

Why we Give a Dam

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Beavers have always been important to humans: used as a source of food, clothing, currency, and even medicine, by native and colonial Americans. Intense hunting, trapping, and deforestation eliminated the beaver from much of North America by the Revolutionary War. However, beaver populations have recently rebounded, helping us restore our lost wetlands, 50% of which had been filled, degraded, or destroyed before the first wetlands protection laws were enacted.



A beaver-felled tree at Hop Brook

Beaver mate for life and reproduce exponentially, having 3-5 kits each year. They are very territorial, each beaver pond supporting only one colony or family. At three years of age, male beavers are driven away from the colony to seek their own territory. The growth rate and territorial nature of beaver has allowed them to quickly repopulate their original range.

Renowned as nature's engineers, beaver build dams in small rivers and streams, to create access to food, protection from predators, and shelter. The wetlands that result from these dams create diverse habitat that supports up to 80% of other species from fish and frogs, to rookeries for heron, and yes, mosquitos, which are a critical food source for birds, bats, amphibians, and other insects. These dammed up systems create wet meadows and swamps, which benefit people by slowly releasing floodwaters and improving water quality by binding excess nutrients, toxins, and sediment, while recharging our aquifers. Studies have shown that beaver dams help create climate resilient landscapes that protect us against the effects of climate change by creating fertile soil, recharging clean water to aquifers, and reducing susceptibility to wildfires.

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Water levels at a Hop Brook footbridge before and after the installation of the beaver deceiver.

The beavers' return to Massachusetts, however, occurred after many lands adjacent to streams were already developed, creating beaver-human conflicts that can have significant impacts to public health and safety. Expanding wetlands can flood structures, inundate septic systems, or damage roadway infrastructure. Drinking water supplies can also become contaminated with E. coli. or Giardiasis when a colony is located in close proximity to municipal drinking wells. This need to create ever expanding territories is one reason why beaver management is necessary in our suburban environment.

Recently, beavers took up residency in Duck Pond at Hop Brook Conservation Land. Beavers built a dam under the footbridge at the inlet to Duck Pond, while also clogging up the culvert at the outlet to Duck Pond. This caused the water levels to rise a couple feet, flooding a number of trails around the pond. The Conservation Commission saw this as an opportunity to see how we could co-exist with the resident beavers.

We first tried to manually manage the situation; removing the debris from the culvert and notching the dam to release some water. We also had a number of bog bridges constructed to allow passage through more flooded portions of the trail system. The beavers rose to the occasion, encouraged by the challenge, reinforcing their dams each night.

We quickly realized that we were no challenge for them and additional efforts needed to be explored to manage the water levels. We engaged professionals to assess the situation. The goal was to achieve a water elevation that would provide sufficient habitat for the beavers, while maintaining the water levels at a height that would not impact the trails around the pond. It was determined that a 1+/- foot drop in water would find that happy medium where both wildlife habitat and recreational use were maximized. After measuring the depth upgradient of these obstructions, it was determined that the conditions were right to install flow devices, or "beaver deceivers"; one through the beaver dam, and one at the culvert.

In July, these devices were installed. At the culvert, an exclusionary fence was installed in front of the culvert, to prevent the beaver from blocking the structure. A cage was installed about 40 feet upgradient of the culvert and a flexible pipe was installed between the cage and the culvert. This allows water to continue to flow through the culvert without the beavers feeling the flow of water, which would trigger them to clog up the culvert. The inlet and outlet of the pipe were set at the elevation of the target pond level. A similar system was installed through the beaver dam. The pipes were sized based on the volume of water that would regularly flow through the pond.

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One week following the installation of the deceivers, the trails started to emerge from under the water. After three weeks, the trails are completely dry and the system continues to function with no required maintenance. This sustainable system is a permanent solution to allow humans and wildlife to live together without impacting each other's use of the space. However, environmental conditions do not always allow for these flow device systems to function, and trapping may still be needed.