Aquatic
Invasive Species
Guide
for Ontario's
The Land Between
Bioregion



## Foreword

This guide has been compiled for the purpose of the Blue Lakes Project through The Land Between charity.

The purpose of this guide is to provide the user with relevant information about the invasive species currently found within Ontario's "The Land Between" bioregion, with a specific focus on aquatic invasive species.

This guide will provide information about the identification, potential issues, and ways of managing different invasive species.

Invasive aquatic plants will be designated by **GREEN** pages Invasive fish species will be designated by **BLUE** pages Invasive invertebrate species will be designated by **YELLOW** pages

If you think you see an invasive species, please report any signings online through EDDMapS Ontario OR by calling the Invading Species Hotline @ 1-800-563-7711

Always follow protocols as outlined by the Ontario Ministry of Natural Resources (https://www.ontario.ca/page/managing-invasive-species-ontario) to ensure you are helping to manage the lake responsibly and within your jurisdiction.

# Table of Contents

Plants	
Carolina Fanwort (Cabomba caroliniana)	p. 5
Curly-leaved Pondweed (Potamogeton crispus)	p. 6
Eurasian Watermilfoil (Myriophyllum spicatum)	p. 7
European Frog-bit (Hydrocharis morsus-ranae)	p. 8
European Waterchestnut (Castanea sativa)	p. 9
Flowering Rush (Butomus umbellatus)	p. 10
Japanese Knotweed (Reynoutria japonica)	p. 11
Phragmites (Phragmites australis subsp. australis)	p. 12
Purple Loosestrife (Lythrum salicaria)	p. 13
Reed Canary Grass (Phalaris arundinacea)	p. 14
Rough Mannagrass (Glyceria maxima)	p. 15
Starry Stonewort (Nitellopsis obtusa)	p. 16
Water Hyacinth (Pontederia crassipes)	p. 17
Water Lettuce (Pistia stratiotes)	p. 18
Water Soldier (Stratiotes aloides)	p. 19
Yellow Floating-Heart (Nymphoides peltatum)	p. 20
Yellow Iris (Iris pseudacorus)	p. 21
Fish	
Asian Carp	p. 22
Chain Pickerel (Esox niger)	p. 23
Eurasian Ruffe (Gymnocephalus cernua)	p. 24
Goldfish (Carassius auratus)	p. 25
Rainbow Smelt (Osmerus mordax)	p. 26
Round Goby (Neogobius melanostomus)	p. 27
Rudd (Scardinius erythrophthalmus)	p. 28
Tubenose Goby (Proterorhinus semilunaris)	n 29

# Table of Contents

Invertebrates
Asian Clam (Corbicula fluminea)p. 30
Chinese & Banded Mysterysnails
(Cipangopaludina chinensis) & (Viviparus georgianus)p. 31
Rusty Crayfish (Faxonius rusticus)p. 32
Spiny Waterflea (Bythotrephes longimanus)p. 33
Zebra & Quagga Mussels
(Dreissena polymorpha) & (Dreissena bugensis)p. 34
<b>Glossary</b>
Referencesp. 38
Photo Creditsp. 39

# Carolina Fanwort

## Cabomba caroliniana





- Rooted, submergent plant
- Often found in shallow waters (< 3 m deep)</li>
- Forms thick mats
- Leaves
  - Submerged = finely divided, fanshaped, and oppositely arranged (appear feather-like)
  - Floating = small, oblong, up to 3 cm long
- Stems are green/red with white or red/brown hairs
- Flowers are 0.6-1.5 cm wide, white or pale yellow, and appear in late spring-early fall above the water

## **?** Why Are They Problematic?

- Can block sunlight from entering the water column
- Can disrupt fish habitat and change habitat composition
- Can clog waterways with dense mats
- Can interfere with recreational activities such as boating, fishing, and swimming
- Looks similar to many native plants, so it can be difficult to identify

## ( How Can I Manage Them?

#### IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Avoid boating in infested areas
  - Propellors and wave activity can break off fragments of the plant and allow it to re-root in other places



- Bladderwort (Utricularia vulgaris)
- Water Marigold (Megalodonta beckii)
- Northern Water-Milfoil (Myriophyllum sibiricum)





# Curly-Leaved Pondweed

## Potamogeton crispus





- Submerged aquatic plant
- Leaves
  - Alternately arranged, wavy in appearance
  - Light or dark green, may appear red when close to water's surface
  - Somewhat translucent
  - Sharp, finely toothed margins
- Flowers
  - o Small, red-brown in colour
  - 4 petal-like lobes
  - o 3-5 whorls of flowers on a spike
  - Appear May-September

## ? Why Are They Problematic?

- Can grow in through winter and early spring to outcompete native species
- Can create dense monocultures that impact water flow and recreational activities
- When the plant dies off, it reduces oxygen levels and can cause fish kills
- Releases phosphorus when it dies which can contribute to algal growth

## → How Can I Manage Them?

#### IF YOU SEE IT:

- Report it on EDDMapS
- o Report it on iNaturalist
- Report it using the Invading Species Hotline
- Avoid boating in infested areas
  - Propellors and wave activity can break off fragments of the plant and allow it to re-root in other places



• Richardson's Pondweed (*Potamogeton richardsonii*)





# Eurasian Water-Milfoil

## Myriophyllum spicatum







- Submerged aquatic plant
- Leaves
  - Green, circle the stem in groups of 4 or 5
  - 12 or more thread-like segments make leaves look feather-like
- Flowers
  - Tiny, reddish/pink flowers
  - Grow on spikes 5-20 cm long that
  - Rise above the water in August-September

## ? Why Are They Problematic?

- Can reduce biodiversity by aggressively outcompeting native species
- When the plant dies off, it reduces oxygen levels and can cause fish kills
- Can impact recreational activities such as boating, fishing, and swimming
- Dense stands can cause stagnant water

## ( How Can I Manage Them?

#### IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Avoid boating in infested areas
  - Propellors and wave activity can break off fragments of the plant and allow it to re-root in other places
- Clean, drain, and dry your boat and equipment after each use



- Northern Water-Milfoil (Myriophyllum sibiricum)
- Raccoontail (Ceratophyllum demersum)





# European Frog-Bit

## Hydrocharis morus-ranae





## Q What Does It Look Like?

- Can float free or be rooted (up to 40 cm long in shallow water)
- **Single white flower** with 3 rounded petals and a yellow centre up to 2 cm wide
- Leaves
  - 2.5-5 cm wide
  - Round or heart-shaped
  - Form a rosette up to 6 cm wide
  - Leaf bottom is purple-red with a spongy coating along the middle of the leaf vein

## **?** Why Are They Problematic?

- Fast-growing and can quickly outcompete native species
- Forms thick mats that can crowd out native species and reduce biodiversity
- When the plant dies and decomposes, it removes oxygen from the water which can cause fish kills
- Can impact recreational activities such as boating, fishing, and swimming
- Can clog drainage canals and streams

## ( How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Clean, drain, and dry your boats, vessels, and equipment after each use
- Remove all plants, animals, and mud from equipment before entering a new waterbody
- Avoid planting in your gardens or ponds



- North American Frog-Bit (Limnobium spongia)
- Watershield (Brasenia schreberi)
- White Water-Lily (Nymphaea odorata)





# European Water Chestnut

Trapa natans







- Floating
- Leaves (floating)
  - leathery, bright green, diamond or fanshaped with sharply toothed margins
  - Form densely crowded rosette up to 30 cm in diameter
  - Leaf stems have spongy, swollen section
- Leaves (submerged)
  - Feather-like in appearance
- Flowers
  - Very small, white, with 4 petals
- Produce a hard nut (~3-4 cm wide) with sharp, barbed spines

## **?** Why Are They Problematic?

- Forms dense floating mats that outcompete native species and reduce biodiversity
- Can impact recreational activities such as boating, fishing, and swimming
- Sharp, barbed nuts can cause injuries when they accumulate on shore
- When the plant dies and decomposes, it removes oxygen from the water which can cause fish kills



- IF YOU SEE IT:
  - Report it on EDDMapS
  - Report it on iNaturalist
  - Report it using the Invading Species Hotline
- Clean, drain, and dry your boats, vessels, and equipment after each use
- Remove all plants, animals, and mud from equipment before entering a new waterbody
- Avoid planting in your gardens or ponds







# Flowering Rush

## Butomus umbellatus





- Can outcompete native species and reduce biodiversity
- Can impact recreational activities such as boating, fishing, and swimming
- Can negatively impact habitat for native wildlife



#### IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading **Species Hotline**
- Avoid boating in areas with Flowering Rush
  - Propellors and wave activity can break off fragments of the plant and allow it to re-root in other places



- Arrowheads (Sagittaria spp.)
- Bur-Reeds (Sparganium spp.)
- Cattails (Typha spp.)







- Numerous flowers on an erect, leafless stalk
- Grows over 1.5 m tall
- Flowers
  - Umbrella-shaped clusters
  - Emergent
  - Pink with 3 sepals and 3 petals
  - o 2-2.5 cm wide
- Leaves
  - Erect
  - Floating or submersed
  - 5-10 mm wide and up to 2.7 mm long
  - Triangular in cross-section
  - Spiral towards the tips

# Japanese Knotweed

## Reynoutria japonica





- Semi-woody
- Stems are round, reddish-purple, and smooth
  - o Bamboo-like appearance
- Leaves are ovate with a flat base and pointed tips; 8-16 cm long and 5-13 cm wide
- Flowers are greenish-white
- **Fruit** is small, white, and has wings that help it disperse
- Seeds are brown and shiny

## ? Why Are They Problematic?

- Spreads quickly and creates dense thickets that degrade habitat
- Outcompetes native vegetation and reduces biodiversity
- Very aggressive root system
  - Known to break through pavement and concrete!
- Very resilient and persistent
- Can reproduce from root fragments and has weak roots
  - Likely to have pieces break off and re-establish somewhere else

## How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Do not purchase Japanese Knotweed
  - It is **illegal** to buy, sell, trade, propagate or purposely grow it
- When hiking, stay on designated trails and keep pets on leash to avoid spreading seeds to other areas



- Dogwoods (Cornus spp.)
- Native Viburnums Viburnum spp.)
  - Can include Nannyberry, Hobblebush, some Arrowwoods, etc.





# Phragmites

## Phragmites australis subsp. australis







- Erect, perennial grass
- Grows 4-6m tall
- Seed heads are densely tufted
- Leaves
  - Alternate
  - 70 cm long
  - Ligule of hairs up to 1.5 mm long
  - Blades are flat, up to 60 cm long and 8-60 mm wide

## **?** Why Are They Problematic?

- Can create dense monoculture stands and decrease biodiversity
- Provides poor habitat quality for wildlife
- Can transpire water much faster than other native species, causing lower water levels
- Increases fire hazard due to dense stands of dead material
- Can impact recreational activities such as boating, swimming, and fishing



- IF YOU SEE IT:
  - Report it on EDDMapS
  - · Report it on iNaturalist
  - Report it using the Invading Species Hotline
- When hiking or exploring shorelines, stay on designated trails to avoid spreading seeds
- Do not plant invasive Phragmites
  - It is illegal to import, deposit, release, breed/grow, buy, sell, lease, or trade in Ontario
- DO NOT MOW! This will promote spread
- Join monitoring programs such as The Land Between's Phrag Fighters!



Native Phragmites
 (Phragmites americanus)





# Purple Loosestrife

## Lythrum salicaria





- Stems are woody and square
- Can grow up to 2.4 m tall and 1.5 m wide

#### Flowers

- Spike-like clusters
- 5-7 petals that are pink/purple
- ~10 mm long

#### Leaves

- Opposite or whorled
- 3-10 cm long
- Smooth margins
- Hairy surface

## ? Why Are They Problematic?

- Can form dense stands with thick mats of roots, degrading habitat for wildlife
  - One underground stem (rhizome)
     can produce 30-50 above-ground
     stems
- Can crowd out native species and reduce biodiversity
- Large stands can clog irrigation canals, degrade farmland, and reduce property values

## → How Can I Manage Them?

#### • IF YOU SEE IT:

- o Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- When hiking, stay on designated trails and keep pets on leash to avoid spreading seeds to other areas



- Blue Vervain (Verbena hastata)
- Blazing Stars (*Liatris spp.*)
- Fireweed (Epilobium agustifolium)





# Reed Canary Grass

## Phalaris arundinacea subsp. arundinacea





## ? Why Are They Problematic?

- Can aggressively displace native wetland species
- Can clog wetlands and waterways and increase flooding and sediment build-up
- Can spread quickly (through seed and rhizome) to quickly take over large areas and reduce biodiversity



- Stems are smooth, steady, and usually hollow
- Can grow 1-2 m in height
- Leaves
  - Open sheath, clasping auricles, transparent ligules
  - Blades are 0.5-2 cm wide
  - o Flat, long, tapered
  - Held at a 45 degree angle from the stem
  - Roughly textured
- Seed heads are dense, spiky, and narrow... green when young, and grow to become more purple/brown



#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Reduce nutrient inputs around your property to prevent creating ideal conditions for growth
- Stay on designated trails and keep pets leashed to avoid spreading seeds
- Clean equipment and clothes before exploring new areas



 Bluejoint Grass (Calamagrotis canadensis)





# Rough Mannagrass

# Glyceria maxima





- Emergent
- Can grow 1-2.5 m tall
- Stems are unbranched
- Leaves
  - Blades are 30-60 cm long, flat, pointed
  - Shallowly grooved, prominent midribs, visible transverse veins
  - Bright green but can be red-tinged
  - Leaf margins are hairy

#### Flowers

- Appear June-August
- In long, open branches... branches have stiff hairs

## **?** Why Are They Problematic?

- Can form large, dense monocultures and reduce biodiversity
- Can form dense floating mats in deeper water and block sunlight used by other native species
- Thick root mats can alter flow regimes and cause sediment build-up and flooding
- Creates poor food and habitat for native wildlife



#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Stay on designated trails and keep pets leashed to avoid spreading seeds
- Ensure to clean and remove any plant parts all equipment, clothes, or tools before travelling to a new area



 American Mannagrass (Glyceria grandis)





# Starry Stonewort

Nitellopsis obtusa





- Macroalgae
- No roots
- Thin stems and branchlets, similar to thick fishing line
- Whorls of 4-6 branchlets from 1 main shoot
  - o Branchlets have blunt tips
- White, star-shaped bulbils at the nodes
  - o 3-6 mm wide
- Can form dense mats up to 3 m thick in water 2-10 m deep

## **?** Why Are They Problematic?

- Can form dense mats (sometimes called "pillows") that can compete aggressively with native plants and reduce biodiversity
- Can impact the movement of fish, water flow, and recreational activities like boating, fishing, and swimming
- Able to spread very quickly when introduced to a new area via plant fragments



#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Do not boat in infested areas
  - Propellors and wave activity can break off fragments of the plant and allow it to re-root in other places
- Remove all plant fragments from equipment, clothes, or other tools when moving between areas to prevent re-growth



• Muskgrass (Chara spp.)





# Water Hyacinth

## Pontederia crassipes





- Grows and spreads rapidly
- Forms dense, floating, tangled mats of vegetation that can shade out native plants
  - Mats can also speed up succession, making areas more desirable to terrestrial plant species and reduce biodiversity
- Can restrict water flow and increase flood risk
- Can impact navigation and recreational activities like boating, fishing, and swimming

# Native Lookalikes

- Water Arum (Calla palustris)
- Pickerelweed (Pontideria cordata)



## Q What Does It Look Like?

 Emergent aquatic plant. ~60-120 cm tall

#### Leaves

- Thick and shiny, almost **glossy**
- Roundish/elliptic with a rounded top and cylindrical base, ~15 cm wide
- o 6-8 leaves per plant
- Petioles are inflated up to 30 cm long that help the plant float

#### Flowers

- Single spike with 8-15 flowers up to 30 cm long
- Violet-blue
- One petal has a darkened middle area with a yellow spot
- Appear between early spring late fall

## How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Clean, drain, and dry your boats and equipment before entering new areas to prevent seed spread





## Water Lettuce

## Pistia stratiotes





- Free-floating aquatic plant
- Has roots that float freely under the plant
- Resembles a head of lettuce, 6-30 cm wide and ~15 cm long
- Leaves
  - o Form a tight rosette
  - o Thick, velvety, spongy
  - Light green
  - 7-15 prominent ridges run parallel to each other
  - Rounded at the top
- Flowers
  - o Small, white to pale green

## ? Why Are They Problematic?

- Form large, dense mats that can impede water flow and interfere with recreational activities (boating, fishing, swimming)
- Decomposing plant matter reduced oxygen in the water, impacting fish and other aquatic organisms
- Can reproduce from fragments and break apart very easily
- Can change physical and chemical aspects of the water (pH, velocity, nutrient levels, etc.)



#### How Can I Manage Them?

#### IF YOU SEE IT:

- Report it on EDDMapS
- o Report it on iNaturalist
- Report it using the Invading Species Hotline
- Do not boat in infested areas
  - Propellors and wave activity can break off fragments of the plant and allow it to reproduce in other places









# Water Soldier

## Stratiotes aloides





## Q What Does It Look Like?

- Submerged with emergent leaves
- Resembles an aloe plant
- Leaves
  - Sword-shaped, up to 40 cm long
  - Bright green
  - Have sharp spines (serrated)
  - Form a large rosette
- Flowers
  - White with 3 petals
  - Not common to flower in Ontario
- Roots can either be lightly rooted in the mud or unattached

## ? Why Are They Problematic?

- Form dense mats that crowd out native plants and reduce biodiversity
- Can impact recreational activities (boating, fishing, swimming)
- Potential to alter water chemistry, which can harm algae and other aquatic organisms
- Have sharp, serrated leaves that can cut swimmers or those who handle the plant
- Can produce clones, similar to a spider plant

## $\odot$

## How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- o Report it on iNaturalist
- Report it using the Invading Species Hotline
- Do not buy Water Soldier
  - It is illegal to import, possess, deposit, release, transport, breed/grow, buy, sell, lease, or trade it in Ontario.
- Avoid infested areas when boating
  - Propellors and wave activity can break off fragments of the plant and allow it to reroot in other places
- Clean, drain, and dry your boat and equipment after each use to prevent plant spread



- Bur-Reeds (Sparganium spp.)
- Arrowheads (Sagittaria spp.)





# Yellow Floating-Heart

Nymphoides peltata





 Aquatic, bottom-rooted, perennial plant

PLANT

- Stems are located beneath the water's surface, are long and branched, reaching up to 1m or more
- Leaves are ~3 to 10 cm and circular or heart-shaped
- **Flowers** are bright yellow with 5 petals
- **Seed capsules** contain numerous flat, oval seeds

## **?** Why Are They Problematic?

- Shade out native aquatic plants
- Degrade fish and other wildlife habitats
- Decrease oxygen levels in water, creating stagnant water environments
- Impact recreational activities such as boating, fishing, and swimming

## How Can I Manage Them?

#### IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Avoid infested areas when boating
  - Propellors and wave activity can break off fragments of the plant and allow it to re-root in other places



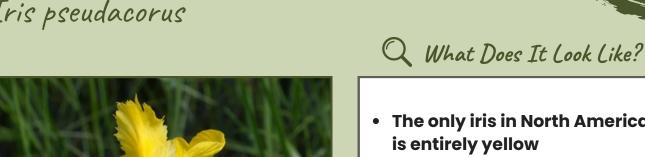
 Variegated/Bullhead Pond-lily (Nuphar variegata)





## Yellow Iris

## Iris pseudacorus





• Can grow 30 cm to 1 m tall in groups of 2 to 10

#### Flowers

- 3 drooping, deep-yellow sepals with purple/brown markings
- Bloom between April and July

#### Leaves

- Flattened, 2-3 cm wide and up to 1 m
- Fan out from the plant base



- Can form dense stands with thick mats of rhizomes and dead leaved
  - Can displace native plants and dry out wetlands
  - Can block water flow
- Reduces habitat available for wildlife
- Dangerous to both humans and wildlife
  - Poisonous if ingested
  - Contact with sap can cause dermatitis



#### IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Stay on designated trails and paths when exploring to prevent spreading plant fragments and seeds



- Blue Flag Iris (Iris versicolor)
- Cattails (Typha spp.)
- Sweet Flags (Acoraceae spp.)





# Asian Carps



# Bighead carp Silver carp Grass carp

Black carp

Hypophthalmichthys nobilis

Hypophthalmichthys molitrix

Ctenopharyngodon idella

Mylopharyngodon piceus

## Q What Does It Look Like?

#### Bighead Carp

- 2-4 kg (can weigh up to 40 kg)
- Large heads with toothless mouths
- o Dark grey in colour; mottled
- Eyes sit below the mouth

#### Silver Carp

- o Smaller than Bighead Carp
- Silvery colour with white belly
- Eyes sit below the mouth

#### Grass Carp

- Large scales, appear cross-hatched
- Eyes sit in line with the mouth

#### Black Carp

Look similar to Grass Carp, typically darker in colour

## ? Why Are They Problematic?

- Can displace and outcompete native species for food and resources
  - Can eat 40% of their body weight EACH DAY!
- Grow quickly
- Reproduce quickly
  - Can lay more than I million eggs in a single spawning event
- Can grow very large and create dangers to lake users

## → How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Inspect your boat, trailer, or fishing gear before leaving or getting to a new fishing spot.
- Release water from your motor, live well, bilge, and transom wells once on land
- Do not capture Asian Carps
  - It is illegal to possess them in Canada unless they are dead and eviscerated



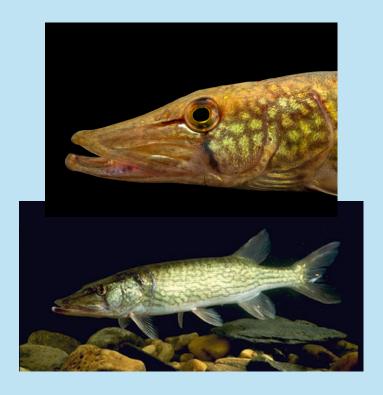
 Many common baitfish [ex. Shiners, Minnows, Lake Herring (Cisco), Blacknose Dace, Creek Chub, Fallfish]





# Chain Pickerel

## Esox niger





- Highly predatory, feeds on native fish and their young
- Outcompetes native fish for food and habitat
- Able to hybridize with native species (ex. Grass Pickerel or Northern Pike) and decrease genetic diversity
- Often introduced to areas as a sportfish

# Native Lookalikes

- Grass Pickerel (Esox americanus)
- Northern Pike (Esox lucius)
- Muskellunge (Esox masquinongy)



## What Does It Look Like?

- Can measure up to 95 cm long
- Green sides with dark, interconnecting lines over yellowgreen areas... resemble a chain pattern
- Jaws are elongated with large, sharp teeth
- Dorsal fin is large and located far back, close to the tail
- Cheeks and gills are fully scaled
- Has a dark, vertical bar that extends from the eye to the bottom of the cheek

## How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Inspect your boat, trailer, or fishing gear before leaving or getting to a new fishing spot.
- Release water from your motor, live well, bilge, and transom wells once on land
- **Do not** release live fish into Ontario water bodies





# Eurasian Ruffe

## Gymnocephalus cernua





## Q What Does It Look Like?

- Perch-like body, lack dark vertical stripes like native Perch
- Less than 20 cm long
- Glassy eyes
- Turned down mouth
- Front and dorsal fins are jointed
  - First fin → 11-16 sharp, stiff spines with rows of dark spots between them
  - Second fin → soft, flexible rays
- Sharp spines on anal fins and gill covers
- No scales on their head

## ? Why Are They Problematic?

- Capable of adapting to a wide range of environmental conditions... allows them to thrive in many areas
- Can directly compete with native Yellow Perch for food, habitat, and by preying on their eggs
- Reproduce and grow rapidly
- Have few predators
  - Sharp fin spines make it difficult for other organisms to eat them

## How Can I Manage Them?

#### IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Do not release live fish into Ontario lakes or rivers
- Empty bait buckets on dry land or dispose of in the garbage... if you want to save your bait for later, salt or freeze it



- Juvenile Walleye (Sander vitreus)
- Yellow Perch (Perca flavescens)
- Trout Perch (Percopsis omiscomaycus)





# Goldfish Carassius auratus







## ? Why Are They Problematic?

- Competes with and is a predator of native fish and other organisms (insects, snails)... reduces biodiversity
- Stirs up mud when they feed, increasing water cloudiness and impacting plant growth
- Potential to live many years (30-40) in proper conditions
- Can carry diseases (such as the Koi herpesvirus) which can harm local fish populations
- Often are released from aquariums, which is illegal

## Q What Does It Look Like?

- Elongated bodies, average 12-22 cm long but can grow up to 40 cm long
- Typically bright orange, can be olive green or creamy white
- Head and eyes are large relative to the rest of the body
- **Dorsal fin** is long with a single stout, serrated spine
- Anal fin is short with a single stout, serrated spine
- Tail is deeply forked
- Mouth is small with no trailing whiskers (barbels)



#### IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Do not release live fish into Ontario waterbodies
  - If you have unwanted aquarium fish, return or donate to a pet store or somewhere able to take fish
- Remove all mud, plants, and animals from equipment before using them in another water body









# Rainbow Smelt

## Osmerus mordax





- Long, slim bodies ~19 cm long
- Olive green on the back, purple, pink or blue iridescence on the sides, silver belly
- Mouth is large relative to the fish
- Protruding lower jaw and large canine teeth on the roof of the mouth and tongue
- **Single dorsal fin** in the middle of its back
- Adipose fin present
- Scales are small and easily detached when handling

## **?** Why Are They Problematic?

- Have eating habits that can disrupt food webs
- Can decline zooplankton populations for other native species
- Prey on native fish eggs and juveniles
- Has reduced native fish populations of Walleye, Yellow Perch, Lake Herring (Cisco), Lake Whitefish, and Lake Trout

## How Can I Manage Them?

- IF YOU SEE IT:
  - Report it on EDDMapS
  - Report it on iNaturalist
  - Report it using the Invading Species Hotline
- Do not use live Rainbow Smelt as bait;
   it is illegal
  - Dead Rainbow Smelt MAY be used, but check your local Fisheries Management Zone to review rules set in place
- Do not release live fish or bait into Ontario waterbodies
- When cleaning Rainbow Smelt, ensure you do not dump entrails into nearby waterbodies

# Native Lookalikes

- Minnows (Cyprinidae sp.)
- Lake Whitefish (Coregonus clupeaformis)
- Lake Herring (Cisco) (Coregonus artedi)





# Round Goby

## Neogobius melanostomus

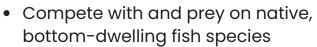






- Bottom-dwelling
- 6-16 cm long
- Cylindrical body
- Rounded/blunt snout
- Nostril tubes do not reach the upper lip
- Prominent black spot on dorsal fin
- Fused, scallop-shaped pelvic fin
- Brown or olive in colour with dark brown spots... can appear almost entirely black
- Fully scaled body

## ? Why Are They Problematic?



- Reduce populations of sportfish by eating their eggs and young and by outcompeting for food resources
- Research suggests they are linked to outbreaks of botulism type-E in Great Lakes fish and fish-eating birds

## $\langle \rangle$

## How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Never use Round Goby as bait; it is illegal
- Round Goby cannot be released into waterbodies... if you catch one, it is recommended to destroy it
- Always clean, drain, and dry your boat, trailer, and other equipment after each use



- Mottled Sculpin (Cottus bairdii)
- Slimy Sculpin (Cottus cognatus)





# Rudd

## Scardinius erythrophthalmus







- Relatively large, 10-25 cm long
- Deep-bodied minnow
- Small, upturned mouth
- Fins are bright red
- Fully scaled belly (keel)
- Eyes are red or have a red spot

## ? Why Are They Problematic?

- Can adapt to a variety of environmental conditions and are tolerant of poor quality water
- Able to breed with Golden Shiner, an important native baitfish
  - o Offspring are also considered invasive
  - Can create loss of genetic diversity in Golden Shiner
- Compete with native species for habitat and food
- Can degrade spawning and nursery habitat along shorelines for native fish

## How Can I Manage Them?

- IF YOU SEE IT:
  - Report it on EDDMapS
  - Report it on iNaturalist
  - Report it using the Invading Species Hotline
- Never buy or keep live Rudd; it is illegal
- Inspect your boat, trailer, or fishing gear before leaving or getting to a new fishing spot.
- Release water from your motor, live well, bilge, and transom wells once on land



 Golden Shiner (Notemigonus crysoleucas)





# Tubenose Goby

## Proterorhinus semilunaris



## Q What Does It Look Like?



- Small, bottom-dwelling fish
- Fused scallop-shaped fin
- Light grey, light brown, olive, or tan
- Black or reddish-brown mottling
- Small nostril tubes extend over upper lip
- Fully scaled body

## ? Why Are They Problematic?

- Many long-term impacts not yet known
  - Further research is necessary
- Compete with native fish species for food and habitat
- Eat the young of other native fish species
- Prefer areas near shores of lakes and rivers... may compete with other native species in these area

## How Can I Manage Them?

- IF YOU SEE IT:
  - Report it on EDDMapS
  - · Report it on iNaturalist
  - Report it using the Invading Species Hotline
- Never use Tubenose Goby as bait; it is illegal
- Tubenose Goby cannot be released into waterbodies... if you catch one, it is recommended to destroy it
- Remove all mud, plants, and animals from equipment before using them in another water body



- Mottled Sculpin (Cottus bairdii)
- Slimy Sculpin (Cottus cognatus)





# Asian Clam Corbicula fluminea







- Oval/triangular shaped shell up to
   25 mm wide
- Light green and brown in colour
- Elevated concentric ridges
- Serrated lateral teeth (must be seen through a magnifier)
- Muscular foot extends out from the shell with travelling

## **?** Why Are They Problematic?

- Can fertilize their own eggs
- Population densities can reach a whopping 10,000 per square foot
- Negatively impact food webs
- Reduce biodiversity
- Clog intake pipes and interfere with infrastructure
  - o Can cost millions of dollars in damages
- Are commonly used as fishing bait or eating in some areas
- Not yet identified in The Land
   Between, but is in surrounding areas

## How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Do not release leftover live bait into water bodies – it is illegal
  - You can freeze or salt the bait to save for next time, OR
  - Throw it in the garbage
- Inspect your boats, fishing gear, and trailer before leaving and entering new areas
- Release water from your motor, live well, bilge, and transom once you are on land



Fingernail or Pea Clams (Pisidiids)





# Chinese & Banded Mystery Snails







Cipangopaludina chinensis



Viviparus georgianus

- Chinese Mystery Snail (top)
  - o 6.5 cm or less
  - Spherical shoulder whorls separated by prominent grooves
  - o Brown or olive-green in colour
  - Operculum is oblong with concentric growth lines
- Banded Mystery Snail (bottom)
  - o 3.5 cm or less
  - Spherical with whorls separated by prominent grooves
  - Yellow/greenish-brown in colour
  - o 3-4 dark reddish-brown spiral bands
  - Operculum is ear-shaped with concentric growth lines

## **?** Why Are They Problematic?

- Can reproduce and spread rapidly
- Can prey on fish eggs
- Out-compete native snails for food and habitat, reducing biodiversity
- Chinese Mystery Snail has been reported to clog water intake pipes
   Can be expensive to fix damages
- Can thrive in degraded areas including fresh or brackish waters with silt, sand, and mud substrates

## ( How Can I Manage Them?

#### IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Clean all equipment with a high pressure wash, hot water, OR let it dry in the sun for at least 5 days before using again
- Drain water from motor, live well, bilge, and transom wells once you are on land

## Native Lookalikes

 Similar looking native freshwater snails can be found in Quebec, but experts are often needed to differentiate them





# Rusty Crayfish

## Bythotrephes longimanus





## Q What Does It Look Like?

- 7.5-13 cm long (from rostrum to tail)
- Rusty patches on each side of the shell, about where you would place your fingers if picking one up
- Grayish-green to reddish-brown claws; black bands near their tips
- Claws have an oval gap when closed
- Rostrum is smooth, pinched, and distinctly concave

## **?** Why Are They Problematic?

- Outcompete native crayfish species for food and resources, reducing biodiversity and severely impacting native crayfish populations
- Better at avoiding being eaten by fish, so less likely to be preyed upon
- Eat large amounts of aquatic vegetation, reducing fish habitat
- Females can carry fertilized eggs under their tail for long distances, allowing them to spread rapidly

### ✓) How Can I Manage Them?

#### **IF YOU SEE IT:**

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- If you want to use crayfish as bait, you can only use them in the waterbody that they were caught
  - It is **illegal** to transport them over land
  - The maximum number of live crayfish you can have is 36



- Northern Clearwater Crayfish (Orconectes propinguus)
- Virile Crayfish (Orconectes virilis)





# Spiny Waterflea

## Bythotrephes longimanus





## Q What Does It Look Like?

- Total length can reach 1.5 cm
  - About 60% of their length is made up of the tail spine
- Tail is straight or slightly angled with
   1-3 barbs and a pointed end
- Red stripe runs half the length of the tail
- May have orange, blue, or green colouring
- Single dark eye
- Four pairs of legs
- Branched antennae
- Balloon-like egg pouches

## **?** Why Are They Problematic?

- Compete with native fish for food resources (zooplankton)
- Greatly reduce zooplankton populations
  - o Can reduce by 30-40%
- Can multiply quickly
- Easily spread through water bodies via fishing equipment, bait buckets, bilges, and live wells
- Can impact fishing... their tail spines catch on fishing gear, making it difficult to reel lines and can clog nets

## How Can I Manage Them?

- IF YOU SEE IT:
  - Report it on EDDMapS
  - Report it on iNaturalist
  - Report it using the Invading Species Hotline
- Clean all equipment with a high pressure wash, hot water, OR let it dry in the sun for at least 5 days before using again
- Drain water from motor, live well, bilge, and transom wells once you are on land



Daphnia (Daphnia longispina)

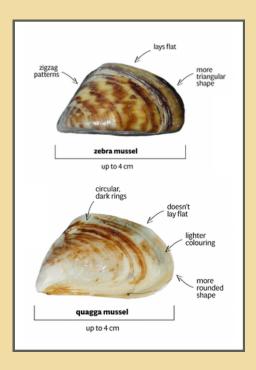




# Zebra & Quagga Mussels

## Dreissena polymorpha

## Dreissena bugensis





- Freshwater bivalves
- Zebra Mussels
  - Average 2-2.5 cm long, can be up to 4 cm long
  - o Sits flat on its underside
  - Triangular shape, like a "D"
  - Black or brown with white/yellow zigzags
- Quagga Mussels
  - Average 2 cm long, can be up to 3 cm long
  - Does not sit flat
  - Round in shape
  - Dark concentric rings on shell
  - o Pale colour near hinge

## ? Why Are They Problematic?

- Filter water excessively to a point where food sources (plankton) are removed from the system
  - Can alter food webs
- Makes water clearer and lets more sunlight in causing:
  - o Shifts in aquatic vegetation growth
  - Growth of harmful algal blooms as they do not feed on toxic algae
  - Increases in pathogenic bacteria, avian botulism, and anoxia
- Can increase
- Very sharp shells can cause injuries to fishers and swimmers

## How Can I Manage Them?

#### • IF YOU SEE IT:

- Report it on EDDMapS
- Report it on iNaturalist
- Report it using the Invading Species Hotline
- Drain water from motor, live well, bilge, and transom wells when you are on land
- Clean your equipment with a high pressure wash, hot water, OR let it sit in the sun for at least 5 days before using again

## Native Lookalikes

 Some native freshwater mussels, experts may be needed to help differentiate species





# Glossary

Adipose Fin: a small, fleshy, rayless fin found between the dorsal and caudal fins

Baitfish: small-sized fish (usually minnows) caught and used by anglers to catch other fish

Barbels: slender, whisker-like sensory organs near a fish's mouth

**Biodiversity**: the variety of life in a particular ecosystem... the amount of different species present

**Brackish Water**: Natural waters that are more salty than freshwater, but not as salty as sea water

Bulbil: a small, bulb-like structure that can form a new plant

Concave: curves inward

**Concentric**: arcs that are stacked on top of one another, sharing the same middle-point. Ex. a rainbow

Dermatitis: skin irritations or rashes caused by various sources

**Elliptic Leaf**: a leaf that is widest in the middle and tapers at both ends. Similar shape to an eye

**Emergent Plant**: A type of rooted aquatic plant that roots in the sediment and has leaves or flowers that grow above the water

Food Web: All food chains in an ecosystem

**Free-Floating Plant**: A type of aquatic plant that is not rooted to anything and floats along the surface of the water

**Genetic Diversity**: the variety of genes within a species

**Harmful Algal Bloom**: large growths of algae that can cause health issues to humans and wildlife. Typically made of blue-green algae (cyanobacteria)

**Hybridize**: to cross-breed between species

# Glossary

**Invasive Species:** a species that has not historically been reported in the area. Typically cause some kind of financial stress or harm

**Iridescence:** showing luminous colours that seem to change colours when seen from a different angle

Large Stand: greater than or equal to 15 individuals of a species

**Leaf Margin**: the outer edge of a leaf

**Ligule**: a membranous scale on the inner side of the leaf sheath... grows at the meeting point between the leaf sheath and the blade

Midrib: the central vein of a leaf

Monoculture: a dense growth of only one species

**Native Species**: a species that has been reported to be historically present in an area. Typically, it evolved in the area or arrived there naturally, without human intervention

Node: a specific point along a plant's stem where leaves, buds, or branches originate

**Operculum**: a specialized structure that covers the shell opening when a snail retracts into its shell. Similar to a trapdoor or a lid

**Ovate Leaves**: a leaf that is broad at the base and gets narrower towards the leaf's tip. Egg-shaped.

Pathogenic Bacteria: bacteria capable of causing or spreading disease in living organisms

**Perennial**: a type of plant that regrows every year

Petiole: the stalk that joins a leaf to the stem on a plant

Plant Fragment: a piece of a plant; leaf, stem, root

**Rhizome**: a stem that grows horizontally underground that can put out lateral shoots to form new plants from one original plant

## Glossary

Rooted Plant: a plant that roots itself in the ground

**Rosette**: a formation of leaves that is circular or spirally arranged radiating out from the base of the plant

**Rostrum**: a beak-like projection (stiff snout or prolongation of the head) found in insects, crustaceans, or cetaceans

Serrated: a leaf whose margin is jagged or saw-like

**Sepals**: the small, green, leaf-like growth on the underside of a flower... encloses the petals before a flower blooms

Small Stand: less than 15 individuals of a species

**Spawning Event**: the period of time when fish breed... the release of eggs and sperm into the water for the purpose of fertilization and reproduction

**Sport Fish**: a fish that is pursued for the enjoyment of the fishing experience rather than for its value as food

**Stagnant Water**: water that is not circulating or flowing... can become a breeding ground for bacteria, parasites, mold, and other microorganisms

**Submergent Plant**: a type of aquatic plant that is rooted in sediment and grows entirely underneath the water

**Succession**: the progressive change in the composition of an ecosystem over time. Ex. a grassland will eventually turn into a forest via succession.

Transpiration (transpire): the exhalation of water vapor by a plant through its stomata

**Transverse Veins**: smaller veins that connect larger, longitudinal veins... creates a network or grid-like structure

**Whorl(ed) Leaves**: 3 or more leaves emerging from the same point on a stem. These leaves are typically evenly spaced, creating a circular or spiral pattern when viewed from above

**Zooplankton**: very small animals that live in water bodies. A very important piece of many food chains

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