

Testimony on Beavers to the Vermont House of Representatives Committee on Environment and Energy

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April 2, 2025



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Dear Committee members,

As a Vermonter involved in beaver management for decades, I wanted to provide the following testimony. I hope it is helpful.

Introduction

I was first introduced to beavers as a child via the stump-chew lamps my parents made at their furniture business in Townshend, Vermont. We also lived on a beaver pond in Grafton, the town to the north. After beavers returned to our property in the early 1970s following hundreds of years of absence because of the Fur Trade (ca.1600-1900), the extraordinary density and diversity of life in that habitat made a lasting impression on me. To protect the beavers and thus ensure the maintenance of the dam and wetlands, I built my first “flow device” on a town-road culvert here when I was a teenager. This background eventually led me to get a Master’s Degree in Wildlife Management and to specialize in beavers, wetlands, and habitat improvement.

Beaver-created wetlands, or flowages, are remarkably rich and valuable habitats. We can help counter the steady and alarming loss of the world’s biological wealth by using beavers to maximize the quality and extent of wildlife habitats locally. Ecological miracles often occur when beavers are protected, and the opposite is true when they are killed. Therefore, since 2001 my Vermont-based business has focused on developing Beaver Deceivers™, which are high-quality flow devices (HQDs). Using fences and pipe systems, they control damming behavior non-lethally by essentially sneaking water away from beavers. They can eliminate conflicts for decades at virtually any site.

As anything other than a short-term remedy, the reliance on killing beavers to protect the infrastructure (basically, culverts) is very poor stewardship of the environment and taxpayer money. I fear it is a strategy our state government is doubling-down on instead of what we should be doing: transitioning away for it.

It only takes one dispersing beaver to quickly clog a culvert. Therefore, even semi-effective lethal defense strategies require permanently extirpating this Keystone Species from the general vicinity of every conflict point. But even that is not enough. It must be combined, as reflected in a 5-month, unlimited-harvest trapping season in Vermont, with continual efforts to reduce overall populations. However, after 75 years of killing beavers repeatedly at the same culvert sites, and never eliminating the problem, the high cost and inefficiency of this approach is obvious.

A uniquely valuable species

“Wetland” is a broad term. I will use it narrowly here to mean a rich, open, shallow-water marsh. It’s a miracle that we have an animal that makes them; most of the world does not. When beavers are not eradicated, most of the time their wetlands, or “flowages,” are a unique and dynamic type of marsh. When dams go unmaintained, flowages can become “wet meadows” until the next beaver arrives. Always rare, marshes are far more so today because of the Fur Trade and later “draining and filling” for agriculture and development.

Prisoners of physics, flowages always occur in the same places: low-gradient areas on small streams. These locales could also be characterized as “in valleys and basins.” Re-dammed as beavers recovered during the past century, most flowages appear from high above as small, isolated patches often in a forested matrix. They likely total no more than 3% of the landscape.

Beavers enjoy the prestigious title, Keystone Species. Remove the supporting stone from the middle of the ecological arch and dams decay, wetlands drain, and thousands of species lose their habitats.

Flowages also have enormous hydrological value, particularly when they are “active.” For example, the reservoirs they create, and the plants and soils within them, protect the quality of downstream brooks and lakes by sequestering stormwater, fine sediments, carbon, nitrogen, phosphorous, and other pollutants. During floods, flowages typically act as sponges that hold and release water slowly over time, suppressing destructive peak flows. Beautiful habitats brimming with life, these wetlands are also aesthetically pleasing. Given these broad and diverse values, beavers deserve an even more grandiose title: perhaps, Super Species.

The Fur Trade

The Fur Trade was a monumental and unprecedented event that continues to have a huge impact on beavers and flowages today. It is unlikely that anything else in history, including disease, could have wiped beavers out for so long across a continent. For centuries, it also eliminated hundreds of thousands of flowages, which then, probably for the first time, became forested. Without water and unable to compete for sun, this also extirpated many small, wetland-plant species. As well as a symbol of beaver recovery, the prevalence of standing, drowned timber in flowages today represents the arrival of Europeans, and the beginning of the Fur Trade, 400 years ago.

Consequently, beavers are not really the “landscape disturbers” or “agents of change” as they are frequently characterized. Aside from glaciation events and the blip of the Fur Trade, they have lived in the same areas for millions of years. Their work today simply represents the return of an ancient landscape feature that was “disturbed” out of existence by humans.

Many varieties of small, native wetland plants may return with beavers. A much slower process than flooding alone, it will require the longstanding presence of beavers as bulwarks against dryness, reservoir loss, and shade. Their resurgence would benefit hundreds of wildlife species while producing a lot of high-value, un-depletable, soft-stemmed food for beavers. Emergent (e.g., cattails), floating-leaf (e.g., water lilies and water shield), and small, woody (e.g., willow) plants are highly important for beavers. Like the seed-carrying waterfowl and wading birds often needed to reintroduce them, these plants require wetlands with relatively reliable and permanent reservoirs.

The beaver-human conflict

The conflict is as limited as damming habitat. For example, the public roads of an average town might only contain five chronic conflict points. With HQDs, these could quickly be

eliminated for decades. Otherwise, the same sites will produce, as they already have for 50 or 75 years, scores of expensive, never-ending conflict *events*.

Most conflict points are narrow, manmade outlets that can be quickly clogged. These include overflows on ponds, short bridges and, most numerous and threatening of all, road culverts. “Regular” beaver dams also threaten roads, but to a much lesser degree. All Vermont’s public roads are managed by state and town highway departments, so they have the biggest issue with beavers.

As perfect dam sites, culverts represent great habitat. As such, they are beaver magnets. Territorial animals, beavers often seek what kill strategies produce: vacancy. Without “protection,” this doubles the magnetic draw, guaranteeing eternal conflict.

Clogged culverts can lead to huge maintenance and property-damage costs. Furthermore, if a road is closed, broader economic/lack-of-transit losses are accrued. A jurisdiction unwilling or unable to protect culverts with HQDs has little choice but to wage a veritable war on beavers. In most states and provinces, this has translated into what is essentially pest or vermin management: wide-open seasons like Vermont’s, the green-lighting of year-around beaver shooting, and even bounties. Other than encouraging further killing with talk of “over-population” and attempting to recruit additional trappers, which they do, there is little more our wildlife agency can do to further reduce beaver populations.

With kill strategies, and without the use of HQDs, there are many hundreds of potential habitats in VT that will never benefit from the environmental and societal values of beavers.

Killing beavers creates a false sense of security. Apparently, it is often assumed that the dead beavers are the last beavers. When trappers or shooters leave, the culvert is typically as nakedly vulnerable as when they arrived. While it does not reliably protect culverts and other narrow outlets, “killing” is more than enough to prevent the post-Fur Trade restoration of often non-threatening wetlands in the general vicinity. It requires an extended beaver presence to build and maintain much longer, “regular” dams.

Flow devices

Sneaking water away from beavers and building structures that will survive an incredibly harsh environment is a serious, often underappreciated engineering challenge. Poorly designed and built flow devices will always fail. Invariably, this leads to big costs, dead beavers, drained wetlands, diminished public confidence in non-lethal remedies, a general doubling down on trapping and killing, and the reversal of any potential societal progress on the issue. For instance, failures can lead to the kind of property damage—nearly \$500,000—described in your hearing at just two sites. With that kind of money, an entire county could be beaver-proofed for decades with HQDs. Flow-device failures, whether intentional or not, are sometimes used as a way for trapping proponents to reinforce the alleged critical need for that activity.

Conversely, HQDs are a reliable, long-lasting, fixed defenses that make the presence of beavers irrelevant. As noted by Ben Goldfarb in his testimony to you, they are tremendous investments. In Virginia, and scores of other states, provinces, tribes, and countries, they have saved our customers millions of dollars.

No Vermont town, many of which have yearly budgets in the millions or tens of millions, can afford *not* to solve the otherwise extremely expensive beaver-human conflict. In fact, I have encountered few private individuals who, once they understand the multi-faceted investment potential, cannot find the money for an HQD. Nevertheless, when that is not possible, I often reduce my prices or help customers find grant monies.

For several thousand dollars, a conflict point can be eliminated for decades in a day or two by one skilled person using hand tools. That's not exactly a big-budget Public Works project. By contrast, one arch-culvert on a small brook may cost over \$200,000.

Sophisticated, modern Beaver Deceivers have little in common with my early designs or any other flow devices used in Vermont or elsewhere. For example, after a lot of trial-and-error I invented the Trapezoidal Fence concept in 1995 when I was a Wildlife Biologist at the Penobscot Indian Nation in Maine. Even then, we made them large and extremely rugged. Three years later, I invented a good pipe system (for its time) called the Castor Master. This quickly made the trapezoid obsolete. Nevertheless, small, poorly made trapezoids are still being used by many other people 27 years later.

While solving expensive problems, HQDs often indirectly produce the most productive wildlife habitats on the landscape. These wetlands are extremely valuable for brook trout, furbearers like mink, otter, muskrat, raccoons, and bobcats, many species of waterfowl, woodcock, partridge, and rabbits (on the periphery), and deer, bear, and moose. Simultaneously, HQDs prevent the need to kill "nuisance" beavers (and often their orphaned kits) in the spring and summer when their pelts are worthless. Both as taxpayers and consumptive users, no one stands to benefit more from HQDs, and having more beavers in more places, than fisherman, hunters, and trappers.

Biological Carrying Capacity (BCC)

Locally, beavers cap their own populations. Outside of immediate family members, they do not share their territories, which are often large, with other beavers. Generally, the number of beavers in an occupied territory ranges between one and ten. The average may be three or four. A "colony" might be one or two individuals or a mated pair with one- or two-year's offspring. With births, deaths, and dispersal, the number is always changing.

In the natural world, "stress" is the natural condition of all species almost all the time. Both within and between species, all individual animals fight over resources. With beavers, bite wounds are caused by population-controlling territorial behavior. Like getting ticks and other parasites, these injuries cannot be assumed to be caused by over-population. Trying to kill enough members of a species so that the survivors never get hungry or stressed is an unreasonable management goal. For individual beavers, and their close-knit families, wouldn't the killing process itself be deeply stressful?

Beavers in Vermont have many predators, of which humans—shooters, trappers, and motor vehicles—are Number One. This includes, when "nuisance" beavers are nonchalantly killed in spring and summer, the slow starvation (also stressful) of perhaps hundreds of baby beavers each year.

Coyotes are probably the top non-human predator. Bears may be second. The state has no regulations that protect coyotes in any way or at any time, including when they have helpless, dependent puppies.

Young and weak beavers can be prey for fishers, otters, bobcats, eagles, and large owls and hawks. Like all animals, whether "managed" or not, beavers also die of starvation and disease.

Oddly, BCC concerns are only applied to a few species. Beavers are, for some reason, the most prominent. Managers ignore 99% of other lifeforms, which survive fine without the benefits of Euro-American population management. At a glance, for example, my lawn suggests robins might be over-populated. The bird feeder says the same about blue jays. Both are out-of-balance with any definition of a "natural" ecosystem. Nevertheless, no one suggests killing them.

Until the last 100 years, in fact, no species profited from BCC analysis and management for millions of years. Nevertheless, the wildlife of North America was much more abundant when Europeans arrived than it has been at any time since.

Every habitat is different in its ability to support the few beavers that territorial behavior allows. Some wetlands are small and may only have, initially at least, tree-bark to eat. Although short-term habitats, even these might have great value for getting beavers through one winter, which is the most threatening time of all. A small flowage might also be part of many little, disjunct wetlands in an expanded, “landscape territory” in which beavers bounce around. Topography determines the size and density of flowages, which varies in every area and region. Beavers adapt accordingly. As they have for millions of years, they will also dam every basin, no matter how small, that has a little water flow. It’s just what they do, not over-population.

Beavers have a far broader diet than large-tree bark alone. For example, they feed on small willows, cattails, pond lilies, water shield, and many other soft-stemmed plants in wetlands and uplands. Combined with territorial behavior, a large wetland will often support beavers indefinitely, especially if it has the above-mentioned wetland plants. Although the “beaver cycle” is a popular theory, many habitats are not in one. The most significant cycle is the big, 400-year one that began with the Fur Trade and continues today.

There are hundreds of viable, unoccupied habitats in Vermont. These include roughly 75 that I recently visited in the vicinity of Woodford. The absence of beavers in them is an indication of under-population, not the opposite.

An unoccupied flowage does not prove that beavers left because there wasn’t enough to eat, which is often interpreted as “over-population.” Actually, it might indicate the opposite: a low regional population would translate to more vacant-habitat options, which would logically increase the frequency of site abandonment. Furthermore, it’s not always “movement.” A one- or two-beaver population can be quickly erased by predators. Humans are much more efficient, so even a large complement of beavers can be rapidly eradicated by a trapper.

Beavers don’t need big wetlands surrounded by large, nutritious trees to survive. For instance, they eke out a living in tiny flowages on the tundra with almost nothing to eat but small willows. It’s just what they do there, too.

In what is now a 12-acre beaver flowage on my property in Grafton made possible by an HQD, we have had a constant beaver presence for half a century. Over the decades, this has simply translated into a steady increase in wetland area, which was non-existent when beavers first arrived. The number and diversity of wildlife produced and supported there has followed the same trend. In a flat area of the Penobscot Nation, a similar scenario, but produced indirectly by three BDs, has translated into nearly 400 flowage-acres.

The number of conflicts points in Vermont cannot be used to conclude that beavers are over-populated. As they always were before towns existed, beavers, like thousands of other species, are now present everywhere in Vermont. That just indicates we have a wet state with widespread habitat—lakes, large rivers, and low-gradient areas on small streams. There are also culverts in damming habitat in every town, which will always be clogged, often by one beaver. Rather than some too-high population figure, the number of conflicts is reflective of a dense, unprotected road network.

The natural population trend of many prey species is “boom and bust.” Among other things, “peaks” simply mean more food for predators and scavengers, and a corresponding growth of their populations. This dynamism is a sign of a normal ecosystem.

As beaver-food availability decreases, birth rates do the same while mortality increases. Smaller, weaker beavers must venture further into the upland and away from escape habitat to find food, which increases predation rates.

Cultural Carrying Capacity (CCC)

Clogged culverts, washed-out roads, and flooded, high-value properties are unacceptable to everyone. Without HQDs, CCC is zero at every conflict point. Because these points are found in virtually every town in Vermont, the CCC of an unprotected infrastructure is essentially zero across the state not to mention the world. Management-by-CCC means killing all beavers in the vicinity of every conflict point and driving overall beaver populations down to the lowest possible level. As an accepted, long-term condition, this should be unacceptable to any responsible stewardship agency. Hopefully, it's not an unspoken goal in Vermont.

Few people object to the presence of beavers once properties are protected. For example, when I built my first flow device on my property CCC instantly went from 0 to 100. Of course, that "capacity," will never be more than one family. CCC has remained at 100 for 50 years despite the constant presence of beavers. Because of the rich, roadside wetlands created over the decades, it is the most popular wildlife-viewing place in town. If the "culture" welcomes beavers, does that push CCC over 100? CCC could quickly be made irrelevant at any conflict point. Any metric that can jump from one end of the scale to the other that easily is meaningless. This scientific-sounding phrase just confuses the issue without solving it.

The potential for population growth

The rapid beaver population growth in the 1950s cannot happen again and should not be used for management decisions. None of those environmental and population variables exist today. Then, there were only a few beavers residing in a vast region. The old-growth forests were gone, and most farms had been abandoned. For the first time in history, there was an abundance of hardwood food—often early-successional species like aspen—around flowages. Moreover, wolves and mountain lions had been eliminated, coyotes had not yet filled their niche, and bears were scarce. Unlike today, predators of small beavers like eagles, otters, and bobcats were rare or non-existent. Motor vehicles, which today probably kill hundreds of beavers each year, were comparatively few and slow-moving in the 1950s.

The Massachusetts example

"Massachusetts" (MA) is often used by wildlife agencies in other states to underscore the danger of not killing enough beavers through trapping. Trapping with kill traps was largely banned there in 1996. However, trapping never really ended. Since then, it has been done "humanely" via live-trapping and subsequent killing by gassing or head-shooting. It took a while to get started, but today it may account for more killing per year than was done pre-1996 with traditional traps. Trappers also get paid far more for this service than they formerly did for pelts.

In MA, as with Vermont and virtually every other state and province where traditional trapping was not banned, there was only enough trapping to slow, but not stop, the recovery of beavers in the post-Fur Trade landscape. In the 1990s, for instance, beavers had not yet returned to most of Eastern Massachusetts. Regardless of legal changes or trapping methods, a large population increase, and geographical spread, was inevitable.

The semi-protection of beavers in MA probably increased the rate of return of tens of thousands of acres of fantastic wetland habitats worth hundreds of millions of dollars. In addition, MA has provided a good example of the possible and logical transition from kill-based defenses to the use of flow devices, which they have in abundance.

Conclusion

The CCC-driven "forever war" on beavers is inefficient and environmentally harmful.

A growing number of Vermonters would like the state to adopt a new and improved management paradigm that focuses less on reducing populations and more on truly solving conflicts. Virtually all voters would favor saving money while improving flood resiliency and wildlife habitats.

Vermont is full of talented, energetic people who care about their greater habitat. With this “bench,” Vermont Fish & Wildlife, has an unparalleled opportunity to be an incredibly progressive agency that sets an example for all the other polities on the continent. Particularly with their support and leadership, Vermont can begin to transition away from a focus on killing, ensuring that “best management” never becomes “pest management.”