

Polk County Wisconsin Department of Natural Resources Aquatic
Invasive Species Countywide Education, Prevention, and Planning Grant
(AEPP-476-16) Final Report, 2016-2017



Yellow iris, St. Croix River, July 2016

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In 2016, the Polk County Land and Water Resources Department received a two-year Aquatic Invasive Species Education, Prevention, and Planning Grant from the Wisconsin Department of Natural Resources to implement a countywide aquatic invasive species program. The following report details the tasks completed from February 2016 through December 2017.



Bass Lake, July 2017

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Appendix I: Polk County Response to Early Detection Aquatic Invasive Species

Eurasian Water Milfoil

Eurasian water milfoil is a submerged aquatic invasive plant with delicate, feather-like leaves arranged in a whorl around the stem of the plant. Eurasian water milfoil can be distinguished from native milfoils by the numerous (usually 12-21) leaflets that make up each leaf.

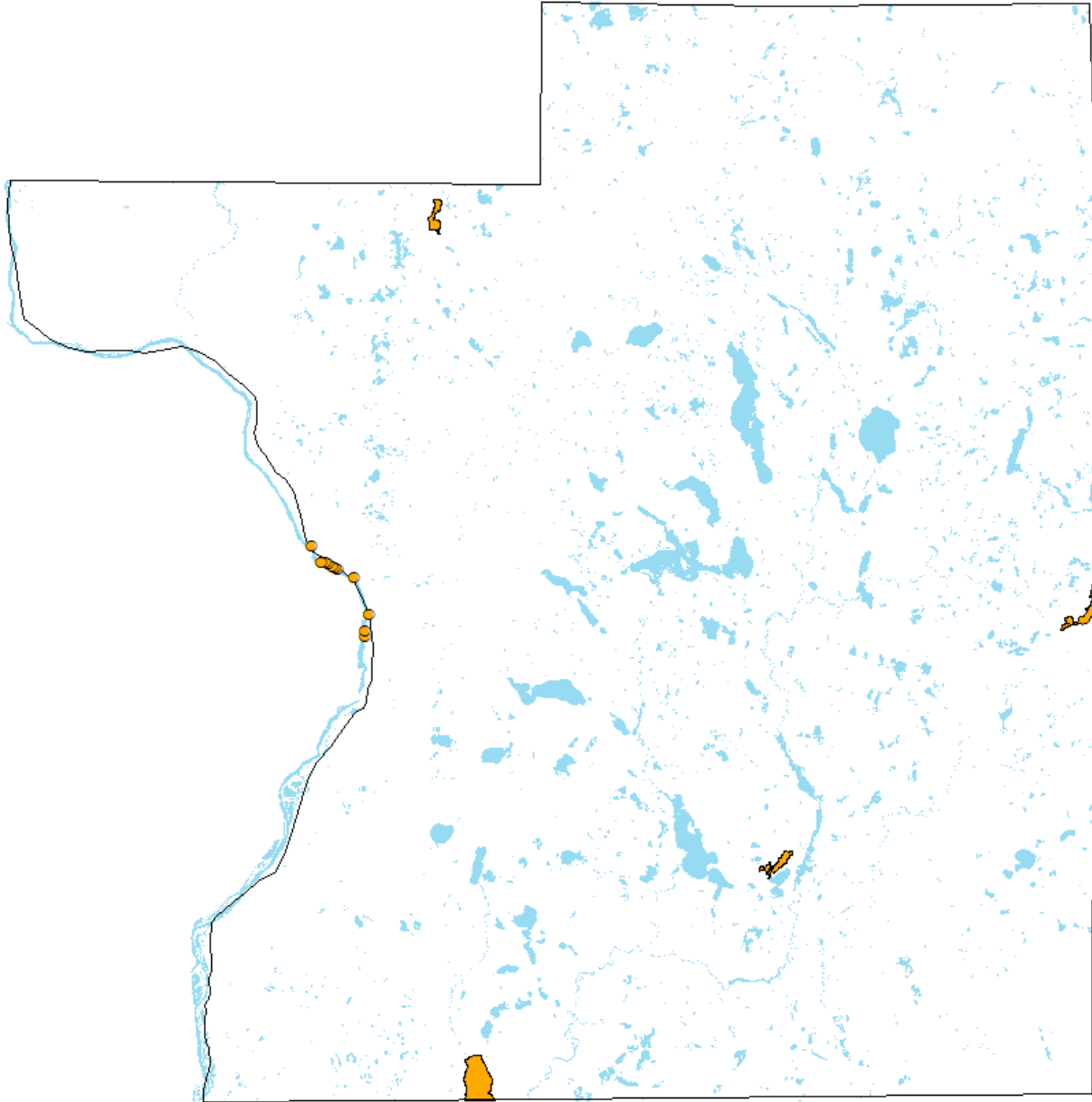
Additionally, whereas the leaves of most native milfoils remain erect when out of water, the leaves of Eurasian water milfoil are usually limp when out of water. Eurasian water milfoil is highly invasive and is capable of forming large, thick mats which interfere with swimming, boating, fishing, and waterfowl hunting. Additionally, Eurasian water milfoil can have devastating effects on native ecosystems, displacing native aquatic plants and impacting fish and wildlife populations.

Eurasian water milfoil was first discovered in North America in the 1940's. Since this time, Eurasian water milfoil has invaded nearly every state in the United States. Eurasian water milfoil can spread when small fragments of the plant break off and float on water currents or are transported by boater traffic. Eurasian water milfoil is able to reproduce from small fragments, which sprout roots and are able to colonize new areas.

Establishment of Eurasian water milfoil populations in Polk County has occurred relatively recently. Eurasian water milfoil was first found in Polk County in Long Trade Lake in 1995. Long Trade Lake is part of the Trade River System, which includes Little Trade Lake, Big Trade Lake, and Round Lake in Burnett County. Eurasian water milfoil was discovered in Round Lake in 2003 and in Little Trade Lake in 2009. In addition to the Trade River System, Eurasian water milfoil was found in Horseshoe Lake in 2006, in Pike Lake in 2010, in the St. Croix River between Spanglers Landing and Lions Park Landing in 2013, and in Cedar Lake in 2015.



Eurasian water milfoil, Horseshoe Lake, 2017



Eurasian water milfoil has been documented on 5 Polk County waterbodies as of December, 2017: Cedar Lake, Horseshoe Lake, Long Trade Lake, Pike Lake, and the St. Croix River

St. Croix River Eurasian Water Milfoil Monitoring

In 2013, the Land and Water Resources Department discovered Eurasian water milfoil in the St. Croix River between Spanglers Landing and the hydroelectric dam in St. Croix Falls.

In both 2014 and 2015, water levels on the St. Croix River were lowered for dam maintenance. As a result, most sites with Eurasian water milfoil were above water with the exception of a few large bays with tributaries flowing to the St. Croix River. In 2014, volunteer opportunities to hand pull Eurasian water milfoil were organized to take advantage of the fact that most plants were above the water line and more easily accessible. Additional drawdowns occurred in October 2016, March 2017, and November 2017.



High water levels at a St. Croix River campsite, 2016



In 2016, water levels were extremely high on the St. Croix River, making surveying for Eurasian water milfoil nearly impossible. The area from Nevers Dam to Spanglers Landing was surveyed for Eurasian water milfoil in August 2017.

Likely as a result of low water levels, the 2015 and 2017 populations of Eurasian water milfoil were substantially reduced. In the map (left), the 2013 sites represent beds of plants; whereas, the 2015 and 2017 sites represent individual plants, with the exception of the bay. A GPS point was taken at either end of the bay and individual plants were not marked in this area (non-navigable).

The Land and Water Resources Department and St. Croix River Association assessed milfoil growth in November 2017 during the drawdown and were only able to find milfoil in one area of the bay.

Curly Leaf Pondweed

Curly leaf pondweed is a submerged aquatic invasive plant. The leaves of curly leaf pondweed are easily distinguished by their rounded tip, prominent mid-vein, and finely toothed edges. In most growing conditions, the leaves appear wavy or crimped.

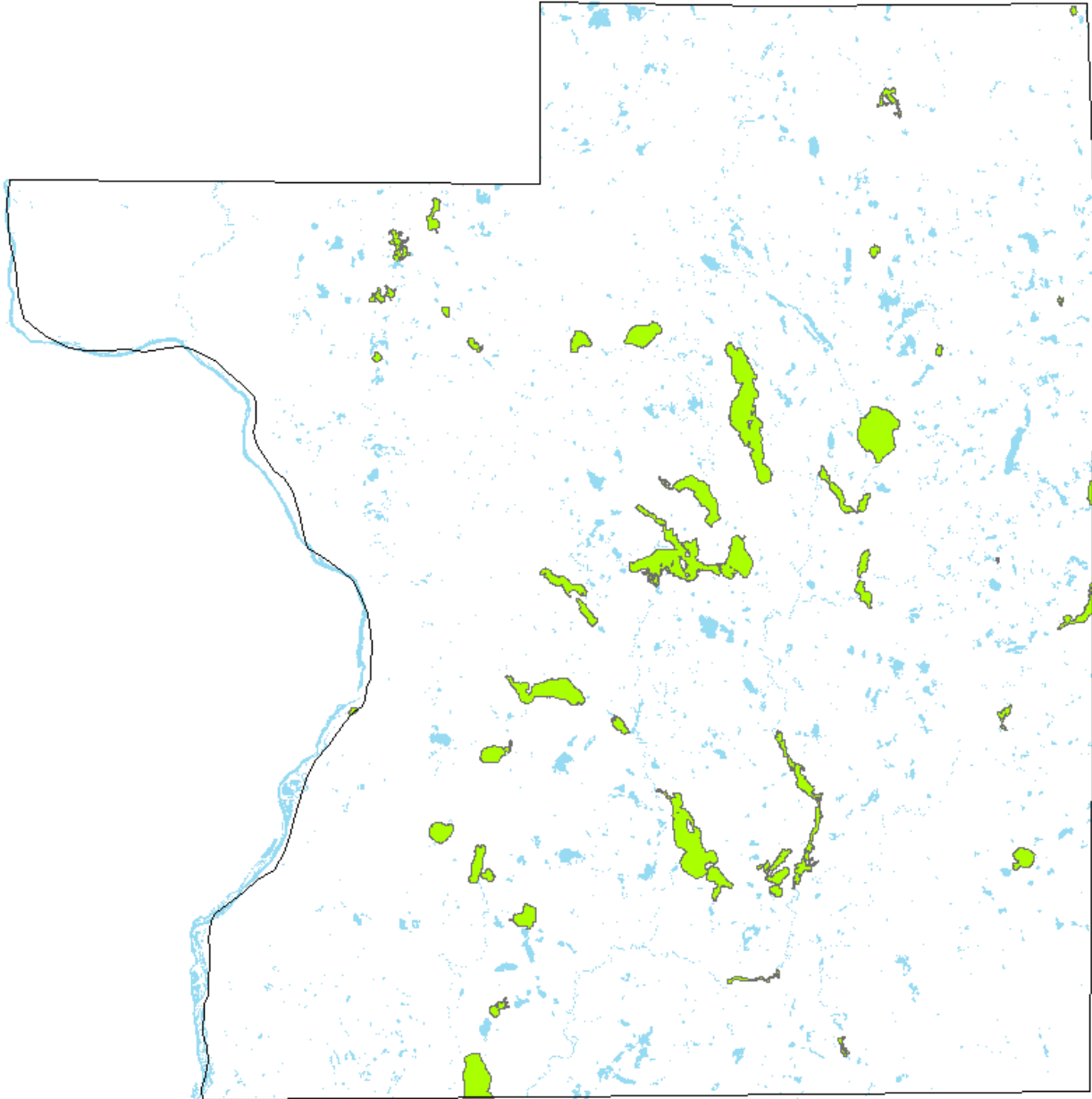
Curly leaf pondweed is found in a wide variety of habitats, although it prefers alkaline and high nutrient waterbodies and typically grows in less than 3 meters of water.

This invasive species is able to outcompete native aquatic plants because it exhibits rapid growth in the early spring, sometimes growing beneath ice cover. Curly leaf pondweed forms large, dense mats on the surface of waterbodies inhibiting the light necessary for native plant growth and interfering with navigation and recreational activities such as fishing, boating, and swimming.

Curly leaf pondweed was first discovered in Polk County in the Apple River Flowage in 1977. As of December 2015, curly leaf pondweed was documented in forty-two waterbodies in Polk County. The Polk County Land and Water Resources Department documented the species in five additional waterbodies in 2016-2017: Andrus Lake, Joel Flowage, Lotus Lake, Round Lake (Laketown), and Tarbert Lake.



Curly leaf pondweed leaf close up, Round Lake (Laketown), 2017



Curly leaf pondweed has been documented on 47 Polk County waterbodies as of December, 2017 including: Alabama Lake, Andrus Lake, Apple River, Apple River Flowage, Balsam Lake, Bear Trap Lake, Big Blake Lake, Big Butternut Lake, Big Lake, Big Round Lake, Black Brook Flowage, Bone Lake (Black Brook), Bone Lake (Georgetown), Bridget Lake, Cedar Lake, Clam Falls Flowage, Deer Lake (Balsam Lake), Deer Lake (McKinley), Dwight Lake, Half Moon Lake, Herby Lake, Horse Lake, Horseshoe Lake, Joel Flowage, Lake O' the Dalles, Little Blake Lake, Little Butternut Lake, Little Mirror Lake, Long Lake (Balsam Lake), Long Trade Lake, Lotus Lake, Loveless Lake, Magnor Lake, McKenzie Lake, North Twin Lake, North White Ash Lake, Pike Lake, Pine Lake (Alden), Round Lake (Laketown), Sand Lake, Sandhill Lake, South Twin Lake, Staples Lake, Tarbert Lake, Unnamed (Beaver), Wapogasset Lake, and White Ash Lake

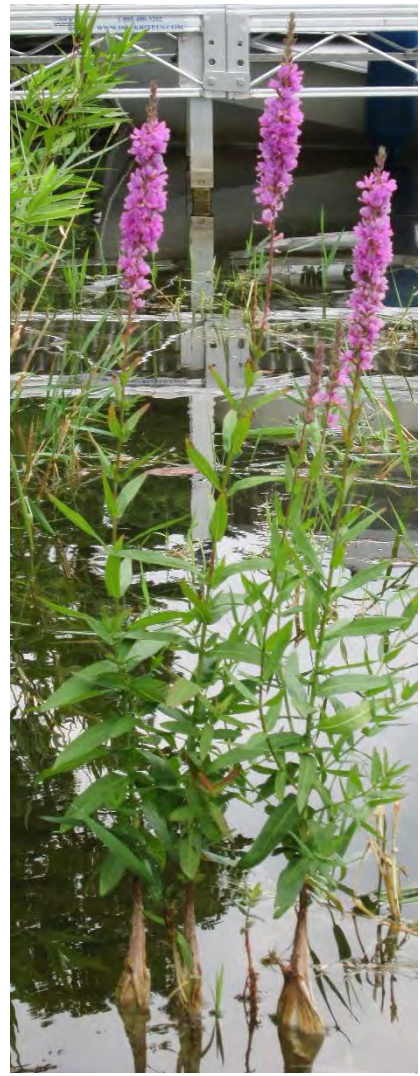
Purple Loosestrife

Purple loosestrife is an aquatic invasive perennial plant that grows 3-7 feet tall and develops a spike of small purple flowers in late summer. The leaves of the plant are oblong and arranged oppositely along a square shaped stem. Purple loosestrife spreads rapidly and colonizes wetlands, shorelines, and roadside ditches. Thick stands of purple loosestrife crowd out native vegetation and reduce food, shelter, and nesting sites for a variety of wildlife including birds, turtles, and frogs.

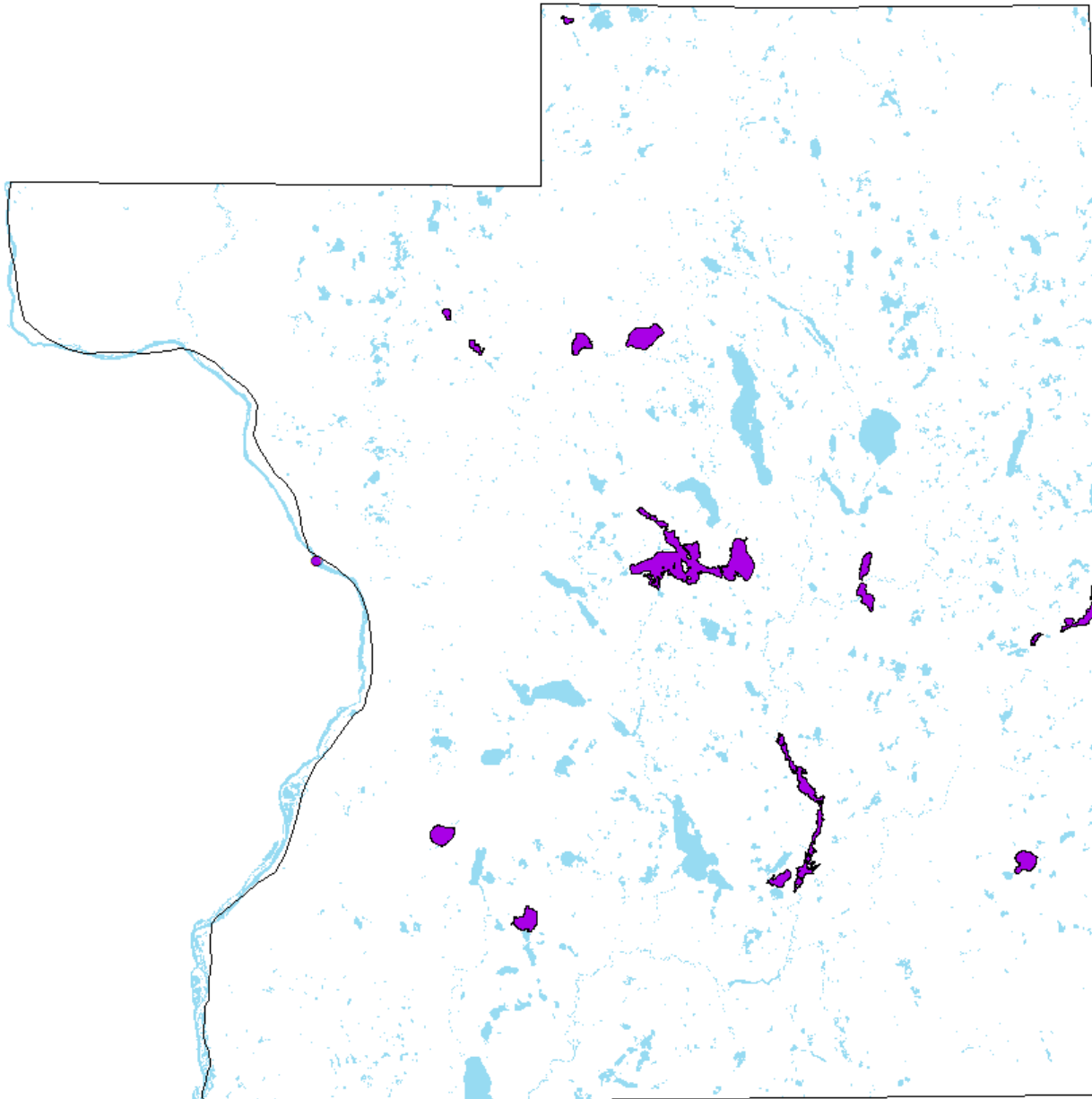
This plant, native to Europe and Asia, was introduced in North America in the 1800's for beekeeping and as a garden ornamental. Purple loosestrife has been present in Polk County for many years. An elaborate inventory was conducted in 2000 by the Land and Water Resources Department to identify the extent of purple loosestrife in the county and to reduce its spread.

In 2016, the Polk County Land and Water Resources Department held a training with volunteers of the Lotus Lake Association regarding purple loosestrife management. In 2017 the Polk County Land and Water Resource Department assisted a volunteer in raising and releasing *Galerucella* beetles. Beetles were released on the Trade River and in the Luck wetland.

As of December, 2015 purple loosestrife was documented on nine Polk County waterbodies. The Polk County Land and Water Resources Department documented the species in seven additional waterbodies in 2016-2017: Big Butternut Lake, Horseshoe Lake, Little Butternut Lake, Little Mirror Lake, Magnor Lake, Sandhill Lake, and the St. Croix River.



Purple loosestrife, Horseshoe Lake, 2017

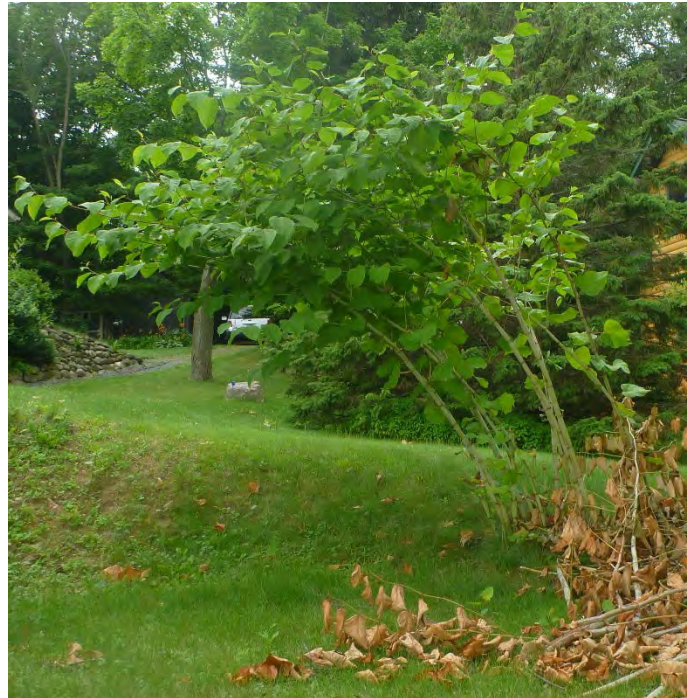


Purple loosestrife has been documented on 16 Polk County waterbodies as of December, 2017 including: the Apple River Flowage, Balsam Lake, Big Butternut Lake, Big Lake, Grimhs Lake, Horseshoe Lake, Little Butternut Lake, Little Mirror Lake, Lotus Lake, Magnor Lake, North Twin Lake, North White Ash Lake, Sandhill Lake, Silver Lake, the St. Croix River, and White Ash Lake

Japanese and Giant Knotweed

Japanese and giant knotweed are native to Asia and were imported to the United States in the mid 1900's as ornamental plants, although they are becoming more prevalent in the wild. The plant can reach up to fifteen feet and is easily distinguished by hollow bamboo-like stalks.

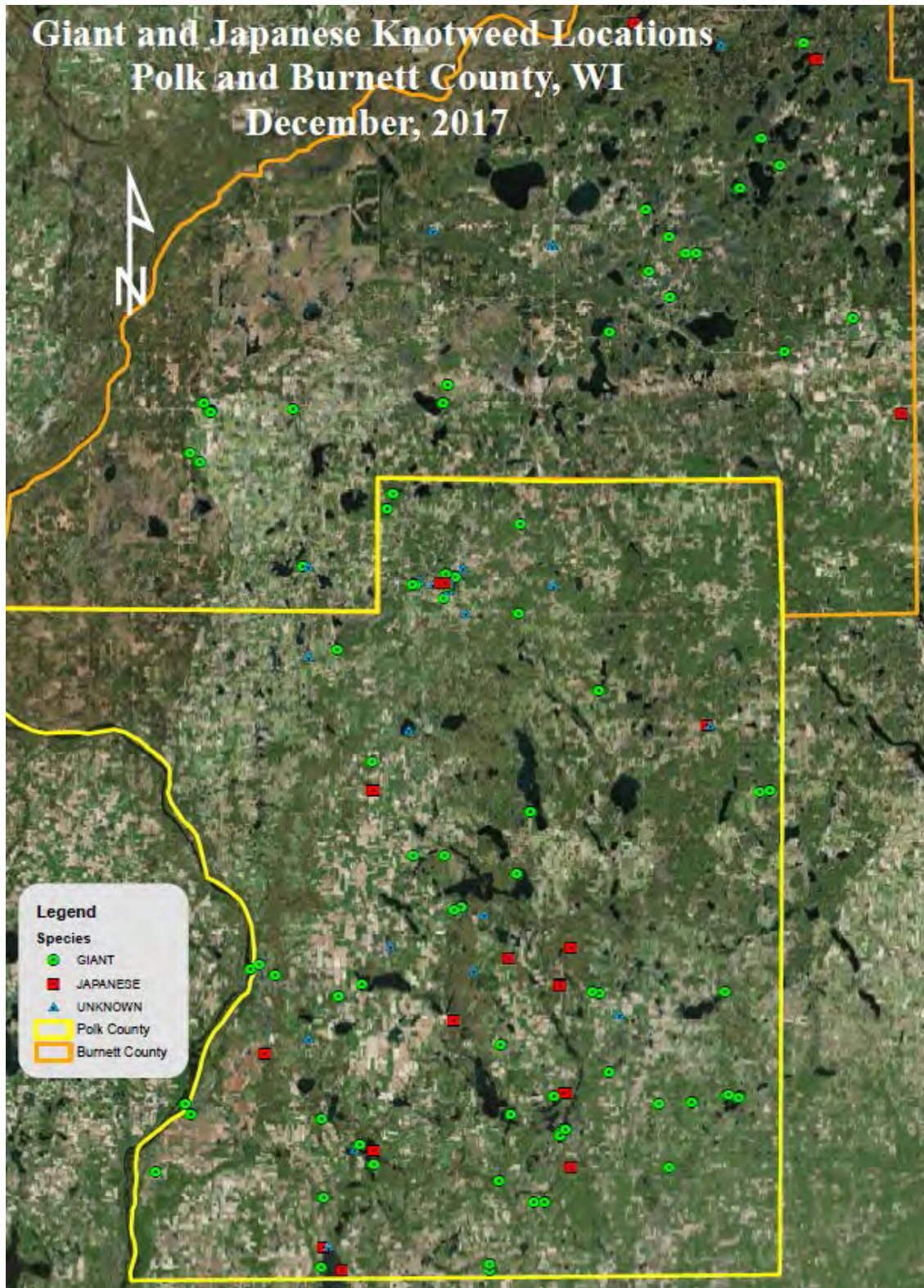
Knotweed is a perennial, meaning that each spring it re-grows from an extensive root system. Japanese and giant knotweed grow extremely fast and form a dense canopy of foliage which blocks sunlight from reaching the ground. As a result, native vegetation is unable to grow beneath a knotweed stand. When knotweed establishes on stream banks, the lack of understory can promote intense erosion, causing soil and knotweed roots to move downstream.



Knotweed, Deer Lake, 2017

The existence of knotweed was confirmed for the first time in Polk County in 2009. Since 2012, knotweed control measures and trainings have been conducted by the Polk County Land and Water Resources Department under early detection and response grants and aquatic invasive species education, prevention, and planning grants. As of December 2017, knotweed has been documented at one hundred nine sites in Polk County and a total of ten waterbodies have knotweed present. Two new sites were found in 2016-2017.

In 2016 and 2017 the Polk County Land and Water Resources Department continued to provide knotweed control guidance to numerous landowners in Polk County. Two new sites were identified and four sites were treated during the 2017 season for follow up control.



Knotweed has been documented on 10 Polk County waterbodies as of December, 2017 including: the Apple River Flowage, Balsam Lake, Big Lake, Cedar Lake, Deer Lake, Hatchet Lake, Little Butternut Lake, the St. Croix River, unnamed pond, and Wapogasset Lake

Chinese Mystery Snails

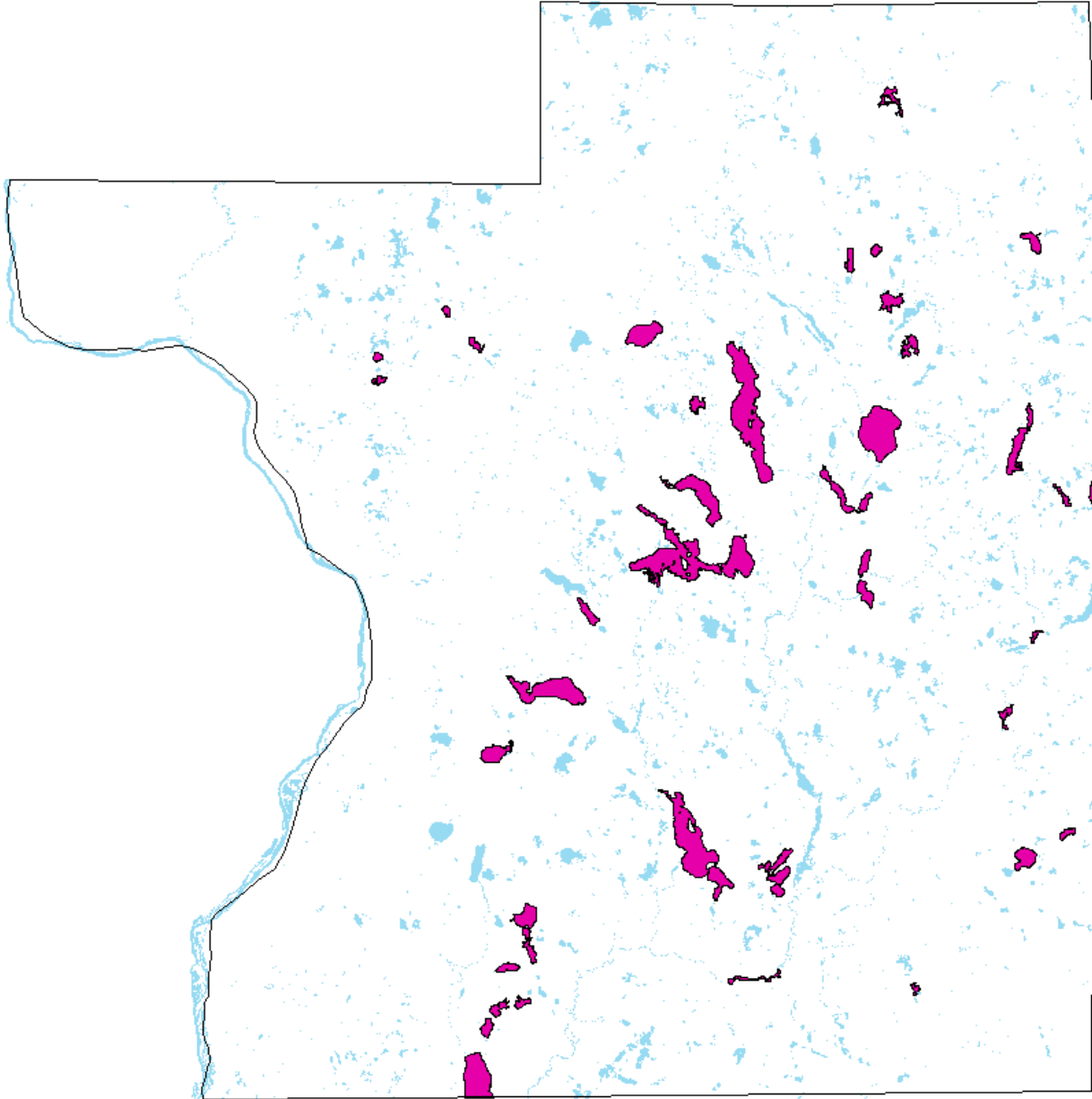
Chinese mystery snails were imported to the west coast in the late 1800's as a food source for the Asian market and have spread via aquarium release and other accidental and intentional introductions. When introduced to a new water body, Chinese mystery snails alter the ecosystem composition, structure, and function by competing with native snails for food and space.

Populations of Chinese mystery snails are now established in many Northern Wisconsin lakes. As of December 2015, Chinese mystery snails were documented on thirty-eight Polk County waterbodies.

The Polk County Land and Water Resources Department documented the species in nine additional waterbodies in 2016-2017: Bass Lake, Big Butternut Lake, Joel Flowage, Little Mirror Lake, Long Lake (Johnstown), Loveless Lake, Rice Lake (Alden), Round Lake (Laketown), and Wind (Round) Lake.



Chinese mystery snail, Bone Lake, 2016



Chinese mystery snails have been documented on 47 Polk County waterbodies as of December, 2017 including: Antler Lake, Apple River, Balsam Lake, Bass Lake, Bear Trap Lake, Big Blake Lake, Big Butternut Lake, Big Lake, Big Round Lake, Black Brook Flowage, Bone Lake, Camelia Lake, Cedar Lake, Church Pine Lake, Clam Falls Flowage, Clear Lake, Deer Lake, Half Moon Lake, Horseshoe Lake, Joel Flowage, Largon Lake, Little Blake Lake, Little Mirror Lake, Long Lake (Johnstown), Loveless Lake, Lower Pine Lake, Magnor Lake, McKenzie Lake, Middle Pine Lake, North Pipe Lake, North Twin Lake, North White Ash Lake, Pike Lake, Pine Lake, Pipe Lake, Rice Lake (Alden), Round Lake (Laketown), Sand Lake, Sandhill Lake, Silver Lake, South Twin Lake, Staples Lake, Swede Lake, Wapogasset Lake, Ward Lake, White Ash Lake, and Wind (Round) Lake

Banded Mystery Snails

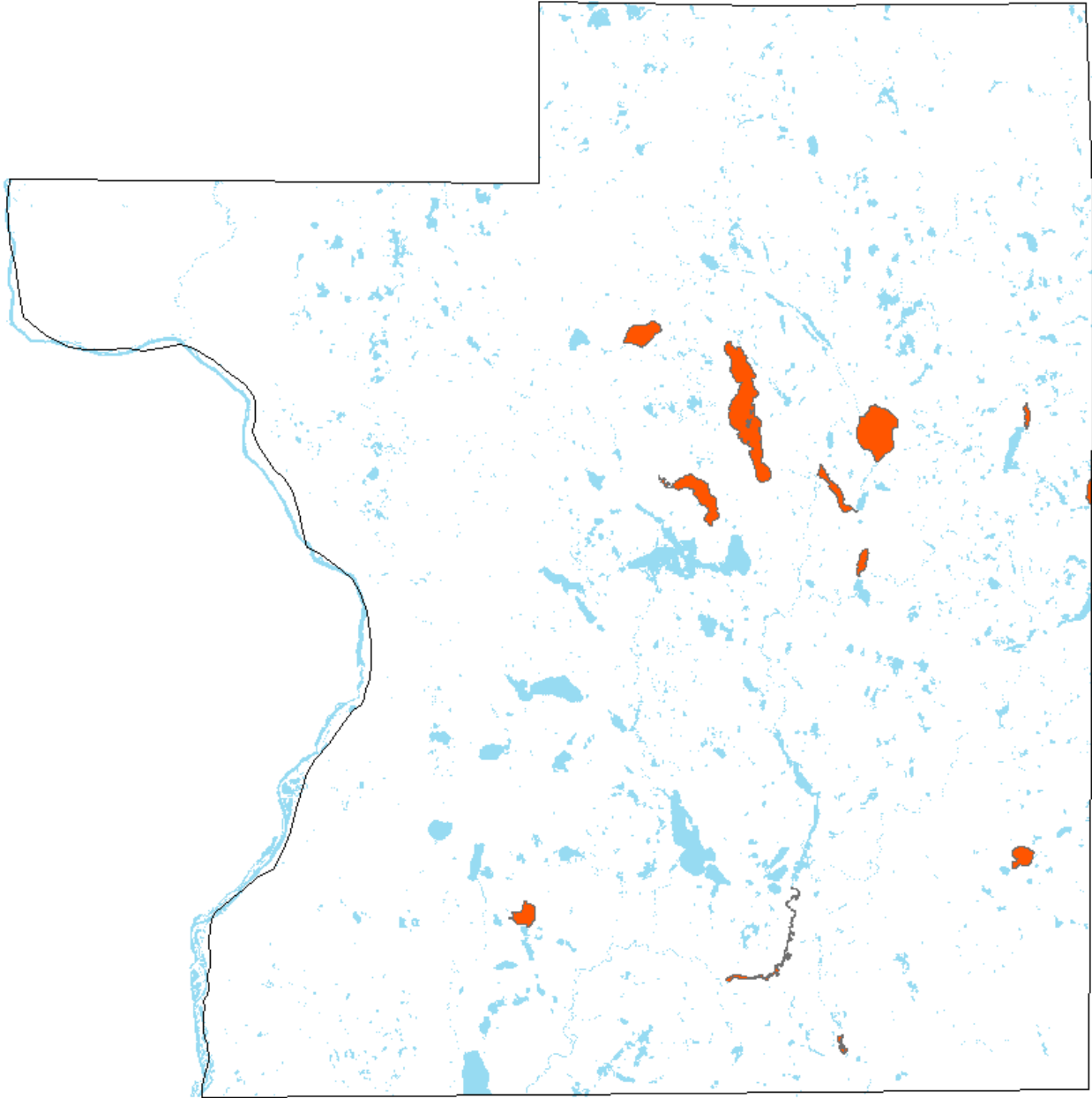
Banded mystery snails are native to the southeastern United States, being found primarily in the Mississippi River System up to Illinois. This invasive snail species is popular in the aquarium trade which likely explains its presence outside its native range. Besides causing aesthetic problems, banded mystery snails can cause mortality of largemouth bass embryos if nests are invaded.



Banded mystery snail, Big Butternut Lake, 2017

The banded mystery snail is easily distinguished by the presence of reddish bands which are arranged parallel to the whorl of the shell.

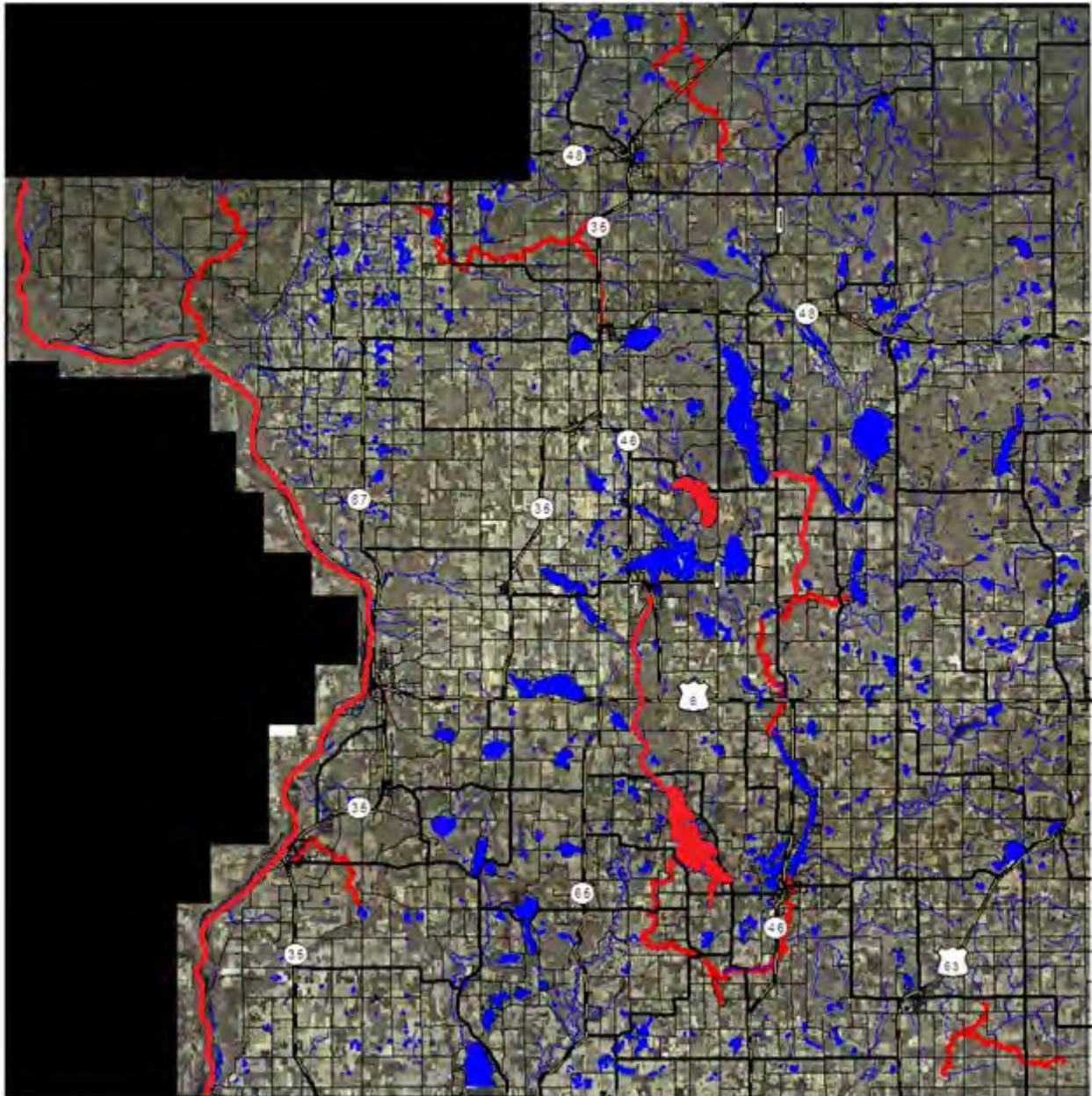
Banded mystery snails were first documented in Polk County in 2003 in Half Moon Lake. Although their spread had continued, they are still much less common in Polk County as compared with the Chinese mystery snail and had been documented in only eleven Polk County waterbodies as of December, 2015. The Polk County Land and Water Resources Department documented the species in one additional waterbody in 2016-2017: Big Butternut Lake.



Banded mystery snails have been documented on 12 Polk County waterbodies as of December, 2017 including: Big Blake Lake, Big Butternut Lake, Big Lake, Big Round Lake, Black Brook Flowage, Bone Lake (Black Brook), Bone Lake (Georgetown), Half Moon Lake, Magnor Lake, North Pipe Lake, North White Ash Lake, and Staples Lake

Rusty Crayfish

Rusty crayfish are invasive crustaceans that can have profound impacts on lakes, rivers, and streams. They are more aggressive than native crayfish and are better able to avoid predation than native crayfish. Rusty crayfish can also harm native fish populations by eating their eggs and young.



Rusty crayfish have been documented on 10 Polk County waterbodies as of December, 2017 including: Apple River, Balsam Branch, Fox Creek, Half Moon Lake, Osceola Creek, St. Croix River, Trade River, Wapogasset Lake, Willow River, and Wood River

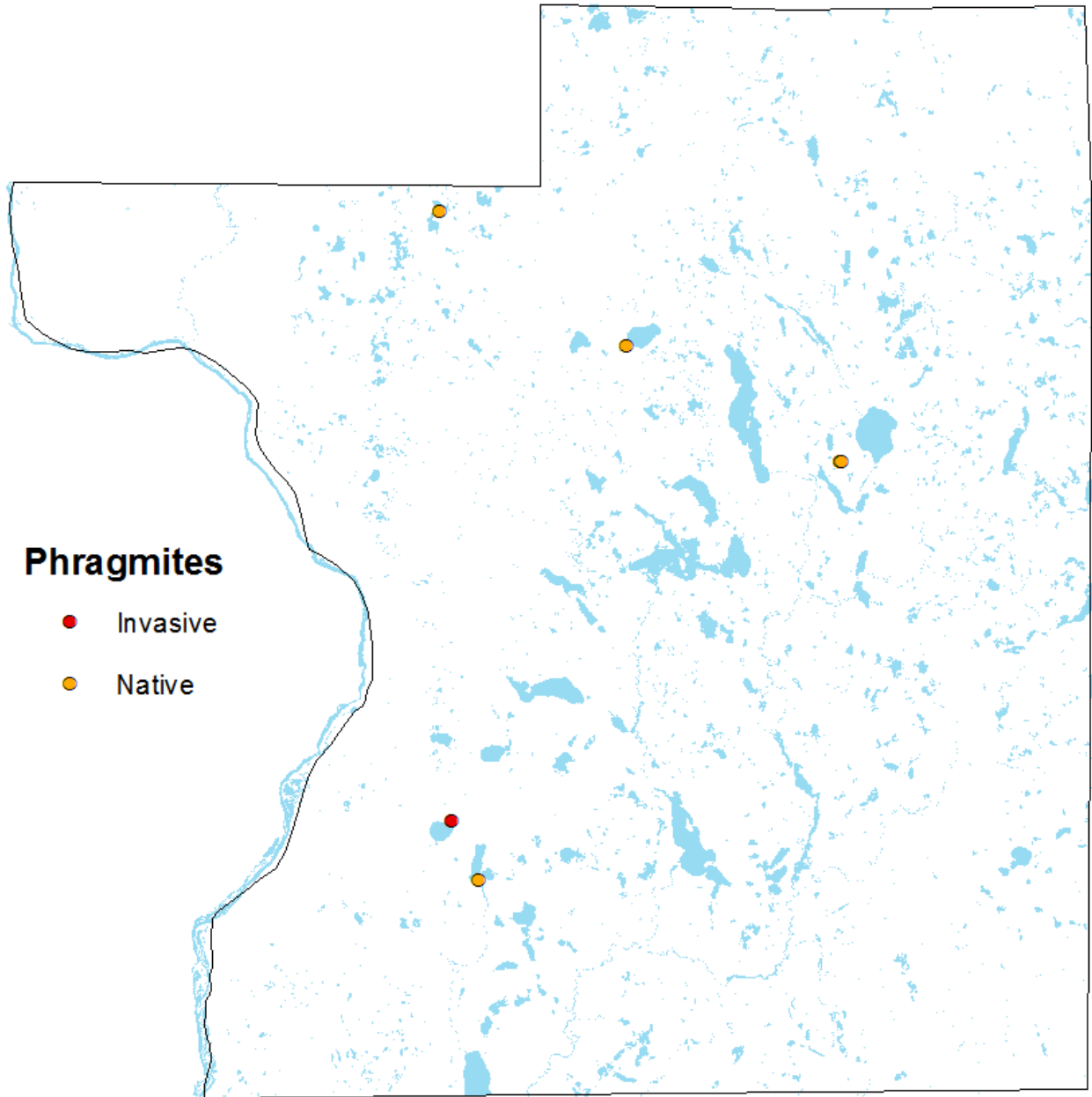
Phragmites

Phragmites is a wetland grass that invades moist habitats, although it can tolerate dry conditions. It can grow from 3-20 feet in height and has dull, rigid, hollow stems.

In 2017 a contractor reported a suspect stand of invasive phragmites in the road right of way near the outlet of Lotus Lake. The Land and Water Resources Department visited the site and confirmed the stand as invasive. Samples were sent to the University of Wisconsin-Whitewater Tippery Lab for genetic analysis.



Phragmites stand in the road right of way near the outlet of Lotus Lake, 2017



Invasive phragmites has been documented near 1 Polk County waterbody as of December, 2017: Lotus Lake

Native phragmites has been documented at 4 sites in Polk County

Yellow Iris

Yellow iris is a showy perennial plant that can grow under a variety of conditions from drier upland sites to floating aquatic mats. The leaves and flowers of yellow iris resemble ornamental or native iris species. The leaves of yellow iris have a slight blue-grey tint and a thicker more pronounced midrib. Flowers are yellow and between 3-4 inches wide and bloom from April to June. The flowers are produced in a stem that can grow 3-4 feet tall among leaves that are usually as tall or taller. Yellow iris is native to Eurasia.

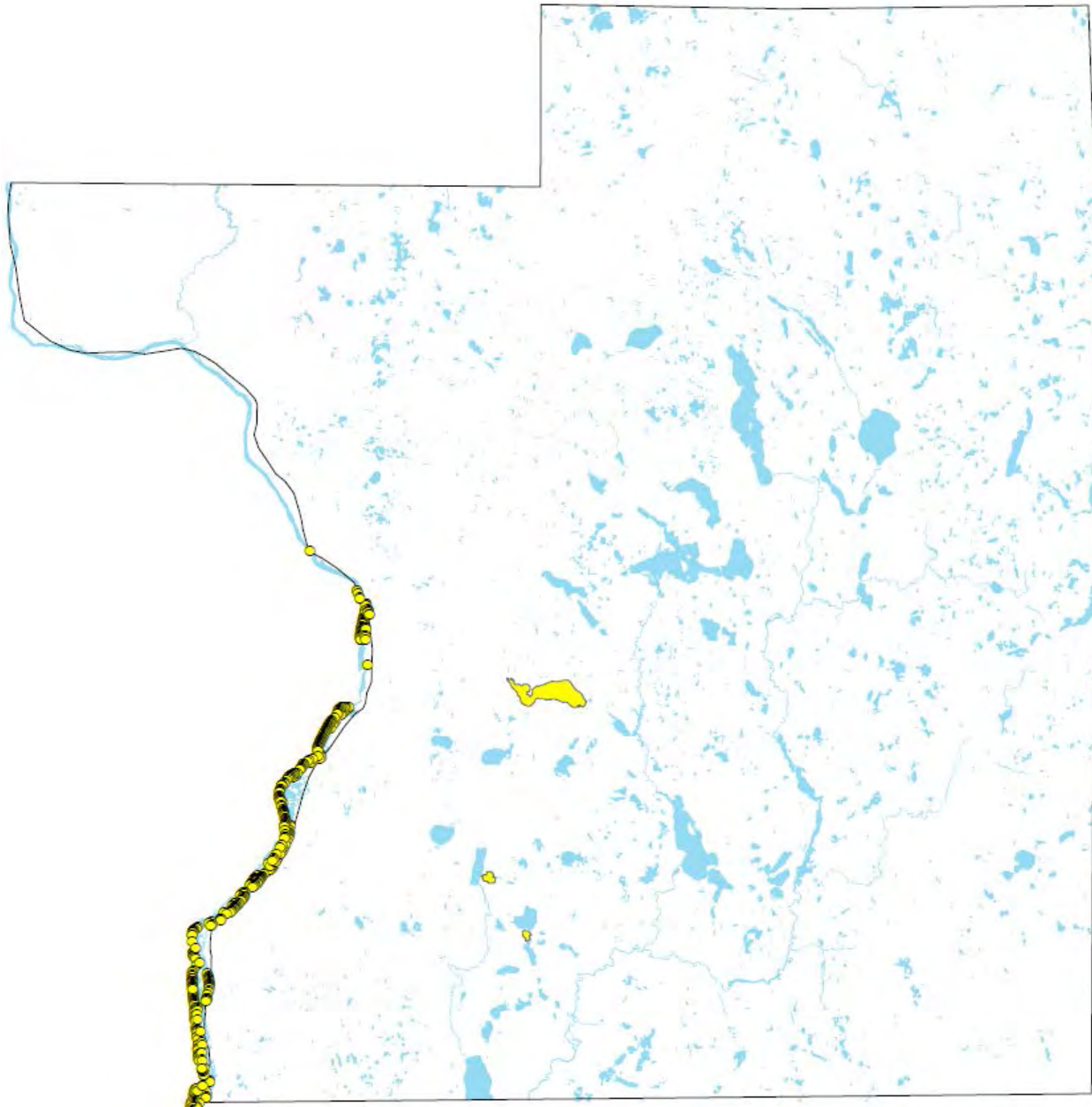


Yellow iris leaf cross-section to show pronounced midrib, Wind Lake, 2017

The Polk County Land and Water Resources Department documented yellow iris in four waterbodies in 2016-2017. The St. Croix River Association completed a comprehensive survey of yellow iris on the St. Croix River in 2017, monitoring from Riverside Landing to the Boomsite Landing. The Land and Water Resources Department assisted with this effort from the Wisconsin Interstate Park Landing to the Osceola Landing.



Yellow iris, St. Croix River, 2016



Yellow iris has been documented on 4 Polk County waterbodies as of December, 2017 including: Deer Lake, Dwight Lake, the St. Croix River, and Wind Lake.

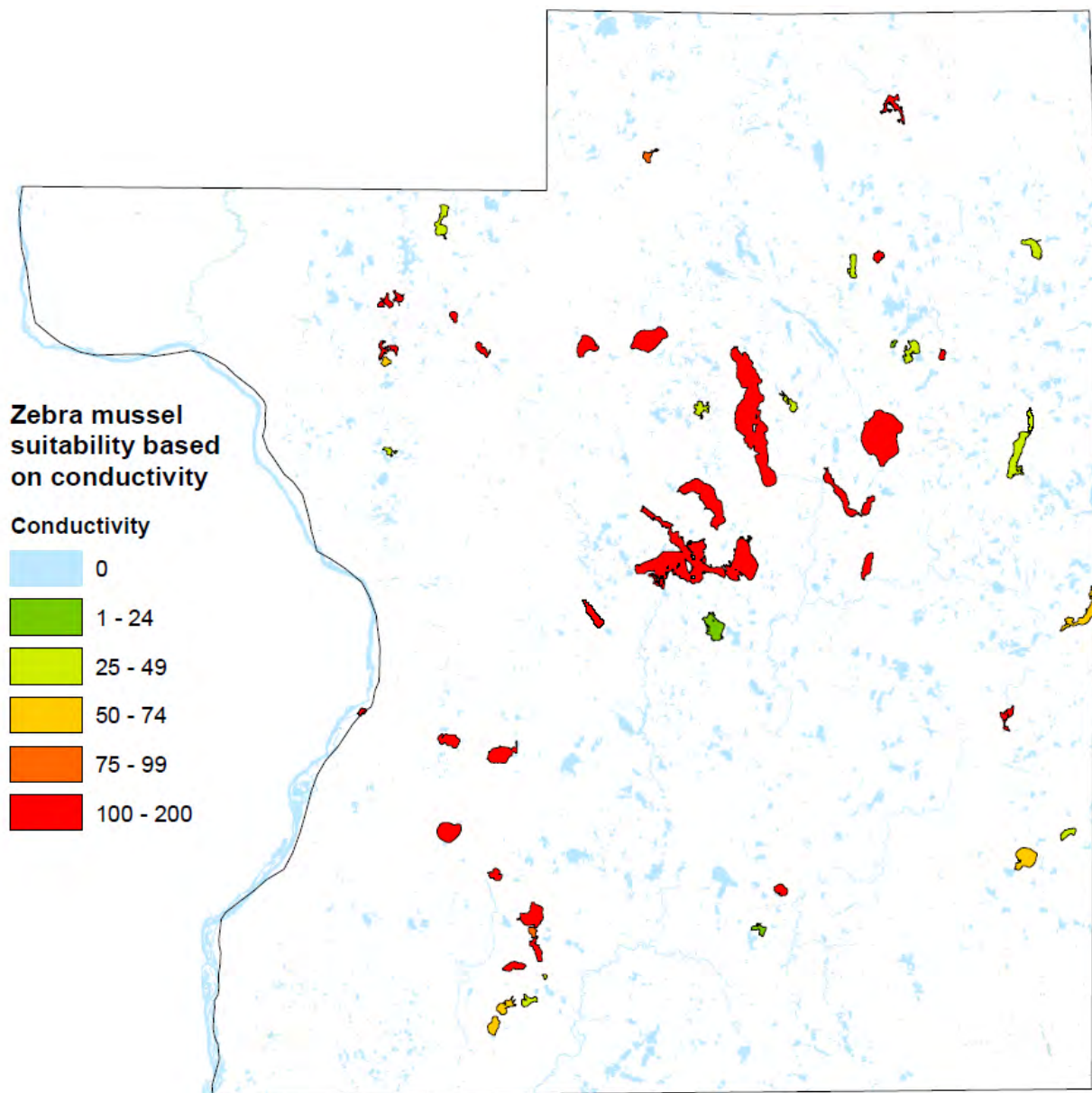
Zebra Mussels

Zebra mussels are aquatic invasive mussels with a D-shaped shell exhibiting alternating black and white stripes. Since they are able to attach to hard surfaces, zebra mussels can clog water intakes and damage equipment such as boat motors. When waterbodies are infested with zebra mussels, their shorelines can become littered with sharp shells that impede human recreational opportunities. Additionally, zebra mussels damage ecosystems by harming fisheries and smothering native mussels, snails, and crayfish.

Zebra mussels arrived in the Great Lakes in the late 1980's from contaminated ballast water. Since that time they have expanded in range via the Mississippi River. In September 2016, a single adult zebra mussel was found on the northeast side of Deer Lake by a citizen.



Conductivity can be used to predict a lakes suitability for supporting populations of zebra mussels. Although calcium is a better indicator for suitability, very little data for this parameter exists for Polk County. However, conductivity data exists for many lakes in the county. Lakes with conductivity levels below 99 $\mu\text{S}/\text{cm}$ are not suitable for zebra mussels. The majority of the larger lakes in Polk County have conductivity levels that would indicate they can support zebra mussels.



Zebra Mussel Discovery and Task Force

On September 2nd, 2016, a single adult zebra mussel was found on the northeast side of Deer Lake by a citizen. The specimen was identified by the Land and Water Resource Department and brought to the Wisconsin Department of Natural Resources for verification.

Later that same week representatives from the Land and Water Resource Department, the Deer Lake Improvement Association, and U.S. Fish and Wildlife Service searched the



Zebra mussel attached to rock, Deer Lake, 2016

shallow water in the vicinity where the zebra mussel was found and at the public access. No additional zebra mussels were found at this time.

In September, the Deer Lake Improvement Association sent out email and mail notices to lake residents with information regarding the zebra mussel that was found. The notices provided a description of zebra mussels and encouraged residents to check docks and boats as they were pulled from the water for the season. The Association also informed dock service providers about the zebra mussel discovery and requested that they check docks and equipment pulled out of Deer Lake. In late October, volunteers checked docks and lifts pulled out of Deer Lake.

In response to this discovery, the Land and Water Resource Department and Harmony Environmental organized a Zebra Mussel Task Force to coordinate a zebra mussel monitoring effort for Deer Lake and additional Polk County lakes and rivers. Partners from the Deer Lake Improvement Association, Harmony Environmental, Bone Lake Management District, Polk County Land and Water Resources Department, St. Croix River Association, Wisconsin Department of Natural Resources, National Park Service, and U.S. Fish and Wildlife Service attended two meetings of the Polk County Zebra Mussel Task Force. These meetings occurred on January 20th and February 9th, 2016 and were facilitated by Harmony Environmental.

At the first meeting, the current status of zebra mussels in Deer Lake, Big McKenzie Lake (Burnett/Washburn County), the St. Croix River, Bass Lake (St. Croix County), and Minnesota was discussed. A matrix of monitoring methods and a 2017 monitoring plan for Deer Lake was created at the meeting. Additionally, a basic monitoring plan for lakes without zebra mussels

and priority/destination lakes was created. Lastly, a list of methods and messages for a countywide zebra mussel monitoring and prevention outreach strategy was compiled.

During the second meeting, an example zebra mussel monitoring worksheet was presented by the National Park Service. Rapid response grants were discussed and the group decided it was un-necessary to apply for a grant for the 2017 season. Additionally, tasks were assigned for the countywide zebra mussel monitoring and prevention outreach strategy.

The following monitoring efforts were undertaken on Deer Lake and additional Polk County waterbodies in 2017.

- ✓ Cinder block and plate sampler monitoring by the Deer Lake Improvement Association with suspect specimens reviewed by the Land and Water Resources Department
- ✓ Plate sampler and substrate examination at the Deer Lake boat landing and additional Polk County waterbodies by U.S. Fish and Wildlife Service
- ✓ Plate sampler and substrate examination at the site where the zebra mussel was found by the Land and Water Resources Department
- ✓ Shoreline searches and substrate examination at the site where the zebra mussel was found by the Deer Lake Improvement Association
- ✓ Smart prevention protocol on Deer Lake (including veliger tows) by the Land and Water Resources Department and the St. Croix River Association
- ✓ Veliger tows on Deer Lake, Bone Lake, Balsam Lake, and two sites on the St. Croix River by the National Park Service, St. Croix River Association, Land and Water Resources Department, Deer Lake Improvement Association, and Bone Lake Management District

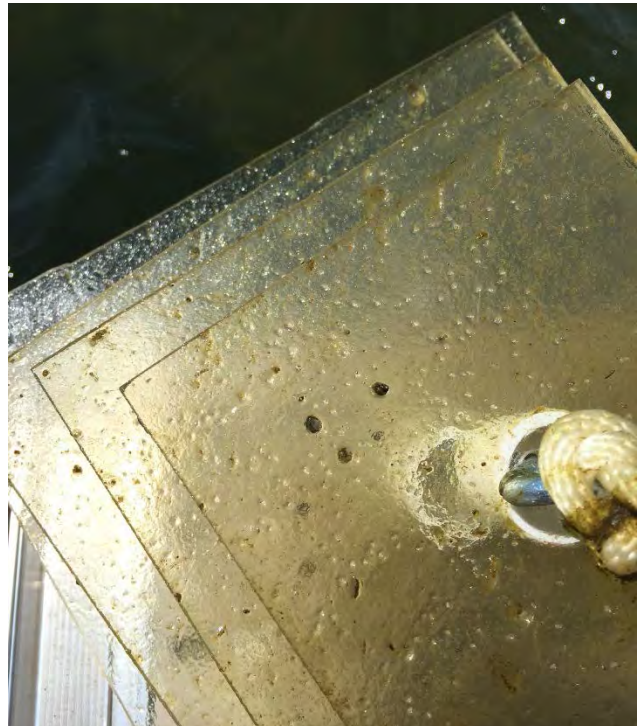


Plate sampler from Deer Lake, 2017

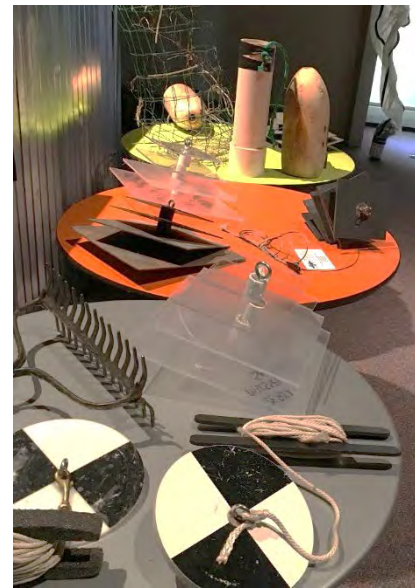
The Land and Water Resources Department also made zebra mussel plate sampler supplies obtained from the Wisconsin Department of Natural Resources available to Polk County waterbodies. As a result, a total of fifty-five plate samplers were placed on the following lakes and monitored by volunteers: the Apple River Flowage, Balsam Lake, Bear Trap Lake, Big Blake

Lake, Big Round Lake, Big Lake, Bone Lake, Cedar Lake, Church Pine Lake, Deer Lake, and Wapogasset Lake.

The following zebra mussel monitoring and prevention outreach methods and messages were developed by the Land and Water Resource Department and made available to the public in 2017.

- ✓ Press release
- ✓ Template PowerPoint presentation
- ✓ Template article for websites, newsletters, Facebook, etc.
- ✓ Zebra mussel materials, publications, and resources

The Land and Water Resource Department, in partnership with the St. Croix River Association, offered a Joint Minnesota and Wisconsin Zebra Mussel Workshop in St. Croix Falls, Wisconsin on April 24th. The day-long workshop featured presentations on monitoring by the Land and Water Resources Department, National Park Service, and the Comfort Lake-Forest Lake Watershed District; control by Minnesota Department of Natural Resources and the University of Minnesota; and decontamination (with three different decontamination units) by Chisago County, U.S. Fish and Wildlife Service, and the Wisconsin Department of Natural Resources Water Guard. The workshop was attended by seventy people from three states. Example monitoring equipment and educational resources were also on display.



Joint MN and WI Zebra Mussel Workshop presentation and example monitoring equipment, 2017 (Photo credits: SCRA)

Aquatic Invasive Species Early Detection Smart Prevention Protocol

The Polk County Land and Water Resources Department partnered with the Wisconsin Department of Natural Resources to implement the statewide aquatic invasive species early detection smart prevention protocol on Polk County Lakes. This study began in 2011 and concluded in 2015. The Land and Water Resources Department continued using this protocol to monitor Polk County waterbodies in 2016 and 2017.

The protocol includes the collection of basic water quality data (secchi depth and conductivity) along with numerous detection methods for aquatic invasive species:

- ✓ Thirty minute searches at all boat landings
- ✓ Ten minute searches at five sites
- ✓ Spiny water flea dredge at the deep hole
- ✓ Zebra mussel veliger tows at three sites
- ✓ Rake throws and D-nets while completing a shoreline meander

Lakes monitored in 2016 include:

- ✓ Bone Lake
- ✓ Horseshoe Lake
- ✓ Little Butternut Lake
- ✓ Little Mirror Lake
- ✓ Long Lake (Johnstown)
- ✓ North Pipe Lake
- ✓ Pipe Lake
- ✓ Dwight (Round) Lake (Osceola)
- ✓ Sandhill Lake

Lakes monitored in 2017 include:

- ✓ Andrus Lake
- ✓ Bass Lake
- ✓ Big Butternut Lake
- ✓ Deer Lake
- ✓ Joel Flowage
- ✓ Lee Lake
- ✓ Loveless Lake
- ✓ Magnor Lake
- ✓ Pike Lake
- ✓ Rice Lake (Alden)
- ✓ Round Lake (Laketown)
- ✓ Dwight (Round) Lake (Osceola)
- ✓ Tarbert Lake
- ✓ Twin Lakes
- ✓ Wild Goose Lake
- ✓ Wind (Round) Lake (Alden)



Curly leaf pondweed sprouting from turion, Tarbert Lake, 2017

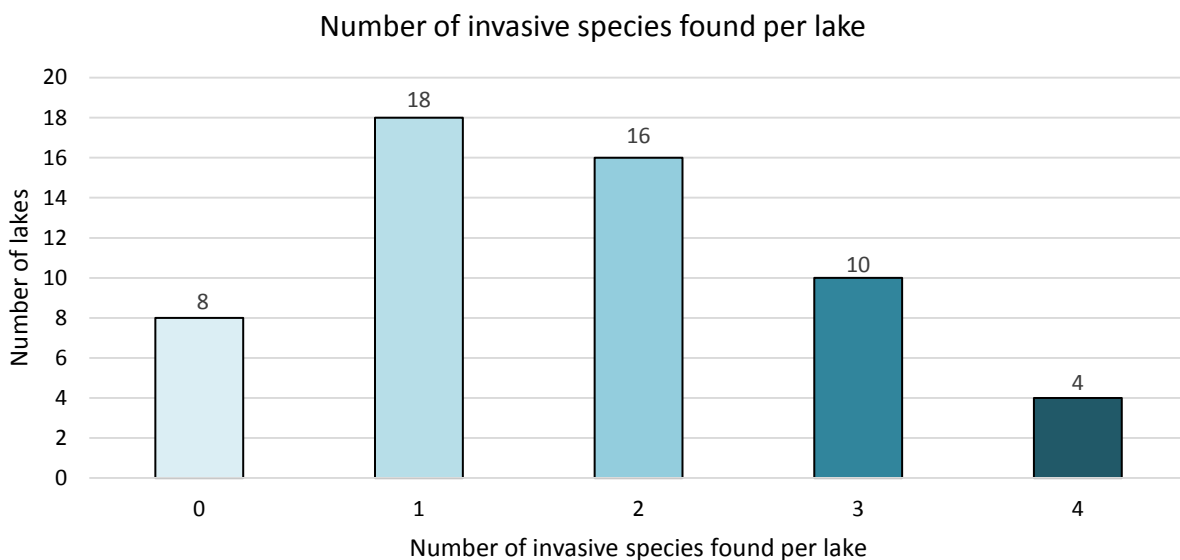
Data for secchi depth, conductivity, and GIS location of aquatic invasive species populations were entered into the Surface Water Integrated Monitoring System (SWIMS). Aquatic plant specimens were sent to the UW-Stevens Point Herbarium and waterflea and veliger samples were sent to the Wisconsin Department of Natural Resources.



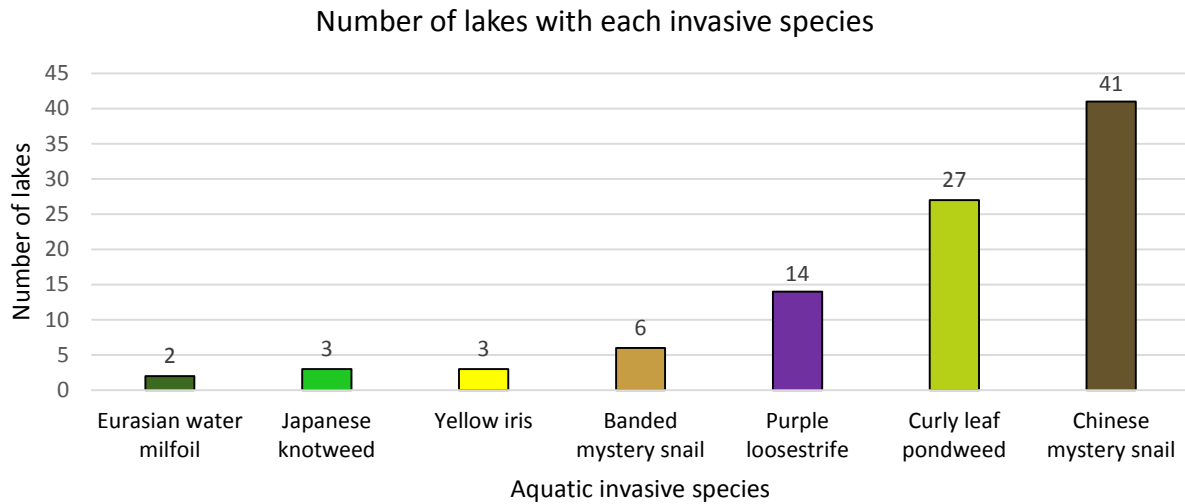
Eurasian water milfoil, Horseshoe Lake, 2016

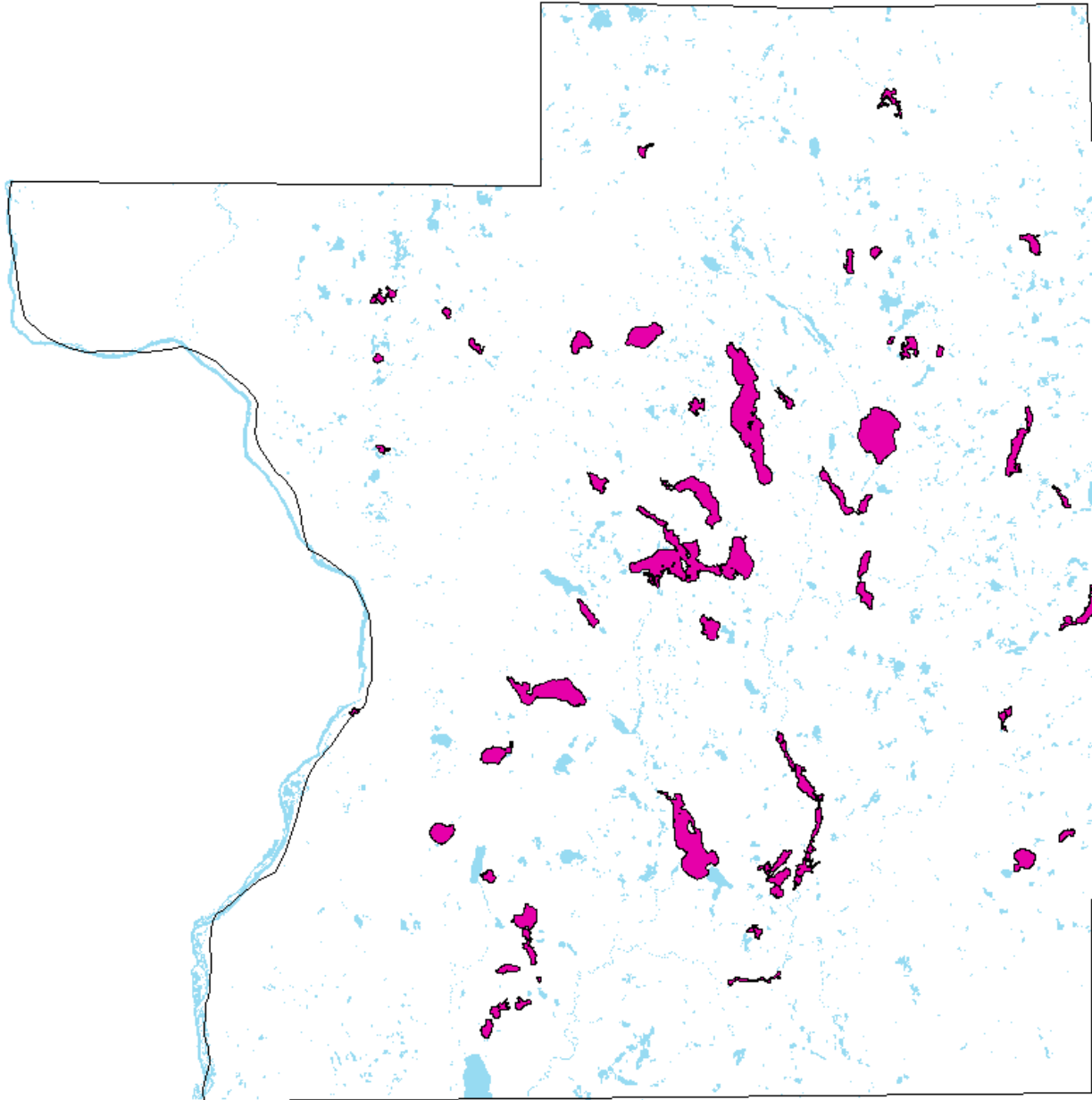
Under previous aquatic invasive species grants, the Land and Water Resources Department implemented the protocol on nine lakes in 2011, seven lakes in 2012, three lakes in 2013, nine lakes in 2014, and seven lakes in 2015.

In total since 2011, fifty-six Polk County lakes have been monitored for aquatic invasive species with the early detection smart prevention protocol. Additionally, some lakes were chosen as revisit lakes and monitored twice. The number of invasive species per lake ranged from zero to four. Fourteen percent of lakes sampled (n=8) had zero invasive species present, 32% of lakes (n=18) had one invasive species present, 29% of lakes (n=16) had two invasive species present, 18% of lakes (n=10) had three invasive species present, and 7% of lakes (n=4) had four invasive species present.



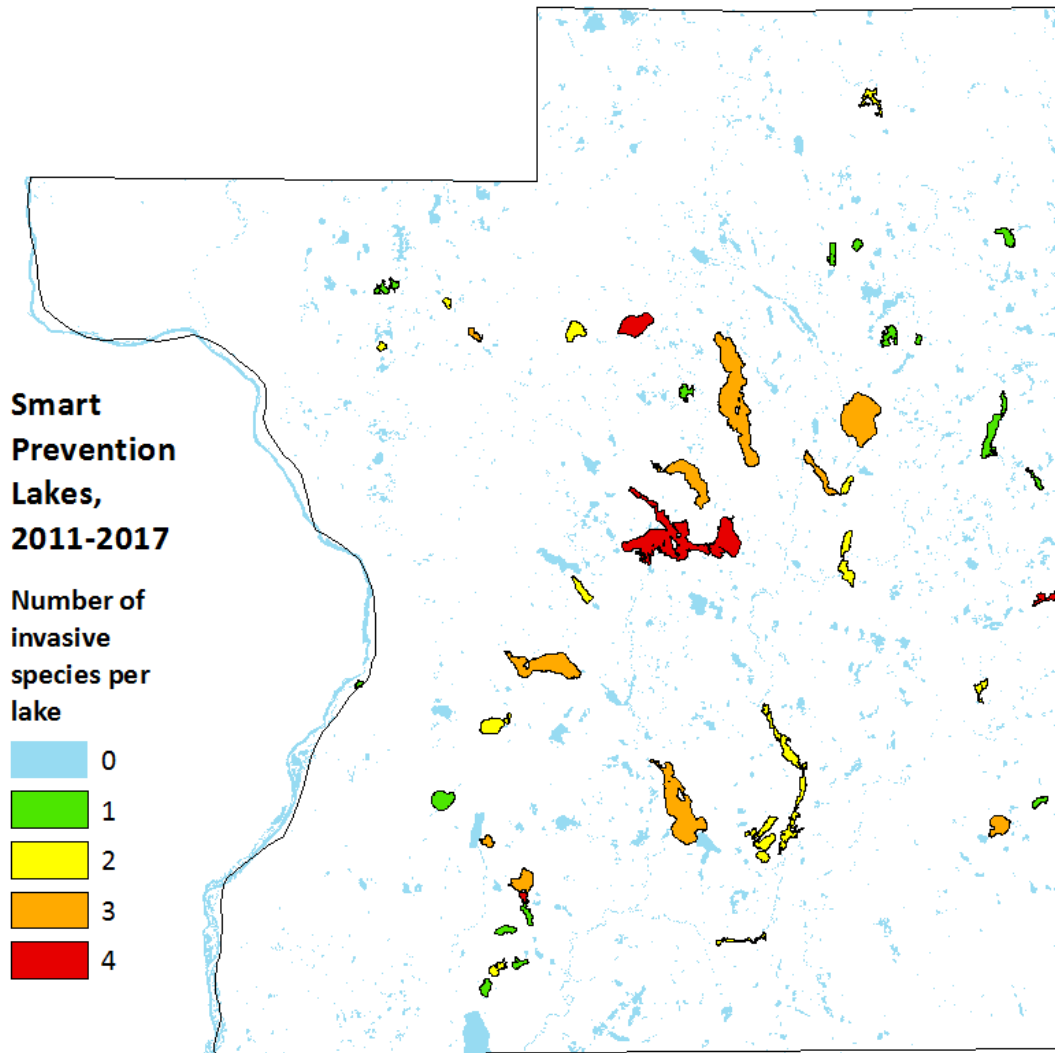
Species detected through the protocol included: Eurasian water milfoil, Japanese knotweed, yellow iris, banded mystery snail, purple loosestrife, curly leaf pondweed, and Chinese mystery snail. Eurasian water milfoil was detected in only 4% of the lakes sampled (n=2), Japanese knotweed was detected in only 5% of lakes sampled (n=3), yellow iris was detected in only 5% of the lakes sampled (n=3), and banded mystery snail was detected in only 11% of lakes sampled (n=6). Purple loosestrife was detected in a quarter of lakes sampled (25%, n=14), curly leaf pondweed was found in nearly half of the lakes sampled (48%, n=27) and Chinese mystery snails were found in nearly three-quarters of lakes sampled (73%, n=41).





Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

Andrus Lake, Antler Lake, Apple River Flowage, Balsam Lake, Bass Lake, Big Blake Lake, Big Butternut Lake, Big Lake, Big Round Lake, Black Brook Flowage, Bone Lake, Camelia Lake, Church Pine Lake, Clam Falls Flowage, Coon Lake, Deer Lake, Dwight (Round) Lake, Half Moon Lake, Herby Lake, Horseshoe Lake, Joel Flowage, King Lake, Lake O' the Dalles, Largon Lake, Lee Lake, Little Blake Lake, Little Butternut Lake, Little Mirror Lake, Long Lake (Johnstown), Lotus Lake, Loveless Lake, Lower Pine Lake, Magnor Lake, McKenzie Lake, North Pipe Lake, North Twin Lake, North White Ash Lake, Pickerel Lake, Pike Lake, Pine Lake, Pipe Lake, Rice Lake (Alden), Rice Lake (Milltown), Round Lake (Laketown), Sand Lake, Sandhill Lake, South Twin Lake, Swede Lake, Tarbert Lake, Twin Lakes, Vincent Lake, Wapogasset Lake, Ward Lake, White Ash Lake, Wild Goose Lake, and Wind (Round) Lake.



Number of aquatic invasive species found per lake

Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

Lakes without aquatic invasive species: Coon Lake, King Lake, Lee Lake, Pickerel Lake, Rice Lake (Milltown), Twin Lake, Vincent Lake, Wild Goose Lake

Lakes with 1 aquatic invasive species: Andrus Lake, Antler Lake, Bass Lake, Camelia Lake, Church Pine Lake, Herby Lake, Lake O' the Dalles, Largon Lake, Long Lake (Johnstown), Lotus Lake, Lower Pine Lake, McKenzie Lake, North Pipe Lake, Pipe Lake, Rice Lake (Alden), Swede Lake, Tarbert Lake, Ward Lake

Lakes with 2 aquatic invasive species: Apple River Flowage, Black Brook Flowage, Clam Falls Flowage, Joel Flowage, Little Blake Lake, Little Butternut Lake, Little Mirror Lake, Loveless Lake, North Twin Lake, North White Ash Lake, Pike Lake, Pine Lake, Round Lake (Laketown), Sand Lake, South Twin Lake, White Ash Lake

Lakes with 3 aquatic invasive species: Big Blake Lake, Big Lake, Big Round Lake, Bone Lake, Deer Lake, Dwight (Round) Lake, Half Moon Lake, Magnor Lake, Sandhill Lake, Wapogasset Lake

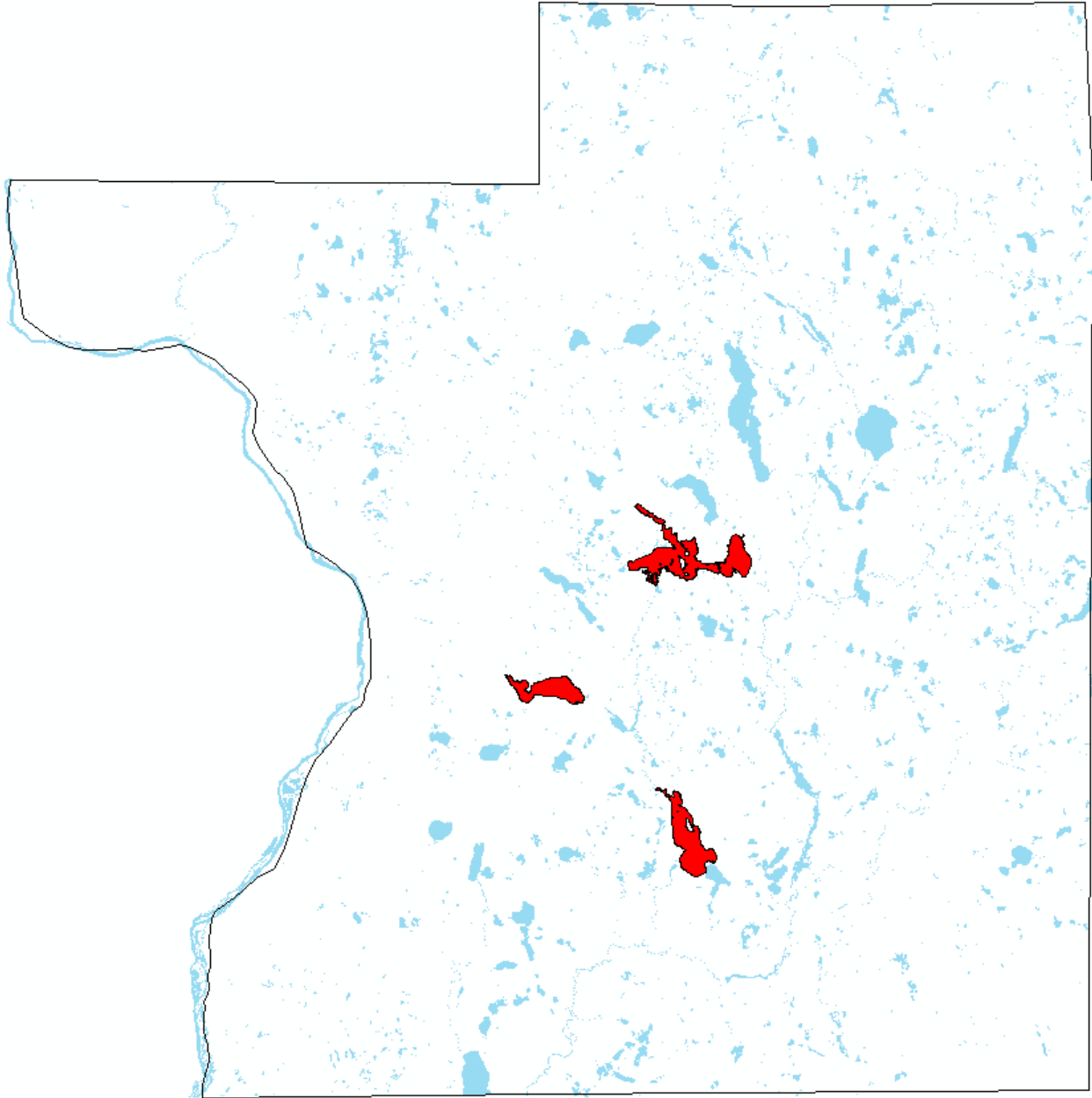
Lakes with 4 aquatic invasive species: Balsam Lake, Big Butternut Lake, Horseshoe Lake, Wind (Round) Lake



Eurasian water milfoil

Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

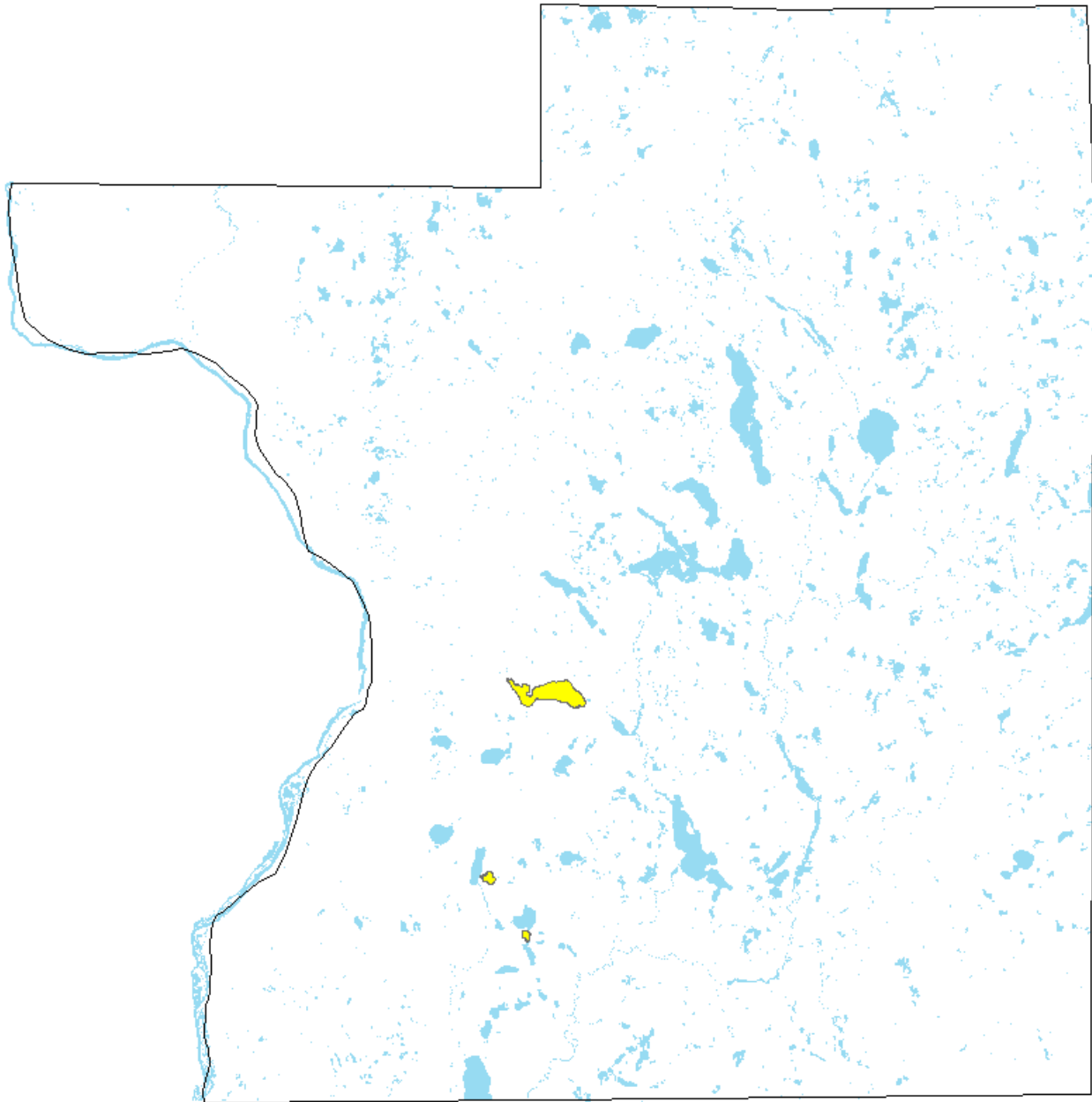
2 Lakes: Horseshoe Lake, Pike Lake



Japanese knotweed

Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

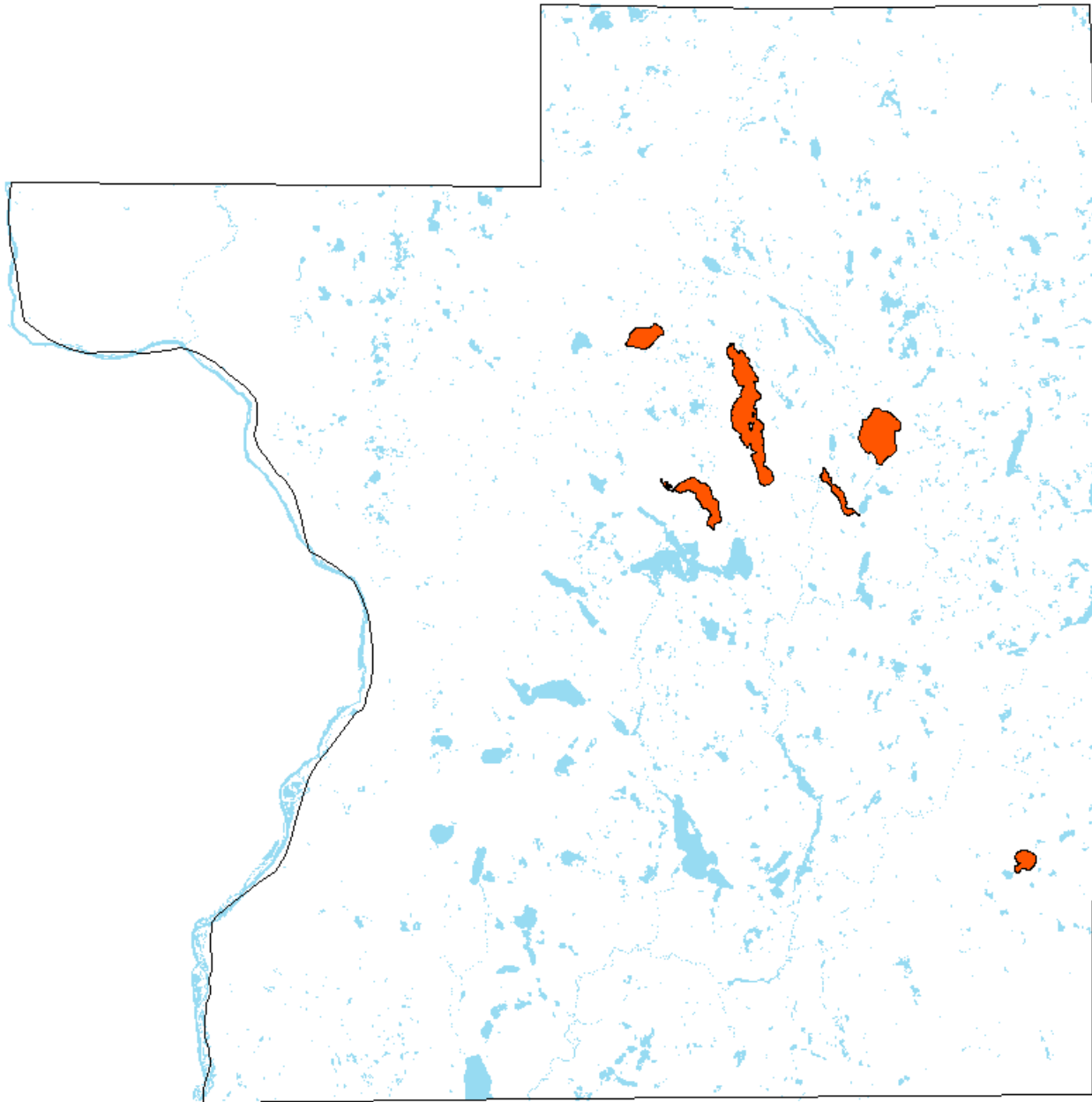
3 Lakes: Balsam Lake, Deer Lake, Wapogasset Lake



Yellow iris

Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

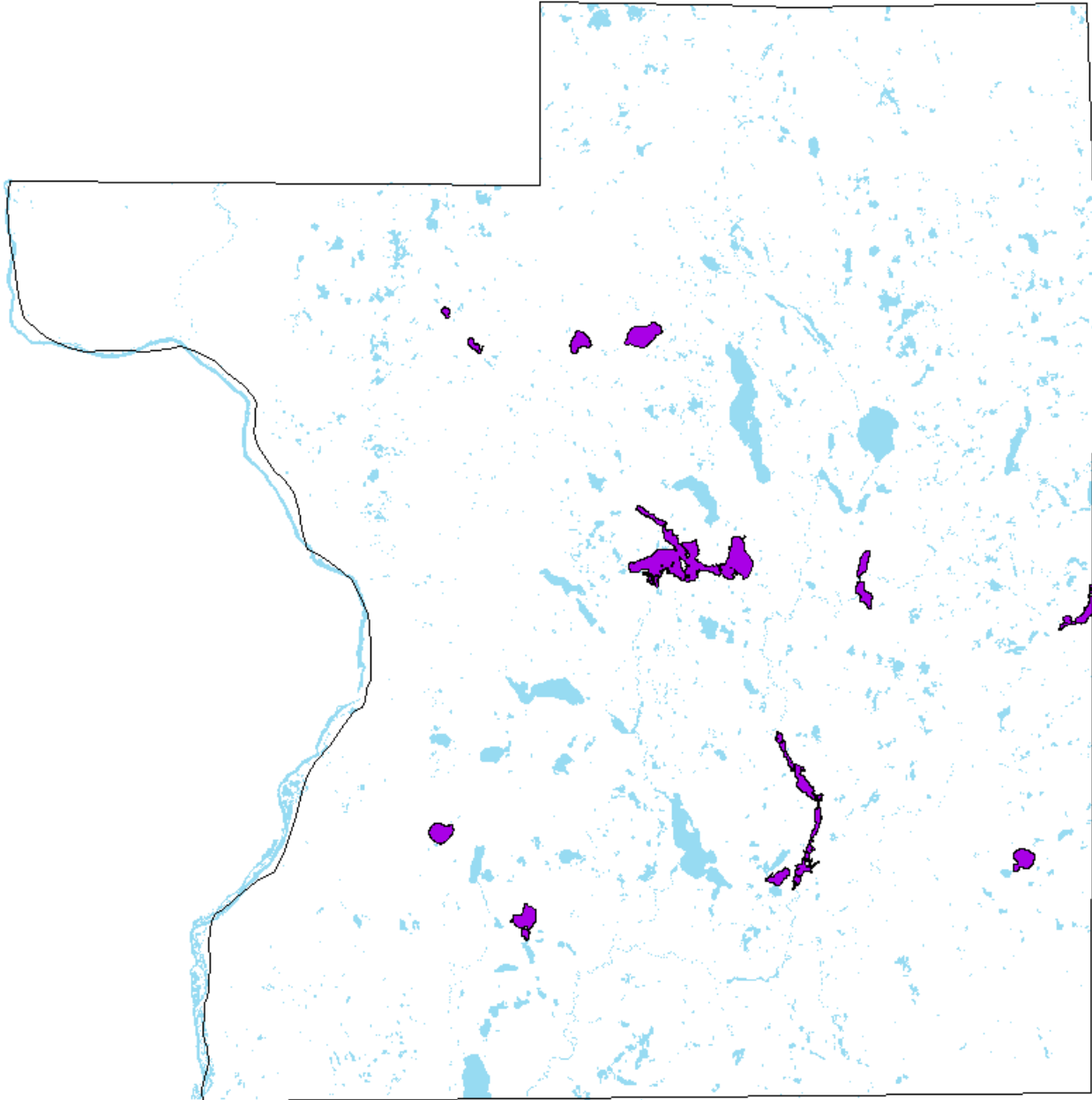
3 Lakes: Deer Lake, Dwight (Round) Lake, Wind (Round) Lake



Banded mystery snail

Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

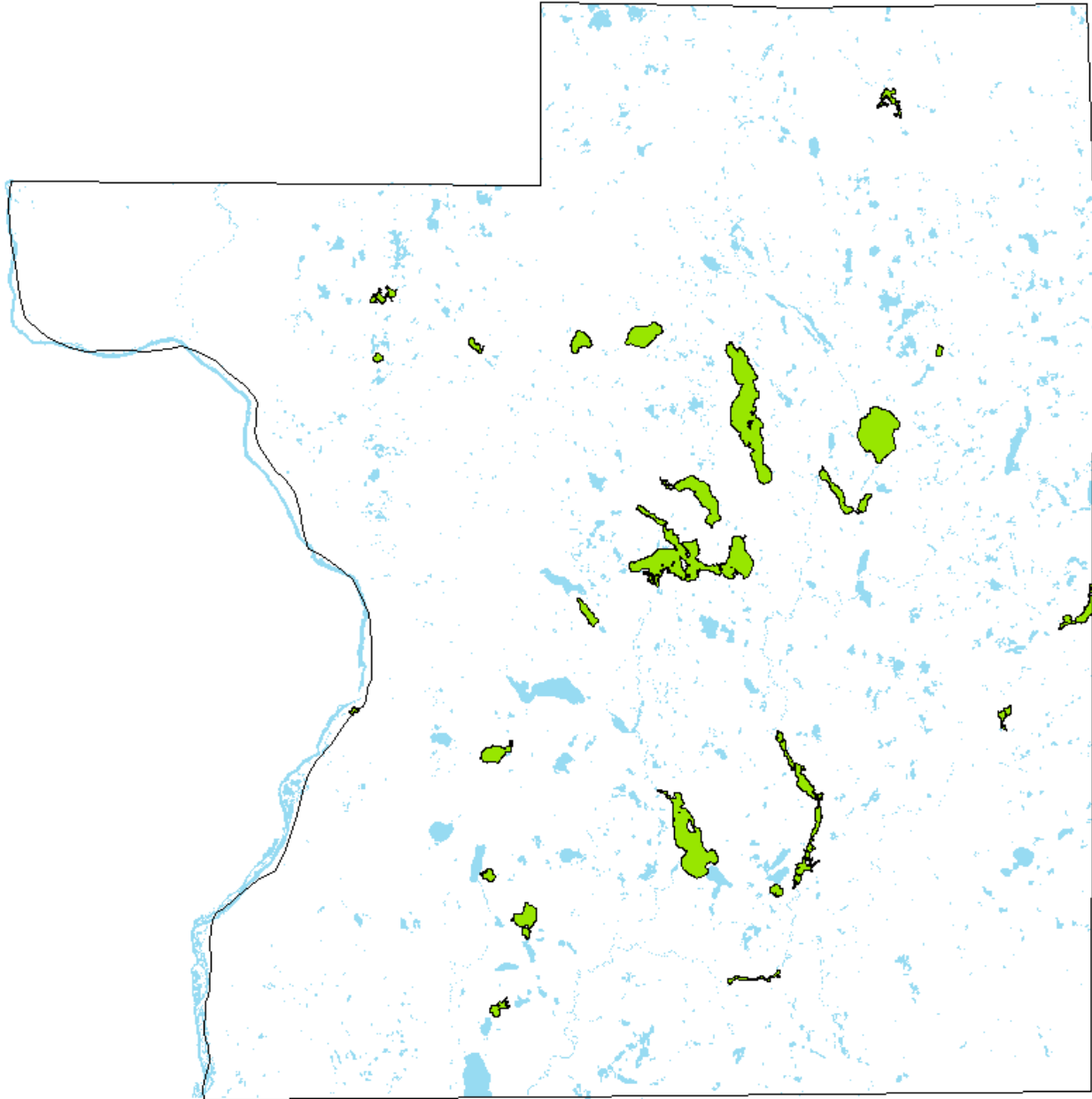
6 Lakes: Big Blake Lake, Big Butternut Lake, Big Round Lake, Bone Lake, Half Moon Lake, Magnor Lake



Purple loosestrife

Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

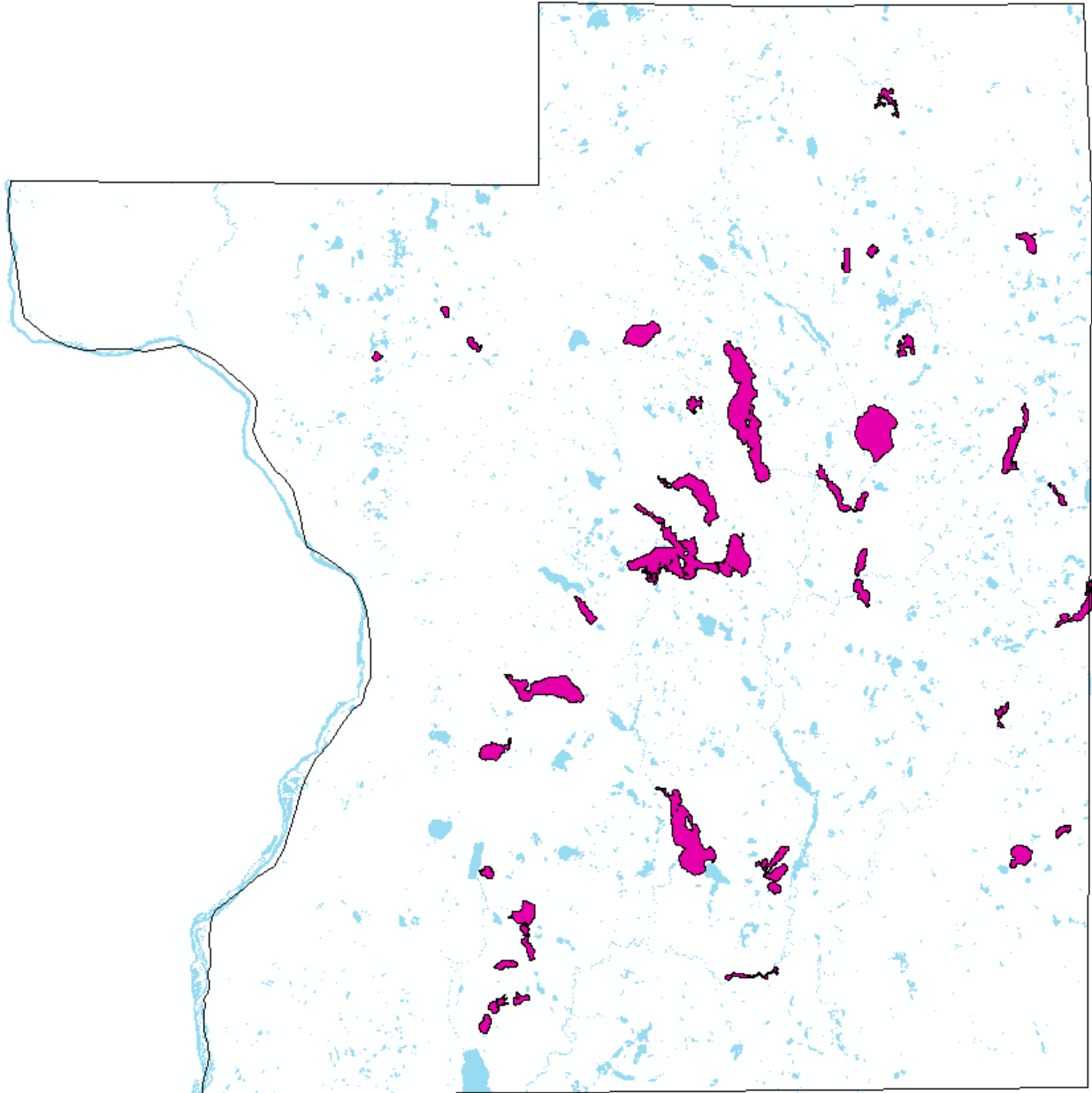
14 Lakes: Apple River Flowage, Balsam Lake, Big Lake, Big Butternut Lake, Horseshoe Lake, Little Butternut Lake, Little Mirror Lake, Lotus Lake, Magnor Lake, North Twin Lake, North White Ash Lake, Sandhill Lake, White Ash Lake, Wind (Round) Lake



Curly leaf pondweed

Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

27 Lakes: Andrus Lake, Apple River Flowage, Balsam Lake, Big Blake Lake, Big Butternut Lake, Big Lake, Big Round Lake, Black Brook Flowage, Bone Lake, Clam Falls Flowage, Dwight (Round) Lake, Half Moon Lake, Herby Lake, Horseshoe Lake, Joel Flowage, Lake O' the Dalles, Little Blake Lake, Little Butternut Lake, Loveless Lake, Pine Lake, Round Lake (Laketown), Sand Lake, Sandhill Lake, South Twin Lake, Tarbert Lake, Wapogasset Lake, Wind (Round) Lake



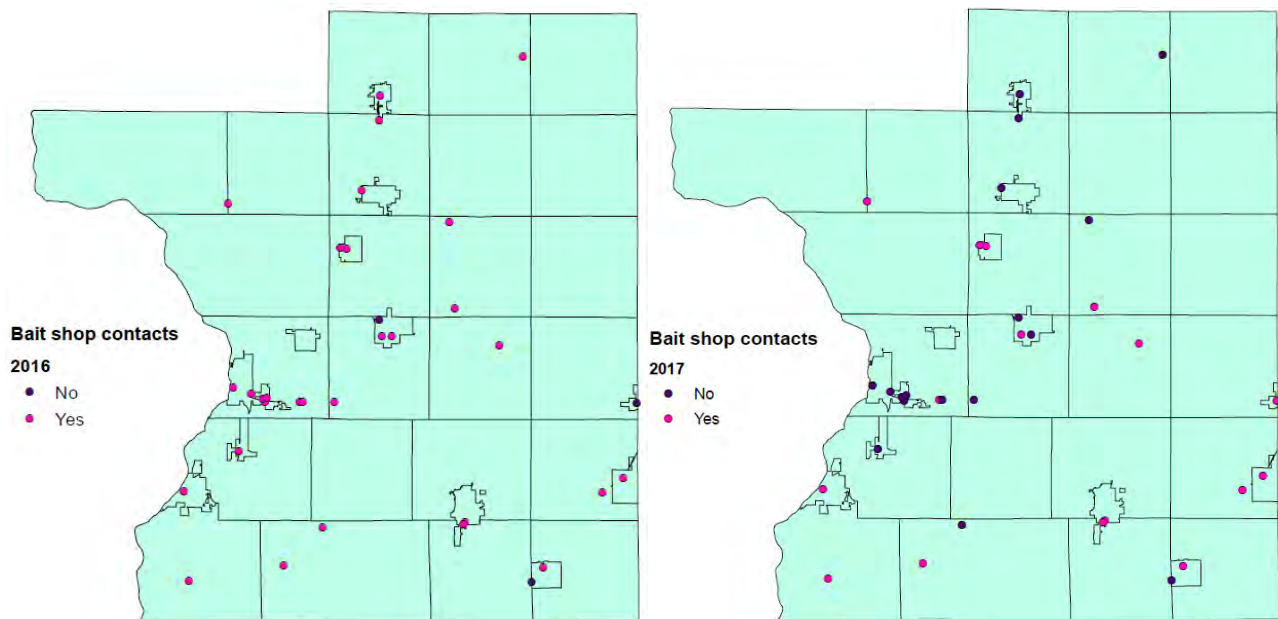
Chinese mystery snail

Aquatic invasive species early detection smart prevention protocol lakes, 2011-2017

41 Lakes: Antler Lake, Balsam Lake, Bass Lake, Big Blake Lake, Big Butternut Lake, Big Lake, Big Round Lake, Black Brook Flowage, Bone Lake, Camelia Lake, Church Pine Lake, Clam Falls Flowage, Deer Lake, Dwight (Round) Lake, Half Moon Lake, Horseshoe Lake, Joel Flowage, Largon Lake, Little Blake Lake, Little Mirror Lake, Long Lake (Johnstown), Loveless Lake, Lower Pine Lake, Magnor Lake, McKenzie Lake, North Pipe Lake, North Twin Lake, North White Ash Lake, Pike Lake, Pine Lake, Pipe Lake, Rice Lake (Alden), Round Lake (Laketown), Sand Lake, Sandhill Lake, South Twin Lake, Swede Lake, Wapogasset Lake, Ward Lake, White Ash Lake, Wind (Round) Lake

Bait Dealer Initiative

The Polk County Land and Water Resources Department visited thirty-three locations that sell fishing licenses in Polk County in 2016 and twenty-four locations in 2017 as part of the statewide Bait Dealer Initiative. At each location, AIS messaging was shared and educational brochures and key chains were made available.



Landing Blitz

In 2016 and 2017, the Polk County Land and Water Resources Department assisted in organizing the Landing Blitz by providing information to all lake organizations in Polk County. Both years, the Land and Water Resources Department wrote a press release promoting the event. Seventeen waterbodies participated in the Landing Blitz in 2016 and ten participated in 2017.

Drain Campaign

In 2016 and 2017, the Polk County Land and Water Resources Department promoted the Drain Campaign to local lake organizations and signed lakes up for this statewide initiative. The Land and Water Resources Department also authored a press release to promote the event, served as a pick up site for ice packs, and ordered the free flyers and educational brochures for each participating lake. In total, seventeen waterbodies participated in the Drain Campaign in 2016 and nineteen waterbodies participated in 2017.

Clean Boats, Clean Waters

The Polk County Land and Water Resources Department provided countywide Clean Boats, Clean Waters trainings in both 2016 and 2017. The 2016 training was held on April 27th, 2016 and attended by twenty-five individuals. An individualized training was also held for a volunteer with Balsam Lake on April 29th, 2016. The 2017 training was held on April 26th, 2017 and attended by ten individuals. Template presentations were edited to include local aquatic invasive species locations and concerns.

In 2016, the Polk County Land and Water Resources Department assisted the Pipe and North Pipe Lakes District with gathering information regarding the amount Clean Boats, Clean Waters volunteers are paid. Results were compiled from 15 lakes (all in Polk County with the exception of one). Ten lakes pay their monitors \$10 per hour, three pay less than \$10 per hour, and two pay greater than \$10 per hour. Several lakes pay \$12 per hour to administer their program.

Fall Snapshot Day

In 2016 and 2017, the Polk County Land and Water Resources Department partnered with the St. Croix River Association to offer the Fall Snapshot Day in Polk County. A partnership with the Grantsburg High School and the Round Trade Lakes Improvement Association made it possible to monitor nine tributaries in the Long Trade Lake Watershed on September 10th, 2016. Nineteen volunteers attended the training and found Chinese mystery snails at one site and curly leaf pondweed at another site. The 2017 training was held on August 5th and attended by seven participants. Eight sites along the St. Croix River were monitored in both Wisconsin and Minnesota. Yellow iris was found at four sites, curly leaf pondweed was found at one site, rusty crayfish was found at one site, and Asian clams were found at one site.



Fall Snapshot Day, 2016

Aquatic Invasive Species Citizen Lake Monitoring Network

An aquatic invasive species Citizen Lake Monitoring Network training was offered by the Polk County Land and Water Resources Department in 2016 and 2017. The 2016 training was held on June 7th and attended by nineteen volunteers. In 2017 the training was held on July 18th and attended by fourteen volunteers. Both trainings included a hands-on session to view specimens of aquatic invasive species, with a focus on native and invasive plants. Template presentations were edited to include local aquatic invasive species locations and concerns. The St. Croix River Association assisted with both trainings. In response to the 2017 training, ten volunteers took home kits to monitor for aquatic invasive species on their waterbody. The Polk County Land and Water Resources Department assisted lakes with identification of specimens following the training, follow up regarding entering data into SWIMS, and data entry into SWIMS.



Aquatic invasive species citizen lake monitoring network training, 2017 (Photo credit: SCRA)

Project RED

The Polk County Land and Water Resources Department partnered with the St. Croix River Association, the National Park Service, and the River Alliance to offer Project RED trainings in 2016 and 2017. Seventeen volunteers attended the training in 2016 and twenty volunteers attended the training in 2017. One volunteer returned two datasheets in 2016 and one volunteer returned two data sheets in 2017. Data was entered into SWIMS. Template presentations were edited to include local aquatic invasive species locations and concerns.



Project RED training, 2016

Education and Outreach

The Polk County Land and Water Resources Department delivered or provided aquatic invasive species education and outreach at numerous events and meetings for a variety of audiences.

- ✓ Big Blake Lake Annual Meeting, 2016
- ✓ Big Round Lake Annual Meeting, 2016 and 2017
- ✓ Bone Lake Annual Meeting, 2017
- ✓ Deer Lake Annual Meeting, 2017
- ✓ Pipe Lakes Annual Picnic, 2016
- ✓ Wapogasset/Bear Trap Lakes Annual Meeting, 2017
- ✓ Wild Goose Lake Annual Meeting, 2016 and 2017
- ✓ Polk County Fair, 2016 and 2017
- ✓ Amery School 4th and 5th grade, 2017
- ✓ Clayton School 3rd grade, 2016
- ✓ Luck School 3rd grade, 2016 and 2017
- ✓ Osceola School 4th grade, 2016 and 2017
- ✓ St. Croix Falls School 5th grade, 2016 and 2017
- ✓ Bi-weekly radio program, 2016 and 2017
- ✓ Amery Lakes District newsletter, 2016 and 2017
- ✓ DNR press releases to local papers, 2016 and 2017
- ✓ Balsam Lake Library, 2016 and 2017



Luck School 3rd grade, 2017 (Photo credit: SCRA)

Lake Maps

In 2017, the Polk County Land and Water Resources Department assisted the Polk County Association of Lakes and Rivers with a reprint of customized waterproof aquatic invasive species lake maps. Five lake organizations reprinted maps and one organization paid for a map to be designed for their lake.

Augmented Enforcement

In 2016, the Polk County Land and Water Resources Department worked with the Polk County Sheriff's Department to develop education information for officers to use to enforce the Aquatic Invasive Species Transport Ordinance. The Land and Water Resources Department also began a discussion with the Sheriff's Department regarding future training needs related to aquatic invasive species.

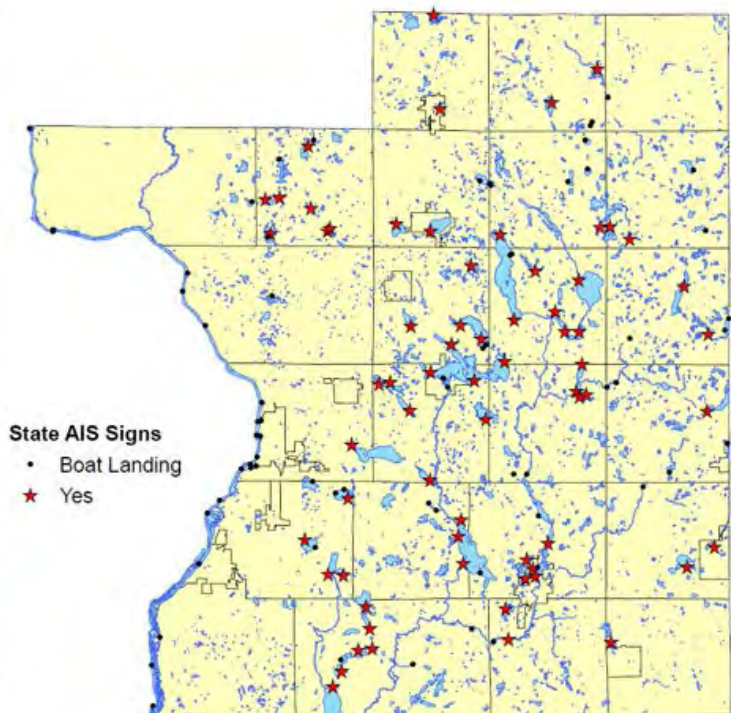
On Saturday, August 6th, 2016, the Polk County Land and Water Resources Department worked with the Wisconsin Department of Natural Resources Water Guard to provide augmented enforcement at Cedar Lake. The effort was paired with their Clean Boats, Clean Waters program.

Aquatic Invasive Species Signs

Lakes that were visited in 2016 and 2017 were checked for Wisconsin Department of Natural Resources and Polk County Ordinance aquatic invasive species signs at the boat landings. Signs were installed at Andrus Lake, Antler Lake, Bass Lake, Half Moon Lake, Largon Lake, McKeith Lake, Pickerel Lake, Round Lake (Laketown), and Tarbert Lake.



Aquatic invasive species sign installation at Andrus Lake, 2017



Fishing Tournaments

The Polk County Land and Water Resources Department assisted in making contacts between lakes involved in a June 2016 musky tournament which included Bear Trap Lake, Big Blake Lake, Big Round Lake, Bone Lake, Cedar Lake, Deer Lake, and Wapogasset Lake. The Bone Lake Management District spoke with the tournament director regarding the Eurasian water milfoil that had recently been found in Cedar Lake. Tournament anglers were alerted that there was Eurasian water milfoil in Cedar Lake. Additional lakes in the tournament were notified and it was suggested that their Clean Boats, Clean Waters volunteers be especially vigilant the weekend of the tournament.

Aquatic Invasive Species Trainings

The Polk County Land and Water Resources Department attended all Wisconsin Department of Natural Resources aquatic invasive species trainings in 2016 and 2017, including spring and fall aquatic invasive species coordinator meetings and aquatic invasive species partnership calls. Staff also attended train-the-trainer workshops for programs such as Project RED, Bridge Snapshot Day, Aquatic Invasive Species Citizen Lake Monitoring Network, and Clean Boats, Clean Waters.

Polk County Aquatic Invasive Species Strategic Plan

The Polk County Aquatic Invasive Species Strategic Plan was approved in October 2015 and largely implemented with this grant. While creating the plan, citizens determined that progress should be reviewed and updated on an annual basis. This review took place at the October 2016 and October 2017 Polk County Association of Lakes and Rivers meetings. The status of implementation was presented and ideas for future action items were discussed.

Priority ideas for future focus included: infestation indication signs at landings, a Polk County aquatic invasive species database, the formation of a communication network, the inclusion of aquatic invasive species information in the Polk County Tourism Guide, and providing education for fishing tournaments.

Polk County Response to Early Detection Aquatic Invasive Species

The Polk County Land and Water Resources Department prepared a Polk County Response to Early Detection Aquatic Invasive Species document in 2017. This document outlines the Land and Water Resources Department's response to the early detection of aquatic invasive species discovered in Polk County and includes steps to form a task force in response to new infestation and example lake-specific rapid response plans. Activities to increase the likelihood of early detection of aquatic invasive species by lake and river organizations and citizen steps to report a new aquatic invasive species are also included in the document. The draft Polk County Response to Early Detection Aquatic Invasive Species was presented at the October 2017 PCALR meeting.

Regional Aquatic Invasive Species Strategic Plan

The Polk County Land and Water Resources Department also participated in the Aquatic Invasive Species Work Group lead by the St. Croix River Association to develop a St. Croix Basin Aquatic Invasive Species Strategic Plan.