

Wetlands for a Sustainable Environment

BY RADHIKA THEKKE KURUVATH

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Alberta may soon face more flooding in the coming years. That's because each time the global temperature rises by half a degree Celsius, it's followed by a rise in heat waves, wildfires, drought, change in sea level and heavy precipitation. The Canadian government's climate models project that national annual precipitation could increase by 24 percent by the end of the century. Extreme precipitation events that used to occur once in 20 years are expected to occur once in 10 years by 2050 and once in five years by the end of this century, according to research from 2023.

So how does Alberta protect itself from flooding? The answer may lie partly in a natural solution — wetlands. That is, as long as we don't keep destroying them, and we restore the ones that have been drained or degraded.

In Alberta, wetlands cover 143,628 square kilometres, or 21.7 percent of the province, according to the Wetland Atlas of Alberta. These areas are of immense ecological value, home to birds and sensitive species. They act as an important filtration system that helps to remove impurities and recharge groundwater. Wetlands help to retain water during flooding and slow the speed of water, which in turn helps the ground absorb water. In the upland wetland areas this water serves as a valuable source of reservoir through seepages and springs in the event of drought. In addition, wetlands help in carbon sequestration, increased wildlife habitat and biodiversity. If Alberta works to restore and maintain our current wetlands, we may also be helping mitigate flooding in the province.

Take the award-winning project in Parkland County. In recent years, the county encountered extreme weather events like flooding of roadways, agricultural land and private properties, disruption of water treatment from high runoff due to large storms and drought conditions. Faced by these challenges and extreme climate events, the municipality decided to assess the role of wetlands to help mitigate the effects of these extreme weather events.

The county calculated the expense involved in preserving and improving wetlands. One goal was to reduce the total suspended solids (TSS) in water which causes increased water temperature and decreased oxygen. A cost of \$170,303 annually was estimated to reduce TSS in waterways by five percent (3,000 tonnes) through building wetland and riparian buffers. Benefits include improved water and ecosystem quality, increased wildlife and pollinator habitat and carbon sequestration, according to the Green Municipal Fund. A quarter of the county's annual budget is spent on road maintenance and construction. By restoring wetlands and riparian zones the speed of overland flow is reduced by 13 to 55 percent which reduces pressure on roads, their maintenance and repairs and lowers capacity requirements for drainage ditches and culverts. The cost of restoring wetlands was estimated for three sites in the county. The cost ranged from \$150,000 to \$260,000 per site (as per a 2023 CBC news article) which is the same as reconstructing and repairing roads. But in the long run wetland restoration can prevent further damages to roads and multiple repairs during flooding and can root out the cause of the damage in future.

Draining wetlands for canola cultivation

Development in Alberta has had a major impact on the province's wetlands. From oil and gas extraction, to building of homes and business, and of course transforming natural lands to agricultural lands, many wetlands have been drained and destroyed. In the case of agriculture, one study sought to find out whether the cost for producers to drain wetlands for food production was worth it from a cost perspective.

The study was conducted in Camrose County, another central Alberta region, in the spring of 2019. The study team selected three producers who are involved in canola production. Canola was selected as it is the most profitable cash crop in Canada and because wetlands are often drained for canola crop production. The area was mapped over the course of the summer using drones, first in June (before canola



The unique McClelland Lake wetlands in northern Alberta are at risk of being destroyed by an oil and gas project.

Photo © A. Tucker

emergence), then in August (before flowering), followed by September (during harvest). Current and historic aerial photographs of the area were taken to identify visible drainage ditches in the field. A 3D model of the terrain was created to give an idea of high and lows of the terrain and also map the low lying areas to identify wetland basins. The areas with ditches were identified as drained and those without ditches were considered as intact. The operational cost for each producer was determined, along with revenue and input cost and was combined to create a spatially explicit profit-loss map using data collected from agricultural precision equipment for each basin. This raster data was overlaid with a wetland boundary map to calculate the profit/loss of each basin.

According to the producers, \$100 per acre is the benchmark for the canola in the region (any profit greater than \$100 is considered as a good financial return). The results showed that the cost to drain the basins far exceeded the profit that resulted in the canola yields. For the intact basins, the profit was above the benchmark value.

Drained wetlands:

- 55% of basins yielded a financial loss.
- 70% of basins produced less than the benchmark of \$100/acre.

Intact wetlands:

- 30% of basins yielded a financial loss.
- 55% of basins produce less than the desired benchmark of \$100/acre.

In the present climate change reality, wetlands are needed to help mitigate or potentially prevent flooding, along with the road damage and repair expenses it can cause.

Moreover, draining wetlands for canola cultivation leads to financial loss. Any development that can lead to wetland loss should be given a second thought and sustainable development should take place for the betterment of future generations. 🌱



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