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Beaver (*Castor canadensis*)

The Beaver (*Castor canadensis*) is common, and are present throughout the province. They are very common in the Battle River and its tributaries (including Camrose Creek). They are a common sight in Mirror Lake, as well as in the river Valley. In some places they are so common they are considered pests ². They require freshwater environments with surrounding suitable woody vegetation. They are present in lakes, but are more commonly associated with flowing water bodies, such as rivers and streams ^{1,2}. The beaver, our national icon, is the largest rodent in Canada, weighing in at 8-45 kg, and 89-120 cm in length. The fur of the beaver is dark brown with a reddish hue, with short ears and small eyes on its broad head. Only the hindfeet are webbed, the source of propulsion underwater. Large incisor teeth that continuously grow are used to cut vegetation and strip off bark. The broad, black, scaly tail (29-53 cm) is used to stabilize the beaver while cutting trees, for thermoregulation, as a fat storage are, and are slapped on the ground or water surface as an alarm signal ¹

Beavers, like porcupines, eat the bark of trees, preferring aspen, birch, and willow. Aquatic pond vegetation is also eaten in the summer. They may even come ashore in search of grains and grasses. Trees are also cut for other purposes. Beavers use branches and logs to build their dams and lodges. Beavers usually have a series of dams, one main one and

several serial ones. Lodges are built so that the entrance is underwater to evade predators and maintain access trees stored under the ice during the winter ¹. The lodges are also used to protect beavers from extreme cold and heat. Lodges usually contain three generations of beavers: the parent pair, yearlings, and the current year's kits (baby beavers). Once the youngsters reach two years old, they leave the lodge to find their own territory, often downstream of their parents ¹.

The beaver a keystone species, meaning that it plays a key role in the ecosystem. These species affect many other species, and whose presence or absence would have great impacts on the existence of these other species. Beavers affect not only animal life, but because of their need for trees and its ability to change its environment means they also greatly impact the vegetation in the vicinity ¹.

Abundance of moose (Martell et al., 2006), waterfowl (Brown et al., 1996; McCall et al., 1996; McKinstry et al., 2001), herpetofauna (Metts et al., 2001; Stevens et al., 2007), fish (Collen & Gibson, 2000; Pollock et al., 2003), and invertebrates (Margolis et al., 2001) are all affected by beavers. Beaver dams have been found to alter the invertebrate assemblages in streams. Biodiversity was not altered, though changes in dominance and differences in taxonomic groups present were found⁴. Standing water created by beaver dams also helps wetland birds and waterfowl by creating more suitable feeding and breeding habitat ⁵.

The physical structure of the dam itself (as well as beaver lodges) can also serve as breeding structures ⁶. In terms herpetofauna, it appears that beaver ponds are able to affect biodiversity and numbers of a variety of species. Overall, beaver ponds tend to increase the abundance of anurans (frogs and toads), but salamanders tend to decrease in abundance.

Variation in species depends on life histories. Reptiles associated with water may increase in abundance, and life history characteristics may be affected by the warmer water and the resulting warmer air surrounding beaver ponds. Local species, such as the wood frog and the boreal chorus frog were found to be present in beaver ponds, but not in unobstructed streams ⁷. In both studies, the beaver dams created appropriate breeding habitat⁷.

The beaver dams also influence fish populations, which can affect amphibian populations as predatory fish species eat amphibian eggs and larvae. Some species of amphibians appear to be more vulnerable to fish predation, such as salamanders ⁸. The way the beaver dams affect fish populations depends on the species and its physiological and behavioural needs. The changes in hydrology and stream bottom morphology can increase some species, such as trout ^{9,10}. However, depending on the chemical composition of water, pH, temperature, and oxygen content, as well depth (important for overwintering) beaver ponds may decrease certain species but increase others, such as smaller species becoming

more abundant and larger species less abundant ⁹. Beaver dams also create obstacles for migrating fish (like salmon) ⁹. Beaver dams also create refuges “from high or low water flows, low oxygen or high temperatures”⁹ are provided in the presence of adverse conditions in any season.

As previously mentioned, hydrology is altered by beavers, dramatically altering the dynamics of stream systems ¹⁰. Dams alter sedimentation, allowing sediment to settle on previous spawning areas ⁹ and otherwise change the overall morphology of the stream floor ¹⁰. Temperature and chemical composition of the water is affected to varying degrees depending on where the dams are placed ¹⁰.

Beavers alter not only the aquatic ecosystem, but also the surround terrestrial ecosystem. Beavers set back succession, altering the landscape considerably by their activities and new ecosystems are created ¹. Their preferred food is aspen (*Populus tremuloides*) and beavers will typically only colonize areas where aspen is within 60 m from the water. However, trees may be harvested from several hundred feet away ³. When aspen becomes less abundant beavers will move to less preferred species, such as willow, birch, and/or broadleaf plants. Few coniferous trees are

harvested as the higher levels of resin make them less palatable. In high quality habitats, beavers select fewer trees, but take the larger trees. In lower quality habitats, beavers are less selective ¹¹. For the size of the trees seen cut down each year, it would appear the Camrose valley is a higher quality habitat. Due to their selective feeding, beavers significantly impact riparian ecosystems, affecting the diversity and structure of plant communities).

As previously mentioned, beavers were extirpated through much of their range in Alberta through trapping in the 1800s and 1900s. The removal of the beavers without any inclination to re-establish beavers in some areas may aggravate the effects of land use on the groundwater levels ¹⁰.

Due to the impacts beavers have on a riparian ecosystem and biodiversity, forest managers and county governments should carefully manage beaver populations. Biodiversity would be affected by both the presence and absence of beavers. Management practices should be determined by location⁹.



From the Wildlife Management Section

Beaver

Beavers in the area were completely wiped out during the trapping era. In that period of time a beaver pelt was worth \$75, which was a whole month's wages. However in the 50's and 60's, they were re-introduced. Beavers were protected until about the 80's. During this time, prices (and demand) for beaver pelts fell to roughly \$20, barely worth the time it took to prepare the pelt. Now, there are beaver hunting licenses available, but are not very valuable.

The main source of beavers (in our case, the Battle River) is the young beavers looking for territory. A pair, a male and female, finds some flowing water, builds the dams and a lodge. There is the main dam, but there are a series of other dams downstream put up as secondary dams. Not only do beavers need trees for all these dams, but also for the lodge and food. This requires a lot of trees

Today, beaver are viewed as agricultural pests as their dams flood fields and de-forest river banks and riverfront property. Any trees that are sweet, such as crabapple and some exotic trees are favorites, though they naturally prefer poplars and willow. Efforts are made through use of backhoes and dynamite to get rid of the dams. Some trapping and shooting of beavers also takes place to temporarily remove the perceived problem. But, more will move in.

In the Camrose Creek system, from the Lyseng Reservoir to the Battle River, a number of habitats exist. North of the city, agricultural land tilled to the banks of the creek leave tall rushes and grasses. Further down, the creek passes through aspen forests. In the city, some trees are available. South of city, the creek runs through the aspen forest before entering the Battle River. Areas where aspen forests border the creek, significantly more dams and food caches are found ³. In the aspen forest, there are around 2.6 active dams per kilometer and 1.0 food caches (representing one colony of beavers) per kilometer ³. Lodges were also more abundant in aspen forest habitat, around 1.2 per kilometer ³. In one lodge, there can be up to six beavers: parental pair, yearlings, and new kits.

The county of Camrose and private landowners use various forms of beaver management. The two most common methods are dam removal and harvesting ³. Within the city limits, dam removal is done either manually or through the use of back hoes. Further south along the creek, the County uses dynamite to remove dams more quickly ⁴. Harvesting of the beavers is done either through controlled shooting or trapping. City or county officials, as well as individual landowners are all able to harvest ⁴. Live trapping using “suit case” traps is also used by the city. This form of management is limited as there are a limited number of places to relocate the beavers. The beavers’ territoriality would prevent the relocated beavers from integrating into other colonies ^{1,4}. Camrose has also placed PVC piping through dams to allow continuous water flow to help avoid flooding of areas and to increase water flow. The technique is only temporarily effective as the pipes are quickly dammed by beavers ^{1,4}. The city has also used the beavers’ dislike of conifers as a management method. Planting of coniferous trees along the banks may force the beavers out of the area ⁴.