

AQUATIC INVASIVE WATCH LIST SPECIES



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Water Resources Division

*Agriculture and
Natural
Resources
Week: Great
Lakes
Conference*

March 6, 2018

*East Lansing,
Michigan*









ASIAN LONGHORNED BEETLE

ANOPLOPHORA GLABRIPENNIS

- Wood Boring Beetle native to eastern China, Japan, and Korea
- Status: Not known to be in Michigan
- Pathway:
 - Arrived to US from Asia in solid wood packing material
 - Can be moved on firewood
- Impacts:
 - Forest Ecosystems
 - Industries: Lumber, Nursey, Tourism





First identified in North America in
New York in 1996

Chicago 1998
(declared eradicated 4/08)

New Jersey 2002
(declared eradicated 3/11)

Toronto 2003
(Declared eradicated 4/13
But detected again later in 2013)

Massachusetts 2008

Most recently detected in
Ohio 2011

More than 1 billion maples grow in Michigan





IMPACT OF ASIAN LONGHORNED BEETLE





IDENTIFICATION



Male



Female

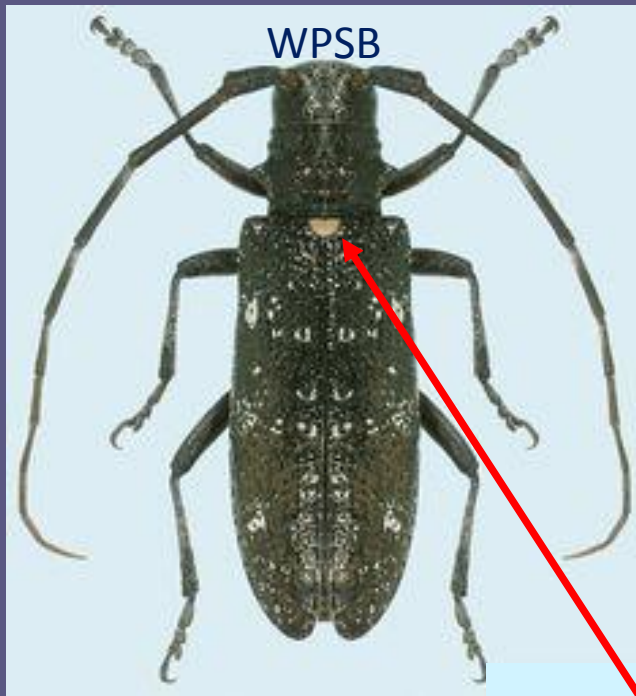


- Adults are glossy black with irregular white spots on their wing covers
- Body size ranges from $\frac{3}{4}$ to $1\frac{1}{4}$ inches in length, not including the very long black and white antennae



ASIAN LONGHORNED BEETLE VS. WHITE SPOTTED PINE SAWYER BEETLE

A white spot is all it takes to tell the difference between a dangerous invasive insect, the Asian longhorned beetle (ALB), and its harmless native look-alike, the white spotted pine sawyer beetle



The native has a distinct white spot between the top of it's wing covers; ALB does not



No white spot

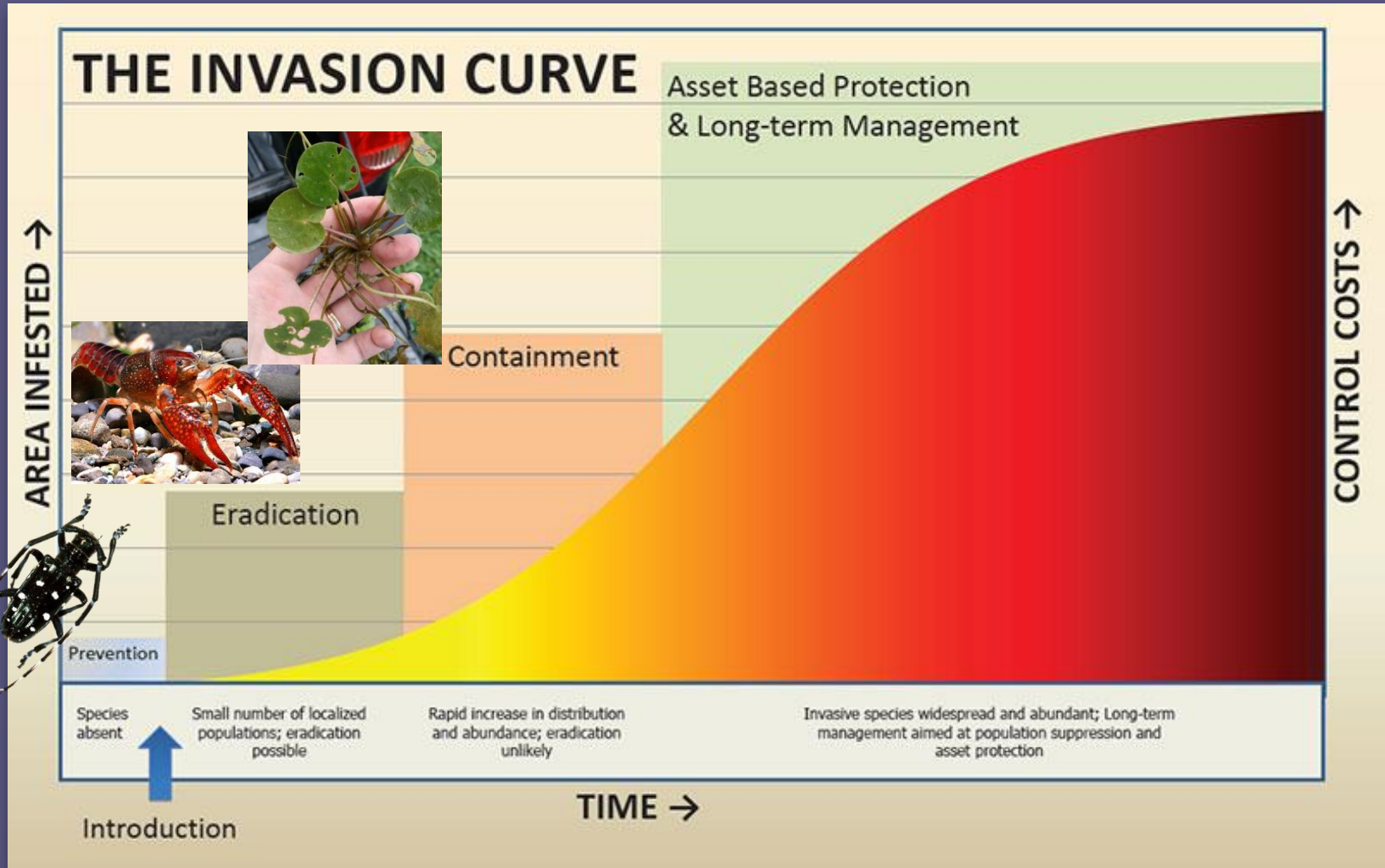


ASIAN LONGHORNED BEETLE SIGNS & SYMPTOMS





INVASION CURVE





EUROPEAN FROG-BIT

HYDROCHARIS MORSUS-RANAE

- Floating aquatic plant native to Europe and parts of Asia and Africa
- Status: Established in Michigan
 - First report in Michigan: 1996
 - Occurs from the eastern UP to Lake Erie with one outlier population near Grand Rapids
- Pathway: Ornamental, Recreation
- Impacts:
 - Reduced light, nutrients, dissolved oxygen, aquatic plant diversity
 - Obstruct recreation and reduce property values





EUROPEAN FROG-BIT IDENTIFICATION

Leaves

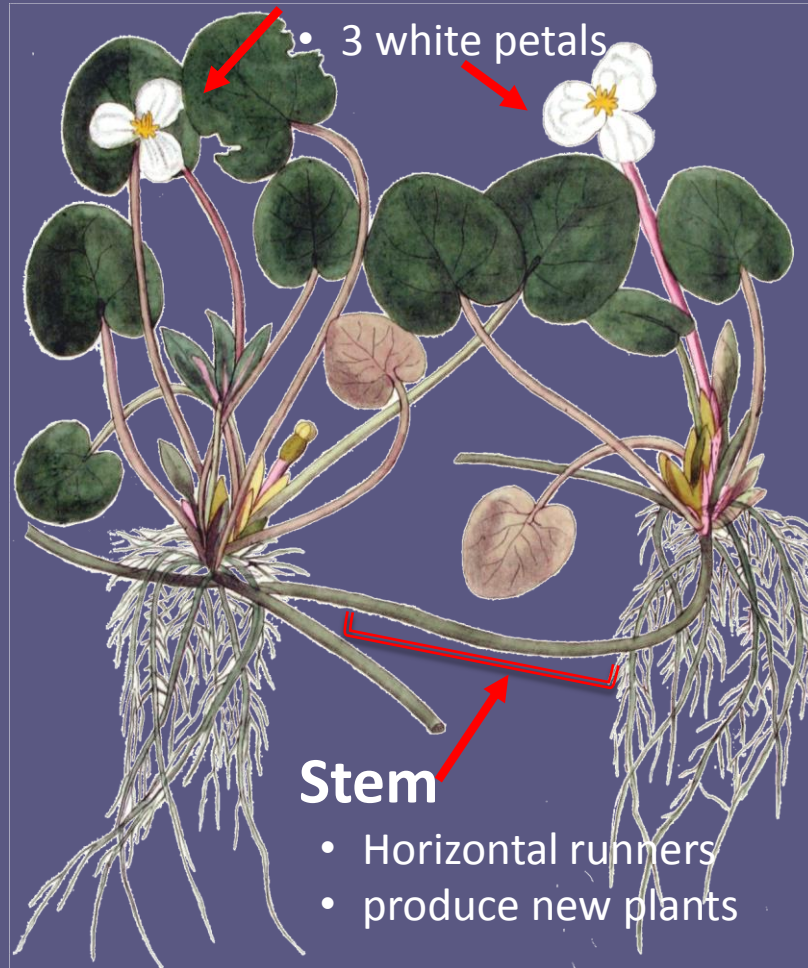
- 0.5 – 2.25” across
- Round to Heart-shape
- Leathery



- Habitat: lentic or slow lotic
- Free-floating
- Rosette form
- Develops dense mats

Flower

- 3 white petals





EUROPEAN FROG-BIT VS. NATIVE PLANTS

Spadderdock

- Heart-shaped leaf with round lobes
- Large leaves up to 16"
- Yellow flower



White water lily

- Pointed leaf lobes
- Many-petaled white flower



Duckweed

- Leaves 1/16 – 1/8"
- Free-floating

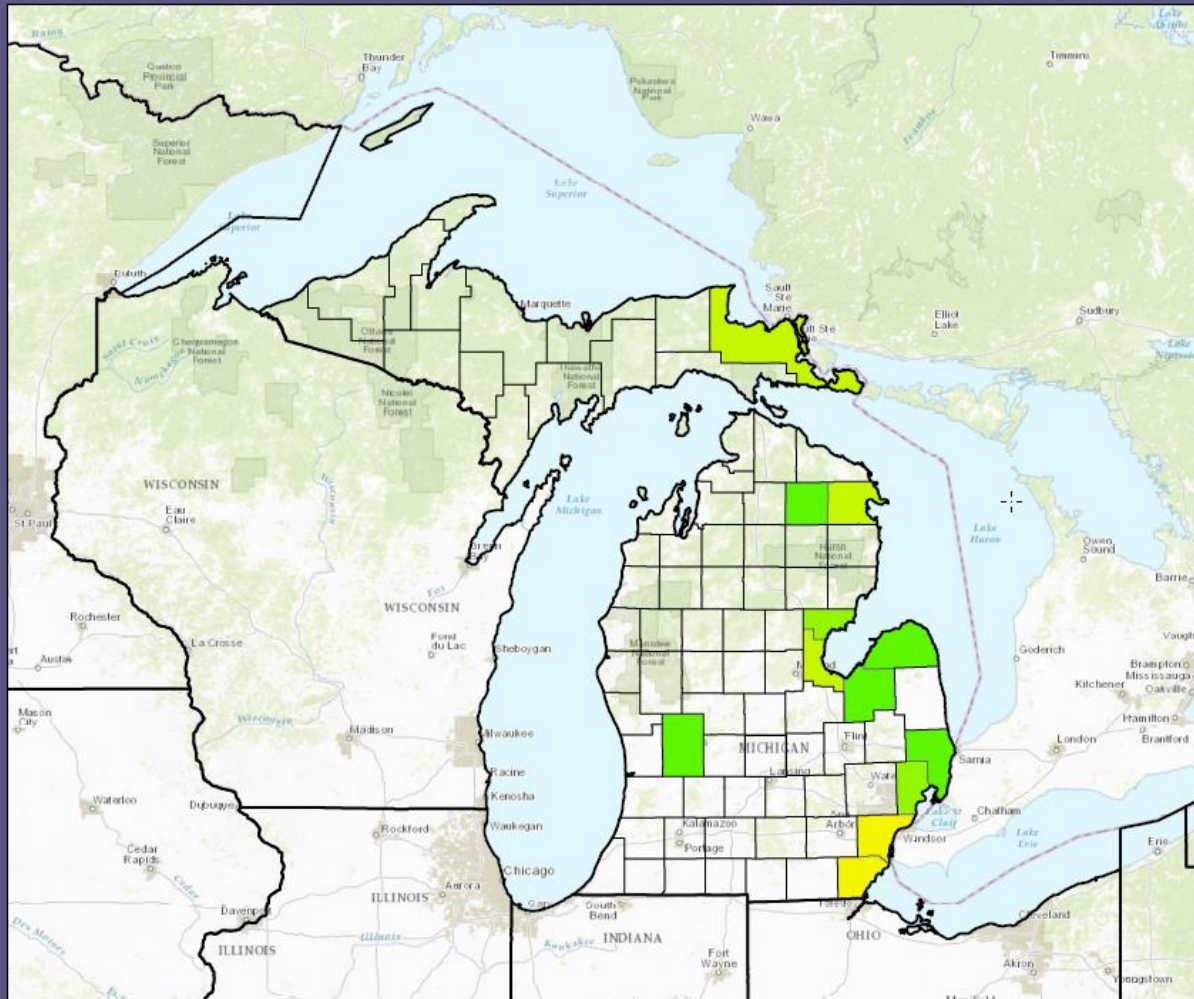




DISTRIBUTION

Michigan: European frog-bit (*Hydrocharis morsus-ranae*)

2017



Total Species Occurrences

Legend

Observations per County

- 25(00)-
- 2(00) - 25(00)
- 15(00) - 2(000)
- 1(00) - 15(00)
- 5(0) - 1(000)
- 1(0) - 5(0)
- 5(0) - 1(00)
- 1 - 5(0)

No Data



MISIN
Midwest Invasive Species Information Network

Map prepared by the Center for Invasive Species and Ecosystem Health
 University of Georgia, Athens, Georgia
 Data provided by the Michigan Department of Natural Resources
 and Environment, Lansing, Michigan

Map data provided by the Center for Invasive Species and Ecosystem Health
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 and Environment, Lansing, Michigan



SAGINAW BAY





MUNUSCONG BAY





NAYANQUING POINT, SAGINAW BAY

2015

- Management of priority areas within State Game Areas
- Multiple years of control efforts





NAYANQUING POINT, SAGINAW BAY

- 2017
- Coastal wetland treatments
 - Reduce density
 - 315 acres
 - Airboat application of herbicides
 - \$26,000
- Multiple years of control efforts





THREE SHORES COOPERATIVE INVASIVE SPECIES MANAGEMENT AREA





NORTHEAST MICHIGAN COOPERATIVE INVASIVE SPECIES MANAGEMENT AREA

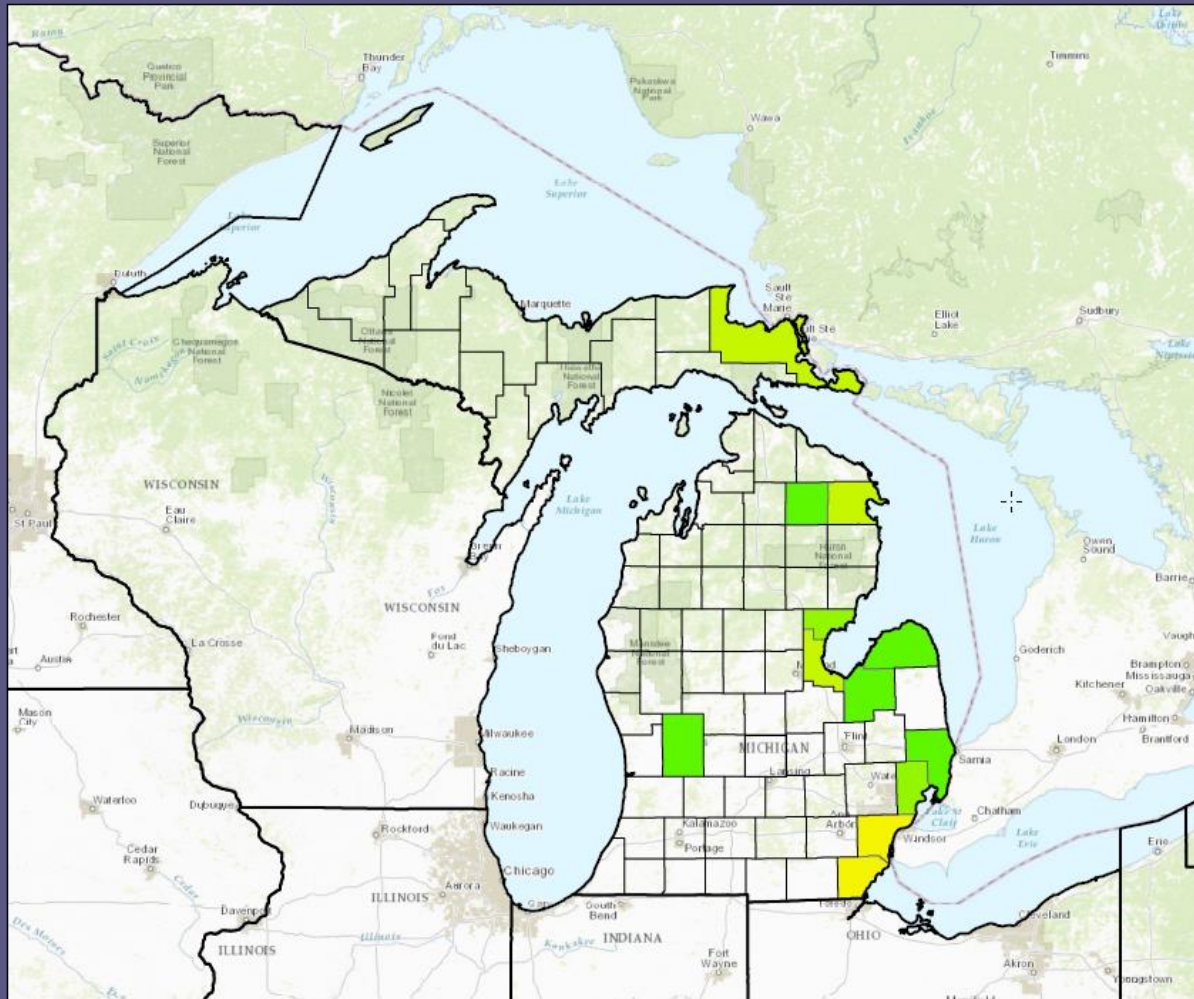




DISTRIBUTION

Michigan: European frog-bit (*Hydrocharis morsus-ranae*)

2017



Total Species Occurrences

Legend

Observations per County

- 25,000+
- 20,001 - 25,000
- 15,001 - 20,000
- 10,001 - 15,000
- 5,001 - 10,000
- 1,001 - 5,000
- 501 - 1,000
- 1 - 500

No Data



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Midwest Invasive Species Information Network

Map prepared by the Center for Invasive Species Research, University of Wisconsin-Madison. Data provided by the Michigan Department of Natural Resources, the Wisconsin Department of Natural Resources, and the Ohio Department of Natural Resources.

Map data is derived from the National Map Accuracy Standards, National Map Accuracy Standards, and the National Map Accuracy Standards. The accuracy of the data is not guaranteed. The accuracy of the data is not guaranteed. The accuracy of the data is not guaranteed.



REEDS AND FISK LAKES





REEDS AND FISK LAKES





REEDS AND FISK LAKES





REEDS AND FISK LAKES

July 2017



Aug 2017



- Management goal is eradication
- Manual removals and herbicide treatments



RESEARCH ON NOVEL TREATMENT

- Loyola University Chicago
- European frog-bit and invasive *Typha* co-occur in Great Lakes coastal wetlands

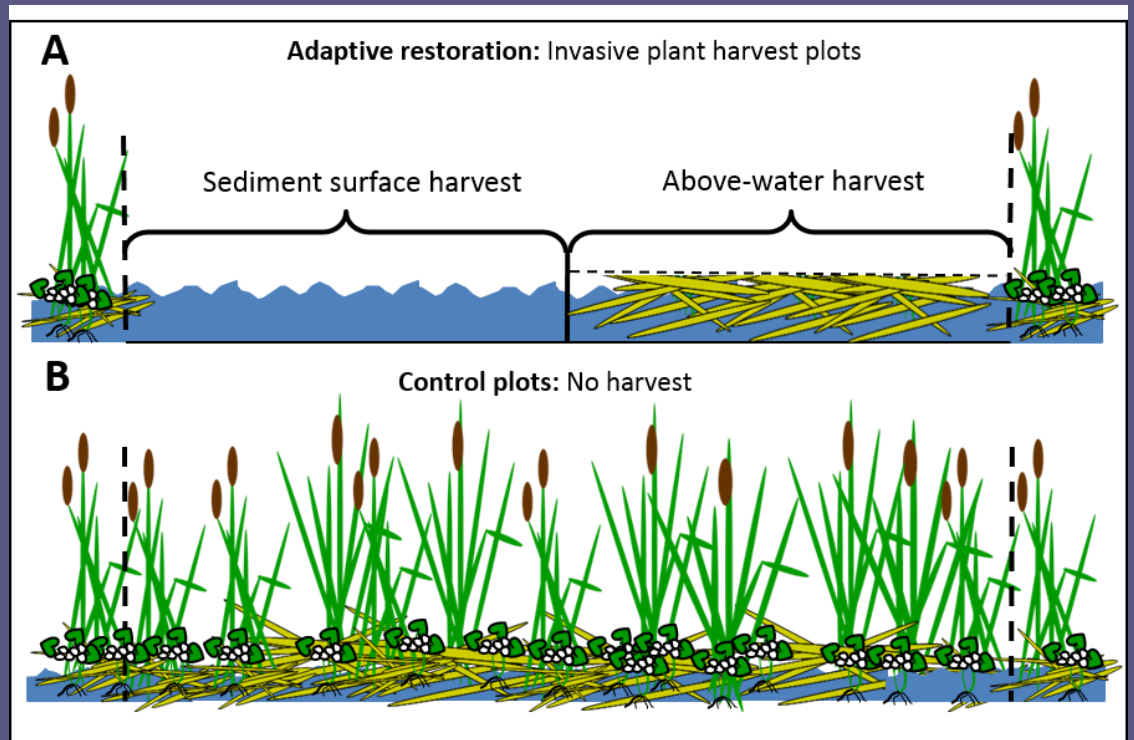


Figure 3 Diagram of 1-acre plots: A) treatment plots – each plot will be split with $\frac{1}{2}$ acre harvested above-water (Softrak harvest alone) and $\frac{1}{2}$ acre harvested at sediment surface; B) control plots.

Figure from Shane Lishawa, Loyola



RESEARCH ON NOVEL TREATMENT

- Loyola University Chicago
- European frog-bit and invasive Typha co-occur in Great Lakes coastal wetlands



Figure 1 European frogbit at Munuscong Wildlife Management Area. A) 2011, frogbit growing densely within a stand of invasive cattail during experimental cattail harvesting; B) 2012, reduced cattail and frogbit cover in a plot where cattail was harvested, note that frogbit leaves are concentrated on the plot's more protected periphery.



RED SWAMP CRAYFISH

PROCAMBARUS CLARKII

- Native to southern US
- Status: Isolated locations in southern Michigan
 - First report: 2017
- Pathway: Aquaculture, aquarium trade, food markets, bait, biological supply
- Impacts:
 - Food web alteration, native species decline
 - Habitat changes





RED SWAMP CRAYFISH IMPACTS

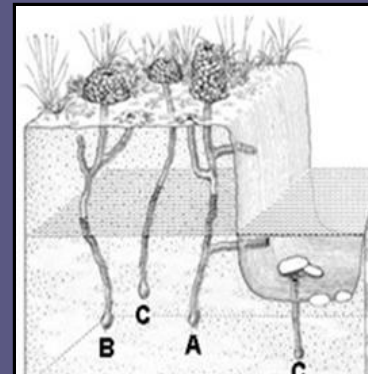
■ Most invasive crayfish worldwide

- Outcompete native species
- Dig complex burrows causing erosion and infrastructure problems
- Feed on vegetation and negatively impact water clarity (water becomes turbid)
- Reproduce in large numbers



■ Prohibited in 2015

- Anglers- live crayfish as bait in SW MI
- Teachers- classrooms





PATHWAYS

- Michigan State University 2014-2015
- Michigan Science Teacher Survey K-12
 - Crayfish Acquisition and Disposal categorized as risky or safe
 - 157 respondents from 45 counties
 - 17 use crayfish- many risky behaviors
- Inspections for live crayfish in major population centers
 - Pet shops, bait shops, food markets
 - 125 visits, 60 revisits
 - Confirmed many shops selling red swamp crayfish, even after prohibition



Examples of *P. clarkii* color morphs found in pet shops



RED SWAMP CRAYFISH IDENTIFICATION



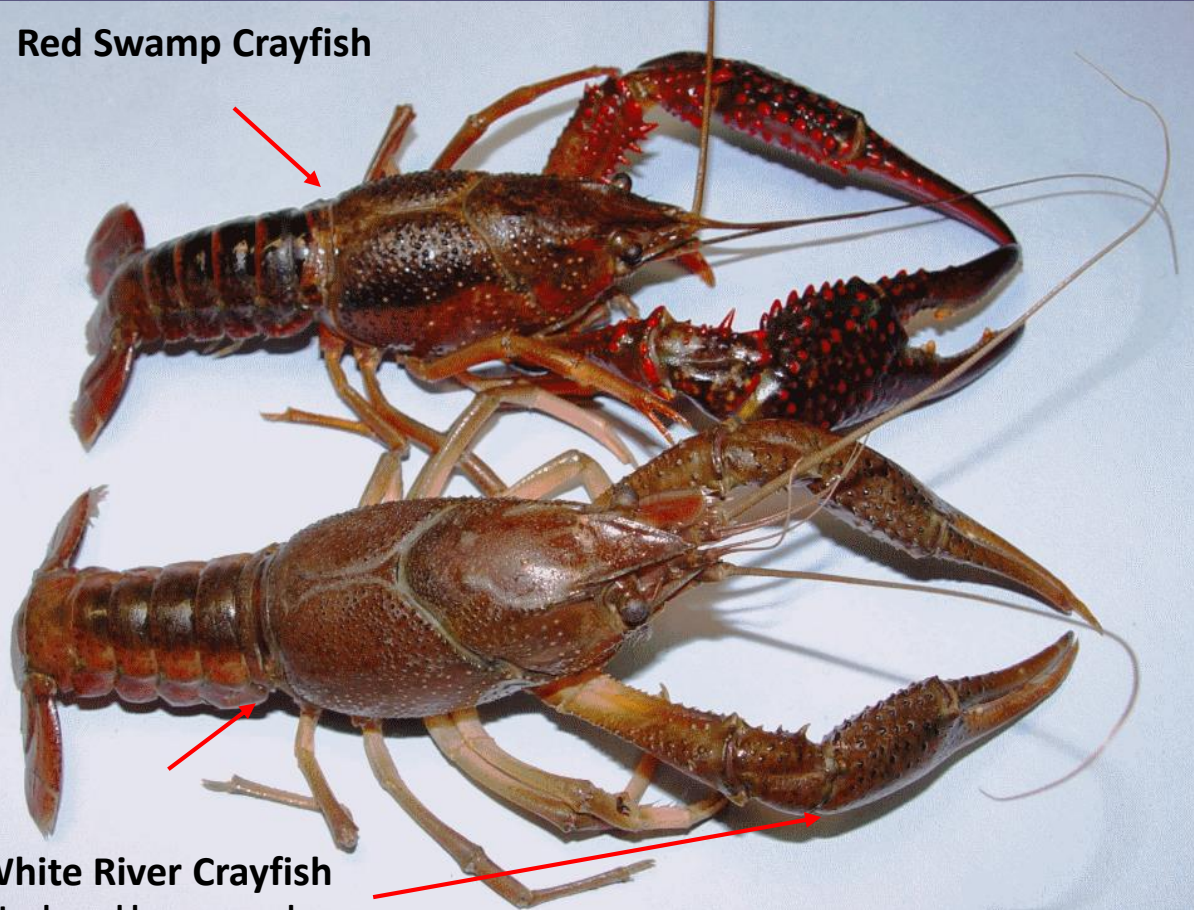
- Dark red with bright red raised spots
- 2-5" long
- Black wedge shaped stripe on top of tail
- Black to blue line under the tail





RED SWAMP CRAYFISH VS. NATIVE WHITE RIVER CRAYFISH

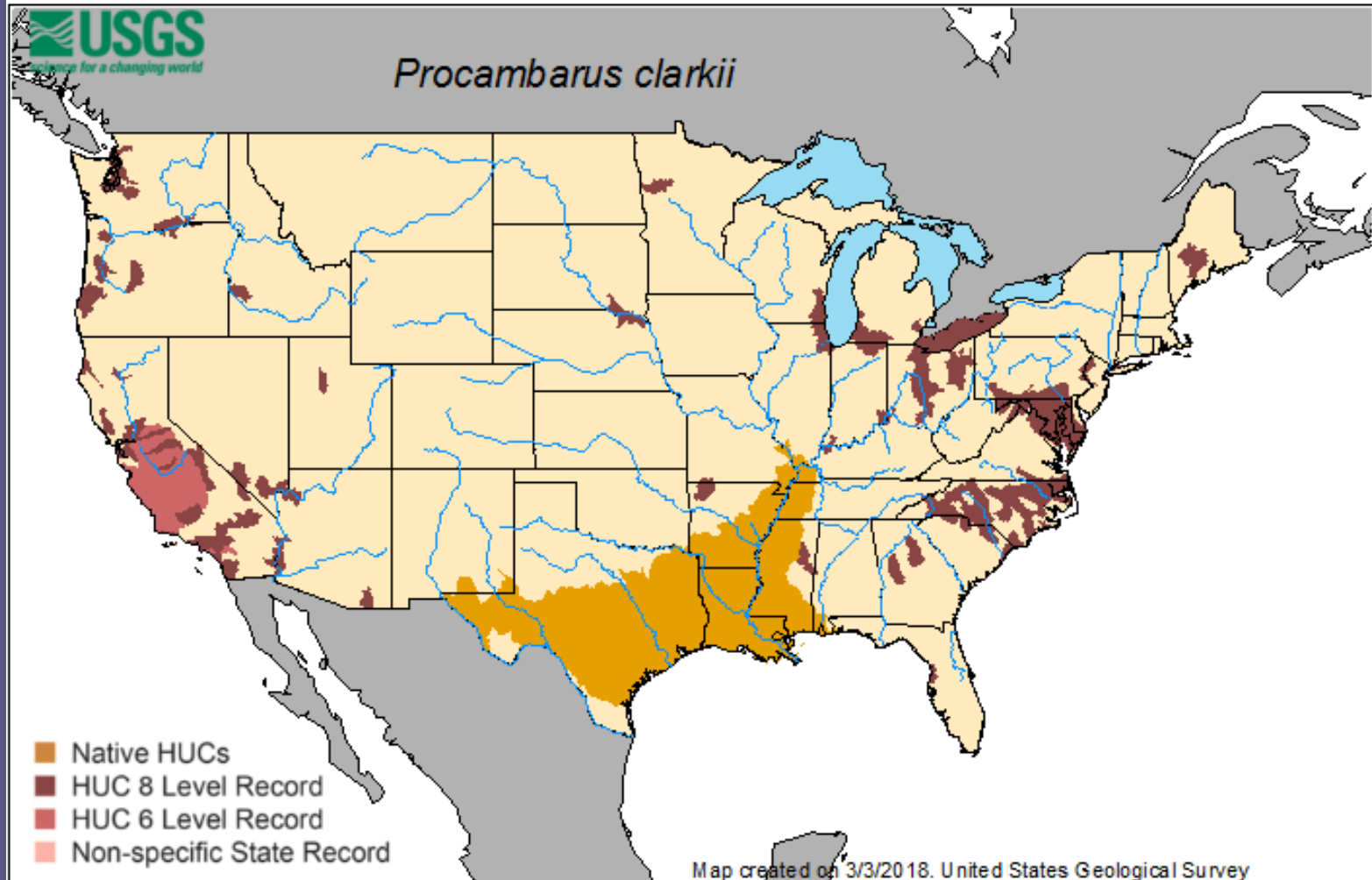
Red Swamp Crayfish



White River Crayfish
• Lacks red bumps on claws

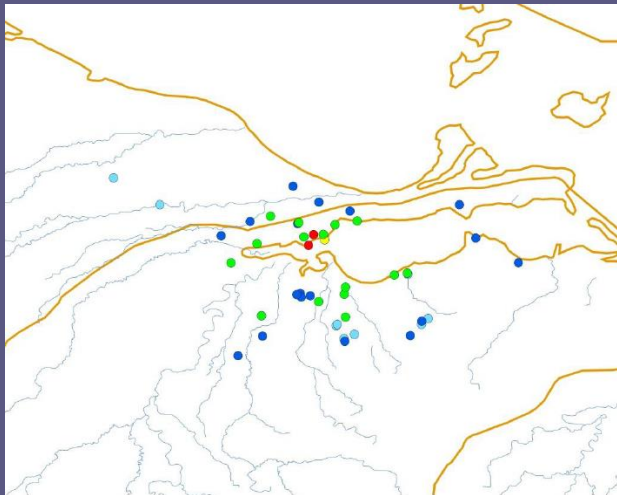
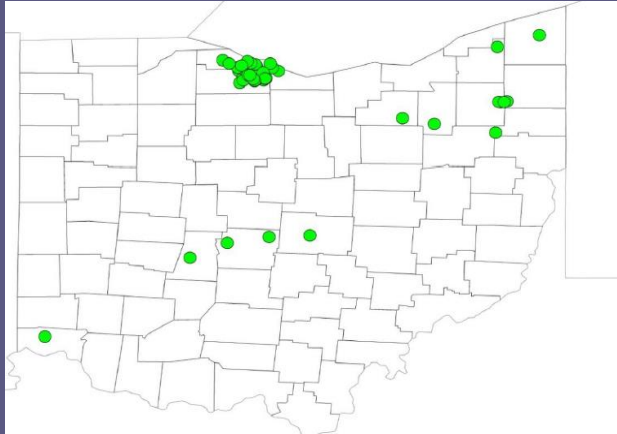


DISTRIBUTION





RED SWAMP CRAYFISH IN OHIO



- Established in Sandusky Bay for >50 years
- Low gradient ditches dispersal route
- Prefer soils with high organic content
- Widespread and abundant
- Outcompeting other crayfish

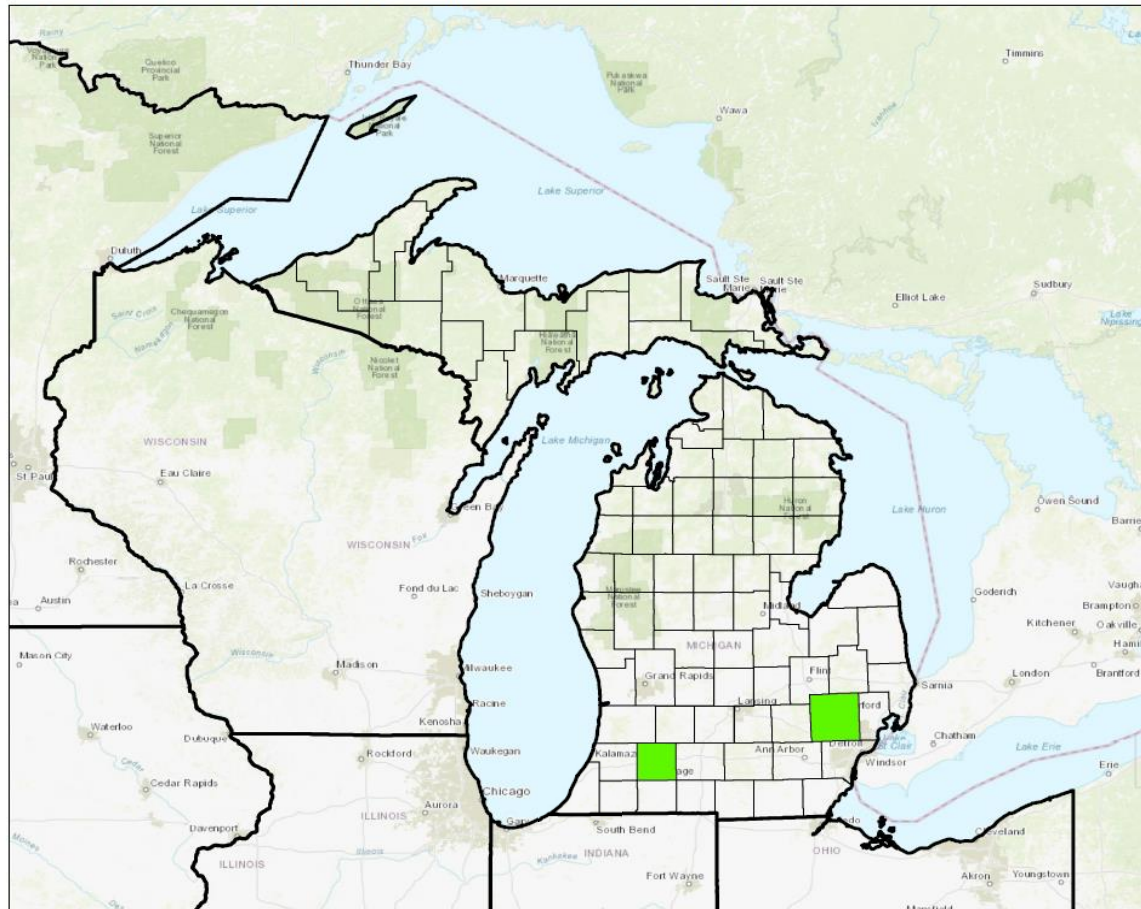
Red - 1960s
Yellow - 1970s
Green - 1980s
Light Blue - 1990s
Dark Blue - 2000s



RED SWAMP CRAYFISH IN MICHIGAN

Michigan: Red swamp crayfish (*Procambarus clarkii*)

2018



Total Species Occurrences

Legend

Observations per County

- 2500+
- 2001 - 2500
- 1501 - 2000
- 1001 - 1500
- 501 - 1000
- 101 - 500
- 51 - 100
- 1 - 50
- No Data



MISIN

Midwest Invasive Species Information Network

This map depicts the total number of observations reported for a certain species in a county. Changes in the number of observations is displayed as a color progression. Large amounts are shown in darker colors.

Please note that these colors and numbers are not meant to represent infestation levels or show uninfested areas. Some areas tend to be more active than others. This is a distribution of point data, which may be clustered.



2017 RED SWAMP CRAYFISH REPORTS

- Initial report to Fisheries Division on July 14, 2017 from Sunset Lake in Vicksburg (Kalamazoo County)
- Second report from Novi Retention pond on July 16, 2017
- Increased awareness through statewide press release, social media, you tube video, and signage
 - Followed up on over 100 public reports

Tiny lobsters of doom: Why this invasive crayfish is bad news

By KATE WELLS · JUL 27, 2017

PROGRAM
The Environment
Report

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This is the photo sent to Seth Herbst. "And as soon as I saw that photo, it was a clear as day that that was a red swamp crayfish," he sighed.

COURTESY SETH HERBST



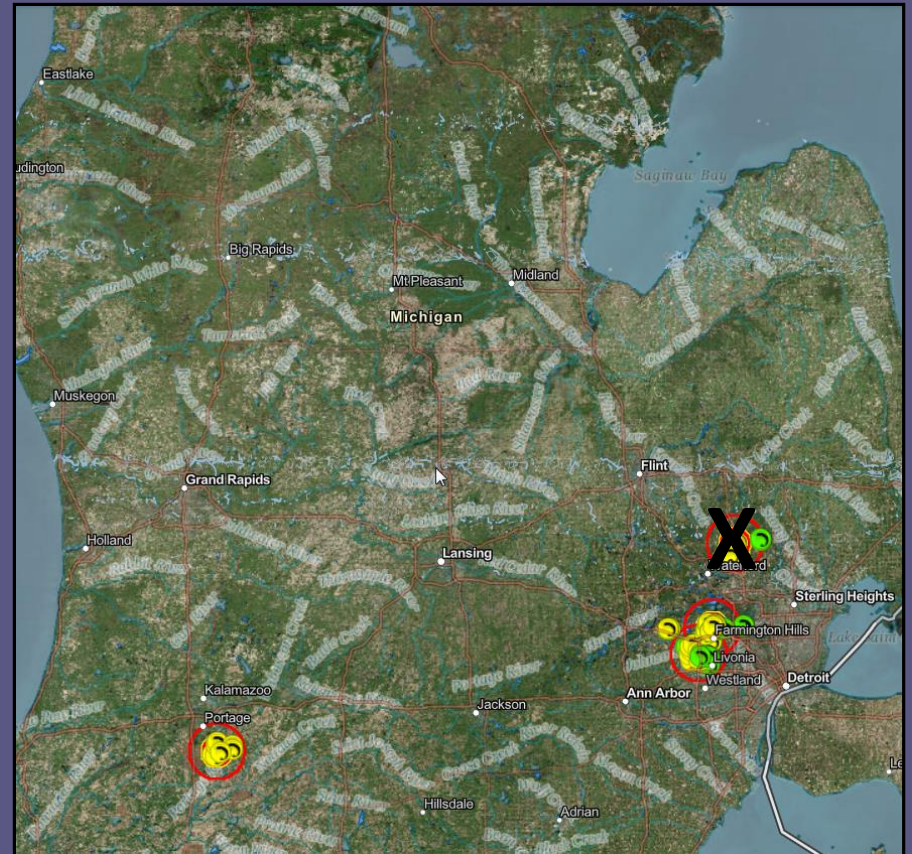


2017 RED SWAMP CRAYFISH RESPONSE

- Multiple credible reports
- Most of reports are of native crayfish

Confirmed:

- Sunset Lake
 - No detected spread
 - ~70 removed
- Novi
 - 11 infested ponds
 - >4,000 removed
- Farmington Hills
 - 3 infested ponds
 - ~1,500 removed





POTENTIAL PATHWAYS

- Red swamp crayfish were widely available prior to 2015
- Crayfish could have been introduced from releases linked to multiple vectors
- Law Enforcement Division has been active with enforcing regulations to prevent future introductions

Live Crawfish Value Pack 100 lb FedEx/UPS	Live Crawfish Value Pack 120 lb FedEx/UPS	Live Crawfish Value Pack 150 lb FedEx/UPS
<ul style="list-style-type: none">• Field Run \$474.99• Select \$499.99	<ul style="list-style-type: none">• Field Run \$564.99• Select \$599.99	<ul style="list-style-type: none">• Field Run \$709.99• Select \$749.99





RED SWAMP CRAYFISH RESPONSE PLAN

Goals:

- 1) Determine the **distributional extent** of the infestations
- 2) Implement and evaluate an **early detection** monitoring strategy in high risk areas
- 3) Determine the **source and relatedness** of red swamp crayfish infestations
- 4) Collect **baseline biological** and physical information that will inform a future assessment of impacts
- 5) Implement and evaluate **control measures** to increase effectiveness of response efforts





RED SWAMP CRAYFISH RESPONSE

- Continued implementation of Michigan's response plan with MSU
- Collaborate with crayfish and AIS control experts to evaluate and implement effective controls
 - USGS, USFWS, MSU, Auburn, others
- Potential field application of chemical treatments in 2018





WATCH LIST SPECIES AND RESPONSE





IDENTIFICATION & REPORTING TOOLS

MISIN Midwest Invasive Species Information Network

Learn, Identify, Report, Map

www.misin.msu.edu

www.michigan.gov/invasives

Free

Report Invasive Species

MISIN Smartphone App

The MISIN smartphone app provides a mobile solution for the capture of invasive species observations. You can play an important role in the early detection and rapid response to new invasive threats in your area by contributing invasive species observations to the MISIN project.

Features

- ✓ Identify and report 230+ different species
- ✓ Capture and submit species field observations
- ✓ View real-time species observation maps
- ✓ Include field images with your observations
- ✓ Browse information about top Midwest invaders

Available on the **App Store** | **Google play**

Midwest Invasive Species Information Network
www.misin.msu.edu • info@misin.msu.edu

MICHIGAN STATE UNIVERSITY
 Developed by the Applied Spatial Ecology and Technical Services Laboratory, Department of Entomology - <http://www.asetl.msu.edu>

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