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KANSAS MUSTELIDS
by
Virleen Bailey

Right away someone is saying, "What in the world is a mustelid? I don't remember ever having seen a mustelid in the woods or in the zoo!"

At one time or another almost everyone has been aware of the presence of one type of mustelid, even if he has never actually seen any. The odor of a skunk is a well-known indication of the nearness of the animal. And a skunk is a mustelid. Mustelids form a family group of animals called the Mustelidae (Latin for "weasel").

All mustelids belong to the class Mammalia, order Carnivora (from two Latin words meaning "flesh-eating," referring to the food habits of the group). The Mustelidae occur on all the continents except Australia and Antarctica. Eight species are presently found in Kansas, although the River Otter — once native to the state — has only recently been reintroduced, while the existence of the endangered Black-footed Ferret in Kansas remains in question.

Knowledge of the life history of mammalian species is important, not only for a biologist, but also for the non-scientist with a growing interest in nature. Awareness of the development and behavior patterns of a species is essential for an appreciation of all the aspects of the biology of that species. It is the purpose of this booklet to encourage this understanding by providing a glimpse of the lives and times of the various species of one family group, the Mustelidae.

The family name "weasel" calls to mind the characteristic elongated, sinuous body, small triangular face and secretive manner of the weasel. Many people are astonished to learn that skunks and badgers are also members of the weasel family because body conformation, pelage (coat), and habits exhibit a noticeable degree of difference from the other mustelid species. Typically short-legged, all mustelids possess five toes on each foot and a pair of musk glands in the anal region.

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family members are less vocal than many other mammals, yet each mustelid species has its own set of vocalizations. The Least Weasel, for example, makes four typical sounds. When disturbed near the nest, the adult weasel will chirp and hiss. A threat is met with a hiss; and pain, with a squeal. A trill is heard during a "friendly" encounter; presumably between mates. The Long-tailed Weasel, in addition to a repertoire similar to the Least Weasel's, also gives a raucous screech when alarmed. Minks have a varied, but low-pitched, vocabulary of growls, hisses, and screeches, while Badgers confine their sounds to grunts and growls. Skunks are ordinarily silent, but squeal, growl, hiss, or snarl on occasion. River Otters not only grunt and growl, but also whistle or scream. Familial otters (parents, brothers, sisters) keep in touch when they travel together by frequently voicing bird-like chirps.

Most mustelid genera and species demonstrate a breeding phenomenon called delayed implantation. Once fertilization has taken place, the eggs cease development, remaining unattached to the uterine wall. Then, about 30 days before birth, the egg nestles into the uterine lining and development resumes. Thus, gestation may endure up to several months — an unusually lengthy period for this size animal.

Sleek, dark, small, and stealthy animals, some mustelid species are quite familiar to Kansas residents, while others are rarely seen and, therefore, less well known. Their mostly nocturnal habits set the mustelids apart from many of our more noticeable furred neighbors, where they seem to move in an aura of mystique on the edge of our awareness. In fact, the Least Weasel has been glimpsed in the wild by relatively few Kansans. Not until 1965 was its appearance first recorded in the state, and from then until 1979 it had been reported only in the upper northcentral and northeastern counties — and then but rarely. In 1979, however, a specimen was found northwest of Marion, near the federal impoundment. Additional evidence of its occurrence in Marion County, indicating a yet deeper extension of its range into the state, was provided March 1, 1982, with the live trapping of an adult male south of Hillsboro. During the two years following, a Least Weasel "population explosion" seemed to be taking place in Marion County, with ten additional specimens accounted for. Another specimen was reported from Harvey County in 1983. Sightings from other counties will continue to record the gradual widening of the Least Weasel's range.

The Mustelidae are among the most aggressive of the carnivores, and the genus *Mustela* is no exception. The author personally attests to this character trait! A few years ago a young adult weasel was captured alive and brought to the Tabor College laboratory. The customary procedure in accepting wild-caught additions to the animal-care facility is to record the weight, sex, and measurements of the animal. As the intent was to keep the little animal alive, it was decided to take the vital statistics without anesthetizing it. To demonstrate innate mustelid ag-
gressiveness: measuring the total length and the length of tail, ear, and hind foot took the concerted energy of two experienced scientists! By the time the outraged, diminutive scrap of fur was safely caged, the mustelid anal scent glands were also well documented! Generally, weasels are apt to make their presence apparent to humans through behavioral rather than visual impact. Weasel forays on poorly protected poultry flocks tend to eclipse, in the opinion of the targeted farmer, the value of weasels in keeping rodent populations in check. Yet, while certain individuals sometimes "weasel" into a henhouse, the species as a whole causes relatively little economic loss.

On the other hand, the food habits of the Mink are neither beneficial nor harmful to man's interests. Living chiefly on fish, rodents, and other small mammals, this "weasel-like" animal is, like the Weasel, seen only rarely during the daytime.

Another Kansan of the genus *Mustela* may well be the rarest mammal in North America. The last verified sighting of the Black-footed Ferret in the state was in December, 1957, in Sheridan County. Although there have been other reports since then, they were probably of sightings of the Long-tailed Weasel which is widely distributed throughout the state and somewhat similar in size and coloring to the black-footed ferret. While the Black-footed Ferret is included on the Kansas Endangered Wildlife list, biologists are not discounting its extirpation in the state. Moreover, so seldom is the Black-footed Ferret seen in its reputed national range, that recent discovery of remnant populations in Wyoming attracted nationwide attention.

The disappearance of the Black-footed Ferret from our state and the efforts of the rangeland owner to control the Prairie Dog appears to be correlated. Prairie Dogs, in establishing and maintaining their colonies, clear away large areas of grass for food and for an unblocked view of approaching danger. This habit destroys a significant amount of pasture grass if the colony is of any size. Up to 95% of a Black-footed Ferret's food consists of Prairie Dogs; a single ferret requires a relatively large Prairie Dog colony to satisfy its dietary needs. Since Black-footed Ferrets, like others of their genus, are essentially solitary except during breeding season, several large Prairie Dog "towns" in close proximity are a must for the ferrets to encounter other ferrets to breed. With the number of Prairie Dog colonies drastically reduced in the state, Kansas Black-footed Ferrets appear doomed.

The Badger, Striped Skunk, and Spotted Skunk are perhaps better known than Weasels and Minks to the average Kansas resident. Unfortunately, most people who have seen Badgers have seen dead ones. Because of their roadside embankments for den sites, Badgers will occasionally venture onto the road into the path of passing traffic. Skunks, also, seem to be prime targets for cars, especially during the mating season. Nature's urging to find a mate, together with the need for food to rebuild winter's depleted body fat sends the beautiful black and white little
animals abroad in great numbers and inevitably, many meet death under the wheels of speeding cars.

Because it has become relatively well-adapted to the presence of man, the Striped Skunk is probably the best known mustelid in the state. Even urban Kansans are instantly able to identify the skunk’s pungent aroma — which is said to “carry” up to two miles! With its ability to spray accurately nearly four feet, and with enough musk in its glands for five to six sprays, this little animal is equipped with one of nature’s most potent defenses. The potential implied in this defense system was realized when a young man (now a biology professor) disturbed a skunk at the base of a windmill on his family’s farm. He quickly climbed the windmill tower to a height (established through trial and error) just above the range of the skunk’s “sprayer,” while the determined animal exhausted its reservoir through several successive discharges, the potent material lifting as high as four to five feet!

The skunk also boasts a warning color scheme not found among other mammals. If you will give the matter some thought you will recall various modes of animal protection involving coat color and markings. Those modes include “cryptic” coloration (patterns, shapes, and colors that tend to hide the animal from its predators.) Deer fawns and snowshoe hares, for example, exhibit cryptic coloration and mimicry (resemblance of one organism to another or to an object in its environment) to deceive predators. Tail rattling by the deer mouse in imitation of a rattlesnake has been given as an example of mimicry in mammals. Both of these modes are designed to distract attention away from the animal, whereas the skunk’s glossy black and white pelage is like a flag suddenly run up a pole. The skunk’s presence is unmistakably announced! But in spite of their “double-defense,” skunks are subject to predation. Great horned owls are the most important predators, with coyotes, badgers, and bobcats also feeding on skunks. Man, however, remains the skunk’s chief enemy.

Most authorities believe that Striped Skunks are a major carrier of rabies in the wild. As much as 75-90% of animal rabies in the state has been attributed to skunks. Rabies may remain latent in skunks, that is, a skunk may be a “carrier” without actually becoming sick; yet pass the virus on to another skunk or other mammal, either wild or domestic.

Not many people are familiar with Spotted Skunks. Fewer in numbers in Kansas than Striped Skunks, they are most nocturnal and keep close to shelter while they hunt. Spotted Skunk musk is said to be stronger and more pungent than that of the Striped Skunk. In some rural areas the Striped Skunk goes under the alias “civet cat,” a name that fails to indicate the Spotted Skunk’s membership in the weasel family.

Of particular interest to native Kansans is the reintroduction into the state’s streams of another native: the River Otter, also a mustelid. Closer kin to the Badger than to the weasels, River Otters once swam and cavorted in all the major rivers and creeks across the state. Valued because of their dense, sleek
pelts, otters were trapped to extinction in Kansas, the last one apparently taken near Manhattan in 1904. While occasional, though unconfirmed, reports placed a few otters along the Missouri River on the northeast border, the species was gone from the state until 1982 when biologists from the Kansas Fish and Game Commission released seven animals, secured in Minnesota, on upper tributaries of the Cottonwood River. Since that time, additional animals have been imported. While a few have been unable to handle the stress of moving, it appears that enough of the northern otters have adapted to their new homes for wildlife biologists to feel cautiously optimistic.

The Badger is so seldom seen by even rural people as to arouse curiosity and unfounded tales. Badgers do not hibernate, although like many other prairie species, they spend considerable time sleeping away the cold winter days. During late summer they acquire a store of body fat that serves them well through the cold months. However, they frequently come out to sun themselves on warm days; then dig up some hibernating animal to eat and return to their burrows for more sleep.

Badger morphology is adapted to the animal's semi-fossorial life style. The heavy body, powerful muscles, strong front feet, and long claws are well-suited for digging. Badgers dig at a faster rate than a man can dig with a shovel. In fact, a Badger's life depends on the speed with which it can move earth! Since much of its food is secured by digging, it is essential that the Badger dig faster than the burrowing prey. Moreover, a rapid digging rate is essential to enable the Badger to escape a determined coyote.

Neater in habit than their weasel cousins, Badgers dig a hole in which to bury their droppings. In the past, before protective legislation was enacted, people sometimes made pets of young badgers. Badger pelts were not so much in demand as the furs of other mustelids. The long, coarse hairs were often used as trimming or accents on garments made of other fur, and in the days before electric razors, Badger fur was made into shaving brushes.

An animal’s teeth are an indication of its feeding habits. Weasels and their relatives are members of the order Carnivora, which means “flesh eating.” Carnivore teeth are especially well adapted for securing and eating flesh, especially the canine teeth which are large and pointed for seizing and holding prey animals. The last upper premolar and first lower molar teeth have developed into specialized flesh-cutting teeth, the carnassials, which acts like scissors.
DESCRIPTION. The Least Weasel, in addition to being the smallest of the family Mustelidae, is also the smallest of the order Carnivora. Males are larger than females. Both sexes are uniformly dark chocolate brown with white underparts. In the northern part of the range the winter pelage may be either brown or white. Some individuals show incomplete or no color change at all. When an animal seasonally sheds its hair and grows a new coat, the animal is said to molt. In some species, this seasonal regrowth of hair is characterized by a change of color.

The Least Weasel has a long, lithe body, short legs, and a short tail without the black tip characteristic of other weasels, although a few black hairs may be present. The ears are inconspicuous.

SIZE. Total length, 166-216 mm; tail, 26-44 mm; hind foot, 20-28 mm; ear, 9-15 mm; and weight, 32-63 g.

RANGE IN KANSAS. Primarily found in the northeast and north-central parts of the state, although the range recently appears to be expanding southward and westward into Marion and Harvey Counties.

HABITAT. Usually grassland, particularly in sparse, low ground cover of pastures, stubble fields, and marshy places. Riparian areas have been mentioned as preferred habitat.

HABITS. Home for a Least Weasel may be an appropriated Mole run or Pocket Gopher burrow. Nesting material consists of dead grass and other plant matter and fur from its victims. Least Weasels are nocturnal predators, with field mice comprising the main food source. Insects and small birds may also be eaten. It is extremely aggressive, exhibiting little or no avoidance behavior; and will not hesitate to attack an adversary of any size, including humans. A disturbance may elicit a musky secretion from its anal musk glands.

Least Weasels breed throughout the year, producing more litters and more young annually than any other American weasel, with no evidence of the delayed implantation demonstrated in other weasel species. On the average, five young are produced per litter.
LONG-TAILED WEASEL
Mustela frenata

DESCRIPTION. The most widely distributed weasel in North American, as well as in Kansas, the Long-tailed Weasel is a medium-sized weasel with long body, short legs, and a relatively long, well-furred tail, one-fourth of which is black. Both front and hind feet have five slightly webbed toes. The summer fur is brown on the back with buffy to white throat, belly, and insides of the legs. The winter pelage is white, except for the black tail tip. A few individuals may not change color completely and present a mottled winter coat, whereas some retain the brown color throughout the winter. Long-tailed Weasels in southwest Kansas have white blazes on nose and cheeks. The head is usually darker than the rest of the body. Males are larger than females.

SIZE. Total length, 484 mm; tail, 110-175 mm; hindfoot, 38-50 mm; ear, 20 mm; weight, 170-316 g.

RANGE IN KANSAS. Found throughout the state, most prevalent in eastern and western thirds.

HABITAT. Long-tailed Weasels are found in open grasslands, shrubby areas, woodland borders, and forested stream banks.

HABITS. The home of the Long-tailed weasel is often a shallow burrow abandoned by its former small-animal owner, although a weasel may construct a burrow of its own at the base of a tree or rock. The nest chamber contains little bedding other than the fur and feathers of the prey.

Long-tailed Weasels hunt both day and night, but are more often night hunters. They are extremely aggressive and without fear, killing animals much larger than they. Speed and slender girth enable them to follow prey through all kinds of obstacles. They may chirp or screech as they hunt. Rodents are preferred foods, with small rabbits and ground-nesting birds being eaten if rodents are scarce.

The Long-tailed Weasel breeds in July and August. This species demonstrates the delayed implantation of the fertilized egg that is characteristic of many mustelids. The gestation period (from fertilization to parturition) may cover 279 days. There is a single litter per year, usually of five to eight young.
BLACK-FOOTED FERRET
*Mustela nigripes*

The Black-footed Ferret, *Mustela nigripes*, listed as a Kansas endangered species, may well be extinct in Kansas.

**DESCRIPTION.** This large, weasel-like animal has a yellowish brown to buffy body, black forehead, black-tipped tail, black feet, and a brown mid-dorsal stripe running from the head to the base of the tail. Tail length is approximately one-third the body length. The muzzle is white. Males are slightly larger than females.

**SIZE.** Total length, 500-700 mm; tail, 90-150 mm; hindfoot, 57-68 mm; ear, 27-32 mm; weight, 530-590 g.

**RANGE IN KANSAS.** Once an inhabitant of the western short grass prairie (see map), the Black-footed Ferret’s occurrence was associated with that of the Prairie Dog. In recent years scientists have been carefully searching for signs that the Black-footed Ferret may still be living within the boundaries of the state.

**HABITAT.** The Black-footed Ferret may be dependent on the burrows of the Prairie Dog for shelter, on the short grass rangeland of the high plains.

**HABITS.** Black-footed Ferrets are mainly active at dusk and at night. They seem to be solitary rather than social, with usually only a single individual or a female and her litter occupying a Prairie Dog town. They seem to prefer old Prairie Dog dens, but are excellent burrowers and may construct their own.

While the diet consists mainly of Prairie Dogs, Black-footed Ferrets are also known to eat voles, mice, rabbits, and ground-nesting birds.

Breeding may occur in April or May, with two to five young born approximately 40 days later. Nothing definite is known about the reproductive habits. Probably only one litter is produced each year.
MINK
Mustela vison

DESCRIPTION. The Mink has a long, slender, weasel-like body, with a well-furred tail about a third of the body length. The legs are short and on each foot are five slightly webbed toes. The body's weight is supported on the toes. The ears are short and rounded. The dense, oily body fur is a rich, dark brown with a white chin patch and occasional small white spots on the belly. The tail is the same color as the body fur, with black tip hairs. A pair of anal musk glands, typical of mustelids, secretes a strong odor when the animal is aroused. Mink is one of the most valuable fur-bearing animals. Most commercially utilized pelts are from farm-grown animals, however.

SIZE. Total length, 500-685 mm; tail, 155-240 mm; hindfoot, 50-80 mm; ear, 22-25 mm; weight, 616-1137 g.

RANGE IN KANSAS. Although the Mink is found across the state, it is less common in the western third. Mink appear to be more abundant in the northcentral and eastern regions.

HABITAT. Mink are rarely found any distance from water. Preferred habitat is along stream banks, lake shores, timber edges near water, and marshy areas.

HABITS. Dens are usually under the roots of trees, cavities in banks, hollow trees, or deserted muskrat burrows and lodges, seldom over 600 feet from open water. The nest chamber may have several entrances and contains grass or leaves and fur. Males and females maintain separate dens.

Mink are clearly nocturnal but come out at dawn or dusk and sometimes during the day. They are adapted to water, and aquatic prey figure largely in their diet, although preferred foods appear to be field mice, rabbits, and squirrels.

Mink life expectancy in the wild may be from four to six years. They exhibit the phenomenon called delayed implantation, with gestation enduring as long as 75 days. A single litter of three to five kits is born in the Spring. One authority states that while Mink are essentially solitary animals, the male may help to care for the young.
BADGER
*Taxidea taxus*

**DESCRIPTION.** The Badger is the largest mustelid residing in Kansas. It has a squat, flattened appearance, with yellowish gray dorsal fur and long, white-tipped, black-banded guard hairs that are longest on the animal's sides. A white stripe runs medially from the nose along the head to the shoulders. Nose and face are dark with white cheek patches and black spots in front of the small, rounded ears. Underparts are white to buffy, and the tail is short and bushy. The forefeet are somewhat webbed, and are equipped with strong, extremely long, recurved claws.

**SIZE.** Total length, 46-56 cm; tail, 10-15 cm; hindfoot, 98-112 mm; ear, 45-56 mm; weight, 5-7.3 kg.

**RANGE IN KANSAS.** Found in nearly all sections of Kansas, except for the more wooded southeast counties. The Badger is most numerous in the central third of the state.

**HABITAT.** Preferred habitat is dry, open country, especially rolling grasslands with loose sandy soils.

**HABITS.** Badgers are mostly nocturnal, but are often seen along roadsides in the early morning. Dens are excavated by these powerful diggers in banks and roadside ditches. A large mound of earth usually marks the entrance, and the main tunnel leads to a central chamber about 0.6 m below the ground. During bad weather, Badgers have been known to block their entrances.

Although Badgers mate in late summer, embryo development is essentially delayed (delayed implantation, a common characteristic among Mustelidae) until about February, and the birth of 1 to 5 young occurs in April or May. The young remain with the mother until early autumn. Small, burrowing mammals make up the diet, although some insects and reptiles are eaten. A trait specific to the Badger among the Mustelidae is its habit of burying its feces.
Three subspecies of *Mephitis mephitis* (Schreber) occur in Kansas: *M. m. avia* is found in the northeastern quarter, *M. m. mesomelas* in the southeast quarter, and *M. m. varians* in the western two-thirds.

**DESCRIPTION.** The Striped Skunk, about the size of a housecat, is probably the best known mustelid in Kansas. It is a beautiful animal with a black body, narrow white median forehead stripe, and a broad white area on the nape which usually divides into a V at the shoulders and continues as a broad stripe on either side to the base of the tail. Much variation in length and width of the side stripes has been noted. White hairs usually tip the black bushy tail. The scent glands, situated on either side of the anus, are well developed.

**SIZE.** Total length, 51-71 cm; tail, 18-25 cm; hindfoot, 54-89 mm; ear, 25-35 mm; weight, 1.8-4.1 kg. Males are larger than females.

**RANGE IN KANSAS.** Throughout the state, although less numerous in the west-central region.

**HABITS.** Striped Skunks are chiefly nocturnal. They forage throughout the night and occasionally are encountered during the day. They may dig burrows themselves or enlarge and occupy abandoned burrows of other small animals. In cold weather several den up together in deeper burrows and sleep. Not true hibernators, they venture out during periods of milder weather.

The Striped Skunk breeds in later winter, with gestation averaging 63 days. Usually six or seven kittens make up a litter, with a single litter per breeding season. Preferred food depends largely on what is available in the animal's locality, although insects are the single most important dietary item. They also eat small rodents, bird eggs, amphibians, crayfish, berries, and seeds.

Striped Skunks are known to carry rabies. One source states that Striped Skunks may be a major reservoir for rabies in wild animals populations, as rabies can remain latent in skunks, to become active later. The skunk may harbor the virus without exhibiting the symptoms.
DESCRIPTION. Known by the popular name “civet cat,” the Spotted Skunk has a slender, more weasel-like body than the Stripped Skunk. In fact, its musculature is such that the Spotted Skunk moves more in the manner of a weasel than the Stripped Skunk. Its front claws are shorter than those of its striped relative, and the black body fur is marked by four to six broken white stripes along the neck, sides, and back, with a white triangle on the forehead. The tail is solid black. Like the Striped Skunk, the Spotted is equipped with a pair of anal musk glands.

SIZE. Total length, 34.5-57 cm; tail, 11.5-23 cm; hindfoot, 33-70 mm; ear, 25-26 mm; weight, 425-661 g. This is the smallest North American skunk.

RANGE IN KANSAS. Found mainly in the east and south, and occasionally in the northwest, they apparently avoid the southwest. It is not common, even in the more frequented part of its range.

HABITAT. In the eastern section of the state, primary habitat seems to be forest edges and upland grasslands. Elsewhere, riparian areas are preferred.

HABITS. The Spotted Skunk is primarily nocturnal and, unlike the Striped, is seldom seen by day. It is an excellent climber, and, while foraging, prefers to keep near some form of shelter. There may be more than one den site per skunk, and conversely, several skunks may frequent a single den. Winter dens extend below the frost line. Spotted Skunks do not hibernate.

A wide variety of food, both plant and animal, is eaten, but rodents, insects, and fruits are the chief items.

Spotted Skunks breed in early spring, somewhat later than Striped Skunks. The extended gestation period (120 days) indicates that Spotted Skunks, like most of the mustelids, exhibit delayed implantation of the fertilized egg in the uterus. A single litter, averaging five kittens, is born in June. They reach adult size in October.

Although Spotted Skunks sometimes carry rabies, they may not be as threatening to the health of other animals as Striped Skunks, due to their fewer numbers.
RIVER OTTER
*Lutra canadensis*

**DESCRIPTION.** Short-legged, with fully webbed feet, the River Otter is a mammal "designed" for swimming. It has a round, flattened head with small ears and a short, thick neck the same diameter as the head. The thick-based, heavily-muscled tail appears to merge imperceptibly into the body. Sleek, dark-brown, oily dorsal fur is overlain by glossy guard hairs. Venter fur is light brown with a silvery sheen. Like other Mustelidae, Otters possess anal scent glands.

**SIZE.** Total length, 96-119 cm; tail, 30-43 cm; hindfoot, 110-139 mm; ear, 12-24 mm; weight, 5-10.4 kg. Males are larger than females.

**RANGE IN KANSAS.** Formerly, the River Otter was found along all the major rivers and larger creeks in the state. The last known specimen in Kansas was captured in September, 1904, near Manhattan. From that time until the recent (1983) reintroduction of River Otters along the upper reaches of the South Cottonwood River in Chase County, this interesting animal probably was not a resident in the state. However, one authority suspects that it may still occur naturally in the extreme northeast, along the Missouri River.

**HABITAT.** Preferred habitat includes aquatic situations along streams and lake borders.

**HABITS.** Mostly active after nightfall, otters also venture out during the day. Dens may be constructed under tree roots, driftwood heaps, or in abandoned bank burrows opening under water. Throughout their home range (the area centering around the den where they forage for food), scent "posts" are piled up and marked with urine and feces signaling their presence to other otters.

The diet of the River Otter is primarily fish, but small rodents, birds, eggs, aquatic animals, and amphibians are eaten.

Breeding occurs during the winter, from December to April, with embryo implantation delayed until the following January when development is resumed (gestation period of 288 to 380 days). Two young make up the average litter. Both parents apparently care for the young, even after they leave the den.
REFERENCES


NEW EDUCATIONAL FILMSTRIP HIGHLIGHTS AN ENDANGERED SPECIES: SOIL

SOIL—We Can't Grow Without It, a new fifteen-minute filmstrip and slide/tape kit, is now available from the National Wildlife Federation. The kit is designed for use in schools, nature centers, and meetings of youth and civic organizations. The audio-visual production offers an excellent introduction to soil—one of America's most vital resources.

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