

Seminole County Lake Management Program

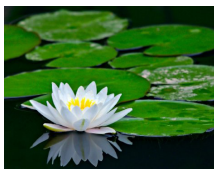
# A Citizens' Guide to Lake Management



*HELPING TO  
PROTECT,  
PRESERVE &  
RESTORE  
SEMINOLE  
COUNTY'S  
LAKES.*



Seminole County Department of Public Works • Roads-Stormwater Division  
177 Bush Loop • Sanford, FL 32773 • 407-665-2439



# OVERVIEW OF THE SEMINOLE COUNTY LAKE MANAGEMENT PROGRAM

The water quality of the lakes, which to most people is a matter of how clear the water is, directly relates to the quality of water coming into the lakes from their surrounding watersheds. Increasing development pressure and poor management practices around lakes has raised concerns about water quality and impacts on our lakes.

Often property owners find that they do not have all the resources to properly manage their lake. The Seminole County Lake Management Program (SCLMP) offers options that are understandable and responsive to undesirable lake conditions affecting water quality and biological habitats for insects, fish, birds and other wildlife.

The term “Environmental Stewardship” is taking active participation to care for natural resources ensuring that they are sustainably managed for current and future generations. By becoming a lake steward, citizens actively care for the needs of their lake. SCLMP promotes remediation of undesirable lake conditions by facilitating stewardships (lake associations) and partnerships among various stakeholders including fellow neighbors, landowners, community groups and local and state government professionals, working together protecting/improving/managing your lake.

## SCLMP provides the following resources for unincorporated County lakes:

- *Conducts detailed lake assessment and restoration studies*
- *Provides actions to control invasive aquatic plants*
- *Prepares reports analyzing the condition of County lakes*
- *Provides public education, volunteer monitoring and technical assistance to lake groups and lakeside residents*

- *Provides technical assistance with aquatic plant management*
- *Provides funding resource options*
- *Brings other local and state agencies and management professionals to establish the best management plan*

The development of a successful Lake Management Program is dependent on active community participation. SCLMP is very active in meeting with property owners, lake associations and professional officials to promote and assist in various lake management projects. It's the cumulative effect of all of our efforts that will help protect our watershed.

**Contact Us:** For more information about this program, please contact:

### Lake Management Program Coordinator

Department of Public Works  
Roads-Stormwater Division

177 Bush Loop • Sanford, FL 32773

Phone: (407) 665-2439

E-mail: [geby@seminolecountyfl.gov](mailto:geby@seminolecountyfl.gov)



# HOW *YOU* CAN PROTECT SEMINOLE COUNTY'S WATERWAYS

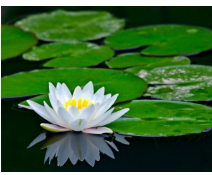


**M**any of our daily activities can cause pollution to our lakes. This includes: lawn maintenance services that do not shield grass clippings from moving into the lake, excess fertilizing, use of phosphorus-containing fertilizer, leaf-litter accumulation in street gutters from surrounding private neighborhoods and altered shorelines. Each of these activities greatly affects the nutrient levels of the lake since the basic elemental make-up of these components is nitrogen and phosphorus. As the materials break down, they are washed into the lake during storm events and irrigation. This input of excess nitrogen and phosphorus leads to an excess in algae production and degrades water quality. By reducing the pollution sources around the lake and continuing to encourage native aquatic plant communities (to help uptake nutrients) within the lake, this nutrient cycle can be slowed to a more productive rate for your lake.

**T**o help prevent these negative impacts to the lakes, follow these simple suggestions:

- **Fertilize and spray sparingly** - These substances can be very detrimental when they are carried to the lakes by stormwater runoff. When fertilizers and pesticides are applied to a lawn, keep them away from the driveway and streets so they don't run into the storm drain. Assurance a 25-foot buffer between the fertilized area and the water body. Most people fertilize and spray more than is necessary.
- **Be careful with grass and leaves** - Grass clippings and leaves can add nutrients (nitrogen and phosphorous) to lakes. Don't blow them into the street or lake; instead, blow them back into the lawn, which provides nutrients for your lawn.
- **Maintain lakefronts** - Aquatic plants provide habitat, food and shelter for fish and wildlife. Plants also reduce erosion and filter stormwater runoff, which helps to protect water quality. A portion of the lakefront (the lesser of 50 feet or 50 percent, with a permit) can be cleared for boating and swimming, but aquatic vegetation should be maintained.

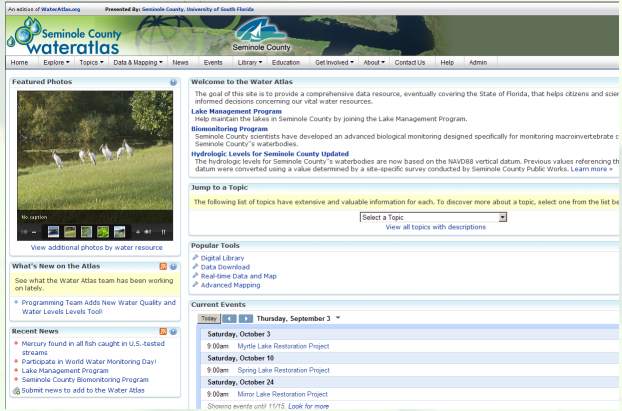
- **Wash cars and boats in the yard** - If vehicles are washed on a paved surface, the detergents (phosphates) can run into the street and end up in the lake. Detergents add nutrients, which aid the growth of algae within the lake.
- **Don't Litter** - Trash, food wrappers and litter in the streets can get into lakes and cause harm to fish and wildlife. It also destroys the beautiful natural view.
- **Protect against erosion** - Exposed soil on construction sites and earthen stockpiles can wash into the storm drains, which run into the lakes. Make sure barriers, such as silt fencing or turbidity screens, are erected to prevent the soil from discharging into the lake.
- **Be a responsible boater** - Oil, gasoline and trash deposited in lakes by boaters are harmful to the lake and the wildlife. Use caution when operating boats near the shore because waves can erode the shoreline and disturb wildlife.
- **Use lake-friendly surface cover** - Surfaces such as pavers, porous stone, gravel and mulch are much better for walkways and driveways than asphalt or concrete. If you do have a paved area, divert the runoff into a separate area, such as a grassy swale that allows the water to soak into the ground rather than discharging directly into the storm drain or lake.
- **Keep septic tanks and drain fields away from the lakes** - Keep septic tanks and drain fields away from the water's edge and make sure that they are working properly. Use low phosphorous detergents if you have a septic tank. Septic tanks and the drain field must be 75 feet from the surface water.
- **Conserve water** - Using less water in homes, yards, businesses and agriculture can help conserve water. Observe water guidelines. Consider the right plant for the right site characteristics. Effective watering conserves water and reduces runoff.
- **Properly maintain vehicles** - Automobiles and other vehicles that leak oil, gas and other fluids pollute the lakes when these materials are washed down the storm drain. Keep driveways and parking areas pollutant free. Properly dispose of motor oil at the County landfill.
- **Obtain the proper permits for shoreline structures** - Structures such as docks, seawalls and boardwalks require an application and proper



# HOW YOU CAN PROTECT SEMINOLE COUNTY'S WATERWAYS (Continued)

permits. A private landowner must obtain a permit from the Florida Department of Environmental Protection (DEP), and a homeowners' association or community area must obtain a permit from the St. Johns River Water Management District. A zoning clearance and building permit must also be obtained from Seminole County or a local municipality.

- **Report suspicious activities** - Keep an eye out for activities that might be harmful to lakes. Chemical spills or dumping, wetland or shoreline destruction, wildlife harassment or any other suspicious activity should be reported to local environmental officials. For more information, contact the Seminole County Sheriff's Office-Special Operations Division at (407) 665-6600 or report water pollution to (407) 665-7623.



## Do you know how long it takes trash to disappear from lakes?



- Paper towels - 2 to 4 weeks
- Newspapers - 6 weeks
- Cardboard box - 2 months
- Apple core - 2 months
- Cigarette butt - up to 12 years
- Painted wood - 13 years
- Styrofoam cup - 50 years
- Aluminum can - 200 years
- Plastic drink bottle - 450 years
- Glass bottles - Undetermined

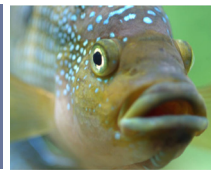
Seminole County and the University of South Florida have developed an interactive web application using the County's Geographic Information System (GIS) database to provide water quality data, lake management data, hydrology, weather data, ecological, watershed, historical information, bathymetric maps, fishing reports, comprehensive mapping capability, aerial photographs, lesson plans for educators, volunteer opportunities and a way to report illicit discharges.

Seminole County has been monitoring the water quality in the majority of the unincorporated County lakes since 1999 and has hydrological data on some of our waterbodies since the 1930's. This data is compiled into the atlas under the specific water body page.

The atlas was developed as a "One-Stop Information Shop for All Water Resources" to provide citizens, environmental professionals, planners and others with current and historical water resource data and other related information on Seminole County waterbodies. To access this information, log on to our Web site:

[www.seminole.wateratlas.org](http://www.seminole.wateratlas.org)

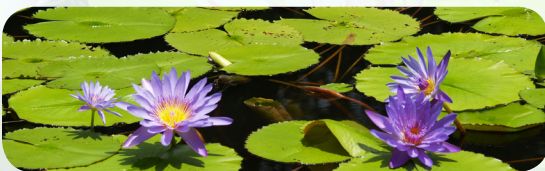
# AQUATIC PLANTS AND *INVASIVE* AQUATIC PLANTS



**P**lants are an important part of a healthy, diverse aquatic ecosystem. Aquatic plants play a vital role in maintaining the integrity of lakes, ponds, streams and rivers for fish, wildlife, other organisms and human enjoyment. Specific roles of aquatic plants include:

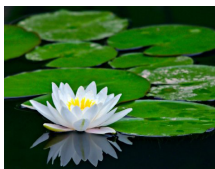
- *Habitat and food for fish, invertebrates, amphibians and water fowl*
- *Food for other wild life and mammals*
- *Spawning area for fish, invertebrates and amphibians*
- *Oxygen production*
- *Erosion protection of river banks and lake shorelines*
- *Water quality improvement through nutrient uptake and slowing of sediment transport*

**T**he natural balance between vegetation and other aquatic organisms is disrupted when invasive or non-native (exotic) plants from other lakes are introduced and become nuisance weeds. Once introduced, these noxious or harmful plants can displace native plants(which are important sources of food and shelter for wildlife) and can interfere with recreational activities such as fishing, boating and swimming; property values; and the enjoyment of the natural beauty of Seminole County's water resources. Often property owners find that they do not have all the resources to properly manage their lake. The Seminole County Lake Management Program offers options that are understandable and responsive to undesirable lake conditions affecting water quality and biological habitats for insects, fish, birds, etc.



**B**asic Components of the Seminole County Lake Management Program include:

- ***Provide biological and water quality diagnosis*** - *to assess the extent of eutrophication and evaluate trends in water quality conditions.*
- ***Conduct watershed assessment*** - *a detailed evaluation of important watershed features, such as land uses and soil types, is conducted to identify active or potential sources of pollution that need to be addressed to protect and improve lake water quality.*
- ***Develop lake management plan*** - *the results of the water quality diagnosis and watershed assessment are used to evaluate methods to remediate undesirable lake conditions and to manage pollution sources in the lake watershed. The plan identifies the most effective ways to achieve water quality objectives.*
- ***Provide plan implementation*** - *the lake management plan may involve one or more of a variety of technologies including sediment dredging, weed harvesting, artificial aeration, grass carp fish and aquatic herbicide treatments. Watershed management invariably involves the implementation of best management practices for non-point sources or pollution. (Examples are improved lawn fertilization practices, routine catch basin clean outs and installation of storm water treatment technology.) SCLMP provides oversight and assistance to guide recommended lake management activities.*



## WHERE DO I NEED A PERMIT? *WHEN IN DOUBT, ASK . . .*

### Aquatic Planting Permitting:

For any lake greater than 10 acres, Florida Fish and Wildlife Conservation Commission (FWC) Aquatic Plant Management guidelines allow for homeowners to clear non-woody plants (no trees) from 50% or 50 feet of their shoreline (whichever is less) by physical or mechanical means to create an access corridor which allows for navigation to open water without a permit from the State. However, a permit from FWC is required for the use of herbicides and for the removal of any plants outside this access corridor. This FWC permit is free and should you feel (based upon the above guidelines) you may require a permit, please contact your FWC regional biologist at (407) 275-4004 for assistance. For more FWC permitting information, please visit:

<http://myfwc.com/nonnatives/invasiveplants/FieldOperationPermits.htm>

### Shoreline Alteration Permitting: (Docks, Seawalls, Dredge and Fill):

Florida Department of Environmental Protection (FDEP) Environmental Resource Permitting Section (ERP) requires permits for any structure construction, dredging (excavating) or filling of any materials within wetlands or surface water areas, unless it otherwise meets specific criteria for an exemption. Since processing applications for these activities are more in-depth, there is a cost associated with this type of permitting. For more ERP permitting information, please call (407) 893-7863 or visit: [www.dep.state.fl.us/water/wetlands](http://www.dep.state.fl.us/water/wetlands).

Additionally, Seminole County requires a building permit for docks and seawalls. Please contact the Planning and Development Department's Development Review Division at (407) 665-7331 ([www.seminolecountyfl.gov/pd/devrev/wetlands.asp](http://www.seminolecountyfl.gov/pd/devrev/wetlands.asp)) prior to construction or your local municipality for requirements.

**Manmade "beaches" are prohibited by local and state regulations.**

Since these are constructed by importing sand and clearing of the lake's shoreline, thus reducing shoreline function, it is a violation impacting the floodplain, increasing erosion and sediment/nutrient loading to lakes.



# COMMON *NATIVE* PLANTS IN FLORIDA

## Submersed Plants



### Bladderwort

Bladderworts (*Utricularia* sp.) are submersed free-floating plants. There are about 200 species in the world, ranging in size from a few inches to several feet long. Tiny bladders attached to the leaves trap and digest very tiny animals. *Utricularia* species occurs almost always (estimated probability 99%) under natural conditions in wetlands. Bladderwort flowers are usually bright yellow (but sometimes lavender, depending on species); the flowers have two “lip-like” petals of about equal size. Flowers are on long stalks that emerge several inches above the water.



Little Bladderwort  
*Utricularia radiata*  
Photo by A. Murray  
Copyright 1999, University of Florida

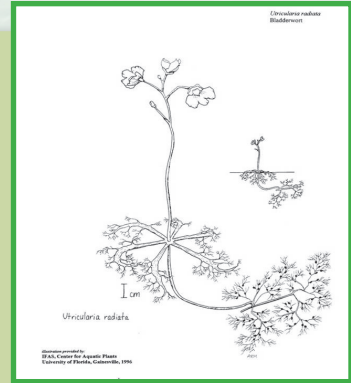


Illustration provided by:  
D. A. Cooney, Center for Aquatic Plants,  
University of Florida, Gainesville, 1996

### Coontail

Coontail (*Ceratophyllum demersum*) has no roots and is free floating. It grows in sluggish waters. Because its feathery leaves are arranged in whorls on the stem, this plant resembles a raccoon's tail. The fan-shaped leaves are best observed in the water. Each leaf has several small teeth on the midribs. These tiny teeth give the plant a rough feel when pulled through the hand. Coontail's flowers are very small and rarely seen.



coontail  
*Ceratophyllum demersum*  
Photo by Vic Starnay  
© 1999 University of Florida

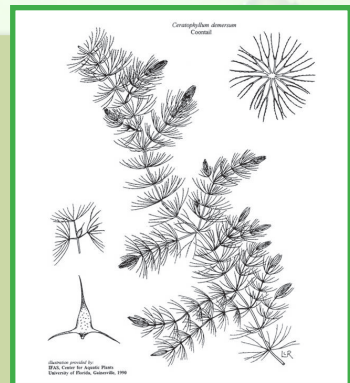
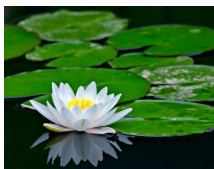


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# COMMON *NATIVE* PLANTS IN FLORIDA

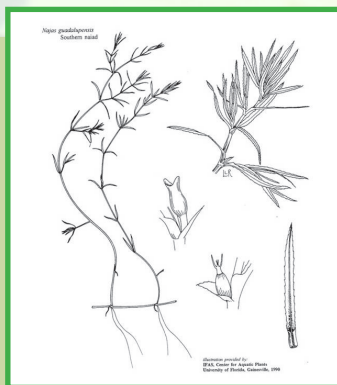
## Submersed Plants

### *Southern Naiad*

Southern naiad (*Najas guadalupensis*) is a submersed plant with very long stems and many branches. All naiads have very narrow, inch-long leaves that have definite teeth on their margins. Southern naiad leaves are less than 1/16 inch wide. With a hand lens, very tiny teeth can be seen along the leaf margins. Naiad leaves are arranged oppositely on the stem or sometimes in whorls of three. The leaves are deep green to purplish-green. The flowers are very small and inconspicuous.



Photo by Mark Hoyer  
Copyright 1998 University of Florida



*Najas guadalupensis*  
Southern naiad

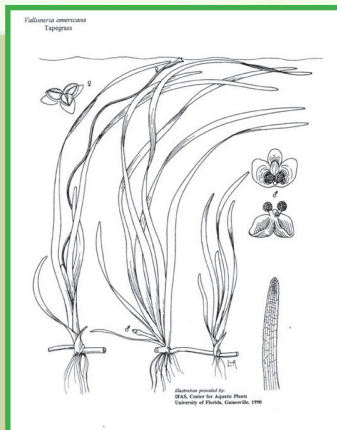
Illustration provided by:  
DRA, Center for Aquatic Plants,  
University of Florida, Gainesville, 1998

### *Eelgrass/ Tape Grass*

Eelgrass/Tape Grass (*Vallisneria americana*) is a submersed plant that spreads by runners and sometimes forms tall underwater meadows and is commonly found growing in lakes and streams in most of Florida (Wunderlin, 2003).



Tape grass  
*Vallisneria americana*  
Photo by Vic Ramey  
Copyright 2001 Univ. Florida



*Vallisneria americana*  
Tapegrass

Illustration provided by:  
DRA, Center for Aquatic Plants,  
University of Florida, Gainesville, 1998

*Vallisneria americana* blooms all year and occurs almost always (estimated probability 99%) under natural conditions in wetlands. Eelgrass leaves arise in clusters from their roots. They are about one inch wide and can be several feet long. Single white female flowers grow to the water surface on very long, spiraling stalks.



# COMMON *NATIVE* PLANTS IN FLORIDA

## *Emersed Plants*



## *Duck Potato*

Duck potato (*Sagittaria lancifolia*) is an emersed plant. Its large leaves and conspicuous flowers make it easy to find in the wild. It grows commonly

in swamps, ditches, lakes and stream margins. Duck potato has large, firm, lance-shaped leaves, which are typically four inches wide and up to two feet long. The leaf bases taper to the stem. The leaves grow as a fan-like rosette from underground the rhizomes. Duck potato flowers are typical sagittaria flowers: showy and white with three petals. Flowers are extended on thick stalks that are often a foot or more above the leaves.



Duck potato  
*Sagittaria lancifolia*  
Photo by Vicki Ramsey  
Copyright 2001 Univ. Florida

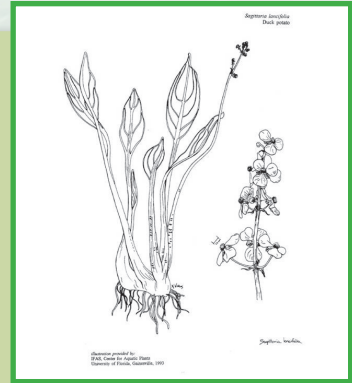


Illustration provided by:  
FWS Center for Aquatic Plant  
Inventory of Florida, Gainesville, 1993

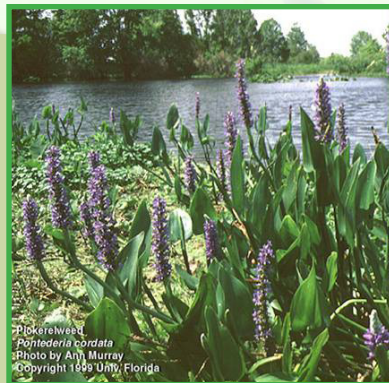
*Sagittaria lancifolia*  
Duck potato

*Sagittaria lancifolia*

## *Pickerel- weed*

Pickerelweed (*Pontederia cordata*) is a very common emersed plant that is commonly found growing in streams, marshes, ditches, ponds and lake

margins nearly throughout Florida (Wunderlin, 2003). It is a prolific grower that can cover large areas. Pickerelweed blooms from spring to summer and typically grows to about two to three feet tall. Its leaves are large, up to five inches wide and are usually twice as long. Leaf shapes are variable, but are usually lance-shaped. The easiest way to recognize pickerelweed is by its spike of violet-blue flowers.



Pickerelweed  
*Pontederia cordata*  
Photo by Amy Murray  
Copyright 1999 Univ. Florida

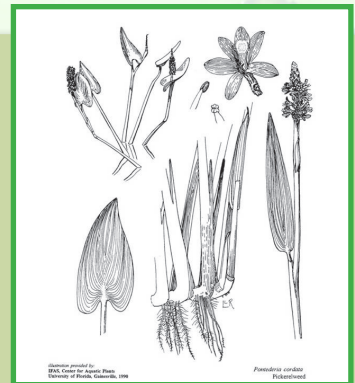


Illustration provided by:  
FWS Center for Aquatic Plant  
Inventory of Florida, Gainesville, 1993

*Pontederia cordata*  
Pickerelweed

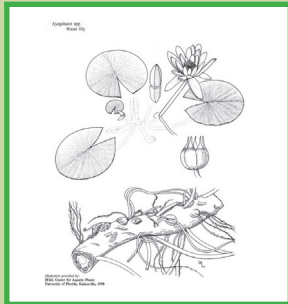
# COMMON **NATIVE** PLANTS IN FLORIDA

## Free-Floating & Floating Leaved Plants

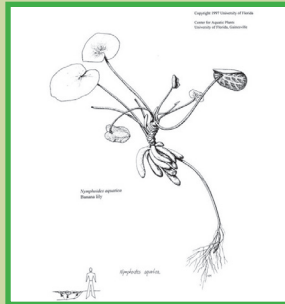


### Water Lillies

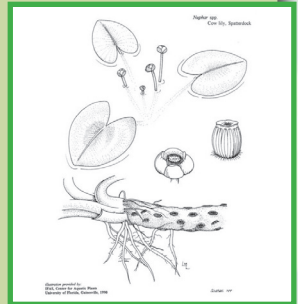
Water lilies (*Nymphaea odorata*, *Nymphoides aquatic*, *Nuphar lutea subsp. advena*) are often recognized by their floating leaves. There are about 40 species of water lily in the world, plus numerous hybrids and varieties. Water lily leaves are nearly circular in shape. The leaves arise on stalks from long rhizomes in the mud. Fragrant water lily flowers are showy white and aromatic. Flowers of unusual color and shape are characteristic of hybrid water lilies.



*Nymphaea odorata*



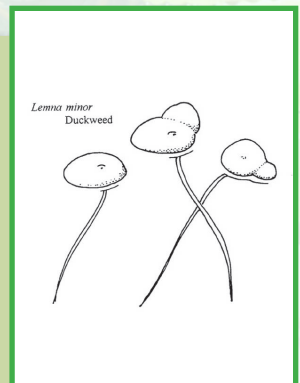
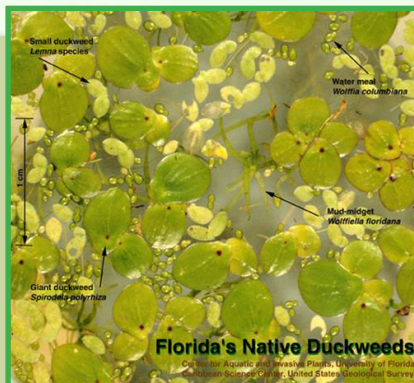
*Nymphoides aquatic*



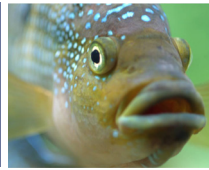
*Nuphar lutea subsp. advena*

### Florida's Duckweed

Duckweeds are common plants in Florida. Although very small, they are nonetheless sometimes quite noticeable when they cover a pond in dense masses. These are very small flowering plants indeed; in fact, water meal (*Wolffia spp.*), at 1 to 1.5 mm long, is the smallest flowering plant on earth! Types of Native Duckweeds include: *Spirodela polyrhiza* - Giant duckweed, *Lemna valdiviana* - Small duckweed, *Wolffia columbiana* - Water meal, *Wolffiella gladiata* (syn. *W. floridana*) - Mud-midget.

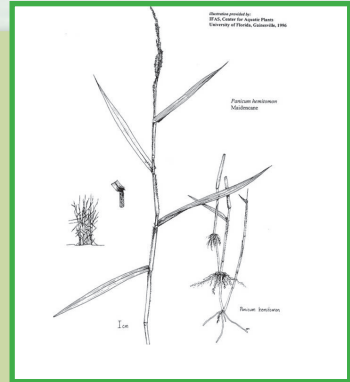


*Grasses*



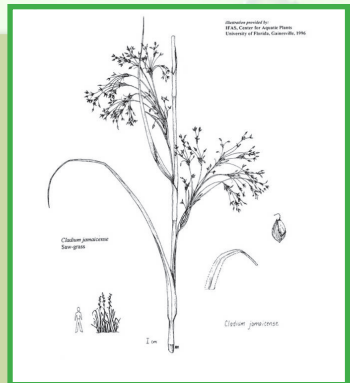
*Maidencane*

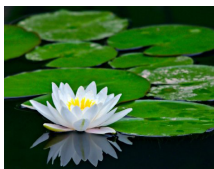
Maidencane (*Panicum hemitomon*) is a valuable and common native that can form large stands in the water or even on dry banks. It may be confused with torpedo grass, para grass, cupscale grass or blue maidencane. It provides food, protection and nesting material for wildlife. Maidencane is a grass with extensive rhizomes and narrow stems up to six feet long. The smooth leaf blades are flat or folded, pointed at the tips and up to one inch wide and 12 inches long. Inflorescence (flowers) are erect, narrow, spike-like and range from four to 12 inches long.



*Saw-Grass*

Saw-grass (*Cladium jamaicense*), aptly named for its small sharp teeth on the leaf blades, is a large sedge that occurs throughout the southeastern U.S. growing in fresh- and brackish-water wetlands where it provides food and shelter to water birds and other animals (Kartesz, 1999). Two species of *Cladium* exist in Florida (Wunderlin, 2003).





## COMMON *NATIVE* PLANTS IN FLORIDA

### Trees

## Bald Cypress

Bald cypress (*Taxodium distichum*) grows to be a huge tree in Florida and the southeast. Although it is reported as far north as New York (Kartesz, 1999). It is commonly found growing in lakes, swamps, floodplains and along streams (Wunderlin, 2003). Bald cypress occurs almost always (estimated probability 99%) under natural conditions in wetlands. *Taxodium distichum* leaves are linear and spread on the branchlets.



*Taxodium distichum*



*Taxodium ascendens*

## Pond Cypress

Pond cypress (*Taxodium ascendens*) doesn't grow as tall or as robustly; it is the cypress of the Everglades. It commonly occurs in flatwood pond and lake margins throughout Florida and only in the southeastern coastal states (Wunderlin, 2003). Pond cypress leaves are awl-shaped and press against the branchlets (appressed), with branchlets generally ascending. *Taxodium ascendens* occurs almost always under natural conditions in wetlands.

## Dahoon Holly

Dahoon holly (*Ilex cassine*), an evergreen, is native to Florida's swamps, margins and other wetlands, growing to be a large shrub or a medium-sized tree, sometimes much larger. It is found throughout Florida and occurs in all southeastern U.S. coastal states. It flowers in the spring; later it has bright red to orange-red drupes. There are 13 species and varieties of *Ilex* in Florida.



Dahoon holly  
*Ilex cassine*  
Photo by A. Murray  
Copyright 2002 Univ., Florida

# COMMON **NON-NATIVE** PLANTS IN FLORIDA

## *Submersed Plants*



## *Hydrilla*

**Hydrilla (*Hydrilla verticillata*)** is a submersed plant. It can grow to the surface and form dense mats and may be found in all types of water bodies. Hydrilla stems are slender, branched and up to 25 feet long. Hydrilla's small leaves are strap-like and pointed. They grow in whorls of four to eight around the stem. The leaf margins are distinctly saw-toothed with one or more sharp teeth along the length of the leaf mid-rib. Hydrilla produces tiny white flowers on long stalks. It also produces 1/4 inch turions at the leaf axils and potato-like tubers attached to the roots in the mud. Hydrilla is an invisible menace, invisible that is, until it fills the lake or river that it infests, "topping out" at the surface. Hydrilla can grow an inch a day. When hydrilla invades, ecologically-important native submersed plants such as pondweeds (*Potamogeton spp.*), tapegrass (*Vallisneria americana*) and coontail (*Ceratophyllum demersum*) are shaded out by hydrilla's thick mats or are simply outcompeted and eliminated (van Dijk 1985).

Millions of dollars are spent each year on herbicides and mechanical harvesters in Florida alone in an effort to place hydrilla under "maintenance control." Hydrilla spreads to new waters mainly as fragments on boats and trailers.



Hydrilla  
*Hydrilla verticillata*  
Photo by Vic Ramey  
Copyright 1990 Univ. Florida

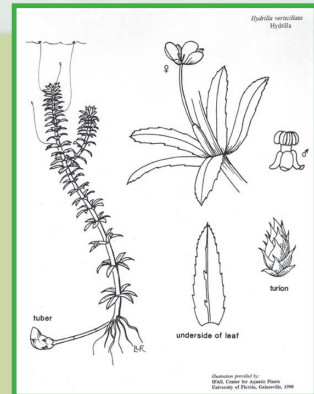


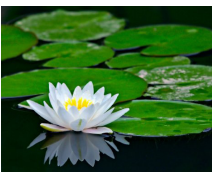
Illustration provided by:  
B.W. Todd for Robert Peck,  
University of North Carolina, 1989



Be sure to check your boat and trailer for "hitchhikers" when entering or leaving a waterbody.

# COMMON *NON-NATIVE* PLANTS IN FLORIDA

## Emersed Plants



### Alligator Weed

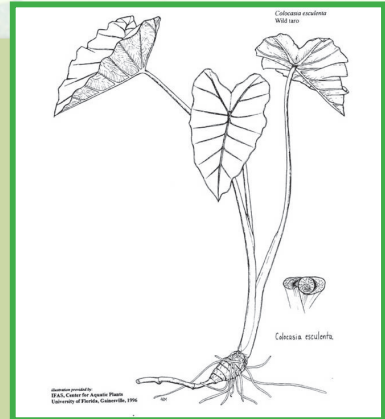
Alligator weed (*Alternanthera philoxeroides*) is an emersed plant. It can grow in a variety of habitats, including dry land, but is usually found in water. It may form sprawling mats over the water or along shorelines.

Stems are pinkish and can become hollow when larger. Flowers are reduced in round white heads on long stalks; each flower has four to five thin, papery bracts, five stamens, one pistil.



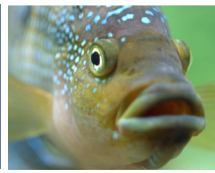
### Wild Taro

Wild taro (*Colocasia esculenta*) is a non-native emersed plant, having been imported from the Pacific Islands. It occurs in and out of water. Wild taro leaves are medium to large-size. They are arrowhead-shaped with heart-shaped leaf bases. The leaves can grow up to two feet long. They are dark, velvety green and water repellent. Wild taro leaves are peltate: the leaf stem attaches more-or-less to the middle of the underside of the leaf. Leaf stems grow up to four feet tall. Flowers occur in small finger-like spikes.



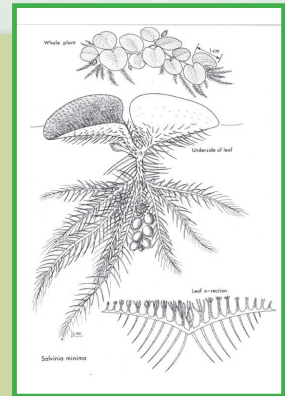
# COMMON *NON-NATIVE* PLANTS IN FLORIDA

## Free Floating and Floating Leaved Plants



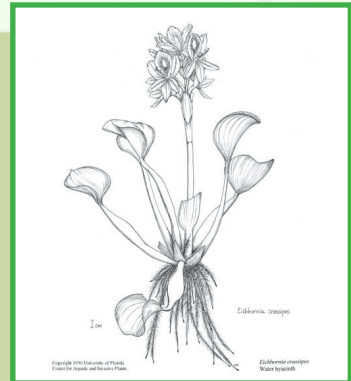
### *Salvinia*

*Salvinia* (*Salvinia minima*) are floating ferns, thus also referred to as water ferns. There are 10 species of *Salvinia* in the world, none of which are native to the United States. This species is about 3/4 inch in width. *Salvinia* has joined oval leaves which are covered with stiff hairs. It has root-like structures which are actually modified fronds.



### *Water Hyacinth*

Water hyacinth (*Eichhornia crassipes*) is a floating plant. This invasive nuisance plant often jams rivers and lakes with uncounted thousands of tons of floating plant matter. A healthy acre of water hyacinths can weigh up to 200 tons. The plants vary in size from a few inches to over three feet tall with showy lavender flowers and dark feathery roots. Water hyacinth leaves are rounded and leathery, attached to spongy and sometimes inflated stalks.



# COMMON *NON-NATIVE* PLANTS IN FLORIDA

## *Free Floating and Floating Leaved Plants*

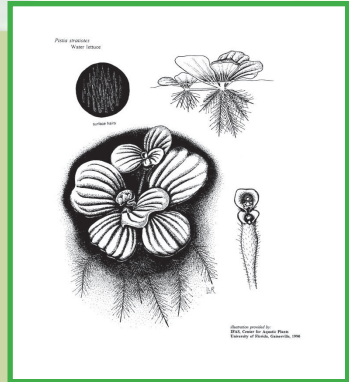


### *Water Lettuce*

Water lettuce (*Pistia stratiotes*) is a floating plant. Experts disagree as to whether water lettuce is a native or has been introduced. It occurs in lakes, rivers and canals, occasionally forming large dense mats. As its name implies, water lettuce resembles a floating open head of lettuce. Water lettuce has very thick leaves which are a light dull green, hairy and ridged. There are no leaf stalks. Water lettuce roots are light colored and feathery. Its flowers are inconspicuous.

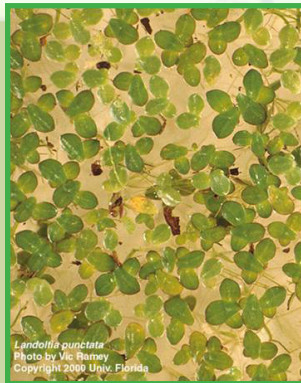


Water lettuce  
*Pistia stratiotes*  
Photo by Ann Murray  
Copyright 1999 Univ. Florida

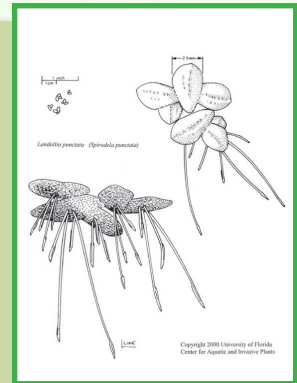


### *Dotted Duckweed*

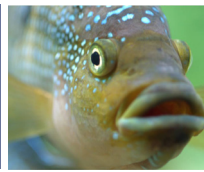
Dotted duckweed (*Landoltia punctata*, *syn. S. punctata*) is a new name for this duckweed, which used to be known as *Spirodela punctata*. It looks very similar to the native giant duckweed, *Spirodela polyrhiza*. It is frequently found growing in rivers, ponds, lakes and sloughs nearly throughout the state and blooms all year (Wunderlin, 2003). *Landoltia punctata* can grow into dense masses in stagnant water bodies. *Landoltia punctata* usually has two leaves attached together. The leaves are shoe-shaped, which makes it resemble a large Lemna species. *Landoltia punctata* has two to five roots descending from each leaf. This plant is easily confused with the native plant, giant duckweed, *Spirodela polyrhiza*. *Landoltia* duckweed is smaller than *Spirodela polyrhiza*, is more shoe-shaped, does not have a red dot on top, usually only has up to four roots and sometimes has a red margin on the underneath of the leaves. The native giant duckweed is larger, has rounder leaves, some have a red dot on the top, has up to nine or more roots and is dark red underneath the leaves.



*Landoltia punctata*  
Photo by Vic Blaney  
Copyright 2000 Univ. Florida



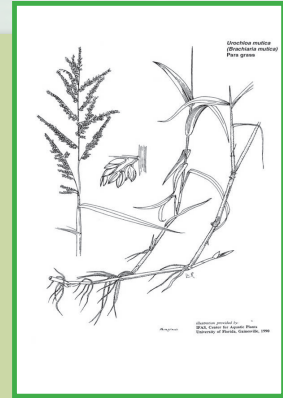




## Para Grass

Para grass (*Brachiaria mutica*) is in the family Poaceae, along with other familiar grasses such as St. Augustine, Bermuda and Centipede grass. Stems will often root at the base and can reach up to eight feet in height, having hairy nodes and sheaths. Leaf blades are four to 12 inches long and 1/2 an inch wide.

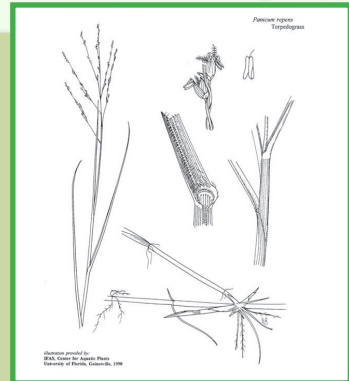
Although there are many flower heads produced by para grass, seed production is very poor with poor seed viability.



## Torpedo Grass

Torpedo grass (*Panicum repens*) is a highly invasive exotic weed from Australia and is often mistaken for native maidencane. It grows rapidly and extensively throughout

Florida, along canal ditches and banks and along shores of lakes, often extending into the water to form large floating mats. It also grows terrestrially and may be found in pastures, grovelands and even sand dunes. The plants are erect or leaning up to about three feet tall. Its stems are rigid with narrow leaves which are only 1/16 to 1/4 inch wide and two to 10 inches long. The inflorescence (flower) is three to nine inches long, branched and somewhat open, with branches pointing upward.





## Brazilian Pepper Tree

Brazilian pepper tree (*Schinus terebinthifolius*) is one of the most aggressive of the invasive non-indigenous plants in Florida. It is invading aquatic and terrestrial habitats, greatly reducing the quality of native biotic communities in the state. Brazilian pepper is a small tree, growing up to 30 feet tall with a short trunk usually hidden by dense intertwining branches. The leaves have a reddish, sometimes winged midrib with three to 13 finely-toothed leaflets which are one to two inches long. The leaves smell of turpentine when crushed. Flowers are white. The fruits are in clusters, glossy, green and juicy at first, becoming bright red as they ripen. The skin dries to become a papery shell surrounding the seed.



Brazilian pepper tree  
*Schinus terebinthifolius*  
Photo by A. Murray  
Copyright 2000 Univ. Florida

## Chinese Tallow

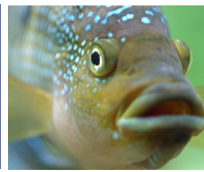
Characteristics that make Chinese tallow (*Sapium sebiferum*) a popular ornamental are its fast growth rate, attractive fall color and its ability to resist damage from pests. It is a small to medium-sized tree that grows to about 20 feet tall, but some specimens can reach 40-50 feet. It is freely branching with leaves arranged alternately on branches. The flowers of Chinese tallow are attractive to bees and other insects and are borne in spikes roughly eight inches long. Fruit ripens from August to November. Chinese tallow trees are deciduous with a strong, deep taproot. This enables young trees to withstand periods of drought. Seeds are spread by many species of birds, and moving water can also serve as a mechanism for seed dispersal.



*Sapium sebiferum*  
Chinese tallow on Lake Manatee, Florida  
Photo by Vic Hanney  
Copyright 1999 University of Florida



# HELPFUL RESOURCES



## Other Resources to Help With Your Questions:

Boating Safety and Regulations: [http://www.myfwc.com/SAFETY/Safety\\_Boat\\_Safety\\_index.htm](http://www.myfwc.com/SAFETY/Safety_Boat_Safety_index.htm)

Seminole County MSBU Program: Funding format for Aquatic Weed Control or Lake Restoration (407) 665-7185 or [www.seminolecountyfl.gov/fs/mсбу/msbuprogbroch.asp](http://www.seminolecountyfl.gov/fs/mсбу/msbuprogbroch.asp)

Florida Yard & Neighborhood Program (FYN) Program: For more information or to schedule a Florida Yards & Neighborhoods presentation, call (407) 665-5575, Web site: [www.seminolecountyfl.gov/fyn](http://www.seminolecountyfl.gov/fyn), e-mail: [fyn@seminolecountyfl.gov](mailto:fyn@seminolecountyfl.gov)

Seminole County Watershed Atlas: Comprehensive Web site for lakes and rivers that includes water quality, hydrology, history and events. (407) 665-2424 or visit the Web site: [www.seminole.wateratlas.org](http://www.seminole.wateratlas.org)

Seminole County Lake Management Program: (407) 665-2439 or visit the Web site dedicated to lakes [www.seminole.wateratlas.usf.edu/LakeManagement](http://www.seminole.wateratlas.usf.edu/LakeManagement)

Watershed Action Volunteers (WAV) Program: For volunteering opportunities, call (407) 665-2457 or visit [www.seminolecountyfl.gov/pw/roadstorm/education\\_wav.asp](http://www.seminolecountyfl.gov/pw/roadstorm/education_wav.asp); e-mail: [wavsem@seminolecountyfl.gov](mailto:wavsem@seminolecountyfl.gov)

## Plant and Fish Information:

### Aquatic Plant (Permit/Herbicides):

Florida Fish and Wildlife Conservation Commission (FWC) Aquatic Plant Management Permit Application: [www.myfwc.com/nonnatives/InvasivePlants/docs/20%20Application-07-26-05.pdf](http://www.myfwc.com/nonnatives/InvasivePlants/docs/20%20Application-07-26-05.pdf)

FWC Invasive Plant Management Section: (407) 275-4004 or [www.myfwc.com/WILDLIFEHABITATS/InvasivePlants\\_index.htm](http://www.myfwc.com/WILDLIFEHABITATS/InvasivePlants_index.htm)

Why You Need an FWC Aquatic Plant Management Permit: <http://plants.ifas.ufl.edu/guide/permit.html>

Use of Herbicides for Aquatic Plant Management: <http://plants.ifas.ufl.edu/guide/herbcons.html>

Listing of the Eight Aquatic Herbicides Registered for Florida's Waters: <http://plants.ifas.ufl.edu/guide/sup3herb.html>

### Other Aquatic Plant Resources (Identification/Management/Nurseries):

Plant Management in Florida's Waters: <http://plants.ifas.ufl.edu/guide/index.html>

UF's Center for Aquatic and Invasive Plant Identification: <http://plants.ifas.ufl.edu/plants&animals.html>

USF's Plant Atlas: [www.plantatlas.usf.edu](http://www.plantatlas.usf.edu)

UF Herbarium (digital images of plants): [www.flmnh.ufl.edu/herbarium/cat/imagesearch.asp?srchproject=IN](http://www.flmnh.ufl.edu/herbarium/cat/imagesearch.asp?srchproject=IN)

Plants for Lakefront Revegetation (PDF): [www.seminole.wateratlas.usf.edu/upload/documents/651\\_Lakefront%20Revegetation.pdf](http://www.seminole.wateratlas.usf.edu/upload/documents/651_Lakefront%20Revegetation.pdf)

Native Aquatic Plant Nursery List (PDF): [www.seminole.wateratlas.usf.edu/upload/documents/Native%20Aquatic%20Plant%20Nursery%20List.pdf](http://www.seminole.wateratlas.usf.edu/upload/documents/Native%20Aquatic%20Plant%20Nursery%20List.pdf)

### Triploid Grass Carp Fish (Permits/Information):

Florida Fish and Wildlife Conservation Commission (FWC) - Triploid Grass Carp Permitting: (352) 357-2951 or [www.myfwc.com/License/FreshwaterPermit\\_grasscarp.htm](http://www.myfwc.com/License/FreshwaterPermit_grasscarp.htm)

Triploid Grass Carp Vendor/Supplier List: [http://myfwc.com/freepermits/tgc-internet/tg\\_vendorlist.asp](http://myfwc.com/freepermits/tgc-internet/tg_vendorlist.asp)

Use of Biological Controls for Aquatic Plant Management: <http://plants.ifas.ufl.edu/guide/biocons.html>

### Report a Fish Kill or Pollution:

FWC Fish Kill Hotline: (800) 636-0511 or <http://research.myfwc.com/fishkill/submit.asp>

Report Water Pollution: (407) 665-7623 or [www.seminole.wateratlas.usf.edu/forms/pollution.asp](http://www.seminole.wateratlas.usf.edu/forms/pollution.asp)





**Seminole County Water Quality Section**  
Department of Public Works • Roads-Stormwater Division  
177 Bush Loop • Sanford, FL 32773

**Water Quality Program**  
(407) 665-2424 or (407) 665-2456  
[www.seminole.wateratlas.usf.edu](http://www.seminole.wateratlas.usf.edu)

**Lake Management Program**  
(407) 665-2439 • [www.seminole.wateratlas.usf.edu/lmp](http://www.seminole.wateratlas.usf.edu/lmp)

### Report Water Pollution

(407) 665-7632  
[www.seminole.wateratlas.usf.edu/forms/pollution.asp](http://www.seminole.wateratlas.usf.edu/forms/pollution.asp)



### Watershed Action Volunteer Program

A Program of the St. Johns River Water Management Program  
177 Bush Loop • Sanford, FL 32773

### Seminole County WAV Coordinator:

Web site: [www.seminolecountyfl.gov/pw/roadstorm/education\\_wav.asp](http://www.seminolecountyfl.gov/pw/roadstorm/education_wav.asp) or  
[www.sjrwmd.com/education/wav/](http://www.sjrwmd.com/education/wav/)  
E-mail: [wavsem@seminolecountyfl.gov](mailto:wavsem@seminolecountyfl.gov)  
Phone: (407) 665-2457



**Florida Yards & Neighborhood Program**  
250 West County Home Road • Sanford, FL 32773  
Web site: [www.seminolecountyfl.gov/fyn](http://www.seminolecountyfl.gov/fyn)  
E-mail: [fyn@seminolecountyfl.gov](mailto:fyn@seminolecountyfl.gov)  
Phone: (407) 665-5575

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