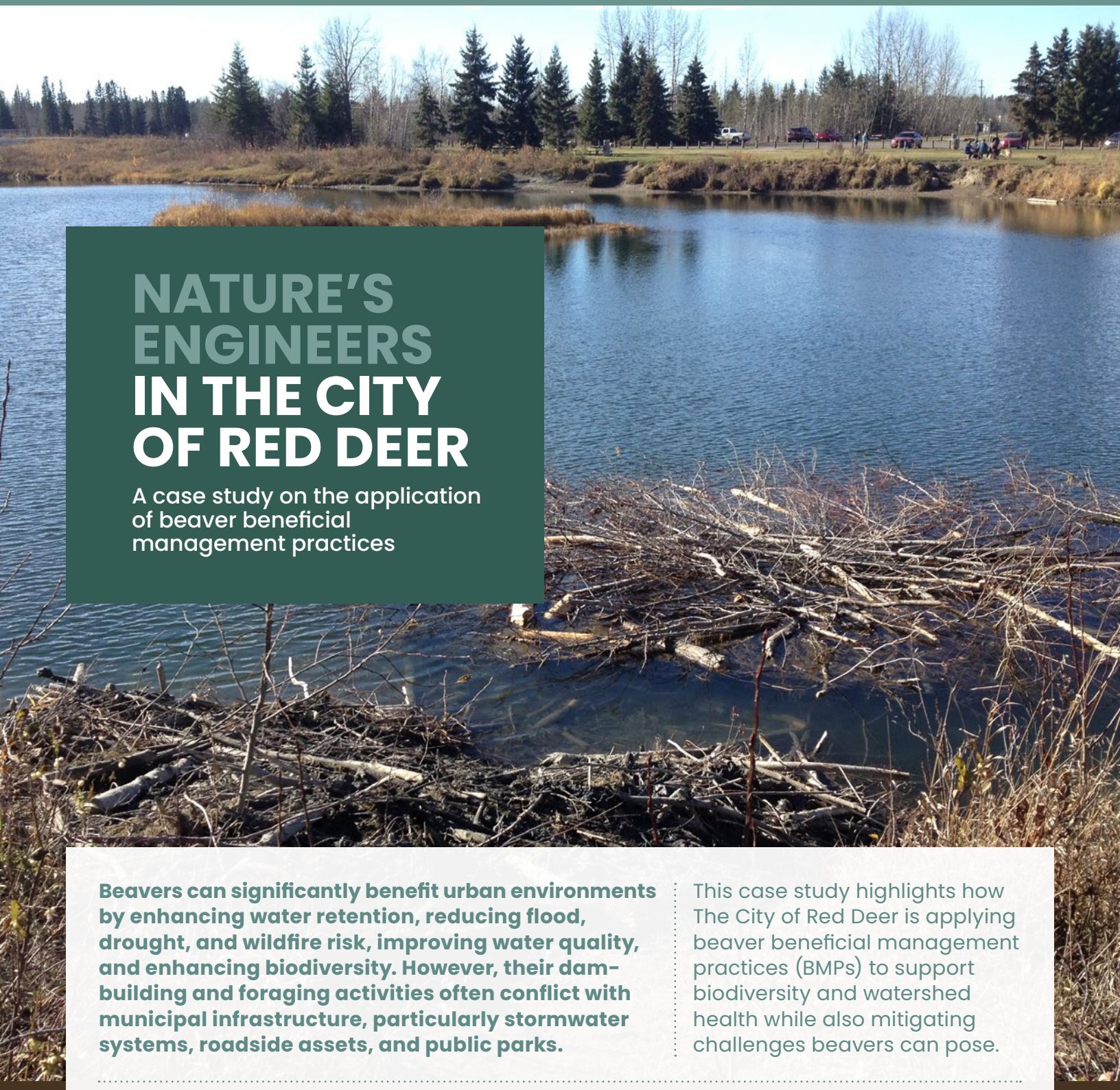


NATURE'S ENGINEERS IN THE CITY OF RED DEER

A case study on the application of beaver beneficial management practices

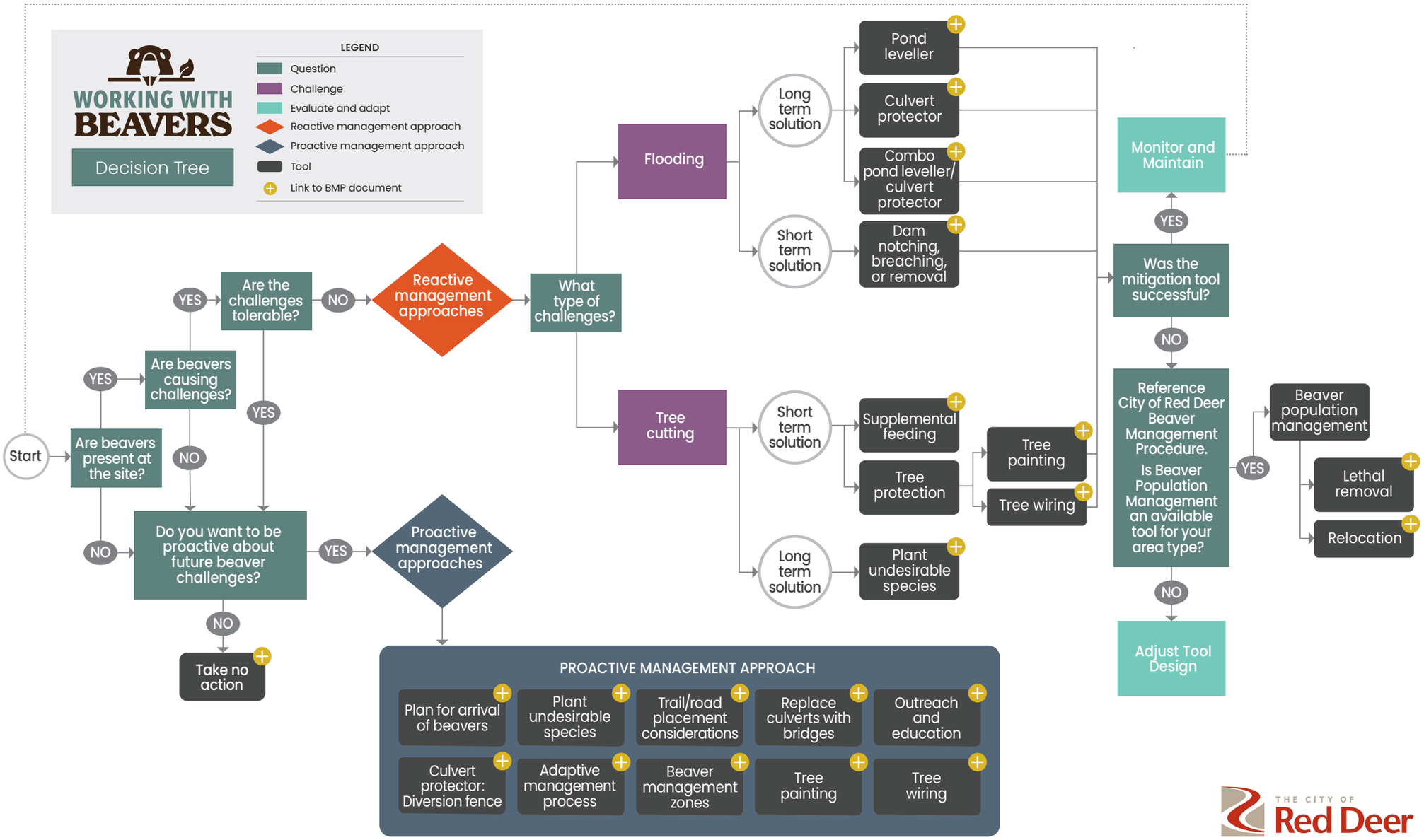
Beavers can significantly benefit urban environments by enhancing water retention, reducing flood, drought, and wildfire risk, improving water quality, and enhancing biodiversity. However, their dam-building and foraging activities often conflict with municipal infrastructure, particularly stormwater systems, roadside assets, and public parks.

This case study highlights how The City of Red Deer is applying beaver beneficial management practices (BMPs) to support biodiversity and watershed health while also mitigating challenges beavers can pose.

By taking this more naturalized approach, The City can support many of the goals outlined in their Climate Adaptation Strategy (2024), Environmental Master Plan (2019), and Urban Forest Management Plan (2017). This case study includes a decision support tree and outlines four practical coexistence tools that staff can implement to reduce maintenance costs, minimize flood risk, and support ecological function.

Building on the Alberta Beaver Beneficial Management Practices (2024), the City of Red Deer adapted the decision tree to better align with their Beaver Management Procedure (2025). This decision tree supports the decision-making process of City staff.

Site Assessment Decision Tree



THE CITY OF Red Deer

Coexistence tools

1 Culvert Protectors

PROBLEM

Beavers are attracted to the sound and flow of water through culverts, often leading to damming that can cause culvert failure and upstream flooding.

SOLUTION

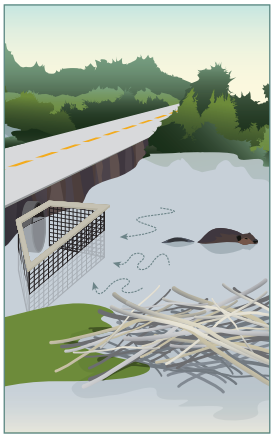
Install culvert protectors to deter damming while maintaining flow.

MAINTENANCE

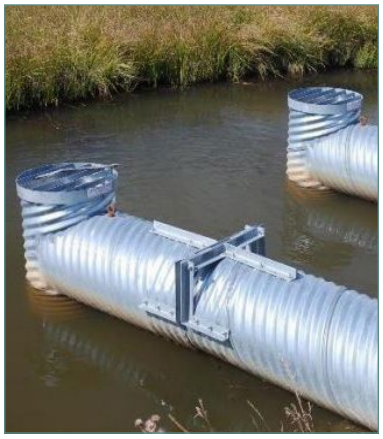
Inspect seasonally and after high-flow events; remove accumulated debris to maintain flow capacity. Lifespan is typically 10 years.

DESIGN CONSIDERATIONS

- **Trapezoidal culvert fences** (Keystone Fence™) are preferred for their effectiveness.
  - Trapezoidal (not rectangular) to disperse flow and potential damming materials.
  - Use 6" galvanized steel mesh wire panels extending 3-4 m from the culvert inlet.
  - Height should be 30-45 cm taller than the expected highest water.
  - Anchor with steel T-posts and a wood header.
  - A floor to prevent beavers from digging underneath.
- **Pre-made Beaver-Proof culvert add-on** (an effective alternative to the Keystone Fence™) comes in a variety of sizes.



Trapezoidal Culvert Fence



Beaver-proof Culvert Add-On

2 Pond Levellers

PROBLEM

Beaver dams can raise water levels and flood roads, trails, or private land.

SOLUTION

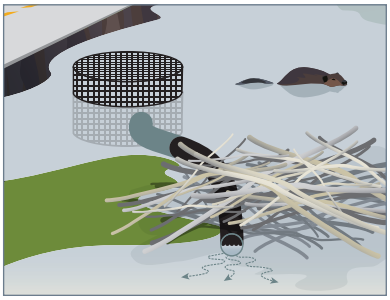
Install pond levellers to act as overflow valves through the dam, allowing the pond to be maintained at a level that prevents flooding but allows beavers to maintain their habitat for survival.

MAINTENANCE

Check for blockages at the intake and outlet end and ensure water level remains within target range. Lifespan is typically 10 years.

DESIGN CONSIDERATIONS

- **Double wall high density polyethylene (HDPE) pipe** reduces sounds of running water and the stimulus to dam. A wire mesh cage at the intake prevents beaver interference.
- **Protective cage made with 6" galvanized steel wire mesh** with a 30-60 cm gap between the pipe and the sides of the wire cage.
- **Pipe intake extended 9-12 m upstream of the dam** to minimize detection by beavers.
- **The height of the bottom of the outlet end of the pipe dictates the pond level** and can be adjusted but ensure pond is at least 1 m deep for beaver survival.
- **Pipe diameter** needs to be at least 30% of the nearest downstream conduit.



Pond leveller with protective cage (LEFT)

Pond leveller installed at Piper Creek (BELOW)

3 Tree Wiring

PROBLEM	SOLUTION	MAINTENANCE
Beavers fell desirable trees for food or building material, damaging urban forests and landscaped areas and causing a potential human safety hazard.	**Install tree wiring to protect from gnawing.**	**Inspect annually; expand wiring as trees grow.**

SPECIFICATIONS

- **Use wire mesh fencing around individual trees;** 14 gauge minimum, 2" x 4" maximum hole size, 1.2 m (4') minimum height.
- **Maintain 30 cm clearance** around the trunk to accommodate growth.
  - *NOTE*: Alternatively, in some scenarios where aesthetics is a factor, a tighter wire wrap is used.
- **Anchor bottom wire to the ground** using landscape staples or pins to prevent beavers from lifting wire.
- **Secure wire ends** with hog rings or durable zip ties.

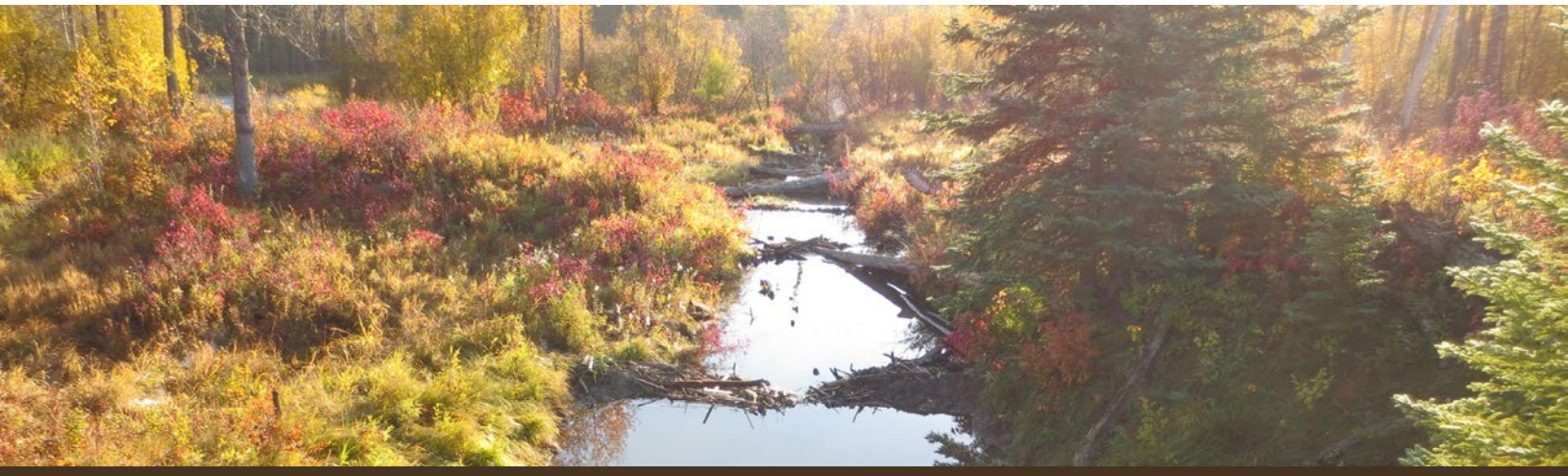
Wire mesh fencing

4 Planting Unpalatable Tree Species

PROBLEM	SOLUTION
Beavers fell desirable trees for food or building material, damaging urban forests and landscaped areas and causing a potential human safety hazard.	**Plant species that beavers are less likely to consume, reducing attractive forage near conflict areas.**

SPECIFICATIONS

- **Plant coniferous species** such as spruce and pine, beavers often avoid these if there are other foraging options.
- **Maintain diversity in the plant community** to provide a variety of options and encourage the health of the treed areas.
- **Prioritize native, drought- and flood-tolerant species** suitable for riparian zones.
- **Avoid planting woody plant species that beaver commonly prefer:** aspen, willow, cottonwood, green ash, and poplar. If planted, consider tree wiring to protect the area until established. Many native species such as willows, have evolved with beavers where gnawing stimulates new growth from the plant.



Why use Beaver BMPs?

Beaver activity can pose challenges to infrastructure, but removing or relocating beavers often results in ongoing conflict and repeated costs. Beaver BMPs offer a proactive, cost-effective approach to managing these challenges while retaining the ecological benefits that beavers provide. Adopting these BMPs helps municipalities:

- **Reduce recurring maintenance** by minimizing culvert blockages, dam removal efforts, and emergency repairs
- **Prevent flooding and infrastructure damage**, including washouts of roads, trails, and stormwater systems
- **Advance biodiversity and climate adaptation goals** by maintaining natural hydrology and riparian ecosystems

Using beaver BMPs allows municipalities to shift from reactive mitigation to sustainable, long-term coexistence—protecting infrastructure and the environment.

"Beaver BMP's have enhanced our decision making and support for beaver coexistence within the city. Ultimately this has helped to protect and enhance biodiversity and the health of the watershed."

Ken Lehman,
The City of Red Deer
Community & Program Facilitator – Parks

For detailed information on each of these tools and more, view the Alberta Beaver Beneficial Management Practices (2024) at **www.workingwithbeavers.ca**.

The Working with Beavers project aims to enhance coexistence with beavers for watershed health and the ecosystem services they provide. Contact us to see how we can help you achieve similar results in your municipality.

WORKING WITH BEAVERS

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COWS & FISH

THE CITY OF Red Deer