

## 2011 Mississippi Survey for Hydrilla and Giant Salvinia



A Report to the Mississippi Bureau of Plant Industry

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## Introduction

Aquatic plants are a vital component in our water bodies and aquatic ecosystems. Invasive aquatic plants pose a threat to these systems and present obstacles in these water bodies when introduced. Interruption of natural and vital ecological interactions by these species can change the properties of ecosystems, decrease water quality and property value, and limit recreational use (Madsen 2004).

Water bodies in Mississippi provide recreational opportunities, transportation, municipal and drinking supply, and wildlife habitat. The introduction of invasive plant species may impact the use of these water bodies and the ecosystem services they provide. Two non-native species of concern in Mississippi are Hydrilla [*Hydrilla verticillata* (L.f.) Royle] and giant salvinia (*Salvinia molesta* D. S. Mitchell).

Hydrilla is a submersed aquatic plant native to warmer areas of Asia and has become a serious nuisance plant in the United States (Langeland 1996). The growth habit, reproduction, and physiological properties of hydrilla allow it to out-compete more desirable plant species with respect to light acquisition, nutrient acquisition, and oxygen use. For this reason, hydrilla has the well-deserved nickname “the perfect aquatic weed”. Although both dioecious and monoecious biotypes of hydrilla exist in the United States, only the dioecious biotype occurs in Mississippi. Hydrilla can reproduce by fragmentation and through the production of turions and tubers.

Giant salvinia is a free-floating aquatic fern native to southeastern Brazil. It primarily reproduces asexually (daughter plants arising from buds on stolons) and can double in leaf number in less than 8 days (McFarland et al. 2004). Its free-floating growth form also enables giant salvinia to travel long distances during flood events, or by boat or other equipment. The rapid growth rate and vegetative spread make it an extreme nuisance and competitor in aquatic environments.

Hydrilla and giant salvinia are listed on both the Mississippi and Federal Noxious Weed Lists. In order to mitigate potential impacts by these species a statewide monitoring and management program should be implemented. Mississippi State University and the Mississippi Bureau of Plant Industry have developed a Memorandum of Agreement to survey water bodies in Mississippi for aquatic plant species listed on the State Noxious Weed List. This agreement has been renewed over the last six years to serve as part of an invasive plant monitoring program for the state. An update to the current status of hydrilla and giant salvinia occurrence in the state of Mississippi is included in the following report.

## Methodology

Surveys to detect the presence or absence of hydrilla and giant salvinia have been conducted across Mississippi since 2005. In 2011, approximately 120 new locations were surveyed for the presence of hydrilla and giant salvinia during August, September, and October. Known sites of hydrilla populations were resurveyed in the Ross Barnett Reservoir, the Tennessee Tombigbee Waterway, Wall Doxey State Park, Bluff Lake, and Loakfoma Lake. In order to focus on new sites within the state we chose not to recheck known hydrilla and giant salvinia populations in Southeastern Mississippi. This included the two known populations of giant salvinia and two eradicated populations of hydrilla (Cox & Madsen 2010). A Trimble Yuma® and Garmin etrex with Global Positioning System (GPS) capabilities were used to obtain geographic locations. All data were collected and reported in latitude and longitude using WGS 84 geographic coordinate system. Location maps with presence points were produced using ArcGIS 10.

## Hydrilla and Giant Salvinia Status

Locations at which hydrilla or giant salvinia were found in Mississippi in 2011 are indicated in Figure 1 with red or blue stars, respectively; negative locations from 2011 are indicated with a yellow circle, all past survey locations are indicated with a black dot (Figure 1).

### Hydrilla Status

#### **1- Bluff Lake**

Hydrilla was not found in Bluff Lake at Noxubee National Wildlife Refuge in 2011 (Figure 1). However, numerous topped out mats of hydrilla were observed in Bluff Lake in 2010 (Cox & Madsen 2010). If plants are still present in Bluff Lake, it is possible that they had senesced at the time of survey. A tuber bank is very likely to be present in the sediment of Bluff Lake given its extensive history of hydrilla occurrence (Robles et al. 2009). Monitoring should continue to note the status of hydrilla in Bluff Lake.

#### **2- Loakafoma Lake**

Hydrilla was not found in Loakfoma Lake at Noxubee National Wildlife Refuge in 2011 (Figure 1). Two to three hydrilla plants were found in Loakafoma Lake in 2010 at which time they were removed (Cox & Madsen 2010). Continued monitoring should occur to note any reoccurrence of hydrilla in Loakfoma Lake.

#### **3- Ross Barnett Reservoir**

Hydrilla populations were observed in the central portion of the reservoir south of MS Highway 43 and in several locations north of MS Highway 43 in 2011 (Figure 1, Table 1). These have received treatments over the last six years (Cox & Madsen 2010). Active management of hydrilla since 2005 has suppressed the populations (Wersal et al. 2009) as indicated by field observation. Most of the populations are small and somewhat scattered with very few tubers being found in the sediment since 2005. This suggests that the chemical treatments have been successful, and the scattered occurrence of hydrilla in the reservoir may be attributed to fragmentation by boat traffic and/or water movement. Management of hydrilla is currently being conducted on the reservoir by AquaServices, Inc. and distribution of the species is being monitored.

#### **4- Wall Doxey State Park**

Hydrilla was found beside the boat ramp in Spring Lake at Wall Doxey State Park in 2011 (Figure 1, Table 1). Hydrilla was found in Spring Lake in 2009 but not in 2010 (Cox, et al. 2010, Cox & Madsen 2010). Control efforts and continued monitoring should be conducted to eradicate and prevent future spread of hydrilla in Spring Lake.

#### **5- Fallen Oak Golf Course**

Fallen Oak Golf Course (FOGC) was not surveyed in 2011. Hydrilla was reported as eradicated in the lakes at FOGC in 2010 (Cox & Madsen 2010). However, continued monitoring should be done to note any reoccurrence of hydrilla in lakes at FOGC.

#### **6- Tennessee Tombigbee Waterway**

Hydrilla was found in the Tennessee Tombigbee Waterway in 2011 at numerous locations (Figure1, Table 1). These populations are not new to the TTW (Robles et al. 2008). Control efforts should be put in place to prevent the future spread of hydrilla in the TTW or into neighboring or adjoining water bodies. Monitoring should be continued to note the status of hydrilla in the TTW.

### **Giant Salvinia Status**

#### **1- Wedgeworth Creek**

Wedgeworth Creek was not surveyed in 2011 (Figure1) because giant salvinia has persisted there in past years. This site will be resurveyed in 2012. However, giant salvinia was found to be expanding in Wedgeworth Creek in Forrest County, MS in 2010 after it had been reported as eradicated in 2007 (Cox et al. 2010, Cox & Madsen 2010, Robles et al. 2008). Chemical control should be implemented as biological control efforts were deemed ineffective after the reoccurrence of giant salvinia in 2009 (Cox et al. 2010, Cox & Madsen 2010, Robles et al. 2008). Monitoring should be continued on this population.

#### **2- Pacagoula River Delta**

The Pascagoula River Delta (PRD) was not surveyed in 2011 (Figure1) because giant salvinia has persisted there in past years. This site will be resurveyed in 2012. Presence was confirmed in 2010 by the Mississippi Department of Marine Resources but was not found when surveyed by Cox and Madsen (2010). Monitoring should continue to note any changes in the status of the giant salvinia population in the PRD.

### **Conclusions and Recommendations**

Persistent hydrilla populations in the Ross Barnett Reservoir, Spring Lake, and the Tennessee Tombigbee Waterway suggest that control methods should be continued or initiated in these areas. Observed hydrilla populations at Fallen Oak, Bluff Lake, Loakfoma Lake in 2010 should continue to be monitored to record any reinfestation or spread. A management program has been implemented on the Ross Barnett Reservoir to address the hydrilla infestation.

Existing giant salvinia populations were not surveyed in 2011. However, monitoring should continue, and techniques should be implemented to control the spread of any existing populations.

### Acknowledgements

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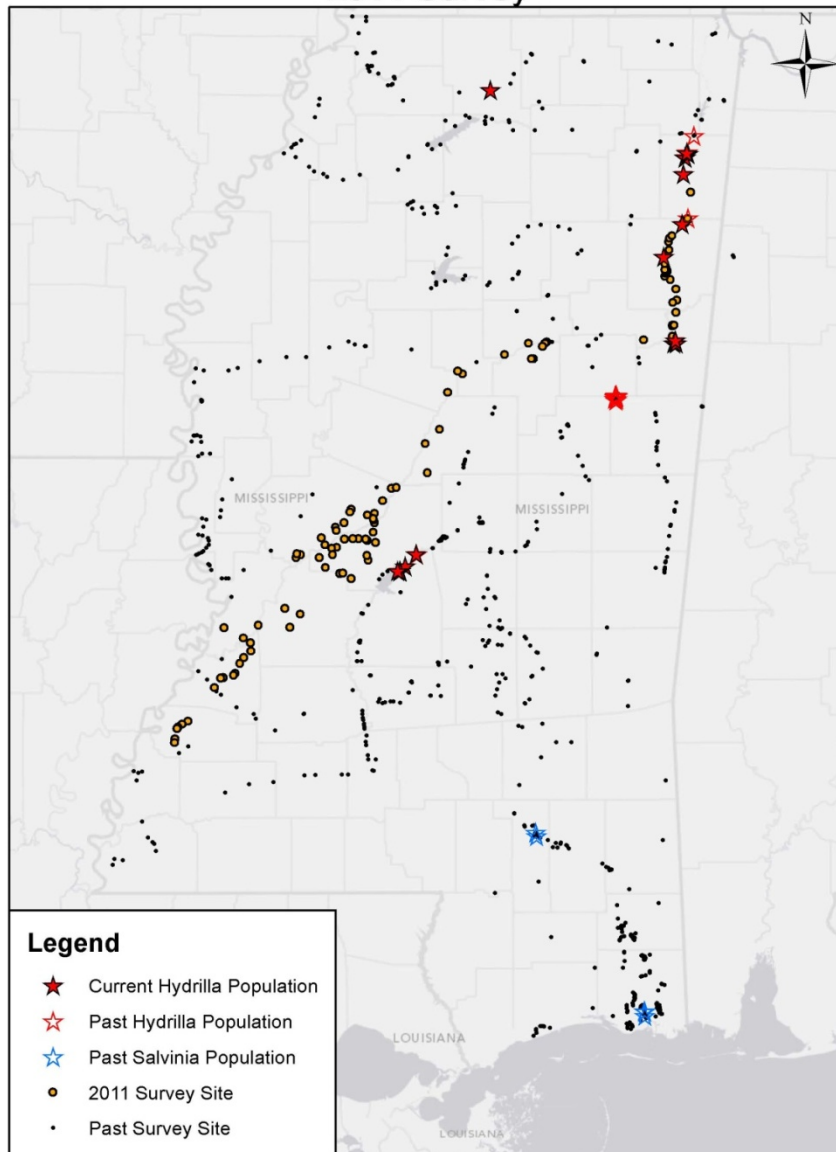
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**Table 1:** Geographic location of hydrilla in Mississippi.

| <b>Waterbody</b>       | <b>Nearest Town</b> | <b>County</b> | <b>Coverage (acres)</b> | <b>LAT</b> | <b>LONG</b> |
|------------------------|---------------------|---------------|-------------------------|------------|-------------|
| Spring Lake            | Holly Springs       | Marshall      | <1                      | 34.6643    | -89.4664    |
| Tenn-Tom Waterway      | Smithville          | Monroe        | <1                      | 34.0635    | -88.4237    |
|                        |                     |               | Fulton                  | Itawamba   | <1          |
|                        | <1                  | 34.3625       |                         |            | -88.4068    |
|                        | <1                  | 34.3616       |                         |            | -88.4070    |
|                        | <1                  | 34.3784       |                         |            | -88.3914    |
|                        | <1                  | 34.3816       |                         |            | -88.3973    |
|                        | Columbus            | Lowndes       | <1                      | 33.5252    | -88.4682    |
|                        |                     |               | <1                      | 33.5249    | -88.4545    |
|                        |                     |               | 3                       | 33.5372    | -88.4597    |
|                        | Becker              | Monroe        | <1                      | 33.9159    | -88.5247    |
| Ross Barnett Reservoir | Sandhill            | Madison       | <1                      | 32.5642    | -89.8712    |
|                        |                     |               | Sand Hill               | Rankin     | <1          |
|                        | 4                   | 32.4870       |                         |            | -89.9575    |
|                        | 4                   | 32.4861       |                         |            | -89.9579    |
|                        | 4                   | 32.4852       | -89.9582                |            |             |



## 2011 Survey



**Figure1:** All survey sites for the presence of hydrilla and giant salvinia from 2005 to 2011. Black dots are survey sites from years 2005 to 2010. Orange dots are sites surveyed in 2011. Red star outlines are survey sites where hydrilla was found in the past but not in 2011. Red stars are sites positive for hydrilla in 2011. Blue star outlines are survey sites where giant salvinia was found in the past but not in 2011.