

Prevention of Starry Stonewort & Spiny Water flea



JASON MILLER

&

VALERIE O'CONNOR



**STOP AQUATIC
HITCHHIKERS!**



Agenda

Introduction

Understanding Invasive Species

Featured Aquatic Invasive Species

Community Solutions and Action Steps



Wisconsin DNR



Jim Grazio, PA DEP



Gary Montz, Bugwood.org



Wisconsin DNR

Door County Invasive Species Team (DCIST)

- Cooperative Weed Management Area (CWMA)
- County-wide education and control
- Collaboration across agencies and partners
- Our goal is to empower Door County citizens and municipalities with the information, tools, and skills to tackle invasive species



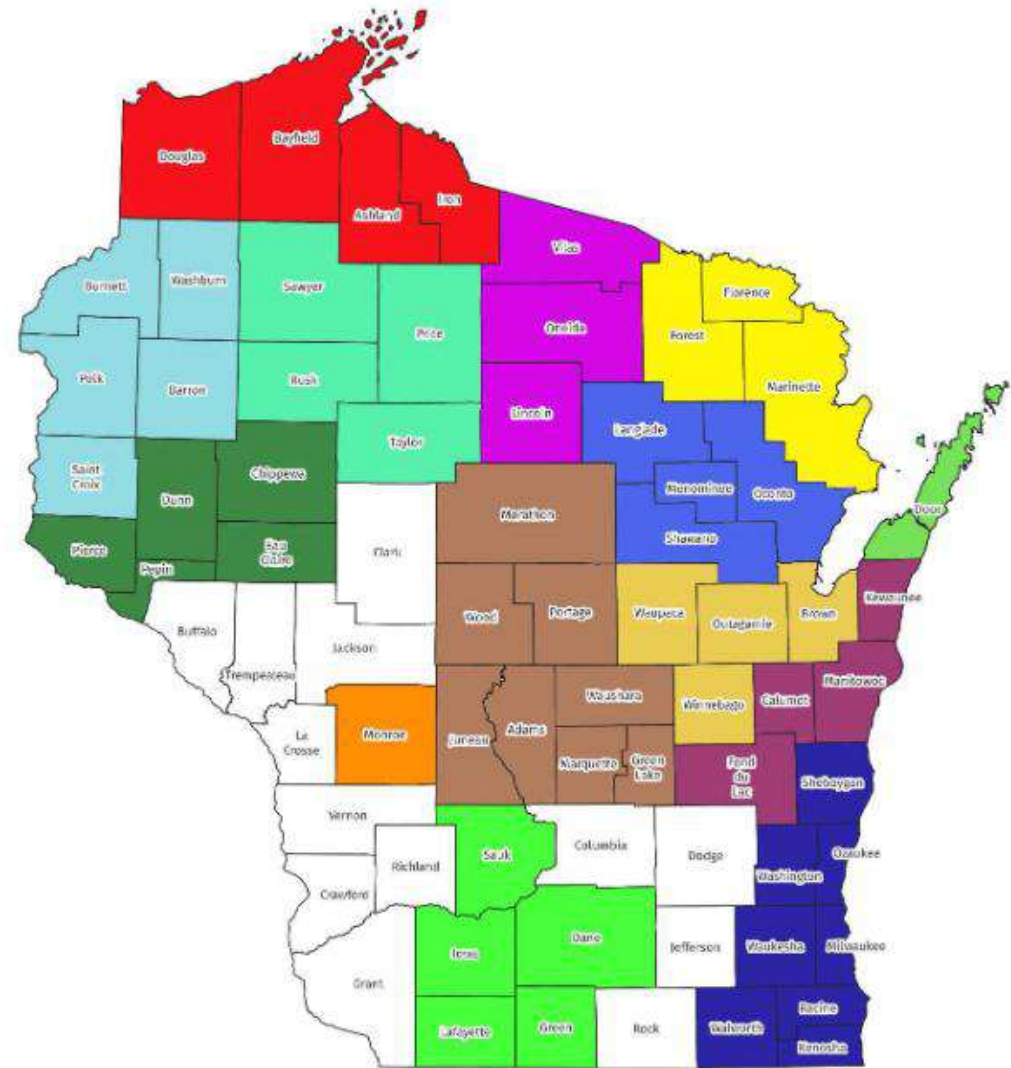
Glacierland RC&D

- Grass roots non-profit organization
- RC&D = Resource Conservation & Development Council
- Serves eastern Wisconsin
- Areas of focus: Environmental, social, and economic sustainability
- Current projects: Clean water, invasive species, sustainable agricultural & multiple use forestry



CWMA

- A partnership of federal, state, and local government agencies, tribes, individuals, and various interested groups that manage invasive species in a defined area

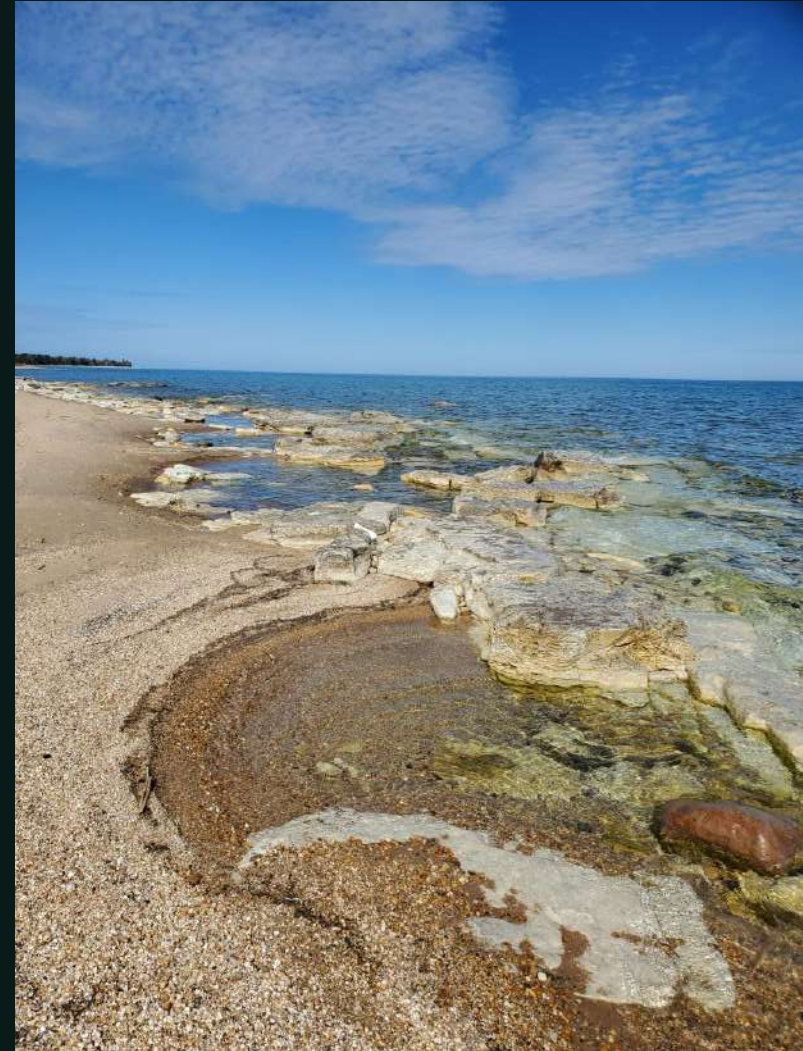


CISMA Distributions

Central Wisconsin Invasives Partnership	Southeast Wisconsin Invasive Species Consortium
Door County Invasive Species Team	South Central Invasives Partnership
Lakeshore Invasive Species Management Area	St. Croix - Red Cedar Cooperative Weed Management Area
Lower Chippewa Invasives Partnership	Timberland Invasives Partnership
Monroe County Invasive Species Working Group	Upper Chippewa Invasive Species Partnership
Northeast Wisconsin Invasives Partnership	Wild Rivers Invasive Species Coalition
Northwoods Cooperative Weed Management Area	Wisconsin Headwaters Invasives Partnership

Overview of Invasive Species

- High-quality waters worth protecting
- 350+ miles of coastal shoreline
- Numerous inland lakes, streams, and rivers
- Waterways that support fishing, boating, wildlife habitat, and tourism

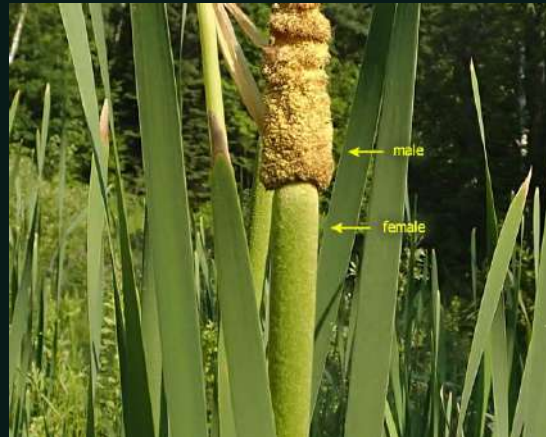


Definitions

- **Native species:** A species that naturally occurs
- **Weeds:** A native nuisance plant
- **Naturalized:** A non-native plant that is now found in natural areas
- **Invasive species:** A non-native species that has potential to negatively impact the environment



Ben Kimball



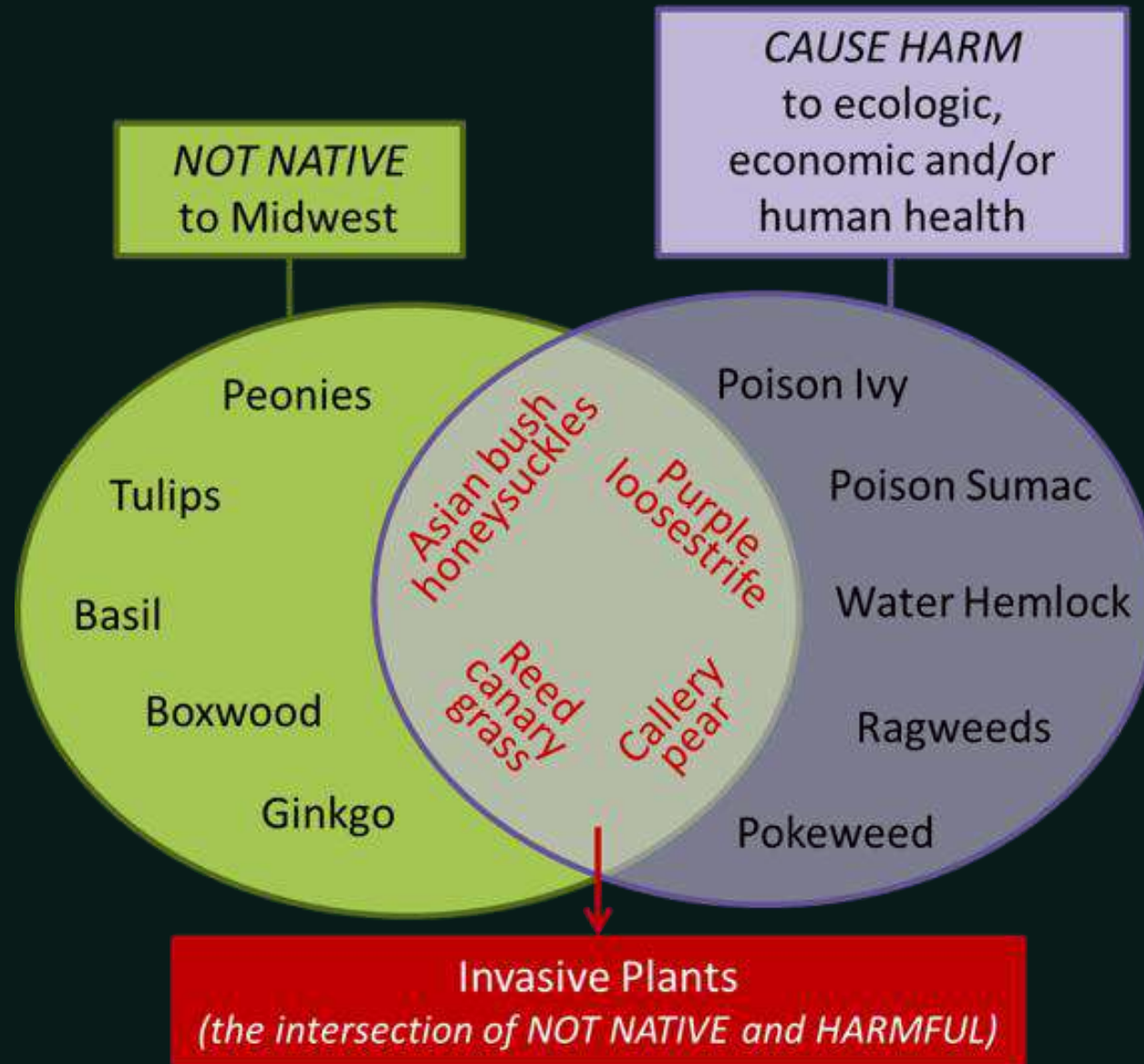
Peter M. Dziuk, MN Wildflowers



Peter M. Dziuk, MN Wildflowers



Richard Gardner, Bugwood.org



NR 40

- The invasive species rule
- Adopted in 2009
- Defines invasive species as
A species “whose introduction causes or is likely to cause economic or environmental harm or harm to human health”
- 245 species on list
- Not all species on the list are found in WI

Common Wetland Invasive Plants in WI

Please report **prohibited** species (as indicated by red on the maps) and all other species marked with an asterisk (*) when found in or near wetlands or shores. Provide the following data: exact location, land ownership (if known), population size, a photo or voucher specimen, and your contact information.

To report a sighting: send an email to: Invasive.Species@wi.gov or CALL 608-267-5066



NR 40

- Restricted Invasive Species
 - Already widely established in the state

Control is encouraged but not required

- Cannot transport, transfer, or introduce without a permit

- Prohibited Invasive Species
 - Not yet in the state or only in a few places

Control is required

- Cannot transport, possess, transfer, or introduce without a permit

What makes a species invasive?

- Non-native
- Negative impact on the environment, economy, or human health
- Competitive traits
 - Growth
 - Reproduction
 - Allelopathy



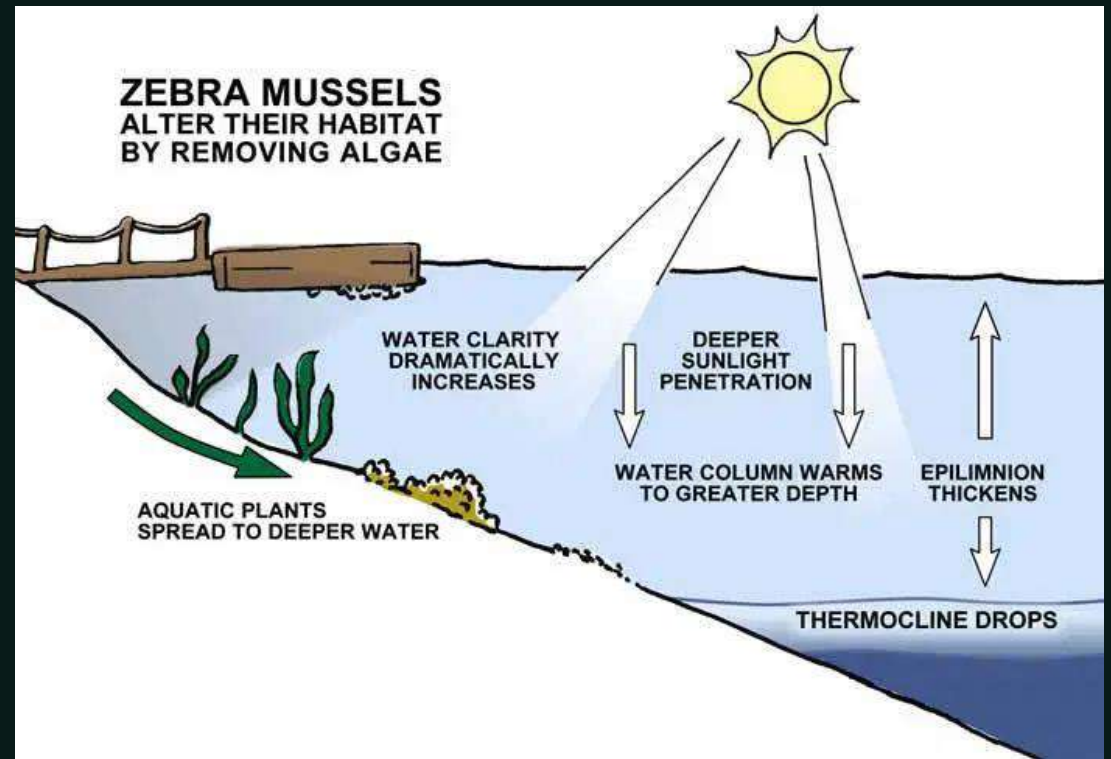
Impacts of Invasive Species



Ryan Hagerty, USFWS

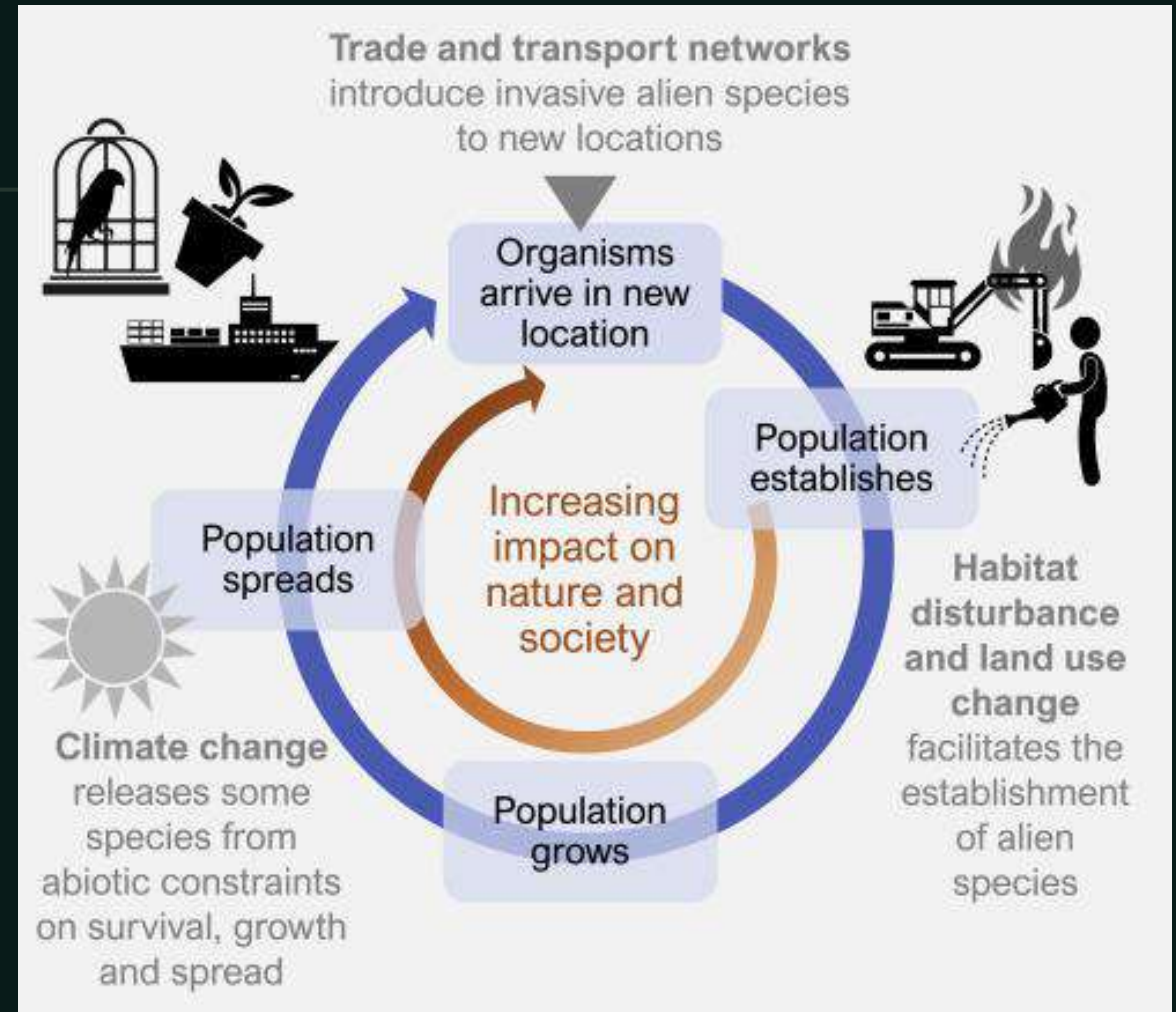
Ecological Impacts

- Key role in 60% of global plant animal extinctions
- 42% of species listed in the ESA are threatened by invasive species
- Modify water and soil chemistry



Ecological Impacts

- Creates a feedback loop that benefits itself
- Decrease diversity & ecological resilience
- Negative impacts to wildlife
- How do we break this cycle?



Melodie McGeoch and Walter Jetz (2019) Measure and Reduce the Harm Caused by Biological Invasions. One Earth, Volume 1, Issue 2, 171-174.

Economic Impacts

- Multi-billion dollar impact
- Impacts to fishing, agriculture & forestry industry, and to water sources



Paul Skawinski, UW – Stevens Point



Pathways of Introduction and Spread

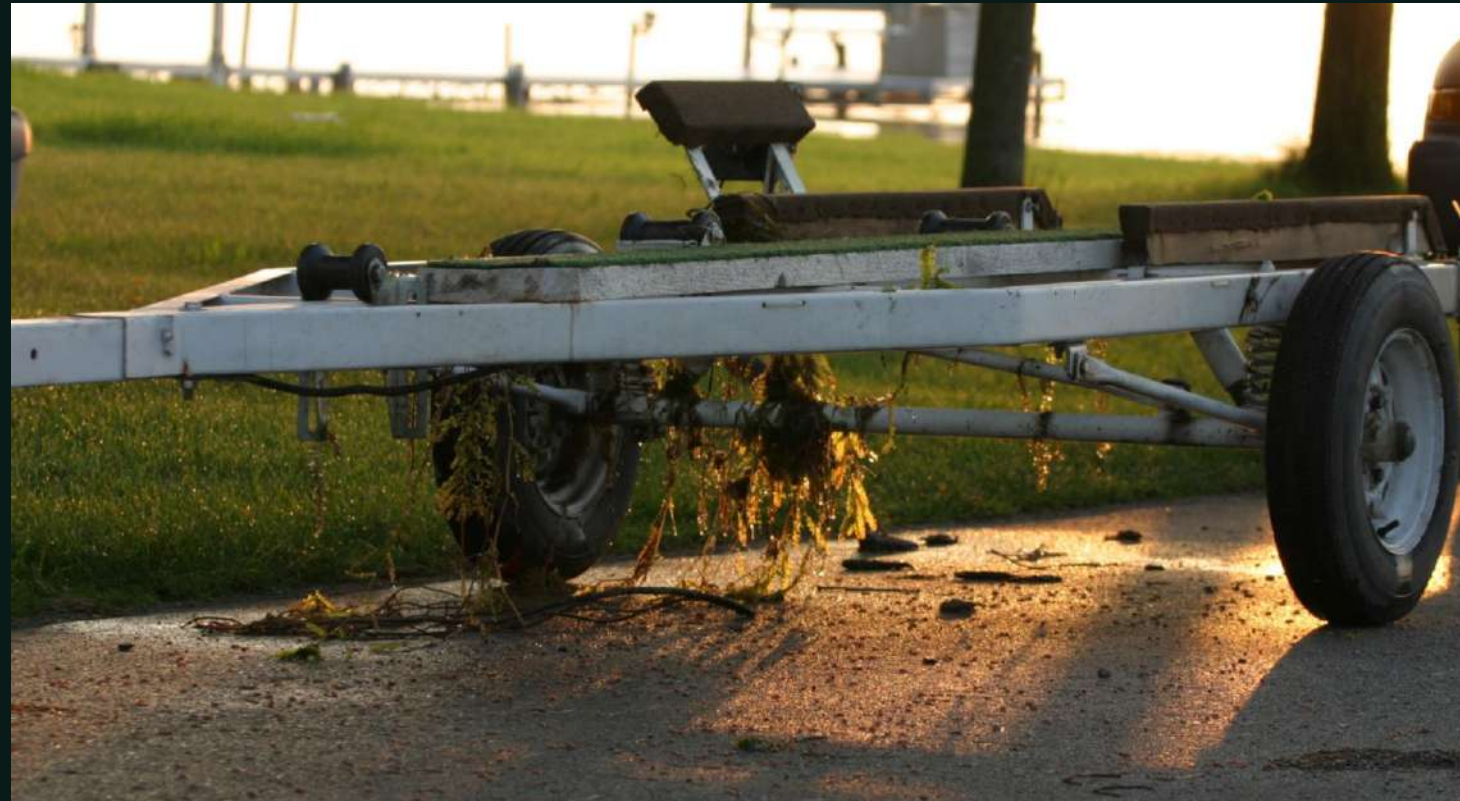
Pathways

- Routes by which invasive species move
- Most introductions are directly or indirectly caused by humans
- Species can use multiple pathways
- Some are deliberate, others unintentional



Boating & Equipment

- Attach to boats, trailers, docks, fishing gear
- Zebra mussels and Eurasian watermilfoil
- Live wells and bait buckets



Wisconsin DNR

Additional Pathways

- Horticultural trade & landscaping
- Pet and aquarium trade
- Mail order
- Transportation networks

Police in Wisconsin find alligator near Lake Michigan

by: Indiana Schilz, Michael Bartiromo
Posted: Nov 8, 2023 / 01:21 PM EST
Updated: Nov 8, 2023 / 02:36 PM EST

Graves Lovell, Alabama Department of Conservation and Natural Resources



5400414



USGS, US Geological Survey

5431088



Leslie J. Mehrhoff, University of Connecticut

5487114

Featured Aquatic Invasive Species



UWGB



Paul Skawinski, UW – Stevens Point



Paul Skawinski, UW – Stevens Point

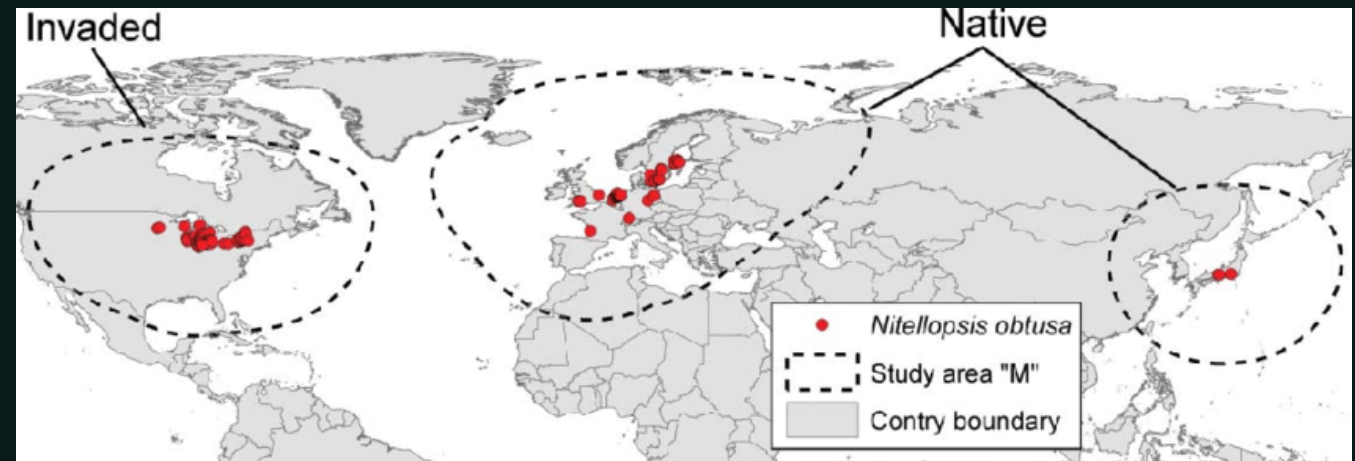
Starry Stonewort (*Nitellopsis obtusa*)

Starry Stonewort

- Member of the Characeae family
- Are green algae
- Not a vascular plant
- Native to Europe and Asia



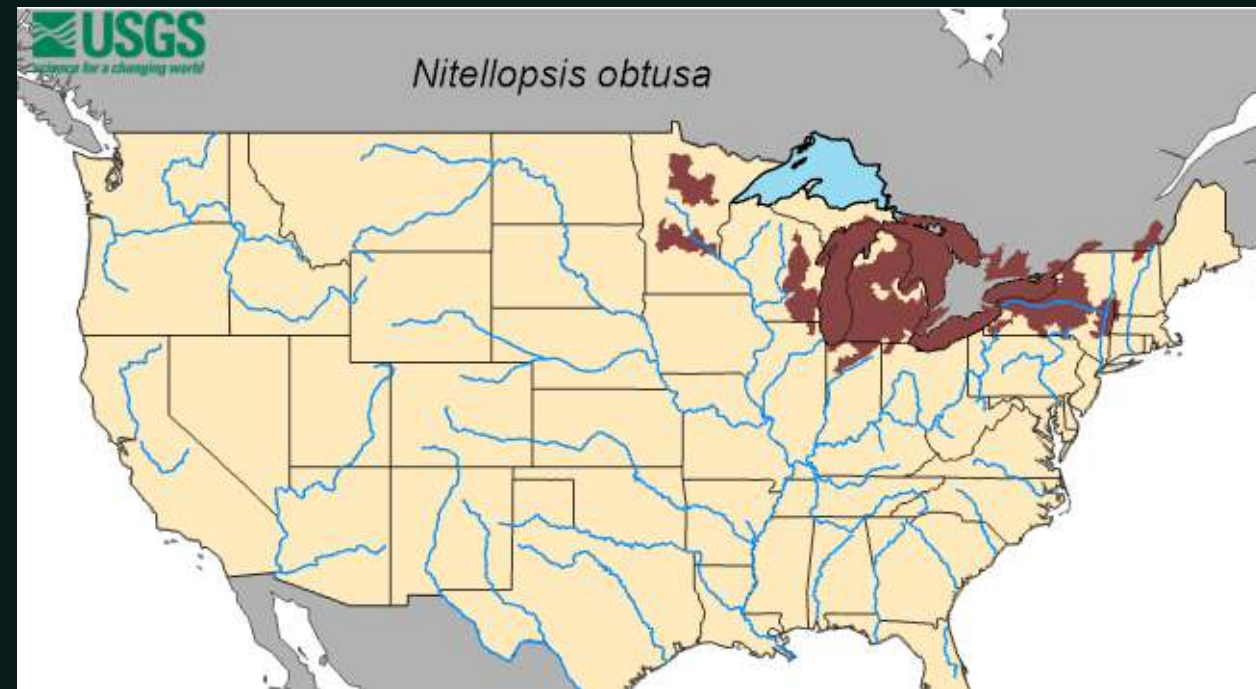
Paul Skawinski, UW – Stevens Point



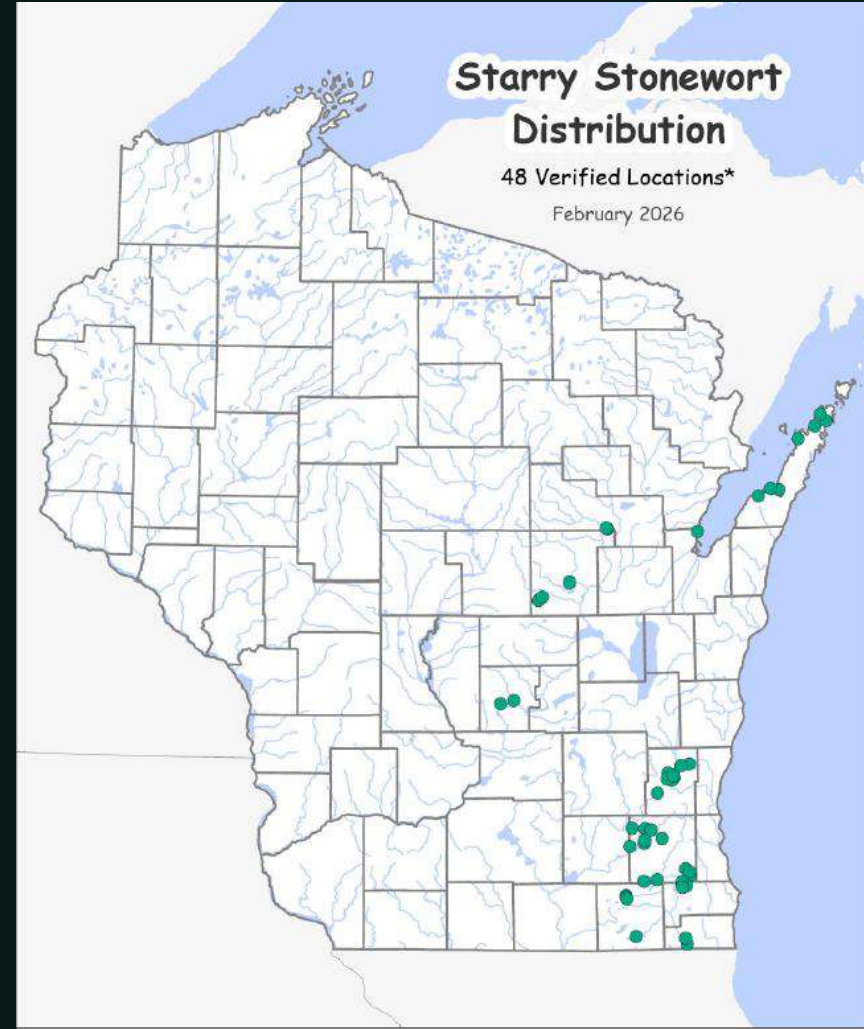
Escobar, Luis, et al (2017) Aquatic Invasive Species in the Great Lakes Region: An Overview. Reviews in Fisheries Science & Aquaculture.

Starry Stonewort

- First document in North America in 1978
- Found in Michigan in the mid-2000's
- First documented in Wisconsin in September 2014
- Found in Door County in August 2016

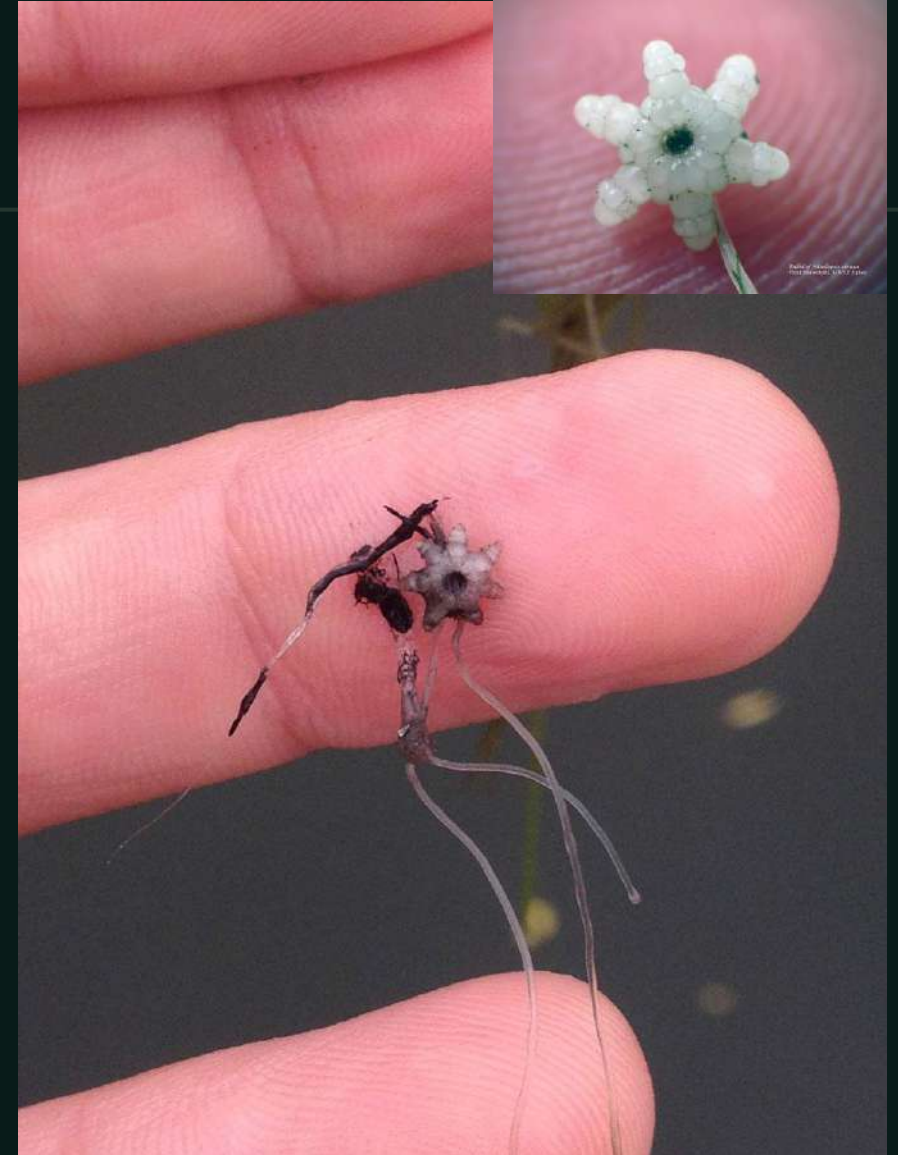


Starry Stonewort



Starry Stonewort

- Plants can grow up to 7 feet tall
- Anchored to the sediments with clear filaments called rhizoids
- Can persist under the ice
- Peak biomass is in late summer or early fall



Robin Sleith

Starry Stonewort

- Can grow in a broad range of habitats
- Lakes, ponds, and slow-moving water bodies
- Needs a relatively high concentration of calcium
- Tolerate of low light



New York Dept of Environmental Conservation

Starry Stonewort

- Only asexual reproduction in North America
- Reproduces via fragments of stem
- Or bulbils

Small, white, star-shaped structures



Paul Skawinski, UW – Stevens Point

Starry Stonewort

- Dispersed to new waterbodies primarily by boats, trailers, and anchors



Starry Stonewort

- SSW impacts on water ways are not clear
- It might outcompete native plants
- Dense patches may alter habitat for fish
- Potential for a navigational nuisance in shallow waters



Paul Skawinski, UW – Stevens Point



Lake Simcoe Region Conservation Authority

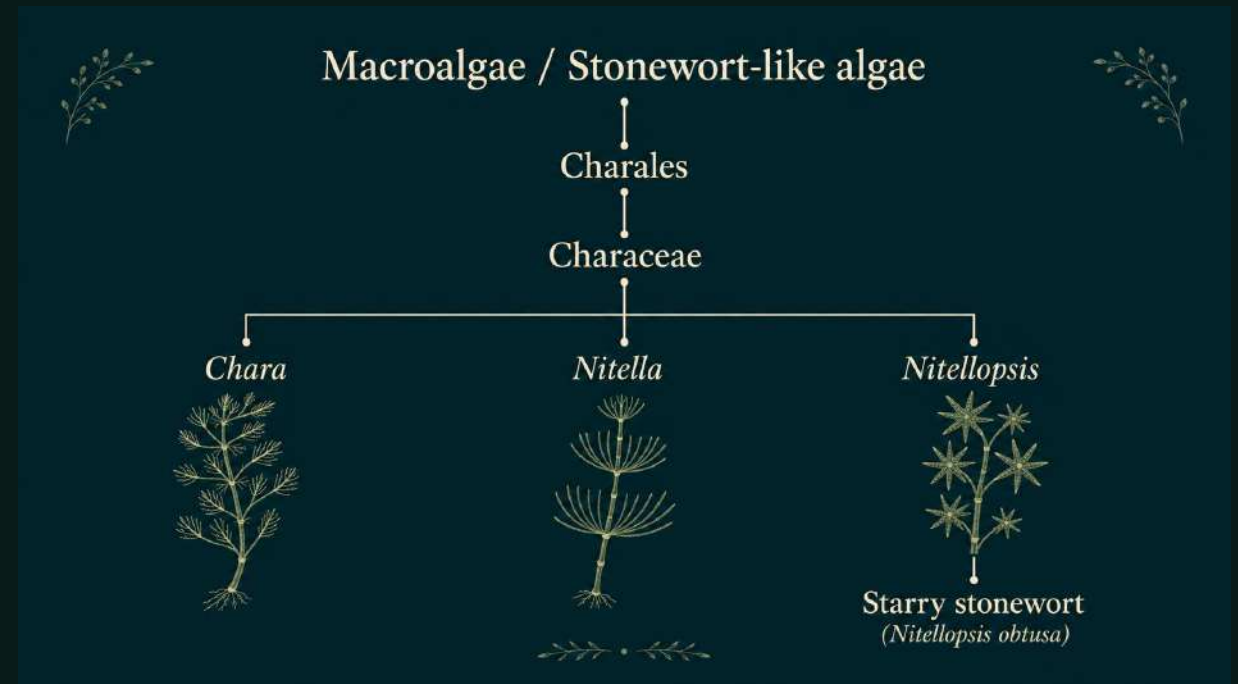


Buffalo State University – Great Lakes Center

Starry Stonewort - Identification

Starry Stonewort

- Related to many other native macroalgae in Wisconsin
 - Chara* (10+ species)
 - Nitella* (9+ species)
- We'll highlight features that set SSW apart from other common species you might encounter



Starry Stonewort

- SSW is large compared to most of its native look-a-likes



Paul Skawinski, UW – Stevens Point

Starry stonewort



Chara contraria



Chara globularis



Nitella flexilis



Starry Stonewort

- Retains its shape when held out of water

Starry stonewort

Nitella mucronata



Paul Skawinski, UW – Stevens Point



Paul Skawinski, UW – Stevens Point

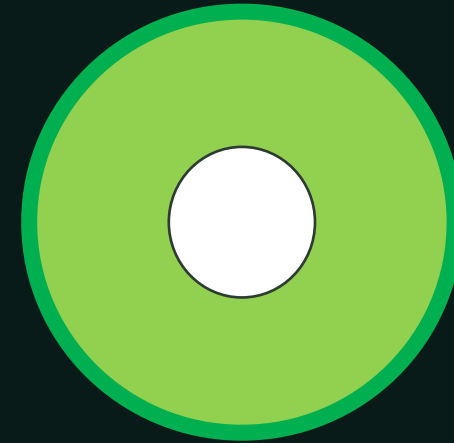
Starry Stonewort

- Squeeze test

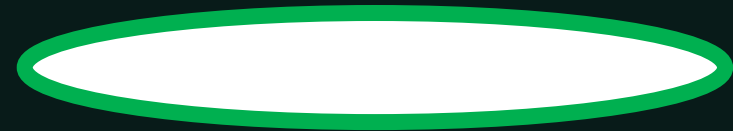


Nitellopsis obtusa
Starry stonewort
© Paul Skawinski 2011

- Chara response



- Starry and Nitella response



Starry Stonewort

- Distinct star-shaped bulbils
- Most natives do not produce bulbils



Paul Skawinski, UW – Stevens Point



Paul Skawinski, UW – Stevens Point

Spiny Water
flea
(*Bythotrephes
longimanus*)



Spiny water flea

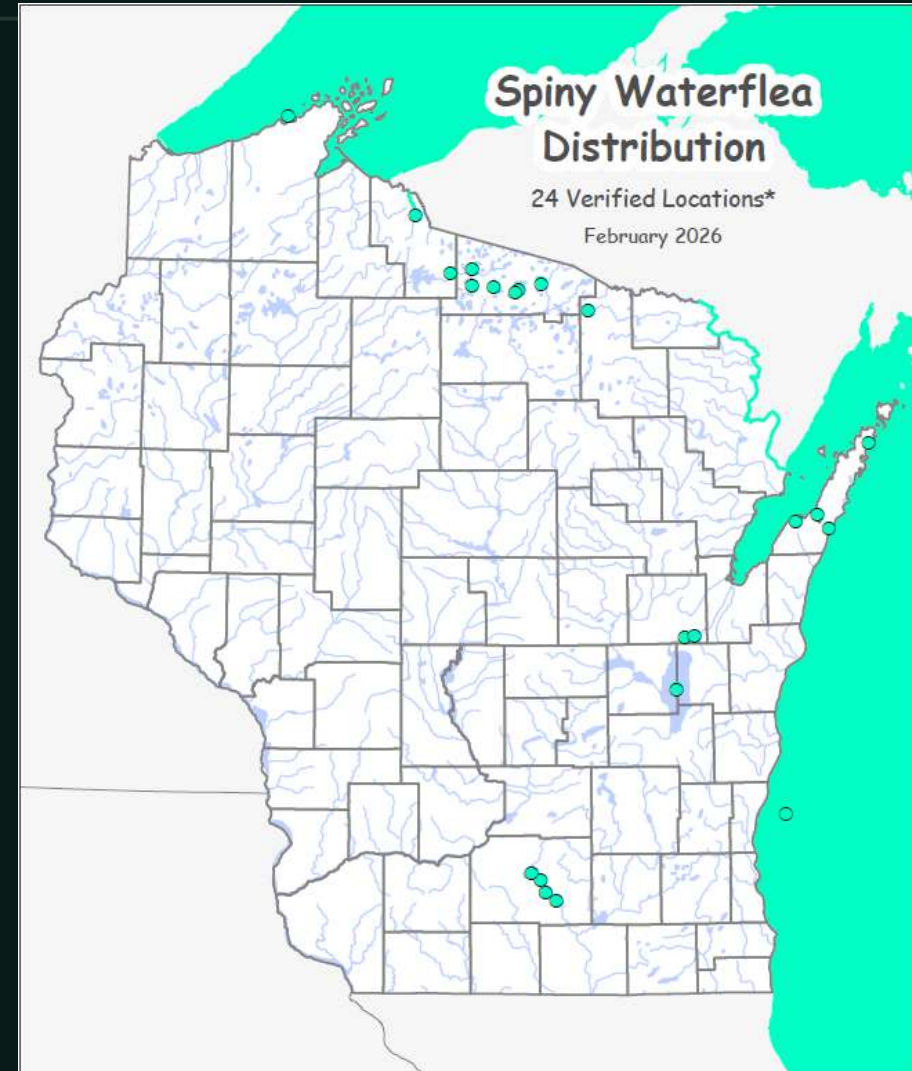
- Microscopic
- Zooplankton
- Native to Europe and Asia



Gary Montz, Bugwood.org

Spiny water flea

- Discovered in Lake Ontario in 1982
- Found in all the Great Lakes and some inland lakes



Spiny water flea

- Small – 1/4 to 1/2 inch long
- Translucent bodies
- Single long tail with one to four spines
- One large, distinctive black eyespot



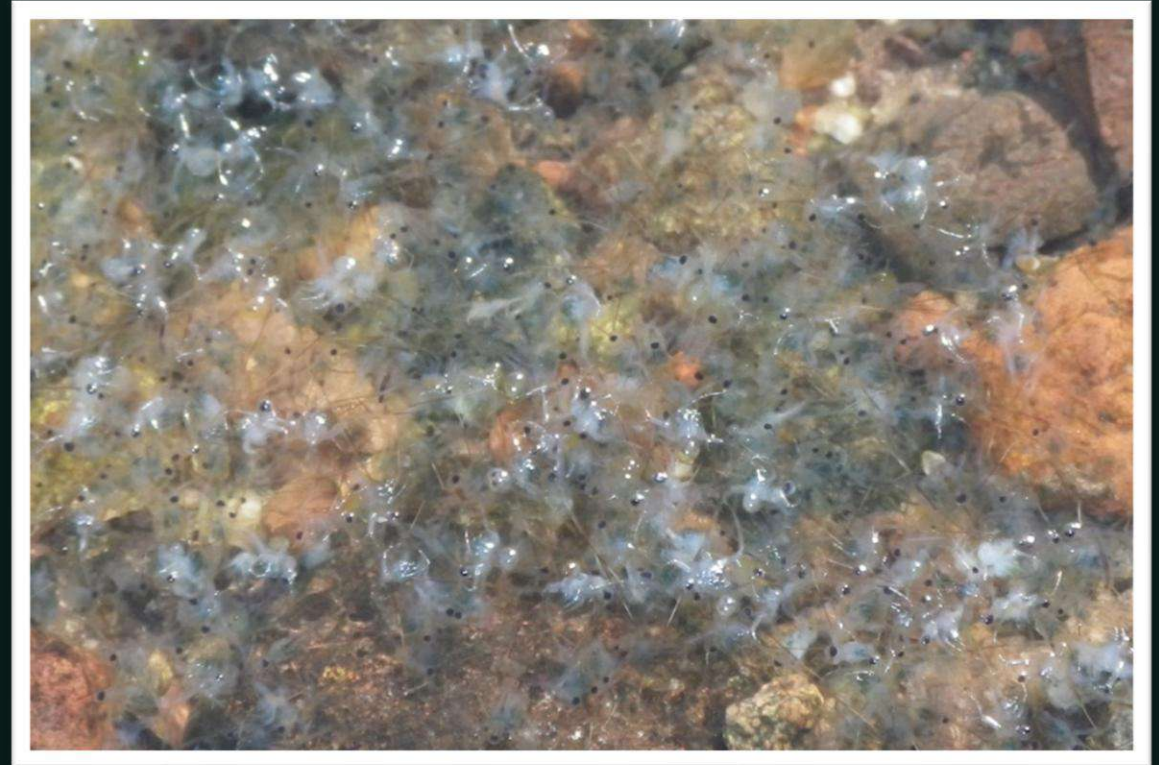
Gary Montz, Bugwood.org



Lake Champlain Basin Program

Spiny water flea

- A predatory species
- Not a suitable food source for young fish
- Not a risk to humans, dogs, larger fish, or wildlife



Wisconsin DNR

Spiny water flea

- Population mostly female
- Reproduce by cloning during warmer months
- Will produce eggs in the fall
- Eggs are hardy



Henk Ketelaars

Spiny water flea

- Found on equipment in clumps
- May clog eyelets of fishing rods



Lisa Burns



Jeff Gunderson, Minnesota Sea Grant

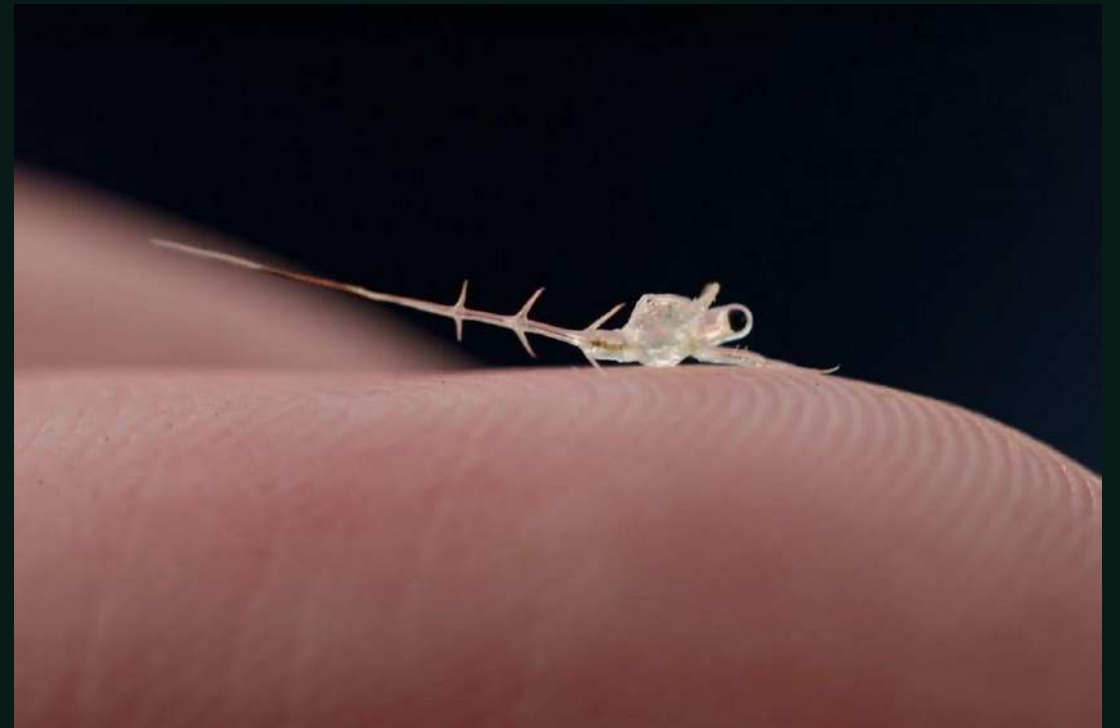
Spiny water flea

- How does it spread?

Primarily through the movement of water-related equipment

They can survive in water-containing devices

Can move with water flow and wind



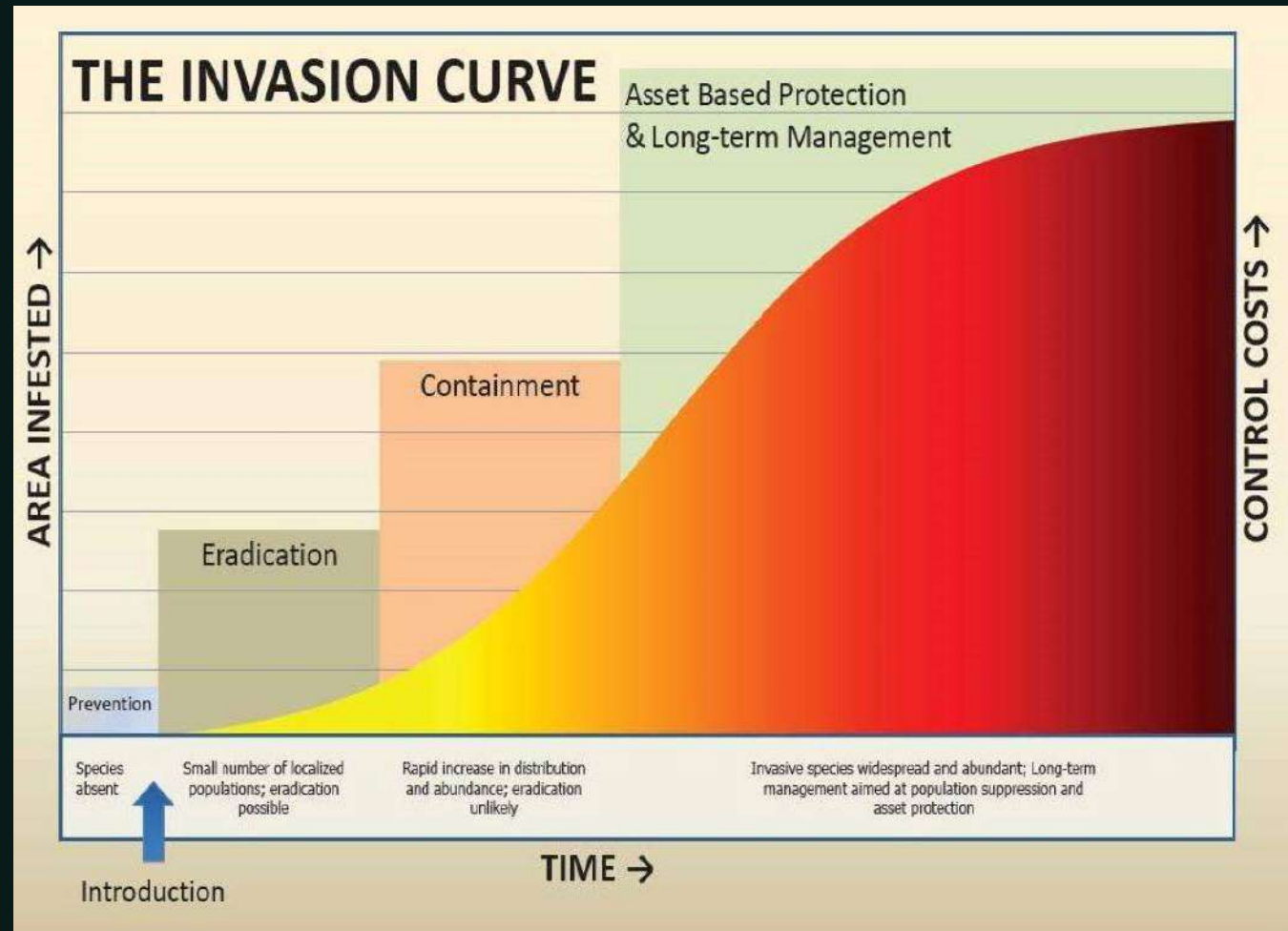
The Minnesota Aquatic Invasive Species Research Center



Community Solutions and Action Steps

What can we do?

- Prevent the introduction of new invasive species into Wisconsin



The invasion curve. Adapted from Invasive Plants and Animals Policy framework, State of Victoria, Dept of Primary Industries

What can we do?

- Prevent the introduction of new invasive species into Wisconsin
- Contain the spread of invasive species in Wisconsin



STOP AQUATIC INVASIVE SPECIES

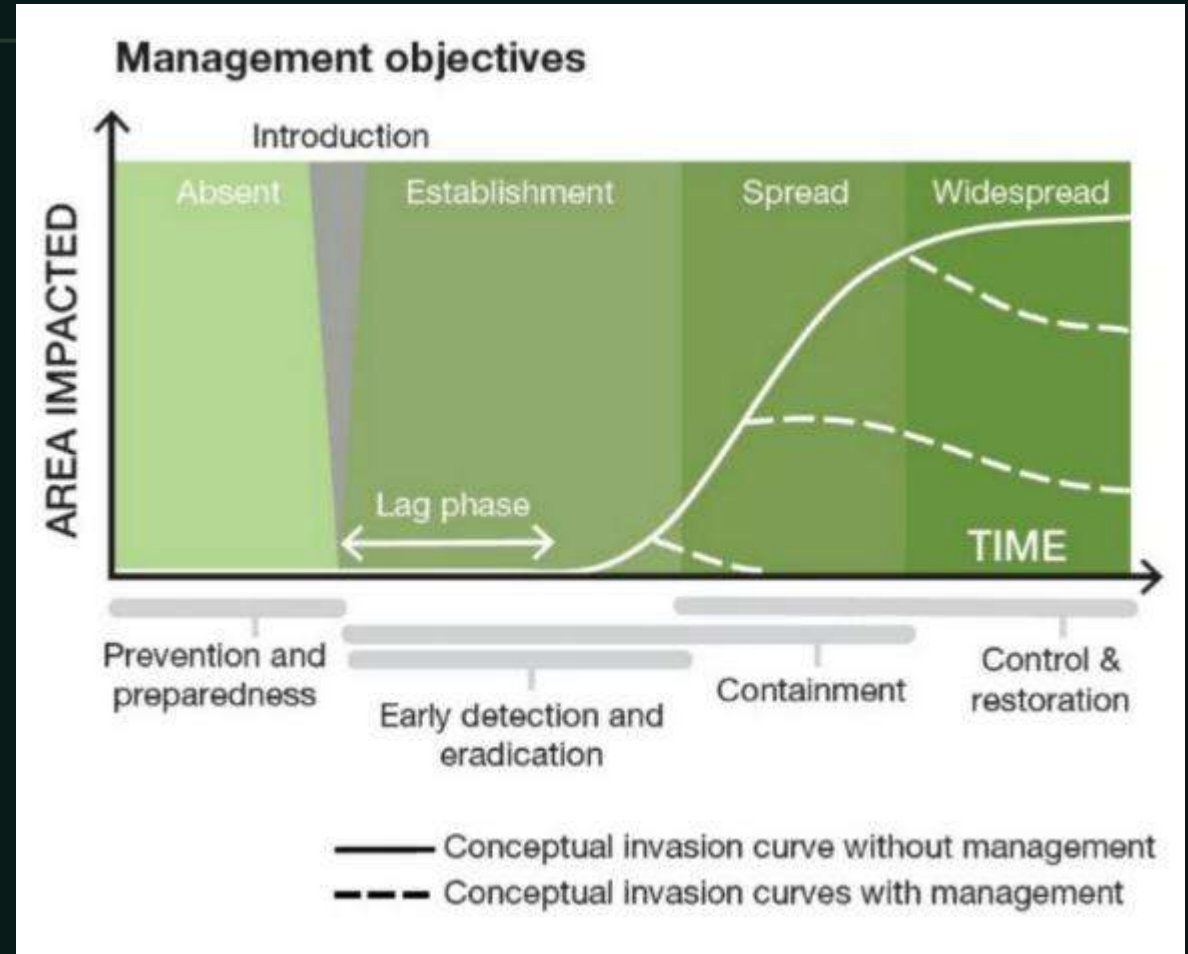
HELP PROTECT OUR WATERS

CHECK
and remove mud, weeds, and aquatic life

DRAIN
water from bilges, pumps, coolers and buckets

CLEAN
boat and gear by freezing, drying, or power washing

Don't move water, fish, plants or aquatic life from one waterbody to another



What can we do?

- Prevent the introduction of new invasive species into Wisconsin
- Contain the spread of invasive species in Wisconsin
- Search surrounding lakes with a focus on heavily used waterbodies





Prevention

Why prevention matters

- Current control methods have not shown measurable success for starry stonewort
- Spiny water flea is tiny and hard to notice and can easily hitchhike to new locations
- Simple steps can be taken to reduce the risk of spread



Jeanne Scherer

What can we do?

- Inspect
- Remove
- Drain
- Never move



Preventing the spread of starry stonewort

- Check for plant fragments after every trip
- Remove all visible vegetation
- Drain the boat and equipment before leaving the access point
- Report if you find a star-shaped bulbils



Preventing the spread of spiny water flea

- Drain water from live wells, bait containers, bilges, motors, and other water-holding areas
- Wipe and check fishing line, cables, nets, and other gear

STOP THE SPREAD OF SPINY WATERFLEA:

- Wiping fishing lines and reels
- Draining and wiping livewells
- Draining and wiping bait buckets

Allow cloth to dry
between uses





Decontamination & Disinfection

- Decontamination involves inspecting, removing, and draining boat and any equipment used

Live well

Waders

Shoes

Nets



DCIST

Decontamination & Disinfection

- Disinfection involves picking one of these options:

Dry five days

Hot water $\geq 140^{\circ}\text{F}$

500 ppm chlorine

2% Virkon Aquatic

AIS	Steam Cleaning (212°F)	Hot Water (140°F)	Drying (5 days)	Chlorine (500 ppm, 10 min)	Virkon (2:100 solution, 20 min)	Freezing (26°F ¹)
Curly Leaf Pondweed	✓ ⁷⁹	Ⓡ	✓ ^{3, 55}	Ⓡ	Ⓡ	✗ ⁵²
Curly Leaf Pondweed Turion	✓ ⁵³	✓ ⁵³	✗ ³	Ⓡ	Ⓡ	Ⓡ
Eurasian Watermilfoil	✓ ¹⁵	✓ ¹⁵	✓ ^{3, 12, 55}	Ⓡ	Ⓡ	✗ ⁵⁸⁺
Eurasian Watermilfoil Seed	Ⓡ	Ⓡ	✗ ⁵⁶⁺	Ⓡ	Ⓡ	Ⓡ
Hydrilla	Ⓡ	Ⓡ	✓ ^{55+, 59, 60+, 61}	Ⓡ	Ⓡ	Ⓡ
Yellow Floating Heart	Ⓡ	Ⓡ	✗ ⁶²⁺	Ⓡ	Ⓡ	Ⓡ
Starry Stonewort	✓ ⁸⁴	Ⓡ	✓ ^{81+, 84}	Ⓡ	Ⓡ	✓ ^{81+, 82, 84}
Didymo	✓ ⁴⁸	✓ ⁴⁸	✓ ^{13, 48}	✓ ^{13, 48, 49, 50+}	Ⓡ	✓ ⁴⁸

AIS	Steam Cleaning (212°F)	Hot Water (140°F)	Drying (5 days)	Chlorine (500 ppm, 10 min)	Virkon (2:100 solution, 20 min)	Freezing (26°F)
Faucet Snail	✓ 18+	✓ 18+	✗ 35	✗ 18	Ⓡ	Ⓡ
New Zealand mud snail	✓ 4, 65+	✓ 4, 65+	✓ 6+, 66+	✗ 76+	✓ 9, 10+, 74, 76, 83	✓ 4, 6+
Quagga Mussel (Adults)	✓ 7+, 16+	✓ 7+, 16+	✓ 14+	Ⓡ	✓ 9	Ⓡ
Quagga Mussel (Veligers)	✓ 4, 17, 80+	✓ 4, 17	✓ 69+	Ⓡ	✓ 9	Ⓡ
Zebra Mussel (Adult)	✓ 7+, 8+, 25	✓ 7+, 8+, 25	✓ 14+, 25+, 27	✓ 22+	Ⓡ	✓ 25, 27
Zebra Mussel (Veligers)	✓ 4, 80+	✓ 4	Ⓡ	✓ 22+, 25	Ⓡ	Ⓡ
Asian Clam	✓ 4, 37, 78	✓ 4, 37	✗ 4	✗ 37+, 38+	Ⓡ	Ⓡ
Spiny Water Flea (Adult)	✓ 7+, 47+, 80+	✓ 7+, 47+	Ⓡ	✓ 76, 83	✓ 76, 83	✓ 76, 83
Spiny Water Flea (Resting Eggs)	✓ 2+, 80+	✓ 2+	✓ 2+, 4	✗ 2	Ⓡ	✗ 2+
Bloody Red Shrimp	Ⓡ	✓ 83+	✓ 83+	✓ 83+	✓ 83+	Ⓡ
Rusty Crayfish	✓ †	✓ †	Ⓡ	Ⓡ	Ⓡ	Ⓡ

AIS	Steam Cleaning (212°F)	Hot Water (140°F)	Drying (5 days)	Chlorine (500 ppm, 10 min)	Virkon (2:100 solution, 20 min)	Freezing (26°F)
Curly Leaf Pondweed	✓ 79	Ⓡ	✓ 3, 55	Ⓡ	Ⓡ	✗ 52
Curly Leaf Pondweed Turion	✓ 53	✓ 53	✗ 3	Ⓡ	Ⓡ	Ⓡ
Eurasian Watermilfoil	✓ 15	✓ 15	✓ 3, 12, 55	Ⓡ	Ⓡ	✗ 58+
Eurasian Watermilfoil Seed	Ⓡ	Ⓡ	✗ 56+	Ⓡ	Ⓡ	Ⓡ
Hydrilla	Ⓡ	Ⓡ	✓ 55+, 59, 60+, 61	Ⓡ	Ⓡ	Ⓡ
Yellow Floating Heart	Ⓡ	Ⓡ	✗ 62+	Ⓡ	Ⓡ	Ⓡ
Starry Stonewort	✓ 84	Ⓡ	✓ 81+, 84	Ⓡ	Ⓡ	✓ 81+, 82, 84
Didymo	✓ 48	✓ 48	✓ 13, 48	✓ 13, 48, 49, 50+	Ⓡ	✓ 48

Dry 5 Days

- Remove sediments
- Wash with soap and water
- Store for 5 days



Steve Gorman

Chlorine Solution

- 500 ppm solution = ~ 2.5 Tbsp / gal
- Soak for 10 minutes
- Neutralize bleach if needed
- Rinse with tap water



What can you do?

- Report things

AIS Incident Report

EDDMapS

iNaturalist



Clear Data Print... Save... Note: In order to fill and save this form electronically, it must be opened using Adobe Reader or Acrobat software. Save a copy of the file, open Adobe Reader, select File > Open and browse for the file you saved.

State of Wisconsin
Department of Natural Resources
Wisconsin Lakes Partnership

Aquatic Invasive Species Incident Report
Form 3200-153 (R 03/22) Page 1 of 2

The purpose of this form is to notify DNR of a new populations of AIS. Only use if you found an aquatic invasive species where it hasn't been found previously.

To find where aquatic invasives have already been found, visit: <https://dnr.wi.gov/lakes/invasives/AISByWaterbody.aspx>

Notice: Information on this voluntary form is collected under ss. 33.02 and 281.11, Wis. Stats. Personally identifiable information collected on this form will be incorporated into the DNR Surface Water Integrated Monitoring System (SWIMS) Database. It is not intended to be used for any other purposes, but may be made available to requesters under Wisconsin's Public Records laws, ss. 19.32 - 19.39, Wis. Stats.

If the plant or animal cannot be collected due to safety concerns or it is located on private property, please take a photo (see Sample section below). DNR staff will then follow-up if further monitoring is needed for identification

Primary Data Collector

Name	Phone Number	Email

Location

Name (e.g. Lake, Stream, Wetland)	Township	County

Date and Time of Monitoring or Discovery

Monitoring Date	Start Time	End Time

Add a new Invasive Species found below ==> [+]

Information on the Aquatic Invasive Species Found (Fill out one form for each species found.)

AQUATIC PLANTS	RIPARIAN PLANTS	INVERTEBRATES

Habitat Type (Lake, Stream, Wetland, Roadside, or Other)

Where did you find the invasive species? (Give boat landing, nearest intersection/road, stream crossing, and general description)

Latitude in decimal degrees (xx.xxxxx, -xx.xxxxx): Longitude in decimal degrees (xx.xxxxx, -xx.xxxxx):

Area species was covering. Estimate in square feet. About how many individuals were there (1, 50, 100, 1,000, many beds, etc.)?

Can the species move or is it attached? Check One: ☐ Rooted/Attached ☐ Floating/Swimming/Crawling Is specimen alive or dead? Check One: ☐ Live ☐ Dead

Habitat

Water depth where the Invasive(s) were found (if applicable) ☐ Feet ☐ Meters

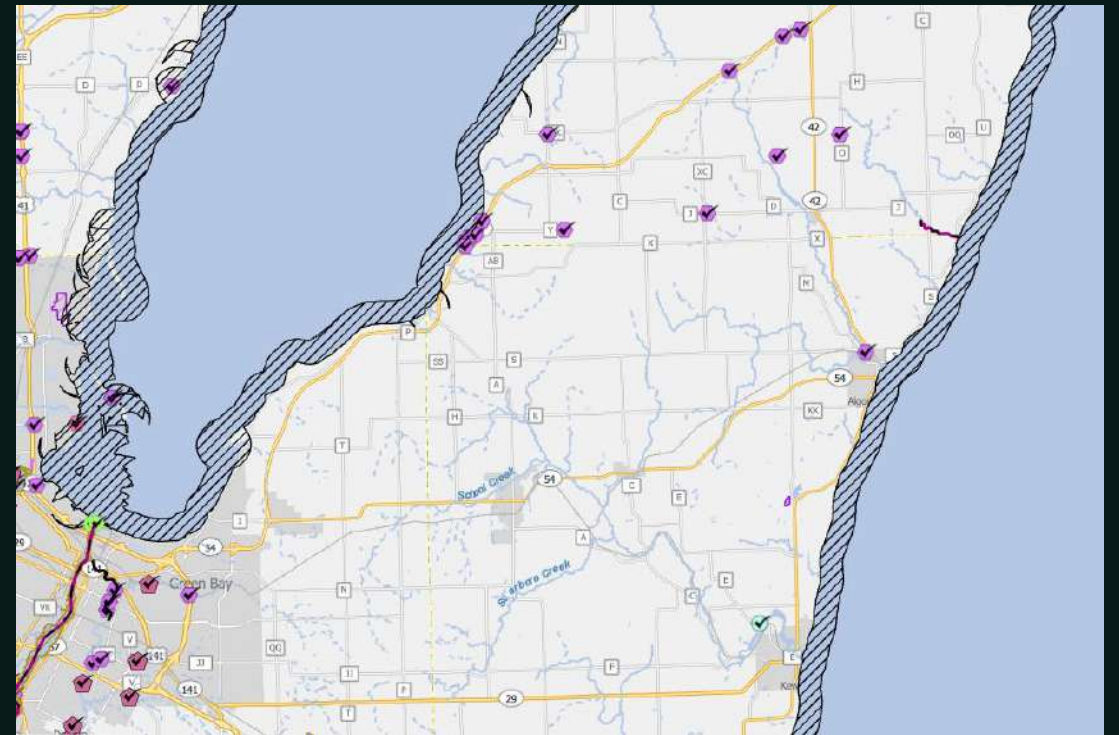
Where was the Invasive Species Located? Check all that apply

☐ Below water	☐ Mud / Muck	☐ Sand	☐ Rock	☐ In/on plants	☐ Dock / Pier
☐ Watercraft	☐ Above water	☐ Shoreline	☐ Wet field	☐ Ditch	☐ Other

Sample

What can you do?

- Utilize the Lakes & AIS Viewer



Thank you

Jason Miller

jmiller@co.door.wi.gov

www.doorinvasives.org

Valerie O'Connor

Valerie@glacierlandrccd.org

www.glacierlandrccd.org



**STOP AQUATIC
HITCHHIKERS!**

