



BEAVERS: HOW A 100 POUND RODENT FIGHTS CLIMATE CHANGE AND PRESERVES BIODIVERSITY

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Meet the Beaver

Meet the North American beaver: a 100 pound rodent native to nearly the entire continent, from northern Mexico to northern Canada and Alaska. They have large, paddle-like tails to help them swim, thick fur to insulate against the cold, and giant incisor teeth to help chew down trees. To clarify, there are two species of beaver: the European and North American beaver, but this article will only focus on the North American beaver. Beavers are a keystone species, meaning they have a disproportionately large impact on their ecosystems relative to other species; their ecosystem engineering projects of vegetation clearing, canal digging and dam building completely transform landscapes and improve biodiversity and resilience to climate change. Recognizing just how influential they are, conservation initiatives are restoring beavers to landscapes that have missed them for a century or longer.

A History of Exploitation

To better understand the current role of beavers in conservation in the United States, it is important to first understand their tumultuous history. Before European colonization, beavers were extremely abundant: it is estimated that up to 400 million beavers lived in North America (Scamardo et. al). Imagine how different the American landscape looked saturated by this many beavers: walking through a forest would have required navigating a maze of wetland after wetland. You would be hard-pressed to find dry soil anywhere east of the Mississippi River. The fast flowing streams of today would have been slow, meandering pond complexes. That all changed when European voyagers set foot on the North American continent, and discovered the immense potential for fur production.

Middle left: A beaver explores a creek at sunrise in Baxter State Park, Maine. Middle right: A beaver feeds on aquatic vegetation at sunset in the Androscoggin River in Lewiston, Maine. Bottom left: a breeding pair of beavers patrol the edge of their pond on Stetson Brook in Lewiston, Maine.



Samuel de Champlain established North America's first fur post in Quebec in 1608 (Müller-Schwartz). French colonists worked with Native Americans to produce large quantities of beaver pelts for shipment back to France, England, the Netherlands and other European countries. The beaver pelts would be used to make high-fashion hats that dominated the market. Working in the fur trade was highly profitable: "on the way from the Native trapper to the fur merchant in Europe, the price for a beaver pelt was marked up by almost 1000%" (Müller Schwartz). Thus the fur trade crept down into what is now the United States in the mid-1600s, and Native Americans began trading with colonists along the New England and New York coasts.

Before metal traps were invented, beaver hunting was a difficult and complex endeavor. Müller-Schwartz explains that “harvesting beavers and other game required large hunting parties. The Iroquois broke down dams and speared beavers as they struggled to flee the drained pond. In winter, they cut holes in the ice, destroyed the lodge, and intercepted the beavers as they surfaced for air.” Settlers traveled up rivers to colonize the northeast’s interior and set up more fur trading posts. By the early 1700s, the construction of large factories allowed for great numbers of beaver pelts to be processed for export to Europe. A period of bloody conflict had erupted called the “Beaver Wars,” which pitted the French and Iroquois against the English and various Great Lakes tribes over control of the fur trade. In 1713 these “Beaver Wars” ended, and France ceded Hudson Bay to the English.

The European beaver demand grew throughout the 1700s, and hunting operations were established up and down the east coast and midwest. By the turn of the century trappers looked westward for new opportunities. Lewis and Clark set out from St. Charles Missouri in 1804, where they would explore the western frontier and survey land for fur potential. Merely 70 miles from St. Charles, they started to notice beavers becoming “very abundant;” upon reaching Montana, Clark noted that “some of the party catch beaver every day and every night,” (Burroughs). The extravagant observations noted during the expedition inspired fur trappers to penetrate westward.

A giant British fur-trading corporation called the Hudson Bay Company acquired an enormous area of the Pacific Northwest that included Washington, Oregon, and parts of British Columbia in 1821. Fearful that American trappers would flood their land, they ordered a “scorched earth policy” where all beavers must be killed (Müller-Schwartz). This operation was highly successful, and beavers largely disappeared from the region in less than two decades – partly thanks to Sewell Newhouse’s invention of the steel trap in 1823, which contributed to the immense depletion of beaver stocks across not just the northwest but also the entire continent. By the mid 1800s, the fur trade started to steeply decline, after successfully decimating American beaver populations and leaving tiny, fractured populations in its wake.



Above: A moose feeds in on aquatic vegetation in Russell Pond, Maine. A beaver dam at the outlet of the pond helps regulate the water level of the pond. The talons of the fur trade did not escape the state of Maine, and waterways like the Kennebec River helped trappers expand and colonize interior regions.

In the early 1900s, beaver populations started to rebound, largely as a result of new legislation like the Lacey Act of 1900 that criminalized illegal trade in wildlife. In the early to mid 1900s, beaver translocation efforts ramped up; Massachusetts started reintroducing beavers in 1928, and North Carolina started reintroducing beavers in 1939, for example. These efforts helped to jumpstart large-scale recoveries of beavers across the east coast. Today, there are an estimated 10-15 million beavers across the United States; a drastic improvement from 1900 but far from historic populations. Beavers are now abundant across much of the east, but less so in the West. Large-scale beaver restoration efforts are taking root in the West, inspired by the plethora of new research explaining just how beneficial beavers are. Beaver activities increase biodiversity, improve habitat connectivity, and perform a variety of other ecological functions. They also do something particularly relevant to modern environmental concerns: they fight climate change.

Climate Change? Beavers Got It Handled



Above: A beaver builds a dam using willows and other vegetation growing on the bank of Stetson Brook in Lewiston, Maine.

We can confidently predict that climate change will melt polar ice caps, raise sea levels, and increase global temperatures. Changes in precipitation, however, are more difficult to predict; the general verdict within the scientific community is that precipitation events will become less predictable and fluctuate wildly, with longer droughts and larger, more violent storm events. The lack of consistency in rainfall patterns will result in an increased frequency of floods. Watersheds will not be able to store all of the floodwater, and increased heat and drought intensity will accelerate evaporation and quickly dry streams and rivers out. Beavers play an important role in mitigating the effects of these great climactic swings.

Amanda Ronquist and Cherie Westbrook's paper, "Beaver dams: how structure, flow state, and landscape setting regulate water storage and release", explains how beavers mitigate climate impacts. During periods of high precipitation, beaver dams greatly increase the volume of water stored in a section of stream relative to an undammed section. The beaver dam slows the flooding process and prevents flooding in the lower stream reaches. Beaver dams also work magic during droughts, where they hold onto water for long periods of time before rain returns. Müller-Schwartz used a computer model that compared the time it took for water to flow through a dammed and undammed stream; the results showed that a single beaver dam complex could hold water for 11 days, compared to just 3-4 hours when they were absent.

The ecosystem engineering behaviors of beavers have strong influences on stream hydrology. Dams create a "hydraulic head," which raises the water level and circulates water throughout both surface and groundwater. Dittbrenner et. al investigated their impacts on water temperature and groundwater storage by relocating beavers to various beaver-less streams in Washington state. At successful relocation sites, surface water volume was 22 times greater than beaver-less control sites; at these relocation sites, beavers recharged groundwater that stored 2.4 times more water than at the surface. They also found that beaver dams had a significant downstream cooling effect compared to control sites, the result of upwellings and other hydrological conditions. The findings of this study suggest that beavers have a strong positive influence on hydrological systems, which will help fight climate change induced groundwater depletion and warming temperatures.

By altering the behavior of streams and rivers, beavers increase the area of the riparian zone, an area along their banks that has more water-reliant vegetation. The enlarged riparian zone not only improves habitat for other animals, but also creates an effective fire break (Fairfax & Whittle). Climate change is expected to increase the severity and frequency of wildfires, and while they can spread with ease across large areas of dry vegetation, beaver wetlands present an incombustible obstacle to their path. Conservationists have been surprised to find that post-fire, an entire landscape may turn to char except for the large, wet riparian zone created by beavers (Goldfarb). These fire-resistant fortresses provide refuge to wildlife fleeing the flames, helping to maintain biodiversity in the wake of such a large natural disaster.

Coupled with improving a watershed's resilience to climate change, beavers can filter out pollutants from streams and rivers. Nitrates, chemicals that are common in fertilizers, can be carried in rainwater runoff from farms and enter into a water body. When nitrates flood the water they can cause massive algal blooms. This can greatly destabilize an ecosystem; when all of the algae die off, they consume a lot of oxygen in the water, leaving a deoxygenated "dead zone" in the water column that may kill off fish. Because beaver dams slow the speed of water through a watershed, they allow the nitrates (and other pollutants, like heavy metals) to settle at the bottom and prevent them from traveling farther downstream (Dewey et. al).



Beavers and Biodiversity

Beavers create complex and dynamic wetland habitats that both boost organism abundance and biodiversity. Unfortunately, since 1700, the United States has lost 40% of all its wetlands (Fluet-Chouinard et. al). The destruction and degradation of wetlands have had deleterious consequences on wildlife populations, and have helped drive many species to near extinction. Fortunately, beavers can help reverse the trend; much of the adequate American beaver habitat is below carrying capacity, suggesting ample room for beaver populations to grow; in Colorado, for example, Scamardo et. al explain that “while beaver populations have declined by an estimated minimum of 80%, capacity for beaver has only declined by approximately 50%, leaving potentially significant opportunity for reoccupation and reintroduction on streams once housing beaver.” The return of beavers often coincides with the rebound of other threatened riparian wildlife. Let's explore the different ways in which some species benefit from beavers.

In the central Appalachian mountains, beaver wetlands provide key habitat for threatened dragonfly species. Liberto and Studinski's study investigated populations of two species, *L. Glacialis* and *L. Hudsonica*, which live in an acidic bog habitat that is very rare in central Appalachia. They selected 22 study sites scattered throughout the Maryland and West Virginia Appalachians, and found *L. Glacialis* at only 2 sites and *L. Hudsonica* at only 3 sites. The most important site, Negro Mt. bog, had populations of both species with a particularly robust *L. Glacialis* population. Aerial imagery of the pond shows consistent loss of pond area over time, and as of 2016 it had dropped by over 50% from 1995. This could be because there aren't enough beavers: Liberto and Studinski explain that “beaver populations are far below historical estimates, leading to an uncertain future for *L. Glacialis* and *L. Hudsonica* in the region.” They concluded that “beaver appear to play a crucial role in the persistence and conservation of these two Leucorrhinia species in central Appalachia,” and that beaver restoration solutions may help boost populations of these species. Although much of the eastern US has seen beaver populations fully rebound, it is important not to generalize, as wildlife in regions like central Appalachia are suffering because there aren't enough beavers.

Top right: A stream courses unabated through a meadow in northern California. Top left and middle left: after heavy rains, a stream in southern Utah floods. Bottom left: Two days after flooding, the same stream struggles to retain water and water levels steeply decrease.

In the state of Maine the rusty blackbird is in big trouble. Maine has the rusty blackbird listed as a priority 1 species of special need, and their global conservation status is listed as “vulnerable to extinction,” largely a result of habitat loss. Beavers play a key role in their recovery, as they both create important nesting habitat by clearing out woody tree species and create habitat that boosts prey abundance. Pachomski et. al’s study investigated the relationship between beavers and rusty blackbirds in Maine, and found that all sites that had rusty blackbird populations had at some point been modified by beavers, regardless of whether or not there were beavers currently present. Furthermore, the study revealed that beavers created ideal odonate and anisoptera habitat, two macroinvertebrate species that rusty blackbirds actively seek out for food. Because the erratic weather predicted by climate change could destabilize the wetlands rusty blackbirds need, beavers will play an increasingly critical role to maintain them.

A stark contrast to Maine, the American southwest is expected to get even hotter and drier than it already is. This is particularly devastating for amphibians. Globally, amphibians are declining at an alarming rate relative to other taxa; because they require reliable precipitation patterns, climate change poses an enormous threat to their survival. The Columbia spotted frog is one such imperiled species, as they are becoming locally threatened across much of its range. In the Great Basin region of Idaho, Oregon and Nevada, Smith and Goldberg explored co-occurrence of beavers and Columbia spotted frogs by collecting environmental DNA from beaver dam sites, testing each sample to infer the presence of both species, and then generating a computer model to quantify their co-occurrence patterns. They found that spotted frogs are increasingly associating with beaver-created habitats because they provide much needed environmental stability. They concluded that “future climate scenarios predict a decrease in spring snowpack and precipitation in the Great Basin that could negatively impact Columbia spotted frog breeding; this could potentially be mitigated by beaver-created dams that raise water levels during spring snow melt.” The tadpole stage is the most vulnerable part of an amphibians life -- by relieving the threat of habitat deterioration, beavers help tadpoles graduate to adults.

Teaming up With Beavers to Restore Our Ecosystems

Understanding that beavers have such wide-ranging benefits to so many species, conservationists are working to bring them back to landscapes they have not fully returned to. In some cases, the restoration projects have broad goals of restoring general biodiversity. In other cases, restoration projects are targeted toward supporting specific species. Most of the time there is overlap between the two, where restoration efforts aimed at boosting general biodiversity benefit species of special conservation needs, and vice versa.

In Tillamook County Oregon, conservationists aimed to restore a plot of degraded wetlands bordering the Miami River (Castro et. al). Surveying their various options, they turned to beaver restoration, hoping that if they made some basic landscape renovations beavers would move in and do the rest of the work. They planted willow trees and dug new channels, and before finishing beavers had already started making new dams. Following the beaver return, conservationists noticed increased numbers of threatened coho salmon and cutthroat trout, and recognized that the beaver impoundments created ideal spawning habitat. Supporting threatened fish was not the original intention of bringing beavers back, but it was a welcomed impact.



Top: A rusty blackbird is silhouetted against the clouds on a warm spring day. Bottom: A beaver lodge sits on a wetland rich with birdlife.



Across the Pacific Northwest, beavers are intentionally being reintroduced to waterways to boost endangered salmonid numbers. The Methow Beaver Project is an organization doing just this; based out of Methow, Washington, it aims to improve the riparian habitat complexity of waterways throughout the large Methow River watershed by relocating nuisance beavers from private lands and into degraded waterways. Making the waterways more complex and dynamic will improve threatened salmonid habitat, helping restore low populations. Coho salmon and steelhead are incredibly important for ecosystem health: they provide sustenance for bears, eagles, mountain lions, indigenous people, and when their bodies decompose, the nutrients nourish the trees themselves.

The Pacific Northwest is not the only region taking on beaver restoration efforts; they are also being used in the Lower White River in Utah. This stretch of water is one of Utah's most critical habitats for threatened fish species like the Colorado pikeminnow, the largest minnow in the United States that can grow up to 6 feet in length. A major concern for the river is that climate change will reduce water flow and narrow the river channels, decreasing the available habitat for fish. Thus, numerous management projects are underway attempting to re-establish healthy beaver populations on the river to improve water retention and increase available habitat. Pennock et. al's "Conservation, Restoration, and Monitoring Plan for the Lower White River, Utah" explains that "reducing encroachment by riparian vegetation (native and nonnative) on the active channel will prevent river banks from further narrowing and will help maintain natural channel movement." Beavers are being reintroduced to do just this: by regulating water flow and thinning out encroaching vegetation they might just create the perfect environment to save the Colorado pikeminnow.

California, a state constantly reeling from wildfires, high temperatures and drought conditions exacerbated by climate change, recently approved a proposal to spend 1.6 million and 1.44 million in the 2022/23 and 2023/4 respective fiscal years on beaver restoration initiatives. Funds will be channeled into hiring esteemed scientists tasked with managing the project, purchasing equipment to trap, tag and haul beavers for relocation and providing health analyses (Swan). At a holistic level, conservationists hope that this initiative will perform ecosystem services like replenishing groundwater reserves and increasing climate resilience, on top of improving biodiversity.

Sometimes, beaver restoration doesn't even need the beavers themselves; conservationists can try to mimic beaver dams by installing beaver dam analogs, dam-like structures made of natural materials intended to have the same effect as a real beaver dam. Like beaver dams, they are expected to temporarily raise water levels, improve pool formation, increase the availability of riparian habitat, reduce water temperatures, and more (Castro et. al). When translocating beavers to a stream system is expected to be too difficult or take too long, beaver dam analogs are popular alternatives that can bide the time for beavers to return. Beaver dam analogs have been used in restoration projects all across the American West, and have effectively performed many of the duties of regular beaver dams.

Beaver restoration has received a lot of positive attention, but it does not come without its drawbacks. Beaver translocation efforts can elicit negative reactions from landowners concerned that if they restore beavers to their property they might run into irrigation issues, challenges to livestock operations, undesirable regulation and permit issues, liability for restored habitats, and undesirable landscape alterations (Abrams, Johnduff and Charnley). Landowners worried about these potential problems want to be sure that they "would not lose land management and income options because of the presence of beavers or species that benefit from wetlands" (Abrams, Johnduff and Charnley).

Pillod et. al conducted a literature review investigating beaver restoration efforts on rangeland streams across the American West, and found that translocated beavers have a much higher likelihood of mortality than resident beavers; in an Oregonian translocation study, "57% of predator-related mortality occurred within the first week post-release." Mortality of translocated beavers is an incredibly common problem in beaver restoration, which both provokes ethical reconsiderations and slows the process of restoring and revitalizing waterways. Beaver translocation tends to place large amounts of stress on beavers; sometimes translocated beavers travel abnormally great distances from their release site, and sometimes release sites do not provide the resources necessary for beavers to build dams and feed themselves. Pillod et. al conclude that "beaver translocation and artificial structures that mimic the effects of beaver dams are widely and increasingly used, but with few guidelines and little effort to monitor restoration effectiveness or assess social or environmental consequences." Clearly, beaver restoration has its fair share of challenges, and is far from perfect. It might take more time to learn how to best harness the immense power of beavers.

Top left: a beaver investigates activity on its pond near Gold Beach, Oregon.

A Personal Side Quest: How Might Beavers Impact Maine's Threatened Turtles?

When starting this project, I tried to locate the front line of beaver research and restoration so that I could investigate something new. As a Bates College student in Lewiston, Maine, I started exploring threatened species in Maine that could potentially benefit from beaver restoration efforts. I landed on three turtles – spotted turtles, Blanding's turtles and wood turtles, which are all threatened in the state of Maine largely because of habitat destruction and fragmentation. I looked into papers that might draw some parallels between ideal turtle habitat and beaver-engineered habitats, and found a surprising number of connections. Joyal, McCollough and Hunter Jr.'s "Landscape Ecology Approaches to Wetland Species Conservation: a Case Study of Two Turtle Species in Southern Maine" found that Blanding's and spotted turtles have unique habitat preferences; in general, Blanding's turtles favor larger, permanent pools and spotted turtles prefer more shallow hummock wetlands. However, individuals of both species are highly mobile and will travel throughout all different types of microhabitats occurring in interconnected wetland complexes. Beavers engineer ecosystems to be more active and dynamic, creating both deep ponds and shallow wetlands – ideal habitat for both turtle species.

In Ontario, Yagi and Litzgus investigated the effects of beaver-induced wetland flooding on habitat preferences among an endangered spotted turtle population. Peat farming activities at the site had reduced connectivity between wetlands, as the carving of deep drainage ditches prevented water from spreading across the landscape. This stunted the mobility of the turtle population, and the only suitable habitat became the ditches and a few small ponds dug out by the peat miners. However, when transient beavers colonized the site, they built dams that completely flooded the landscape. The flooding greatly increased the amount of suitable spotted turtle habitat, and the turtles responded positively to the change by traveling farther to seek new, larger territories. Beavers had completely improved the habitat, and as a result the turtle population grew.

The third turtle species – the wood turtle – is quite different from the other two. While spotted and Blanding's turtle populations huddle Maine's southern and mid coast regions, wood turtles are distributed statewide. They tend to prefer moving streams and rivers compared to stagnating wetlands and ponds; thus, at first glance, it would seem like they would depend less on beavers than the other two. Upon closer review this may not be the case. Compton, Rhymer and McCollough explain that wood turtles need stream-side habitat with moderate forest cover that both provides adequate sun penetration for basking and shade that supports populations of slugs, worms, and other organisms they feed on. This connects to beavers because by harvesting trees for their dams and lodges, they clear up the canopy and allow the sun to shine through (Müller-Schwartz).

Upon scouring literature in google scholar and scopus, I realized that nobody has published any papers investigating the relationship between beavers and wood, spotted or Blanding's turtles in the American northeast. Thus, I decided to reach out to Derek Yorks, Maine Department of Inland Fish and Wildlife's head reptile biologist, who has worked extensively with turtles and might know more about their relation to beavers. He responded with geniality, expressing that he would be happy to talk about turtles and beavers. He generously offered to take me out with him to do a wood turtle stream survey and assess a proposed land development for potential spotted turtle habitat. I happily accepted his request, and in early October we set out for the field.

Unfortunately, we didn't get our hands on any wood turtles; we found one turtle at the beginning, couldn't catch it, and failed to find another before the end of the study. But hiking up the stream Derek pointed out numerous places where beaver activity altered stream-side habitat, often improving conditions for basking and nesting. Confirming my assumptions from the Compton paper, he explained that because wood turtles often inhabit streams that are heavily forested, and humans or other herbivores don't clear out the canopy in those areas, beavers play a key role in opening up the canopy for turtles to thermoregulate and forage. The constant installation, abandonment, and rearranging of beaver dams changes the course of the streams. This active and dynamic landscape provides wood turtles with new opportunities to nest, forage, or engage with their environment.



Left: Derek Yorks conducts a survey looking for threatened wood turtles. He stands on a sunny riverbank that has been drastically altered by beaver activity: woody trees have been entirely cleared out, providing high quality basking and potential nesting habitat for wood turtles.

A few weeks after our field day, I called Mr. Yorks to confirm his perspective of the role that beavers play in the lives of spotted and Blanding's turtles. He explained that along with creating the wetlands and pools that both species desire, beavers carve channels through dense vegetation mats across the wetland that lead to the edge of the forest – the turtles use them like roadways to navigate the wetland. When asked if there is potential for beaver management solutions to be used to conserve these species, he explained that “at the moment, beavers are really widespread and abundant in Maine...they kind of get to everywhere they could live, because they disperse widely and find every place they can make a living.” If something were to happen to reduce beaver populations in the northeast, that could become a serious problem for the turtles. Instead, the beavers are already doing a lot to help maintain viable populations of these threatened turtle species.

I then asked him if the role beavers play in providing habitat for threatened turtles in Maine could serve as a model for turtle conservation elsewhere. He discussed that there are a lot of conservation initiatives on the west coast to support populations of threatened western pond turtles, a species belonging to the same family (*emydidae*) that Blanding's, wood and spotted turtles belong to. This species shares a lot of the same life history traits that the threatened Maine turtles do, so Mr. Yorks suggested that conservationists might want to investigate the role that beavers could have in restoring their populations. Given that the federal government recently approved a proposal to spend millions of dollars on beaver restoration projects in California, this could increase the amount of available high-quality, dynamic wetland habitat for western pond turtles.

In mid-October, I went out in the field with Mark Ward, a wildlife biologist and ecological consultant working with a local land trust, assessing a population of spotted turtles in midcoast Maine. Some turtles were fixed with a small radio transmitter on the outside of their shell, and we were locating them to remove the tracker before the turtles started their winter hibernation. The site throbbed with beaver activity, with dams, channels and clearings burgeoning across the landscape. We successfully captured two individuals, a male and female spotted turtle, each within 30 feet of an active beaver dam.

Mr. Ward explained that in the last few years beaver activity had accelerated at the site, and thus water levels across the wetland increased. We discussed the impact of higher water levels on spotted turtles, and his response closely resembled the findings of Yagi and Litzgus: he explained that flooding had “increased the amount of available aquatic habitat for them. They, as a result, used a lot more of the potential habitat.” Mr. Ward went on to describe a lot of the turtle/beaver dynamics that Mr. Yorks explained, elaborating on the turtles' ability to respond to beaver activity by utilizing clearings for basking and traveling through canals. He emphasized that no studies investigating the relationship between spotted turtles and beavers have been conducted thus far in Maine, and it would be a very interesting and important study to conduct. If he were to conduct a study himself, he would test his hypothesis that spotted turtle habitat use patterns closely follow beaver alterations.



Bottom Left: The female spotted turtle was located less than 30 feet from a large beaver dam, pictured at the right of the frame. Bottom right: Mark Ward performs measurements on the male spotted turtle to assess health condition.

Top right: a male spotted turtle that was captured and had its radio transmitter removed by Mark Ward. Middle right: a western pond turtle basks on the bank of an artificial pond that represents a key sanctuary for extremely rare Santa Monica Mountains western pond turtles. Bottom right: two western pond turtles found active in a creek after a heavy rain in the Santa Monica Mountains, California. Bottom left: a female spotted turtle captured with Mark Ward comes out of her shell after having her radio transmitter removed. Middle left: nineteen western pond turtles were found dead in a dried up creek during an intense drought in 2017 in the Santa Monica Mountains, California. Next Page: a beaver investigates me inquisitively after checking up on a dam with its mate at Stetson Brook in Lewiston, Maine.





Key Takeaways

Despite benefiting humans and wildlife in so many amazing ways, beavers can be highly controversial figures. Beavers whose water management activities pester landowners are often referred to as “nuisance beavers,” which sometimes get relocated but more often than not get killed. Trapping nuisance beavers can be highly unethical: drowning rods are a highly popular method that kill beavers by snaring them at the water’s edge, provoking them to swim down into deep water and then locking at a certain depth, preventing them from coming back up for air. In Maine, it just became easier to do this: a bill got passed proposing a relaxation on regulations preventing illegal removal of nuisance beavers in 2021 (Maine Legislative Document 547). Trapping a nuisance beaver without consulting with state game management was previously listed as a class E crime, which states that an offense can be punishable by up to 6 months of jail time or a 1,000 dollar fine; that law was repealed and trapping a nuisance beaver is no longer a class E crime (Office of the Maine Attorney General, Maine Legislative Document 547). As beavers face increasing public pressure, it is as important as ever to spread awareness about just how important they really are.

Beavers are a climate hero, strapped with an impressive arsenal of defenses ready to combat fires, floods, and droughts. They clean our waterways, filtering out nitrates and heavy metals, preventing them from infecting the downstream ecosystems. They boost biodiversity, making habitats more dynamic and complex for all different types of animals to find a home. Endangered species, victimized by widespread land degradation and destruction, find refuge in beaver haven. It makes sense why beaver restoration efforts are taking off across the country – beavers clearly bring a lot to the table, and once established they do all of the management and improvement without the need for human intervention!

While there may not be a huge demand for beaver restoration projects in the northeast, it is important to recognize that it’s because beavers are already there doing the most they can to provide habitat for threatened species. To reiterate the argument of Pachomski et. al, maintaining and improving blackbird habitat is the best way to restore their populations in Maine; they emphasize that “it is important that land managers retain existing beaver populations and manage hydrology in the face of climate change.” Wood turtles, spotted turtles and Blandings turtles are all threatened in New England, and beavers create the types of habitat they rely on to survive.

In Oregon, California, and Washington, watershed degradation and habitat loss continues to whittle down western pond turtle populations (Spinks et. al). West coast conservationists should take note of how impactful beavers are to similar turtle species in Maine, and consider first restoring beavers to the watersheds where they might have a disproportionately beneficial influence on western pond turtle populations. Too often we realize too late that we lost something incredibly special or valuable; western pond turtles are the only native freshwater turtles to California and Oregon (and one of two native to Washington), if we lose them we will have no native turtles left.

In an increasingly unpredictable time, beavers provide the consistency that we need. Yes, they are probably not the first thing that comes to mind when thinking about conservation management. But do not overlook them: a 100 pound rodent engineer may be the key line of defense against some of the greatest environmental threats America faces today.

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