

Ecosystem Engineers: Living with Beavers on the Landscape

An Important Part of Our Cultural and Natural History



Mike Digout

The beaver (*Castor canadensis*) is an important part of our history.

Love them or hate them, you'd be hard pressed to name any other species that has had as much of a pivotal role in Canadian history as the beaver. The exploration of Canada, and the rest of North America, was largely a result of the demand for beaver pelts. It was this demand for fur that brought about European commercial interest to North America in the 1500s, and with it, exploration and settlement. Without the beaver, our history as a country might have looked very different.

Fast forward to 2021, the beaver finds itself very much in demand once again. This time not for its fur, but for the precious commodity that it helps store. A commodity that seems to be getting scarcer all the time: water. Much like our grasslands evolved with grazers on the landscape, our watersheds evolved with beavers in them. And just as grazers play an integral role in maintaining the health of our grassland ecosystem, beavers have a similar role in helping to maintain the health of our watersheds.

I'll be Dammed: The Benefits of Beavers

A common belief is that beavers hurt riparian health through the loss of trees and other woody species. As it turns out, allowing beavers to build dams on degraded streams actually helps restore these systems, not the contrary. When beavers build dams across creeks and streams, they slow the flow of running water, creating ponds. Water is retained on the landscape in these ponds, as opposed to rushing through. More water on the landscape means it is more readily available, whether for livestock use, drought relief, wildlife habitat, and even flood and wildfire resistance. The slower stream flows created by the damming of creeks and streams also reduce erosion and trap sediment in the resulting beaver ponds. This allows streambeds to rise, causing a wider, flatter stream channel. As water levels rise, depth may be added to the stream, resulting in cooler water temperatures downstream.



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Beavers use a variety of materials including trees, shrubs, grasses, rocks, and mud to build dams across creeks and streams.

Ecosystem Engineers: The Benefits of Beavers (continued)



Kristen Rumbolt Miller

The northern leopard frog (*Rana pipens*) is just one of many wildlife species that benefit from beaver ponds.

Beaver ponds also sequester carbon, filter contaminants, and raise ground water tables, maintaining them at higher levels, which is especially valuable during dry periods. Higher water tables also mean increased forage production in surrounding uplands for livestock and may help improve grazing distribution. Also, as the land retains more water, the more resistant it is to fire.

Beaver ponds also help create plant and wildlife habitat. When beavers move into an area and water levels rise, upland vegetation such as grasses and forbs are gradually replaced with water loving species, like cattails and sedges. As the vegetation becomes more diverse, so to does the diversity of wildlife species. Amphibians, waterfowl, fish, ungulates, and songbirds can all benefit from the presence of beavers and the resulting changes to the landscape. One species that directly benefits from beavers is the Threatened northern leopard frog. A study conducted in Wyoming found that while leopard frogs bred in many different types of wetlands, the main driver of leopard frog distribution in southeastern Wyoming was the degree of beaver activity at wetlands and the ability of the site to hold water throughout the

summer months. Even after beaver have disappeared from a system, the benefits to plant and animal communities remain, with old ponds developing into productive habitats such as wet meadows or forested wetlands.

The Beavers of Bar XT Ranch

Paul and Twyla von Huene are the owners of the Bar XT Ranch, located on Ross Creek, south of Irvine. They've been there for 20 years and have allowed the area's beavers to dam the creek for as long as they've been there. "In 2010, the flood came through and wiped all the dams out. It took some years for them to come back because a lot of the trees were wiped away", says Paul. But they did come back, and currently there are more than ten dams on their stretch of Ross Creek. Paul says that as the beaver ponds grow, the beavers extend the dams to continue capturing the water. He's noticed that they'll use different materials (besides trees) to build their dams, including mud and rocks that they carry to the dams. A stream's ability to capture and store water increases with the number of dams and resulting ponds, but even with the number of dams on their land, Paul says that it has been so hot and dry these last few years that the creek has all but dried up. One thing the von Huene's have noticed however, are willows springing up all around the beaver ponds. He says that the abundance of willows is now attracting moose.

MULTISAR has completed several wildlife and range assessments on the Bar XT Ranch in the last ten years, during which over 64 species of wildlife (including 30 species at risk) and 138 plant species were documented. Many of these species were associated with Ross Creek and its surrounding riparian area.



Kristen Rumbolt Miller

One of many beaver dams on the Bar XT Ranch.

Ecosystem Engineers: The Benefits of Beavers (continued)

The von Huene's stretch of Ross Creek provides habitat for the northern leopard frog, which is undoubtedly benefiting from the presence of so many ponds. Beaver ponds are ideal breeding habitat for the leopard frog and if deep enough, ponds may be used for over-wintering as well. Other species found along the von Huene's stretch of Ross Creek include a diverse assemblage of songbirds, including Baltimore oriole and common yellowthroat, great-blue herons, which hunt along the creek, and several bat species, which feed over the beaver ponds at night for flying insects like mosquitos.



Paul says that not all his neighbours feel the same way about beavers as they do, but some are more than happy to let the beavers do their thing. He takes the long view when it comes to their land: "Allowing the beavers to engineer the creek is what's best for the water, the trees, the riparian area, and our livestock. Society needs to start looking at life a little more philosophically. We are part of the landscape. It's not ours. We are just the stewards of it. I have an obligation to the animals I have, to care for them".

Despite the beaver dams, Ross Creek has run dry on the von Huene's the last several years with the hot, dry weather.

What About My Trees?



A poplar tree having been cut by beavers several times, showing new growth.

It's true. Beavers can be hard on trees. Particularly aspens and poplars. While these species do regenerate, it does take time and beavers may harvest these species at a faster rate than they can re-grow. Willows on the other hand grow more quickly and their ability to regenerate plays an important role in the mutualistic relationship they have with beavers. When beavers dam streams, willows benefit from the increased water levels that result, and in turn, the beavers benefit by having an abundance of willow to eat and build their dams and lodges with. When beavers take willow, willows often sprout multiple shoots and the amount of woody biomass present actually increases. Luckily, steps can be taken to protect those tree species that don't grow back quite as quickly.

With the help of MULTISAR, Paul and Twyla von Huene have wrapped many of the trees in their riparian area along Ross Creek. In addition to their large cottonwoods, they have wrapped many of the smaller and medium sized trees so that there will be trees of a range of ages on the landscape. MULTISAR has been to the Bar XT Ranch twice in the last several years to help wrap trees and a third visit is planned before the year is out.

Using heavy gauge mesh fencing (not chicken wire), trees of various sizes can be wrapped to protect them from beavers. Fencing with mesh sizes of 10 cm by 10 cm, or smaller, is recommended and is readily available at most hardware and farm supply stores. Make sure to always leave enough room between the trees and fencing for trees to grow and expand their trunk size.



Paul von Huene of Bar XT Ranch with one of the many trees they have wrapped along Ross Creek.

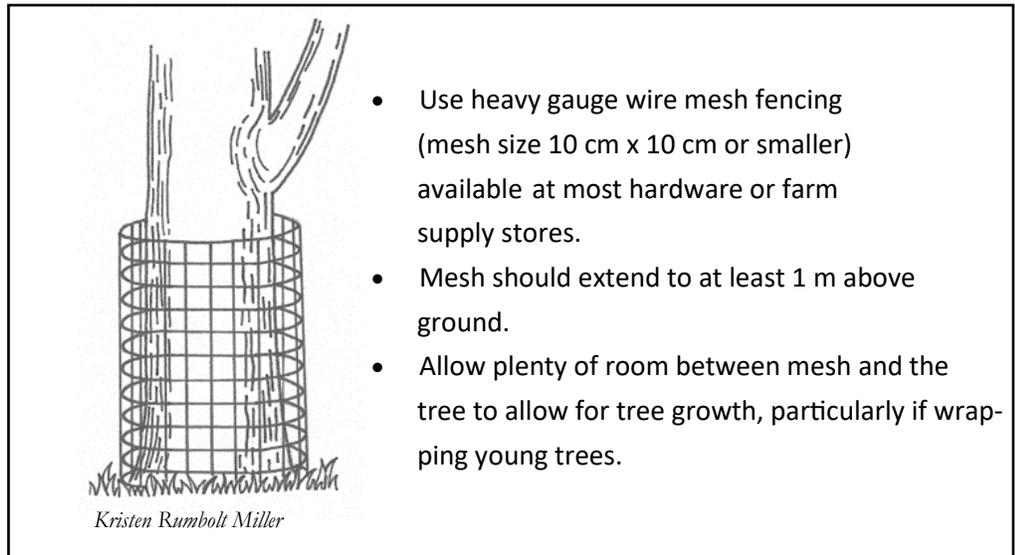
Ecosystem Engineers: The Benefits of Beavers (continued)

It's also important to make sure that fencing extends at least 1 metre above ground. This helps protect the tree when there is snow cover, when beavers may be able to reach higher up the tree. If you are interested in giving beavers a shot in your riparian areas and would like some help protecting your trees, be sure to contact MULTISAR, as assistance is available.

Additional Resources

With the popularity of beavers and their benefits to the ecosystem on the rise, there is a wealth of information available, including the following publications:

- Caring for the Green Zone: Beaver – Our Watershed Partner by Cows and Fish (Alberta Riparian Habitat Management Society): <https://cowsandfish.org/wp-content/uploads/BeaverOurWatershedPartnerWEB.pdf>
- Alberta Landholder's Guide to Wildlife Friendly Fencing by Alberta Conservation Association: https://www.ab-conservation.com/downloads/educational_materials/brochures/ACA_Wildlife_Friendly_Fencing.pdf?fbclid=IwAR2Hdu2NiUVfBq9ymyNvOpDEI7UllLa2AbZkwX0Hsa22RegEa1Qm_v0os9MA



Where wanting to protect many trees, fencing a small area with mesh fencing is also an option to exclude beavers, as well as cattle.

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PORTABLE ELECTRIC FENCERS



Adam Moltzahn

Norm Ward created the Razer Grazer, a portable electric fencing system.

As most of us know, there are different types of grazing strategies that a rancher can use to aim at keeping both livestock and the ecosystem in the best possible health. Some methods employ lots of fencing and some do not. For wildlife, the best option would be to have no fencing at all, however, in today's landscape that is not a realistic option in most places. The 'Alberta Landholder's Guide to Wildlife Friendly Fencing' can provide you with many different options for wildlife friendly fencing (https://www.ab-conservation.com/downloads/educational_materials/brochures/ACA_Wildlife_Friendly_Fencing.pdf). However, in this article, we would like to draw your attention to a specific type of portable electric fencing that was made in Alberta and is becoming more and more popular.

In some areas of the province, permanent fencing is difficult to install because of terrain and maintenance can be time-consuming and expensive. Also, pastures can have different plant communities and features (such as riparian areas, tame pasture and native prairie) that may require different grazing strategies (such as timing of grazing). Using permanent fence to create many smaller pastures is certainly an option, however it creates more barriers on the landscape and has a higher cost to implement. To address some of these issues, Norm Ward, of Range Ward in Nanton, Alberta invented some portable electric fencing systems that work to help promote healthy soil and ecosystems by managing the timing and location of where animals graze.

The idea and the need came about in 1997 when Norm's ranch had sustained damage from the Granum Fire. The result was the loss of about 4,000 acres of grass and 30 miles of fence. Not wanting to construct any more permanent fences, they were looking for options that were portable and provided more flexibility in their grazing system. The fire gave them the opportunity to replace the old fence lines along the property boundaries with electric fence and to fence off paddocks with common ecological characteristics.

Norm started constructing his grazing system using Ghallager 3/16-inch diameter rope and built an electric wind-up reel. They were able to isolate north facing slopes from south facing slopes and grazed hay land separately from native grassland. They noticed the benefits to the ecosystem right away. When they were able to control the timing of the grazing, they observed an increase in soil moisture and noted that they were retaining enough moisture to be resilient even in drought years.

Many participants in the MULTISAR program are discovering the benefits of using these portable electric units. Dan Robley, from the SN Ranch in the Porcupine Hills, is using his Razer Grazer for several jobs, taking advantage of their versatility.

"Number one is the ability to move our cows while implementing a rotational grazing system. The ability to reduce the length of grazing on any particular place with rotational grazing, without turning the entire ranch into small parcels with permanent fencing, allows us to keep our place "wild" for the animals that call our ranch home. We have also used the units to fence off riparian areas and dugouts (in conjunction with utilizing a portable

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-Dan Robley, SN Ranch

PORTABLE ELECTRIC FENCERS (CONTINUED)

solar waterer) to keep our animals out of these sensitive areas. And this spring we used it to keep the bulls apart from the cows until we were ready to put the bulls out.”

Before using the Grazers, Robley was having challenges getting the cows into places they would not voluntarily go. The ranch is located in the Porcupine Hills and permanent fencing is difficult to construct and maintain because of the topography, the size of the pastures, and soils. Having a portable system allowed them to place fencing in places where it is needed, which is often in these difficult-to-fence spots. The ability to move fences has also allowed the ranch to time their grazing, avoid overgrazing in favoured areas, and encourage grazing in underutilized areas. Other benefits include the ability to protect sensitive places like riparian areas and sharp-tailed grouse leks. It also keeps their ranch from becoming a maze of fences, which can disrupt the movement of wildlife.



Many ranchers are using Razer Grazers to fence out sensitive habitats, such as wetlands and riparian areas.

One of the biggest obstacles Robley points out is the human capital in the time it takes to plan, set up and take down the units, but says overall it is a very useful tool in allowing them the ability to achieve their grazing and stewardship goals for their ranching operation.

Katie Durec, from the Bar 15 Ranch west of Claresholm, has also been using a Razer Grazer in their ranching operations.

“Our Razer Grazer has been essential in fencing pastures into different pieces so that we can rest overgrazed areas and force the cows to graze higher on the hills. We also utilize the Razer Grazer to more effectively graze around riparian areas or to exclude the riparian areas altogether.”



Ranchers from Oyen (left) to the Porcupine Hills (right) are finding beneficial ways to incorporate portable electric fences into their operations.

The Razer Grazer has made it possible for them to install temporary fencing quickly to facilitate better rotation of pastures. It makes the process efficient and more possible, instead of using wire fence which would be too expensive and too difficult to manage. There have been some challenges using the unit. Most of their land is hilly and they have had to use fibreglass anchor posts, pounded into place by hand or tractor, where an anchor post is required.

Today, Range Ward has several portable electric fence choices. The most popular model is the Razer Grazer, which contains everything you would need for a ½ mile of fence. The original Power Grazer is a larger model, and has everything needed for 2 miles of fencing. Other new models include a Bison Razer Grazer and the Power Shepard, which is an adaptation of the Razer Grazer that includes 4 reels with up to 800 meters that can be controlled by the touch of a button to make a portable electric sheep fence for larger landscapes. Norm is now manufacturing his products full time. If you would like more information about these portable electric fencing options, you can check out Norm Wards website at www.rangeward.ca, or contact MULTISAR at info@multisar.ca.

Species Profile: Eastern Yellow-bellied Racer



Description:

The eastern yellow-bellied racer (*Coluber constrictor flaviventris*) is a long, slender snake with a whip-like tail and smooth body. Its head is wider than its neck and has a rounded snout and large, round eyes with dark pupils. This non-venomous snake has a distinctive bright yellow belly and blueish-green or grey back, and can travel quickly, sometimes reaching speeds up to 7 km/hr; hence, its name “yellow-bellied racer”.

Status:

The eastern yellow-bellied racer is currently listed as *Threatened* under Schedule 1 of Canada’s *Species at Risk Act*. In Alberta, this fast-moving snake species is known to only occur in the Onefour and Lost River areas of the Milk River Valley. One active hibernaculum, also

known as an over-wintering den site, has been confirmed in the province. Due to insufficient search efforts and lack of provincial population estimates/trends, this snake species is given a conservation status of *Undetermined* in Alberta.

Habitat:

In Canada, the eastern yellow-bellied racer generally prefers mixed-grass prairie and sagebrush thickets. In the summer, this snake species favours areas with tall grasses, shrub patches, and mammal burrows, which all provide escape cover from predators and serve as valuable habitat for prey species including grasshoppers, small rodents, and other insects. In addition, racers remain close to water sources and riparian areas in the summer. Over-wintering dens, or hibernacula, consist of mammal burrows, rock crevices, deep holes on hillsides, and slump zones containing fissures, sinkholes, and loose soil. This habitat specialist seeks den sites extending below the frost line to avoid freezing and are known to return to the same den each autumn.

Threats:

The primary threat is habitat loss and degradation due to activities such as cropland conversion, industrial developments, unsustainable grazing practices, and natural geological processes. The destruction of hibernacula by human activities and landslides, or slumping, can significantly reduce local population numbers, and human disturbance at hibernacula can alter individual snakes’ sun-basking behaviours and dispersal patterns. Linear developments, such as roads, can obstruct snake movements between winter and summer habitats, and sometimes lead to individual mortalities (i.e., roadkill). Lastly, extreme weather events and fatalities due to farm machinery also threaten these small populations of eastern yellow-bellied racers in Canada.

Beneficial Management Practices:

- Retain or reseed native prairie habitat and maintain sagebrush patches.
- Avoid or reduce the use of insecticides near racer habitats.
- Install signage along roads where snakes are frequently seen and drive accordingly.
- Restrict cattle access or alter timing of grazing near hibernacula to reduce trampling of snakes and other potential conflicts.
- Avoid overgrazing of riparian areas and hillsides.

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