

Water woes in southern Alberta could spell disaster for aquatic ecosystems, and the people who rely on them

March 21 2024, by David Barrett and Kerry Black



Credit: Pixabay/CC0 Public Domain

Freshwater will be an increasingly scarce resource as we head into spring and summer in Western Canada with implications for the livelihoods and

economic prosperity of humans, and non-humans alike, in southern Alberta and the downstream Prairie provinces.

The Bow River—in addition to the Oldman and South-Saskatchewan sub-basins—play a vital role in Western Canada. These rivers also have [a large number of competing uses](#) including agricultural and irrigation needs, municipal uses, hydroelectric developments, industrial consumption and [recreational and cultural uses](#)—including a [world-class sports fishery](#).

The Rocky Mountains serve as Western Canada's water towers and are the critical source of the snowpack which plays a major role in [groundwater recharge](#). The [diminishing winter snowpack](#), combined with increasing frequencies of [multi-year droughts in the Prairies](#) from below-average regional precipitation, is setting up the summer of 2024 as another year of [abnormally low volumes](#) of water flowing through the basin.

Make no mistake, dwindling flows will have wide reaching social, environmental and [economic impacts](#). Governments and policymakers must act quickly to avert a larger crisis.

Compounding impacts

In addition to impacting the water available for human use, low flows and [water levels](#) have direct and indirect impacts on the [organisms that live in and rely on the aquatic ecosystem](#). Limited water supplies raise serious concerns about the [long-term impacts on our aquatic ecosystems](#).

Complicating matters is the ["first in time, first in right" \(FITFIR\) water governance](#) principle which emerged out of the Western United States and is essentially a first come, first served system of water allocation. To make matters worse, [new applications for water access have been closed](#)

[since 2006](#), a decision which will have a "significant effect on water supply strategies available to municipal water users, as many communities currently hold water licenses that are not adequate for their projected growth."

In [2006 the government of Alberta](#) acknowledged that "the limits for water allocations have been reached or exceeded in the Bow, Oldman and South Saskatchewan River sub basins." In the South Saskatchewan Basin, most of the water is allocated to a handful of license holders who have had licenses for high volumes of water for years. This is a substantial hurdle to overcome when trying to retain [river water](#) for aquatic ecosystems—a goal [often referred to as environmental flows or "e-flows"](#).

Without substantial changes to the licensing program, [aquatic ecosystem](#) health will continue to be secondary to existing license holder uses.

Further complicating the matter is that allocations are looked at [annually and not seasonally](#). This means that the system can't adapt "on the fly" when low flows hit, unless there are specific government directives implemented to that effect. This is also true of current monitoring and reporting efforts across the country, with reporting and interpretation of data being done only after an [issue has occurred, if at all](#).

Perhaps most egregiously, the FITFIR approach has also long been criticized by Indigenous groups as disproportionately impacting their [water rights](#) and [limiting water supplies in favor of competing industry and large agricultural needs](#).

Low-level impacts

Alberta's water regulations are generally not helping matters. Currently, regulations around pollution release are predominantly applied at the end-

of-pipe, not throughout the river, meaning the impacts on the river will vary based on how much water is present. This often results [in poor water quality events occurring in the summer](#), when flow is lowest and the pollutants are less diluted. This has direct consequences on aquatic food webs and those that rely upon the river, especially in areas downstream of major sources of pollution.

Lower river flows and levels can result in [increased water temperatures](#) [and](#) decreased oxygen availability for aquatic organisms. This can have harmful consequences on sensitive species like fish and their invertebrate food sources. The projected low flows in 2024 will likely lead to increased fish mortality.

There are numerous habitats around rivers that rely on certain levels of flow to be present for survival. Riparian areas (river banks) along the river run the risk of drying up and dying off if flow isn't [adequate](#). While seasonal fluctuations in water levels are normal, the [uncharacteristically low flows this past fall and winter](#), combined with expected lower water levels in the coming year may mean that these sensitive habitats are isolated for extended periods of time—not receiving the water and nutrients required for their survival.

The impacts aren't restricted to organisms living directly in and around rivers in the region either. Low water flows affect the entire food web [from aquatic insects to apex predators](#) and with fewer prey available, larger fish populations may decline. These impacts also will only grow downstream as cumulative pressures on the river increase.

While rivers have seasonal flow patterns, low water flow isn't just a seasonal issue. Climate change projections have been predicting more [frequent and severe droughts](#), which will only exacerbate this issue.

Preventing drought?

2024 is likely the first of a series of years where we will see reduced snowpack, altered precipitation timing (and amounts) and increased water use pressures all combining to reduce river flows.

We have seen an initial reaction by [the provincial government](#) in Alberta; however, there has been a noticeable lack of acknowledgement from many governments and regulatory bodies across the country. This is a national issue and will be an ongoing issue as a result of climate change.

The [tension between different water users has been predicted for over a decade](#). Policy options to date have been limited and have lacked the inclusion of ecosystem-related considerations. There [also has been discussion](#) around [increasing the allowance](#) of water which can be moved between basins. However, such systems could have major implications on [aquatic ecosystem health if utilized widely and must be done with great care](#).

As we move through what will be an unprecedented low water year, it will be critical that policymakers, regulators and all Canadians understand the far-reaching impacts.

Our existing approaches aren't working. We must look beyond our current systems. This includes utilizing the knowledge of water quality experts as well as Indigenous Peoples who have relied on the river for centuries.

The management issue presenting itself is extremely complex and [will require equally complex responses with input from all concerned parties](#). But the costs of failure will be far greater than the costs of action.

This article is republished from [The Conversation](#) under a Creative Commons license. Read the [original article](#).

Provided by The Conversation

Citation: Water woes in southern Alberta could spell disaster for aquatic ecosystems, and the people who rely on them (2024, March 21) retrieved 28 April 2024 from <https://phys.org/news/2024-03-woes-southern-alberta-disaster-aquatic.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.