

Two-horned Trapa (*Trapa bispinosa*): A New Threat

Interstate Commission on the Potomac River Basin

2024 Conference

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&

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Who we are



- **Northern Virginia Soil and Water Conservation District (NVSWCD)**

- Our boundary is the same as Fairfax County.
- Not a regulatory agency and not a part of Fairfax County Government.
- Collaborate with partners to support conservation efforts.
- Promote soil and water conservation.
- Provide technical expertise.
- Develop young environmental leaders.

Web: fairfaxcounty.gov/soil-water-conservation

Email: conservationdistrict@fairfaxcounty.gov



- **Fairfax County Maintenance & Stormwater Management Division (MSMD)**

- MS-4 Phase 1 permit holder
- MSMD responsible for maintaining “public facilities”
 - approximately **one-third** of inventory are dry ponds serving residential areas.
 - Approximately 20 wet ponds.
- Remaining **two-thirds** of the stormwater management facility inventory are referred to as “private facilities”.
- Initial efforts for functionality of facilities.
- Program expanding annually – progressively treating and managing for water quality.

Web: fairfaxcounty.gov/publicworks/stormwater/maintenance-and-inspections



What is Trapa?

- Two-horned Trapa, or Two-horned Water Chestnut (*Trapa bispinosa*), is an invasive plant
 - Aquatic (freshwater)
 - Annual
 - Shallow, to 15 feet (4.5 meters) deep
 - Rooted and floating plant, “emergent”
 - Native to Japan, Taiwan, China and Korea
 - Slow flowing or calm water
- Recorded in over 100 ponds and lakes since 1995, mostly in Northern Virginia.
- Was not recognized in our region as *T. bispinosa* until 2014



Photo of old seedpod,
Courtesy of S. Tangren, WMCOG

Photo by Scott Baron, NVSWCD

WHAT TO LOOK FOR THROUGHOUT THE YEAR

in any slow-moving or still bodies of freshwater in the Potomac River Watershed

FIRST HARD FROST - MARCH



1.5 - 2 inch horned, barbed, dark brown seeds floating in the water or on the shoreline

APRIL - MAY



Seedlings just beginning to come to the surface in shallow water; leaves presenting in a 3" diameter rosette

JUNE - FIRST HARD FROST



Triangular, toothed, green leaves floating on the surface in a 14" diameter rosette pattern

REPORT SIGHTINGS TO: <https://nas.er.usgs.gov/SightingReport.aspx>



Flowers as early as June
Fruit as early as July

- Learn to recognize it
 - Present from April/May to the first hard frost (Nov./Dec.)
 - Rosettes up to 14 inches wide
 - Triangular saw-toothed leaves, leaf undersides often red. Small pink 4-petaled flowers.
 - Mature fruit greenish with *two spines*, 2.5 inches (3 – 5 cm.) Old seedpods are black.

Look-alikes

Species of Concern:
***Trapa bispinosa* (water chestnut)**



Brasenia (water shield, purple wen-dock) (USGS).



Azolla (mosquito fern). USGS.



Trapa natans (also water chestnut)

L.J. Mehrhoff, University of Connecticut, Bugwood.org



Ludwigia sedioides (Primrose, Mosaic Flower). NPS



Eichhornia (water hyacinth) USGS

Why do we need to control *Trapa*?



Photo courtesy of Nancy Rybicki, USGS

- All species in the genus *Trapa* qualify as “**Early Detection, Rapid Response**” invasives.
- **Tier II noxious weed, Virginia, 2024.**
 - Virginia Dept. of Agriculture and Consumer Services splits weeds deemed to be noxious into three tiers: Tier 1: “not known to be present in the Commonwealth”, **Tier 2 “present in the Commonwealth and for which successful eradication or suppression is feasible”**, and Tier 3: (i) present in the Commonwealth, (ii) whose spread may be slowed by restrictions on its movement, and (iii) for which successful eradication or suppression is not feasible.”
- **Invasive Species Plant List, Virginia DCR, 2024.**
- **Funding** has been secured recently for control of this plant from Fairfax Co. and Virginia.

Why do we need to control Trapa?

- Trapa quickly forms dense mats which:
 - harm biodiversity
 - decrease oxygen in the water
 - hinder navigation and recreation
- The barbed seeds hurt!
- A related species, Eurasian Water Chestnut (*Trapa natans*), colonized the tidal Potomac and quickly spread. From 1939 – 45, the U.S. Army Corps of Engineers mechanically harvested this invasive plant, successfully removing it at a cost of over \$4 million.
- There is a definite risk in the short term of introduction of Two-horned Trapa into the Potomac.
- Act now while the population is still relatively limited or else spend way more \$ later! Funding secured through federal, state and local government.
- **Stop the spread!**

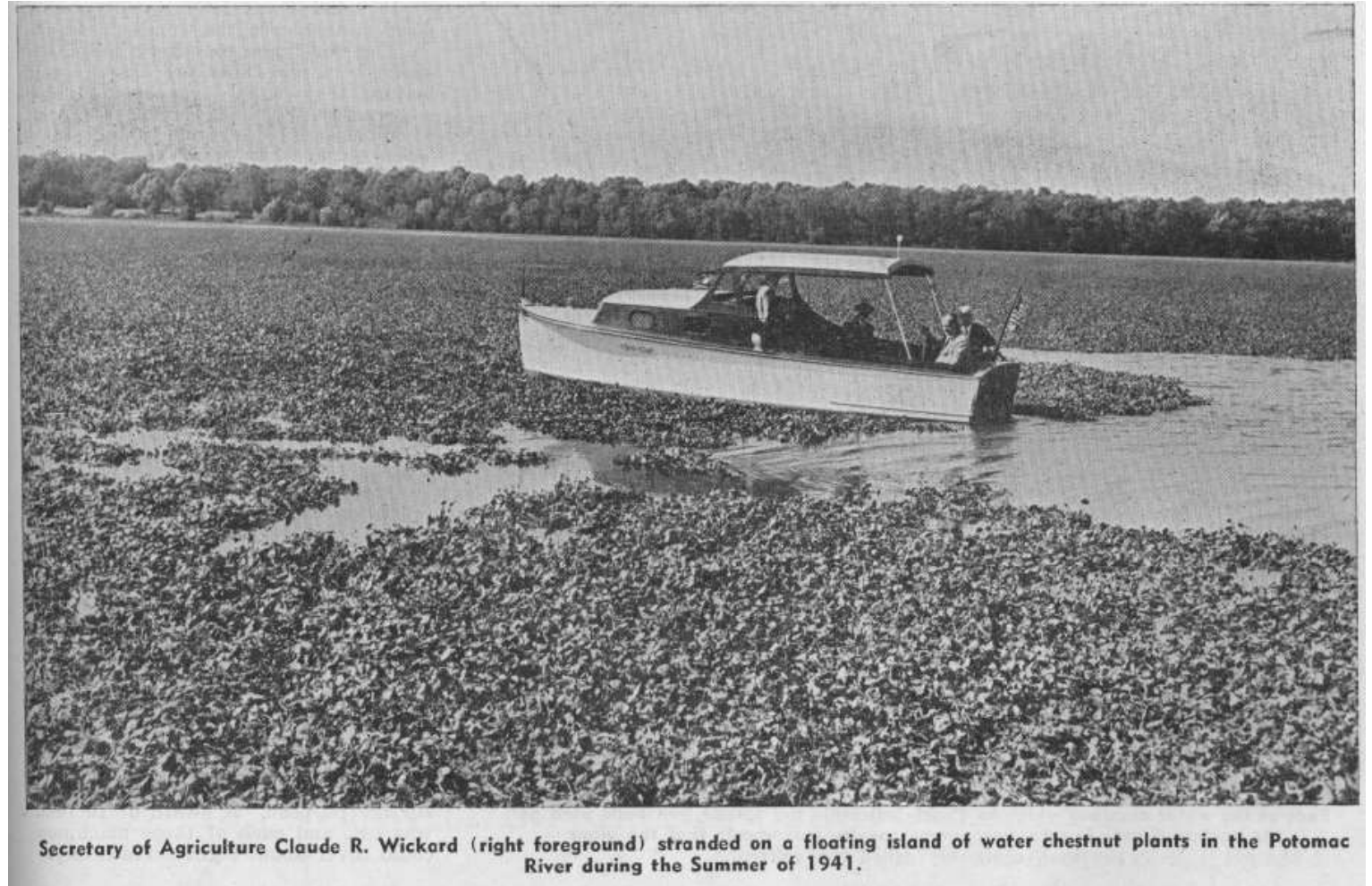


Photo courtesy of Maryland Conservationist

Primarily spread by Canada Goose

Hitchhiking – boats, animals, clothing, equipment.
Floods – rosettes detach



Geese photos by Nancy Rybicki, USGS. Rosette photo by Sara Tangren, MWCOG.

Photo Credit: Michael S. Braverman, www.inaturalist.org

Control

- Two-horned Trapa sprouts from late April/May until first hard frost
- Ideal time to **begin control** of this annual plant is **before seeds mature** - May/June
- Frequent treatment or harvesting into autumn!
- Monitor for up to 5 years after apparent eradication!
- **Coordination with partner agencies for Countywide coverage**



Photo by NVSWCD



Photo by Scott Baron, NVSWCD

Herbicide effectiveness on Two-horned Trapa

Herbicide	Application	% control	non-target effects?
• Flumioxazin	foliar	86 to 96%	Practically non-toxic to bees. Moderately toxic to aquatic invertebrates, fish.
• Florpyrauxifen-benzyl	subsurface	89 to 98%	Minimally affects on <i>Vallisneria americana</i> Variable results for <i>Heteranthera dubia</i> (related to plant age?)
• 2,4-D	foliar	58 to 68%	Depends on the form. Ranges from non-toxic to very toxic.
• Imazamox	foliar	35 to 70%	Practically non-toxic to animals. Varies in plants.



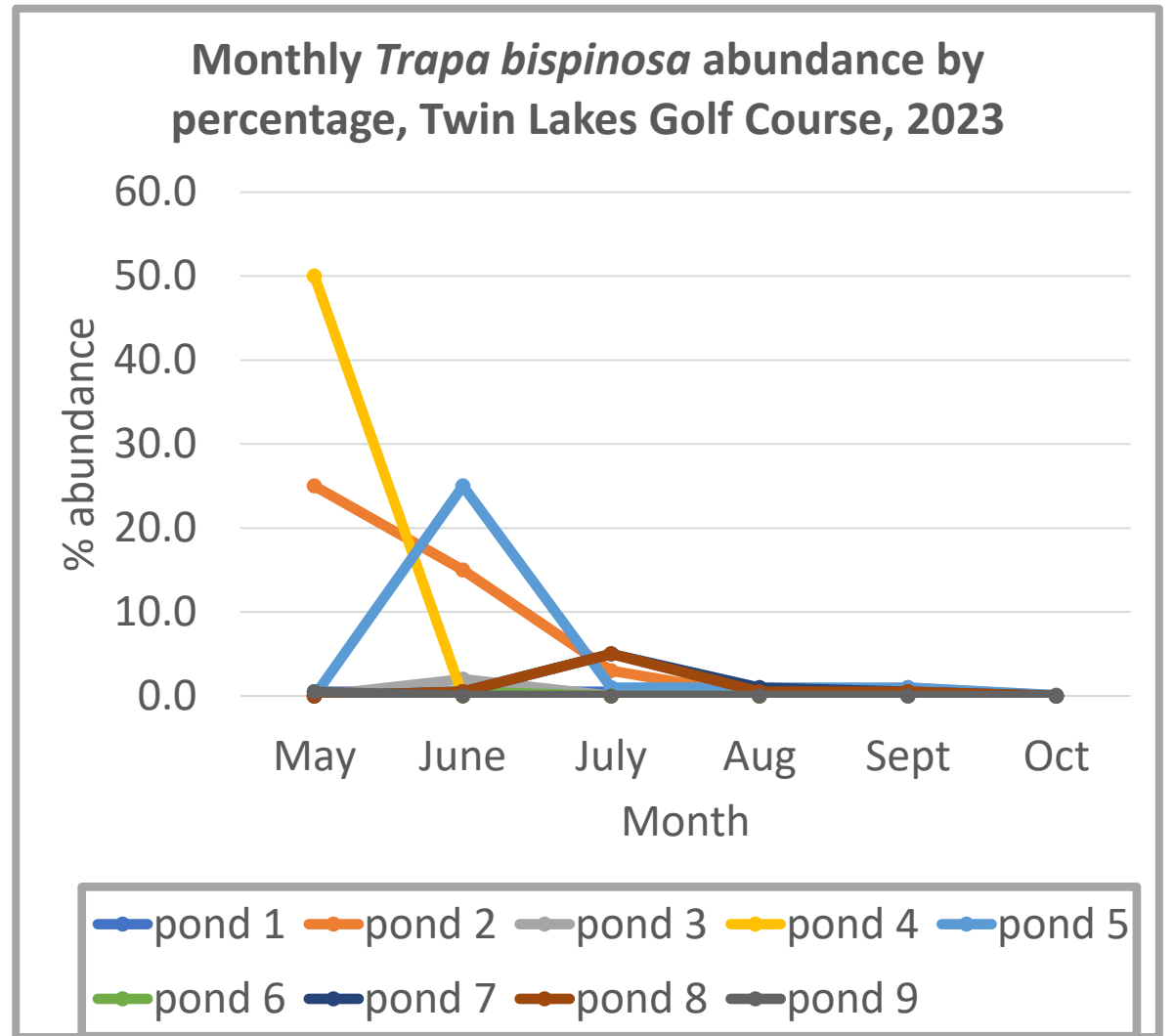
Other effective herbicides but no published data:

- Fluridone (pre-emergent)
- Flumioxazin (with diquat) works faster than without diquat.

DODD, LYNDE L., CHRISTOPHER R. MUDGE, and AARON N. SCHAD. "Comparative trials of herbicides for control of *Trapa natans* and *T. bispinosa* var. *iinumai* in the presence of *Heteranthera dubia* and *Vallisneria americana*." *J. Aquat. Plant Manage* 60: 66-74.

Study: flumioxazin effectiveness at Twin Lakes Golf Course

- **Abundance is shown as a percentage of *Trapa* cover on the water's surface**
- **Abundance varied greatly early in the season** among the 9 ponds, from 0 to 50%
- Ponds 2, 4 and 5 were the only ones with recorded abundance in the double digits at any point in the season
- *Trapa* responded well to treatment here, a Fairfax County Park Authority park
- This park is considered the center of abundance for *Trapa bispinosa*, present since at least 2000



Report Trapa sightings

Report Two-horned Trapa to:

- USGS nonindigenous aquatic species website (nas.er.usgs.gov > Sightings Report)
- EDDMapS (eddmaps.org)
- iNaturalist (inaturalist.org)

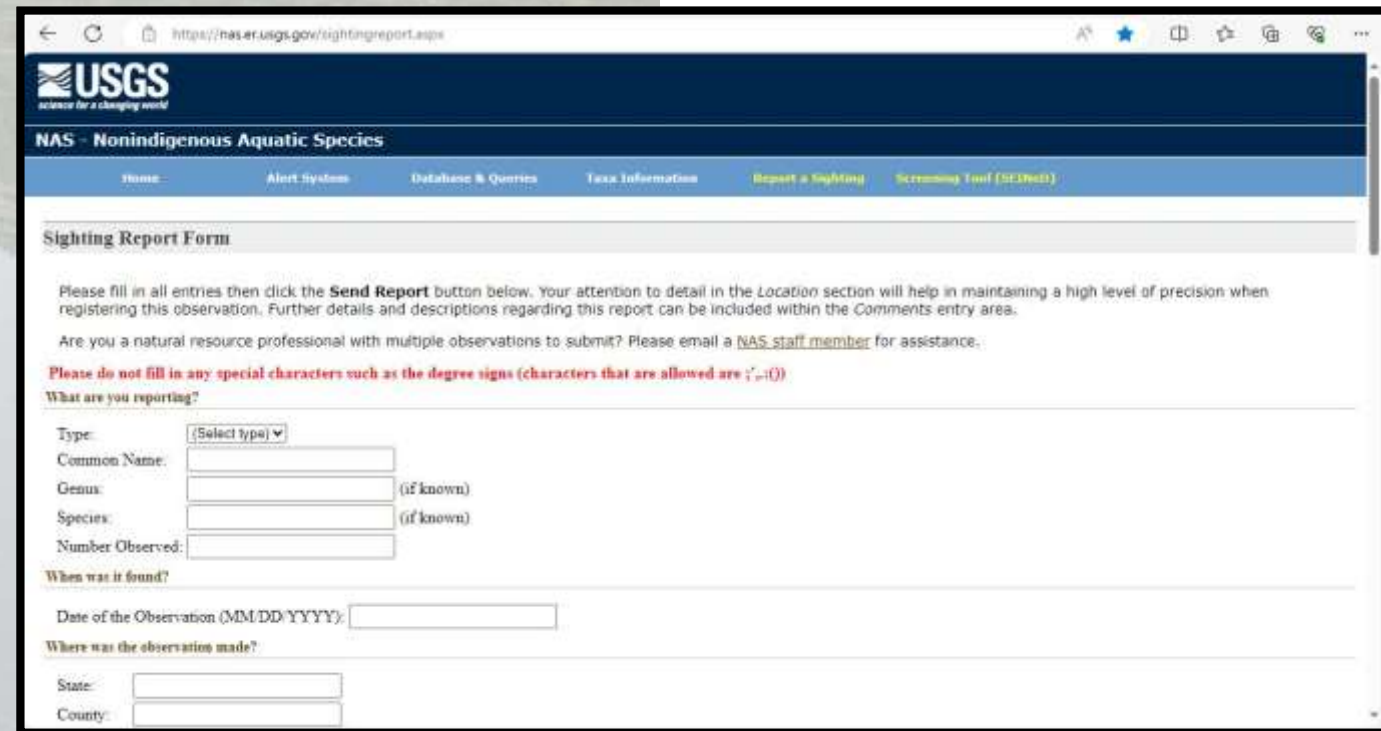
The logo for iNaturalist, featuring a green leaf icon to the left of the word "iNaturalist" in a bold, black, sans-serif font.The logo for EDDMapS, with "EDDMapS" in a large, black, serif font, "find • map • track" in a smaller, green, sans-serif font below it, and a red location pin icon to the right.A screenshot of the USGS Nonindigenous Aquatic Species (NAS) Sighting Report Form. The page has a dark blue header with the USGS logo and the text "NAS - Nonindigenous Aquatic Species". Below the header is a navigation bar with links for "Home", "Alert Systems", "Database & Queries", "Taxa Information", "Report a Sighting", and "Screening Tool (SEIWeb)". The main content area is titled "Sighting Report Form" and contains instructions for users to fill out the form and click the "Send Report" button. It also includes a section for "What are you reporting?" with fields for Type, Common Name, Genus, Species, and Number Observed. There are also fields for "When was it found?" (Date of the Observation) and "Where was the observation made?" (State and County).

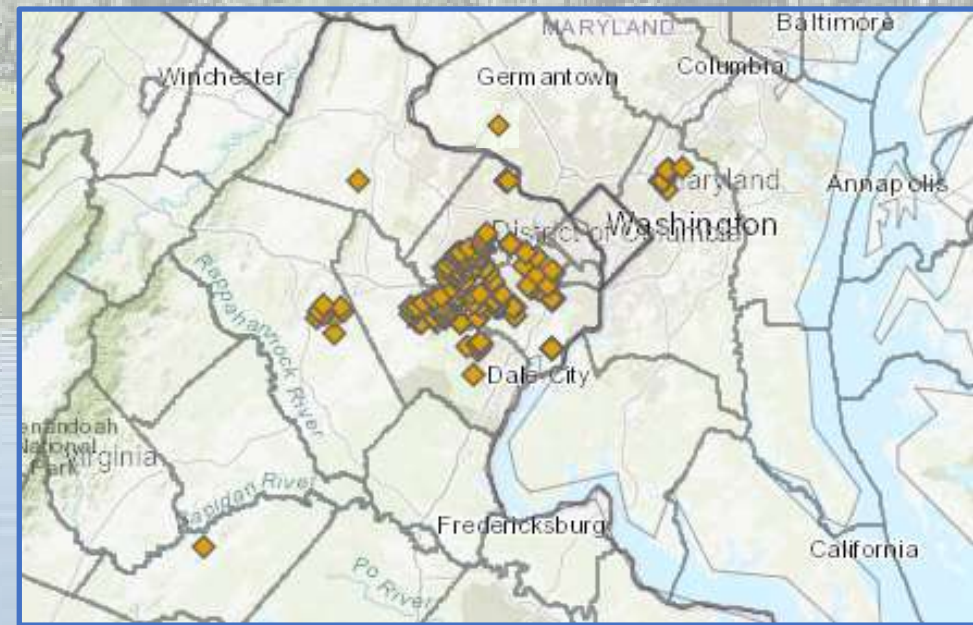
Photo: Waples Mill Meadow Park by Scott Baron, NVSWCD

Where is Two-horned Trapa located?

[Nonindigenous Aquatic Species \(usgs.gov\) map of Trapa bispinosa 2000 to present](https://www.usgs.gov/nonindigenous-aquatic-species)
First found in North America (Virginia) in 1995. Reported in new locations each year.

Virginia - Mostly in Fairfax and Prince William counties. Also, Loudoun, Fauquier, Orange (central VA), Charlotte (Southside VA).

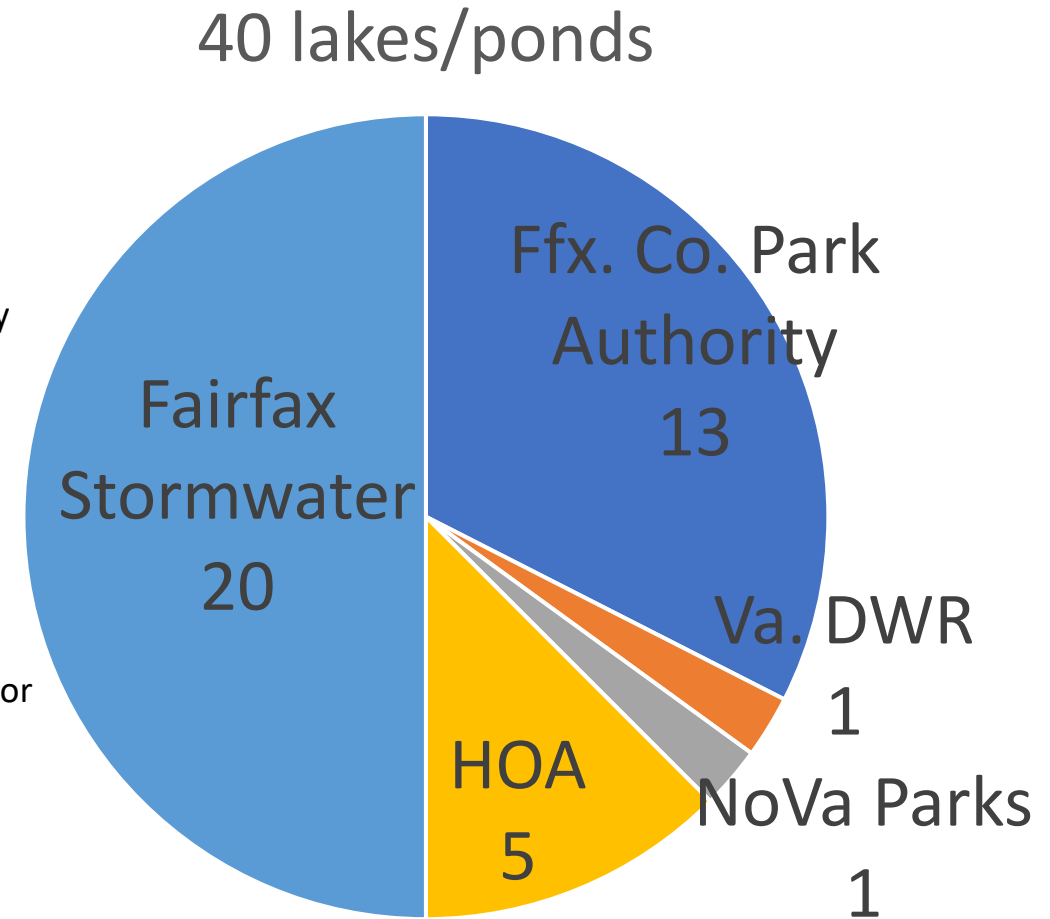
Maryland - Prince George's and Montgomery counties.



Woodglen Lake, Photo by Scott Baron, NVSWCD

How are we controlling Two-horned Trapa? - Herbicide

- US Army Corps of Engineers is researching this species in Fairfax County. Their findings may lead to more effective control.
 - Size of the waterbodies varies from < 1000 sq. ft. to 88 acres
- **Fairfax Stormwater**
 - Approximately 20 ponds in regular treatment
 - Monitor each facility 2x/month March – November, 1x/month December - February
 - Herbicide with surfactant applied
 - Ponds treated for all priority aquatic invasives. Trapa recurs in facilities periodically.
 - Currently approximately 2 new sites added annually for Trapa and other priority invasives
- **NVSWCD**
 - 20 ponds in regular treatment
 - Grant from Fairfax County for 1) Limited term employee and 2) Contractor to monitor and treat **monthly**
 - Trapa sampled by hand, reproductive characteristics recorded
 - Herbicide with surfactant applied
 - Reports with photos for documentation
 - **Trapa only**



Help stop the spread of *Trapa bispinosa*, an invasive plant spreading in waterbodies in the Potomac and Roanoke River watersheds.

Trapa bispinosa covers pond



Trapa range map in US
nas.er.usgs.gov/viewer/amap.aspx?id=f3a647f4-6906-4928-b5b4-1421cd95a211

Identification tips
mdinvasives.org/iotm/july-2019/

Report Trapa!
nas.er.usgs.gov/sighting/report.aspx



Updated May 2024

Stop the Spread of *Trapa bispinosa* (two-horned trapa/water chestnut), a new invasive aquatic plant found in ponds and lakes. Reports of this or other invasive aquatics can be made via the US Geological Survey's Nonindigenous Aquatic Species website. Scan here:

Trapa is an annual. It begins to sprout in May, flowers and fruits by July, then drops seeds in summer and fall.



To stop the spread, harvest the plants in early to mid July.

It may take several years of effort. For more information:
<https://www.invasivespeciesva.org/document/management-plan-for-two-horned-trapa-2022-final.pdf>



Trapa bispinosa leaves and seed

Be a habitat hero



IDENTIFYING CHARACTERISTICS:

- Plants found April to December
- Small 4-petaled pink flowers
- Triangular, toothed leaves, often red underneath
- Seeds are green, then black in autumn

Help us find this damaging plant invader.

- **Two-horned trapa** (*Trapa bispinosa*), also known as two-horned water chestnut is a floating, rooted weed of lakes, ponds, and rivers.
- Large mats clog waterways, disrupt boating, fishing, and harm wildlife.

What you can do:

- ✓ Take photos and report to USGS using the QR code below.
- ✓ Volunteer to pull out trapa from our waterways, throw away from water, spread on land to dry



Caution! Barbed, sharp seeds attach to animals and fabric to spread.



- Public awareness of Trapa
 - Outreach - internet, flyer/sign, fact sheet, card, social media
- Featured in newspapers, WJLA channel 7 news (Washington DC), Fairfax public access TV
- See the Trapa poster displays at this conference!

It takes a village...



Photo: Trapa removal at Lake Accotink. Courtesy of Fairfax County Park Authority

Partners

AEC Lakes
Expectation Church
Fairfax County Board of Supervisors
Fairfax County Department of Public Works and Environmental Services
Fairfax County Office of Environmental and Energy Coordination
Fairfax County Park Authority
Forest Hills Community (HOA)
Fox Heritage Associations (HOAs) and neighbors
Fox Lake Property Owners (HOA)
Lake Source LLC
National Capital PRISM/Metropolitan Washington Council of Governments
Northern Virginia Soil and Water Conservation District
NOVA Parks
SOLitude Lake Management
US Army Corps of Engineers
US Geological Survey
Vale Valley Estates (HOA)
Virginia Association of Soil and Water Conservation Districts
Virginia Department of Agriculture and Consumer Services
Virginia Department of Wildlife Resources
...and our awesome volunteers!

Challenges



- We wear many hats!
- No regulatory requirements – recently added to DCR Invasive Plant Species list. Poses some difficulties with funding availability.
- Limited resources
 - So many ponds!
 - Limited survey capacity. Hard to be “proactive”
 - Outreach
 - Many parties involved - Trapa knows no jurisdictional bounds!
 - Data management and sharing
- Trapa grows in stormwater facilities designed to hold a permanent pool – i.e. wetland retrofits/extended detention
- Larger PL-566 facilities are difficult to treat – need new cost structures
- Needs more studies – plant characteristics and treatment methods
- We are seeing a lower abundance overall – although persistent and new colonies are found annually

Trapa – The takeaway

- Reduce biomass before Trapa produces fruit!
 - Monitor throughout season, start early
 - Herbicide or mechanical/manual
- Do it now or you'll pay a lot more later (ecologically and economically!)
 - Prevent Trapa from reaching the Potomac!
- Learn, adjust
- Support from government agencies
- Check your clothing, boat and equipment for the spiny, barbed fruit.
- Report it!
 - USGS
 - EddMapS
 - iNaturalist
- **More research is needed**

Thank you!

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Photo of flowering Two-horned Trapa
Courtesy of Fairfax Co. Dept. of Public Works

Questions?

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