Where's the River?

In many urban areas it can be hard to find any rivers. Many urban rivers have been converted into concrete channels or metal culverts. Channelization prevents natural processes like the growth of aquatic vegetation and the formation of pools and riffles; in other words, fish habitat. During times of high water, culverts can also:

a. increase erosion
b. increase flooding
c. increase turbidity of water
d. all of the above

Answer: d. all of the above

Channelization can harm fish.
(Subtract 2 "fish")

Shoreline Revitalization

Urban shorelines were once ideal sites for factories—oftentimes because factory waste could be released directly into the water (point source pollution). Today, many of these areas are being turned into shoreline parks, boardwalks, and community centers, providing access to fishing and other recreation.

Your city is considering a shoreline revitalization project, though taxes would be raised to pay for it. You head to the voting booth to decide on a referendum to support the project. Do you vote **yes** or **no**?

Yes: Revitalization can help fish.
(Add 3 "fish")

No: The status quo is maintained
(Don't do anything)

Tough Decisions

As money taken out of a bank, water is withdrawn from waterways for a variety of human uses: agriculture, hydroelectric power, manufacturing, public drinking water, etc. During drought or in drier states, communities are faced with tough decisions: do they continue to "spend" water resources to provide for increasing human needs, or do they restrict additional development so that fish and habitat have adequate water? If put to a vote, which would you choose: **restrictions** or **more development**?

Restrictions can help fish.
(Add 3 "fish")

More development can harm fish.
(Subtract 3 "fish")

Diversity is the Spice of Life

Your class finds high biodiversity in your local waterway.

True or False: This likely indicates a very healthy habitat with a healthy fish populations.

True: Having lots of different species of plants and animals is called "biodiversity." Biodiversity results in a complex and interdependent food web of different predators and prey, producers, consumers, and decomposers. High biodiversity often indicates healthy habitat.

High biodiversity often means healthy fish populations.
(Add 2 "fish")

Wild Card!

Your state's natural resource agency offers FREE FISHING DAYS. The agency, along with partners, host fishing clinics to teach you how to fish and may have a tackle loaner program to help you get acquainted with the equipment you'll need.

Check your state fishing regulation booklet or the agency's website to find out when these days are scheduled.

Go Fishing!

(Subtract 2 "fish")

Adopt a Stream

True or False: Your class can help state biologists manage fish.

True: School classes and other groups can adopt a stream and collect data to share with state biologists. Your class might test for pH, dissolved oxygen, turbidity, and other water quality factors. You might also search for certain aquatic critters; the presence of "biological indicators" is evidence of the health of the stream. Sharing data about streams with state biologists helps them manage fish.

Collecting data and sharing it with state biologists help fish.
(Add 2 "fish")

Fish Ladders

Imagine trying to exit the freeway but having all the off ramps blocked. You'd be trapped. That's what happens to fish when they encounter a dam.

True or False: Fish ladders can help fish get around a dam.

True: Special structures called fish ladders or fishways can be built to help fish get around a dam. These structures are important for fish that need to get farther upstream to reproduce or spawn.

Fish ladders help fish.
(Add 2 "fish")

Fishable Waters Are Good Business

How much does fishing contribute to your state's economy?

Florida $14 billion
California $ 9 billion
Texas $ 8 billion
Minnesota $ 5 billion
N. Carolina $ 4 billion
Wisconsin $ 4 billion
Michigan $ 4 billion
New York $ 4 billion
Ohio $ 3 billion

_____ _____
(your state) *(contribution to economy)*

A booming fishing industry may mean more $ spent on stewardship of fish and fish habitat. This helps fish.
(Add 1 "fish")

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Algal Blooms

You discover algae growing out of control in your favorite fishing hole. It is beginning to rot and stink. You see a dead fish floating on the surface of the water and remember that the rotting process (called decomposition) uses up oxygen. This means there is less dissolved oxygen for aquatic animals, such as fish. What is the likely cause of this algal bloom?

a. too much sunlight
b. excess nutrients, including nitrogen and phosphorous
c. emptying aquarium water into the fishing hole
d. none of the above

Answer: b. excess nutrients

Algal blooms harm fish.

(Subtract 3 "fish")

Riparian Buffer Zones

How can trees, shoreline vegetation, and wetlands help fish and improve water quality?

a. Trees and shoreline vegetation trap runoff before it gets to our waterways.
b. Wetlands absorb and filter out pollutants and protect young fish.
c. Trees shade waterways, keeping them cooler.
d. all of the above

Answer: d. all of the above

Riparian buffer zones help fish.

(Add 3 "fish")

Storm Drain Stenciling

True or False: It is easier and more cost effective to prevent pollution from getting in our water than to restore water quality, habitat, and fish populations later.

True: Pollution prevention, including public education and storm drain stenciling, can help reduce the often enormous costs of restoring waterways after they have been polluted. You can help by educating your community about the harm in using sewers as dumps by stenciling:

"all drains lead to
name your waterway here"

Pollution prevention helps fish.

(Add 1 "fish")

Fish in the Classroom

Native fish in your area are in trouble—they aren't reproducing at a rate that maintains a sustainable population.

Your class wants to help by hatching eggs and raising fish in the classroom and then releasing them back into your local waterway. Who might you work with to achieve this goal?

a. environmental education center
b. state fish and game offices
c. local fishing clubs
d. all of the above

Answer: d. all of the above

Raising and releasing fish helps maintain fish populations.

(Add 3 "fish")

In Hot Water

Thermal pollution, adding warm water to a waterway, reduces dissolved oxygen, changes habitat, and can stress fish if the temperature rises too much. Which of the following cause thermal pollution?

a. direct discharge of warm water from factories and power plants
b. runoff from hot city streets and pavement
c. a summer heat wave
d. both a. and b.

Answer: d. both a. and b.

Thermal pollution harms fish.

(Subtract 2 "fish")

Fishing Regulations

You know someone who keeps all the fish they catch—no matter how large or small the fish are. ***What if everyone did this?***

How can you learn about current fishing regulations?

a. Read your state's current fishing regulations booklet.
b. Ask your fishing buddy
c. Ask your uncle (he hasn't gone fishing in 5 years).
d. none of the above

Answer: a. Read your state's current fishing regulations booklet.

Following fishing regulations helps fish.

(Add 1 "fish")

Stream Cleanups

We can't prevent all pollution from entering our water—but we can take action.

Your group decides to organize a local cleanup event to help get the trash out. You invite the local media so that your community can learn how they can help maintain "fishable and swimmable waters," too.

Stream cleanups can help fish.

(Add 1 "fish")

Litter: Trash or Treasure?

True or False: Litter may look ugly, but it poses no harm to fish and other aquatic wildlife..

False: Many types of litter can cause great harm to aquatic wildlife. Litter may be mistaken for food and ingested, such as when sea turtles eat floating plastic bags, thinking that they are jellyfish. Wildlife can also become ensnared in plastic rings used to package beverages or in discarded fishing line.

Litter harms fish.

(Subtract 2 "fish")

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Conservation Officer

True or False: Conservation officers, officials responsible for enforcing fish and game laws, can't ticket people.

False: Conservation officers are like police officers, but their main duty is to protect our natural resources. They ticket people who don't follow regulations and can arrest poachers—people who don't follow fishing or hunting regulations.

Enforcing fishing regulations helps fish.

(Add 1 "fish")

Clean Water Act

The Clean Water Act of 1972 did much to regulate point source pollution—pollution that can be traced to a definite point where it enters the environment. An example of point source pollution is:

a. chemicals leaking from a factory's discharge pipe
b. runoff from fields
c. sewage from a discharge pipe
d. both a. and c.

Answer: d. both a. and c. Both chemicals and sewage from discharge pipes can be traced to their sources. Regulating this type of pollution has led to a dramatic improvement in water quality in many waterways.

The Clean Water Act helps fish.

(Add 3 "fish")

Keep or Release?

Many anglers choose to practice "catch and release." After reeling in a fish, they carefully unhook their catch and gently return it to the waterway. When practiced properly, catch and release does not harm fish. There are no limits on catch and release fishing.

Go fishing and practice catch and release!

Catch and release helps fish.

(Add 2 "fish")

Fish Consumption Advisories

True or False: All fish are good for you to eat.

False: Some fish may contain high levels of mercury and other toxins, which make them unsafe to eat. Each state publishes "fish consumption advisories." Check your regulations to know which fish are listed as unsafe to eat.

Fish under consumption advisories are living in polluted waters.

(Subtract 1 "fish")

Permeable or Impermeable Materials

You are a member of the city planning commission. A vote has come up to decide whether new parking lots should be made of permeable or impermeable materials. Permeable materials allow some rain to seep into the ground whereas impermeable materials do not absorb water and can cause runoff. You know that controlling runoff helps reduce erosion, but permeable materials can be very costly. Which way will you vote?

permeable or **impermeable**?

Impermeable materials: Increasing runoff can harm fish.

(Subtract 2 "fish")

Permeable materials: Controlling runoff can help fish.

(Add 2 "fish")

Construction and Water Quality

Which of the following would help your construction company win a "*Water Steward of the Year Award*?"

a. Leaving as much native vegetation and trees on site as possible
b. Installing silt fencing or wattles to prevent erosion and reseeding after construction
c. Installing raingardens and catchment basins that take up excess storm water
d. all of the above

Answer: d. all of the above

Environmentally responsible construction helps fish.

(Add 2 "fish")

Water Conservation

Water conservation increases the availability of water for all life forms, but sometimes there just isn't enough to go around.

During times of drought, should your city restrict certain water uses, like watering lawns, washing cars, and filling swimming pools?

Yes or **No**?

Yes: Conserving water, especially during drought, helps fish.

(Add 3 "fish")

No: Using water for nonessential purposes, especially during drought, harms fish.

(Subtract 3 "fish")

Aquatic Vegetation

True or False: Submerged aquatic vegetation, like grasses, is messy and should be cleaned out of rivers and lakes.

False: Fish need a place to hide from predators and to rest. If you've ever gone fishing, you know that many species of fish hang out near grasses and other aquatic plants. This structure is "home sweet home" to fish.

Submerged aquatic vegetation helps fish.

(Add 2 "fish")

Nonpoint Source Pollution

Which is an example of nonpoint source pollution?

a. oil leaking from a docked ship
b. chemicals seeping from a landfill
c. motor oil washing from drive–ways, streets, and parking lots
d. sewage overflow from a sewage treatment plant

Answer: c. When we can't point to the source of pollution in waterways—which may come from many different streets, lawns, construction sites, parking lots, and farms—we call it nonpoint source pollution. Most water pollution today comes from nonpoint sources.

Nonpoint source pollution harms fish.

(Subtract 2 "fish")

Impermeable Surfaces

An example of an impermeable surface is:

a. a wetland
b. a dirt road
c. a concrete parking lot
d. none of the above

Answer: c. concrete parking lot. Many urban and suburban areas are concrete: streets, sidewalks, parking lots, and buildings. These impermeable surfaces don't allow rain or snowmelt to seep into the ground. During heavy rains, city storm drains are often flooded by runoff that has picked up chemical pollution and street trash, too.

Impermeable surfaces on land can harm fish.

(Subtract 2 "fish")

Off-season fishing

It's a week before bass season opens. Your buddy hooks a trophy-sized Largemouth Bass. This is:

a. illegal
b. called poaching
c. a great opportunity for his uncle, a taxidermist
d. both a. and b.

Answer: d. both a. and b. Poaching means fishing or hunting out of season, taking more than the legal limit, and fishing or hunting without a license. Seasons and limits are set by resource managers to prevent overfishing. License sales help pay for management and track the number of anglers.

Poaching harms fish.

(Subtract 1 "fish")

Hydropower Dams

True or False: A dam provides extra water, which is good for the native fish that lived in the river before it was blocked by the dam.

False: Large dams generate power and store water for municipal and agricultural needs. But most fish and other native species prefer their natural river environment—not a warm, still reservoir. Some dams drain rivers virtually dry, allowing only a trickle to pass below—not good for fish or other aquatic species.

Dams can harm fish.

(Subtract 1 "fish")

Turbidity

Turbidity means:

a. cloudy or muddy water
b. still or slow moving water
c. cranking a fishing reel slowly

Answer: a. Another word for muddy water is "turbidity." Storms can stir up sediments from the bottom of waterways, and heavy runoff erodes banks and washes soil into streams and rivers. Some fish have a hard time feeding in turbid, muddy water, and sediments can smother fish eggs as well as reduce resting and hiding places.

Turbid water can harm fish.

(Subtract 2 "fish")

Attack of the Aliens

True or False: It's okay to dump or release your live bait when you're done fishing.

False: If bait is not native to your waterway, it is called an "alien species." Unfortunately, some aliens can become invasive, meaning they out-compete native species for food and habitat. They can take over and disrupt the natural ecological balance.

Alien species can harm fish.

(Subtract 1 "fish")

Go Green!

Your neighbor removed trees and shrubs from her yard that were blocking her river view.

True or False: She can be fined and forced to replant.

True: In many areas setback laws require that business and residents maintain a "buffer zone" of trees and other plants along waterways. This vegetation filters pollutants and stabilizes banks, preventing erosion.

A single tree can keep more than 4,000 gallons of water out of the sewer each year. Just imagine what a whole shoreline of trees can do!

Setback laws help fish.

(Add 2 "fish")

Nutrient-rich Wastes

Excess nutrients in waterways can cause algal blooms, which in turn may cause "dead zones" and "fish kills" by depleting dissolved oxygen. How can we prevent excess nutrients from entering our waterways?

a. Maintain or upgrade wastewater treatment plants.
b. Limit fertilizer use on lawns, golf courses and farms.
c. Scoop pet and livestock droppings.
d. all of the above

Answer: d. all of the above

Keeping excess nutrients out of waterways helps fish.

(Add 2 "fish")

Fishable Waters Action Cards

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