



# Biological Control of Alligatorweed Annual Report 2020

US Army Corps of Engineers, Invasive Species Management

Jacksonville District



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# INTRODUCTION

## What is alligator weed? (*Alternanthera philoxeroides*)

- ➔ Invasive aquatic plant native to South America.
- ➔ Introduced to the US in 1884, and by 1963 an estimated 162,400 acres of water throughout the US were infested
- ➔ Forms thick mats on the surface of the water which:
  - Inhibit water flow
  - Pose a threat to navigation and recreation
  - Displace native plants



## History of the Alligator weed Biocontrol Project

In 1959, the US Department of Agriculture (USDA) partnered with the US Army Corps of Engineers (USACE) to begin using biological control to manage alligator weed. *Agasicles hygrophila*, the alligator weed flea beetle, was first released in the United States in 1964, and has now become established in lakes and rivers throughout Florida. However, because the alligator weed flea beetle cannot survive the winter of other southeastern states, many other bodies of water throughout the southeastern United States still struggle with the management of alligator weed. Because of this, USACE's Jacksonville District has conducted annual flea beetle collections since 1982 in order to distribute biological control throughout the southeastern United States. Alligator weed flea beetles are shipped annually to state and federal government agencies to be released onto properties that require management of this invasive weed.

In 2020, the Invasive Species Management Branch (ISM) at the Jacksonville District collected approximately 33,000 beetles for shipment to 9 different agencies among 6 states.



# 2020 COLLECTION SITES

## Astor - Lakes Woodruff & Dexter

Lakes Woodruff and Dexter are located in north central Florida, about 25 miles west of Daytona Beach. These lakes are jointly managed, but the main governing body is the US Fish and Wildlife Service (FWS). USACE's small craft operators (SCO) that are based out of Palatka manage aquatic vegetation in these two lakes, and most other locations along the St Johns River. The lakes' edges and connecting tributaries are characterized by shallow freshwater marsh habitat, with 2-5 acre mats of alligator weed scattered throughout. Paths taken are outlined in white below.

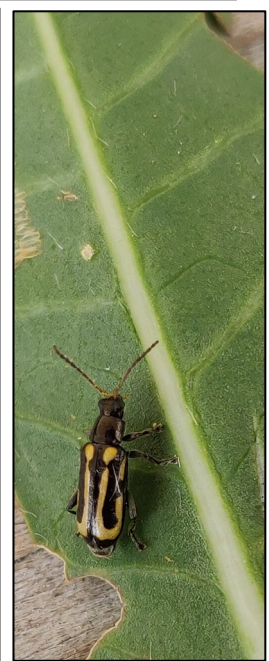


Figure 1. Panoramic view of large alligatorweed mat on Lake Woodruff. Biologist Joshua Bauer and small craft operator (SCO) Bruce Squires collect flea beetles.

# THE COLLECTION

April 6 - 7, 2020

- April 6 - 5 Boats (All USACE, 1 Volunteer)
  - 3 boats in Lake Woodruff, 2 boats in Lake Dexter
  - Rained out upon arrival, only collected ~800 beetles total the first day.
- April 7 - 5 Boats (All USACE, 1 Volunteer)
  - 3 boats in Lake Woodruff, 2 boats in Lake Dexter. (31,000 beetles collected)
- April 22 - 1 boat (an extra day was added on for a late requester. 1,500 beetles collected)
  - 1 boat in Lake Woodruff

Each day, boats were on the water at 10:30am. It is best to wait until the sun comes out and the dew dries off the alligator weed mats so that the insects will fly up off of the plants as sweep netting occurs. It also prevents unnecessarily damp and heavy nets while working. Each boat consisted of two ISM employees (one to drive the boat, and one to sweep net). The driver idles in rows through the alligator weed mats as the netter constantly sweeps just above the tops of the alligator weed. Once the net is full of insects, it is emptied into a Styrofoam cup and stored in a cooler to be sorted back at the office. All non-target insects and plants must be removed (**especially *Salvinia minima* and other local invasive species**). April 6<sup>th</sup> turned out to be a rainy day, and barely any insects were collected (see bottom middle photo). However, April 7<sup>th</sup> made up for the weather, and about 31,000 beetles were collected. Clouds of insects were flying up in front of the sweep netters. According to Angie Huebner and Tim Harris, 170 cups have never been collected that quickly in one day before.



Figure 2. SCO Mark Haltiwanger and Sean Moore collect beetles.



Figure 4. SCO Terry Driggers and Biologist Chelsea Bohaty out on Lake Woodruff.



Figure 3. (left) SCOs Harry Beatty and Bruce Squires wait with Biologist Joshua Bauer and volunteer Samantha Lynch as rain clouds close in above Lake Woodruff. (right) Cooler full of insect cups ready for sorting.



## Shipment & Numbers

In 2020, the Invasive Species Management Branch (ISM) at the Jacksonville District collected approximately 33,000 beetles for shipment to 9 different agencies among 6 states (shown below in light grey). The number of recipients was decreased in 2020 due to limitations caused by COVID-19.

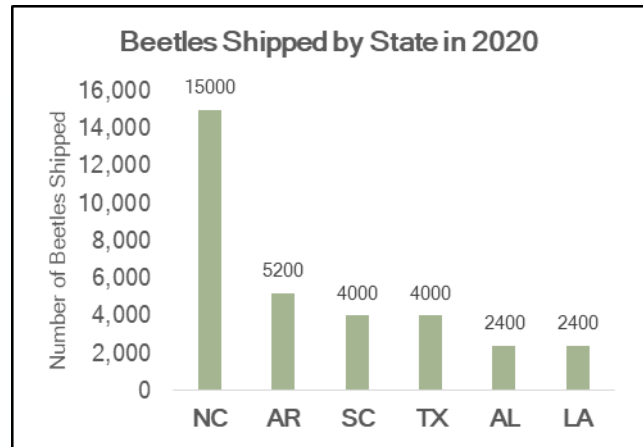
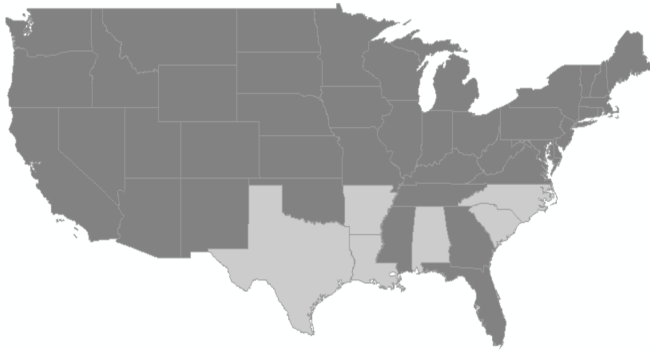


Figure 5. Beetles were shipped to 6 different states in 2020, with the highest number of beetles going to North Carolina.

Before the beetles are shipped, meticulous sorting takes place to ensure non-target plants and insects are not shipped with the flea beetles. All non-target insects, plants and alligator weed stems and flowers are removed, leaving only flea beetle adults and larvae with alligator weed leaves for food. Beetles are shipped in Styrofoam cups (~200 insects per cup) and packed into Styrofoam coolers on ice, with newspaper for insulation.

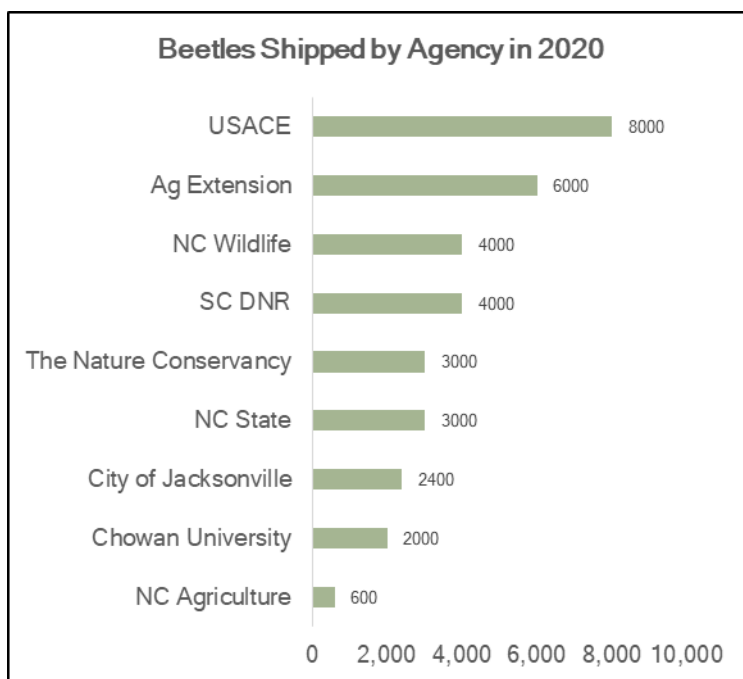


Figure 6. Beetles were shipped to 9 different agencies, with the highest number of beetles shipping within USACE. The images on the right show finished boxes waiting to be shipped, and a clean cup of flea beetles.

# BETTER RELEASE HIGHLIGHTS

## North Carolina

About 3,000 beetles were sent to North Carolina's Three Sisters Swamp in 2020. Upon receiving the beetles, land manager Michelle Ly excitedly reported how helpful they were in preserving an ecologically important marsh area, specifically that which contains some of the oldest cypress trees in the nation. By controlling the invasive alligator weed, ecologically important native vegetation is encouraged to thrive. The Nature Conservancy of North Carolina highlighted the flea beetle release on their instagram (@tnc\_nc), reaching their 20,000+ followers.



Figure 7. TNC's Land Manager Michelle Ly releases flea beetles into a mat of alligatorweed in Three Sister's Swamp.

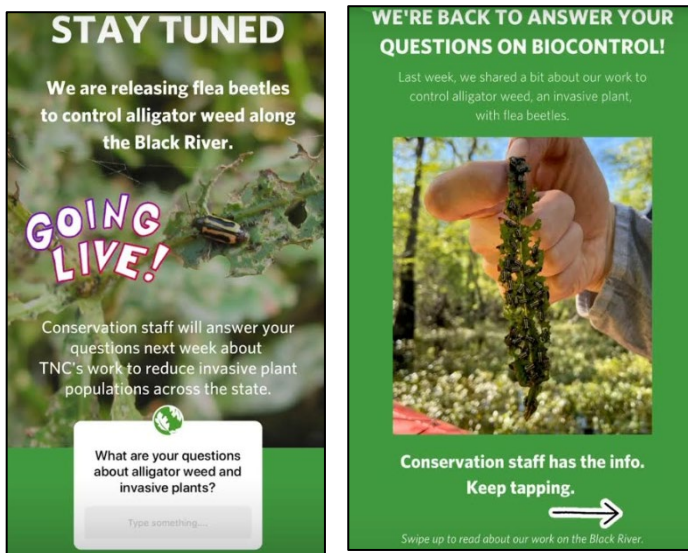


Figure 8. The Nature Conservancy's instagram page highlighted the release of flea beetles into Three Sister's swamp, using it as an opportunity for education and outreach.

# FUTURE PLANS & GOALS

→ Education and Outreach

- Bohaty plans to collaborate with University of Florida and/ or the Engineering Research and Development Center (ERDC) in Vicksburg to develop educational materials to spread the word about the Jacksonville District's Flea Beetle Program.

→ Engineering Research and Development Center (ERDC) Collaboration

- Bohaty and Nathan Harms plan to collaboratively prepare an analysis of alligator weed biocontrol efficacy, using citizen science as a framework for data collection.
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## Contact Information

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