BE ON THE LOOKOUT FOR THESE

AQUATIC INVADERS

A Field Guide for Lake and Stream Monitors

Produced by Tip of the Mitt Watershed Council and Gun Lake Tribe

Cooperative Invasive Species Management Areas (CISMA)

CISMAs are groups of non-profit and government agencies, businesses and volunteers that joined together to combat invasive species in their regions. Please view the map above to identify your local CISMA in West Michigan.

Gun Lake Tribe

The mission statement of the Gun Lake Tribe addresses the protection of traditions, land, and natural resources for future generations. The Gun Lake Tribe Environmental Department strives to accomplish this by proactively managing natural resources for the next seven generations through the conservation and restoration of environmental resources, developing the foundations for safeguarding these resources. The Gun Lake Tribe works with state and local partners for the protection of the region's natural resources. *Bmadzewen yawen I mbish (water is life).*

2872 Mission Drive, Shelbyville, MI 49344
Phone: 269-397-1780
www.gunlaketribe-nsn.gov

EUROPEAN FROG-BIT

Hydrocharis morsus-ranae

AQUATIC PLANT INVADER

Be on the lookout for this invader!

Description:

Aquatic, floating, herbaceous annual reaches 8" in length, with strong, cord-like stolons. Forms large colonies, creating dense mats. Kidney-shaped leaves that resemble tiny water lilies, 0.5" - 2.25" across. White three-petaled flowers with yellow at the base; blooms mid-summer.

Habitat:

Grows in open, still waters; found in lakes, ponds, ditches and along the sheltered edges of streams and rivers.

Mode of Spread:

Reproduces by vegetative buds, limited seed production. Spreads rapidly by stolons; dispersed by boats.

IDENTIFICATION

STEM

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

LEAVES

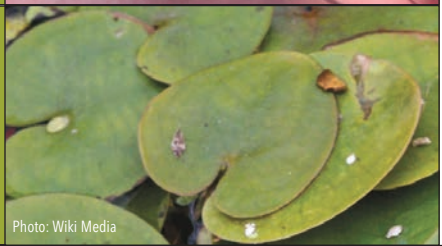


Photo: Wiki Media

FLOWERS

Stems: Strong; cord-like horizontal stolons. Free rooted with no vertical main stem.

Leaves: Usually floating, kidney shaped with long stems, dark purple underneath, resemble tiny water lilies, 0.5-2.25″ across.

Flowers: White in color, cup-shaped, three-petaled with yellow dots at the base.

Inspect and wash your boat, trailer, kayaks, canoes, and any other gear for aquatic vegetation *before* and *after* leaving any water body.

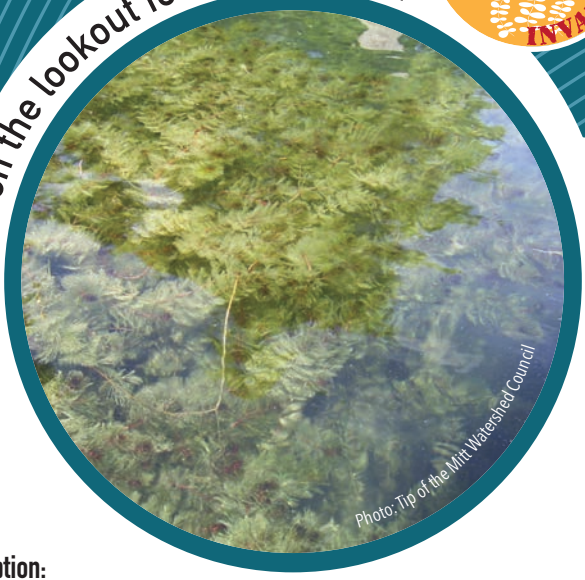
Report all sightings to www.misin.msu.edu

EURASIAN WATERMILFOIL

Myriophyllum spicatum

AQUATIC PLANT INVADER

Be on the lookout for this invader!



Description:

Submergent, aquatic perennial, reaches 3-10 ft. or more in length; forms dense mats. Stems green, brown or pinkish white. Olive green leaves whorled, pinnately divided with 12-21 fine segments on each side. Leaves lie parallel with water surface. Male and female flowers on the same inflorescence. At least two other (native) watermilfoils occur in Northern Michigan.

Habitat:

Ponds, lakes and low-energy zones in rivers and streams.
In depths of 3-15 ft.

Mode of Spread:

Vegetatively by fragmentation and runners; dispersed by boats and currents.

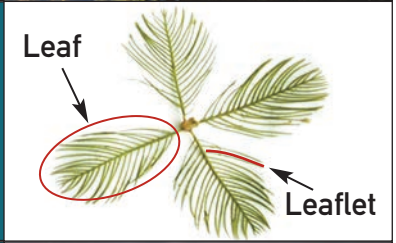
IDENTIFICATION

STEM

Photo: Tip of the Mitt Watershed Council

Stems: Thick near the base, becoming more slender and branching near the water surface; usually 3-10 ft. long.

LEAVES



Leaves: Submerged, feather-like, 4 (rarely 5) leaves whorled around stem at each node, each leaf with 12-21 (natives usually have 5-10) threadlike pairs of leaflets. Leaves have a "fish bone" appearance with a clipped tip. Bright green in color, limp when out of water.

FLOWERS

Photo: Tip of the Mitt Watershed Council

Flowers: Inconspicuous, yellow in color, 4-parted, flower spikes rise 2-4" above water surface.

Fruit and Seeds: Seed pod that contains 4 seeds.

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CURLY-LEAF PONDWEED

Potamogeton crispus

AQUATIC PLANT INVADER

Be on the lookout for this invader!

Photo: Leslie J. Mehrhoff, University of Connecticut

Description:

Submergent, aquatic perennial; ranges from 1-2.5 ft. in length; forms dense mats. Leaves alternate, oblong, up to 3.5" long and 0.4" wide, wavy leaf margins with fine teeth. Flowers found on dense cylindrical spikes that rise above the water. Easily distinguished from other pondweeds by its curly, finely toothed leaf margins.

Habitat:

Shallow to deep waters of lakes and rivers; pollution-tolerant; prefers alkaline, nutrient-rich waters.

Mode of Spread:

Reproduces by vegetative buds, fragmentation; carried by water, boats.

IDENTIFICATION

STEM

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

LEAVES

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

FLOWERS

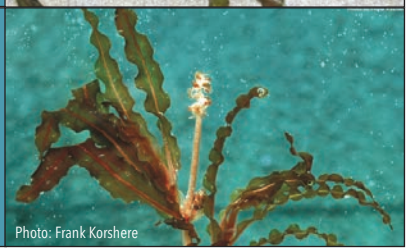

Photo: Frank Korshere

Stems: Compressed (flat), few branches, up to 31″ long and .″ wide

Leaves: Submerged, alternate, oblong, up to 3.5″ long and 0.4″ wide, rounded at the tip; slightly clasping the stem at the base, distinctly wavy leaf margins with fine teeth.

Flowers: Found on dense cylindrical spikes that rise above the water for wind pollination; bloom in late spring/early summer.

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WILD PARSNIP

Pastinaca sativa

WETLAND INVADER

Be on the lookout for this invader!

Above shows Phytophotodermatitis from contact with wild parsnip. Chemicals found in leaves, stems, and flowers of wild parsnip can cause skin rashes, burns, and blisters, especially in the presence of sunlight. *(Photo: USDA, APHIS PPQ)*

Description:

Tall, herbaceous biennial, dies after producing seed; up to 5 ft. in height; long, thick taproot. Stems are upright, unbranched, thick, hairy, and deeply grooved. Flowers have a similar appearance to dill. They grow up to 6" wide and bloom June through mid-July.

Habitat:

Open spaces such as prairies, savannas and fens. Commonly found in roadside ditches and open areas along streams and lakes. Tolerates a range of soil conditions. Shade intolerant.

IDENTIFICATION

STEM

LEAVES

FLOWERS

Stems: Upright; unbranched; thick; hairy; deeply grooved.

Leaves: 6" long alternate leaves with 5-15 oval, smooth, toothed leaflets.

Flowers: Numerous, small, yellow in color, 5 petals, found in flat groupings up to 6" wide; blooms June through mid-July.

Seeds: Seeds are large, flat, round, yellowish; can remain viable for up to four years.

AVOID CONTACT WITH THIS INVASIVE

Never transport this plant or soil near rooted plant. If you should come in contact with wild parsnip sap, you should immediately cover the exposed skin to prevent the reaction to sunlight. The contact area should be washed with warm water and mild soap.

Report all sightings to www.misin.msu.edu

STARRY STONEWORT

Nitellopsis obtusa

AQUATIC PLANT INVADER

Be on the lookout for this invader!

Description:

Aquatic macroalgae with smooth, irregular branches, root-like rhizoids. Forms dense mats along bottom forming irregularly spaced pillows of biomass at various heights. Stems may reach 33" in length. Whorls of 5-8 fine, uneven length branches arise at an acute angle from nodes. Distinctive white star-shaped rhizoids on all parts of plant at all times of year; dark reddish gametangia (berry-like structures). Feels gelatinous, unlike native Chara (aka Muskgrass), which feels bristly and scaly. Musky smell of native muskgrass not as pronounced for Starry Stonewort.

Habitat: Still or slow-moving waters; grows at depths ranging from 39" to 93 ft.!

Mode of Spread: Fragments and gametangia dispersed by boats, waterfowl, and drift.

IDENTIFICATION

STEM

Photo: Kristian Peters, wikicommons_2

LEAVES

Photo: Michelle Nault

Stems: May reach 33″ in length. Dark reddish gametangia on branches at nodes.

Leaves: Whorls of 5-8 fine, uneven-length branches arise at an acute angle from nodes. Contents can be squeezed out of tube-like cell wall when cut.

Flower: Lacks true flowers. Cream colored bulbs (star-shaped) form at the base of each cluster of branches.

FLOWERS

Photo: McNALMS

GAMETANGIA

Photo:Doug Pullman, MiCorps, 2013 presentation

Never take algae from one body of water to another. Clean your boat, trailer, kayaks, canoes, and other gear *before* and *after* leaving any water body.

Report all sightings to www.misin.msu.edu

RUSTY CRAYFISH

Orconectes rusticus

AQUATIC ANIMAL INVADER

Be on the lookout for this invader!

Photo: U.S. Geological Survey Archive, U.S. Geological Survey, Bugwood.org

Description:

Rusty crayfish can generally be identified by their dark, rusty spots on each side of the carapace; the spots appear as though you picked up the crayfish with paint on your forefinger and thumb. Their robust, grayish-green to reddish brown claws have black bands at the tips. They grow to over 4" in length. Rusty crayfish displace native crayfish and reduce aquatic plant diversity and abundance.

Habitat:

Rusty crayfish live in lakes, ponds, and streams preferring areas with rocks, logs and other debris, and with clay, silt, sand or rocky bottoms. They typically inhabit permanent pools and fast moving streams of fresh, nutrient-rich water. They generally do not dig burrows other than small pockets under rocks and debris.

IDENTIFICATION

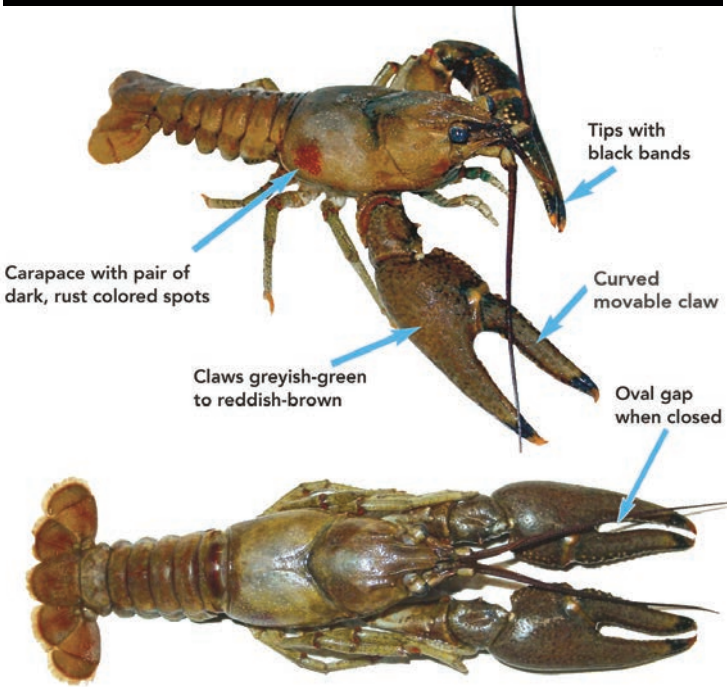


Photo: U.S. Geological Survey Archive, U.S. Geological Survey, Bugwood.org

Never transport crayfish from one body of water into another; do not use rusty crayfish as live bait. Clean your boat, trailer, and gear *before* and *after* leaving any water body.

Report all sightings to www.misin.msu.edu

ROUND GOBY

Neogobius melanostomus

AQUATIC ANIMAL INVADER

Be on the lookout for this invader!

Photo: Dave Jude, Michigan Sea Grant

Description:

Usually 3-6" long, but can be up to 10" long. They have frog-like raised eyes with large heads and soft bodies. Young are gray while adults have blotches of black and brown. The front dorsal fin is scalloped with sharp spines, has a black spot, and may be tinged with green. The back dorsal fin lacks spines. This goby is similar to native sculpins, but can be distinguished by the presence of fused pelvic fins (sculpins have two separate fins).

Round gobies displace native bottom-dwelling fish, such as sculpins and darters, and prey on eggs of lake trout and other fish species.

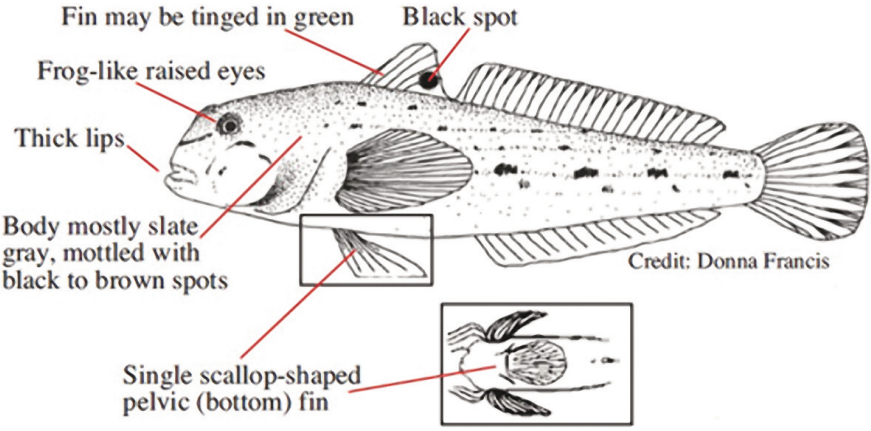
Habitat:

Round gobies are a bottom-dwelling fish that perch on rocks and other substrates in shallow areas; however, they are now moving into deeper habitat (extending more than 360' deep!) and far upstream into trout streams and warm-water rivers.

Report all sightings to www.misin.msu.edu

IDENTIFICATION

Illustration used with permission from Minnesota Sea Grant



Never dump fish or bait from one body of water into another. Never use gobies for bait. Clean your boat, trailer, kayaks, canoes, and other gear *before* and *after* leaving any water body.

QUAGGA MUSSELS

Dreissena bugensis

AQUATIC ANIMAL INVADER

Be on the lookout for this invader!

Photo: Amy Benson, U.S. Geological Survey, Bugwood.org

Description:

Freshwater mollusk reaching up to 1.5" in length. Similar in appearance and size to the zebra mussel *(Dreissena polymorpha)*, the quagga mussel, when placed on a surface, fall over as they lack a flat underside (hinged side), while zebra mussels are stable on their flattened hinge side. Quagga mussel shells are also rounder, lack ridges, and usually have dark concentric rings, yet are pale in color near the hinge.

Habitat:

Quagga mussels are commonly found in waters more than 90 ft. deep, while zebra mussels are usually found at depths of less than 50 feet. Unlike zebra mussels, quagga mussels can live and thrive directly on a muddy or sandy bottom. They also tolerate a wider range of extremes in temperature and water depth than zebra mussels and spawn at colder temperatures.

IDENTIFICATION

Photo: USGS

Never transport mussels from one body of water into another. Clean your boat, trailer, kayaks, canoes, and other gear *before* and *after* leaving any water body. Allow your vessel to dry and inspect between uses.

Report all sightings to www.misin.msu.edu

PURPLE LOOSESTRIFE

Lythrum salicaria

WETLAND INVADER

Be on the lookout for this invader!

Description: Herbaceous perennial with showy magenta-colored flowers on spikes in mid to lake summer, 1.5-6 ft. tall; strongly developed taproot; stem becomes woody with age. Spreads vigorously in moist soil conditions. Very persistent.

Habitat: Wetlands, lake shorelines, streambanks, and disturbed wet areas (e.g. ditches), tolerates up to 50% shade.

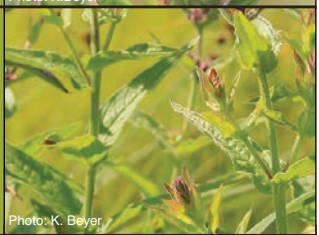
Mode of Spread:
Reproduces by seed, or vegetatively by resprouting from cut stems and regenerates from pieces of root stock.

IDENTIFICATION

STEM

Stems: Squarish, 4-6 sided, smooth or fine-haired with nodes evenly spaced. Becomes woody as plant matures.

LEAVES



Leaves: Pointed or linear shape; opposite or spiraled around stem; flat to somewhat curved; 1-4"; larger leaves at the base.

FLOWERS

Flowers: Numerous, purple clusters of two to several, 5-7 petals; blooms July through September.

SEEDS

Fruit and Seeds: Seed pod, small, abundant seed production (2 million seeds per plant).

Never transport this plant or soil near rooted plant. Never buy or use as a landscaping plant and be aware of plants that can cross pollinate with purple loosestrife.

Report all sightings to www.misin.msu.edu

EURASIAN PHRAGMITES

Phragmites australis

WETLAND INVADER

Be on the lookout for this invader!

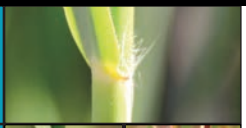
Description: The "Common Reed" is a stout, warm-season perennial grass ranging in height from 6-15 feet. Forms dense, impenetrable stands, in contrast with the native subspecies, which typically occurs in a colony of scattered stems.

Habitat: Wetlands, ditches, streambanks, lake shorelines, and other wet areas. Tolerates road salt.

Mode of Spread: Most commonly, *Phragmites* spreads by horizontal above-ground stolons and underground rhizomes. The use of maintenance equipment in wetland areas (particularly ditches) and shoreline erosion caused by waves and ice can move live rhizome fragments that establish new stands. It can also be spread by wind or animal-born seeds. Once established, *Phragmites* is difficult to control or eradicate.

IDENTIFICATION

LIGULE



LEAVES AND STEMS

Leaves: Flat, smooth leaf blades: 10-20" long, 0.4-1.4" wide. Leaf sheaths stay attached even after stem dies. Ligule consists of many fine white hairs.

Stems: Upright, rigid and hollow, dull yellow or green, covered by leaf sheaths. In contrast, native stems develop a bright red color.

Flowers: Dense branched clusters at the end of each stem, becoming open and feathery at maturity.

Fruit and Seeds: Seeds with white hairs below that are almost as long as the seed; abundant seeds (up to 2,000 per head).

Rhizomes: Can spread 10 or more feet and several feet deep in one growing season.

FLOWERS

RHIZOMES

Photos: Tip of the Mitt Watershed Council

Avoid operating earth moving machines or recreational ATV's in the vicinity of Phragmites stands to prevent the spread of seeds and rhizome fragments. Contact local professional for management options and manage stands as soon as possible.

Report all sightings to www.misin.msu.edu

JAPANESE KNOTWEED
Polygonum cuspidatum (Fallopia japonica)
GIANT KNOTWEED
Polygonum sachalinense

WETLAND INVADER

Be on the lookout for this invader!

Description:
Herbaceous perennial shrub growing from 3-10 ft. (Japanese knotweed) or up to 12 ft. (Giant knotweed); broad leaves, hollow stems that resemble bamboo. Deep taproot with surface roots that extend laterally from 23-65 ft. Can cause structural damage to buildings, roads, etc.

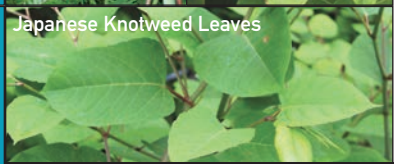
Habitat:
Roadsides, river banks, wetlands, wet depressions, and woodland edges.

Mode of Spread:
Spreads primarily through rhizomes or fragments, in fertile locations by seeds. Extremely difficult to control once established.

IDENTIFICATION

STEM

LEAVES



FLOWERS

AGGRESSIVE GROWING PLANT

Stems: Upright, round, hollow, and often mottled, with a fine whitish coating that rubs off easily. Resembles bamboo.

Leaves:

Japanese Knotweed: Simple, alternate and broad, typically growing up to 6" long and 5" wide with an abruptly pointed tip and a flat or tapering base.

Giant Knotweed: 6-12" long and 2/3 as wide with a shallow, heart-shaped base.

Flowers: Numerous, small, white or greenish flowers on a slender stalk in leaf axils and stem tips; bloom August-September.

Avoid operating earth moving machines or recreational ATV's in the vicinity of Japanese knotweed stands to avoid the spread of seeds and rhizome fragments. Never transport this plant or soil near rooted plant.

Report all sightings to www.misin.msu.edu

HYDRILLA

Hydrilla verticillata

AQUATIC PLANT INVADER

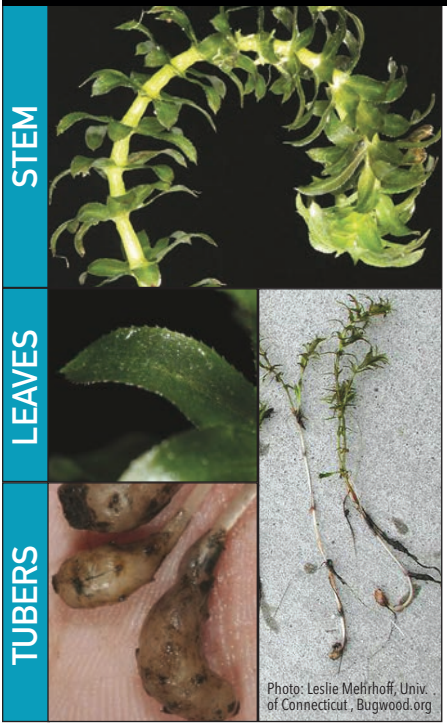
Be on the lookout for this invader!

Description: Aquatic, submergent perennial, at depths of up to 20 feet. Leaves with finely serrated margins, typically occur in whorls of five around the stem, whereas the native *Elodea* has three leaves per whorl and no teeth on the leaf margins. Hydrilla can quickly overwhelm waterways, causing severe ecological and economic impacts. It can grow up to an inch per day and forms large, dense mats near the water surface that block recreational access, impede drainage and restrict water movement, causing sediment to accumulate. Considered by many to be the most problematic aquatic plant in the United States.

Habitat: Occurs in slow-moving water of lakes, ponds, streams and rivers; tolerates a wide range of water quality conditions.

Mode of Spread: Spread vegetatively, by fragments and tubers; dispersed by waterfowl and boats.

IDENTIFICATION



Photos: Robert Vidéki, Doronicum Kft., Bugwood.org

Stems: Usually rooted in water up to 20 ft. deep; little branching in deep water but dense at water's surface; forms horizontal stems in water (stolons) and sediments (rhizomes).

Leaves: Whorls of five thin, rough leaves at the node, up to 0.5" long, small spines give the leaf margin a toothed appearance, midribs red and often spiny. Native *Elodea* typically has three leaves in each whorl.

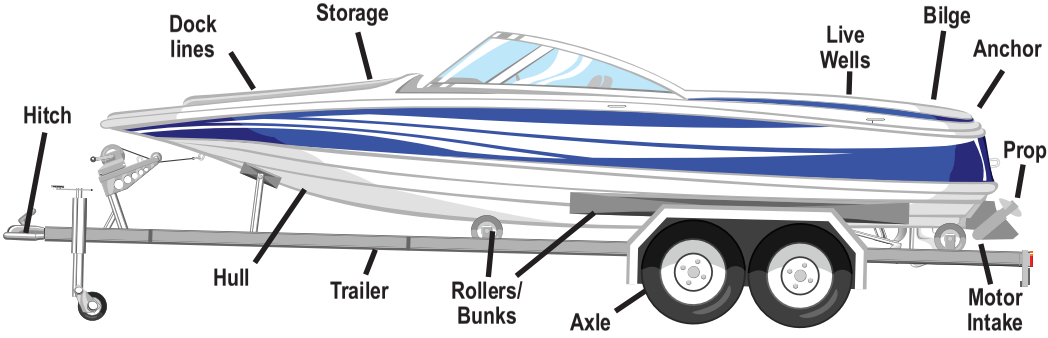
Flowers: Female flowers are small, white, six- parted, and occur from leaf axils; male flowers are green in color and resemble an inverted bell.

Inspect and wash your boat, trailer, kayaks, canoes, and other gear for aquatic vegetation *before* and *after* leaving any water body.

Report all sighting to www.misin.msu.edu

Before launching and before leaving....

Inspect everything!



RESOURCES

Michigan Natural Features Inventory
mnfi.anr.msu.edu

Midwest Invasive Species Information Network
misin.msu.edu

Center for Invasive Species and Ecosystem Health
invasive.org

Michigan Department of Natural Resources &
Michigan Department of Environmental Quality

Questions about identification, management, and control of ***terrestrial invasive species.***
DNR - Wildlife Division
www.michigan.gov/invasivespecies
517-241-1153

Questions about identification management, and the control of ***aquatic invasive species***
www.michigan.gov/aquaticinvasives
DEQ - Water Resources Division
517-284-5473

Report Sightings

www.misin.msu.edu

For verification purposes, note location and take photos or samples if possible. If collecting a specimen for ID, place in a sealed plastic bag or container at the site and don't release into the wild or compost. Hand deliver specimens; don't mail them.

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