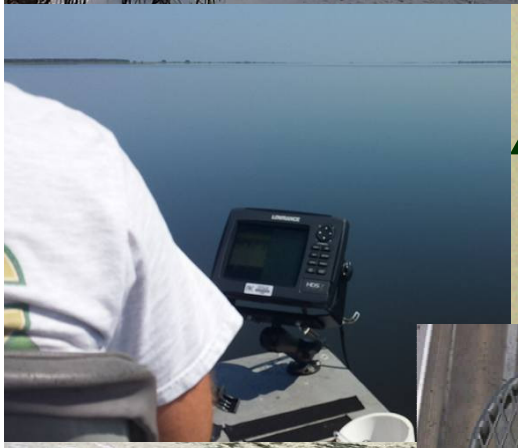
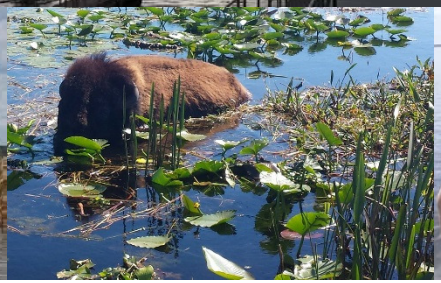


Aquatic Plant Management in Stormwater Ponds






The Florida Fish and Wildlife Conservation Commission

Invasive Plant Management Section

Geoffrey Lokuta
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Bartow, FL 33830
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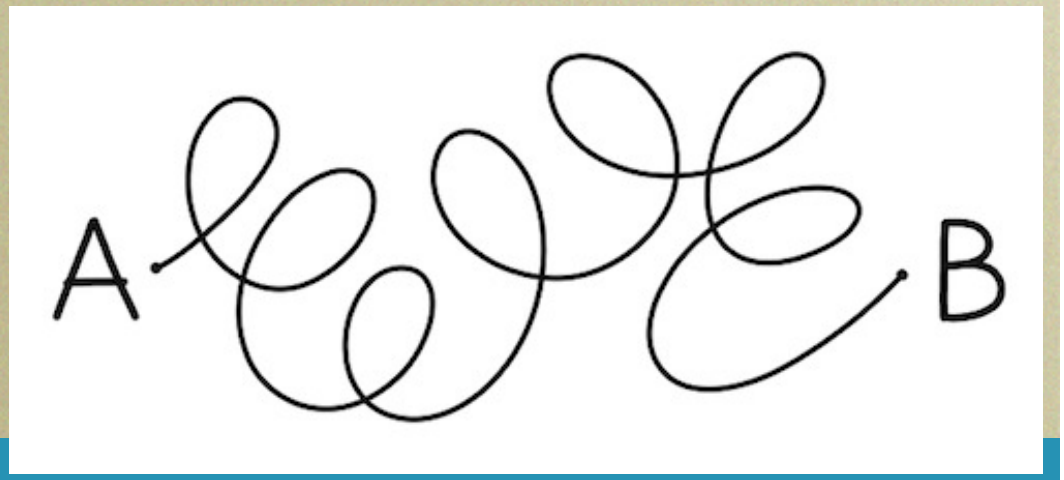
Email: Geoffrey.Lokuta@MyFWC.com

Outline

- Benefits of aquatic vegetation
- Why aquatic vegetation requires management
- Problematic aquatic plant species
- Control Methods



Aquatic Plant Benefits

The benefits of native aquatic plants

- Food source and habitat for wildlife
- Protective cover for fish and other animals
- Source of nesting material for reptiles, birds and small mammals
- Shade for fish and people
- Erosion control & shoreline stabilization
- Aesthetics and landscape appeal
- Nutrient uptake
- Plant competition for preventing encroachment from invasives (e.g., hydrilla)
- Living surface for beneficial insects and other invertebrates important to fisheries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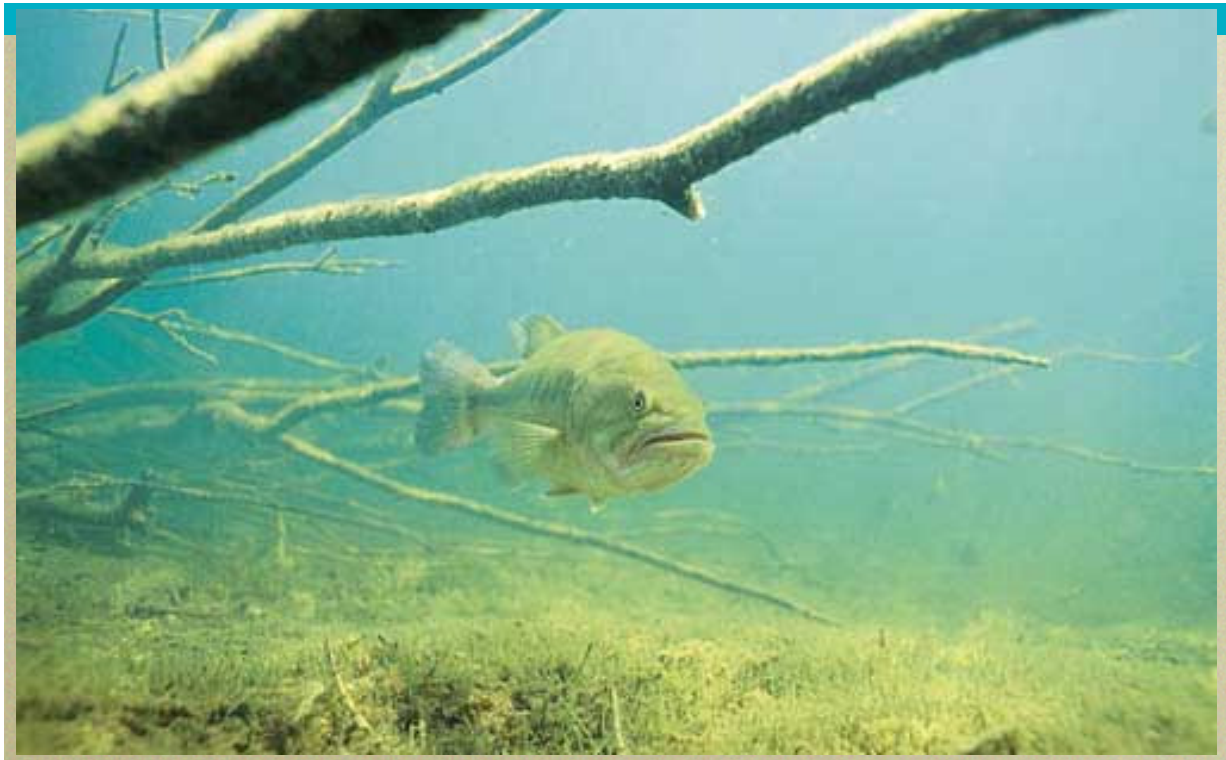

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

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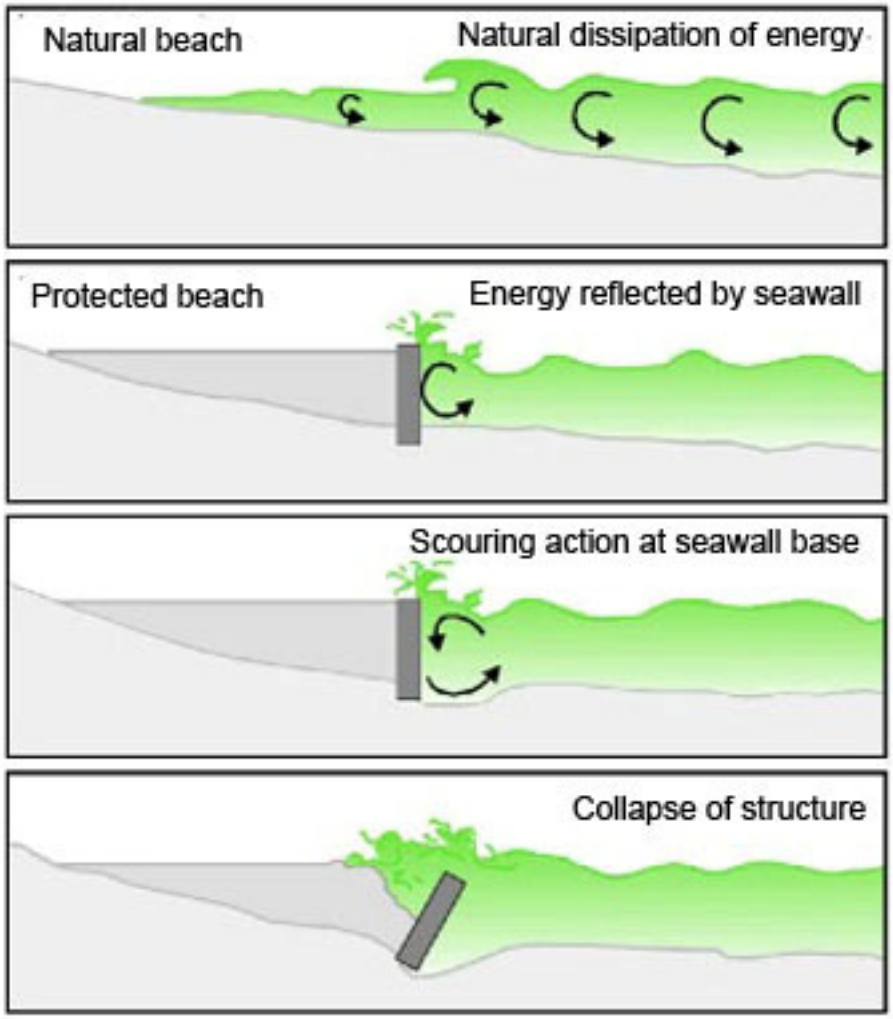
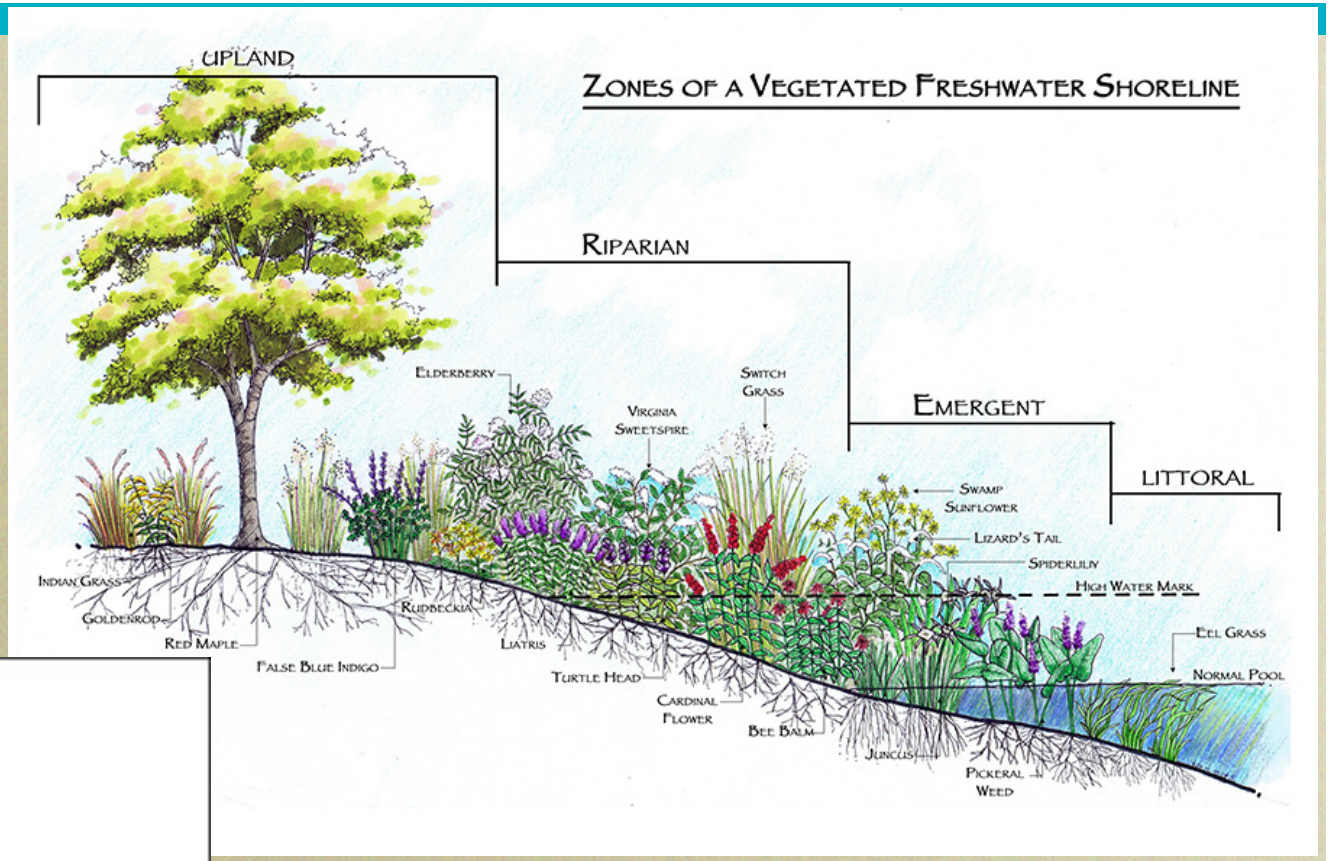
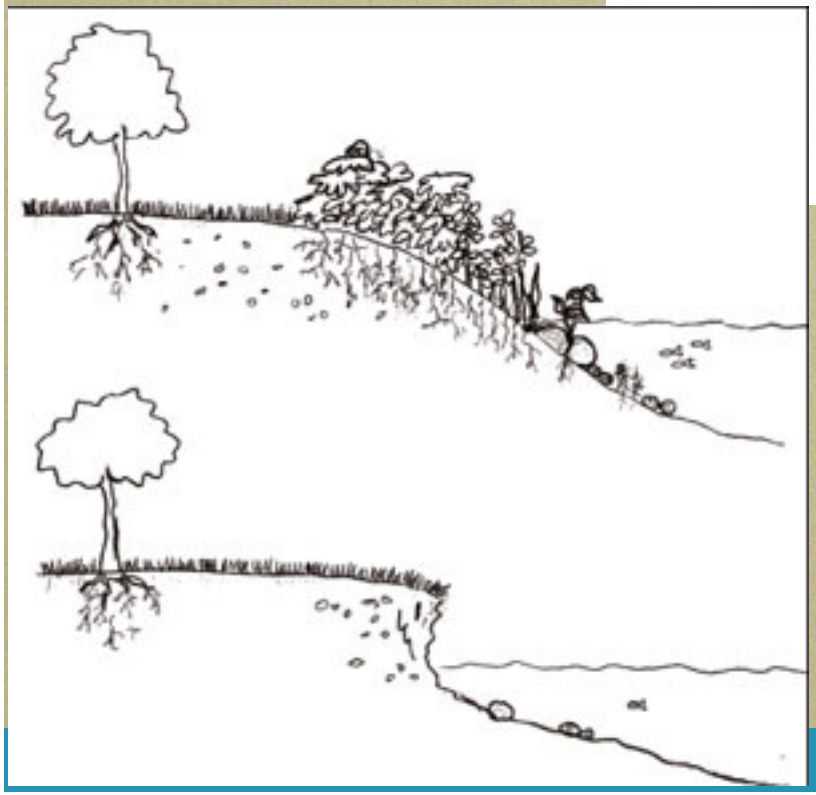
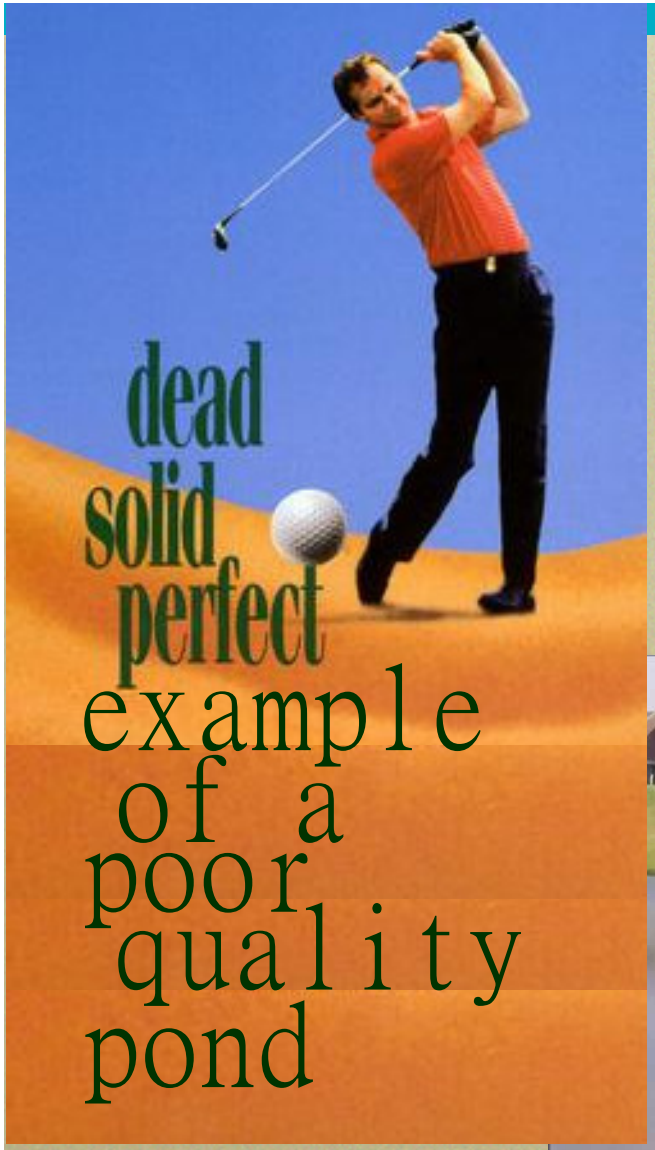

Natural beach
Natural dissipation of energy
Protected beach
Energy reflected by seawall
Scouring action at seawall base
Collapse of structure


Zones of a Vegetated Freshwater Shoreline
UPLAND
RIPARIAN
EMERGENT
LITTORAL
Elderberry
Switch Grass
Virginia Sweetspire
Swamp Sunflower
Lizard's Tail
Spiderlily
High Water Mark
Indian Grass
Goldenrod
Red Maple
Rudbeckia
False Blue Indigo
Liatris
Eel Grass
Normal Pool
Turtle Head
Cardinal Flower
Bee Balm
Juncus
Pickeral Weed





example of a poor quality pond

"The golf course look"

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THE GOOD THE BAD AND THE UGLY

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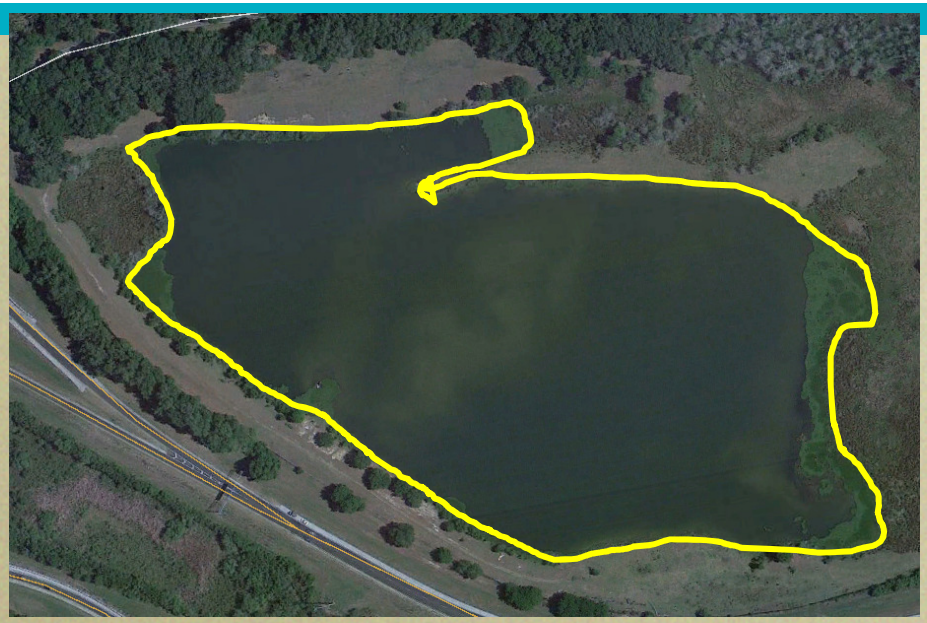
- Living surface for beneficial insects and other invertebrates important to fisheries and overall lake health

If all these benefits……

Why is vegetation management important on stormwater ponds?

- Prevent non-desirable vegetation from taking over
  -faster growing non-native plant species or native nuisance plant species are better adapted to outcompete our desirable native vegetation
- Increased organic matter loading – water storage capacity concerns
- Shallow, clear, nutrient rich water coupled with a warm climate
- Lowest feasible levels – problems left unchecked cost more to fix
- Vegetation may block inlet/out structure
- A desirable level of vegetation is around 30% plant coverage
- We exacerbate the problem => excessive growth
  -leaves from streets, mowed grass clippings, fertilizer use, stormwater runoff


Frontage
75
4



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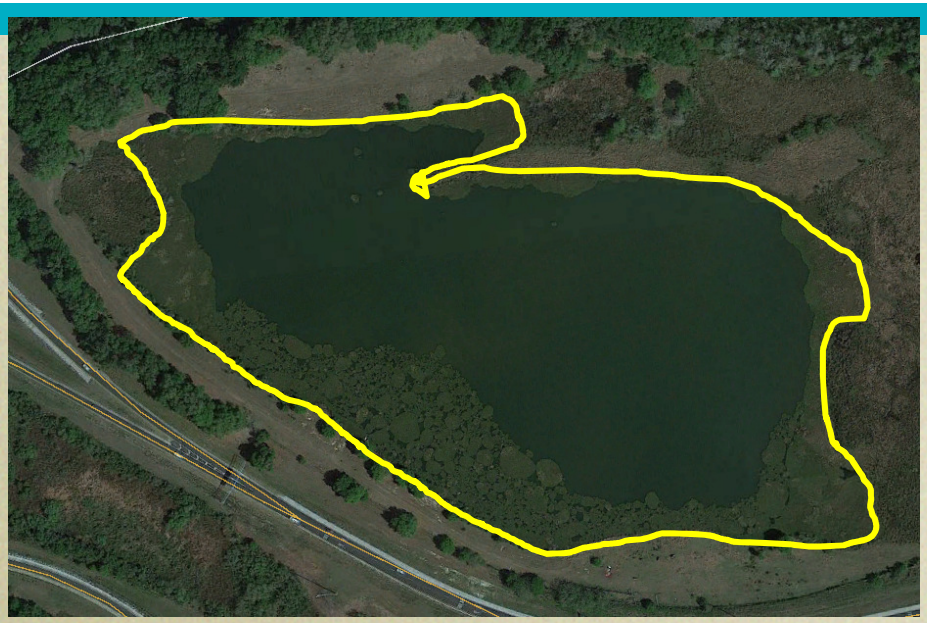

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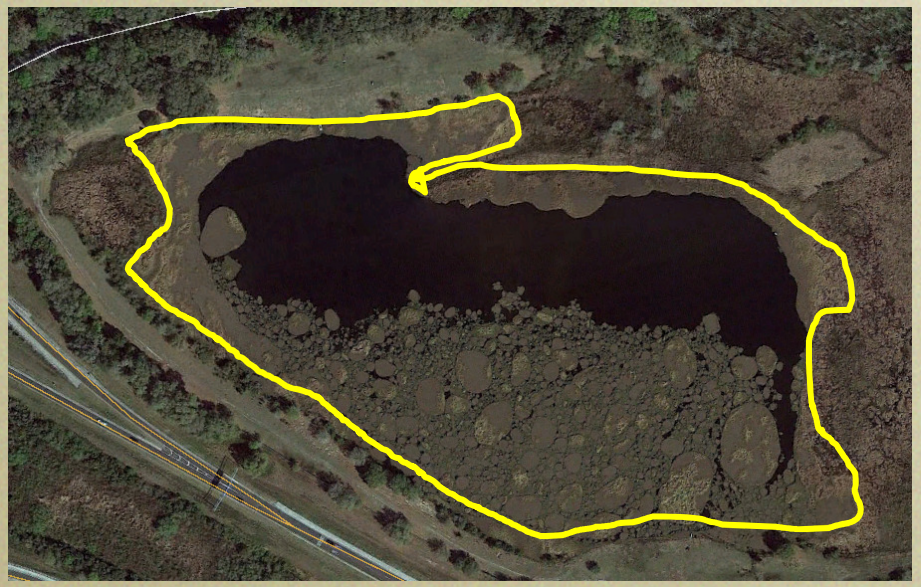


02/2015

Problematic aquatic plant species

Panicum repens
Torpedo grass

Non-Native in Florida

Alternanthera philoxeroides
Alligatorweed

Non-Native to Florida

"Primrose willow" species

Ludwigia peruviana
Peruvian water-primrose

Ludwigia octovalis
Mexican primrosewillow

Ludwigia leptocarpa
Anglestem primrosewillow

Non-Native to Florida

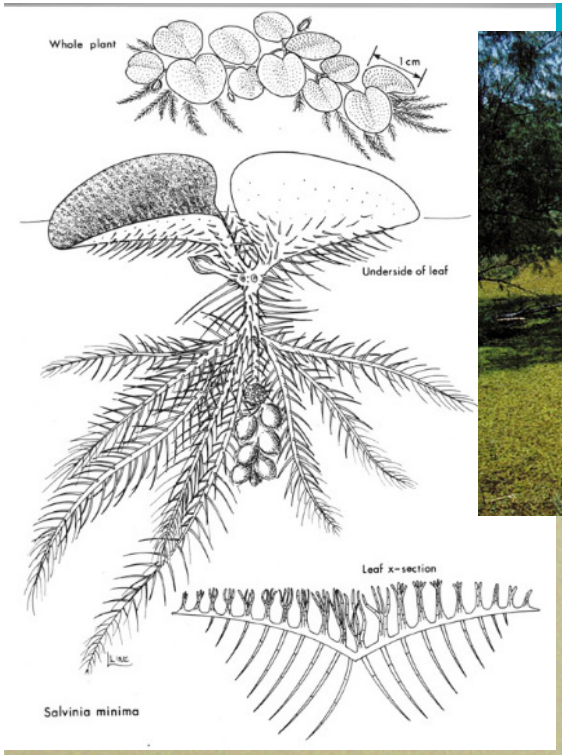
Native to Florida

Burhead sedge
Oxycaryum cubense (syn. Scirpus cuber
Photo by Ann Murray
© 1999 University of Florida

Oxycaryum cubense
Burhead sedge, cuban bulrush

Non-Native to Florida

Burhead sedge
Oxycaryum cubense (syn. Scirpus cubensis)
Photo by Ann Murray
© 1999 University of Florida



Salvinia minima

Water fern, common salvinia, water spangles

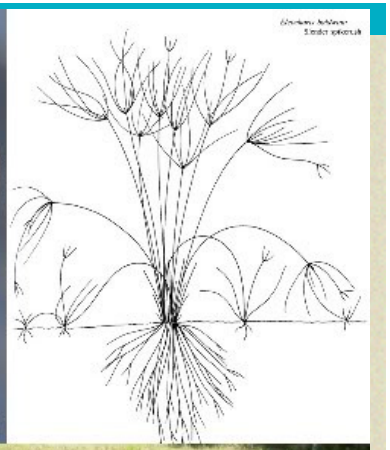
Non-Native to Florida

Lemna species
Duckweed

Native to Florida

Hydrilla
Hydrilla verticillata

Non-Native to Florida



Eleocharis baldwinii

Slender spikerush, hairgrass, roadgrass, proliferating spikerush

Native to Florida

Eicchornia crassipes
Water hyacinth

Non-Native to Florida

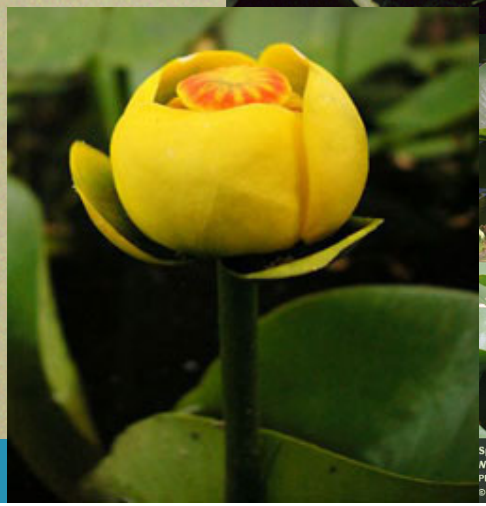
Pistia stratiotes

Water lettuce

Non-Native to Florida

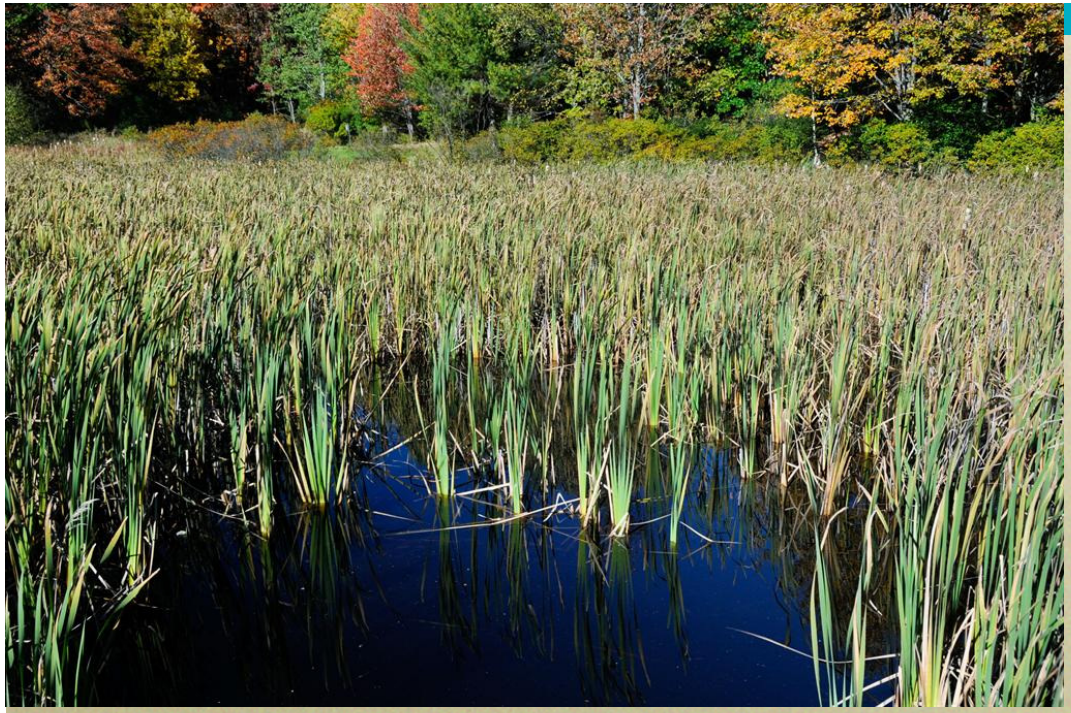
Nuphar advena
Spatterdock

Native to Florida



Najas guadalupensis
Southern naiad

Native to Florida



Typha spp.
Cattail

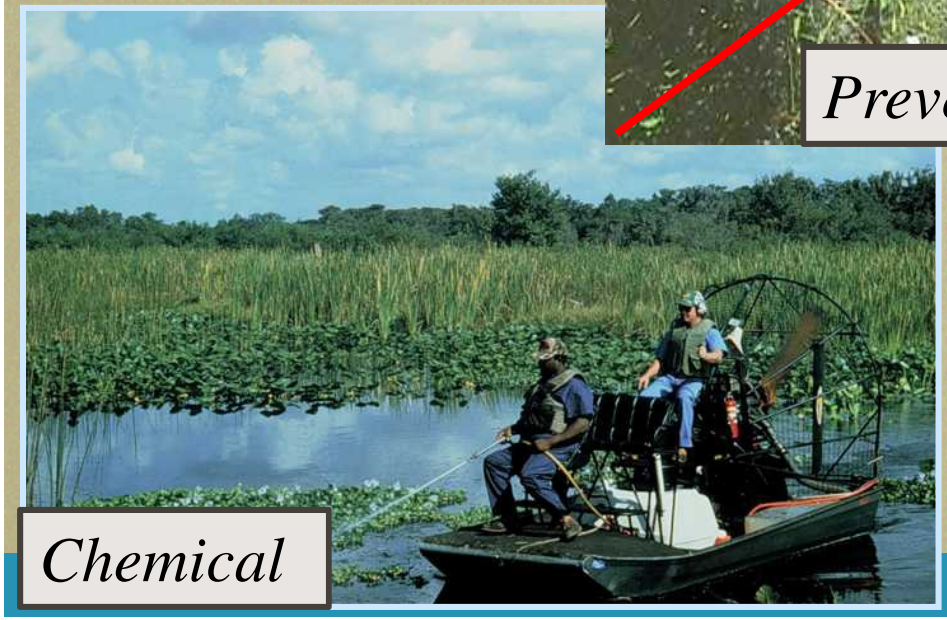
Native to Florida

Control Methods

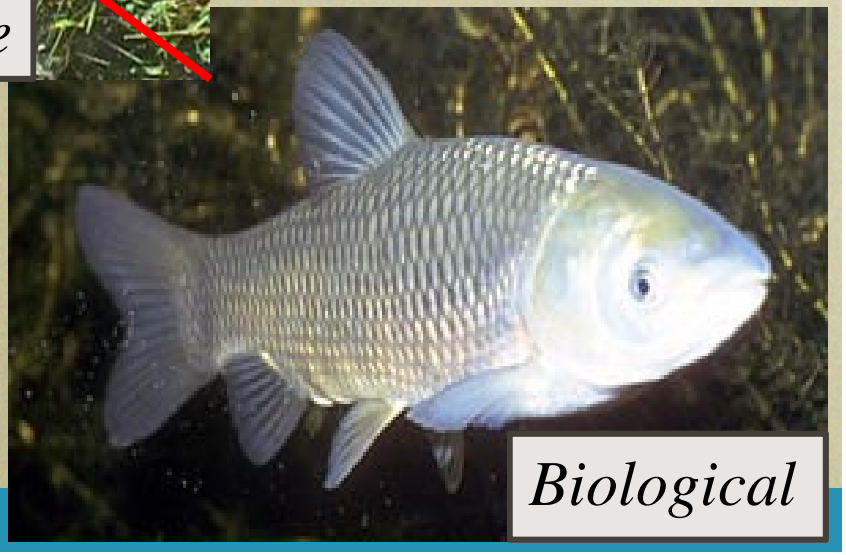
Physical

Mechanical

Preventive



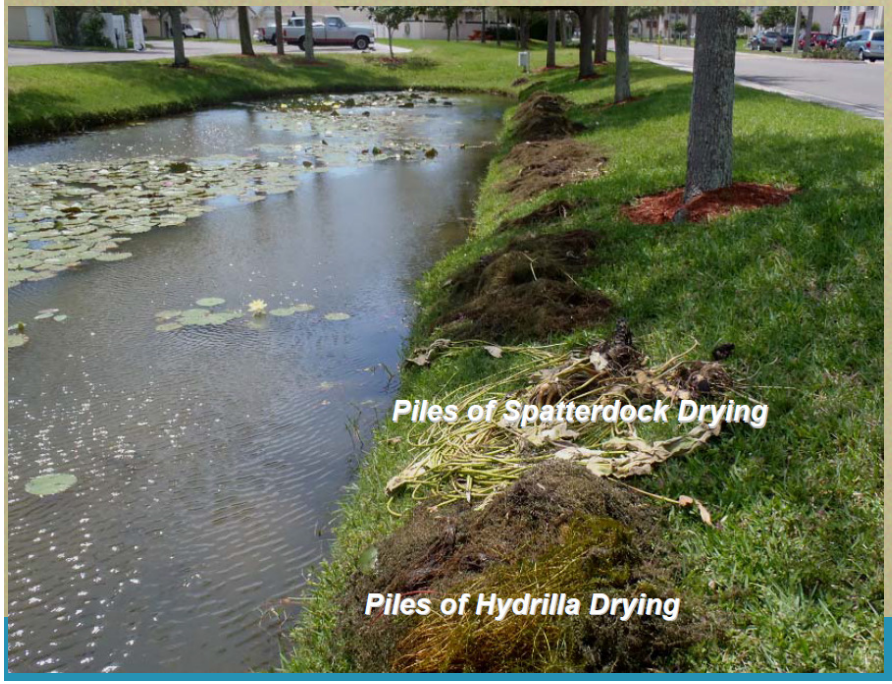
Chemical



Biological

Physical removal

- Involves the use of hand pulling, cutting, raking
- Minimizes harm to beneficial native vegetation
- Can limit future maintenance
- Relatively inexpensive, but can be costly for large areas
- Not practical for deeper waters or large areas
- Labor intensive
- May not be possible to rely on as your sole method of control



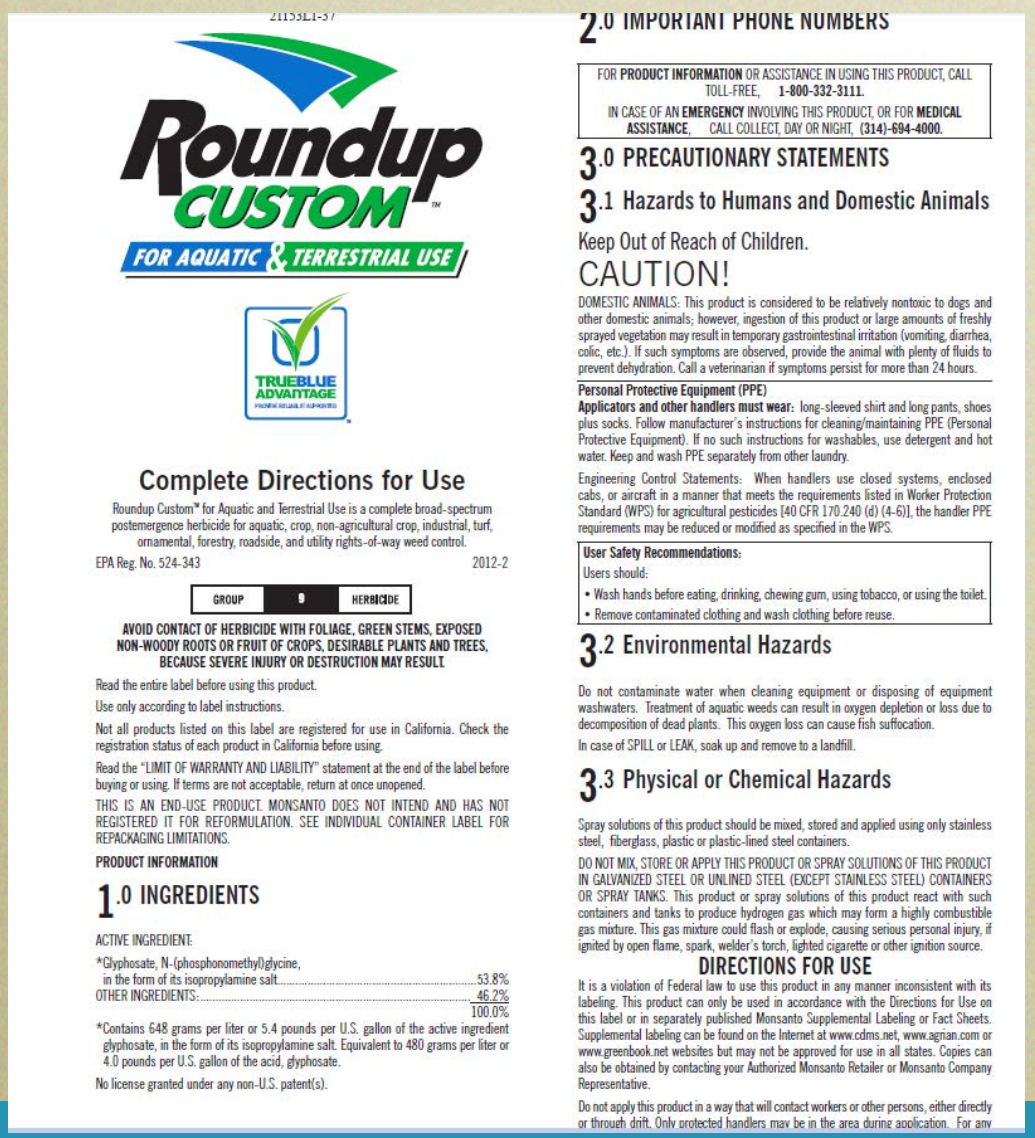
Chemical control

- Involves the use of a backpack sprayer, hand sprayer, UTV tank sprayer, small boat mounted sprayer
- Ideal for larger areas- effective and fast control
- Herbicide selectivity can allow for target control, avoiding non-target vegetation
- Requires strong knowledge of herbicide label reading, mixing rates, PPE requirements, target/non-target damage
- Various restrictions and cautions: potable water intakes, irrigation, domestic pets, fish, swimming, etc

Chemical control

- Can be costly depending on target vegetation and herbicide used
- May be difficult to acquire products depending where you live
- Typically takes multiple treatments to achieve full control
- Decaying plant material, if not harvested, will remain in the system
- May not be possible to rely on as your sole method of control

The label is the law!



Roundup CUSTOM™
FOR AQUATIC & TERRESTRIAL USE

TRUEBLUE ADVANTAGE

Complete Directions for Use

Roundup Custom® for Aquatic and Terrestrial Use is a complete broad-spectrum postemergence herbicide for aquatic, crop, non-agricultural crop, industrial, turf, ornamental, forestry, roadside, and utility rights-of-way weed control.

EPA Reg. No. 524-343 2012-2

GROUP 9 HERBICIDE

AVOID CONTACT OF HERBICIDE WITH FOLIAGE, GREEN STEMS, EXPOSED NON-WOODY ROOTS OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, BECAUSE SEVERE INJURY OR DESTRUCTION MAY RESULT.

Read the entire label before using this product.

Use only according to label instructions.

Not all products listed on this label are registered for use in California. Check the registration status of each product in California before using.

Read the "LIMIT OF WARRANTY AND LIABILITY" statement at the end of the label before buying or using. If terms are not acceptable, return at once unopened.

THIS IS AN END-USE PRODUCT. MONSANTO DOES NOT INTEND AND HAS NOT REGISTERED IT FOR REFORMULATION. SEE INDIVIDUAL CONTAINER LABEL FOR REPACKAGING LIMITATIONS.

PRODUCT INFORMATION

1.0 INGREDIENTS

ACTIVE INGREDIENT:

*Glyphosate, N-(phosphonomethyl)glycine, in the form of its isopropylamine salt	53.8%
OTHER INGREDIENTS:	46.2%
	100.0%

*Contains 648 grams per liter or 5.4 pounds per U.S. gallon of the active ingredient glyphosate, in the form of its isopropylamine salt. Equivalent to 480 grams per liter or 4.0 pounds per U.S. gallon of the acid, glyphosate.

No license granted under any non-U.S. patent(s).

2.0 IMPORTANT PHONE NUMBERS

FOR **PRODUCT INFORMATION** OR ASSISTANCE IN USING THIS PRODUCT, CALL TOLL-FREE, **1-800-332-3111.**

IN CASE OF AN **EMERGENCY** INVOLVING THIS PRODUCT, OR FOR **MEDICAL ASSISTANCE,** CALL COLLECT, DAY OR NIGHT, **(314)-694-4000.**

3.0 PRECAUTIONARY STATEMENTS

3.1 Hazards to Humans and Domestic Animals

Keep Out of Reach of Children.

CAUTION!

DOMESTIC ANIMALS: This product is considered to be relatively nontoxic to dogs and other domestic animals; however, ingestion of this product or large amounts of freshly sprayed vegetation may result in temporary gastrointestinal irritation (vomiting, diarrhea, colic, etc.). If such symptoms are observed, provide the animal with plenty of fluids to prevent dehydration. Call a veterinarian if symptoms persist for more than 24 hours.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear: long-sleeved shirt and long pants, shoes plus socks. Follow manufacturer's instructions for cleaning/maintaining PPE (Personal Protective Equipment). If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Control Statements: When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations:

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove contaminated clothing and wash clothing before reuse.

3.2 Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

In case of SPILL or LEAK, soak up and remove to a landfill.

3.3 Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, fiberglass, plastic or plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling. This product can only be used in accordance with the Directions for Use on this label or in separately published Monsanto Supplemental Labeling or Fact Sheets. Supplemental labeling can be found on the Internet at www.cdms.net, www.agnan.com or www.greenbook.net websites but may not be approved for use in all states. Copies can also be obtained by contacting your Authorized Monsanto Retailer or Monsanto Company Representative.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any

Mechanical control

- Involves the use of a mechanical harvester, cookie cutter, excavator
- Removes plant biomass from system
- Can be most expensive method of control- best for smaller areas where quick control is desired.
- Not selective- can harvest non-target plants, turtles, invertebrates, fish, etc
- Disposal site required, need depth, temporary turbidity issues
- If system is deep, you are essentially 'mowing the grass'
- May not be possible to rely on as your sole method of control

Biological control

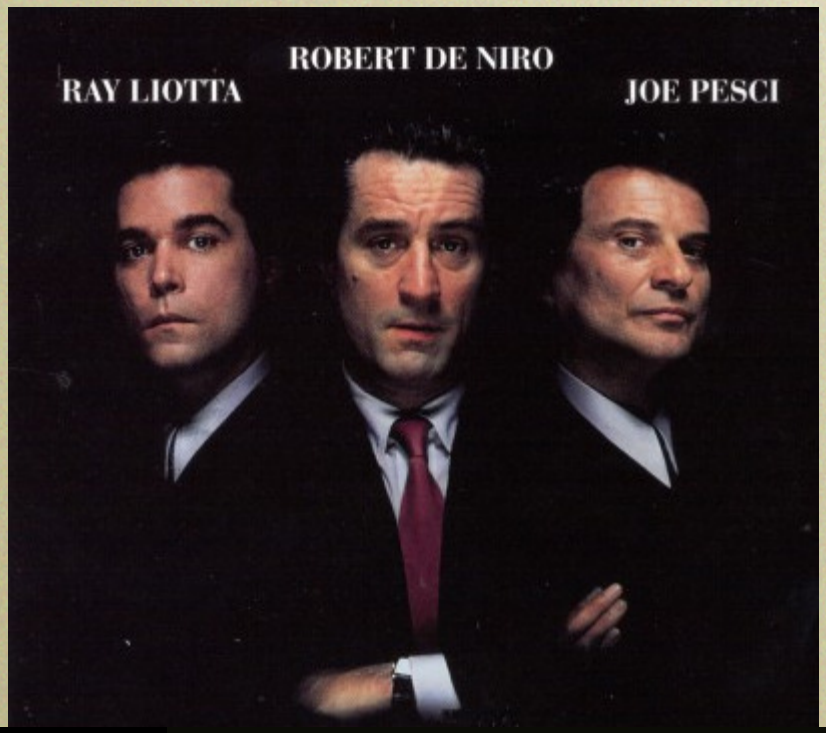
- Involves the use beetles, weevils, thrips, wasps, moths, midges, leaf-mining flies, stem borers, triploid grass carp
- Few success stories- populations crash after release or control lacks efficacy
- Often target species specific
- Free or relatively low cost control
- Can provide longer term control
- May damage non-target vegetation
- May not be possible to rely on as your sole method of control

Alligatorweed flea beetle

Triploid grass carp

Preventive control

Plant/maintain desirable native aquatic vegetation

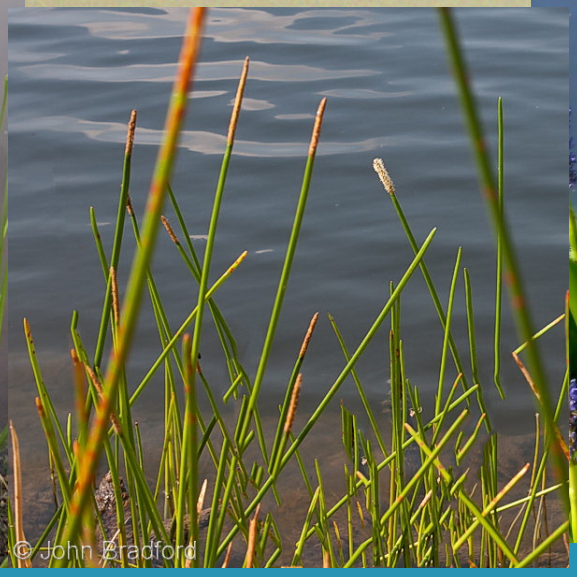


Bulrush

Fragrant water lily

Duck potato, Lanceleaf arrowhead

Jointed spikerush



Pickerelweed

Golden canna

Southern blue flag, Virginia iris

Sand Cordgrass

Buttonbush

Cypress trees

Swamp lily

Soft rush

Plants for lakefront revegetation

Florida Fish and Wildlife
Conservation Commission
Division of Habitat and Species Conservation

MyFWC.com

Pickerelweed

(Pontederia cordata)

Description

Average height: 3 ft.
Leaf type: Lance to heart shape
Leaf size: 7" to 10" long
Flower type: Spike
Flower color: Purple
Flowering season: Spring to fall
Habitat: Marshes, rivers, lakes
Wildlife value: Habitat for fish and other aquatic animals; stems provide surface for apple snail attachment; butterfly attractor; ducks and mammals feed on seeds
Distribution: Statewide
Overwinter: Hard freeze will brown leaves, but will not kill plant
Common Uses: Along shoreline as a border plant, provides good erosion control

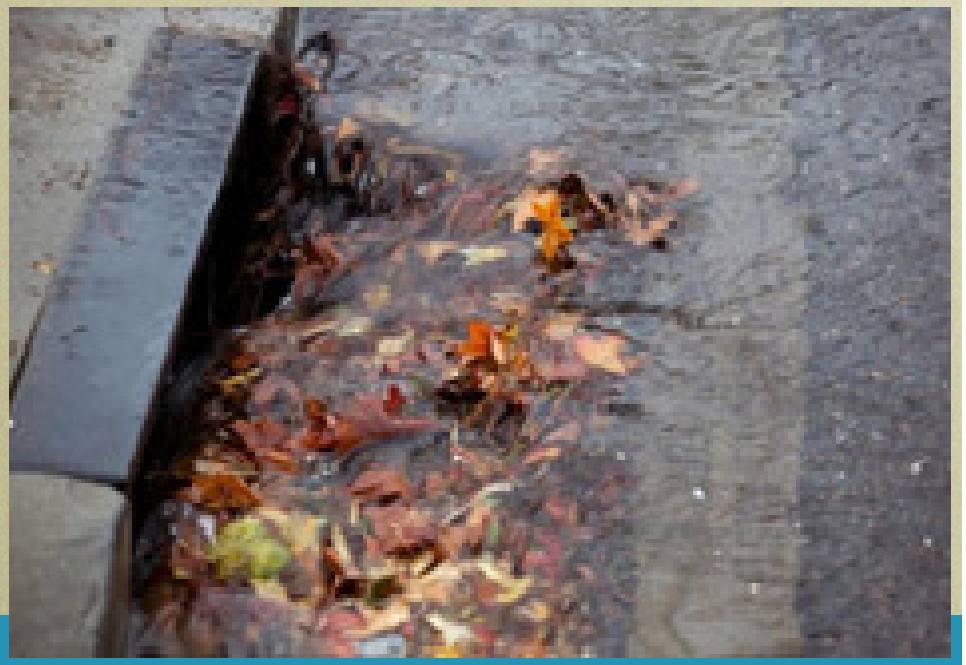
Planting requirements

Soil: Sand or muck
Light: Medium to high
Salinity: Low
Propagation: Seeds and rhizom
Pest problems: Not a preferred grass carp plant; insect (borer and weevil) damage on leaves and stems is not uncommon, but usually will not kill plant
Growth rate: Medium
Water depth: 6" to 18" of water
Density: 1 ft. to 2 ft. apart
Planting: Make sure leaves are above water; tends to grow in slightly deeper water than arrowhead
Survivability: High
Cost: Retail $2.25, 1 gallon; wholesale $0.25 - $0.45, bareroot (1000 minimum order); $1.25, 4" pot (1000 minimum order)

...Other stormwater pond BMPs related to aquatic vegetation

- Clean leaves from streets to prevent entry into stormwater systems
- Coach lawn maintenance company on mulching grass clippings away from lake, not weedwacking aquatic vegetation
- Fertilize smart- soluble nitrogen content, timing, seasonality, maintaining lake buffer
- Become familiar with native/non-native plants- question the practices of your aquatic plant management company
- Clean up pet waste
- Consider Florida friendly landscaping
- Monitor for new plant infestations- find out what you have out there


WELCOME TO YOUR NEW NIGHTMARE.
A NIGHTMARE ON ELM STREET
04.30.10



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Don’t be like this guy!

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