

MAMMALS

Status: Common, Native Resident

BEAVER

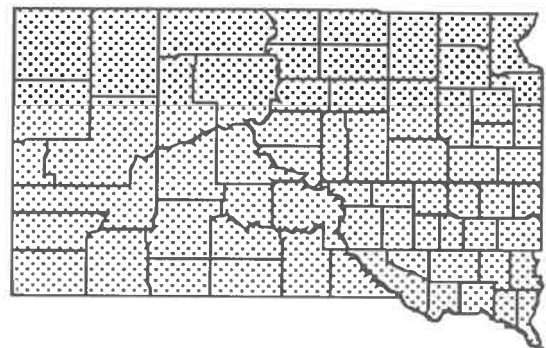
(*Castor canadensis*)

Description

Beavers are often portrayed in American folklore and popular culture as busy little animals chewing down trees with their big teeth, building dams, and hauling mud and their babies on their paddle-like tails. When you think of beavers, do you think of real animals or do you think of a cartoon or advertising image? Because there are so many images of beavers in the media, the real animal can easily be confused with the stereotype. In the case of the beaver, the scientific facts are far more interesting than the simple image of our popular culture.



Beavers are the largest *rodents* in North America. Like mice and squirrels, beavers have front teeth that are large, strong and never stop growing. They have dark brown fur, small eyes and a large, flattened, scaly tail. They may weigh up to 60 pounds (27 kg) and measure 4 feet (122 cm) long. Fossils of the ancestors of modern beavers have been found in South Dakota. These ancestors were more than 6 feet (183 cm) long and weighed up to 300 pounds (136 kg).



Distribution

Beavers are found wherever there is permanent water and a supply of woody

plants. Beaver numbers have been increasing enormously for the last fifty years wherever there is suitable habitat

for *foraging* associated with lakes, ponds, streams or rivers.

Natural History

Beavers have many *adaptations* for living in the water. They have large, webbed hind feet for swimming and a flat tail that is used as a rudder. Their ear and nostril openings can be closed to keep out water. Beaver eyelids are transparent so they can see through them as they swim underwater. Floppy lips seal behind their front teeth so that the beavers can carry objects under water while keeping their mouths closed. Beavers can't breathe underwater, but they have a special respiratory *adaptation* that allows them to store enough oxygen to swim submerged for half a mile. Beavers produce a water-proofing oil, called *castoreum*, which they groom into their fur with their feet. This keeps them dry, even underwater. Their *dexterous* front feet can be used for holding branches, grooming, digging and dam construction. Beavers have adaptations that allow them to eat bark and wood. Their teeth are ideally suited for cutting down trees. While mammals cannot digest the *cellulose* in wood, bacteria can. Bacteria living in the digestive system of beavers digest the *cellulose*, and then the beavers digest the bacteria. Although these specialized *adaptations* make beavers successful, they limit the animals to habitats for which these adaptations are well-suited.

Beavers are *nocturnal herbivores*, which means they eat plants at night. As green plants become available in the spring and summer, beavers eat fresh buds, greens, grass, leaves and *aquatic* plants. When beavers cut cottonwood and willow trees during the fall, their activity is most visible. Because beavers don't *hibernate* they must store food for winter, either as fat on their bodies or in a food cache. Trees are trimmed, cut into convenient sizes, and carried to the dam site. There, beavers either eat the bark, turning branches in their forefeet as humans eat an ear of corn, or store them in underwater food piles near the lodge so that

they can get to them easily even when the beaver pond is frozen over. Beavers eat the bark and *cambium* layer, of each limb. The survival of a beaver colony depends on the availability of this under-ice food supply.

In addition to cutting trees to eat, beavers cut trees to build dams and lodges. Small trees 2 to 6 inches (5-15 cm) in diameter are usually chosen. A willow 5 inches (12.7 cm) thick can be cut down in 3 minutes. Dams serve at least two purposes. The ponds created by the dams serve as a *moat* protecting beavers and their homes from predators. The dams also create ponds deep enough so that the bottom does not freeze during the winter, which allows beavers to travel underwater to their food *cache*. Dam building allows beavers to live in shallow streams and creeks they otherwise would not be able to inhabit. Winter is a time of limited activity for the beaver. With ice covering a beaver pond, activities are generally restricted to foraging under the ice, feeding, sleeping and grooming. Dams are constantly maintained. The sound of running water will cause a beaver to begin dam building behavior. A dam in disrepair has probably been abandoned.

Beavers build two types of homes. In South Dakota they typically dig a burrow in the bank of a river or stream with the entrance under the water level. Burrows are dug from 6 to 20 feet (189 - 610 cm) into the bank before an above-water room is excavated and lined with fresh shredded bark. If the soil is too sandy, the root systems of trees and shrubs will be used as a support. If a stream has low banks, the entrance might be marked with a house of logs and sticks plastered with mud.

The beaver lodge is built in standing water of lakes, ponds or marshes. It consists of limbs and logs plastered with mud and sod. The inner chamber always has an air vent and is lined with grasses or shredded bark to absorb moisture. Entrances are underwater. The chief construction materials of aspen, willow, cot-

tonwood, and maple are also preferred foods.

A beaver family includes a pair of adults, yearlings and kits. A colony consists of one or more families. Adult beavers mate for life. They breed once a year and four months later, in May or June, a litter of 4 to 5 kits is born, each weighing about 1 pound (0.5 kg). The kits are born with fur, front teeth and their eyes open. As soon as one half-hour after birth they can swim, and within a week they are skillful swimmers although, if tired, they may be carried on their mother's back. They are weaned by 2 months. The young remain with their parents for 2 years before they leave to start their own families. Young beavers may travel more than 30 miles (48 km) before finding a mate and a place to settle. One marked animal in North Dakota traveled 148 miles (237 km) before finding a suitable home. Beavers generally live 8 to 10 years, but have been known to live 20 years.

Beavers are protected from predators, such as coyotes, dogs, bobcats, and mountain lions by their *aquatic* habits. When disturbed they will slap their tails on the water surface to warn the colony of danger and then dive to deep water. They can stay submerged at least 25 minutes, but most dives last 1 to 2 minutes. Beaver populations are affected by drought and floods more than by predators. Human activities exert the greatest effect on beaver populations.

Significance

Beavers have been used as a resource by humans throughout history. From the time of the early Greeks through the 18th century *castoreum* was regarded as a cure-all health remedy (it contains salicylic acid, one of the main ingredients of aspirin). Today *castoreum* is still used as a fixative in perfumes. Beaver fur was in constant demand for robes and coats, clothing trim and hats. The thick under-fur of beavers, called felt, once was used to make a fabric of the same name. Today this fabric is made from synthetic fibers.

By the 1600's, beavers in Europe and Asia were close to extinction.

Much of the exploration of North America was a result of the search for beavers. Beaver pelts were the single most valuable commodity in much of North America through the early 1800's. Some of America's greatest financial empires and real estate holdings were originally founded on beaver profits. Close to 3 million beaver pelts were sold by The Hudson's Bay Company between 1853 and 1877. Profits were often enormous; one trapper earned \$50,000 in a single year. Beaver trapping shaped South Dakota history. Many of the first Europeans in South Dakota were French fur trappers. Such place names as Pierre, Belle Fourche and Flandreau are legacies of this era.

Beavers probably have a more profound effect on their immediate environment than any other mammal except humans. The greatest environmental change results from their building of dams. Damming of streams raises the level of the water table. Many species of trees cannot survive in waterlogged soil and their death allows the spread of species that are adapted to permanently wet soil. These include willows, cottonwoods, and alders, which are the preferred source of food for beavers. Beaver ponds are a favorable habitat for many forms of life: insects lay eggs in them, fish feed on the insect larvae, and muskrats, mink, shorebirds and fish thrive. There are over fifty species of animals that live in beaver ponds.

Management Considerations

Intensive trapping continued for so long that beavers disappeared from much of their original range. Recently beavers have returned to areas where they have been absent and populations have increased dramatically. There are several reasons for this recovery. Beavers are now managed by the state and trapping is regulated. As people have become more

urbanized, public opinion has reduced the demand for furs. Trapping has become less profitable although beavers still have commercial value and are trapped in South Dakota.

In some areas beavers have become an agricultural pest as their numbers have increased. They cut many trees and occasionally they cut valuable hardwoods

or fruit trees. Their dams may impound irrigation water, alter stream courses, or raise water levels to flood crops, water wells or sewage systems. Occasionally local roads and highways may be flooded. When the interests of a landowner are jeopardized, beavers may be harvested or transplanted by conservation personnel to a more favorable site .

Glossary

Adaptation - a structure or behavior that improves the species' chances for survival or increases its rate of reproduction.

Aquatic - referring to fresh water.

Cache - a hiding place used for storing food supplies.

Cambium - the moist green layer just beneath the bark that gives rise to new wood and bark.

Castoreum - an oily, brown, odorous substance from beavers and used as a perfume fixative.

Cellulose - a carbohydrate substance that is the chief component of cell walls or woody parts of plants.

Dexterous - having the ability to use one's hands effectively.

Foraging - searching for food.

Herbivore - an animal that eats plants.

Hibernate - to pass the winter in a dormant state with lowered metabolism and heart rate.

Moat - a deep, water-filled ditch often constructed around castles for protection from enemies.

Nocturnal - being active at night.

Rodents - the group of mammals that include mice, rats and squirrels and who are recognizable by their large front (incisor) teeth and lack of eye (canine) teeth.

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Written by:

Donna Graham, Rapid City, SD 57701. ©1997.

Reviewed by:

Barry Parrish, Wildlife Biologist, U.S. Forest Service, Custer, SD 57730.

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