

North American Beaver

(*Castor canadensis*)



The North American Beaver (*Castor canadensis*) is highly adapted to its semi-aquatic life in the rivers and waterbodies in which it lives. Beaver are largely nocturnal, and are known for their unique dam building behavior. They are also considered an ecological “keystone” species, supporting a wide variety of other plants and animals through their dam-building and hydrological engineering. In addition, beaver provide a wide variety of benefits to humans, including fisheries enhancement, water and sediment storage, and flood control.

Beaver are thought to have once numbered 60-400 million throughout North America before European settlement. Prior to 1825, explorers in Utah noted beaver in abundance throughout the state. Highly prized for their lustrous pelts, beaver populations were decimated by fur trapping during the 1700s and 1800s to supply a worldwide demand for warm and fashionable accessories. By the end of the decade they were considered rare and in Utah, their harvest was closed in 1899.

Beaver have since recolonized a large portion of their former range, however loss of habitat due largely to competing land uses, has severely limited populations in many areas throughout Utah.

DESCRIPTION

Beaver are the largest rodents in North America. Their soft pelts range in color from nearly black, brown, reddish brown to blonde. Adults can grow to over four feet in length and up to 60 pounds or more in weight. They can live to be 20 years old. The most distinctive feature of beaver is their broad paddle-like tail, which they use like a rudder to navigate their watery environment and to balance upon as they stand on their hind legs gnawing on trees and various woody plants they harvest and use for food.

While generally clumsy on land, beaver are incredibly graceful in the water, where they use their webbed rear feet to propel them and their tail to steer. This large tail is also used as a defense mechanism. When beaver are threatened, they will slap their tail on the surface of the water to alert family members of potential danger and to startle potential predators such as bears, bobcats or otters. Beaver also have a keen sense of smell, which helps them find food sources, identify family members and avoid predators.

Another prominent characteristic of beaver is their large incisor teeth. Beaver have four prominent bright orange incisors, two on top and two on the bottom. These teeth never stop growing, so beaver must constantly file them down by gnawing on trees and grinding their teeth together. The orange enamel on the front of the incisors, which contains iron, wears slower than the white dentin on the backside of the teeth, so the teeth of beaver self-sharpen as beaver chew through wood.



DISTRIBUTION and HABITAT

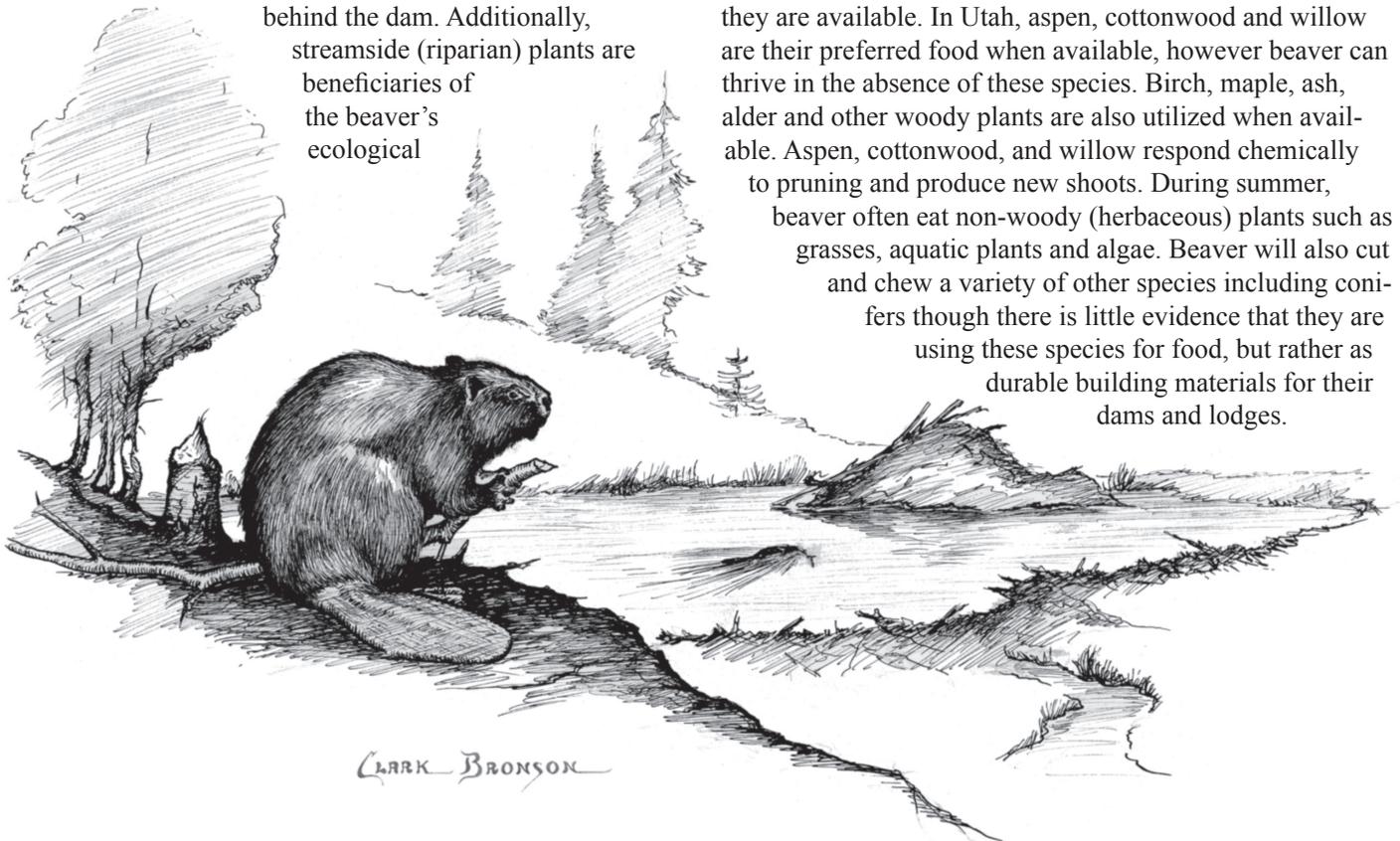
Beaver range throughout North America from Canada to Mexico. They typically live along gently flowing creeks and streams, and in lakes and reservoirs. Their most important habitat requirements are year-round water and access to preferred food and building materials.

Beaver are unique in that they engineer their own ideal environment. They are well known for their dams and lodges which they build out of harvested trees, plants, mud, rocks and even human debris. Beaver are least vulnerable to predators in water at least 2.5 feet deep, so they build dams on small creeks and streams to create ponds in which they can safely live and forage for food.

The dam a beaver creates floods the area around its lodge, or den, which can take the form of a freestanding mound of sticks, mud and tree limbs, or of a bank lodge, which is a den dug into the bank. Bank lodges are often seen on larger rivers or those more prone to flooding. Whether free-standing or built into the bank, an underwater access leads to a raised platform where beaver can safely relax out of the water. The formation of ponds behind beaver dams expands their available habitat, and expands their access to their favored food sources which grow alongside the streams.

Many plant and animal species benefit from the expansion of wetland habitat as a result of beaver dams, including a wide variety of fish, small mammals, big game, waterfowl, and other birds. Beaver dams increase the complexity of streams, providing better and more diverse habitat for aquatic life.

Dams also heal badly eroded streams by capturing sediment behind the dam. Additionally, streamside (riparian) plants are beneficiaries of the beaver's ecological



engineering, as they are provided areas to colonize along the shoreline of the new ponds and side channels.

Beaver dams also provide a host of benefits to humans. For example, they capture spring runoff that leaks out slowly, creating steadier flows year round and helping to insure that streams that they are on don't go dry during late summer. Water flowing over the banks of a stream during floods due to the presence of a beaver dam also helps recharge aquifers and subirrigates land below the dam making them more productive. As water in the beaver ponds seeps into the ground, the sediment filters pollutants and unwanted nutrients from the water before it reaches the homes of people. The dams also capture large amounts of sediment that would otherwise clog irrigation systems and fill reservoirs.

NATURAL HISTORY

The beaver we know today is thought to have evolved from a prehistoric giant beaver, *Castoroides ohioensis*, of which fossilized remains have been found in North America. *Castor canadensis* is one of two remaining species in the genus *Castor*. *Castor fiber*, the Eurasian beaver, is native to Europe and Asia and is slightly larger than the North American beaver, though the general appearance and behaviors of the two species are very similar.

Diet

Beaver are strictly vegetarian and are known to be choosy generalists when it comes to their diet. This means they prefer certain types of plants above others but will sample and utilize a wide variety of plant materials when and where they are available. In Utah, aspen, cottonwood and willow are their preferred food when available, however beaver can thrive in the absence of these species. Birch, maple, ash, alder and other woody plants are also utilized when available. Aspen, cottonwood, and willow respond chemically to pruning and produce new shoots. During summer, beaver often eat non-woody (herbaceous) plants such as grasses, aquatic plants and algae. Beaver will also cut and chew a variety of other species including conifers though there is little evidence that they are using these species for food, but rather as durable building materials for their dams and lodges.

Family Units

Beaver spend most of their lives as part of an extended family unit, or colony. A colony typically contains 6 to 8 related individuals, consisting of an adult pair, the young of the current year (kits), and the previous year's offspring (yearlings). Beaver are monogamous and tend to mate for life, unless one mate dies, in which case, beaver will often form new pairs. Beaver typically breed in the winter and give birth in the spring, producing only one litter per year. After reaching sexual maturity, sub-adult beaver (age 2+) most often disperse from their colonies, find a mate, and establish new colonies in nearby available habitat. Beaver establish their territorial boundaries by creating scent mounds where they mark their territories by mixing their pungent castor oil with mud and leaves.

BEAVER AND PEOPLE

Beaver Economics

Beaver provide both positive and negative economic impacts to society. The ecosystem services provided by dam-building beaver, including increased aquatic and wetland habitat, increased base stream flows, recharged aquifers, and other habitat improvements, are all benefits in the form of avoided costs for water storage, habitat restoration, and water quality improvement. Coupled with a number of other direct and indirect benefits, the value of a healthy beaver populations in a watershed can total well into the millions of dollars each year.

On the other hand, money is spent each year managing beaver when they come into conflict with human infrastructure such as roads, homes, or agricultural land. Beaver are known to plug irrigation canals and road culverts, leading to costly maintenance and repairs. They also occasionally dine on landscaped trees and cause flood damage to roads or private property. Wildlife managers must spend time and money to either live-trap and transplant beaver away from potential conflict areas, or use lethal means of removal.

To address these issues, wildlife managers are working collaboratively with land managers and owners to promote awareness and use of simple, time-tested, nonlethal means, such as construction of sturdy flow-control devices and fencing of trees, that allow the amazing dam building skills of beaver to provide maximize benefits to people while at the same time reducing or eliminating any negative impacts.

Beaver Restoration & Management in Utah

Beaver in Utah are classified as protected wildlife. The Utah Division of Wildlife Resources (UDWR) is solely responsible for their management. In 2010, UDWR created and adopted its first comprehensive beaver management plan, to

address a wide variety of management goals and concerns. The goal of UDWR in managing beaver in Utah is to maintain healthy, functional beaver populations in ecological balance with available habitat, human needs, and associated species.

Beaver populations never fully recovered from the losses they incurred with widespread trapping in the 1800s. In their absence, much of their historic streamside habitat abundant with cottonwood, aspen, or willow has been repurposed or degraded by other land uses such as water development and livestock grazing. To provide much needed watershed restoration, the UDWR, the United States Forest Service (USFS), and other stakeholders are engaged in identifying areas within the historic range of beaver where they could potentially be reestablished. Efforts are being made to live trap and transplant beaver from sites of conflict to sites where their benefits will be apparent.

ADDITIONAL READING

Buckley, et. al. 2011. The Economic Value of Beaver Ecosystem Services, Escalante River Basin, UT. ECONorthwest, Eugene, OR.

Collier, Eric. 2007. Three Against the Wilderness. Touchwood Editions.

Müller-Schwarze, Dietland and Lixing Sun. 2003. The Beaver: Natural History of a Wetlands Engineer. Cornell University Press.

Long, Kim. 2000. Beavers: A Wildlife Handbook. Johnson Books, Boulder, CO.

INTERNET RESOURCES

Utah Division of Wildlife Resources - Utah Beaver Management Plan 2010-2020:

http://www.wildlife.utah.gov/furbearer/pdf/beaver_plan_2010-2020.pdf

Beaver Solutions LLC: pioneering best management practices for beaver since 1998, with information and DVDs available showing how to install a variety of flow control devices and protective fencing.

<http://www.beaversolutions.com>

Grand Canyon Trust - Utah Forest Program: helping to resolve beaver-related conflicts and restore beaver to southern Utah's National Forests, where they are needed to restore watersheds following decades of drought, fires, and other impacts.

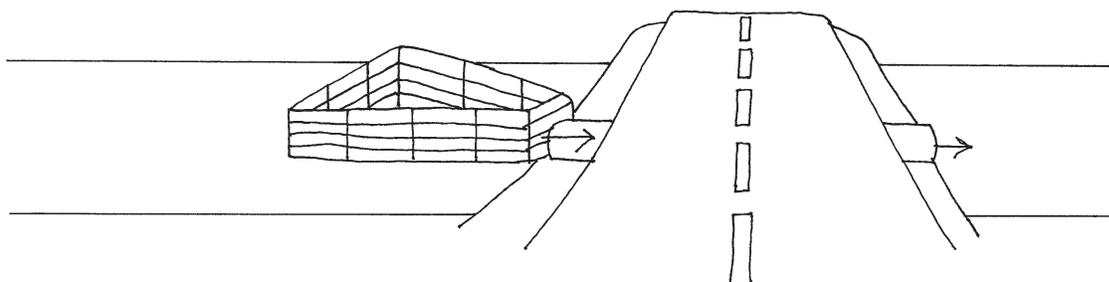
http://www.grandcanyontrust.org/utah/forests_issues.php

LIVING AND WORKING WITH BEAVER

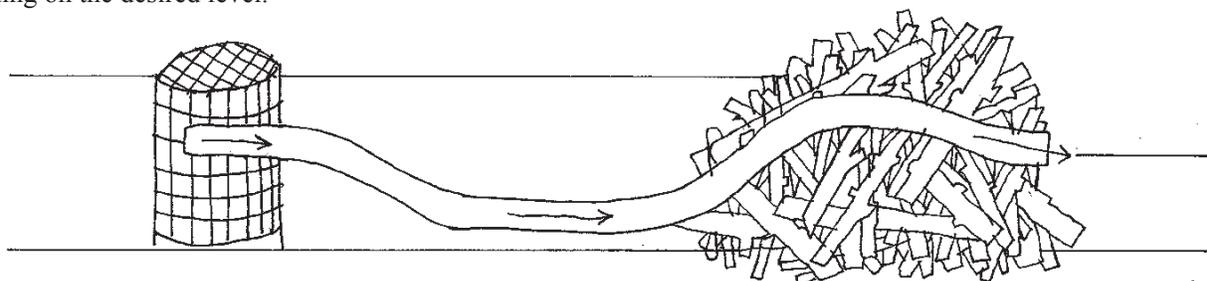
Most beaver conflicts can be solved or addressed by being proactive and taking the beaver's needs and behavior into account when building homes, roads and culverts, or when planting landscaping. The goal should be to prevent damage and conflict, while eliminating the need to relocate or kill beaver.

Valuable trees along waterways that may be accessible to beaver, including small creeks and irrigation ditches, should be fenced to prevent beaver from gnawing or cutting them. Heavy 12.5 gauge welded wire fencing to 4 foot high (or higher in areas of heavy snow) will prevent beaver from cutting down trees. Fencing should be wrapped so that a 1 foot gap is left between the fence and tree to allow the tree to continue growing.

Culvert-protective fences can be extremely effective at deterring beaver from plugging culverts and causing flooding which can damage roads and property. The ideal shape for culvert protective fences is trapezoidal as in the diagram below.



A simple pond leveling device (see below) can be an easy-to-build solution to flooding from beaver dams. A culvert pipe is installed in an intact beaver dam, and the inlet is sunk into the upstream beaver pond. A cage of heavy welded wire is constructed to prevent beaver from plugging the intake. The outlet end of the pipe can be set higher or lower in the dam depending on the desired level.



A pond leveler can be combined with a protective culvert fence in situations where the height of the roadbed is sufficient that a small beaver pond does not pose a threat. Ideally the pond should be left as large as is feasible without creating conflicts.

Sometimes beaver get into irrigation ditches or other places where their presence simply cannot be accommodated. In these cases, the Utah Beaver Management Plan encourages wildlife managers and land owners and managers to live-trap beaver and relocate them to suitable vacant habitat, instead of using lethal methods of removal. The Utah Beaver Management Plan lists 120 such sites with potentially suitable habitat.

There is an open trapping season which generally runs from October through early April with unlimited take (consult the UDWR Furbearer Proclamation for specific season and harvest requirements). Beaver causing damage may be taken or removed during closed seasons provided a permit is obtained from UDWR. The UDWR also licenses wildlife control companies to remove beaver causing property damage.

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