

Grade Level **3-12**

Class Periods **2**

### Goals/Objectives/Student Outcomes:

The student will:

- Gain awareness of Iowa's natural resources the availability and continuous change of these re-sources his or her relationship to the environment

The student will:

- Recognize that Iowa's environment has changed over time
- Identify ancient and historic uses of Iowa's natural resources;
- See three habitats that settlers changed to make the land more economically productive;
- Explain ways in which we witness changes in our environment;
- Describe various state efforts to regulate and manage Iowa's natural resources
- Describe choices and their consequences in preserving Iowa's natural resources for future generations.

### Materials:

1. Topographical map of Iowa
2. Current magazines and newspapers
3. Examples of recyclable articles

### Background:

While changes in nature are inevitable, human presence hastens these changes. We have created a dilemma for ourselves: our way of life depends on using natural resources, yet overusing these resources will make them unavailable to future generations. And so we must find a balance between our needs and the needs of the environment.

The bedrock of Iowa is represented by a stylized rock profile. Each of the layers depicts a particular time period and environment in Iowa's geologic history. The oldest rocks are on the bottom of the profile, with newer layers on top. The study of the rock's structure, composition, and fossils can tell us about the environments in which the rocks were formed. Environmental change is an on-going, natural process.

Iowa's oldest rocks are the pre-Cambrian era. They are composed of quartzite, a metamorphic derivative of sandstone. This would have formed on the edge of a sea, perhaps a beach or a sandbar. The Paleozoic rocks are composed of limestone, sandstone, coal, and shale. These developed in marine environments, along coastlines, and in swamps. During this period, Iowa was covered by warm, shallow seas. In the Mesozoic era the sea began to evaporate. Mesozoic deposits consist of limestone and sandstone. Gypsum, the result of this evaporation, is found around Fort Dodge. The Cenozoic era is the most recent. Iowa was covered by a series of glaciers. This glacial advancement and melting produced the state's hills, plains, and excellent soil.

Iowa rocks contain fossils that tell us about the environment in which they were deposited. Paleozoic rocks have remains of starfish, crinoids, sharks, leaves, and bark. Cenozoic rocks contain bones of giant ice age mammals such as mammoths and musk ox. These animals become extinct about the time humans arrived in the area. Humans have also left behind remnants of their lives. Some of these remnants were natural, and some were manufactured.

From the earliest inhabitants to the people of today, Iowans have found many uses for their available resources. Stones were chipped and shaped to form tools and pipes. Clay became pottery. Animal products such as hide, bone, and horn were fashioned into clubs, scrapers, clothing and ornaments.

Nineteenth-century settlers in Iowa found abundant resources in rivers, streams, and lakes. Water replaced human and animal power and was used as a source of energy for saw and grain mills. For instance, a waterwheel placed in a stream could run the mill. Because water provided transportation, boats and rafts became common sights on the waterways. The wealth of clams in the Mississippi provided the materials for pearl buttons, a major Iowa industry before World War I. And today, we use water for leisure activities like sailing, swimming, and fishing.

Rocks and minerals are also important resources. Limestone and dolomite, used as building materials, were quarried across Iowa. Gypsum from the Fort Dodge area became fertilizer and plaster

products. Clay was turned into pottery, brick, and tile. Galena, a lead compound, was mined in the northeast corner of the state. Deposits of sandstone provided sand for glass factories in Keota and Iowa City.

Weathered rock produced Iowa's rich soils. In some areas of Iowa the soil is up to four feet deep. This resource has made the state a major provider of food for the nation and the world. Unfortunately, soil is rapidly eroding, and the loss of topsoil means fewer crops. Ultimately, this creates higher food prices and taxes. To slow erosion we may have to alter some of the ways we farm.

Deposits of coal formed in Iowa over 300 million years ago from decomposed plants. Coal mining was a major industry in the late 19th and early 20th centuries. Towns quickly grew around coal mines and thrived as long as the mines operated. Mines attracted immigrants and migrant workers. Coal mining was dirty, hazardous work, most miners left for work before sunrise and returned home after sunset. Sundays were often the only day they enjoyed sunshine.

In the 19th century, large fairs—called expositions—were held to show off new products, machines, and ideas to the public. In Iowa, several "palaces" were built as showplaces for these innovations. The palaces were enormous, temporary buildings lined and decorated with the most important local product. There were corn palaces in Sioux City, flax palaces in Forest City, blue grass palaces in Creston, and a coal palace in Ottumwa.

A century ago there were about one thousand mills along Iowa's rivers and streams. The Pottawattamie Mill was built in the 1840's on Mosquito Creek, near Council Bluffs. The dam slowed the current, forcing some of it to flow against the huge, wooden waterwheel. The turning wheel provided energy to run the saw (under the small roof). The saw cut rough logs into boards for building houses, stores, and furniture.

Clam shells were common along the Mississippi. In the 19th and early 20th century they were used in Iowa to make pearl buttons. A Native American carved this shell as a neck ornament depicting a rattlesnake body with a cat's head. It's 3,000 years old and was found in Jones County.

During the 19th century, settlers arrived in Iowa and began to take advantage of the plentiful resources. This development slowly diminished the habitats available to our plants and animals, many of which had to adapt to new habitats. Those that failed to adapt became extinct.

Iowa's woodlands provided settlers with opportunities for lumbering and farming. From the uplands of the northeast to the southern hills and the stream valleys, forests once covered some 6 million acres—about 15% of Iowa's total area. Working with saws and axes, settlers used the skills they had learned back east to clear the land for cultivation. The timber they sent to the sawmill became fence posts, railroad ties, and lumber for houses. With the loss of forest land there was also the loss of many animals, including elk, black bear, panther, porcupine, and timber wolf. Today an estimated 1.5 million acres of trees remain in Iowa.

When the last glacier retreated from Iowa thousands of years ago, it left a smoothed landscape with small depressions. These filled with water, becoming the lakes, marshes, sloughs, and seasonal potholes that once dotted the land from Des Moines to the Minnesota border. The Swamp Act of 1853 encouraged the use of drainage ditches and tiles to drain the wetlands to make farm-lands. At that time a marsh was often considered a wasteland because it was unable to yield crops. In the 1840s over a million acres of wetlands existed. Today only 30,000 acres remain. But now some wetlands are protected, and

animals, including beavers, river otters, and giant Canadian geese, have been reintroduced into their native habitats.

In the mid-19th century nearly 30 million acres of tall grass prairie stretched from Iowa's eastern forests to the Missouri River. It was an area of gently rolling hills covered with a variety of grasses and flowers, with trees along rivers and lakes. These grasses—like big blue stem, little blue stem, side oats gramma, and Indian grass—grew up to six feet high. Mixing with these grasses were flowers such as golden rod, compass plant, blackeyed Susan, and milkweed. The development of the steel plow blade enabled settlers to quickly turn the prairie into farmland. This destroyed the habitat for buffalo, coyote, and prairie chicken. Today only a few scattered remnants of prairie survive across the state.

The environment changes in response to natural forces and human choices. These changes often happen so gradually that they escape our notice. Through our memories and those of others we can document and reconstruct the environmental change.

Wildlife is an economic resource, providing food, clothing, and sport. Game is harvested by the hunter just as corn is by a farmer. In some cases the over-harvesting of a species led to its extinction (like the passenger pigeon) or near-extinction (like the buffalo).

Iowa's environmental attitudes are expressed in laws that regulate, manage, and encourage the wise use and appreciation of the state's natural resources and wildlife.

As more people settled here and adapted the land to suit their needs, many natural habitats disappeared. Some people grew concerned about this and lobbied for legislation to protect and regulate our resources. Creating our state symbols was one way of focusing on our natural resources. The geode is our state rock, the oak our state tree, and the wild rose our state flower. These symbols represent things native to Iowa, that if protected will remain in Iowa.

What has been done to protect Iowa's wildlife? Efforts include identifying endangered species, "Chickadee Check-Off," regulating hunting seasons, establishing daily limits, and requiring hunting licenses. In addition, state game preserves were created to set aside land where hunting of animals is forbidden.

The Department of Natural Resources (DNR) was established in 1987 to combine under a single administration the State Conservation Commission; Geological Survey; Water, Air and Waste Management; State Preserves Board; Energy Policy Council; and the Department of Environmental Quality.

In the years after Iowa became a state, its population grew rapidly and water became a valued resource. As early as 1851 laws were enacted to stop people from polluting streams and ensure the purity of drinking water. This concern continues today with a variety of laws monitoring public water supplies and protecting surface and ground water.

Other legislation shaped how our state uses its land. In 1855 a geologic survey determined the economic potential of Iowa's rocks and mineral. Tax breaks were given to those who preserved wooded areas and planted orchards. New state agencies were created to manage waste, resources, and state parks. These efforts show Iowans' appreciation for their environment. Because of this legislation residents and visitors may enjoy Iowa's lakes and parks and still view wildlife in its native habitat.

Pope John Paul II during his 1979 visit to Iowa said that those "who live in the heartland of America have been entrusted with some of the earth's best land, the soil so rich in minerals, the climate so favorable for producing bountiful crops, with fresh water and unpolluted air

available all around you. You are the stewards of some of the most important resources God has given to the world. Therefore, conserve the land well, so that your children and generations after them will inherit an even richer land than was entrusted to you." Each of us is a steward of Iowa, responsible for protecting our resources for the future. And that includes using our resources wisely.

There is growing concern about the quality of our drinking water. There is growing concern about the pollution from farm chemicals. This concern has sparked new programs and new methods designed to decrease pollution and improve the ways in which we use our resources. But chemical pollution is not limited to farms. Many common household products are also hazardous to the environment. Making people more aware of these toxic products and teaching them how to properly dispose of them will alleviate some of the problems.

Many of our pollution problems can be controlled through the everyday decisions we make. These choices are not simple. The Delicate Balance offers an example of such a choice—whether to use cloth or disposable diapers. While disposable diapers are more convenient they are also a hazardous waste. But cloth diapers also present problems. Detergents, which may pollute our water, must be used to clean them. Which is the best choice? Choices like this affect our environment for better or worse.

## Vocabulary:

**Conservation:** The controlled use or systematic protection of soil, forest, wildlife and other natural resources.

**Ecology:** The study of the relationship between living things and their environment.

**Environment:** The external physical conditions that influence the growth of a living thing.

**Erosion:** Natural processes—like wind and rain—that wear away the earth's surface.

**Habitat:** The natural environment of a plant or animal.

**Naturalist:** A person who studies the thinks of nature, especially plants and animals.

**Organic:** Produced without artificial fertilizers or pesticides; using fertilizers made only of animal or vegetable matter.

**Pesticide:** A substance used to kill harmful or destructive plants, animals, and insects.

**Pollution:** The contamination of soil, water, or the atmosphere by harmful substances.

**Recycle:** To convert waste material into a form in which it can be reused.

**Resource:** An available supply of natural materials that can be used by people when needed.

**Toxic Waste:** Harmful, destructive, or deadly garbage.

## Procedure:

1. Begin a class discussion by asking some of these questions. After each question some suggested answers are given. Urge your students to expand on these answers.

**Q.** Water is one of our most important resources. What do we use water for?

**A.** Drinking, Plants, Housework, cooking, bathing, power.

**Q.** By observing the natural world we can learn many lessons. For instance, what helps us tell time or predict the weather?

**A.** Time: season, sun, moon, stars, Weather predictors: ground hogs, fuzzy caterpillars, beaver house, clouds, sun.

**Q.** People often use "nature" terms in everyday speech. Can you think of any you and your friends and family use?

**A.** Busy as a beaver. Right as rain. Shaking like a leaf. Old as the hills. It's all down hill from here.

**Q.** What are the positive and negative aspects of urban development— like shopping malls or housing developments?

**A. Positive:**

- Shopping is more convenient.
- People will drive less to go shopping and therefore save fuel.
- The mall provides entertainment.
- People need housing and like peaceful areas to escape to.

**Negative:**

- Animal and plant habitats are destroyed.
- Malls create noise, pollution, and use resources.
- Related businesses are built near the mall that also use more resources.

**Q.** Make a list of things that can be done to protect our resources. Which of these can be done by you, your family, and your friends?

**A.** Recycle cans and papers.

- Use the minimum amount of water necessary for cleaning.
- Only run full loads in the washing machine.
- Use low wattage light bulbs.
- Combine auto trips to stores and walk when possible.
- Use only cleaners that are environmentally safe/
- Recycle used car oil and batteries.
- Keep your yard and neighborhood litter-free.
- Use public transportation such as the bus.
- Plant a tree or other plants.

2. These are suggested themes for student research. To explore the themes, use the Resource List at the end of this guide. The themes can be presented in an oral report or a written research paper. Students could be encouraged and given class time to present their findings in more creative form by making their own documentary on video or through a slide show.

Choose an era from Iowa's geologic past (Pre-Cambrian, Paleozoic, Mesozoic, or Cenozoic). Write a report about the animals that lived then. Describe the environment.

Find out what types of rocks are found in your county. If you need help, ask your county conservation board. What are the economic uses for the rocks? Include a rock profile (sometimes called a stratigraphic column) for your area.

Make a report on one of the featured economic resources—such as water, soil, coal, or rocks and minerals. Find out where they are located, how they are obtained, and what is procured from them. Describe the history of their use.

Choose any of the three habitats: prairie, woodlands, and wetlands. Investigate the habitat's environment, and find out about its soil, plants, animals and food chains. How does the habitat keep itself in balance? What happens if that balance is disturbed?

Many environmental-related laws have been enacted. The early laws

were designed to protect people from the environment. The later ones protect the environment from people. List some of these later laws (such as the 5-cent bottle law and the laws that require hunting and fishing licenses). How are these laws related? How did they develop? Who was involved in promoting them? What effects did they have? How are they enforced?

Read your local newspaper or national news magazine (such as Time or Newsweek) and look for articles on natural resources, and their management and protection. What concerns are expressed and by whom? What solutions are presented? Do you feel they are practical? Are they solutions that affect you? How can you help?

## Assessment of Outcomes:

Research findings can be presented in written or oral form through panel discussions, research papers, video, "you-are-there-on-the-scene" report, slide presentation, display, or bulletin board.

## Extensions and Adaptations:

1. Plan a class field trip to a quarry or other area of rock outcrops. Ask your county conservation board for suggestions. Look for fossils, and bring along books for identifying them. Talk about the kinds of environments they might have lived in.
2. Using an outline map of Iowa, identify and sketch the areas of prairie, marsh, and woodlands. Make symbols for the following economic materials and place them at the appropriate locations on the map; clay, limestone, gypsum, galena, (lead), sand, and coal.
3. Make a drawing or painting of a wetland, prairie, or woodland.
4. Visit an art museum or look at art books to see how various artists represent natural environments. Compare art work from different time periods. How does this reflect attitudes toward nature?
5. Write a story or poem about changes you have witnessed (such as the construction of a building on the edge of town). As a class, make a booklet out of the writings and illustrate them.
6. Interview your family members. Ask them to describe how their local area has changed during their lifetime. Compare your findings in class.
7. Make a list of animals that have become extinct—both in Iowa and in the U.S.—during the past 150 years. Why have they become extinct? Other animals that were hunted to near extinction managed to survive and are now being reintroduced. Which animals? See the attached listing for a start.
8. Investigate the procedure for developing environmental legislation. Have any of your public officials been active in promoting local, state, or federal legislation?
9. Plan a campaign on an environmental concern affecting your region. Select one group to support regulation and management of the resource, and another group to oppose such actions. Draw poster, give speeches, and try other methods to win support for your point of view.
10. Take a walk around your school or neighborhood. Are there any places still in their natural state? What do people use in their yards that creates a "back-to-nature" look?

11. Visit one of the following museums to learn more about Iowa's natural history and resources: Putnam Museum, Davenport; University of Iowa Museum of Natural History and Science, Waterloo; UNI Museum, Cedar Falls; Sanford Museum and Planetarium, Cherokee; and Sioux City Public Museum.

12. Plant a tree at your school

13. Spend a day and a night without electricity. Which of your usual activities are difficult to do without electricity? How did you have to adapt your habits?

## Resources:

These materials will help you find out more about Iowa's "delicate balance." Next to each listing are locations where the material can be found. (SHSI stands for the State Historical Society of Iowa; AEA is Area Education Agency).

### Books and Articles: 4th-8th Grade

"Iowa's Incredible Exposition Palaces." *The Goldfinch*, Vol. 6, No. 1 (October 1984). (SHSI, School library) Includes an article on the Ottumwa coal palace.

"Life on the Iowa Prairie." *The Goldfinch*, Vol. 7, No. 2 (November 1985). (SHSI, School library) Description of prairie habitat, settlement, and changes.

"Labor in Iowa." *The Goldfinch*, Vol. 10, No. 3 (February 1989). (SHSI, School library) Life in the coal mines is described.

"Natural Resources." *The Goldfinch*, Vol. 5, No. 3 (February 1984). (SHSI, School library) Use of resources by early inhabitants, air and water pollution, Ding Darling, soil, and minerals.

"Rivers in Iowa." *The Goldfinch*, Vol 6, No. 4 April 1985. (SHSI, School library)

Rivers as a resource for power and navigation, river habitats, and changes over time.

### Books and Articles: Grades 9-12

Bennet, H. Arnold. "Fish and Game Legislation in Iowa." *Iowa Journal of History and Politics* 24 (1926): 335-444. (SHSI, Public Library) Development of needs for fish and game protection, including development of Fish and Game Department.

Berry, William. "The Influences of Natural Environments in North Central Iowa." *Iowa Journal of History and Politics* 25 (April 1927) (SHSI, Public Library) Life on the Iowa prairies.

Bowles, John Bedell. "Iowa's Mammal Fauna: An Era of Decline." *Proceedings of the Iowa Academy of Sciences* 88 (1981): 38-42. (SHSI, Public Library) Species decline and extinction since settlement.

Brown, Joseph K. "Althea Sherman." *Iowan* 21 (Spring 1973): 5-9. (SHSI, Public Library) A prominent ornithologist and native of National, Iowa.

Dick-Peddie, William A. "Primeval Forest Types in Iowa." *Proceedings of the Iowa Academy of Science* 60 (1953): 112-116. (SHSI, Public Library) Taken from surveyors notes of three eastern counties during 1836-1859.

Gwayne, Charles S. "Quarrying in Iowa." *Palimpsest* 38 (1957): 177-204. (SHSI, Public Library)

*Iowa's Natural Heritage*. Edited by Tom C. Cooper. Iowa Natural Heritage Foundation, 1982. (SHSI, Public library, School library, AEA 1, 7, 9, 10, 14) Various articles on Iowa natural history, excellent photographs.

Leopold, Aldo. *A Sand County Almanac*. Oxford University Press, Inc., 1966. (Public Library, School library) Depicts a farm in Wisconsin owned by Aldo Leopold.

Madson, John. *Where the Sky Began: Land of the Tallgrass Prairie*. Boston: Houghton-Mifflin, 1982. (Public Library, School library) History of the prairie, focusing on Iowa.

Righter, Miriam. *Iowa City Glass*. Wallace-Homestead, 1966. (Public library, School library, AEA 10) Iowa City Flint Glass Manufacturing Co., 1880-1882.

Troeger, Jack Clayton. *From Rift to Drift: Iowa's Story in Stone*. Ames: Iowa State University Press, 1983. (Public library, School library, AEA 1, 2, 10, 14) Iowa geology for non-scientists, humorous in places.

### Books and Articles: Adult

Bonney, Margaret. *Land Between Two Rivers Part Two: A Guide For Teachers*. Johnston: Iowa Public Television. Material for use in conjunction with the TV series.

Buxton. *Work and Racial Equality in a Coal-mining community*. Ames: Iowa State University Press, 1987. Buxton was unusual in its degree of racial equality.

*Global Climate Change: Implications for Energy Policy in Iowa*. Iowa Department of Natural Resources, 1989.

*Groundwater Primer for Iowa Issues*. Department of Natural Resources, 1989

Gwayne, Charles S. "B.H. Beane and the LeGrand Grinoid Hunters." *Annals of Iowa* 35 (1961): 481-90. (SHSI, Public library) Discovery of part of the geologic history of Iowa.

*Iowa Soil: Digging Deeper, A Third Grade Unit on Soil*. Iowa City: University of Iowa, 1985 (Iowa Hall) Developed for visit to Iowa Hall.

*Iowa On The Move: A Fourth Grade Geology Unit*. Iowa City: University of Iowa 1985. (Iowa Hall) Developed for a visit to Iowa Hall.

Schwieder, Dorothy. *Black Diamonds: Life and Work In Iowa's Coal Mining Communities 1885-1925*. Ames: Iowa State University Press, 1983. (Public library) Study of several coal communities.

### Film, Filmstrip, Video

*Coming Heritage*. (Video Recording) Iowa Public Broadcasting Network, 1979. 30 min. teachers guide. (AEA 1, 2, 5, 7, 9, 10, 11)

*Ding Darling, Aldo Leopold and Wood Ducks*. (Video recording) Iowa Public Broadcasting Network, 1980, 30 min. (AEA 12)

*4-H/Ding Darling Project* (Kit— Includes one sound filmstrip, poster, and computer program) Heartland AEA 11, 1983. (AEA 1, 9, 11)

*Iowa Coal* (16mm film, color). Iowa State University Film Production Unit, 1977. 20 min. (ISU, 1, 7, 11, 14)

*Iowa Wildlife Series* (Video Recording) Iowa Public Broadcasting Network, 1980. 30 minutes. (AEA 10, 12, 14)

*Iowa's Black Gold*. (Filmstrip) Heartland AEA Media Center, 1981. 70 frames, audiocassette; teachers guide. (AEA 9, 10, 11, 12, 14)

*Iowa's Prairie Heritage*. (Filmstrip) Heartland AEA Media Center, 1980. 75 frames, audiocassette; teachers guide (9, 10, 11, 12, 14)

*Iowa's Precious Water*. (16mm film) Iowa State University Media Resources, Film Production Unit, 1978. 29 minutes (AEA 1, 5, 7, 9, 10, 12)

*Land Between Two Rivers*: Series 1 and 2. (Video recording) Iowa Public Television, 60 min. (AEA 1, 2, 9, 12, 14)

*Last Pony Mine* (Film, color) Iowa State University, 1971. 23 min. (Supplementary material: *Iowa's Coal Mining Heritage*) (State Library, AEA 1, 2, 5, 7, 9, 11, 12)

*A Sand County Almanac* (Film, color), 1979. 15 min. (State Library)

# A Matching Game of River Names

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Can you match the Iowa river names with  
the meanings behind those names?

Name	Meaning
1. Panther Creek	A. Natives made paint from the blue soil along its shore.
2. Maquoketa River	B. Name of a tribe that lived in the area.
3. Floyd River	C. A member of the cat family was killed nearby.
4. Mississippi River	D. Native word for <i>snake</i> .
5. Skunk River	E. Lewis and Clark named it after Charles Floyd, who died on their expedition.
6. Medicine River	F. The father's name was Daniel. The son explored Iowa in 1835 with Albert Lea.
7. Nodaway River	G. Translation of <i>chicaqua</i> , a native word for a smelly, striped animal.
8. Missouri River	H. Means <i>spiritual power</i> to Native Americans.
9. Boone River	I. Native word for <i>the great river</i> .
10. Blue Earth River	J. <i>Makwok</i> means <i>bear</i> . <i>Eteg</i> means <i>there are</i> . Say the words together.

Answers:

1-C 2-J 3-E 4-I 5-G 6-H 7-D 8-B 9-F 10-A

# Threatened & Endangered Species in Iowa

## Mammals

Bobcat, Grasshopper Mouse, Indiana Bat, Least Shrew, Plains Pocket Mouse, Red-Backed Vole, River Otter, Spotted Skunk, Woodland Vole.

## Birds

Bald Eagle, Burrowing Owl, Common Barn Owl, Cooper's Hawk, Double-Crested Cormorant, Henslow's Sparrow, King Rail, Least Tern, Long-Eared Owl, Northern Harrier, Peregrine Falcon, Piping Plover, Red-Shouldered Hawk, Short-Eared Owl.

## Fish

American Brook Lamprey, Black Redhorse, Blacknose Shiner, Bluntnose Darter, Burbot, Chestnut Lamprey, Freckled Madtom, Grass Pickerel, Lake Sturgeon, Least Darter, Orangethroat Darter, Pallid Sturgeon, Pearl Dace, Pugnose Shiner, Weed Shiner, Western Sand Darter.

## Reptiles & Amphibians

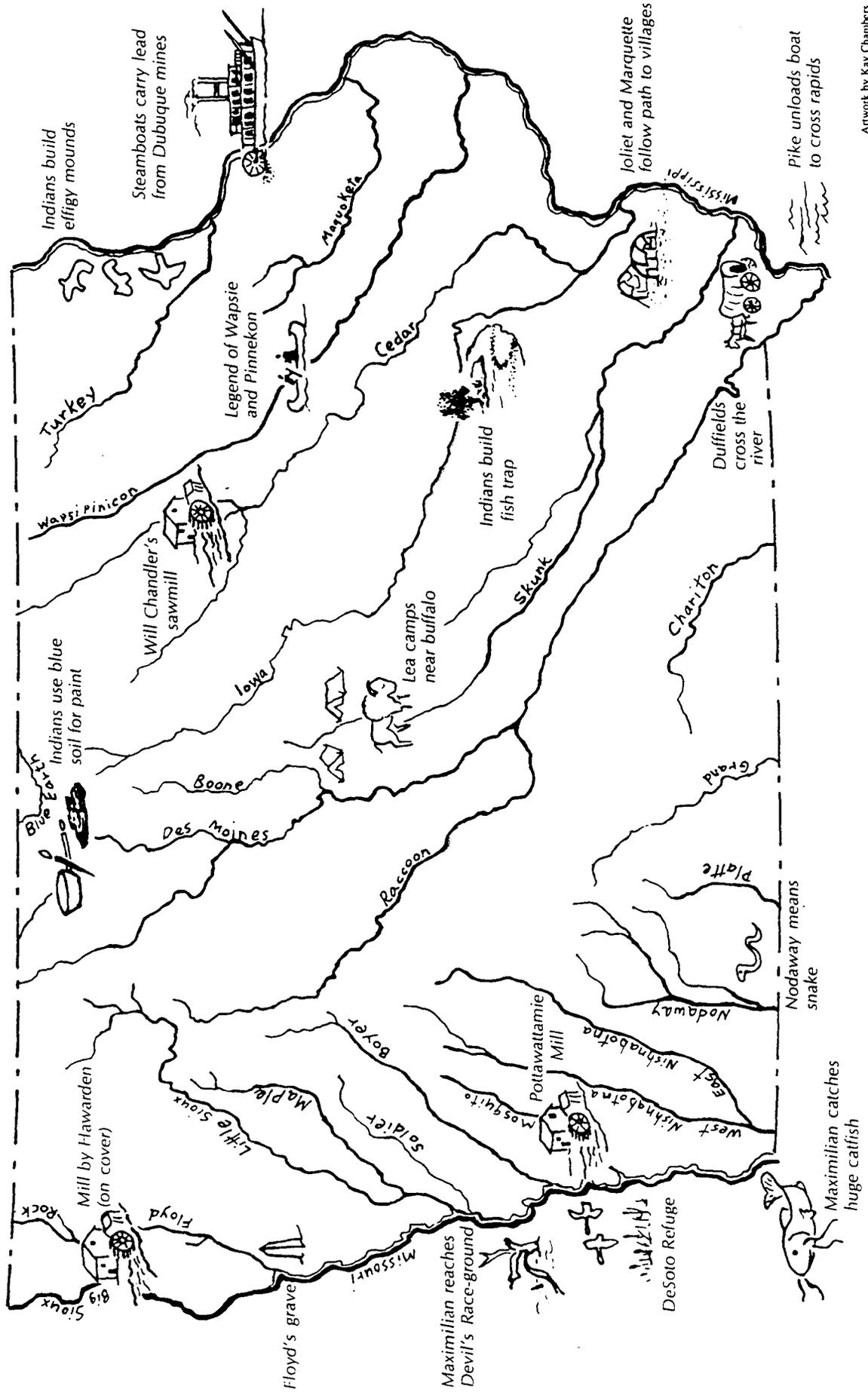
Blue-Spotted Salamander, Central Newt, Copperhead, Crawfish Frog, Diamondback Water Snake, Earth Snake, Great Plains Skink, Masasauga, Mudpuppy, Yellow Mud Turtle, Ornate Box Turtle, Prairie Rattlesnake, Slender Glass Lizard, Speckled Kingsnake, Stinkpot, Western Hognose Snake, Yellow-Bellied Water Snake.

## Butterflies

Baltimore, Bunch-Grass Skipper, Dakota Skipper, Dusted Skipper, Mulberry Wing, Olympia Marblewing, Silvery Blue, Swamp Metalmark.

*Source: Iowa Department of Natural Resources*

This map shows many of Iowa's rivers. Find where the stories in the Goldfinch happened. What would you add to the map to show more river history?



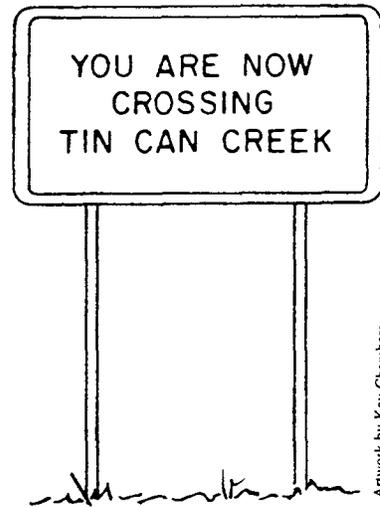
# Name it, paint it, shape it

## First come, first name

Most of us never get the chance to name streams or rivers. The first people to explore or live near them usually named them. They often chose names of people, animals, or plants that lived in the area, or called them after events that happened nearby.

Pretend that none of the creeks, streams, or rivers near your home have names yet. You can name them whatever you like. You might name them after people (even yourself!) or after something that happened there once to you (like "Thin Ice Creek").

Draw a map of the waterways and the new names you have chosen. Do the old names still describe the waterways? For example, do maple trees still grow along Maple Creek? But instead of renaming it "Tin Can Creek" (even if that's how it looks), perhaps you and your parents could organize a clean-up of the creek.



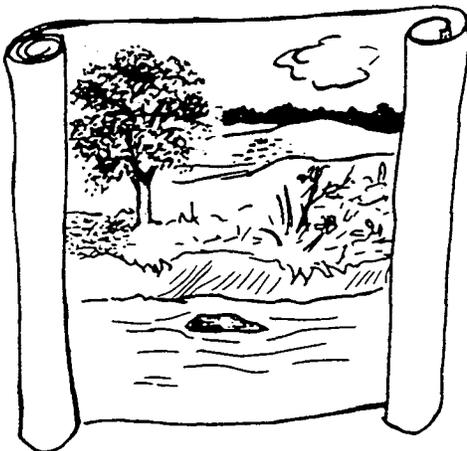
Artwork by Kay Chambers

## Paint a panorama

In the 1850s Europeans—without ever leaving Europe—could watch the Mississippi River roll by in front of them. They were watching Henry Lewis's moving *panorama*.

Henry Lewis was an American artist who painted the entire Mississippi onto a roll of canvas 12 feet high and three-quarters of a mile long. He showed the panorama to audiences in America and Europe. As he unwound the canvas from one roller to another, the audiences saw scenes of riverboats, Indian villages, bluffs, and towns—from Minnesota to the Gulf of Mexico.

Make your own panorama of a river or creek near your home. Cut an old white bedsheets into strips about two feet high, and sew them together. Use acrylic paints. They work best on cloth. (Instead of cloth you could use paper that comes on a roll. Ask at your butcher shop or art shop. Draw the scenes with felt markers or other paints.) Use cardboard tubes from gift wrapping paper for the rollers.



## Make a salt dough map

The map on the opposite page shows some of the river history from this *Goldfinch*. Choose your favorite part and make a salt dough map of that area.

You will need a large piece of wood or cardboard and a lot of salt dough. (Use the recipe on the right to make the salt dough.) Pat the dough onto the board to form the land. Mound the dough into hills or bluffs, and scoop out the rivers and streams.

Then fill in the details. For the Missouri River you could use sand and twigs to show the sandbars and snags that made the river so treacherous. Use pieces of gravel for the Des Moines Rapids on the Mississippi.

Use your imagination and whatever you can find to show the history of the river. How could you show the *Bertrand* sinking? How could you show Albert Lea's description of his campsite near the Skunk River (on page 5)?

Salt Dough

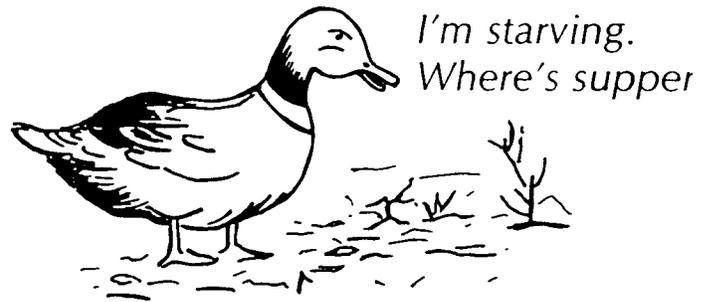
2 cups flour

1 cup salt

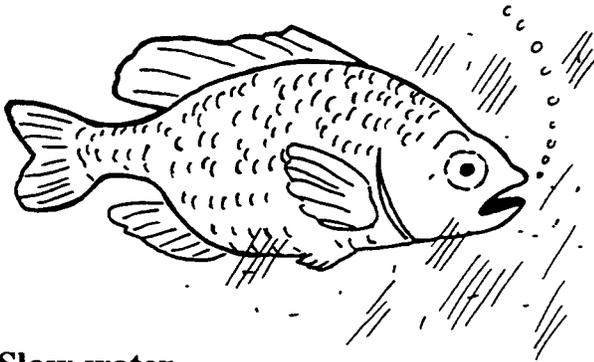
Mix. Add water slowly.

# What happened to the water?

**H**AVE THE RIVERS changed since the explorers canoed up and down them? Yes, they certainly have. Some of the changes are from people *using* the rivers. Some of the changes are from people *abusing* (or harming) the rivers. The changes have been the hardest on the animals, fish, and fowl that live in Iowa. Let's look at some of the changes.



*It's so murky down here. I can't see a thing.*



## Slow water

Iowans have built dams on the Mississippi and some smaller rivers. The dams have many purposes. They help control the water when floods occur. They hold back or save water if a drought, or dry season, is expected. They turn the energy of the running water into electricity for communities. They make the water deep enough for boats to travel easily.

But when you build a dam, you control the speed of the water flowing through it. The water slows down and becomes *murky* (or not clear). Fish that find their food by touch or taste can live in murky water. But some kinds of fish search for food with their eyes. And other kinds of fish need fast-flowing water. These kinds can no longer live in rivers with many dams, like the Mississippi.

## No water

The Missouri and Mississippi valleys are important routes for migrating waterfowl each spring and fall. Along the rivers there once were many marshes where the birds could nest and find food. Years ago, 7 to 10 million ducks stopped on the Upper Mississippi, but

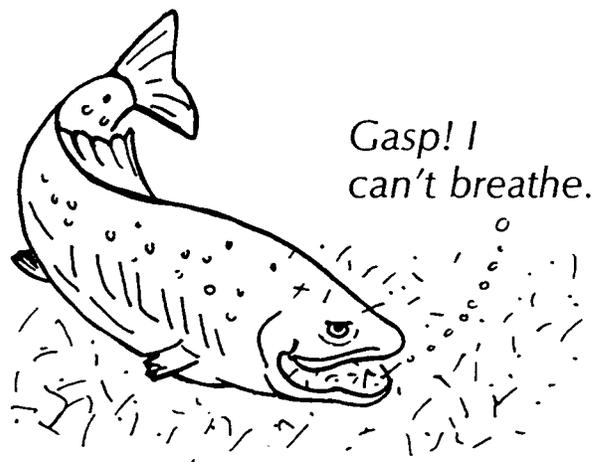
now *only* about half a million do. People have drained the marshes that attracted the wildlife. They farm the drained land or build on it. The wildlife must search for another place to find food and make nests.

## Dirty water

Water becomes polluted when anything harmful enters it. The chlorine in drinking water and the chemicals from factories are harmful to the fish when the used water is flushed back into the river. They are harmful to us when we eat the fish.

But most water pollution in Iowa comes from farming. Farmers use fertilizers to make their crops grow better. They use chemicals that kill weeds and insect pests. But rain can wash the fertilizer and chemicals off the land and into the streams and rivers.

The fertilizer makes water plants (like algae) grow in the water. The algae leaves less open space for boating and swimming. It takes oxygen away from the fish who need it to breathe. Soil washes into the rivers, too, and settles on the bottom. Then the water is not deep enough or clear enough for fish to live in. □



# How to care for a river

**H**OW DO YOU save a river? Iowans have found many ways to take good care of the water, the wildlife, and the history of their streams and rivers. Here are some of the ways.

## Save the soil!

Farmers can plow their fields in certain ways to stop the soil and chemicals from *eroding* or washing into streams. After farmers harvest a crop, the old cornstalks or soybean plants are left in the field. If farmers use *moldboard plows*, the stalks are buried as the soil is turned over. But farmers can use *chisel plows* that do not bury the stalks. More of the stalks are left on top of the ground. They help hold the soil in place during rain and winds.

Farmers plow and plant in rows across the hills instead of up and down the hills. Rows running up and down would make little ditches in which the rainwater would run down easily, taking topsoil with it. Rows across the hill make little edges that stop the water from washing away.

Some farmers grow their crops without fertilizers or chemicals that kill insects and weeds. Then there are no chemicals that can wash into the rivers and streams.

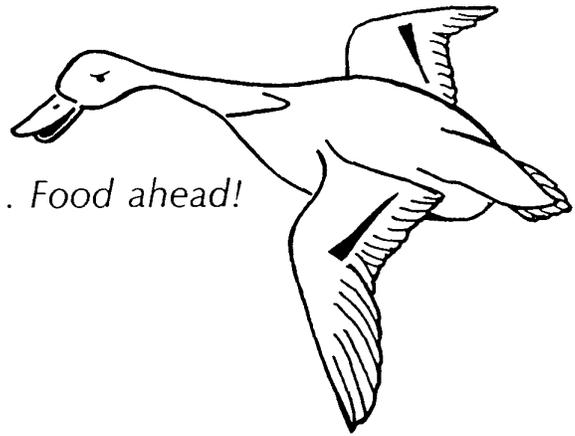
## Revive the rivers!

Communities can join the Mississippi River Revival. (A *revival* brings something back to life.) Iowa towns like Lansing, McGregor, Bellevue, and Dubuque have already held festivals. Any town on the Mississippi or on its *tributaries* (rivers that flow into the Mississippi) can join the revival.

A folksinger named Larry Long first had the idea for the revival. In 1981 he had worked on the Clearwater Project in the state of New York. The goal there was to clean up the polluted Hudson River.

When Larry returned to the Midwest he wanted to clean up and revive the Mississippi. So he started the River Revival.

In 1984 over 15,000 people attended the festivals along the river. There were folksingers, rock musicians, puppet shows, children's plays, and canoe rides. People learned about the problems of the river and how they could help solve them. They hauled more than 20 tons of garbage out of the rivers. A lot of the garbage was aluminum cans that factories could recycle.



Ah. . . Food ahead!

## Feed the birds!

In 1960 the Army Corps of Engineers cut a new channel for the Missouri River. That made traveling on the river easier. The new channel blocked off the seven-mile bend in the river where the steamboat *Bertrand* had sunk years ago. This turned the U-shaped loop of river into a U-shaped lake. The federal government set aside almost 8,000 acres and called it the DeSoto National Wildlife Refuge.

The refuge includes the lake, marshes, prairie, woods, and fields. Every autumn, 140,000 snow geese and blue geese and 125,000 ducks stop over at DeSoto on their way south. Loons, pelicans, herons, and hundreds of other birds make their homes at DeSoto. Farmers plant extra crops and leave some for the birds to eat. The staff at the refuge build nesting boxes. They restore sandbars to encourage endangered birds to live there.

Other animals live at DeSoto, too—like bald eagles, raccoons, beaver, muskrat, and mink. Deer and coyote roam the fields of prairie grass.

Visitors are welcome at the DeSoto Refuge. There are places to gather mushrooms in the spring and to ice fish in the winter. In the summer people can camp, swim, and hike on the nature trails. They can visit the museum where the artifacts from the steamboat *Bertrand* are on display.

## Watch the rivers on television!

Iowa Public Television has filmed four special shows on Iowa rivers—the Des Moines, the West Nishnabotna, the Little Sioux, and the Upper Iowa. The broadcast dates are Mondays (May 6, 13, 20, and 27) and again on Sundays (May 12, 19, 26, and June 2). Videotapes of the series, called "The Land Between the Rivers," will be available for use in classrooms.

If you would like to learn more about Iowa history and its rivers, visit your local library or historical society. The people there can help you find out more about the rivers and streams in your part of the state. □