

Wisconsin Lakes Partnership

Starry stonewort

Public Informational Meeting

Four Slide Presentations

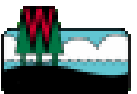
1. Biology and Management
2. Status and Monitoring
3. Identification
4. Clean Boats Clean Waters/Citizen Lake Monitoring Network

Starry Stonewort (*Nitellopsis obtusa*)

Biology and Management



Scott Van Egeren
Wisconsin DNR
July 29, 2015



What is starry stonewort?

- Starry stonewort (*Nitellopsis obtusa*) is a member of the Characeae family.
- Characeae are green algal macrophytes that can range in size from centimeters to meters
- Chara and Nitella species are found around the world.



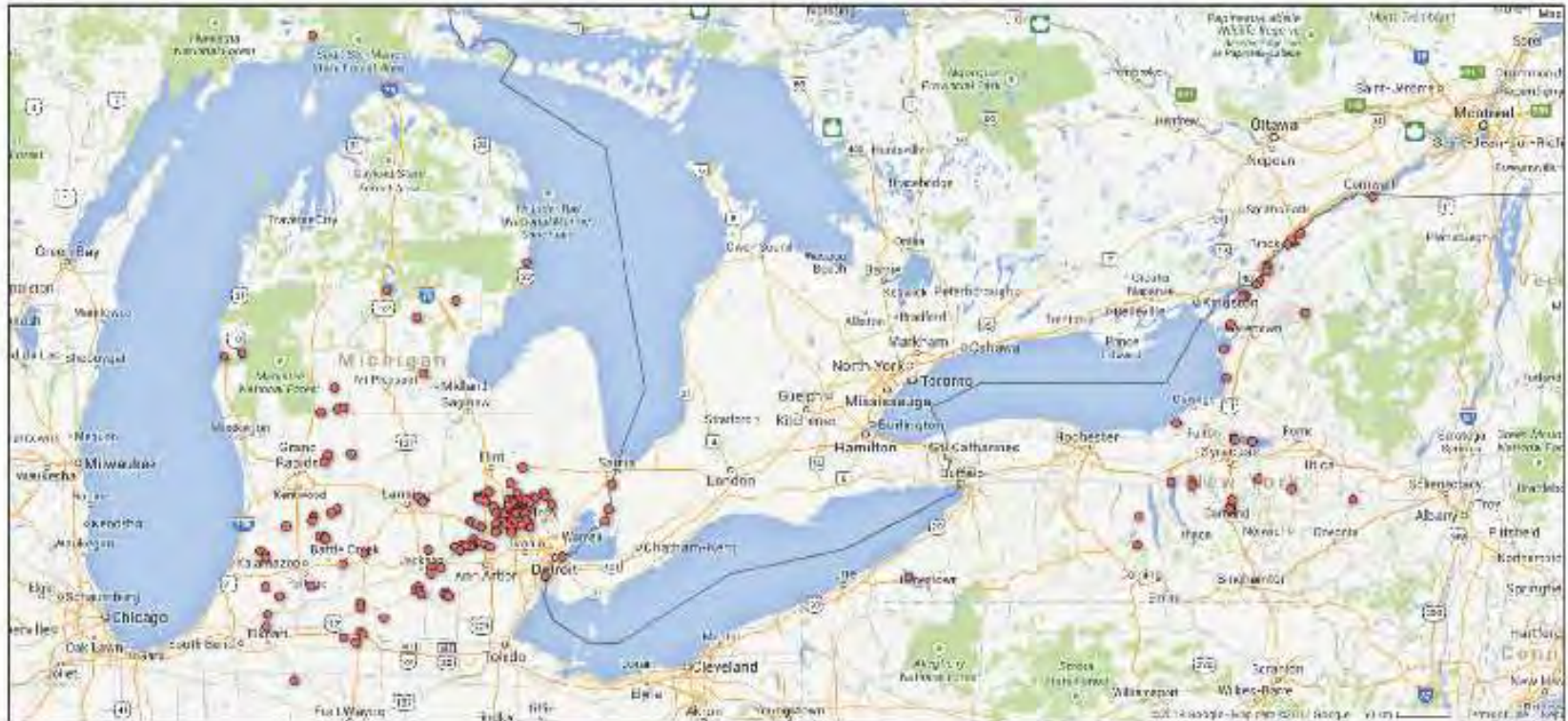
Where did it come from?

Starry Stonewort Distribution

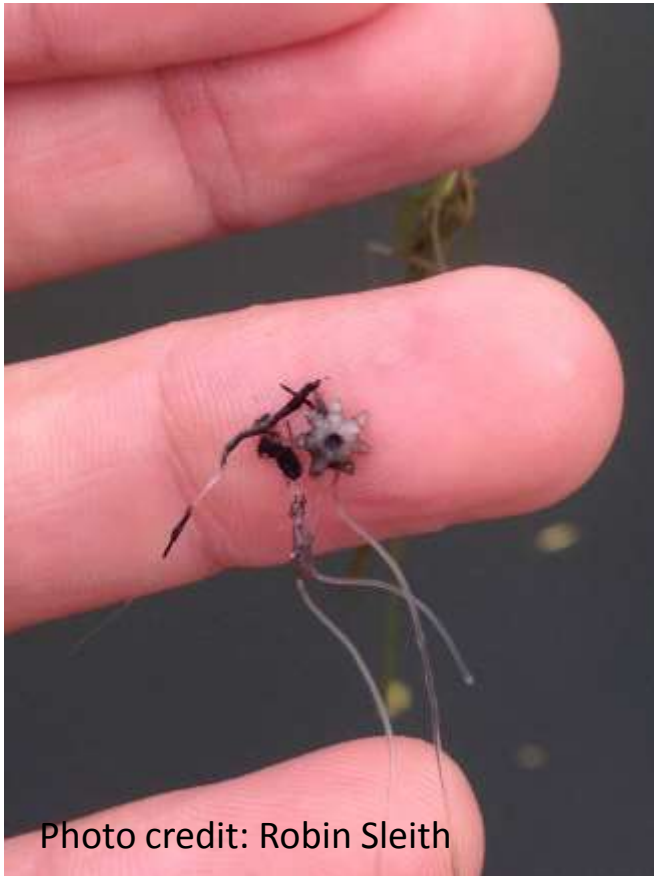


Where is it within the US?

Characeae distribution – *Nitellopsis*



Reproductive and Dispersal Capacity



Characeae sexual state



- Capable of sexual and asexual reproduction
- North American clones are all male – no zygotes produced
- Asexual reproduction occurs by bulbil or plant fragments

How might starry stonewort affect a lake?

MICHIGAN LAKE & STREAM ASSOCIATIONS, INC.

HOME

LEARN MORE ▾

MEMBERSHIP ▾

NEWS ▾

2015 ML&SA ANNUAL CONFERENCE

RESOU

Starry Stonewort Continues to Plague Michigan Inland Lakes

September 15th, 2011 | Scott Brown |



Starry Stonewort, a highly aggressive and rapidly spreading invasive macro algae, continues to infect Michigan inland lakes at an alarming rate. Introduced to the Great Lakes region via the ballast water of freighters navigating into the Great Lakes region from the St. Lawrence Seaway, Starry Stonewort (scientific name: *Nitellopsis obtusa*) was first observed in Lake St. Clair in 1986, and was detected in a Flint area inland lake in 2006.

The invasive macro algae, a native of the United Kingdom and Europe, is thought to have infected over two hundred Michigan inland lakes as of the summer of 2011.

Starry Stonewort is often confused with chara, a beneficial, native macro algae that occupies the near bottom shallow areas of many inland lakes.

Inland lakes plagued by Starry Stonewort rapidly lose diverse populations of native floating, emergent and submerged aquatic plants as increasingly large areas of the lake are covered by light green aquatic "meadows" of the invasive macro algae. Inland lakes infested with Starry Stonewort often develop very clear water by preventing the re-suspension of bottom sediments and depriving native phytoplankton (various species of native algae) of life sustaining nutrients.

How might starry stonewort affect a lake?

- May outcompete native aquatic plants
- Thick “meadows” may prevent fish from spawning
- Can become a navigational nuisance in shallow waters (< 6 feet)
- Meadows may increase water clarity by minimizing sediment resuspension, producing allelopathic substances that inhibit algae and precipitating calcium carbonate that may bind phosphorus.

Found in Wisconsin in September 2014

Subscribe Subscriber Login Search JSOnline Today's Paper

MILWAUKEE-WISCONSIN JOURNAL SENTINEL


STOREWIDE! USA MADE SALE 11% OFF OR UP TO 3 YEARS LEASE TO OWN SPECIAL FINANCING

3420 W. Layton Way, Greenfield, WI 53220 414-238-2020

News Watchdog Opinion Sports Business Food Entertainment Lifestyle Green Sheet Marketplace Jobs Autos Homes

News Home » News

Invasive algae found for the first time in a Wisconsin lake



Scott Brown

Stony stonewort, an invasive algae, was found for the first time in Wisconsin, in Little Muskego Lake in Waukesha County. The algae has caused problems for boaters and fishermen in lakes in Michigan.

By Lee Bergquist of the Journal Sentinel

Nov. 25, 2014

NewsWatch

- WIAA Division 3 State Baseball: Lake Country (Larchmont) walks off with title | 3:07 p.m.
- Wisconsin's unemployment rate rose to 4.6% in May | 2:58 p.m.
- Regulator orders Esairi to pay \$17.8 million after arbitration hearing | Updated: 2:18 p.m.
- Pool play not suspected in death of woman | 2:13 p.m.
- PelitaFact: Factchecking the Wisconsin state budget | 1:27 p.m.
- Harley stock climbs after buyback plans announced | 1:27 p.m.
- Pond on Lac restaurant apologizes to local firefighters | 1:08 p.m.
- Common Ground meets with Nationalist Party



Book Now »

Management alternatives

- **First, need to assess the amount of starry stonewort present and determine management goals.**
- **Chemical control**
 - Copper sulfate + hydrothol
 - Flumioxazin
 - Spot treatment –
 - Potential for targeting high traffic areas
 - Mixed success at best when attempting EWM control due to rapid herbicide dissipation.
 - Whole-lake treatment
- **Physical control**
 - Hand pulling and diver assisted suction harvest (DASH)
 - Dredging
 - Mechanical harvest
- **Drawdown**
- **Biological control – no control method known.**
- **“Wait and see” – monitoring and assessing**

Herbicide treatment

- Copper sulfate + hydrothol typically used
 - These treatments “give the mats a haircut”, but don’t kill plants.
 - Several treatments per year are often required.
 - Michigan and Clemson University lab research project to determine concentration and exposure time needed.
- Flumioxazin trials occurring
 - Indiana treated one 15 acre patch this year.
 - Indiana and Lonza lab research project to determine concentration and exposure time requirements.
- Both types of chemical treatments are not selective and will control many non-target plants.

Physical removal

- Hand pulling and DASH could be used in small new infestations if found early.
- Dredging may be employed to remove the sediments and bulbils following plant removal.



Photos: Scott Van Egeren – Little Muskego Lake

Drawdown?

- Exposing shallow sediments to freezing over the winter may damage plants and bulbils.
- Native Chara species do well following drawdowns.
 - They reproduce sexually and many zygospores are formed. Not the case with starry stonewort.
 - Research being started to determine the drying and freezing time needed to kill bulbils and fragments.

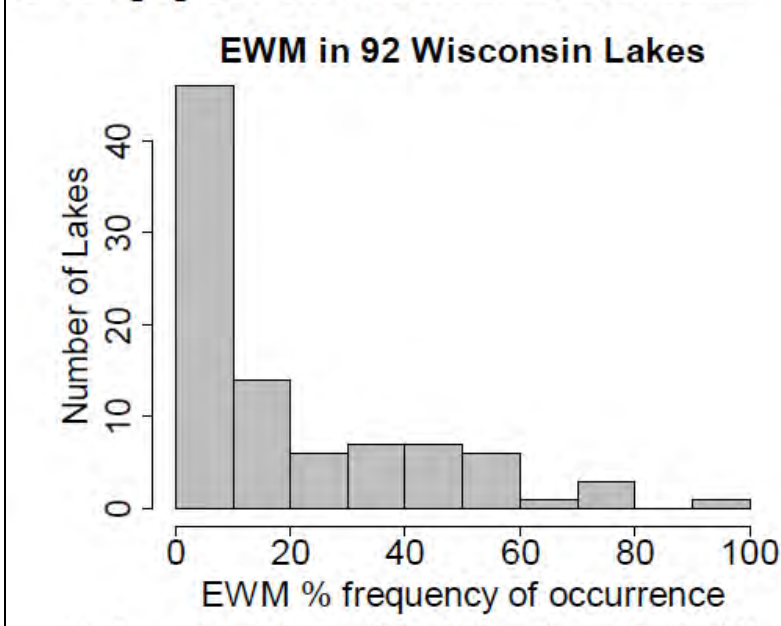
Monitor and Assess

- Native plant beds may compete with starry stonewort.
 - Allow native plants to compete with the invasive.
- Wait to see if the species becomes problematic.
- Prevention is a must with any of the management strategies.
 - Stop propagules from being spread from lake to lake.

Commonly Rare and Rarely Common: Comparing Population Abundance of Invasive and Native Aquatic Species

Gretchen J. A. Hansen^{1*^{da}}, M. Jake Vander Zanden¹, Michael J. Blum², Murray K. Clayton³, Ernie F. Hain⁴, Jennifer Hauxwell⁵, Marit Izzo^{1^{ab}}, Matthew S. Kornis^{1^{bc}}, Peter B. McIntyre¹, Alison Mikulyuk^{1,5}, Erika Nilsson^{1^{cd}}, Julian D. Olden⁶, Monica Papeş^{1^{de}}, Sapna Sharma^{1^{ef}}

EWM populations are often small in scale.



“both invasive and native species occurred at low densities in most locations where they were present.”

Plan for Little Muskego Lake

- The population is localized within the lake and coexists with native species.
- Handpulling and DASH to clear large infestation near boat landing and “satellite” locations farther from landing.
- Dredging to follow hand removal to control the bulbil reproduction.
- Monitoring the population
 - Before and after management
 - Whole-lake to watch for spread

Plan for Wisconsin

- Stress prevention of spread.
- Search for species at nearby heavily used lakes
- Assess the population at newly discovered sites to determine appropriate management.
- Engage local stakeholders in management planning.
- Stress monitoring of management actions.
- Work with other states and partners to learn and adaptively manage starry stonewort.

Management take homes

- **Prevention and surveillance monitoring are necessary.**
- **Eradication is not a realistic goal.**
- **No one management strategy alone will control and maintain low levels of AIS, while not causing other impacts.**
- **A wait and see strategy is a viable option.**
- **Herbicide treatments have not been effective at large reductions in other states.**
- **We will adaptively learn together with other regional partners**

Starry stonewort

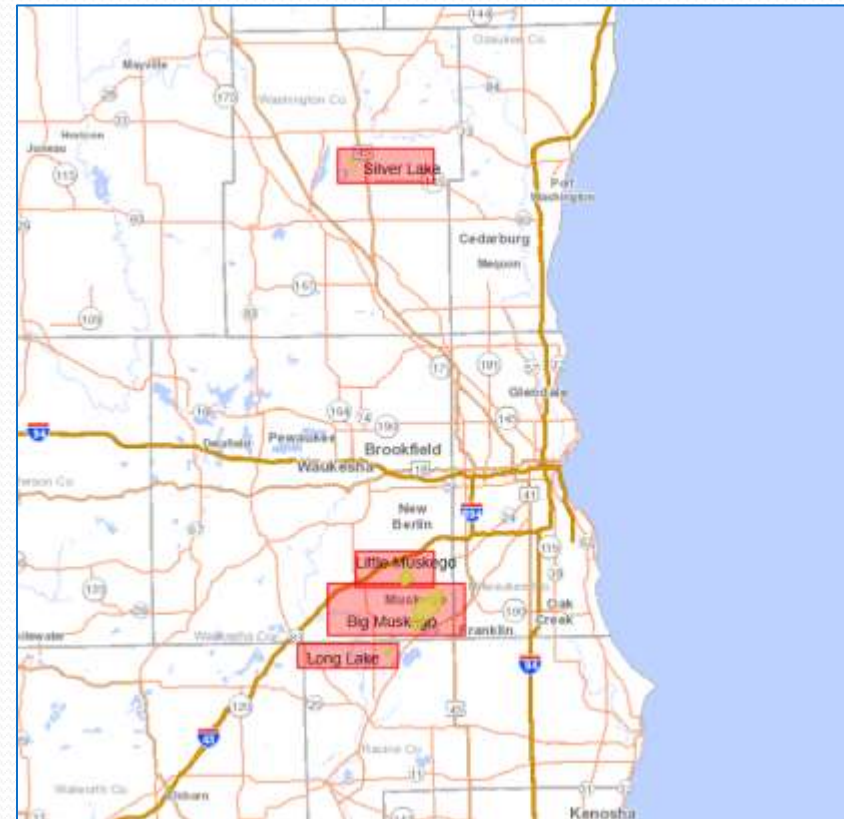
Status and Monitoring

Tim Plude

WI-DNR

Status of Starry stonewort, in WI

- Verified in 4 waterbodies, in 3 counties
 - Little Muskego Lake, Wauk. Co.
 - Big Muskego Lake, Wauk. Co.
 - Long Lake, Racine Co.
 - Silver Lake, Washington Co.



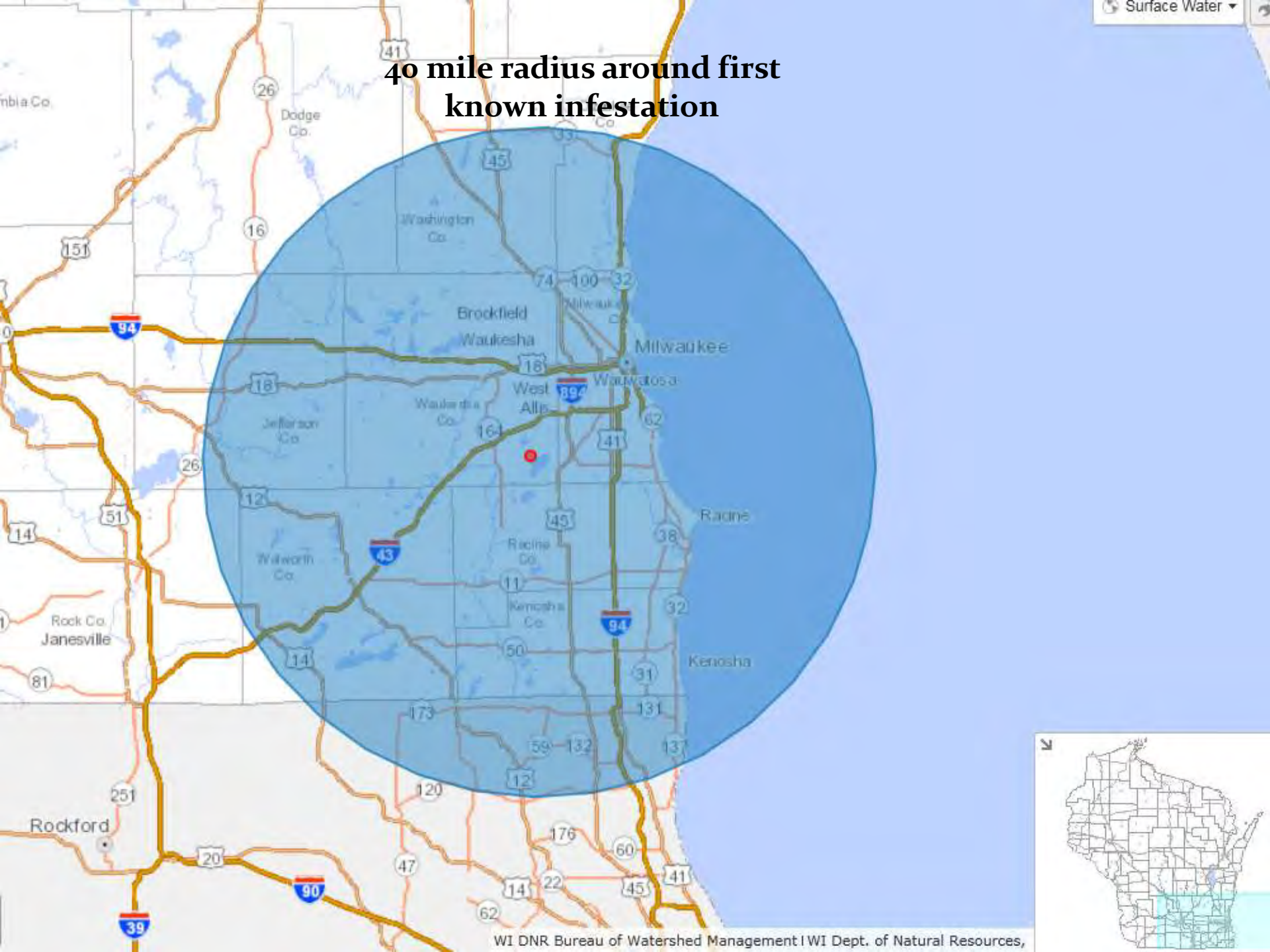
Monitoring

- Survey method-
 - Aquatic Invasive Species statewide Early Detection project protocol
- Slowly meander the entire shoreline, actively looking and dipping plant rakes
- Target Chara beds, boat landings, private landings for more intensive searching; snorkeling the target sites whenever possible

Monitoring

- Started with searching lakes within the immediate area of initial infestation (~7 mile radius around Little Muskego Lake).....then we found more
- Place **40** mile radius all around likely epicenter
- Include all lakes **>200** acres with public access

40 mile radius around first known infestation



Monitoring

- **Large list**, (all 200+ac. lakes w/in 40 mi. radius)=
40+lakes
- Prioritized list for 2015
- Prioritize search by:
 - Is Chara a dominant species?
 - Are there multiple landings?
 - Is there respectively high recreational use?

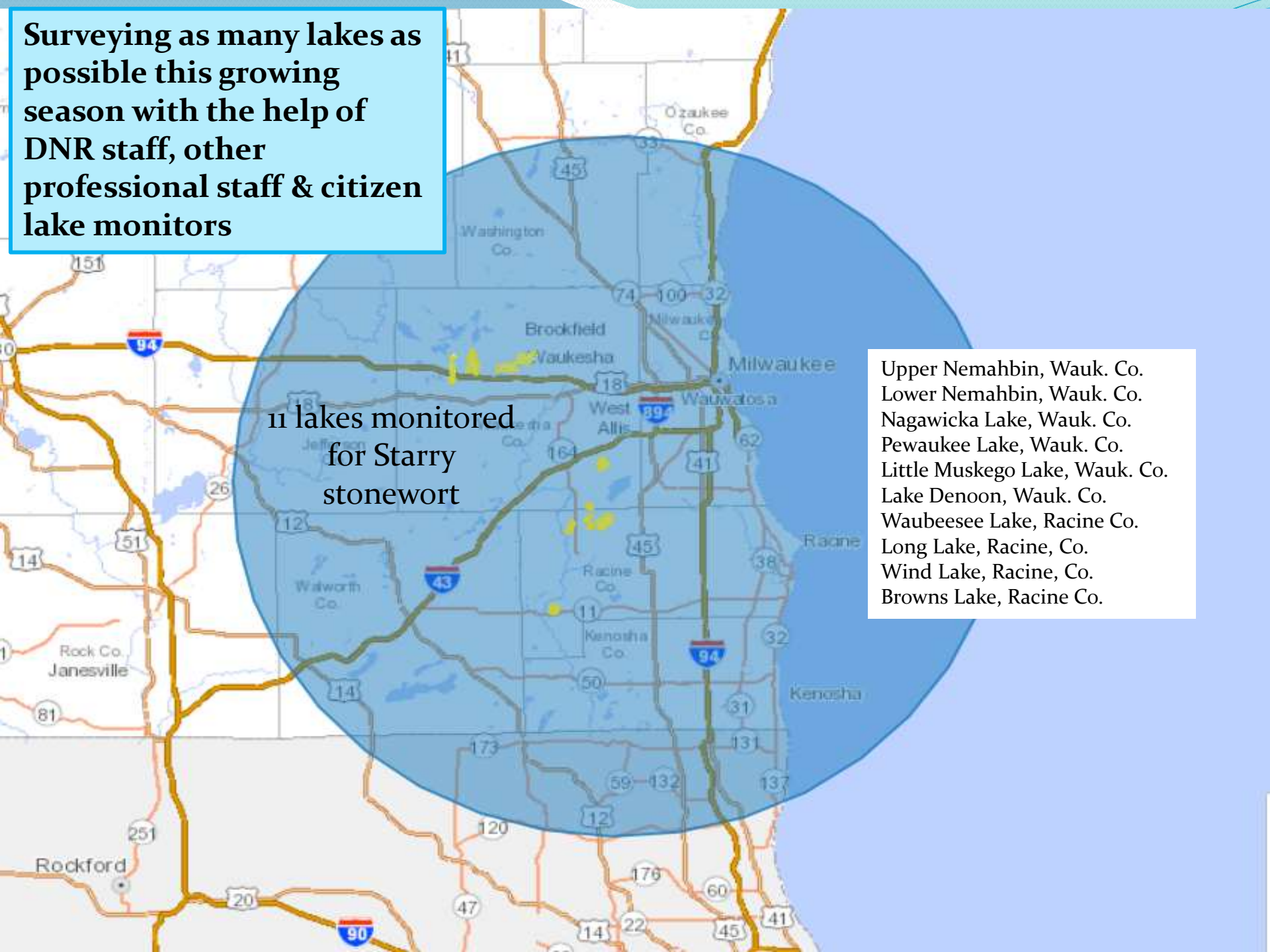
Monitoring

- Started looking in late-Spring of 2015
- So far, 11 lakes searched specifically for Starry stonewort...
- We will continue to search for possible infestations
- Currently using prioritized list then moving to larger list of lakes

Surveying as many lakes as possible this growing season with the help of DNR staff, other professional staff & citizen lake monitors

11 lakes monitored for Starry stonewort

Upper Nemahbin, Wauk. Co.
Lower Nemahbin, Wauk. Co.
Nagawicka Lake, Wauk. Co.
Pewaukee Lake, Wauk. Co.
Little Muskego Lake, Wauk. Co.
Lake Denoon, Wauk. Co.
Waubeesee Lake, Racine Co.
Long Lake, Racine, Co.
Wind Lake, Racine, Co.
Browns Lake, Racine Co.



Starry stonewort ID

- Some helpful characteristics to use when looking for *Nitellopsis obtusa*
 - **Squeeze test**
 - **Rough or Smooth?**
 - **Branchlet forking**

Charophytes

- **Chara**
- **Nitella**
- **Nitellopsis**
- Tolypella
- Lychnothamnus



Globular stonewort
Chara globularis
© Paul Skawinski 2012



Common stonewort
Chara corallina
© Paul Skawinski 2012



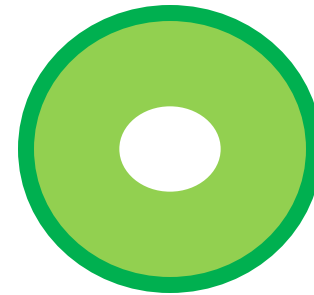


Starry stonewort
Nitellopsis obtusa
Paul Skawinski, UWEX Lakes

1. Squeeze Test



Common Chara response



Starry and Nitella response

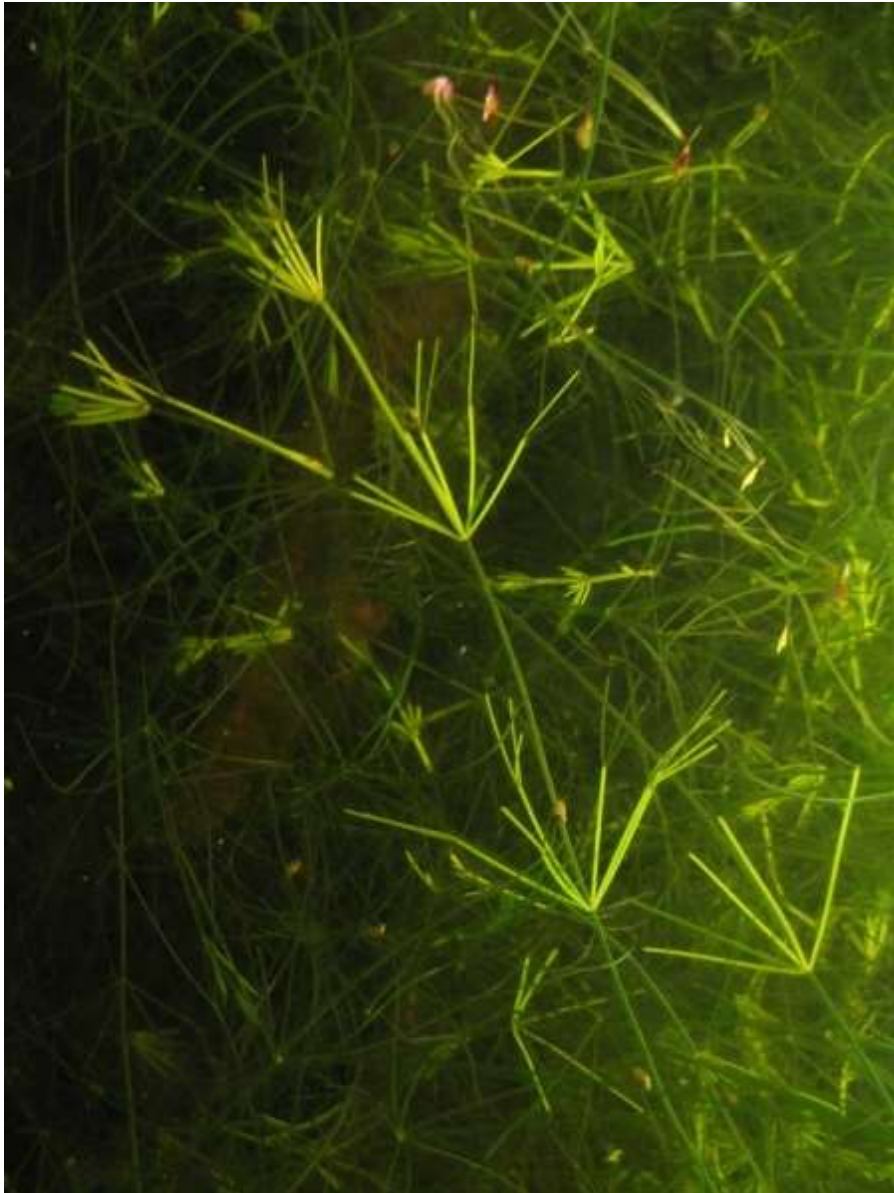


Most Chara will hold its shape well after you pinch the stem in half. Nitella, Nitellopsis and a few others will not hold the shape and squish all green material out.

2. Rough or Smooth stems and branchlets?

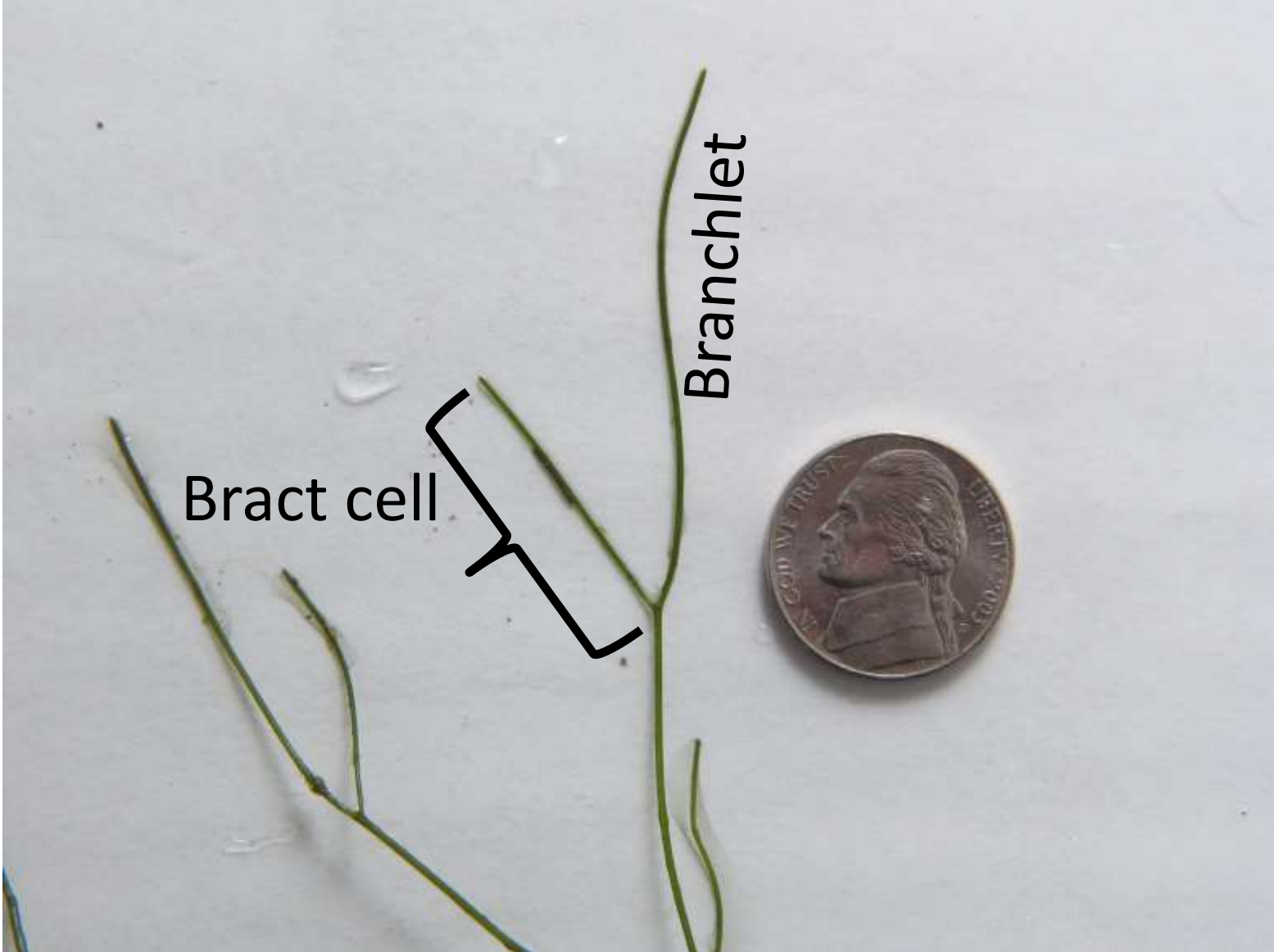


3. Branching/ forking in Nitella



Nitella will fork on many of the branchlet ends. Nitellopsis (starry) will occasionally look like it is branching but, it is not branching evenly.

Starry stonewort (*Nitellopsis obtusa*)



Starry stonewort (*Nitellopsis obtusa*)



Starry stonewort (*Nitellopsis obtusa*)

Bulbils



Starry stonewort (*Nitellopsis obtusa*)



Starry
stonewort



Chara sp.





Starry stonewort
Nitellopsis obtusa
Paul Skawinski, UWEX Lakes

Thanks

Tim Plude

Southern Lake Michigan Basin Aquatic Invasive Species
Rapid Response Coordinator

1155 Pilgrim Rd.

Plymouth, WI 53073

Timothy.plude@wisconsin.gov

920-893-8552

The background image shows a close-up of a starry stonewort (Nitellopsis obtusa) growing on a sandy substrate. The plant is a small, white, star-shaped organism with six distinct arms. It is surrounded by dark, fibrous material, likely decaying plant matter, and some green grass-like blades are visible in the upper left. The overall scene is dimly lit, suggesting an underwater or shaded environment.

Biology and Identification of Starry Stonewort (*Nitellopsis obtusa*)

Paul Skawinski

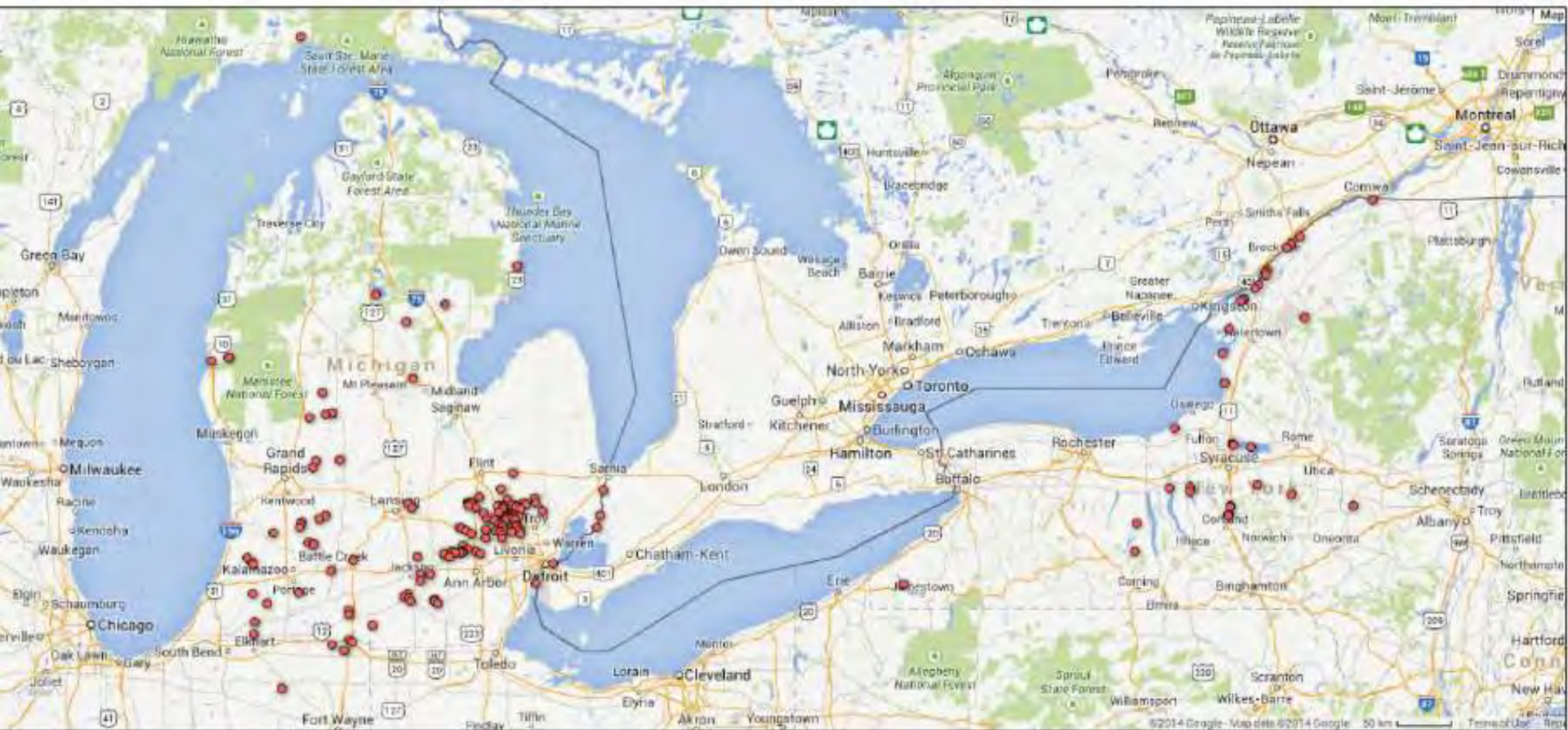
UW-Extension Lakes Program

Paul.Skawinski@uwsp.edu

Origin

- Native to Europe and Asia
- Documented in St. Lawrence River in 1978
- Documented in Lake St. Clair in Michigan in 1983.
- Documented in inland Michigan lakes in 2000.
- Found in Waukesha County, WI in Sept. 2014.

Characeae distribution – *Nitellopsis*



Dispersal

- Probably moved by boats, trailers, anchors (NOT waterfowl)
- Only male starry stonewort has been found in North America. No sexual reproduction (seeds)





Identification

- Related to many native macro-algae in Wisconsin
 - *Chara* (10+ species)
 - *Nitella* (9+ species)
 - *Tolypella* (2 species)
 - *Lychnothamnus* (1 species)
- All tend to improve water clarity and quality



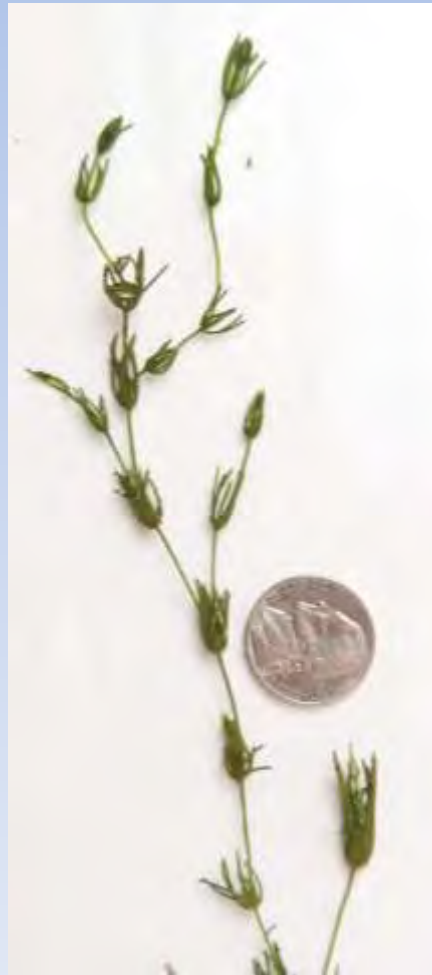
Identification

HUGE compared to most of its native relatives

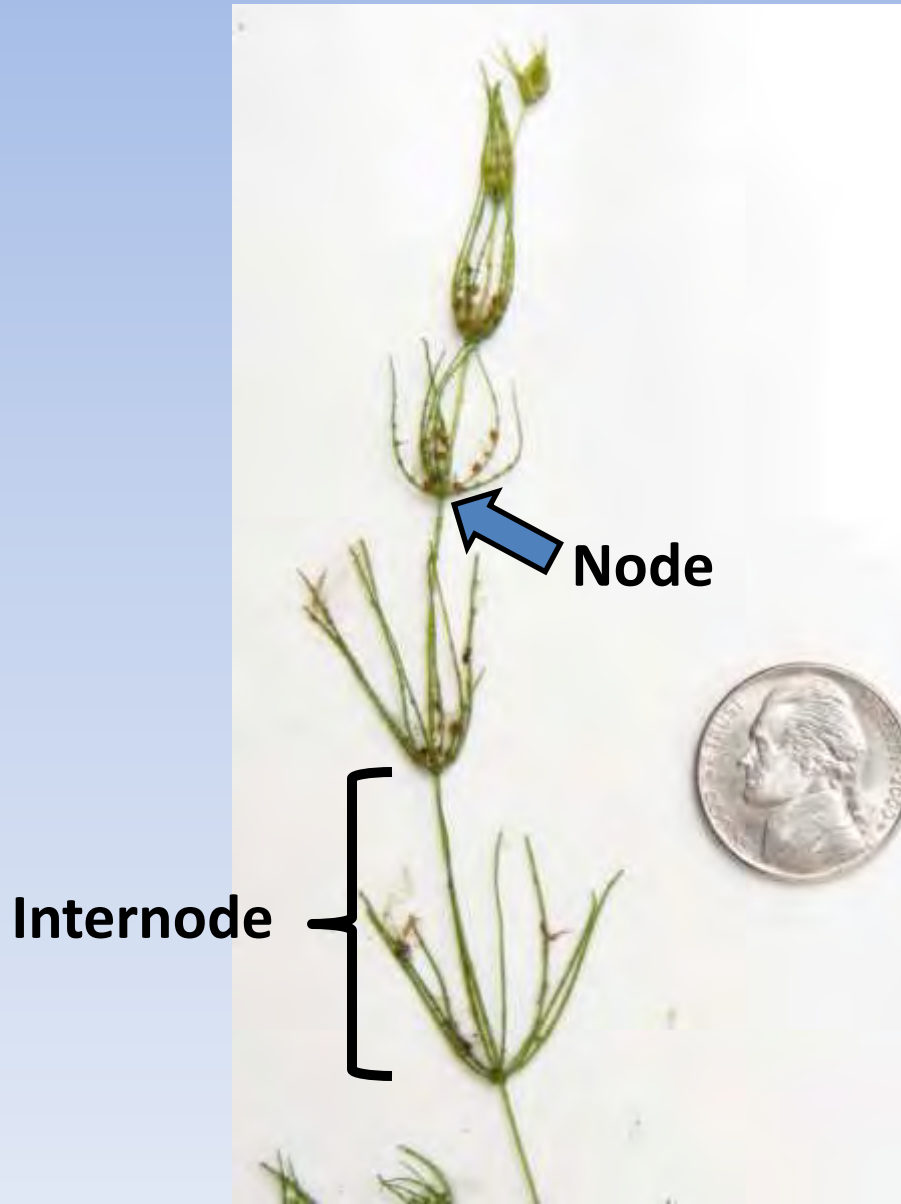
Starry stonewort

Nitellopsis obtusa

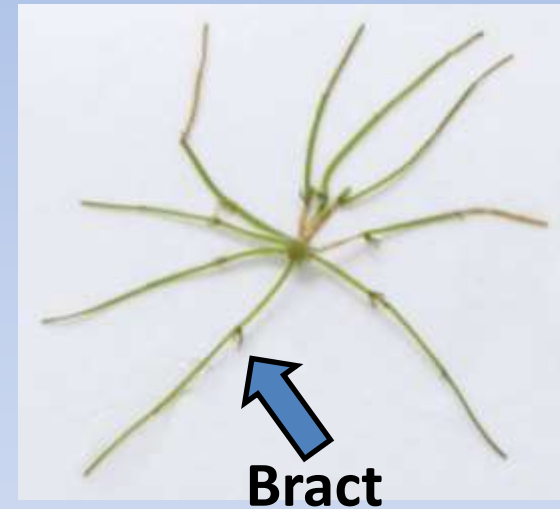
Chara contraria *Chara globularis* *Nitella flexilis*



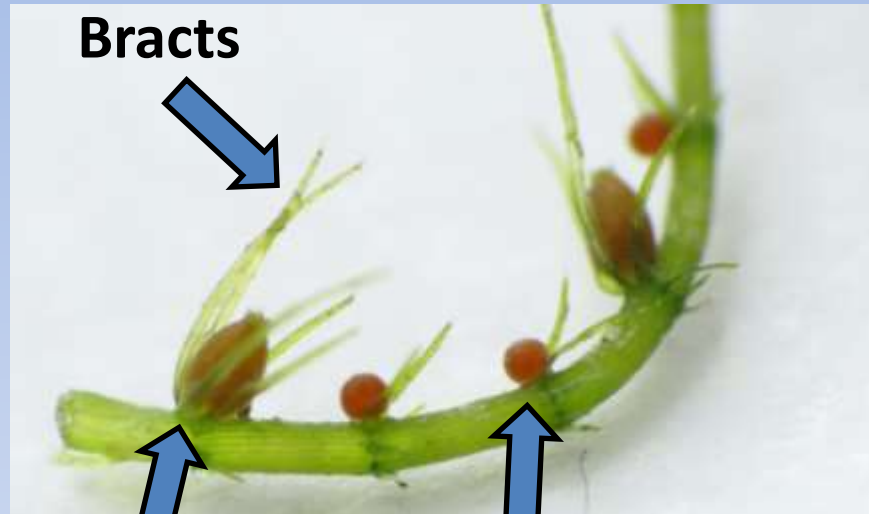
Identification – basic body plan



Whorl of branchlets



Identification – basic body plan



Oogonium
(female)

Antheridium
(male)



Oogonium
(female)

Antheridium
(male)



Identification – basic body plan

If you see/feel these long cells on the stem, it is NOT starry stonewort



Chara contraria

Identification

Starry stonewort
Nitellopsis obtusa



**Branchlet has a short
bract coming off the
right side**

Nitella mucronata



**Branchlet divides into
equal-length parts**

Identification

- Bulbils
- Most macro-algae do NOT produce bulbils.



Chara aspera

Identification

- Bulbils produce clones of the parent
- Most macro-algae do NOT produce bulbils.



Chara aspera



Nitellopsis obtusa (starry stonewort)

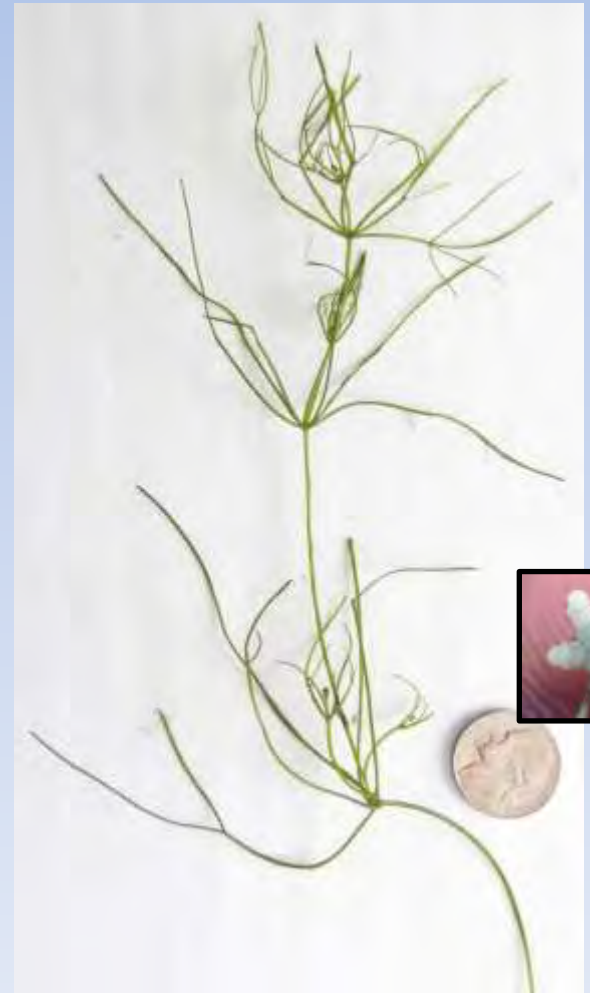
Identification

Horned pondweed
(*Zannichellia palustris*)

vs.

Starry stonewort
(*Nitellopsis obtusa*)

NATIVE



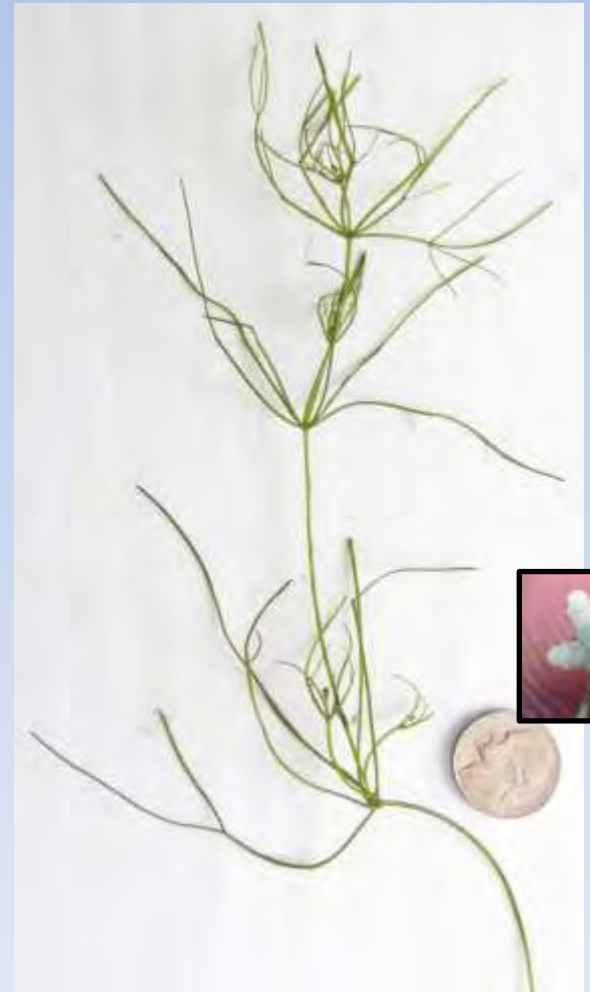
Identification

Sago pondweed
(*Stuckenia pectinata*)

vs.

Starry stonewort
(*Nitellopsis obtusa*)

NATIVE



Wisconsin's Citizen Lake Monitoring Network



University of Wisconsin Stevens Point

Giving | Directory | Site Index | myPoint | D2L | Web Email

Sign In


Search this site... GO

Admissions Academics Athletics Alumni Campus Life Community

UW-Extension Lakes
College of Natural Resources


LAKE S
UW Extension

About UWEX Lakes
Events
Lake Organization Search
Clean Boats Clean Waters
Citizen Lake Monitoring Network
Lake Leaders
Bookstore
Newsletter
Resources



Citizen Lake Monitoring Network

Get Involved
Monitoring types
Using the data
Submit Data
Forms
Resources
CLMN Newsletter


Monitoring - another excuse to be on the lake!

1000+ active citizens

Monitoring changes in water clarity, water chemistry, aquatic plant communities, aquatic invasive species, duration of ice cover, lake levels

Wisconsin's Citizen Lake Monitoring Network



AIS fact sheets

- [Asian clam \(*Corbicula fluminea*\)](#)
- [Banded mystery snail \(*Viviparus georgianus*\)](#)
- [Big-eared Radix \(*Radix auricularia*\)](#)
- [Brittle naiad \(*Najas minor*\)](#)
- [Chinese mystery snail \(*Cipangopaludina chinensis*\)](#)
- [Curly-leaf pondweed \(*Potamogeton crispus*\)](#)
- [Eurasian watermilfoil \(*Myriophyllum spicatum*\)](#)
- [Faucet snail \(*Bithynia tentaculata*\)](#)
- [Flowering rush \(*Butomus umbellatus*\)](#)
- [Hydrilla \(*Hydrilla verticillata*\)](#)
- [Japanese knotweed \(*Fallopia japonica*\)](#)
- [New Zealand mudsnail \(*Potamopyrgus antipodarum*\)](#)
- [Phragmites a.k.a. common reed \(*Phragmites australis*\)](#)
- [Purple loosestrife \(*Lythrum salicaria*\)](#)
- [Rusty crayfish \(*Orconectes rusticus*\)](#)
- [Starry stonewort \(*Nitellopsis obtusa*\)](#)
- [Water chestnut \(*Trapa natans*\)](#)
- [Yellow floating heart \(*Nymphoides peltata*\)](#)
- [Yellow Iris \(*Iris pseudacorus*\)](#)
- [Zebra mussel \(*Dreissena polymorpha*\)](#)



Free 1-page printable PDFs on 20 AIS of concern for Wisconsin



Erin McFarlane, CBCW Coordinator

715-346-4978

Erin.McFarlane@uwsp.edu

www.uwsp.edu/cnr/uwexplakes/cbcw



Paul Skawinski, CLMN Coordinator

715-346-4853

Paul.Skawinski@uwsp.edu

www.uwsp.edu/cnr/uwexplakes/clmn

Questions

Starry Stonewort

Public Informational Meeting