WISCONSIN AQUATIC INVASIVE SPECIES EARLY DETECTOR HANDBOOK

NOTES

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AIS EARLY DETECTORS

Early detection of aquatic invasive species (AIS) can be the difference between long-term management and potential eradication--the difference between $$$ and $. Once they become well-established, invasive species can be very difficult to control, and may be impossible to eradicate. Early detection and rapid response to new AIS populations in Wisconsin has resulted in some populations being eradicated from entire lakes, including notable invaders like Eurasian watermilfoil, flowering rush, and yellow floating heart (cover photo). The best possible option for a lake is to have trained eyes on the water often, so that a suspicious plant or animal can be detected early and quickly responded to.

Your Citizen Lake Monitoring Network staff and local Aquatic Invasive Species Coordinators are ready to help you! They can provide hands-on training workshops, assist with identification, suggest the best locations to monitor on your lake, and more. This is a team effort to stop invasive species from spreading to our favorite fishing spots, our cherished swimming holes, and the peaceful places where we love to observe native plants and animals. We can all do our part. Thank you for being a partner to protect the amazing lakes of Wisconsin.

This booklet is adapted from *Aquatic Invasive Species Early Detectors: A How-to Guide*, produced by the Minnehaha Creek Watershed District, Minnetonka, Minnesota, used with permission.

Produced by the Wisconsin Citizen Lake Monitoring Network, UW-Extension Lakes Program.
Photos by Paul Skawinski except the following:
Jeff Gunderson, Minnesota Sea Grant (top photo, p. 38);
Jeffrey Thompson, Minnesota Public Radio; (page 3)
Minnehaha Creek Watershed District; (pages 6, 10)
Tina Wolbers, Minnesota Department of Natural Resources (top photo, page 32)

WISCONSIN DEPT. OF NATURAL RESOURCES

Wisconsin Lakes Partnership

UW Extension
University of Wisconsin-Extension

HOW TO PREPARE

1. Know which invasive species are already present in the lake or stream you are monitoring. Lists of invasive species in each water body can be found on the Wisconsin Department of Natural Resources website: dnr.wi.gov/lakes/invasives/AISbywaterbody.aspx

2. Determine several locations to sample. Be sure to target boat landings, inlets/outlets, public parks, developed shorelines, and a variety of sediment types (mucky, sandy, etc.). Your own shoreline is also a great place to keep an eye on. Mark these sampling locations on a map so that you can show others where you sampled or found a suspicious species.

3. Refer to the *Assembling a Monitoring Kit* section on page 6 to prepare for monitoring. If any of your gear has been used in another waterbody, be sure that it doesn't contain any plants, animals, or debris that could be holding invasive species.

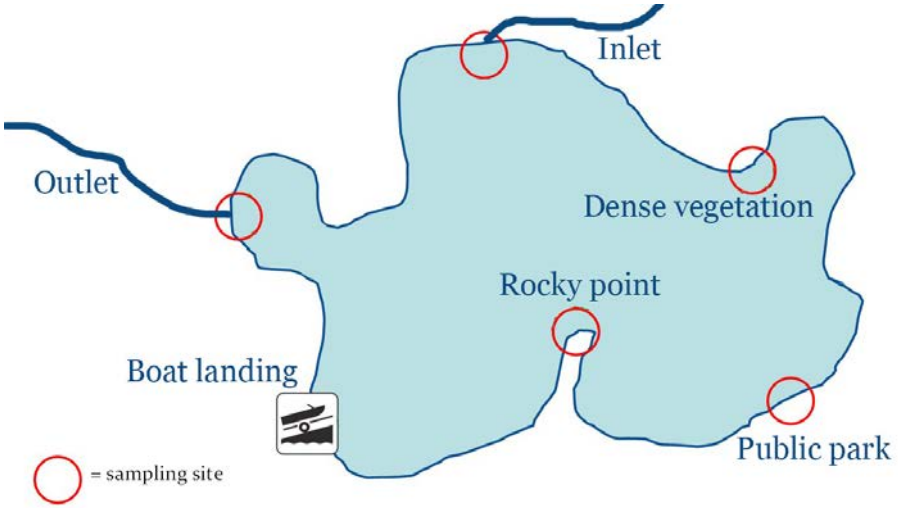
Inspect
your equipment for any attached plants, animals, or mud

Remove
all attached debris

Drain
water from your boat, motor, live wells, bait buckets, and any other location that holds water

EXAMPLE MAP

Great maps can be found for public lakes across the state by searching dnr.wi.gov for “lake maps”.



ASSEMBLING A MONITORING KIT

Use the checklist below to assemble an AIS monitoring kit. Items marked with an asterisk (*) can be provided by your Regional Citizen Lake Monitoring Network Coordinator or local Aquatic Invasive Species Coordinator.

1) Aquatic plant sampling rake*
2) Waterproof labels*
3) Ziploc bags*
4) Hand lens*
5) Pencil*
6) AIS monitoring forms*
7) Polarized sunglasses
8) Towel to dry your hands and equipment
9) Underwater viewing scope (optional)

Waders (10) and snorkeling gear (11) can also be very useful tools for AIS monitoring, but are not required. Volunteers wishing to do a very thorough check of an area may choose to use these items.

10

11

A steel rake head (usually with at least 30 feet of rope attached to it) is a very effective aquatic plant sampling tool. You can buy a rake head by itself, or simply cut the handle off of a rake and tie the rope to the head. If desired, a double-sided rake can be made by attaching two rake heads together with cable ties or welding.

1

7

Polarized sunglasses reduce glare and allow a person to see much more clearly into the water.

8

A towel is useful to wipe your hands and your gear!

HOW TO SURVEY FOR AQUATIC INVASIVE SPECIES FROM SHORE

Identify the public boundaries of the site. Beginning at one of the boundaries, conduct the sampling steps outlined below, and repeat these steps at five points spaced about equally between the site boundaries.

1. Scan the area for at least 30 seconds, examining plants in the water and any plant fragments/shells that are washed up on shore.

2. Toss your sampling rake from shore into the water, aiming for concentrations of plants or anything suspicious that you noticed during your scan. Be sure to hang on to the end of your rope!

3. Retrieve the rake and examine the attached vegetation and animals. Snails, mussels, and other creatures will often be attached to the vegetation or stuck on the rake itself. Continue tossing the rake until you feel that you have adequately sampled this location (usually 2-3 rake tosses). Use this handbook to help you identify suspicious plants and animals.

If there is a dock or pier, use it as one of your sampling locations. You can sample off of any side of the dock. If you are able to see or touch the legs of the dock, this is a good way to look for zebra mussels.

Place a sample of any suspected invasive species in a plastic bag with a waterproof label. Bags, labels, and pencils are included in your monitoring kit. Seal the bag tightly and place it somewhere secure until you can get it into a refrigerator or deliver it to an expert.

4. Report what you found. If you did not find any suspected invasive species, that's great! We want to know the good news! Please enter this information into the Surface Water Integrated Monitoring System (SWIMS) database, or email the *Aquatic Invasives Surveillance Monitoring* form to your local Aquatic Invasive Species Coordinator. This form can be used to record results from one day or from an entire season of monitoring, whichever is most convenient for you. Please enter or mail your results by November 1st so we can compile information from across the state.

If you found a suspected invasive species, please record that on the form. Then take digital photographs of the invasive species (please include the waterproof label in the photos) and email the photos to your local AIS Coordinator (DNR or county). Please save all suspicious plants and animals in the refrigerator or in a cooler until you hear back. Your AIS Coordinator may ask to see the actual specimen to confirm its identification.

Who is my local AIS Coordinator? Visit the Wisconsin DNR website at dnr.wi.gov and type "AIS Coordinator" into the search box. Then click on your county to find contact information for AIS staff that cover your area.

If you need help finding this information, please contact:

Paul Skawinski
Statewide Citizen Lake Monitoring Network Coordinator
Pskawins@uwsp.edu or 715-346-4853

HOW TO SURVEY FOR AQUATIC INVASIVE SPECIES FROM A BOAT

Identify sites with a high risk of invasive species introductions, such as boat landings, public parks, bridges, and inlets. Conduct the sampling steps outlined below at each site you have identified around the lake. While motoring/paddling between sites, stay shallow enough that you can see aquatic plants, and watch for AIS as you go.

1. Scan the area for suspicious plants and animals, both in the water and along the shoreline. Scan for at least 30 seconds at each site.

2. Toss your sampling rake into the water, once from each side of the boat. Aim for concentrations of plants or anything suspicious that you noticed during your scan. Be sure to hang on to the end of the rope!

3. Retrieve the rake and examine the attached vegetation and animals. Snails, mussels, and other creatures will often be attached to the vegetation or stuck on the rake itself. Continue tossing the rake until you feel that you have adequately sampled this location (usually 2-3 rake tosses). Use the identification resources provided to help you identify suspicious plants and animals.

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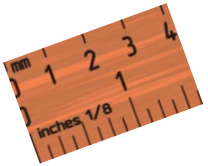
PHOTOGRAPHING AQUATIC INVASIVE SPECIES

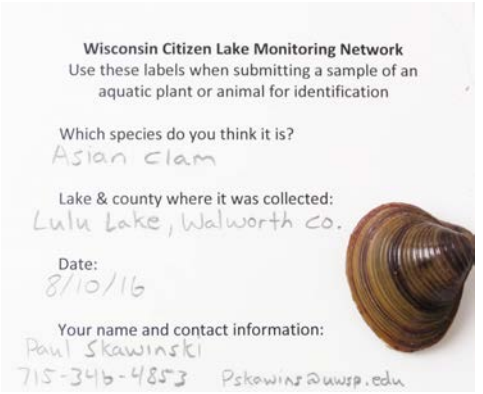
Most aquatic invasive species can be readily identified from a good photograph. Here are some tips to make your specimen easy for your local AIS Coordinator to identify.

Light it up! Have the sun or other light source behind you, not behind the object. Shadows make it difficult to see colors and patterns.



Show scale. Some species can be differentiated based on size. Use a coin, hand, key, or the ruler at the front of this handbook to demonstrate size.

Have a contrasting background. Small features of plants and animals are tough to see against backgrounds that are busy or contain similar colors/textures.



PLANT ID

BRAZILIAN WATERWEED AND HYDRILLA

Plant type: Submergent
Status: Prohibited
Native look-alike: Common waterweed

INVASIVE

Brazilian waterweed
(*Egeria densa*)

- Rings (whorls) of 4-8 leaves around the stem
- Fine teeth on leaf edges. This usually requires a hand lens to see
- No teeth underneath the leaves




NATIVE

Common waterweed
(*Elodea canadensis*)

- Rings (whorls) of 3 leaves around the stem
- Smooth leaf edges
- No teeth underneath the leaves

INVASIVE

Hydrilla
(*Hydrilla verticillata*)

- Rings (whorls) of 4-8 leaves around the stem
- Fine teeth on leaf edges
- Teeth are also produced underneath the leaf, along the centerline


BRITTLE NAIAD

Plant type: Submergent
Status: Prohibited
Native look-alike: Slender naiad

INVASIVE	NATIVE
Brittle naiad (*Najas minor*)	Slender naiad (*Najas flexilis*)
• Noticeably toothed • Readily breaks into small fragments • Leaves curve strongly downward	• Teeth on edge of leaf require magnification to view • Flexible • Leaves straight or slightly curving

CAROLINA FANWORT

Plant type: Submergent
Status: Prohibited
Native look-alike: Water marigold

INVASIVE

Carolina fanwort
(*Cabomba caroliniana*)

- Leaves on short stalks, attaching on opposite sides of the stem
- Flower white with a yellow center
- May have tiny, floating leaves

NATIVE

Water marigold
(*Bidens beckii*)

- Ring/whorl of leaves around the stem
- Leaves do not have stalks
- Yellow, daisy-like flower

CURLY-LEAF PONDWEED

Plant type: Submergent
Status: Restricted
Native look-alike: Clasping-leaf pondweed

INVASIVE

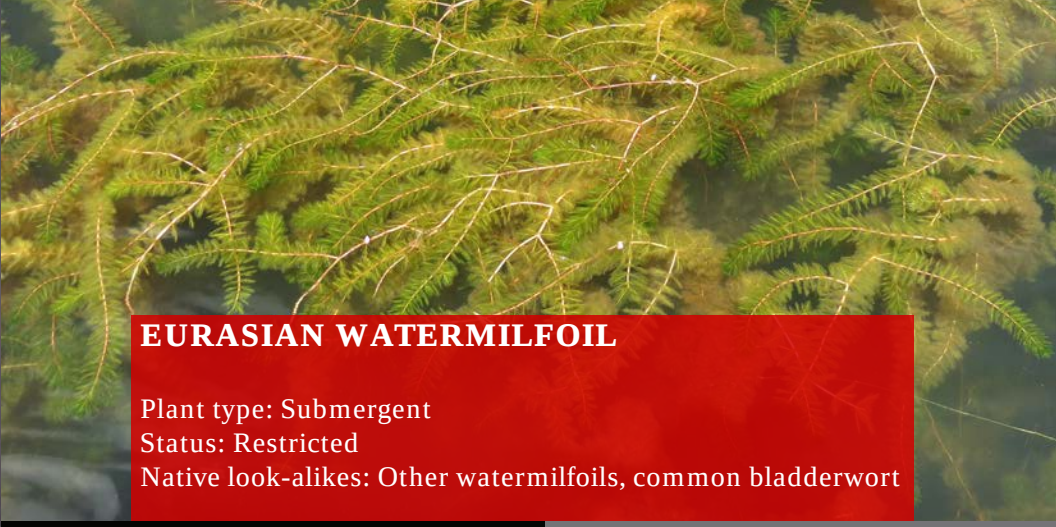
Curly-leaf pondweed
(*Potamogeton crispus*)

- Leaves are usually very wavy
- Finely toothed leaf edges
- Leaf tips are blunt
- Leaf base not wrapped around stem

NATIVE

Clasping-leaf pondweed
(*Potamogeton richardsonii*)

- Leaves are gently wavy
- Leaf edges smooth, no teeth
- Leaf tips are pointed
- Leaf base wraps around stem



EURASIAN WATERMILFOIL

Plant type: Submergent
Status: Restricted
Native look-alikes: Other watermilfoils, common bladderwort

INVASIVE

Eurasian watermilfoil
(*Myriophyllum spicatum*)

- 12+ pairs of leaflets per leaf
- Stems usually weak and limp, reddish-brown to pink
- Leaves at tip of branches often red

NATIVE

Northern watermilfoil
(*Myriophyllum sibiricum*)

- 5-10 pairs of leaflets per leaf
- Stems tan to green, usually stiff, holding shape out of water
- Leaves at tips of branches usually green

NATIVE

Whorled watermilfoil
(*Myriophyllum verticillatum*)

- 8-17 pairs of leaflets per leaf
- Stems brown or dark green
- Rings (whorls) of leaves packed closely together on the stem

NATIVE

Common bladderwort
(*Utricularia macrorhiza*)

- Leaves contain many small sacs (bladders) that trap invertebrates
- Stems are unrooted, usually tangled on other vegetation

EUROPEAN FROG-BIT

Plant type: Floating
Status: Prohibited
Native look-alike: White water lily

INVASIVE

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

- Free-floating, roots hang below
- Small, heart-shaped leaves (2-3”)
- Small, white flower, 3 petals

NATIVE

White water lily
(*Nymphaea odorata*)

- Rooted to the bottom
- Round leaves with a slit/notch
- Large leaves up to 12” diameter
- Large, white flower, many petals

FLOWERING RUSH

Plant type: Emergent/submergent
Status: Restricted
Native look-alike: Bur-reeds

INVASIVE

Flowering rush
(*Butomus umbellatus*)

- Cluster of pink/red flowers held above the plant
- Can be emergent or submergent
- Tall, dark green leaves are triangular in cross-section and often twisted near the top
- Produces small, onion-like growths on the roots called bulbils
- Usually 3-6 feet tall

NARROW-LEAF CATTAIL

Plant type: Emergent
Status: Restricted

INVASIVE

Narrow-leaf cattail
(*Typha angustifolia*)

- Leaves 4-10mm wide
- Male and female flowerheads separated by 1” or more
- Pollen is shed as single grains

NATIVE

Broad-leaf cattail
(*Typha latifolia*)

- Leaves >12mm (1/2”) wide
- Male and female flowerheads touching, or nearly touching
- Pollen is shed in clusters of four grains

Note: Narrow-leaf and broad-leaf cattails can hybridize. Hybrid cattail (*Typha* x *glauca*) typically has a gap of 1/4” to 1” between the male and female flowerheads, sheds pollen mostly in single grains but also as clusters of two, three, and four, and grows in very dense stands.

PARROT FEATHER

Plant type: Emergent/submergent
Status: Prohibited

INVASIVE

Parrot feather
(*Myriophyllum aquaticum*)

- 6-30 pairs of short leaflets
- Rings/whorls of 4-6 widely spaced leaves
- Can emerge up to 8” from the water

PHRAGMITES

Plant type: Shoreline or emergent
Status: Prohibited/restricted (split-listed)
Native look-alike: Native Phragmites

INVASIVE

Non-native Phragmites (*Phragmites australis* ssp. *australis*)

- Often more than 10 feet tall
- Large, feathery seedheads
- Dark green leaves
- Dull, ridged stem

NATIVE

Native Phragmites (*Phragmites australis* ssp. *americanus*)

- Usually less than 8 feet tall
- Sparse seedheads
- Bright green leaves
- Smooth, glossy stem, often reddish

PURPLE LOOSESTRIFE

Plant type: Emergent/shoreline
Status: Restricted
Native look-alike: Blue vervain

INVASIVE

Purple loosestrife
(*Lythrum salicaria*)

- Flowers pink-purple, with 6 petals, blooming in a tall spike
- Leaves have smooth edges and are opposite or in rings/whorls of 3,
- Square or 6-sided stem

NATIVE

Blue vervain
(*Verbena hastata*)

- Flowers blue, with 5 petals, blooming one ring/whorl at a time
- Leaves opposite with toothed edges
- Square stem

STARRY STONEWORT

Plant type: Submergent
Status: Prohibited
Native look-alike: Native stoneworts

INVASIVE

Starry stonewort
(*Nitellopsis obtusa*)

- Rings/whorls of 4-6 branchlets
- Smooth stem
- Uneven forking near end of branchlets
- Produces star-shaped bulbils in sediments
- Stiff; holds shape out of water

NATIVE

Slender stonewort
(*Nitella flexilis*)

- Rings/whorls of 4-6 branchlets
- Smooth stem
- Symmetrical forking near end of branchlets
- Does not produce bulbils in sediments
- Delicate; collapses out of water

WATER CHESTNUT

Plant type: Floating
Status: Prohibited

INVASIVE

Water chestnut
(*Trapa natans*)

- Triangular, toothed leaves
- Leaf bases are inflated
- Mostly free-floating
- Fruits with sharp spines formed underneath the leaves
- Entire plant may be over 1 foot in diameter

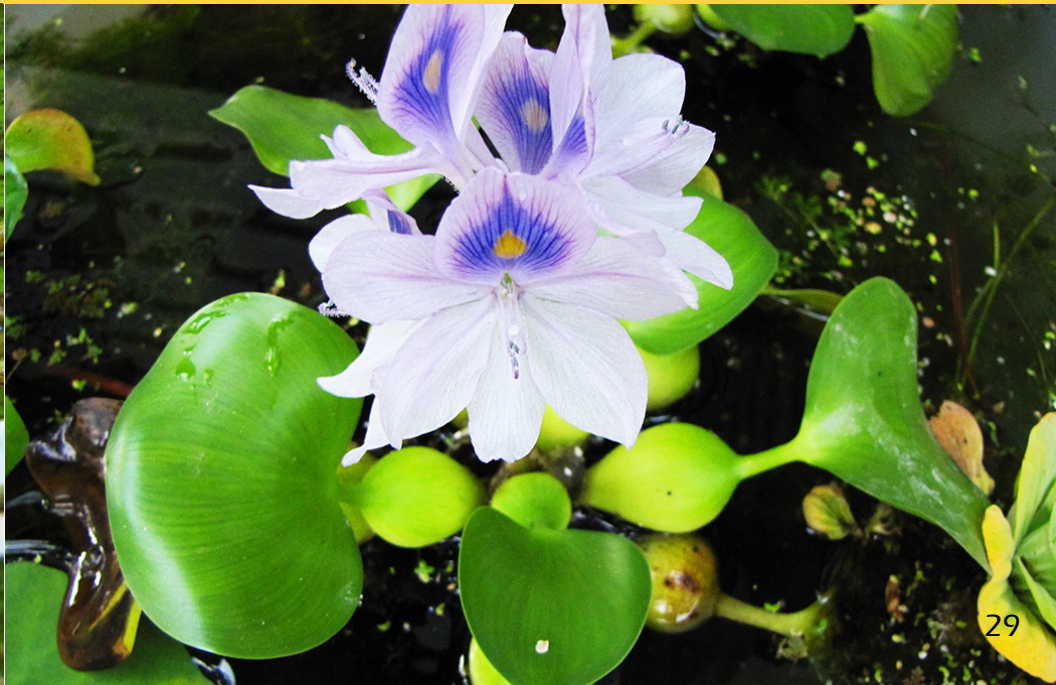
WATER HYACINTH

Plant type: Floating
Status: Prohibited

INVASIVE

Water hyacinth
(*Eichhornia crassipes*)

- Leaves are waxy and very shiny
- Leaf base is inflated
- Lavender flower with a purple/yellow spot
- Roots hang below the plant
- Forms interconnected colonies



WATER LETTUCE

Plant type: Floating
Status: Prohibited

INVASIVE

Water lettuce
(*Pistia stratiotes*)

- Free-floating
- Roots hang below the plant
- Leaves are thick, ridged, fuzzy, and light green
- Forms dense, interconnected colonies
- Resembles a floating head of lettuce

YELLOW FLOATING HEART

Plant type: Floating
Status: Prohibited
Native look-alike: Bullhead pond lily

INVASIVE

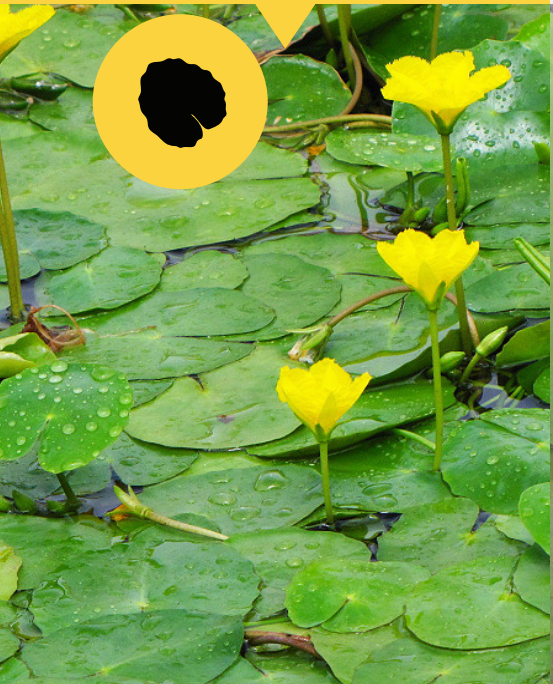
Yellow floating heart
(*Nymphoides peltata*)

- Heart-shaped leaves up to 4 inches long
- Leaves have wavy edges
- Yellow flowers have five fringed petals
- Plant is rooted to the bottom

NATIVE

Bullhead pond lily
(*Nuphar variegata*)

- Heart-shaped leaves up to 15 inches long
- Leaves do not have wavy edges
- Yellow flower is cup-shaped
- Plant is rooted to the bottom



YELLOW IRIS

Plant type: Emergent
Status: Restricted
Native look-alike: Blue-flag Iris

INVASIVE

Yellow Iris
(*Iris pseudacorus*)

- 3-5 feet tall
- Leaves are dark green or blue-green
- Flower is yellow
- Center of leaf is sharply thickened

NATIVE

Blue-flag Iris
(*Iris versicolor & Iris virginica*)

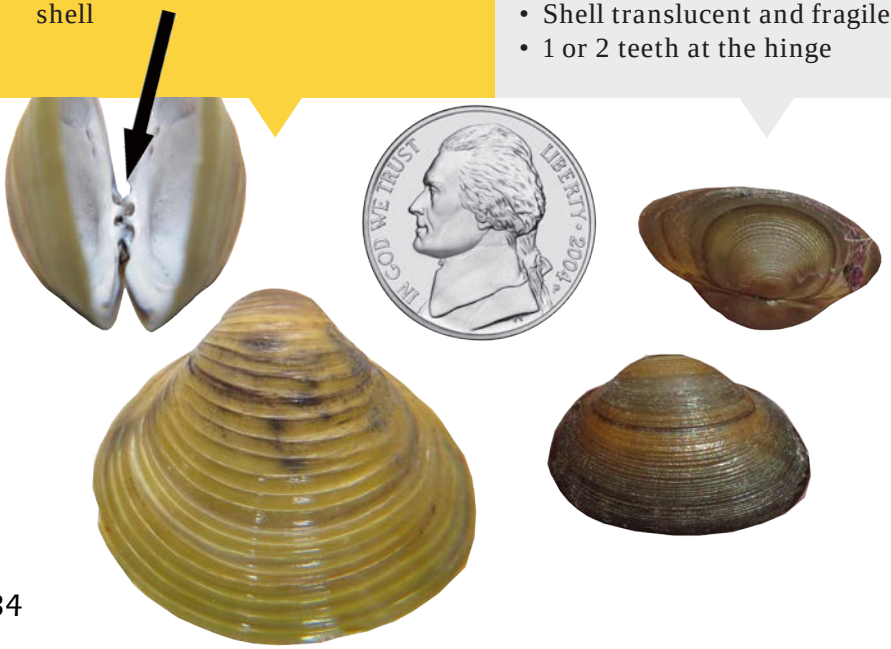
- 2-4 feet tall
- Leaves light green
- Flower is blue
- Center of leaf gradually thickened

ANIMAL ID

ASIAN CLAM

Status: Prohibited
Native look-alike: Fingernail clams

INVASIVE	NATIVE
Asian clam (*Corbicula fluminea*)	Fingernail clams (many species)
• Distinctly raised rings on shell • Up to 2 inches across • Shell yellow-brown, often blue inside, solid and opaque • Three large hinge teeth on each shell	• Rings of shell not distinctly raised • Under 1 inch across • Shell light to dark brown and white inside • Shell translucent and fragile • 1 or 2 teeth at the hinge



BANDED & CHINESE MYSTERY SNAILS

Status: Restricted

INVASIVE

Banded mystery snail
(*Viviparus georgianus*)

- 1-1.5 inches tall
- Horizontal brown bands on shell
- Bands may be hidden by algae or sediment

INVASIVE

Chinese mystery snail
(*Cipangopaludina chinensis*)

- Up to 3 inches tall
- Dark brown shell, often with short ridges near the shell opening

FAUCET SNAIL

Status: Prohibited
Native look-alike: Several other small snails. Consult an expert for verification.

INVASIVE

Faucet snail
(*Bithynia tentaculata*)

- Small, 12-15mm long (1/2 inch)
- Light brown to black
- 5-6 spirals
- Shell opening is on right side and teardrop-shaped

NEW ZEALAND MUDSNAIL

Status: Prohibited
Native look-alike: Several other small snails. Consult an expert for verification.

INVASIVE

New Zealand mudsnail
(*Potamopyrgus antipodarum*)

- Very small, 4-6mm long (1/8-1/4 inch)
- 7-8 spirals separated by deep grooves
- Gray to brown
- Shell opening is on right side
- Typically found in cold streams

ROUND GOBY

Status: Restricted
Native look-alike: Sculpins

INVASIVE

Round goby
(*Neogobius melanostomus*)

- Commonly 3-6 inches long
- Round head with bulging eyes
- Pelvic fins on underside are fused into one circular fin
- Dark spot on back of dorsal fin

RUSTY CRAYFISH

Status: Restricted
Native look-alike: Several native crayfishes

INVASIVE

Rusty crayfish
(*Orconectes rusticus*)

- Rusty brown spot on each side
- Body is mostly light brown
- Up to 5 inches long
- Claws have black and orange bands

SPINY WATER FLEA

Status: Prohibited

INVASIVE

Spiny waterflea
(*Bythotrephes longimanus*)

- About 1cm (3/8”) in length
- Very long tail spine
- Often seen as clumps on fishing line, anchor lines. downriggers

ZEBRA AND QUAGGA MUSSEL

Status: Restricted (Zebra), Prohibited (Quagga)

INVASIVE

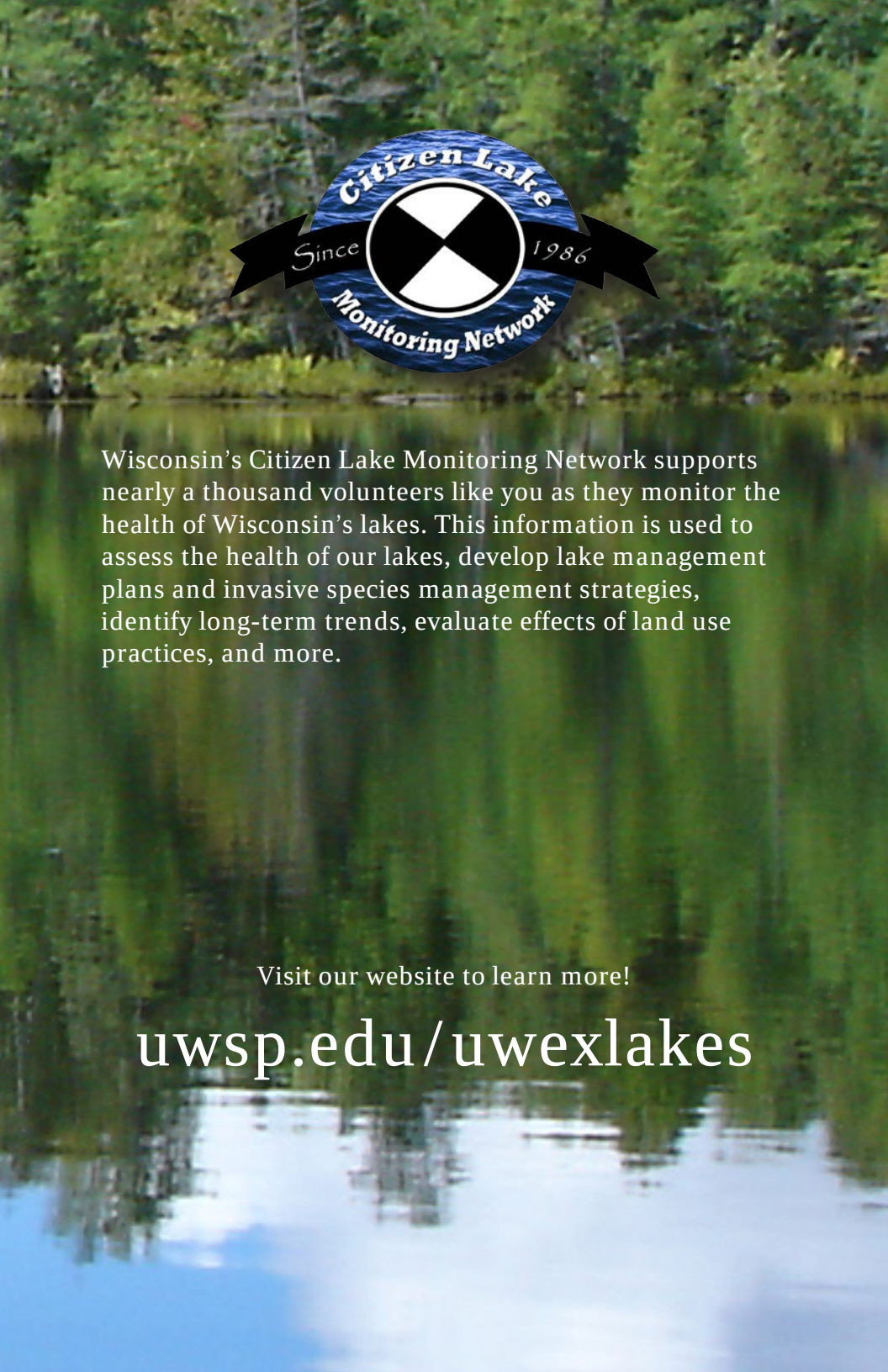
Zebra mussel
(*Dreissena polymorpha*)

- D-shaped shell
- Sits flat on its side
- Color varies but is usually light brown to white with brown-black stripes
- Up to 1.25” in length
- Usually attached to hard surfaces

INVASIVE

Quagga mussel
(*Dreissena bugensis*)

- Teardrop-shaped shell
- Does not sit flat on its side
- Color varies but is usually light brown to white with brown stripes
- Can grow up to 1.5” in length
- Usually attached to hard surfaces



Wisconsin's Citizen Lake Monitoring Network supports nearly a thousand volunteers like you as they monitor the health of Wisconsin's lakes. This information is used to assess the health of our lakes, develop lake management plans and invasive species management strategies, identify long-term trends, evaluate effects of land use practices, and more.

Visit our website to learn more!

uwsp.edu/uwexlakes