*The*

# Florida Invasive Plant Education Initiative

By Karen Brown and Amy Richard

University of Florida/IFAS
Center for Aquatic and Invasive Plants
Gainesville, FL

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

**Southeast EPPC 2010**

***For 30 years ~***

**The Center for Aquatic and Invasive Plants (CAIP)** has been assembling and disseminating educational resources about aquatic and invasive plants.

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

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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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# General outreach only goes so far…




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# Florida Invasive Plant Education Initiative

An education outreach program and curricula about native, non-native and <u>especially</u> invasive plants for use by science teachers and other disciplines (language arts, social studies)

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Florida Invasive Plant Education Initiative

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# Goals

❖ **Capture** the attention of educators, students (maybe even their parents) and raise awareness;

❖ **Inform** teachers and students of challenges and costs associated with invasive plant management in Florida and around the world;

❖ **Provide** useful information on how they can help;

❖ **Gain a greater acceptance** of plant management.

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**Year 1 & 2** Introduced the subject of invasive plants to teachers at the Florida Association of Science Teachers conference & other venues

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## Year 1 & 2

Conducted workshops to find out what they wanted and needed to teach this subject

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# Top Requests from Teachers

- Website for easy access to materials
- PowerPoint™ lessons (with bells & whistles)
- Supporting materials
- Sunshine State Standards
- Hands-on materials
- Continued support
- Workshops to enhance background knowledge

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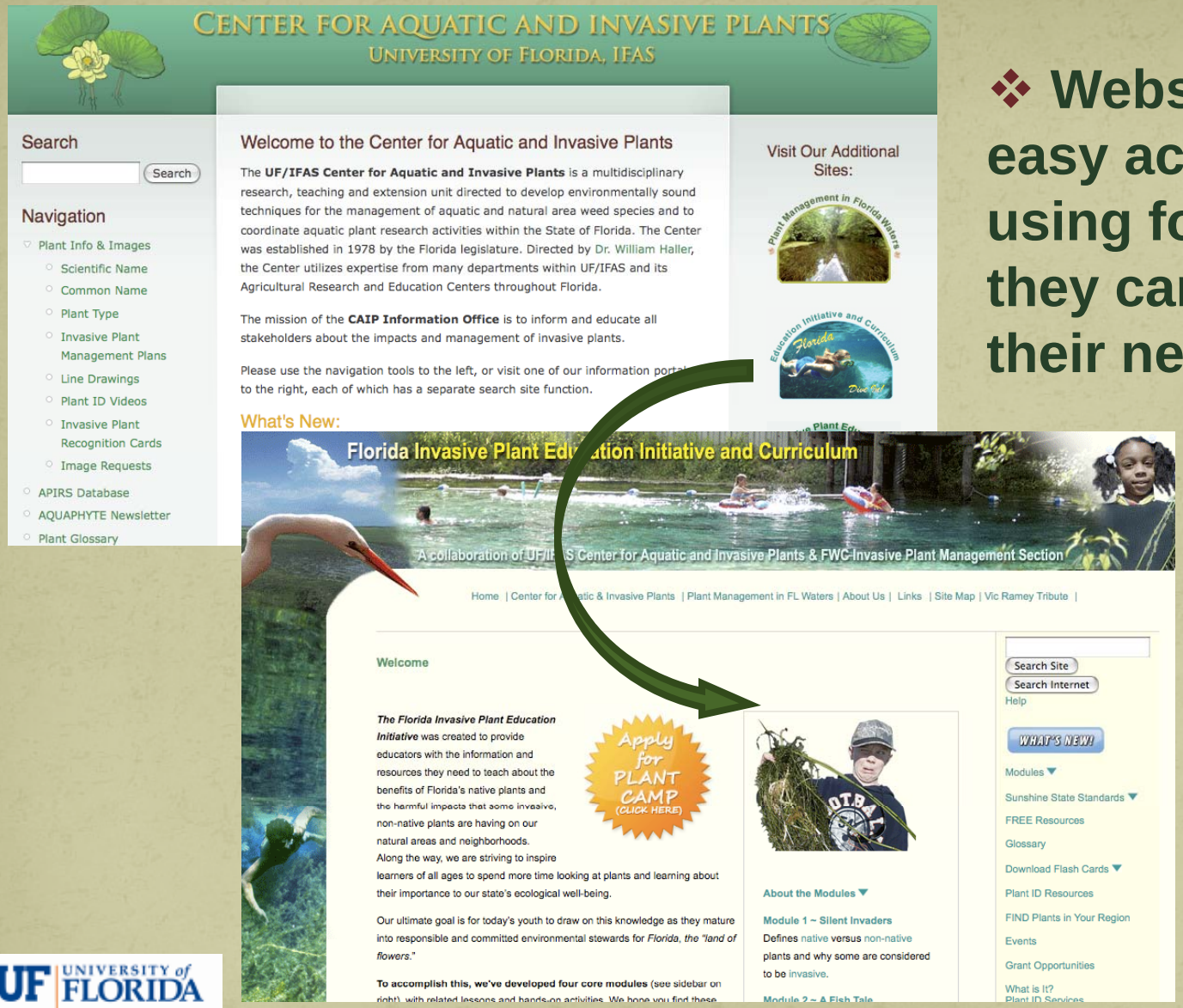


- **Website for easy access, using formats they can alter for their needs.**

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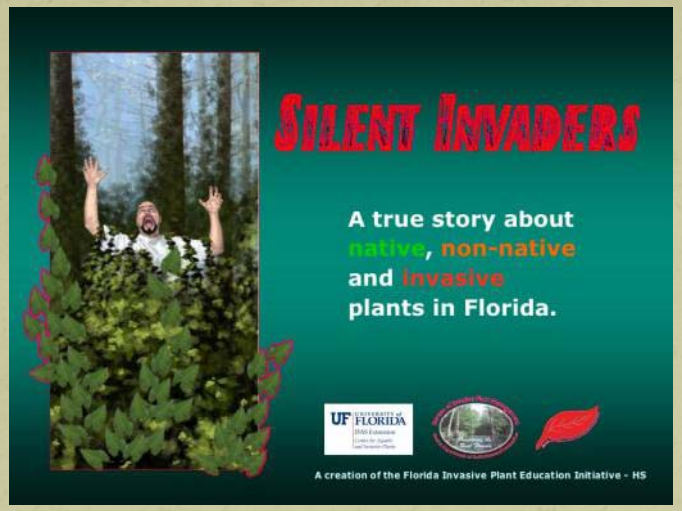
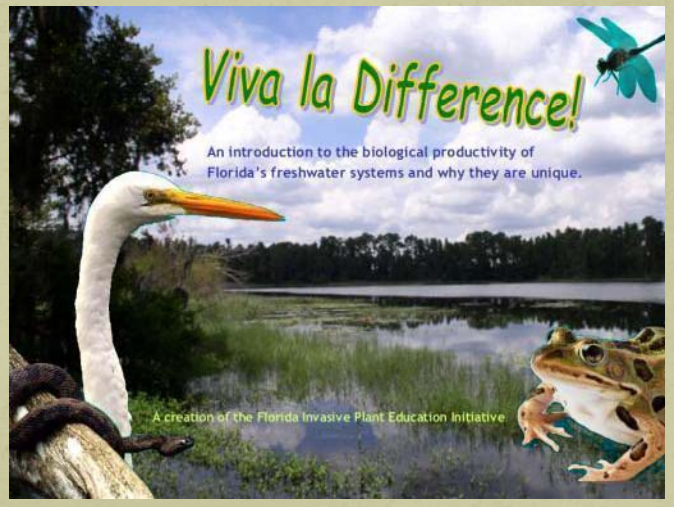
## ❖ Top request: PowerPoint™ Presentations



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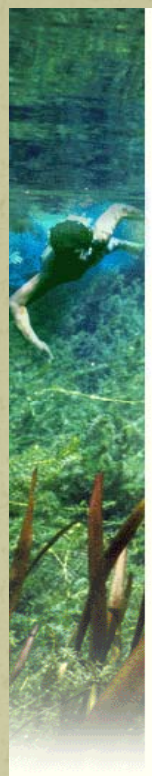
# ❖ Provide Lots of Supporting Materials



## 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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# ❖ Supporting Materials

**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)

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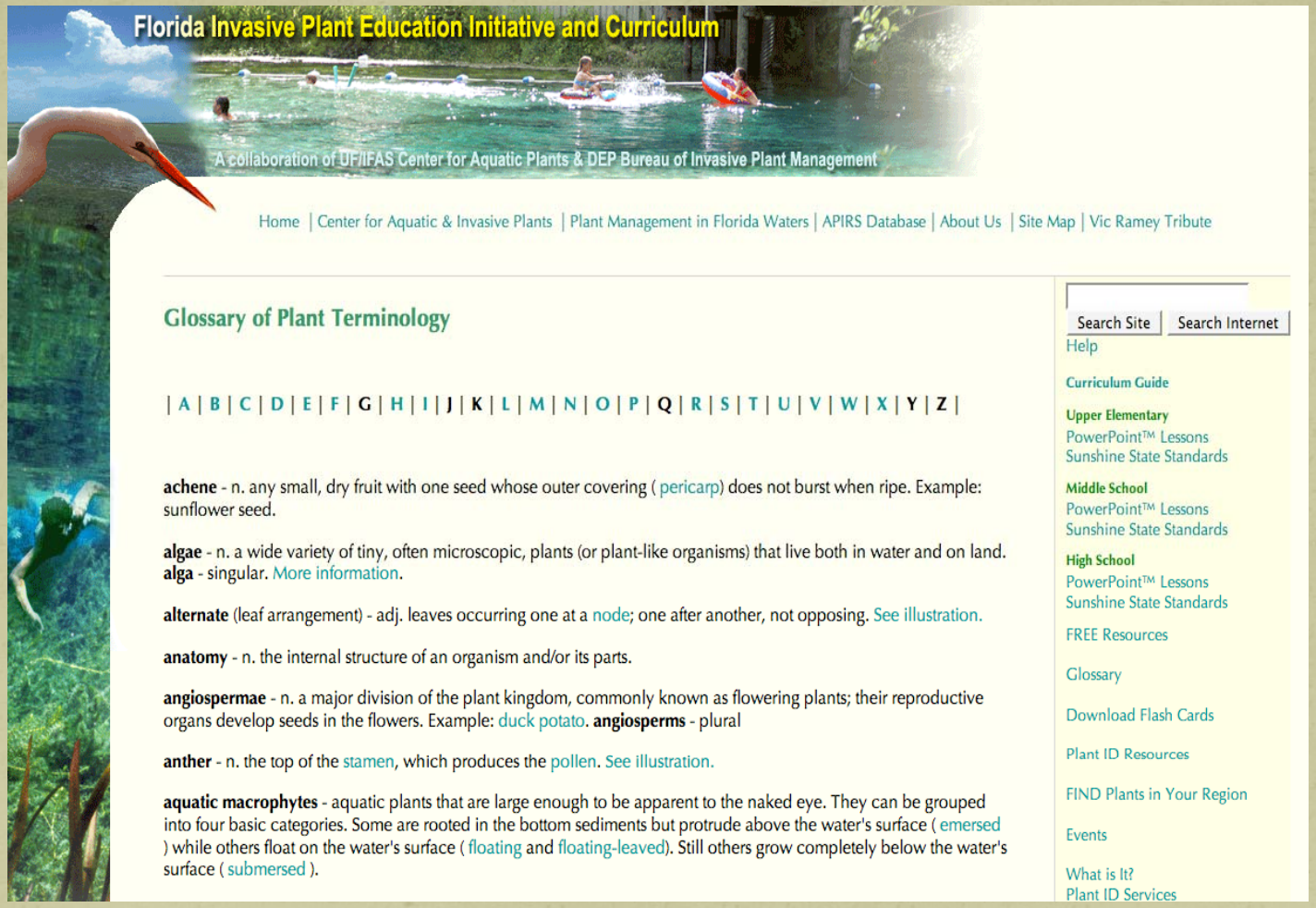
# ❖ Supporting Materials

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# ❖ Supporting Materials


We would like to collaborate with EDDMapS here.

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and the Florida Fish and Wildlife Conservation Commission / Invasive Plant Management Section

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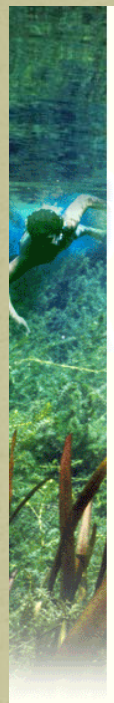
# ❖ Adapt pre-existing materials



## 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*



***Hydrilla verticillata*** hydrilla

**Appearance:** Submersed, usually rooted, aquatic perennial herb with slender ascending stems to 9m (30 ft) long; heavily branched.

**Leaves:** Whorled, 3-8 per whorl, 2-4 mm (0.1–0.2 in) wide and 6–20 mm (0.2–0.8 in) long, bearing coarse (visible) teeth along the margins and usually 1-4 small conical bumps along underside of midrib, which is often red.

**Flowers:** Male flowers detached and free floating at maturity, with 3 sepals and 3 petals, white to reddish brown, about 2 mm (0.7 in) long, releasing floating pollen from stamens when flower pops open at water surface.

**Fruit:** N/A

**Ecological threat:** Competitively displaces native submersed plant communities. In dense stands, alters fisheries populations, causes shifts in zooplankton communities, and affects water chemistry. FLEPPC Category I

**Distribution:** NW, NE, C, SW, SE

**Field Notations**

HYDRVERT/HYVE3

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# ❖ All lessons correlate to Sunshine State Standards

Module 1 ~ Silent Invaders
**Summary of Sunshine State Standards (Grades 4 - 12)**

This is a summary of all the linked standards for Module 1. See the individual activities for the specific linked standards. Note: Standards in black font are explicitly addressed by the various activities. Those in blue are touched on briefly and can be more fully developed by the teacher.

**4th Grade**

LA.4.1.5.1: TSW demonstrate the ability to read grade level text.
LA.4.1.6.1: TSW use vocabulary that is introduced and taught directly.
LA.4.1.6.2: TSW listen to, read, and discuss familiar and conceptually challengin
LA.4.1.6.3: TSW use context clues to determine meanings of unfamiliar words.
LA.4.1.7.3: TSW determine explicit ideas and information in grade-level text, incl
relevant supporting details, implied message, inferences, chronological order of
paraphrasing.
LA.4.2.2.1: TSW locate, explain, and use information from text features (e.g., tab
charts, graphs, diagrams, illustrations).
LA.4.2.2.2: TSW use information from the text to answer questions related to exp
details.
LA.4.2.2.3: TSW organize information to show an understanding of main ideas w
mapping, or summarizing
LA.4.3.1.1: TSW prewrite by generating ideas from multiple sources (e.g., text, b
drawing, writers notebook, group discussion) based upon teacher-directed topics
LA.4.3.1.3: TSW prewrite by organizing ideas using strategies and tools (e.g., te
chart, log) to make a plan for writing that prioritizes ideas and addresses the mai
LA.4.3.2.1: TSW draft writing by using a prewriting plan to focus on the main idea
supporting details that shows an understanding of facts and/or opinions
LA.4.3.3.4: TSW revise by applying appropriate tools or strategies to evaluate ar
checklists, rubrics).
LA.4.3.5.1: TSW prepare writing using technology in a format appropriate to aud
multimedia).
LA.4.3.5.2: TSW use elements of spacing and design to enhance the appearanc
where appropriate.
LA.4.4.2.1: TSW write in a variety of informational/expository forms (e.g., summa
instructions, graphs/tables, experiments, rubrics, how-to manuals).
LA.4.4.2.2: TSW record information (e.g., observations, notes, lists, charts, map
including visual aids as appropriate.
LA.4.5.2.1: TSW listen to information presented orally and show an understandir
LA.4.6.2.1: TSW select a topic for inquiry, refine a predetermined search plan.
LA.4.6.2.2: TSW apply evaluative criteria (e.g., readability, currency, accuracy) f
appropriate resources, gather and record information, noting the difference betw
LA.4.6.4.1: TSW use appropriate available technologies to enhance communicat
video, presentations).
LA.4.6.4.2: TSW determine and use appropriate digital tools (e.g., word processi
graphic organizers) for publishing and presenting a topic.
SC.4.E.6.6: TSW identify resources available in Florida (water, phosphate, oil, lir
energy).
SC.4.L.16.4: TSW compare and contrast the major stages in the life cycles of Fl
those that undergo incomplete and complete metamorphosis, and flowering and
SC.4.N.1.4: TSW recognize ways plants and animals, including humans, can im
SS.4.C.2.1: TSW discuss public issues in Florida that impact the daily lives of its
SS.4.C.2.3: TSW explain the importance of public service, voting, and volunteeri
SS.4.E.1.2: TSW explain Florida's role in the national and international economy
businesses to the state.
SS.4.G.1.1: TSW identify physical features of Florida.

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Module 2 ~ A Fish Tale
**Summary of Sunshine State Standards (Grades 4 - 12)**

This is a summary of all the linked standards for Module 2. See the individual activities for the specific correlated standards. Note: Standards in black font are explicitly addressed by the material. Those in blue are touched on briefly and can be more fully developed by the teacher.

**4th Grade**

LA.4.1.5.1: TSW demonstrate the ability to read grade level text.
LA.4.1.6.1: TSW use vocabulary that is introduced and taught directly.
LA.4.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.
LA.4.1.6.3: TSW use context clues to determine meanings of unfamiliar words.
LA.4.1.7.3: TSW determine explicit ideas and information in grade-level text, including but not limited to main idea, relevant supporting details, implied message, inferences, chronological order of events, summarizing, and paraphrasing.
LA.4.2.2.1: TSW locate, explain, and use information from text features (e.g., table of contents, glossary, headings, charts, graphs, diagrams, illustrations).
LA.4.2.2.2: TSW use information from the text to answer questions related to explicitly stated main ideas or relevant details.
LA.4.2.2.3: TSW organize information to show an understanding of main ideas within a text through charting, mapping, or summarizing
LA.4.3.1.1: TSW prewrite by generating ideas from multiple sources (e.g., text, brainstorming, graphic organizer, drawing, writers notebook, group discussion) based upon teacher-directed topics and personal interests.
LA.4.3.1.3: TSW prewrite by organizing ideas using strategies and tools (e.g., technology, graphic organizer, KWL chart, log) to make a plan for writing that prioritizes ideas and addresses the main idea and logical sequence.
LA.4.3.2.1: TSW draft writing by using a prewriting plan to focus on the main idea with ample development of supporting details that shows an understanding of facts and/or opinions
LA.4.3.3.4: TSW revise by applying appropriate tools or strategies to evaluate and refine the draft (e.g., peer review, checklists, rubrics).
LA.4.4.2.1: TSW write in a variety of informational/expository forms (e.g., summaries, procedures, recipes, instructions, graphs/tables, experiments, rubrics, how-to manuals).
LA.4.5.2.1: TSW listen to information presented orally and show an understanding of key points.
LA.4.5.2.2: TSW plan, organize, and give an oral presentation and use appropriate voice, eye, and body movements for the topic, audience, and occasion.
LA.4.6.2.1: TSW select a topic for inquiry, refine a predetermined search plan.
LA.4.6.2.2: TSW apply evaluative criteria (e.g., readability, currency, accuracy) for selecting and using a variety of appropriate resources, gather and record information, noting the difference between opinions and fact.
SC.4.E.6.3: TSW recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.
SC.4.E.6.6: TSW identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).
SC.4.L.17.2: TSW explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them.
SC.4.L.17.3: TSW trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.
SC.4.N.1.4: TSW recognize ways plants and animals, including humans, can impact the environment.
SS.4.C.2.1: TSW discuss public issues in Florida that impact the daily lives of its citizens.
SS.4.C.2.3: TSW explain the importance of public service, voting, and volunteerism.
SS.4.E.1.2: TSW explain Florida's role in the national and international economy and conditions that attract businesses to the state.
SS.4.G.1.1: TSW identify physical features of Florida.
SS.4.G.1.3: TSW explain how weather impacts Florida.
SS.4.G.1.4: TSW interpret political and physical maps using map elements (title, compass rose, cardinal directions, intermediate directions, symbols, legend, scale, longitude, latitude).

**5th Grade**

LA.5.1.5.1: TSW demonstrate the ability to read grade level text.
LA.5.1.6.1: TSW use vocabulary that is introduced and taught directly.
LA.5.1.6.2: TSW listen to, read, and discuss familiar and conceptually challenging text.
LA.5.1.6.3: TSW use context clues to determine meanings of unfamiliar words.
LA.5.1.7.3: TSW determine the main idea or essential message in grade-level text through inferring, paraphrasing, summarizing, and identifying relevant details.
LA.5.2.2.1: TSW locate, explain, and use information from text features (e.g., table of contents, glossary, index, transition words/phrases, headings, subheadings, charts, graphs, illustrations).

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Module 3 ~ Why Manage Invasive Plants?
**Summary of Sunshine State Standards (Grades 4 - 12)**

of all the linked standards for Module 3. See the individual activities for the
standards. Note: Standards in **black** font are explicitly addressed by the material.
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prize that humans need resources found on Earth and that these are either renewable or nonrenewable.
fy resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).
lfy processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed
ion.
pare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo
e metamorphosis, and flowering and nonflowering seed-bearing plants.
prize ways plants and animals, including humans, can impact the environment.
in the effects of technological advances on Florida.
es public issues in Florida that impact the daily lives of its citizens.
fy ways citizens work together to influence government and help solve community and state problems.
in the importance of public service, voting, and volunteerism.
in Florida's role in the national and international economy and conditions that attract businesses to the state.
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ret political and physical maps using map elements (title, compass rose, cardinal directions, intermediate directions,
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n a variety of informational/expository forms (e.g., summaries, procedures, instructions, experiments, rubrics, how-to
tructions).
and speak to gain and share information for a variety of purposes, including personal interviews, dramatic and poetic
esentations.
formal oral presentations for a variety of purposes and occasions, demonstrating appropriate language choices, body
nd the use of gestures, the use of supporting graphics (charts, illustrations, images, props), and available

pare and contrast adaptations displayed by animals and plants that enable them to survive in different environments
tions, animal behaviors and physical characteristics.
fy ways good citizens go beyond basic civic and political responsibilities to improve government and society.
eographic knowledge and skills when discussing current events.

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- **Provide lots of materials for hands-on activities in the classroom**


Artificial plant kits, Freshwater Plant BINGO!, puzzles, etc.

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# ❖ Maintain communication for additional support

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

**Re: Bingo**

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

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

**Sent:** Friday, November 09, 2007 12:14 PM
**To:** RICHARD,AMY N

I have 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.

Best Regards,

Wendy Norton-
STAR Discovery Educator
Science Lab Teacher
Bellalago Academy

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

**Re: artificial plants**

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

**Sent:** Tuesday, November 06, 2007 6:32 PM
**To:** RICHARD,AMY N

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

Best Regards,

Wendy Norton-
STAR Discovery Educator
Science Lab Teacher
Bellalago Academy
3651 Pleasent Hill Road
Kissimmee, FL 34746

**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

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.

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



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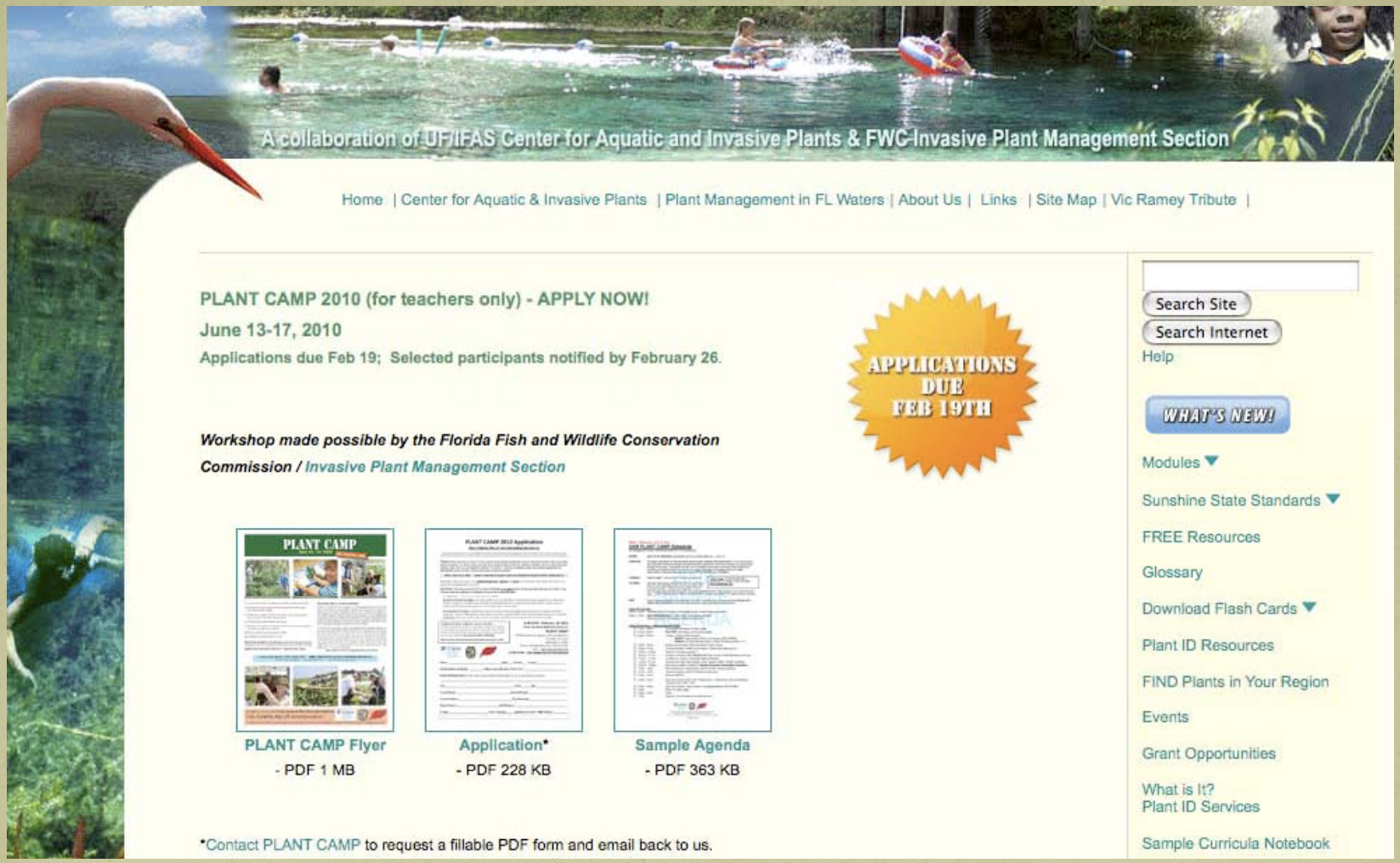


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Center for Aquatic and Invasive Plants


# PLANT CAMP Goals

❖ **Provide in-depth training on topic of invasive plants** (4.5 days).

❖ **Develop enthusiasm for subject** among teachers so they will pass it along to their students.

❖ **Gain greater appreciation (& acceptance)** of plant management methods.

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**Southeast EPPC 2010**

# Welcome Session

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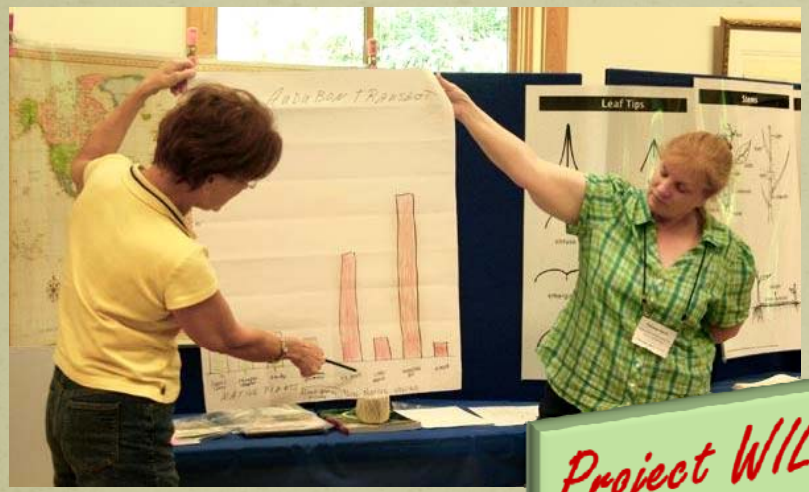
# Day 1 — Upland Plants




Project WILD!

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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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# Day 3 ~ Invasive Plant Video Festival

## For teachers and students...

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# Day 4 — Curricula Development

## Game Show ~ *"Manage This!"*


## 12 Citizen Role Cards and a WILD CARD...

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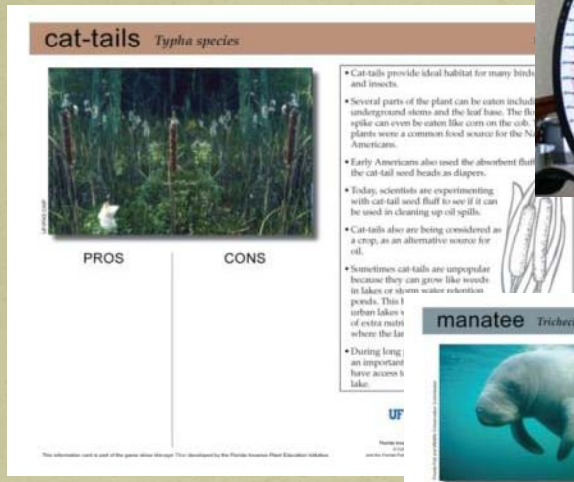
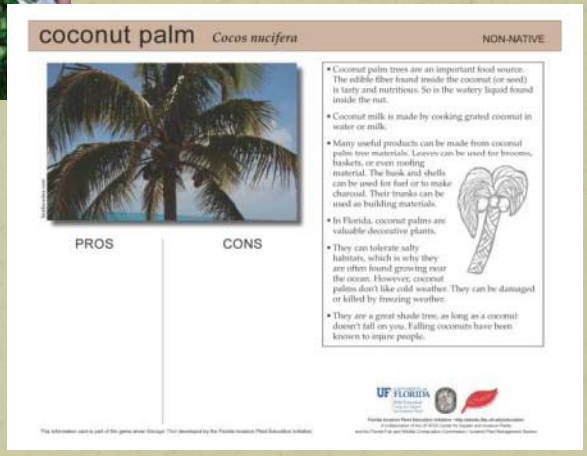
# Game Show ~ *"Manage This!"*

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## Critter Cards

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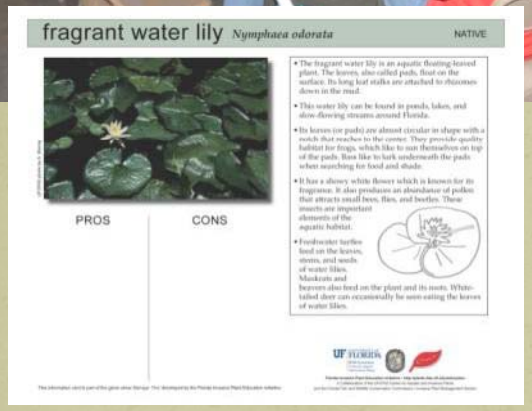
# Day 4 — Curricula Development




***"Manage This!" in action...***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# Game Show… *"Manage This!"*

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# Day 4 — 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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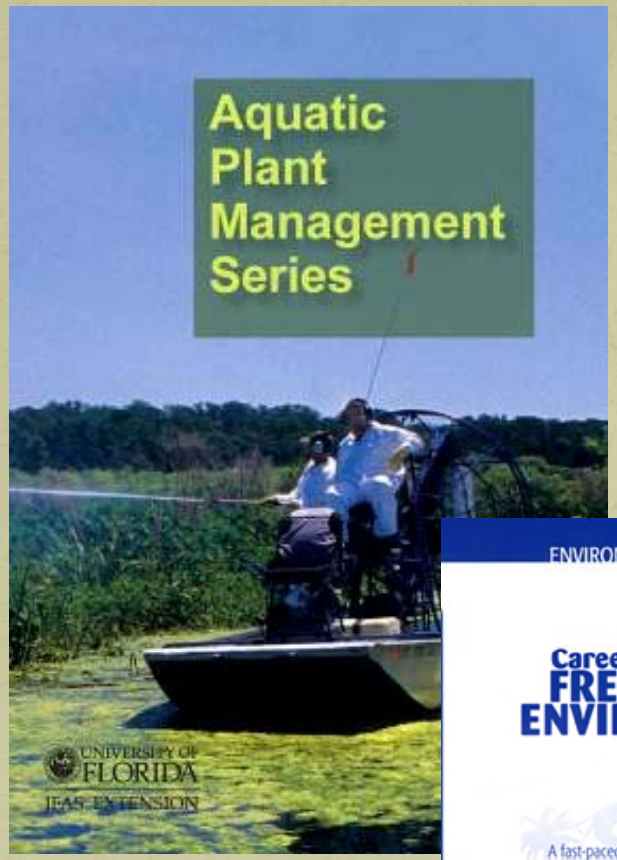
# GREEN JOBS !



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## This would not be possible without the long-term 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**

7922 NW 71st Street

Gainesville, FL 32653

CAIP-education@ufl.edu

352.392.1799

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

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