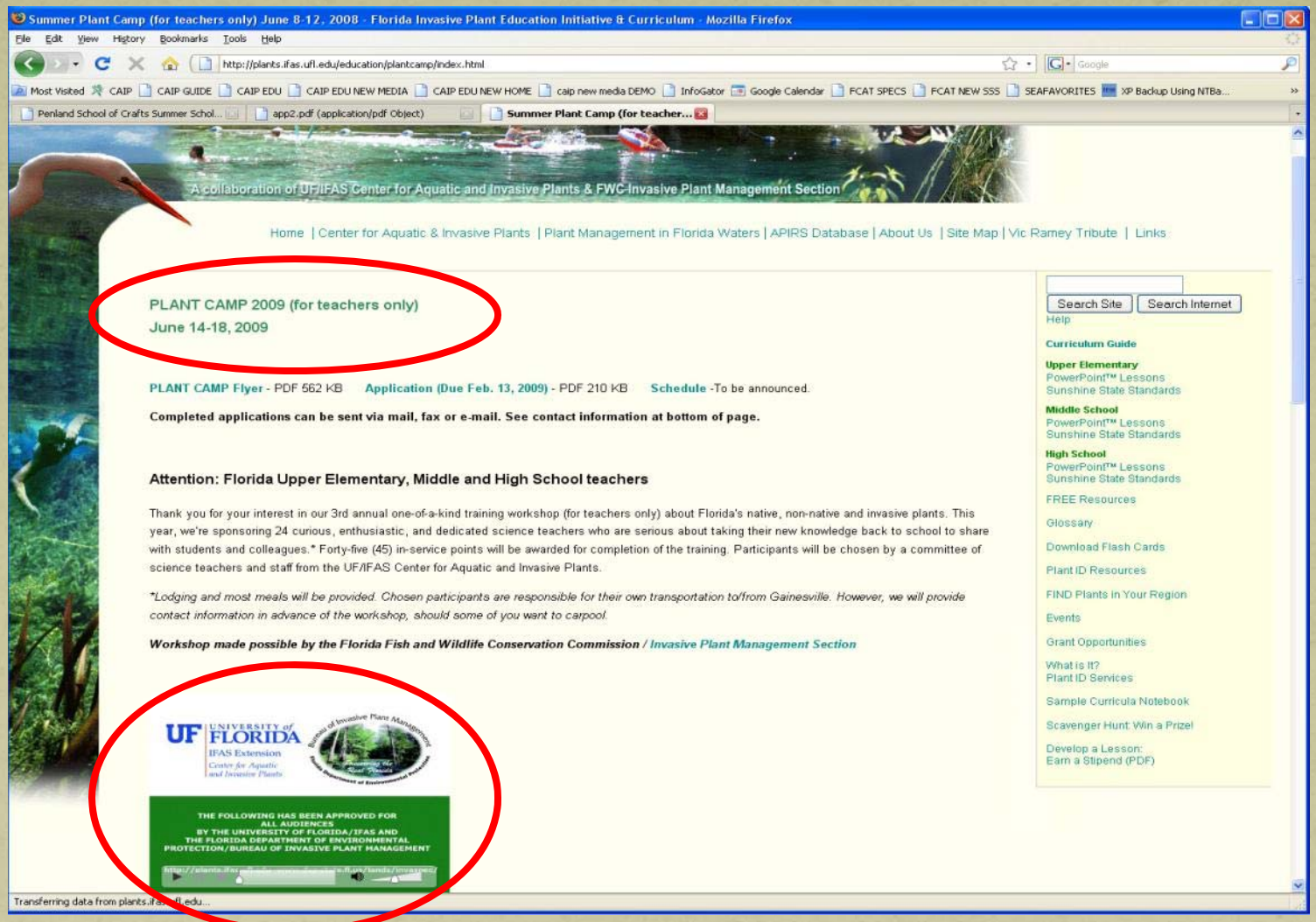
"Thanks for getting us out in the *real thing*."

"Hands-on activities on boats were a real eye opening experience."

"This has given me a deeper insight into the seriousness of the issue."

"Helpful to see the actual invasions of specific species."

"The number of invasive plants was amazing! "



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Looking forward ~

Sneak Preview: Invasive Species Film Festival

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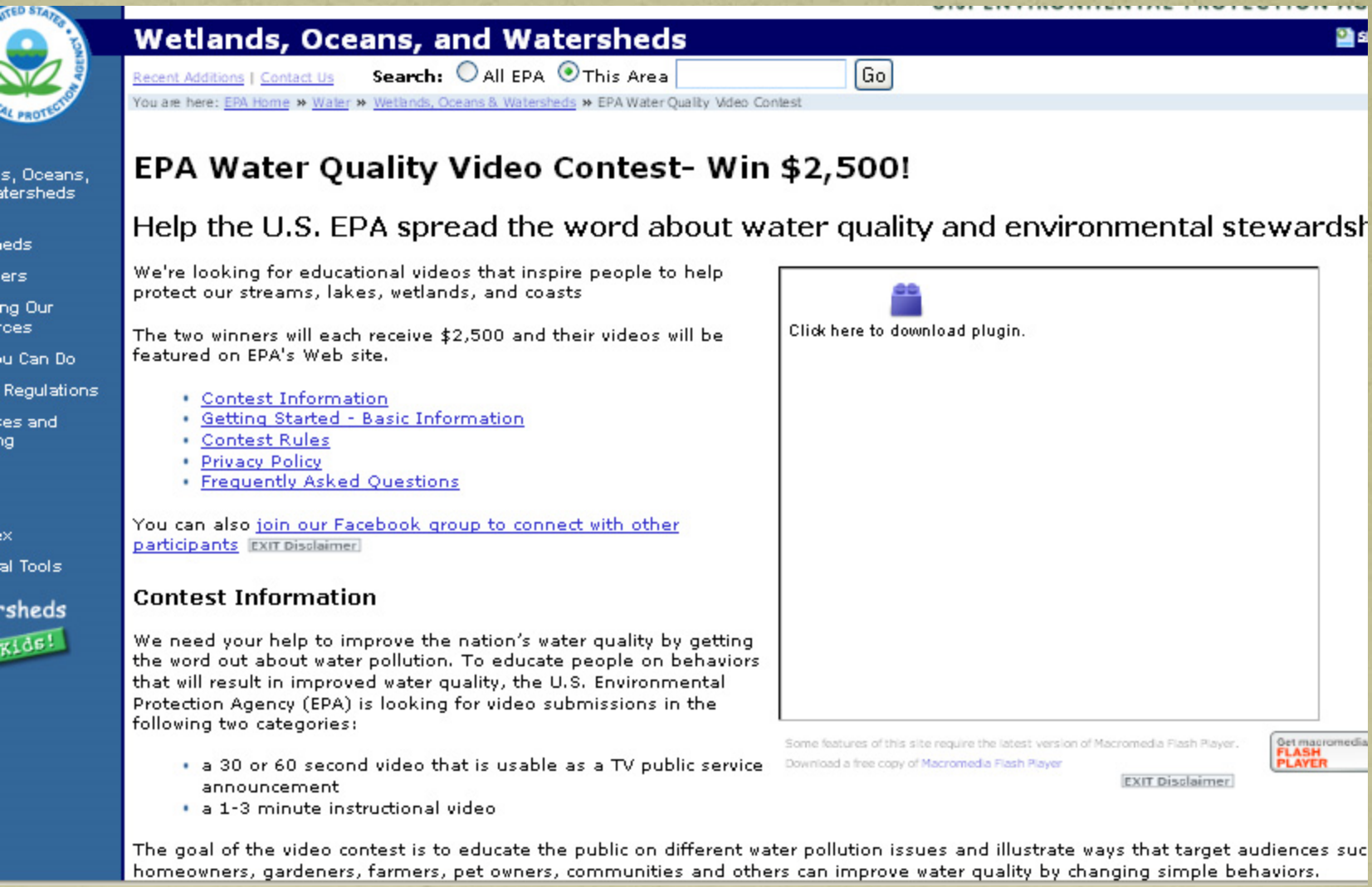
Wetlands, Oceans, and Watersheds
Recent Additions | Contact Us
Search: All EPA This Area Go
You are here: EPA Home » Water » Wetlands, Oceans & Watersheds » EPA Water Quality Video Contest
EPA Water Quality Video Contest- Win $2,500!
Help the U.S. EPA spread the word about water quality and environmental stewardsh
We're looking for educational videos that inspire people to help protect our streams, lakes, wetlands, and coasts
The two winners will each receive $2,500 and their videos will be featured on EPA's Web site.
Contest Information
Getting Started - Basic Information
Contest Rules
Privacy Policy
Frequently Asked Questions
You can also join our Facebook group to connect with other participants EXIT Disclaimer
Click here to download plugin.
Some features of this site require the latest version of Macromedia Flash Player.
Download a free copy of Macromedia Flash Player
EXIT Disclaimer
Contest Information
We need your help to improve the nation's water quality by getting the word out about water pollution. To educate people on behaviors that will result in improved water quality, the U.S. Environmental Protection Agency (EPA) is looking for video submissions in the following two categories:
a 30 or 60 second video that is usable as a TV public service announcement
a 1-3 minute instructional video
The goal of the video contest is to educate the public on different water pollution issues and illustrate ways that target audiences suc
homeowners, gardeners, farmers, pet owners, communities and others can improve water quality by changing simple behaviors.

In the Parks…

Also working with biologists, environmental specialists and volunteers in select Florida state parks.

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Brochures produced for a number of state parks:

- Bill Baggs/Cape Florida
- Crystal River Preserve
- Estero Bay
- Jonathan Dickinson
- Oscar Scherer
- Paynes Prairie Preserve
- Rainbow River

Customized by region....

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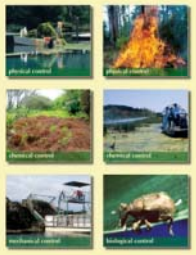
Keeping Things Under Control

After much research, we know that some invasive plant species will never be eradicated in Florida; they simply reproduce too fast. So now, the strategy is to keep infestations at the lowest feasible levels.

Regular 'maintenance control' lessens overall environmental damage; it maintains habitat for native wildlife; and it keeps plants from damaging bridges and flood control structures. It also reduces the total amount of herbicides needed over the long term.

Control of invasive plants allows us to enjoy our natural areas and preserves Florida's unique diversity.



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

You Can Help

Preventing the introduction and spread of non-native, invasive plants in Florida is the most effective and least expensive way to protect Florida's natural habitats. Here are a few things we can all do:

- Learn to identify which plants are invasive, especially in your area.
- Volunteer to help remove invasive plants in your neighborhood.
- Inspect your yard for invasive non-native plants; dispose of them in household trash (don't compost them).
- Always remove plant matter from boats and trailers after use.
- Ask your nursery or garden center for native and/or non-invasive plants.
- Practice good stewardship; never transport Florida's aquatic, wetland or upland plants to other areas, and never empty your aquarium into a body of water (not even a ditch).

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

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An opportunity ?

Invasive Species Education Summit –

for those involved in the education side of things. (Currently, most meetings seem focused on the control and/or policy aspect.)

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More ideas:

- Invasive Species Video Festival (online)

- Take time to create a listing of all agencies/groups working on invasive species education and open a dialogue…

The Team

- **Karen Brown ~** Information Office Coordinator
- **Amy Richard ~** Education Initiative Coordinator
- **Rob Horsburgh ~** Education Initiative Assistant
- **Beth Hathaway ~** Website Development
- **Lynda Dillon ~** Program Assistant
- **Joshua Huey ~** Graphics Assistant

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With <u>great</u> appreciation for a 25 year collaboration and continued support of…

the FWC / Invasive Plant Management Section
(formerly the DEP/Bureau of Invasive Plant Management)

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If we can be of service…

UF/IFAS Center for Aquatic and Invasive Plants

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