



INVASIVE

FISH

SPECIES

A QUICK REFERENCE GUIDE





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TABLE OF CONTENTS

Introduction	6
How do invasive fish arrive and spread?	7
Invasive Species Act, 2015	7
Prohibited invasive fish species as of January 1, 2018.....	8
What can I do about invasive fish?	9
How to report invasive species	9
Template for reporting a sighting.....	10
.....	
Bighead Carp (Asian Carps) <i>Hypophthalmichthys nobilis</i>	12
Black Carp (Asian Carps) <i>Mylopharyngodon piceus</i>	14
Grass Carp (Asian Carps) <i>Ctenopharyngodon idella</i>	16
Silver Carp (Asian Carps) <i>Hypophthalmichthys molitrix</i>	18
Eurasian Ruffe <i>Gymnocephalus cernua</i>	20
Goldfish <i>Carasius auratus</i>	22
Northern Snakehead <i>Channa argus</i>	24
Round Goby <i>Neogobius melanostomus</i>	26
Tube-nose Goby <i>Proterorhinus marmoratus</i>	28
Rudd <i>Scardinius erythrophthalmus</i>	30
Stone Moroko <i>Pseudorasbora parva</i>	32
Tench <i>Tinca tinca</i>	34
Wels Catfish <i>Silurus glanis</i>	36
Zander <i>Sander lucioperca</i>	38
.....	
Glossary of fish terms.....	40
Fish anatomy.....	42
References used	43
Photo credits	44

INTRODUCTION

Invasive species are plants, animals, and micro-organisms that, when introduced outside of their natural environment, out-compete 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 fish and their ecosystems.



Invasive fish, by contrast, are a concern because they have a 'displacement capacity,' meaning they out-compete our native fishes for space, food, and other resources.

HOW DO INVASIVE FISH ARRIVE AND SPREAD?

Invasive fish can be introduced and spread in a variety of ways including ballast water, movement of bait, the aquarium and water garden trades, live food trade (fish), unauthorized introductions, and canals and water diversions.

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 threat. Some key elements of the Invasive Species Act 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 FISH SPECIES REGULATED AS PROHIBITED UNDER THE INVASIVE SPECIES ACT, 2015 AS OF JANUARY 1ST, 2018

In Ontario, it's **illegal** to import, possess, deposit, release, transport, breed/grow, buy, sell, lease, or trade these species:

Bighead Carp (*Hypophthalmichthys nobilis*) page 12

Black Carp (*Mylopharyngodon piceus*) page 14

Grass Carp (*Ctenopharyngodon idella*) page 16

Silver Carp (*Hypophthalmichthys molitrix*) page 18

Snakeheads (all species of *Channidae*) page 24

Stone Moroko (*Pseudorasbora parva*) page 32

Wels Catfish (*Silurus glanis*) page 36

Zander (*Sander lucioperca*) page 38

Under the Federal Fisheries Act, it is illegal to possess, transport, or release the following invasive fish unless they are dead: Round Goby, Tubenose Goby, Ruffe, and Rudd

WHAT CAN I DO ABOUT INVASIVE FISH?

- » Learn to identify invasive fish species that are a threat to Ontario and how to prevent the spread of these unwanted species.
- » Never buy or keep live invasive fish. If you have any information about the illegal importation, distribution, or sale of invasive fish, report it immediately to the Ministry of Natural Resources and Forestry TIPS line at **1-877-TIPS-MNR (847-7667)** toll-free any time.
- » Don't release any live fish into Ontario lakes, rivers, or streams. Return or donate unwanted aquarium fish to a pet store or local school.
- » 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.
- » If you see an invasive fish in the wild, please contact the toll-free Invading Species Hotline at **1-800-563-7711** or report a sighting online at EDDMapS.org/Ontario

HOW TO REPORT INVASIVE SPECIES

- » **Call:** 1-800-563-7711
- » **Email:** info@invadingspecies.com
- » **Create a profile:** on EDDMapS.org/Ontario and submit your reports digitally.

TEMPLATE FOR REPORTING A SIGHTING

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

What?

What species do you suspect you encountered?
Are there native lookalikes that you may not have considered?

Picture?

In order to confirm reports, a picture is required. However, with some high-priority species (e.g. Asian Carps), it is best to always report!

When and where?

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

Specimen?

Do you have the fish in hand?

Species Profiles

BIGHEAD CARP (ASIAN CARPS)

Hypophthalmichthys nobilis

CYPRINIDAE / MINNOW AND CARP FAMILY



ORIGIN (NOT CURRENTLY KNOWN IN ONTARIO)

- » Native to China and far eastern Russia, it was introduced to the US in the 1960's and 70's for water quality management in fish culture ponds.
- » Flooding resulted in their escape into the Mississippi River Basin.

DESCRIPTION

- » Deep-bodied fish with a large toothless mouth and very large head that is about 1/3 of total length.
- » Eyes are located forward and low on the head, well below the axis of the body.
- » Coloration is dark gray above and cream-coloured below with dark gray to black irregular blotches on the back and sides.
- » Can measure up to 1.5 m and weigh up to 41 kg.

HABITAT

- » Spawning occurs in moderate to large rivers and lakes with areas of slow current and depths of more than 2 metres.
- » Extremely adaptable and can adapt and thrive in many freshwater environments.

IMPACTS

- » Filter large amounts of plankton out of the water column to a greater degree than native fishes.
- » May cause a large decrease in native forage fish.
- » May result in a decrease of sport fish species that feed on forage fish.

LOOKALIKE SPECIES

- » Gizzard Shad, Mooneye, Alewife (introduced).

BLACK CARP (ASIAN CARPS)

Mylopharyngodon piceus

CYPRINIDAE / MINNOW AND CARP FAMILY



ORIGIN (NOT CURRENTLY KNOWN IN ONTARIO)

- » Large rivers and lakes in eastern Asia from southern Russia to southern China and Vietnam.
- » Introduced to the US in the 1960's and 70's for water quality management in fish culture ponds.
- » Flooding resulted in its escape into the Mississippi River Basin.

DESCRIPTION

- » Appears elongated and laterally compressed.
- » Large scales with appearance of crosshatching, terminal mouth with pharyngeal teeth.
- » Colour is anywhere from a brown to black with a lighter underbelly and their fins are a darker colour (appear lighter near the base).
- » Scales are large with a crosshatch pattern and they can grow to 1.8 m and 35 kg.

HABITAT

- » Prefer habitats in the lower reaches of rivers and lakes with spawning occurring in areas of high turbulence.

IMPACTS

- » Predates primarily on mollusks and may impact many species at risk if introduced to the Great Lakes.
- » Compete with native fishes for food and habitat.

LOOKALIKE SPECIES

- » Fallfish, Creek Chub, Common carp (introduced)

GRASS CARP (ASIAN CARPS)

Ctenopharyngodon idella

CYPRINIDAE / MINNOW AND CARP FAMILY



ORIGIN

- » Large rivers and lakes in eastern Asia from southern Russia to northern Vietnam.
- » Introduced to the US in the 1960's and 70's for vegetation management in fish culture ponds.
- » Flooding resulted in its escape into the Mississippi River Basin.

DESCRIPTION

- » Oblong in shape with a broad head.
- » The eyes appear small and are centred on the side of the head.
- » Large, crosshatched pattern scales and lacks serrated fin rays.
- » The colouration varies from an olive-brown at the top to a brassy/silver-white towards the sides and belly.
- » Their length can be 1.5 m and up to 45 kg.

HABITAT

- » Prefer large, slow moving water bodies and will spawn in large rivers with a moderate current.

IMPACTS

- » Alter habitat through feeding of aquatic vegetation; may cause water to become more turbid by uprooting plants and disturbing sediment.
- » Compete with native fishes for food and habitat.

LOOKALIKE SPECIES

- » Creek Chub, Common Carp (introduced), Fallfish, Bigmouth Buffalo.

SILVER CARP (ASIAN CARPS)

Hypophthalmichthys molitrix

CYPRINIDAE / MINNOW AND CARP FAMILY



ORIGIN (NOT CURRENTLY KNOWN IN ONTARIO)

- » Large rivers, canals and lakes in eastern Asia from southern Russia and North Korea to southern China.
- » Introduced to the US in the 1960's and 70's for water quality management in fish culture ponds.
- » Flooding resulted in its escape into the Mississippi River Basin.

DESCRIPTION

- » Deep-bodied with a moderately large, broad head.
- » Toothless with an upturned lower jaw and eyes located below the axis of the body.
- » Silver in colour with a gray head and dorsal surface.
- » The belly is white with a keel that extends from the anal fin to the throat.
- » Can reach lengths of 1 m and weighs up to 27 kg.

HABITAT

- » Prefers stagnant waters of rivers, canals, and lakes.

IMPACTS

- » Filter large amounts of plankton out of the water column to a greater degree than native fishes.
- » May cause a large decrease in native forage fish.
- » May result in a decrease of sport fish species that feed on forage fish.

LOOKALIKE SPECIES

- » Gizzard Shad, Mooneye, Alewife (introduced).

EURASIAN RUFFE

Gymnocephalus cernua

PERCIDAE / PERCH FAMILY



ORIGIN

- » Native to northern Europe and Asia.
- » It was likely transported to North America in the ballast water of vessels arriving from Europe in the mid 1980's.

DESCRIPTION

- » Perch like body <20 cm long with glassy eyes and a down-turned mouth.
- » Olive-brown on the back and turn a pale colour on the sides.
- » The two dorsal fins are joined; first fin has 11-16 sharp spines with rows of dark spots between them, and the second dorsal fin has soft, flexible rays.
- » Sharp spines on their anal fin and gill covers with no scales on their head.

HABITAT

- » Highly adaptable and able to thrive in a wide range of environmental conditions including water with low or high nutrients, and a wide range of depths and temperatures.
- » Capable of spawning in a wide variety of conditions and habitats.

IMPACTS

- » Compete with native sportfish for food and habitat.
- » Can become the most dominant fish in localized areas.

LOOKALIKE SPECIES

- » Juvenile Walleye, Sauger, Yellow Perch.

GOLDFISH

Carasius auratus

CYPRINIDAE / MINNOW AND CARP FAMILY



ORIGIN

- » Native to eastern Asia, brought over to North America for the pet trade.

DESCRIPTION

- » Elongated bodies which average 12 to 20 cm long but can grow to 40 cm in a larger ecosystem.
- » Colour can vary from the typical orange to an olive green or creamy white, however wild populations are typically olive to grey.
- » Large head and eyes. Dorsal fins are long with a single stout spine with serrated trailing edge.
- » Short anal fin, single stout serrated spine, deeply forked tail with a small mouth and no barbels.

HABITAT

- » Quiet vegetated ponds, streams, and pools, which are often in populated urban or suburban areas.
- » Established populations have been reported along the north shores of Lake Erie and the west end of Lake Ontario.

IMPACTS

- » Compete with and predate on native fish species.
- » Feeding patterns affect the growth of aquatic plants.
- » Potential to produce large populations and carry diseases that harm native fish species.

LOOKALIKE SPECIES

- » Common Carp (introduced), Koi (introduced)

NORTHERN SNAKEHEAD

Channa argus

CHANNIDAE/ SNAKEHEAD FAMILY



ORIGIN (NOT CURRENTLY KNOWN IN ONTARIO)

- » Native to China and was introduced by consumers after purchasing for the live-food trade or as released pets.
- » First North American discovery in the wild was in Maryland, USA in 2002.

DESCRIPTION

- » Narrow, torpedo shaped body.
- » Colour is dark brown to tan with irregular blotches.
- » Long single dorsal fin and long single anal fin.
- » Head has large scales which gives it a “snakehead” appearance and their jaws are canine-like.

HABITAT

- » Lives in ponds, lakes, rivers, and streams.
- » Ability to live in areas with very little oxygen due in part by a lung like organ that allows them to inhale oxygen by gulping air at the surface.

IMPACTS

- » Compete and predate on native fish species due to its aggressive feeding behaviour.
- » Highly adaptable and is likely to thrive in Ontario's waters.

LOOKALIKE SPECIES

- » Burbot and Bowfin.

ROUND GOBY

Neogobius melanostomus

GOBIIDAE/ GOBY FAMILY



ORIGIN

- » Native to eastern Europe; introduced through ballast water and was first discovered in 1990 in the St. Clair River.

DESCRIPTION

- » 6 to 16 cm long with a cylindrical body and a rounded to blunt snout.
- » Mottled gray and brown.
- » Single suction cup shaped pelvic fin, bulging eyes, and a black spot on the rear of their front dorsal fin.

HABITAT

- » Found near shore, can tolerate a wide range of conditions, however prefers rock, cobble, and rip rap or sandy areas.

IMPACTS

- » Reduce populations of sportfish by eating their eggs and young, and by competing for food sources.
- » Linked to botulism type - E, which can impact fish-eating birds.

LOOKALIKE SPECIES

- » Slimy and Mottled Sculpin, Tubenose Goby (invasive).

TUBENOSE GOBY

Proterorhinus marmoratus

GOBIIDAE/ GOBY FAMILY



ORIGIN

- » Native to eastern Europe; introduced to the Great Lakes via ballast water and was first detected in the St. Clair River in 1990.

DESCRIPTION

- » Small, bottom-dwelling invasive fish that grows up to 10 cm in length.
- » Mottled brown body with no black spot on their dorsal fin, unlike the round goby. (pg. 26)
- » Characterized by a fused scallop-shaped pelvic fin.
- » Small nostril tubes that extend over the upper lip.

HABITAT

- » Prefers waters near the shores of lakes and rivers, where they can hide among aquatic plants.

IMPACTS

- » Eat bottom-dwelling fish and compete with them for food.
- » May also eat and compete for food with other species that spawn near shore areas.

LOOKALIKE SPECIES

- » Slimy and Mottled Sculpins, Round Goby (invasive).

RUDD

Scardinius erythrophthalmus

CYPRINIDAE / MINNOW AND CARP FAMILY



ORIGIN

- » Native to Europe and central Asia. Brought over to the US for use in the bait trade.

DESCRIPTION

- » Large, deep-bodied; on average 10-25 cm long.
- » Protruding lower jaw and are a gold bronze in colour with a white belly.
- » Can also be dark to light olive in colour.
- » Usually red-orange coloured fins.

HABITAT

- » Still, shallow weed lines in lakes, slow moving rivers and ponds.
- » Seldom move into open water.

IMPACTS

- » May impact genetic diversity due to their ability to hybridize with Golden Shiner. (native)
- » May impact genetic diversity of native fish species due to their ability to breed with Golden Shiner.
- » Eating habits can degrade spawning and nursery habitat for native fish.

LOOKALIKE SPECIES

- » Golden Shiner, Goldfish (invasive).

STONE MOROKO

Pseudorasbora parva

CYPRINIDAE / MINNOW AND CARP FAMILY



ORIGIN (NOT CURRENTLY KNOWN IN ONTARIO)

- » Native to eastern Asia, and first recorded in Albania and southern Romania, in a little over 40 years, it has colonized Europe almost entirely, moving rapidly from east to west.

DESCRIPTION

- » Range from 2-7.5 cm long.
- » Upturned mouth that allows them to feed from the surface of the water.
- » Dorsal fin contains 3 spines and several soft rays with a large caudal fin.
- » Black and dark grey in colour with lighter shades of grey on their sides and a yellow-green to silver on the belly.

HABITAT

- » Known to live in a wide variety of freshwater habitat types.
- » Prefer well-vegetated channels, ponds, reservoirs or small lakes however, adults prefer cool moving water.

IMPACTS

- » May impact native biodiversity by consumption of larger planktonic crustaceans resulting in algal blooms and decreased dissolved oxygen.
- » Compete with native species for resources.
- » May prey directly on juveniles of native fish species.

LOOKALIKE SPECIES

- » Most Minnows, and Shiners.

TENCH

Tinca tinca

CYPRINIDAE / MINNOW AND CARP FAMILY



ORIGIN

- » Native to Europe and western Asia. Introduced in US for food and sport fish.
- » They were brought to a Quebec fish farm in 1986 and escaped into the Richelieu River which is a tributary of the St. Lawrence River.

DESCRIPTION

- » Dark olive to pale golden tan above with a white to bronze belly and a bright reddish-orange eye.
- » Usually 20-25 cm in length with a deep but thin body.
- » Terminal mouth and has a single barbels hanging from each side of the mouth.
- » Fins are deep dark and rounded with no spines.
- » Scales are small and embedded in thick skin.

HABITAT

- » Prefers lakes and slow moving waterways with abundant vegetation and muddy bottoms.
- » Can sustain life in waters with very low levels of oxygen.

IMPACTS

- » Competes with native species for food.
- » Feed heavily on snails, which may contribute to algal blooms. Aggressive feeding stirs up sediments leading to cloudy water.

LOOKALIKE SPECIES

- » Common Carp (introduced), Golden Shiner, Redhorse.

WELS CATFISH

Silurus glanis

SILURIDAE/ CATFISH FAMILY



ORIGIN (NOT CURRENTLY KNOWN IN ONTARIO)

- » Native to Eurasia, however, the distribution of this species extends from southern Sweden to Greece, Turkey, and Iran.

DESCRIPTION

- » Dark greenish black colour along the back, mottled yellow, and a grey to white underbelly.
- » Typically range in size from 1.3 – 1.6 m long, and weigh 15-20 kg but are capable of reaching 3 m in length and weigh up to 150 kg.
- » Long with a mucous-coated and scaleless body.
- » Nostrils will appear widely spaced with a round, flat snout.
- » Small eyes and a large mouth with very small pointed teeth.
- » Distinct barbels including 4 short coming from the lower jaw and 2 large on either side of the mouth.

HABITAT

- » Found near the bottom of a water body.
- » Can be found in a wide variety of areas, including: large rivers, lakes, backwaters, ponds, etc. Prefer muddy/ weedy areas with slow running to still waters.

IMPACTS

- » Predation on native species of fish, amphibians, mammals, and birds impacting biodiversity.
- » Competition with native fish species for food and habitat.

LOOKALIKE SPECIES:

- » Channel Catfish and Brown Bullhead.

ZANDER

Sander lucioperca

PERCIDAE/ PERCH FAMILY



ORIGIN (NOT CURRENTLY KNOWN IN ONTARIO)

- » Native to continental Europe through to western Siberia.

DESCRIPTION

- » Can grow to 100 cm in length (or 1 metre).
- » Green to blueish grey in colour on the sides with a white belly.
- » Two dorsal fins, the first containing spines while the second contains soft rays.
- » The dorsal and caudal fins have rows of black spots on the membrane.
- » Mouth has many small teeth and 1-2 enlarged canine teeth in the anterior portion of each jaw.

HABITAT

- » Prefer to live in lakes, rivers, and streams.
- » Prefers calm waters ranging from 2-30 m in depth, although mostly found between 2-3 m.
- » Can tolerate water temperatures ranging from 4-30 degrees Celsius and cannot tolerate waters with very low dissolved oxygen.

IMPACTS

- » Compete with native fish species for food and habitat.
- » Prey directly on native fish species.
- » Possibility of hybridizing with Walleye and Sauger.

LOOKALIKE SPECIES

- » Walleye, Yellow Perch, Sauger, Eurasian Ruffe (invasive).

GLOSSARY OF FISH TERMS

Anal fin

the fin on the median ventral line behind the anus.

Barbel

whisker-like projection close to the mouth, like those seen on catfish.

Caudal fin

pertaining to the tail.

Dorsal fin

a fin on the back, usually central in position supported by rays of spines.

Juvenile

a younger, not fully developed fish early in its life-cycle.

Keel

the flat undersurface of a fish usually found between the pelvic fin and anal fin, but sometimes extends the full length of the fish.

Lateral line

series of pore-like openings, extending from the head to the tail on either side of a fish, that detects movement in the water and other fish.

Pectoral fins

the most anterior/uppermost of the paired fins, usually dorsal to the pelvic fins.

Pelvic fins

ventral, paired fins either side of the ventral midline, may be below the pectoral fin, between the pectoral and the anal fin, forward of the pectoral fin, between the pectoral and the anal fin, forward of the pectoral fin, modified into a suction cup, or absent entirely.

Pharyngeal teeth

teeth composed of hard, moveable plates located in the throat of certain fish and used for crushing or grinding food.

Prohibited

forbidden by law.

Rays

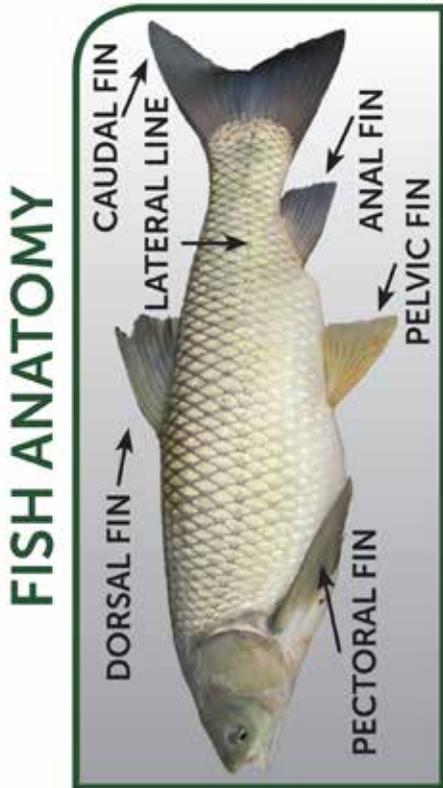
the articulated or jointed rod that supports the membrane of a fin.

Spine

a sharp, rigid animal process like a porcupine quill.

FISH ANATOMY

Photo Credit: Jeff Hill, University of Florida
IFAS Tropical Aquaculture Laboratory



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ONTARIO'S
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