

BE ON THE LOOKOUT FOR THESE

AQUATIC INVADERS



A Field Guide for Lake and Stream Monitors

Produced by Tip of the Mitt Watershed Council



OUR MISSION

Tip of the Mitt Watershed Council speaks for Northern Michigan's waters. We are dedicated to protecting our lakes, streams, wetlands, and groundwater through respected advocacy, innovative education, technically sound water quality monitoring, thorough research and restoration actions. We achieve our mission by empowering others and we believe in the capacity to make a positive difference. We work locally, regionally and throughout the Great Lakes Basin to achieve our goals.



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www.watershedcouncil.org

Funding for this project provided by:

TheJoyceFoundation

Published 2015

CURLY-LEAF PONDWEED

Potamogeton crispus



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 .4" 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.

Known to occur at these locations in Northern Michigan:

- Crooked River (near Alanson)
- Crooked Lake
- Lake Michigan
- Lake Huron
- Ruggy Pond (Rapid River)

(Published 2015)

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Funding for this project provided by: **TheJoyceFoundation**

EURASIAN WATERMILFOIL

Myriophyllum spicatum



Be on the lookout for this invader!



Photo: Tip of the Mitt Watershed Council

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.

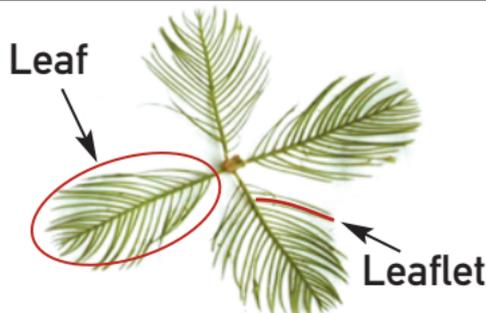
IDENTIFICATION

STEM



Photo: Tip of the Mitt Watershed Council

LEAVES



FLOWERS



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

Fruit and Seeds: Seed pod that contains 4 seeds.

Known to occur at these locations in Northern Michigan:

- Burt Lake
- Lake Charlevoix
- Mullett Lake
- Thumb Lake
- Clam Lake
- Lake Huron
- Paradise Lake
- Torch Lake
- Clam River
- Lake Michigan
- Six Mile Lake
- Torch River
- Elk Lake
- Long Lake
- St. Clair Lake
- Walloon Lake

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EUROPEAN FROG-BIT

Hydrocharis morsus-ranae



Be on the lookout for this invader!



Photo: Michigan Sea Grant

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.

Known to occur at these locations in Northern Michigan:

- Not yet found in the Tip of the Mitt Watershed Council Service area.
- Fletcher Pond and Thunder Bay River, both near Alpena.
- Munuscong Lake at the east end of Upper Peninsula.

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HYDRILLA

Hydrilla verticillata



Be on the lookout for this invader!



David J. Moorhead, University of Georgia, Bugwood.org

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

STEM



LEAVES



TUBERS



Photo: Leslie Mehrhoff, Univ. of Connecticut, Bugwood.org

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.

Known to occur at these locations in Northern Michigan:

Not yet found in Michigan. Hydrilla was found in Lake Manitou, Indiana in 2006, approximately 50 miles from the Michigan border, but has been successfully contained thus far.

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JAPANESE KNOTWEED

Polygonum cuspidatum (Fallopia japonica)

GIANT KNOTWEED

Polygonum sachalinense



Be on the lookout for this invader!



Photo: Trip of the Mitt Watershed Council

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



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

LEAVES

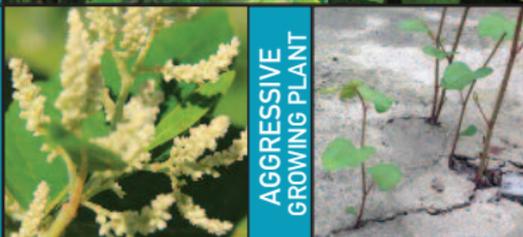


Japanese Knotweed Leaves



Giant Knotweed Leaves

FLOWERS



AGGRESSIVE GROWING PLANT

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.

Photos: K.Beyer

Known to occur at these locations in Northern Michigan:

- Walloon Lake
- Mud Lake (near M-119)
- Bear River
- Brown Creek (East Jordan)
- Tannery Creek (near US 31)
- Torch Lake

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EURASIAN PHRAGMITES

Phragmites australis



Be on the lookout for this invader!



Credit Michigan Tech Research Institute (MTRI)

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



Invasive



Native

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.

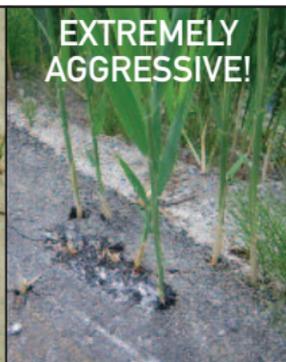
FLOWERS



RHIZOMES



EXTREMELY AGGRESSIVE!



Photos: Tip of the Mitt Watershed Council

Known to occur at these locations in Northern Michigan:

- Bear River
- Tannery Creek
- Mullett Creek
- Lake Michigan
- Lake Huron
- Black Lake
- Cedar River
- Intermediate Lake
- Lake Charlevoix
- Steele Lake
- Jordan River
- Black River

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PURPLE LOOSESTRIFE

Lythrum salicaria



Be on the lookout for this invader!



Description: Herbaceous perennial with showy magenta-colored flowers on spikes in mid to late 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).

Known to occur at these locations in Northern Michigan:

- Elk River Chain of Lakes
- Walloon Lake
- Douglas Lake
- Bear River
- Crooked Lake
- Widespread throughout the Northern Lower Peninsula.

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QUAGGA MUSSELS

Dreissena bugensis



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

Zebra Mussel



Quagga Mussel



Known to occur at these locations in Northern Michigan:

- Lake Michigan
- Lake Huron
- Lake Charlevoix

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Funding for this project provided by: **TheJoyceFoundation**

ROUND GOBY

Neogobius melanostomus



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).

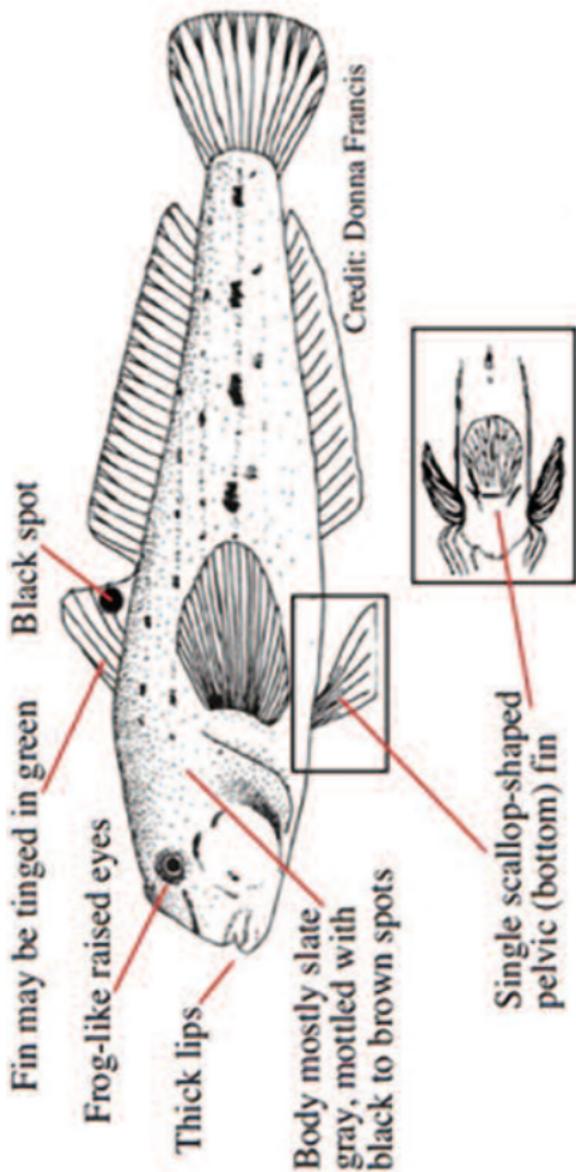
Round gobies displace native bottom-dwelling fish, such as sculpins and darters, and prey on eggs of lake trout and other fish species.

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.

IDENTIFICATION

Illustration used with permission
from Minnesota Sea Grant



Known to occur at these locations in Northern Michigan:

- Mullett Lake
- Lake Charlevoix
- Lake Huron
- Lake Michigan
- Pickere! Lake
- Crooked River
- Crooked Lake
- Indian River
- Black River
- Cheboygan River

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RUSTY CRAYFISH

Orconectes rusticus



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

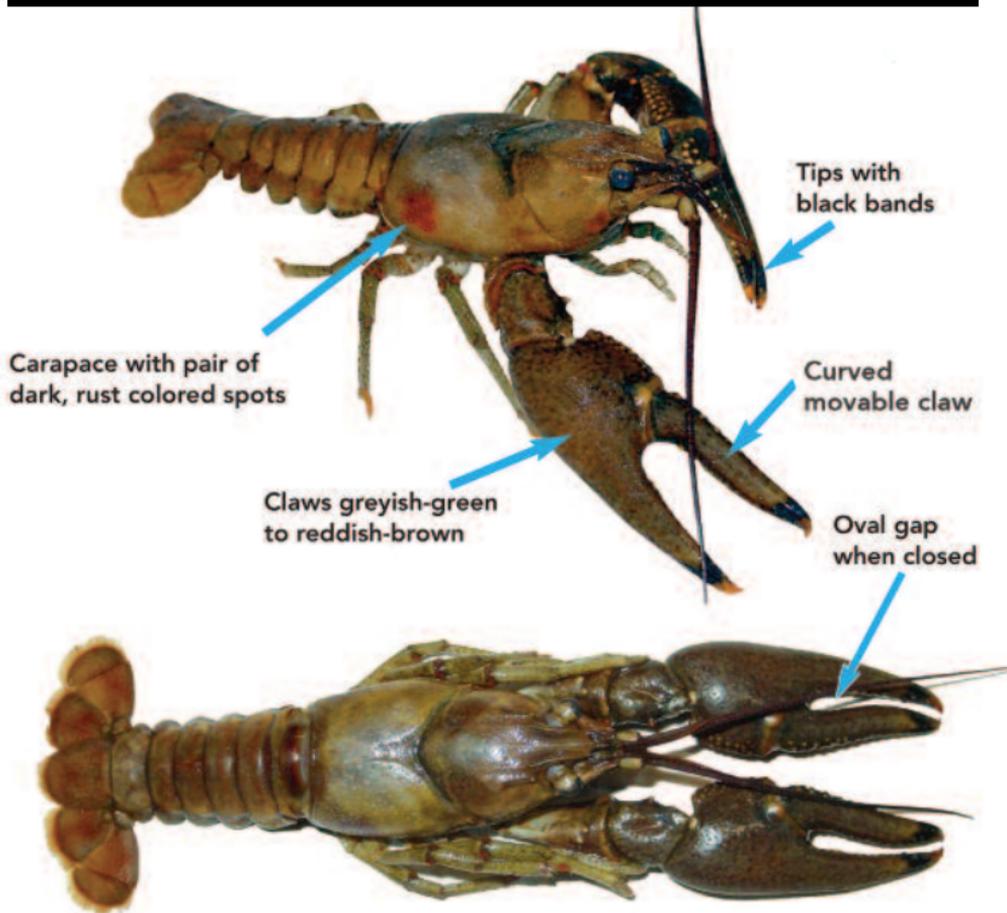


Photo: U.S. Geological Survey Archive, U.S. Geological Survey, Bugwood.org

Known to occur at these locations in Northern Michigan:

- Great Lakes
- Bear River
- Carp River
- Burt Lake
- Lake Charlevoix
- Douglas Lake
- Lower Maple River
- Widespread in the Tip of the Mitt Watershed Council Service area.

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Funding for this project provided by: **TheJoyceFoundation**

STARRY STONEWORT

Nitellopsis obtusa



Be on the lookout for this invader!



Photo: Lisa Huberty, PhD, MDEQ Water Resource Division

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

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.

LEAVES



Photo: Michelle Nault

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

Known to occur at these locations in Northern Michigan:

- Not yet found in the Tip of the Mitt Watershed Council Service area.
- Nearest occurrence is in **Millecoquin Lake** near Naubinway (Upper Peninsula)

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Funding for this project provided by: **The Joyce Foundation**

WILD PARSNIP

Pastinaca sativa



Be on the lookout for this invader!



WARNING
PROCEED WITH CAUTION

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.



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 PPO)

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

Known to occur at these locations in Northern Michigan:

Widespread throughout much of Northern Michigan particularly alongside roads and surface waters.

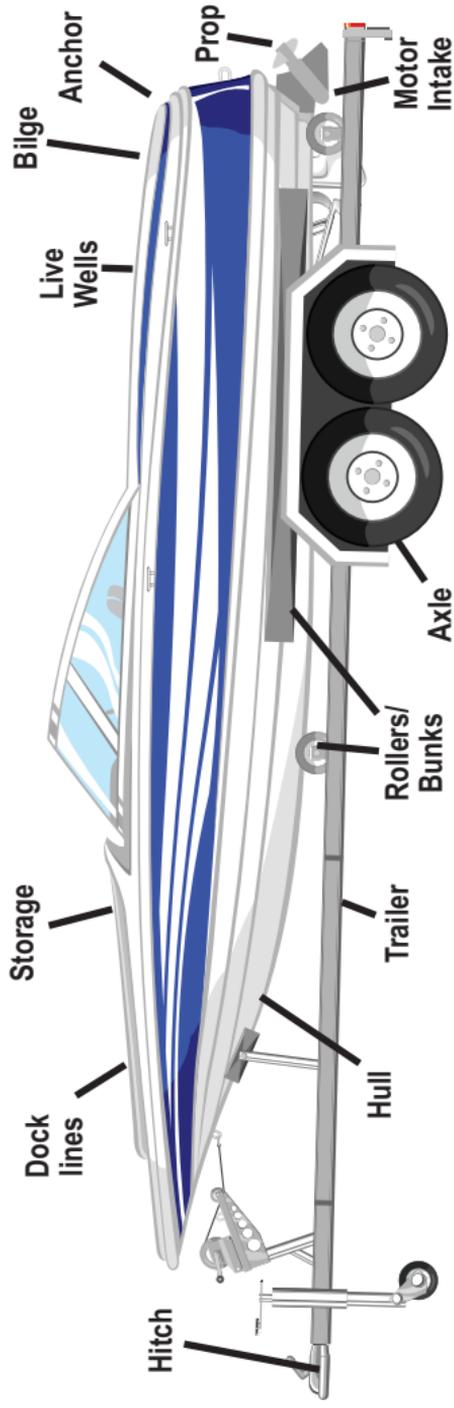
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Before launching and before leaving....

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



www.watershedcouncil.org/ais-reporting

or call our Watershed Protection Team at 231-347-1181

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. Please leave all flowers or fruits at site.



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