

An Identification Guide to

**PROHIBITED**

# AQUATIC INVASIVE SPECIES

*in British Columbia*



The species of fish and mussels described in this identification guide are **PROHIBITED** from POSSESSION, BREEDING, RELEASE, **SALE OR TRANSPORT** in BRITISH COLUMBIA.

The following identification guide provides information on **prohibited** aquatic invasive species that are listed under British Columbia's *Wildlife Act*, Controlled Alien Species Regulations.

Please report any known or suspected violations to the **B.C. Conservation Officer Service: 1-877-952-7277 (RAPP)**

All prohibited species are highlighted in yellow boxes. This guide also includes some similar looking species in the trade, or native to B.C., which are displayed in blue boxes and labeled as SIMILAR NON-REGULATED SPECIES.



Cover photo of Snakehead by Ministry of Environment

## Table of Contents

Introduction: Why are Invasive Species a Concern? .....	2
Impacts of Aquatic Invasive Species .....	2
What You Can Do .....	3
Snakeheads (Family Channidae) .....	4
Oriental Weatherfish ( <i>Misgurnus anguillicaudatus</i> ) .....	6
White Cloud Mountain Minnow ( <i>Tanichthys albonubes</i> ) .....	7
Asian Carp .....	8
Grass Carp ( <i>Ctenopharyngodon idella</i> ) .....	8
Black Carp ( <i>Mylopharyngodon piceus</i> ) .....	9
Silver Carp ( <i>Hypophthalmichthys molitrix</i> ) .....	10
Bighead Carp ( <i>Hypophthalmichthys nobilis</i> ) .....	11
Bitterlings ( <i>Rhodeus</i> sp.) .....	12
Tench ( <i>Tinca tinca</i> ) .....	14
Gobies .....	16
Round Goby ( <i>Neogobius melanostomus</i> ) .....	16
Tubenose Goby ( <i>Proterorhinus semilunaris</i> ) .....	18
Monkey Goby ( <i>Neogobius fluviatilis</i> ) .....	18
Amur Goby ( <i>Rhinogobius brunneus</i> ) .....	19
Bullhead and Channel Catfish (Family Ictaluridae) .....	20
Yellow Bullhead ( <i>Ameiurus natalis</i> ) .....	21
Black Bullhead ( <i>Ameiurus melas</i> ) .....	22
Brown Bullhead ( <i>Ameiurus nebulosus</i> ) .....	23
Western Mosquitofish ( <i>Gambusia affinis</i> ) .....	24
Zebra Mussel ( <i>Dreissena polymorpha</i> ) and Quagga Mussels ( <i>Dreissena bugensis</i> ) .....	25
Conrad's False Mussel ( <i>Mytilopsis leucophaeata</i> ) .....	27
Glossary .....	28



## **Introduction: Why are Invasive Species a Concern?**

Invasive species pose a serious economic and environmental threat to British Columbia. They might consume native fish or compete with them for habitat and food, seriously threatening native freshwater species. Others, such as zebra and quagga mussels, have serious impacts on hydropower dams and municipal water supplies.

## **Impacts of Aquatic Invasive Species**

### **Environmental**

Displace native fish and plant species; reduce desirable aquatic habitat; alter wetland and shoreline structure; decrease fish populations; increase sedimentation (decrease water clarity); and clog stream channels.

### **Economic**

Impact commercial and recreational fisheries; increase boat and industry repair and maintenance costs (clogged dams and structures); extremely costly to control/eradicate.

### **Social**

Degrade water quality; impede swimmers and boat traffic, may cause harmful algae blooms leading to health risks.

## What you can Do

### PREVENTION AND EARLY DETECTION ARE KEY!

All watercraft should follow **CLEAN, DRAIN, DRY** to avoid the spread of invasive species:



**CLEAN** off plant parts, animals, and mud from boat, trailer, outdrive, and equipment (e.g. boots, waders, fishing gear).



**DRAIN** onto land all items and compartments that can hold water (e.g. bilge, ballast, wells, buckets).



**DRY** all items completely before launching into another body of water.

### Aquariums/Ponds

Check that species are not invasive before acquiring or sharing them. Drain aquarium water on dry land away from drains and waterways. Don't buy fish, plants or live rock from overseas on the internet. Design fish tanks and ornamental ponds so that they cannot overflow into drains or waterways.

### Disposal

Never dump or flush healthy unwanted aquarium fish; instead, consider giving them to a local fish/pet shop, other fish owners, fish clubs, or schools, nursing homes, or offices (*If they don't have an aquarium consider donating yours*). If you have a diseased aquarium, fish cannot be given away and must not be dumped or flushed into waterways. The sick fish should be humanely euthanized and disposed of in a sanitary landfill.

## Snakeheads (Family Channidae)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Long body is nearly round in cross-section with large thick tile-like scales on the head. Pelvic fins are positioned along the belly about half-way between the gills and anus. Both dorsal and anal fins are elongate, with no notches or separation between a spiny and soft portion.

## Northern Snakehead

**BANNED  
ALIVE**



Photo: J. Tomelleri

- Snakeheads are found in the aquarium and live food trades in B.C. and pose a significant risk to B.C.'s rivers and lakes (*avoid purchase; report if found*).
- With over 30 species in the family Channidae, the most commonly sold Snakeheads are Northern (*Channa argus*), Giant (*C. micropeltes*), Blotched (*C. maculata*) and Chevron (*C. striata*).
- The head looks flattened, and the eyes appear to angle up and to the side. The tail fin is rounded.
- The lower jaw extends past the upper jaw, and the mouth contains sharp canine-like teeth.
- Can grow up to 1 m and reach 20 kg.

## Giant Snakehead (Juveniles)

**BANNED  
ALIVE**



Photo: Courtney & Williams

### SIMILAR NON-REGULATED SPECIES

- **Burbot** (*Lota lota*) have a short anterior dorsal fin, a longer posterior dorsal fin, and a single barbel at the tip of the chin. Slender pelvic fins are forward of the pectoral fins, beneath the gills.

## Burbot

**SIMILAR  
SPECIES**



Photo: J. Tomelleri

- **Pike Cichlids** (in the pet trade) have thin scales on the body and none on the head, a far shorter anal fin, and completely lack enlarged canine-like teeth. The origin of the pelvic fin in Pike Cichlids is directly below the pectoral fin; in Snakeheads, the pelvic fins are about half-way along the pectoral fin.

## Oriental Weatherfish

(*Misgurnus anguillicaudatus*)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Eel-like, cylindrical body, with several pairs of large and small barbels surrounding the mouth.



Photo: G. F. Hanke



Photo: North American Native Fishes Association

- Weatherfish are found in the aquarium trade (*avoid purchase; report if found*), with one introduced population established in B.C.
- Also called Dojo, Gold Dojo, Weather Loach, Japanese Weatherfish, Amur Weatherfish.
- Leading ray of the pectoral fin is thickened.
- Has retractable sharp spine below the eye.
- Weatherfish are brown with greenish grey-brown marble markings on the back.
- Can grow up to 25 cm.

## White Cloud Mountain Minnow (*Tanichthys albonubes*)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Large red spot on base of tail fin; white tips to fins, pink mid-lateral band and black pin-stripe which ends as a black spot at the tail base; small size.



Photo: H. J. Chen

- Common in the aquarium trade as pets and as “feeder fish” (*avoid purchase; report if found*). Albino and long-finned varieties are found in the pet trade, but would be less successful in nature.
- Have an iridescent golden-green back. Their ventral fins tend to be yellow-green with white tips, while their tail has a large round red spot at its base. The dorsal fin can be yellow-orange to red with a white tip.
- Have no barbel, but its lower jaw projects slightly forward.
- Grows to a maximum of 3-4 cm.

## Asian Carp

(Grass, Silver, Bighead and Black Carp)

BANNED  
ALIVE

Asian Carp are part of the live food trade. Grass Carp have been used to control plant growth in ponds and irrigation ditches.

## Grass Carp (*Ctenopharyngodon idella*)

BANNED  
ALIVE

**KEY ID FEATURES:** Grass Carp have no scales on their head, the snout is pointed, and they have a short dorsal fin. The dorsal fin lacks the hardened spine-like leading ray and the mouth lacks barbels.



Photo: J. Tomelleri

- Large circular scales cover body with dark edges. Adults are dark olive grey-brown, with lighter coloured golden sides; young are silvery.
- Can grow to more than 1 m, and up to 30-50 kg.

## Black Carp (*Mylopharyngodon piceus*)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Closely resembles the Grass Carp but have molar-like pharyngeal teeth; usually in a single row with four or five per side; two rows of pharyngeal teeth are possible in some fish with the outer row containing (at most) two teeth.



Photo: J. Tomelleri

- Black-tipped scales give the appearance of a cross-hatched or net-like pattern.
- Dark to blue-gray or black body with a pale belly; fins are dark to almost black.
- Can grow to 1.5 m, and 70 kg.

### SIMILAR NON-REGULATED SPECIES

- **Common Carp** have a long dorsal fin with a serrated leading edge spine, and a pair of barbels at the angle of the mouth.

## Silver Carp

(*Hypophthalmichthys molitrix*)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Have a keel from beneath the gills to the anus; tiny scales cover the body; the pectoral fin does not extend past the base of pelvic fin; and the large upturned mouth opens above the eyes.

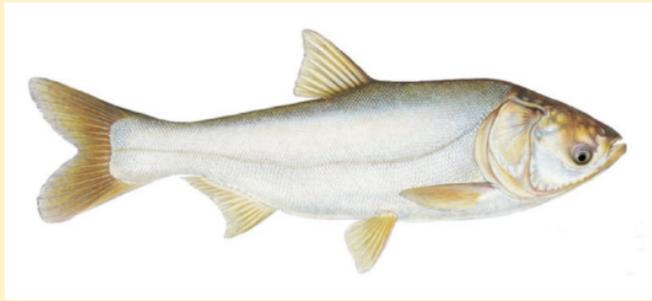


Photo: J. Tomelleri

- Silver-grey-black back, sides with olive to silver shades, and silver on the belly.
- Can grow to 1.2 m, and over 40 kg.

## Bighead Carp

(*Hypophthalmichthys nobilis*)

BANNED  
ALIVE

**KEY ID FEATURES:** Very similar to Silver Carp but has a smooth keel only between the anus and pelvic fins; gill rakers form a fine comb-like structure.

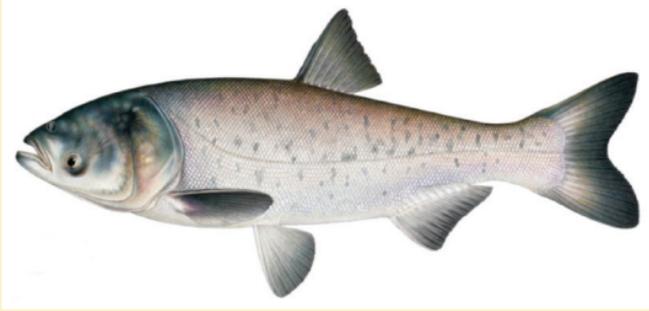


Photo: J. Tomelleri

- Small round scales closely resemble Silver Carp.
- Have a greyish back, a cream-coloured belly, and grey-black blotches on back and sides.
- Can grow to 1.5 m, and over 40 kg.

### SIMILAR NON-REGULATED SPECIES

- **Suckers** (*Catostomus* sp.); however, all B.C. suckers have a mouth that faces downwards and is slightly overhung by their snout, as well as thick lips with folds or bumps.

## Bitterlings (*Rhodeus* sp.)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Pink-purple-blue base colouration; an orange-red spot in the tail fins of adults; some red pigment in the dorsal and anal fins.

## Rosy Bitterling (*Rhodeus ocellatus ocellatus*)

**BANNED  
ALIVE**



Photo: Fishbase, T. Y. Liao

- With over 40 species in the genus *Rhodeus*, Bitterling and Rosy Bitterling are the most common in the pet trade, and bags of imported fish can contain more than one *Rhodeus* species. All species of the genus are banned in B.C. (*avoid purchase; report if found*).
- Distinct silvery-grey-blue stripe from the base of the tail to about halfway along the body, and a dark tear-drop band behind the gills; there are fewer than 12 scales with lateral line pores along the body.
- Deep bodies appear flattened from side to side. Dorsal fin begins behind the origin of the pelvic fins.
- Have a rounded snout, with a terminal to slightly subterminal mouth. Can grow to about 11 cm.

## SIMILAR NON-REGULATED SPECIES

- **Red Shiner** (*Cyprinella lutrensis*) is a high risk to south-western B.C.; appears in pet trade as Asian Rainbow Barbs or Rainbow Mountain Dace.
- Never develops the deep compressed body of adult bitterlings. Adults have similar blue-purple colour, a blue tear-drop band behind gills, and bright red pigment in breeding fish.
- Native to the Mississippi, Missouri drainages.

### Red Shiner (Breeding Male)

SIMILAR SPECIES



Photo: North American Native Fishes Association

### Red Shiner (Non-Breeding Adult)

SIMILAR SPECIES



Photo: North American Native Fishes Association

## Tench (*Tinca tinca*)

BANNED  
ALIVE

**KEY ID FEATURES:** The iris of the eye is orange-red; the body is robust, deep, and covered with small, embedded scales; the mouth is small with a single thin barbel per side at corner of the jaw; fins are dark with rounded margins, and the tail has no fork or is only slightly indented.

## Tench (Adult)

BANNED  
ALIVE



Photo: Provincia Di Treviso

- Tench are part of the live food and aquaculture trade. The golden variety is used as an ornamental fish in garden ponds (*avoid purchase; report if found*). In B.C., Tench have been introduced to the Okanagan, and are easy to see in the weedy shallows of Christina Creek.
- Dark yellow-brown-green to almost black in colour, blending to yellow-gold along the sides and belly. The belly lacks any keels; one captive-bred variety ("Golden Tench") is uniformly golden yellow with dark blotches. Can grow to 70 cm.

## Tench (Juvenile)

BANNED  
ALIVE



Photo: Gunther Schmida

## Tench (Golden)

BANNED  
ALIVE



Photo: Giardina D'Acqua

- Tench that are artificially bred may resemble Goldfish (*Carassius auratus*). These fish, called Golden Tench or Schleis, can be light gold to red with black or red spots on the sides and fins.

## Gobies

(Round, Monkey, Tubenose and Amur Gobies)

BANNED  
ALIVE

**KEY ID FEATURES:** Pelvic fins fused to form a cone. Round, Monkey, Tubenose and Amur gobies present a threat from accidental introduction.

## Round Goby (*Neogobius melanostomus*)

BANNED  
ALIVE

**KEY ID FEATURES:** Solid slate gray in youth; older fish are black and brown blotched with white to buff-yellow fins. The anterior (spiny) dorsal fin has a black eye-spot near the base towards the back of the fin.



Photo: North American Native Fishes Association

## Round Goby

**BANNED  
ALIVE**



Photo: J. Tomelleri



Photo: New York Invasive Species

- Can grow up to 30 cm.

### SIMILAR NON-REGULATED SPECIES

- B.C. has three **native species of goby** in marine and estuarine environments: Black-eye Goby (*Rhinogobiops nicholsii*), Bay Goby (*Lepidogobius lepidus*), and the Arrow Goby (*Clevelandia ios*).
- Superficially similar-looking native species: Sculpins (*Cottus* sp.); however, sculpins have two separate pelvic fins or no pelvic fins.

## Tubenose Goby

(*Proterorhinus semilunaris*)

**BANNED  
ALIVE**

**KEY ID FEATURE:** Long nostril tubes over upper lip.



Photo: J. Tomelleri

- Grey-brown colouration over a lighter background colour, with at least three dark saddles extending down from the pair of dorsal fins.

## Monkey Goby (*Neogobius fluviatilis*)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Narrower head and bigger fins than other goby species; most commonly found in sandy substrates.



Photo: Daniel Grula

- Can grow to 12-13 cm.

## Amur Goby (*Rhinogobius brunneus*)

**BANNED  
ALIVE**

**KEY ID FEATURE:** Red or dark line from front edge of the eye to snout tip.



Photo: Fugupuff



Photo: ffish.asia

- Long, broad snout with large fleshy lips.
- Dorsal fin is high and terminates at a point. Median fins have white-yellow tips; the pectoral fin is translucent.
- Scale colouration alternates orange-red/blue-green.

## Bullhead and Channel Catfish (Family Ictaluridae)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Four pairs of barbels on a large, flattened head; no scales; adipose fin present; only freshwater fish in B.C. with a strong (sometimes serrated) spine along the leading edge of the pectoral fin. Dorsal fin has a strong spine at its leading edge, and the combined trio of spines can be locked into place when a fish is in danger.

- These fish are found in the live food trade. There are many introduced populations of *Amieurus* in B.C.. Other fish in this family (i.e., *Ictalurus punctatus*) occasionally appear in B.C. in the pet trade under false names, such as “Blue Channel Catfish” (avoid purchase; report if found).
- Family Ictaluridae has 46 species of North American catfish. All species in the family are banned in B.C..
- B.C. has three introduced species of bullheads: the Yellow (*Ameiurus natalis*), the Brown (*A. nebulosus*), and the Black (*A. melas*).
- Have an adipose fin, and four pairs of barbels on the snout (one pair behind the nostrils, one long pair attached to the upper lip, and two shorter pairs found under the chin).
- Bullhead catfish males guard their young. Inky black looking schools of young bullheads are found near the surface of ponds, streams and lakes in calm water and break up later in summer.
- Can grow to 50 cm. Larger ictalurids grow to 1.5 m.

## Yellow Bullhead (*Ameiurus natalis*)

**BANNED  
ALIVE**

**KEY ID FEATURE:** Mental (chin) barbels are pale cream to white coloured.



Photo: North American Native Fishes Association



Photo: Gavin Hanke, Royal BC Museum

- Most likely arrived as contaminants with shipments of other game fish or bullhead catfish.
- Since 2005 several populations have been identified in the Lower Mainland.

## Black Bullhead (*Ameiurus melas*)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Darkly pigmented mental (chin) barbels. Both adults and juveniles are black-brown above and light below (white in juveniles, white or lemon yellow in adults). The body colouration is even, in contrast to the blotched appearance of the Brown Bullhead.



Photo: North American Native Fishes Association



Photo: National Park Service

- Both anal and tail fins have distinctly darker fin membranes between lighter fin rays. Pattern of dark fin membranes ends well before the anal fin base, leaving a pale band along the anal fin base.

## Brown Bullhead (*Ameiurus nebulosus*)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Mental (chin) barbels are dark; adult fish are yellow-brown above and dirty white below; juveniles are dark above and white below.



Photo: Lubomir Hlasek

- These likely arrived as contaminants with shipments of other game fish or bullhead catfish. Since 2005 several populations have been identified in the Lower Mainland.
- The caudal and anal fin web has the about same colouration as the fin rays. Colouration continues to the fin base (contrast fin features with Black Bullhead). The sides of the fish are blotched rather than evenly coloured as in Black Bullhead. Pectoral fin spines may be strongly serrated.

## Western Mosquitofish

(*Gambusia affinis*)

**BANNED  
ALIVE**

**KEY ID FEATURES:** Dusky/black teardrop below eye; 1-3 rows of black spots on dorsal and caudal fins. The mouth is horizontal and in dorsal view, appears straight across the snout. Males have a modified anal fin (gonopodium) for reproduction.



Male with elongate gonopodium; Photo: Rene Reyes



Female with rounded anal fin; Photo: Rene Reyes

- Stocked in ponds in B.C. (*report if found*); all known introductions were subject to winterkill.
- Also called Top Minnow, Plague Minnow, but are not minnows; part of the Guppy family Poecilia.
- Small, silver fish with a greenish-blue hue, and peppered with gray and black markings.
- Produce many broods of live young each year.

**Zebra Mussels** (*Dreissena polymorpha*)

**Quagga Mussels** (*Dreissena bugensis*)

**Conrad's False Mussel**

(*Mytilopsis leucophaeata*)

**BANNED  
ALIVE OR  
DEAD**

**KEY ID FEATURE:** Attaches to hard surfaces—can be easily transported by boats and equipment.

**Zebra Mussels** (*Dreissena polymorpha*)

**Quagga Mussels** (*Dreissena bugensis*)

**BANNED  
ALIVE OR  
DEAD**

**KEY ID FEATURE:** Small freshwater mussels named for the striped pattern of their shells.



Photo: United States Geological Survey - Nonindigenous Aquatic Species

- Attach to objects, surfaces—like boat hulls—or other mussels by threads extending from underneath shell.
- Release free-swimming larvae which can be transported in any water in a boat, including the bilge and the engine cooling system.

## Zebra/Quagga Mussels

**BANNED  
ALIVE OR  
DEAD**



Photo: Myriah Richerson



Photo: David Britton

- Zebra Mussels are stable on flattened underside; Quagga Mussels, lacking a flat underside, fall over.

### **SIMILAR NON-REGULATED SPECIES**

Freshwater mussels **native to BC** are commonly found in soft substrates (mud, sand, gravel, cobble), are larger and are oval shaped. They lack the ability to attach to vertical surfaces.

## Conrad's False Mussel

(*Mytilopsis leucophaeata*)

**BANNED  
ALIVE OR  
DEAD**

**KEY ID FEATURES:** Juveniles may have zebra-striped appearance of Zebra Mussels. As the mussels grow they become brownish in appearance.



Photo: Ari O. Laine

- Found in estuaries due to tolerance to brackish water.
- Also called “Dark False Mussel” or “Brackish Water Mussel.”
- Can grow to 2.5 cm.

### **Report Invasive Mussels:**

Report ALL sightings of invasive mussels to the  
**B.C. Conservation Officer Service:**

**1-877-952-7277 (RAPP)**

## Glossary

**Adipose fin:** a small fleshy fin, without spines or rays, on the back between the dorsal and caudal fins.

**Anal fin:** the fin on the median ventral line behind the anus.

**Barbels:** fleshy projections found on the head, usually near the mouth.

**Caudal fin:** pertaining to the tail.

**Dorsal:** back, pertaining to the back.

**Dorsal fin:** a fin on the back, usually central in position supported by rays or spines.

**Gill rakers:** a series of bony projections along the anterior edge of the gill arch.

**Keel:** a sharp compressed edge on the ventral (belly, abdomen) surface between the paired fins, or the lateral surface of the caudal peduncle (the fleshy end of the body behind the anal fin and before the tail fin).

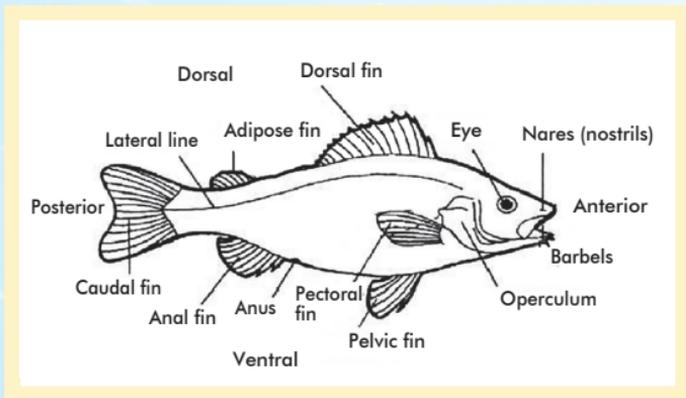
**Lateral:** on the side.

**Lateral line:** series of porelike openings (to sensory canal) along the sides of a fish.

**Pharyngeal teeth:** teeth in the pharyngeal arch of the throat of cyprinids, suckers, and a number of other fish species lacking teeth.

**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, modified into a suction cup, or absent entirely.



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

**Spine:** the hard and unbranched rays in a fin.

**Subterminal (mouth):** when the mouth opens below the foremost part of the head, slightly overhung by snout.

**Terminal (mouth):** when the mouth opens at the foremost part of the head, tips of the jaws form the foremost part of the head.

## BC INTER-MINISTRY INVASIVE SPECIES WORKING GROUP



PROTECTING BC'S RESOURCES



This publication was produced by the **Inter-Ministry Invasive Species Working Group (IMISWG)** with the support of the **Invasive Species Council of British Columbia (ISCBC)**.

**IMISWG** employs science-based, innovative strategies to protect the health and diversity of B.C. ecosystems and minimize the negative impacts of invasive species:  
[www.gov.bc.ca/invasive-species](http://www.gov.bc.ca/invasive-species)

**ISCBC** works in partnership with government and others to increase coordination and actions to reduce the negative impacts of invasive species to B.C.: [www.bcinvases.ca](http://www.bcinvases.ca) | 1-888-933-3722



## Report Aquatic Invasive Species

Report **ALL** activities involving prohibited fish or mussels to the **B.C. Conservation Officer Service: 1-877-952-7277 (RAPP)**

Report invasive species to:  
[www.gov.bc.ca/invasive-species](http://www.gov.bc.ca/invasive-species)

For more information:  
[www.bcinvases.ca](http://www.bcinvases.ca)  
1-888-933-3722

