



Alberta Wilderness Association  
*"Defending Wild Alberta through Awareness and Action"*

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October 31, 2019

### **Re: Bow Basin Water Management Options**

Alberta Wilderness Association (AWA) appreciates the opportunity to participate and provide comments for the proposed Bow Basin Water Management Options.

Founded in 1965, AWA strives to help Albertans understand the intrinsic values of our wilderness and wildlife, and encourage communities to participate in conservation initiatives that ensure a legacy for future generations. With over 7,000 members and supporters in Alberta and across Canada, AWA remains committed to assuring protection of wildlife and wild places in Alberta for all Canadians.

AWA believes that the primary strategy for flood mitigation for Calgary and surrounding communities should not be on-stream dam infrastructure, but rather upstream land use improvements, and strictly limiting the future establishment of commercial, industrial, residential developments within the floodplain of the Bow River. This project has gained considerable momentum without adequate scrutiny of environmental impacts or of alternatives to on-stream dams. AWA strongly believes that all three options must be vetted thoroughly for potential negative ecological effects. While we support none of the projects, we believe that the Ghost dam option is potentially the least harmful.

AWA suggests the following as potential mitigation efforts to reduce the likelihood of Bow River flooding:

- 1) Reducing the existing network of linear features prevalent within the Foothills and Rockies. By reclaiming and limiting the number of linear features such as seismic lines, logging roads, and motorized recreation trails, more water would be absorbed into the rocky and vegetative interfaces, ultimately decreasing the amount of excess water and sediments that overflow into the Bow River.
- 2) Reclaiming upstream wetlands and riparian areas along the watercourse. Both of these natural communities serve to absorb water during times of excess, in addition to improving the overall productivity and biodiversity of their associated watercourse.
- 3) Replacing the current timber-supply oriented forest management with ecosystem-based forest management that, among other goals, prioritizes avoiding or buffering wetlands and tributaries. Ecosystem-based operations would also incorporate selective harvesting rather than full clear cuts that reduce the amount of water collected and absorbed by forests prior to meeting tributaries or rivers.

There is a considerable amount of scientific evidence to support that on-stream infrastructure reduces the ecological integrity of aquatic communities and the surrounding landscape, in addition to reducing the quality of water flowing downstream.

The ecological impacts of an on-stream reservoir can vary depending on when and where it is installed, in addition to how the facility is operated, however some generalizations can still be made about the potential ecological impacts of on-stream infrastructure:

- 1) Reservoirs and dams often produce standing water habitat that is far less productive than a free flowing watercourse. The health of aquatic and riparian communities associated with reservoirs is affected by the restricted movement of organisms, nutrients and minerals. This has the potential to reduce biodiversity, including lowering the survival and reproductive success of native aquatic species by limiting their access to different habitats within the channel.
- 2) With limited cycling of nutrients and minerals, reservoirs have the capacity to produce more eutrophic conditions, in which nutrient levels are overly high. Within a reservoir, the natural gradient and hydrodynamic scour is essentially eliminated, increasing the level of sedimentation within the water column, and the amount of organic material that is sequestered in bottom sediments. Reduced organic material processing results in fewer macroinvertebrates to support fish populations, with an increase in suspended matter (turbidity) limiting primary productivity that can occur<sup>1</sup>.
- 3) Reservoirs can develop very low oxygen (anoxic) conditions within the thermal stratification layers. Anoxic conditions in the cold non-circulating (hypolimnetic) layer of a reservoir have been shown to increase the mobilization and concentration of heavy metals within the water column and at the sediment-water interface (SWI)<sup>2</sup>, which has significant implications for water quality, water use, and bioaccumulation in wildlife.
- 4) On stream reservoirs also destroy riparian habitat, particularly if fluctuating water levels do not allow for functioning wetlands along the shore. Riparian zones and wetlands have a disproportionately large effect on their watersheds. Along with maintaining resources and nutrients within the channel, they contribute in increasing productivity and biodiversity by providing habitat for terrestrial plants and animals.

This project has gained considerable momentum without adequate scrutiny of environmental impacts or of alternatives to on-stream dams. AWA strongly believes that all three options proposed must be vetted thoroughly for potential negative ecological effects and reduced drinking water quality, allowing the public to discern all potential ecological and socio-economic effects of a new dam/reservoir.

Of the proposed dam/reservoir options, AWA believes that the extension of the Ghost Dam reservoir could potentially have the least amount of harmful new environmental impacts, in comparison to the

<sup>1</sup> Liu, WC., Chen, WB. & Kimura, N. *Environ Monit Assess* (2009) 159: 393.  
<https://doi.org/10.1007/s10661-008-0637-3>

<sup>2</sup> Nix, J., and Ingols, R. 1981. Oxidized Manganese from Hypolimnetic Water as a Possible Cause of Trout Mortality in Hatcheries. *The Progressive Fish Culturist*. 43 (1981), pp. 32-36

Morley and Glenbow Dam options, which would result in an entirely new anthropogenic footprint within sensitive landscapes.

AWA is particularly concerned with the proposed Glenbow Dam option because of the negative ecological impacts from flooding the sensitive grasslands within the Bow River valley, in addition to the potential elimination of important historical and heritage features. The Glenbow Dam reservoir could also result in the relocation of the railway tracks that traverse the Glenbow Ranch Provincial Park. AWA is concerned that relocating the tracks would result in additional landscape disturbances, compounding the environmental effects of the proposed reservoir. The relocation of train tracks could potentially result in creosote contamination into the surrounding environment from dismantling the tracks and railroad ties.

AWA appreciates the opportunity to provide comments, and looks forward to seeing the concerns in this letter addressed as the proposals are reviewed.

ALBERTA WILDERNESS ASSOCIATION

A handwritten signature in cursive script, appearing to read "Nissa Petterson", with a long horizontal flourish extending to the right.

Nissa Petterson  
Conservation Specialist

<sup>1</sup> Liu, WC., Chen, WB. & Kimura, N. Environ Monit Assess (2009) 159: 393.  
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