Monitoring and Eradication of Invasive Aquatic Plants in South Mississippi

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THE Sun

Alien Plant Eats House !

Invasive Aquatic Species – Why Should We Care?

- **Water Use Losses**
  - Boating, Fishing, Swimming Access Hindered
  - Pumping Water For Domestic and Agricultural Uses Reduced
  - Native and Threatened/Endangered Species Displaced

Invasive Species – Big Problem

- 1.4 Trillion dollars in losses/year worldwide
- Second largest threat to biodiversity.
  - Over 15,000 species threatened worldwide with extinction
  - Over 1,200 in North America

Gopher tortise (*Gopherus polyphemus*)

Characteristics of Non-Native Invasive Plants

- Able to establish in natural areas
- Rapid and aggressive growth
- High rate of reproduction
- Spreads easily
- No diseases or predators

How Do Invasive Species “Get Here”?

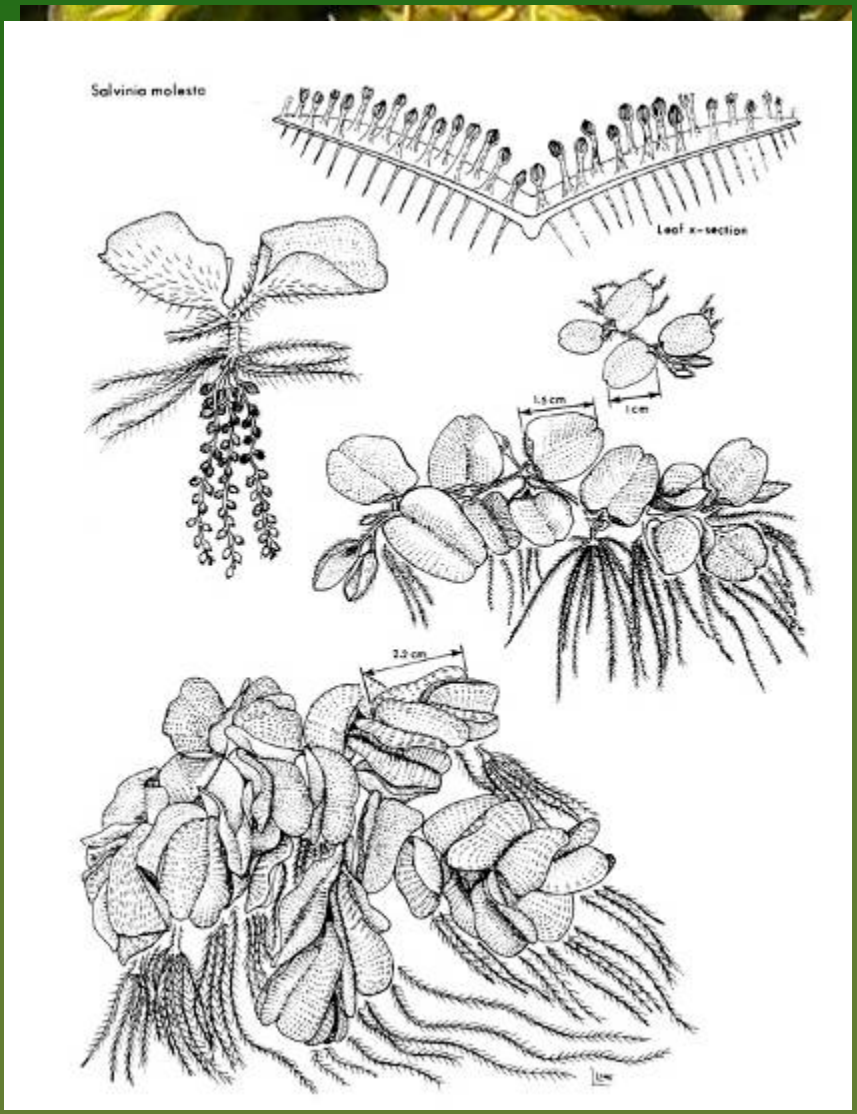
- Shipping
- Intentional Introduction
- Nursery Industry

- Anglers/Bait Industry
- Aquarium/Water Garden Trade
- Natural Dispersal

Common Invasive Plant Species of South Mississippi

- Giant Salvinia (*Salvinia molesta*)
- Common Salvinia (*Salvinia minima*)
- Water Hyacinth (*Eichhornia crassipes*)
- Chinese Tallow (*Triadica sebifera*)
- Cogon Grass (*Imperata cylindrica*)
- Common Reed (*Phragmites australis*)
- Parrot Feather (*Myriophyllum aquaticum*)
- Alligator Weed (*Alternanthera philoxeroides*)
- Torpedo Grass (*Panicum repens*)
- Giant Reed (*Arundo donax*)
- Invasive Roses (*Rosa spp.*)
- Japanese Climbing Fern (*Lygodium japonicum*)
- Kudzu (*Pueraria montana*)
- Eurasian Watermilfoil (*Myriophyllum spicatum*)

Giant Salvinia (*Salvinia molesta*)



- Native to South America
- Floating aquatic fern
- Found in still and slow-moving water
- Reproduces by fragmentation
- Population can double in less than on week
- Can cover surface of water
- Extremely invasive and undesirable

Giant salvinia overtaking much of the waterway at Lake Bistineau Louisiana

Photo Credit:Greg Pearson - ShreveportTimes

Common Salvinia (*Salvinia minima)*

Water Hyacinth (*Eichhornia crassipes*)

Chinese Tallow (*Triadica sebifera*)

Cogon Grass (*Imperata cylindrica*)

Common Reed (*Phragmites australis*)

Parrot Feather (*Myriophyllum aquaticum*)

Photos Credit: Ali Leggett, MDMR

Alligator Weed (*Alternanthera philoxeroides*)

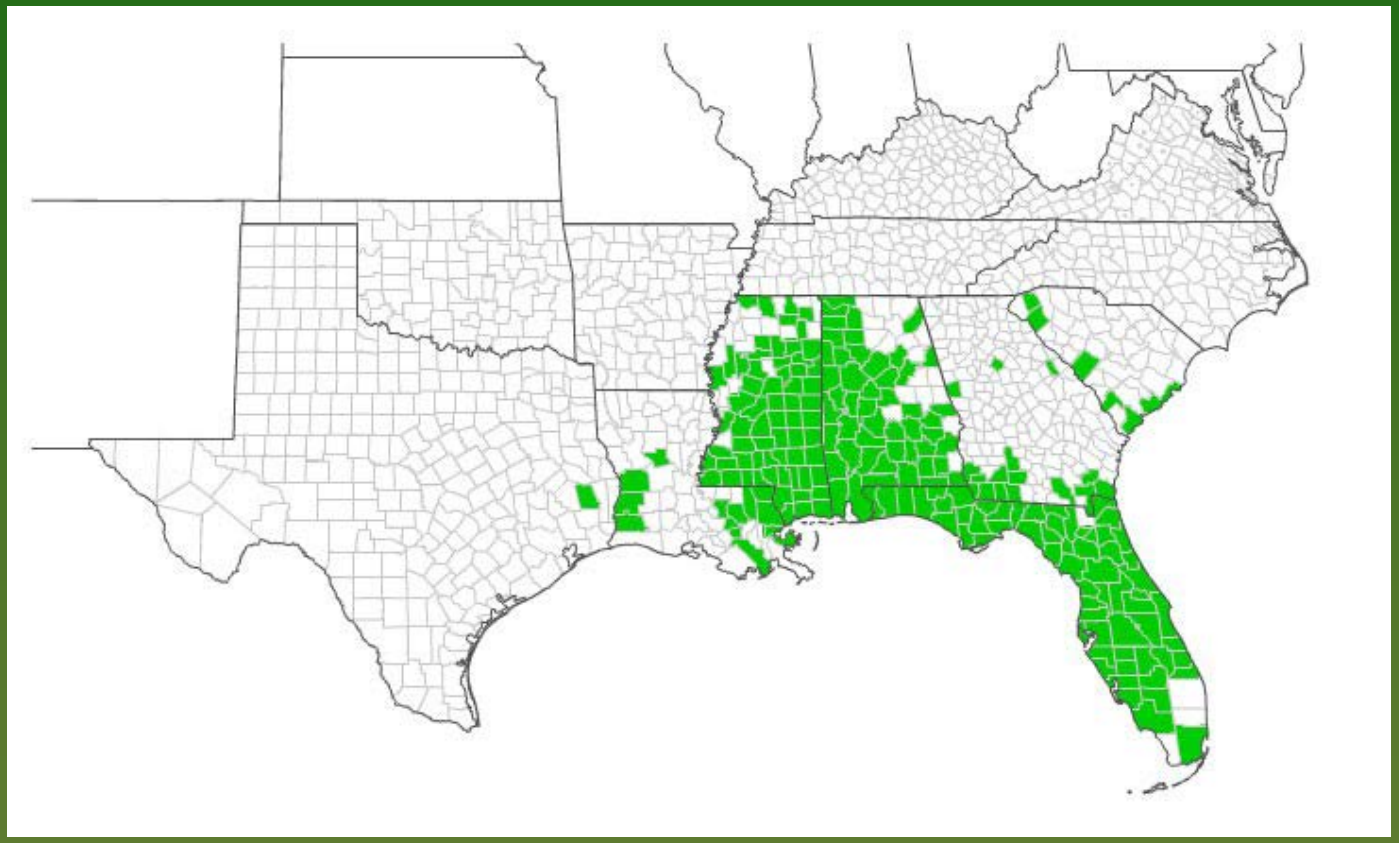
Torpedo Grass (*Panicum repens*)

Eurasian Watermilfoil (*Myriophyllum spicatum*)

Monitoring for Invasive Plants

- Boat surveys
  - Presence/Absence Point Sampling
  - Plant Area Mapping
- Land surveys
  - Presence/Absence Point Sampling
  - Plant Area Mapping
  - Transect surveys
- Aerial Surveys
  - Large Area coverage
  - Follow-Up Boat or Land Survey

County Level Mapping, Cogongrass Distribution

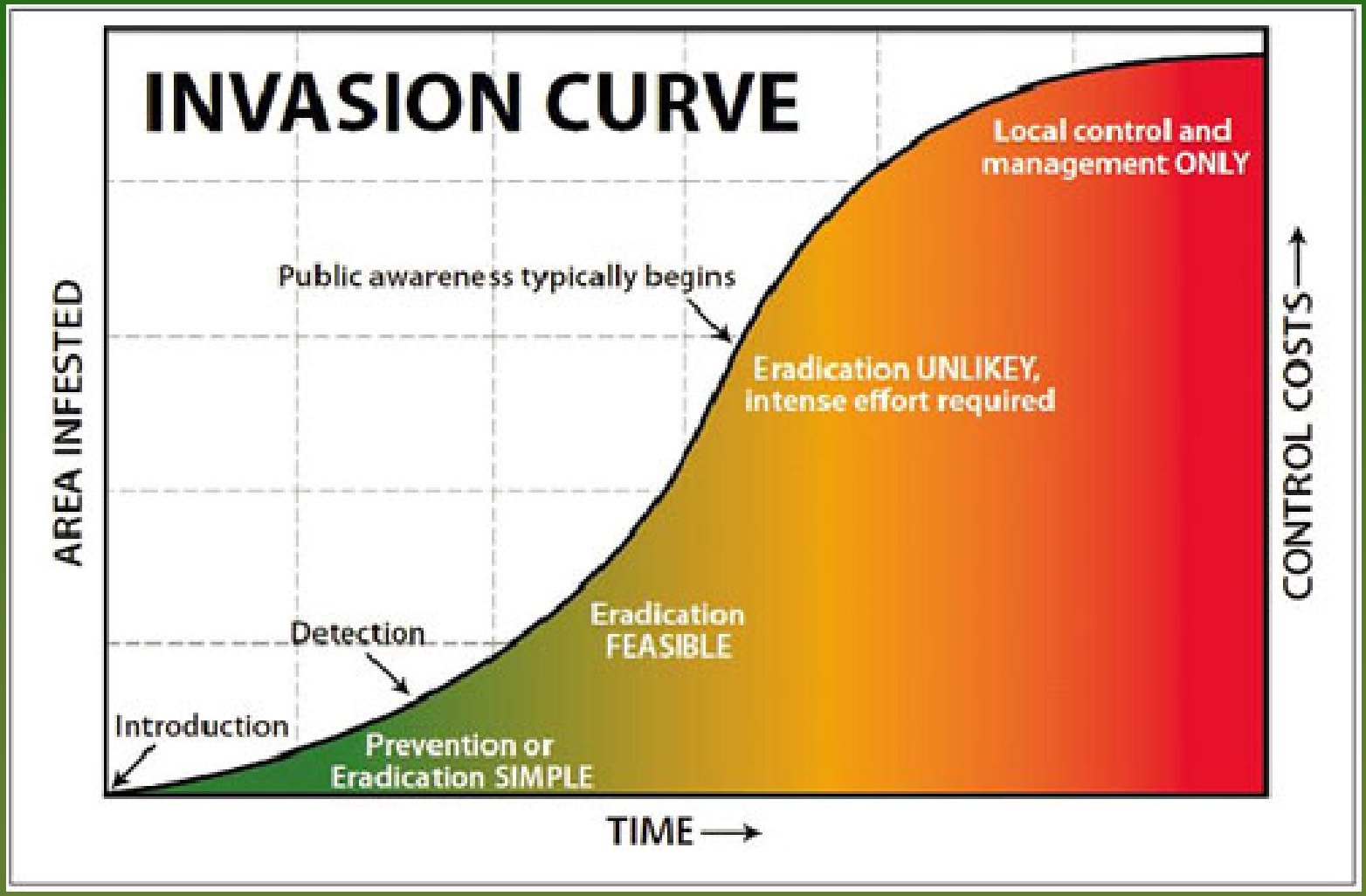


EDDMaps – Bugwood Network.

Early Detection Rapid Response (EDRR)

- Surveying and monitoring program
- Goal is to find plants at early stages of invasion
- Less damage to environment
- More cost efficient than eliminating widespread problem

Advantages of Early Detection - Rapid Response



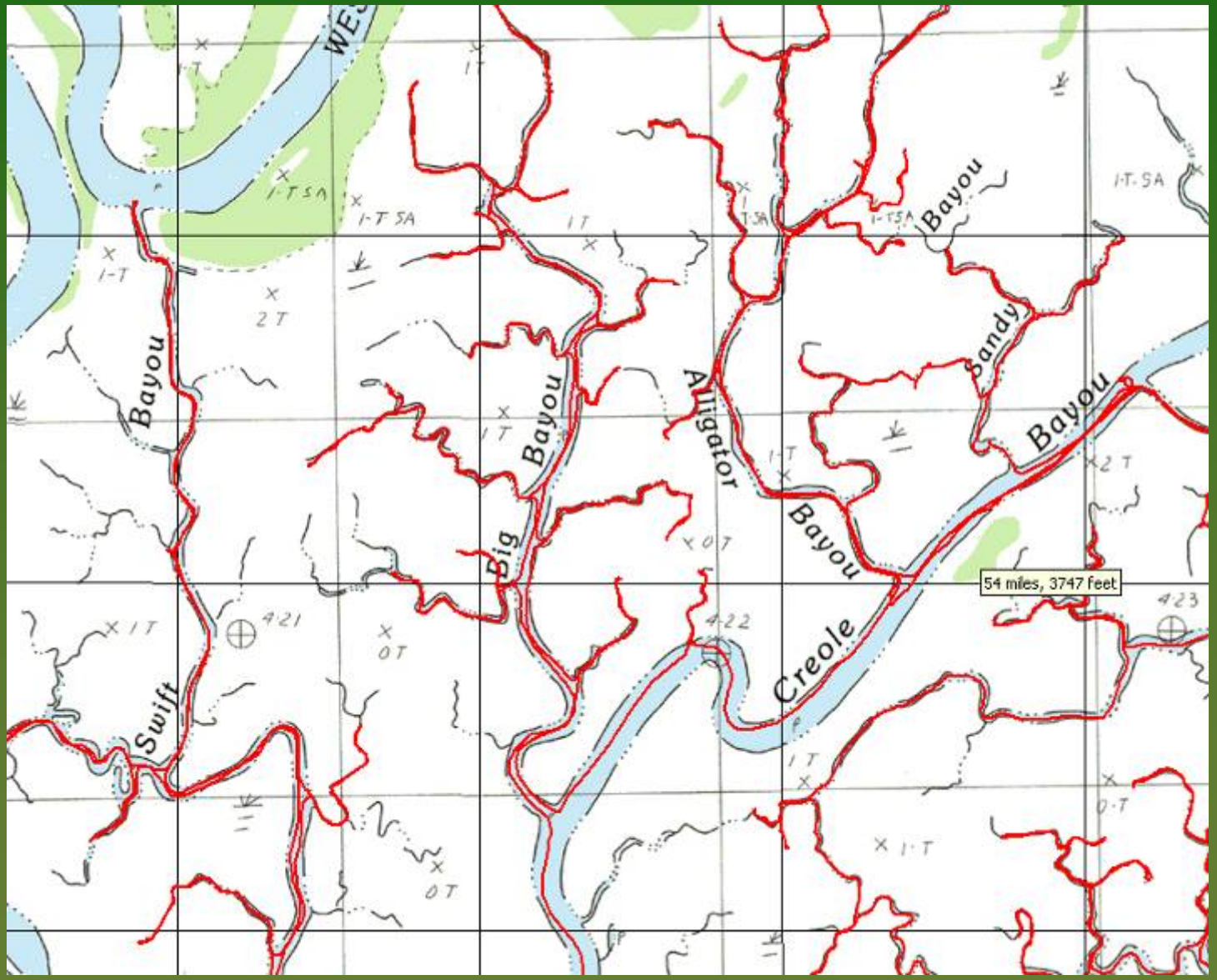
Graph Credit: Robert Emmanuel Oregon Sea Grant

Cost of Invasive Aquatic Plant Control

- Florida spent $27 million in 2006 on AIS control efforts
- LDWF spending $12 million/year on giant salvinia control
- OTA estimates national cost of AIS control = $135 million
- Early detection and rapid action essential to minimize control costs and protect coastal Mississippi's economic interests.

Aerial Surveys For Early Detection in Inaccessible Areas

GPS Track Logs Help Insure Complete Boat Survey



Current EDRR Objectives

- **Control and eliminate, if possible, giant salvinia from the Pascagoula River**
- **Manage common salvinia population outbreak in the Bogue Houma (Pearl River)**
- **Early detection and control of new AIS**
- **Spray less noxious invasives where control is feasible**
- **Yearly mapping of AIS in the survey area**

Giant Salvinia Infestation Discovered During Routine Boat Survey, August 2009

Effects of Hurricane Katrina on Giant Salvinia

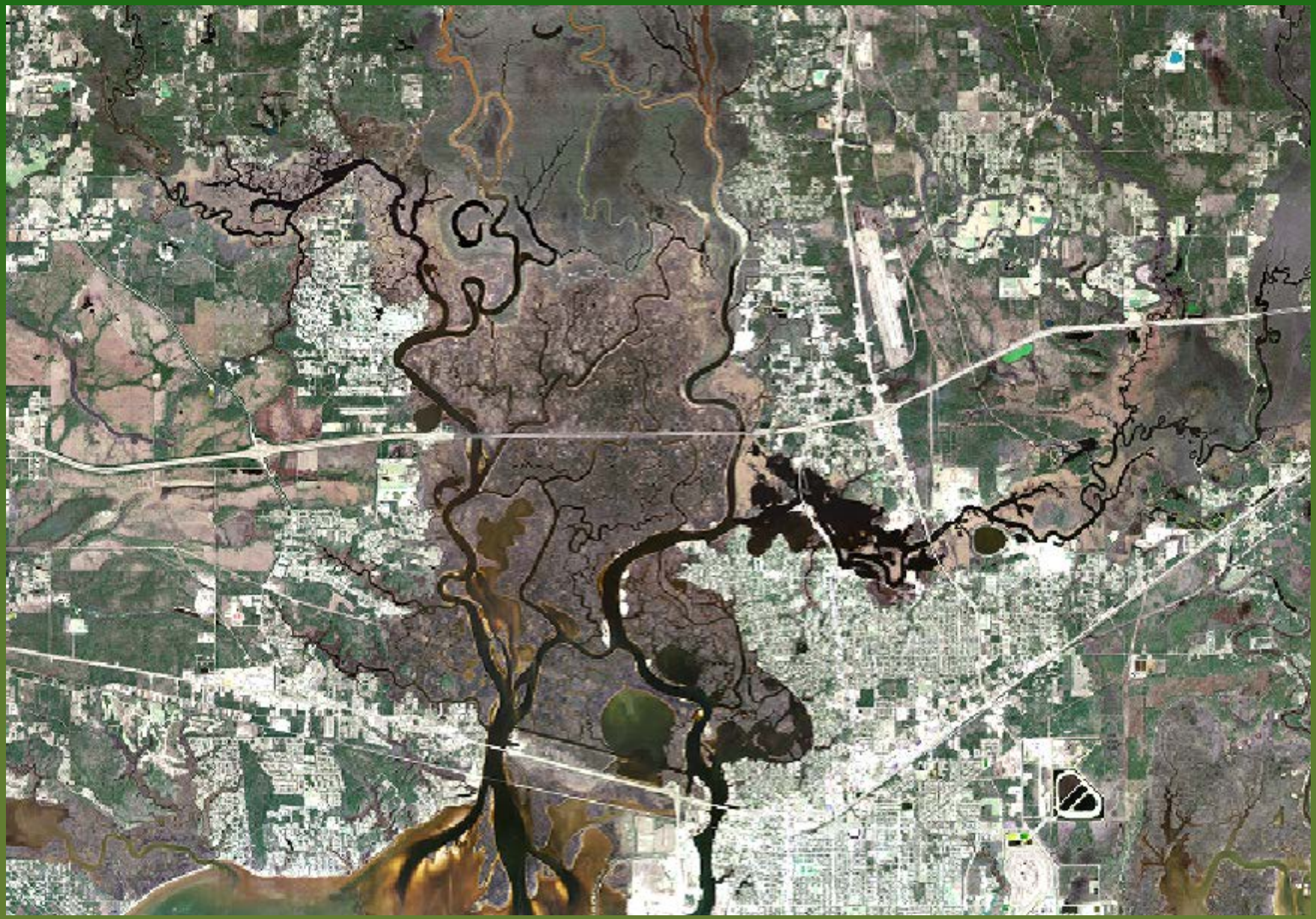
- Tidal surge stranded salvinia on land, in trees and on structures
- Increased salinity killed much of existing infestation
- Concern that storm may have spread salvinia to new areas

- Surviving salvinia was rapidly re-infesting area
- Reduced population provided a window of opportunity for control

Post-Katrina Pascagoula River Mapping Project

- **Summer, 2006**
- **Exhaustive aquatic invasive plant inventory**
- **Thales mobile mapping device**
- **Point search every 1,000 ft.**
- **Recorded – Water temp., salinity and all invasive plants encountered**
- **Logged 3,300 points, surveyed 400 miles in 37 field days**

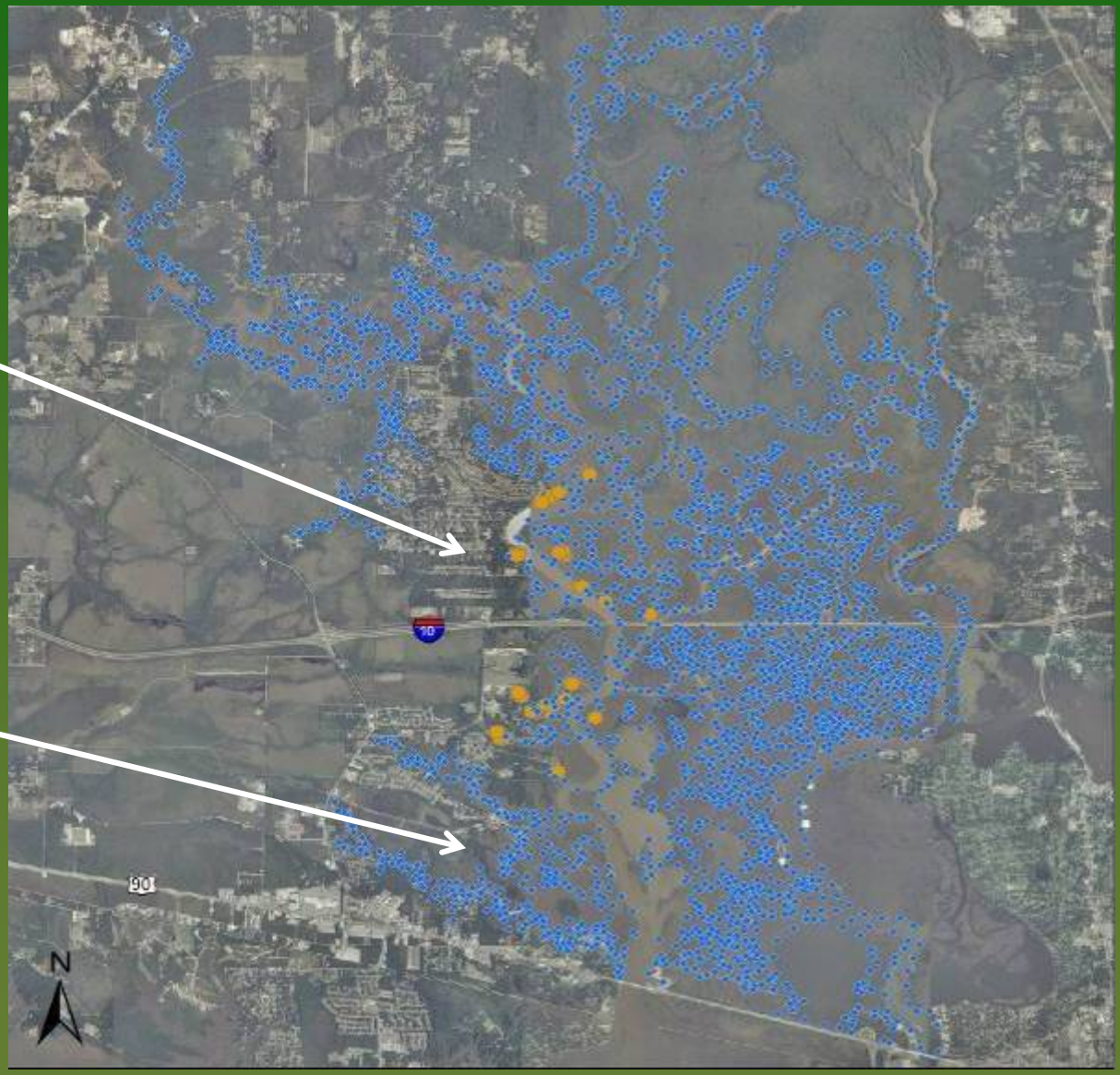
Pascagoula River Basin – Jackson County, MS



Results

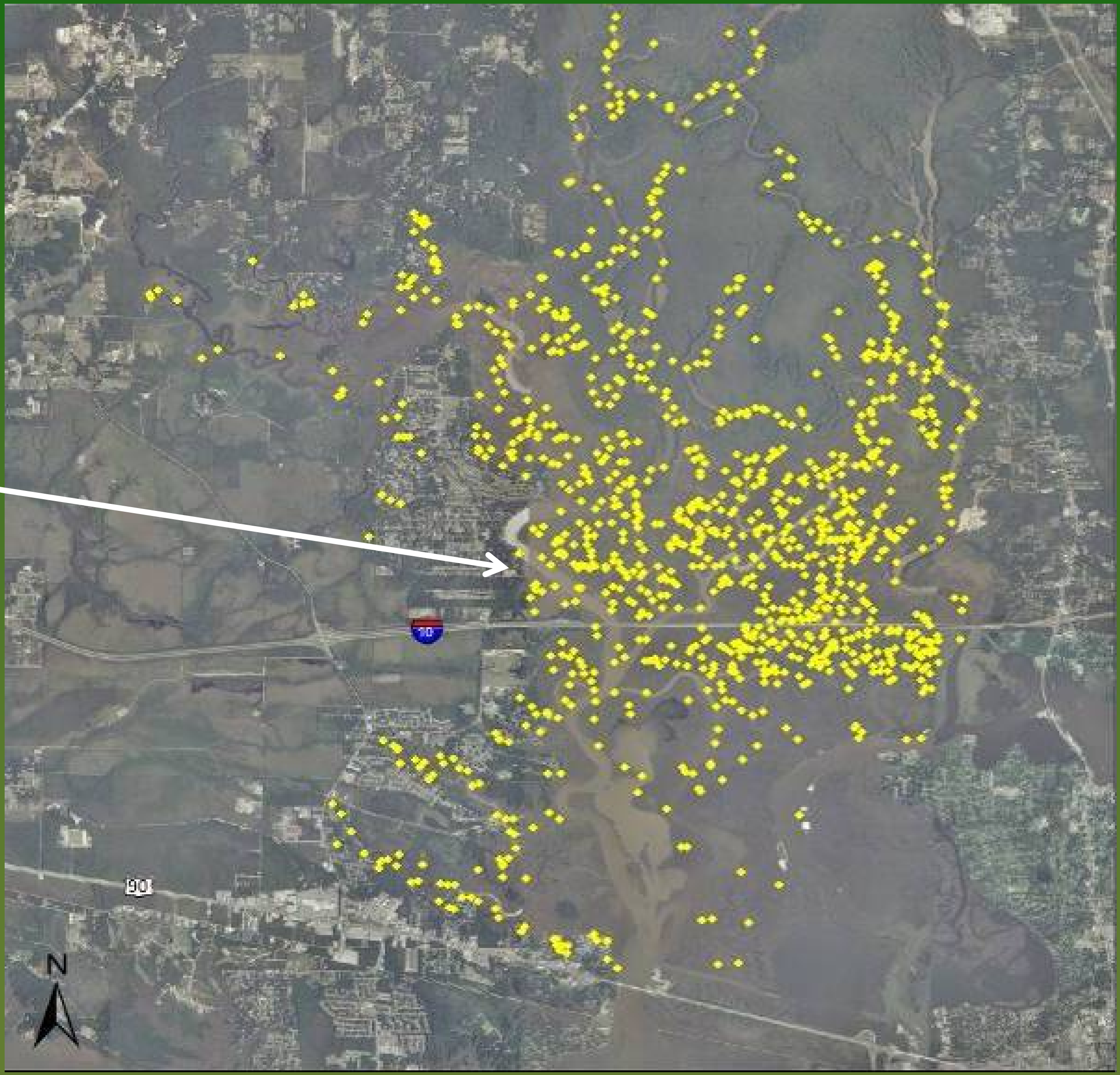
Orange = Giant Salvinia Found

Blue = Giant Salvinia Not Found

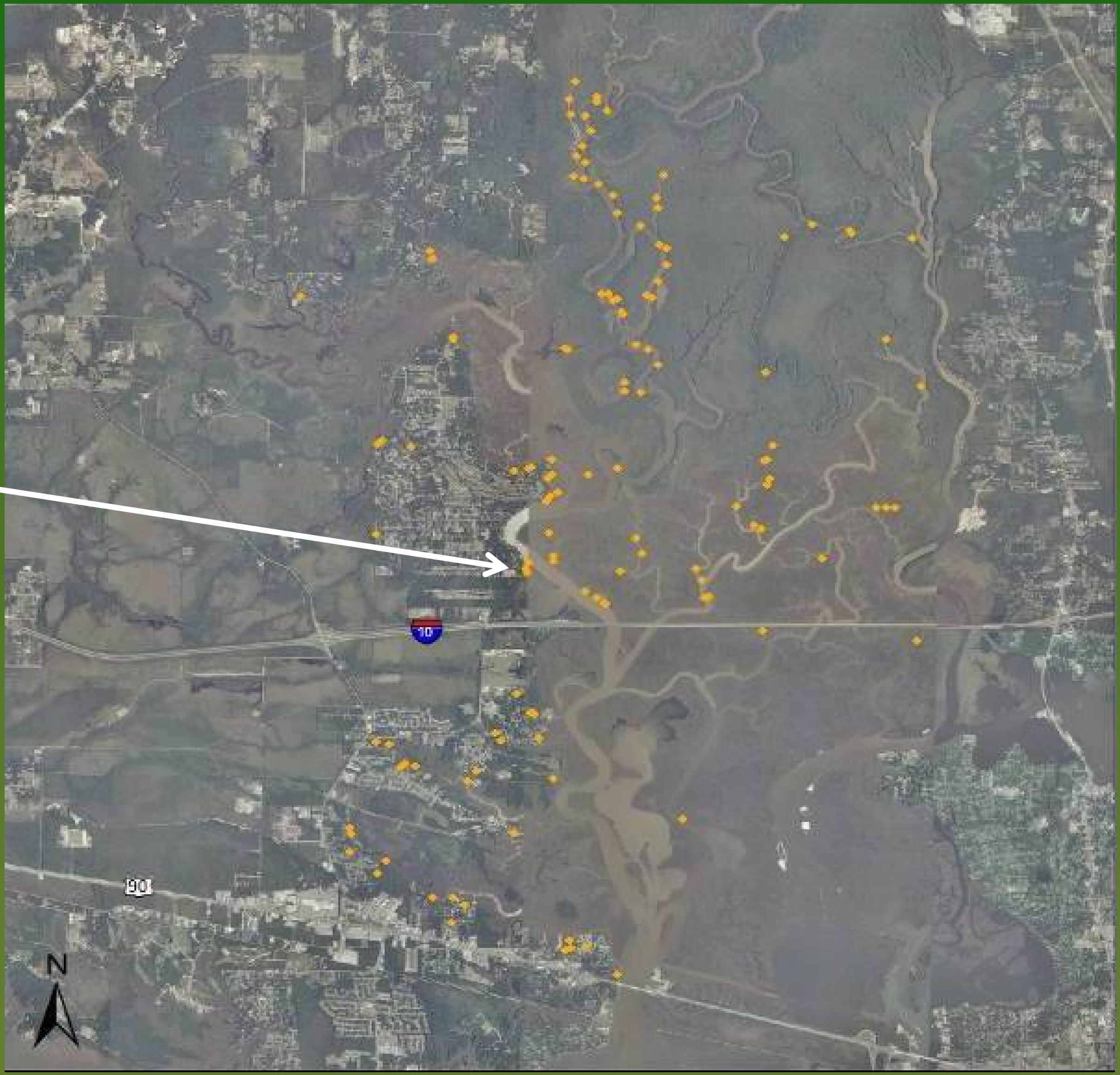


Results

Yellow = Sample Points with One Species of Invasive Plant



Results



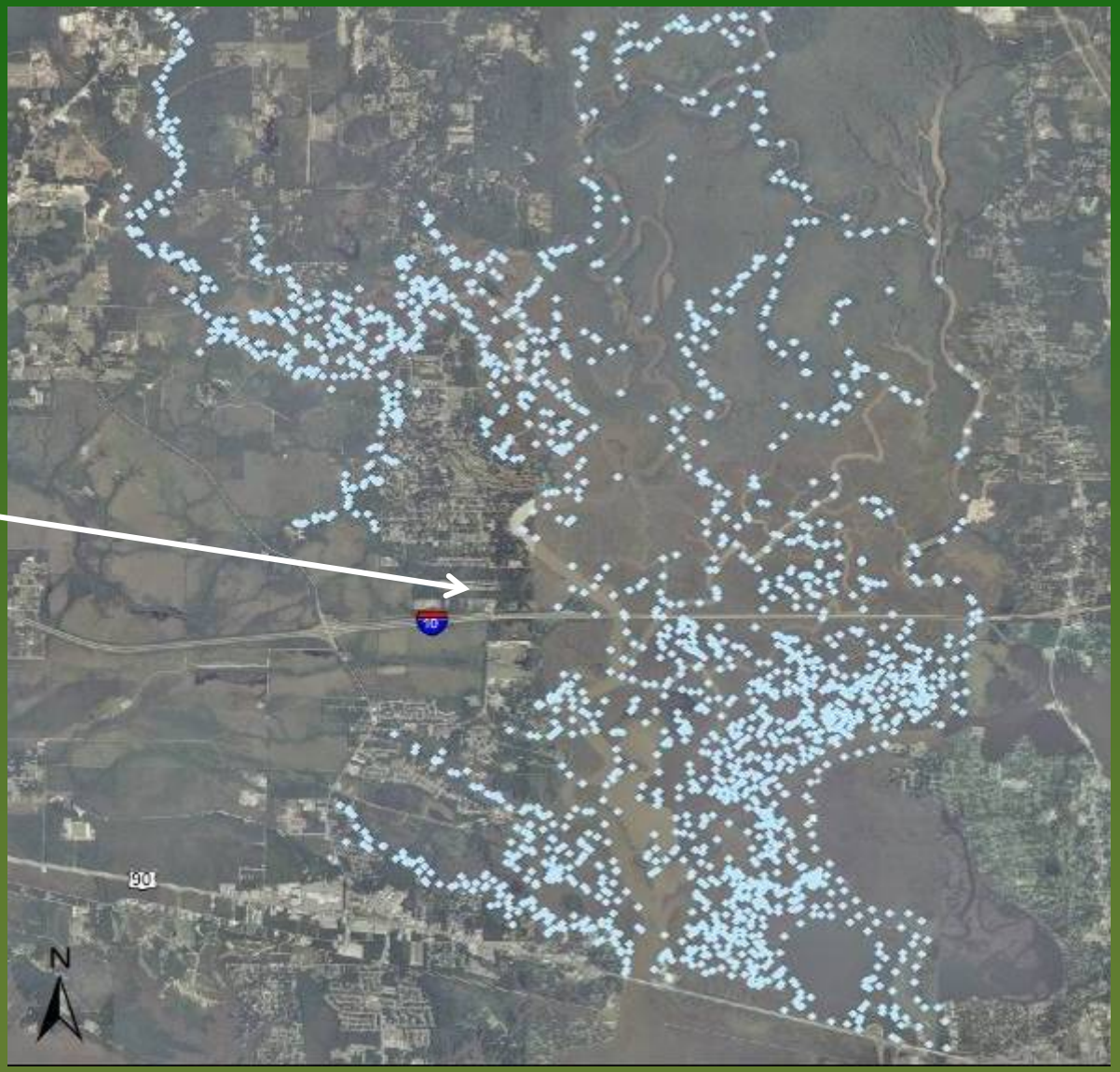
Orange = Sample Points with two Species of Invasive Plants

Results

Red = Sample Points with Three Species of Invasive Plants

Results

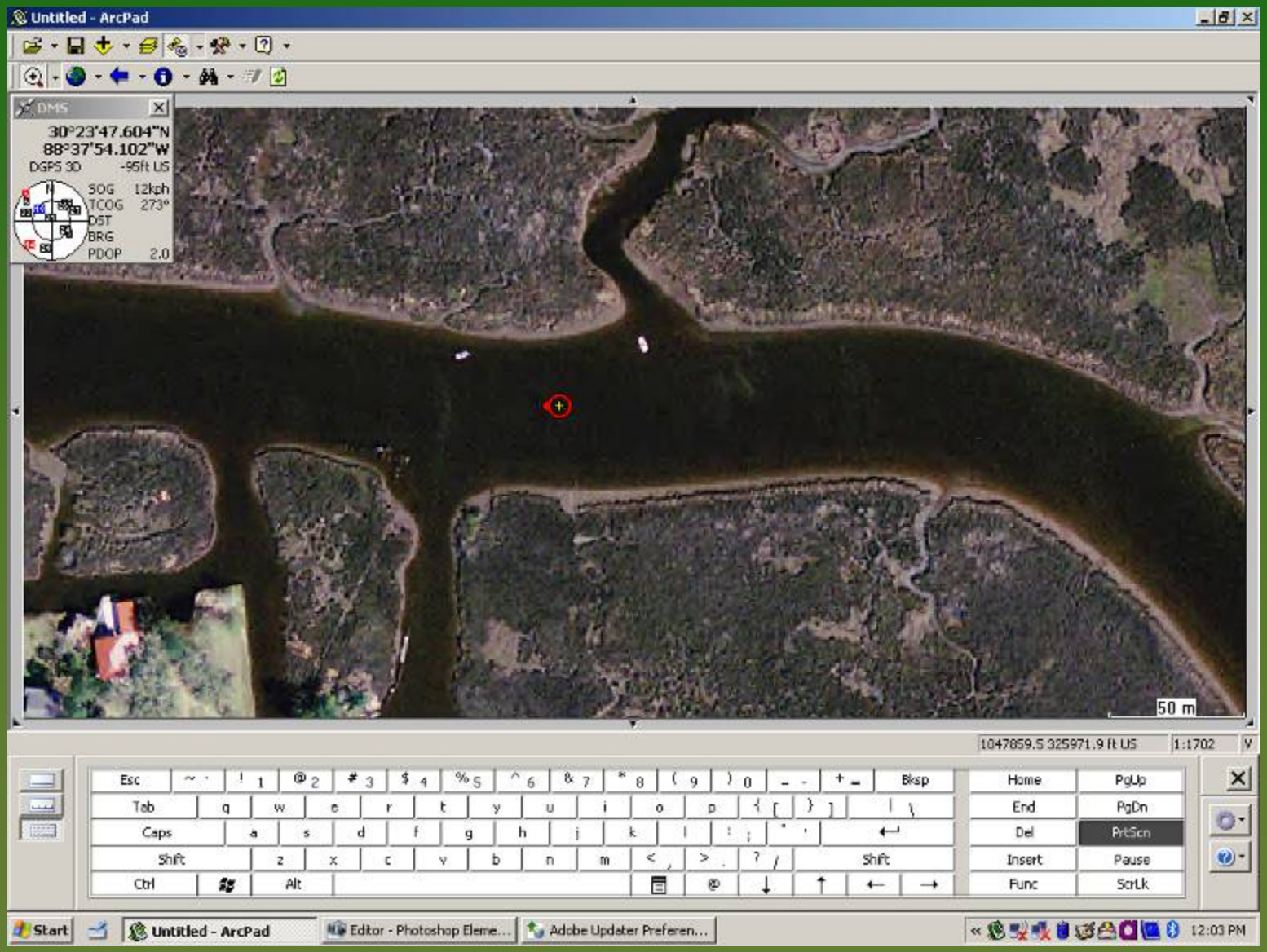
Light Blue = Sample Points with No Invasive Plants



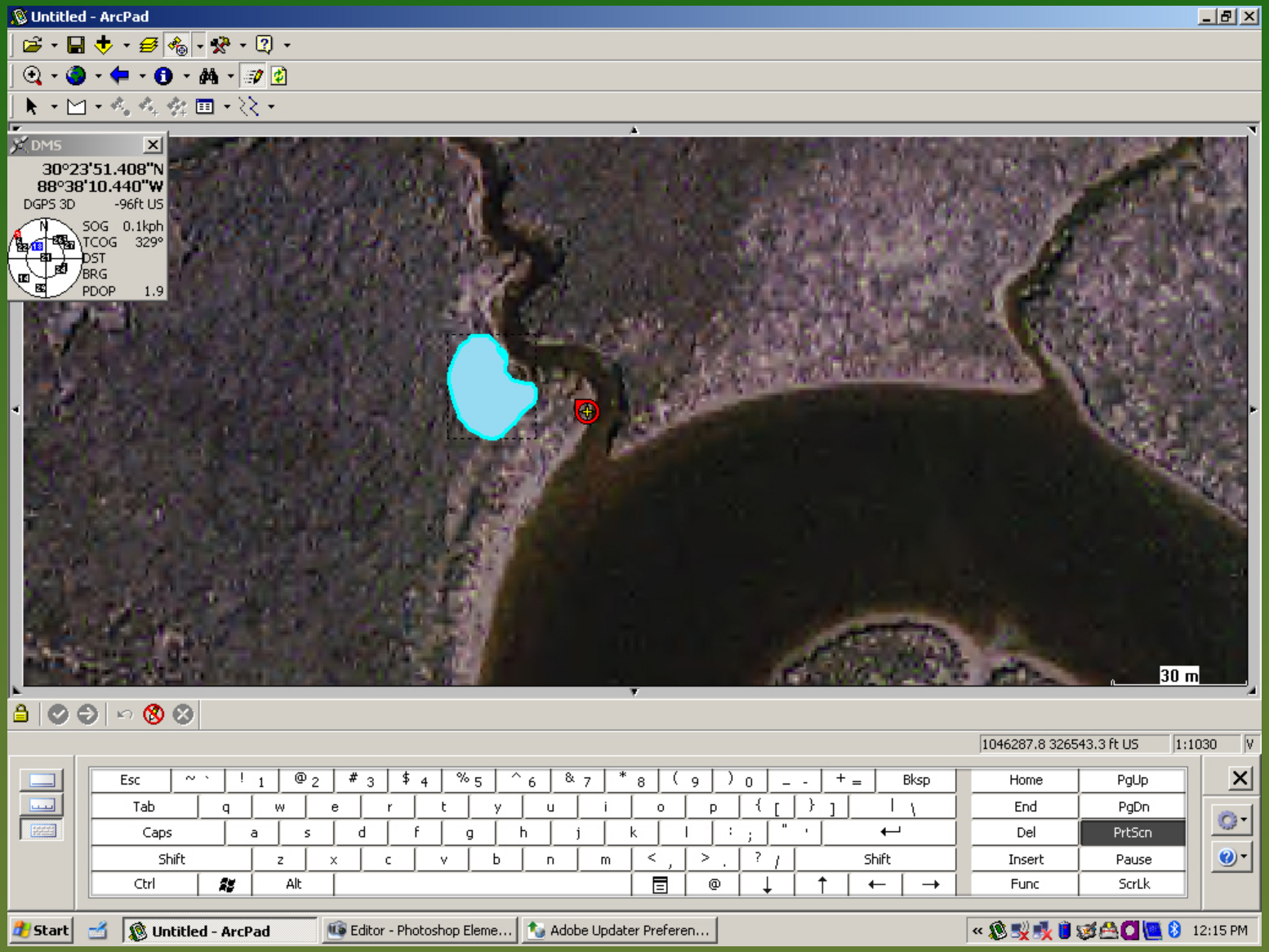
Mapping Invasive Plant Infestations

- Ruggedized Tablet PC / ArcPad 7
- Customized Data Forms Created With ArcPad Application Builder
- Trimble External GPS
- Allows for Point and Area mapping

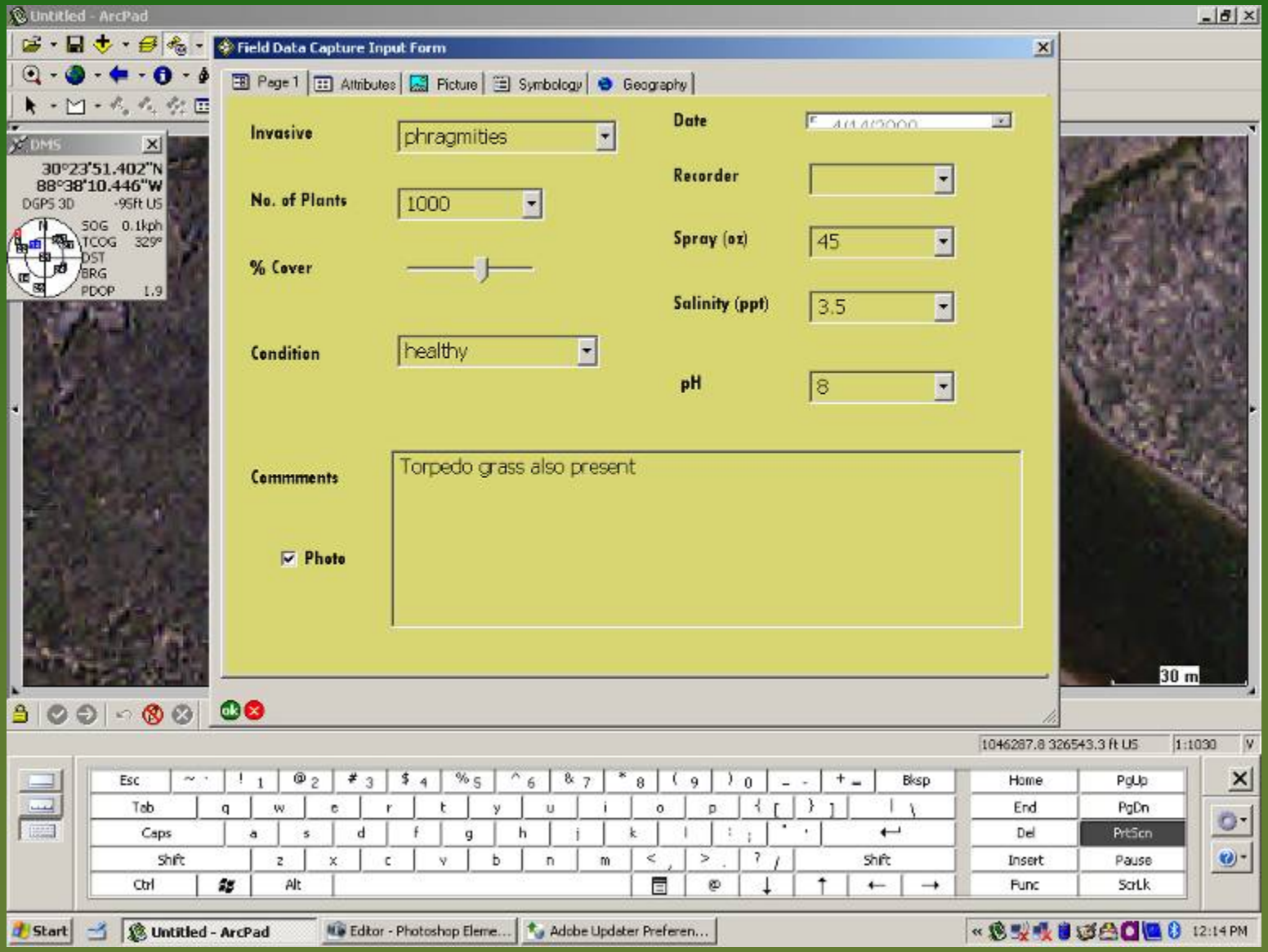
Mapping Invasive Species



Remote Mapping Possible Using Aerial Imagry



Drop-Down Menus For Efficient Data Capture



Area-Wide Surveys For Early Detection of Invasive Plants

Controlling Invasive Plants

Biological

Chemical / Physical

Bogue Houma 8/22/07 – Common Salvinia Infestation

Bogue Houma 10/16/07

Stennis Space Center – Pearl River
Before Herbicide Treatment

Stennis Space Center – Pearl River
After Herbicide Treatment

Waterhyacinth Moth - *Niphograpta albiguttalis*

Photo Credit: Gretchen L. Grammer, GBNERR

Large-Scale Experimental Farming of Salvinia Weevils

- Started in 2008
- Cooperative effort between private landowner, state agency and university
- To date, over 54 million weevils have been released
- Reduction in salvinia biomass already apparent
- Long term results

Current Giant Salvinia Control Efforts

- Known areas surveyed and sprayed every 10-14 days
- Former areas surveyed monthly
- Quarterly low-altitude aerial surveys provide a view of inaccessible areas
- All waterways in South Mississippi now being regularly surveyed for aquatic invasive species
- AIS mapping using tablet PC w/ GPS and ArcPaD 7.1 underway

Project Status – Giant Salvinia

Avoiding Spread of Invasive Plants

- **Clean radiators, screens, and equipment parts that collect seed or come into contact with soil or rhizomes**
- **Inspect all sources of off-site material such as soil, gravel, and mulch before allowing on property**
- **Establish central staging areas to allow easy inspection and monitoring of equipment and materials for the introduction of invasive species.**

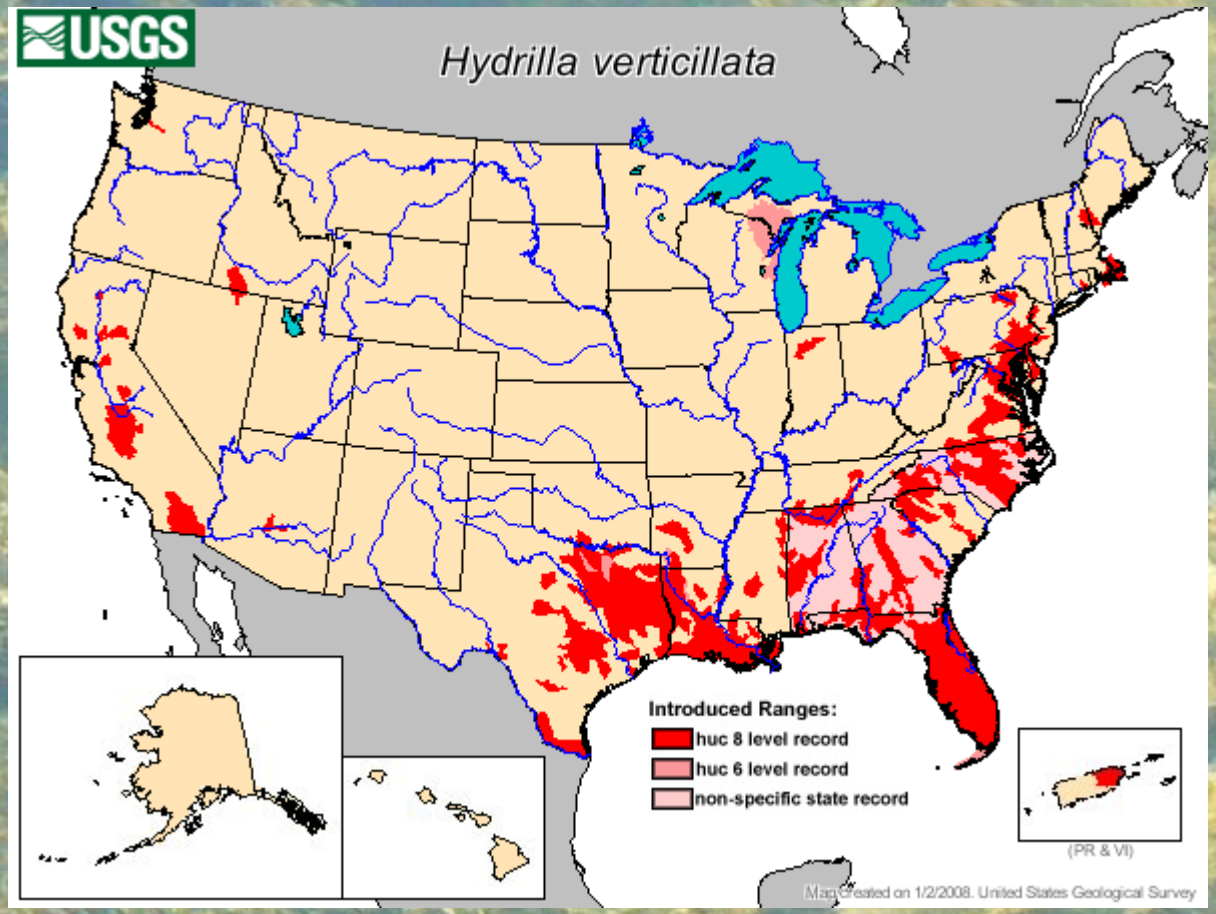
Species of Concern

- Hydrilla (*Hydrilla verticillata*)

Photo Credit: Georgia DNR

- Apple Snails (*Pomacea spp.*)

Why Not Here Yet? - Hydrilla



STOP AQUATIC HITCHHIKERS!

PROTECT NATIVE FISH HABITAT

When you leave a body of water:

- *Remove* any visible mud, plants, fish or animals before transporting equipment.
- *Eliminate* water from equipment before transporting.
- *Clean* and dry anything that comes into contact with water (boats, trailers, equipment, clothing, dogs, etc.).
- *Never* release plants, fish or animals into a body of water unless they came out of that body of water.

Have you seen this plant?

Giant salvinia, *Salvinia molesta,* is an aquatic fern prohibited in the United States by Federal law.

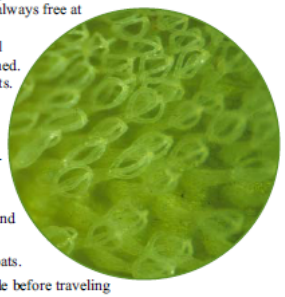
Status: Currently invading sites in Texas, Louisiana, Mississippi and Alabama; giant salvinia has the potential to infest aquatic habitats, wetlands and rice fields across the South. Native to South America, its introduction by humans caused severe economic and ecological problems in many countries, including New Zealand, Australia and South Africa.

The Problem: Giant salvinia grows rapidly to cover the surface of lakes and streams, spreading aggressively by vegetative fragments. It forms floating mats that shade and crowd out important native plants. Thick mats reduce oxygen content and degrade water quality for fish and other aquatic organisms. Mats impede boating, fishing, and swimming and clog water intakes for irrigation and electrical generation.

Characteristics: Oblong floating leaves, ½ to 1½ inches long. Young plants have smaller leaves that lie flat on the water surface. As plants mature and aggregate into mats, leaves are folded and compressed into upright chains.

Leaf surfaces have rows of cylindrical hairs topped with four branches that are joined at the tips to form a "cage" (view with hand lens). These hairs give a velvety appearance and repel water. Distinguish from common salvinia, *Salvinia minima,* which has leaf hairs with branches always free at the tips.

Underwater root-like structures conceal stalks with egg-shaped spore cases attached. Spore cases are not found on young plants.



Prevention: Plants can be carried overland on anything entering infested waters. Boaters and anglers can help prevent the spread of this species by:

1. Removing visible mud and aquatic plants from propellers, intakes, trailers, and gear before leaving the launch area.
2. Flushing out intakes on jet skis and boats.
3. Washing boats and equipment land-side before traveling to a new waterway.
4. Never releasing any plant into a body of water unless it came out of that water.

If you have seen this plant in cultivation or in the wild, please contact:

Mississippi Department of Marine Resources (if found south of Interstate 10): (228) 523-4103

Mississippi Department of Wildlife, Fisheries & Parks (if found north of Interstate 10): (601) 432-2207

FACT: **Giant salvinia may be introduced with aquarium water garden plants. It is illegal to release giant salvinia in Mississippi.**

Help protect our aquatic resources. Watch out for and report giant salvinia.

More information on the WWW at http://nas.er.usgs.gov. Click on "Plants." By: C. Jacono, U.S. Geological Survey. Photos: C. Jacono and R. Helton. Modified (with permission) by: Mississippi Department of Marine Resources, February 16, 2006.

The End