

6/30/00

## Species Action Plan Giant Salvinia

*Salvinia molesta* D.S.Mitchell



photo by C. Jacono

**Life History/Identification:** Giant salvinia is a free-floating aquatic fern native to southeastern Brazil. It occupies quiet waters and can be expected to occupy ponds, lakes, ditches, swamps, marshes and slow moving lakes and rivers. The plant has a horizontal stem that floats just below the surface and a pair of ovate to oblong floating leaves and a highly dissected submerged leaf at each node. The leaves on immature plants lie flat on the water surface, but leaves eventually curl and reach a vertical position as the plants mature.

Mature plants form tight mats of many floating plants. The leaf surfaces have rows of papilla, which branch to form 2 to 4 hairs that rejoin to form an eggbeater shaped structure. Mature plants form many sporocarps, but the plants are functionally sterile. Giant salvinia reproduces vegetatively. One individual can form a large clone at the location it is introduced. Stems become fragmented as plants mature and new plants develop from apical and lateral buds. Individual plants can withstand low temperatures and dewatering as dormant buds. Giant salvinia has been found in water bodies in Arizona, Texas, Louisiana, Georgia, Florida, California, and Hawaii. It apparently does not tolerate freezing water but can tolerate low temperatures by dying back and becoming dormant. Giant salvinia was found in several locations in the lower Colorado River in August 1999 including the Imperial and Cibola National Wildlife Refuges.

**Status:** Giant salvinia is recognized as a federally listed noxious weed. Importing giant salvinia and transporting the plant across state lines is prohibited under federal noxious weed laws. The weed laws in individual states regulate possessing or cultivating giant salvinia within the state. Possession and cultivation of giant salvinia is illegal in some states such as California but not others. It is legal to possess and cultivate giant salvinia in Hawaii. Introduction of giant salvinia can be from sales of the plant at retail outlets or from contamination of nursery or aquarium stock.

**Impacts:** Giant salvinia impacts habitat by forming dense mats of vegetation. These mats can eliminate native submerged vegetation by blocking the sunlight as it enters the water. Native emergent vegetation such as cattails and bulrushes may be also being affected. Decaying plants, plant respiration and the lack of surface mixing decrease the available amount of dissolved oxygen for fish. The amount of water for terrestrial animals may also be affected. Terrestrial animals could walk out onto the dense mats, mistaking them for land and drown. Mats could become so dense that they would eliminate the access to water for drinking.

Recreation could be affected by the presence of giant salvinia in lakes and rivers. The presence of the plants decreases the quality of recreation experience. The plants can clog the working parts of boats resulting in mechanical failure.

Water sources for humans could be affected as well if the plants were to become established in municipal reservoirs. Decaying vegetation could cause water contamination and the devices used to extract water could become clogged with plant material, resulting in mechanical failure.

**Control:** No populations of *Salvinia molesta* are known to exist on the Coconino, Kaibab or Prescott National Forests at this time. However, with the discovery of the species in the lower Colorado River, the rapid rate at which the plant grows and its ability to reproduce vegetatively from fragments introduction of this species is possible in the lower elevations of Northern Arizona. The plant may be unable to persist in waters at higher elevations. However, caution should be used and water sources should be included in survey routes.

### **1. Cultural Control:**

**Education** is needed to prevent infestations. This species could exist in aquatic gardens and garden shop outlets within the area. In other areas the plants have been found as accidental contaminants in nursery stock. Garden shop operators and potential buyers should be informed of the risk.

**Prevention** is the most effective and economic method of control of this species. Recreationists and others utilizing water sources coming from potentially infested areas should be urged to inspect all equipment before leaving the infested area and before entering any local water source. This includes trailers and vehicles used to move boats. Giant salvinia plants can have been found on “take out” ramps at recreation areas in other states. These plants can become lodged in vehicle tires, on boats and in water held in the boat and be transported to new locations. Water from aquatic gardens, aquaria, bait buckets, and other potentially infested sources should not be dumped into open water sources.

### **2. Mechanical Control:**

*Salvinia molesta* can be removed from infested water by various mechanical methods including scooping by hand from a boat or on the shoreline. However, this process can be labor intense and there is some danger of fragmenting the plants. The plants then reproduce from these fragments. Some plants can be missed while gathering the mats from the water, especially if there is a lot of shoreline vegetation.

**3. Chemical Control:** *Noted here are chemical control techniques in use in other areas. Always check with weed specialists or chemical suppliers to ensure correct dosage and application. Mention of these products does not imply endorsement by the Northern Arizona Weed Council, San Francisco Peaks Weed Management Area, the USDA Forest Service, nor the Nature Conservancy. Currently the use of herbicides is not allowed on lands administered by the Coconino, Kaibab and Prescott National Forests. Always check with your local land manager before using herbicides on public lands.*

Giant salvinia has been treated with herbicides in other states where it occurs. The current ***Draft Environmental Assessment For Control of the Aquatic Weed, Giant Salvinia (Salvinia molesta) On Four National Wildlife Refuges On the Lower Colorado River (Arizona/California)*** includes a preferred alternative for treating part of the infestation with Diquat in combination with an adjuvant such as Kinetic. Other herbicides were considered in process but rejected. Endothal and chelated copper were dismissed from consideration because of a greater risk to fish. Fluridone was rejected because the herbicide must stay in direct contact with the plants for a longer period of time to be

effective. Glyphosate was considered but rejected because it is a systemic herbicide and might have more impact on desirable emergent vegetation.

(Note: as of 2/15/2000 the Coconino, Kaibab and Prescott National Forests do not have NEPA clearance to use herbicides. Check with local land agency offices before using herbicides on any public domain)

#### **4. Biological Control:**

A weevil, *Cyrtobagous salviniae* is currently being tested by U. S. Department of Agriculture, APHIS for use on giant salvinia.

#### **5. Integrated Control:**

The current proposal for control and eradication of giant salvinia outlined in *Draft Environmental Assessment For Control of the Aquatic Weed, Giant Salvinia (Salvinia molesta) On Four National Wildlife Refuges On the Lower Colorado River (Arizona/California)*

uses an integrated approach to controlling this weed. It recognizes the value of education in both prevention and control. Mechanical control will be used to remove plants from infested areas. Herbicides will be used for control and eradication where appropriate.



#### **References:**

Arizona Noxious Weed List, Plant Services Division, Arizona Department of Agriculture, Phoenix, AZ

Draft Environmental Assessment For Control of the Aquatic Weed, Giant Salvinia (*Salvinia molesta*) On Four National Wildlife Refuges On the Lower Colorado River (Arizona/California). December 1999. U.S. Fish and Wildlife Service, Division of Refuges, P.O. Box 1306, Albuquerque, New Mexico.

Phillips, B.G, David Lutz and Debra Crisp. 1997. Noxious Weed List for Coconino, Kaibab and Prescott National Forests. On file at Forest Supervisors Office, Coconino National Forest.

US Army Corps of Engineers, Jacksonville District, Aquatic Plant Control Section, Jacksonville, Florida *Salvinia molesta* – Possibly the Worlds Worst Weed found on website

<http://www.saj.usace.army.mil/conops/aps/Salvinia.html>

USGS Nonindigenous Aquatic Species *Salvinia molesta* D. S. Mitchell

[http://nas.er.usgs.gov/ferns/sa\\_mol.html](http://nas.er.usgs.gov/ferns/sa_mol.html)

Photos from USGS Non-indigenous Aquatic Species Website

[http://nas.er.usgs.gov/ferns/sa\\_mol.html](http://nas.er.usgs.gov/ferns/sa_mol.html)

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Moser, L; D. Crisp. San Francisco Peaks Weed Management Area fact sheet on *Salvinia molesta*.  
Coconino National Forest.