

A Field Guide to

Fish Invaders

of the Great Lakes Region

Non-Native Fish and Native Look-a-Likes



A Component of the Aquatic Invasive Species-Hazard
Analysis and Critical Control Point (AIS-HACCP) Program



Fish Invaders

This guide highlights harmful aquatic invasive fish that pose threats to the recreational, environmental, and economic value of the Great Lakes region. Similar-looking native species are included for comparison.

The non-native species identified in this guide could spread during harvest, stocking, or fishery and law enforcement operations. These fishes have the potential to displace native species, harm habitats, and degrade lakes, rivers, streams, and wetlands.

The purpose of this guide is to assist private and public fisheries personnel in identifying and reporting potentially invasive fish species. It is also designed to accompany Aquatic Invasive Species-Hazard Analysis and Critical Control Point (AIS-

HACCP) training workshops, curriculum, video (*From Net to Sale*), and other program materials. For details, visit www.seagrant.umn.edu/ais/haccp.

Specimens of non-native fish are needed to confirm sightings and infestations, but many Great Lakes jurisdictions have differing rules regarding possession and transport. Some non-natives represented in this field guide are regulated under state or provincial laws. Other non-native or native species can be harvested, transported, or sold commercially.

Contact your local natural resource management agency for instructions. Never dump live fish from one body of water into another without a permit.

This Field Guide Contains:

- Full-color illustrations for 38 invasive and common look-a-like fishes
- Key characteristics to aid accurate identification*

*Size estimates taken from Page, L. M. and B. M. Burr. 1991. *Freshwater Fishes*, Peterson Field Guides. Houghton Mifflin Company, New York.

A Field Guide to Fish Invaders of the Great Lakes Region

⊘ Denotes Invasive Fish

✔ Denotes Native Fish

Group 1 4

- ⊘ Fourspine Stickleback
- ⊘ Threespine Stickleback
- ✔ Ninespine Stickleback
- ✔ Brook Stickleback

Group 2 6

- ⊘ Round Goby
- ⊘ Tubenose Goby
- ✔ Spoonhead Sculpin
- ✔ Slimy Sculpin
- ✔ Mottled Sculpin
- ✔ Deepwater Sculpin

Group 3 8

- ⊘ Rudd
- ✔ Golden Shiner
- ✔ Redfin Shiner
- ⊘ Goldfish

Group 4 9

- ✔ Bigmouth Buffalo
- ⊘ Bighead Carp
- ⊘ Silver Carp
- ⊘ Black Carp
- ⊘ Grass Carp
- ⊘ Common Carp

Group 5 12

- ⊘ Ruffe
- ✔ Walleye
- ✔ Sauger
- ✔ Trout-perch
- ✔ Yellow Perch
- ✔ Logperch

Group 6 14

- ⊘ White Perch
- ✔ White Bass
- ✔ Yellow Bass
- ✔ Yellow Perch
- ✔ Freshwater Drum

Group 7 16

- ⊘ Inland Silverside
- ✔ Brook Silverside

Group 8 17

- ⊘ Rainbow Smelt
- ✔ Emerald Shiner
- ✔ Cisco (Lake Herring)

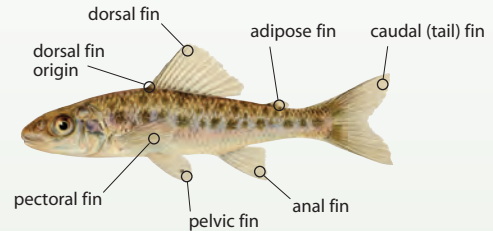
Group 9 18

- ⊘ Northern Snakehead
- ✔ Bowfin
- ✔ Burbot

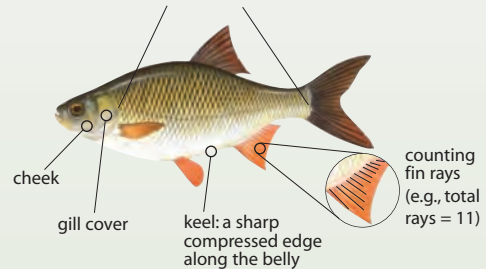
How to Use This Guide

Each page includes one or more invasive fish and its native look-a-likes with key characteristics such as length and color.

Guide to Key Features



To count lateral line scales: count the number of scales along the line formed by a series of pore-like openings from behind the gill cover to the tail.



Fourspine Stickleback



- **Four dorsal spines;** first two spines are longer than second two spines
- Scaleless body with no bony plates



Apeltes quadracus

Length: Up to 2.5 in. (6.4 cm)

Coloring: Body is olive green with dark mottling

Ninespine Stickleback



- **Nine short dorsal spines**
- Scaleless body sometimes with bony plates



Pungitius pungitius

Length: Up to 3.5 in. (9 cm)

Coloring: Body is olive green to pale green

Threespine Stickleback



- **Three dorsal spines;** first two spines are longer than third
- Scaleless body with bony plates
- Native to Lake Ontario



Gasterosteus aculeatus

Length: Up to 4 in. (10 cm)

Coloring: Body is silvery with dark mottling

Brook Stickleback



- **Five to six short dorsal spines**
- Scaleless body with no bony plates



Culaea inconstans

Length: Up to 3.5 in. (9 cm)

Coloring: Body is olive green to dark green with light spots

Round Goby



- Pelvic fins are **fused** to form a single scallop-shaped fin
- Large head with frog-like raised eyes
- Black spot on rear of first dorsal fin
- Fine scales on body



Apollonia melanostomus
Length: Up to 10 in. (25.4 cm)
Coloring: Mottled olive and brown body

Tubenose Goby



- Pelvic fins are **fused** to form a single scallop-shaped fin
- First nostrils extend beyond lower lip
- Black lines on first dorsal fin; no black spot
- Fine scales on body



Proterorhinus semilunaris
Length: Up to 4 in. (10 cm)
Coloring: Mottled brown body, usually with five dark bars on sides

Spoonhead Sculpin



- **Two separate** pelvic fins
- Large head with well-developed spine on each side, curving upward and backward
- All fins are lightly speckled except pelvic fins, which are clear
- Scaleless body



Cottus ricei
Length: Up to 5 in. (13 cm)
Coloring: Head and body are light brown and tan, mottled with small dark speckles

Slimy Sculpin



- **Two separate** pelvic fins
- Large head with large spine on each side directed upward and inward; two lower spines covered by skin
- No spot on first dorsal fin
- Scaleless body



Cottus cognatus
Length: Up to 4.5 in. (12 cm)
Coloring: Mottled brown to olive-green body

Mottled Sculpin



- **Two separate** pelvic fins
- Large head with large spine on each side directed upward and inward; two lower spines covered by skin
- Large dark spots all over first dorsal fin
- Scaleless body



Cottus bairdii
Length: Up to 6 in. (15 cm)
Coloring: Body is light to dark brown with mottled back and sides

Deepwater Sculpin



- **Two separate** pelvic fins
- Head is wide and flat with four conspicuous spines on each side; top spine directed upward, others downward
- No spot on first dorsal fin
- Scaleless body



Myoxocephalus thompsonii
Length: Up to 9 in. (23 cm)
Coloring: Body is gray brown with light mottling on back and sides

Rudd

- **Scaled keel** along belly, from pelvic to anal fins
- Bright red-orange fins
- 38–42 lateral line scales
- Iris of eye has red spot dorsally



Scardinius erythrophthalmus

Length: Up to 19 in. (48 cm)

Coloring: Golden bronze body; white belly



Golden Shiner

- **No scales on keel** along belly from pelvic to anal fins
- Breeding males have orange on pelvic and anal fins, otherwise their fins are yellowish
- 44–54 lateral line scales
- No red spot on iris of eye



Notemigonus crysoleucas

Length: Up to 12 in. (30 cm)

Coloring: Silvery to golden body with green to brown back; yellowish to yellow-silvery belly



Redfin Shiner

- **No keel** along belly
- Fins typically clear except in breeding males, which have pink or orange tinted fins
- Small dark or dusky spot at anterior base of dorsal fin
- 41–48 lateral line scales



Lythrurus umbratilis

Length: Up to 3.5 in. (9 cm)

Coloring: Body is bluish with silvery tints



Goldfish

- No barbels
- No keel along belly
- Single **serrated spine** on long dorsal fin with more than 15 soft rays
- Large scales, 27–30 in lateral line



Carassius auratus

Length: Up to 16 in. (41 cm)

Coloring: Body is gold to olive green with white or black patches



Bigmouth Buffalo (Carp Look-a-Likes)

- Buffalos, Quillback, Carpsuckers (*Ictiobus* and *Carpoides* species)

For all members of these groups:

- No barbels
- Single, long sickle-shaped dorsal fin without serrated spine; 22–32 soft rays
- Large scales, 33–40 in lateral line



Ictiobus cyprinellus

Length: Up to 35 in. (90 cm)

Coloring: Olive-brown to bronze body; sides and belly lighter



Non-native carps to compare with the Bigmouth Buffalo are featured on the next two pages.

Bighead Carp

- Large scaleless head with upturned mouth, no barbels
- **Eyes** forward, below midline and project downward
- Scaleless keel extends only from anal fin to pelvic fin
- Single dorsal spine is moderately stiff but not serrated, followed by 8 soft rays
- Very tiny scales (trout-like), 91–120 in lateral line
- Long and comb-like gill rakers



Aristichthys nobilis

Length: Up to 44 in. (112 cm)

Coloring: Body is dark gray dorsally to silver white on sides. Many dark irregularly shaped blotches are scattered over body



Black Carp

- Broad, blunt head with slight downturned mouth, no barbels
- No keel
- Pointed dorsal fin with 7–8 soft rays
- Dark-edged scales, give a cross-hatched effect, 39–46 in lateral line



Mylopharyngodon piceus

Length: Up to 48 in. (122 cm)

Coloring: Blackish-brown to dark olive body; blackish-gray fins; white belly



Grass Carp

- Broad, blunt head with slight downturned mouth, no barbels
- No keel
- Pointed dorsal fin with 8–10 soft rays
- Scales are silver to gray with a prominent dark edge, giving a cross-hatched effect, 34–45 in lateral line



Ctenopharyngodon idella

Length: Up to 49 in. (125 cm)

Coloring: Body has dark olive shading with brownish-yellow sides; white belly



Silver Carp

- Scaleless head with large upturned mouth, no barbels
- **Eyes** forward, below midline and project downward
- Scaleless keel extends all the way from anal fin to base of gills
- Dorsal spine moderately stiff but not serrated, followed by 8 soft rays
- Very tiny scales (trout-like), 91–124 in lateral line
- Gill rakers appear spongy



Hypophthalmichthys molitrix

Length: Up to 41 in. (104 cm)

Coloring: Body is olive green dorsally; silver but sometimes bronze to red sides



Common Carp

- Two barbels on each side of the upper jaw
- No keel
- Single **serrated spine** on long dorsal fin with more than 16 soft rays
- Large scales, 32–41 in lateral line



Cyprinus carpio

Length: Up to 48 in. (122 cm)

Coloring: Bronze to golden-yellow body; yellowish-white belly



Ruffe

- Spiny and soft dorsal fins are **connected**
- Rows of dark spots between dorsal spines
- Many sharp spines on gill cover
- Small downturned mouth
- Very slimy when handled



Gymnocephalus cernuus

Length: Up to 10 in. (25 cm)

Coloring: Body is olive to golden brown on back, paler on side with yellowish-white underside



Trout-perch

- **Single** dorsal fin with two spines (usually quite soft) and an adipose fin
- Rows of black spots on back and sides
- Jaw ends below nostril, well in front of eye



Percopsis omniscomaycus

Length: Up to 7.75 in. (20 cm)

Coloring: Body is pale olive or silvery to almost translucent



Walleye

- Spiny and soft dorsal fins are **separated**
- Single dark spot on rear base of spiny dorsal fin
- Bottom of caudal fin white-tipped
- Large mouth; jaw extends beyond middle of eye



Sander vitreus

Length: Up to 36 in. (91 cm)

Coloring: Body is olive brown to golden brown to yellow



Yellow Perch

- Spiny and soft dorsal fins are **separated**
- Dusky coloration on the front and back of the spiny dorsal fin, but no distinct spots
- Upper jaw reaches to the pupil of the eye



Perca flavescens

Length: Up to 16 in. (40 cm)

Coloring: Body is green above, 6-9 green-brown saddles extend down yellow sides



Sauger

- Spiny and soft dorsal fins are **separated**
- Rows of dark spots on both dorsal fins
- Large mouth; upper jaw extends beyond middle of eye
- Caudal fin not white-tipped as in walleye



Sander canadense

Length: Up to 25 in. (63 cm)

Coloring: Body is sandy to dull brown with 3-4 dark saddles along back and sides



Logperch

- Spiny and soft dorsal fins are **separated**
- Lightly barred dorsal fin
- Dark vertical bands on sides
- Pig-like snout; upper jaw does not reach to the eye



Percina caprodes

Length: Up to 7.25 in. (18 cm)

Coloring: Body is yellowish green with dark olive-black markings



White Perch



- Anal fin has three spines; second and third spines are the same length
- Back or sides generally have no lines or stripes
- Two dorsal fins slightly joined by membrane at base, 11–12 rays on second dorsal fin



Morone americana

Length: Up to 22.8 in. (58 cm)

Coloring: Silvery-green to brownish-black body

Yellow Bass



- Anal fin has three spines; second and third spines are the same length
- Sides have 6-7 dark horizontal stripes; lowest stripes lines offset about midbody
- Two dorsal fins are not joined
- Native to Mississippi River Basin



Morone mississippiensis

Length: Up to 18 in. (46 cm)

Coloring: Golden-yellow body

White Bass



- Anal fin has three spines of different lengths, stair-stepped
- Six or more dark horizontal stripes on sides
- Two dorsal fins are not joined



Morone chrysops

Length: Up to 17.8 in. (45 cm)

Coloring: Silvery to pale-green body

Yellow Perch



- Anal fin has two spines
- Several dark vertical bands extend over back and down sides
- Two dorsal fins are not joined



Perca flavescens

Length: Up to 16 in. (40 cm)

Coloring: Body is green above, 6-9 green-brown saddles extend down yellow sides

Freshwater Drum



- Anal fin has two spines, the second is greatly enlarged
- Two dorsal fins are connected; long second dorsal fin, with 24–32 rays
- Rounded tail



Aplodinotus grunniens

Length: Up to 35 in. (89 cm)

Coloring: Body is silvery to bronze with no stripes

Inland Silverside

- Anal fin has one spine and 18 or fewer rays
- 36–44 lateral scales
- Beak-like mouth, considerably upturned
- First dorsal fin origin **in front of** anal fin origin



Menidia beryllina

Length: Up to 6 in. (15 cm)

Coloring: Silvery body with bands that extend caudally



Rainbow Smelt

- Has single dorsal fin and an adipose fin
- Large teeth on both jaws and especially on tongue
- Large mouth, protruding lower jaw, upper jaw extends to middle of eye or beyond
- 11–14 pectoral fin rays



Osmerus mordax

Length: Up to 12 in. (30 cm)

Coloring: Silvery body with steel blue along back; white belly



Brook Silverside

- Anal fin has one spine and 22 or more rays
- 75–84 lateral scales
- Beak-like mouth, almost horizontal near tip
- First dorsal fin origin directly **above** anal fin origin



Labidesthes sicculus

Length: Up to 5 in. (13 cm)

Coloring: Translucent to silvery body



Emerald Shiner (and other shiners, *Notropis* species)

For all shiners:

- Single dorsal fin and no adipose fin
- No large teeth on jaws or tongue
- Small mouth, lower jaw does not protrude, upper jaw does not extend past front of eye



Notropis atherinoides

Length: Up to 4 in. (10 cm)

Coloring: Silvery body with slightly darker back and silvery-white belly



Cisco (formerly Lake Herring) (and other *Coregonines*)

- Single dorsal fin and an adipose fin
- No teeth on jaws
- Large mouth, upper jaw does not extend beyond pupil of eye
- 15–16 pectoral fin rays (14–18 for all species in this group)



Coregonus artedii

Length: Up to 20 in. (51 cm)

Coloring: Silvery body with iridescence along back; white belly



Northern Snakehead



- Single long dorsal fin
- Long anal fin
- Square tail
- Head has large scales
- Jaws with canine-like teeth



Channa argus

Length: Up to 33 in. (84 cm)

Coloring: Dark brown body or tan with irregular blotches

Bowfin



- Single long dorsal fin
- Short anal fin
- Caudal eyespots found on juveniles and adult males
- No scales on head, large scales on body
- Jaws with canine-like teeth



Amia calva

Length: Up to 43 in. (109 cm)

Coloring: Dark olive to brown body

Burbot



- Two dorsal fins
- Long anal fin
- Single median chin barbel
- Scales so small they are almost invisible
- Jaws with many tiny teeth in wide bands



Lota lota

Length: Up to 33 in. (84 cm)

Coloring: Light yellow body that is mottled dark brown or black dorsally



STOP AQUATIC HITCHHIKERS!™

Prevent the transport of nuisance species.

Clean all recreational equipment.

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When you leave a body of water:

- **Inspect** your boat, trailer, and equipment and **remove** visible aquatic plants, fish or animals, and mud.
- **Drain** water from bait buckets, livewell, bilge, transom, and motor.
- **Dispose** of unwanted live bait and worms in the trash.
- **Spray/wash** your boat, trailer, and equipment with high pressure or hot water before going to other waters, OR
- **Dry** everything for at least five days.

Prevention guidelines for public and private aquaculture and baitfish managers and researchers can be found in Sea Grant's "Aquatic Invasive Species-Hazard Analysis and Critical Control Point Training Curriculum," Appendix 1.

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