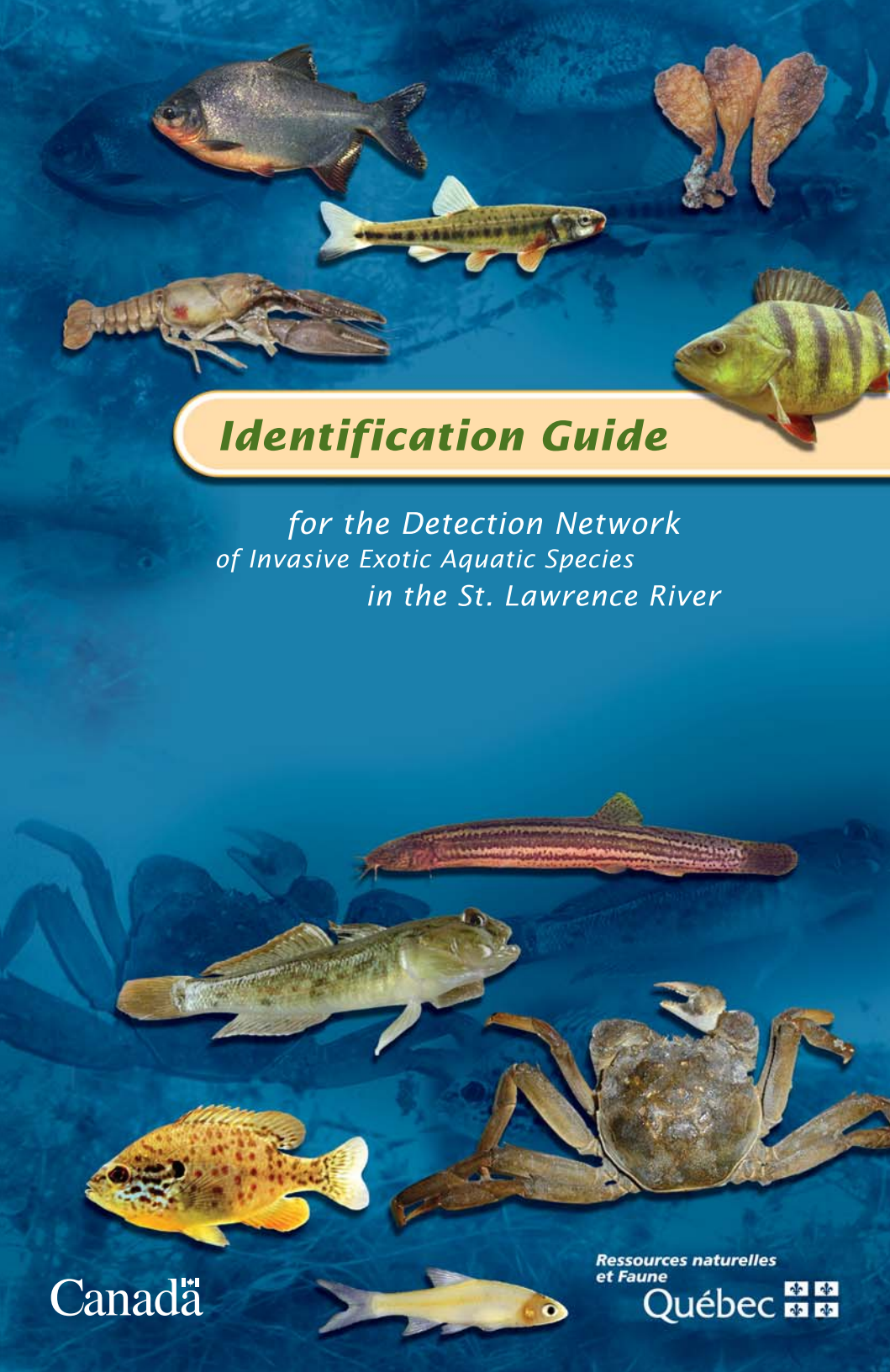

Identification Guide

for the Detection Network
of Invasive Exotic Aquatic Species
in the St. Lawrence River

Canada

Ressources naturelles et Faune
Québec

This guide is the property of: _____

Identification Guide for the Detection Network
of Invasive Exotic Aquatic Species in the St. Lawrence River

Note : the information contained in this guide was accurate as of the spring of 2007.

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Symbols used in this guide

Fresh water
Brackish water
Salt water

Declaration of catches

To declare a catch or to obtain any information, please contact:

Geneviève Bourget, Biologist

Phone : **418 862-8213, extension 302**
Fax : **418 862-1188**

genevieve.bourget@mrnf.gouv.qc.ca

Ministère des Ressources naturelles et de la Faune
Direction de l'aménagement de la faune du Bas-Saint-Laurent
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The index fishermen network is used to quickly detect new invasive aquatic species in the St. Lawrence River. This network is implemented in the St. Lawrence River and estuary, between Portneuf and Sainte-Luce. It is composed exclusively of commercial sturgeon and eel fishermen.

Visit to the fishermen:

In the course of the fishing season, visits will be made by the project manager. The purpose of these visits is to support the fishermen involved in the network.

Specimen conservation:

For each suspicious catch, fishermen will have to write the **date** on the tag provided at the beginning of the fishing season:

Date of catch: _____ _____ _____
Month Day Year

Name of the fisherman: _____

Municipality: _____

- Place the fish or the crustacean in a plastic bag as soon as possible. Place only one specimen per bag and place the duly completed identification tag in it;
- Freeze the specimen;
- Immediately contact the project manager at the following phone number: **418 862-8213, extension 302.**

Equivalence chart

Size	Temperature
10 cm = 4 in.	10 °C = 50 °F
30 cm = 12 in.	20 °C = 68 °F
Weight	**Salinity**
225 g = 0.5 lb	10 ‰ = Brackish water
1 kg = 2.2 lb	30 ‰ = Salt water

Bighead carp
Hypophthalmichthys nobilis
Carpe à grosse tête

Credit: David Riecks, UIUC/ II-IN Sea Grant

This species is native to southern and central China. It has been found in the Great Lakes Basin, in Lake Erie. Its earliest introduction may have resulted from escapes from aquaculture facilities.

Description:

Freshwater fish.

Average overall length of 1.4 m.

Average weight of 40 kg.

Bighead carp are deep-bodied, laterally compressed fish with big heads.

This species is very similar to the Silver carp.

As in the case of the Silver carp, they are filter feeders. However, their filter feeding apparatus is not developed as much as that of the Silver carp. They feed themselves by filtering the water and collecting the zooplankton present in it.

This species is opportunistic, and when concentrations of zooplankton are low, it may feed on phytoplankton and detritus.

Impact of the introduction:

They exert considerable pressure on zooplankton, which increases phytoplankton concentrations in the aquatic environment.

They may compete for food with other species.

They may disturb the food chain and therefore force other native fish populations to relocate.

References:

Archives de documents de la FAO. Biologie succincte des carpes chinoises principales. [On line] *[http://www.fao.org/docrep/field/003/AC549F/AC549F02.htm]* (March 2007).

USGS. *Hypophthalmichthys nobilis.* [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=551]* (March 2007).

Gulf States Marine Fisheries Commission. *Hypophthalmichthys nobilis.* [On line] *[http://nis.gsmfc.org/nis_factsheet.php?toc_id=190]* (March 2007).

Black Sea silverside

Aphanius (Atherina) boyeri
Athérine

Credit: Environmental database on the lagoon of Venice

This species is native to the Ponto-Caspian Basin (Sea of Azov, Caspian Sea, and Black Sea). Its earliest introduction may have resulted from escapes from aquariophily activities and facilities.

Description:

They live in salt, fresh, and brackish water.

They can reach an overall length of 10 to 15 cm.

Body elongate, fusiform, covered with large cycloid scales, belly rounded. The back is laterally compressed, and gray with black spots. A silver strip runs through the flank, the abdomen is whitish. They have no lateral line.

In the Ponto-Caspian Basin, we find these fish in various habitats of different salinities. They occur in waters with salinity range of 0-60 ‰, but mostly 3-12 ‰.

They occur in waters of wide temperature range, from 6 ºC to 25 ºC.

They feed on zooplankton, crustaceans, benthic organisms, and fish larvae.

They are gregarious (shoaling in large numbers).

Impact of the introduction:

They compete for food with other native species.

They are predators of many food species.

References:

Caspian environment. *Atherina boyeri caspia.* [On line] *[http://www.caspianenvironment.org/biodb/eng/fishes/Atherina%20boyeri%20caspia/main.htm]* (March 2007).

Environmental database on the lagoon of Venice. *Atherina boyeri.* [On line] *[http://www.istitutoveneto.it/venezia/divulgazione/pirelli/pirelli_2005_en/Banca_Dati_Ambientale/192.168.10.66/pirelli_new/divulgazione/valli/indexbce2.html]* (March 2007).

FishBase. *Atherina boyeri.* [On line] *[http://www.fishbase.org/Summary/SpeciesSummary.php?id=1696]* (March 2007).

Black Sea sprat

Clupeonella caspia
Tyulka

Credit: Otel Vasile (Atlas of fishes from the Danube Delta Biosphere Reserve/2007)

This species is native to the Ponto-Caspian Basin (Sea of Azov, Caspian Sea, and Black Sea). It may soon be introduced into our waters through sea transport.

Description:

They occur in fresh, brackish and salt water.

Average overall length of 6 to 12.8 cm.

The back and the upper part of the head vary in color from light green to blue-green, and their abdomen is silvery white or golden yellow.

In the Ponto-Caspian Basin, they mostly inhabit shallow zones and do not descend depths of more than 100 m.

They are capable of withstanding salinities up to 34 ‰. The biggest concentrations are reported in zones with salinity ranging from 3 to 7 ‰.

They feed on zooplankton.

Impact of the introduction:

Unknown.

References:

Caspian environment.org.
[On line] *[http://www.caspianenvironment.org/biodb/eng/fishes/Clupeonella%20cultriventris%20caspia/main.htm]* (March 2007).

FishBase.org. [On line] *[http://www.fishbase.org/Summary/SpeciesSummary.php?id=1470&lang=French]* (March 2007).

Blueback herring

Alosa aestivalis

Alose d'été

Credit: Jim Negus

This species is native to the east coast of the United States and has been introduced in the Great Lakes. Its presence was first reported in the Great Lakes in 1995. It has probably been introduced through the release of live baits.

Description:

These are anadromous fish which closely resemble the Alewife. They live in salt, fresh and brackish water.

They can reach 40 cm in length and weigh up to 200 g.

They consume plankton, small fish, and fish eggs.

They are silvery in colour, and the most distinguishing characteristic of this species is the black to dusky in color of its peritoneum (membrane in the abdominal cavity).

Impact of the introduction:

Unknown, but it seems that the introduction of this species in Lake Ontario has caused a decrease in the population of native fish.

References:

Anonymous. Blueback Herring *(Alosa aestivalis)*.
[On line] *[http://fish.dnr.cornell.edu/nyfish/Clupeidae/blueback.html]* (March 2007).

Anonymous. *Alosa aestivalis*. [On line]
[http://filaman.ifm-geomar.de/Summary/SpeciesSummary.php?id=1574&lang=French]
(March 2007).

USGS. *Alosa aestivalis*.
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=488]* (March 2007).

Potentially invasive exotic fish
from the Great Lakes

Bluespotted sunfish

Enneacanthus gloriosus

Crapet à points bleus

Credit: John F. Bunnell

This species is native to the Atlantic Coast. It has probably been introduced in the Great Lakes as a result of the release of aquarium specimens. Its presence was first reported in the Great Lakes in 1971.

Description:

Freshwater fish.

Overall length of about 9.5 cm.

The preferred habitats for the Bluespotted sunfish are streams with oxbows and side ponds characterized by dense submerged aquatic vegetation.

Bluespotted sunfish are planktivorous, feeding primarily on copepods, cladocerans, insect larvae, or similar invertebrate assemblages throughout their range.

Impact of the introduction:

Unknown.

References:

Anonymous. *Enneacanthus gloriosus*. [On line]
[http://filaman.ifm-geomar.de/Summary/SpeciesSummary.php?id=3368&lang=English]
(March 2007).

USGS. *Enneacanthus gloriosus*.
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=377]* (March 2007).

Eurasian minnow

Phoxinus phoxinus

Vairon

Credit: Zoltan Sallai, Nimfea Environmental and Nature Conservation Association

This species is virtually established in all Eurasia, from northern Spain to eastern Siberia. It could potentially be introduced and establish itself in our waters through aquariophily activities and facilities.

Description:

Freshwater fish.

Average overall length of 4 to 10 cm.

They have a long and slender body and a rounded snout profile. Their dorsal fin is tall. Their back is dark green in color. The upper part of their flanks is light brown with large black spots which form a thick straight line. The lower part of their flanks is yellowish-green with glints of silver. The belly is cream-coloured.

They are mainly found in clear, fresh and well-oxygenated waters, with sandy, gravelly or rocky bottoms. They inhabit various types of watercourse, large or small, as well as channels, lakes and ponds. They especially enjoy the holes along river banks and seagrass beds.

They are omnivorous and voracious. They feed on small crustaceans, insect larvae and small fish. They also consume algae and plant debris.

Eurasian minnows are gregarious (shoaling in large numbers). They are typically bottom dwellers and they prefer to occupy shallow water areas.

They are sometimes sold as aquarium fish and used as bait fish.

Impact of the introduction:

At least one country reports adverse ecological impact after introduction.

References:

Anonymous. *Phoxinus phoxinus*. [On line] *[http://filaman.ifm-geomar.de/Summary/SpeciesSummary.php?id=4661&lang=French]* (March 2007).

Système d'Informations sur la Biodiversité en Wallonie. *Phoxinus phoxinus*. [On line] *[http/mrw.wallonie.be/cgi/dgrne/sibw/sibw.esp.ecol.pl?TAXON=Phoxinus_phoxinus]* (March 2007).

Wikipedia. Vairon. [On line] *[http://fr.wikipedia.org/wiki/Vairon_(poisson)]* (March 2007).

Potentially invasive exotic fish
from aquarium trade

European perch

Perca fluviatilis

Perche commune

Credit: Biopix.dk, http://www.biopix.dk

This species is native to Europe and Siberia. It could potentially be introduced and establish itself in our waters through aquariophily activities and facilities.

Description:

Anadromous fish which lives in fresh and brackish water.

Average overall length of 20 to 30 cm.

The body is greenish-yellow with 5 to 7 transverse black bands on the flanks. The belly is whitish-grey. It has two long and tall dorsal fins. The first dorsal fin is gray with a black spot at the tip, and the second dorsal is greenish-yellow. Ventral and anal fins are orange.

It is found in still water and slow-flowing rivers. It avoids cold, fast-flowing waters and nutrient-poor watercourses.

These fish gather in groups in submerged dead trees along constructions (culverts) and in between boats. They inhabit environments where the aquatic vegetation is abundant.

A predatory species, juveniles feed on zooplankton, benthic invertebrate, and small fish. Adults feed on invertebrates and fish.

Impact of the introduction:

Many countries in which this species has been introduced for sportfishing have reported adverse ecological impacts.

References:

Anonymous. *Perca fluviatilis*. [On line] *[http://filaman.ifm-geomar.de/Summary/SpeciesSummary.php?id=358]* (March 2007).

La boîte à pêche du web. Perche. [On line] *[http://www.jcpoiret.com/bapw/index.html?page=poissons/perche.htm]* (March 2007).

Système d'Informations sur la Biodiversité en Wallonie. *Perca fluviatilis*. [On line] *[http://mrw.wallonie.be/cgi/dgrne/sibw/sibw.esp.ecol.pl?TAXON=Perca_fluviatilis]* (March 2007).

Wikipedia. Perche commune. [On line] *[http://fr.wikipedia.org/wiki/Perca_fluviatilis]* (March 2007).

Ghost shiner

Notropis buchanani

Méné fantôme

Credit: Alabama Wildlife and Freshwater Fisheries Division

This species is native to the Mississippi River. It has been found in Lake Huron and Lake Michigan (Great Lakes). Its presence was first reported in the Great Lakes in 1979. It has probably been introduced through the release of bait fish.

Description:

Freshwater fish.

Average overall length of 6.4 cm.

Silvery or translucent with very little pigment. It has a small mouth.

It is commonly found in water less than 1 metre deep over substrates consisting of clay, silt, and detritus. It is often found in areas with submergent vegetation.

Turbidity or siltation does not appear to limit the distribution of the Ghost shiner as it thrives both in areas of high and low turbidity.

Impact of the introduction:

Unknown.

References:

FishBase. *Notropis buchanani*. [On line] *[http://www.fishbase.org/Summary/SpeciesSummary.php?id=2835]* (March 2007).

Iowa Fish Atlas. Ghost shiner. *Notropis buchanani*. [On line] *[http://maps.gis.iastate.edu/iris/fishatlas/IA163414.html]* (March 2007).

USGS. *Notropis buchanani*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=590]* (March 2007).

Gizzard shad

Dorosoma cepedianum

Alose à gésier

Credit: Jim Negus

This species is native to the Mississippi River. Its presence was first reported in Quebec in 1944. It is now considered as a naturalised fish.

Description:

Pelagic, anadromous fish. They can be found in salt, fresh and brackish water.

Average overall length of 52 cm.

Maximum weight of 1.98 kg.

Their body is a greyish or silvery blue above, becoming silver on the sides and white below.

They have a small mouth and a dark spot behind gill openings.

The last ray of the dorsal fin is elongated into a thin whiplike filament.

They consume mostly phytoplankton.

Impact of the introduction:

These fish compete for food with other species.

References:

Anonymous. [On line] *[http://filaman.ifm-geomar.de/Summary/SpeciesSummary.php?id=1604]* (March 2007).

USGS. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=492]* (March 2007).

Goldfish

Carassius auratus

Carassin/poisson rouge

Credit: USGS

This species is native to Asia. These fish have been introduced in Quebec before 1899 and they are considered today as naturalised. The earliest introduction may have resulted from the intentional release of aquarium specimens.

Description:

Freshwater fish which can live in waters with salinities as high as 17 ‰.

They usually reach 15 to 20 cm in length (sometimes up to 59 cm).

They usually reach between 100 to 300 g in weight (sometimes up to 3 kg).

They are capable of withstanding low temperatures.

Their omnivorous diet includes zooplankton, phytoplankton, insect larvae, fish eggs and fry, benthic vegetation, and detritus.

Impact of the introduction:

They compete for food and habitat with native fish.

References:

AquaBase.org. [On line] *[http://www.aquabase.org/fish/view.php3?id=137]* (March 2007).

USGS. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=508]* (March 2007).

Grass carp

Ctenopharyngodon idella

Amour blanc

Credit: Jim Negus

This species is native to Asia and former Soviet Union. It is now observed in many areas, especially in the Great Lakes.

Description:

They usually live in freshwater, but can also be found in brackish water.

They usually reach 125 cm, and a maximum weight of 45 kg.

These are herbivorous fish (they consume tall and submerged aquatic weeds), but they also consume detritus, insects and other invertebrate.

They can adapt to a large range of water temperatures (0 to 38 ºC), and to salinities of up to 10 ‰.

Impact of the introduction:

The introduction of this species causes a decrease in the aquatic vegetation of small water bodies. This can alter the phytoplankton and zooplankton communities.

They can sometimes compete for food with other fish species or invertebrate.

They can alter the preferred habitats of some species.

References:

Anonymous. *Ctenopharyngodon idella*. [On line] *[http://filaman.ifm-geomar.de/Summary/SpeciesSummary.php?id=79&lang=French]* (March 2007).

Anonymous. *Ctenopharyngodon idella*. [On line] *[http://nis.gsmfc.org/nis_factsheet.php?toc_id=182]* (March 2007).

USGS. *Ctenopharyngodon idella*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=514]* (March 2007).

Wikipedia. *Ctenopharyngodon idella*. [On line] *[http://fr.wikipedia.org/wiki/Ctenopharyngodon_idella]* (March 2007).

Monkey goby

Neogobius fluviatilis

Gobie fluviatile

Credit: Dr. Carol Stepien, Lake Erie Center, University of Toledo

This species is native to the Ponto-Caspian Basin (Sea of Azov, Caspian Sea, and Black Sea). It may soon be introduced into our waters through sea transport.

Description:

Freshwater fish.

Average overall length of 16 cm.

As in the case of other goby species, its pelvic fins form a suctorial disc[1].

Impact of the introduction:

Unknown.

References:

Anonymous. *Neogobius fluviatilis*. [On line] *[http://filaman.ifm-geomar.de/Summary/SpeciesSummary.php?id=48268]* (March 2007).

1. Suctorial disc: Both pelvic fins are attached in the manner of a festoon.

Mosquitofish

Gambusia affinis

Alevin

Credit: USGS

This species is native to the freshwater of southern and eastern United States. It is now well established in many areas in the United States and in the Great Lakes. Its presence was first reported in the Great Lakes in 1923. Its earliest introduction may have resulted from the intentional release of aquarium specimens.

Description:

Freshwater fish.

Small fish of about 5 to 7 cm in length.

Body colour is a dull green or chestnut brown (depending on the environment in which they live) and translucent on the back. The abdominal cavity shows viscera.

Impact of the introduction:

They are considered as one of the 100 worst invasive alien species in the world.

They compete with other native fish species.

They are predators of the eggs of various native species, which jeopardizes the existence of many of those fish species.

They can promote the occurrence of algae blooms by consuming a large amount of herbivorous zooplankton.

References:

Anonymous. *Gambusia affinis*. [On line] *[http://www.fishbase.org/Summary/SpeciesSummary.php?id=3215]* (March 2007).

Lowe, S., M. Browne, S. Boudjelas, M. De Poorter 2000. 100 of the World's Worst Invasive Alien Species Database. Published by The Invasive Species Specialist Group (ISSG) a specialist group of the Species Survival Commission (SSC) of the World Conservation Union (IUCN), 12 pp.

USGS. *Gambusia affinis*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=845]* (March 2007).

Wikipedia. Mosquitofish. [On line] *[http://en.wikipedia.org/wiki/Mosquitofish]* (March 2007).

Northern snakehead
Channa argus
Poisson à tête de serpent

Credit: USGS. Archives, USGS. www.forestryimages.org

This species is native to Asia (China, Korea) and Russia. It is now established in many states on the east coast of the United States. It has probably been introduced through the release of fish intended for Asian food markets.

Description:

They occur in fresh, warm, and cold water with a temperature range of 0 to 30 ºC.

Average overall length of 85 to 150 cm.

They have a torpedo-shaped body. Young are golden brown to pale gray in color, turning dark brown and developing black splotches as they age. Other distinguishing characteristics are long dorsal and anal fins, small head, and large mouth.

They prefer swamps, shallow ponds, and slow moving streams with vegetation.

Young Northern snakeheads eat zooplankton. At a length of about 18 mm, they begin to eat fish larvae and small crustaceans. Adults prefer fish but will eat frogs, crustaceans, and even small reptiles, birds, and mammals.

They remain close to shore, typically under aquatic vegetation.

They can survive out of water for up to four days.

Impact of the introduction:

They can disturb freshwater ecosystems. As a predator species, they compete with other predators and exert considerable pressure on food species.

Cont'd

Northern snakehead

References:

Herborg, L.M., N.E. Mandrak, B.C. Cudmore and H.J. MacIsaac, 2007. Comparative distribution and invasion risk of Snakehead (Channidae) and Asian Carp (Cyprinidae) species in North America. Can. J. Fish. Aquat. Sci. 64: 1723-1735.

Mendoza, R., S. Contreras, P. Koleff, C. Ramirez, C. Escalera, P. Alvarez, B. Cudmore, N. Mandrak, J.P. Fisher, R. Orr, W. Courtenay, G. Greene and D. Lee, 2008. Proposed trinational risk assessment guidelines for invasive alien species : test cases for the snakeheads (Channidae) and armored catfishes (Loricariidae) in North American waters. Project of the Commission for Environmental Cooperation, Montreal, 167 p.

National Biological Information Infrastructure (NBII) and Invasive Species Specialist Group (ISSG). *Channa argus*. [On line] *[http://www.issg.org/database/species/ecology.asp?si=380&fr=1&sts]* (March 2007).

USGS. *Channa argus*. [On line] *[http://fisc.er.usgs.gov/Snakehead_circ_1251/html/channa_argus.html]* (March 2007).

USGS. *Channa argus*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=2265]* (March 2007).

Orangespotted sunfish

Lepomis humilis

Crapet menu

Credit: Wayne Davis

This species is native to the Mississippi Basin. It has been found in the Great Lakes, more specifically in Lake Erie. Its presence was first reported in the Great Lakes in 1929. Its earliest introduction may have resulted from the release of bait fish.

Description:

Freshwater fish.

Average length of 15 cm.

Spawning males carry orange-red lines of their bodies. Their bellies and lower fins are reddish. The sides of their bodies are olive coloured with fine golden or emerald dots.

Operculum (gill cover) are dark with a pale border.

They eat mainly insect larvae and small crustaceans.

Impact of the introduction:

This species may compete for food with other fish.

References:

USGS. *Lepomis humilis.*
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=383]* (March 2007).

NatureServe explorer. *Lepomis humilis.* [On line], 2006,
[http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Lepomis%20humilis] (March 2007).

Orfe

Leuciscus idus

Ide

Credit: Zienert, Steffen

This species is native to northern Europe (Siberia). It has been introduced in the United States through the accidental release of aquaculture. It is now established in nine American states. It may soon be introduced into our waters through sea transport.

Description:

They occur in fresh and brackish water.

They resemble the Rudd.

The body is elongate and laterally compressed. The back is dark green and the flanks are yellowish-brown with glints of gold or silver. The belly is white. Pelvic and anal fins are pinkish-gold or red-orange.

Average overall length of 30 to 50 cm.

They feed on insects, molluscs, and crustaceans. Young Orfe also feed on aquatic plants. Larger individuals also consume small fish.

Impact of the introduction:

They may compete with other native fish.

References:

La boîte à pêche du web. Ide. [On line]
[http://www.jcpoiret.com/bapw/index.html?page=poissons/ide.htm] (March 2007).

Système d'Informations sur la Biodiversité en Wallonie. *Leuciscus idus.*
[On line] *[http://mrw.wallonie.be/cgi/dgrne/sibw/sibw.esp.ecol.pl?TAXON=Leuciscus_idus]* (March 2007).

USGS. *Leuciscus idus.*
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=557]* (March 2007).

Wikipedia. Ide mélanote.
[On line] *[http://fr.wikipedia.org/wiki/Ide_m%C3%A9lanote]* (March 2007).

Oriental weatherfish

Misgurnus anguillicaudatus

Loche orientale

Credit: USGS. Windsor Aguirre

This species is native to eastern Asia. It is now established in many areas in the United States, and especially in Lake Michigan (Great Lakes). Its presence was first reported in the Great Lakes in 1939. Its earliest introduction may have been the result of an unintentional release.

Description:

Freshwater fish.

Maximum length of 25 cm.

This species has a long, cylindrical, eel-like body, that is clay-brown with greenish grey-brown marble markings dorsally, and pale silver ventrally. The mouth is small, narrow and subinferior surrounded by six barbels. The lips are thick and fleshy. The caudal fin is rounded.

It is typically found in still or slow moving, shallow waters with mud-bottoms, which they burrow into.

They can inhabit ponds and lakes poor in oxygen thanks to their intestinal accessory organ which allows them to absorb atmospheric oxygen.

It is capable of withstanding broad temperature ranges. Under experimental conditions Oriental weatherfish tolerated temperatures as low as 2 ºC.

Its diet is comprised mostly of benthos: algae, insect larvae, snails, worms, and detritus.

Impact of the introduction:

Unknown.

References:

AquaBase.org. *Misgurnus anguillicaudatus.*
[On line] *[http://www.aquabase.org/fish/view.php3?id=328]* (March 2007).

Gulf States Marine Fisheries Commission. *Misgurnus anguillicaudatus.*
[On line] *[http://nis.gsmfc.org/nis_factsheet.php?toc_id=192]* (March 2007).

USGS. *Misgurnus anguillicaudatus.*
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=498]* (March 2007).

Potentially invasive exotic fish
from the Great Lakes

Red pacu

Piaractus brachypomus

Pirapatinga

Credit: USGS. L. Lovshin

This species is native to South America and other tropical areas. It is now established in many areas in the United States and in the Great Lakes. The earliest introductions may have resulted from the intentional release of aquarium specimens.

Description:

Freshwater fish.

Average overall length of 60 cm.

Maximum weight of 25 kg.

Its shape resembles that of the piranha. The pectoral region, the lower part of the operculum (gill cover) and the pectoral, pelvic, and anal fins are red. The rest of the body is silvery.

It is a toothy species, but its head is smaller than that of its carnivorous cousins. Anal and caudal fins are bordered with black.

This species is omnivorous and becomes more vegetarian with age.

Impact of the introduction:

Unknown.

References:

AquaBase.org. *Piaractus brachypomus.*
[On line] *[http://www.aquabase.org/fish/view.php3?id=377]* (March 2007).

FishBase. *Piaractus brachypomus.*
[On line] *[http://fishbase.org/Summary/SpeciesSummary.php?id=5808]* (March 2007).

USGS. *Piaractus brachypomus.*
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=427]* (March 2007).

Redear sunfish

Lepomis microlophus

Crapet à oreilles rouges

Credit: Jim Negus

This species is native to the States of the Atlantic Coast. It is now established in Lake Michigan (Great Lakes). Its presence was first reported in the Great Lakes in 1928. Its earliest introduction may have resulted from the intentional release of some specimens.

Description:

Freshwater fish.

Average overall length of 25 cm.

The Redear sunfish is a deep-bodied fish with a relatively small mouth. Color ranges from dark olive-green above to almost white on the belly. The sides are usually yellow to green.

The species' most distinct characteristic is the red edge on the operculum (gill cover) of the male (orange on the female).

Redear sunfish usually feed on molluscs (such snails), hence their common name "shellcracker." However, insect larvae and cladocerans may also be found in their diet.

The species is usually found near the bottom in warm water with little current and abundant aquatic vegetation. They live in vegetated littoral zones of small to large lakes, marshes, and reservoirs, and streams or rivers with sluggish to slow moving flow.

Impact of the Introduction:

They are a potential competitor with other native species.

References:

USGS. *Lepomis microlophus.*
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=390]* (March 2007).

Texas Parks and Wildlife Department. Redear sunfish *(Lepomis microlophus).*
[On line] *[http://www.tpwd.state.tx.us/huntwild/wild/species/sunfish/]* (March 2007).

Round goby

Neogobius melanostomus

Gobie à taches noires

Credits: Andrée Gendron, Environment Canada

1. Pelvic fin which forms a suctorial disc[2]

Freshwater fish native to the Ponto-Caspian Basin (Sea of Azov, Caspian Sea, and Black Sea) and Asia. They have been accidentally introduced in the Great Lakes through the release of ballast water. Their presence was first reported in Quebec in 1990. They can be found up to Quebec City.

Description:

They occur in fresh, salt and brackish water.

They are typically between 8 and 15 cm in length (maximum of 25 cm).

Young Round gobies are solid slate gray. Upon maturation, the coloring becomes spotted with gray, black, brown, and olive green markings.

Their eyes protrude slightly from the top of their head.

They are characterized by their single pelvic fin which forms a suctorial disc[2] (See the image above).

They are bottom dwellers in the nearshore region of lakes and in rivers, and prefer rocky habitat that provides lots of hiding opportunities.

Their diet is composed primarily of crustaceans and molluscs, including zebra mussels. They also consume polychaetes, small fish, goby eggs, and chironomid larvae.

The female spawns 500 to 3 000 eggs on a hard substrate. The male stays to guard and care for the eggs until they hatch. Females spawn up to six times during the spawning season which spans April to September.

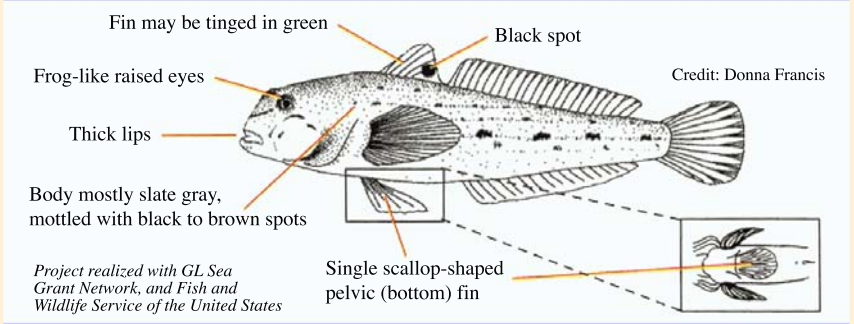
Their robust ability to survive in degraded environmental conditions has increased their competitive advantage compared to native species.

2. Suctorial disc: Both pelvic fins are attached in the manner of a festoon.

Cont'd

Round goby

How to identify a Round goby *(Adult specimen)*



General Characteristics

- The only St. Lawrence's fresh water species with a single pelvic fin.
- Young Round gobies are solid slate gray
- Adult specimens are typically between 8 and 15 cm in length with a maximum of 25 cm

Illustration : Ministère du Développement durable, de l'Environnement et des Parcs

Impact of the introduction:

The numbers of native fish species have declined in areas where this species has become abundant. It has been found to prey on small fish and fish eggs.

It competes for food with other native species.

Adults aggressively defend spawning sites and occupy prime spawning areas, keeping natives out.

References:

Global Invasive Species Database. *Neogobius melanostomus*. [On line] *[http://www.issg.org/database/species/ecology.asp?si=657&fr=1&sts=]* (March 2007).

Wikipedia. Round goby. [On line] *[http://en.wikipedia.org/wiki/Round_goby]* (March 2007).

USGS. *Apollonia (Neogobius) melanostomus*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=713]* (March 2007).

Ministère du Développement durable, de l'Environnement et des Parcs. Le gobie à taches noires *(Neogobius melanostomus)*. [On line] *[http://www.mddep.gouv.qc.ca/biodiversite/nuisibles/gobi.htm]* (March 2007).

Rudd

Scardinius erythrophthalmus

Rotengle/gardon rouge

Credit: USGS

This species is native to the Ponto-Caspian Basin (Sea of Azov, Caspian Sea, and Black Sea). Its presence was first reported in Quebec in 1990. It has been introduced through the release of live bait. It is now reported in many areas in the Great Lakes.

Description:

They are usually found in freshwater, in sites with large seagrass beds, but it sometimes occurs in brackish water.

Overall length of 15 to 25 cm (up to 50 cm).

Average weight of 200 g (up to 1.8 kg).

The body is oval and laterally compressed. The back is gold-olive and the belly is silvery. The dorsal fin is brown-red and other fins are bright red.

Omnivorous, they feed on aquatic plants, algae, and zooplankton. Juveniles feed on small crustaceans, and as they grow bigger, they feed on larger invertebrate.

Impact of the introduction:

Largely unknown. They would probably compete for food with native species. They may possibly damage the communities of the aquatic plants they ingest.

References:

AquaBase.org. *Scardinius erythrophthalmus*. [On line] *[http://www.aquabase.org/fish/view.php3?id=1264]* (March 2007).

Global Invasive Species Database. *Scardinius erythrophthalmus*. [On line] *[http://www.issg.org/database/species/ecology.asp?fr=1&si=614&sts=]* (March 2007).

USGS. *Scardinius erythrophthalmus*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=648]* (March 2007).

Système d'Informations sur la Biodiversité en Wallonie. Fiche écologique résumée : *Scardinius erythrophthalmus*. [On line] *[http://mrw.wallonie.be/cgi/dgrne/sibw/sibw.esp.ecol.pl?TAXON=Scardinius_erythrophthalmus]* (March 2007).

Ruffe

Gymnocephalus cernuus

Grémille

Credit: Doug Jenson, Minnesota Sea Grant, www.forestry.org

This species is native to Europe. It has been introduced in the middle of the 1980's through the release of ballast water. It is now established in many areas in the Great Lakes since 1986. Its presence was first reported in Quebec in 2001. Some scientists still believe that this species has not reached Quebec water, but that it is just a question of time before it does.

Description:

They can be found in fresh and brackish water with salinities greater than 12 ‰.

They rarely exceed 15.5 cm and their average weight is of 50 g.

They resemble other perch. They have a rounded snout profile and a small downturned mouth.

The Ruffe is a member of the perch family and is characterized by a large spiny dorsal fin.

Their body is mottled with brown spots and dark spots are visible between each spine.

They are capable of withstanding a wide range of ecological and environmental conditions. They occur at depths varying from 0.25 m to 85 m.

They feed on small crustaceans and insect larvae.

Impact of the introduction:

They affect the native fish population where they are introduced. They compete for food with other native species.

They may feed on the eggs of other fish species.

References:

USGS. *Gymnocephalus cernuus.*
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=7]* (March 2007).

Global invasive species database. *Gymnocephalus cernuus.* [On line]
[http://www.issg.org/database/species/ecology.asp?si=544&fr=1&sts=] (March 2007).

Encyclopêche. Les poissons d'eau douce : la grémille.
[On line] *[http://www.encyclopeche.com/ED-gremille.htm]* (March 2007).

Minnesota Sea Grant. Ruffe: a new threat to our fisheries.
[On line] *[http://www.seagrant.umn.edu/exotics/ruffe.html]* (March 2007).

Potentially invasive exotic fish
from the Great Lakes

Shortnose gar

Lepisosteus platostomus

Lépisostée à museau plat

Credit: USGS. Dave Fuller

This species is native to Mississippi. It is now established in the Great Lakes. Its presence was first reported in the Great Lakes in 1962. It has been introduced through the channel between the Great Lakes and the Mississippi River.

Description:

Freshwater fish.

Average length of 83 cm.

The Shortnose gar has olive or brown coloration with white on the ventral side and black spots on median fins.

Generally it is recognized by its long snout and sharply toothed jaws. Compared with other species of gar, its snout is shorter, but larger.

It spawns in shallow water among the grass and aquatic weeds.

It is typically opportunist, consuming the most available food. It consumes more invertebrates than any other species of gar. It feeds on insects, fish and invertebrate.

Impact of the introduction:

Unknown.

Possible competitor for food with sportfishing species.

References:

University of Michigan, Museum of Zoology. *Lepisosteus platostomus.*
[On line] *[http://animaldiversity.ummz.umich.edu/site/accounts/information/Lepisosteus_platostomus.html]* (March 2007).

USGS. *Lepisosteus platostomus.*
[On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=757]* (March 2007).

Silver carp

Hypophthalmichthys molitrix

Carpe argentée

Credit: David Riecks, UIUC/ II-IN Sea Grant

This species may be found near the Great Lakes Basin. It is native to eastern Asia and eastern Russia. Its earliest introduction may have resulted from escapes from aquaculture facilities.

Description:

Freshwater fish.

Average overall length of 1 m.

Average weight of 27 kg.

Silver carp are large, laterally compressed with a uniform silver coloration.

This species is very similar to the Bighead carp.

As in the case of the Bighead carp, they are filter feeders. Their gills are equipped with filter feeding apparatus so efficient that they can filter planktonic algae and organic detrital matter as small as 0.02 mm. When concentrations of phytoplankton are low, they may feed on zooplankton.

Impact of the introduction:

This species is a potential competitor with some native fish that also rely on plankton for food.

References:

Archives de documents de la FAO. Biologie succincte des carpes chinoises principales. [On line] *[http://www.fao.org/docrep/field/003/AC549F/AC549F02.htm]* (March 2007).

USGS. *Hypophthalmichthys molitrix*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=549]* (March 2007).

Gulf States Marine Fisheries Commission. *Hypophthalmichthys molitrix*. [On line] *[http://nis.gsmfc.org/nis_factsheet.php?toc_id=189]* (March 2007).

Starry goby

Benthophilus stellatus

Gobie étoilé

Credit: Otel Vasile (Atlas of fishes from the Danube Delta Biosphere Reserve/2007)

This species is native to the Ponto-Caspian Basin (Sea of Azov, Caspian Sea, and Black Sea). It may soon be introduced into our waters through sea transport.

This is not an abundant species, but it inhabits a variety of areas in the Ponto-Caspian Basin.

Description:

Brackish water fish that sometimes occur in freshwater.

Maximum overall length of 13.5 cm.

Starry goby does not require for high oxygen concentration.

It feeds on molluscs, fish, crustaceans and worms.

Impact of the introduction:

It competes for food and habitat space with other benthic fish. It can be a predator of other fish.

References:

Caspian environment.org. [On line] *[http://www.caspianenvironment.org/biodb/eng/fishes/Benthophilus%20stellatus/main.htm]* (March 2007).

FishBase.org. [On line] *[http://filaman.ifm-geomar.de/Country/CountrySpeciesSummary.cfm?Country=Turkey&Genus=Benthophilus&Species=stellatus]* (March 2007).

Suckermouth minnow

Phenacobius mirabilis

Méné suceur

Credit: USGS

This species is native to the Mississippi River. It is now established in Lake Erie (Great Lakes). Its presence was first reported in the Great Lakes in 1950. It has probably been introduced through the release of bait fish.

Description:

Freshwater fish.

Average overall length of 6 cm.

It is called “suckermouth” because its mouth is shaped like a sucker. This species has no barbel.

It has a slim body and it feeds on insects and benthic organisms.

In agri-environments, several clear, gravelly and sandy watercourses have become silty ones. This species prefer nutrient-rich watercourses with moderate current and turbidity. This is why their presence has increased in agri-environments.

Impact of the introduction:

Unknown.

References:

Anonymous. Suckermouth minnow. [On line] *[http://gf.state.wy.us/wildlife/CompConvStrategy/Species/Fish/PDFS/Suckermouth%20Minnow.pdf]* (March 2007).

Mills, E.L., J. H. Leach, J.T. Carlton and C.L. Secor, 1993. Exotic species in the Great Lakes: a history of biotic crises and anthropogenic introductions. J. Great Lakes Res. 19(1):1-54.

USGS. *Phenacobius mirabilis* (suckermouth minnow). [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=617]* (March 2007).

Tench

Tinca tinca

Tanche

Credit: Claude Lemire, Association des pêcheurs commerciaux

This species is native to Europe. Its presence was first reported in Quebec in 1991. It has been introduced through the accidental release of farmed fish. It is now established in the Richelieu River and Lake Saint-Pierre, and also in many areas in the United States.

Description:

They occur in fresh and brackish water.

They reach 30 to 40 cm in length (up to 60 cm).

They usually weigh 3 to 4 kg (up to 6 kg).

They have a stocky, oval body covered with small scales deeply imbedded in a thick and slippery skin. Their mouth is provided at each corner with a very small barbel.

Fins are rounded in shape. Males possess a very thick and long ventral fins. The colour of the back varies from olive-green to green-brown. Flanks are iridescent in colour and the belly is yellowish. The eyes are small and red-orange in color.

They normally inhabit slow-moving freshwater habitats, shallow ponds and lowland lakes. They are most often found in still waters with a clayey or muddy substrate and abundant vegetation.

They feed mostly at night on insect larvae, molluscs, and soft aquatic plants of various kinds that they root up from the bottom.

They are capable of withstanding low oxygen concentrations. They can colonize habitats inhospitable to most species.

During the winter, they cover themselves in silt and hibernate. They remain in a dormant state until spring time.

Impact of the introduction:

Limited knowledge.

Cont'd

Tench

References:

Doucet, G. *Tinca tinca* (la tanche). [On line] *http://guillaume.doucet.free.fr/index.php?id_partie=2&id_page=1&table=poisson&genre=Tinca&espece=tinca&nom=Poissons]* (March 2007).

Dumont, P., N. Vachon, J. Leclerc and A. Guibert. Introduire délibérément un poisson au Canada peut être facile : l'exemple de l'implantation de la tanche dans le sud du Québec. *Cité dans* Claudi, R., P. Nantel et E. Muckle-Jeffs. 2002. Envahisseurs exotiques des eaux, milieux humides et forêts du Canada. Ottawa. Ressources naturelles Canada. pp. 169-177.

La boîte à pêche du Web. Tanche. [On line] *[http://www.jcpoiret.com/bapw/index.html?page=poissons/tanche.htm]* (March 2007).

La pêche avec pechez.com. Tanche *(Tinca tinca)*. [On line] *[http://www.pechez.com/tanche-tinca-tinca-2.html]* (March 2007).

USGS. *Tinca tinca*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=652]* (March 2007).

Tubenose goby

Proteorhinus semilunaris

Gobie à nez tubulaire

Credit: USGS. David Jude, Center for Great Lakes and Aquatic Sciences

This species is native to Eurasia. It is now established in the Great Lakes, in which its presence was first reported in 1990. Its earliest introduction may have resulted from the release of ballast water.

Description:

Fresh and brackish water fish.

The Tubenose goby can be distinguished from its Round goby cousin because it has long anterior nostrils. The Tubenose goby rarely exceeds 11 cm in length, as opposed to the Round goby which can reach 25 cm in length.

In general, they are mottled brown in color. They have relatively large eyes and scales on their heads, and like the Round goby, they are characterized by the fusion of their pectoral fins to form a suctorial disc[1].

It is a benthic species which feeds on small invertebrate. Tubenose goby do not feed on zebra mussels, as do Round goby.

They prefer habitats with vegetation cover.

Impact of the introduction:

This species is less aggressive and less invasive than the Round goby.

References:

Great Lakes Sea Grant Extension Office. Gobies. [On line] *[http://www.glerl.noaa.gov/seagrant/GLWL/Fish/goby/goby.html#Pm]* (March 2007).

Illinois-Indiana Sea Grant. Tubenose goby. [On line] *[http://www.iisgcp.org/EXOTICSP/tubenosegoby.htm]* (March 2007).

USGS. *Proteorhinus semilunaris*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=714]* (March 2007).

1. Suctorial disc: Both pelvic fins are attached in the manner of a festoon.

Walking catfish

Clarias batrachus

Silure grenouille

Credit: USGS

This species is native to Asia. It has been introduced in the waters of the east coast of the United States through the release of aquarium specimens. It may soon be introduced into our waters through sea transport or aquariophily.

Description:

Freshwater fish.

They can reach 60 cm in length.

Walking catfish are typically a uniform shade of gray or gray-brown with many tiny white spots laterally. The head is flat and broad and the body tapers to the tail. The mouth is broad and the lips are fleshy, the upper more so than the lower. The walking catfish possesses very small eyes and lengthy dorsal and anal fins.

They have walking skills and can move to other sources of water.

They can remain out of the water for many hours thanks to their secondary respiratory system which allows them to breathe atmospheric oxygen.

Walking catfish are benthic omnivores. They search the bottom with their barbels vigorously sifting through detritus and soft substrates. They consume a wide variety of prey, including eggs or larvae fishes, small fishes, and a number of invertebrates (worms, crustaceans, and insects).

Impact of the introduction:

They are considered as one of the 100 worst invasive alien species in the world.

This species will unlikely be found in Quebec since the water temperature is too cold.

References:

Florida Museum of Natural History. Walking catfish. [On line] *[http://www.flmnh.ufl.edu/fish/Gallery/Descript/WalkingCatfish/WalkingCatfish.html]* (March 2007).

USGS. *Clarias batrachus*. [On line] *[http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=486]* (March 2007).

Wikipedia. *Clarias batrachus*. [On line] *[http://fr.wikipedia.org/wiki/Clarias_batrachus]* (March 2007).

Weatherfish

Misgurnus fossilis

Loche d'étang

Credit: Zoltan Sallai, Nimfea Nature Conservation Association

This species is native to Europe, from France to Russia. It could potentially be introduced and establish itself in our waters through aquariophily activities and facilities.

Description:

Freshwater fish.

Average length of 15 to 30 cm.

It has a long cylindrical greenish body with two dark bands on the flanks in which are interspersed two copper-coloured bands. Its belly is orange-coloured with black dots. It has a small cone-shaped head and 10 barbels around the mouth. Fins are small and rounded, including the caudal fin.

These are nocturnal fish. They bury themselves in silt during the day and become active at night.

When oxygen concentrations are too low in the aquatic environment, they can breathe outdoor air through their secondary respiratory system.

They are capable of withstanding high temperatures and deoxygenation, and can adapt to the drying of their environment.

They are usually found in silty ponds, low-current watercourses and estuarine areas.

They feed on worms, small crustaceans and insect larvae.

Impact of the introduction:

Unknown.

References:

Anonymous. Loche d'étang- *Misgurnus fossilis*. [On line] *[http://www.alsace.ecologie.gouv.fr/UserFiles/File/Patrimoine_naturel/Natura_2000/RRB/fiches_especes/poissons/loche_etang_fiche_espece.pdf]* (March 2007).

Gruyere-peche. La loche d'étang - *Misgurnus fossilis*. [On line] *[http://www.gruyere-peche.ch/newsite/IMG/_article_PDF/article_77.pdf]* (March 2007).

Système d'Informations sur la Biodiversité en Wallonie. *Misgurnus fossilis*. [On line] *[http://mrw.wallonie.be/cgi/dgrne/sibw/sibw.esp.ecol.pl?TAXON=Misgurnus_fossilis]* (March 2007).

Asian shore crab
Hemigrapsus sanguineus
Crabe sanguin

Credits: USGS. Susan Park, University of Delaware

This species is native to the Asia-Pacific Region. It is distributed from Russia to the coasts of Korea and China. Its presence was first reported in the east coast of the United States in 1988. It has rapidly established itself along the Atlantic Coast, from Maine to North Carolina. Their earliest introduction may have resulted from the release of adult specimens and larvae in the Atlantic Ocean via ballast water.

Description:

They inhabit estuarine and marine habitats. They are found in salinities lower than 24 ‰.

Their square-shaped carapace is small (35 to 42 mm in width for adult specimens) and it has three spines on each of its sides.

The color of the carapace is mottled and ranges from green to purple, orange-brown and red. The legs have a distinct banding pattern of alternating light and dark colors. The claws have a speckled pigmentation pattern.

Male crabs have a fleshy, bulb-like structure at the base of the moveable finger of the claws.

They are not much larger than the females, but their claws are more robust.

They typically live in the intertidal or shallow subtidal zone, where water depth is only a couple of feet at low tide. The crab can often be found under rocks in the intertidal zone during low tide.

This species is an opportunistic omnivore, feeding on macroalgae, salt marsh grass, larval and juvenile fish, and small invertebrates such as amphipods, gastropods, bivalves, barnacles, and polychaetes.

The females are capable of producing 50,000 eggs per clutch with 3-4 clutches per breeding season (from May to September).

The larvae are suspended in the water for approximately some months before developing into juvenile crabs. Because of this, the larvae have the ability to be transported over great distances towards new environments.

Cont'd **Asian shore crab**

Impact of the introduction:

They have an adverse ecological impact on the environment in which they are introduced by competing for food and habitat space with other crustaceans and fish.

They also occupy habitats very similar to native crabs, possibly overwhelming and dominating their habitat.

Their population increases rapidly and they are capable of withstanding a wide range of salinities and temperatures, which allows them to reproduce in various types of habitats.

References:

Anonymous. *Hemigrapsus sanguineus.* [On line] *[http://www.ciesm.org/atlas/Hemigrapsussanguineus.html]* (March 2007).

Global Invasive Species Database. *Hemigrapsus sanguineus.* [On line] *[http://www.issg.org/database/species/ecology.asp?si=756&fr=1&sts=]* (March 2007).

MIT Sea Grant: Center for Coastal Resources. *Hemigrapsus sanguineus.* [On line] *[http://massbay.mit.edu/exoticspecies/invaders/hemi.html]* (March 2007).

Salem Sound Coastwatch. *Hemigrapsus sanguineus*: Asian shore crab. [On line] *[http://www.mass.gov/czm/invasives/docs/invaders/h_sanguineus.pdf]* (March 2007).

USGS. *Hemigrapsus sanguineus.* [On line] *[http://cars.er.usgs.gov/Nonindigenous_Species/Asian_shore_crab/asian_shore_crab.html]* (March 2007).

Welty, D.J. *Hemigrapsus sanguineus*: Invasive species population study. [On line] *[http://www.cosee-ne.net/edu_project_1/documents/AsianShoreCrab.pdf]* (March 2007).

Veilleux, E., and Y., de Lafontaine. 2007. Biological Synopsis of the Chinese Mitten Crab *(Eriocheir sinensis).* Can. Manusc. Rep. Fish. Aquat. Sci. 2812: vi + 45 p.

Chinese mitten crab
Eriocheir sinensis
Crabe chinois à mitaines

Credit: Guy Verreault (MRNF)

This species is native to the Yellow Sea, which is located between Korea and China. It has been introduced in Europe, on the west coast of the United States and in the Great Lakes. It is found in Quebec in the St. Lawrence system. To date, the presence of at least eight specimens have been reported in the St. Lawrence River. It has probably been introduced through the release of ballast water.

Description:

They are catadromous. They spend most of their life in freshwater, but they must return to the sea to breed. During their third, fourth or fifth year, before attaining sexual maturity, they migrate over distances of up to hundreds, even thousands, of kilometres to reproduce in salt water.

The main characteristic of this species is its dense patches of hair on its claws that resemble mittens. Claws have white tips.

The carapace is about 30 to 100 mm wide. It is convex and rough, and barely wider than long. It is light brown to olive-green in color, sometimes mottled.

Legs are longer and lighter in colour than the carapace. There is a notch on the carapace between the eyes.

Males and females die shortly after the breeding period.

Juvenile crabs spend some time in salt water before gradually moving upstream into freshwater, thus completing their life cycle.

It has an opportunistic diet which includes algae, detritus and a variety of aquatic invertebrates.

Impact of the introduction:

They are considered as one of the 100 worst invasive alien species in the world.

Their presence in the St. Lawrence Estuary is a cause for concern as they can enjoy perfect conditions to reproduce. The tributaries of the river and estuary are also considered as risk-prone areas.

Since their population dramatically increases in areas where they are introduced, they could be a potential competitor for food with native species.

Cont'd **Chinese mitten crab**

Juvenile crabs form dense colonies and create burrows in the intertidal portions of streams, a process which has undermined the integrity of stream banks in both Europe and the United States. The purpose of these burrows is to protect themselves from predators and desiccation which occurs during low-tide periods. Tunnels are 12 to 20 cm in diameter and 20 to 80 cm deep. Their density can sometimes be significant – up to 30 burrows/m^2.

They have excellent walking skills. They can travel over very long distances on earth.

The Chinese mitten crab is the secondary intermediate host for the *Paragonimus westermani* parasite (Oriental lung fluke – similar to tuberculosis), with mammals, including humans, are the final host. Humans can become infested by eating this crustacean.

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Green crab

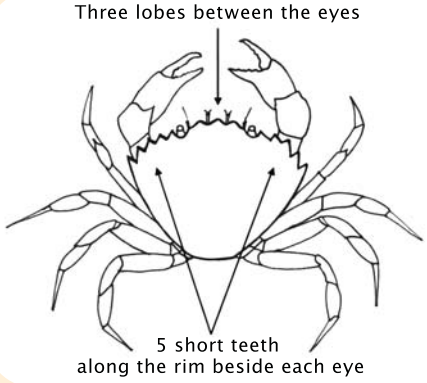
Carcinus maenas

Crabe vert

Credit: Guglielmo Tita
Illustration : Paille et al. 2006

The Green crab's native range extends along the Atlantic coasts of Europe and northern Africa, from Norway to Mauritania. It has been introduced in the United States at the beginning of the 19th century. It has progressively established itself in other areas, especially from Maryland to northeast Maine, and would have reached southwest New-Brunswick in the 1950's. Its presence was first reported in Quebec in 2004 in Îles de la Madeleine. During that period, 7 crabs were captured by an eel fisherman.

Description:



They inhabit brackish and salt water.

Their trapeze-shaped carapace is larger than long (up to 85 cm wide and 65 cm long).

Despite its name, the colour of its carapace cannot be considered as a distinctive characteristic. It is variable, usually mottled, dark brown to dark green, granules for the most part yellow. The ventral surface of the adult crab may vary from green to yellow, orange and red.

Claws may be of various sizes.

The main distinctive characteristic of this species is that there are five large triangular spines (teeth) peripheral to its carapace on each side of its eyes.

There are three lobes (small tips) between both eyes. Moreover, the fourth pair of walking legs is somewhat flattened and pointed.

They are capable of withstanding a large range of temperatures and salinities, which allows them to easily adapt to new environments – temperatures from 0 to 33 ºC and salinities from 4 to 54 ‰.

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Green crab

They have the capacity to remain out of the water for ten days if the air is fresh and humid.

Adult females are typically smaller than adult males.

They inhabit all types of protected and semi-protected marine and estuarine habitats and they avoid turbulent areas.

During their larval stage, crabs feed on zooplankton, bacteria, phytoplankton and detritus. Once adult, they become voracious omnivores. They feed on a variety of organisms, including molluscs such as quahogs, clams, mussels, aquatic worms, fish, algae, and other small crustaceans (including other crab species).

Impact of the introduction:

They are considered as one of the 100 worst invasive alien species in the world.

Due to their capacity to consume large amount of molluscs, they ravage mussel cultures.

They compete for food and habitat space with other native species. A study has shown that the Green crab and Rock crab are huge competitors. However, the Green crab is smaller, but more aggressive than the Rock crab.

Introduced non-native species may sometimes represent a disease vector. Effectively, they may sometimes transmit parasites to certain populations of native species. For example, the Green crab may be the intermediate host of the *Profilicollis botulus* worm which causes many fatalities among common eider ducks.

Green crabs can have adverse impacts on eeling. Effectively, eels do not enter traps in which there are Green crabs.

In Europe, Green crabs are exploited as a food resource. They are also used as baits.

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Rusty crayfish
Orconectes rusticus
Écrevisse à taches rouges

Credit: USGS

This species is native to Ohio, Kentucky and Tennessee. Spread by anglers who use them as bait, its presence was first reported in Quebec in 2001, in Lake Pemichangan and in the Ottawa River.

Description:

They occur in freshwater.

It is very hard to identify crayfish species; they somewhat all look alike. However, some distinctive characteristics allow identifying the Rusty crayfish.

Their carapace is in hues of bluish grey to brown or dark green.

Adult Rusty crayfish have large rust-coloured spots on each side of their carapace.

Their claws are more robust than that of some other crayfish species.

They inhabit lakes, ponds, and streams. They prefer areas that offer rocks, logs, or other debris as cover. Rusty crayfish inhabit both pools and fast water areas of streams.

They generally do not dig burrows other than small pockets under rocks and other debris.

They feed on a variety of aquatic plants, benthic invertebrates (like aquatic worms, snails, leeches, clams, aquatic insects, and crustaceans), detritus, fish eggs, and small fish.

Impact of the introduction:

They are aggressive and frequently force native crayfish to relocate.

They reduce the amount and kinds of aquatic plants and invertebrates.

The destruction of aquatic plants caused by this species has resulted in the loss of breeding areas and habitats of several fish.

Potentially invasive exotic crustacean found in Quebec

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Rusty crayfish

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Clubbed tunicate
Styela clava
Ascidie plissée

Credit: Luis A. Solorzano, californiabiota.com

This ascidian is gradually invading all salt waters worldwide. It is native to Asia, West Pacific Ocean, from Korea to Siberia. It is now found in Europe and on both coasts in the United States. It was probably introduced into Californian waters in the late 1920's. It could have come to the east coast on the hulls of boats that passed through the Panama Canal from California. Its presence was first reported in Prince Edward Island in 1998.

Description:

They occur in salt water.

They have a cylindrical club-shapes body and they can reach 15 cm in length (with peduncle).

The peduncle is narrow and resistant, and almost accounts for the third of the total length. They are immobile invertebrates and as a fouling species they adhere to substrates using the fixation system located at the base of their peduncle.

Their tunic is tough, leathery and rumpled. It is irregularly pleated, as if it was covered with warts, and its colour is opaque and brownish.

There are two short siphons towards the top of the organism with radial purple marks that are sometimes hard to see.

They are frequently found in groups of 500 to 1,500 individuals per square metre. They firmly attach themselves to substrates and are hard to remove.

They are abundant in protected areas of shallow waters such as bays and havens. They grow under shallow water attached to hard substrates such as quays, buoys, hulls, pylons or mussel culture facilities.

They can survive out of the water for a few days.

They filter water to nourish themselves with phytoplankton, zooplankton and organic matters.

It is a hardy species, capable of withstanding salinity changes and temperature fluctuations.

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Clubbed tunicate

Impact of the introduction:

Clubbed tunicates cause serious damage to the mollusc culture industry. They cling to mussel lines, making growing and harvesting more difficult and expensive. As fouling species it can have negative impacts on aquaculture species through competition for space and food.

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Solitary tunicate
Ciona intestinalis
Ascidie solitaire

Credit: © Wilfried Bay-Nouailhat/ Mer et littoral

This ascidian is native to the waters of northern Europe, but it is now widely distributed throughout subarctic and tropical regions. It is one of the most widely distributed tunicate in the world and maritime transport is the main cause of its introduction in various environments. In the course of the last decade, population booms have been observed in several sites along the southwest coast of Nova Scotia and similar booms are now threatening the mussel culture industry in Prince Edward Island.

Description:

They occur in salt water.

The solitary tunicate can reach 15 cm in length and 3 cm in diameter.

They grow 10 to 20 mm per month.

Their body is cylindrical with a soft, pale, translucent tunic, yellowish to orange in colour, through which the internal organs are visible.

At the top of their body, there are two siphons which may have yellow margins with orange/red pigment spots.

Their body is soft, retractile. When they are disturbed, they flex the muscles along their body and their tunic tightens and shrinks. The contractile tension ejects the water present in their siphons, which explains why they are often referred to as Sea Syringes.

Thanks to an extension of their tunic (villi), these sessile animals (no peduncle) grow on bedrock, algae or hard artificial surfaces such as hulls, pylons, and buoys.

They are found in the low intertidal zone at depths of up to 500 m.

They often occur in large groups of individuals.

They feed themselves by filtering the water and collecting the food present in it.

They have the capacity to withstand a large variety of environmental conditions. They prefer cold and warm water, but they can also be found in tropical environments.

They have the capacity to withstand a large variety of salinities (12 to 40 ‰). They are usually found in environments with salinities greater than 30 ‰.

Cont'd **Solitary tunicate**

Impact of the introduction:

They are a significant nuisance fouling species in aquaculture.

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Québec