

INVASIVE AQUATIC PLANT SPECIES

A QUICK REFERENCE GUIDE

SECOND EDITION, 2024

ACKNOWLEDGEMENTS

Support for the development of this guide was provided by the Ontario Ministry of Natural Resources

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TABLE OF CONTENTS

Introduction 6
What makes an aquatic plant invasive? 7
Invasive Species Act, 2015 7
Regulated invasive aquatic plants 8
What can I do? 9
How to report invasive species 9

Brazilian Elodea (*Egeria densa*) **12**
Carolina Fanwort (*Cabomba caroliniana*) **14**
Eurasian Water-Milfoil (*Myriophyllum spicatum*) **16**
European Frog-Bit (*Hydrocharis morsus-ranae*) **18**
European Water Chestnut (*Trapa natans*) **20**
Floating Primrose-Willow (*Ludwigia peploides*) **22**
Flowering Rush (*Butomus umbellatus*) **24**
Hydrilla (*Hydrilla verticillata*) **26**
Oxygen Weed (*Lagarosiphon major*) **28**
Parrot Feather (*Myriophyllum aquaticum*) **30**
Starry Stonewort (*Nitellopsis obtusa*) **34**
Watermoss (Genus *Salvinia*) **36**
Water Lettuce (*Pistia stratiotes*) **38**
Water Soldier (*Stratiotes aloides*) **40**
Yellow Floating Heart (*Nymphoides peltata*) **42**
Yellow Iris (*Iris pseudacorus*) **44**

Glossary of plant terms 46
References used 48
Photo credits 49

INTRODUCTION

Invasive species are plants, animals, and micro-organisms that, when introduced outside of their natural environment, outcompete native species (Government of Canada, 2016). Invasive species can have harmful consequences for the natural environment, economy, and society, including human health. However, not all introduced species are invasive. Some, like the introduced Chinook Salmon (*Oncorhynchus tshawytscha*), produce economic incentives for society, while also not posing a significant threat to native fishes and their ecosystems.

Invasive aquatic plants, by contrast, displace native vegetation, slow down water flow, alter oxygen levels, and can affect recreational activities (e.g. boating, fishing, and swimming).

HOW DO AQUATIC INVASIVE PLANTS ARRIVE AND SPREAD?

Aquatic plants are introduced and continue to spread by shipping vessels, recreational boating, and the aquarium and water garden trade.

INVASIVE SPECIES ACT, 2015

The Ontario Invasive Species Act (ISA) came into force on November 3rd, 2016. The goal of the Invasive Species Act is to support the prevention, early detection, response to, and eradication of invasive species in Ontario. Preventing invasive species from arriving and becoming established in Ontario is critical in the fight against this growing continued threat. Some key elements of the ISA include:

- Giving Ontario the tools to regulate invasive species as either prohibited or restricted and banning activities, such as buying, selling, possessing, and transporting certain invasive species;
- Enabling response actions to address urgent threats; and
- Helping to promote compliance through modernized inspection and enforcement measures.

INVASIVE AQUATIC PLANT SPECIES REGULATED AS PROHIBITED OR RESTRICTED UNDER THE INVASIVE SPECIES ACT, 2015 AS OF JANUARY 1ST, 2024

In Ontario, it is **illegal** to import, possess, deposit, release, transport, breed, buy, sell, lease or trade prohibited species.

It is also **illegal** to import, breed, buy, sell, lease, or trade restricted species, which can be transported for management purposes.

Brazilian Elodea (*Egeria densa*) *page 12*
Carolina Fanwort (*Cabomba caroliniana*) *page 14*
Eurasian Water-Milfoil (*Myriophyllum spicatum*) *page 16*
European Frog-Bit (*Hydrocharis morsus-ranae*) *page 18*
European Water Chestnut (*Trapa natans*) *page 20*
Floating Primrose-Willow (*Ludwigia peploides*) *page 22*
Flowering Rush (*Butomus umbellatus*) *page 24*
Hydrilla (*Hydrilla verticillata*) *page 26*
Parrot Feather (*Myriophyllum aquaticum*) *page 30*
Water Soldier (*Stratiotes aloides*) *page 40*
Yellow Floating Heart (*Nymphoides peltata*) *page 42*

WHAT CAN I DO?

- Learn to identify invasive aquatic plant species that are a threat to Ontario and how to prevent the spread of these unwanted species.
- Never buy or keep invasive aquatic plants. If you have any information about the illegal importation, distribution, or sale of invasive plants, report it immediately to the Ministry of Natural Resources TIPS line at **1-877-TIPS-MNR (847-7667)** toll-free any time.
- Don't release any aquatic plants into Ontario lakes, rivers, or streams. Properly dispose of unwanted aquatic plants.
- Clean, Drain, and Dry your boat, trailer, and equipment– remove all plants, animals, and mud, and dispose of them on dry land or in the garbage. For more information on boater regulations in Ontario, visit: www.invadingspecies.com/invasive-species-act/.
- If you see an invasive aquatic plant in the wild, report it!

HOW TO REPORT INVASIVE SPECIES

- Call: **1-800-563-7711**
- Email: isap@ofah.org
- Create a profile on EDDMapS.org and submit your reports digitally.

When submitting a report through the Invading Species Hotline or online at EDDMapS.org, it is best to have the following information on hand to submit a complete report:

What?

What species do you suspect you have encountered? Are there native look-alikes that you may not have considered?

Picture?

In order to confirm reports, a picture is required. However, with some high-priority species (e.g. prohibited species), it is best to always report if you suspect you have encountered one!

To photograph an invasive aquatic plant:

- Capture a view of the entire infestation.
- Remove the plant from the water, if possible, and photograph the leaf shape and arrangement along the stem.
- Capture flower shape, size, colour, and arrangement.
- Use a common item for scale (coin, pen, keys, etc.).

When and where?

Be sure to note the date and geographical location where you encountered the invasive plant (e.g. latitude and longitude).

Specimen?

Do you have the plant in hand? If so, call **1-800-563-7711** and ISAP staff will direct you on your next steps.

Species Profiles

BRAZILIAN ELODEA

Egeria densa

PLANT TYPE: SUBMERGED

ORIGIN

- Native to South America.

LEAVES

- Submerged, bright green, found in whorls of 4-8.

FLOWERS

- Emergent, small flowers with three white petals, and three smaller green sepals.

HABITAT

- Slow-moving water like wetlands, lakes, ponds, and slow-moving streams - rooted at depths of 1-2 m, up to 6 m; can also drift freely.

IMPACTS

- Rapidly forms dense mats on the surface that may restrict water movement, increase sedimentation, affect water quality, and crowd out native species.
- Changes to water quality may include lowered temperature, reduced oxygen concentrations, reduced nutrient availability, and eutrophication.
- Ecosystem impacts may include smothering of native plant seeds through sedimentation and changes to native fish populations through reduced habitat quality.
- Thick mats may impede recreational activities and clog infrastructure and water supply intakes.

LOOKALIKE SPECIES

- Native waterweed's leaves are shorter, and opposite or three in a whorl, and petals are the same size as sepals.
- Canadian waterweed (*Elodea canadensis*), hydrilla (*Hydrilla verticillata*).

CAROLINA FANWORT

Cabomba caroliniana

PLANT TYPE: SUBMERGED

ORIGIN

- Native to the sub-tropic and temperate regions of South America.

LEAVES

- Small oblong floating leaves. Submerged leaves are finely divided and fan-shaped; they grow in pairs on opposite sides of the stem, creating a feathery effect.

FLOWERS

- Emergent, three white to pale yellow petals.

STEM

- Green-reddish colour, white or reddish-brown hairs.

HABITAT

- Rooted in silty substrate of stagnant to slow-moving waters e.g. streams, small rivers, ponds, lakes, and ditches.
- Creates thick mats in <3 m deep water.

IMPACTS

- Fast growing, forms thick mats that crowd out native plants, blocks sunlight to submerged plants, disrupts fish communities, and clogs drainage canals and streams.
- Dense stands can hinder recreational activities.

LOOKALIKE SPECIES

- Bladderwort (*Utricularia vulgaris*), white water-crowfoot (*Ranunculus aquatilis*), northern water-milfoil (*Myriophyllum sibiricum*), water marigold (*Megalodonta beckii*), and coontail (*Ceratophyllum demersum*).
- Only fanwort has opposite, finely divided, fan-shaped leaves on distinct stems.

RESTRICTED INVASIVE SPECIES (ISA)

EURASIAN WATER-MILFOIL

Myriophyllum spicatum

PLANT TYPE: SUBMERGED

ORIGIN

- Native to Eurasia and North Africa.

LEAVES

- Whorled, green, feather-like, pinnately divided with 12 or more thread-like segments.

FLOWERS

- Emergent, grow on terminal spikes above the water, reddish colour. Usually seen late summer in Ontario.

STEMS

- Leafy shoot, branching at water surface, tip is usually reddish and thin, getting thicker below the flowers.

HABITAT

- Most common in 1-3 m deep water of lakes, rivers, and ponds.

IMPACTS

- Reduces biodiversity by competing aggressively with native plants.
- Reduced oxygen levels in the water caused by decomposing plants can kill fish.
- Forms dense underwater mats that can impede recreational activities and impact aquatic habitats.

LOOKALIKE SPECIES

- Native northern water-milfoil has leaves with 11 or fewer leaf segments on each side of axis.
- Native coontails have leaves that fork in pairs.

EUROPEAN FROG-BIT

Hydrocharis morsus-ranae

PLANT TYPE: FREE-FLOATING

ORIGIN

- Native to Eurasia.

LEAVES

- Round to heart-shaped, 2.5-5 cm, forming a rosette. Green top, purple-red bottom with spongy coating along the middle vein of the leaf.

FLOWERS

- Single emergent white flower, three rounded petals, yellow centre.

HABITAT

- Slow-moving water such as sheltered inlets, shorelines, ponds, slow-running rivers, and ditches.

IMPACTS

- Forms thick mats that reduce biodiversity by crowding out native plants and preventing sunlight from reaching submerged plants.
- Decomposition removes oxygen from the water, which can affect fish communities and other aquatic life.
- Dense mats impede recreational activities and clog drainage and streams.

LOOKALIKE SPECIES

- North American frog-bit (*Limnobium spongia*) leaves have a spongy coating covering the entire bottom of the leaf. Watershield (*Brasenia schreberi*) leaves do not form a rosette and the leaves and stems under water have a slimy coating. White water lily (*Nymphaea odorata*) leaves are round and larger (15-30 cm wide).

PROHIBITED INVASIVE SPECIES (ISA)

EUROPEAN WATER CHESTNUT

Trapa natans

PLANT TYPE: FLOATING (ROOTED OR FREE-FLOATING)

ORIGIN

- Native to Eurasia and Africa.

LEAVES

- Floating leaves are alternate, forming a densely crowded rosette. Bright green, leathery, diamond/fan-shaped with sharp toothed edges. Submerged leaves are opposite, finely dissected, and feather-like.

FLOWERS

- Emergent, four white petals.

STEMS

- Has a spongy swollen section that helps the plant float.

HABITAT

- Lakes, rivers, streams, and ponds with soft substrate.
- Found commonly at 2 m depth and creates dense floating mats.

IMPACTS

- Forms extremely dense floating mats of vegetation that shades out native vegetation, which reduces plant biodiversity.
- Dense mats impede recreational activities and the hard nuts with sharp, barbed spines can accumulate on shore and cause injury when stepped on.
- Reduced light penetration combined with decomposing vegetation can lead to lowered levels of dissolved oxygen, which affects native species and can kill fish.

RESTRICTED INVASIVE SPECIES (ISA)

FLOATING PRIMROSE-WILLOW

Ludwigia peploides

PLANT TYPE: BOTTOM ROOTED, FLOATING

ORIGIN

- Native to South America, Central America, and the southeastern United States.

LEAVES

- Perennial, herbaceous aquatic plant.
- Green, smooth leaves arranged in alternate pattern.
- Early growth leaves are round, older growth leaves are longer ovals that end in more of a point.

FLOWERS

- Bright yellow flowers with five petals.

HABITAT

- Can grow in wetlands and wet terrestrial areas.
- Grows in many different waterbodies, but ideal habitat is 2-3 m deep water, with little current, such as marshes, ponds, and slow-moving rivers.

IMPACT

- Has the ability to shade out native plants and reduce water quality by removing available nutrients and oxygen in the water.
- Due to its fast growth rate, it can also cause blockages in natural drainage, irrigation, and other damages to infrastructure.

LOOKALIKE SPECIES

- Water purslane (*Ludwigia palustris*) has green flowers and opposite arranged leaves.

FLOWERING RUSH

Butomus umbellatus

PLANT TYPE: EMERGENT

ORIGIN

- Native to Africa, Asia, and Europe.

LEAVES

- Leaves resemble that of a sedge, and cross sections are triangular in shape, which narrow and spiral towards the leaf tip.
- Leaves are erect, floating, or submersed.

FLOWERS

- 20-50 pink flowers can emerge from a single plant in the shape of an umbrella. Numerous flowers can grow on a single stalk.
- Flowers have three sepals and three petals.

HABITAT

- Grows primarily along water margins, but can grow as a submerged plant with flexible leaves suspended in deeper water.
- Can tolerate a variety or soil types and acidity.
- Requires full sun and wet soil.

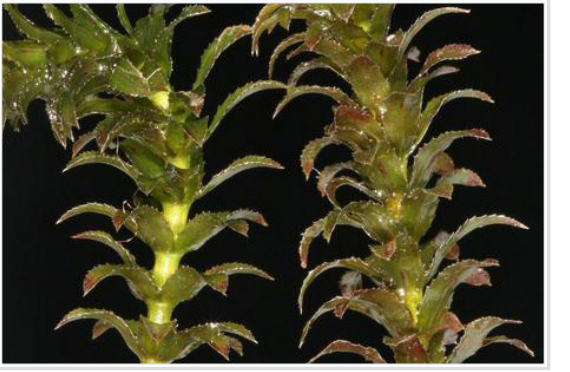
IMPACT

- Flowering rush can displace native plants by forming dense monocultures, reducing native biodiversity.
- Can facilitate increases in nutrient levels, decreases in oxygen levels, which can lead to algal blooms.
- Can impact on infrastructure functionality by forming dense stands in irrigation canals and stormwater management ponds.
- Can limit waterbody access for recreational use.

HYDRILLA

Hydrilla verticillata

PLANT TYPE: SUBMERGED



ORIGIN

- Native to Asia.

LEAVES

- Green, arranged in whorls of 3-8 on the stem. Saw-toothed edges, and sometimes prickles on underside.

FLOWERS

- Emergent, small, three white to reddish, or white to light green petals, with red stripes.

HABITAT

- Still or flowing water of rivers, lakes, ponds, wetlands, streams, and wet ditches.

IMPACTS

- Aggressive growth, may outcompete native plants.
- May form dense mats that block sunlight from reaching other submerged plants, including native species.
- Decreases oxygen levels, increases water temperature and degrades water quality by raising pH levels.
- May hinder water flow and impede recreational activities.

LOOKALIKE SPECIES

- Canadian waterweed (*Elodea canadensis*) has three leaves per whorl and no visible toothed leaf edges or prickly hairs on the leaf underside.

OXYGEN WEED

Lagarosiphon major

PLANT TYPE: SUBMERGED

ORIGIN

- Native to South Africa.

LEAVES

- Submerged, dark green, leaves strongly curled, arranged in a dense spiral.

FLOWERS

- Small, purple or pink flowers with 6 petals that grow on clear stalks on the surface of the water.

HABITAT

- Slow-moving wetlands, lakes, ponds, and streams, can grow in depths of up to 6 m.

IMPACTS

- It can be easily transported from one waterbody to another and grows aggressively to compete with native plants.
- It forms dense mats of floating vegetation, blocking available sunlight, reducing water quality, and negatively impacting fish habitat.
- Mats can dislodge and cause stagnant waters as they decompose, killing native plants and animals.
- Dense mats can hinder recreational activities, such as boating, angling, and swimming.

LOOKALIKE SPECIES

- Canadian waterweed (*Elodea canadensis*) has leaves that are grouped in three, flowers are white and have three petals. Hydrilla (*Hydrilla verticillata*) has leaves that are in groups of four to six and more spaced out, flowers are greener in colour.

PARROT FEATHER

Myriophyllum aquaticum

PLANT TYPE: SUBMERGED

ORIGIN

- Native to South America.

LEAVES

- Submerged leaves are whorled, bright green, feather-like with 20-30 segments per leaf. Emergent leaves are longer and much greener than submergent leaves.

FLOWERS

- White, occur on axils of emergent leaves and form a terminal spike above the water.

HABITAT

- Shallow waters of ponds, lakes, streams, and ditches.

IMPACTS

- May clog waterways.
- Potential to displace native vegetation.
- May impede recreational activities.

LOOKALIKE SPECIES

- Northern water-milfoil (*M. sibiricum*) has leaves with <11 segments on each axis. Native coontails (*Ceratophyllum demersum* & *C. echinatum*) have leaves that fork in pairs.

STARRY STONEWORT

Nitellopsis obtusa

PLANT TYPE: SUBMERGED

ORIGIN

- Native to parts of Europe and Western Asia.

LEAVES

- Starry stonewort resembles aquatic plants but is a filamentous algae. Thus, they do not have traditional leaves, but rather have smooth green stems with branchlets in whorls of four to six.

FLOWERS

- Small, white, star shaped bulbils that form at the nodes of rhizoids.

HABITAT

- Can grow in a variety of aquatic habitats with soft substrates ranging from 1 m–10 m deep.

IMPACT

- Starry stonewort can spread through fragmentation and can grow rapidly to create large pillows that block out sunlight, choke out native plants, and remove fish habitat.
- Can easily be transported from one waterbody to another.
- As mats decompose, they can create stagnant water and can kill other native plants and animals.
- Dense mats can hinder recreational activities, such as boating, angling, and swimming.

LOOKALIKE SPECIES

- Starry stonewort looks similar to native macroalga like *Chara* spp. (Muskgrass) or *Nitella* spp. (Brittlewort).

WATERMOSS

Genus *Salvinia*

PLANT TYPE: FREE-FLOATING

ORIGIN

- Native to South America, one species, floating watermoss (*Salvinia natans*) is native to Europe, Asia, Africa, and South America.

LEAVES

- Oval shaped.
- Floating leaves have fine hairs on the surface.
- Young leaves lie flat on the surface of the water, older leaves are forced upright, creating long chains.

FLOWERS

- None.

HABITAT

- Grows in nutrient-rich open and still waters, flood canals, and other waterbodies.
- Prefers exposure to full sunlight and warm water.

IMPACTS

- Dense mats formed by chains can degrade water quality by blocking available sunlight and removing fish habitat.
- Mats can also dislodge and cause stagnant waters as they decompose, killing native plants and animals.
- Mats can also hinder recreational activities such as boating, swimming, and angling.
- Can be easily transmitted by clinging to watercraft and watercraft equipment.

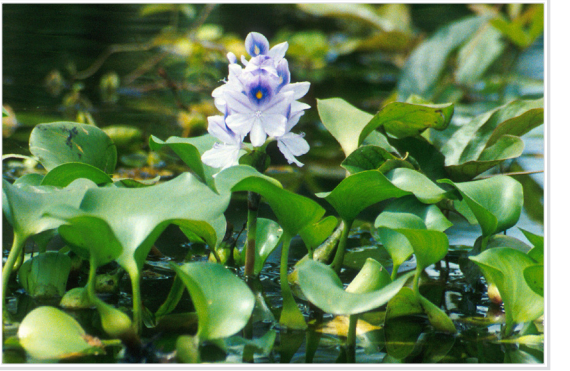
LOOKALIKE SPECIES

- Floating plant species like duckweeds (*Lemnoideae* spp.) and North American frog-bit (*Limnobium spongia*).

WATER HYACINTH

Eichhornia crassipes

PLANT TYPE: FREE-FLOATING



ORIGIN

- Native to South America.

LEAVES

- Floating or emergent; forming a rosette. Leaf blades are bright green, thick and glossy, egg-shaped to round, and appear on an inflated leafstalk filled with spongy tissue.

FLOWERS

- Emergent, showy, six violet-blue petals, loosely clustered with 4-15 flowers on a spike above the rosette. One petal is deeper violet with a yellow spot.

HABITAT

- Ponds, rivers, canals, and wet ditches in warm climates.

IMPACTS

- Outcompete and/or displaces native species for space, light, and nutrients.
- Thick mats reduce oxygen levels and can alter the composition of invertebrate and fish communities.
- Slows water flow, blocks irrigation canals, and delays hydroelectric and water treatment plants.
- Hinders recreational activities.

LOOKALIKE SPECIES

- Common arrowhead (*Sagittaria latifolia*) produce wedge-shaped leaves with white flowers whorled by threes. Pickerelweed (*Pontederia cordata*) leaves are lanceolate to oval in shape and unbranched flowering stalks produce blue-violet flowers with buds arranged all around the spike, which can produce 100 or more flowers.

WATER LETTUCE

Pistia stratiotes

PLANT TYPE: FREE-FLOATING

ORIGIN

- Native to Australia and Pacific Islands, Africa, Asia, South and Central America, West Indies, and Mexico.

LEAVES

- Ridged leaves are light green, with short white hairs, rounded edges and no stem. Leaves form a rosette that resembles a head of lettuce.

FLOWERS

- Small, white to pale green, on stalk from centre of rosette, produces a green berry that turns brown when mature.

HABITAT

- Slow-moving water, such as streams, rivers, lakes, ponds, and wet ditches.

IMPACTS

- Thick mats block sunlight and slow or prevent the growth of native aquatic plants.
- Plant decomposition reduces oxygen in the water.
- Dense mats hinder many recreational activities, restrict water flow in irrigation, and flood control canals.

WATER SOLDIER

Stratiotes aloides

PLANT TYPE: SUBMERGED BUT OFTEN BECOMES SEMI-EMERGENT DURING SUMMER MONTHS.

ORIGIN

- Europe and northwest Asia.

LEAVES

- Sword-shaped, bright green with sharp spines, forming a large rosette.

FLOWERS

- Emergent, three white petals.

HABITAT

- Slow/still water, such as ponds, ditches, fens, oxbows, and inlets of lakes.
- Occurs in water <5 m deep.

IMPACTS

- Forms dense mats of floating vegetation, which crowds out native aquatic plants resulting in decreased biodiversity.
- Potential to alter surrounding water chemistry, which may harm phytoplankton and other aquatic organisms.
- Dense floating mats hinder recreational activities.
- Sharp serrated leaf edges can cut swimmers and individuals who handle this plant.

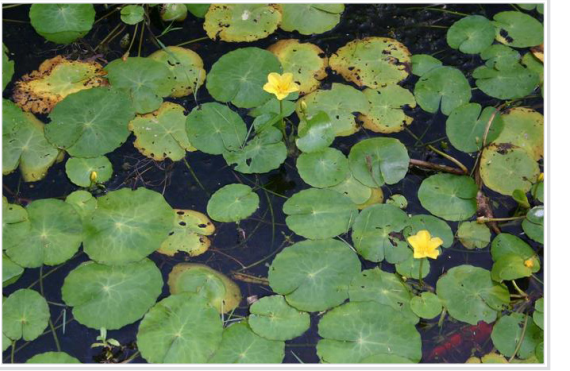
LOOKALIKE SPECIES

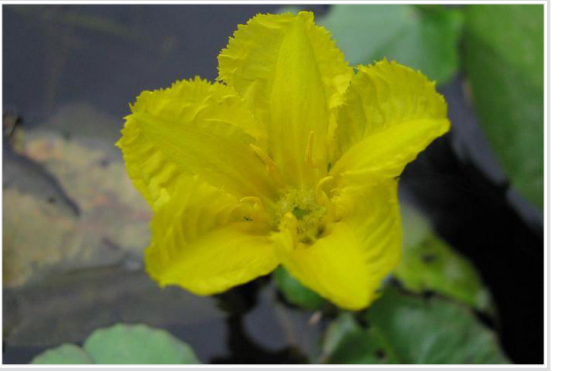
- Flowering plants are distinctive. Non-flowering plants could resemble Native bur-reeds (*Sparganium* spp.), arrowheads (*Sagittaria* spp.), and eel-grass *(Vallisneria americana*). None of these plants have serrated leaf edges.

YELLOW FLOATING HEART

Nymphoides peltata

PLANT TYPE: BOTTOM ROOTED, FLOATING





ORIGIN

- Native to southern Europe and Asia.

LEAVES

- Circular or heart-shaped.

FLOWERS

- Emergent, five bright yellow petals with fringed edges.

HABITAT

- Slow-moving water of lakes, ponds, canals, and slow-moving rivers.
- Can grow in damp mud and water up to 4 m deep.

IMPACTS

- Creates dense mats of floating vegetation.
- Shades out native aquatic plants.
- Degrades fish and wildlife habitats.
- Affects water quality by decreasing the level of oxygen.
- Makes it difficult to enjoy recreational activities.

LOOKALIKE SPECIES

- Native yellow pond and bullhead lilies (*Nuphar variegatum* & *N. advena*) have yellow flowers, but not fringed petals.

YELLOW IRIS

Iris pseudacorus

PLANT TYPE: EMERGENT

ORIGIN

- Native to Eurasia.

LEAVES

- Linear and sword-shaped.

FLOWERS

- Three bright yellow drooping sepals with purple-brown markings, surrounding three smaller upright petals.

HABITAT

- Wetlands and shallow waters along streams, rivers, ponds, and lakes.

IMPACTS

- Forms dense stands with thick mats of rhizomes and dead leaves that can displace native plants and change wetlands from a wet to a drier environment.
- Reduces habitat available for wildlife, including native fish and bird nesting and rearing sites.
- Dense mats block water flow in irrigation and flood control ditches.
- Poisonous to both humans and animals if eaten and its sap can cause dermatitis.

LOOKALIKE SPECIES

- Yellow iris is the only iris in North America with yellow petals. Without flowers, it resembles native blue flag iris (*I. versicolor*), which has shorter stems and is often purplish around the leaf base.

GLOSSARY OF PLANT TERMS

Annual
a plant that completes its life cycle in one year- germinating from seed, flowering, setting seed, and dying in one growing season.

Elongate
considerably longer than wide.

Emergent
partly submerged in water, partly above water surface.

Midvein
the central vein of a leaf.

Node
the place where a leaf or branch is attached to a stem.

Oblong
shaped like a geometrical rectangle (other than a square).

Perennial
a plant that lives for more than two years.

Rhizome
an underground stem, usually elongate.

Rosette
a cluster of leaves or other organs radiating from a centre point.

Submerged
under water.

Sepal
small leaves located directly under a flower- they are the outermost part of a flower.

Terminal
at the end, or tip of.

Turion
a winter bud; sometimes a scaly, bulb-like growth from a bud on a rhizome or other vegetative organ.

Whorl
a ring of three or more similar structures (e.g., leaves) radiating from a node or common point.

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PHOTO CREDITS

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NOTES

NOTE:

At the time of writing (July 2024), we are providing you with the most up-to-date information on the status of invasive aquatic plants in Ontario. It is important to understand that regulatory status, establishment status, and scientific names may change over time. For up-to-date information, visit **www.invadingspecies.com** or call the Invading Species Hotline at **1-800-563-7711**. For up-to-date distribution maps, visit **www.EDDMapS.org**.


ONTARIO'S
INVADING
SPECIES
AWARENESS PROGRAM


OFAH