

**Texas A&M 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
AgriLife Contact #: 07-428530

Quarter No. 16 From: 4.01.2014 Through: 6.30.2014

Abstract:

The **Center for Invasive Species Eradication** (CISE) has continued operations this quarter but is in the process of closing out. The focus of operations this quarter has been on conducting on-lake over wintering studies. On-lake weevil population surveys showed the rapid mortality of weevils in the cold temperatures seen in late 2013 and early 2014. High water conditions and abnormal cold resulted in an estimated 95 – 98 % reduction in salvinia on the lake thus making weevil discoveries difficult.

Education and outreach continues to be a focus of the project. The Extension Assistant at Caddo Lake spoke with several groups about the project, Caddo Lake and the perils of giant salvinia this quarter along with numerous visitors who stop by the weevil rearing facility. Presentations regarding project progress were given at the Annual Aquatic Plant Management Society Meeting in Savannah, GA. The project website, Facebook page and blog were all updated as appropriate. Supported with technical guidance from the Center, a local group called Caddo Bio Control Alliance formed and has constructed an additional greenhouse on the shores of Caddo Lake and will focus primarily on weevil production.

Work on the program final report continued and the close out process has intensified as the program end date approaches.

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.

As of June 30, 2014 approximately \$890,000 has been spent on the project.

Task 99% 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.

Task complete, but communication will continue as needed throughout the project shut down period.

Task 100% 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

Numerous phone calls and in person meetings with project personnel were held this quarter to ensure timely completion of tasks and reporting requirements for the project prior to project completion.

Task complete.

Task 100% 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

Another meeting of the Inter-Agency Giant Salvinia Control Team was held in Jefferson, TX on July 17th and further facilitated the exchange of ideas and current efforts to combat giant salvinia infestations in Texas and Louisiana.

Task complete.

Task 100% Complete

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

Project final report refinement continued this quarter and is nearing completion and will be delivered to NRCS promptly. This report will effectively describe the accomplishments of the project when complete.

Task 100% 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)*

Task complete.

Task 100% 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)*

Task complete. Evaluations completed will be described in the project final report.

Task 100% Complete

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

Task complete. Evaluations completed will be described in the project final report.

Task 100% Complete

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

No new treatments were made this quarter; however, plans are in place within USACE, TPWD and Texas A&M AgriLife Extension Service to test this approach this summer.

Task complete.

Task 100% 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)*

Lab-based extended cold-thaw experiments were performed to determine the impacts of cumulative cold exposure on weevil survival. This evaluation will continue past the end of the project.

Task complete.

Task 100% 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*

Using information gleaned throughout the course of the project, the Caddo Bio Control Alliance, a new non-profit organization, has constructed a weevil rearing facility adjacent to the lake. The Extension Assistant that ran the CISE facility began managing that facility at the end of this project.

Additionally, TPWD agreed to take over operation of the CISE facility and will continue its operation into the future thus maintaining weevil production near Caddo Lake.

Task complete.

Task 100% Complete

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

Extension personnel continue to maintain routine contact with LAERF personnel regarding weevil rearing and release methods. USACE personnel at BA Steinhagen were also engaged this quarter regarding their use of salvinia weevils to control giant salvinia.

Task complete.

Task 100% 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.*

Research conducted evaluating weevil populations on the lake and winter survival studies confirmed the importance of overwintering survival in maintaining effective weevil populations at Caddo Lake. This highlights the need to be able to release as many new weevils on to the lake as early in the growing season as possible.

Proximity to the lake is critical in efforts to expand weevil production and the Caddo Biocontrol Alliance took this point into consideration in building their new weevil rearing facility.

The "Guide to Mass Rearing the Salvinia Weevil for Biological Control of Giant Salvinia" remains available online at <http://cise.tamu.edu/caddo/> and in the Texas AgriLife Extension Service Bookstore online at <https://agrilifebookstore.org/> and provides a variety of information on various weevil production strategies utilized in the U.S.

Task complete.

Task 100% Complete

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

Task complete.

Task 100% 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*

Treatment recommendations have been included in the project final report.

Task complete.

Task 100% Complete

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

No new treatments were made this quarter; however, plans are in place within USACE, TPWD and Texas A&M AgriLife Extension Service to test this approach this summer.

Task complete.

Task 100% 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*

Task complete.

Task 100% Complete

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

Treatment recommendations have been included in the draft final report.

Task 100% 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.*

The document titled "A Guide to Mass Rearing the Salvinia Weevil for Biological Control of Giant Salvinia" was completed this quarter and published online at <http://cise.tamu.edu/caddo/> and in the Texas A&M AgriLife Extension Service bookstore online at <https://agrilifebookstore.org/>

Tri-fold “The Pond Destroyers: Common and Giant Salvinia” continues to be distributed at meetings.

While not a treatment prescription, the development of the manuscript titled “Biological control of giant salvinia (*Salvinia molesta*) in a temperate region: cold tolerance and low temperature oviposition of *Cyrtobagous salviniae*” will provide critical information to scientist actively engaged in the advancement of biological control application and effectiveness globally.

Treatment prescriptions have been included in the draft final report.

Task 100% 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*

Numerous presentations and discussions have been held locally in preparation for the construction and operation of the new weevil rearing facility at Caddo Lake. Presentations continue to be made recently to local groups in the vicinity of Caddo Lake including local chapters of Master Gardeners, Master Naturalists, and the Natural Plant Society.

Newspaper articles, Facebook posts and blog posts continue to be published highlighting the giant salvinia problem at Caddo Lake, CISE efforts and other partner efforts. Progress made by the weevils has also been documented through online outlets and a newspaper article is also in the works.

A series of 3 videos describing the collaborations that have taken place through the CISE program, the local support for biological control, findings to date and future direction of biological control research. These videos can be found on the Caddo Lake Salvinia Eradication Blog (<http://caddosalvinia.blogspot.com/>) and YouTube (<http://www.youtube.com/watch?v=eL34JLKXHqM>).

Task 100% 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*

The Caddo Bio Control Alliance formed as a local non-profit group and an off-shoot of the CISE program. This group built a greenhouse to produce more weevils at Caddo Lake. This effort will widely spread the word about giant salvinia as it is collocated with a local marina on the banks of Caddo.

The CISE team also worked with TPWD to continue operation of the weevil rearing facility at the Caddo Lake National Wildlife Refuge.

Task 100% Complete

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

Website development is complete and provides links to numerous information outlets. Content is continually being added to the site. In addition, a Facebook page and online blog are updated as new information is ready to be presented. All pages are advertised to the public when the opportunity is available.

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

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

Project blog: <http://caddosalvinia.blogspot.com/>

Facebook page: link can be found on the above blog.

All project documents will be posted to this website once completed.

Task 100% Complete

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

Numerous presentations and discussions have been held locally in preparation for the construction and operation of the new weevil rearing facility at Caddo Lake. Presentations continue to be made recently to local groups in the vicinity of Caddo Lake including local chapters of Master Gardeners, Master Naturalists, and the Natural Plant Society.

Technical presentations were made regarding research and accomplishments at the Annual Aquatic Plant Management Society meeting held in Savannah, GA on July 13 – 16.

Task 100% 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*

Task complete.

Task 100% 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*

The “Guide to Mass-Rearing Salvinia Weevils for Biological Control of Salvinia” provides a complete current state of knowledge for raising salvinia weevils under different scenarios. This document was published as an AgriLife Extension Electronic Special Publication and is available on the project website and the AgriLife Bookstore at: agrilifebookstore.org/

Other treatment recommendations are included in the draft final report.

Task 100% Complete

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

“The Pond Destroyers: Common and Giant Salvinia” continues to be distributed at Extension meetings.

Copies of “Aquatic Vegetation Identification Cards,” Texas A&M AgriLife Extension Service publication B-6095 have been distributed to expand general knowledge on the ID and treatment of giant salvinia and other aquatic plants present in Texas.

The “Guide to Mass-Rearing Salvinia Weevils for Biological Control of Salvinia” provides a complete current state of knowledge for raising salvinia weevils under different scenarios. This document was published as an AgriLife Extension Electronic Special Publication and is available on the project website and the AgriLife Bookstore at: agrilifebookstore.org/

All project publications are available on the project website at <http://cise.tamu.edu/caddo/>

Task 100% Complete

Planned Activities for Next Quarter:

Close out project. Contract ends on July 27, 2014.