

*History and management of  
our most controversial wildlife—*

# **The Furbearers**

*Neil Johnson*

**F**urbearers have always figured prominently in human enterprise on the North American continent. Native Americans relied on them for thousands of years as sources of food and clothing. The first Euro-

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## *Six notables among Kansas furbearers*

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peans to explore the New World used furbearers on a much broader scale: as raw materials for haberdashers

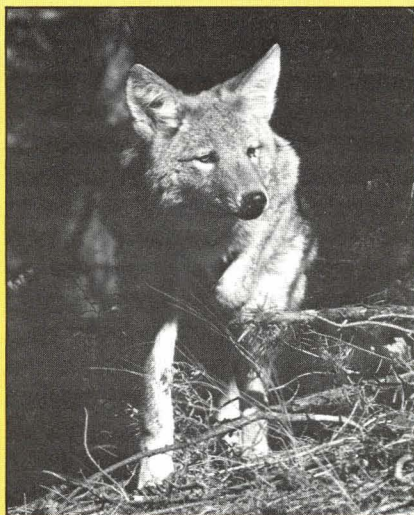
and tailors, and the standard form of "currency" in a land not yet equipped with dollars and cents. The search for beaver, mink, muskrat, and otter pulled trappers and hunters deep into the unexplored continent and evolved into the first large-scale commercial enterprise in North America. For two centuries, the fur trade was the economic foundation upon which the new land was being developed.

By the mid-nineteenth century, fur had been supplanted in importance by another great American resource: the land itself. The transformation from exploitation of a wild resource to production of domestic crops and livestock again focused attention on furbearers, this time for their negative value. Cougars,



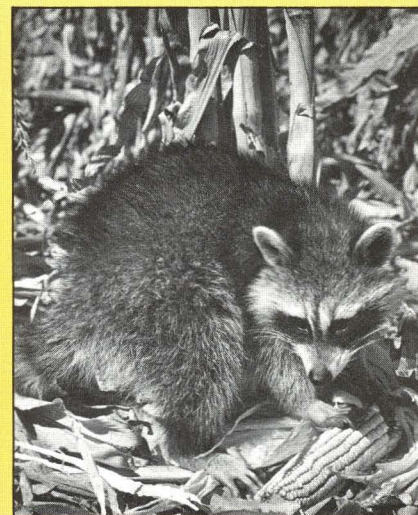
**BOBCAT**

Primarily nocturnal and seldom seen by humans, bobcats prefer life in lightly populated areas of broken terrain. They depend on keen eyesight and superlative hearing for their nightly hunting forays. Bobcats are good climbers and readily take to trees to rest or observe their surroundings. Although capable of killing an animal as large as a deer they primarily consume rabbits, squirrels, mice, rats, shrews, opossums, domestic cats, and carrion. Their reputation for controlling populations of rodents is tarnished by occasional reports that they destroy domestic fowl and young pigs. Their dens are usually located in inaccessible areas, often in rocky cliffs or hill-sides.



**COYOTE**

Nocturnal scavengers and predators, coyotes are respected for their craftiness and cunning. Their adaptability has enabled them to expand their range despite large-scale attempts to reduce coyote numbers. They prefer semi-open country and establish dens in unused fields and pastures, although they also may establish residence under hollow trees, in rock cavities, and under deserted buildings. Although they do occasionally kill young livestock and poultry they have often been blamed unjustly for damage done by free-running dogs. They rely on rabbits, mice, and other small rodents for the bulk of their diet, as well as carrion and some plant foods.



**RACCOON**

Expert climbers and swimmers, raccoons usually live in hollow trees near streams, lakes, and marshes. They are nocturnal, foraging from dusk to dawn on a diet more varied than that of any other furbearer. Crayfish, clams, fish, insects, frogs, snakes, turtles, wild fruits, grasses, and nuts make up a large part of their diet. They use the tactile senses in their front feet to locate food by groping in shallow pools, under rocks, or in rotting logs. On rare occasions, they can cause problems for rural residents by feeding on corn, eggs, or poultry. They also can be a suburban nuisance by taking up residence in and around buildings inhabited by humans.

bobcats, wolves, coyotes, and foxes were considered formidable liabilities for these new endeavors. In the new American mindset, these furbearers were not just pests, they were mortal enemies. Their eradication was considered just reward for their indiscretions.

Extermination techniques grew more sophisticated and effective. They became so effective that new factions eventually argued for, and often won, a reevaluation of these furbearers' role in the growing country.

The story of furbearers in Kansas and the entire country is a mixture of successes and failures, truths and myths, regrets and mollification. Some aspects of the story are timeless, such as their continuing economic role as the base of a multi-million dollar busi-

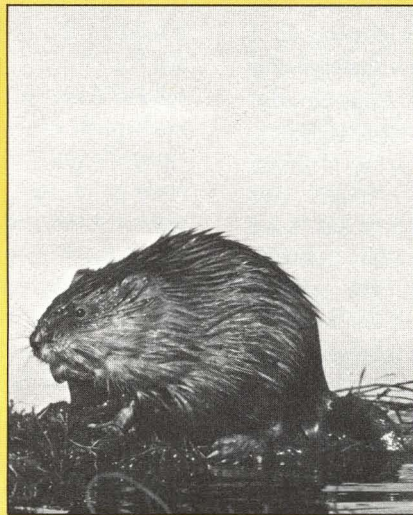
ness in Kansas. They still can be pests, jeopardizing the endeavors of their human neighbors. They continually face the threat of habitat loss.

Some changes have also been made. A strictly controlled harvest and improved management techniques help stabilize this wild resource. Changes in law have abolished some furbearer population control methods that were hurting more than they were helping. An enlightened public has helped make possible the return of many species from near disaster to again healthy populations. We keep learning. And furbearers continue to fill an important role in our society. Described below are six of Kansas' most important furbearing species. (Photos by Leonard Lee Rue III.)



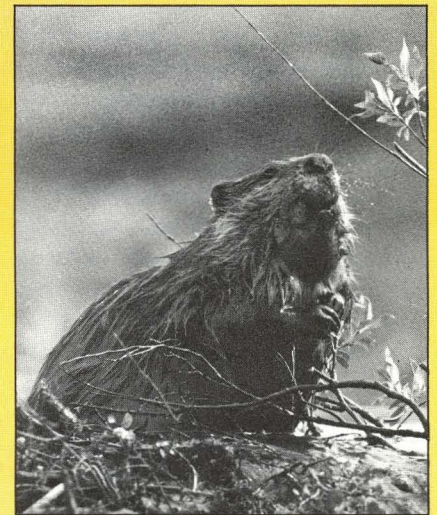
MINK

A basic requirement for mink is existence of permanent water. Mink live along banks of streams or shorelines of lakes and marshes, making their homes in cavities excavated in stream banks or under logs or stumps, in hollow trees, or in abandoned muskrat lodges. They are primarily nocturnal and live solitary lives except during rearing of their young. They are aggressive and often attack animals larger than themselves. Their eyesight is not acute but they rely heavily on a highly-developed sense of smell to locate prey. Mice, rabbits, and other small terrestrial animals, as well as fish, crayfish, frogs, and other small aquatic creatures are preferred mink food. Their living habits cause us few problems.



MUSKRAT

Musk rats prefer still or slow-moving water with abundant vegetation in the water and along the shore. They usually build their houses out of vegetation, with an entrance tunnel that opens underwater, or dig their homes in a stream bank. During most of the year a muskrat lives alone but several may bunch together in a den or lodge during winter. Chiefly vegetarians, they prefer the roots of aquatic plants, but also will feed on snails, crayfish, fish, frogs, reptiles, and young birds. They sometimes cause problems by tunneling in and around dikes and earthen dams.



BEAVER

The beaver, largest of North American rodents, is famous for its dam building capabilities. Beavers customarily confine their activities to a small home range, subsisting largely on the cambium of tender twigs, young trees, and woody plants. They are especially fond of cottonwood and willow bark. Beavers are nocturnal but may be seen during the day, especially in the fall when they are busiest with dam construction. Their dams can stabilize stream flows and control runoff but sometimes cause problems by backing up water and flooding roads, meadows, and crop fields. Their tree-gnawing tendencies also can cause damage in orchards located near beaver habitat.

**T**he Lewis and Clark expedition is a convenient place to start a history of the American West. It was the first formal expression of American ownership of the Louisiana Purchase, far more telling than the shuffling

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## The Early Days

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of papers between Europe and New York that marked the legal transfer of land from France to the U. S. It was a landmark in the American mind, of course, because the English colonies on the east coast had spent most of the eighteenth century just getting past the Appalachians, and it wasn't until the close of the Revolution that Americans gained claim to the "Northwest Territory"—later the states of Michigan, Wisconsin, Ohio, Indiana, and Illinois. To the settlers moving west from the Atlantic in the late 1700s, the Northwest Territory was howling wilderness. The land beyond was nothing more than rumor. Little wonder that the reports of captains Lewis and Clark caused such a sensation.

As far as the natives of the Great Plains were concerned, however, the process of European contact and trade began 200 years before Lewis and Clark. The Spanish were the first whites onto the grasslands. Coronado, Fray Augustin Rodriguez, Bonilla and Humana, and Juan de Onate all penetrated to Kansas and even Nebraska by 1600. Unfortunately for them and the Spanish empire, they explored the southwest constantly in the shadow of Cortez and the treasures he extracted from the Aztecs. They were too busy trying to find easy gold to recognize the other peculiar treasures the West offered. One early Spanish explorer, having heard of the numberless herds of bison on the plains, led an expedition into eastern Colorado to round up these wild cattle and domesticate them. After losing three horses and having another forty wounded, the would-be cowman realized that these American cattle were not the same critter as the European variety. Apparently, the idea of cashing in on the wildlife of the plains never occurred to the Spaniards again.

While the Spanish combed the Southwest for precious metals and pearls, more pragmatic explorers were moving onto the plains from the Canadian canoe country. After Champlain's settlement of Nova Scotia, the French moved rapidly up the St. Lawrence River and out into the Great Lakes. In 1658, two hardbitten

*In the 150 years before the 1840 collapse of the beaver market, the beaver was perhaps the most consistently sought furbearer on the plains. The value of its fur combined with its vulnerability to trapping led to a radical population decline among flatland beaver even before the American entry into the fur trade. (Photo by Bruce Kintner.)*

*voyageurs*, Pierre Radisson and Medard Groseilliers, pushed as far west as Lake Superior, opening a pathway for exploration of the Mississippi and Missouri rivers. By 1690, the British Hudson's Bay Company had also established trade contacts down into the Canadian plains from the north, and both France and Great Britain began to mine a resource that, in its entirety, may have been worth more than all the gold and silver on the continent.

These fur companies didn't work like the Rocky Mountain and American fur companies that sent "enterprising young men" into the Rockies 150 years later. The French and British fur companies let the Indians do the trapping and tanning, then traded for the finished furs. Some Indian tribes along the modern Canadian border and the upper Mississippi and Missouri quickly became middle men for this trade, bringing in furs from far out onto the plains along the ancient established pipestone and obsidian trade routes. They swapped these furs at a profit and used the white men's trade goods to buy more. These tribes were understandably jealous of their unique trading position and did all they could to prevent the white traders from moving out on the trade routes closer to the source of



supply. As a result, the number of white men doing fur business on the plains was small. The effect of the trade on furbearer populations, however, was probably considerable over the long haul.

By 1720, the French had established New Orleans as a base for their commerce upon the Mississippi. In 1719, a trading post was established near the present site of Texarkana, and by 1726, there was an important outpost near Lawrence, Kansas. The annual quota for this one trading post was 100 bales of fur. A bale of furs consisted of 100 otter skins, or 100 wolf, or 100 badger, or forty deer, or 500 muskrat and mink. And this post was only one of several in Texas, Missouri, Nebraska, and the Dakotas.

It was about this time that a concerned government in New Spain dispatched Pedro de Villasur to find out how entrenched the French threat to Spanish claims had become. Villasur proceeded across Kansas to the Platte River where he found out. After making contact with a group of Pawnees, Villasur and more than half of his expedition were killed in an early morning surprise attack. The Pawnees were armed with French guns and driven by French interests. The plains fur trade had become lucrative enough to kill for.

Trade on the plains became more and more cutthroat as the eighteenth century continued. A number of French and British companies emerged, and the Indians, shrewd traders in spite of their gullible reputation, soon learned to play one company off against another. The Hudson's Bay Company was distressed to find that the Indians were trading their heavier, more valuable furs with the French who were close by and saving the lighter hides for the more distant Hudson's Bay trade. The British traders immediately pushed closer to their trade in an attempt to close out the competition.

St. Louis, the capital of the American fur trade, was established in 1764 by a Frenchman, Pierre Laclede, who sought and received a license for fur trade along the Missouri from the Spaniards who had taken Louisiana as part of the agreement that ended the French and Indian War. By the beginning of the nineteenth century, St. Louis had already grown into a wealthy metropolis on the strength of the French-Indian fur trade.

The Europeans knew what they had in the American fur resource, but because of a variety of political and economic problems at home, neither the French nor



the British could establish an unassailable foothold in the New World. It was inevitable that American interests would eventually take control of the West. With the Louisiana Purchase and the Lewis and Clark exploration, U. S. entrepreneurs rushed into the fur trade. The best known of these efforts focused on the Yellowstone country, but trapping activity in southern Colorado and northern New Mexico was just as concentrated, if not as well organized. Although very little mention is made of trapping on the plains, the fur trade on the flatlands was alive and well. Buffalo were taken more and more frequently for their tongues and for production of pemmican which had found a market farther east. The plains Indians were now dependent on white trade for guns, powder, and other goods and, as a result, were compelled to trap and hunt buffalo for trading stock. A single record from 1829 indicates the volume of fur coming off the plains. Fredrick Choteau, one of two generations of St. Louis Choteau's who made their livings from western fur, brought 400 packs of furs into St. Louis from the Kansas River and its tributaries. The packs contained beaver, otter, and muskrat and had a market value of more than \$100,000 in St. Louis at that time.

The intense demand for beaver and the resulting high prices eventually force a change. Through the late 1830s, hat makers began experimenting with substitutes for beaver, and in the early 1840s, the opening of trade with China brought the silk hat into fashion and wiped out the beaver market. The collapse in this element of the fur business should have meant a respite for the aquatic furbearers on the plains, but it may have been disastrous for them. Many mountain men and would-be mountain men settled on the plains rivers when the market for beaver had dried up. They were skilled trappers hungry for a living, and may have pursued beaver, muskrat, and otter even more diligently because of the low prices. In any case, pressure on all the furbearers continued throughout the nineteenth century, culminating in the slaughter of the bison in the late '70s and early '80s. One of the mop-up operations that accompanied the last great buffalo hunt was wolf-hunting. The buffalo wolves prospered temporarily as the hide hunters left them millions of carcasses to pick on, but it wasn't long before itinerant hunters came looking for other prey. A favorite wolf "hunting" technique was to put down a few buffalo and lace the meat with strychnine. One wolf hunter, Robert Peck, reported taking more than 3,000 animals in the winter of 1861-62, 800 wolves, more than 2,000 coyotes, and about 100 foxes.

Although the overall loss of wildlife throughout the

country after 1880 was enough to spawn widespread calls for conservation, most wildlife, including furbearers, continued to decline into the twentieth century. The low water mark came around 1910.

Furbearers were unprotected in Kansas until 1911 when civet cats, raccoons, skunks, opossums, muskrats, and mink were officially brought under the Fish and Game Code with an open season from November 16 to March 14. Beaver and otter seasons were closed for ten years by an act of the state legislature. In 1921, the furbearer season ran from December 2 to February 28, and trappers were required to buy a \$1.00 trapping license for the first time. The state legislature limited trappers to thirty traps in 1925, a limit that was reduced to twenty traps in 1943. Beaver and otter seasons remained closed throughout this period. In 1943, control of the beaver season was turned over to the Fish and Game Commission.

In 1940, the hunting and trapping season on raccoons was sixty-one days—December 2 through January 31. The two seasons ran concurrently for the next twenty-one years, varying in length from sixty-two to 273 days. In 1962, the hunting season was opened year-round while the trapping season ran from December 1 through January 31. In 1974, the hunting season was trimmed to 151 days and has since been reduced to its present sixty-two days. Hunting and trapping seasons on raccoon now run concurrently again.

The muskrat, mink, and weasel season ran for sixty-one days in 1940 like the raccoon season. It was also extended by one day in 1943, running from December 1 through January 31. Both hunting and trapping seasons ran concurrently for sixty-two days out of the year until 1973 when the hunting season for these species was closed. Today, the mink and muskrat season runs from December 1 to February 28.

Throughout the history of furbearer season setting, little emphasis has been placed on understanding what was happening to furbearer populations. The only dependable information the Commission had collected prior to 1974 was the number of trapping licenses that were being sold and records of fur transactions from fur dealers beginning in 1927. In response to sharply increasing license sales and increasing pressure on long-haired furbearers, the Commission reduced the raccoon season in 1974. It wasn't until 1979 that the harvest season for raccoons was lengthened and then only after enough information had been collected to indicate that the season would not have an adverse impact on the state's raccoon population. □

**I**n management of any wildlife species, the manager has to force himself to think at a level of the whole population. This is one of the major stumbling blocks in understanding efforts to manage furbearers, because

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## *Ebb and Flow*

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most nonbiologists always think in terms of individuals or small groups.

What then, are the important principles that underlie the management of furbearers or any other wildlife? Every year, at one time or another, furbearers go through a breeding season. Beaver tend to pair and establish colonies; raccoon meet, breed and go on their way; muskrats have multiple litters in a year. But regardless of specific behavior of different species, young are born to all each year, and this fact is the basis of all population management.

If all these young survived, we would be up to our armpits in furbearers in a matter of a few years. An understanding of the process that keeps this from happening is crucial to understanding wildlife management.

For illustrative purposes, I will describe the annual population cycle of the raccoon, one of our most important furbearers. In January, there are still a fair number of raccoons around the state; for the sake of this explanation, let's say about 230,000. These coons are typically denned up and under considerable stress because of the cold. It is not at all unusual for a raccoon to lose thirty to forty percent of its total body weight as it burns fat to stay warm. There are those raccoons that don't have enough stored fat; these individuals either die in their dens from cold or are forced to forage for food. As

Bruce Kintner



they forage, they are exposed to predation and the elements and often die.

By late February, the population is reduced to 210,000 raccoons, close to the lowest point of the year, and mating is in full swing. Sixty-two days after mating, the sow will have her litter. In Kansas, this litter averages about 3.6 young. The earliest litters start whelping in late March and the numbers of raccoons start to increase, slowly at first and much more rapidly as the major portion of the female raccoons bear their litters.

Some time between February and March, the raccoons reach their lowest population level of 200,000. We call this level the "carrying capacity." It represents the maximum number of raccoons which the state's habitat can support or carry through the most crucial time of year.

By the end of March, our population has increased to 215,000 raccoons, of which 15,000 are less than a month old. Throughout April and May, about ninety percent of the litters are whelped, and by the end of

June, the state's population has reached a peak, potentially near 560,000 raccoons. This figure is never really attained since mortality is always occurring in both the adult portion (200,000) and the kitten portion (360,000) of our population. Right from birth, decimating factors such as still births, desertion of the litter, competition between litter mates, and diseases start reducing the total reproductive effort.

During July, the earliest litters are starting to get out more and are being exposed to other decimating factors such as predation and accidents. Although mortality occurs throughout the summer, the addition of later litters to the population tends to balance out and the total population declines by only a small amount. In

July and August, the living is easy; sweet corn, melons, fish and wild fruit are abundant, so food is not a real problem. Although there is severe weather during this period, it is not a very serious threat to raccoons. But as August draws to a close, most of the young are out and about. Mortality starts to increase as they are exposed to the world nature has created for them.

Sometimes luck determines which animals survive to breed and which die, but more often the individuals best equipped to cope with their world tend to hang on, while the slag of the population is skimmed off. This survival of the fittest, Nature's way of thinning a population, is not sweet, gentle, or compassionate. It is cold, ruthless, and unsentimental, but oddly enough it is responsible for much of what we find beautiful in the wild.

The mortality factors that thin the August raccoon population can be broken into three groupings; food, disease, and accidents. Food availability does not become a major problem for raccoons until late November, but, even before this period, food gathering is a raccoon's major activity. Coons have to eat enough to support themselves and lay down large amounts of body fat to keep them during their denning period in the winter. Disease is a constant threat to all furbearer populations. Raccoons are susceptible to a wide variety of diseases. The major ones are rabies, leptospirosis, distemper, and mange. Most diseases are spread by contact between individuals; therefore, during the months that the population is highest, there is the greatest chance of spreading the disease. Most of these diseases are not quick-killing; some may take as long as two months to cause an individual's death.

I have included predation in the third group, accidents. This group probably counts for the major portion of the reduction of the population during August, September, and October. Most people who drive a lot will notice a substantial increase in raccoon road kills during late August and September. These will generally be naive young-of-the-year animals that have not learned about automobiles. Similarly, animals are taken by predators. Among raccoons, only the young are vulnerable to birds of prey, and only two Kansas predators, bobcats and coyotes, are capable of taking adult raccoons. Predators tend to focus their attention on the young and naive or sick and incapacitated.

By the end of September, the raccoon population (450,000) is started into its major reduction of the year. As food becomes less abundant, raccoons' conditions start to decline and disease becomes a more serious threat. As October, November, and December go by, more and more individuals are removed from the pop-

ulation until only 230,000 of the fittest raccoons are alive in January.

This is where we started the yearly cycle and it is now a rerun. As a matter of fact, every year this is rerun for all wildlife populations. In furbearer management, we realize this and take it into account. Stable furbearer populations lose as many individuals each year as they gain from reproduction. This surplus may be young or old, healthy or diseased, but it has one dependable trait—it does not have access to good unoccupied year-round habitat. As a result, it will disappear. This, together with the fact that it doesn't matter what decimating factors reduce the population, means that we can allow a controlled harvest of raccoons.

With the concept of the yearly cycle in mind, let's take a look at some of the information we have collected on the bobcat. Bobcat research effort has been extremely intense because of the federal government's participation in the Convention on International Trade in Endangered Species (CITES) which requires that detailed population data be collected on certain furbearers like the bobcat before its pelts can be shipped outside the U. S. Our original estimate of Kansas bobcat numbers for CITES was about 10,000. We'll use this as a starting point.

Our research has shown that the average female bobcat will bear a litter of three kittens. Applying that productivity to the Kansas population, we find that Sunflower bobcats should number about 25,000 in the early fall after one breeding season. Hunters and trappers take about 1,000 of these each year. If this were the only source of mortality, the population would grow from 10,000 to 48,000 in just two years.

In fact, research done in 1978 indicated that young bobcats had trouble surviving to their first trapping season. If they made it into their first winter, they had a ninety percent chance of surviving another year. Bobcats more than a year-and-a-half old had about a fifty percent survival rate. At these survival rates, the bobcat population should have been growing from eight to ten percent a year. These estimates of survival were all based on information gleaned from carcasses turned in by hunters and trappers. When we looked at other 1978 surveys of bobcat numbers, they also indicated a slight increase.

We were lucky in 1978. Everything fell into place and pointed the same direction. This is generally not the case. Normally, information from different sources is contradictory and finding the truth of the situation finally depends on the interpretive ability of the biologist who is looking at the information. He has a far easier time when he is working with a number of independent surveys taken continuously over a



number of years. There is no substitute for good information collected every year.

How do we use all these surveys and research efforts to set seasons? With great care. Most of our calculations are only loose estimates and they reflect only the past, never the future. These studies have shown us that sport harvests under past regulations have had no detrimental effect on furbearer populations. New seasons are always set on the safe side; that is, we never set a season that has any chance of permanently reducing a furbearer population.

A season's length and the period of the year in which it occurs are determined more by the way hunters and trappers pursue furbearers than by the biology of the animal. The coon hunter, for example, enjoys listening to his hounds running the ridges. His hunting is best when the evenings are crisp but not so cold as to make

the raccoons den up. Some houndsmen are mainly interested in training their dogs and argue for a year-round running season on raccoons; others want to market hides and hold out for a liberal killing season. Trappers are mainly interested in taking raccoons in prime coat. If they had their way, they would like to take raccoons as long as the pelts are in good shape.

Because of the variety of demands for raccoon seasons, any proposal sparks heated debates. The final product is always a compromise, the best arrangement that can be worked out to give each special interest as much as possible without depriving another group. □

*U.S. entry into the Convention on International Trade in Endangered Species (CITES) brought the bobcat into the middle of a heated debate. Many eastern states consider the bobcat to be endangered while western states like Colorado, Texas, and Kansas feel their populations are in good shape. As a result of the controversy, research on bobcats has expanded radically in the last five years.*



Photo by Bob Henderson

**T**here is no practical way to count all the furbearers in Kansas. Even a carefully collected unbiased sample of furbearer populations would be unbearably expensive if it were run year after year, but it is critical that

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## *The Census*

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biologists have some way of tracing the effect their seasons and limits have on furbearers. Over the years, the Fish and Game Commission has monitored the prosperity of a number of game animals with two basic approaches—surveys of populations in the field and biological examination of harvested animals. Unfortunately, most Commission surveys are designed to track population trends among small game species and are not very useful in furbearer management. The list of effective furbearer surveys is growing in Kansas, but we're still in need of more dependable indicators of population ups and downs.

The longest running furbearer survey in the state is derived from the purchase records of our licensed fur dealers. It has two considerable advantages—it is a long-term survey that is at least partly related to changing furbearer numbers, and it is an inexpensive way to collect a lot of information. It also has its problems. Fur dealers will tend to buy those furs which are most valuable. They may not even be interested in dealing in furs for which there is little or no market. As a result, records of fur dealer purchases often reflect what was bought and may not always be an accurate indicator of how many animals were harvested or how abundant furbearers were. This problem is compounded by the fact that trappers will tend to hold onto furs that have low market value, hoping that the price will eventually go back up. They will also tend to concentrate their efforts on those furbearers that are most valuable.

Over the years, these two biases have resulted in some interesting trends in fur dealer records. Since 1956, the number of bobcat pelts sold to Kansas fur dealers has varied from zero to 1,673 in 1976. In 1958, fur dealers bought only sixteen coyotes and 17,000 raccoons. In 1977, dealers purchased 56,000 coyote hides and in 1979 bought 86,000. These variations do not reflect changes in raccoon, coyote, or bobcat populations but fluctuating demand for these furs on national and international markets.

Mink and muskrat trading, on the other hand, has been fairly stable over the years. Since hunters and trappers seem to put in a constant effort on these furbearers over the years, fluctuations in fur dealer

records probably reflect actual population changes.

In 1965, the Commission started a survey of trapping license holders to augment information gleaned from the fur dealer's records. This survey gets right to the source of furs and avoids some of the market bias that appears in fur dealer's records, but it still has some problems. A group of hunters or trappers may often report the success of their entire party instead of their own harvest, or they may exaggerate their actual success. As a result, there may be substantial differences between what the trappers say they took and the number of furs they actually sold to Kansas dealers. For some furbearers, the difference isn't all that great. Fur dealer reports show that 1,800 mink pelts were sold in 1979. The trapper license survey indicates that 3,300 were harvested. On the other hand, dealers reported 86,000 raccoon pelts purchased in 1979 while the license survey showed a harvest of 207,000!

Although there are significant differences in these numbers, that doesn't mean that these surveys are worthless. Their importance isn't how they relate to each other in any one year but how their trends compare. Until 1977, our contact with trapping license holders came only once every three years, but we now have three years of continuous reports from trappers and hunters and, in general, they show the same trends as the fur dealer's records. The magnitude of change are different, but the directions of change corroborate each other.

Furbearer biologists across the country have searched diligently for better surveys to augment fur-dealer reports and trapper surveys. In the early 1970s, Kansas biologists aware of intense pressure on beaver walked, floated, canoed, and flew rivers throughout the state during November and December, counting food caches and dams to find out how beaver were being affected. The resulting counts were a good index to beaver populations on the rivers that were surveyed. However, because of the decline in demand for beaver and the tremendous expense of the survey, we abandoned it in the mid-1970s.

In 1972 when President Nixon banned the use of the compound 1080 for coyote control, U. S. Fish and Wildlife Service biologists began a coyote population survey to find out whether the end of the poisoning program brought on an increase in coyote populations. They developed a coyote attractant which could be placed in a small, ventilated capsule. The capsule was stuck on a toothpick in the middle of a three-foot circle that had been covered with dust. Biologists across the western U. S. set out lines of such stations, fifty stations to a line spaced three-tenths of a mile apart.

Every morning, they checked these fifteen-mile lines, recording the footprints of wildlife that appeared in each. With recent improvements in statistical treatment of these records, biologists in charge of the program have documented changes in coyote populations. The survey works for coyotes because so many coyotes visit the stations. Other, rarer furbearers show up at the stations much less frequently, so the survey is of little use for following their population changes. Kansas biologists run twenty-one of these scent post lines across Kansas in early September.

Because raccoons are in such great demand in Kansas, we have been looking for surveys that will give us a better handle on coon populations. Right now, we're investigating two possibilities. Iowa biologists have developed a spotlight raccoon count which may have value in Kansas, although we've had trouble finding raccoons during our experiments with it. We are also trying to develop a late summer, early fall raccoon survey based on random raccoon sightings by agency

personnel. This is the first year we've tried this technique. It will probably be four or five years before we can adequately evaluate it.

In 1977, federal regulations threatened to close down the booming business in bobcat pelts by stopping export to the lucrative European markets. The Commission needed information on the state's bobcat population to avoid this closure. Bobcats are particularly elusive predators, so we needed some survey technique that put a large number of people in the field for long periods of intense observation. After a lot of thought, we decided to ask for help from bowhunters. Each archery deer hunter now receives a questionnaire with his permit, asking him to record the number of raccoons, coyotes, bobcats, foxes, and tree squirrels he sees during a season of hunting. In the first year of the survey, more than 4,000 bowhunters responded. They

*One of the most effective methods of keeping track of beaver populations, the aerial survey, is unfortunately one of the most expensive. (Photo by Bob Henderson.)*



reported seeing more than 896 bobcats, 4,700 raccoons, and 12,000 coyotes. This program has gone on for three years and has shown good agreement with our other surveys. The archery index for coyotes and the scent post index have paralleled each other all three years, and the bobcat numbers from the two surveys have agreed two out of the three years. Although these results are encouraging, only time will show us how dependable the archery survey is.

So far, these are the most promising methods we

have been able to find for following furbearer populations, but until it can be shown that they accurately reflect population changes, we will keep trying new methods and evaluating their effectiveness. Major efforts will have to be made to find techniques for monitoring badger, beaver, muskrat, mink, opossum, skunk, and fox.

One of the most dependable sources of information on furbearers is the furbearer population itself. There are two characteristics of these populations that are

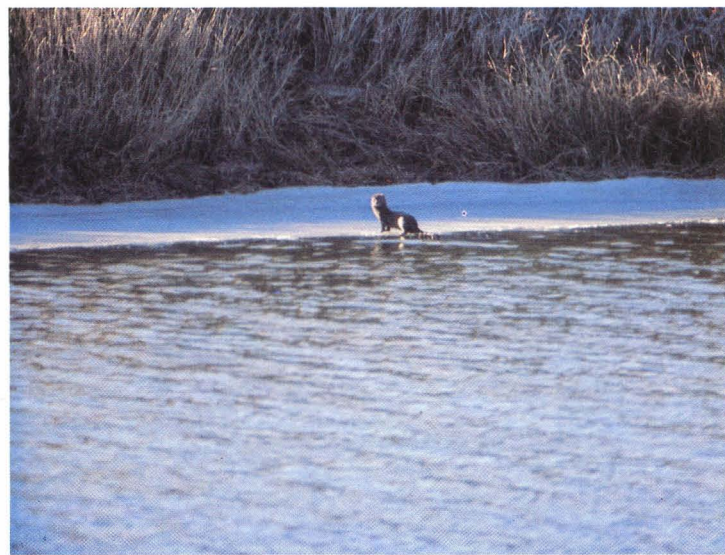
*Muskrats and their works (left) are one of the most common sights on a marsh. Prolific breeders, rats can "eat out" a wetland in a surprisingly short time, removing almost all emergent vegetation. Luckily for most other marsh residents, there are checks on muskrat population growth. Crowded muskrats tend to force the younger, less dominant members of the population into less secure habitat where they are easy prey for their arch enemy, the mink (far right, page 21). Mink are seldom as obvious as muskrats around a marsh, partly because they are less abundant and partly because they are too busy hunting to spend much time loafing in the open. The most common mink sign is a set of tracks along the marsh edge (page 21, left). For a young muskrat wandering far from the security of its lodge, those tracks are very bad news. (Mink, upper right, by Bruce Kintner. All others by Kent Stucky.)*



particularly important to wildlife managers. The first is the age distribution of a given population. In most healthy animal populations, there are more young of the year than any other age group. As a year goes by, each age class loses some of its members to the gauntlet of threats that beset all species—predation, starvation, disease, accident. It makes sense, then, that a population of animals more or less in balance with these threats should have many young individuals and progressively fewer older members. If a breeding year is

unusually poor or the young born are unusually vulnerable to some mortality factor, the unsuccessful generation will make up a smaller part of the overall population than the wildlife manager would expect. If this lack of breeding success continues for a number of years, the population is obviously in trouble.

The age structure of a population is a recording of breeding success and mortality. One look at the ages in a population can tell a biologist a lot, not only about the previous year's breeding success but about the



general success of the population for three or four years into the past.

The age of most furbearers shows in their teeth. The age of a young animal can be determined by looking at the permanent teeth it has, and in older animals, wear patterns in the teeth are usually an indicator of age. In addition, the roots of teeth put on annual growth rings not too different from tree rings.

For the last few years, we have asked for volunteers from our trapping license survey to send us the jaws of furbearers they have taken. We use this sample to establish the age structure of raccoon and coyote populations. Eventually, we hope to have enough cooperation from trappers and hunters around the state to obtain age structure information for beaver, badger, red and gray fox, and mink as well.

The second major population characteristic we're after is the productivity of female furbearers. Each embryo leaves a scar on the mother's womb where its placenta was attached. By dissecting dead animals and counting these scars, we can find out how many young the female bore in her last breeding season. Once we know the age of the female, we can get a good idea of how many young animals a furbearer population is producing, a critical factor in the population's ability to safely support hunting and trapping. Commission personnel collect a sample of furbearer carcasses from

*In the face of great adversity, the coyote continues to be our most successful furbearers. Coyote populations have survived years of bounty hunting and strychnine, 1080, and cyanide control efforts and are thriving in Kansas. Years of this pressure have caused coyotes to breed younger and have more young in order to keep up with constant losses. (Photo by Bruce Kintner.)*



fur dealers each winter so that this information can be obtained. □

**T**he annihilation and subsequent return of beaver populations to Kansas is an interesting tale of exploitation and management of a natural resource. With the advent of mass-production in the manufacture of steel

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## *Back From the Brink*

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leghold traps by 1823, pressure on furbearers drastically changed. Beaver in Kansas were exploited extensively through 1846. At this time, fashion trends had replaced the beaver hat with silk hats and the demand for beaver dropped off substantially. Yet, even though the monetary reward for beaver pelts had dropped, there were too many people who knew no other way of life and continued harvesting beaver, often redoubling their effort in order to make a living on the cheaper fur. By the turn of the century, the damage to Kansas beaver populations had been done and they were scarce. In 1907, what was claimed to be the last beaver in Kansas was trapped near Lawrence.

This prompted the 1911 state legislature to close the beaver season for ten years. At that time, there were still probably scattered colonies spread through the northcentral and western parts of Kansas. It is doubtful that at this time there were more than 500 beaver in the entire state. In 1921, the legislature passed a bill closing the beaver season until the Fish and Game Commission decided a season was warranted. It was not until 1951-52 that the beaver season was again opened. During the forty years that the season was closed there still was a constant harvest of beaver. Initially, the major portion was illegal harvest because of high prices and poor economic times. Later as these populations started to rebound, landowner complaints became more frequent. These complaints were handled several ways. Originally, landowners were given permits to take the beaver. Then, the agency hired people to trap them. Later, game protectors were authorized to take them, and finally they were live-trapped and moved. At various times, policy dictated one of these methods over the others. As the beaver population kept expanding, the significance of this harvest to the population decreased. As a result, the populations increased as did the complaints the agency had to handle. Therefore in 1951, the beaver season was again opened. It had an on-again, off-again existence until 1959 when we began a yearly season.

Today, our annual harvest fluctuates with the pelt prices and judging from the frequency of beaver complaints, our population in Kansas is still increasing. There are few areas with beaver habitat in the state which don't have beaver today. The future looks bright for Kansas beaver except in areas where groundwater is being depleted and rivers such as the Arkansas are being pumped dry. No water, no beaver.

The swift fox is another furbearer that has come back from near extinction in Kansas. The swift, red, and gray foxes were assigned furbearer status in 1943. Prior to this time, they had been bountied and unprotected like the coyote. It was not until 1956 that the swift fox was given protection. Earlier, it was feared that the swift fox had disappeared from Kansas but just prior to 1956 several sightings were reported. Today, sightings of swift fox are not at all uncommon in far western Kansas and roadkilled foxes are found fairly regularly. The feeling is that our swift fox population has started to really rebound. What has caused this is not really clear. It probably has less to do with the closing of the season than with federal laws and regulations. When the federal authorities restricted the uses of poisons like strychnine and 1080, it probably benefited the swift fox. In Kansas, use of poisons was further restricted by state laws. Today, these poisons are strictly controlled and the continued survival of the swift fox is probably assured.

With these comeback stories behind us, it may not be too much to hope that other original Kansas furbearers could return to the state. One of the most likely candidates for reintroduction is the river otter. A common resident along most large Kansas streams before commercial trapping began, otters were reported in the state until 1904 when the last specimen was taken near Lawrence. There has been no trapping or hunting season for otter since 1911. Considering the recent success of Kansas' beaver population, there is little question that the otter could survive if transplanted here. The two major problems standing in the way of this reintroduction are pesticides and overharvest. Sampling of rivers across the state indicates that the pesticide problem may not be nearly as severe today as it once was. The prevention of overharvest obviously depends on the public. In other states like Colorado, there have been successful reintroductions of otter, and local trappers have accepted restrictions to make sure the initially stocked otter weren't taken accidentally. So far, three of Colorado's releases have shown signs of success. Whether a similar program could get off the ground in Kansas depends on the support it gets from the state's trappers and wildlife enthusiasts. □

**T**he biological and survey problems we have described will be solved as years go by and more information is collected. The primary problem which will be facing the sporting public involved with furbearers

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## A Look Ahead

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is one of public opinion. Ohio and Oregon have both had referendums on proposals to curtail trapping, and Washington legislators recently considered a bill to



Lloyd Brockus

outlaw the use of dogs for chasing game and furbearers. The problem is that the public at large doesn't know and understand what the issues are. It is going to be more and more the responsibility of everybody who hunts or traps not to cause bad relations with landowners, other sportsmen, and the public in general. This means that hunters and trappers must maintain high standards of ethical conduct. It means the hunter must stop hiding his trespassing behind the excuse that his dog can't read the signs. It means the trapper must not set traps that could catch coon dogs or pet dogs or leave a caught animal visible to the public. Only through this kind of effort can the roots of the anti-hunt, anti-trap movement be cut. It is a fight which every sportsman must be involved with because the ultimate goal of the anti-trappers is to abolish all wildlife harvest, including hunting. Such an outcome would not only deprive millions of Americans of a unique freedom but would virtually eliminate the financial base on which American wildlife management is built.

In an attempt to upgrade the ethical awareness of trappers and hunters and promote better understanding between the hunter and the trapper, the Kansas Fur Harvesters and the Federation of Houndsmen introduced a furharvester training and licensing proposal in the 1979 legislative session. The principle purpose of the bill was to create one license for harvesting any furbearer, doing away with the need for both the trapping and hunting licenses. It also proposed a course of instruction in ethical behavior of hunters and trappers. Young hunters and trappers would be required to take this course before they could obtain a license. This is one of the biggest steps that sportsmen can take to disarm the anti-groups. It is only through this avenue that we can take away their argument that we have untrained people creating havoc across the state on furbearers.

The Commission strongly urges all sportsmen to look into this bill as it is reintroduced into the 1980 legislative session. □

*Neil Johnson, furbearer biologist for the Fish and Game Commission, stepped into his position when CITES regulations forced the Commission to expand its work on bobcats. Johnson has ramrodded many of the Commission's small game surveys over the last five years, work that has helped prepare him for the problems of collecting and interpreting furbearer data.*