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South East Alberta Watershed Alliance

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Riparian Cottonwoods, Beavers, and Deer

August 2022

In May 2018, beavers started felling a mature cottonwood on the north shore of Connaught Pond, Medicine Hat, Alberta, and finally felled the tree two months later. By August 2018, 65 bunches of suckers emerged from the tree's vast root system. Suckers grew on the open area, north of the stump, that was not occupied by Russian olive trees.

Connaught Pond is a reservoir within the City of Medicine Hat. Natural springs, stormwater, and occasional surface runoff drain into it, but most of its water is provided through the St. Mary River Irrigation District system. Excess water from the pond overflows into a channel, and is joined by natural springs along its way to Seven Persons Creek, a tributary of the South Saskatchewan River. The pond has evolved from an irrigation reservoir to a recreational facility (fishing, canoeing, and kayaking) managed by the City of Medicine Hat.

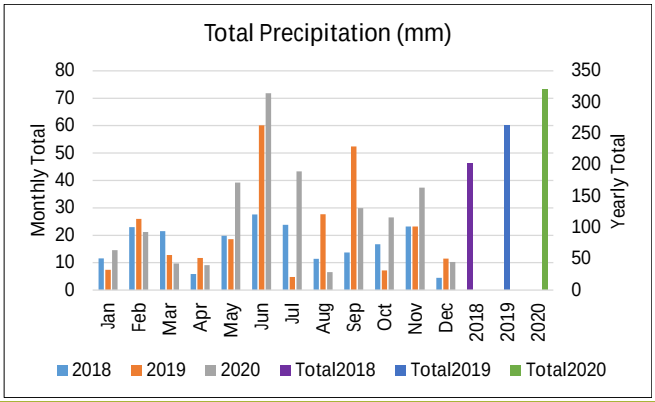
Riparian areas of this pond are dominated by the locally invasive Russian olive. Native shrubs have been crowded out by thickets of Russian olive trees of all age classes—seedlings, saplings, young and mature trees. This indicates that colonization by Russian olive has occurred over decades. A few mature native cottonwoods, and willow trees have gradually been felled by beavers. Beavers have not utilized Russian olive trees.

In 2019, a study was conducted to evaluate different management options that would facilitate the re-establishment of cottonwood trees from suckers. Sixteen bunches were randomly selected and the following treatments were applied: T1— Bunch of suckers protected with a cage and its control, C1—Bunch of suckers without protection, T2—Bunch of suckers pruned to two stems per bunch and protected with a cage, and its control, C2—Bunch of suckers pruned to two stems per bunch and no protection. Each treatment had four replicates that gave a total of 16 bunches. The average distances (cm) from the felled tree were: T1 = 1100, C1 = 1100, T2 = 1200, and C2 = 1100. A few bunches on the periphery started to wither naturally. For reference, the average height of stakes from the ground surface was 90 cm.

The following data were collected at the start of the experiment (May 2019), August 2019, and August 2020: height of two tallest stems (suckers) per bunch, their diameters at base, and number of stems (suckers) per bunch. Height and diameter at base were indicators of growth.

By the spring of 2021, it was observed that deer have started rubbing on the unprotected suckers. Additional data were obtained from bunches of non-experiment suckers that had deer rub: diameter at base, number of suckers per bunch, height of suckers, and height of the center of the rub.

Data were statistically analyzed (2-factor ANOVA) to determine any differences as a result of the treatments and time (May 2019, Aug 2019, and Aug 2020). Standard errors were determined.



Results

Number of stems. There was no difference between unpruned suckers that were caged (T1) and uncaged (C1). Likewise, there was no difference between pruned suckers that were caged (T2) and uncaged (C2). Over time, unpruned suckers decreased in their number of stems naturally (self-pruning) while those pruned to two increased.

Height of stems (cm). There was no difference between unpruned suckers that were caged (T1) and uncaged (C1). Likewise, there was no difference between pruned suckers that were caged (T2) and uncaged (C2). All treatments (T1, T2) and controls (C1, C2) significantly increased in height over time. Unpruned suckers (T1) were significantly taller than pruned suckers (T2). There was no difference in height between controls (C1, C2).

Stem diameter at the base (mm). There was no difference between treatments and controls. Over time, diameter at the base increased significantly in treatments and controls.

Deer rub injury. From a sample of six stems that had deer rub: the average height of stems was 174.2 cm, the average diameter of stems at the middle of the deer rub was 1.6 cm, and the average height of the centre of the rub from the ground surface was 59 cm.

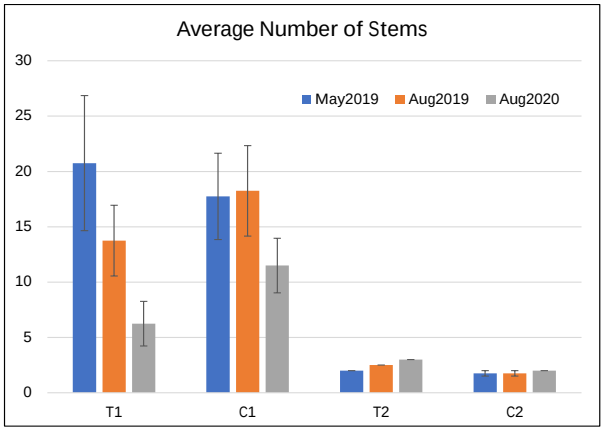
Medicine Hat belongs to the semi-arid grassland natural region. Spring rains (May and June) are critical to plant growth. The precipitation chart on page 1 shows that spring and year totals in 2020 were greater than the previous years. Environment Canada weather data were used.

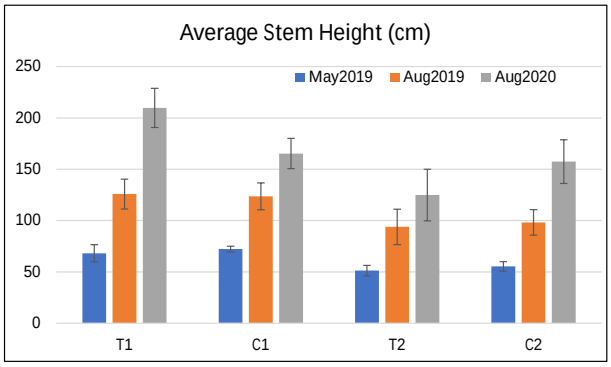
Discussion and Conclusion

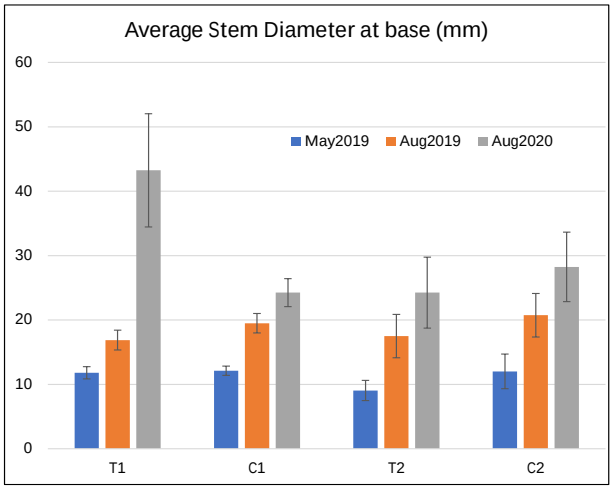
There was no benefit from pruning bunches of suckers to two stems. Unpruned bunches of suckers self-pruned over time and had better growth than pruned ones. There was no benefit of caging either. All suckers grew taller and increased in diameter at the base over the two seasons. It is important to note that these conclusions are based on a total of 65 bunches of suckers with each bunch having on average 2 to 20 stems. Additionally, analyses are based on only two seasons. Fewer suckers and longer time of observation may provide different results.

The average height of the centre of the deer rub from the ground at 59 cm indicates use by adults. Deer rub is known as one of the communication methods used by deer.

Ecological management considerations. Native shrubs and trees grow naturally in riparian areas and topographic niches of the grassland ecosystem with sufficient soil moisture and protection from wind. Riparian cottonwoods are an important source of food and materials to beavers and deer, as well as habitat to birds and other wildlife. Wildlife play important roles in the ecology of healthy riparian areas and healthy aquatic ecosystems. Cottonwood stands are regenerated by beaver activity. When beavers fell a tree, suckers emerge along the lines of the roots meters away from the mother tree. This activity creates a range of age classes within the cottonwood stand that accommodates the diverse requirements of other wildlife. At Connaught Pond, we have observed the preference of beavers for cottonwoods and willow trees. Mature chokecherries were also felled. No Russian olive trees were felled by beavers. Russian olive trees have become invasive in Medicine Hat and area. They are detrimental to native shrubs and trees and negatively impact the ecological integrity and sustainability of the grassland and riparian ecosystems.







Native shrubs and trees are shade intolerant. Russian olive trees not only deprived them sunlight, but of space, soil moisture, and nutrients as well. The negative effects on vegetation extend to the associated plant community, insects, birds and other wildlife.

Located within an urban area, Connaught Pond ecosystem consists of both natural and naturalized elements. As such, this area requires active management to control invasive plants and animals and to maintain native vegetation and wildlife.

By promoting planting and care of native plants that provide food, materials, and habitat for native wildlife, we can help conserve our precious riparian and grassland ecosystems in Southeastern Alberta and continue to enjoy all the benefits they provide.

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