

2020 Survey Training for Starry Stonewort and other Macrophytes





<http://tinyurl.com/sswdocs>



Agenda

- Collaborative Background
- Invasive Species
- Survey and Sampling Steps (including Survey123)
- Identification
- Wrap up, Questions & Feedback



Collaborative Background





HOBART AND WILLIAM SMITH COLLEGES



Finger Lakes Institute (FLI) at HWS, Geneva, NY www.hws.edu/fli

Promote environmental research and education about the Finger Lakes and surrounding environments

Program Areas: Research, Education, Community Outreach, Economic Development



Finger Lakes Partnership for Regional Invasive Species Management (FL-PRISM) www.fingerlakesinvasives.org

Partnerships

Reduce the introduction, spread, and impact of invasive species through coordinated education, detection, prevention, and control measures





The Starry Stonewort Collaborative



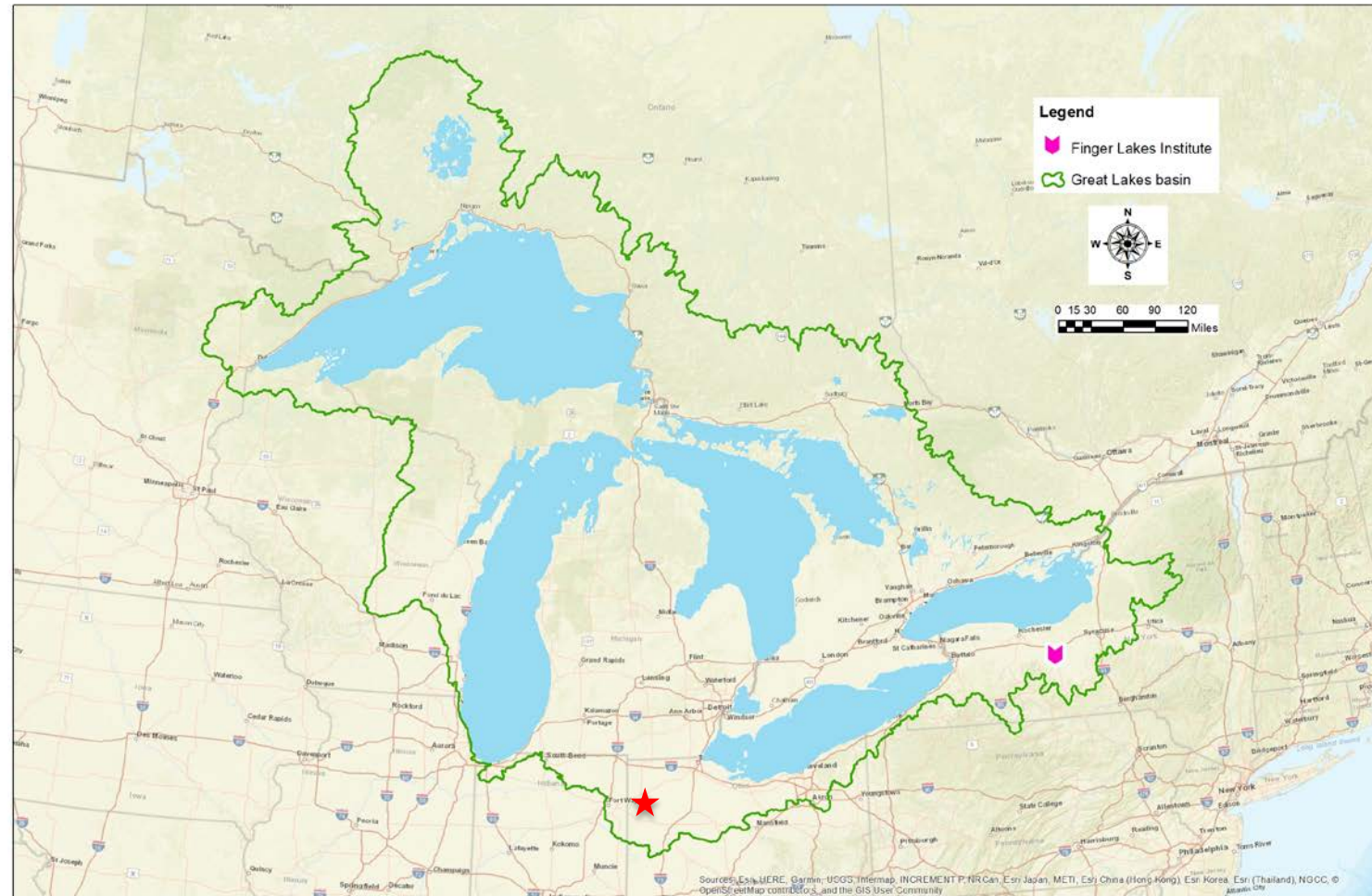
Great Lakes basin

Enhance the capacity of experts, resource managers and local stakeholders to address SSW by:

- providing general knowledge about SSW **Ecology**
- expanding **Outreach** efforts at all levels
- reviewing and distributing the best **Control** techniques (BMPs)



Great Lakes basin (International!)

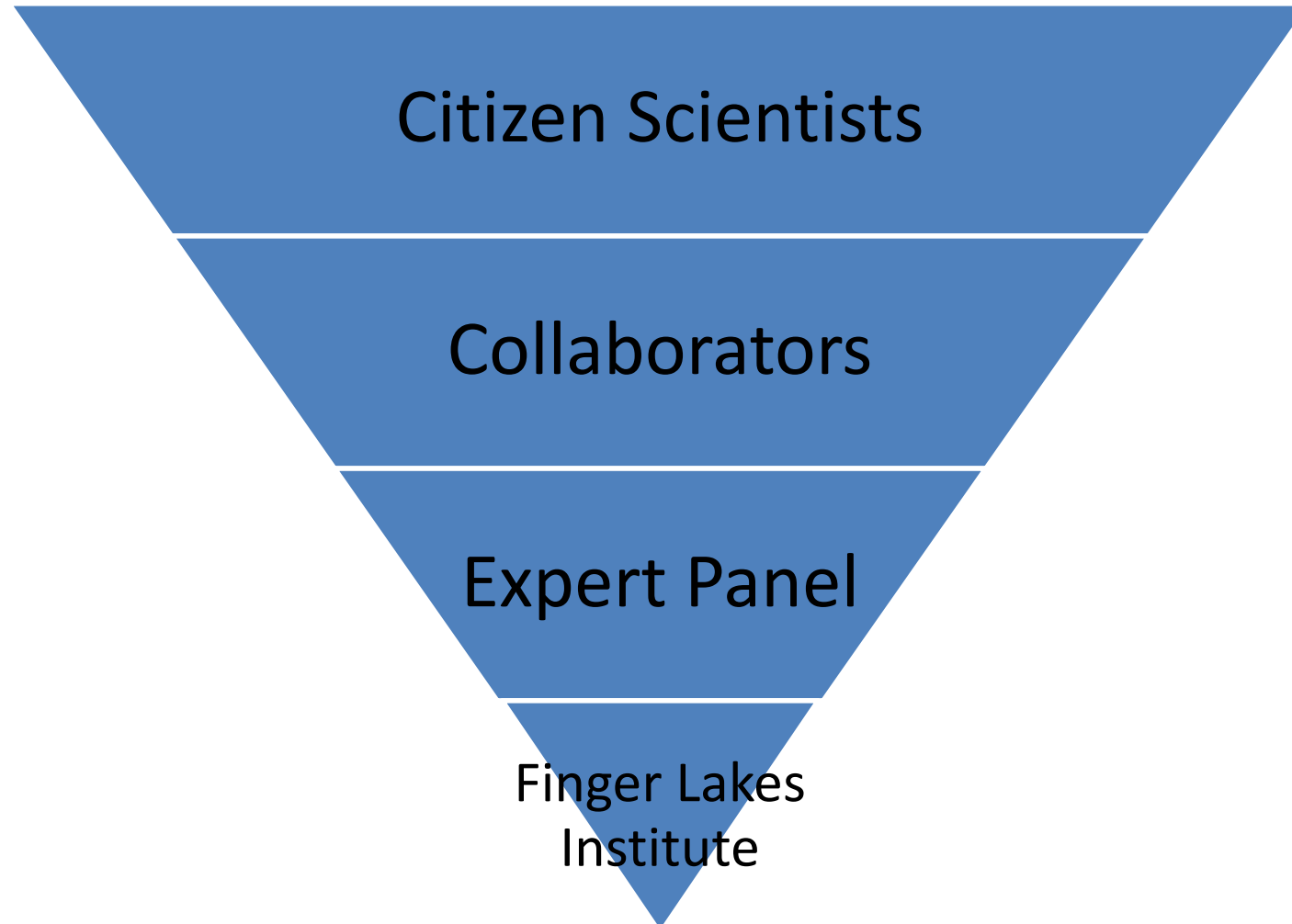


Finger Lakes Region, NY





Collaborative Structure and Roles





Invasive Species



Scott Brown



Invasive Species Defined

An invasive species is one that is **non-native** to the ecosystem under consideration and whose introduction causes, or is likely to cause, **economic** or **environmental** harm or harm to **human health**.

Economic:

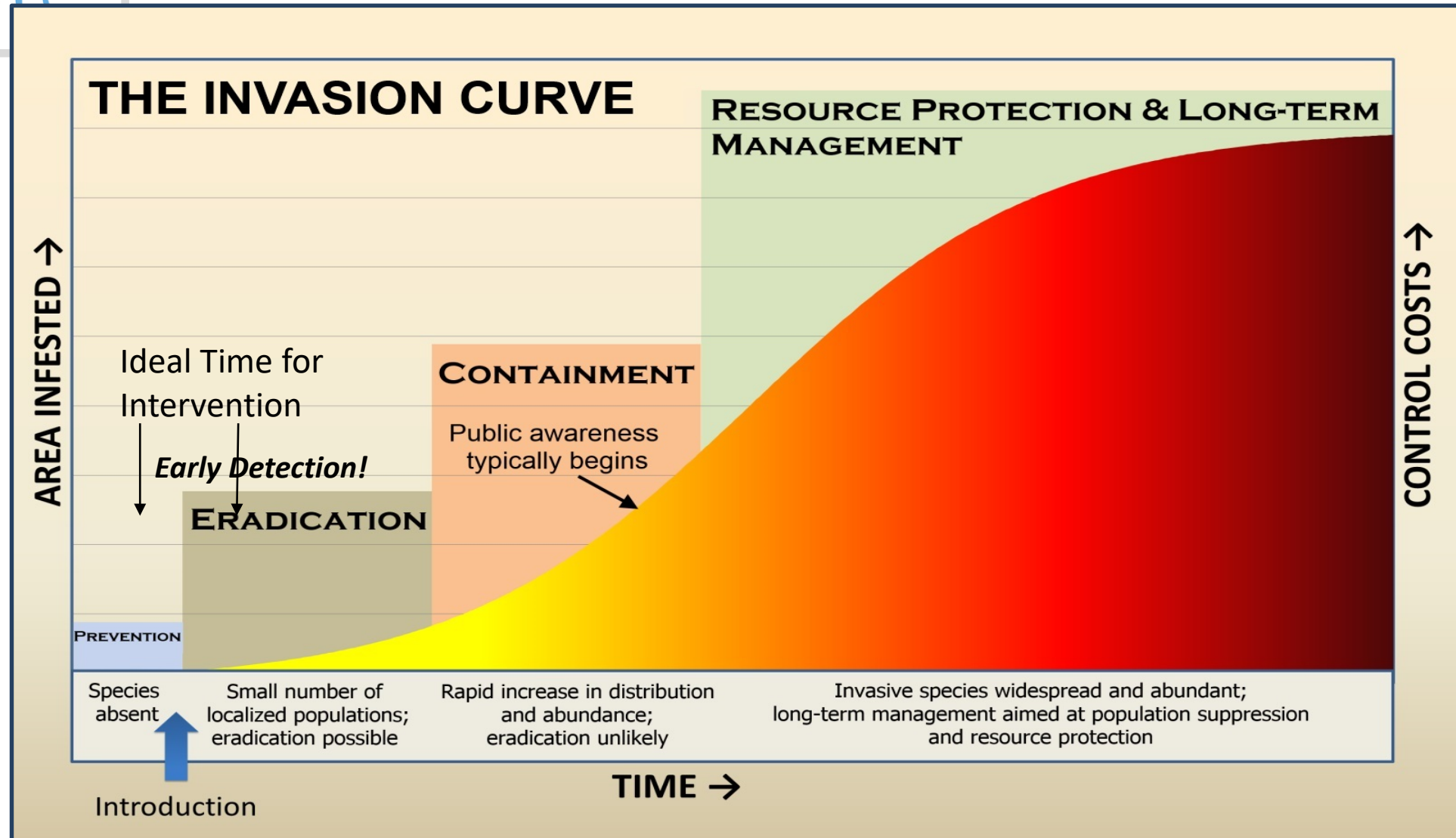
Impacts on agriculture, recreation, wood/forest products, trade/shipping, tourism, utilities (power plants) and management costs.

Environmental:

Impacts on biodiversity, structural diversity, natural processes, aesthetics, ecosystem function and services.

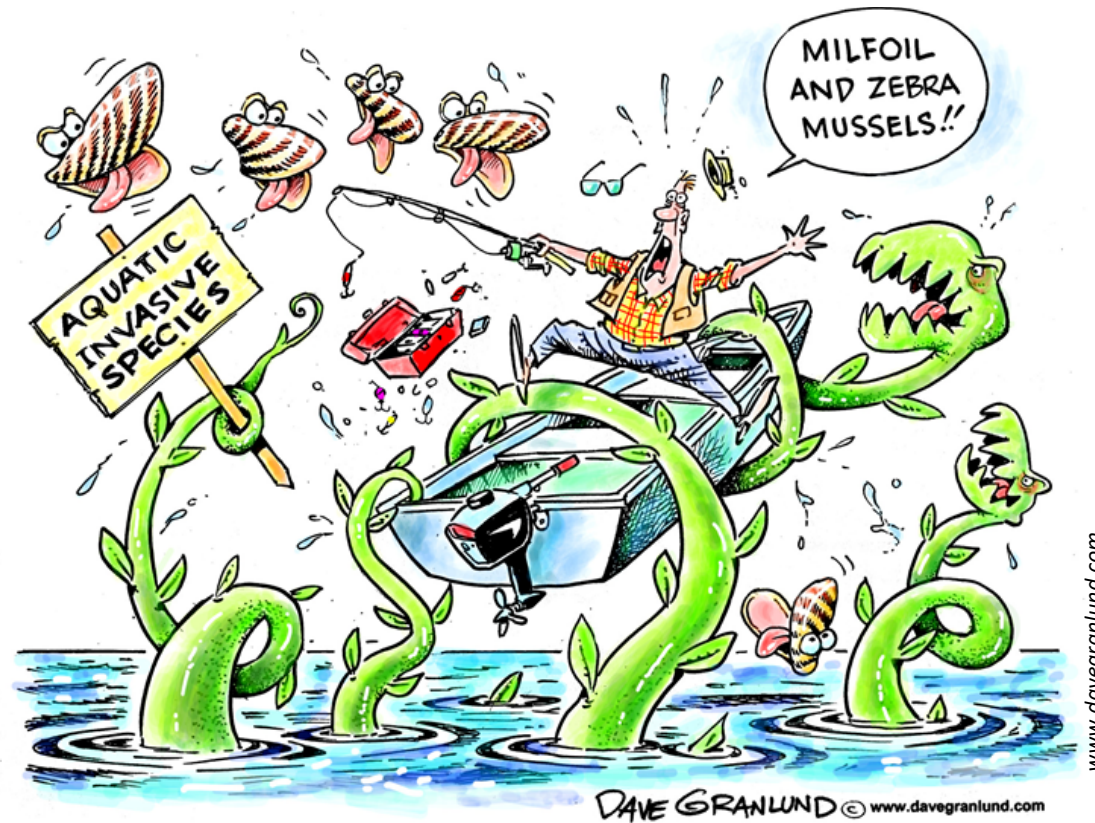
Human Health:

Impacts on soil, water and air quality, flooding, injury, and disease/illness.





Invasive species have no natural enemies, a high rate of reproduction and great adaptations that help to increase survival in the harshest of conditions.



Invasive species effect biodiversity in ecosystems and threaten native species by outcompeting for food and habitat.

Invasive Species Impact on Humans

Japanese barberry, *Berberis thunbergii*



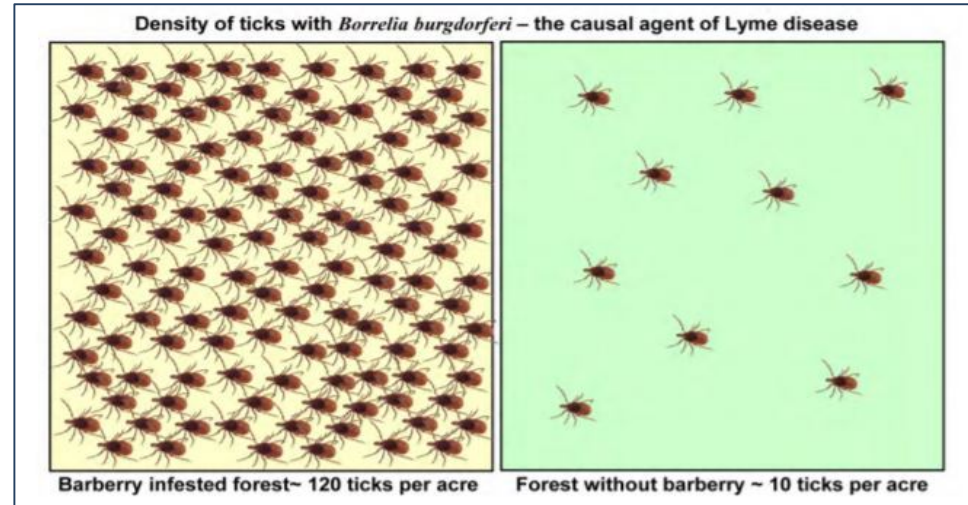
Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

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Leslie J. Mehrhoff, University of Connecticut, Bugwood.org



Extension.umaine.edu

Giant Hogweed

Heracleum mantegazzianum



Spotted Lanternfly

Lycorma delicatula



Starry Stonewort

Nitellopsis obtusa





Prevention=Protection=\$\$ Saved

Dispose of bait in the trash
in the trash

Bait and non-native plants and animals hitchhiking in bait can harm our lakes and rivers.

PROTECT OUR WATERS...

Sea Grant
State University of New York

For more information about non-natives, visit www.ProtectOurWaters.net

Developed by: Wendy Roberts, Sea Grant, State University of New York
Hobart and William Smith Colleges, 1992-05-17

An ounce of prevention is worth a pound of cure.

GIVE INVASIVE SPECIES THE BRUSH OFF

Shoes can carry the seeds of invasive plants. Please brush them off before entering and leaving this area.

What's The Problem?

Non-native and invasive plants can overtake native plants in natural areas. They can also harm native plants and animals. They can also harm the economy by reducing property values and increasing maintenance costs.

Other Invasive Plants On The Move:

- Black locust** (*Rhus glabra*)
- Wild garlic** (*Allium vineale*)
- Reynolds' grape** (*Vitis rotundifolia*)

Play Clean Go

STOP INVASIVE SPECIES IN YOUR TRACKS

Check Your Gear Before Entering and Before Leaving The Area

PRISM

✓ **CLEAN**
✓ **DRAIN**
✓ **DRY**

Before you transport your boat or equipment

Invasive Plant Alert

Hydrilla (*Hydrilla verticillata*) is a highly invasive plant recently found in the Cayuga Inlet.

Hydrilla has small, pointed, often serrated leaves that are arranged around the stem in whorls of 4 to 6. The plant's aggressive growth (25-foot stems can add up to an inch per day) can spread into shallow waters forming thick mats that block sunlight to native plants below. Thick growth of hydrilla can obstruct boating, swimming and fishing and have negative impacts on drinking water and other water withdrawal uses.

Please help keep this harmful plant from spreading.
Clean all vegetation from your boat and recreational equipment (skis, tubes, fishing gear).
Dispose of the plant material on dry land.

STOP AQUATIC HITCHHIKERS!

Prevent the transport of nuisance species.
Clean all equipment before leaving the site.
www.hitchhikers.org

When you leave a body of water:

- Remove all weeds, plants, and animals from recreational equipment.
- Clean and dry equipment before leaving the site.
- Clean and dry clothing that comes into contact with water, boats, tubes, equipment, clothing, dogs, etc.
- Never dump gear, but it is OK to dump into a body of water unless they come out of the body of water.

For more information contact:
Scott Kohlweh
NYSDEC Division of Water, Albany, NY
Phone: 518-452-4285
E-mail: sakohlweh@dec.state.ny.us

RIDE. CLEAN. GO.

Stop Invasive Species In Your Tracks.

Help Prevent The Spread Of Invasive Plants And Animals.

- **REMOVE** plants, animals & mud from boots, gear, pets & vehicle.
- **CLEAN** your gear before entering & leaving the recreation site.
- **STAY** on designated roads & trails.
- **USE CERTIFIED** or local firewood & hay.

Play Clean Go

STOP INVASIVE SPECIES IN YOUR TRACKS

www.PlayCleanGo.org

CLEAN.DRAIN.DRY.

BOATS, TRAILERS & GEAR STOP INVASIVE SPECIES

www.CleanDrainDry.org

NEW YORK STATE
PRISM
Finger Lakes Institute
CLEAN DRAIN DRY INITIATIVE
U.S. Army Corps of Engineers

STOP THE INVASION

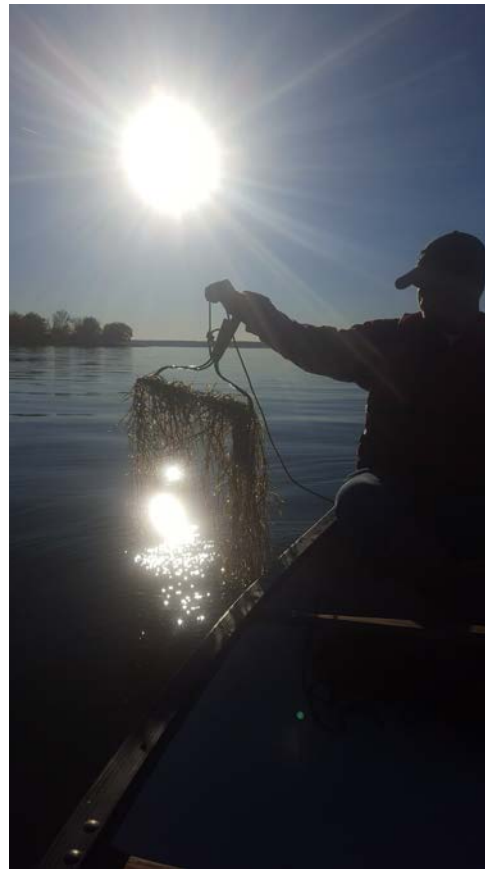
Protect New York From Invasive Species

STOP AQUATIC HITCHHIKERS!

CLEAN DRAIN DRY



Survey and Sampling Steps



Citizen Science: is defined as "scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions". Citizen scientists often partner with professional scientists to achieve common goals.





The goal of the survey is to learn to survey for and identify one to five high priority invasive species of concern:

- **Starry Stonewort** (*Nitellopsis obtusa*)
- **Eurasian Water Milfoil** (*Myriophyllum spicatum*)
- **Curly-leaf Pondweed** (*Potamogeton crispus*)
- **Hydrilla** (*Hydrilla verticillata*)
- **Water Chestnut** (*Trapa natans*)



Photo credit Hilary Mosher

Hydrilla



Photo credit Patty Wakefield-Brown

Water chestnut



Photo credit Kate Des Jardin

Starry stonewort

- Protocol

- Rake tosses in 1 - 3 locations
- Every other week through the summer, July - October
 - 8 weeks X 3 tosses = 24 rake tosses
- Small groups of people
- Record what you find
 - Survey123, paper forms
- Send us 10% of samples (SSW - voucher sample)
 - 24 rake tosses = 2 samples
- Check In



Keep it SIMPLE

Rake Toss Survey





- Survey123



- Free app for smart phones and tablets
- Survey form developed for this project



- Why?

- Easy and efficient way to record SSW locations and sample information.
- Upload to cloud where FLI Staff can review and export to spreadsheet.
- “Live” map of locations recorded in Survey123 on the SSW website.
- FLI Staff will upload to USGS-NAS and IMapInvasives (NY, PA)



NAS - Nonindigenous Aquatic Species





• Survey 123 Installation and Use Instructions

– Included in the Training Documents

- <http://tinyurl.com/sswdocs>
- *05 Survey123_instructions-2020.pdf*



– Use the specific URL, follow prompts

– Subsequent use, start app as normal

Survey Walk Through

FLI Invasive Species Detection Program 2020 (Aquatic)

Sampler Initials

Organization Name

Date
Tuesday, June 9, 2020
12:50 PM

Map Location
Pan and zoom to locate sampling location
43°7'N 77°36'W ± 65 m

Enter Coordinates Manually?
Choose "Skip" if you found your location using the Map above

FLI Invasive Species Detection Program 2020 (Aquatic)

Macrophyte Data

Survey Type
☒ Rake Toss ☐ Visual Survey

Submerged Macrophyte Density
Z= no plants, T= handfull of plants, S= two hand-fulls, M= armful, D= covered rake
Zero Trace Sparse Medium Dense

Floating Macrophyte Density
Z= no plants, T= handfull of plants, S= two hand-fulls, M= armful, D= covered rake
Zero Trace Sparse Medium Dense

Sample Collected
☐ Yes ☐ No

Notes

FLI Invasive Species Detection Program 2020 (Aquatic)

Submerged Dominant Species

Submerged Species
invasive species in red text

- ☐ American eelgrass
- ☐ brittle naiad
- ☐ chara spp
- ☐ common bladderwort
- ☐ coontail
- ☐ curly-leaved pondweed
- ☐ dukckweed
- ☐ Elodea spp
- ☐ Eurasian watermilfoil
- ☐ European frogbit
- ☐ fanwort
- ☐ hydrilla
- ☐ naiad

FLI Invasive Species Detection Program 2020 (Aquatic)

Z= no plants, T= handfull of plants, S= two hand-fulls, M= armful, D= covered rake
Zero Trace Sparse Medium Dense

Sample Collected
☐ Yes ☐ No

Notes

Add photos?
Submit Photo

1 of 1



Website and Interactive Map



What is SSW?

Learn about Starry Stonewort, an invasive aquatic species threatening the Great Lakes basin.



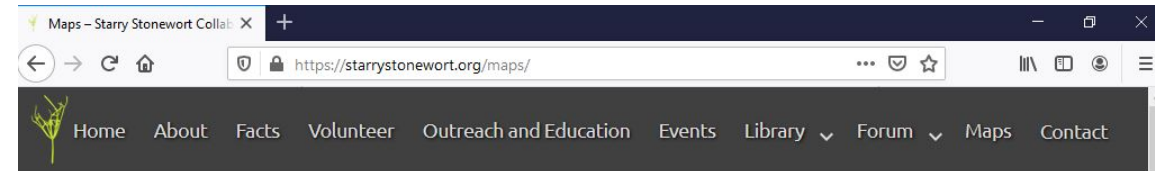
Our Library

Reports, presentations, training materials, and links to information about Starry Stonewort in the basin.



Volunteer

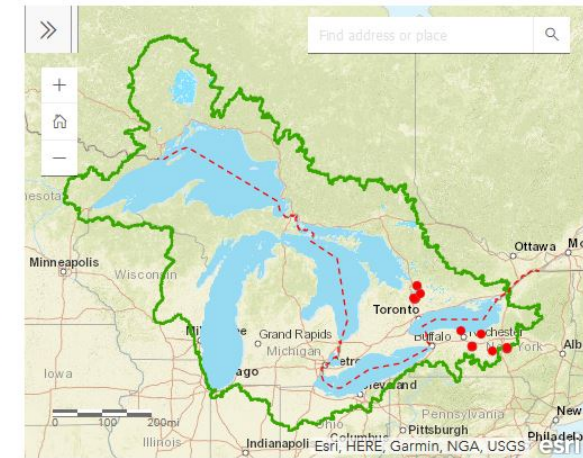
We need help identifying the extent of the infestation of Starry Stonewort in the Great Lakes basin.



Citizen Science Survey Locations

This interactive map shows the locations (red dots) of information collected by citizen scientists using the Survey123 application on a tablet or cell phone. As more people participate the map display will fill with more points.

The map will update within a short time of submitting the data – get involved and see where you and others have surveyed! Pan and Zoom the map to a location and then click on a point and see the information you've collected!



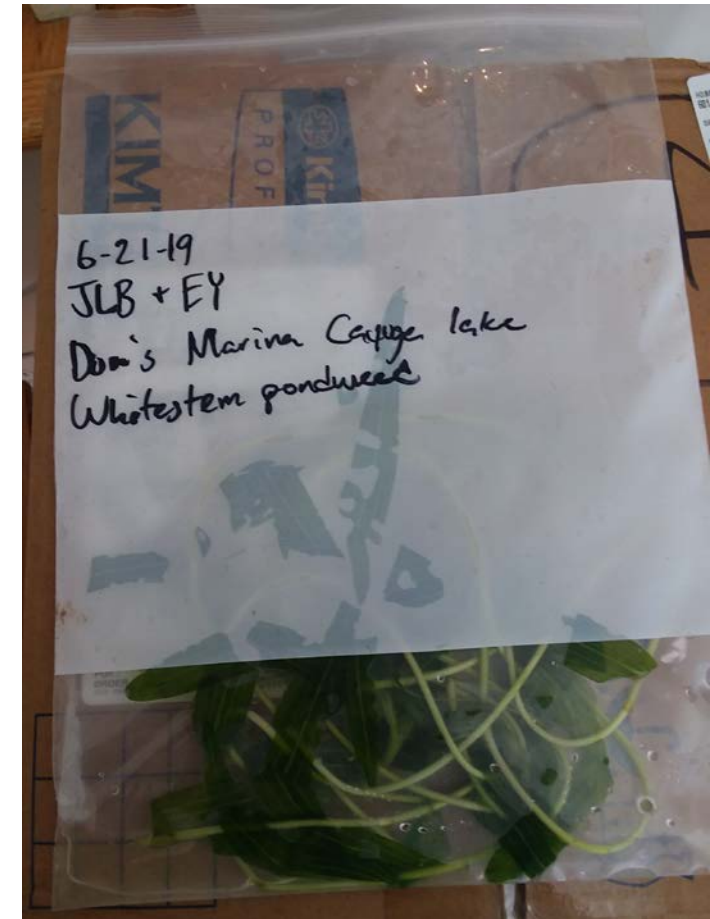
Note: These points represent volunteer survey locations only and do not necessarily reflect verified Starry Stonewort locations or that voucher samples were taken in these locations.



Voucher Sample

Bag and Tag Protocol

- Before you bag and tag the sample, float it in your tray and take a few photos, so the image is clear.
- Using a sharpie, write; date, location (lake), your name and what you think the specimen is on the bag.
- Put a small amount of water into the bag or a wet paper towel/napkin.
- Place the plant specimen in the bag and seal up.
- Keep it in the refrigerator. DO NOT freeze.
- Seal it well and send it.





Identification

Starry Stonewort

Curley Leaf Pondweed

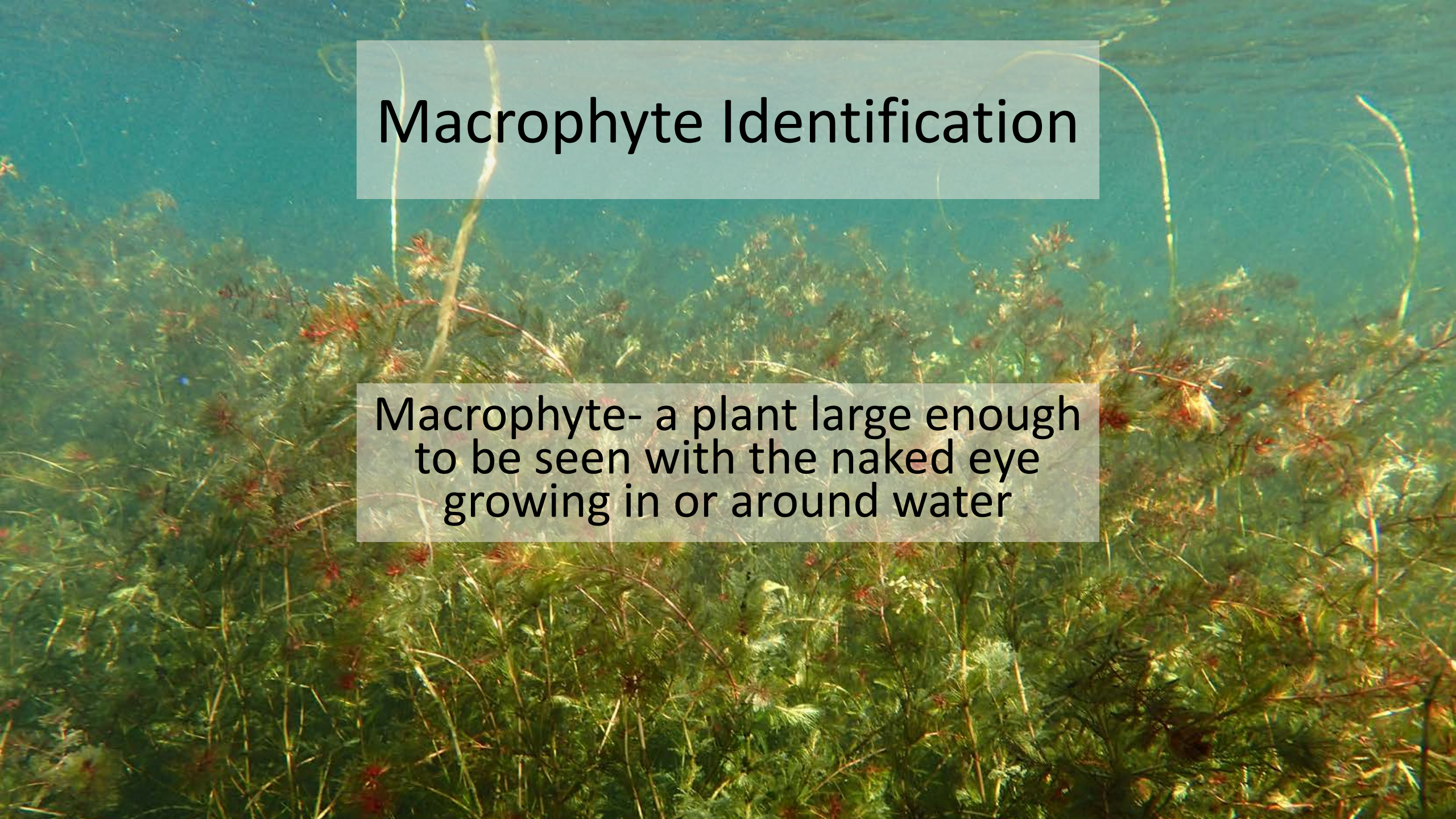
Eurasian Water Milfoil

Water Chestnut

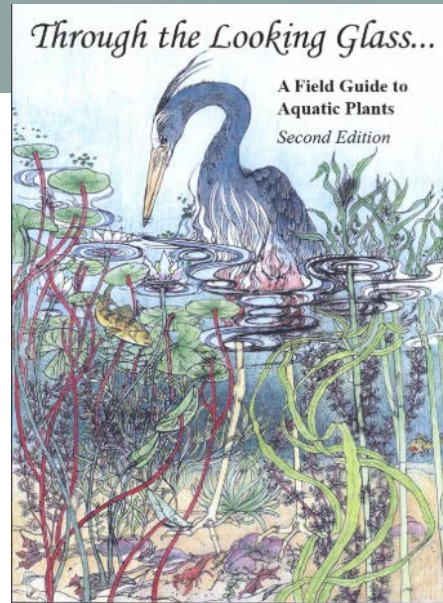
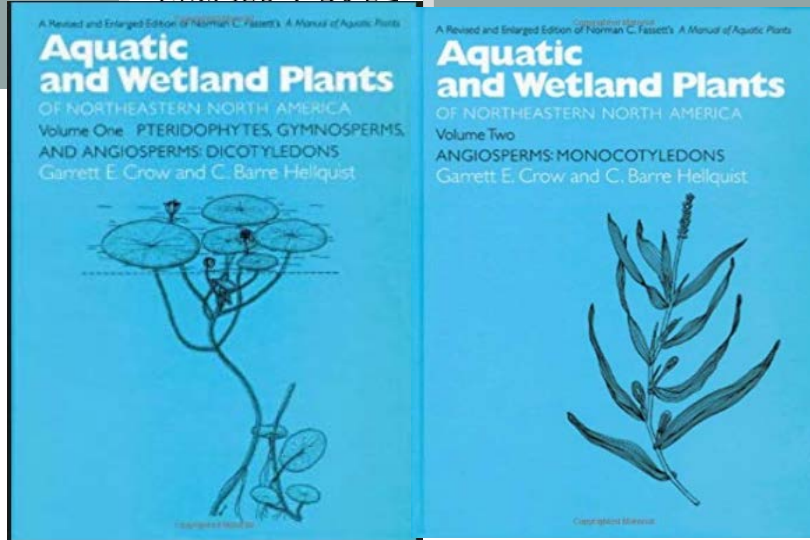
Hydrilla



Macrophyte Identification

An underwater photograph showing a dense field of aquatic plants. The plants have long, thin, green stems and feathery, green leaves. Interspersed among the green foliage are numerous reddish-brown, elongated flower heads or seed pods. The water is clear and blue, with some light rays visible. The plants are growing in a submerged environment, likely a pond or lake.

Macrophyte- a plant large enough to be seen with the naked eye growing in or around water



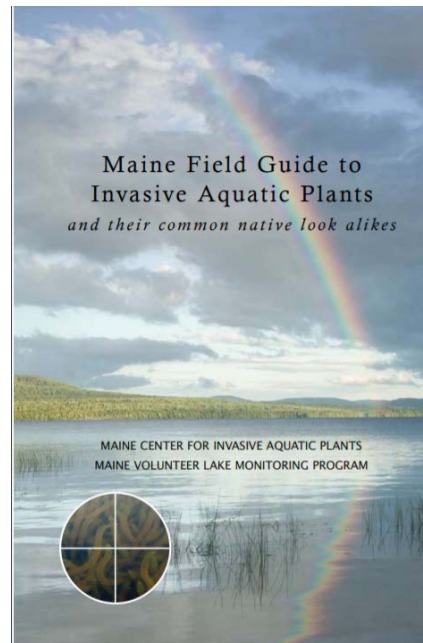
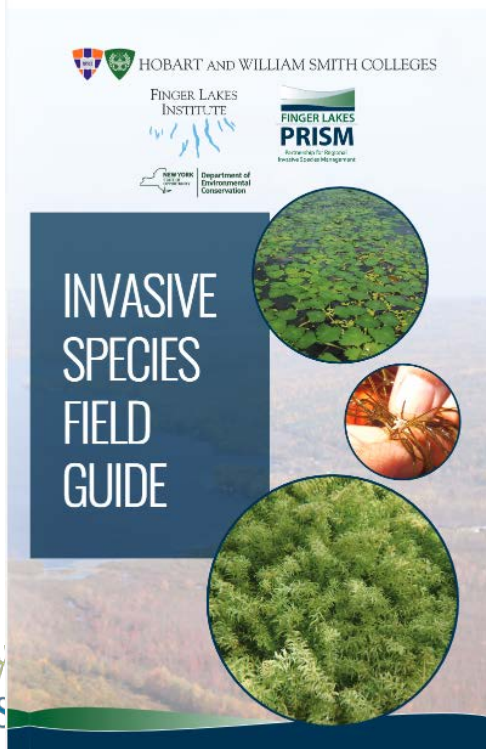
References

Aquatic and Wetland Plants of Northeastern North America- Garret E. Crow & C. Barre Helquist (2 volumes)

Through the Looking Glass...A Guide to Aquatic Plants- Susan Borman, Robert Korth, Jo Temte

Invasive Species Field Guide-
FLI@HWS, NYSDEC, Finger Lakes PRISM

Maine Field Guide to Invasive Aquatic Plants- Maine Center for Invasive Aquatic Plants, Maine Volunteer Lake Monitoring Program





Growth Habit

- Emergent
- Floating-leaved or free-floating
- Submersed





Identifying Characteristics

- Leaves
 - Arrangement
 - Number
 - Margins
- Stems
 - Shape
- Roots
 - Strong/weak
 - Rhizome?
- Flowers
 - Color
 - Petal number
- Seeds/Fruits



PLANT DIAGRAMS

LEAF SHAPES



Wavy Margin

Serrated Margin



Whole Margin



Simple



Compound



Thread



Linear



Elliptic



Lanceolate



Heart



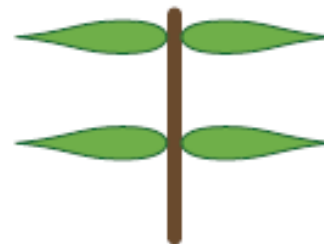
Ovate

Leaves

LEAF ARRANGEMENTS



Alternate



Opposite

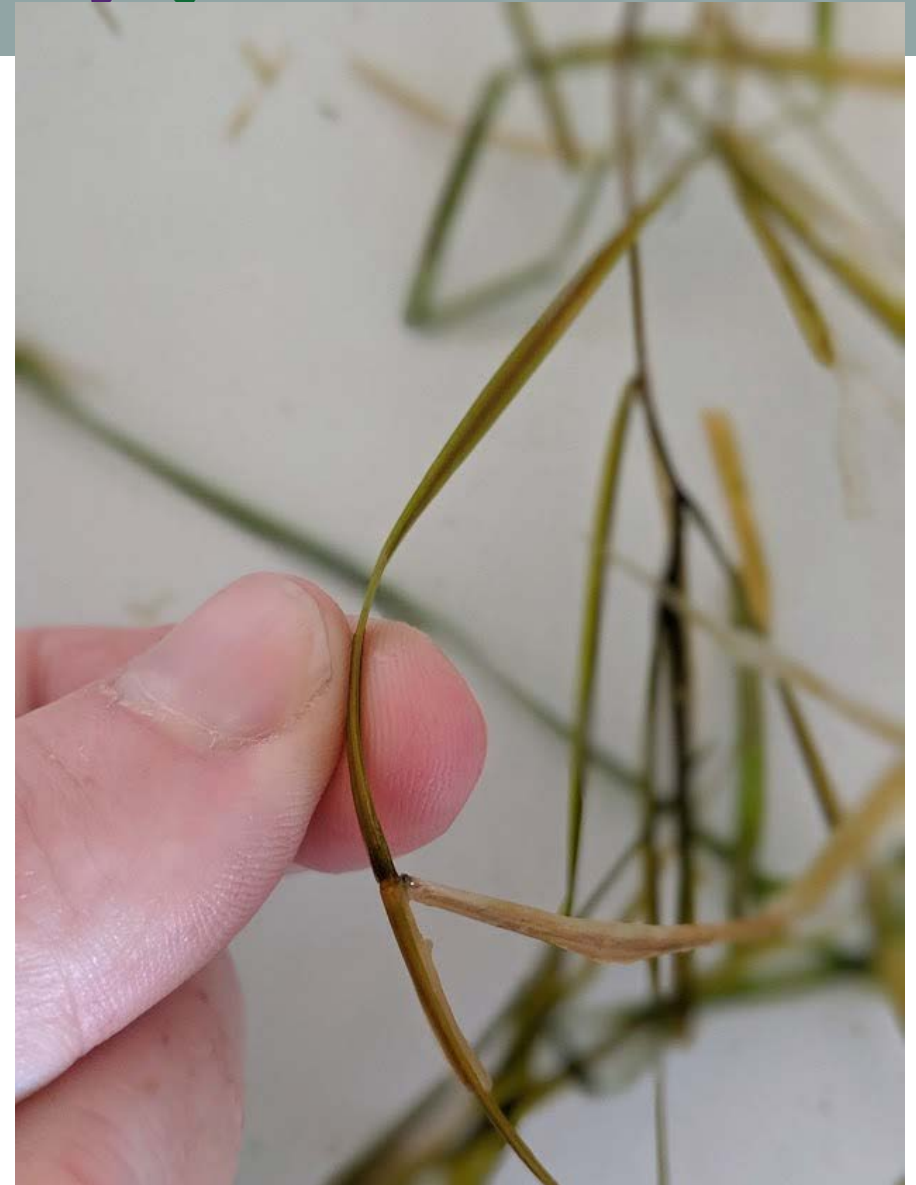


Whorled





Stems





Roots



Flowers



Seeds/Fruits





Nitellopsis obtusa – Starry Stonewort

Aquatic Macro Algae

Europe and Asia

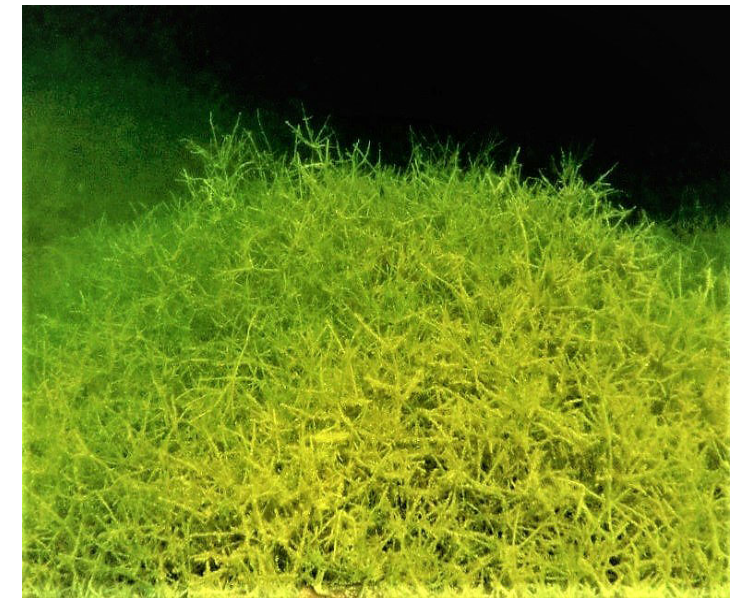
1978 Saint Lawrence River, spread throughout
Great Lakes basin



P. Skawinski



Bulbils



S. Brown

Impacts

Rapid, aggressive growth

Potential harm to environmental systems

Spawning areas

Water quality?

Replacing native species

Human impacts

Inhibit use of waterways

Fishing

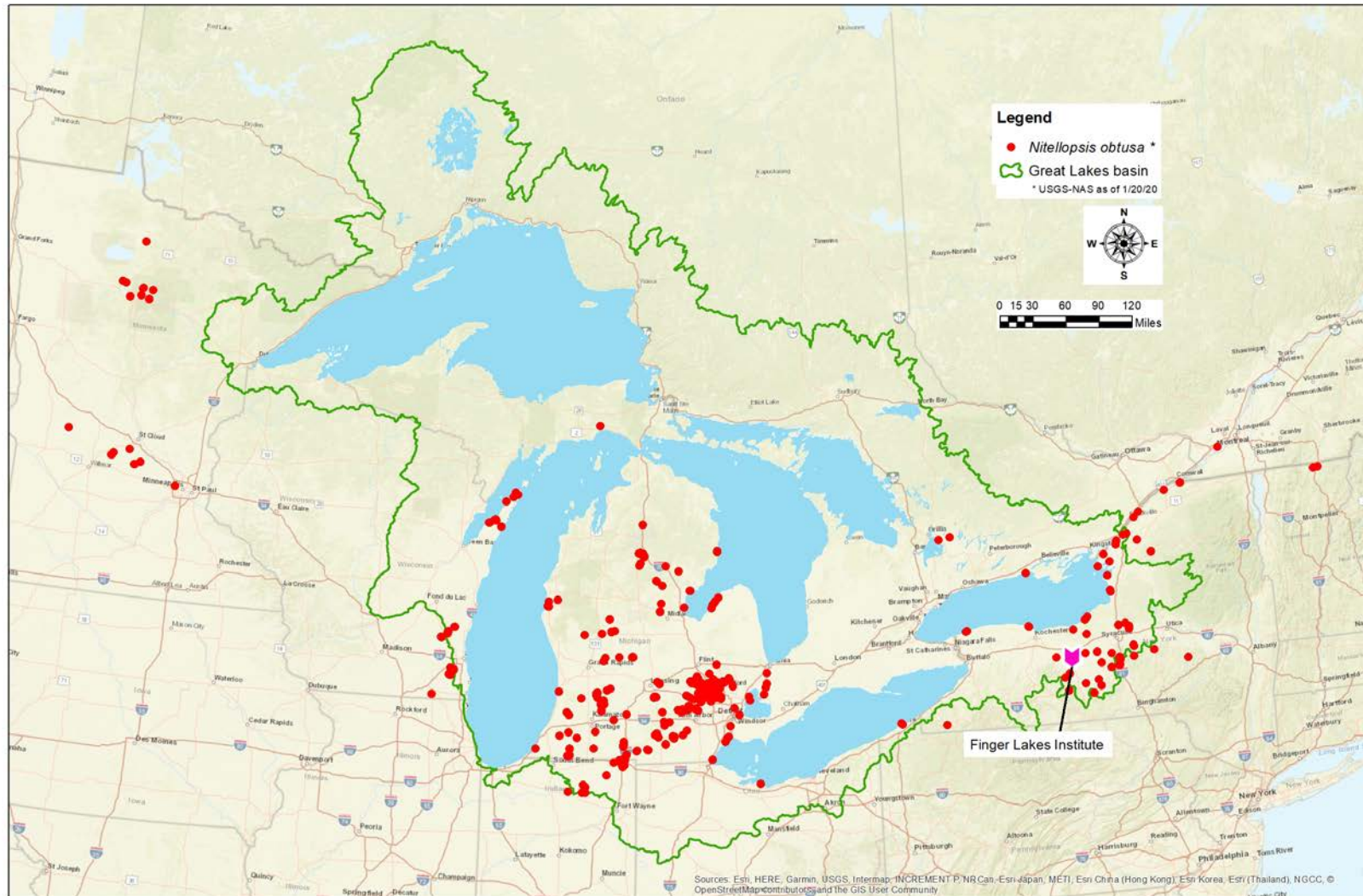
Potential economic

What do we know?





- Current Extent - Great Lakes basin



(INVASIVE)

starry stonewort

(*Nitellopsis obtusa*)

Habitat: Depths up to 9 m in slow-moving aquatic habitats

Description:

- ★ Anchored to the sediment via rhizoids
- ★ Can grow up to 2 m long
- ★ Whorls of 4-6 blunt branchlets
- ★ Similar to other stoneworts, can be identified by the presence of **tiny star-shaped bulbils** or orange antheridium



Starry Stonewort
Nitellopsis obtusa









HOBART AND WILLIAM SMITH COLLEGES

Starry Stonewort Identification Video

Paul Skawinski
Citizen Lake Monitoring Network Educator

UW – Extension Lakes



Chara/muskgrass (*Chara vulgaris*)

Habitat: Fresh or brackish water, in a variety of habitats

Description:

- ★ Plant-like macroalgae
- ★ Cylindrical, whorled branches
- ★ Crusty texture
- ★ **Cells pop with a garlic or skunk-like odor**
- ★ May be confused with invasive Starry Stonewort, has no odor when cells are popped



Sago Pondweed

(*Stuckenia pectinata*)

Habitat: Shallow water of ponds, lakes and slow moving streams.

Description:

- ★ Submerged pond weed with stems growing up to 1 m long and 2 mm wide
- ★ Leaves are thread-like and grow in layers and are up to 12 cm long, 1.5 mm wide
- ★ **Leaves in layers at the end of the stem may appear fan-like**



(INVASIVE)

Curly-leaf Pondweed

(Potamogeton crispus)

Habitat: Shallow alkaline to circumneutral water of ponds, lakes, and streams.

Description:

- ★ Submerged aquatic plant growing up to 5 m long
- ★ **Rigid, oblong, and reddish leaves growing in alternate arrangement with finely toothed, wavy margins and blunt tips**
- ★ Small reddish-green flowers on a spike above the water as well as turions may be present.

Season: May-July



(INVASIVE)

Eurasian Watermilfoil

(Myriophyllum spicatum)

- ★ Habitat: Ponds, lakes, streams, and rivers. Widespread and very abundant at some sites.

Description:

- ★ Submerged aquatic plant with **bluntly** tipped and finely divided leaves
- ★ **Leaves divided into at least 12 pairs of leaflets in whorls of 4** on red-tinged, brown or green stems up to 6 m in length
- ★ Tiny pink flowers may be present in mid June or Late July



Common Coontail

(*Ceratophyllum demersum*)

Habitat: A very common aquatic plant. Ponds, lakes, streams, usually in somewhat slow moving or still water. Very dense in some situations.

Description:

- ★ Submerged aquatic plant
- ★ Whorls of bristle-like, toothed, leaves with the appearance of a raccoon tail



Coontail
Ceratophyllum demersum
Photo by Chuck Cichra
© 2014 University of Florida



coontail
Ceratophyllum demersum
Photo by Vic Ramey
© 1999 University of Florida

(INVASIVE)

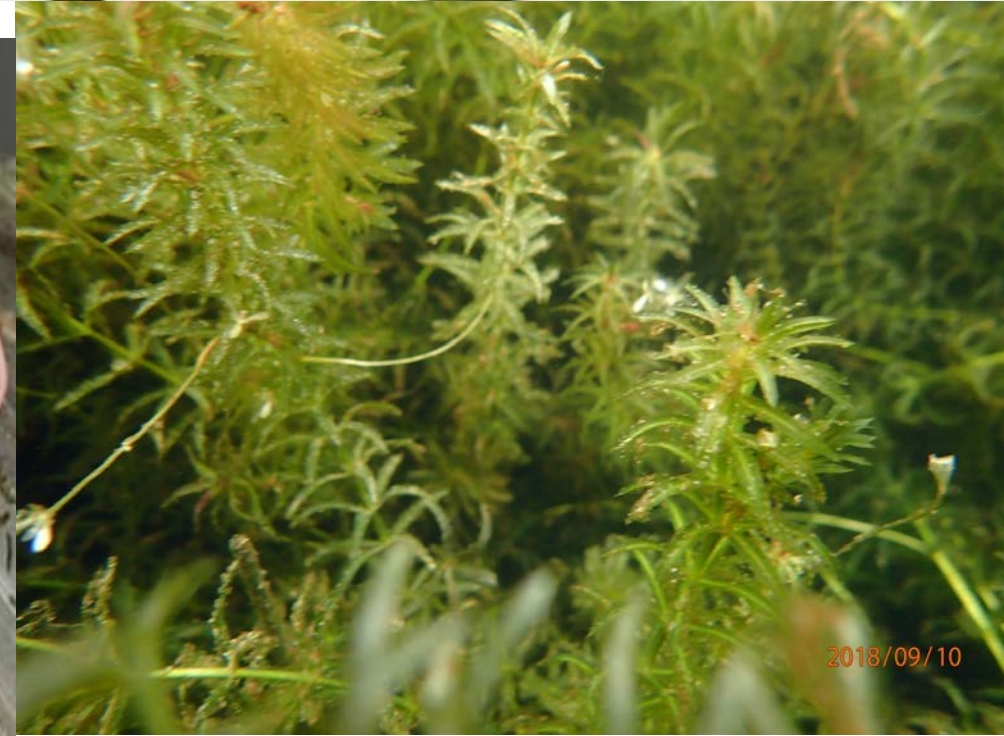
Hydrilla, Water Thyme

(*Hydrilla verticillata*)

Habitat: An invasive aquatic of lakes and ponds.

Description:

- ★ Submerged aquatic plant
- ★ **Visibly serrated leaves in whorls of 3-8 (usually 5)**
- ★ Spreads by seeds, tubers, and turions
- ★ **Tubers** are small potato-like structures in the sediment



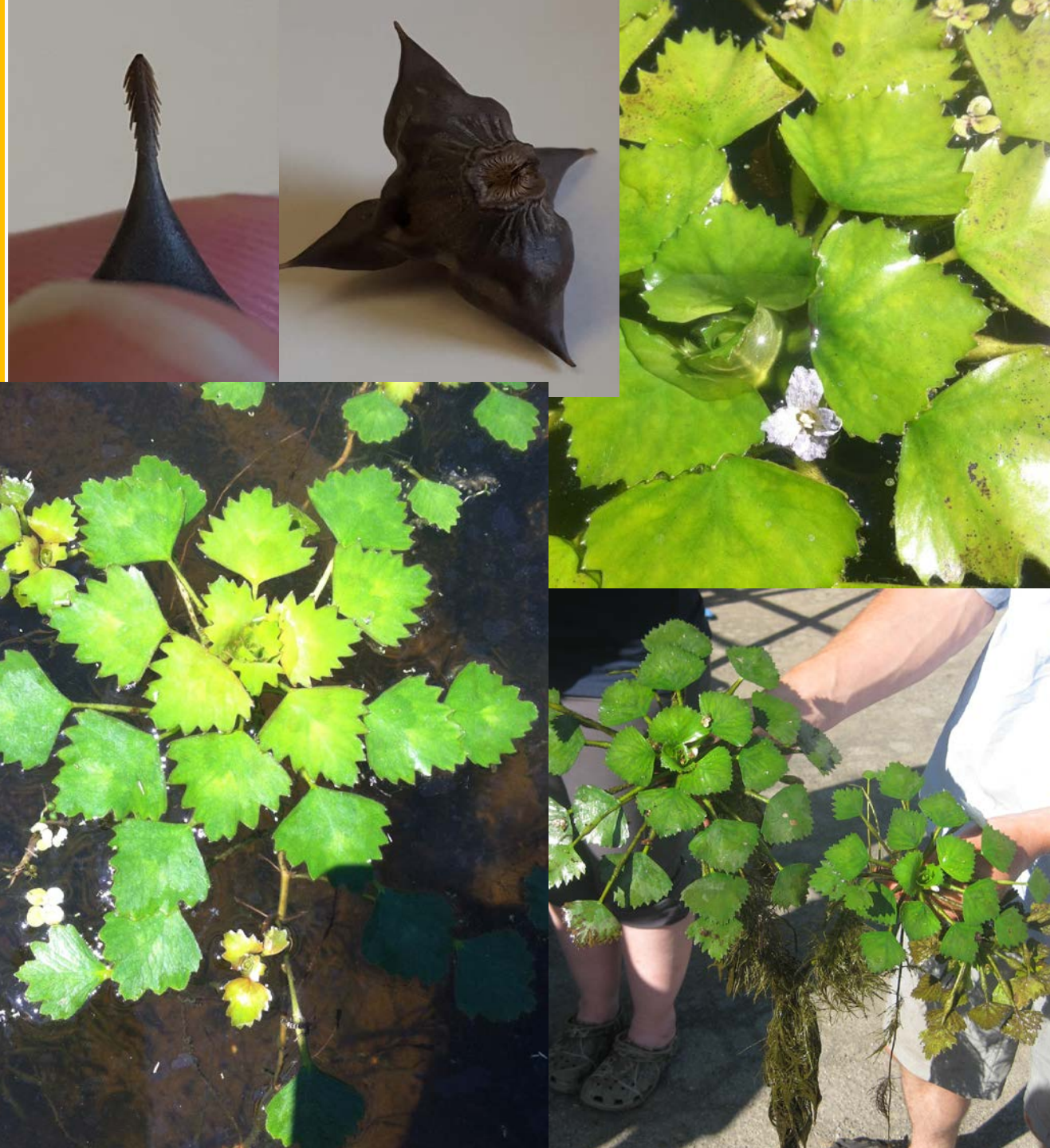
(INVASIVE) Water Chestnut

(*Trapas natans*)

Habitat: An invasive plant of ponds, lakes, bays, canals, and slow moving rivers with muddy bottoms. This plant tends to grow in shallower water, rarely found in water deeper than 15 feet.

Description:

- ★ **Floating leaved** aquatic plant forming a rosette of **glossy, triangular** leaves on the water surface
- ★ Leaves are triangular and toothed with **inflated petioles**
- ★ Roots are feathery and cord-like stems extend up to 5 m
- ★ Small **4 petaled white flowers** can be present in the summer at the center of the rosette, producing large **4-spined seeds**



American Eelgrass

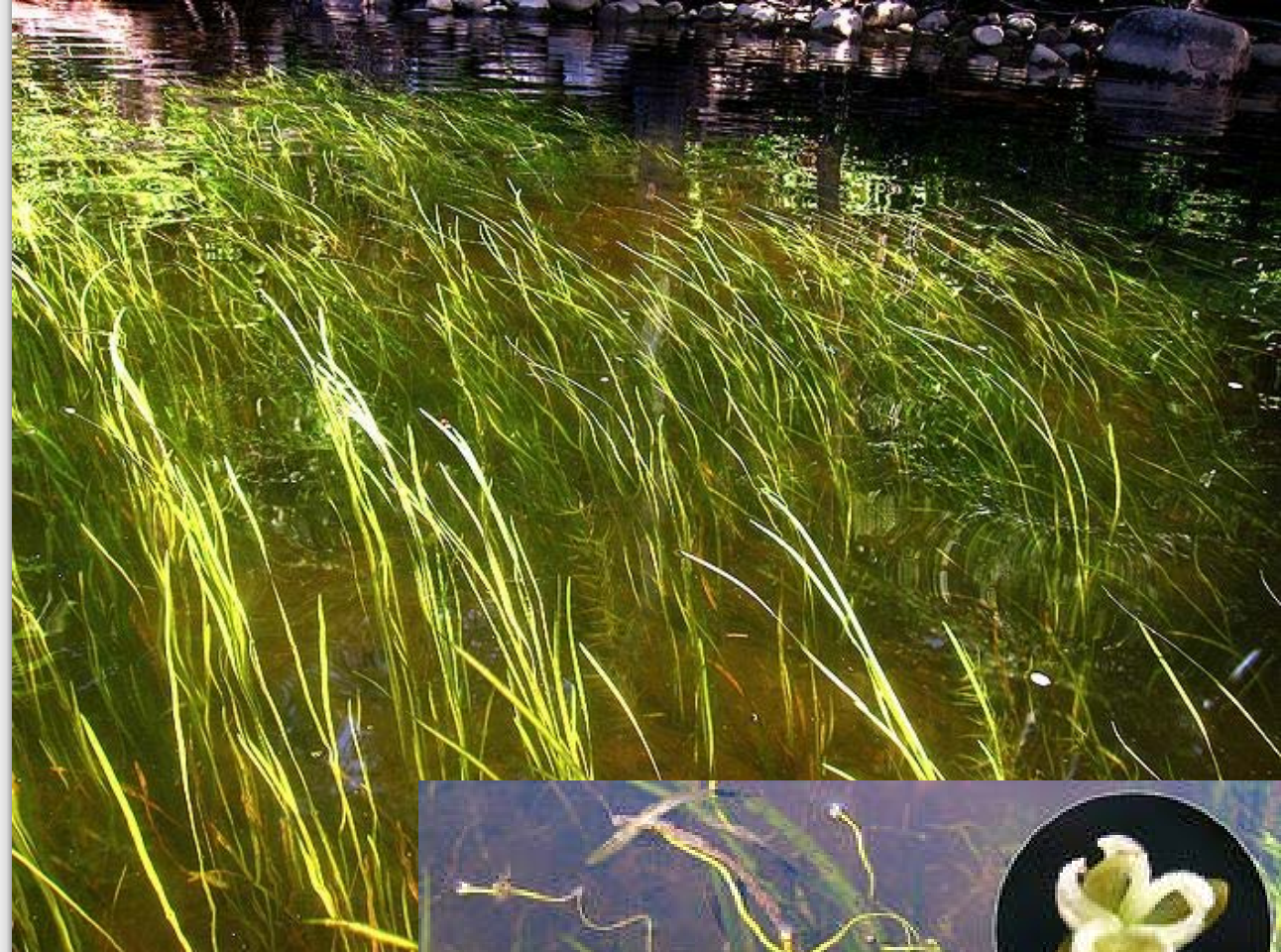
(*Vallisneria americana*)

Habitat: Lakes, streams, rivers, and tidal bays.

Description:

- ★ Submerged aquatic plant with ribbon-like leaves growing up to 2 m long with a **narrow strip in the center**
- ★ Leaves grow up from tubers in clusters
- ★ Grows in mainly solid sediment at depths of several meters

Season: July-September



Common Duckweed

(*Lemna minor*)

Habitat: Quiet water of lakes, ponds, vernal pools, marshes, and channels. Sometimes becoming temporarily stranded.

Description:

- ★ Free-floating, 1-3 green-yellow leaves with single roots hanging below the surface
- ★ Confused with greater duckweed- which has a purple-red spot on the leaf and purple-red underside





Resources:

<http://tinyurl.com/sswdocs>

- “Links to References and Contact”
 - Videos
 - FL-PRISM field guide and factsheets
 - David Carr Contact Information
- Collaborative Overview
- Survey Program Mission Statement
- Survey123 Instructions
- Survey and ID Guides





Questions?

- Feedback Poll -

www.starrystonewort.org

[@starrystonewort](https://www.facebook.com/starrystonewort)

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