

Next steps for AIS monitoring in Wisconsin: citizens and staff combining efforts

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Wisconsin Lakes Partnership Convention
Friday, April 7







Dawn of an era

First new detections in Wisconsin

Year	Species	Waterbody
1923	Rainbow smelt	Lake Michigan
1955	Curly leaf pondweed & Chinese mystery snails	William Lake, Marquette County
1957	Rusty crayfish	Whitefish Lake, Oneida County
1962	Eurasian water milfoil	Lake Mendota, Dane County



Evolution

- Initially incidental reports
- Some systematic *attempts* in 90's
- SWIMS ~ 2002





Evolution

- Data driven web pages
- Spatial and tabular data available

Data & Maps

- + Lakes and aquatic invasive species mapping tool
- + Lakes and Rivers with Aquatic Invasives
- + Sign Installation
- + Species Locations
- + Watercraft Inspection Data

dnr.wi.gov search "AIS efforts"

Lakes & AIS Mapping Tool

Bureau of Water Quality, Environment Management Division

Search...



Basic Tools

Identify Tools

Drawing & Measuring

Find Location

Maps & Data

Help



Home

Lakes and Aquatic Invasive Species Mapping Tool



Print Map



Help

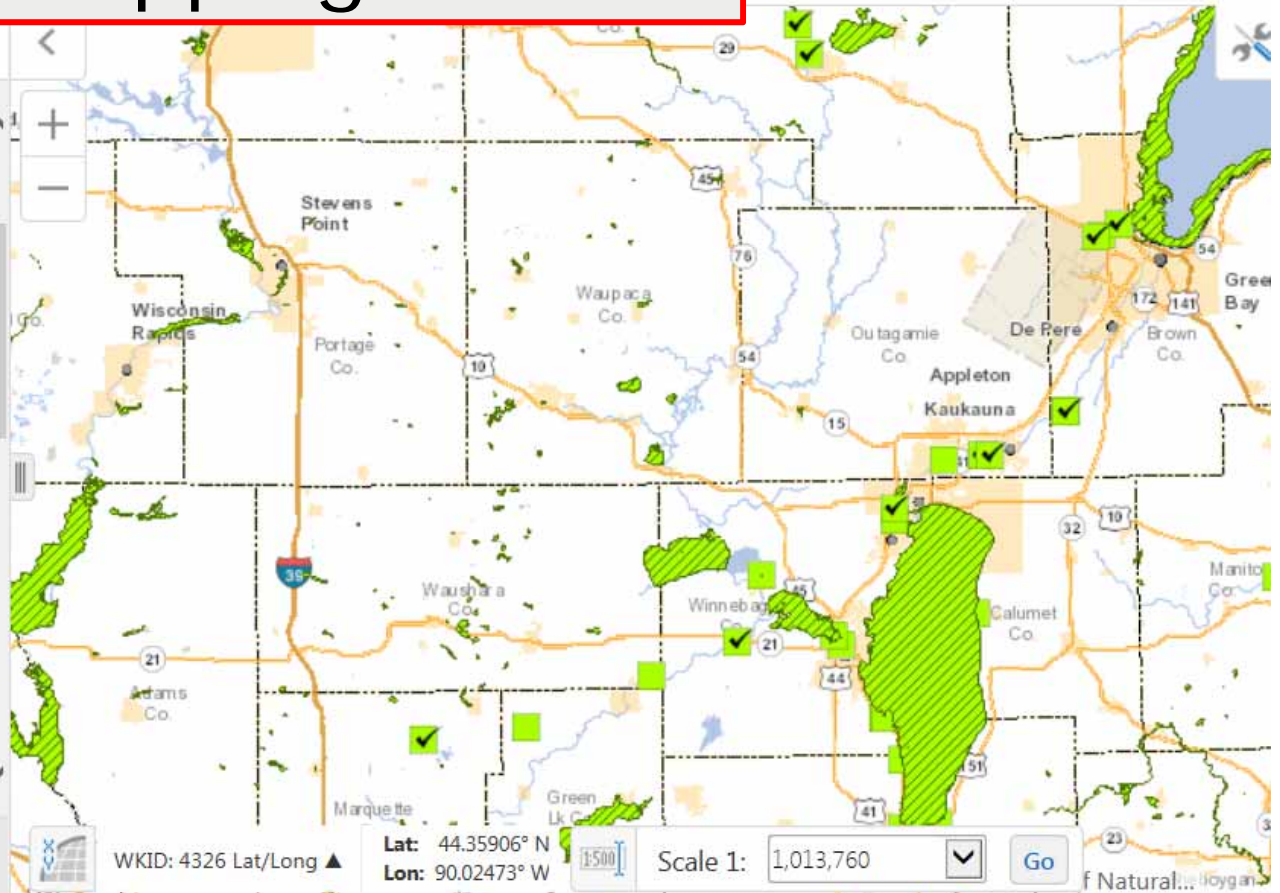


Feedback

Other Tools & Actions

Layers

- Invasive Aquatic Plants
 - Brittle Waterlily (*Najas minor*)
 - Curly-Leaf Pondweed (*Potamogeton crispus*)
 - Eurasian Water-Milfoil (*Myriophyllum spicatum*)
 - Hybrid Water-Milfoil (Eurasian x Northern)
 - Java Water Dropwort (*Oenanthe javanica*)
 - Starry Stonewort (*Nitellopsis obtusa*)
 - Water Hyacinth (*Eichhornia crassipes/azorea*)
 - Water Lettuce (*Pistia stratiotes*)



Lakes & AIS Mapping T...



Layers



WKID: 4326 Lat/Long ▲

Lat: 44.35906° N
Lon: 90.02473° W



Scale 1: 1,013,760

Go



Aquatic Invasive Species

Location

Aquatic Invasive Species

Guidance.

"observed"

observed"

Lakes, Rivers, and Wetlands with Aquatic Invasive Species

based on AIS Status

ations with the

ns with the "no longer

necessarily exhaustive so

it is important to report occurrences. To report new discoveries visit: <http://dnr.wi.gov/topic/Invasives/report.html>. See the Aquatic Invasive Species Guidance for information on how statuses are assigned. Personally identifiable information on data collection forms may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stats.].

To Excel

< First	< Prev	Page 1 of 99	Next >	Last >
Waterbody Name	Waterbody ID Code (WBIC)	Invasive Species		
Adams County (28)				
Arkdale Lake	1374300	Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-Milfoil, Purple Loosestrife, Rusty Crayfish, Water Hyacinth		
Big Roche A Cri Creek	1374100	Japanese Knotweed, Rusty Crayfish, Water Hyacinth, Zebra Mussel		
Bia Roche a Cri	1374800	Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-		

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[B](#)

[A](#)

[C](#)



Asiatic Clam (Corbicula)

Select Another Location:

Statewide

Total Locations: 22

Total Lakes: 22

Species Locations

Disclaimer: Aquatic Invasive Species (AIS) status is assigned based on the "no longer observed" based on AIS Status Guidance. In general, "verified" populations are established and have been verified by a taxonomic expert. Populations with the "observed" status have not been verified by a taxonomic expert or do not have established populations. Populations with the "no longer observed" status include populations where a reproducing population did not establish. Our inventories are not necessarily exhaustive so it is important to report occurrences. To report new discoveries visit: <http://dnr.wi.gov/topic/Invasives/report.html>. See the Aquatic Invasive Species Guidance for information on how statuses are assigned. Personally identifiable information on data collection forms may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stat. 19.31-19.39].

[By County](#) | [By Waterbody](#) | [By Species](#) | [By Year](#) | [Open In Excel](#)

Waterbody	Status	Waterbody ID Code (WBIC)	County
Bohners Lake	Verified and Vouchered	750800	Racine
Browns Lake	Verified and Vouchered	750300	Racine
Eagle Spring Lake	Verified and Vouchered	768600	Walworth, Waukesha
Fox River - CTH E	Verified and Vouchered	742500	Waukesha
Lake Andrea	Verified and Vouchered	733850	Kenosha

Aquatic Invasive Species

Contact information

For information on Lakes in Wisconsin, contact:

[Wisconsin DNR Lakes](#)

Division of Water

Bureau of Water Quality

[Aquatic Invasive Species](#)

[Contacts](#)



Business Licenses & Regulations Recreation

Aquatic Invasive Species Locations

- [All - New 2016](#)
- [All - New 2017](#)
- [Asiatic Clam \(Corbicula\)](#)
- [Banded Mystery Snail](#)
- [Bighead Carp](#)
- [Brittle Waternymph](#)
- [Chinese Mystery Snail](#)
- [Curly-Leaf Pondweed](#)
- [Eurasian Water-Milfoil](#)
- [Faucet Snail](#)
- [Fishhook Waterflea](#)
- [Flowering Rush](#)



Evolution

- GLRI Partnership Grant in 2010 for prevention, education, and **monitoring**.
- First statewide systematic AIS monitoring



Great Lakes
RESTORATION

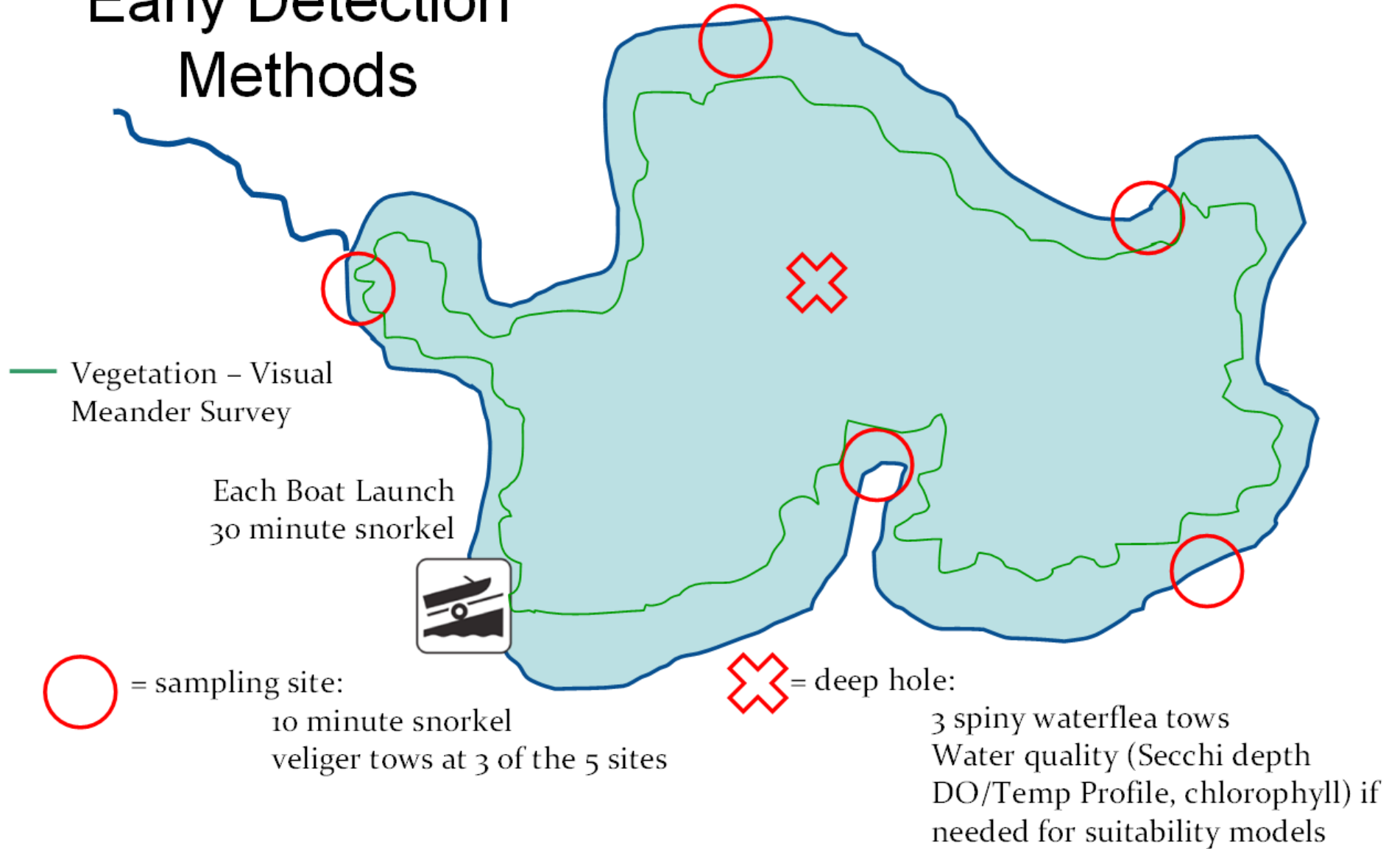


"We're committed to creating a new standard of care that will leave the Great Lakes better for the next generation."

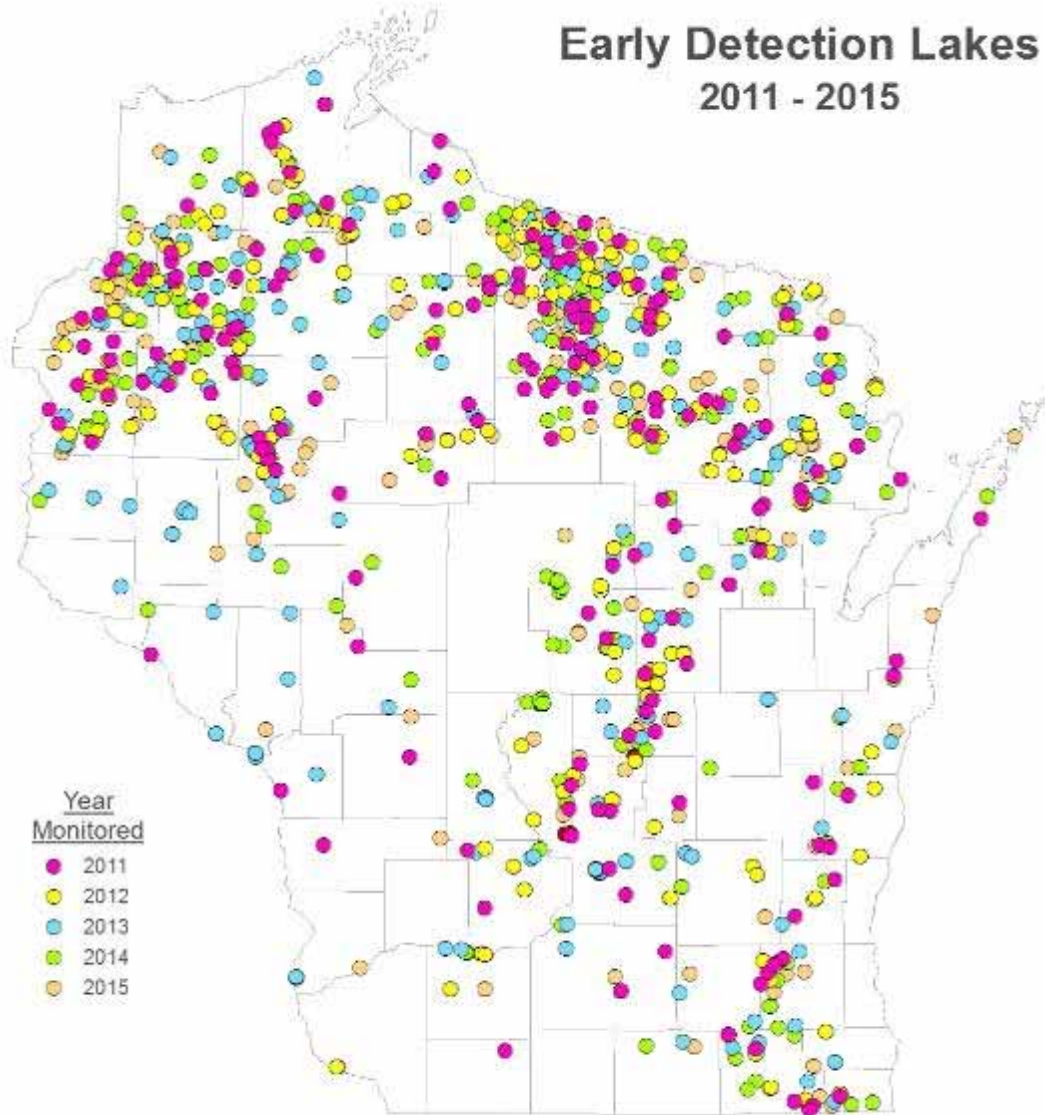


Early Detection Methods

Any new species found will be counted as a “detect.”



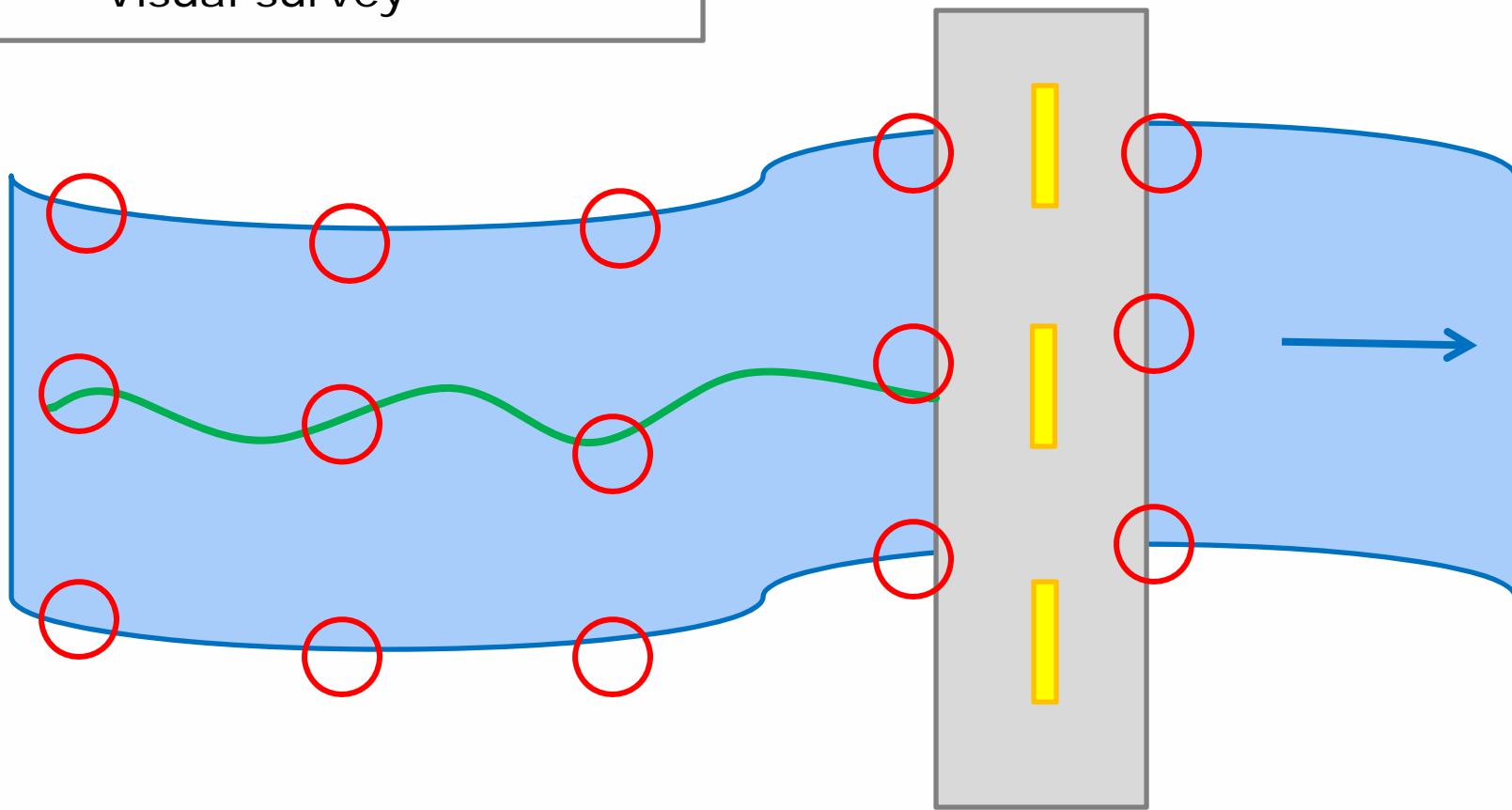
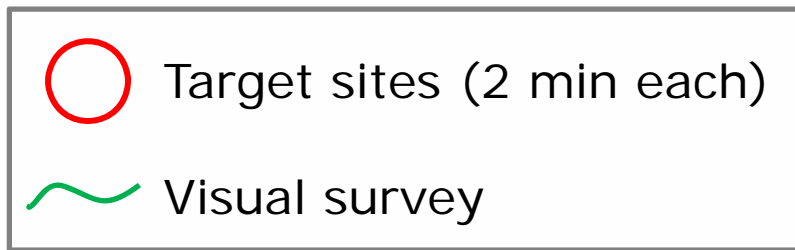
Early Detection Lakes 2011 - 2015



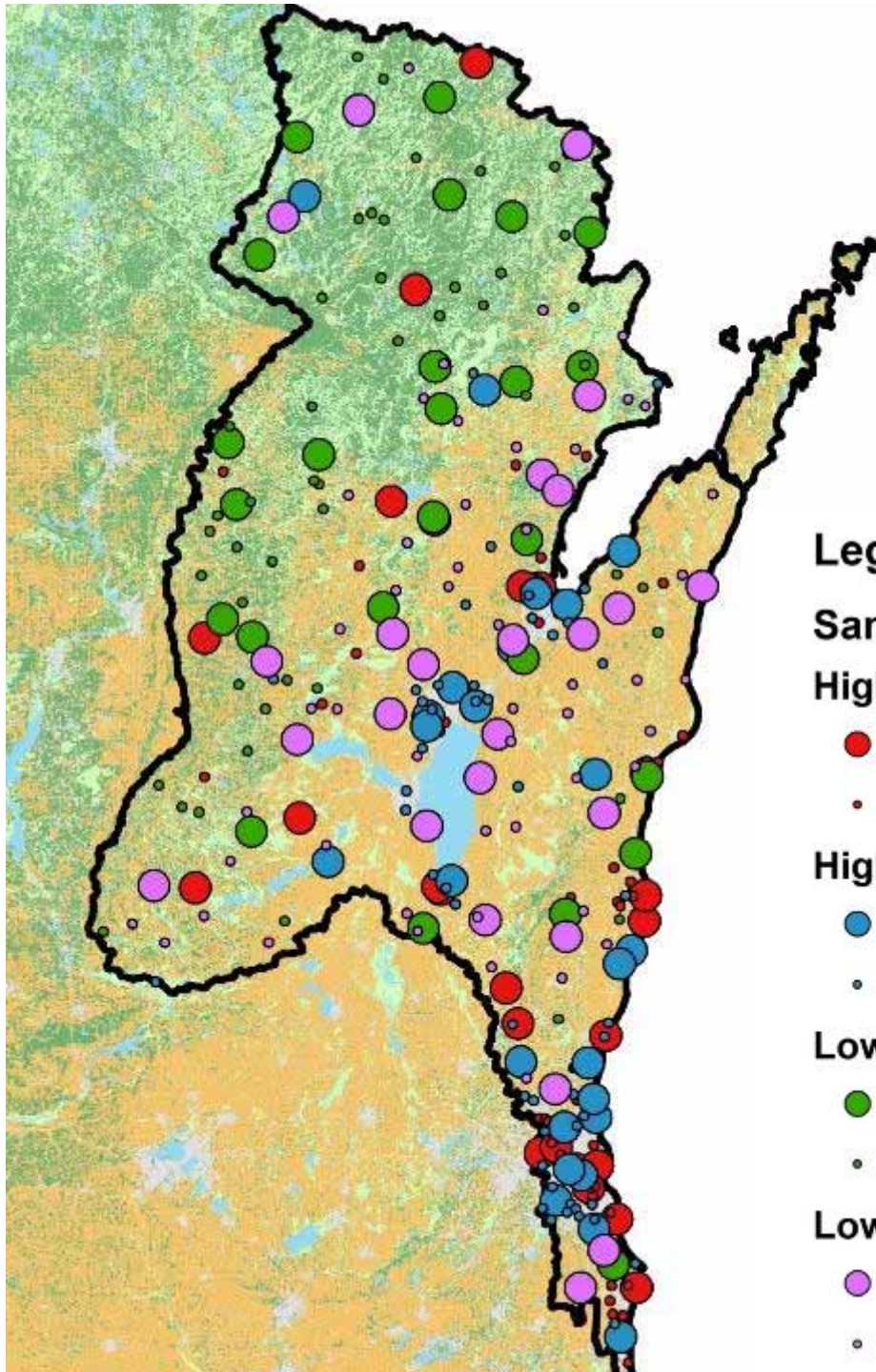
- 200 lakes/yr for 5 years
- Rate of AIS spread stable
- Protocols effective



Early Detection Methods Stream Pilot Project



2015 Streams



Legend

Sample2

HighUrbHighRec

- 1
- 2

HighUrbLowRec

- 1
- 2

LowUrbHighRec

- 1
- 2

LowUrbLowrec

- 1
- 2

- 100 streams

- Urban land use

- Protocols effective

Early Detection Methods Wetland Pilot Project

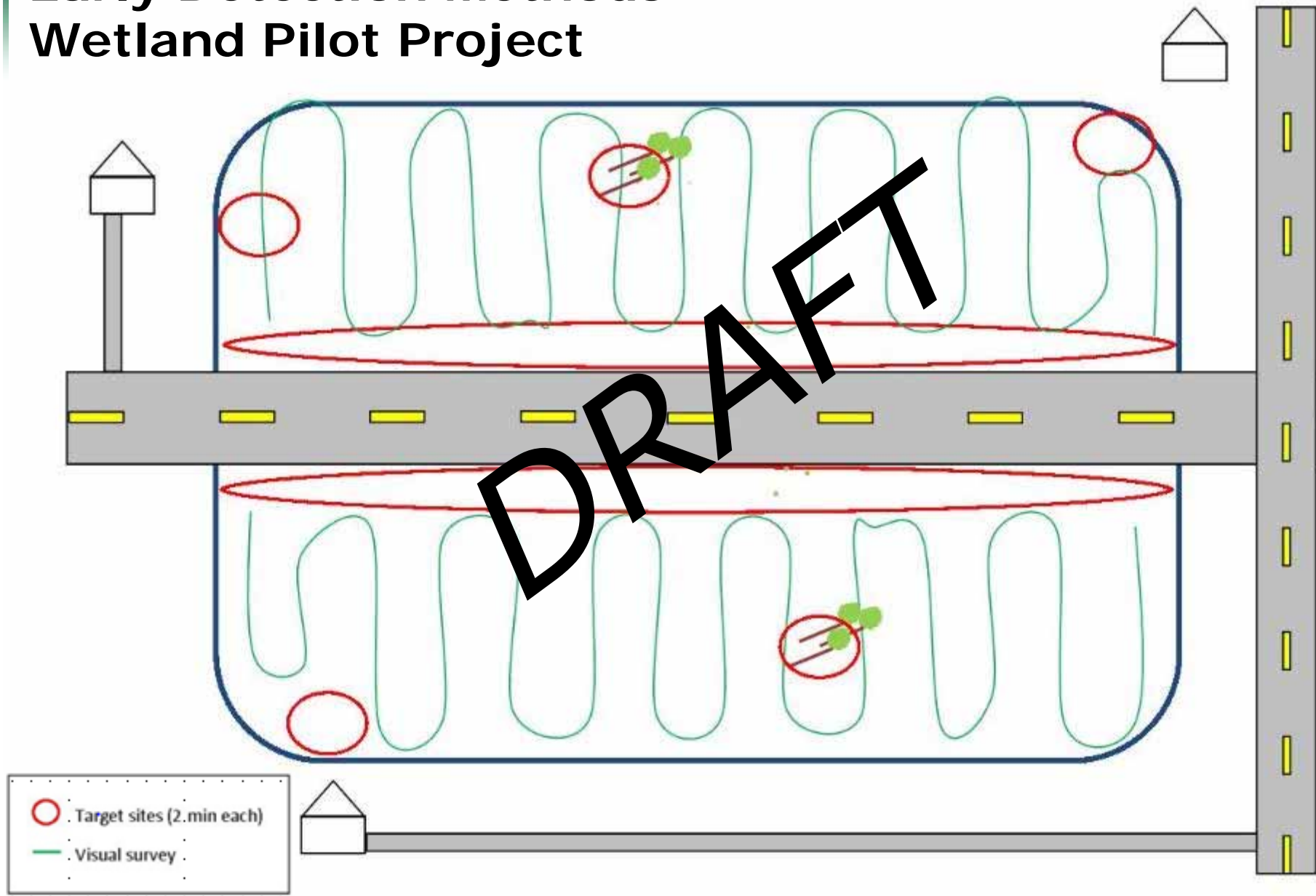





Table 1. Species targeted for aquatic invasive species sur



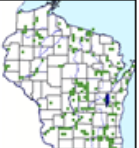
Common Name	Latin Name
AQUATIC PLANTS	
European Frog-bit	<i>Hydrocharis morus-ranae</i>
Yellow Floating Heart	<i>Nymphoides peltata</i>
Brazilian Waterweed	<i>Egeria densa</i>
Hydrilla	<i>Hydrilla verticillata</i>
Curly-Leaf Pondweed	<i>Potamogeton crispus</i>
Fanwort	<i>Camboba caroliniana</i>
Parrot Feather	<i>Myriophyllum aquaticum</i>
Eurasian Water Milfoil	<i>Myriophyllum spicatum</i>
Water Hyacinth	<i>Eichhornia crassipes</i> and <i>E. azurea</i>
Water Lettuce	<i>Pistia stratiotes</i>
Water chestnut	<i>Trappa natans</i>
Didymo	<i>Didymosphenia geminata</i>
WETLAND PLANTS	
Flowering Rush	<i>Butomus umbellatus</i>
Tall Manna Grass	<i>Glyceria maxima</i>
Phragmites	<i>Phragmites australis</i>
Japanese Knotweed	<i>Polygonum cuspidatum</i>
Giant Knotweed	<i>Polygonum sachalinense</i>
Purple Loosestrife	<i>Lythrum salicaria</i>
Japanese Hop	<i>Humulus japonicus</i>
Yellow Iris	<i>Iris pseudoacorus</i>
Moneywort	<i>Lysimachia nummularia</i>
Narrow leaf cattail	<i>Typha angustifolia</i>
Hybrid cattail	<i>Typha x glauca</i>
Japanese stiltgrass	<i>Microstegium vimineum</i>
INVERTEBRATES	
Zebra Mussels	<i>Dreissena polymorpha</i>
Quagga Mussels	<i>Dreissena bugensis</i>
Asian Clam	<i>Corbicula fluminea</i>
New Zealand Mudsnail	<i>Potamopyrgus antipodarum</i>
Faucet Snails	<i>Bithynia tentaculata</i>
Chinese Mystery Snails	<i>Cipangopalundina chinensis</i>
Banded mystery Snails	<i>Viviparus georgianus</i>
Rusty Crayfish	<i>Orconectes rusticus</i>
Red Swamp Crayfish	<i>Procambarus clarkii</i>
Spiny Waterfleas	<i>Bythotrephes longimanus</i>
FISH	
Rainbow smelt	<i>Osmerus mordax</i>
Round goby	<i>Neogobius melanostomus</i>
Tubernose goby	<i>Proterorhinus marmoratus</i>
Ruffe	<i>Gymnocephalus cernuus</i>
Alewife	<i>Alosa pseudoharengus</i>
Three-spine stickleback	<i>Gasterosteus aculeatus</i>
Western mosquito fish	<i>Gambusia affinis</i>
Eastern mosquito fish	<i>Gambusia holbrooki</i>
White perch	<i>Morone americana</i>
Snakehead	<i>Channidae</i>





Target species


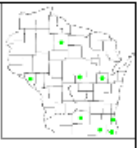

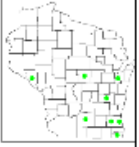
- 12 Aquatic plants
- 12 Wetland plants
- 10 Invertebrate
- 10 Fish
- Adding more!

Aquatic Invasive Species Identification Guide

SUBMERGED AQUATIC		
Species – code <i>Scientific name</i>	Identification	Distrib
European frog-bit - EFB <i>(Hydrocharis morsus-ranae)</i>  <p>Photo: Fish Hawk</p>	<p>Leaves: Usually floating; heart-shaped with long stems; 1.2-6.3 cm (0.5-2.5 in) in diameter; smooth margins; often dark purple beneath; lateral veins are arching and make a 75-90° angle with the midvein; tissue containing airpockets, are located mostly along the midvein.</p> <p>Flowers: Three white petals with yellow center; blooms mid-summer.</p> <p>Fruits & seeds: Rarely produces viable seeds and instead relies on vegetative stolons and turions for reproduction.</p> <p>Similar species: Often confused with American frog-bit (<i>Linnabium spargia</i>; not known in WI), whose leaves have lateral veins that make a 30-80° angle with the midvein, and whose leaf tissue contains large air pockets throughout. White water lilies (<i>Nymphaea odorata</i>) have circular leaves with a triangular slit, and large, multi-petaled, white flowers. <i>Najas</i> spp. have yellow cup-like flowers.</p>	Not repc Wiscons
Yellow floating heart - YFH <i>(Nymphoides peltata)</i>  <p>Photo: Paul Skauhall</p>	<p>Leaves: Floating; heart-shaped with slightly wavy margins; 3-15 cm (1.2-6.0 in) in diameter; alternately arranged near the stem base and oppositely arranged near the top; frequently have purplish undersides.</p> <p>Flowers: 2-5 bright yellow flowers arise from erect flower stalks; 3-4 cm (1.2-1.6 in) in diameter; 5 petals arranged like the spokes of a wheel, each with a distinctive fringe along the edge.</p> <p>Fruits & seeds: Fruit is a pod-like capsule (1.2-2.5 cm; 0.5-1.0 in) that splits on one side. One fruit is produced from each flower, and contains many smooth, oval seeds with winged margins.</p> <p>Similar species: Spatterdock (<i>Najas</i> spp.) have much larger leaves, and cup-like flowers without fringed petals. <i>Watershield</i> (<i>Rosaea schrebica</i>) has small oval floating leaves often with a jelly-like covering on the undersides, and small purple flowers. Other species of <i>Nymphoides</i> such as <i>N. aquatica</i> and <i>N. cordatum</i> (native</p>	

Parrot feather - PF <i>(Myriophyllum aquaticum)</i>  <p>Photo: 777, Paul Skauhall</p>	<p>Leaves: Feather-like; emergent leaves are bright blue-green, stiff and 2-5 cm (0.8-2 in) long, arranged in whorls of 4-6 leaves, and divided into 6-18 leaflet pairs; underwater leaves are often decayed, but if present, they are limp, 1.5-3.5 cm (0.6-1.4 in) long, and are divided into 20-30 leaflet pairs per leaf.</p> <p>Flowers: Tiny (1.5mm; 0.06 in) flowers with 4 white sepals occur individually on short stalks in the axils of the emergent leaves; male and female flowers are on separate plants, but only female plants are known in North America.</p> <p>Fruits & seeds: Because there are only female plants in North America, no fruits are produced here. Spreads through fragmentation of the stems and rhizomes.</p> <p>Roots: Many, thin, from rhizomes</p> <p>Similar species: Similar to other milfoils (<i>Myriophyllum</i>) species. Non-native Eurasian watermilfoil (<i>M. spicatum</i>) typically has 4 leaves in a whorl, and does not produce any emergent leaves. Other native milfoils generally have less than 12 leaflet pairs.</p>	Documented in Pool 5 of the Mississippi River in 2012
Eurasian water-milfoil - EWM <i>(Myriophyllum spicatum)</i>  <p>Photo: Paul Skauhall</p>	<p>Leaves: Feather-like; leaves with 12 or more pairs of leaflets; typically arranged in whorls of 4 leaves around the stem; leaves fall limp when pulled out of water; whorls of leaves spaced 1-3 cm (0.4-1.2 in) apart on stem.</p> <p>Flowers: Small, yellow or reddish, 4-parted on a spike that projects 5-10 cm (2-4 in) above the water surface.</p> <p>Fruits & seeds: A hard, segmented capsule containing four seeds.</p> <p>Roots: Fibrous, often developing on plant fragments.</p> <p>Similar species: There are several native water-milfoils (<i>Myriophyllum</i> spp.) which may be confused with EWM, however these milfoils generally have fewer than 12 pairs of leaf segments, whereas Eurasian water-milfoil leaves have 12 or more. <i>M. spicatum</i> can cross with native <i>M. sibiricum</i>, forming a viable hybrid with intermediate characteristics. Non-native parrot feather (<i>M. aquaticum</i>) often produces more than 4 leaves in a whorl and has emergent leaves. Native <i>Coontail</i> (<i>Ceratophyllum demersum</i>) has leaves that are forked like a wishbone (not feather-like) and toothed, giving the plant a rough feel when pulled through the hand.</p>	

Brazilian waterweed - BWW <i>(Egeria densa)</i>  <p>Photo: 3222, (left); Washington State Department of Ecology (right)</p>	<p>to the southern U.S.), and <i>N. cristata</i> and <i>N. indica</i> (non-native and sold as ornamental plants) are also similar in appearance.</p> <p>Leaves: Finely serrated (under magnification); 1-3 cm (0.4-1.2 in) long and up to 5 mm (0.2 in) wide; occur in whorls of 4-8.</p> <p>Flowers: Small (1.8-2.5 cm; 0.7-1.0 in); three white petals with yellow center; float on or rise above the surface of the water.</p> <p>Fruits & seeds: Seeds are not known to be produced outside of its native range. Spreads through vegetative reproduction - plant fragments containing double nodes can produce new plants.</p> <p>Roots: Slender, and white or pale. Adventitious roots are freely produced from double nodes on the stem.</p> <p>Similar species: Common and slender waterweed (<i>Elodea</i> spp.) have leaves in whorls of 3, and leaf edges appear smooth to the naked eye. <i>E. densa</i> is overall more robust than native <i>Elodea</i> spp. Non-native <i>hydrilla</i> (<i>Hydrilla verticillata</i>), often produces tubers and has small teeth on the underside of the leaf midrib, while <i>E. densa</i> does not produce tubers and the leaf underside is smooth.</p>	
Hydrilla - HYD <i>(Hydrilla verticillata)</i> 	<p>Leaves: Occur in whorls of 3-8; 6-20 mm (0.2-0.8 in) long and 1-4 mm (0.04-0.16 in) wide; small spines give leaf margins a visible toothed appearance; midrib on underside of leaf is often reddish and has visible spines; rough to the touch.</p> <p>Flowers: Tiny (4-8 mm; 0.16-0.31 in); female flowers are white, have 3 petals and 3 sepals, and are located on threadlike stalks emerging from the leaf axils; male flowers are white to red/brown.</p> <p>Fruits & seeds: Monococious variety can set viable seed although primarily</p>	

Water hyacinth WH <i>(Eichhornia crassipes)</i>  <p>Photo: Graves Lovell, Paul Skauhall</p>	<p>Leaves: Free-floating; thick green waxy leaves, rounded, circular or elliptical in shape with gently incurved sides. Leaves are formed in rosettes up to 15 cm (6 in) wide and can rise 0.3-1 m (1-3 ft) above the water.</p> <p>Flowers: Lavender blue with a yellow blotch. Flowers have 6 petals and are 5 cm (2 in) wide.</p> <p>Fruits & seeds: Three celled capsule with many seeds.</p> <p>Roots: Submersed roots blue-black to dark purple, feathery, dense near root crown, tips with long dark root caps.</p> <p>Similar species: Native pickerelweed (<i>Bontaderia cordata</i>) is a rooted emergent plant with numerous tiny bluish-purple flowers densely packed into 7.5-15 cm (3-6 in) spikes atop flower stalks which rise 0.3-0.6 m (1-2 ft) above the water surface. May also be confused with emergent form of American frog-bit (<i>Linnabium spargia</i>; not known from WI). Non-native anchored water hyacinth (<i>E. azurea</i>) has leaves which are alternate rather than in a rosette, and is typically found rooted in mud rather than free-floating.</p>	
Water lettuce - WL <i>(Pistia stratiotes)</i> 	<p>Leaves: Free-floating; light green to grayish green; soft and spongy, formed in rosettes; leaves 2-20 cm (0.8-8 in) long; raised parallel ridges (veins); covered in short hairs; leaf margins slightly wavy, top margins scalloped.</p> <p>Flowers: Inconspicuous; nearly hidden in the center amongst the leaves; on small stalk, single female flower below and whorl of male flowers above; flowers in late summer to early winter.</p> <p>Fruits & seeds: Seeds cylindrical, light brown, and 1-2 mm (0.04-0.08 in).</p> <p>Roots: Hang submersed beneath floating leaves; feathery, numerous.</p>	





Next Steps

- Integrating with routine DNR water quality monitoring
- Identifying priority waters for early detection monitoring
- Lack staff to sustain efforts beyond routine so need help from citizen programs!

LIFE IS EASIER WHEN YOU'VE GOT A POSSE.

