

An Agricultural Decision Matrix Tool for Beaver Management

	ACTION	Decision Criteria	Agricultural Concerns and Values	Short, Medium or Long Term Solution	Advantages / Considerations	Disadvantages / Consequences	Relative Costs (Money/Time) <small>High, Medium, Low</small>	Agricultural Effects	Ecological Effects	Predicted Management Effectiveness <small>(Poor, Fair, Good)</small>
Barriers / Riparian Zone Management	Tree wrapping	3, 8	L	Save important, specific or small groves of trees	Labor intensive initially; doesn't protect all age classes of trees and shrubs	L / M	Saves shade trees for livestock and humans	Stream banks partially protected, shade for water temperature moderation, habitat for some animals	G	
	Fencing to exclude beavers	3, 4, 8	L	More woody species in the riparian area protected	High cost; maintenance time increased; variable success rates based on type of fence and maintenance	H / M	Better erosion protection with woody species protected; shade and shelter for livestock	Maintains natural biological diversity and ecological benefits	F	
	Riparian grazing management	3, 5	L	Better livestock management and reduced competitive overlap with beavers	Some increased costs to manage livestock and monitor effects	M / L	Better livestock gains, less herd health issues	Improved water quality, resilience to floods, enhanced biodiversity	G	
Habitat Management	Beaver occupancy zones	1, 2, 5-7	L	Creates areas where beavers are tolerated and management actions minimal	Potential for negative impacts still present	L / L	Better assurance of stock water in dry periods	Beaver presence improves water storage for riparian health, biodiversity	G	
	Substitute food sources	3, 8	S	Minimizes impacts on riparian trees and shrubs	Only a stop gap measure; alternate supply of woody plants required	H / H	Short term reduction of effects on riparian trees and shrubs	Protects riparian health until alternatives found	P	
	Improve habitat for beaver predators	1-4, 8	L	Natural population regulation	Some predators may target livestock	M / M	Limits beaver population size and impacts	Moderates negative impacts of beavers on riparian health	P-F	
	Remove dam materials and food sources	1-4	L	Forces beaver migration elsewhere	Removal of trees and shrubs reduces riparian health	H / M	Loss of beneficial aspects of beavers	Erosion, weed infestation, water quality impacts, other wildlife species harmed	P	
Deterrents / Aversive Conditioning	Noise/frightening devices (e.g. propane canon)	1-4	S	Low maintenance	Impacts on neighbors; deterrent value not clear; nocturnal habits minimize effects	L / L	May cause some beaver movement away from area	Impacts on other wildlife species unclear, non selective impacts	P	
	Remove dam	1-4	S	Lower water levels, reduced flooding of adjacent shoreline areas, possible movement of beavers elsewhere	Increased tree cutting and possible new dam development; may cause temporary downstream flooding; requires engagement with downstream neighbors; dam removal without population control is wasted effort	H / H	Temporary water level and flooding solutions; other beneficial effects end	Downstream flooding, bank erosion; other wildlife negatively affected, especially fish	F	
	Remove lodge	1-4	M	May cause beavers to move elsewhere; increases natural predation	Possibility of in migration of new beavers with new tree cutting and dam rebuilding	L / H	Temporary to long term solution to negative agricultural impacts	Loss of beaver population negatively affects other wildlife species, lowers ground water table and changes riparian health	F	
Repellants	Chemical repellants	3	S	Application relatively simple and fast	Constant reapplication necessary, unreliable, inconsistent results	M / M	Temporary solution to beaver use of trees, may force use of other food sources	Unknown effects on other wildlife	P	
	Natural repellants	3	S	Application relatively simple and fast	Difficult to source, constant reapplication, unreliable results	H / M	Can cause temporary changes in areas used and some reduction in negative effects	Minimal effects on other wildlife	F	
	Scent markers	2, 3	S	Can be effective if properly used to cause beavers to avoid areas thought to be occupied by other beavers	Difficult to source, requires constant reapplication, ineffective if beavers already present	H / M	Eliminates beavers moving into new, unoccupied areas	No effects on other wildlife or riparian area health	F	
Population Management	Assess carrying capacity for beavers to determine appropriate population	5-8	L	Knowing appropriate population is an aid to other management options	Requires some biological expertise to gauge appropriate carrying capacity	L / L	Make the most of beavers as an aide to agricultural operations, benefits of water supply and storage	Maintaining beaver populations at a desirable carrying capacity supports ecological services, fish and wildlife habitat	G	
	Regulate beaver population	1-8	L	Determine tools to achieve stable population that does not exceed carrying capacity of habitat; long-term economic benefit of trapping maintained	May require assistance for harvest levels; periodic harvest required to keep population below targets	M / M	Keeps beaver numbers at sustainable levels and provides agricultural benefits	Maintain ecological services	G	
	Reduce beaver population	1-4	S	Reduce populations below carrying capacity of habitat and to tolerable levels for agricultural operations	Requires lethal and non-lethal techniques; complete elimination of beavers may be difficult and undesirable; without beavers existing dams will likely fail	L / M	Reduces beaver numbers to tolerable levels; maintains agricultural benefits	Keeps some beavers in area to produce ecological services but may reduce those benefits	F	
	Introduce beaver	5-8	L	Reintroductions to benefit water storage, streamflow in low flow, drought periods, enhance lake/wetland levels	Needs a carrying capacity estimate first, followed by plans to regulate numbers; neighbors should be engaged to support reintroductions; may require multiple introductions; requires government permit	H / M	Improves water supplies for agricultural operations	Multiple benefits to ground water storage, surface water storage, other fish and wildlife habitat	F	
Regulate Water Levels / Locations of Beaver Use	Pond levelers	1-3	M	Reduce water levels in dams and limit potential flooding; sets a constant water level that is tolerated	Installation and maintenance required for successful operations variable success rates	L / M	Reduces loss of crop and pasture due to flooding	Keeps beavers in the area with multiple ecological/agricultural benefits	G	
	Baffles/Meshes/Grills	1, 2	M	Reduces conflicts at culverts and low bridges by reducing plugging of flow	Installation and ongoing maintenance required for success; may become blocked by ice or debris	M / M	Reduced flooding of roads, infrastructure	Keeps beavers in the area with multiple ecological benefits	G	
	Shift dam location / shift use to off stream sites	1-8	L	Uses behavioral cues to cause beavers to construct dams in areas with less risk to agricultural operations; uses other lands (i.e. wetlands, small tributary streams, intermittent streams) to shift beaver use; creates alternative water sources	Requires expertise and time to effect shifts in beaver behavior	M / H	Moves beavers to areas with fewer conflicts; benefits to agriculture still kept	Keeps beavers in the area with multiple ecological benefits	G	
Community / Watershed Involvement	Community/watershed group	1-8	L	Looks at beavers from a larger, community/watershed scale; greater ability to tap into outside financial resources for management; greater ability for larger scale management actions; ability to see where beavers can co-exist at a watershed scale	Individuals may still have beaver issues; takes time and effort to work with neighbours/community	L / H	Community decision making about beaver management to reduce problems and maintain benefits	Solutions to beaver issues that keeps beavers on the landscape to supply other benefits. Working at a community scale allows flexibility and enables beavers and their benefits to be maintained in some areas.	G, F-G	
	Infrastructure planning for road and water crossings	2, 4, 8	L	Road and water crossing designs and site selection considered with understanding of beaver ecology; mitigative features built in at the onset of construction	Potential exists for new beaver activity to cause issues; occasional flooding problems	L / H	Reduces negative effects on crossing structures, reduces repetitive repair costs and inconvenient beaver impacts	Maintains beavers and other benefits of natural water management	G	

Agriculture concerns and values: 1. Flooding of pasture, crops, trees; 2. Flooding and damage to roads, fences, buildings; 3. Loss of valued trees and shrubs; 4. Hazards to livestock; 5. Surface water supply for agricultural operations; livestock distribution; 6. Ground water storage/enhanced agricultural production of forage or crops; 7. Flood prevention/moderation with beaver dam storage; 8. Amenity value with landscape diversity/ wildlife



Concerns and Benefits for Agricultural Producers

Concerns of agricultural producers resulting from beavers may include:

- Flooding of pasture, crops or trees;
- flooding and damage to roads, fences or buildings;
- loss of valued trees and shrubs;
- hazards to livestock; and
- inconvenience and additional work to address the impacts of beaver activities

Benefits that beavers provide to agricultural operations include:

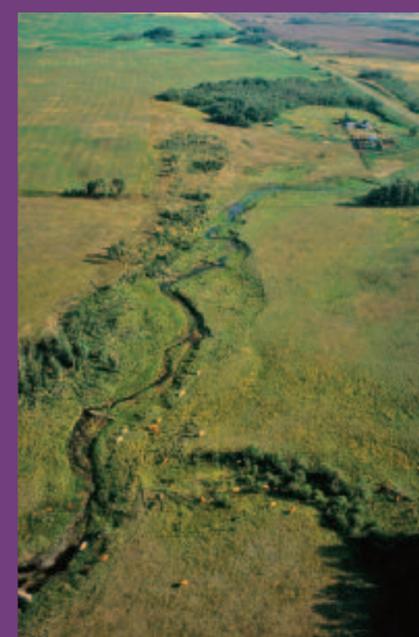
- Greater surface water supply for agricultural operations, that allows better distribution of cattle on pasture;
- drought resilience with more stored water for livestock use while on pasture;
- higher water table leading to improved forage or crop production, including in dry periods;
- flood prevention and stream flow moderation resulting from water held behind beaver dams;
- aesthetic and amenity values to enjoy wildlife and increased habitat diversity resulting from beaver activities; and
- increased property values due to water availability as well as wildlife habitat

Ecological Goods and Services

Beavers provide many environmental benefits, known as ecological goods and services, which directly and indirectly benefit agricultural producers, their communities and landscapes around them. These benefits are often overlooked or not immediately apparent, but the value they provide is considerable. When identifying beaver management approaches to take, consider these additional benefits beavers provide:

- Improved water quality resulting from more sediment being trapped behind beaver dams.
- Beavers create significant riparian and wetland habitat for a diversity of wildlife.
- Landscapes influenced by beaver maintain more surface water over long periods, even when beavers are no longer present.
- The deep pools created behind beaver dams provide high quality fish habitat and greater opportunity for fish to survive over winter; their dams are generally not barriers to fish movement.
- Beavers are responsible for creating wide flat valleys, due to centuries of dam building and sediment trapping, resulting in deep, rich soils.
- The inconvenience and potential economic losses to agricultural operations can be balanced with benefits of water storage, flood and flow moderation, enhanced primary production, and increased land values with more abundant and stable water supplies.

The inconvenience that beavers cause can be costly but before control actions are taken, it may be useful to review the matrix on the reverse side to guide your decisions and to balance benefits of beavers against real or perceived costs. If you are looking to gain the benefits beavers provide, the matrix will also provide a cost-benefit analysis of the various beaver management techniques available.



An Overview of Beaver Management for Agricultural Producers

These natural dam builders and water engineers can be aggravating and helpful, costly and beneficial. It is a matter of where and when.

This beaver management decision matrix tool, developed for agricultural producers, provides a host of potential actions to respond to various concerns and opportunities that producers have, related to beavers on their land. Beavers can pose management challenges, but also offer many potential benefits to agricultural operations and to ecosystems.



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Visit Our Website to access information on riparian health and management, extension materials, and further contact information:

www.cowsandfish.org

Cows and Fish Partners
Landowners, Producers and Community Groups, Alberta Beef Producers, Freshwater Conservation Canada, Canadian Cattle Association, Rural Municipalities of Alberta, Association of Alberta Agricultural Fieldmen, Alberta Agriculture and Irrigation, Alberta Environment and Protected Areas, Alberta Forestry and Parks.

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