

Aquatic Invasive Species

Currently Established within the 1854 Ceded Territory

Below is a compiled list of all aquatic invasive species and diseases currently found in the 1854 Ceded Territory. Identification of these aquatic invasive species are described on the following pages. A complete [list of Infested Waters](#) in the 1854 Ceded Territory is available on our website.

Eurasian Watermilfoil Hybrid Watermilfoil Curly Leaf Pondweed Common Carp Eurasian Ruffe Round Goby White Perch White Bass Rainbow Smelt Rusty Crayfish Spiny Water Flea	Fishhook Water Flea (only 1 specimen found) Faucet Snail Chinese Mystery Snail New Zealand Mud Snail Zebra Mussels Purple Loosestrife Non-native Phragmites Narrow-leaf Cattails Hybrid Cattails Viral Hemorrhagic Septicemia (VHS)
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Watch List for the 1854 Ceded Territory

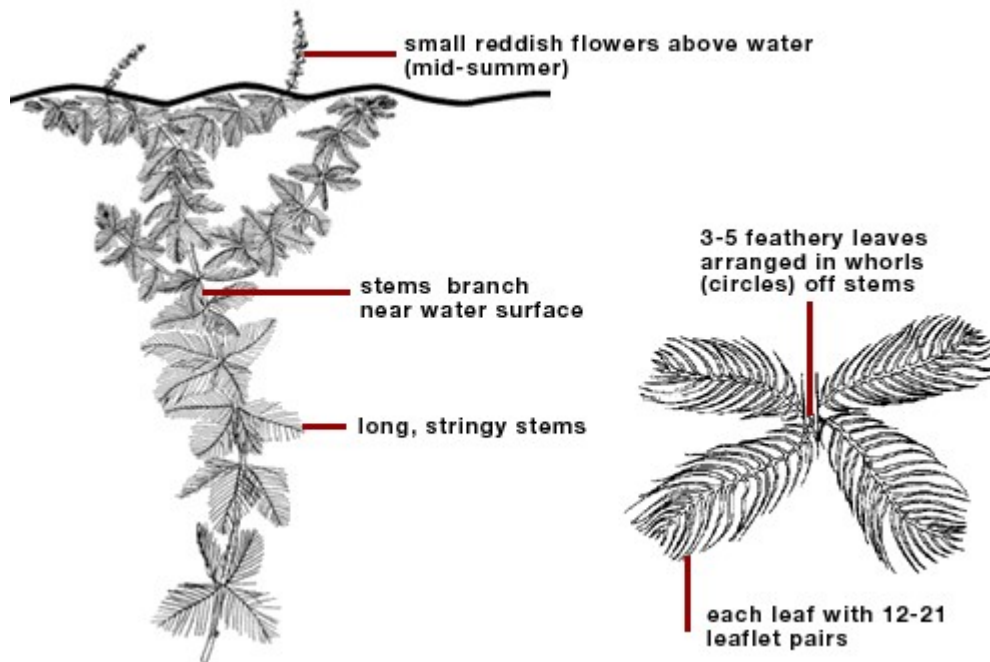
Below is a compiled list of aquatic species threatening to invade the 1854 Ceded Territory. This list is not comprehensive, but is meant to highlight some invasive species that pose a high risk for spreading into the 1854 Ceded Territory in the near future. Identification of the aquatic invasive species is listed below.

Bighead Carp
 Silver Carp
 Grass Carp
 Black Carp
 Rudd
 Bloody Red Shrimp
 Red Swamp Crayfish
 Flowering Rush
 Starry Stonewort
 Harmful Algal Blooms (blue-green algae)

Aquatic invasive species currently in the Ceded Territory

Eurasian watermilfoil (*Myriophyllum spicatum*)

(Pictures and identifying characteristics from <http://www.seagrant.umn.edu/ais/watermilfoil>)

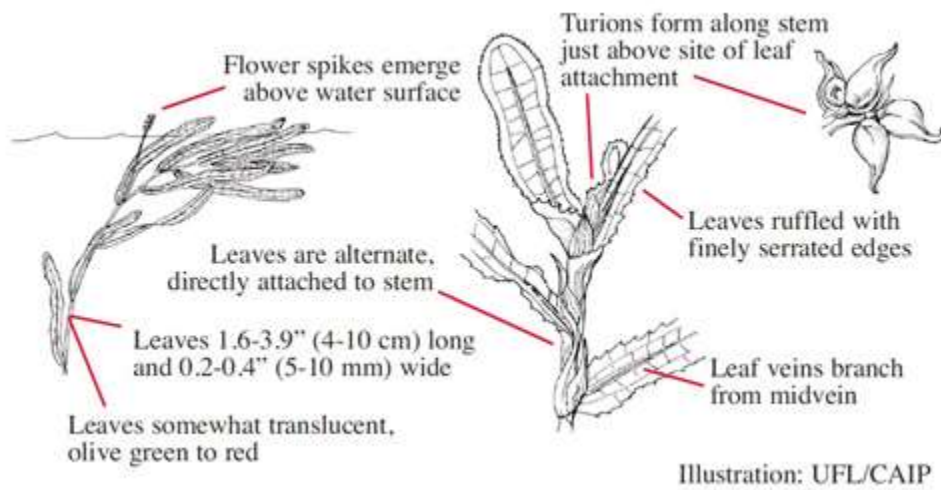


Identifying characteristics:

- Found in water less than 20 feet (6 meters) deep.
- May form mats in waters less than 15 feet (4.5 meters) deep.
- A native look-alike, northern watermilfoil, has fewer (5-10) leaflet pairs.
- Hybrid milfoil will look similar with usually fewer leaflet pairs than Eurasian watermilfoil.

Curly leaf pondweed (*Potamogeton crispus*)

(Pictures and Identifying characteristics from <http://www.seagrant.umn.edu/ais/curlyleaf>)

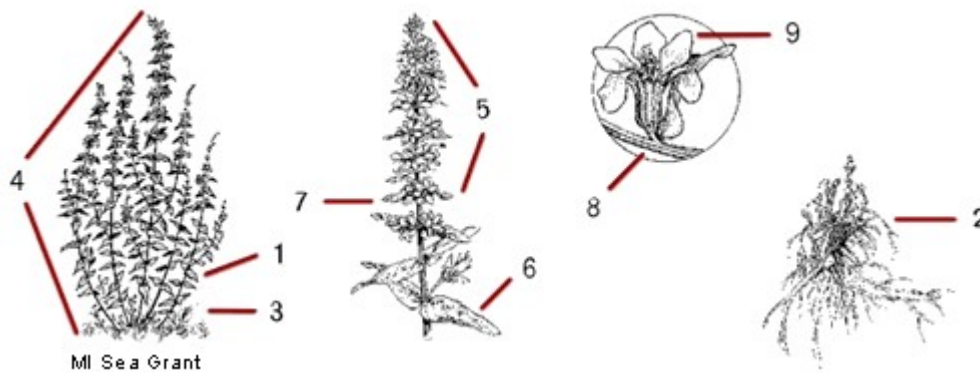


Identifying characteristics:

- Tolerant of low light, it grows throughout the winter
- Forms floating mats in littoral areas in lakes, ponds, and moderately flowing rivers
- May be confused with largeleaf pondweed or claspingleaf pondweed

Purple loosestrife (*Lythrum salicaria*)

(Pictures and identifying characteristics from <http://www.seagrant.umn.edu/ais/purpleloosestrife>)

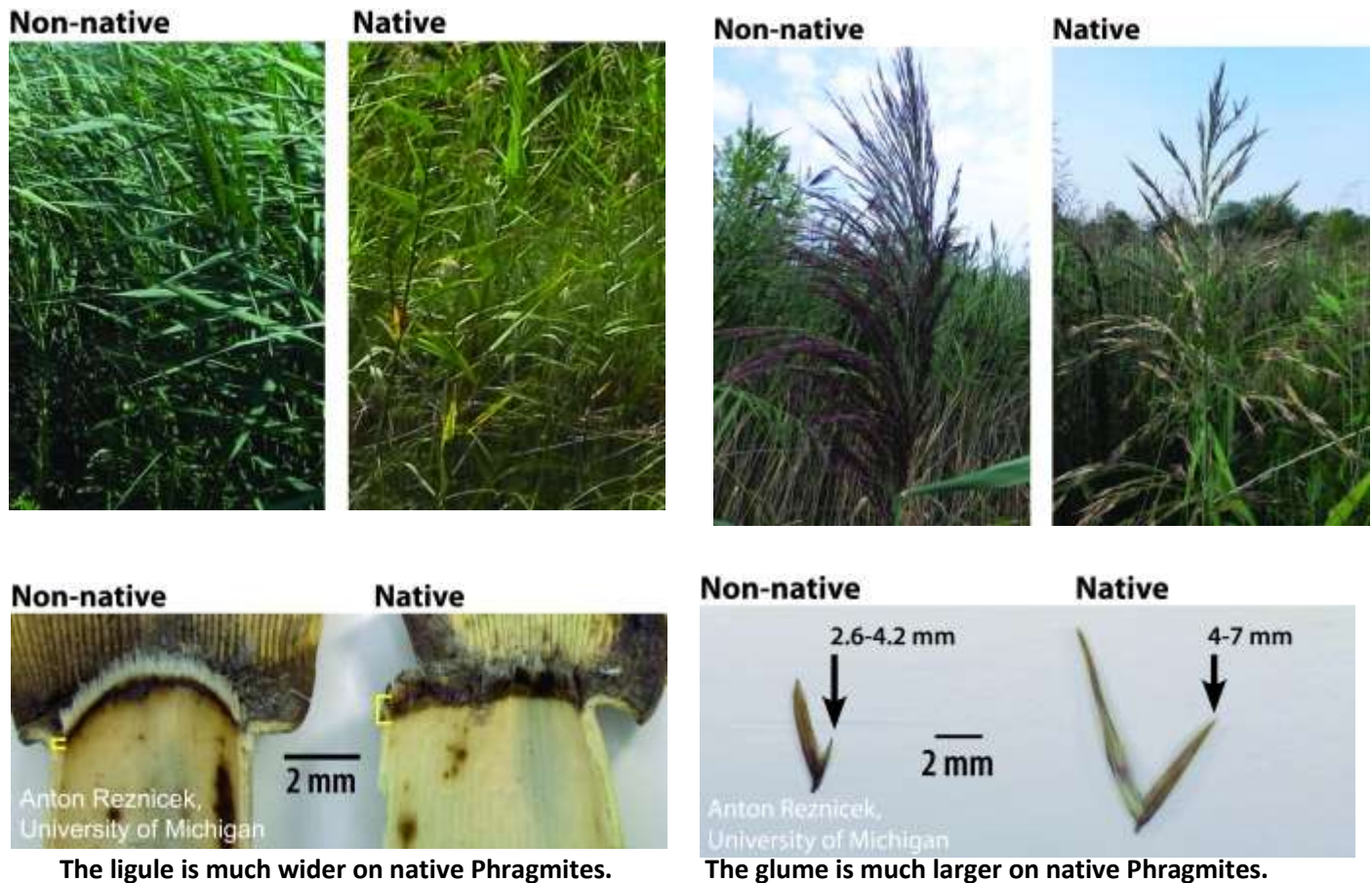


Identifying characteristics (numbers match diagram above):

1. Mature plants have many stems that grow from a...
2. Root crown
3. Dead stems stand until spring
4. Height 3 to 7 feet (1 to 2 meters)
5. Spike covered with many flowers
6. Downy, smooth-edged leaves
7. Leaves usually paired, opposite
8. Stem has ridges
9. Flower has several pink-purple petals

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

(Pictures and Identifying characteristics from <https://mnfi.anr.msu.edu/phragmites/>)



Identifying characteristics:

- Leaf sheaths of non-native Phragmites will cling tightly to the stems
- Typically, non-native Phragmites will grow much taller and be in much denser stands
- Non-native Phragmites has a longer growing season and will remain green into the fall after native Phragmites has turned brown and dispersed its seed
- Non-native Phragmites typically will have a fuller seed head, this is especially apparent in the early spring and late fall.
- The ligule is much wider on native Phragmites (pictured above)
- The glume is much longer on native Phragmites than invasive Phragmites.

Pickerelweed (*Pontederia cordata*)

(Pictures are from https://webapps8.dnr.state.mn.us/restoreyourshore/plants/plant_detail/277)

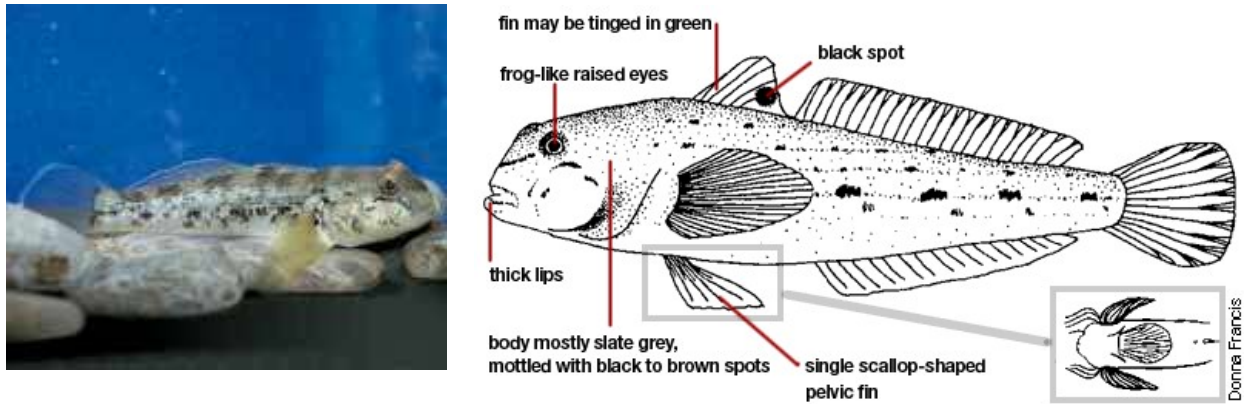


Identifying characteristics (refer to pictures above):

- Purple to blue flower spike 2-3 inches long.
- Grows in water, 1-3 feet tall (from lakebed to the top of the flower).
- Heart shaped leaves with parallel veins.

Round gobies (*Apollonia melanostomus*)

(Pictures and identifying characteristics from <http://www.seagrant.umn.edu/ais/roundgoby>)



Identifying characteristics:

- No other native fish in the Great Lakes has the single pelvic fin.
- Young are solid slate gray.
- Usually 3-6 inches (7-15 cm) long, may be up to 10 inches (25 cm).

Tubenose gobies (*Proterorhinus marmoratus*)

(Pictures and Identifying characteristics from <http://www.invadingspecies.com/invaders/fish/tubenose-goby/>)

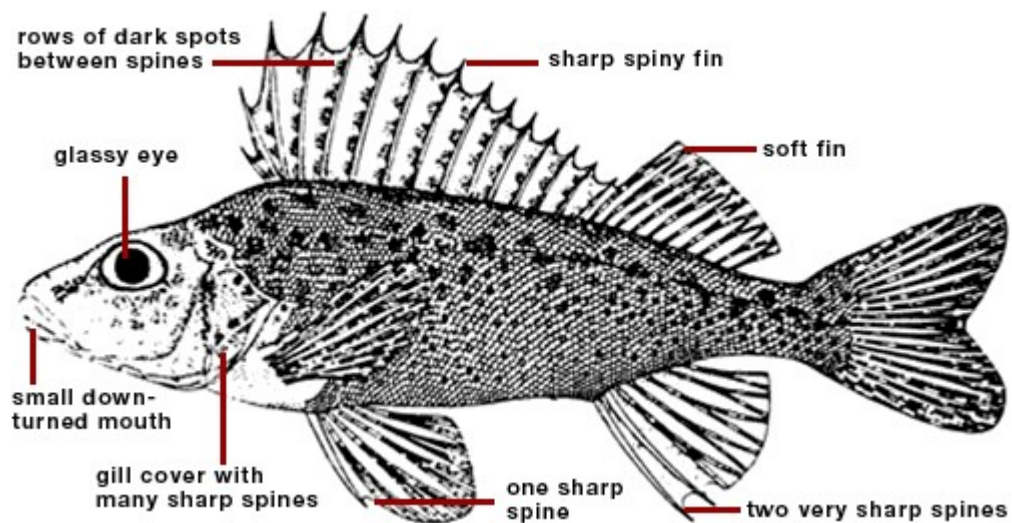


Identifying characteristics:

- Fused, scallop-shaped pelvic fin
- Small, nostril tubes extend over upper lip
- Unlike the **round goby**, the tubenose goby has no black spot on its dorsal fin

Eurasian ruffe (*Gymnocephalus cernuus*)

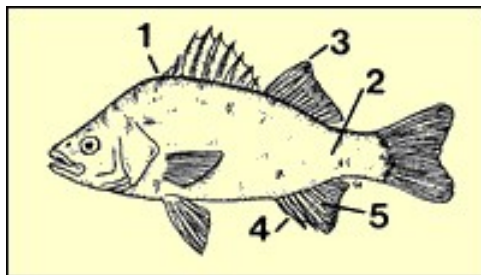
(Pictures and identifying characteristics from <http://www.seagrant.umn.edu/ais/ruffe>)

**Identifying characteristics:**

- Small fish resembling a yellow perch with walleye markings (member of the perch family)
- Adult ruffe are about five to six inches long and rarely exceeds 10 inches in length.
- Characters that make ruffe differ from other perch species are:
 1. A very large dorsal fin, joined together, front and back. The front part of this large dorsal fin has 11-16 spines.
 2. A slightly downturned mouth.
 3. Absence of scales on its head.

White perch (*Morone americana*)

(Picture is from <http://www.seagrant.wisc.edu/Home/Topics/InvasiveSpecies/Details.aspx?PostID=657>)

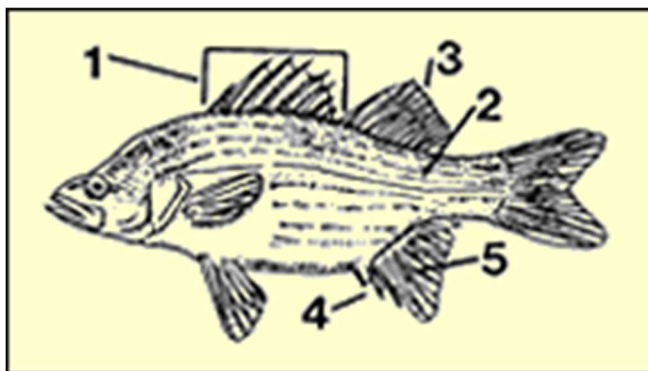
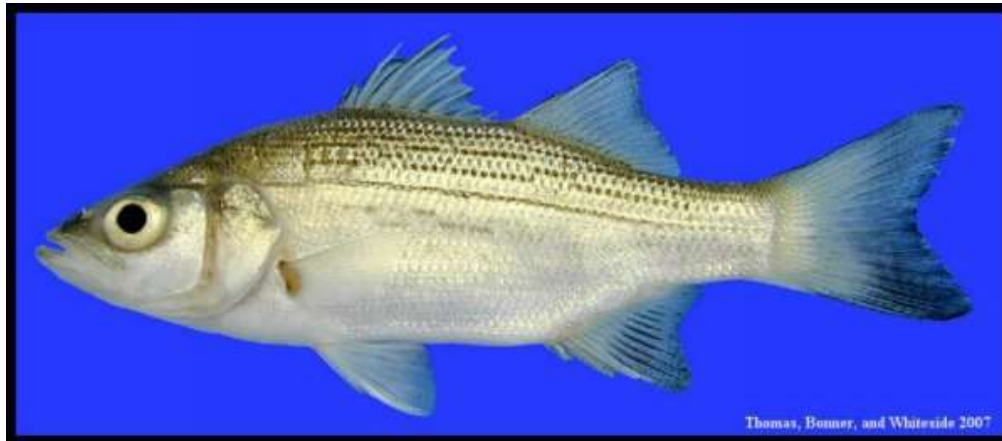


Identifying characteristics (labeled picture above and corresponding characteristics below are from <http://www.seagrant.umn.edu/exotics/wperch.html>):

1. The body is deepest just ahead of, or at the beginning of, the dorsal fin.
2. There are no lines or stripes on the back or sides.
3. When the spiny dorsal fin is pulled erect, the soft dorsal fin also becomes erect.
4. The second and third bony anal spines are almost exactly the same length.
5. The anal fin usually has 8 or 9 soft rays behind the 3 bony spines.

White bass (*Morone chrysops*)

(Picture is from <https://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=779>)



Identifying characteristics (labeled picture above and corresponding characteristics below are from <http://www.seagrant.umn.edu/exotics/wperch.html>):

1. The body is deepest below the dorsal fin and the depth remains fairly uniform below the entire spin dorsal fin.
2. From 6 to 10 dark lines run horizontally down the back and sides.
3. When the spiny dorsal fin is pulled erect, the soft dorsal fin remains relaxed
4. Each of 3 bony anal fin spines are of different lengths and are arranged in ascending order.
5. The anal fin usually has 11 or 12 soft rays behind the 3 bony spines.

Rainbow smelt (*Osmerus mordax*)

(Identifying Characteristics and Images from <http://www.seagrant.umn.edu/ais/smelt> and <http://www.bentzenlab.ca/research-interests/84-2/>)



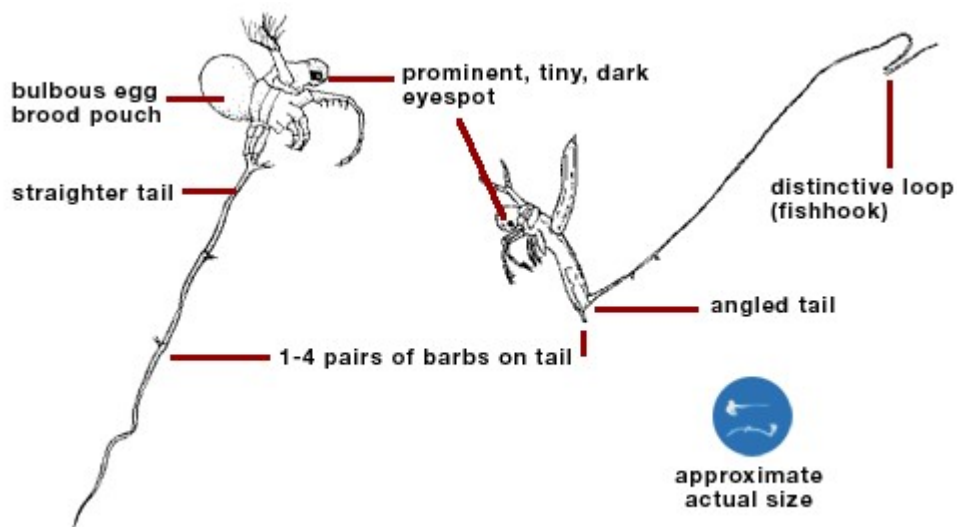
Identifying characteristics:

- The body is cylindrical, slender, and long
- The back is a silvery pale green with stripes of iridescent pink, purple, and blue
- The underside is white
- There are 26-35 gill rakers
- It has a pointed snout and large black and silver eyes

Spiny (*Bythotrephes longimanus*) and **fishhook** (*Cercopagis pengoi*) water fleas
 (Pictures and identifying characteristics from <http://www.seagrant.umn.edu/ais/waterflea>)



(Spiny water fleas clumped on fishing line)



MI Sea Grant, Ontario Federation of Anglers and Hunters

Identifying characteristics:

- Difficult to distinguish without magnification, 1/4-5/8 inches (5-15 mm) total length.
- Clumps look and feel like gelatin or cotton matting with tiny black spots (see picture above).
- Prefer deep lakes, but can establish in shallow waterbodies and rivers.
- Abundant during summer (June-September) depending upon water temperatures.

Viral hemorrhagic septicemia (VHS)

(Pictures and identifying characteristics of infection from http://www.dnr.state.mn.us/fish_diseases/vhs.html)



Photo courtesy of Dr. Mohamed Faisal



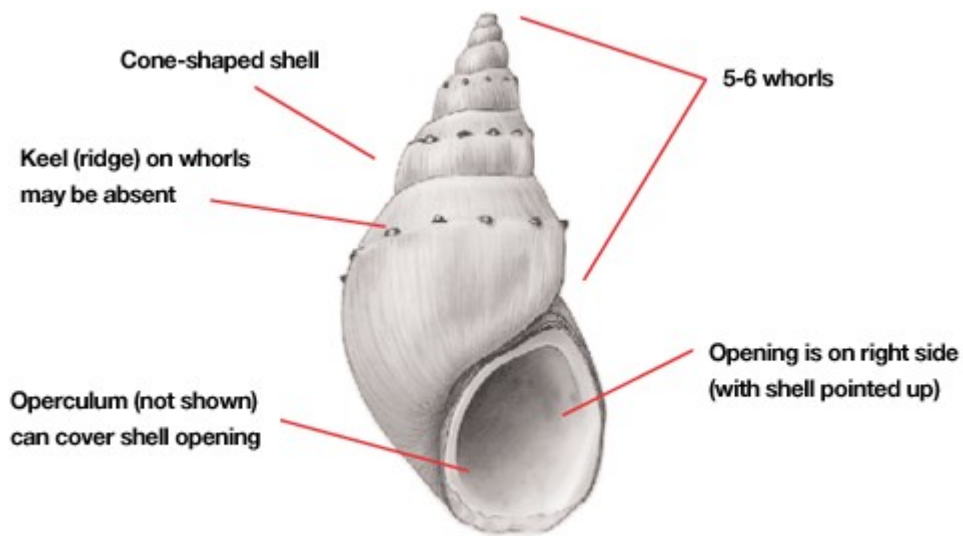
Photo courtesy of Dr. Mohamed Faisal

Identifying characteristics of infected fish:

- At low levels of infection, fish may not display any symptoms.
- Fish will display widespread bleeding (see pictures above) throughout the body surface (eyes, skin and fins).
- Fish will display widespread bleeding within the internal organs (swim bladder, intestine, kidney, etc.).
- Fish will often swim in circles and stay at or near the surface.
- Confirmation of VHS requires laboratory testing.

New Zealand mud snails (*Potamopyrgus antipodarum*)

(Pictures and identifying characteristics from http://www.seagrant.umn.edu/ais/newzealand_mudsnail)



Credit: U.S. Geological Survey

Identifying characteristics:

- Small, up to 1/5-inch (5 mm) long.
- Difficult to distinguish from native snails; shell more elongated.
- Usually horn-colored, but ranges from light to dark brown.

Zebra mussels (*Dreissena polymorpha*)

(Pictures and identifying characteristics from <http://www.seagrant.umn.edu/ais/zebramusssel>)

**Identifying characteristics:**

- Look like small clams with a yellowish or brownish “D”-shaped shell, usually with dark and light-colored stripes.
- Can be up to two inches long, but most are under one inch. Zebra mussels usually grow in clusters containing numerous individuals and are generally found in shallow (6-30 feet), algae-rich water.
- Only freshwater mollusk that can firmly attach itself to solid objects – submerged rocks, dock pilings, boat hulls, water intake pipes, etc. To do this, they use byssal threads (see drawing above).
- On smooth surfaces, young zebra mussels feel like fine sandpaper.
- Juveniles are about the size of peppercorns.

Quagga Mussels (*Dreissena rostriformis*)

Images and identifying characteristics from

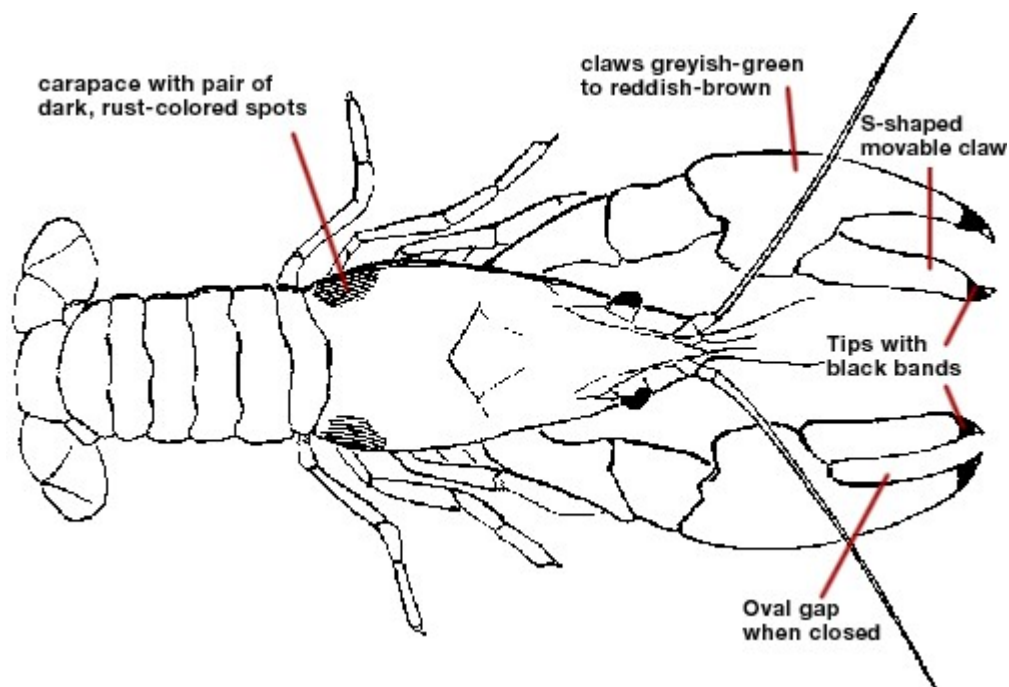
<https://nas.er.usgs.gov/taxgroup/mollusks/images/zebra&quagga2.gif> and
<https://www.invasivespeciesinfo.gov/aquatics/quagga.shtml>

**Identifying Characteristics:**

- Does not sit flat on ventral side
- Rounder (less triangular) in shape than zebra mussel
- Dark concentric rings on shell
- Pale in color near hinge of shell

Rusty crayfish (*Orconectes rusticus*)

(Pictures and identifying characteristics from <http://www.seagrant.umn.edu/ais/rustycrayfish>)

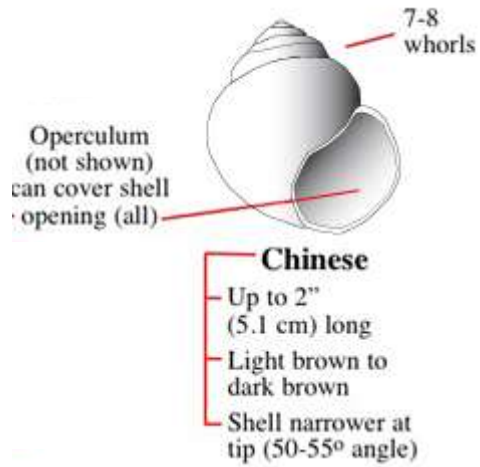


Identifying characteristics

- Adults generally are 3-5 inches (7-13 cm) long.
- Claws larger and smoother than many other crayfish; usually without wart-like white bumps.
- Claws with oval gap when closed; no distinct thin slit or notch present.

Chinese mystery snail

(Images and Identifying characteristics from <http://www.seagrant.umn.edu/ais/mysterysnail> and <https://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=1045>)

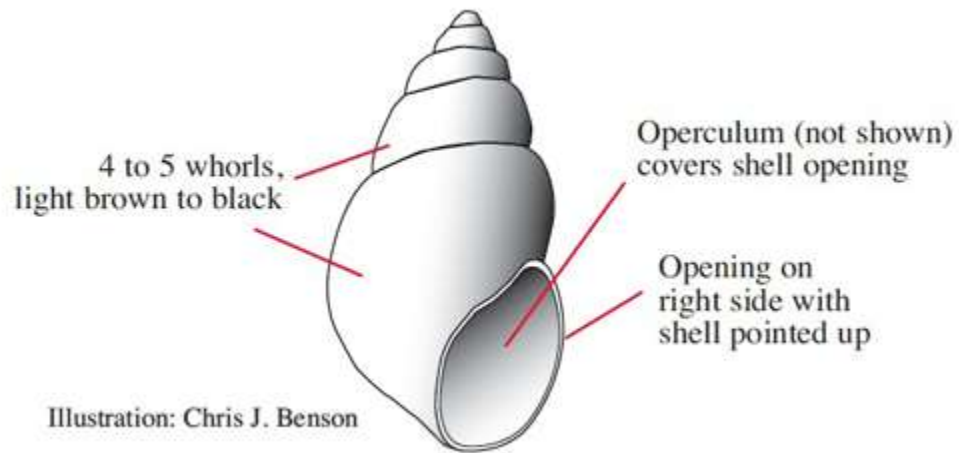


Identifying characteristics:

- Golf ball size snails with a trap door, allowing them to seal in moisture when out of the water
- Found in lakes and slow moving rivers
- Chinese mystery snails will have 6-8 whorls on their shell
- The inner coloration of the mystery snail is white to light blue

Faucet snail (*Bithynia tentaculata*)

(Images and characteristics from <http://www.seagrant.umn.edu/ais/faucetsnail> and http://www.dnr.state.mn.us/invasives/aquaticanimals/faucet_snail/index.html)



Identifying characteristics:

- Up to ½" long
- Found on rocky shorelines, river and lake bottoms, aquatic vegetation, and docks
- Difficult to distinguish from native snails or immature invasive mystery snails

Cattail comparisons: hybrid, narrow-leaved, and broadleaf cattails



Narrow-leaved cattail – invasive
Typha angustifolia

Spreads: by seed and vegetatively

ID: largest gap between female (bottom) and male (top) flowers



Hybrid cattail – invasive
Typha angustifolia x latifolia

Spreads: vegetatively and possibly by seed

I.D: gap between female flowers and male flowers varied



Broadleaf cattail – native
Typha latifolia

Spreads: by seed and vegetatively

I.D: no gap between female and male flowers

I.D. characteristics are circled in red

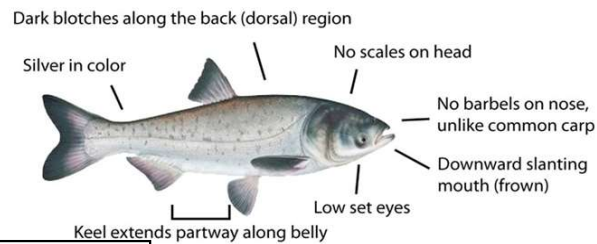
Aquatic species threatening to invade the 1854 Ceded Territory

Bighead, black, grass, and silver carp ((*Hypophthalmichthys nobilis*, *Mylopharyngodon piceus*, *Ctenopharyngodon idella*, and *Hypophthalmichthys molitrix*)

(Pictures and identifying characteristics from

www.watershedcouncil.org/learn/aquatic%20invasive%20species/asian-carp/how-to-identify-bighead-and-silver-carp/ and <https://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=514>)

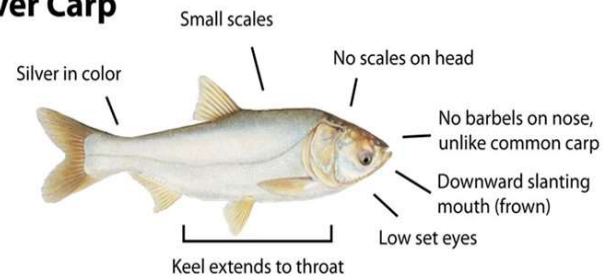
Bighead Carp



Black Carp



Silver Carp



Grass Carp



Identifying characteristics of bighead carp:

- Has large scaleless head with upturned mouth, no barbells.
- Eyes are forward, sit below the mouth and project downward.
- Keel is scaleless and extends only from anal fin to pelvic fin.
- Scales are very small (troutlike), 91–120 in lateral line.
- Gill rakers are long and comb-like.
- Body is dark gray on the top (dorsal) side and transitions to silver white on sides.
- Has many dark irregularly shaped blotches scattered over body.

Identifying characteristics of silver carp:

- Has scaleless head with large upturned mouth, no barbells.
- Eyes are forward, sit below the mouth, and project downward.
- Keel is scaleless and extends all the way from anal fin to base of gills.

- Scales are very small (troutlike), 91–124 in lateral line.
- Gill rakers are fused and appear spongy.
- Body is olive green on the top and transitions to silver (sometimes bronze to red) on the sides.

Identifying characteristics of black carp:

- Similar to grass carp, however, appears darker (not black) in color
- Has pharyngeal teeth (throat teeth) which are similar to human molars
- More pointed snout than other carp species

Identifying characteristics of grass carp:

- Smaller dorsal fin than any other type of Asian carp
- Scales are fewer, but larger and have a dark edging around the outside
- Fewer anal rays are present
- White Belly
- No barbels present

Rudd (*Scardinius erythrophthalmus*)

(Images and identifying characteristics from <http://www.invadingspecies.com/invaders/fish/rudd/> and <http://www.great-lakes.net/envt/flora-fauna/invasive/rudd.html>)



Identifying characteristics:

- The Rudd is in the minnow family and has been consistently used for aquaculture, adding to its spread in the United States
- The fins of the Rudd are bright red and they have a fully scaled belly and usually have red eyes or a red spot around the eye area
- They are usually four to 10 inches' long
- They are adaptable to several types of environments, including poor water quality, and are omnivores or opportunistic feeders

Bloody red shrimp (*Hemimysis anomala*)

(Images and identifying characteristics from

<http://www.seagrant.wisc.edu/Home/Topics/InvasiveSpecies/Details.aspx?PostID=664>)



Identifying characteristics:

- The biggest difference between bloody red shrimp and the native shrimp is that the bloody red shrimp has a flat end to the tail and then two anal spines. The native look alike shrimp will just have a deeply forked tail.
- They will appear in reddish swarms. In July, the swarms will appear in shady areas during the day.
- The shrimp will be about a ¼" to ½" long

Red swamp crayfish (*Procambarus clarkii*)

(Images and identifying characteristics from <http://www.seagrant.umn.edu/ais/redswampcrayfish>)

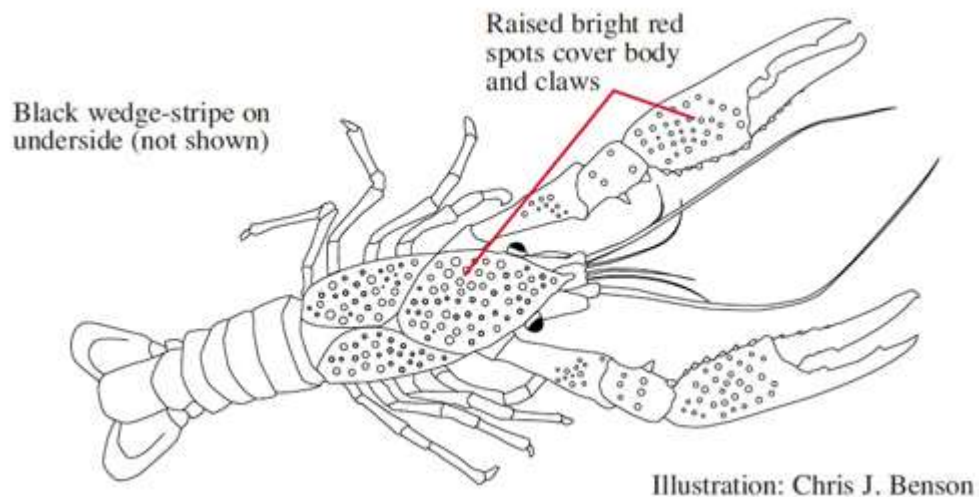


Illustration: Chris J. Benson

Identifying characteristics:

- Found in all types of freshwater ecosystems, native to the southern United States
- Digs burrows deep into the bottoms of lakes, ponds, and rivers
- They have a dark red body and are up to 5 inches' long
- One easily identifiable characteristic is they have raised bright spots all over there body and claws

Flowering rush (*Butomus umbellatus*)

(Images and identifying characteristics from <http://www.seagrass.umn.edu/ais/floweringrush>)



Identifying characteristics:

- Easiest to identify when flowering. Flowers grow in umbrella shaped clusters and each individual flower has 3 whitish pink petals. Plants only produce flowers in very shallow water or on dry sites.
- Green stems that resemble bulrushes but are triangular in cross section.
- Along shore, erect leaves and grows to about 3 feet in height. The leaf tips may be spirally twisted. Under water, the leaves are limp.
- Has an extensive root system that can break into new plants if disturbed.

Starry stonewort

(Images and identifying characteristics from <https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=1688> and <http://www.dnr.state.mn.us/invasives/aquaticplants/starrystonewort/index.html>)



Identifying characteristics:

- Starry stonewort is identified by its star-shaped bulbils, other than that it looks similar to many other types of native musk-grasses and algae
- It forms dense mats and easily outcompetes native algae and vegetation
- Native musk-grasses and stoneworts will usually have a garlic odor, starry stonewort does not
- Branches are whorled around the stem and tend to be in variable lengths

Harmful algal blooms (blue-green algae) (*Anabaena* sp., *Aphanizomenon* sp., etc.)

(Images and identifying characteristics from <https://www.pca.state.mn.us/water/blue-green-algae-and-harmful-algal-blooms>)



Identifying characteristics:

- Harmful algal blooms can appear in a variety of ways, pictured above is just one example. Typically, the water will appear to have a green tint, or large algal mats can be seen on the surface of the water described as looking like “pea soup”
- Harmful algal blooms are associated with places with lots of runoff or areas with good water clarity
- Harmful algal blooms can result in fish kills or poisoning of species that drink from affected areas
- Blooms can also have indirect effects causing respiratory problems for skin irritations for humans near affected areas