



# Beaver

The beaver, *Castor canadensis*, is North America's largest rodent. Before European colonists arrived, the species was plentiful from the Mexican border to the Arctic. Beaver fur is thick and considered valuable. Raw pelts brought \$4 each in the early 1800s. Adjusting for inflation, beaver pelts back then would be about \$80 each in today's dollars. The fur was used to make top hats and to trim clothes. Tremendous demand for beaver fur sent trapping expeditions throughout the unexplored West, stimulating expansion of the new American nation.

By the end of the nineteenth century, uncontrolled trapping and habitat loss eliminated beavers in Pennsylvania and most eastern states. But, today this aquatic furbearer is back. Aided by modern wildlife management, the beaver has repopulated most of its former range.

Beavers are found throughout Pennsylvania with the highest concentration found in the glaciated northwestern and northeastern counties. Using branches, mud and rocks, beavers build dams and lodges on streams and creeks, and along the edges of lakes and rivers. Beavers are shy and mainly nocturnal, but those interested in catching a glimpse of a beaver may get lucky by staking out a beaver pond in the early morning and near sundown.

## Biology

Adult beavers weigh 40 to 60 pounds on average and grow up to 40 inches in length. Beavers weighing in excess of 70 pounds have been recorded in Pennsylvania. They have blunt heads, short necks and legs, and stocky bodies. Their coat is glossy tan to dark brown above, paler below. The

pelage consists of dense underfur covered with longer guard hairs. The thick pelt and deposits of body fat insulate the animal and allow it to remain in the water many hours at a time.

A beaver's tail is trowel-shaped, 8 to 12 inches long and five or six inches wide. It has a scaly, leathery covering. When this furbearer swims, it uses its tail as a propeller and a rudder. The tail also supports a beaver when it sits erect or gnaws a tree on dry land. A sharp slap of the tail on water is a signal warning other beavers of danger. Tail slapping is also a diving aid that gives a beaver extra propulsion to tip its body down for descent and may not always be intended to be a danger signal.

A beaver's front feet are remarkably dexterous. They have long claws and are used for digging, handling food and working on dams. The hind feet, broad and webbed between the toes, propel the animal through the water. The second claw from the inside on each hind foot is double (or split) and is used for grooming.

A beaver's vision is weak, but its hearing and sense of smell are acute. Most food is located by smell. Beavers are vulnerable to predators on land but relatively safe in water. A beaver can stay submerged up to 15 minutes. Membrane valves seal the ears and nostrils from water while it is submerged.

Both males and females possess castor glands, which produce an oily, heavily-scented substance called "castoreum," used for marking territories. Commercially, castoreum is used as an ingredient for some medicines, perfumes and trapping lures. Beavers have two other

glands, one on each side of the urogenital opening, which secrete oil. The beaver rubs this oil into its fur to repel water.

A beaver's ever-growing front teeth maintain sharpness despite the animal's frequent gnawing. The teeth are self-sharpening, in part, because the enamel on the front of the teeth has a higher iron content than the enamel on the back. The front of the tooth is harder and the back wears more quickly producing a chisel-shaped tooth. The iron produces the orange-red color of the incisors. The upper and lower incisors are the primary cutters. A beaver can close its lips behind its incisors to keep from swallowing or inhaling water as they gnaw on and transport saplings while underwater.

Beavers eat vegetable matter. They prefer soft plant foods, including grasses, ferns, mushrooms, duckweed, algae, and the leaves, stems, or roots of water plants such as cattails and water lilies. When soft foods are available, beavers cut down few trees unless they are needed for dam or lodge repair.

They also eat the bark, twigs, and buds of aspen, maple, willow, birch, black alder and black cherry trees. In autumn, beavers anchor branches, twigs, or small logs, which they have cut, into the mud of their home ponds. Then when the pond freezes over in the winter, they still have access to this food cache.

Beavers fell trees to get at the higher, newer, more succulent growth that is found high up in the tree canopy. After eating, the beavers gnaw the trees into pieces which are then used in building dams or lodges. Small trees are eaten more completely than larger, woodier ones because the material is more digestible than that of older trees.

Beavers usually cut trees within 200 feet of the water's edge. They feel safest within this zone, and the trees do not need to be dragged far. They sometimes dig canals 1 to 4 feet wide and up to two feet deep from the pond inland to float logs back to the dam.

Beavers build dams on streams and creeks. This building behavior is instinctive, rather than learned and is also exhibited by beavers in captivity. Dams are made of cut tree branches packed together with mud and rocks. While a dam may hold back a sizeable pond, it also allows most of the stream flow to seep through. A dam backs up a barrier of water around the beaver's home lodge, much like a moat around a castle.

Dams require periodic maintenance, especially after heavy rains and during snow melt. Beavers may heighten the dam to raise the water level so they can reach more food without having to leave the water. They may also build additional dams upstream for the same reason.

For shelter and rearing young, beavers construct lodges where possible. These are dome-shaped islands of sticks and logs plastered with mud. A lodge's interior compartment (the den) may be up to five feet high, with a small air hole at the top. The mud freezes in winter, making the lodge impregnable to predators that might visit. The entrance to a lodge, whether it's on the bank or in the middle of a pond, is always below

water level, while the den is dry and above water. Along fast, turbulent streams or creeks and rivers too wide to dam, beavers either burrow deep into the bank or build lodges at the water's edge.

Beavers are generally congenial, although rivals fight during the January-March breeding season. Females are believed to be monogamous. A female usually drives her family out of the lodge when she nears the end of the 12-week gestation period. In April or May, she bears 3 to 6 (usually 4 or 5) young called "kits." Newborns weigh about a pound; their eyes are open, teeth erupted and they are fully furred. If an emergency arose, they could swim, but usually they nurse 5 to 7 weeks before venturing from the den.

Young remain with their parents for up to two years. When the young mature sexually at about 21 months, they leave on their own or are driven off by adults. Subadults (2-year-olds) usually travel downstream to look for their own territories. Dispersing beavers occasionally strike out across dry land – and may be found miles away from water.

Dogs and occasionally bobcats, bears and coyotes may kill some beavers, especially young ones away from the water. However, beavers typically have little to fear from predators. Some are struck by cars, and a few die when hit by trees they felled. Beavers live up to 15 years in captivity. The estimated lifespan in the wild is 10 to 12 years.

## Population

By the beginning of the twentieth century, beavers were extirpated from Pennsylvania. In 1903, the state legislature passed a law protecting the species. In 1917, the Game Commission released a pair of Wisconsin beavers in a remote Cameron county valley. Subsequent releases of 100 beavers occurred during 1918-1925. Beavers bought from Canadian agencies were live-trapped and released on refuges throughout the state. By 1934, the population was large and stable enough to allow a trapping season. That year, 6,455 beavers were harvested. In 2014 (80 years later) 17,602 beavers were harvested. Today, beavers are abundant and found throughout Pennsylvania.

Beavers live in colonies. A colony is a family group with occasional unrelated members occupying a pond or a stretch of stream, feeding from a common food supply, and maintaining a common dam or series of dams. Members of one colony may live in multiple lodges or bank burrows. Beavers within the family group maintain and defend a territory. Colony territories do not overlap.

Generally, 5 to 12 beavers occupy a colony. In the summer, a colony may include parents, young born the previous year (subadults) and kits. The following winter, kits, now 1-year old, are allowed to remain in the colony. The adults drive any residing subadults from the colony before the birth of a new litter. The 2-year-old subadults move to new sections of stream, find mates, and build their own dams and lodges. This disperses the population and establishes colonies in new areas.

Beavers can and do become troublesome for some people. Water backed up by their dams floods pastures, crop fields and roads, disrupts public water supplies and kills trees. They also cut down valuable shade trees and excavate unwanted channels. Trapping has proven to be an acceptable and economical method of controlling their numbers.

## Habitat

Beavers prefer slow-moving streams and rivers narrow enough to be dammed. They also live along rivers and around forest-edged lakes and marshes. They prefer remote areas, but will live near human development if other sites are not available.

Beavers prosper in aspen and willow environments. Studies have indicated that each year an adult beaver cuts up to 300 trees (most having diameters less than three inches) and that under average conditions, one acre of aspen supports a five – or six-member colony for 1 to 2½ years.

The dam building behavior of beavers affects many other wildlife species. After a dam is built, a portion of a wooded valley is changed to an open pond. Water covers the bases of trees, preventing oxygen from reaching the roots, and kills the trees within a few years. These “snags” provide homes for many cavity-nesting birds. Ponds vary in size from

a few to many acres. They provide habitat for ducks, geese, shore birds, fish, reptiles and amphibians. Otters, raccoons, mink, herons, ospreys, hawks, owls and other predators are attracted by the rich variety of life and food.

Healthy beaver populations can support moderate levels of annual harvest, which allow managers to balance beaver populations and human concerns. Valuable beaver wetlands can be maintained for 20 to 30 years or more as long as the food requirements of the colony do not exceed available food resources. Left unchecked, beavers will exhaust their food supply in the area and will move on. Their abandoned dams may last several years longer, accumulating silt, leaves and other organic material. Finally, during the spring thaw, or after a long, hard rain, the dam gives way. Most of the pond water drains off, leaving an open area. Grass grows in the rich soil and later, berry bushes and shrubs grow. Insects and small rodents thrive in the new habitat. Deer, bears, grouse, turkeys, songbirds and insectivorous birds come to these beaver meadows, which provide edge and openings in the forest.

The stream continues to flow through the meadow, amid many standing dead trees. Aspens and willows send up shoots. In time, another beaver colony may find this valley to be good habitat.

