

BIOLOGICAL GIANT SALVINIA MANAGEMENT ON SMALL PONDS

DEFINITION

Management of the aquatic invasive fern, giant salvinia, using the salvinia weevil (*Cyrtobagous salviniae*) on small, privately owned, waterbodies

PURPOSE

- Reduce coverage of the giant salvinia on private ponds to manageable levels
- Restore the aquatic habitat and functionality of the treated pond
- Reduce the threat of giant salvinia spreading to nearby or downstream waterbodies
- Increase ability of native or desirable aquatic plants to thrive in the treated pond

CONDITIONS WHERE PRACTICE APPLIES

On privately owned ponds currently infested with significant levels of giant salvinia where the landowner or designee has obtained the appropriate permits from the Texas Parks and Wildlife Department for the acquisition, transport and dissemination of salvinia weevil laden giant salvinia. This practice is especially applicable where philosophical reasons or ecological considerations prevent or strongly out-weigh the use of chemical control methods.

This practice is not applicable on public waters. The Texas Parks and Wildlife Department or their designees oversee and manage invasive species on public waters. If invasive species control is needed on public waters, regional Texas Parks and Wildlife Department personnel should be contacted.

CRITERIA

General Criteria Applicable to All Purposes

Biological control of giant salvinia should be applied where complete eradication of the invasion is not practical or possible via chemical, manual, or mechanical control methods. When possible, always completely eradicate this highly invasive species.

Where eradication is not possible, apply biological control to establish a natural equilibrium between the invasive giant salvinia and its natural enemy, the salvinia weevil. This will maintain salvinia levels at low and tolerable levels and provide some salvinia plants necessary to maintain a salvinia weevil population.

Application of weevils should be made as early in the growing season as practical; typically in the first half of April. Treatments should be applied in areas of less dense

giant salvinia where plants are actively growing as this is the ideal plant type for the weevil to complete its life cycle.

In areas where the salvinia has formed dense mats, salvinia weevils can/should be applied soon after other control methods are used that temporarily reduce the giant salvinia infestation. Wait until the salvinia begins to regrow after herbicide treatments to ensure the released weevils have plants with new buds on which to feed. Actively growing salvinia increases the ability of the salvinia weevil to expand its population and enhances ultimate control effectiveness.

In all situations, giant salvinia infestations and planned control techniques should be coordinated with Texas Parks and Wildlife Department personnel, Texas A&M AgriLife Extension Service agents and Natural Resource Conservation Service at the local level. Herbicide usage in concert with biological control must adhere to guidance listed on pesticide labels, Extension Service and other pest management references related to environmental hazards and site-specific application criteria.

CONSIDERATIONS

If complete eradication of giant salvinia is possible via chemical treatment or physical removal, it should be strongly considered.

Salvinia weevils are not widely available in Texas or the rest of the U.S. Only a few facilities produce weevils in Texas and Louisiana and may have available weevils upon request. Texas Parks and Wildlife Department personnel should be able to provide contact information.

Biological giant salvinia control is not rapid. Effective control may require several years and is impacted by many factors including the infestation density, number of weevils stocked, weather conditions, water fertility and predation on the weevil population.

Giant salvinia possession and transport in Texas without proper permission from the Texas Parks and Wildlife Department is a class C misdemeanor punishable by a fine up to \$500. Rapid death and the subsequent decay of giant salvinia may cause low dissolved oxygen levels in small ponds. An aquatic habitat biologist with AgriLife Extension, NRCS or TPWD should be consulted to plan mitigation strategies for potentially adverse impacts.

PLANS AND SPECIFICATIONS

Site specific plans should be prepared for each infested waterbody. At a minimum the planning process and plan should include:

1. Notify Texas Parks and Wildlife Department personnel of the giant salvinia infestation by calling (409) 384-9965 or emailing giantosalvinia@tpwd.state.tx.us.
2. Discuss treatment options with TPWD and select the most appropriate method for the given situation.
3. If biological control is chosen, work with TPWD to secure permits to possess and transport weevil infested giant salvinia from its location of origin to the infested pond.
4. Identify a source of salvinia weevils and arrange for their acquisition and transport upon receipt of proper permitting.
5. Define the current size and extent of the problem and plan pre-treatment actions such as thinning the mat with isolated chemical treatments.
6. Define the locations and planned number of weevil release sites and the desired number of weevils to be released at each site.
7. Describe a monitoring plan that notes monitoring increments and the planned approach. At a minimum include photo documentation with scale references to enable control estimates to be made periodically. If possible, physically measure the area using a tape measure or GPS unit.

BIOLOGICAL CONTROL APPLICATION METHOD

1. Following acquisition of required permits, obtain giant salvinia infested with salvinia weevils in a container such as a plastic storage container or cooler with a secure lid. The salvinia plants will contain adults, eggs and larvae of the salvinia weevil. The rearing facility should provide an estimate of the number of adult weevils per kilogram of live salvinia plants, as determined by extracting the adults from a known weight of plants. The number of eggs and larvae are difficult to determine and not usually reported. Ensure that plant material is moist but not saturated during transport.
2. Immediately transport the infested salvinia plants to the planned release site while protecting the containers from direct sunlight and high temperatures to prevent weevil mortality. Ensure that containers are well secured to the transport vehicle.
3. Once at the release site, place plants on open water within the salvinia mat; create openings if needed, so that the weevil infested plants directly contact the water.
4. Guidelines on the number of weevils needed to establish a weevil population have not been determined. However, releases should be concentrated within a small area to be sure adults quickly find mates. For small ponds, releasing about 500-600 adults within an area of one square yard at each of 4-5 locations is a good start. A second release 2-3 weeks later can supplement the initial release. Releasing more weevils increases the chances of establishment, the rate of population growth and speed of control.

5. If feasible, mark the release site within the salvinia mat with a stake or other marker. Take post-release photos with a scale reference to document the initial conditions before the biological controls begin working.

OPERATION AND MAINTENANCE

Operation

Once weevils have been released, routinely observe the release site for evidence of plant damage. The salvinia plants at the release site should begin to turn brown 6 - 8 weeks after the weevils are released. This discoloration is a result of weevil larvae feeding within the salvinia plants. These plants will eventually break apart and sink. The area of plant damage should expand as the weevils disperse from the original release site. Take monitoring photos and measurements during these trips as planned.

Ensure that insecticides are not used in close proximity to the release area. If insecticides are planned for use nearby, ensure that any drift will not impact the release site and that any potential runoff carrying residual insecticide will not enter the treated waterbody.

Keep a log book of activity related to the treatment. Note activities such as release date and quantity of weevils released, inspection dates, estimates of damaged salvinia area, and any additional treatments with herbicides.

Maintenance

During observations, assess the stage of giant salvinia growth and determine if salvinia plants are scattered or if the plants have formed a continuous and dense mat. Plants within a dense mat produce few buds on which the weevil feeds. Thinning the mat with a targeted herbicide will break up the mat, allowing the salvinia to resume growth and provide buds for the weevil population to feed, increase in numbers and eventually reduce the salvinia infestation.

REFERENCES

- Knutson, A., Nachtrieb, J., et al. 2012. "A guide to mass rearing the salvinia weevil for biological control of giant salvinia." Texas A&M AgriLife Extension. Special Publication. ESP-475. List web site for this publication since its on-line only
- Oosterhout, E. van. 2006. Salvinia Control Manual. New South Wales Department of Primary Industries. Australia. bookshop@dpi.nsw.gov.au