

Preface

Recreational fishers, managers, and outdoors persons often have a need or desire to know what kind of fish they have just caught or seen in the water. We hope this guide will make it easier to recognize the fish quickly and with an enjoyable sense of discovery.

Fish species are our most readily observable guides to water quality in nature. To know what species of fish are under your boat or along the shore is to know how suitable the water is for a variety of human uses. For example, if you find a Redhorse Sucker, a Pumpkinseed, and a Smallmouth Bass, you can usually count on good water quality and a good bottom substrate. The combination of species and the number of species that you see around you are the key. The judgment is not simple because we must also take into consideration the fact that combinations of fishes that suggest poor quality in cool waters might indicate clean waters where temperatures are high. The bottom line is that the more kinds of fish you see, the cleaner the water is.

And if you can figure out the names of the species, that knowledge will be both useful and satisfying.

Identification of an individual fish can sometimes be frustrating because of natural variation in populations. Different colors and shapes arise from age, sex, season, emotion, and hybridization, among other things. Young fish have large eyes, females tend to blend in with their environment, males ready to mate advertise with bright colors, frightened fish may be dark or pale, and hybrids are a mess to identify (as well as a mess for the environment because they reduce the food and space available to and fitness of natural populations).

The goal of this guide is to enable accurate assessment of fish life in the Great Lakes. To the extent that people can accomplish this, our devotion to biodiversity and clean water will be enhanced.

Fishes of the Great Lakes Basin

Fishes are classified on the basis of natural groups, which have descended from the common ancestors. We know from the fossil record that some of these groups are ancient and lived alongside the dinosaurs for millions of years. Other groups appear later in the fossil record just before or after the dinosaurs became extinct.

Three ancient groups with relatives still living in the Great Lakes are the sturgeons, gars, and Bowfin. Much more ancient still are the lampreys, which arose before any other vertebrates, more than two hundred million years before the dinosaurs. Lampreys are such an ancient branch that they have no jaws or paired fins. Sturgeons have primitive plates and a sharklike tail fin while gars have extremely hard, enamel-covered, diamond-shaped scales. The Bowfin has an asymmetrical tail and a large bony plate on the throat. Bowfins have scales somewhat like those of more modern fish, which apparently branched off the Bowfin line.

Four related groups or families date from the period in which the last dinosaurs lived. These are the Mooneye group, which has its main biting teeth on the tongue and the roof of the mouth; the herrings, which have unique

scales and feeding apparatuses; the catfishes, a huge group characterized by the absence of scales and presence of unique spines, often associated with venom glands; and the minnow-sucker pair, which lacks jaw teeth. Eels are not related to these families, but they arose at about the same time.

Spiny-rayed fishes branched from the ancestor of these groups, and the ten thousand or so species in the perch group came to dominate the world's shallow marine habitats. Some of our most important Great Lakes families belong to this group, which is characterized by the presence of a spiny dorsal fin, several spines in the anal fin, and one spine in the leading edge of each pelvic fin. The perch-walleye-darter family has only one or two spines in the anal fin; the temperate or striped bass family has three anal spines; the bass and sunfish family has three to six anal spines; the drum family has huge ear stones (otoliths); the species of Great Lakes gobies and four Great Lakes members of the sculpin family have soft dorsal spines and sculpins have unique spines on their cheeks.

Earlier branches of the spiny-rayed line evolved in their own strange directions. The salmon family, along with its relatives the whitefishes, graylings,

smelts, and somewhat related pikes, became dominant in northern freshwater. Pikes have large predatory teeth, but teeth are tiny in the grayling and whitefish subfamilies. The distantly related cods became hugely important in northern saltwater seas and contributed one eel-like species to northern freshwaters. Trout-perches are small fishes with a strange combination of a troutlike adipose fin and a spiny dorsal fin. Topminnows and killifish belong to a mostly southern and mostly freshwater family, but a few small members can be found as far north as the Great Lakes. Sticklebacks are small northern fishes that have unusual, separated dorsal spines ahead of the soft-rayed dorsal fin.

The organization of this guide follows roughly the order of branching of these groups in time in order to enable the comparison of relatives, groups of which are arranged on color-coded pages. Another way to introduce these fishes utilizes some of their distinctive ecological and morphological adaptations, which cut across lines of relationship. These somewhat artificial groupings are introduced in the next section and form the basis of the pictorial guide to groups on pages 7–11.

Sea Lamprey

Petromyzon marinus



HEAD Funnel-shaped mouth with radiating rows of teeth, the inner ones double pointed; tongue with teeth in center of mouth; one nostril on top of head.

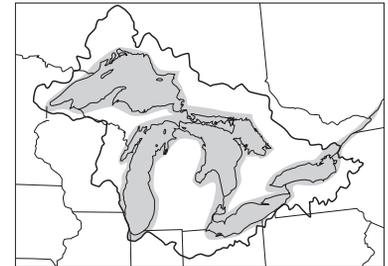
BODY Long and slender; seven pairs of separate gill openings; no scales.

FINS Two separated dorsal fins, the second connected to the round-tail; no paired fins.

COLOR Mottled gray or brown; teeth orange.

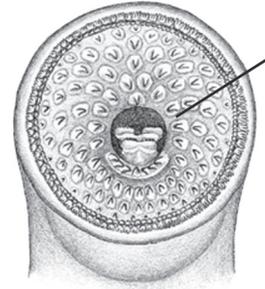
BEHAVIOR Parasitic lampreys attach to prey with sucking mouth, rasp a hole with the tongue, and suck out blood and fluids (see p. 71).

HABITAT Live in deep Great Lakes waters as young adults; shallower waters as late adults; larvae live in mud, usually in tributary streams.

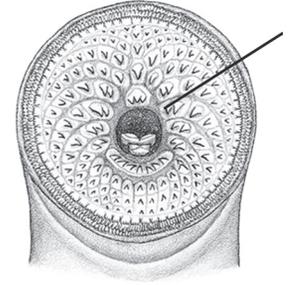




Sea Lamprey body and fins



Silver Lamprey



Chestnut Lamprey

Invasive Sea Lamprey with mouth detail



FOOD Larvae filter detritus from mud; adults are parasitic on large trouts, salmon, Burbot, suckers; adults usually hunt in deep water at night.

LIFE HISTORY Spawning lasts several hours to several days in tributaries (some in lakes) in the last spring of life; adults die after spawning; larval period lasts 6 to 14 years; adults transform fall through spring and migrate to a lake to begin a short parasitic life.

CONSERVATION STATUS Sea Lampreys are destructive parasites that gained access to the Great Lakes through shipping canals.

SIMILAR to Chestnut Lamprey (dorsal fins broadly connected, double-pointed teeth in inner row) and Silver Lamprey (dorsal fins connected, all teeth single pointed). Brook Lampreys are not parasitic and do not occur in the lakes.

Lake Sturgeon

Acipenser fulvescens



HEAD Flat and triangular with 4 small, ventral barbels; mouth ventral and tubular with no teeth.

BODY Long and tapered; no scales; 5 rows of keeled, bony plates.

FINS Many slender fin rays close together; large, asymmetrical tail fin with a long pointed upper lobe as in sharks.

COLOR Greenish gray or brown.

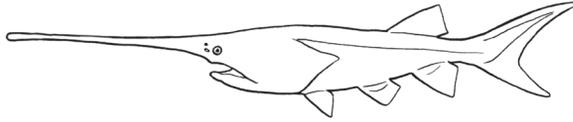
BEHAVIOR Sturgeons can locate prey through electrosensory organs; suction feeders; migrate considerable distances upstream to spawn unless blocked by dams.

HABITAT Large rivers and lakes, including shallow waters of the Great Lakes over clean bottom.

FOOD Bottom insects, crustaceans, small clams, and snails; sometimes fish.

LIFE HISTORY Females mature at 14–23 years and spawn in tributaries to which they home in the spring every 4–6 years; may reach 150 years of age; may grow to 9 feet long and 300 pounds or more; largest fish in the Great Lakes.





Paddlefish

Lake Sturgeon



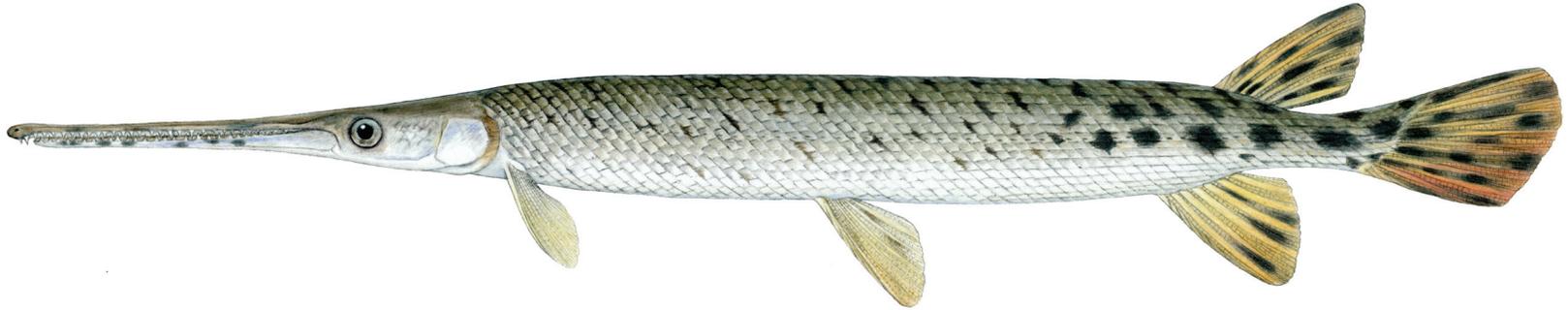
Lake Sturgeon

CONSERVATION STATUS Sturgeons were nearly wiped out by wasteful destruction in the 1800s. Now rare and protected, but spearfishing is allowed on some populations.

SIMILAR to the Paddlefish, which has a long, paddle-shaped snout but is now extinct in the Great Lakes. It could be restored someday.

Longnose Gar

Lepisosteus osseus



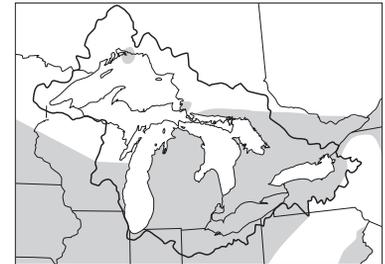
HEAD Bony, with long slender jaws more than 10 times as long as narrowest width containing many extremely sharp teeth.

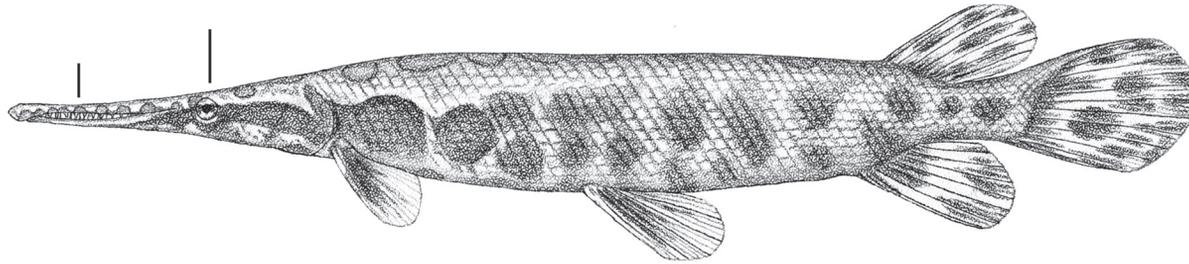
BODY Arrow shaped, with rows of diamond-shaped, enamel-covered bony scales.

FINS Dorsal and anal fins far back; tail fin rounded and asymmetrical.

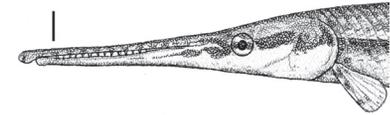
COLOR Black and silver as young, olive brown as old adults; some have spots on jaws; tail may have faint orange and dark spots; eggs green.

BEHAVIOR Gars feed by approaching prey slowly and grasping the fish with a quick, sideward motion of the long jaws; they spawn in spring over vegetation or gravel bars; all gars are air breathers with a lung.

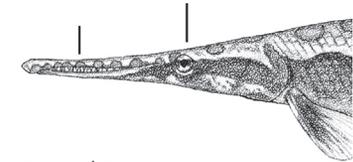




Spotted Gar



Longnose Gar



Spotted Gar

Longnose Gar



HABITAT Large, shallow rivers and lakes, often near aquatic vegetation.

FOOD Crustaceans as small young; fish, usually caught near the surface, thereafter.

LIFE HISTORY Mature at age 3 or 4; grow up to 12 inches in the first year; maximum length often 4 feet or more; may live 10–30 years.

CONSERVATION STATUS Vastly more abundant in the 1800s than now; classified as a nongame fish; common in large waters.

SIMILAR to the Spotted Gar (spots on the head) in the southern Great Lakes and the Shortnose Gar (no spots on the head) in Wisconsin.