

## Lesson 6: The Mighty Beaver

### *Background for Educators*

The beaver is an unusual animal with lots of interesting features!

[From Eric Sanderson's *Mannahatta: A Natural History of New York City*.]

It is easy to underestimate the importance of beavers. Beavers are what ecologists call “ecosystem architects” because through their daily business – cutting brush, hauling wood, and building dams – they create ecosystems, in particular ponds and the fringing wetlands, which are so important to other species in the short-term and to all of us in the long-term. Every stream in eastern North America, including all the streams on Mannahatta, once had beaver denizens, generations of them, each literally “busy as a beaver.” Beaver dams do more than back up water; they also back up soil, collecting the rich silt that the rain and snow are slowly weathering down off the hills. That silt builds up behind the dam, and eventually drowns the pond in dirt. The pond dies, gradually morphing into a marsh, which becomes a meadow. That meadow eventually becomes a forest, or if a lucky person stops by and cuts away the overgrowth, an extraordinarily rich parcel of cropland. The Lenape loved to grow their ceremonial tobacco in the rich soils beavers had left along Minetta Water, about where Washington Square Park is today; the Dutch, and then the British, followed on, leading to the founding of Greenwich Village. Farmers in Iowa and Illinois today still make a living on soils collected by beaver work from many generations ago.

[From *The Beaver: Natural History of a Wetlands Engineer*, by Dietland Müller-Schwarze and Lixing Sun.]

#### **Beaver habitat needs:**

First and foremost, beavers need water. Water can be in the form of a stream, lake, river or pond, as long as there is a year-round supply sufficient for swimming, diving, floating logs, protection of lodge and burrow entrances, and general safety from predators. Beavers always escape into water; they are extremely wary on land. On streams, beavers prefer slow-moving water. Beavers are vegetarians. They will eat a variety of plant species, but they prefer aspen and willow trees. They like these trees (both as a source of food and as building materials for their dams and lodges) because they grow fast and have soft wood that is easy to chop down and peel. Beavers will also eat non-woody vegetation, including aquatic plants and ferns, berries and grasses. A slowly meandering stream with aspen trees and alder or willow thickets near the water comprises the ideal beaver habitat.

#### **Beaver dams and lodges:**

Beavers build dams along streams in order to flood the area behind the dam with a shallow pond or wetland created by the dam. Creating this flooded area keeps lodge entrances under water and permits beavers to float logs and branches across the water (which is easier than dragging them across land); it lets them dive to safety underwater; and it lets them travel to feeding areas by swimming, which is easier (and less risky) than traveling over land. Dams can be as low as 20 cm or as high as 3 meters; counting tiny dams across branches of parted streams, there may be as many as 40 dams per site! Beaver dams are superior to human-built concrete dams in terms of retaining water and releasing it in a slow, controlled way. Beavers build their lodges inside the flooded area created by the dam. The entrance to the lodge is under water, while the resting platforms inside the lodge are built above the water level. The size of a lodge can vary from very small to over 6 meters in diameter at the water line! The lodge is the focal point of the beaver colony, providing the principal shelter for the family. This is where beavers rest, sleep, bear their young, and rear them.

**Beaver family structure:**

Beaver pairs are monogamous. Beaver pairs usually have two kits each year. On average, a beaver family is made up of the parents, that year's pair of kits, and a pair of yearlings. Beaver young are typically expelled from the lodge when they are two years old, but they may stay on for another year. Studies have shown that, when 2-year-olds stay on an extra year, they help their parents raise the newborn kits, by feeding, grooming, and guarding them. Such "cooperative breeding" has been noted in other species as well, including birds such as crows, jays, and woodpeckers (and humans!).

**Beavers and habitat creation:**

Beavers profoundly affect their ecosystem by damming up water and removing trees. Needless to say, the stored water and raised water table can be important for many plants and animals, especially during droughts. Furthermore, the water flow pattern is altered, reducing erosion. Larger areas are wetted, and there is more sediment accumulation. As beavers open up forest along streams, they create new landscapes, such as ponds, swamps, and meadows, albeit on a smaller scale than "landscape" as humans see it. The new habitat invites a myriad of plants and animals and leads to complex communities of organisms.

The loss of wetlands is a major ecological problem in North America, and the beaver could be an important ally in wetland restoration. The leaky dams created by beavers do two important things: they control flooding better than solid concrete dams because of their gradual release of water; and they slow water flow sufficiently to allow time for the cleansing of the water. Loss of wetlands worsens erosion and degrades natural habitats. If beavers could be induced to settle along streams in degraded areas, they could fix the problems by damming water, raising the water table, and stabilizing erosion and lowering the risk of large-scale flooding.

**Beavers as pests:**

Because beavers chop down so many trees and can change the landscape so rapidly, they are sometimes viewed as pests when their numbers grow large. Beavers can cause economic losses by flooding and softening roads, and flooding farmland and golf courses. Beavers can also change a habitat so much that it is no longer a suitable habitat for local endangered species.

**More info (with pictures) on beavers and beaver dams:**

<http://www.beaverdam.info/>

<http://www.geocities.com/bobarnebeck/dams.html>

<http://www.wcs.org/353624/bronxbeaver> (includes video of a beaver swimming in the Bronx River, as well as images of trees chopped down by beavers)