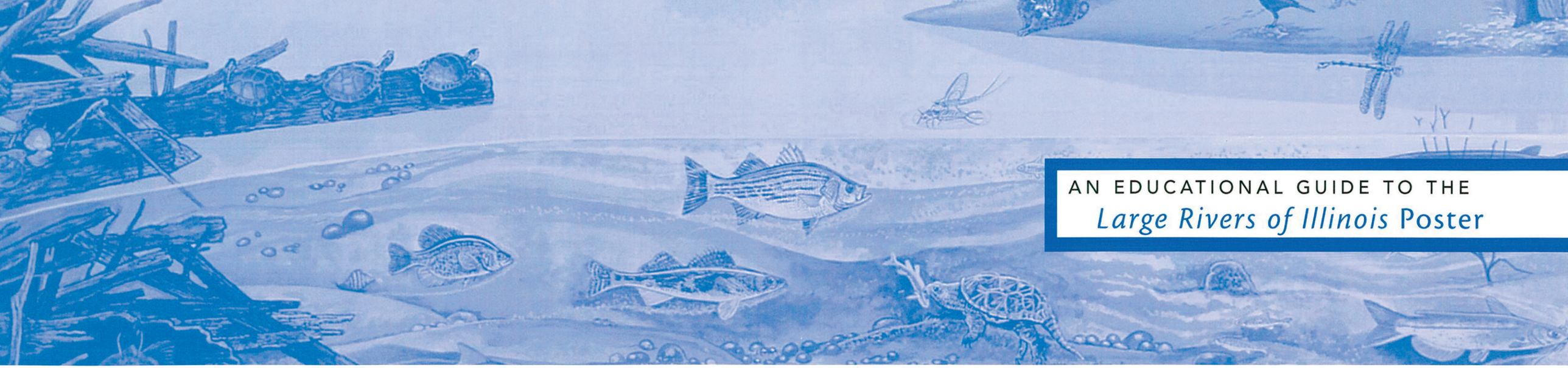

AN EDUCATIONAL GUIDE TO THE

Large Rivers of Illinois Poster

Suggested Activities

1. Use the poster to generate a discussion on biodiversity. Define biodiversity. How many different organisms are present in this scene? Generally, the more kinds of organisms present in an area, the healthier the area is considered to be. Does the scene in this river show a healthy habitat? Which organisms that would be in the area in life are missing from the poster?

2. Illinois aquatic habitats host several exotic species, including the zebra mussel which came on ships from Europe into the Great Lakes in 1986. Since then, the zebra mussel has spread through all of the Great Lakes and into many major rivers. As zebra mussels filter water to remove their food source, plankton, they can improve water quality. However, they also attach themselves to cooling systems of boat engines, water intake pipes of power companies and water treatment plants, all of which can be costly to repair. If zebra mussels attach in great numbers to living mussels, the mussels may not be able to open their shells to feed or reproduce. Have students research and discuss these impacts: the Great Flood of 1993 on zebra mussel populations: zebra mussels on native mussels; and economic costs of zebra mussels.

3. Rivers are an important part of Illinois history. Have students imagine the early Illinois pioneers and how they utilized rivers in their everyday lives. How did pioneers use these important waterways? (Pioneers utilized waterways for transportation, cleaning, trade, food and water.)

4. Discuss the ways we utilize rivers in today's society. List 10 uses for a river near your area. Do these uses affect the environment? If so, do they make a positive or negative impact on the environment? If there is a negative impact, what kind of things can be done to improve the situation? Discuss the impact erosion has on rivers.

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The large river environment depicted in this poster is common in Illinois as the state lies at the center of North America's central lowlands. Because of its low elevation, many of the continent's large rivers flow to Illinois or its borders before turning south to the Gulf of Mexico. The Mississippi, Illinois, Ohio and Wabash rivers are large rivers in or bordering the state, while the Missouri, Tennessee and Cumberland rivers empty at its borders. Illinois has nearly 106,900 miles of rivers and streams within its borders.

The diverse fauna of these rivers is among the richest in species numbers of the world's temperate-climate river systems. Illinois has more than 180 native fish species, about 80 mussels and clams, 23 native crayfish and 41 native amphibians.

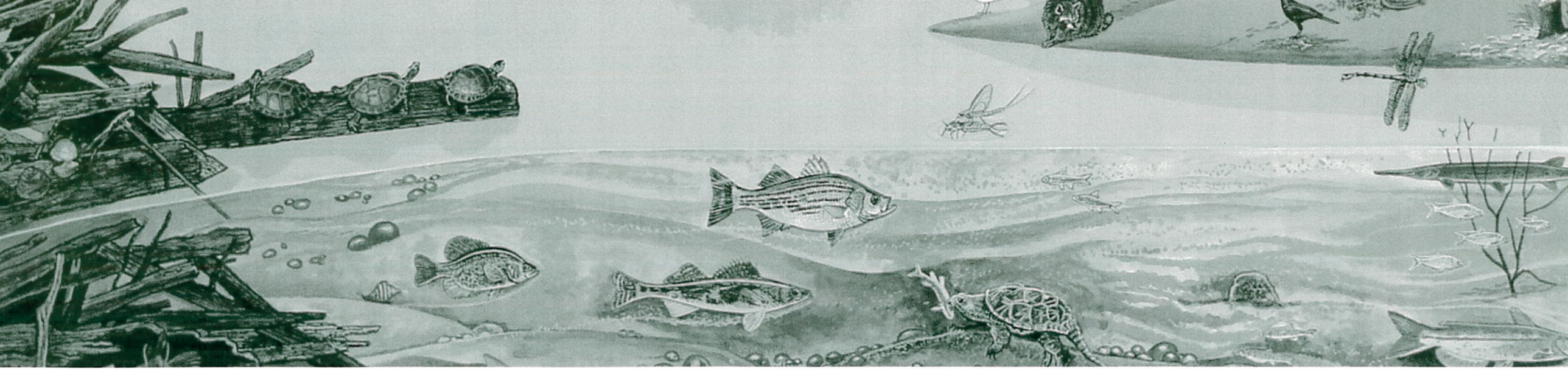
Running water is important to aquatic organisms. The constant movement of water aerates the water, providing oxygen. This movement also keeps nutrients available and flushes wastes further down stream. Most large Illinois rivers have been greatly altered for human use, especially by damming and dredging. Dams change the river environment from flowing stream to one of a series of slack water pools, eliminating habitat for many organisms that require flowing water. Improvements, such as wing dams along the shore to control the channel location, minimize sandbars and backwater sloughs that provide habitat diversity and nursery sites for some young river fishes.

Soil erosion from crop fields, polluting chemicals and introduced exotic animals, such as the zebra mussel, also degrade our big river habitats. The Wabash is Illinois' only big river that has not been modified significantly for navigation, recreation and/or water supply.

Interpreting Features of the *Large Rivers of Illinois* Poster

The poster depicts the Mississippi River in mid-June, but the features apply to most large river systems in Illinois. The site is along the western border of Illinois somewhere upstream from the mouth of the muddy Missouri River at St. Louis. The locality is below one of the 15 navigation dams in this reach where the river has current and most closely resembles its original condition. Waters are much clearer here than in the Mississippi below St. Louis.

The poster shows the river from the Illinois shore so the flow is from the right side to the left. Most fishes are facing into the current. The sandbar is on the downstream end of one island and the pile of driftwood to the left is lodged against the upstream



end of another island, just out of view to the left. Numbers in parentheses refer to the numbered key on the poster.

Fishes provide much of the food for animals that live in and along the river. While one bald eagle (5) rests at its nest, its mate circles over the river looking for fish to feed their newly hatched young. The immature ring-billed gull (14) has just picked up a fish from the surface of the river. Adults of its species have migrated farther north to nest. Great blue herons (11) and great egrets (12) wade the shallows along the sandbar searching for minnows. They have come here to feed from their nearby nesting colony, or rookery.

The crow (7) is feeding on a dead fish that has washed up on the sandbar, while the turkey vulture (6) looks for carrion on the far shore. The least tern (15) is searching for small fishes schooling at the surface. It catches these by diving at them and grabbing them in its beak. Only a few least terns wander up the Mississippi River this far. Most turn when they reach the Missouri River and follow it north, as it has more of the sandbars they need for nesting.

The double-crested cormorant (8) catches fishes while swimming under water. This one has been fishing and is now spreading its wings to dry in the morning sun. It nests in the rookery with the herons.

The wood duck (10) and Canada geese (9) eat mostly plant material, often leaving the river to feed elsewhere. The bank swallow (17) and cliff swallows (16) feed on insects taken while flying. The nest holes of the bank swallow colony are visible on the far bank. Cliff swallows attach their mud nests to structures such as the dam upstream.

The killdeer (13) is one of a group of birds called shorebirds that feed along the water's edge. Killdeers feed on small worms, insects, snails and crustaceans that inhabit the shore zone.

The river otter (21) forages along the far shore as a beaver (20) makes off with a branch of sandbar willow (4). Beavers eat the bark of the willow. A raccoon (18) hunts along the shore for crayfish and mussels. A muskrat (19) is perched on a log, opening and eating mussels. It can collect mussels from the bottom and carry them to the surface, where it opens the shells with its gnawing teeth.

A smooth softshell turtle (22) is digging its nest on the sandbar. Eggs are laid in June and covered with sand to let the sun incubate them. They hatch in late summer. The snapping turtle (43) feeds on a dead fish, while two western painted turtles (23) and a false map turtle (24) bask on a log. The sawtooth-like bumps on the false map turtle's back are distinctive.

The flathead catfish (30) is guarding the eggs it has laid in a hollow log. The channel catfish (29) waits facing into the current for a worm or other food item to float by. The white bass (33), shortnose gar (36), black crappie (35) and sauger (34) are predators that feed on other fishes. The white bass is stalking some spottail shiners (40) schooling near the water's surface. River shiners (41) school at a greater depth and river darters (42) sit on the bottom. Unlike other fishes that have an internal balloonlike swim bladder that allows them to float within the water, darters lack a swim bladder and sink to the bottom whenever they stop swimming.

The gizzard shad (32), river carpsucker (38) and bigmouth buffalo (37) feed on microscopic life forms called plankton. The freshwater drum (31) feeds on snails and small mussels, crushing them with the molarlike teeth in its throat. It makes a grunting or drumming noise with its swim bladder, giving it its name.

Large rivers, such as the Mississippi, provide habitat for some unique mussel species not found in medium and small-sized streams. For example, the threeridge mussel (44) lives in all streams, but the butterfly mussel (46) is only found in large rivers, and the threehorn wartyback (45) is limited to large and medium-sized rivers. The old, dead ebony shell mussel (47) is a reminder that this big river species was abundant in the Mississippi River before dams were constructed in the 1920s. These dams prevented the migratory skipjack herring fish from entering the upper river. Since it is the host animal for the parasitic stage of the ebony shell, the ebony shell was unable to reproduce successfully and has died out. The invasive, exotic zebra mussels (48) have attached themselves to the back of a native threeridge mussel by anchor threads they generate. Zebra mussels interfere with the breathing and feeding of native mussels and can kill them if enough of them grow on the shell.

The mayfly (28) has transformed from its aquatic nymph stage and floats on its shed skin while its wings dry. Mayflies are easy prey for predatory fishes at this stage, but they typically hatch by the thousands, which compensates for those that are eaten. The clubtail dragonfly (27) cruises over the river where its nymph (50) feeds on the bottom. While the dragonfly may go to shore to hunt, it must return to the river to lay its eggs.

The eastern cottonwoods (1), sycamores (2), black willows (3) and sandbar willows (4) thrive in the moist conditions along rivers.