

**Texas AgriLife Extension Service
Texas Water Resources Institute**

Quarterly Progress Report

**Water Quality at Caddo Lake
Center for Invasive Species Eradication: Caddo Lake Giant Salvinia Eradication Project
USDA NRCS Agreement #: 68-7442-10-499**

Quarter No. 2 From: 10.1.2010 Through: 12.31.2010

Abstract:

The **Center for Invasive Species Eradication** (CISE) was fully established this quarter and is now operational. The focus of the Center is primarily on controlling invasive plant species in Texas. The Caddo Lake Giant Salvinia Eradication Project is the initial project being run through the Center and will focus on eradicating giant salvinia in Caddo Lake, evaluating new or improvements to methods to kill giant salvinia, expanding the public knowledge about giant salvinia and developing prescriptions for cost-effectively treating this noxious species.

Work this quarter has focused on establishing the weevil rearing facility at Caddo Lake National Wildlife Refuge (NWR). Above ground tanks and greenhouses were constructed to grow giant salvinia and salvinia weevils for release on Caddo Lake and research purposes. Research activities currently underway include evaluations on the ability of the salvinia weevil to tolerate cold air and water temperatures. Planning is in full swing for activities to occur during the 2011 growing season. Expanding the presence of information on the web and in social media outlets has also taken off this quarter. Coordination meetings are also in the works and will further the information transfer between agencies at the local, state and national level.

Overall Progress and Results by Task:

Task 1. Project Administration: Texas Water Resources Institute

***Subtask 1.1:** Establish a Center for Invasive Species Eradication at Texas A&M University under the administrative leadership of Texas AgriLife Research and Texas AgriLife Extension Service to utilize funds provided through USDA Natural Resources Conservation Service to focus research and Extension educational programs on controlling invasive plant species.*

This action has been completed and the Center for Invasive Species Eradication is fully operational with personnel at TWRI handling day to day management activities.

Task 100% Complete

Subtask 1.2: Provide fiscal oversight of funds, make funds allocations to scientists and Extension personnel, establish contracts and subcontracts as necessary, perform accounting functions

Fiscal management is being carried out by TWRI personnel. Budgets and planned expenditures are continually being monitored to ensure that expenses are within the scope of the project and within the available budget.

Task 20% Complete

Subtask 1.3: Facilitate project and program discussions between AgriLife Research and Extension administration and NRCS administrative personnel to ensure that programmatic goals and objectives are met in a timely manner through this project

Work toward this task is carried out as needed. As the project is in its beginning stages, limited progress has been made on this task to date.

Task 10% Complete

Task 2. Project Coordination: Texas Water Resources Institute and other Agencies

Subtask 2.1: Coordinate and facilitate meetings among project personnel to ensure research focus, maximum collaboration, educational programs and transfer of information

Several meetings have been held amongst project personnel both in person and via conference call to discuss the focus of project research, demonstration and education.

Task 20% Complete

Subtask 2.2: Work with groups currently engaged in controlling Giant Salvinia and other invasive species to foster collaboration and information transfer on the state of the science in controlling Giant Salvinia. These groups include those participating in the Interagency Giant Salvinia Control Team, including the Caddo Lake Institute, Cypress Valley Navigation District, East Texas Baptist University, Northeast Texas Municipal Water District, Northwestern State University, Louisiana Dept. of Fish and Wildlife, Louisiana State University, Texas AgriLife Research, Texas AgriLife Extension Service, Texas Parks and Wildlife Dept., USDA Agricultural Research Service, Animal & Plant Health Inspection Service, Natural Resource Conservation Service, US Army Corps of Engineers, Engineer Research & Development Center and Lewisville Aquatic Ecosystem Research Facility, and US Fish and Wildlife Service

Project personnel have been in contact with numerous personnel from the majority of the agencies/entities listed above. Further collaboration is being planned through the continuation of the Inter-Agency Giant Salvinia Control Team. CISE personnel requested

a re-convening of the group at Caddo Lake NWR and will highlight the actions and future plans of the Caddo Lake Giant Salvinia Eradication Project.

Task 20% Complete

Subtask 2.3: *Work with project personnel to meet reporting requirements and to produce effective project publications*

Work on this task has been delayed. Educational publications will be developed when sufficient information has been gleaned to produce new publications. This quarterly report was submitted 2 weeks late due to project manager oversight.

Task 15% Complete

Task 3. Chemical Treatment and Evaluation: Texas AgriLife Research and Extension

Subtask 3.1: *Researchers and Extension Specialists will work with others to establish chemical treatment research and demonstration sites to the extent possible at Caddo Lake for Giant Salvinia control. (Killing Giant Salvinia at Caddo Lake is the primary focus; as such, demonstrations at private or isolated locations may be required for research demonstrations of chemical treatment combinations)*

Planning is ongoing for on-lake chemical demonstrations during the 2011 growing season. Planning is also underway to collaborate with USACE's Lewisville Aquatic Ecosystem Research Facility (LAERF) in conducting small-scale chemical evaluations.

Task 20% Complete

Subtask 3.2: *Test and evaluate chemical treatment practice alternatives for controlling Giant Salvinia at Caddo Lake using a variety of chemicals, surfactants, and combinations at various concentrations and timings (This may include contracting with local or private chemical applicators to chemically treat Caddo Lake)*

Plans are being made for this task to be carried out beginning in the 2011 growing season. No further activity to report at this time.

Task 5% Complete

Subtask 3.3: *Evaluate the efficacy and cost effectiveness information of each treatment scenario*

No activity to report at this time.

Task 0% Complete

Subtask 3.4: Work with personnel in Task 4 to evaluate the efficacy of utilizing chemical treatments in concert with biological control

No activity to report at this time.

Task 0% Complete

Task 4. Biological Treatment and Evaluation: Texas AgriLife Research and Extension

Subtask 4.1: Collaborate with other agencies and groups to setup new studies and cooperate in ongoing research and Extension educational programs dealing with biological strategies for controlling Giant Salvinia at Caddo Lake; practices which can be utilized for public and private lands statewide (If needed, research and demonstration sites away from Caddo Lake will be utilized as quickly killing Giant Salvinia at Caddo Lake is the priority)

AgriLife Extension is leading the efforts in researching the salvinia weevil. Extension has worked closely with personnel at LAERF, USDA ARS, LSU Ag Center, TPWD and others to glean as much information as possible on salvinia weevils. Current research efforts are evaluating the ability of salvinia weevil to tolerate cold temperatures.

Task 20% Complete

Subtask 4.2: Work with TPWD and local Caddo Lake agencies, organizations and individuals to enhance weevil rearing capabilities for use at Caddo Lake (This may include contracting with local or private entities to expedite the delivery of weevils to infected areas)

The Caddo Lake Institute, TPWD, TWRI and local volunteers worked very closely to establish a weevil rearing facility at the Caddo Lake NWR. The facility was completed in November with the completion of 2 greenhouses that cover 4 weevil rearing tanks. This facility will enhance the number of weevils available for release on Caddo Lake in the 2011 growing season and beyond.

Task 75% Complete

Subtask 4.3: Coordinate with USACE's Lewisville Aquatic Ecosystem Research Facility to collaborate in ongoing efforts, transfer knowledge and expand their operations

AgriLife Extension personnel maintain routine contact with LAERF personnel regarding weevil rearing and release methodologies.

Task 20% Complete

Subtask 4.4: Evaluate improved methods of rearing weevils, harvesting weevils, delivering weevils to infested areas in Caddo Lake and various timing options of weevil applications in Caddo Lake to determine the most effective biological treatment scenarios to employ to the extent possible; as indicated earlier, killing Giant Salvinia at Caddo Lake may result in the need for research demonstration sites in the vicinity of Caddo Lake.

Work on this task is just beginning. Research efforts to evaluate enhancements to current weevil rearing methodologies are being planned for the 2011 growing season.

Task 10% Complete

Subtask 4.5: Assess practice efficacy and cost effectiveness of utilizing weevils in the control of Giant Salvinia

No activity to report at this time.

Task 0% Complete

Subtask 4.6: Use information gleaned from demonstration sites to develop biological treatment recommendations and guidelines for use of weevils to treat Giant Salvinia in infested areas

No activity to report at this time.

Task 0% Complete

Subtask 4.7: Work with personnel in Task 3 to evaluate the efficacy of utilizing chemical treatments in concert with biological control

Planning is under way to evaluate this methodology in the coming growing season.

Task 5% Complete

Task 5. Other Treatment: All involved agencies

Subtask 5.1: Work with federal, state and local agencies as well as local entities and individuals to evaluate the feasibility, efficacy and cost effectiveness of utilizing other treatment options (hydrological, mechanical, others) for controlling Giant Salvinia

Project personnel are conducting a literature review to see what 'other' methods of control have been utilized and if they have proven effective.

Task 5% Complete

Subtask 5.2: *Convert feasible options into treatment practice descriptions to include in recommended treatment strategies and guidelines*

No activity to report at this time.

Task 0% Complete

Subtask 5.3: *Develop treatment prescriptions suitable for inclusion in NRCS FOTGs, Extension printed materials and other guides for treating Giant Salvinia; these will take the form of job sheets, fact sheets, supplements to conservation practice standards and technical brochures.*

No activity to report at this time.

Task 0% Complete

Task 6. Education and Outreach: Texas AgriLife Extension Service and Texas Water Resources Institute

Subtask 6.1: *Extension and TWRI will work with TPWD and other agencies to enhance existing outreach and education efforts through the use of news releases, TV spots, demonstrations, and other communications focused on prevention of spread and control methods for Giant Salvinia*

Several newspaper articles have been written about the efforts being undertaken through this program. Project fact sheets have been developed, TPWD produced videos are being promoted and other outreach items are in the works. A blog and facebook page have also been developed to provide additional avenues for reaching the general public and educating them on giant salvinia. Signage has also been established at the salvinia weevil rearing facility at Caddo Lake NWR describing the need to address giant salvinia infestations and how bio-control can be used as a tool to do so.

Task 20% Complete

Subtask 6.2: *Identify and secure partnerships with local, state, regional and national organizations (ex: B.A.S.S., fishing and hunting guides, cities, water sports manufacturers, Ranger Boats, Evinrude, Mercury, others) to expand the dissemination of educational materials on Giant Salvinia*

Contacts were made with the Fly Fishing Federation and options are being explored for partnering with them to further expand the knowledge of giant salvinia and its control. Additional contacts will be made in the future.

Task 10% Complete

Subtask 6.3: Develop and host CISE website for invasive species eradication information and as an outlet for information dissemination

Website development is now complete and provides links to numerous information outlets. Content is continually being added to the site and links are also provided to the blog and facebook page as well.

CISE Web address: <http://cise.tamu.edu/>

Project Web address: <http://cise.tamu.edu/caddo>

Blog address: <http://caddosalvinia.blogspot.com/>

Facebook: search "Caddo Lake Salvinia"

Task 75% Complete

Subtask 6.4: Facilitate education and outreach efforts and support media relations

Plans are being made for 2 project specific meetings this spring that will enhance existing information transfer to the public. Project personnel are also actively involved in attending local meetings of various organizations to expand the distribution of information on project happenings, knowledge transfer and material dissemination.

Task 20% Complete

Task 7. GIS Support: Texas AgriLife Research

Subtask 7.1: Texas AgriLife Research will provide GIS support for all aspects of the project and develop maps illustrating project activities and demonstration locations

No activity to report at this time.

Task 0% Complete

Task 8. Include Treatment Scenarios in Agency Guidelines: All Agencies

Subtask 8.1: Using information gleaned from this project, develop detailed strategies and practices for control of Giant Salvinia for inclusion in agency guidelines such as NRCS FOTGs, Extension bulletins and factsheets, TPWD outreach information and other agency materials for utilization in both private and public water bodies

No activity to report at this time.

Task 0% Complete

Subtask 8.2: *Work closely with NRCS and other agencies to disseminate the control practices for Giant Salvinia as appropriate*

No activity to report at this time.

Task 0% Complete

Attachments:

Photo 1: Weevil tank construction



Photo 2: Greenhouse construction



Photo 3: Completed Greenhouse



Photo 4: Sign at salvinia weevil rearing facility

cise.tamu.edu CENTER FOR INVASIVE SPECIES ERADICATION cise.tamu.edu

SALVINIA WEEVIL REARING FACILITY

Putting Biological Control to Work to "Eradicate" Giant Salvinia at Caddo Lake

What are we doing here?
Giant salvinia is being grown in four 15 ft x 48 ft tanks and inoculated with adult weevils. When weevil populations reach sufficient numbers (approximately 128 days), infested plant material and weevils will be harvested from these tanks and introduced to control giant salvinia infestations on Caddo Lake and other affected reservoirs.

Giant salvinia (*Salvinia molesta*) is a floating aquatic fern native to Brazil that grows readily in warm, slow-moving water. It can double its coverage area in as little as 7 days, forming dense mats that block sunlight, degrade water quality and displace native aquatic vegetation, fish and wildlife.

The salvinia weevil is an effective biological control agent for giant salvinia and only feeds on salvinia species, all of which are not native to the United States. Adult weevils are 3.5 to 5.2 mm long and can live up to 250 days with females producing 148 to 383 eggs in their lifetime.

Salvinia weevils feed on terminal buds of the plant, creating cavities within the plant where females lay their eggs. Larvae emerge from the eggs about 10 days later and begin eating through the terminal buds and rhizomes of the plant ultimately damaging the plant so that it dies, decays and eventually sinks to the lake's bottom.

Giant salvinia is currently present in 11 states threatening all uses of aquatic resources where found. Due to the aggressive growth of giant salvinia, people should be vigilant in their efforts to prevent the spread of this invasive species. Possession of giant salvinia is illegal and punishable by fines of up to \$500 per plant. Report giant salvinia infestations at: texasinvasives.org.

Logos: NRCS, ANR LIFE RESEARCH & EXTENSION, Texas Water Resources Institute, Caddo Lake, TEXAS, and the U.S. Fish and Wildlife Service.

The Center for Invasive Species Eradication was developed through support from Senator Ray Burris (Republican) and U.S. Department of Agriculture, Natural Resource Conservation Service. The Center is administered by Texas A&M University Research and the Texas AgriLife Extension Service and merged by the Texas Water Resources Institute. Center collaborators include the Caddo Lake Institute, Caddo National Wildlife Refuge, Texas Parks and Wildlife Department, the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service.