Fish of the Mississippi River

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Objectives:

- To become familiar with the history of the river and how it has affected fish populations
- To become familiar with and identify the different types of fish found in the Mississippi River and its tributaries
- To understand the function and identify the anatomy of fish
- To understand aspects of managing fish populations in the Mississippi River

Activities:

Students will each access the "Fish of the Mississippi River and its Tributaries" study guide from the following website: www.missriver.org – under Interpretive Services. Eco-test questions will be taken from this guide. Before the test, a short presentation including identification of fish species and other information will be presented.

Study Questions:

1. How did navigation lock and dams affect fish populations?
2. What part of a fish's anatomy can you use to determine its habitat? What are the different types?
3. What are the different locations of a fish's mouth? What does this tell us about them?
4. What is the lateral line? Why is it important?
5. What are the different types of fins? Where are they located?
6. Name three common species of fish found in the Mississippi River.

Bonus: How many states are in the watershed of the Mississippi River? Can you name them?!?

Background

The Mississippi River is one of the greatest rivers in the world. Drainage of this river and its tributaries embraces nearly one-third of the land surface of the United States. It originates at Lake Itasca, Minnesota, and flows some 2,350 miles to the Gulf of Mexico. Through the ages it has formed chutes, side channels, and sloughs while carving a valley two to six miles wide. It first served as a corridor for settlement by Native Americans and later as a major mode of transportation for Euro-American settlers.

The Upper Mississippi River (from the entrance of the Ohio at Cairo, Illinois) was a mosaic of braided channels with rapids and shallow areas. Water levels were unpredictable and the river was vulnerable to drought and floods. In 1824, Congress authorized "improvement" of the river for navigation through removal of snags and other obstructions and the addition of wing dams.

In 1907, work began to form a six foot navigation channel in the Upper Mississippi. This was achieved using lateral walls, locks, and additional wing and closing dams.

The Mississippi became a major transportation route and the U.S. Army Corps of Engineers (Corps) constructed locks and dams for navigation on the Upper Mississippi between 1930 and 1963. A nine-foot channel now is maintained by the Corps of Engineers.

The level of the river is controlled by 29 locks and dams. Damming the Mississippi raised water levels so many chutes between islands, and even islands themselves, were inundated. It also changed the habitat structure from a continuous, flowing body of water to a series of "lake-like" pools (stretch of river between two navigation dams). Each pool is numbered in reference to the dam at its downstream end. Example: Lock & Dam 12 in Bellevue, Iowa creates Pool 12 above it.

With the navigation locks and dams creating a series of lake-type pools in the river, there was a change in the fish populations. Fast-flowing fish species such as smallmouth bass, declined in abundance, and fish that preferred a more pond-like habitat, such as crappie, bluegill, walleye, carp, and freshwater drum increased in abundance.

Best fishing for species such as walleye, sauger, and paddlefish is just below the locks & dams, especially in late spring and autumn. The popularity of fishing below the dams is accounted for by several basic factors that influence fish behavior. The dams represent a physical barrier to fish movement in the upstream direction. For some distance below each structure, the bottom is scoured into a series of deep holes creating diverse fish habitats and a favorable bottom environment with highly oxygenated water. These conditions provide great habitat for bait fish and other forms of fish food. Predator fish concentrate here because of the easy meals available. Humans fishing these areas find great, but potentially dangerous fishing conditions. Obeying safety regulations and posted warnings are required.

Wing dams and jetties are also important fishing locations. Walleye, sauger, catfish, white bass and freshwater drum inhabit these channel devices both for food and shelter (current breaks). Sloughs, backwaters, and flowing side channels also produce large numbers of crappie, bluegill, largemouth bass, white bass, and carp for fisherman.

Fish Anatomy

There is a lot of diversity between the 25,000 different fish species found all over the world. Fish are cold-blooded or poikilothermic animals, their body temperature varies according to the temperature of the surrounding water. Each species is adapted to life in a specific habitat. By examining the body shape of the fish, you can learn much about the habitat of the fish.

Body Shape
The body shape is one of the best indicators in determining the fish's environment. Tall bodied, laterally compressed species are adapted to life in slow-moving waters (bluegill). Slender, torpedo shaped fish are better adapted to moving waters (redhorse carpsucker). Bottom-dwelling fish have flattened bellies and inferior mouths (sturgeon).

Mouth
There are three general locations of a fish's mouth which indicates a specie's feeding habits. Surface feeding fish usually have an undershot, upturned (**superior**) mouth for feeding on insects. Fish that feed in mid-water have a **terminal** mouth, which is usually considered the "normal" fish mouth (perch, bass, trout). Predatory fish usually have a wide mouth, while omnivorous fish have smaller mouths. Bottom feeding fish generally have an **inferior** mouth (suckers). Often, bottom feeding species have barbells (whiskers), which are tactile and have taste organs used for locating food in dark or muddy waters (catfish).

Body Covering
Most fish are covered with scales, which protects the body. Some fish such as sturgeon, have bony plates which serve the same purpose. Other species have very small scales or no scales at all. Most fish also have a very important mucus layer covering the body that helps prevent infection. Anglers should be careful not to rub this "slime" off when handling a fish that is to be released.

Body Coloring
Color has an important role for fish. Some species rely on stripes or brown color to be camouflaged and escape from predators. Some species use fake "eye-spots" to confuse predators. Color is determined by the pigment of the fish and the light reflection. Fish with sold dark coloration usually have pigmented skin, while species with silvery iridescence rely on light reflection. Most fish have dark coloration on their sides and back with a white or light color on their bellies.

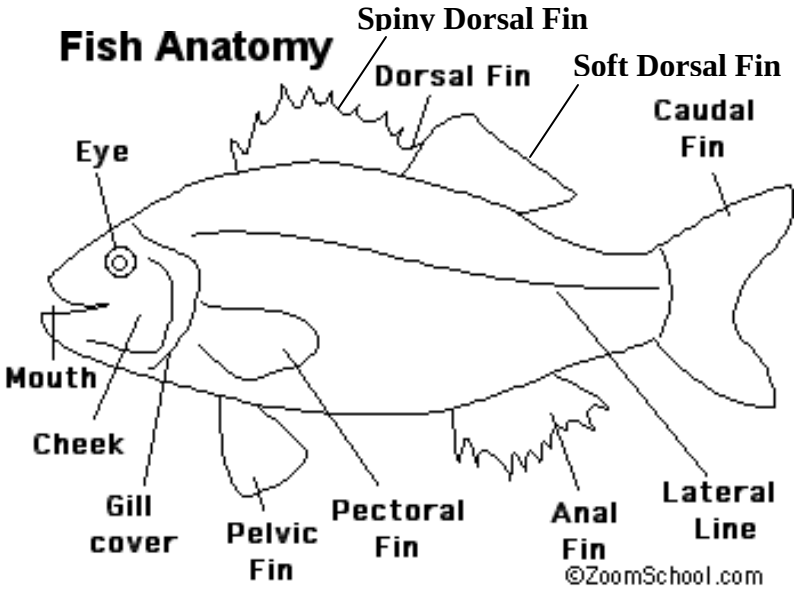
Gills
The **gills** are the organ by which gases are exchanged between the fish and surrounding water. Through the gills, fish are able to absorb oxygen and give off carbon dioxide. Like the lungs, the gills have a large area for gas exchange. The **operculum** is a hard bony plate which covers and protects the gills. Movement of the operculum allows more water to be drawn in and over the gills.

Lateral Line
The **lateral line** picks up vibrations in the water. Fish use these vibrations to detect predators, find food, and navigate more efficiently. Many fish species can navigate without vision in darkness or muddy water.

Swim Bladder
The **swim bladder** is an air-filled bladder that allows fish to conserve energy by maintaining neutral buoyancy (suspending) in water. This way fish are able to sleep in mid-water.

Fins
Fins are appendages used by fish to maintain its position, move, steer and stop.

- **Dorsal Fin (back)** – balance, staying upright. The rays of this fin are often sharp, and a spine is often present for protection from predator fish.
- **Caudal Fin (tail)** – forward movement. Fish with forked caudal fins are regular fast-swimmers. Fish that have rounded caudal fins are capable of quick action like predators.
- **Pectoral Fin (chest)** – used for up and down movements in the water column
- **Pelvic Fin (hip)** – help fish to turn, balance, and brake.
- **Anal Fin** – used to stabilize and steer, and help prevent rolling over while turning at high speeds. Some fish have spines in the anal fin for protection from predators.
- **Adipose Fin (fat)** – tiny fin found between dorsal and caudal fin on some fish (catfish).



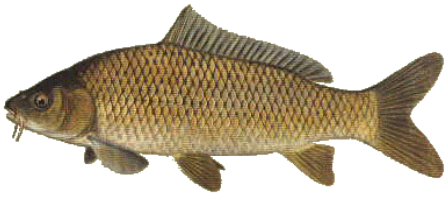
Fish of the Upper Mississippi River

Catfish Family – *Ictaluridae*

Channel Catfish – silvery-gray above fading to lighter shades on the belly; body marked with dark spots; tail fin deeply forked; may reach lengths of about 20 inches by 10 years of age. The worst it smells the more likely a channel catfish will bite on it!

Flathead Catfish – dark to olive brown with dark brownish mottlings on sides; anal fin is very short and tail fin is square or slightly notched; head broad and flat. Try fishing with sunfish under cut banks after dark and do not forget to use strong hooks!

Minnow Family – *Cyprinidae*



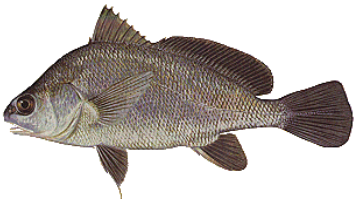
Common Carp – gray to olive on sides and yellow or white on belly; robust body that is compressed laterally with a long dorsal fin; conspicuous barbell on either side of mouth. Carp love to explore and feed in newly flooded areas, try using worms or dough balls when the river is rising!

Common Shiner – olive-green with bluish reflections on back and sides, silvery belly; dark pigmentation behind scattered scales; scales along side elevated and appear diamond-shaped. This is a very popular bait fish.

Perch Family – *Percidae*

Walleye – brassy olive buff above, white below; large, white glossy eyes and sharp teeth; no distinct bars or mottlings on sides, but caudal fin has white tip on lower lobe. Backtrolling the upstream side of wing dams using crankbaits is an excellent way to catch walleye!

Drum Family – *Scianidae*



Freshwater Drum – deep bodied, silvery fish; head and body slope steeply up from the snout and dorsal fin; long dorsal fin divided into two lobes; commonly weigh up to 5 lbs. Freshwater Drum are bottom feeders that are easily caught from the bank using worms.

Sturgeon Family – Acipenseridae

Shovelnose Sturgeon – buff or olive drab above, lighter below; covered by heavy plate-like scales; flattened snout; long, threadlike filament attached to top lobe of tail fin (often missing); 4-8 pound fish common. Sturgeon are usually caught accidentally while fishing for catfish on the bottom.

Paddlefish Family – *Polyodontidae*

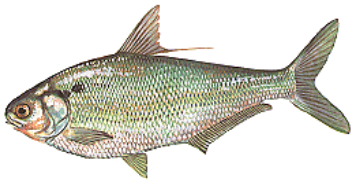
Paddlefish – slate-colored above, lighter below; greatly elongated snout, long gill covers and a shark-like mouth; scaleless with a skeleton of cartilage. Paddlefish can be caught in the spring below dams by snagging.

Sunfish Family – *Centrarchidae*

Bluegill – dark olive-green back and sides yellow or reddish below; dark vertical bars usually present on sides; chin and gill covers bright blue; black, flexible tip at rear of gill cover; seldom exceed 8 inches. When fishing for bluegills with live bait use small hooks(#8) with a long shank.

Largemouth Bass – body green-shaded with broad, continuous dark stripe along each side; belly white to yellowish; dorsal fin almost completely separated between spiny and soft portion and lower jaw extends past the gold-colored eye; commonly reach lengths up to 16 inches by three years of age. A great place to find bass is around submerged trees and boat dock pilings!

Herring Family – *Clupeidae*



Gizzard Shad – bright silvery blue on back, silvery sides and dusky white belly; deep oblong body that is laterally compressed; maximum size range in Iowa is about 9-14 inches. Makes great bait for catching channel catfish and a bald eagle favorite!

Fisheries Management

Fishery Surveys
Fishery management teams use many different methods to collect fish for examination. Some are caught using nets, while others are captured using a special boat that uses electrical current to temporarily stun the fish. Once fish are captured, various pieces of information are collected including quantity, length, weight, age, and growth rates. Biologists use this information to evaluate the "health" of individual fish populations. This information is then used to make regulation and stocking recommendations and a variety of other management decision.

Electrofishing
Electrofishing boats & backpacks are used by fisheries staff to collect fish such as largemouth bass, bluegill, and walleye. The electric current stuns the fish which causes them to float to the surface making them easy to collect. The electric current does not harm the fish and they recover very quickly. Fish are then weighed, measured and a few scales may be collected to age the fish. Fish scales have rings, similar to tree rings, which can be used to age the fish.

Seine Nets
Seines are large fine mesh nets that are pulled through the water to the shoreline collecting fish within its path. This method is used to collect minnows and young game fish.

Fyke Nets
Fyke nets are used to collect crappie, bluegill, northern pike, and many other species. Fish swim through a series of net hoops and funnels that make it nearly impossible to escape. The net is then collected and the findings are recorded and the fish are released.

Managing the Mississippi River
Fisheries management personnel along the Mississippi River attend a tremendous amount of coordination meetings between Federal, State and private agencies that have an interest in and jurisdiction of the river. These groups address topics ranging from; changes in barge traffic up and down the river, placement of dredge spoils, and fish population concerns. Private organizations include groups who are concerned with real-estate development to groups concerned about the protection, preservation, and conservation of the Mississippi River. Some of the important agencies involved in the management of the river include the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the Iowa Department of Natural Resources, the Wisconsin Department of Natural Resources, the Minnesota Department of Natural Resources, and the Illinois Department of Natural Resources. This is only a small portion of all of the agencies and organizations involved in managing the Upper Mississippi River.

Research
Fisheries staffs are also involved in performing research projects to improve the fishery of the Mississippi River and the angling opportunities. They also study the health of the entire aquatic ecosystem including mussels, aquatic vegetation, macroinvertebrates, animals, and of course the fish species. Many research studies are done by surgically implanting radio transmitters in fish so

that their movements can be followed. By learning what type of habitat is needed for spawning, over-winter and normal feeding, biologists can try and improve or protect these important areas.

Fun Facts

A raindrop falling in Lake Itasca would arrive at the Gulf of Mexico in about 90 days!

At the headwaters of the Mississippi, the average surface speed of the water is 1.2 miles/hour – roughly one-third as fast as people walk. At New Orleans, on 2/24/03, the speed of the river was 3 miles per hour.

Thirty-one states and 2 Canadian provinces are included in the Mississippi River watershed. Can you name them?

References

Iowa Fish and Fishing (Mayhew, J. (editor). 1987. Iowa Department of Natural Resources, Des Moines, Iowa. 323 pp.)