Aquatic Invasive Species Early Detection

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Why are AIS a problem?

• Displace beneficial native species
• Decrease biodiversity
• Harm fish populations
• Damage natural habitat
• Interfere with recreation
• Alter water quality
• Cause economic harm
### MN Invasive Species Regulations

<table>
<thead>
<tr>
<th>Prohibited Invasive Species</th>
<th>Regulated Invasive species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlawful to possess, import, purchase, transport, or introduce these species</td>
<td>Legal to possess, sell, buy, and transport, but they may not be introduced into a free-living state</td>
</tr>
</tbody>
</table>

### Early Detection
Non-native, invasive plants with limited distribution in Minnesota that are assessed as high risk

### Focus on species
- Those not found in MN, or
- found in limited locations in MN, or
- found in nearby states or similar latitude, or
- most likely to survive in MN
Organized by growth habit

Submergent
Floating-leaved
Emergent
Shoreline

Submergent
Rooted or floating underwater
Brazilian waterweed
*(Egeria densa)*

- Whorls of 4 - 6 bright green leaves
- Leaves 0.8 – 1.2” long, 0.2” wide
- Leaf edges slightly serrated
- Whorls spaced close together (bushy), especially at top
- White 3-petalled flowers

Hydrilla
*(Hydrilla verticillata)*

- Leaves in whorls of 3 - 10
- Whorls are 0.1 – 2” apart
- Slender, branching stem, up to 20’ long
- Leaves with saw-toothed edges, rough to touch
- Leaves with pointed tips
- Produces turions (winter buds)
Brazilian waterweed/Hydrilla

Similar species

Whorls of 4 – 6 Fine-toothed leaves

Whorls of 3 short leaves

Whorls of 3 – 10 toothed leaves

Brazilian waterweed

Canada waterweed

Hydrilla

Brittle naiad

(Najas minor)

- Slender stems, many branches
- Leaves opposite, linear, toothed, stiff and curled
- Leaves 1-2” long
- Flowers small, single
- Older plants brittle and leaves recurved
- Young plant leaves may not be toothed or curled
Brittle naiad

Similar species

Bushy pondweed (slender naiad)

Carolina fanwort

(*Cabomba caroliniana*)

- Fan shaped submersed leaves 2" wide
- Two leaves attach on opposite sides of stem
- Short stem attaching leaves (petiole)
- Finely divided leaves
- Less common- floating narrowly diamond shaped leaves
- Flowers white to purplish ½" diameter
Carolina fanwort
similar species

- Carolina fanwort
  *Cabomba caroliniana*

- Water marigold
  *Bidens beckii*

- Water crowfoot
  *Ranunculus aquatilis*

Curly-leaf pondweed

- Stiff wavy leaves ½” wide, 2-3” long
- Leaf edges serrated
- Alternate translucent leaves
- Winter buds (pinecone like) turions

Prohibited
Curly-leaf pondweed

- Similar species
  - Clasping-leaf/Richardson’s pondweed
  - Curly-leaf pondweed
  - Flat-stem pondweed

Eurasian water-milfoil
(Myriophyllum spicatum)

Prohibited

Leaflet pairs
12-21 leaflet pairs
<12 leaflet pairs

Graphic: U of M Extension
Eurasian watermilfoil

Similar species

- Northern watermilfoil
- Coontail
- Eurasian watermilfoil

Starry Stonewort

*(Nitellopsis obtusa)*

- Macrolga
- Tiny star-shaped bulbils
- Irregular branching, whorls of 4 – 6 branchlets
- Looks similar to Chara, but
  - Taller (up to 2 ½ + feet)
  - Longer branchlets
  - Lighter, brighter green
  - No garlicky smell
  - Smooth stems

-Prohibited-
Starry Stonewort
similar species

Chara 😎 Starry stonewort 😎 Nitella 😎

UWEX has a good Youtube video on Starry stonewort identification

Emergent
Rooted below water and growing out of the water

Peter Wiltshire (CC BY-SA 2.0) [http://creativecommons.org/licenses/by-sa/2.0], via Wikimedia Commons
Flowering Rush
(*Butomus umbellatus*)

- Triangular sword-like leaves, parallel veins
- Whitish-pink flower cluster (June – Aug)
- Submergent- limp, ribbon-like leaves
- Grows in shallow water, mud flats to 10’ deep
- ~3 – 6’ tall
- Other similar species have some cross veins
- Stems may be curved at base, bulbets

Flowering Rush

Similar species

- Flowering rush
- Bulrush
- Arrowhead
- Burreed
Parrot feather
(Myriophyllum aquaticum)

- Leaves in whorl of 4 - 6 around stem, ½ - 2” long
- Feather-like, but stiff
- Stems up to 5’ long
- Can emerge up to 1’
- Inconspicuous white flowers

Parrot Feather
Similar species

Parrot feather
Northern watermilfoil
**Floating-leaved**
Rooted or free floating, with floating leaves

![Floating-leaved leaves](https://example.com/floating-leaved.jpg)

- Leathery, round to heart-shaped leaves
- Like miniature water lily (1-2" wide)
- Smooth-edged
- Spongy, purplish undersides
- Flowers ½" wide, 3 white petals, yellow center

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**European frogbit**
*(Hydrocharis morsus-ranae)*

![European frogbit](https://example.com/european-frogbit.jpg)

- Leathery, round to heart-shaped leaves
- Like miniature water lily (1-2" wide)
- Smooth-edged
- Spongy, purplish undersides
- Flowers ½" wide, 3 white petals, yellow center

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*Photo: Louise-M. Landry, CalPhotos*
**Water chestnut**
*(Trapa natans)*

- Rooted floating plant
- Triangular shaped, toothed leaves
- Feather-like submersed leaves (resemble milfoil)
- Inflated petiole (between leaf and stem)
- Small four-petaled white flower, July - frost
- Nut-like fruit, sharp spines

**Water Aloe or Water Soldiers**
*(Stratiotes aloides)*

- Similar to aloe plant
- Sword shape-serrated leaves, 16" long (sharp)
- Leaves arranged in circle
- Bright green leaves
- White 3-petaled flowers
Yellow floating heart
(Nymphoides peltata)

- Up to 3’ long
- Floating leaves on stalks from rhizomes
- Heart-shaped leaves
- Wavy edges, purplish underside
- Flowers bright yellow, 5 fringed petals
- Flowers on stalks of 2 - 5

Not likely to survive in MN

Water hyacinth
(Eichhornia crassipes)

Water lettuce
(Pistia stratiotes)
Water hyacinth
(*Eichhornia crassipes*)

- Round waxy leaves, up to 6” wide
- Floating, air-filled petioles
- Grow in rosettes
- Showy spike of 8 – 15 light purple 6-petaled flowers
- Dark purple/black feathery roots

Shoreline
Growing along the edge of a lake, stream or wetland. May be in water during wet periods.
Chinese Amur/Silver Grass
\textit{Miscanthus species}

- Popular ornamental; many varieties
- Looks like pampas grass
- \textit{M. sacchariflorus} often found along waterways
- White mid-vein on leaves (sharp)
- Grows into tall, thick monocultures

Non-Native \textit{Phragmites australis}
\textit{Phragmites australis, ssp. Australis, Haplotype M}

- Widespread in eastern U.S.
- Blue-green leaves
- Large, thick seed heads
- Leaves / seed heads persist through winter
- No red color on upper stems
- No circular fungal spots
Purple Loosestrife
(Lythrum salicaria)

- 3 – 7’ tall
- Purple spike Aug – Sept
- Angled stem (square)
- Downy smooth-edged leaves, usually paired and opposite
Yellow iris
(Iris pseudacorus)

- 3-4 feet tall
- Broad, sword-shaped leaves are stiff and erect with green to greyish-blue coloration.
- Blooms in May and June. Each stem has several white, cream, or yellow flowers.
- Fruit capsules are six-angled and egg-shaped.
- Rhizomes are pink-fleshed.

AIS- Animals

Invertebrates - animals without a backbone
Mystery Snails

**Chinese Mystery Snail**
*(Cipangopaludina chinensis)*
- Large golf ball sized, up to 3”
- Dark brown
- Operculum

**Banded Mystery Snail**
*(Viviparus georgianus)*
- Large up to 1.5”
- Lighter colored shell with Brown bands

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Rusty crayfish
*(Orconectes rusticus)*
- Up to 5” long
- Rusty colored spots on tan/light brown body
- Claws grayish-green, larger and smoother than natives, may have black bands at tips
What If I find Something?

1. Map it
   - Note where found (where on the wetland, near what road, GPS coordinates, smart phone tag).

2. Take photos or make a collection

3. Collection
   - Store in sealed plastic bag/container with water or wet paper towel
   - Label with specific location, date, your name
   - Refrigerate the sample

4. Report ASAP
   - DNR AIS specialist or Eddmaps [http://www.eddmaps.org/midwest]
   - Dakota County/Hennepin County
   - FCI for identification assistance

5. Disposal
   - If sample not needed, dispose by freezing and then sealing in plastic bag and disposing in trash.

Complete the Aquatic Invasive Species Data Sheet
Photo tips

Close ups to show details
- Leaf form
- Leaf attachment
- No. of leaves
- Pairs of leaflets
- Different views
- Color variations

Take Notes

- How tall
- Plant type
- Stem shape
- Branched or not
- Depth where growing or found
- Flowering
- Colors

- Date found
- Where found
It is illegal to transport prohibited AIS

➢ Exception:
transport the invasive species to the Minnesota DNR, or another destination as the Commissioner may direct, in a sealed container for purposes of identifying the species or reporting the presence of the species

Local DNR AIS Specialist

St. Paul

➢ Keegan Lund
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   651-259-5828

➢ Kylie Catoor
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   651-259-5729

➢ April Londo
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   651-259-5861
Clean your equipment and boots
Make sure you are not spreading AIS

➢ Clean
➢ Drain
➢ Dry

Resources

Aquatic Plants of the Upper Midwest- 4th edition
https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/resources/bookstore/APUM.aspx

Aquatic Invasive Species Early Detectors, A How-To Guide, Minnehaha Creek Watershed District

Phragmites Identification Guide- MN Aquatic Invasive Species Research Center
Phragmites

References/credits

**Information**
- USDA Natural Resources Conservation Service Plants Profile [www.plants.usda.gov](http://www.plants.usda.gov)
- MNDNR
- Univ. MN Sea Grant
- Early Detection and Distribution Mapping System
- Center for Invasive Species and Ecosystem Health [www.invasive.org](http://www.invasive.org)
- Midwest Invasive Species Information Network
- University of Florida Center for Aquatic and Invasive Species

**Images**
- Fortin Consulting
- California Department of Food and Agriculture
- Bugwood.org
- University of Florida Center for Aquatic and Invasive Species
- Creative Commons and public domain images

**Maps**