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Teaching Resources Activities and Conservation to Kansas Students

VOL. 3 NO. 2 KANSAS WILDLIFE & PARKS WINTER 1991-92

THREATENED AND ENDANGERED

KANSAS WILDLIFE HERITAGE MONTH IN MARCH CELEBRATES ENDANGERED SPECIES. WE DEDICATE THIS ISSUE TO THOSE SPECIES STRUGGLING TO SURVIVE

The Species Spotlight shines on our American Symbol the Bald Eagle -- search page 11.

Cruise for foxes!! Western Kansas students can assist Kansas Wildlife & Parks with a survey -- check out page 13.

Learn about three federally endangered species that occured (and may occur) in Kansas -- page 4.

Fun & Games -- pages 8 and 12.

What Can You Do?? See page 9.

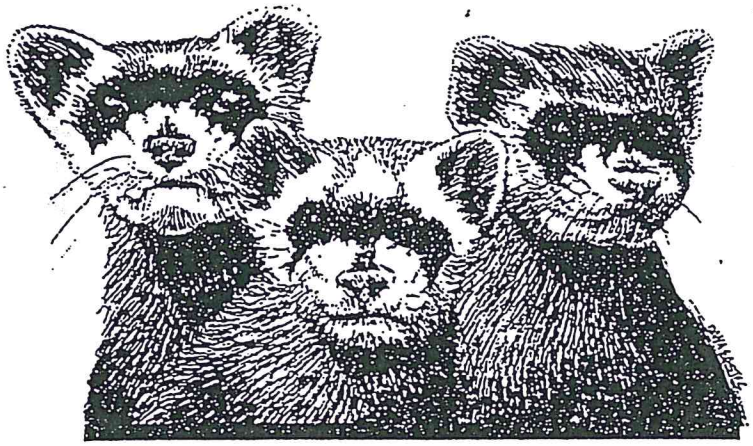
Quick reference for educators -- look at pages 14 and 15.

ENDANGERED OR THREATENED??

Kansas is blessed with many varieties of animals and plants. We sometimes forget the hundreds of species of animals and plants which are gone from the face of the earth. We overlook those plants and animals which struggle to keep a foothold in our state -- at times just barely holding on.

"Endangered" species are plants and animals facing the prospect of disappearing -- becoming extinct. "Threatened" species are in peril of becoming endangered. This system allows us to carefully monitor certain species to attempt to save them from extinction.

There are currently 47 animals on the Kansas Threatened and Endangered Species list. Most are threatened due to habitat changes. Changes in habitat result from changes in food, water, shelter and space available for wildlife. All wildlife need the right combination of these necessities. Without them, the area becomes uninhabitable for wildlife.



Some may ask, "What difference does it make?? What if the peregrine falcon or the Arkansas darter would disappear from the list of Kansas wildlife??" The answer is so simple it is easily overlooked in our rushed world of high-tech and social complexity. Every plant and animal in nature has a role to play in keeping the earth alive and habitable. Their role may directly relate to our lives by providing food at the bottom of a food chain or producing the oxygen we require every second of our existence. The earth is a living interacting system, only as healthy as its individual parts.

Wildlife is a valuable indicator of the total health of this interdependent system, often suggesting an ailing environment long before we realize anything is amiss.

Humans, as the dominant animal on earth, have the awesome power to control the fate of other organisms. We need to raise our stewardship role to a higher consciousness level. We must gain a better understanding of Kansas wildlife and their habitat needs if we are to fulfill our obligation as protector and enhancer -- rather than continue as an abuser and plunderer.

Extinct (ik-stingkt') *adj.* 1. Extinguished or inactive: *an extinct volcano.* 2. No longer existing or living. 3. Lacking a claimant; void: *an extinct title.* 4. No longer in use: *an extinct custom.* [ME<Lat. *extinguere*, to extinguish.]

Endangered (en-dan'jer) *adj.* Faced with the danger of extinction: *an endangered species.*

Threaten (thret'n) *v.* **-ened, -en•ing, -ens.** *--tr.* 1. To express a threat against. 2. To serve as a threat to; endanger. 3. To give signs or warning of; portend. 4. To announce as possible: *threatened to move out of town.* *--intr.* 1. To express or use threats. 2. To indicate danger or other harm. **--threat'en•er** *n.* **--threat'en•ing•ly** *adv.*

KANSAS' ENDANGERED AND THREATENED WILDLIFE

ENDANGERED SPECIES

Invertebrates

Amphibious snail
Flat floater mussel
American burying beetle*

Fish

Speckled chub
Sicklefin chub
Pallid Sturgeon*
Arkansas river shiner

Amphibians

Cave salamander
Graybelly salamander
Grotto salamander

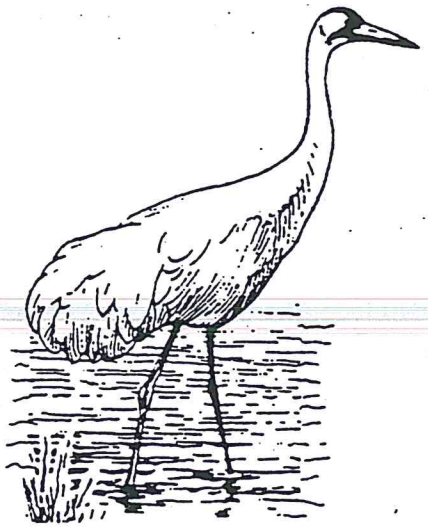
Birds

Bald eagle*
Black-capped vireo*
Peregrine falcon*
Eskimo curlew*
Whooping crane*
Least tern*

Mammals

Black-footed ferret*
Gray myotis (bat)*

* Specie also occurs on the Federal List of threatened and endangered species.



THREATENED SPECIES

Invertebrates

Scott riffle beetle

Fish

Chestnut lamprey
Redspot chub
Hornyhead chub
Arkansas darter*
Neosho madtom*
Silverband shiner
Flathead chub

Amphibians

Northern crawfish frog
Green frog
Strecker's chorus frog
Western green toad
Eastern narrowmouth toad
Northern spring peeper (frog)
Dark-sided salamander
Central newt

Reptiles

Western earth snake
Eastern hognose snake
Checkered garter snake
Northern redbelly snake
New Mexico blind snake
Kansas glossy snake
Texas longnose snake
Texas night snake
Broadhead skink (lizard)

Birds

Snowy plover
White-faced ibis
Piping plover*

Mammals

Eastern spotted skunk

ENDANGERED MEANS THERE'S STILL TIME

For some species of endangered wildlife, time seems to be on their side. Recovery efforts to save a number of today's endangered species have been underway for close to two decades. Researchers have made remarkable strides in the "art" of breeding animals. Species close to extinction that have been helped include the peregrine falcon, bald eagle, black-footed ferret, whooping crane, California condor, and others. Let's take a closer look at some of the endangered species recovery programs.

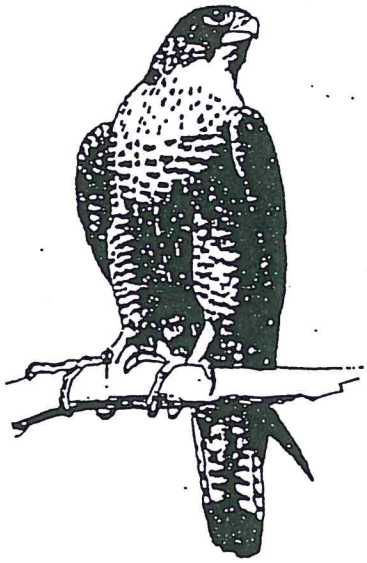
Peregrine Falcon

This crow-sized falcon, considered to be the fastest flying bird in the world (it can dive after prey at speeds exceeding 200 mph!!), was once widely distributed in North America. By 1970 only about 10% of the original population still existed. The major cause of this decline can be traced to the widespread use of pesticides, particularly DDT. DDT, like many pesticides, becomes more concentrated with each link of the food chain (i.e. from plant-eating insects to insect-eating birds to bird-eating peregrine falcons). High DDT levels reduced the level of calcium in the falcon's body causing the female to lay very thin-shelled eggs. These eggs usually broke during incubation.

A recovery program for the peregrine began in 1975 and the first efforts involved hatching wild eggs in the laboratory and returning the chicks to the nest to be raised by the wild parents. Captive-reared chicks were also released in areas that used to be home for the peregrines. The chicks were fed meat until they learned to hunt on their own. Many of these peregrine chicks were lost to predators, particulary great-horned owls. That is when researchers began looking at introducing peregrines in a most unlikely place -- big cities. Cities contain tall buildings (like cliffs) for nesting, abound in pigeons (a favorite food) and are relatively free of predators (like the great-horned owl).

Today, peregrines have been released in over 20 cities including Chicago, St. Louis, Denver and Kansas City, MO. Researchers have now confirmed about 1200 pairs of birds living in the wild in this country -- more than four times as many as a decade ago. The peregrine recovery program has been the most dramatic and successful of all national endangered species programs and efforts for other endangered species have been modeled after the peregrine.

Things are looking up for the peregrine. There is talk of reducing its status to threatened. Although DDT has been banned from use in the U.S. since 1972, it is still used extensively in South America where peregrines migrate in the winter. Consequently, the effects of DDT are still being observed.



Not a common sight in Kansas, most sightings occur when these falcons pass through during migrations (mid-July to February). While peregrines do not nest in Kansas, a statewide restoration program could be in the works if enough funding becomes available.

Other raptors (birds of prey) suffered the same effects from DDT as the peregrine. The banning of DDT also helped the bald eagle (see Species Spotlight) and osprey. Bald eagle recovery programs have included captive breeding of eagles and reintroducing the young into the wild. Ospreys have been helped by constructing artificial nesting platforms in suitable areas.

Black-footed Ferret

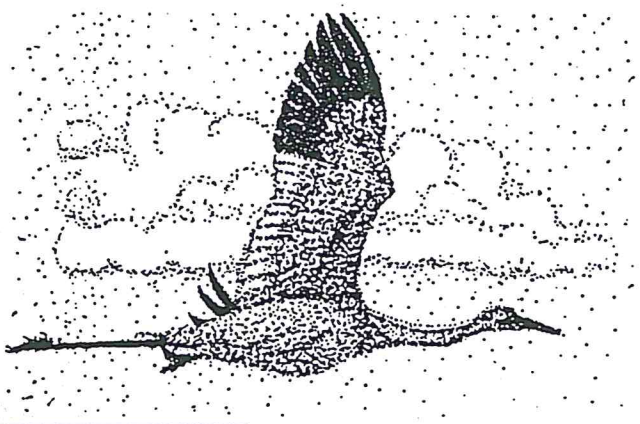
Although never considered abundant in its range, the black-footed ferret was common on short and mid-grass prairies from Canada to Texas. They became endangered when prairie was converted into cropland and due to the poisoning of its main food, the prairie dog. The last verified sighting in Kansas occurred in December of 1957. In other prairie states, the black-footed ferret was in a similar predicament. In 1979 the last two known ferrets died in captivity. Just when it seemed all was lost, a population of black-footed ferrets was re-discovered in 1981 near Meeteetse,

Wyoming. An outbreak of canine distemper in 1985 reduced this population to 18. It was decided to capture all the remaining wild ferrets in hopes of producing offspring in captivity.

A very intensive and delicate breeding program was undertaken and efforts paid off. After 5 years, the population climbed to 325. This fall, 49 ferrets were released back into the wild near the town of Medicine Bow, Wyoming. It is too soon to determine the success of this reintroduction. The U.S. Fish and Wildlife Service hopes to have 1,500 ferrets back in the wild 20 years from now in at least 10 different locations.

Will the ferret return to Kansas?? Prospects for ferrets in Kansas remain bleak. Nearly all land in Kansas is privately owned and most landowners support activities to control prairie dogs. If the captive breeding program meets its high expectations, marginal habitat areas, like Kansas, will be considered.

Another endangered species, the California condor (the rarest bird in North America) has endured the same fate as the black-footed ferret. Today, all remaining wild California condors (three total) have been placed in a captive breeding program along with the 21 condors already in zoos. The causes of the condor's plight include contamination by DDT, poisoning with bait intended for coyotes, shooting, and habitat destruction. In 1992 three California condors will be released back in the wild.



Whooping Crane

Whooping cranes are magnificent white birds of marshland areas known for the graceful dance they perform during mating. Whooping crane numbers reached an all time low of 19 birds in the late 1940's. The main factor contributing to the whoopers decline was the draining and filling in of wetland areas to provide more land for farming and housing. Many cranes were also shot -- mistaken for large geese.

One of the first actions taken to help the whooping crane was to set aside the Aransas National Wildlife Area in Texas as a wintering area. In 1967, biologists began to remove one of the two eggs laid by whoopers and hatch it in captivity at a research center. Though both eggs laid in the wild usually hatched, only one chick survived. The resulting captive flock at the research center matured and began laying new eggs. These eggs are being taken and placed in the nests of non-endangered sandhill cranes. Sandhill cranes become foster parents to the whoopers. Today there are more than 200 whooping cranes, 40 of which are in captivity. While still endangered, there are eight times as many whoopers as in the 1940's.

Whooping cranes migrate through Kansas using areas like Cheyenne Bottoms and Quivira Refuge as resting stops. Unfortunately, they generally spend only one night before they are off again.

A tremendous amount of money, time, dedication and education is needed to keep a species from extinction. The most important factor in the survival of a species is the protection of its habitat. All the money in the world will not save a species if it no longer has a place to live. If species are to survive into the 21st century, we must all become more aware of our environment and the role each species plays. No organism on earth, not even humans, can survive if all other organisms disappear. The loss of diversity, through the loss of endangered species and habitat is the biggest threat facing our earth. And, every time a species becomes extinct what have we lost?? How many cures to diseases will go undiscovered?? What will we be taking away from our children?? Extinction is an act of awesome finality.

THREATENED & ENDANGERED Reference Center Materials:

16 MM Films and Video Tapes

M-8	A Great White Bird (Whooping Crane) Int.-Adult (51 min.)
M-28	Prairie Killers (Black-footed Ferrets) Adult (30 min.)
M-31/VT-7	The American Bald Eagle Int. -Adult (16 min.)
M-69	We Can Save the Eagle Int.-Adult (29 min.)
M-91/VT-16	Protecting Endangered Animals Int.-Jr. High (15 min.)

Filmstrips

FS-1B	Endangered Species Jr. High-Adult (13 min.)
FS-2	World of Endangered Wildlife Int. & up (22 min.)
FS-21	Un-Endangered Species Jr. High-Adult (19 min.)
FS-26	We Care About Eagles Int.-Adult (15 min.)
FS-35	Endangered Species-Special Report Jr. High-Adult (25 min.)
FS-38	Vanishing From the Earth Grades 5-9 (16-17 min. ea.)

Slide Shows

SS-22	Rare and Endangered Animals All Ages (10 min.)
SS-32	Kansas Threatened & Endangered Wildlife Int.-Adult (20 min.)

Game Kits

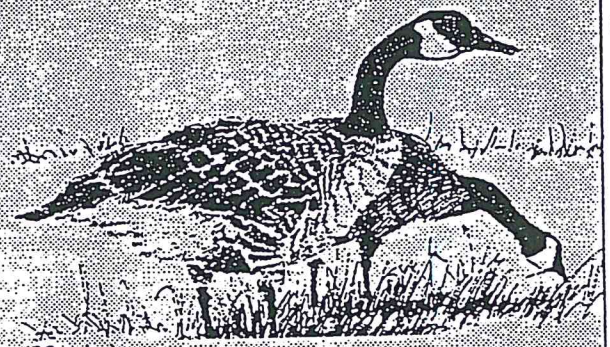
GK-2	Extinction: The Game of Ecology Jr.-Sr. High

Books

3-7	The Bald Eagle 4th Grade-Adult
14-5	Endangered Means There's Still Time
14-9	Teaching About Endangered Species Jr.-Sr. High
14-10	Endangered Species Packet

Posters

PP-16	We Care About Eagles
PP-27	Trumpeter Swan
PP-35	Black-footed Ferret
PP-46	Kansas Endangered Wildlife



COMEBACK ANIMALS Reference Center Materials:

16 MM Films and Video Tapes

M-24/VT-104	Return of the Wild Turkey All Ages (32 min.)
M-100	Bluebirds...Bring Them Back K-4 (20 min.)
M-102	The Greater Sandhill Crane Story K-Jr. High (16.5 min.)
M-115	In Celebration of America's Wildlife Jr. High-Adult (57 min.)

Filmstrips

FS-21	Un-Endangered Species Jr. High-Adult (19 min.)

Slide Show

SS-4	Wild Turkeys in Kansas Jr. High-Adult (20 min.)

Video Tapes

VT-93	Deer in Kansas High School-Adult (20 min.)
VT-96	Kansas Wildlife: The Comeback Continues Jr. High-Adult (21 min.)

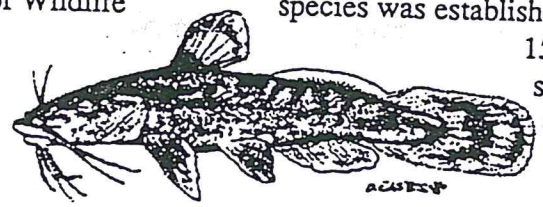
Books

12-8	Restoring America's Wildlife Sr. High-Adult

HOW DO THEY RATE??

Kansas is fortunate to have a rich diversity of wildlife species and habitats. For the most part, Kansas wildlife are thriving.

Unfortunately, some species are not faring so well. One-hundred and four fish and wildlife species currently occupy the Endangered, Threatened or Species in Need of Conservation list (E/T/SINC). The Kansas Department of Wildlife and Parks, under authority of the State's Nongame and Endangered Species Conservation Act, maintains the list, which is updated every five years.



At any time, however, a species can be petitioned to be added to, removed from or moved within the E/T/SINC list. The most recent update began in 1991 when a seven-member task force was appointed to establish procedures and oversee the process. The initial step was to define criteria and methods for listing an animal.

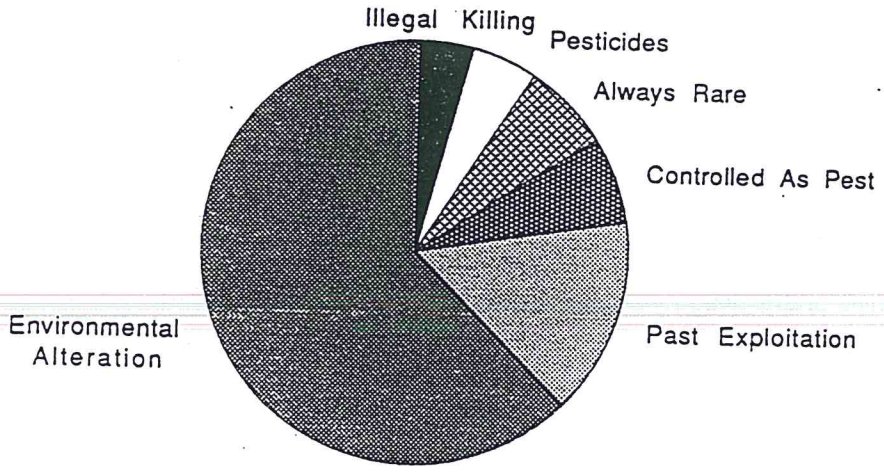
The task force decided that for a species to be considered, supporting scientific data and documentation must accompany all petitions. A mailing list of 180 individuals, companies and organizations that may be interested in petitioning a species were sent forms. From this effort, 49 species were petitioned. Six were reptiles or amphibians, six were fish, six were birds, 26 were mussels and five were insects.

The next procedure was to objectively evaluate each of the petitioned species by rating them numerically. A group of 150 individuals who had knowledge of one or more of the petitioned species was established to rank the species. These 150 raters were to evaluate each species from 0 (species in no danger) to 10 (species near extirpation) in 17 different categories. These categories incorporated questions on population and habitat status and species vulnerability. From these numerical evaluations a species was put into the Endangered, Threatened or Species in Need of Conservation category or was not considered a candidate.

The third step in the process was a final review by the task force, which looked at each of the species and all the available information to make a final recommendation.

These recommended changes in the E/T/SINC list will be presented to the Kansas Wildlife and Parks' Commission in the spring of 1992.

FACTORS THAT CONTRIBUTE TO ENDANGERMENT OF WILDLIFE



TEST YOUR ENDANGERED WILDLIFE IQ

____Bluegill

____Mule deer

____Gray bat

____Cave salamander

____Coyote

____Bald eagle

____Copperhead

____Beaver

____Lesser prairie chicken

____Peregrine falcon

____Bobcat

____Great blue heron

____Riffle beetle

____Ring-necked pheasant

____Great horned owl

____Swift fox

____Armadillo

____Black-footed ferret

____Black-tailed prairie dog

____Channel catfish

____Topeka shiner

____Arkansas darter

____Elk

____Sicklefin chub

____Grotto salamander

____Mourning dove

____Prairie falcon

____Canada goose

____Wild turkey

____Walleye

____Bobwhite quail

____River otter

____Bluebird

____Central newt

____Red fox

____Whooping crane

____Heel-splitter mussel

____Meadowlark

____Muskrat

____Barn owl

____Bison

____Least tern

____Pronghorn antelope

____Northern crawfish frog

DIRECTIONS: If you think a species is endangered mark an "E". If you believe the species is threatened mark a "T". Leave the others blank.

GOING BEYOND

What is the main reason a species faces extinction??

Much controversy surrounds placing all known wild individuals of a species such as the black-footed ferret and the California condor in captivity. What are the pros and cons of captive breeding programs??

Extinction is a natural process. Are captive breeding programs only delaying the natural process?? Man has accelerated the rate of extinction, could this just be part of the natural process -- and not bad after all??

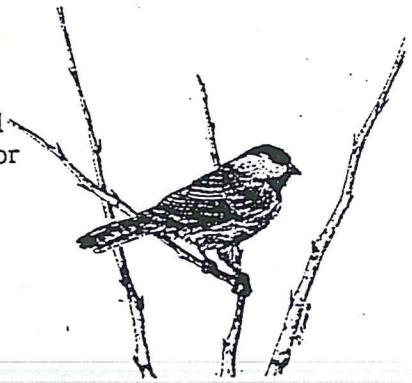
Are all species equally important?? Ask your class if they only had the money to save one species, which species would they choose -- the Scott riffle beetle or the Bald Eagle?? Have them research the two animals and present reports and evidence to support their decision.

WHAT CAN I DO??

- Join an organization interested in natural resource preservation such as: Ducks Unlimited, National Wildlife Federation, Audubon or Sierra Club.
- Arrange programs on natural resources for groups in your community. If you cannot arrange one, attend one.
- Integrate wildlife/environmental education programs into your school's curriculum. The Kansas Department of Wildlife & Parks has an excellent educational program and reference center materials to assist you. Project WILD and Project Learning Tree are interdisciplinary environmental and conservation education programs. The Milford Nature Center and Pratt Museum also offer programs.
- Support legislation -- federal, state and local which promotes natural resource conservation.
- Learn to recognize Kansas endangered and threatened species and their habitat needs.

WHAT'S HAPPENING??

Wildlife Appreciation Day will be held at the Ramada Inn Downtown in Topeka on March 6th from 9 a.m. to 3 p.m. Scheduled events include a non-technical conference on endangered ecosystems sponsored by the U.S. Fish & Wildlife Service and exhibits by concerned organizations. Following the endangered ecosystems conference will be a reception for Kansas legislators. If you would like more information contact Greg Wurst at (913) 539-8511. School groups are encouraged to attend. The conference would be especially appropriate for Sr. high school groups. Packets of activities for educators on endangered species has been made available by the Kansas Wildlife Heritage Month Committee. If you are interested in a packet contact the Milford Conservation Education Center at (913) 238-LEAF (5323) or the Wildlife Reference Center (316) 672-5911.



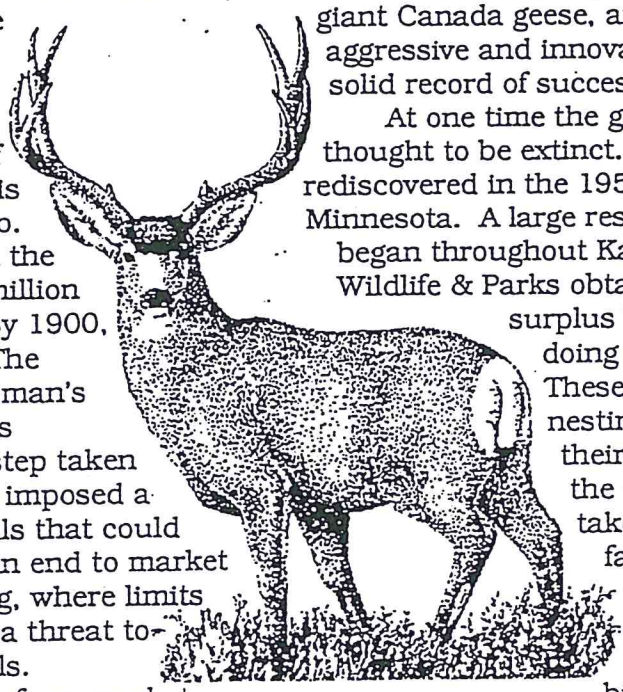
Eagle Days are held in January and February. Call your local Kansas Wildlife & Parks office for information on Eagle Days closest to you.

Walk With Wildlife is coming to Lenexa in April (details in the next newsletter). For more information call the Lenexa office at (913) 894-9113.

COMEBACKS!!.....FROM THE BRINK

Threatened and endangered wildlife receive a lot of attention these days. Many of us may think of wildlife as something that is scarce. Though the number of species in trouble is on the rise, many species of Kansas wildlife fare better today than at the beginning of this century. White-tailed deer, pronghorn antelope, elk, buffalo, beaver, wild turkey, wood duck, and giant Canada geese are examples of how wildlife management restored these animals to the world around us.

The first 300 years of American settlement caused significant problems for wildlife. The rapid change in the land from wilderness to settlement coupled with no-limit harvests, placed a severe strain on wildlife. By 1900, market hunting, the unrestricted harvest for commercial exploitation, had literally driven many of our native animals to the brink of extinction. A prime example is the American bison, or buffalo. When settlers first set foot on the Great Plains as many as 65 million buffalo roamed the prairie. By 1900, buffalo were nearly extinct. The buffalo had suffered because man's ability to kill had exceeded his capacity to reason. The first step taken to preserve dwindling wildlife imposed a limit on the number of animals that could be harvested. This brought an end to market hunting. Legal sport hunting, where limits are enforced, has never been a threat to the existence of native animals.



Removing the pressure from market hunters allowed some animals to make a comeback. For instance, though nearly gone by the turn of the century, more beaver occur in Kansas today than ever before. Hunters sought beaver because of their excellent pelts. The first "felt" came from beaver fur and became a popular 'hat' material.

More had to be done than just restricting the number of animals harvested. Wildlife management truly began when conservationists realized that habitat must be improved. The habitat in Kansas suffered from the clearing of forests and the conversion of the prairie into farmland.

Shelterbelt planting and flood control devices encouraged the growth of trees and shrubs. These techniques helped bring the white-tailed deer back into the state. By 1900, only 500,000 deer remained in the United States. Today they number 20 million. After an absence of more than 50 years, a deer season opened in 1965. Hunting is important in deer management since it allows for the taking of surplus animals. These animals would once have been prey for the wolf, grizzly bear, and mountain lion -- natural deer predators which no longer occur in Kansas.

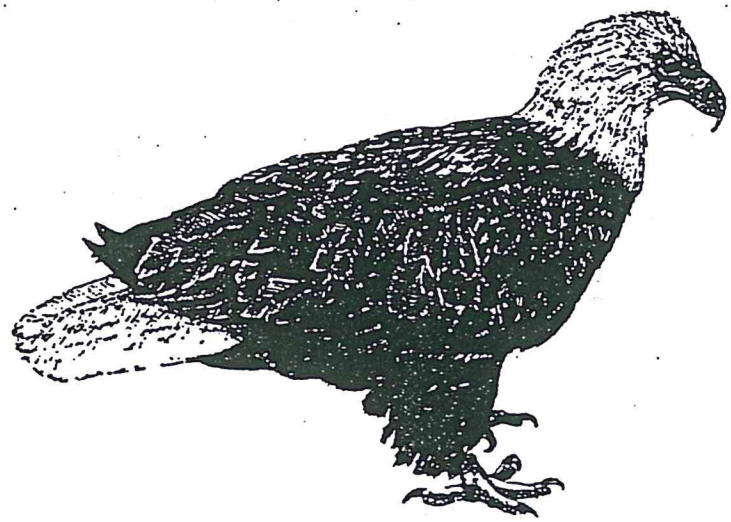
Many cases of successful comebacks involve transplanting animals into suitable habitat. This technique has been used to restore wild turkeys, pronghorn antelope, elk, giant Canada geese, and others. These aggressive and innovative programs have a solid record of success.

At one time the giant Canada goose was thought to be extinct. These big geese were rediscovered in the 1950's around Rochester, Minnesota. A large restoration program began throughout Kansas in 1980. Kansas Wildlife & Parks obtained a captive flock of surplus birds from other states doing similar restorations. These birds used artificial nesting structures to lay their eggs. The young from the captive flocks are taken and released at farm ponds and lakes just before they are able to fly. In three years when the young birds mature they should return to these sites. In this way, a Kansas population of giant Canada geese is being established.

Similar efforts have been undertaken to re-establish wild turkeys and pronghorn antelope. Today the U.S. has about 2 million wild turkey, up from a low of 650,000. Pronghorn number about 750,000 today, up from a low of 13,000 in 1920.

No one single action has caused a species to make a comeback. For a species to make a comeback, there must be biological research, habitat improvement, protection, and education of the public of the needs of the animal.

SPECIES SPOTLIGHT: THE AMERICAN BALD EAGLE



Kansas hosts 300-600 bald eagles each winter. The birds visit Kansas looking for open, unfrozen water so they can feed on fish and waterfowl. Look for bald eagles along Kansas rivers and reservoirs. Kansas has recorded two bald eagle nesting sites in the state.

Of Interest to Eagle Watchers:

* The American Bald Eagle or "bird of freedom" became our national symbol in 1782.
* Bald eagles mate for life and may live up to 45 years in the wild.
* The radiant, white head and tail feathers which give the eagle its name, appear only upon maturity at 4-5 years of age.
* Adult eagles weigh 8-16 pounds (the males are smaller than the female) and have a wingspan of 6-8 feet.
* Bald eagles are primarily fish eaters but will also consume sick or wounded waterfowl.
* Eagle nests may weigh as much as two tons!! A single pair of eagles will add new branches each year.
* An eagle soaring at 500 feet can see a fish swimming a mile away and swoop down on it at 100 miles per hour.
* The eagle's main weapons are its talons (claws).
* In the 1960's, the greatest threats to eagles were the use of the insecticide DDT and loss of critical habitat.
* The eagle's greatest threats in the 1990's are still environmental pollution and a continued high rate of habitat loss.
* Bald eagles are endangered in Kansas and on the federal list although they are doing better today.

WORD SEARCH

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

BIRDS:
Bald Eagle
Black-capped Vireo
Eskimo Curlew
Least Tern
Peregrine Falcon
Piping Plover
Snowy Plover
Whooping Crane

MAMMALS:
Black-footed Ferret
Eastern Spotted Skunk
Gray Myotis (Bat)

AMPHIBIANS:
Cave Salamander
Central Newt
Eastern Narrowmouth Toad
Green Frog

FISH:
Arkansas Darter
Neosho Madtom
Pallid Sturgeon
Redspot Chub
Speckled Chub

REPTILES:
Broadhead Skink
Checkered Garter Snake
Eastern Hognose Snake
Kansas glossy snake
Northern redbelly snake

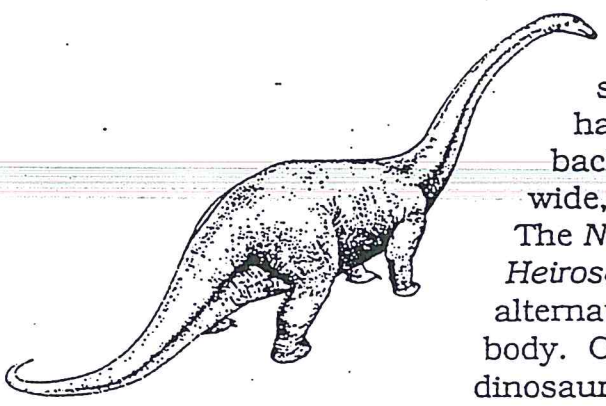
INVERTEBRATES:
Flat floater (clams)

DINOSAURS!!

Perhaps no other group of animals has been linked to extinction as much as the great dinosaurs. These fascinating beasts have captured the imagination and interest of almost every child -- and even some adults!!

The name dinosaur is derived from the Greek words *deinos* meaning terrible or monstrous and *saurus* meaning reptile or lizard. These 'monstrous lizards' lived 64 to 225 million years ago during the Mesozoic era.

According to Natural Kansas, few terrestrial rocks of Mesozoic age are present in Kansas and because all dinosaurs lived on land, these beasts are rare in the Kansas fossil record. But two dinosaurs were found to inhabit prehistoric Kansas. *Silvisaurus* ("forest lizard") was a slow-moving plant eater 13 feet long. Known only from a skull and partial skeleton found in Ottawa County, the Silvisaurus had a long neck and thick, rounded plates covering its back. Sharp spines ran along its sides and along its wide, flat tail.



The *Nodosaurus* ("nodular or lumpy lizard") or *Heirosaurus* could reach lengths of 18 feet. It had alternating rows of large and small bony plates down its body. Considered to be semi-aquatic, this plant eating dinosaur had a mouthful of sharp knife-like teeth -- 40,000 of them!!

FOX AND COYOTE POPULATION MONITORING: SCHOOL BUS ROUTE COOPERATIVE SURVEY

How do you stimulate student interest in wildlife conservation?? Get them involved!! How can a natural resource agency monitor population trends of elusive wildlife?? They build a better mouse trap -- a new technique to accomplish the objective. The Kansas Department of Wildlife & Parks would like to involve students in wildlife conservation and at the same time develop a cost effective population monitoring technique for fox and coyote.

Few things excite youngsters more than seeing wildlife. We would like to use this natural enthusiasm to develop a new survey technique for fox and coyote, as well as educate students.

Monitoring elusive wildlife requires unique methods. Appropriate techniques do not exist for all species, or proven techniques for one part of the country may not work in another region. Cost is an important consideration. We plan to develop survey techniques which require the students to maintain records and conduct observations in a systematic manner.

Sometimes wildlife can be censused. Highly visible species with restricted distributions and small populations, like whooping cranes, can actually be counted. Unfortunately, it is seldom possible to count all members of a wildlife population, especially elusive species like fox and coyote. Biologists rely on indices to monitor trends in the populations. These indices are based on standardized observation over a prescribed route and during a particular time period. Rural mail carriers have provided the indices for species like cotton-tailed rabbit, pheasant and quail. Archery deer hunters have provided the observational base for indices to bobcat and turkey.

Western Kansas is one of the last strongholds of the swift fox. We need to monitor this species in conjunction with other wild canids in the state.

A population index for fox and coyote is proposed for the western part of Kansas. Students will make observations as they ride the bus to and from school. School bus routes remain similar from year to year, and generally travel during early morning and afternoon time periods when fox and coyote are active. The student will record the number of each species seen, including vehicle killed animals. Students will record the miles driven each day and prepare a map of the route. The survey will be conducted three times a year for five consecutive days.

This survey will provide data on the distribution of foxes and coyotes as well as trends in the population from year to year. We should be able to tell whether the distribution of a species is expanding or contracting and if the population density is increasing or decreasing.

Results will be compiled and returned to each participating teacher. Each school can maintain copies of their results and compare with the results from other parts of the state.

Survey forms and instructions will be sent to each biology teacher in the western third of the state. Encourage your students to participate and select students to observe and record. Many of your students will enjoy conducting this type of a survey. Please contact me if you have any questions:

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MATERIALS

The following is a summary of the educational activities available through the Kansas Department of Wildlife & Parks, Project WILD, Project Learning Tree and Project WILD Aquatic regarding Threatened and Endangered species, habitat and related areas.

Kansas Department of Wildlife & Parks Elementary Teacher Guides:

First Grade - Wildlife & Me

1. What Does Wildlife Need?? - match animals with their environmental (habitat) needs - page 20
2. Wildlife Can Be Puzzling - a cut-out puzzle that shows what wildlife needs to live - page 21
3. What Do I Need To Live?? - identify what wildlife requires to be successful - page 22
4. Wildlife's Rainbow - a collage of Kansas wildlife to investigate color - pages 23-28

Second Grade - Food For Wildlife

1. Food Pyramid Bulletin Board - fill in the blanks with animals that fit the food pyramid - page 6
2. Number Know-How - answer the 'number' questions - page 7
3. Pyramid Power - a food pyramid shows the many kinds of foods eaten by animals - page 10
4. Meal Planning - try to identify what wildlife would pick from the 4 food groups - page 11
5. A Mobile Food Chain - the relationships between plants and animals illustrated with a mobile food chain - page 12
6. Race For Food: Eat or Be Eaten - a predator/prey race - page 13

Third Grade - Wildlife Needs A Place To Live

1. Habitat Bulletin Board Idea - students put pictures of animals found in the four habitats outlines - page 6
2. Habitat Crossword - students solve the crossword puzzle based on habitat - pages 20-21
3. Where Do I Belong?? - match the animal to the habitat - pages 22-23
4. Mostly Misplaced Habitat Hoax - find the misplaced animals - page 25
5. Habitat Is Essential For Wildlife - students learn wildlife needs different kinds of habitat - page 26
6. Habitat Cubes - construct a habitat cube for the habitats studied - pages 27-28

Fourth Grade - Endangered, Or Alive & Well Living in Kansas

1. Save Poetry From Extinction - use poetry to express thoughts and feelings about endangered wildlife - page 6
2. Test Your Endangered Wildlife IQ - determine awareness and knowledge regarding endangered species in Kansas - page 7
3. The T and E Of Kansas - a list of the threatened and endangered species in Kansas - page 8
4. Painter's Pallet - color some of the endangered and threatened wildlife of Kansas - pages 10-11
5. Design An Unendangered Species - students design animals to survive in today's environments - page 12-13
6. Endangered and Unendangered - students compare animals to understand the factors which can threaten a species - page 14
7. The Buck Stops Here - shows the success we've had in restoring some of our wildlife - page 15
8. Are Vowels Extinct?? - add the missing vowels to discover the names of endangered and threatened species in Kansas - page 16
9. Caution: English Skills Endangered - circle the punctuation and spelling errors in paragraphs on wildlife - page 17
10. Noah's Ark "100" - name 100 species of wildlife, considering habitat requirements - page 21
11. The Decision Is Up To You - manage a wetland area in Kansas making important decisions and balancing the food chain - pages 22-23
12. Endangered - A Word To The Wise - use correct wildlife vocabulary to fill in the blanks - page 31

Sixth Grade - Home Is Where The Habitat Is

1. Name That Habitat - fill in the blanks with the right habitat - page 7
2. Habitat Matchup - match the animals with their habitat - page 8
3. Mapping Habitats - develop a map showing the habitats currently found in Kansas - page 9
4. Rain Or Shine - how much moisture falls in your area?? How does it affect the habitat?? - page 10

5. Home On The Range - use rainfall and habitat maps to determine what habitat is best for each species listed - page 11
6. Habitat Comparisons - compare three different habitats near your school - pages 12-13
7. Give Wildlife An Edge - find examples of where two or more habitats meet?? - page 14

Partners With Wildlife (7-12 Grade Curriculum Guides)
Look to these areas under the Reference Section:
Ignorance isn't Always Bliss, What is Fisheries Management??, Managing a Kansas Farm Pond, Abundance of Fish, They're Poisoning Our Fish!, When Water Won't Flow, The Four Deadly Sins, What is Wildlife Management??, Principles of Wildlife Management, Wildlife Management On Croplands, Wildlife Conservation-Habitat is a Key, The Extinct: Losses & Lessons, New Life For Nongame, Winter-The Silent Killer, Bringing Back the Geese, Bluebird on the Rebound, Wildlife in Jeopardy, Where Does Your Community Stand on Wildlife Policies??

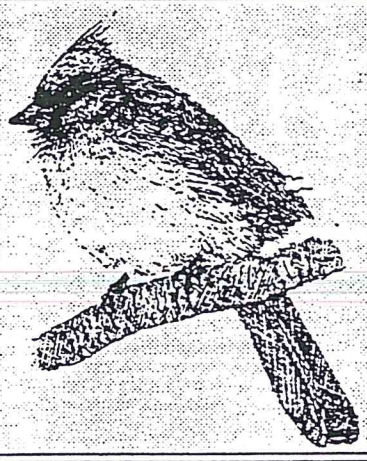
Secondary Conservation Education Activities Section:
Lifestyles (pages 31-56), Hunting & Wildlife Management (pages 57-78), Wildlife Conflicts (pages 85-115), Wetlands Conservation & Use (pages 143-166), Endangered Species (pages 167-196), Rivers & Streams (pages 221-248), Prairies (pages 249-272), Freshwater Marsh (pages 273-295)

There's Something WILD in Nature's Notebook
Look for the following information and activity sheets:
Food Web Game, Pyramid of Life, Honker Restoration, Wetlands Are Not Wastelands, Something WILD in Kansas

Project Learning Tree
Elementary Guide - consult the activities by Topics Section, page 174, and consider the following: Conflicts of Uses, Conservation Endangered Species, Environmental Impact, Food Chains, Forestry Practices, Habitat Land Use, Nonrenewable Resources, Pollution, Recycling, Reforestation, Renewable Resources, Shelter, Wilderness, Wildlife

Project WILD
Elementary Guide (look in the cross reference section titled Topic Index page (248) and consider the following topics: Basic Survival Needs, Carrying Capacity, Components of Habitat, Endangered (Rare, Threatened & Extinct Species), Habitat (application: see components of habitat for introduction), Habitat Improvement, Habitat Loss, Historical Value of Wildlife, Limiting Factors, Management of Habitat, Management Techniques, People and Wildlife Sharing Environments, Recreational Value of Wildlife, Responsible Human Action, Wildlife as an Indicator of Environmental Quality

Project WILD Aquatic
See page 224 for Topic Index and consider the following: Acid Rain, Awareness, Endangered Species, Food Chains, Food Webs, Habitat, Management, Responsible Human Actions, Toxic Substances, Values of Aquatic Species and Environments, Wetlands, Whales



SONGBIRD BUNDLES
Trees and shrubs enhance school grounds. If you're looking for an inexpensive way to add wildlife habitat, consider purchasing a songbird bundle. For $12.00 you receive 20 bare-root seedlings. For more information call your local K-State extension office.

RESOURCE REVIEW

The National Wildlife Federation's *Naturescope* Endangered Species: Wild and Rare is full of excellent activities and information on endangered species, both in the U.S. and around the world. This booklet has 65 pages of wonderful explanations and information as well as Copycat pages which you are free to copy and distribute. It is geared toward preschoolers to 7th graders. The book can be purchased from the National Wildlife Federation, 1400 Sixteenth Street, N.W., Washington D.C. 20036-2266. Additional titles of *Naturescope* books are available. A copy of this book may be borrowed from the Pratt Reference Center or the Satellite Reference Center in Lenexa. For more information call the Reference Center at (316) 672-5911 or the Lenexa office at (913) 894-9113.

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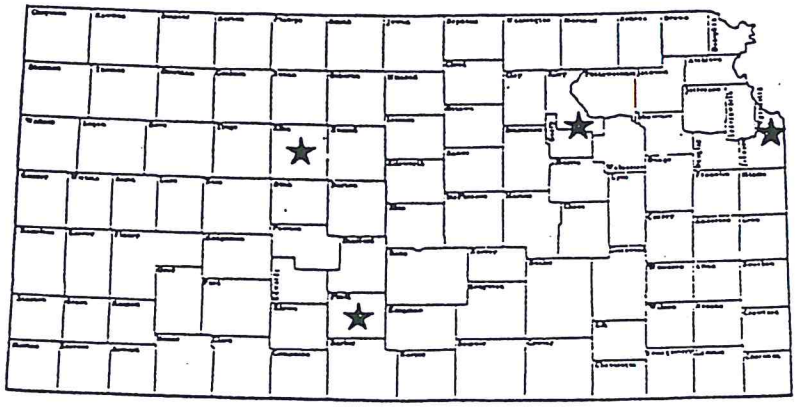

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