LAKE WASHINGTON WEEDS

Submersed Plants (Plants with most leaves growing beneath the water surface)

	Myriophyllum sibiricum	Northern Watermilfoil
@	*Myriophyllum spicatum*	Eurasian Watermilfoil
	Najas flexilis	Bushy Pondweed, Common Naiad
	Potamogeton illinoensis	Illinois Pondweed
	Potamogeton richardsonii	Claspingleaf Pondweed
	Stuckenia pectinata	Common Sago Pondweed

Floating-leaf Plants (Plants with leaves that float on the water surface)

Persicaria amphibia	Water smartweed
Potamogeton gramineus	Variable Pondweed
Potamogeton natans	Floating Leaf Pondweed

Emergent Plants (Plants with leaves extending above the water surface)

Sagittaria cristata	Crested arrowhead
Schoenoplectus acutus var. *acutus*	Hard-stem bulrush
Typha latifolia	Broad-leaved cattail

Shoreline Plants (Plants associated with the wetland habitat)

Asclepias incarnata	Swamp milkweed
Salix sp.	Willow

PREVENTING THE INTRODUCTION OF EXOTIC SPECIES

SOURCE: SHORELINE BEST MANAGEMENT PRACTICES (BMP) Uof M

Why are exotic species a problem

Today, "exotics"-the term for organisms that have been introduced into areas where they are not native-are considered to be among the most severe, worldwide agents of habitat alteration and degradation.

They are a major cause in the continuing loss of biological diversity throughout the world. They have caused extinction of some native species. Exotic species can be thought of as "biological pollutants." Moving plants or animals, accidentally or intentionally, from one habitat into another where they have never been before is risky business.

In the absence of predators, parasites, pathogens, and competitors from their native habitat, species introduced under favorable conditions will often overrun their new home and crowd out important native species. Once established, exotics can rarely be eliminated. To Protect Your Lake from Exotics

There are many BMPs you can adopt as an individual to minimize the spread of aquatic exotic plants and animals: Learn what these organisms look like and monitor for their presence.

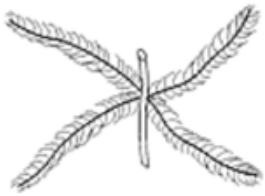
If you suspect a new infestation of an exotic plant or animal, report it to Minnesota Sea Grant Extension in Duluth, (218) 726-8712, or the MN Department of Natural Resources (DNR) Exotic Species Program in St. Paul, 1-800-766-6000 or (612) 296-2835, or a local DNR fishery office.

Species of Concern

Aquatic exotic species that are causing particular concern in Minnesota today are shown below. Other exotics of concern are the common carp, sea lamprey, rusty crayfish, white perch, flowering rush, and curly leaf pondweed. Species are not drawn in correct proportion to each other.

Don Luce Bell Museum of Natural History
Zebra Mussel (Dreissena polymorpha)
Size: 1/4 to 2 inches

MN DNR
Eurasian Water Milfoil (Myriophyllum spicatum)
Leaflet: 1/2 life size



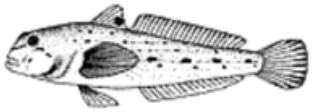
M. Baradlai
Eurasian Ruffe (Gymnocephalus cernuus)
Size: 2 to 5 inches

Best Management Practices

- Consult the DNR for recommendations and permits before you try to control or eradicate an exotic pest. Remember, exotic species thrive on disturbance. Do-it-yourself control treatments often make matters worse and can harm native species.
- Organize educational campaigns and committees. Contact Sea Grant if you would like to become a volunteer zebra mussel monitor. Your lake association or civic group could also undertake an educational campaign in your area. Cconduct public awareness events at water accesses (at DNR accesses, notify the DNR before planning an activity). Don't transport water, animals, or plants from one lake or river to another. In Minnesota, it is illegal to transport surface water, aquatic plants, or exotic species.
- Remove plants and animals from your boat, trailer, and accessory equipment (anchors, centerboards, trailer hitch, wheels, rollers, cables, and axles) before leaving the water access area.
- Drain your livewell, bait bucket, and bilge water before leaving the water access area. Empty your bait bucket on land, never into the water. Never dip your bait bucket into one lake if it has water in it from another. And, never dump live bait from one water body into another.
- Wash your boat, tackle, downrigger cables, and trailer with hot water. Flush hot water (at least 104·F) through your motor's cooling system and other boat parts that normally get wet. If possible, spray your boat, trailer, and accessories with hot, high pressure water. Let everything dry for five days before transporting your boat to another body of water (both hot water and drying will kill zebra mussels).

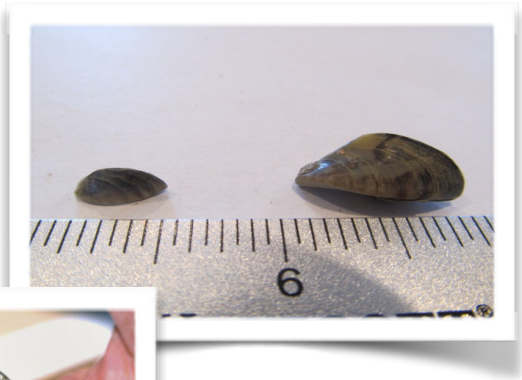
Species of Concern

Donna Francis
Round Goby (Neogobius melanostomus)
SizeL 2 to 12 inches



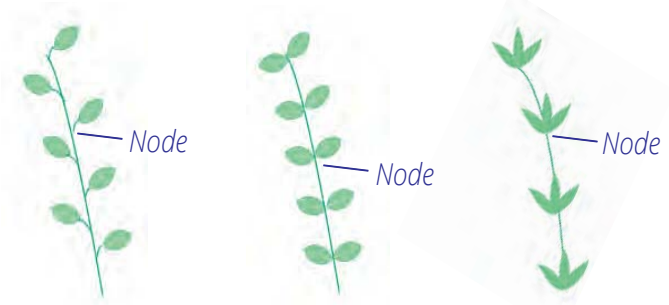
Don Luce Bell Museum of Natural History
Spiny Water Flea (Bythotrephes cederstroemi)
Size: 3/8 inch

MN DNR
Purple Loosestrife (Lythrum salicaria) Size: 2 to 7 feet



Introduction to aquatic plants

Leaf arrangement:



Alternate *Opposite* *Whorled*

Leaf type:

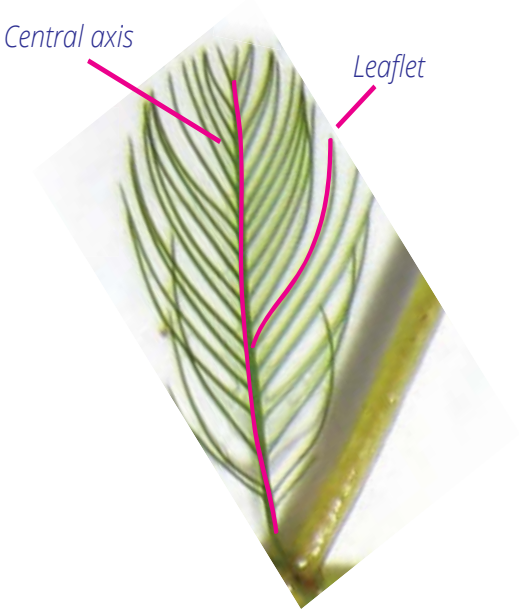
Simple (undivided)

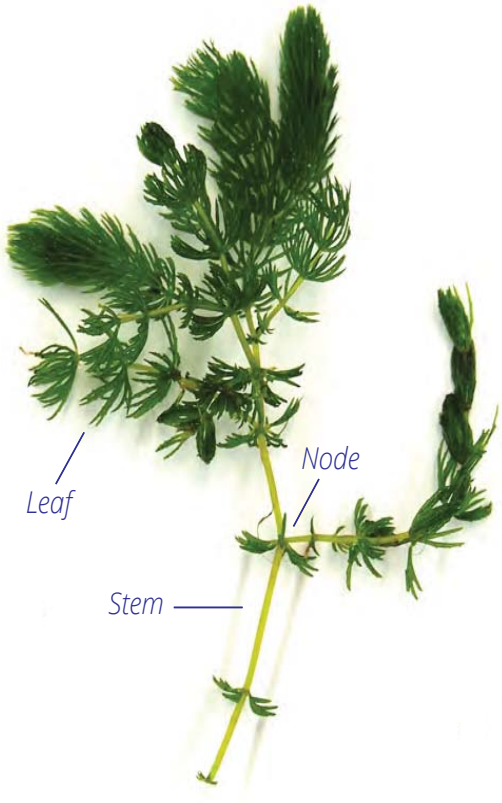
Compound (divided into leaflets)

Leaf margins:

Entire *Serrate* *Undulate*

Whorled leaf





INVASIVE Eurasian watermilfoil

Myriophyllum spicatum

KEYS TO ID

- Feathery looking with four leaves per whorl
- Leaves have central axis with 12 – 20 leaflet pairs
- Can grow up to 10 feet long
- Produces pink and white flowers on spike above surface
- Leaves become limp when taken out of water

LOOKS SIMILAR TO

- Northern watermilfoil (native)
- Coontail (native)
- Bladderworts (native)
- White water crowfoot (native)
- Water marigold (native)

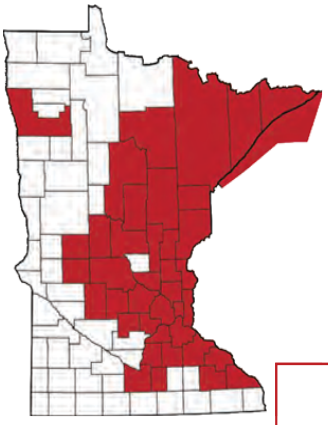
Note: Eurasian watermilfoil is known to hybridize with northern watermilfoil.

Hybrid watermilfoil is also considered invasive and should be reported.

WHERE TO LOOK

- In lakes, ponds, and slow-moving areas of rivers or streams
- Grows best in depths of 3 – 15 feet

CURRENTLY FOUND



Above-surface flowers

Four leaves per whorl with 12 – 20 leaflet pairs per leaf

NATIVE Northern watermilfoil

Myriophyllum sibiricum

KEYS TO ID

- Four leaves per whorl
- Each leaf has between 4 – 11 leaflet pairs
- Leaves have a central axis and are rigid when taken out of water

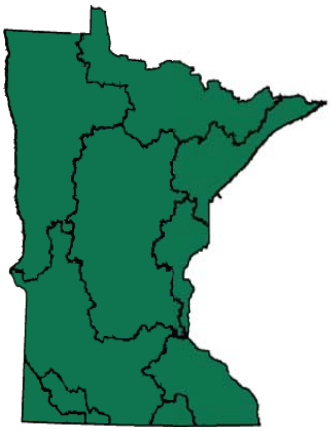
LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Coontail (native)
- Bladderworts (native)
- Water marigold (native)
- White water crowfoot (native)
- Minnesota has six native milfoil species; this is the most common

WHERE TO LOOK

- In depths of up to 20 feet

CURRENTLY FOUND



Four leaves per whorl with 4 – 11 leaflet pairs per leaf

NATIVE Coontail

Ceratophyllum demersum

KEYS TO ID

- Leaves have no central axis and are branching
- Can grow up to six feet long
- Often free-floating

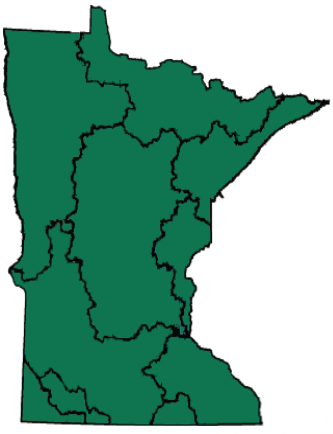
LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Water marigold (native)
- Northern watermilfoil (native)
- Bladderworts (native)
- White water crowfoot (native)

WHERE TO LOOK

- In water up to 20 feet deep
- Upper leaves may reach surface and form dense patches
- Can become highly abundant and form “oil slicks” when it dies back

CURRENTLY FOUND



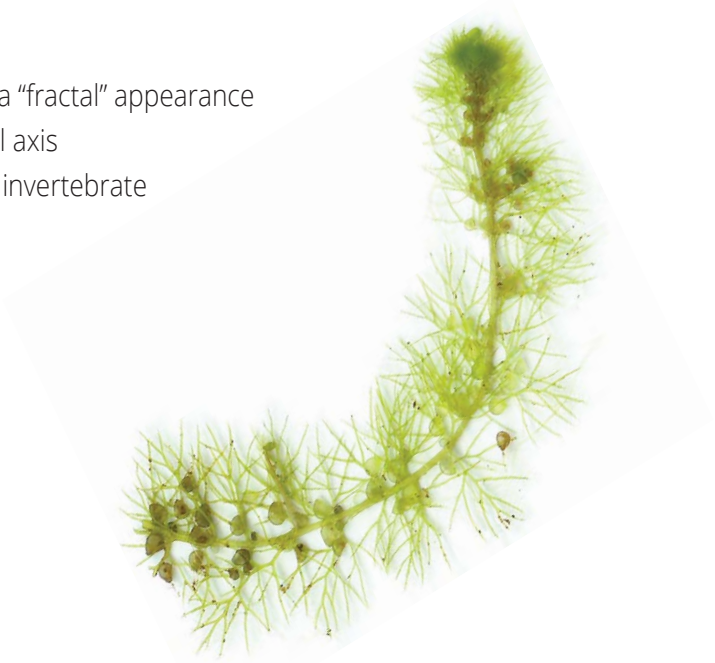
Branching

NATIVE Bladderworts

Utricularia spp.

KEYS TO ID

- Thin leaves branching and zig-zagging can give a "fractal" appearance
- Leaves are highly dissected and have no central axis
- Has bladders, some of which may be filled with invertebrate victims of these carnivorous plants
- Has snapdragon-like flowers

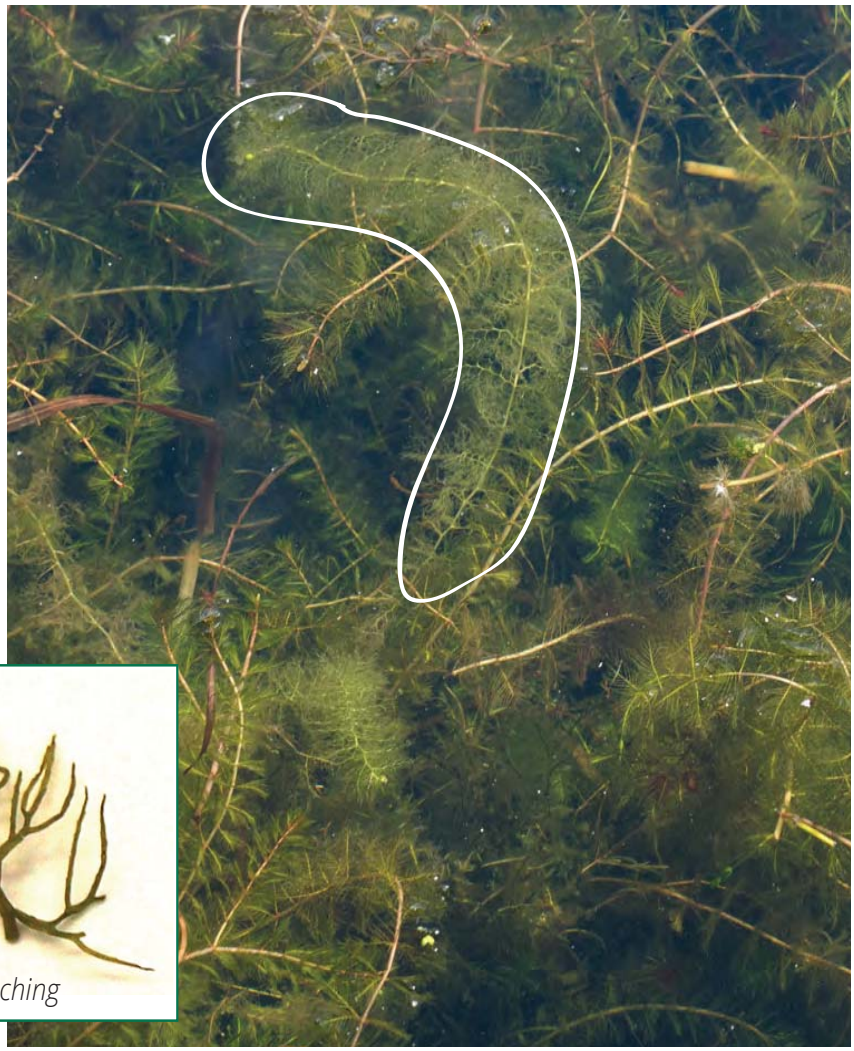


LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Northern watermilfoil (native)
- Coontail (native)
- Water marigold (native)
- White water crowfoot (native)
- Minnesota has eight bladderwort species

WHERE TO LOOK

- Usually found in shallow waters
- Some are free-floating, some prefer to be buried in sediment



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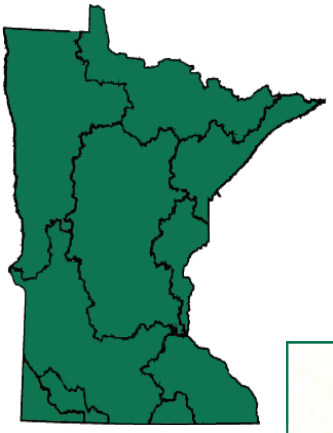


Branching

NATIVE

White water crowfoot

Ranunculus aquatilis

KEYS TO ID

- Grows in mats on the water's surface
- Leaves are highly dissected
- Produces flowers with yellow centers and five white petals
- Often has modified leaves at surface

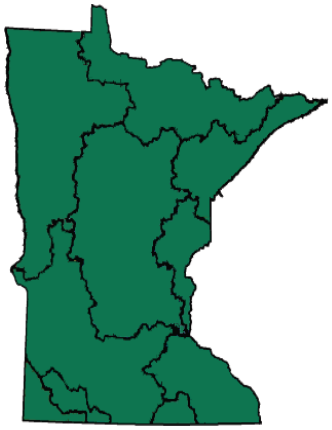
LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Water marigold (native)
- Northern watermilfoil (native)
- Bladderworts (native)
- Coontail (native)

WHERE TO LOOK

- In ponds, slow-moving streams, and marshes
- Can grow up to 1 to 6 inches above water's surface

CURRENTLY FOUND



Branching leaves

NATIVE

Water marigold

Bidens beckii (formerly *Megalodonta beckii)*

KEYS TO ID

- Opposite to whorled, highly dissected leaves that are variable along stems
- Leaves do not have a central axis
- Produces yellow buttercup flowers with more than five petals in mid- to late-summer
- Has two simple emergent leaves under the flower that are serrated

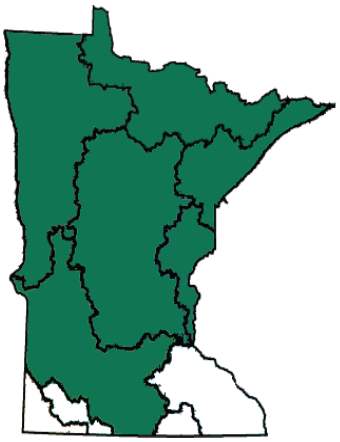
LOOKS SIMILAR TO

- Eurasian watermilfoil (invasive)
- Coontail (native)
- Northern watermilfoil (native)
- Bladderworts (native)
- White water crowfoot (native)

WHERE TO LOOK

- In water up to 12 feet deep
- Flowers are above water

CURRENTLY FOUND

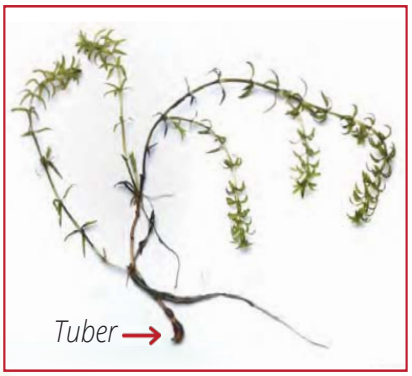


INVASIVE Hydrilla

Hydrilla verticillata

KEYS TO ID

- Submersed plant that grows into thick mats
- Leaves are bright green with a midvein down the center and are between ⅕ and ¾ inches long
- Leaves directly attached to stem (stalkless) in whorls of 3 – 10; often 5
- Ascending stems can grow up to 30 feet long
- Tubers or turions may be present
- Leaves have sharply toothed serrated edges that may require a hand lens to see



LOOKS SIMILAR TO

- *Elodea* (native)
- Brazilian waterweed (invasive)

WHERE TO LOOK

- Streams, lakes, and ponds
- In shallow or deep waters
- May invade deep waters where native plants can't grow
- Has not been found in Minnesota

CURRENTLY FOUND

INVASIVE Brazilian waterweed

Egeria densa

KEYS TO ID

- Leaves in whorls of 4 to 6
- Leaves are between ⅖ and 1.5 inches long
- Small white flowers with 3 petals may be visible
- Can form dense mats that look bushy

LOOKS SIMILAR TO

- Elodea (native)
- Hydrilla (invasive)

WHERE TO LOOK

- Submersed; can be free-floating or rooted
- Commonly used in home aquaria
- No established populations in Minnesota

CURRENTLY FOUND

NATIVE Common waterweed

Elodea canadensis

KEYS TO ID

- Whorls of 3 oval-shaped leaves; whorls of 4 may occur
- Can grow up to three feet tall
- Leaves have smooth edges and are between ¼ and ⅔ inches long
- Small white flowers visible above water in the summer

Three leaves per whorl

LOOKS SIMILAR TO

- Hydrilla (invasive)
- Brazilian waterweed (invasive)
- Minnesota has three native *Elodea* species

WHERE TO LOOK

- In water up to 10 feet deep
- Near stream inlets
- May be free-floating

CURRENTLY FOUND

INVASIVE

Starry stonewort

Nitellopsis obtusa

KEYS TO ID

- Long, smooth branchlets are attached in whorls of 5 – 8 and branch asymmetrically at tips
- Stems are smooth
- Small, star-shaped bulbils form on clear threads at base of plant and may be found above or below the sediment surface
- Small, orange spheres called antheridia may be visible, these are male reproductive structures
- Branchlets typically several inches long, longer than *Chara* or *Nitella*
- Can fill water column and form surface mats

LOOKS SIMILAR TO

- Native *Chara* (native)
- Native *Nitella* (native)
- Sago pondweed (native)
- Water stargrass (native)

WHERE TO LOOK

- In shallow, still water and near accesses

Actual size of bulbils

CURRENTLY FOUND

Below: orange antheridia

NATIVE Muskgrasses

Chara spp.

KEYS TO ID

- Stems are typically rough and crunchy
- Thin branchlets form whorls around thin stems
- Branchlets are not forked at tips
- May produce bulbils, but not star-shaped
- May have musky odor

Rough stems; whorled branchlets

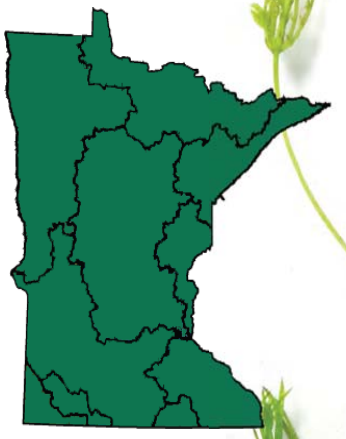
LOOKS SIMILAR TO

- Starry stonewort (invasive)
- Native *Nitella* (native)
- Sago pondweed (native)
- Water stargrass (native)
- Minnesota has nine *Chara* species

WHERE TO LOOK

- Fully submerged
- Along lake bottoms forming patches called meadows

CURRENTLY FOUND



NATIVE

Stoneworts

Nitella spp.

KEYS TO ID

- Stems are smooth
- Branchlets fork off evenly into two or three tips at end
- Typical branchlets are around an inch; much shorter than starry stonewort
- Unlike starry stonewort, forked tips are of equal length
- Becomes limp when out of water

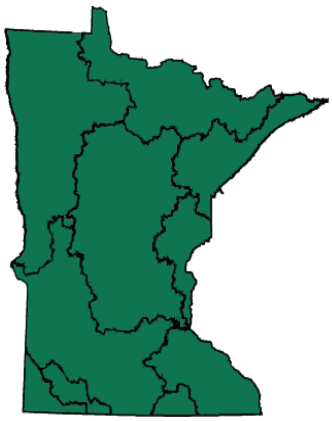
LOOKS SIMILAR TO

- Starry stonewort (invasive)
- Native *Chara* (native)
- Sago pondweed (native)
- Water stargrass (native)

WHERE TO LOOK

- Often in deeper zones of lake
- At depths up to 30 feet

CURRENTLY FOUND



Branchlets; smooth stems

NATIVE Sago pondweed

Stuckenia pectinata

KEYS TO ID

- Has narrow, stiff leaves alternating off the slender stem
- The base of leaves are tightly attached to stem for about 1/4 of an inch before coming off the stem
- Produces clusters of egg-shaped fruits
- Leaves are very fine and almost look like pine needles
- Grows up to three feet tall

Fruit

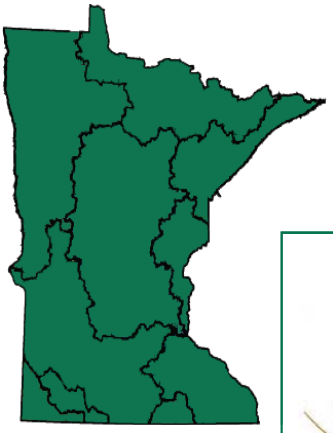
LOOKS SIMILAR TO

- Starry stonewort (invasive)
- Native *Chara* (native)
- Native *Nitella* (native)
- Water stargrass (native)

WHERE TO LOOK

- Usually in shallow waters up to six feet
- Entirely submersed in water

CURRENTLY FOUND



Alternating leaves

NATIVE

Water stargrass

Heteranthera dubia

KEYS TO ID

- Small yellow flowers visible above water in mid- to late-summer
- Leaves lack a visible midvein
- Slender and branching stems with alternating leaves
- Leaves are narrow and flat
- May create dense mats

LOOKS SIMILAR TO

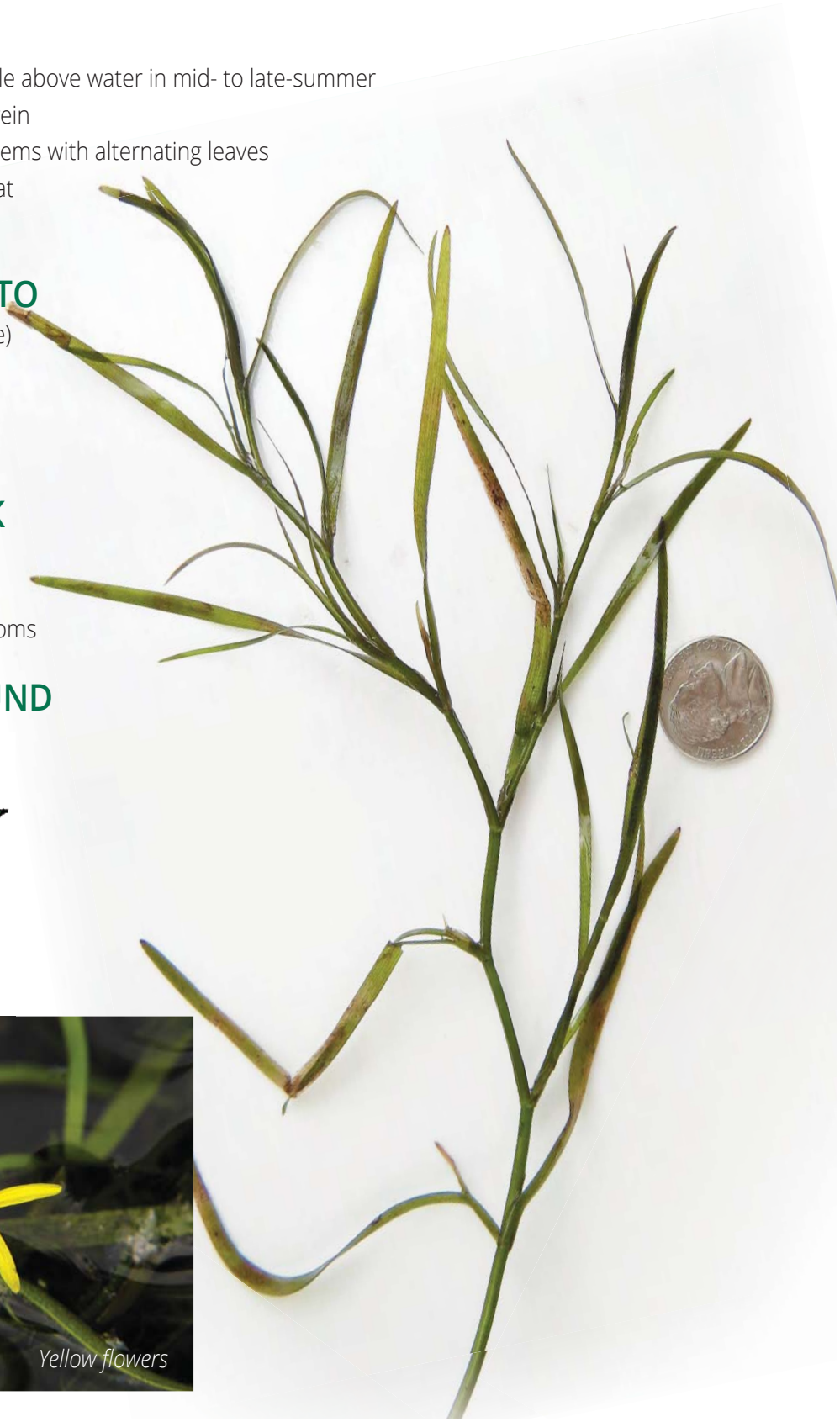
- Starry stonewort (invasive)
- Native *Chara* (native)
- Sago pondweed (native)
- Native *Nitella* (native)

WHERE TO LOOK

- Mostly in shallow waters and near stream banks
- On sandy or muddy bottoms

CURRENTLY FOUND

Yellow flowers



INVASIVE

Curly-leaf pondweed

Potamogeton crispus

KEYS TO ID

- Thin, submerged leaves have distinct "teeth" and wavy edges
- Produces turions that look like small, greenish-brown pinecones
- Generally the first pondweed to come up in the spring; dies back in midsummer
- Leaves do not clasp around stem where they connect

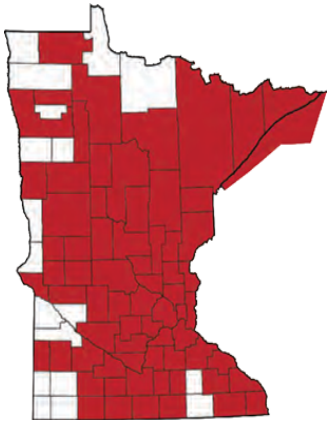
LOOKS SIMILAR TO

- Clasping-leaf pondweed (native)

WHERE TO LOOK

- Lakes, rivers, and streams in waters up to 15 feet deep

CURRENTLY FOUND



Teeth on edges

Turions

NATIVE

Clasping-leaf pondweed

Potamogeton richardsonii

KEYS TO ID

- Leaves alternate along the stem
- Leaves are wide and wavy, but don't have "teeth" like curly-leaf pondweed
- Leaves clasp around stem

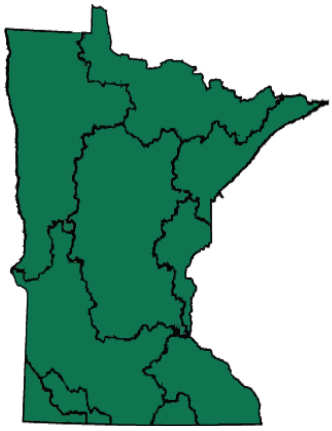
LOOKS SIMILAR TO

- Curly-leaf pondweed (invasive)
- Also called Richardson's pondweed

WHERE TO LOOK

- Fully submersed
- In water up to 12 feet

CURRENTLY FOUND



Leaves clasping stems

Quick reference guide

Eurasian watermilfoil

	Eurasian watermilfoil	Northern watermilfoil	Hybrid watermilfoil	Coontail	Water marigold	White water crowfoot	Bladderworts
Leaves alternate						X	X
Bladders present on leaves							X
Leaves whorled	X	X	X	X	X		
Leaflets on a central axis	X	X	X				
Leaves with <12 leaflets (4-11)		X					
Leaves with ≥12 leaflets (12-20)	X		X				

Hydrilla

	Hydrilla	Brazilian waterweed	Elodea (waterweed)
≤ 3 leaves in a whorl			X
≥ 3 leaves in a whorl	X (usually 5)	X (usually 4)	
Showy white flowers		X	
Serrated leaf margins	X		
Produces tubers and turions	X		

Starry stonewort

	Starry stonewort	*Chara spp.*	*Nitella spp.*	Sago pondweed	Water stargrass
Alternate, flat leaves					X
Branching needle-like leaves				X	
Whorled branchlets, like stem	X	X	X		
Strong odor		Some species			
Rough stems		X			
Forked branchlets	X		X		
Forked tips symmetrical			X		
Stays rigid out of water	X				
Star-shaped bulbils	X				