Burpee Pond and its Beaver Deceiver™

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Introduction

Burpee Pond is an exceptional landscape feature. For narrow-valleyed Southern Vermont, it is also very large. It is an ancient beaver-created wetland, or "flowage." These are a productive, dynamic, and open (short plants) type of marsh that support thousands of species. The pond-hugging roads allow easy viewing of the wetland's beauty and wildlife.

To prevent the bridge at the pond's outlet from being constantly clogged, it is protected by a high-quality "flow device" called a Beaver Deceiver™ (BD). I invented these proprietary, industry-leading products. The BD controls damming behavior by essentially sneaking water away from beavers through a pipe system. The system has three components: a stone wall in front of the bridge, a long 18"-diameter pipe, and a large, Square Fence™ filter (beavers out, water in) that's underwater on the pipe's upstream end.

Historical background

Beavers are in the middle of a long, slow recovery process following their continent-wide extirpation, and near extinction, during the historical anomaly known as the Fur Trade (ca. 1600-1900). They are slowly restoring and re-watering their ancient habitats. These predictable locales are low-gradient areas on small streams (LoGASS, or logass). In a broader sense, beavers are resurrecting a small, rich fraction of the age-old landscape in which all native species evolved.

In a constant state of decay, beaver dams do not persist in the absence of beavers. In an environmental catastrophe, the Fur Trade indirectly drained hundreds of thousands of flowages for centuries. For the first time, this allowed trees to invade the dried-up wetlands. The standing, drowned timber often seen in modern flowages is a sign of the arrival of Europeans 400 years ago. Although a fleeting phenomenon, the dead trees create wonderful habitat, especially for birds. However, they are not present on Burpee Pond. To create a pasture on the rich soils, the forest was probably removed long before the dam was built or beavers returned.

Beavers seek to avoid predators, ill health, and starvation. Pooled water is critical escape habitat. When dams are breached, this shield disappears and beavers become very vulnerable. Unlike dams on large streams, those on small ones survive most high-flow events. Dams that survive floods also save the energy otherwise needed for re-construction. "Good health" also requires an adequate habitat return on damming effort, hence the importance of "flatness." Even gradual slopes, where tall dams can only produce small wetlands, are generally avoided by beavers.

With a narrow outlet at the downstream end of a large, flat area, the Burpee land was an ideal beaver-dam site requiring less work and an excellent return. For millennia before settlers arrived, the deep, rich soils there now were sequestered when fine particles, delivered by fast-moving streams, fell out of the water column in low-energy beaver ponds.

Today, these soils help support the vibrant plant and animal life present. Here and elsewhere in the 1600 and 1700s, beaver soil was the basis for much of the first Euro-American agriculture. Not surprisingly, many New England villages formed on or beside ancient flowages.

The unique value of beavers

Because they create and improve wetlands used by thousands of other lifeforms, beavers have disproportional value. If you remove the beaver center-stone from the ecological arch, all the other components, or species, come tumbling down as wetlands drain. Therefore, beavers enjoy the prestigious ecological title, "Keystone Species."

Beavers also provide many hydrological values. For instance, flowages act as sponges during floods, reducing destructive peak flows. As superb water filters and sediment sinks, they also purify water by removing pollutants from streams. Furthermore, flowages are beautiful viewscapes that provide much aesthetic and spiritual wealth. Given these diverse values, "Keystone Species" is inadequate for an animal that might better be described as a Super Species. It is incoherent and self-destructive to manage this species as a pest, but that is necessary in the absence of effective flow devices.

The value of flowages is increased by their rarity, which is greater in mountainous areas like Vermont. Here, freshwater marshes may only constitute a couple percent of the landscape. Moreover, their presence has been greatly reduced in recent centuries by the killing of beavers, agriculture, and other forms of development. For the good of society, we need to re-establish as many of these as possible. This is why the federal government sometimes pays humans hundreds of thousands of dollars an acre to build wetlands that are far less natural and productive than the flowages beavers build for free.

Even without building dams, beavers make waterbodies like Burpee Pond richer by stirring up nutrients, breaking-up potential monocultures like water lilies, and creating canals, tunnels, and lodges, which are all excellent microhabitats for many species.

Managing and understanding beavers

When managing ecosystems, emulating "natural" is a good thing. In the North, that essentially means recognizing what kind of habitats were here during the 10,000 years between the retreat of the glaciers and the arrival of Europeans. This was the environment, and the habitat types, in which all native species adapted to, and thrived within.

Conversely, "unnatural" is usually harmful. That is why, for example, great efforts are made to combat aggressive, non-native plant and animal species that have been brought here from other continents.

Territorial animals, beavers will never be over-populated in Burpee Pond. They do not tolerate the presence of other beaver families. No matter how large a wetland or pond that is created by one beaver dam, different families will not share damming duties. There will likely never be more than one family in Burpee Pond. The number of members is ever-changing but may average six over the years and decades. A family or individual may build multiple lodges. Each lodge does not represent a separate family.

Given the size and vegetative richness of Burpee Pond, it will support beavers permanently. It is easy for humans to quickly eliminate such a small population. With the Beaver Deceiver™ in place, the real issue is the risk of losing beavers, not their presence.

Beavers have forever chewed and felled trees in a narrow riparian band around lakes, ponds, and wetlands. It is an ecologically heathy, natural activity occurring on less than one percent of the landscape. The resulting dead, standing, horizontal, submerged, and unsubmerged trees all provide great habitat, or habitat features, for many species. In an historically unnatural act, by contrast, humans cut down thousands of times as many trees throughout the entire landscape. By removing trees before they die, this prevents the re-establishment of an important dead-wood component once common in native forests.

The manmade dam on Burpee Pond that replaced the old beaver dam(s), and which has supported the pond for decades, will eventually decay or be removed. If they are not killed, beavers will always ensure that the pond remains at a healthy level.

The Beaver Deceiver ™

After decades of conflict, the BD eliminates the need to extirpate beavers while preventing the otherwise endless and expensive cycles of removing beaver dams from the bridge. If a dam had been inside the bridge during any of the high-flow events of recent years, the road likely would have been lost. Now, it is unlikely that this will ever happen.

Simply by raising the pipe or putting a half-circle block in the bottom of the downstream end of the pipe, the BD can be used to make the pond bigger if desired. However, to prevent leaks, this requires that beavers dam the stonewall the pipe goes through. Dams and damming debris should not be removed from the wall. The wall should also not be removed or knocked down. It is eleven feet in front of the opening to the bridge. Therefore, it has little or no effect on the flows through the bridge. (The downstream manmade dam, however, does reduce the bridge's flow capacity.)

The wall is a critical part of the system. It creates a necessary "damming line" for the pipe to pass through. This attracts damming behavior to where it is wanted rather than inside the culvert. If a dam were to form below the end of the pipe, it would neutralize the BD. As a barrier, the wall makes it less efficient, and less attractive, for beavers to drag debris inside the bridge. Knocked-off by ice, water, or beavers, the rocks on top of the wall may have to be put back from time to time.

Conclusion

Largely because of the presence of beavers today and through time, Burpee Pond is a local and regional gem. As responsible environmental stewards or habitat managers, the most important thing for individuals or the town to avoid is the killing or extirpation of the few beavers present.

BDs are the best flow devices in the world. Because of the large watershed, the Burpee Pond model is much bigger and more robust than average. By defending the infrastructure, eliminating maintenance costs, and allowing for the presence of beavers, it is extremely valuable. It also makes Windham a shining example for other towns and the state on how to responsibly and effectively manage and live with beavers.