

# Short-term risk assessment for a newly introduced waterchestnut, *Trapa bispinosa* Roxb., entering Virginia rivers

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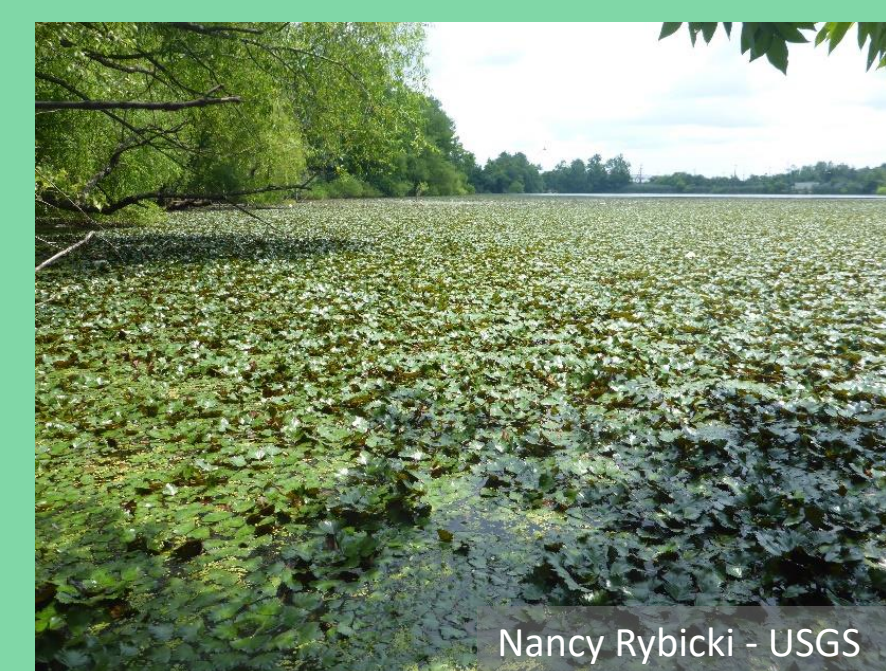
- A new species of waterchestnut (*Trapa* L.) was discovered in the Potomac River in 2014 by USGS and Virginia Department of Wildlife Resources officials.
- By 2023, a total of 100 introductions were verified in lakes and ponds in seven counties of Virginia, one county of Maryland, and in Pohick Bay on the tidal Potomac River and on the non-tidal reservoir of the Occoquan River. All introductions were in the Potomac watershed until August 2022 when reported in the Roanoke watershed.
- Our results identify the number and locations of at-risk waterbodies and boat launches that state and local managers can prioritize outreach, management, signage, and monitoring efforts for early detection and rapid response of *T. bispinosa* in the U.S.

## Introduction

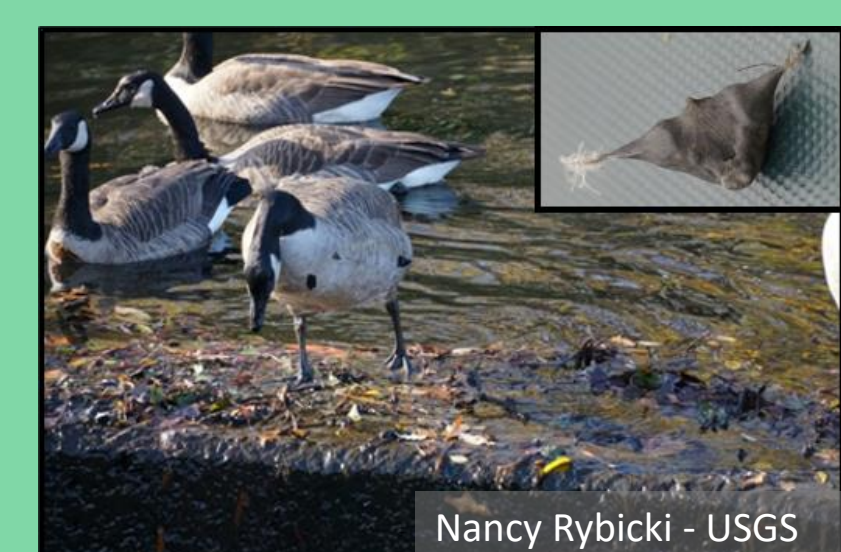
In 1874, four-horned waterchestnut (*Trapa natans* L.) was introduced to North America from Asia as ornamental plantings in rivers. Its range expanded in North America from Washington D.C. to Canada. Fortunately, it was eradicated from the Potomac River by the 1970s where it was known to have obstructed navigation and shaded out the native bay grasses that are preferred wildlife habitat.



Recently, two-horned waterchestnut (*T. bispinosa* Roxb.) was discovered in Virginia. It was also introduced from Asia. In 1995 it was reported in Westmoreland and Stafford counties in the Potomac River watershed. As of 2022 it had established in five more counties in Virginia, including Charlotte county in the Roanoke watershed. Without prevention measures, waterchestnut will continue spreading through the Potomac and the Roanoke River watersheds.



Like four-horned waterchestnut, the newly introduced species is a freshwater tolerant, annual, rooted, floating plant with one-inch-wide leaves and spined fruits. Floating plants spread downstream by flowing water and to disjunct water bodies and rivers by hitchhiking on waterfowl and other wildlife. It may disperse long distances when plants and seeds attach to boat trailers or anchor ropes and thus may be transported unintentionally by humans.



Since four-horned waterchestnut was eradicated in the past from the Potomac watershed it is likely this other waterchestnut could be eradicated as well if an early detection and rapid response (EDRR) plan is established. To develop EDRR plans, managers need to know its distribution and to forecast where it may likely spread.



In this study we provide managers the location and abundance of water bodies most at risk of colonization by two-horned waterchestnut based on proximity of a water body to known colonies. We also map the location of boat launches where signage may be placed to encourage the public to report sightings of *Trapa* and stop aquatic hitchhikers.



## Methods & Results

From 2014 – 2023, we documented and verified **100 introductions** within the Potomac River basin from seven counties in Virginia (Charlotte, Fairfax, Fauquier, Loudoun, Prince William, Stafford, and Westmoreland) and one in Maryland (Prince George's)

- Two archived specimens from 1995 were in Stafford and Westmoreland Counties, but the locations were unknown. At that time, the county extension agent recommended removing the plants.

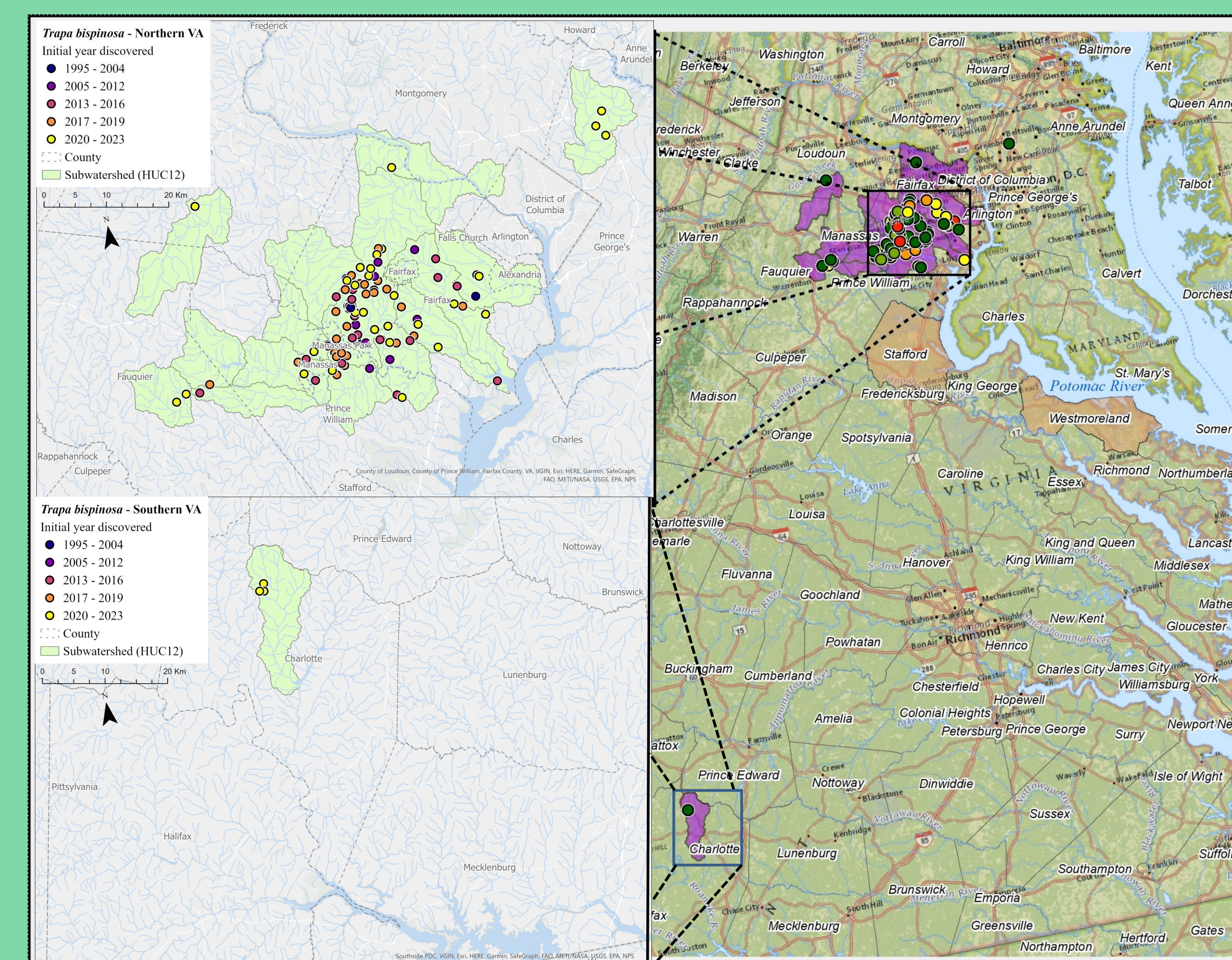


Figure 1. Location and initial year of waterchestnut introductions since 1995. Purple and lime green polygons are subwatersheds. Insets show northern and southern sites. Top inset shows sites in northern VA and MD, in the Potomac River watershed. Bottom inset shows sites in southern VA in the Roanoke River watershed.

### Dispersal by waterfowl

- We determined the oldest and most centrally located of all the current populations was at Fairfax County Park Authority's Twin Lakes Golf Course.
- Most reported introductions are within **30 km** from this location, with the exceptions of Creek View Pond in Charlotte Co., VA (218 km from Twin Lakes Golf Course) and Greenbelt Lake in Prince George's Co., MD (49 km from Twin Lakes Golf Course), which were both reported in 2022.
- The population at Greenbelt Lake, MD is about 33 km from the nearest known population in VA, suggesting dispersal from northern VA via waterfowl.
- The Charlotte Co., VA population substantially increased the perimeter of at-risk waterbodies to southern VA

## Results & Discussion

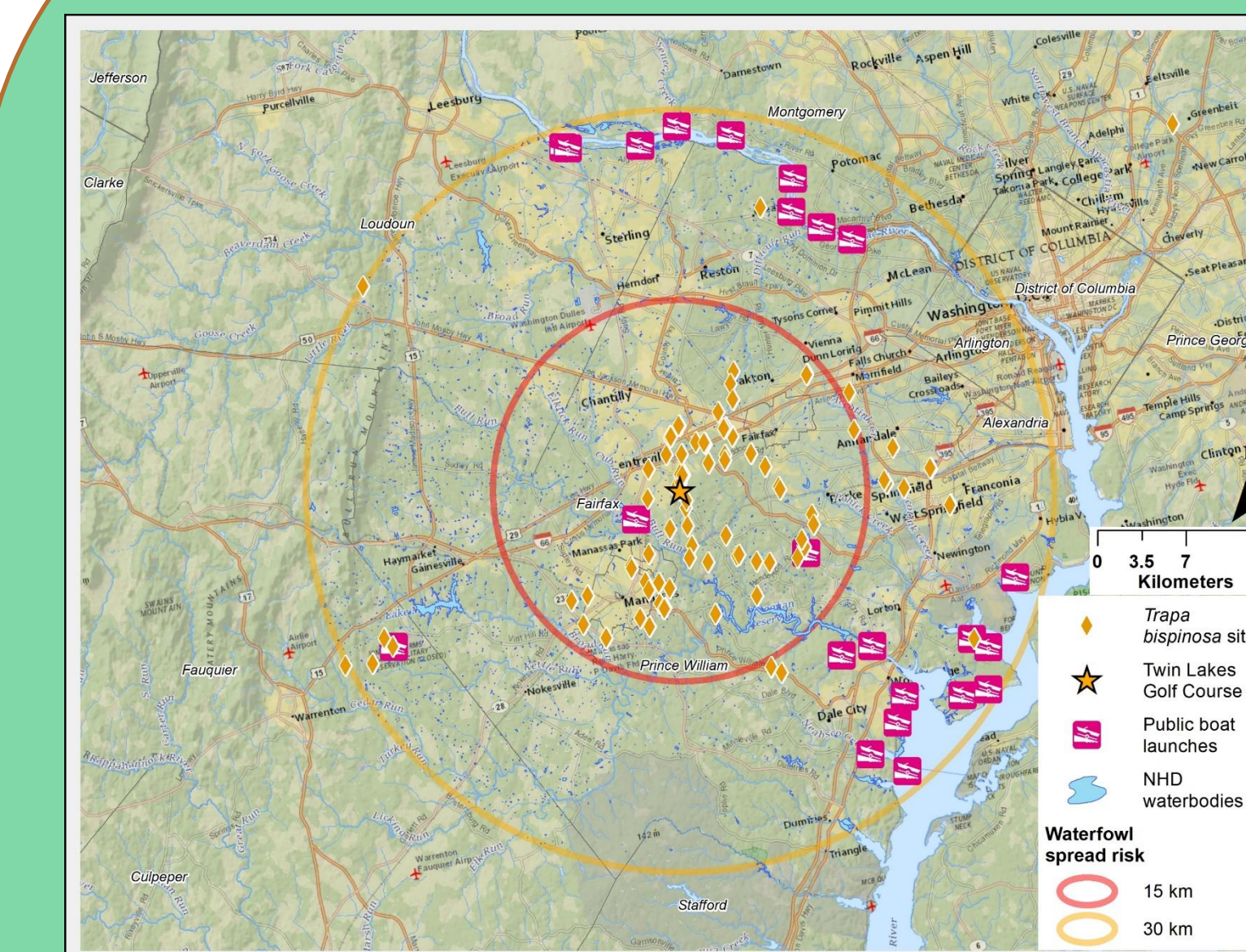


Figure 2. Waterbodies at risk of introduction within 15 km and 30 km of epicenter in Potomac watershed, Twin Lakes Golf Course. National Hydrography Dataset = NHD

### Dispersal by waterfowl from Twin Lakes Golf Course, Fairfax Co., VA

- **3,745** waterbodies are within 30 km and **1,063** are within 15 km
- **23** public boat launches are within 30 km and **2** launches are within 15 km.

### Dispersal by waterfowl from Creek View Pond, Charlotte Co., VA

- **2,598** waterbodies are within 30 km and **633** are within 15 km
- **6** public boat launches are within 30 km while no public launches are within 15 km

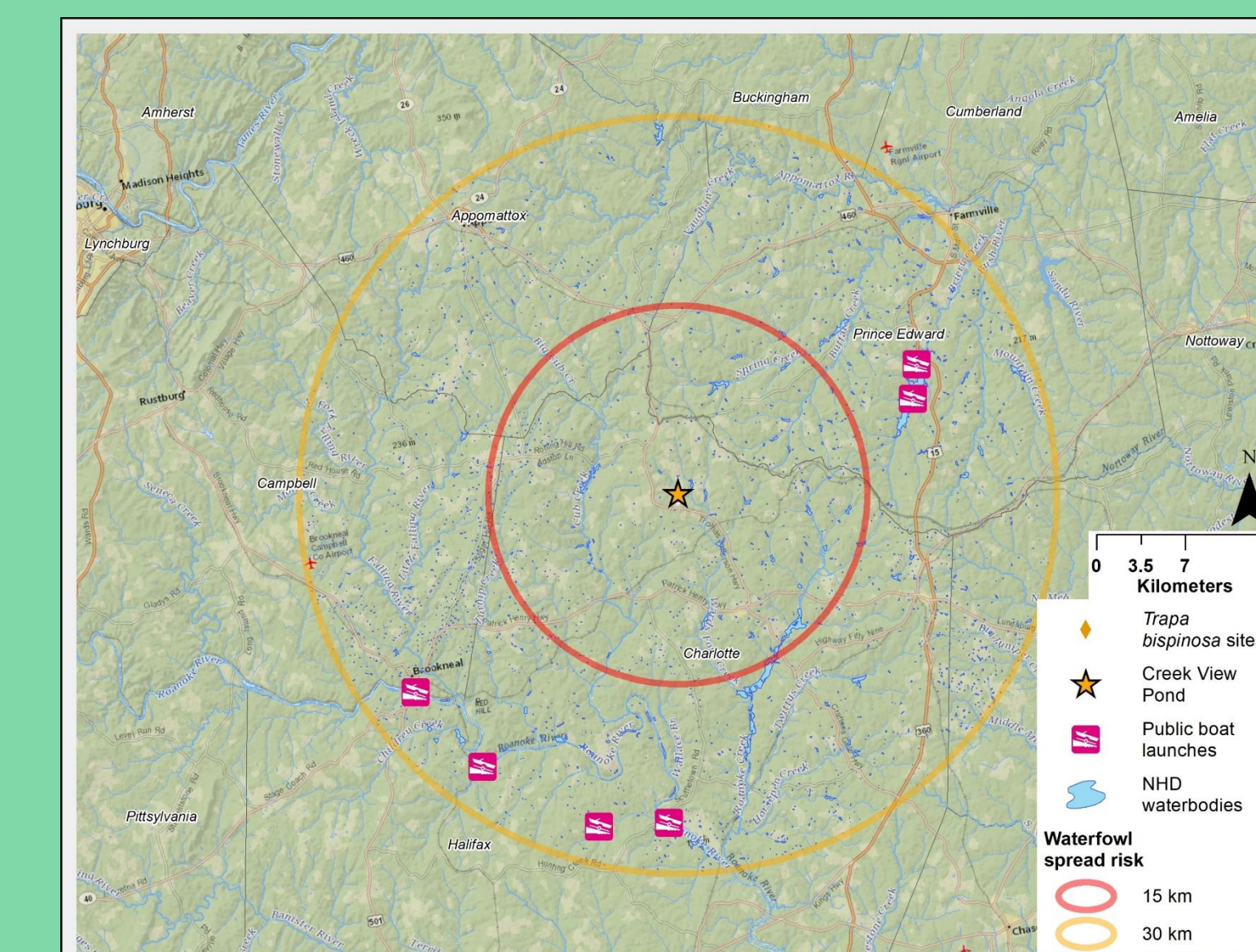


Figure 3. Waterbodies at risk of introduction within 15 km and 30 km of epicenter in Roanoke watershed, Creek View Pond. National Hydrography Dataset = NHD

Two-horned waterchestnut has multiple disjunct introductions clustered in a pattern that suggests a high short-distance dispersal probability (< 15 km) and a low long-distance dispersal probability (> 30 km). Efforts to detect and manage introductions could be prioritized by the distance from known populations. In 2023, Maryland Department of Natural Resources, Virginia Department of Agriculture and Consumer Services and Northern Virginia Soil and Water Conservation District used the NAS distribution map and this assessment to target management and monitoring plans for *Trapa bispinosa*.

### Acknowledgments

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