

A tale of two environmental engineers: the evolving relationship between humans and beavers

by Jen Vanderhoof

The North American beaver is a semi-aquatic mammal that evolved to use water as a key component of survival. Beavers build dams on gently sloping streams to form ponds deep enough to maintain underwater entrances to their lodges. Underwater entrances keep them safe from predators such as coyotes, bears, cougars, and dogs. They also use the ponds as protective cover as they move between their dwelling and the trees and other vegetation they eat. When left to their own devices, a beaver family may build a series of dams along a stream to create a string of ponds that may retain tens of millions of gallons of water.

Beavers, like other wild animals, don't adhere to property lines or plan where the water from their ponds may end up. Challenges for humans arise when beaver ponds flood private property, farmland, roads, and other public infrastructure. There was a time when trapping out the "nuisance" beavers was a fast, simple, and reasonable solution. But now we understand all the benefits to keeping them around whenever possible. Therein lies the rub. More on that further on. First, some historical context.

Beaver history

Beavers were nearly wiped out from this region by around 1850, 170 years ago. In the early part of the 20th century, people started realizing the loss of beavers was harmful to nature, plus fur trappers wanted to be able to trap them once again. So, relocation programs were kicked off all around the country, including in Washington in the 1920s. As beaver populations began to rebound, their numbers were kept in check by trappers.

In 2000, trapping laws changed, making some traps illegal and making it more expensive and difficult to trap beavers recreationally. Around the same time, public agencies and conservation groups all over Puget Sound started doing restoration projects along streams for salmon recovery. These projects typically involved planting trees – trees that are quite attractive to beavers for food and building materials. Trapping plummeted at the same time people were planting beaver food all over the region. While state agencies do not track beaver populations, it is apparent from anecdotal evidence, and the increased number of beaver-related calls to King County since 2000, that beavers are making a substantial comeback.

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Those last six words will delight some people and give others a knot in their stomach. To one, this news could mean more salmon and wildlife. To another, it could mean the loss of livelihood, home, and property. These opposing reactions are at the core of why King County is dedicating time and resources to addressing the beaver conundrum: how can we humans (excellent manipulators of our environment) coexist with these animals (exceptional manipulators of their environment)? We humans occupy land, homes, and roads where we have a keen interest in preventing flooding, and the beavers provide an astonishing array of ecological benefits, but their work may redirect water to places we find unacceptable.

The ultimate goal of King County's Beaver Working Group is to develop the best, most effective solutions for humans and beavers to successfully co-exist in King County.

The importance of coexisting

King County is looking ahead to a not-so-distant future in which our climate brings more rain and less snow in the winter. That means higher stream flows and more flooding in winter and streams with lower to no flow in summer, resulting in problems for agriculture, drinking water supply, and salmon, just to name a few. Warmer, dryer summers also equate to warmer water temperatures in streams and rivers. King County and the entire Puget Sound region have been working hard for two decades to recover salmon populations, which require streams and rivers with adequate amounts of cold, clean water as well as ample large wood.

What does any of that have to do with beavers? It turns out that those ponds beavers build for survival have a variety of other beneficial functions.

Beaver functions:

1 Beaver ponds not only increase water storage, but that stored water increases groundwater recharge and retention. This stored water is released slowly throughout the summer, which increases flows in the streams below dams, some of which might otherwise go dry in summer.

2 Beaver ponds have a cooling effect on stream water temperatures because of the movement of surface water into groundwater aquifers and subsequent release further downstream when the groundwater resurfaces. This means water temperatures below beaver ponds are often cooler than above them.

3 Beaver ponds, especially when there is a series of them, "roughen" stream channels and can help moderate peak stream flows by slowing flow, which reduces erosion and dangerous flash flooding.

4 Beaver ponds function like filters, collecting and storing sediment and pollutants, keeping downstream water cleaner.

5 Beavers add wood to streams both by cutting down trees for dams and food and by flooding trees, which over time die and fall over. Even in river systems where beavers do not create dams, they build bank dens, which often expose trees roots in the water, which become hiding places for young salmon.

6 Beaver ponds are excellent rearing habitat for young coho salmon and are also used by steelhead.

7 Beaver dams help contribute to more complex stream systems as channels braid around dams and eventually, over the long term, through the stored sediment. These braided channels provide habitat for fish, including juvenile Chinook salmon, and the stored sediment eventually becomes nutrient-rich soil.

8 All that water and wet ground makes areas with beaver dams more resilient to fire which is becoming more a common in western Washington.

9 In terms of biodiversity, beavers create and maintain wetlands that attract a much wider variety of plants and animals than ponds and streams lacking beavers. Trees that die in beaver ponds become habitat for woodpeckers, owls, and other cavity nesters such as bats as well as amphibians and many more animals. The wood is also used by insects, food to the other animals, including salmon. Large and small mammals including mink, otters, cougars, bears, and weasels use ponds created by beavers to drink, feed, and cool down in the summer.

In short, healthy ecosystems in our region include—and in fact may require—beavers.

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There are other compelling, practical, and economy-related reasons to leave beaver dams in place and strive towards coexistence:

- 1 Removing part or all of a dam is a very short-term solution to a long-term situation. Beavers are hard-working perfectionists—tear down or notch their dam and they will rebuild it – often better and stronger – overnight. They are hypervigilant of any changes to water level and are constantly performing maintenance to make their dams strong and durable. And, they will also take down more trees to use in their repair jobs.
- 2 Removing a beaver dam can harm salmon by releasing significant stored sediment, and if you do that at the wrong time of year, salmon eggs and baby salmon downstream could suffocate.
- 3 Removing a dam requires permitting. At a minimum, a Hydraulic Project Approval permit, issued by Washington Department of Fish and Wildlife, to ensure salmon downstream are not being harmed; and in addition a permit from the King County Permitting Division may be necessary.
- 4 Removing a beaver dam is not a permanent solution. More beavers are likely to move in anywhere from a couple months to a year or two later. Beavers thrive in our large rivers, such as the Snoqualmie or Cedar, so there are always more beavers waiting to take available space.

Living with beavers

Ultimately, as beavers continue to reclaim lands they haven't stepped foot on in nearly 200 years, the two environmental engineers, humans and beavers, will have to find a new balance. But in the meantime, there is a set of tools at our disposal. Constructed solutions such as pond levelers, culvert fencing, and tree protection can solve many problems. To learn more, a summary of beaver management tools and a detailed technical paper are available at kingcounty.gov/beavers.

What the Beaver Working Group is doing

The King County Beaver Working Group is actively seeking innovative solutions. In the meantime, some highlights of the group's current work are listed below.

- King County recently hosted two “Good Neighbor” workshops to learn more about what communities identify as good neighbor behavior where beavers are present on county-maintained lands. A “Planning for Beavers Manual” is being drafted to better guide proj-

ect managers in anticipating and planning for beavers after a stream restoration project has been built.

- A Fish Passage Committee of the Beaver Working Group has been established to address concerns from state agencies regarding fish passage around beaver dams with flow-control devices. Data collected from field studies will inform future policies and regulations.
- King County Code changes are being drafted to streamline permitting for removal or alteration of beaver dams, including installation of flow-control devices.

Resources currently available

King County Beaver Working Group

Products, technical papers, and resources for beaver management.

kingcounty.gov/beavers

Tulalip Beaver Project

Currently the only local effort actively relocating beavers.

nr.tulaliptribes.com/Programs/Wildlife/Beaver

Beavers Northwest

Specializing in technical advice and installation of flow devices.

beaversnw.org ■

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File: 2002_9792L_SciFYInews.indd 12/20/20

Para pedir una traducción: 206-477-4800

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