March 31, 2021

The Honourable Devin Dreeshen
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Sent by e-mail: AF.minister@gov.ab.ca

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Dear Sir/Madam:

Re: Concerns regarding Proposed Alberta Irrigation Expansion Project
Partnership of Alberta Government, Canadian Infrastructure Bank, Irrigation Districts

We are writing to state our concerns about a recently announced project to upgrade irrigation district infrastructure, build new and expanded storage reservoirs and increase irrigation acres within eight irrigation districts in the South Saskatchewan River Basin of southern Alberta. We are asking that this monumental project be subject to environmental assessment, regulatory review and opportunities for public and indigenous consultation and input. We are requesting that subsidies for efficiency improvements that Government deems to be in the public interest are accompanied by agreements on the use of freed-up water to assist in meeting societal goals for realizing instream flow needs and improving river health.

We understand hundreds of millions of dollars of provincial grants and federal loans to irrigation districts are involved as is the future use of a scarce and valuable public resource in a semi-arid region - water. We are concerned about potential environmental implications of the proposed project particularly on stressed aquatic ecosystems. The apparently secretive process being used to define the project and financing agreements is of concern in that it may preclude consideration of opportunities to support healthy ecosystems and human needs through shared stewardship.

It has been well understood for at least two decades that the health of rivers in the Bow, Oldman and South Saskatchewan sub-basins of semi-arid southern Alberta downstream of major irrigation supply dams and diversions is compromised by significantly reduced flows and altered flow regime as well as by impacts of growing population and intensifying land use (Schindler and Donahue 2006, Byrne et al. 2006, Pentney and Ohrn 2008). Several studies of the health of aquatic ecosystems have been undertaken to inform water and watershed management planning. These studies are listed and key points summarized in Attachment 1. Irrigation agriculture is a major cause of stress on aquatic ecosystems due to water withdrawals from rivers and through pollution of runoff from cropland and return flows. The irrigation sector holds licences to withdraw over half of mean natural annual flow and over three-quarters of licensed water allocation in the Bow and Oldman river basins (Basin Advisory Committees 2018). Increased warming with climate change through its effects on evaporation, evapotranspiration and winter snowpack will continue to contribute to declines in river flow and on health of aquatic ecosystems if we do not take action to maintain and restore them (Jiang et al. 2017, Bonsal 2020).

We understand the potential benefit of improving water use efficiency of irrigation agriculture by converting open canals to underground pipelines. However experience here and elsewhere is that modernization seldom alleviates the consequences of cyclic drought or frees water resources for river flows and the natural habitats they provide but instead increases resource use and reduces society resiliency (Scott et al. 2014). A case in point is the *Irrigation Sector Conservation, Efficiency and Productivity Plan* (2005-2015) by the Alberta Irrigation Projects Association (2010). It does not identify or adopt meaningful opportunities to benefit the environment. It does not identify water sources showing signs of stress. Progress is not being made to allocate conserved water to benefit aquatic ecosystems that have been assessed as degraded because of water withdrawals. Furthermore plans and decisions are being made to commit conserved water (and unused water) for expanding irrigation acres with a resulting further stress on aquatic ecosystems and less water available for future societal needs.

Also of concern to us is proposed increase of off-stream water storage. We are aware of water supply and storage evaluations for the South Saskatchewan River Basin (AMEC 2009 and 2014) that addressed a strategy of the *South Saskatchewan Regional Plan (2014-2024)* toward managing watersheds to "support healthy ecosystems and human needs through shared stewardship". These studies did not recommend new storage development in the Bow and Oldman subbasins but rather suggested pursuing non-structural opportunities first. We are not aware that non-structural opportunities have been fully explored.

We are also aware of climate adaptation strategies defined for the South Saskatchewan River Basin through a collaborative process using the South Saskatchewan River Operational Model (Alberta WaterSMART 2016). Strategies, both structural and non-structural, focused on adapting to drought and flood and increasing resilience to climate change, not increasing risk to existing water users and the aquatic ecosystem as could occur with major expansion of irrigation in the Bow and Oldman subbasins.

A further concern is whether the identification of new or expanded off-stream storage reservoirs that are part of the announced irrigation expansion project arose from a recent ranking of on-and off-stream storage options by the Alberta Irrigation Districts Association (2019)? If so, this is of concern as the AIDA study focused on benefits to the irrigation sector. Broader environmental, social and economic considerations were not addressed.

We expect there will be fulsome impact assessments including cumulative effects assessments and regulatory review of the various components of the project for compliance with relevant legislation and approved water management and land use plans and policies. Legislation that may apply includes the federal *Impact Assessment Act*, *Fisheries Act* and *Species At Risk Act* and the provincial *Environmental Protection and Enhancement Act*, *Water Act*, *Alberta Land Stewardship Act, Wildlife Act* and *Irrigation Districts Act* as well as a variety of approved plans and policies including the *South Saskatchewan River Basin Water Management Plan*, the *South Saskatchewan Regional Plan* and the *Alberta Wetland Policy*. There may be implications for interprovincial sharing of water according to the Master Agreement on Apportionment. As well the Government of Canada and the Province of Alberta have a duty to consult First Nations and Metis. We would like assurance that shared financing of the project by federal and provincial governments and irrigation districts will not affect the objectivity of impact assessments and regulatory review, opportunities for public input and determination of public interest.

Since the brief Alberta government media release (October 9, 2020) announcing the "historic investment to expand irrigation" our attempts to obtain information about project components through contacts with staff of Alberta Agriculture and Food, Alberta Environment and Parks, the Canadian Infrastructure Bank, and the Alberta Irrigation Districts Association have been unsuccessful. We are told that negotiations are ongoing and confidential. However, consultation with legitimate interests must occur and we suggest that it is better to do this prior to formalizing funding agreements. For example, we are interested to ensure any government subsidies for efficiency improvements that Government deems to be in the public interest are accompanied by agreements on the use of freed-up water to assist in meeting societal goals for increased in-stream flows and improved health of rivers.

We would appreciate being informed about the proposed project and assessment and regulatory review process. We request receiving notification of opportunities for consultation and input on any applications for approvals by government (e.g. environmental assessment process, water licence applications, expansion of irrigated acres).

Yours sincerely

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Arlene Kwasniak – Professor Emerita of Law, University of Calgary, in individual capacity
Carolyn Campbell – Conservation Specialist, Alberta Wilderness Association
Maureen Bell – Executive Director, Water Conservation Trust
Silvia D'Amelio – Chief Executive Officer, Trout Unlimited Canada
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Note: According to the Alberta Government technical fact sheet and the Canada Infrastructure Bank (CIB) project description, funding for the project is through a partnership of the Alberta Government ($244.5 million) and CIB ($407.5 million). Irrigation districts, non-profit corporations enabled under the provincial Irrigation Districts Act, are proposing to contribute $163 million.

Attachment 1: Studies of the health of aquatic ecosystems in the South Saskatchewan River Basin

Alberta Environment (June 2003). ***South Saskatchewan River Basin Water Management Plan Phase Two: Background Studies: finding the balance between water consumption and environmental protection in the SSRB.*** **(here)**

Key findings regarding risks to the aquatic environment due to water allocations include:

Overview regarding Aquatic Environment (p. 3)

- "Meeting instream flow needs in the Bow and Oldman rivers downstream of the major water withdrawals requires more flow than is presently available. With existing allocations, restoring flows to these reaches would be difficult."
- "The health of the aquatic environment is believed to be following a long-term declining trend downstream of the major water withdrawals on the Bow and Oldman rivers."
- "Experts rate the majority (22) of 33 mainstem river reaches in the SSRB as 'Moderately Impacted', five reaches as 'Heavily Impacted', and three as 'Degraded'.

Summary of Water Allocations Report (p. 8)

- "The Southern Tributaries of the Oldman River have a high degree of allocation."
- "The Bow and Oldman Rivers have a significant degree of allocation."
- "Some irrigation projects in the SSRB regulation have not made an application for significant or any amounts of their limits. These projects, if they proceed, will be exposed to significant risk of water not being available in dry years."
- "Restoration of even a portion of river flows will require a concerted effort over a lengthy time period."

Summary of Instream Flow Needs Determination (p. 14)

- "In the Bow, Oldman, St. Mary, Belly and Waterton Rivers the IFN are generally much greater than existing flows under the present allocation situation. In these rivers the aquatic environment is believed to be in a state of long-term declining health. This will be a consideration in setting direction for water management in the SSRB."
- See Clipperton G.K., C.W. Koning, A.G.H. Locke, J.M. Mahoney and B. Quazi. (2003). *Instream Flow Needs Determinations for the South Saskatchewan River Basin, Alberta, Canada.* (here)..An integrated aquatic ecosystem IFN was determined based on fish habitat, water quality, riparian vegetation, and channel maintenance for input to the provincial water-balancing model.

Summary of Riparian and Aquatic Condition Report (p. 16-18)

- "The lowest reach of the Bow River (Bassano Dam to Grand Forks) is warm in summer, nutrient rich, and shallow due to upstream extractions, so the ecological condition was considered degraded and among the worst of all river reaches in the SSRB."
- "Among the reaches of the southern tributaries of the Oldman River, the lower two reaches of the St. Mary River (St. Mary Dam to Oldman River) were considered degraded. This is largely due to low flows in combination with riparian areas being used as wintering sites for cattle and non-point run-off from agriculture activities."
- "The lower two reaches of the Waterton River (Waterton Reservoir to Belly River), and the lowest reach of the Belly River (Waterton River confluence to Oldman River), were all considered heavily impacted. Low flows were seen as the main problems for these reaches and for the lower two reaches of the Waterton River. Shallower water has significantly

raised water temperatures resulting in a shift from cold-water fish species to cool-water fish species."

Lalonde K. et al. 2005. Southern Alberta's Watersheds: An Overview. Prairie Conservation Forum Occasional Paper Number 5. (here)

- Summarizes information on the current state and future trends of watersheds in southern Alberta including water supply, aquatic environments and human uses. Challenges for the future include:
  - Adopting a sustainable resource and environmental management approach.
  - Improving our knowledge and understanding of surface and groundwater flows, aquatic and riparian ecosystems and encouraging efficient use of water, best management practices and innovation.
- Instream Flow Needs: Using computer modeling, the IFN values were compared to natural flows for the period from 1928 to 1995. Based on this analysis, the IFN values tend to be about 80% of the natural flow during times of moderate to high flow. During times of low flow, the IFN values are equivalent to or higher than the natural flow due to the need to assimilate wastewater from treatment plants. In an average year, the IFN values are less than natural flow during at least some part of spring and summer, while during the fall and winter the IFN value is the same as or less than natural flow. When the IFN values are compared to the actual river flows under current allocations and commitments, the conclusion is that in the Bow, Oldman, St. Mary, Belly and Waterton Rivers, the IFN values are generally much greater than existing flows, and restoring flows to IFN values would be impossible with the present degree of allocation. In these rivers, the aquatic environment is believed to be in a state of long term declining health.

Alberta Environment (June 2007). ***Aquatic and Riparian Condition Assessment of the South Saskatchewan River Basin.*** **(here)**

Assessment of the aquatic (water quality, hydrology) and riparian condition of all main-stem river reaches in the South Saskatchewan River Basin were assessed. Results for reaches below irrigation dams and diversions include:

- Bow River, Western Irrigation District weir to confluence with Oldman River
  - Water quality is rated fair to good. Calgary contributes treated wastewater and stormwater. Dissolved oxygen sometimes falls below guidelines and nutrient loading is expected to increase with population growth. Irrigation return flows contribute fertilizers, pesticides and nutrients.
  - Riparian health varies from healthy with problems to unhealthy. Water withdrawals and damming are impacting riparian vegetation.
  - The reach below Bassano Dam is considered degraded, with a declining trend largely because of the high degree of hydrological change in the open water season.

- Oldman River, Oldman River Dam to confluence with Bow River
  - Water quality is rated fair to excellent. Lethbridge contributes wastewater effluent and stormwater. Irrigation return flows are often of poor quality
  - Riparian health varies from healthy with problems to unhealthy. Water withdrawals impact riparian vegetation.

- Southern Tributaries, below dams and diversions on Waterton, Belly and St. Mary Rivers

- Water quality is rated as good, however a downward trend is predicted due to high level of water withdrawals. There are no provincial water quality monitoring sites.
- Riparian health varies from healthy with problems to unhealthy. Water withdrawals significantly reduce water availability for riparian communities.

Oldman Watershed Council (2010). ***Oldman River State of the Watershed Report Summary (2010)*** **(here)**

The following risks to the aquatic environment due to current allocations were identified.

Southern Tributaries Sub-Basins (p. 9-10)

- "Recorded flows are approximately equal to natural flows upstream of major storage projects or diversions to irrigation districts but are severely impacted by flow regulation and diversions along the lower portions of the Waterton, Belly and St. Mary rivers."
- "Total allocations are about 75% of the median natural flow, however, actual water use (diversions minus return flows) is about 33%....Only about 51% of total allocations are being used….Expansion of water use by users with high priority (senior) licences may increase deficits to instream flow needs and consumptive water users with junior priority licences. Water quantity indicators are rated as Poor."

Oldman River Mainstem (p. 12-13)

- "Similar to the Southern Tributaries Sub-basins, the Oldman River mainstem is heavily allocated. At the mouth allocations are about 60% and use is about 39% of median natural flow. The difference between allocation and use indicates that there is potential for expansion within existing allocations. Water quantity indicators are rated Poor."

Recommendations and Best Management Practices (p. 14-15)

- "Consider modifying allocations and other options to achieve sustainable water use levels in the future, especially within the Southern Tributaries Sub-basins and Oldman River mainstem."

Bow River Basin Council (2010). ***Bow River State of the Watershed Report Summary*** **(here)**

Degradation of the aquatic ecosystem was identified in several reaches of the Bow River and its tributaries. Findings contained in the identifying risks to the aquatic environment in the mainstem Bow River due to current allocations include:

- "Some of the upstream hydropower reservoirs are used to provide power during periods of peak demand, and these operational schemes known as hydropeaking, can cause large daily fluctuations in river flow." (p.20)
- "In the lower sub-basins during the summer and early fall of some years, the flow is not always adequate to meet desired environmental requirements, plus satisfy the demand from all licensed diversions." (p.6)
- "During times of low flows, the warm, shallow, nutrient-rich waters can occasionally experience low dissolved oxygen concentrations and pH and temperature fluctuations. Although water quality has significantly improved downstream of Calgary, the periodic occurrence of these conditions can stress fish." (p.6)
- "The Bassano Dam, which serves to divert water for irrigation, reduces the flow in the river, impacting fish habitat. With lower flows, the temperature of the water is able to rise more

quickly during the summer, and temperatures can exceed the tolerance of some of the cool water fish species." (p.10)

- "Recorded flows in this sub-basin [Bassano Dam –Oldman River] are lower than those in the rest of the Bow River basin, with the exception of the headwaters. Flows are particularly low during the summer and fall months. During certain periods of most years, river flow rates downstream of the Bassano Dam are reduced to levels potentially threatening to the health of the aquatic ecosystem. Reduced flows are caused by high demand to irrigate fields and to refill reservoirs in the irrigation districts prior to the spring runoff and again prior to winter closure of the canals." (p. 41)
- "There are two ways to respond to flows that do not meet human demand and the needs of the environment. The first is to reduce demand through conservation, efficiency, and productivity of existing and future water use. The second is to store water during high flow periods, for later release during low flow periods, while remembering that high flows also have an important role in maintaining healthy aquatic ecosystems." (p. 6)

Alberta Government. (2014). Bow River Phosphorus Management Plan: Taking Action to Manage Phosphorus Together. (here)

This strategic plan was developed to address sources of phosphorus in the Bow River between the Bearspaw Dam and Bassano Dam. It is being implemented by a multi-stakeholder committee. A maximum loading of 370-490 kg/day has been identified to protect aquatic life. Regular monitoring shows acceptable phosphorus thresholds have not recently been crossed but a growing population, intensification of land use and alteration of flows may cause phosphorus levels to trend upward requiring more proactive management.

Alberta Government (2014). *South Saskatchewan Region Surface Water Quality Management Framework: for the mainstem Bow, Milk, Oldman and South Saskatchewan Rivers (Alberta).* (here)

The *Framework*, mandated to support the South Saskatchewan Regional Plan, monitors long-term cumulative changes in water quality. Baseline is 1999-2009 monitoring results. The *Framework* sets surface water quality triggers and limits for 15 indicators measured at nine monitoring stations. Indicators are total ammonia, chloride, nitrate, total nitrogen, total dissolved phosphorus, total phosphorus, sulphate, sodium adsorption ratio, specific conductivity, total dissolved solids, turbidity, pH and *Escherichia coli*. Secondary indicators are mercury, selenium, 2,4-D, dicamba, methylchlorophenoxyacetic acid and mecoprop. Annual reports on status of water quality are prepared. Reports are available April 1 – March 31 for six years (2014-2020).

Results of long-term monitoring of water quality over three to four decades were briefly summarized. Long-term network sites included: Bow River at Carseland, Cluny and Ronalane; Oldman River at Brocket, Lethbridge and Highway 36; and, South Saskatchewan River at Medicine Hat. Key points regarding water quality prior to 2010 follow.

- Bow River:
  - Nutrient conditions in the Bow River at Carseland had improved due to improving municipal wastewater treatment upstream and despite significant population growth. Non-point source inputs of nutrients increased.
  - WQ index at Cluny and Ronalane was rated 'good' with most exceedances related to nutrients.
  - Pesticides were detected at Carseland, Cluny and Ronalane.

- Oldman River:
  - WQ index at Brocket was rated 'excellent' to 'good' in most years but reduced in high runoff years.
  - WQ index at Lethbridge and Highway 36 was rated 'good' in most years but reduced to 'fair' in high runoff years when nutrients and pesticide detections increased. Nutrient and fecal coliform levels improved due to municipal treatment facility upgrades and flow improvement from Oldman Dam Reservoir operations.

- South Saskatchewan River:
  - WQ index was consistently rated 'good' but reduced due to nutrient exceedances in most years as well as occasional pesticide detections.

Alberta Government (2014-2020). ***South Saskatchewan Region Surface Water Quality Management Framework:*** **Annual status of water quality reports.**

2014-2015 status of surface water quality (here)
- Significant exceedances of median or peak triggers for three primary indicators (total nitrogen, specific conductance, and pH) occurred at two stations on the Bow River (Cochrane, Carseland) and two stations on the Oldman River (Brocket, Hwy 36).

2015-2016 status of surface water quality (here)
- Significant exceedances of median triggers for three primary indicators (nitrate, total nitrogen, sodium adsorption ratio) occurred at two stations on the Bow River (Cochrane, Ronalane) and one station on the Oldman River (Hwy 3 in Lethbridge).
- Selenium exceeded the Alberta surface water quality guideline for the protection of freshwater aquatic life (1 ug/L) at the Oldman River (Hwy 36) station during the winter.

2016-2017 status of surface water quality (here)
- Significant exceedances of median or peak triggers for two primary indicators (sulphate, total dissolved solids) occurred at three stations on the Bow River (Cochrane, Carseland, Cluny)

2017-2018 status of surface water quality (here)
- Significant exceedances of median or peak triggers for two primary indicators (nitrate, sulphate, specific conductivity, total dissolved solids) occurred at four stations on the Bow River (Cochrane, Carseland, Cluny, Ronalane) and one on the South Saskatchewan River (Medicine Hat)
- Selenium was equal to the Alberta surface water quality guideline for the protection of freshwater aquatic life (1 ug/L) at one station on the South Saskatchewan River (Medicine Hat)

2018-2019 status of surface water quality (here)
- Significant exceedances of median or peak triggers for five primary indicators (chloride, nitrate, total nitrogen, sulphate, specific conductivity, pH, *E. coli*) occurred at four stations on the Bow River (Cochrane, Carseland, Cluny, Ronalane), one station on the Oldman River (Hwy 3), and one on the South Saskatchewan River (Medicine Hat)
- Selenium Alberta surface water quality guideline for the protection of freshwater aquatic life was changed to two thresholds: 1 ug/L Alert level concentration and 2 ug/L as the Guideline.

2019-2020 status of surface water quality (*under review by AEP*)

- Significant exceedances of median or peak triggers for five primary indicators (chloride, nitrate, sulphate, specific conductivity, total dissolved solids) occurred at four stations on the Bow River (Cochrane, Carseland, Cluny, Ronalane) and one on the South Saskatchewan River (Medicine Hat)
- Numeric guideline values of 0.05 mg/L for total phosphorus and 1.0 mg/L for total nitrogen have been withdrawn. Narrative statements have been developed.