



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

December 5, 2023

Director, Environmental Assessment, Regulatory Assurance  
Alberta Environment and Protected Areas  
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**RE: Proposed Terms of Reference Environmental Impact Assessment Report for Eastern Irrigation District's Proposed Snake Lake Reservoir Expansion Project**

To the Director of Environmental Assessment,

Alberta Wilderness Association (AWA) appreciates the opportunity to provide comments on the Proposed Terms of Reference for an Environmental Impact Assessment (EIA) addressing an expansion of the Snake Lake Reservoir, as proposed by the Eastern Irrigation District. Founded in 1965, AWA strives to help Albertans understand the intrinsic values that wildlife and wilderness provide and encourage communities to participate in conservation initiatives that will ensure a legacy for future generations. With over 7,500 members and supporters in Alberta and beyond, AWA is dedicated to conserving Alberta's wilderness and advocating for conservation strategies that protect Canada's biodiversity.

On reviewing the Project Description and the Proposed Terms of Reference, AWA has several concerns. These concerns are summarized at a high level below and expanded on in greater detail in the following sections.

*Summary of concerns:*

- Insufficient consideration of potential impacts, avoidance and conservation in native grasslands;
- Insufficient consideration for effect on Alberta's ability to maintain river health, and meet water conservation objectives (WCOs) or in-stream flow needs (IFNs);
- Lack of recognition for project exacerbating climate change and water scarcity in the region;
- Minimal recognition for the total cumulative effects of development, tolerance of landscape and watershed for reservoir expansion, and the effects of expanding irrigated acres; and
- Lack of thorough investigation for all socio-economic influences.

*Avoidance and conservation of native grasslands*

Native grasslands are the most threatened ecosystem worldwide. In Alberta, an estimated 75 percent of all native grasslands has already been lost, and more is lost to agricultural, industrial and other developments each year. The biodiversity and resilience of grasslands to drought and fire develops over

centuries, and recovery of disturbed grasslands often occurs slowly or not at all<sup>1</sup>. Alberta's Grassland Management Strategy identifies as a key principle the "Avoidance of native grasslands where possible, especially in critical ecological sites identified as extremely difficult to reclaim." This is not reflected in the description or proposed Terms of Reference for the EIA of the Snake Lake Reservoir.

The Project Summary Table states that "Land use within the project area consists of native grassland" and "native grassland surrounds most of the areas to the north, east, and south." It also asserts, "Of the total sites sampled, 84% were native grass communities." The Terms of Reference requires the EIA "Discuss the predicted loss, alteration, or fragmentation of native grassland due to the Project" and discuss "...how reclamation and restoration of natural community classes will be used to reduce the project impacts on native grasslands, wetlands, and ecological/community classes," and "Identify any other opportunities for mitigating effects or offsetting losses." However, contrary to the strategy for avoidance of native grassland, there is no discussion of alternatives that would prevent loss of the native grasslands within the current project area. Given the extensive amount of native grassland communities within and surrounding the project area, the EIA should discuss alternatives that would sustain these valuable native habitats. The change in water flow is also likely to impact the soil characteristics and plant communities of nearby lands, and there needs to be consideration for how expanded irrigation will impact the surrounding native grasslands, including on Antelope Ranch and public lands.

### *Prioritizing river health*

Alberta's rivers are already experiencing low flows as a result of extensive water use and sustained drought. In 2020, the *Watershed Report* released by World Wildlife Fund (WWF) assessed the South Saskatchewan River Basin (SSRB) water flow as "fair", suggesting that water flows were only meeting minimum flow requirements, and assessed threats to the watershed as "very high". The large proportion of land converted for agriculture, urban, and industrial development was one of the reasons for the high threat assessment. The *South Saskatchewan River Basin in Alberta Water Supply Study* found that deficits in the WCOs, established in 2005 to maintain river flows and protect the aquatic environment, were high, and warns that "Future reductions in natural streamflow volumes are more likely than increases for all streams in the SSRB." These reports suggest Alberta is already failing to maintain sufficient water levels and river health, and these objectives will be more challenging to meet in future.

In recommendations on water management, the *South Saskatchewan River Basin in Alberta Water Supply Study* suggests "that storage options be considered only after thorough consideration of non-structural options" and "that measures to encourage and expedite water-use efficiency within irrigation districts be considered to conserve water." The proposed Terms of Reference includes a requirement to describe water supply, including "project effects on flows within the Bow River downstream of the project area and whether this may affect apportion requirements", and "Discuss effects of the Project on maintenance of Bow River instream flow needs in normal and drought conditions." It also references the *Alberta Wetland Policy* and *Water Act*. However, the Terms of Reference fail to thoroughly explore alternative, non-structural methods and other measures for improving water-use efficiency. There should also be a requirement to describe and discuss non-structural methods for water retention, and methods for increasing water-use efficiency, including the growth of less water-intensive crops.

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<sup>1</sup> Buisson, E., Archibald, S., Fidelis, A., & Suding, K. N. (2022). Ancient grasslands guide ambitious goals in grassland restoration. *Science*, 377(6606), 594-598.

In addition, the description in the Purpose of the Terms of Reference claims the project will help “to maintain instream flow needs”. Instream flow needs are a measure of the water quality and quantity needed to maintain healthy aquatic environments and differ from WCOs or instream objectives, which may not be science-based. These objectives are often unmet, and even if met, are insufficient as the current level to prevent ecosystem degradation<sup>2</sup>. Thus, unless the project significantly reduces water use, it will not be able to “maintain instream flow needs.” To support this claim, the EIA should describe how water use will be improved to meet WCOs, how these objectives will be met under low water conditions, and how water levels will be continuously monitored to assess withdrawal limits that would maintain a healthy aquatic ecosystem over time.

### *Climate change impact*

The effects of climate change are already being experienced and are likely to worsen. According to *Alberta’s Climate Future* released by the Government of Alberta in 2019, Alberta is expected to experience less snowfall, greater variability in rainfall, and longer dry periods between heavy storms. The result of these changes in precipitation is likely to be drought, particularly in the dry summer months. Projects are needed that would mitigate these effects without contributing to further carbon emissions.

We appreciate that climate change is mentioned in the Terms of Reference, although focus is on the “implications of predicted climate change on the Project” and “benefits of the Project at a regional scale regarding its ability to lessen effects of climate change”. There needs to be a requirement to discuss the role of the project in contributing to and exacerbating climate change. For instance, native grassland stores significant amounts of carbon, and the destruction of native grassland and wetland ecosystems has led to an estimated 25.6 – 86.3Mt CO<sub>2</sub> being released as of 2017, according to the report *Wetland and Grassland Retention and Restoration as an Effective Carbon Management Strategy in Alberta*. Reservoir surfaces also release millions to billions of tonnes of greenhouse gases a year<sup>3</sup>, particularly during and after construction, when landscape disturbance, decomposition of vegetation and activity of microorganisms creates carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and other emissions. The contribution of the project to climate change should be considered along with potential benefits.

Large reservoirs can exacerbate drought and influence local climate. For instance, the greater surface area of still water intensifies evaporation and water loss<sup>4</sup>. Reservoirs were also found to increase the frequency of extreme weather events, especially in warm and dry regions, and these effects were directly affected by reservoir size. Expansion of Snake Lake reservoir would likely increase the rainfall variability already expected with climate change and exacerbate drought conditions in the region. The EIA needs to clearly address the consequences of reservoir expansion for climate change and the ways it could increase drought conditions for the region.

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<sup>2</sup> Unger, J. (2019). Future Flows: Climate resilience, environmental flows and Alberta’s water law. Environmental Law Center (Alberta). Available at: [https://elc.ab.ca/wp-content/uploads/2019/01/Future-Flows\\_ELC\\_AB\\_2019.pdf](https://elc.ab.ca/wp-content/uploads/2019/01/Future-Flows_ELC_AB_2019.pdf).

<sup>3</sup> Deemer, Bridget R., John A. Harrison, Siyue Li, Jake J. Beaulieu, Tonya DelSontro, Nathan Barros, José F. Bezerra-Neto, Stephen M. Powers, Marco A. Dos Santos, and J. Arie Vonk. (2016). Greenhouse gas emissions from reservoir water surfaces: a new global synthesis. *BioScience*, 66(11), 949-964.

<sup>4</sup> Zhao, G., Li, Y., Zhou, L., & Gao, H. (2022). Evaporative water loss of 1.42 million global lakes. *Nature Communications*, 13(1), 3686.

### *Cumulative effects*

We appreciate the mention of cumulative effects, particularly the consideration of “expected cumulative effects of Project and other water users on the Bow River downstream from the source location during Project operations” with regard to water source. However, we question the use of “where warranted” in the need to complete “a cumulative effects assessment as per the *Guide to Preparing Environmental Impact Assessments in Alberta*.” Considering the extensive industrial, agricultural, and other development that has occurred in southern Alberta, and the clear fragmentation, degradation and loss of prairie and freshwater habitat, all project impacts should be assessed with a clear and thorough consideration of cumulative effects with other developments in the region.

Further, the cumulative effects for this project are not restricted to the expansion of the reservoir. Impacts of the project also extend to the irrigated acres that will be increased with the completion of this project. Irrigation can degrade soils, increase salinity and acidification, and cause erosion<sup>5</sup>. When water is applied in excess of need, soils can become water-logged, which reduces soil quality and crop yield. Irrigation can also encourage the development of a water-reliant ecosystem in the surrounding areas that is far more susceptible to drought, and drought resilience of crops also declines as irrigation is expanded<sup>6</sup>. Additionally, irrigation can damage river systems. Irrigation increases contamination, through run-off from irrigated acres that contains nitrogen-rich fertilizer, toxic pesticides, and sediments. Under irrigation, soils and rivers can be considerably degraded, and a cumulative effects assessment must consider these impacts as they are a primary purpose for reservoir expansion.

### *Socio-economic effects*

Several important considerations are missing from the socio-economic considerations, particularly with regard to the impact of losing native grasslands and contributing to further climate change. Though the socio-economic effects addressed in the Terms of Reference concern a range of factors, including impacts on business, housing, services and traditional land use, there is no consideration of the value of the native grasslands, wetlands, and the ecosystem services they provide, which will be destroyed with this project.

The Government of Alberta’s report *The Value of Alberta’s Forage Industry* estimated forages generate \$0.5 to \$2.2 billion through ecological goods and services, and a report prepared for the Ranchers Stewardship Alliance Inc. suggests grasslands provide an average indirect value of \$297.79 per acre per year, although this is likely a gross underestimate that fails to account for many indirect benefits. In the Great Plains of the United States, a value of \$1354 per hectare per year was estimated, and Manitoba’s grasslands, which cover a smaller area than in Alberta, were suggested to provide a socio-economic value of \$702 million to \$2,518 million per year.

As well, climate change, which the project is likely to exacerbate, results in costs of billions per year through extreme weather events, loss of crop production and other impacts of warming. For instance, based on a high emissions scenario, ClimateWest’s *Costs of Climate Change on the Prairies* estimates a

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<sup>5</sup> Hillel, D., Braimoh, A. K., & Vlek, P. L. (2008). Soil degradation under irrigation. *Land use and soil resources*, 101-119.

<sup>6</sup> Lankford, B., Pringle, C., McCosh, J., Shabalala, M., Hess, T., & Knox, J. W. (2023). Irrigation area, efficiency and water storage mediate the drought resilience of irrigated agriculture in a semi-arid catchment. *Science of the Total Environment*, 859, 160263.

\$8.6 billion loss in Alberta by the 2050s. The consequences of allowing this project to proceed must be fully addressed in the EIA, and less destructive alternatives should be thoroughly considered.

Thank you for considering our comments. We look forward to seeing our suggestions incorporated into the final Terms of Reference in the Environmental Impact Assessment Report for Eastern Irrigation District's Proposed Snake Lake Reservoir Expansion Project.

Sincerely,

ALBERTA WILDERNESS ASSOCIATION

A handwritten signature in black ink that reads "Ruiping Luo". The signature is written in a cursive, flowing style.

Ruiping Luo  
Conservation Specialist