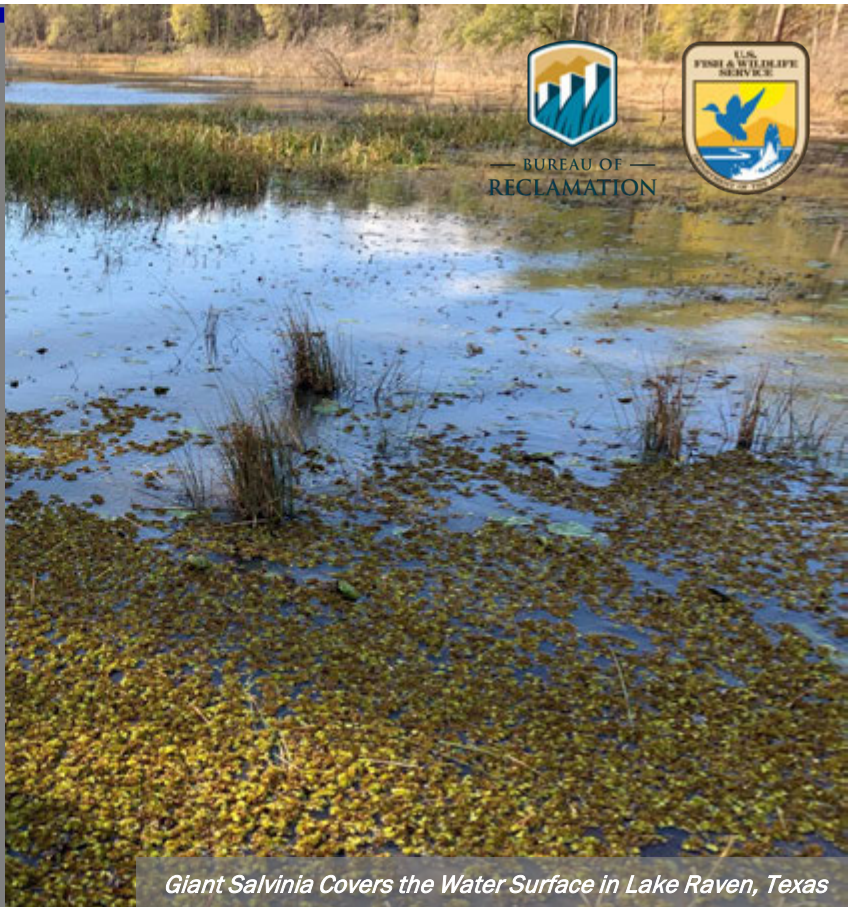
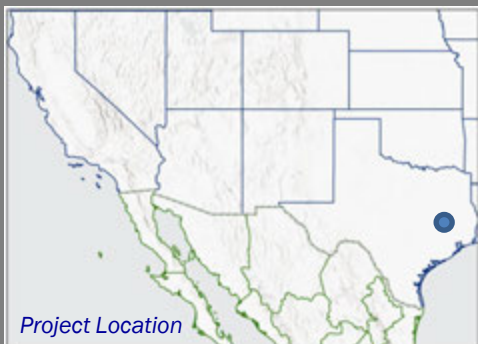


RESTORATION

Giant Salvinia Control in Lake Raven



Lake Raven, a 203-acre reservoir, is located in Huntsville State Park and is managed by the Texas Parks and Wildlife Department (TPWD). Kayakers, swimmers, and anglers frequent the lake and are important for park revenue, but their visits also facilitate non-native plant introductions. Giant salvinia (*Salvinia molesta*), a floating fern native to southern Brazil, is the largest invasive plant threat in Texas. It can double in size in seven to ten days and quickly overtake a body of water. In 2015, TPWD received record funding for vegetation control, largely because giant salvinia had taken over various water bodies in east Texas. TPWD biologists recognized the need to control giant salvinia in Lake Raven using an integrated pest management (IPM) approach.



Giant Salvinia Covers the Water Surface in Lake Raven, Texas

KEY ISSUES ADDRESSED

Giant salvinia is a fast-growing, thick, floating fern species known to quickly cover large bodies of water. Its growth can be three feet thick, sufficient to minimize sunlight in the water column, preventing the growth of native aquatic vegetation that is important to aquatic life and waterfowl for oxygen and habitat. Furthermore, the dense mats of giant salvinia can reduce dissolved oxygen in the water below the amount needed to support native fish by limiting gas exchange between the atmosphere and the water. In addition to these ecological consequences, giant salvinia has the potential to impair recreational use by growing thick enough to block boat access. When giant salvinia was found in Lake Raven in 2015, TPWD biologists began introducing control measures to prevent negative impacts of giant salvinia in the lake.

PROJECT GOALS

- Control giant salvinia in Lake Raven using an IPM approach
- Provide education to recreationists in Huntsville State Park to reduce the introduction and spread of invasive plants

WEEVILS FOR THE WIN

Research shows that 35 weevils per kilogram of giant salvinia is adequate for control. Four months after introducing the weevils in Lake Raven, there were 123 weevils per kilogram.



A Close-Up of Two Salvinia Weevils

PROJECT HIGHLIGHTS

Integrated Pest Management: IPM is a sustainable pest management process that incorporates a combination of methods that are economical and that minimize risk to people and the environment. To address giant salvinia growth in Lake Raven, TPWD biologists combined chemical, physical, and biological techniques. They sprayed herbicides, then began using booms (floating barriers) in 2020 to contain the remaining giant salvinia to two areas on the lake. This concentrated the giant salvinia, making follow-up treatments more efficient while reducing collateral effects on native vegetation. In May of 2020, however, giant salvinia mats began showing up outside the contained areas and herbicide treatments were becoming costly. As a third strategy, biologists harvested salvinia weevils (*Cyrtobagous salviniae*) that feed exclusively on giant salvinia from local reservoirs. They then released over 5,000 weevils onto Lake Raven's remaining giant salvinia.

Education and Outreach: Huntsville State Park introduced the "Clean Drain Dry" campaign through signs and activities that educated recreationists about preventing the spread of invasive aquatic life. TPWD is also using their "Protect the Lakes You Love" campaign that includes boaters and anglers in the fight to stop the spread of giant salvinia and other non-native species.

Funding Partner

- Texas Parks and Wildlife Department

Authors: Krystie Miner, CCAST, John Findeisen, TPWD, September 2021.
Photos courtesy of John Findeisen/TPWD
For more information on CCAST, contact Genevieve Johnson (gjohnson@usbr.gov) or Matt Grabau (matthew_grabau@fws.gov).

Visit CCAST:



LESSONS LEARNED

Salvinia weevils have been shown to be an effective way to control giant Salvinia. However, it usually takes about two years to establish their populations, and weevils are typically killed by low temperatures during the winters. Lake Raven is located far enough south that the weevils survived the winter and established their populations quickly. Additionally, in the winters of 2018 and 2021, unexpected freezes dramatically reduced the remaining giant salvinia. In early 2021, managers had achieved a 99.5% reduction in giant salvinia in Lake Raven. However, some levels of salvinia remain and ongoing control is required.

Importantly, aquatic invasive species and fisheries biologists and state park employees supported the shared goal of controlling giant salvinia without impeding native aquatic life or hampering park use. Biologists at TPWD noted the importance of thinking outside the box when managing invasive species. If TPWD biologists had not opened their minds to other options, such as using floating booms and introducing salvinia weevils, they would not have been so close to achieving successful giant salvinia control in a year's time. This IPM strategy works well in small reservoirs or where giant salvinia can be contained.

NEXT STEPS

- Monitor Lake Raven every 4-5 weeks and remove giant salvinia when found
- Utilize a similar IPM approach for giant salvinia in other water bodies
- Continue education and outreach to prevent the spread of giant salvinia and other invasive plants

For more information on this project, contact John Findeisen:
john.findeisen@tpwd.texas.gov



Giant Salvinia Covers the Water in Lake Raven