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. 10 From: 10.01.2012 Through: 12.31.2012

Abstract:

The **Center for Invasive Species Eradication** (CISE) has continued operations this quarter. The focus of operations this quarter has been on continued execution of laboratory based evaluations of cold tolerance of the salvinia weevil and to determine the minimum temperature at which different weevil populations begin to reproduce. Efforts to obtain weevils from south America were also initiated in hopes of identifying weevils that can reproduce at lower temperatures.

Making several improvements to the weevil rearing facility at Caddo Lake NWR was also carried out this quarter. Permanent end walls were added to the green house and a reverse osmosis water filtration system was incorporated into the set up.

Education and outreach continues to be a focus of the project. The document entitled "A Guide to Mass Rearing the Salvinia Weevil for Biological Control of Giant Salvinia" was published this quarter and is being distributed electronically. Additionally, information on giant salvinia control continues to be distributed via Texas A&M AgriLife Extension Service programming.

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 August 31, 2012 a total of $493,813 has been spent on the project. Another $86,464 is currently encumbered and will be spent this fiscal year.

Task 75% 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 for this task has continued.

Task 80% 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*

Coordination and communication amongst project personnel has continued this quarter with the focus being on continued weevil rearing at Caddo Lake NWR, the need to expand research on cold tolerance of weevils and their genetic adaptations, applying chemical and biological controls simultaneously and securing additional funding to continue needed research efforts.

Task 83% 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

A meeting of the Interagency Giant Salvinia Control Team was held October 14th in Karnack and brought numerous parties representing Louisiana, Texas, and federal government interests together to discuss giant salvinia management and recent advances.

Task 83% Complete

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

The document titled "A Guide to Mass Rearing the Salvinia Weevil for Biological Control of Giant Salvinia" was completed published online. The document can be downloaded at: http://cise.tamu.edu/caddo/

Task 80% 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)*

No new activity to report this quarter.

Task 40% 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)*

Data from the second series of small-scale chemical trials were assessed and treatments for on-lake demonstrations have been selected based on these data. The selected treatments will be applied on-lake during the coming growing season.

Task 83% Complete

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

Preliminary cost analysis was conducted this quarter based on small-scale treatments. Additional work will be conducted in association with the on-lake demonstrations conducted in the coming growing season.

Task 30% Complete

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

Lab based evaluations on chemical and surfactant toxicity continued this quarter with promising results. As compared to the control weevil population, no significant differences in mortality were observed in weevils treated with chemical and/or surfactants.

Small scale evaluations to assess the weevil's ability to move from dying plant material to living plant material following a chemical treatment were continued this quarter. Results indicated that weevils do have the ability to migrate to healthy plants.

A large scale demonstration of this concept is being planned for next growing season.

Task 75% 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)*

Experiments on cold tolerance of populations of salvinia weevil from Florida, Louisiana, Texas and Australia continued this quarter. Results indicate significant difference in the ability of weevils from different regions to recover from exposure to cold temperatures.

Additional studies are underway to determine the minimum temperature at which different weevil populations begin to oviposit as this threshold determines when weevils can begin to reproduce in the spring and could influence their success as biological control agents.

Task 87% 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*

More permanent end walls were added to the weevil rearing facility at Caddo Lake NWR this quarter to facilitate a more controlled environment during the winter months.

A reverse osmosis (RO) water filtering system was secured and installed this quarter at the weevil rearing facility and will mitigate water quality concerns at the site.

Task 95% 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. USACE-LAERF personnel provided significant guidance in the development of the "Guide to Mass-Rearing Salvinia Weevils for Biological Control of Salvinia."

Task 87% 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.*

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

Weevil density studies conducted on Caddo and B.A. Steinhagen Lakes has revealed that building weevil populations earlier in the growing season is best. As a result, it is ideal to maintain an on-lake population and supplement it with additional reared weevils as early in the growing season as possible to increase weevil density. The time of the year, or temperature, at which salvinia weevils begin to lay eggs has proven critical to achieving this goal. As a result, efforts were initiated to secure weevils from high altitudes in south America and evaluate their ability to lay eggs at colder temperatures as compared to weevils currently at Caddo Lake.

Task 92% Complete

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

An initial cost assessment for producing weevils as a biological control of giant salvinia has been completed and is included in "A Guide to Mass Rearing the Salvinia Weevil for Biological Control of Giant Salvinia." Further assessment will be summarized toward the end of the project in a formal report.

No new activity to report.

Task 40% 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*

Information included in "A Guide to Mass Rearing the Salvinia Weevil for Biological Control of Giant Salvinia" briefly discusses these biological treatment recommendations. More work will be conducted on this in the coming quarters.

No new activity to report.

Task 15% Complete

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

Lab based evaluations on chemical and surfactant toxicity continued this quarter with promising results. As compared to the control weevil population, no significant differences in mortality were observed in weevils treated with chemical and/or surfactants.

Small scale evaluations to assess the weevil's ability to move from dying plant material to living plant material following a chemical treatment were continued this quarter. Results indicated that weevils do have the ability to migrate to healthy plants.

A large scale demonstration of this concept is being planned for next growing season.

Task 75% 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*

Other treatment options were briefly discussed at the Inter-Agency Giant Salvinia Control Team meeting in Karnack. The consensus was that other control options available are just not feasible.

No additional evaluations are expected to occur. This task is considered complete.

Task 100% Complete

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

No new activity to report this quarter.

Task 30% 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 Extension meetings.

Task 75% 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*

A student presentation on a predictive model that can be used to assess invasive species threats to the state of Texas was delivered at Texas Aquatic Plant Management Society.

Extension personnel continued to deliver education and outreach material to the public during the quarter.

Task 83% 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*

No new activity to report this quarter.

Task 20% 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.

Task 95% Complete

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

No new activity to report this quarter.

Task 75% 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*

CISE project personnel continue to document treatment and research activities using GIS when needed.

Task 75% 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" was completed this quarter. This document provides a complete current state of knowledge for raising salvinia weevils under different scenarios. This document will be published as an AgriLife Extension Electronic Special Publication.

Task 60% 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.

Task 70% Complete

Planned Activities for Next Quarter:

- continue cold tolerance studies in the lab
- distribute the "Guide to Mass-Rearing Salvinia Weevils for Biological Control of Salvinia" via online avenues
- continue to monitor weevil release sites and release additional weevils as they are available
- continue efforts to obtain weevils from south America for temperature threshold evaluations

Attachments:

- new end walls at the weevil rearing facility at Caddo Lake NWR.