BEAVER

Castor canadensis

The beaver *(Castor canadensis)* is the largest rodent in North America. It is easily recognized by its large, flat, bare, scaled tail and fully webbed rear feet. Beaver range in North America includes most of the United States and southern Canada. The beaver played an important role in the early colonization of North America, as trappers came in search of pelts. At one time, the beaver population had declined to the point that they were absent from most of their range. However today, beaver populations have rebounded and, in some areas, they create conflicts with humans.

VERMONT WILDLIFE FACT SHEET

Physical Description

Beavers normally have dark brown fur with lighter highlights but some with black, white, and silver coats have been reported. The under fur is very dense, short, and waterproof, with sparse, coarse, shiny guard hairs protruding through.

An average adult beaver weighs 40 to 60 pounds. The heaviest known beaver weighed 110 pounds and was taken by Vernon Baily in 1921. Baily caught the record-setting beaver on the Iron River in Wisconsin.

The beaver is a muscular, compact animal with strong, short legs, each having five toes with heavy claws. Its broad, horizontally flattened tail (unlike the muskrat's which is vertically flattened), serves as a rudder and paddle. On land it supports the beaver when sitting up. It also functions as a warning signal to other beavers when it is slapped hard against the water's surface. Additionally, it helps to regulate body temperature through controlled blood flow.

A beaver's head is relatively small and round with large, well developed incisor teeth for gnawing wood. As with other rodents, these teeth grow continually. If opposing teeth do not match correctly, allowing normal wearing and sharpening action, they can grow excessively to the point where eating is nearly impossible and starvation results. Flat-surfaced molars at the rear of each jaw grind the beaver's food.

Beaver are well adapted to their aquatic environment. The ears, nose, and mouth of the beaver are well adapted to swimming underwater. A clear membrane functions, like an inner eyelid, and covers the eyes when the beaver is underwater so that it can see clearly. Its ears, nose, and mouth can also be closed underwater.

Beaver can stay underwater for up to 15 minutes due to their ability to efficiently transfer oxygen from the lungs to the bloodstream and to tolerate a build-up of carbon dioxide in the body. Their heart is more similar to that of an aquatic mammal than a terrestrial one.

The front feet of a beaver are not webbed, but have strong claws for digging. Front legs are tucked up against the chest when the beaver swims. The rear feet are large and webbed for powerful swimming and provide support when walking over mud, like snowshoes. When swimming at normal speed, these feet are paddled alternately, similar to the way people swim. When the beaver swims at higher speeds, it undulates its whole body up and down, like that of a seal. In this situation, the rear feet and tail work together as a rudder, allowing for quick changes in direction.

The rear feet of the beaver have five toes. Each toe has a claw, but the second toe from the inside of each rear foot has a large, double claw, which is used to comb the fur and catch parasites. While combing its fur, the beaver applies a water-repellant oil, which comes from two glands located under its tail. These glands are distinctly

different from the larger 'castor' scent glands that produce castoreum, a yellowish, pleasant -smelling oil, that is deposited on small mounds of mud and acts as a scent communication between beaver. These scent posts vary in size from one small patty to a mound of them as high as two feet.

The sexes are difficult to distinguish except for pregnant or nursing females. Four mammary glands are evident when the young are nursing. A beaver has a 'cloaca', similar to that of bird, fishes, and amphibians. This is a chamber containing reproductive, intestinal, and urinary systems with a common external opening.

Life Cycle

A beaver colony is usually comprised of three generations: the adult male and female, their yearlings, and the kits of the year. These colonies average a half dozen or so individuals, although as many as twelve have been recorded.

Beavers tend to mate for life, but there are exceptions to this rule. The breeding season peaks in mid-February. The gestation period averages 106 days, and a single litter is born each year. Litters vary from one to nine kits, but three to five is normal.

Kits are born from mid-May through early June. They are fully furred at birth but their eyes can only open slightly. They weigh 8 to 22 ounces and are about 12 inches in length (including the tail). The kits begin to swim when they are only a few days old. At two to three weeks, they begin to eat solid food and are weaned at about six weeks.

In late winter, before the litter of the year is born, the mature two-year old beavers are either driven away by their parents or leave on their own to establish a new colony.

Beavers communicate by leaving scent and by making soft whining sounds. The young beavers vocalize often. Splashes motivate the kits to swim and tail slapping on the surface of the water teaches them how to signal for danger.

Beavers live up to 11 years in the wild, but those in captivity have reached 20 years of age.

Food Items

Beavers are herbivores and consume bark, leaves, twigs, and roots growing near water. The most preferred food is the inner bark of deciduous trees, called the cambium layer. During warm months, the beaver's menu includes bulrushes, sedges, pond lily roots, and other aquatic plants. Their woody diet includes the bark of poplar, alder, paper birch, willow, gray birch, red oak, red maple, cherry, and viburnum. White cedar, hemlock, black spruce, red spruce, white pine, pitch pine, balsam fir, and larch are also eaten, sometimes even when more preferred foods are readily available.

Since beavers do not hibernate in the fall, they store their food (branches of edible trees) for winter in a large underwater pile near the lodge (food cache), pulling mud or rocks over the base stems. The pile soon becomes waterlogged and settles to the bottom. A family of eight beavers requires one ton of bark to survive the winter.

Habits and Habitat

Beavers are found in Vermont along wooded streams, marshes, lakes, and ponds. They seek areas of flowing water where the volume of water is reliable or still waters where water levels are consistent. An abundance of desirable trees for food and construction of their lodges and dams is also important. Dams, lodges, burrows, and canals are built in the selected area.

Beavers are one of the only animals, other than humans, that actually modifies the existing habitat to suit its own needs. Beaver wetlands are cyclic. Beavers move into an area and build a dam, some of which can be very large. The dam creates a pond that allows the beavers to access food more easily without having to move too far from the water. For the first seven to ten years, beaver ponds are incredibly productive, and the food web extremely complex. Small microorganisms provide food for insects and other invertebrates, which provide food for amphibians, which provide food for fish, which provide food for birds and mammals, and on and on. As the beaver begins to run out of available food, it attempts to expand the size of the pond to access more. Usually after 10-20 years, the food supply is depleted, and the beavers abandon the site for someplace better up or down stream. The

abandoned pond eventually reverts to meadow, grows a new food source in the form of willows, alders, and aspen, and the process starts over again.

Beavers live in bank dens (hollowed out tunnels in the banks of rivers or ponds) or in lodges. The lodges are built out of sticks, stones, leaves, grass, sod, and mud. Branches are first piled together, then the beavers swim up underneath the pile to hollow out a central living quarter. This inside chamber is built above the waterline and is connected to the outside with one or more underwater tunnels. The outside of the lodge is covered with sticks and mud, which insulates it in the winter. The inside chamber is then lined with grass and shredded bark. There is also a ventilation hole to the outside that allows fresh air to circulate inside the chamber.

The lodges are almost always well placed at a natural low point with solid anchor points on each side of the brook or stream. A long dam is often zigzagged to make use of intermediate anchor points. Structures are constantly maintained when they are not iced in. Additional dams are often built upstream or downstream from the main dam to create smaller reservoirs that increase the safe foraging range. A family of beaver can build a 35 -foot dam in a week.

Beavers are most active in late afternoon and throughout the night. They try to stay in the water or as close to the water as possible. Beavers swim at speeds of about 2 mph, and can stay underwater for as long as 15 minutes without coming up.

Abundance Throughout History

Prior to European settlement, there may have been as many as ten times the number of beaver that presently exist in New England today. The unregulated trapping that occurred as a result of the early fur trade, coupled with the clearing of the New England forests in the 1700s to mid-1800s for farming, virtually eliminated beaver from Vermont by the beginning of the 1800s. In 1910, beaver were protected by state law and began to make a slow comeback. The Vermont Fish & Wildlife Department reintroduced beaver into Vermont from New York and Maine in the 1920s and 1930s. The reintroduction coincided with the abandonment of many of Vermont's farms, and the subsequent reforestation created an excellent habitat for the growing beaver population. To ensure the success of the reintroduction program, Department staff live trapped and transferred beaver to unoccupied flowages around the state. By the 1940s and 1950s, beaver had again become well established in Vermont. The first 15-day open trapping season was set in 1950. Aerial surveys conducted on the Green Mountain National Forest in the 1980s and 1990s indicated that beaver population levels had increased by 120% in the ten years between surveys.

Predators

Historically, wolves, mountain lions, and Native Americans may have been the beaver's major predators. Black bears, coyotes, bobcats, and fishers occasionally prey on beaver today. Beaver are more susceptible to predators when on land. Once they make it to water, however, the odds of their survival are much greater.

Humans trap beavers for their pelts, castor secretion, and for food. It is likely, however, that predation levels today are lower than what they were during pre-European times in Vermont. Prior to European settlement, Native Americans, wolves, and mountain lions probably killed more beaver than today's trappers, coyotes, bobcats, and other predators combined. Throughout history, beaver have provided a naturally healthy, organic and renewable source of protein for human consumption. The U.S. Department of Agriculture rated beaver meat higher in protein and lower in fat when compared on a pound-for-pound basis with beef.

Management Efforts

Beaver are North America's preeminent keystone species; that is, they create habitat for many other species including mammals, birds, plants, fish, and invertebrates. Beaver increase biological productivity in many ways. The wetlands they create in the forests increases the diversity of the landscape. This is important even after a beaver abandons a wetland. When dams decay through lack of maintenance, flowages initially become wet meadows. Like 'active' flowages, these meadows are unique habitats that also have great natural value. Beaver are an ancient species that have been widespread and abundant for a long time. All aquatic and semi-aquatic species in existence

today have evolved in their presence.

Beaver ponds usually provide excellent brook trout fishing during the first few years after the dams are constructed. They also provide flood control by preventing the rapid run-off of water and controlling soil erosion.

Road commissioners and private landowners often complain about damage done by beavers. A beaver pond next to a road can undermine the road and repairs can be costly. Water control devices can sometimes be installed to lower or maintain stable water conditions and minimize conflicts between beaver and humans. However, these structures may not be suitable in all situations and require some regular maintenance. Even so, they often provide a better alternative to removal of the dam and destruction of available wetland. Conflicts can also be avoided by controlling the number of beaver in an area by trapping during the fall/winter trapping season. Half of the beaver taken by trappers are the result of conflicts between beaver and people.

Live-trapping and transferring beavers from one area to another is seldom done now, because most Vermont watersheds already have an abundance of beaver.

Current Management Efforts

Vermont's beaver population is healthy, prospering, and growing. The Vermont Fish & Wildlife Department recognizes beaver as a valuable renewable natural resource. The maintenance of beaver populations ensures the continued production and enhancement of valuable wetland habitat, and provides a broad array of social benefits. The Fish & Wildlife Department strives to maintain as high a beaver population as possible while still maintaining levels that are compatible with public uses of land and minimizing conflicts between beaver and people. Information on beaver is collected annually from each of the watersheds in Vermont. The beaver trapping season begins on December 1st and runs through February. The length and time of the open season for different areas is determined annually based on population levels determined by biologists.