

On T.R.A.C.K.S.



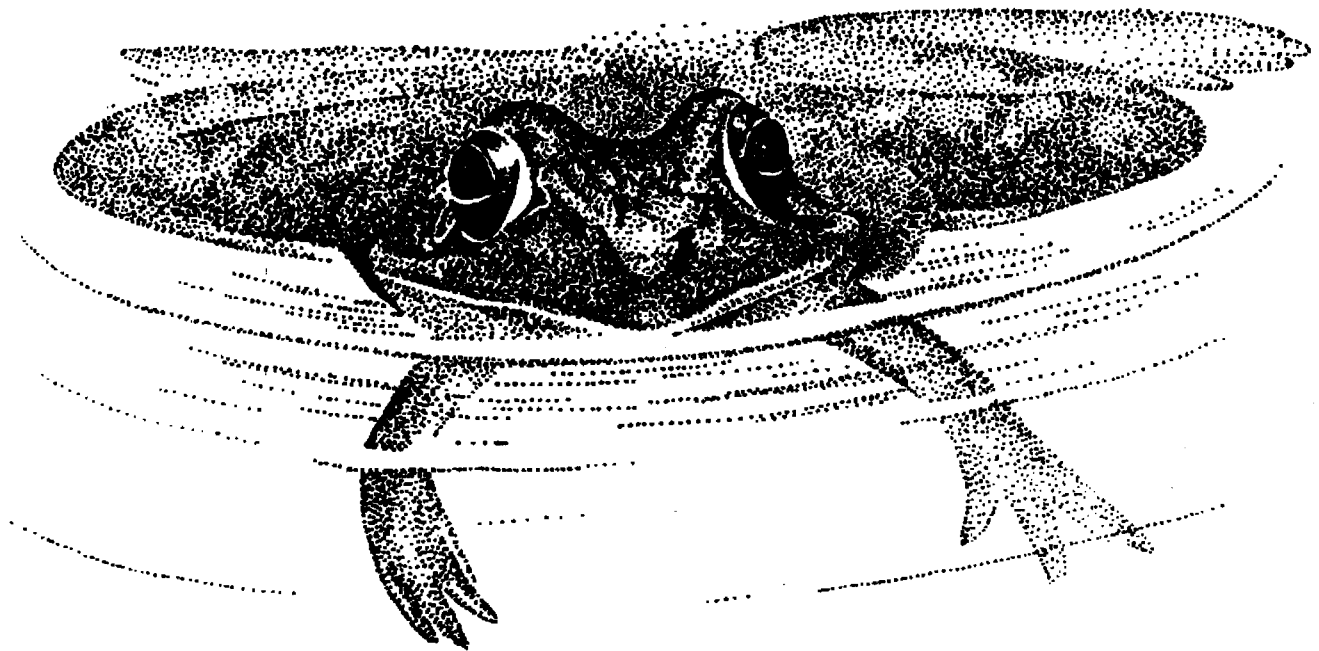
Teaching Resource Activities and Conservation to Kansas Students

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Life in a Pond



Inside...

What is a pond?	2
The zones of a pond	3
A pond Through the Seasons	4-10
A Pond Food Web	5
Check This Out!	7
Pond Puzzler	9
Something's Fishy Here	11
Spotlight on Freshwater Mussels	12
Homemade Equipment for Pond Study	13
The Wild Exchange	14-17
What's Happening?	18
Puzzle Answers	18-19
Materials Order Form	19

**In our
spring
issue:
BUGS!**

What Is a Pond?

In most people's minds, a pond is a distinct place where there are certain conditions and well-defined boundaries. In your mind's eye, you probably see an aquatic place with a muddy bottom, lots of plants like cattails or water lilies, maybe a little "scum" on top, and a host of critters from frogs and turtles to fish, snakes, birds, and lots of insects. These are, indeed, all parts of a pond but there is much more to a pond than what we imagine.

First of all, a pond represents a lentic environment. Lentic environments are those of still waters (as opposed to the lotic environments of moving water). Ecologically speaking, pond environments exist in many places outside the well-defined pond basin. Wetlands and marshes may behave like ponds, as can the oxbows in large rivers or the shallow water on the windward side of lakes. (Aquatic ecologists call these areas palustrine ecosystems.) These areas are like ponds in that they support the same types of plants and animals. But, what is a pond?

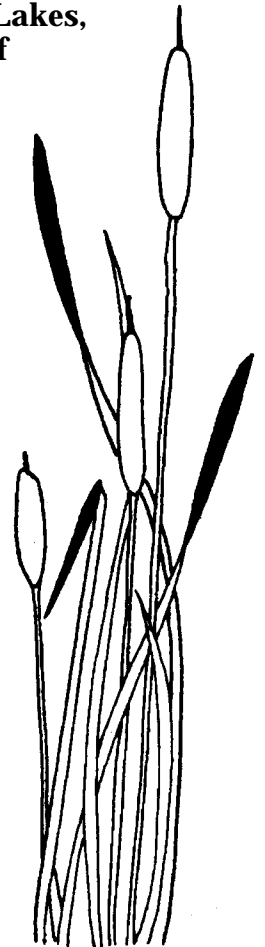
A pond is a shallow body of water that generally supports plant life across its muddy or silty bottom from shore to shore. Typically, plants grow all around the shoreline as well. Water temperature in a pond is fairly uniform from top to bottom and tends to change in response to air temperature. Conditions within a pond can change according to the time of day, weather, and season. No two ponds are exactly alike. All ponds are affected by their size, depth, shape, permanence throughout the year, the surrounding bedrock and soil, the local climate, and, of course, human activities.

One of the factors that has the biggest impact on a pond is sunlight. Sunlight drives photosynthesis in the aquatic plants. Oxygen is a vital by-product of photosynthesis and enters the water in solution to become dissolved oxygen. Ponds experience a great deal of variation in the amount of dissolved oxygen in the water on a daily basis. The highest amount of dissolved oxygen occurs in late afternoon coinciding with

the peak of photosynthesis and is lowest in the hours before sunrise due to respiration. Respiration is the process by which organisms consume oxygen and give off carbon dioxide. Unlike photosynthesis, respiration does not stop when the sun goes down.

Ponds can be the result of tremendous forces in nature such as glaciers or landslides, or they can simply be made by the forces of man. Rivers can create ponds by meandering back and forth to form oxbows which are eventually shut off from the main course of the river. Probably the best-known pond engineer is the beaver who creates ponds and marshes along streams by building a series of dams. Humans may create ponds for irrigation purposes, as sewage lagoons, and as water supplies for farm animals.

What people know as pond varies from region to region across the United States, proving that it is difficult to really define a pond. Many people think of ponds and lakes interchangeably. Lakes, however, are larger bodies of water too deep to support plant life at the bottom and often with distinct temperature zones (in temperature regions). The cycle of dissolved oxygen and temperature in a lake, unlike the pond, will vary little in a 24 hour period. This study of inland waters, the factors that shape them, and what defines them, is called limnology. Whatever you call them, aquatic habitats, whether ponds, lakes, streams, or wetlands, are some of the most productive habitats in nature. Wherever we find a pond, we will find it teeming with life.



The Zones of a Pond

As we've already said, ponds are full of life. What isn't immediately obvious is that each plant or animal finds different areas of the pond to be the most hospitable. A pond or lake can be divided into different communities or habitats. In a pond or lake, these habitats, usually referred to as zones, are the **surface film**, **littoral zone**, **limnetic zone**, and the **benthic zone**. Let's take a closer look at these zones and the life each supports.

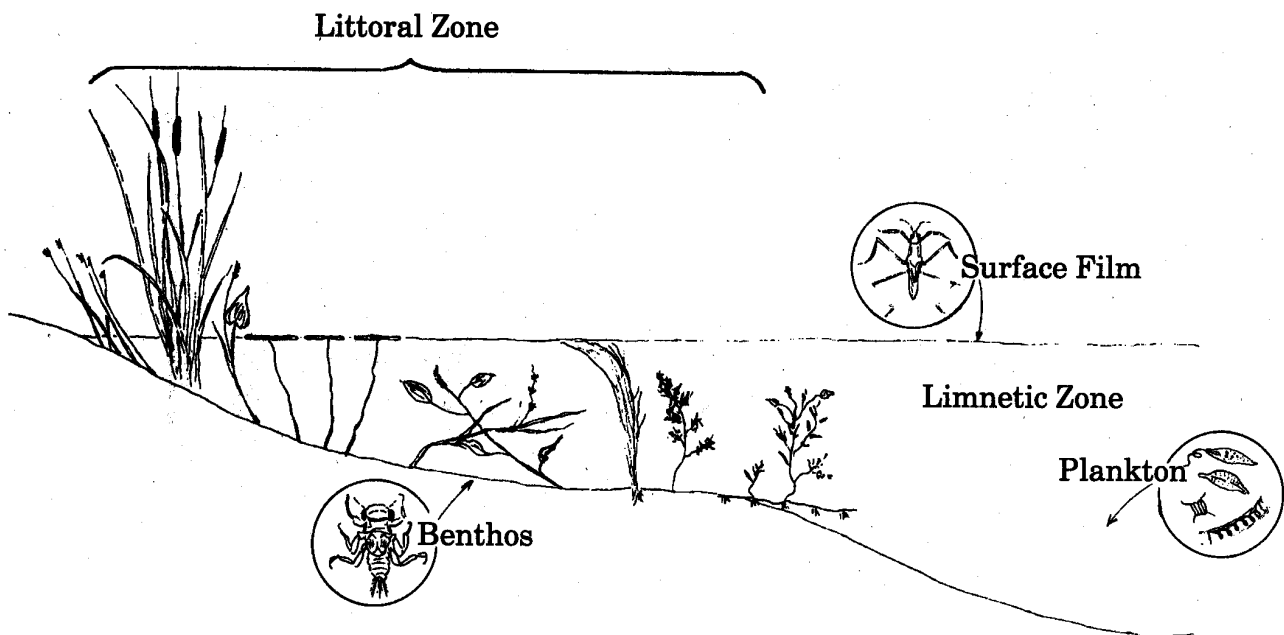
Surface film. This is the habitat of air-breathing, floating animals and those animals which can walk on the surface without breaking through. Many of the inhabitants of this zone are insects such as the water striders, water boatman, and whirligig beetles. The larvae of some beetles and flies, especially the well known mosquito larvae, rest on the underside of the surface film while poking their breathing tubes into the air. Plants, too, are found living on the surface film. Among the smallest and simplest flowering plants in the world are the duckweeds which live free-floating on the surface of ponds and lakes.

Littoral zone. This habitat extends from the shoreline outward as far as rooted plants grow. In most ponds, this area may

stretch from shore to shore. The community found here has the greatest diversity of plants and animals of all the pond. This habitat is used at some point by most of the animals in the pond, including insects, insect larvae, snails, young fish, birds, frogs, and snakes.

Limnetic zone. This habitat can also be called the open-water zone. Life here consists of large, free-swimming animals like the fishes and the plankton community, composed of tiny plants and animals that drift suspended in the water. (Phytoplankton and zooplankton).

Benthic zone. The benthic community is composed of organisms that live on the bottom. The muddy or silty bottom of most ponds is covered with organic debris. Many of the organisms found here act as detritivores or decomposers. These include the crayfish, mayfly and dragonfly larvae, many other insects, snails, mussels, earthworms, and, of course, bacteria. These animals, as decomposers, are very important in returning nutrients to the pond. Benthic animals are most numerous in the shallows. In this way, there is overlap between the benthic zone and the littoral zone.



Winter at the Pond

Winter has indeed arrived at the pond. Those who did not prepare or flee from its cold, icy breath will pay the price. Winter asks for no quarter, nor does it give any. Cattails lean from its icy gale, and the pond freezes deep. Fall is left behind: winter has claimed the land.

These are several strategies used by the pond dwellers for surviving winter, with its cold and ice. "Cold-blooded" animals can live in the coldest water as long as they are not trapped in solid ice. Fish, water insects, mollusks, and worms retreat to the deepest part of the pond to avoid being iced in. Their bodies cool as the water cools, requiring them to use less and less energy to survive on minimal amounts of food.

Cold water can hold more dissolved oxygen than warm water. Oxygen supplies are enriched by various types of water weeds which can carry out photosynthesis using the frosty sunlight that penetrates the layer of ice. Combine this with the reduced needs of the inactive animals, and there should be sufficient oxygen for life even when the pond

is iced over for days. Amphibians and reptiles take advantage of this condition and pass through the winter in a state hibernation.

Another strategy, adopted by the small water creatures, is to lay their eggs in the fall. Even though the adults will die, the eggs hatch in the spring to replenish the population.

As strange as it may sound, a layer of ice may be just the thing the pond habitants need to escape the bone-chilling temperatures of winter. Ice is a good insulator. When temperatures plunge for below freezing, this icy blanket can keep the water in the pond's depths a bearable few degrees above freezing.

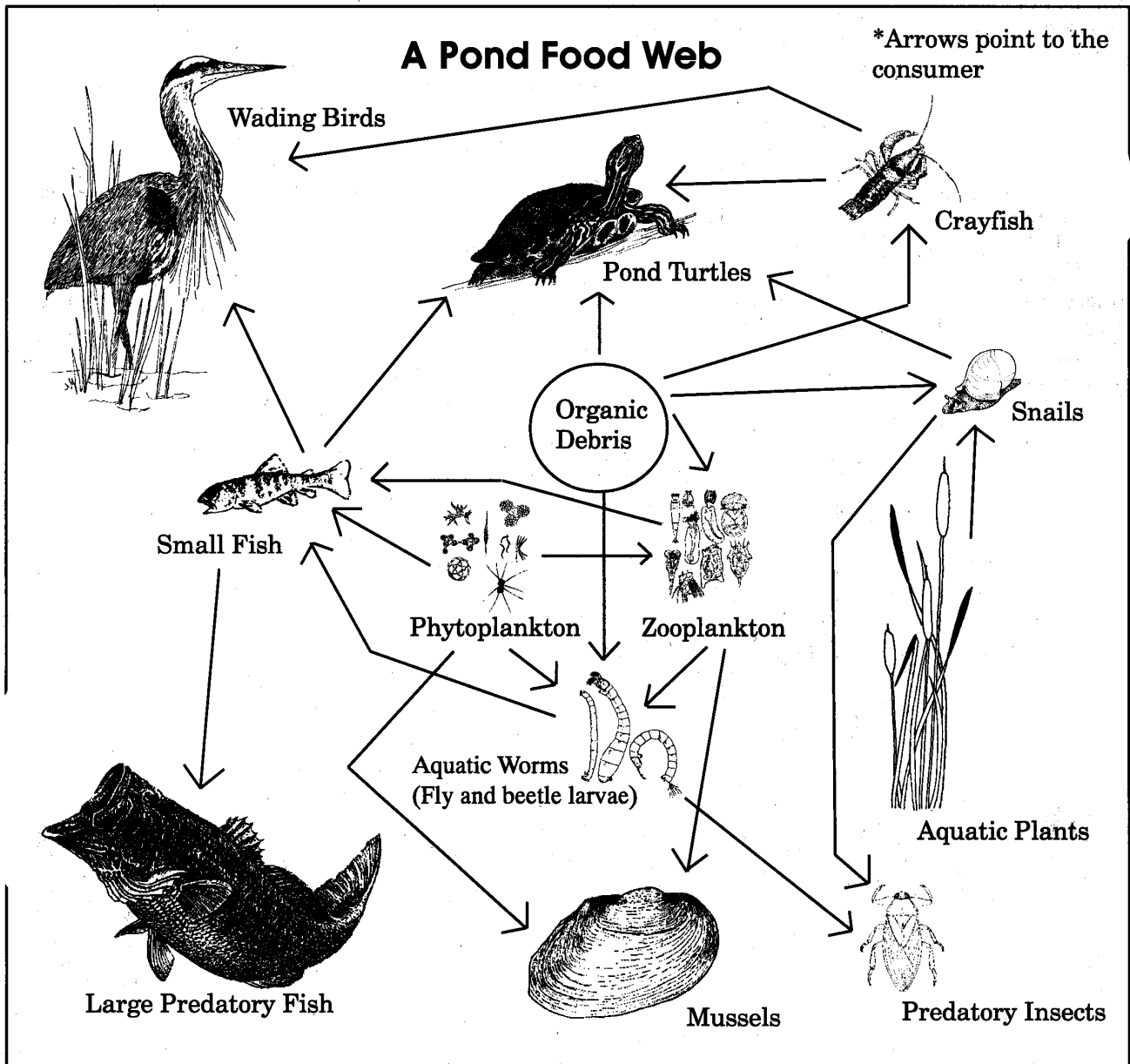
Many of the plants' leaves and stems have turned to crinkly brown ribbons, tattered by the wind and frost. The trees' greenery has been sucked from them by the wind, leaving twigs to rattle in the wind. However, renewed growth is already signaled by the buds that will unfold to make new leaves next year.



Decay is slow in the icy water. The debris that settled in the pond during fall forms blanket-like layers. They protect and insulate the small creatures and the winter bulbs of plants sandwiched between them.

Although the creatures of the pond have prepared diligently, they may fall prey to a "winter kill." Sunlight is required by the microscopic plants in the pond's water to produce oxygen needed by fish and other aquatic life. Oxygen can be eliminated quickly if the pond's icy surface is covered by heavy amounts of snow. The snow lawyer prevents

sunlight from penetrating the water and reaching the oxygen-producing plants. Over a long period of time, the underwater plants will die, and oxygen production will stop. The remaining oxygen will gradually be used up by the pond's aquatic animal life. Soon, fish will die. Their decaying bodies will use up more oxygen. Death will start with the larger predators and work itself down to the smallest organisms. A severe winter kill will carry the deadly silence of winter into spring for the pond it affects, maybe for years to come.



Spring at the Pond

As winter comes to a close, the days start to get longer and daily temperatures rise. Increasing day length (photoperiod) is perhaps the strongest factor in bringing about the rebirth of spring. For some animals, the activity begins as early as February.

As the day gets longer, the ponds water slowly warms from the sun's rays. Activity abounds with the pond becoming a musical theater as male amphibians and birds call to their mates. Photosynthesis begins again in earnest and plants begin to grow. Microscopic invertebrates, such as daphnia, hatch from their wintering egg stage. Aquatic insects, including dragonflies, damselflies, whirligig beetles, and water spiders reappear. Their presence means food for other hungry animals. Crayfish, salamanders, garter snakes, and others emerge from burrows. Leopard frogs, bullfrogs, red-eared sliders, and painted turtles dig out from the mud. The crayfish and turtles begin to feed on dead plant and animal material, cleaning up the pond. Migrating waterfowl and shorebirds return for the summer or just for a brief visit on the way to their summer

range. Muskrats and raccoons enjoy the new variety of food the emerging life adds to their diets, including the sunfish that move from the deeper water to the warmer, shallow waters to feed and set territories for breeding.

Spring is the time when many animals mate and have young. With most of their food stores depleted by the winter's end, a warm spring with abundant food is essential for animals to survive the energy drain of reproduction.

As spring progresses, you can walk the shores of the pond and listen to the birds calling while you spot fish guarding their nests, frogs hiding among the aquatic plants, and turtles sunning on logs. Look closely; these animals are well camouflaged in their habitats because they are countershaded, (an animal is darker on top and lighter on bottom). The darker top makes it hard for a predator looking down on the animal to see it against the dark pond bottom. Likewise, a predator looking up through the water cannot easily distinguish an animal



with a light underside against the sun. Even a turtle on a log can be hidden unless you pay close attention.

Turtles sun on logs for a specific reason: they use the sun's rays to help them digest their food. The warmth of the sun speeds up the digestion process for the cold-blooded creatures. You and your students can feel the energy of the sun much like a turtle does by sitting on a bench warmed by the sun, closing your eyes, and turning your face to the sun. Even on a cool spring day, you can feel the sun's warming energy.

If you picked up some algae from the pond and swirled it around in a jar of pond water, removed the algae, and let the water settle, you could see the tiniest of the pond inhabitants that have emerged from their winter sleep: daphnia, rotifers, scuds, planaria, larval dragonflies and damselflies, and others. Some are easy to see with the naked eye; others require close attention to spot their movement. Aquatic invertebrates may also be found on rocks or sticks. The pond teems with these tiny creatures, upon which so much other life depends.

Check This Out!

Here are some items which may help with your class' pond study! They are available for check-out from the Wildlife Education Service. Contact the Kansas Department of Wildlife and Parks, Reference Center, 512 SE 25th Avenue, Pratt, KS 67124 (620) 672-5911 for more information.

- #12-11PO** Ponds and Rivers: An Eyewitness Book- - large color photographs of freshwater plants and animals.
- #13-6** Edible? Incredible? Pond Life - - identification of plants and animals found near ponds. Contains descriptions and food recipes.
- CD-24** Odell Lake: Apple, 5.25" disk - - students determine the predator/prey relationship, the food web and the relationship among living things in a group of 12 organisms in a lake.
- M-6** Nature's Way: The Inland Pond (13 min.)- - this film takes a close-up look at pond water and its inhabitants, from small crustaceans to fish and amphibians.
- GK-11** Animal Clue: Freshwater Pond - - Nature card games about pond animals and their lives. Discover food webs and how the pond ecosystem works.
- LK-10** Ponds and Lakes - - Learning kit which includes activities such as "Animal Movement in Water," "Damsels and Dragons," "Water Breathers," and others.
- VT-168** The Secret of the Pond (12 min.) - - in this video, a group of children take a field trip to a pond to investigate its plant and animal life.
- LK-85** Discovery Scopes - - hand held magnifiers with a plastic compartment which can hold a water sample. Great for viewing aquatic critters!

AND THAT'S NOT ALL! Check a copy of the Reference Center Catalog for more aquatic items!



Summer at the Pond

Summer has come to the pond. The busy activities of food gathering and reproduction continue. Frog eggs can be found and birds can be seen on their nests or feeding their young. Goslings, hatched from a nearby nest hidden in the tall grass, can be seen closely guarded from predators by the goose and gander. Unlike geese, ducks do not share this duty equally. Hen ducks are often alone with their ducklings, resulting in many being taken by predators.

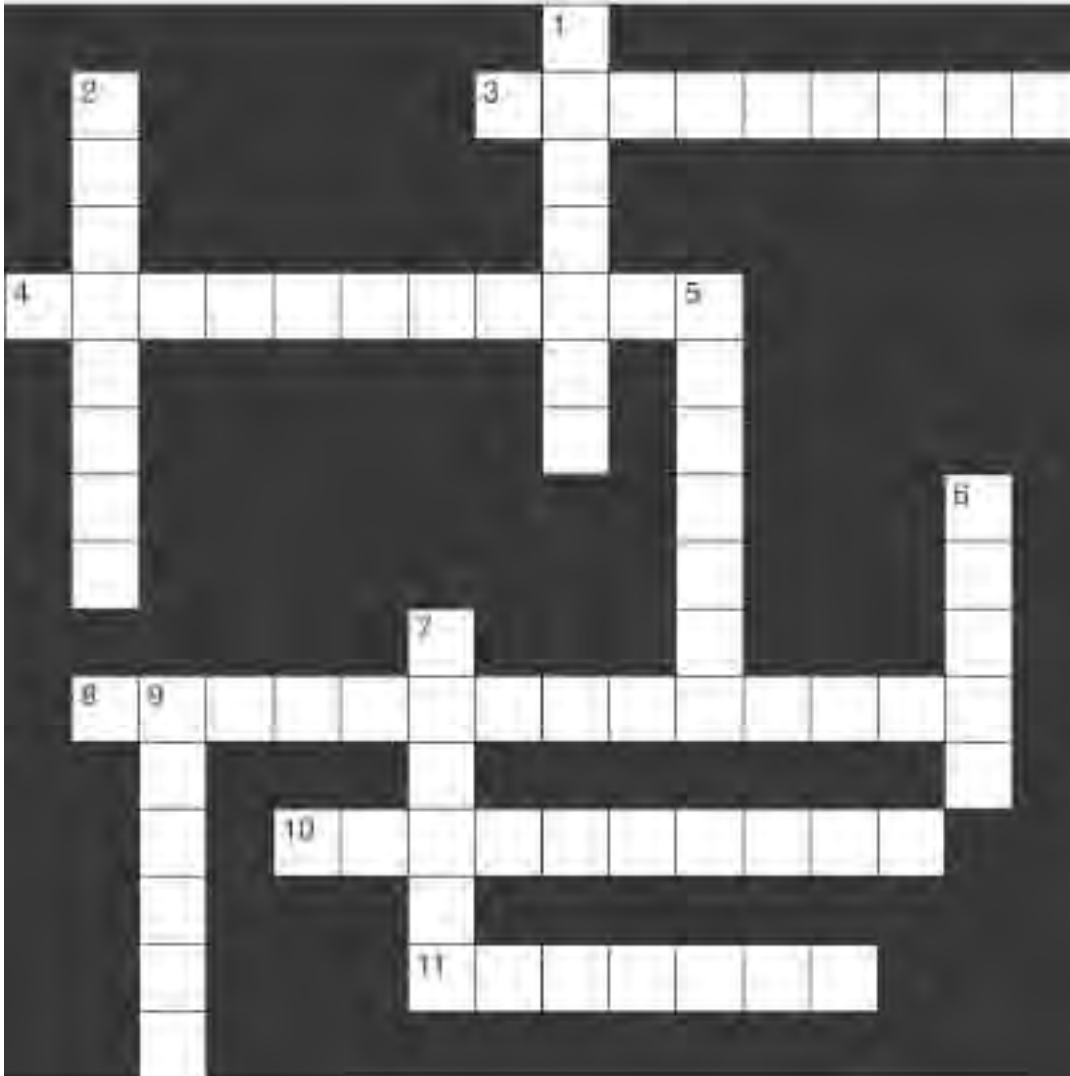
Summer can be a very productive time for the plants and animals of the pond, but just as a very cold winter can mean death, so can a summer that is hot and dry. In the pond, drought and oxygen depletion can wreak havoc. Problems can occur when the sun's rays uniformly warm the pond's water. Warm water holds less oxygen than cool water. A lack of fresh water from little or no rain and uniform warming can lead to an oxygen deficiency in the water. This can be compounded by two other activities. As water becomes more nutrient rich from increased activity of summer, aquatic plants can become over-

This increases the amount of dead plant material. The microbes that help break down the dead plants use more oxygen, depleting the oxygen stores. The result is a stagnant, unproductive pond which may trigger a fish kill (large numbers of fish found floating dead or gasping for air at the pond's surface). Animals able to travel may leave the pond to find fresher waters.

There are ways to beat the heat of summer, which can mean less animal activity for us to witness. Some animals may enter estivation, a type of summer hibernation in which body processes slow, requiring less oxygen and energy for survival. Turtles, frogs, and some invertebrates may do this by burying themselves in the cool mud. Many insects with water-dependent larval forms will complete metamorphosis to the adult form. Many other animals will become nocturnal, even if they are diurnal under cooler conditions. This allows the animals, such as snakes or lizards, to take advantage of cool twilight conditions for hunting. All are effective ways of combat-



Pond Puzzler



ACROSS

- 3 Active at night.
- 4 Length of day.
- 8 A type of camouflage used by many animals.
- 10 A sort of summer hibernation.
- 11 A common plant in Kansas ponds.

DOWN

- 1 A baby goose.
- 2 What may happen if warm summer pond water loses too much oxygen.
- 5 A kind of microscopic animal found in many ponds.
- 6 Male _____ call at night for mates.
- 7 Unmoving water is _____.
- 9 Cold water holds more _____ than warm water.



Autumn at the Pond

There is now a certain urgency in the activity of the living organisms in and around the pond. It is as if they know something is coming, and preparation is required. Daylight is decreasing, the air has a coolness to it, the sun is slowly moving southward. It is coming, be prepared!

Although the sun's rays may still be warm in midafternoon, the nights are becoming increasingly chilly. Fall has arrived, and the pond's wildlife is anticipating what is yet to come. The summer visitors are preparing to leave. The insect-eaters, such as marsh wrens and swallows, have already left. Because air does not have the heat-holding capacity of water, it is subject to sudden temperature variations. Thus, air-born insects, such as the adult dragonflies and damselflies, along with the hordes of mosquitoes, have disappeared. They can't survive what is coming. Blackbirds are forming large flocks. They still use the pond's cattails and bulrushes for refuge at night. They, too, are looking over their shoulders, for they know what is coming. Soon, they must migrate from the pond.

The summer birds have departed, but in their place are many waterfowl who readily accept the pond's invitation of a rich food supply and refuge. Even in the activities of these later arrivals, there is an urgency. They know their supply of food and shelter will fade away when it arrives.

The war for resources has been waged between the prairie vegetation and the pond plant community all summer. Often by early fall the vegetation of the prairie has the upper hand, as it is more able to deal with the punishing, dry heat of July and August. Only if October can supply its fog and gentle rains will the pond plants hold off the pressing forces of the prairie. Both armies know it will soon come. Because of it, they will rest and prepare to renew their battle lines in the spring.

The pond's frogs, toads, salamanders, and turtles also sense its approach. Their hiding places and food are gradually being whittled away as colder winds rattle the browning vegetation and strip the pond of its plant life.



These animals will seek refuge in the soft mud at the pond's bottom to hibernate.

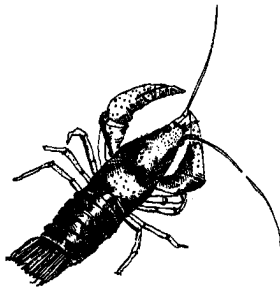
Many of the pond's plants are laden with seeds which will be scattered in the winds of fall or reserved to be relinquished with the arrival of spring. Many water plants, such as the water lilies and arrowhead, are already gone. They have drawn the nutrients from their leaves and stems down deep into their roots to wait out what comes. The rushes, cattails, and sedges are shedding their green colors for more sedate browns and yellows.

Leaves, twigs, and other debris blown or washed into the pond will shelter all kinds of small creatures. This layer of decaying plants will also supply nutrients to be recycled by new vegetation in the spring.

Insect larvae in the pond's water are building protective cases around themselves so they can survive to emerge next year as adults. With the falling temperatures, the pond's snails are moving even more slowly as they make their way to deeper water. Many of the pond's predatory fish have been on a feeding frenzy since early fall to build up their fat reserves.

The night's cold air assaults the pond's water, often leaving an ever-thickening layer of ice over its surface. The southern travelers are gone. A pheasant cackles, breaking the silence which drifts over the pond like a fog. It has arrived again: Winter.

Something's Fishy Here!



I	M	L	B	L	A	C	K	B	I	R	D
H	N	C	A	T	T	A	I	L	O	K	E
I	A	V	V	B	E	E	T	L	E	S	N
B	Y	R	E	M	M	H	X	G	O	A	K
E	M	O	O	R	U	V	E	O	I	T	S
R	I	T	X	Q	T	D	G	B	B	U	U
N	G	I	Y	K	B	E	I	B	I	R	N
A	R	F	G	L	K	H	B	Y	R	T	F
T	A	E	E	I	P	B	J	R	U	L	I
E	T	R	N	M	S	W	K	Z	A	E	S
Y	E	Q	A	M	I	N	N	O	W	T	H
D	R	A	G	O	N	F	L	Y	X	N	E



Can you find the words below hidden in this puzzle?

AMPHIBIAN
BEETLE
BLACKBIRD
CATTAIL
DRAGONFLY

GOOSE
HIBERNATE
INVERTEBRATE
MIGRATE
MINNOW

MUD
OXYGEN
ROTIFER
SUNFISH
TURTLE



Spotlight on Freshwater Mussels

If you want to collect dumbfounded looks from people, try bringing up freshwater mussels in conversation. “Freshwater what?”, someone will say. “Mussels! Why would they be in water?” If you want to carry this a littler farther, throw out some colorful names such as flat floater, Ozark pigtoe, pimpleback, or rock-pocketbook. Now, everyone will definitely know you are crazy!

Most people have never heard of the passive little freshwater creatures known as mussels even though there are nearly 300 species found in the streams, rivers, lakes, and ponds of the U.S. Their saltwater cousins— the oyster and the clam— are very well-known, especially for their delicious taste. So, what is a mussel?

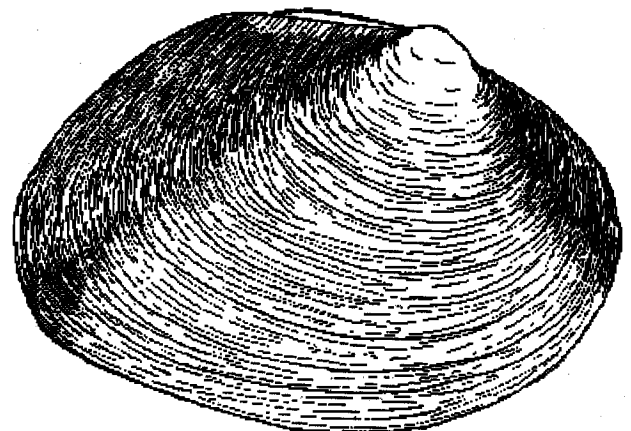
Mussels are soft-bodied animals surrounded by two hinged shells. They are found in th mud and sand at the bottom of ponds, lakes, and especially streams and larger rivers. Most are rare in water deeper than six feet. Mussels belong to a larger group of water animals with shells called mollusks. Mollusks include snails, clams, oysters, mussels, and a few that don't have shells like slugs and octopuses.

The shells of mussels are composed largely of calcium carbonate (limestone) which is extracted from the water and secreted by the mantle (fleshy tissue) surrounding the body. Needless to say, mussels are not abundant in acid waters (those with a low pH) since their limy shells would easily dissolve away. Shells exhibit a variety of shapes, markings, and colors. Mussels, no doubt, owe some of their wonderful names like pigtoe, elktoe, or pistolgrip to this variety of shape. Most are brown, green, or yellow in color on the exterior with pearly colors of white, pink, salmon, gray, or purple inside.

Inside the shell, the soft body consists of a large, muscled (not musseled!) foot for locomotion, gills for breathing, and a digestive tract.

Two openings, called siphons are located at one end of the shell. One siphon takes in water containing food and dissolved oxygen while the other siphon excretes wastes. The food of mussels consists of zooplankton, phytoplankton, and organic detritus which is filtered out of the water when it passes over mucous-covered gills. The mucous traps both edible and non-edible particles. Untasty items are flushed away with the wastes of the mussels. This filtering action of removing impurities and suspended particles is very important in improving the water quality and clarity of lakes and streams. For this same reason, mussels are affected drastically by siltation, mining and industrial wastes, and other water pollution. Mussel populations are excellent indicators of good water quality and are of unique ecological value as “bioindicators.”

North America has nearly 30% of the 1,000 species occurring worldwide. It is considered a “mussel treasure chest” by malacologists (shell-fish experts) who hold that America is one of the finest, last remaining strongholds for freshwater mussels on earth. Sadly, this is changing very rapidly. The abundance and variety of mussels has declined sharply in this century. Eighteen species are extinct, 55 are federally endangered or threatened and nearly 70 species are candidates for special protection. In Kansas, four species are considered extir-



pated (no longer found in the state) and ten out of the remaining 40 species are on the state threatened and endangered list. No other wide-spread group of animals in North America had been jeopardized like the freshwater mussels.

Most of these declines can be attributed to human activities such as dams and impoundments, channelization, and water pollution, especially spills of toxic wastes, pesticides, and fertilizers. Disease and over-harvest by commercial shellers are also contributing factors through not as significant as the changes in habitat. To make matters worse, native mussel species are being threatened by the introduction of the zebra mussel. Zebra mussels were originally found in Europe but have spread by hitching rides

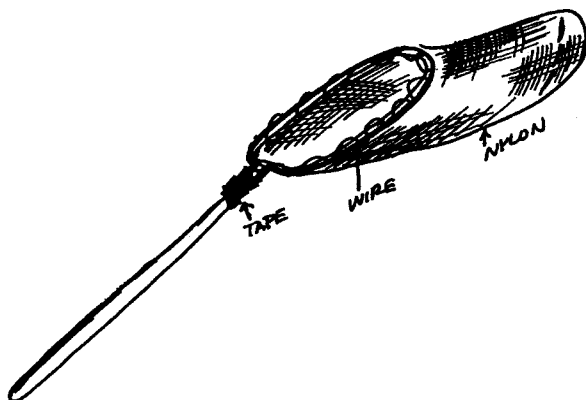
in ballast tanks of ships and boat motors and bilges of smaller boats. They are not in the Mississippi and found recently to be in the Arkansas River at the border of Arkansas and Oklahoma. Because of their ability to reproduce in large numbers (one female can produce 100,000 eggs per season), zebra mussels can smother native freshwater mussel beds.

Conservation and recovery projects to artificially culture, re-introduce, and improve the habitats of freshwater mussels are underway and need our support. Starting a stream adoption program or reporting water pollution problems will go a long way in helping mussel populations recover. Just learning about this little-known creature is the first step.

Homemade Equipment for Pond Study (have your students help!)

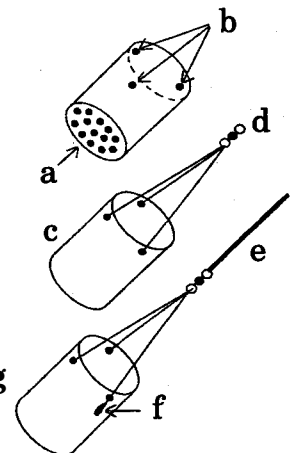
Insect net or plankton tow:

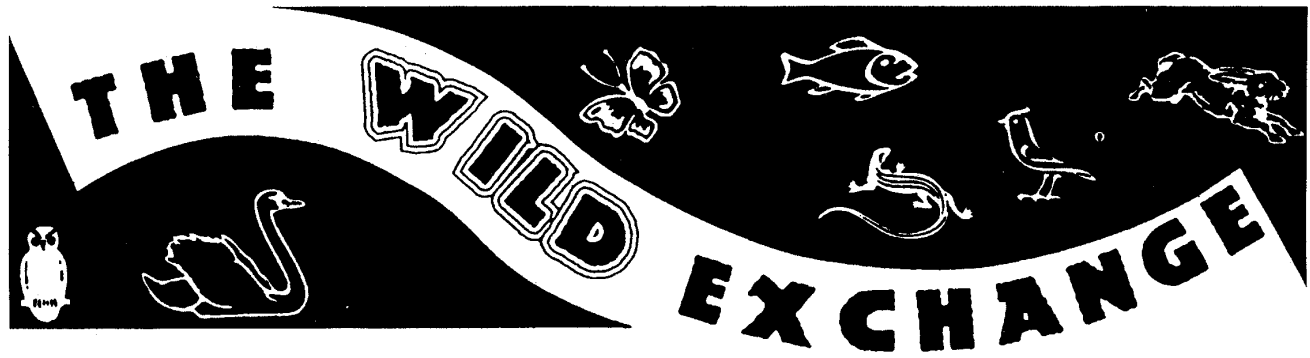
You will need nylon stockings, heavy wire or old coat hangers, old broom handles or one-inch wooden dowels, duct tape, needle, and thread or yarn. Cut the legs off the nylons and save. Bend the wire into a circle and close it with a straight "neck." Tape the neck securely to the end of the stick. Stretch the stocking over the loop, roll the edges to encase the wire and sew. Use this to catch insects on land or scoop it lightly along the surface of the water to catch tiny water animals.



Bottom dredge:

You will need one empty coffee can with one end removed, medium-weight wire, a large brass fishing swivel, and 8-oz. lead sinker, 25 feet of heavy cord, hammer and nail to make several holes in the bottom of the can (a). Make three equally-spaced holes in the side of the upper edge of the can (b). Cut three 8-10 inch lengths of medium-weight wire. Attach each piece of wire to one of the three holes at the tip of the can (c). Attach the fishing swivel to the wires where they come together (d). Attach the heavy cord to the swivel (e). Attach the lead sinker to one side of the can (f). To use: toss the dredge into the water and let it settle to the bottom, holding the free end of the cord. Retrieve the dredge, pulling it along the bottom. Examine the mud and debris in the can, looking for small bottom-dwelling creatures.





Your Source for Project WILD Information in Kansas

Wildlife Education Service Resources Update

It has been some time since we have given you an update on the resources available through the Wildlife Education Service. Our goal is to provide you with the best resources possible. We truly appreciate the support you have given us over the years, and will try to meet your expectations to the fullest that our funds and time will allow.

There is no denying the fact that the number of resources we presently offer has decreased. Our staff is facing three major problems: we are struggling with the increasing demand for our resources, the increasing production costs stemming from the increased demand, and a lack of staff hours to update present resources or develop new ones. In the paragraphs that follow, you will find updates on new resources and also a string of resources no longer available due to budget and time constraints.

The third revision of Nature's Notebook has just been completed. Thirty-five new activities/instructional aids have been added since the last major revision in 1991. Due to increasing demand and production costs, the three-ring binder which housed this publication has been replaced. The present Nature's Notebook will be housed between two heavy card stock covers with aluminum rebuts holding contents together.

In the last year the Reference Center Catalog has been revised for the second time since its considerable revision in 1991. Over 2,500 items are listed in the catalog, from

resource books to computer programs. We have also gone to a different format with the housing and binding of this resource because of cost.

Our student booklet (grades 1-6) supply is just about exhausted. We have less than 300 fourth grade booklets, 1,000 fifth grade booklets, and 2,000 sixth grade booklets. There are no preschool to third grade booklets available. The good news is we are in the final stages of completing a portion of the new student/teacher booklets for preschool to sixth grade. The Lower Primary Booklet (preschool to third grade) will be available in the spring of 1996. It is a combined teacher's guide and student activity booklet. The Upper Primary Booklet (grades 4-6) should be available in the fall of 1996. We will have special features on both of these resources in upcoming issues of On T.R.A.C.K.S.

Our seventh to twelfth grade student/teacher guide, Partners With Wildlife, has been out of production for several years. There is no cost effective way we can reproduce Partners With Wildlife in its original format. Plans are under way to determine how we can use sections of this excellent resource.

Another resource which has been exhausted is "3-D Patterns of Kansas Plants." For years, this resource sat on our warehouse shelves gathering dusts. Suddenly, it became the "hottest" item we



had! The future of this resource is undecided as, again, production cost is a major problem. This publication is also in need of major updating.

Neat Resources!

WILD School Sites: A Guide to Preparing for Habitat Improvement Projects on School Grounds

Outlines the steps for planning and developing a WILD or OWLS site. Includes activities which can be used in coordination with your site development. Write to: Wildlife Education Services, 512 SE 25th Avenue, Pratt, KS 67124.

Taking Action: An Educator's Guide to Involving Students in Environmental Action Projects

Provides a broad overview for involving students in environmental action projects. Includes summaries of thirty "success stories," from protecting and developing habitats, to planning community gardens. Also lists national student organizations, fundraising programs, and other resources to help incorporate student action into your teaching. Write to: Wildlife Education Service, 512 SE 25th Avenue, Pratt, KS 67124.

Harmony, People, and Places

Focuses on the importance of individuals and communities working together to create

harmony between people and places. The kit includes an educator's guide, a pre-K through third grade activity guide, a fourth through sixth grade activity guide, and a poster. Free! Contact your local conservation district or the NACD Service Center at 1-800-825-5547.

Helping Endangered and Threatened Species

An educational packet offered by the U.S. Fish and Wildlife Service which contains suggestions for ways in which children can help wildlife. Free! Contact USFWS, Branch of Education, 4401 North Fairfax Drive, MS304 Webb, Arlington, VA 22203.

Bat Conservation

Learn to help these furry, flying insect-eaters with information on bat houses and an adopt-a-bat program. Free! Contact Bat Conservation International, PO Box 162603, Austin, TX 78716-2603.

Free Seeds!

America the Beautiful Fund is providing free seeds for school and community projects in bulk for only the cost of shipping and handling. For an application form, send a stamped, self-addressed envelope to: America the Beautiful Fund, Dept. W, 219 Shoreham Building, Washington, DC 20005.

Adopt-an Acre Teacher Guide

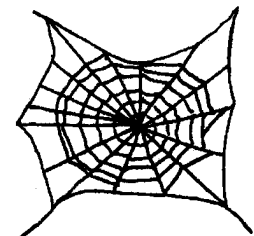
Free from the Nature Conservancy; call 1-800-628-6860.

A New Video From the Kansas Department of Wildlife and Parks

Kansas Outdoor Wonders, VHS, 20 minutes All ages, #VT-294

This video introduces the viewer to a brief yet beautifully inspiring look at some of the most spectacular wildlife native to Kansas. Species found in wetlands, prairie, and woodlands are included. This video would be excellent used to initiate a study unit on Kansas Wildlife and habitats found within the state. Contact the

Kansas Department of Wildlife and Parks, Reference Center, 512 SE 25th Avenue, Pratt, KS 67124, (620) 672-5911 for more information.



They are Waiting For You!

“They” are award winning, interdisciplinary programs which provide hands-on experiences. Just waiting for you to give them the opportunity to show how you can develop a greater understanding and awareness of the environment within your students. Project WILD, Project Aquatic, and Project Learning Tree are outstanding curriculum guides which teach ecology, conservation, and the importance of our natural resources.

These three programs address the need to develop responsible citizens with good problem-solving and decision-making skills. The programs also teach about ecological values and the functioning of ecosystems. They provide the motivation and confidence required to take responsible action on behalf of the

environment. We can make a difference in maintaining, improving, and ensuring the quality of our natural resources if shown the process.

It is not easier than ever to attend a Project WILD, Project Aquatic, or Project Learning Tree workshop. We have initiated a new program which directly contacts you is a workshop is occurring in your area. By filling out the information sheet on the last page of this newsletter, you will receive a postcard informing you of the date, time, place, and contact person whenever a workshop is scheduled within a 75-mile radius of your home address. Don't delay— fill out today so that you will be ready to make hay when the workshop season begins in May (actually, March and April, but that doesn't rhyme!). You will be glad you did, and so will your students.

Is it an eagle? Is it a falcon? No, it's a hawk!

How can you identify the common birds of prey in Kansas? This short guide should provide you with a starting point.



FALCONS

(*i.e. Peregrine Falcon*)

have long slender wings which come to a point. In flight the wings form an angle at the wrists. They also have a rapid wing beat. Their bodies are sleek with a rounded head and long, narrow tails. Many falcons have noticeable markings on their faces, such as the two cheek “sideburns” of the kestrel.



BUTEO

(*i.e. Red-tailed Hawk*)

are called the soaring hawks due to their characteristic hunting strategy of soaring high over open country, then suddenly dropping to the ground to seize their prey. They have blocky bodies, broad wings, and rather short tails.



ACCIPITERS

(*i.e. Cooper's Hawk*)

are known as the woodland hawks. They have short, wide wings and long, often barred tails. They are well-adapted for maneuvering quickly among trees in pursuit of birds and small mammals.



EAGLES

(*i.e. Golden Eagle*)

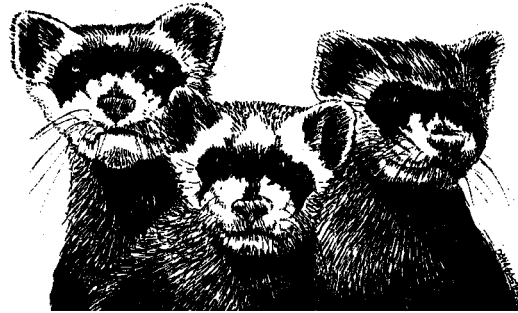
are very large, both in their body and their wings. They often soar at great heights and have a slow, deliberate wing beat.

Winter is an excellent time to observe birds of prey. Kansas is often visited in winter by hawks from the northern states seeking a better food supply. Later in the season, look for early migrants from the south.



A Grand Old Lady

Jezabelle was a legend in her time. The last of the eighteen original wild black-footed ferrets removed from Meeteetse, Wyoming, Jezabelle lived in the Wyoming Game and Fish breeding facility at Sybille for eight years, until she died in 1995. She was captured as a youngster with her mother and four little mates in 1986.



Over 450 kits (young black-footed ferrets) have descended from Jezabelle and her offspring. Ferrets raised in the captive breeding program have been released in Wyoming, Montana, and South Dakota. Each year kits have been born in the wild as

a result of these releases. Currently, There are about 370 ferrets in the captive breeding program. Through the efforts of this program, one of the most endangered mammals in North America may soon re-establish thriving populations in the wild.

Ozark Ecosystems Workshop

The Ozark Ecosystems Workshop was held September 22-24 in Branson, Missouri. Over 65 participants from Kansas, Missouri, Arkansas, and Oklahoma broadened their knowledge regarding the hydrology of the Ozarks, cave biology, bats awareness, glade ecology, and the composition of an upland forest. Project WILD, Project Aquatic, and Project Learning Tree facilitators, along with educators who have participated in any of these workshops in the last two years, were eligible to attend.

The workshop was headquartered at the Woods Resort in Branson. Instructors for the workshop were Tom and Kathy Aley (internationally-known hydrologists), Pat Knighten (Arkansas' Project WILD Coordinator), Frances Main and Bruce Palmer (Missouri Department of Conservation), and Connie Elpers (Wichita WILD). The workshop was sponsored by the Bass Pro Shops and the Missouri Department of Conservation.

The four states would like to sponsor similar workshops on a yearly basis. The state of Kansas is interested in sponsoring the workshop for 1996. More information will be forthcoming in this newsletter.

Environmental Award

Have you sponsored an environmental awareness or action project? You could win \$500 to continue your work! The Albert Schweitzer Environmental Youth Award is presented annually to individuals or groups of students between the ages of 12 and 18, who have worked in the community to effect positive environmental change. It is presented by the Albert Schweitzer Institute for the Humanities, a non-profit organization dedicated to promoting the legacy of Dr. Schweitzer through programs of education, outreach and humanitarian aid. The award reflects Dr. Schweitzer's ethic of Reverence of Life, which emphasizes each person's responsibility to all forms of life on our planet. The application deadline is March 1, 1996, and winners will be notified April 15, 1996. For more information or an application, write to: The Albert Schweitzer Institute for the Humanities, PO Box 550, Wallingford, Connecticut, 06492-0550.

