SUGGESTIONS TO MAINTAIN AND ENHANCE WATER AVAILABILITY

FOR HEALTHY AQUATIC ECOSYSTEMS

Submission for input to the Alberta online engagement on water availability

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Aquatic ecosystems include rivers, stream, lakes, ponds and wetlands as well as the riparian areas on their periphery. These landscape features capture, store, release and convey the water that falls as snow and rain. They are critical for sustaining life in a watershed and provide nature-based functions and services including resiliency to floods and droughts, erosion prevention, sediment capture and transport, recharge of groundwater aquifers, water purification, productive vegetation and important habitats for fish and wildlife. Man-made reservoirs and canals store and convey water but fail to provide other nature-based services. The health of aquatic ecosystems is a measure of how sustainably we live in a watershed.

Over the past century making large and increasing amounts of water available for human uses and significantly altering natural storage and flow regimes has resulted in degraded aquatic ecosystems with reduced resiliency and less ability to provide nature-based functions. Natural water storage in our watersheds is reduced. Large amounts of withdrawal are shrinking rivers. The suggestions that follow focus on water and watershed management that strives to ensure sufficient water is available at the appropriate times to maintain and restore healthy, functioning aquatic ecosystems.

1. **Enhance headwaters storage and yield using nature-based approaches. This includes managing land use to support aquifer recharge and protecting and restoring wetlands including beaver pond complexes.**

   Snow and rain falling in the Eastern Slopes provides 80% of water flowing in rivers of the South Saskatchewan River Basin. Groundwater recharge, late-summer flows and overall water yield are influenced by the natural storage capacities of headwaters. The

maximization of ecosystem services of this type in headwaters includes curtailing industrial and recreational activities that have large water demands and result in surface disturbance footprint, both spatial (mine site) and linear (roads and vehicle trails). It also includes transitioning forest management approaches away from clearcut logging and towards small-scale selective harvest and use of prescribed fire designed to maintain snowpack and vegetation cover and reduce rapid runoff that erodes soil into headwater rivers and their tributaries. Reclamation of existing footprint is also beneficial. Another key component of this approach is protection and restoration of riparian zones and wetlands, including beaver ponds.

A youth conservation corps has been suggested as a means to achieve substantial progress in headwaters restoration. Several watershed stewardship organizations recognize the wisdom of this approach and are working towards it although constrained by inadequate coordination and resourcing as well as lack of enforcement to prevent damage from inappropriate land use.

2. **Determine science-based environmental flows* that will support healthy and resilient aquatic ecosystems. Require collaborative basin water management planning that defines instream flows needed for protection of the aquatic and riparian environment, including protecting biodiversity, and corresponding limits on water available for allocation. Publicly communicate instream flow needs determinations for specific river reaches.**

*"Aquatic ecosystems such as rivers, streams and lakes, need certain levels of water flow throughout the year to remain healthy and sustainable. Environmental flows, also known as instream flows or instream flow needs, are a measure of that water quantity and quality over time. Monitoring and planning for environmental flows conserve freshwater ecosystems, and protect the life that depends on them." Source: https://www.alberta.ca/about-environmental-flows

Instream flow needs determinations were completed for the South Saskatchewan River Basin and documented in a 2003 report (Clipperton et al. 2003) for consideration in development of the Water Management Plan for the South Saskatchewan River Basin (Alberta Environment 2006). The determination considered fish habitat, water quality, riparian vegetation and channel maintenance.

Albertans' understanding of water management performance to support healthy aquatic ecosystems would benefit from including instream flow needs determinations on yearly graphs of river flows on the Alberta River Basins website (https://rivers.alberta.ca/).

3. **Establish water available for the aquatic ecosystem through a legislated Water Conservation Objective (WCO) under approved water management plans for all basins. Implement through placing WCO conditions on all water licenses and dam operations, real time monitoring of instream flows, enforcing compliance with WCO and regular public reporting on performance to achieve WCO.**

   Water Conservation Objective is defined as follows in Alberta's *Water Act* 1(1)(hhh)

   > *"Water Conservation Objective" means the amount and quality of water established by the Director under Part 2, based on information available to the Director, to be necessary for the*
   > - *i) Protection of a natural water body or its aquatic environment, or any part of it;*
   > - *ii) Protection of tourism, recreational, transportation or waste assimilation uses of water; or*
   > - iii) *Management of fish or wildlife and may include water necessary for the rate of flow of water or water level requirements."*

   A licence may be issued by the Director to the Government of Alberta for the purpose of implementing a Water Conservation Objective.

   Ideally the Water Conservation Objective established for protection of a river reach would be equivalent to the Instream Flow Needs determination. To date this has not occurred through approved water management plans for river basins with a high degree of allocation.

   A 2024 *Surface Water Management Performance Audit* by Alberta's Auditor General found that (p. 9) "the Department of Environment and Protected Areas has no water conservation objectives in most basins; does not know if existing water conservation objectives are working; lacks robust processes to monitor water pressures, assess risks, and decide when water conservation objectives are needed, and; has ineffective processes to approve licences and monitor compliance, such as not enforcing licensee compliance with conditions." The Auditor General went on to identify consequences of not taking action: "Failing to proactively identify the need for water conservation objectives, or to evaluate and update existing ones, increases the risk of water shortages. That could lead to higher costs, shortages of goods, and an inability to meet future water needs for people, businesses, and the economy." (Auditor General of Alberta 2024).

   Failing to evaluate and update water conservation objectives increases risks to aquatic ecosystems.

4. **Monitor indicators of aquatic ecosystem health to assess the effectiveness of WCO in protecting the aquatic environment and improve WCO if required.**

   Indicators of aquatic ecosystem health may include approximation of natural flow regime, fish populations and their habitat, water quality (e.g. dissolved oxygen, turbidity) and temperature, and riparian health. The observations, experiences and attitudes of recreational users (fishermen, canoeists, swimmers), of municipalities regarding the quantity and quality of their water supply and of residents living along rivers may be other indicators.

5. **Where Instream Objectives (IO) currently apply to dam operations and water licences replace them with Water Conservation Objectives for protection of the aquatic environment.**

   Prior to enabling water management plans and Water Conservation Objectives, Instream Objectives (IOs) were used as guidance for minimum flows that should remain in the river via dam operations or as a restriction on licenses in over-allocated rivers. IOs were originally set to ensure minimum flows that address water quality needs for urban municipalities (e.g. Lethbridge) and later to address downstream fish habitat needs (Fish Rule Curve) in operation of some dams (e.g. Oldman) or withdrawals from some river reaches in the Oldman and Bow river basins (e.g. Upper Oldman, Castle, Crowsnest, Highwood, Sheep, Elbow).

   IOs are a component of Water Conservation Objectives (WCO) in the approved water management plan for the South Saskatchewan River Basin. WCO is defined as “45% of the natural rate of flow, or the existing IO plus 10%, whichever is greater at any point in time”. Minimum flow IOs should be replaced with more ecologically sound WCOs or IFN.

   Instream Objectives (IO) are not defined under the *Water Act*. In the 2024 water sharing agreements for the Oldman and Bow rivers IOs, not Water Conservation Objectives (WCOs), became ‘targets’ for operating water management infrastructure. The result is extremely low flows and lack of natural variability in annual flow.

6. **For allocation decisions where specific advice or objectives have not been developed or approved, follow guidance to achieve environmental flows provided by the *Surface Water Allocation Directive* (Alberta Environment and Parks 2021).**

7. **In basins closed to further allocation because of insufficient water available to achieve both licensed water withdrawals and environmental flows (e.g. South Saskatchewan River Basin) provide direction for flow restoration using an aspirational Water Conservation Objective and implement measures to achieve the WCO. Monitor progress.**

   Measures towards instream flow restoration include:

   - **Allow repurposing of licenses (change of purpose amendments) <u>only</u> where beneficial effects on environmental flows are demonstrated.**
   - **Allow transfer of unused portions of allocations <u>only</u> where beneficial effects on environmental flows are demonstrated.**
   - **Employ conservation holdbacks in all transfers of water licenses.**
   - **Require a transfer for environmental flows of a portion of the water license allocation saved through public incentives for infrastructure efficiency improvements.**
   - **Allow parties other than government to engage in allocation transfers and to hold water licenses for instream purposes.**
   - **Exercise regulatory discretion for licenses to curtail diversion rates or volumes in order to achieve a WCO. Senior licenses granted under the *Water Resources Act* may have terms permitting the Minister to diminish quantity of water and change rates of diversion.**

8. **In decisions regarding approval of water license allocations (new or transfers), of amendments to water licenses (e.g. reduced return flows) and of proposed new water management projects require assessment of potential impacts on instream flows and achievement of WCO. Consider impacts with predicted climate change and cumulatively with other allocations (existing and proposed). Include assessment of potential impacts of change in land use associated with new allocations and water management projects.**

   Reliable predictive hydrologic and climate models (with acceptable levels of uncertainty) are required to assess river flows and water availability with climate change.

9. **Avoid use of interbasin transfers to address water availability issues given potential serious ecological, economic and social impacts. Continue to focus on water management planning within basins that recognizes basin-specific limits on water availability.**

10. **Broaden opportunity for public engagement in decision-making processes regarding water allocation and water management projects. Expand participation beyond the narrow definition of "directly affected" to all legitimate interests (including environmental and recreational).**

11. **Improve transparency and public access to data collected by government on river flows. For individual rivers or reaches provide Instream Flow Needs and Instream Objectives data and the methods used to determine them, along with historical information on how the methods have changed over time.**

    Provide access to this information through the Alberta River Basins website (rivers.alberta.ca) which is a valuable resource for timely public access to gauging station records on current river and canal flows and weekly/annual flow graphs, on lake and reservoir levels and on precipitation and snow pack.

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