

2023-24 OWC BLOG PLANNING TEMPLATE

Process:

1. Duplicate the template document and fill it out completely.
2. Book a template review meeting with Jon and Sofie.
3. Write first draft of blog.
4. Send to First Draft Reviewer for review and feedback
5. Revise and update based on feedback
6. Send revised blog to Sofie or Jon for review.

Remember, it is normal for there to be a lot of editing along the way, that is how we go from good blogs to great blogs that inspire people to act.

Topic:	Actions and Consequences of Drought				
Assigned to:	Emily	First Draft reviewer:	Jon		
Starting Date:		Target release date:	December 6, 2023		
Working title:	Actions and Consequences of Drought: beyond the human perspective				
Executive Summary: (elevator pitch)	The impact of drought on the broader environment, and how human actions can exacerbate these issues.				
Blog type:	Conceptual (topical)	Experiential (on the ground)		Other	
Audience:	Public	Science	Government	Education	Other (specify):
Angle/curiosity/Rationale:	Human actions = ecosystem-level consequences				
THEMES & CONCEPTS					
What should the reader walk away with after reading this blog? (list three)					
1	Effect of drought on broader ecosystem/ plants/ animals at different time scales				
2	Human influence/ management for drought (humans affecting drought conditions, government regulations/ policy)				
3	Actions for drought solutions over different time scales (sharing/ conserving water right now, or investing in natural infrastructure for the future)				

What questions are we answering/what questions will the reader have?	
What is happening to fish when water dries up?	1 ▾
How does drought affect the broader ecosystem? (outside aquatic-obligate species)	1 ▾
What is happening to woody plants/ cottonwoods and why are they dying?	1 ▾
Is drought natural?/ are plants/ animals adapted to this?	2 ▾
Do humans have a hand in extreme drought conditions?	2 ▾
Does the government consider environmental needs when managing water?	2 ▾
What actions can I take/ what is the solution?	3 ▾
	- ▾
	- ▾
	- ▾
	- ▾
What do you want the reader to do after reading this blog?	
- Think more about the resource they are using, understand water can be finite (especially for urban audiences who probably aren't interacting directly with water sources) - Understand the broader implications of drought on non-human organisms - Engage in solutions (from saving water at home to participating in natural infrastructure projects, volunteering, etc.)	
Direct link:	Banner photo credit
	A dry reservoir? Dead willows? (depending on other drought blogs)
Direct link:	Image caption and credit
	historic water fluctuations (to illustrate animal adaptations)
	drought picture/ spring soil moisture map (to illustrate current drought conditions)

	Animals/ wildlife/ native trout in the water? https://albertawilderness.ca/take-action-defend-westslope-cutthroat-trout/
	fenceline contrast (to illustrate natural infrastructure and the difference in water)
	People volunteering/ willow planting/ BDA/ other human-made natural infrastructure project
Resources/articles/additional documents:	

Conceptual blog format template:

- 1) **Introduction:** Introduce the theme, present the hook, take away message, and 3 concepts.
- 2) **Concept 1**
 - a) transition from 1 → 2
- 3) **Concept 2**
 - a) transition from 2 → 3
- 4) **Concept 3**
- 5) **Conclusion:** Restate the main points and take away message

DRAFT - Step 2

Blog #2 in the Drought Blog Series: Actions and Consequences of Drought in the Watershed

by Emily Purvis, Professional Biologist

Human actions have consequences for the broader environment—this sentiment is not new. Consider drought as an example: while drought is a natural phenomenon in Southern Alberta, human activities can intensify its impacts beyond what would occur under natural conditions. In this blog, we will explore the effects of drought on plants and animals, examine how human activities influence these conditions, and highlight practical solutions to address drought concerns through natural infrastructure. Everyone uses water, but we also have the power to manage, monitor, and make decisions that affect the watershed and all its encompassing ecosystems—the very ecosystems that we, as humans, are part of.

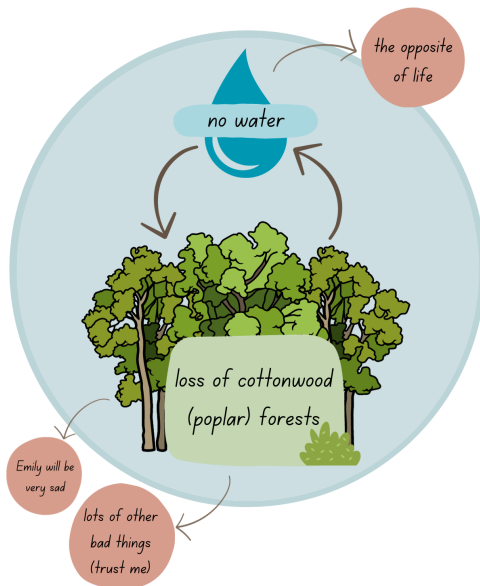
Broader environmental impacts of drought - water is life

Are you alive? Congratulations, you need water. However, the impacts of water shortages extend beyond the immediate concerns of life or death—they can be slow and cumulative, especially in the broader environment.

Lower water levels directly impact fish and wildlife—they need water too! Shallower water tends to have increased sunlight penetration, higher temperatures, and lower oxygen levels; this spells trouble for native fish species, like the [threatened westslope cutthroat trout](#), that thrive in cold water habitats. When water is absent, and fish are not able to move to suitable connected habitat elsewhere, the sad result is that fish die-offs can occur. Similarly, prolonged droughts can affect other aquatic or semi-aquatic species, such as the [northern leopard frog](#). Lower precipitation can cause wetlands to dry up or freeze solid during winter, which can lead to higher mortality among adult frogs and offspring. Moreover, the effects of drought stretch beyond creeks and wetlands to upland ecosystems. For instance, drought can diminish the health and survival of flowering plants, leading to a decline in native bee populations that rely on these plants for sustenance ([Kuppler et al., 2021](#); [Thomson, 2016](#)). Water is vital for life, after all, and the direct or cumulative impacts of drought extend to all living things.

One of the most notable cumulative effects of drought in the watershed is the loss of cottonwood (poplar) forests. These forests are an integral part of the prairie landscape, found in the green riparian areas along rivers and wetlands. In Southern Alberta's semi-arid ecosystem, riparian areas offer some of the only natural canopies available. Cottonwood forests comprise several poplar tree species, willows, and other native shrubs suited to moist soils and seasonal flooding. In fact, trees like [balsam poplar](#) need riparian floods for seed-based reproduction—that's why they produce their famous (or infamous) white seed fluff to coincide perfectly with June flooding and the ensuing moist, nutrient-rich soils. In harmony with their environment, cottonwood forests have deep and extensive root systems that stabilize riverbanks during floods, preventing erosion

and sustaining the entire [riparian ecosystem](#). These trees and shrubs also aid in water retention across the landscape by absorbing water during spring runoff and releasing it gradually as river flows decrease later in the season ([more on this later](#)). However, when cottonwood forests lose access to water and riparian soils dry up, older trees start dying and reproduction ceases. Even in non-drought years, cottonwood forest die-offs can occur in areas where historical water access is altered, such as downstream from dams ([Rood & Heinze-Milne, 1989](#)), highlighting the critical need for water in forest survival.



https://drive.google.com/file/d/1w901yRBV8ILdUsTSKUfw0l1hAAb4wisV/view?usp=drive_link

Photo caption: the negative feedback cycle affecting cottonwood forests under water-limited conditions.

The cumulative outcome is a negative feedback cycle: less water in floodplains leads to fewer cottonwood forests, which in turn results in less water retention, and the cycle continues. But there's more: this feedback cycle can also have cascading, indirect effects on the broader ecosystem as well, since [80% of wildlife in Alberta and all fish species depend on riparian habitats](#). The Oldman Watershed Council (OWC) is hearing from our rural partners that this cycle is unraveling in the watershed—cottonwoods and willows are dying off, and once-thriving riparian ecosystems are vanishing from the landscape.



Photo caption: Dead willows line this dry creek bed, showing evidence that woody vegetation once filled the riparian area. Reduced access to water over many years has caused willow die-offs. Beaver dam analogues were constructed along this creek (visible in the foreground), which represent a natural solution to water retention issues. Credit: Emily Purvis.

Water control and monitoring - who (or what) can I blame?

As dramatic as those last few paragraphs might sound, drought is indeed a natural phenomenon in Alberta that plants and animals have adapted to over centuries. However, human activities across the watershed can intensify the impacts of drought beyond natural levels. This is often due to land conversion that diminishes water retention or alters other key hydrological processes.

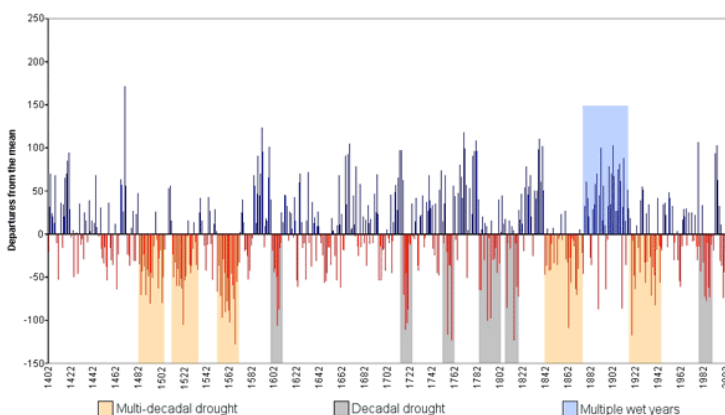


Photo caption: Long periods of drought are natural in Alberta. Image shows annual precipitation variation from the average (acquired from the [Prairie Adaptation Research Collaboration](#)).

Imagine this: it rains heavily in June for three weeks straight, prompting snow melt from the mountains. All this water flows across the landscape and eventually enters a creek. While the water traverses across the land, it runs over native grasslands and woody riparian areas that force it to slow down and seep into the ground. Now it's September, and there hasn't been rain for

two months, but the water stored in the ground from June is gradually releasing into the creek, keeping it flowing even without overhead precipitation. Within the creek, the water meanders around each bend and slows further. Perhaps it encounters a beaver dam complex, causing the water to pool for a while before trickling downstream. Despite that it hasn't rained in months and the mountain snow is long gone, the creek flows throughout the seasons.

But what if the landscape was dominated by crop fields, urban areas, roads, and other infrastructure? What if riparian areas lost woody plants due to unregulated grazing? What if the creek was straightened, removing its meanders to create more space for human developments? What if beaver populations were drastically reduced? The answer: water quickly drains off the landscape, rushes downstream, and evaporates. By September, the creek would be dry.

In the first scenario, fish and wildlife might be stressed due to the lack of rain, but the effects of drought are less severe. Human land-use decisions across the watershed—including on land, in riparian areas, and within watercourses—accumulate to impact plants, wildlife, and all facets of the broader environment. Basically: I'm the problem, it's me (we all are - [but also the solution!](#)).

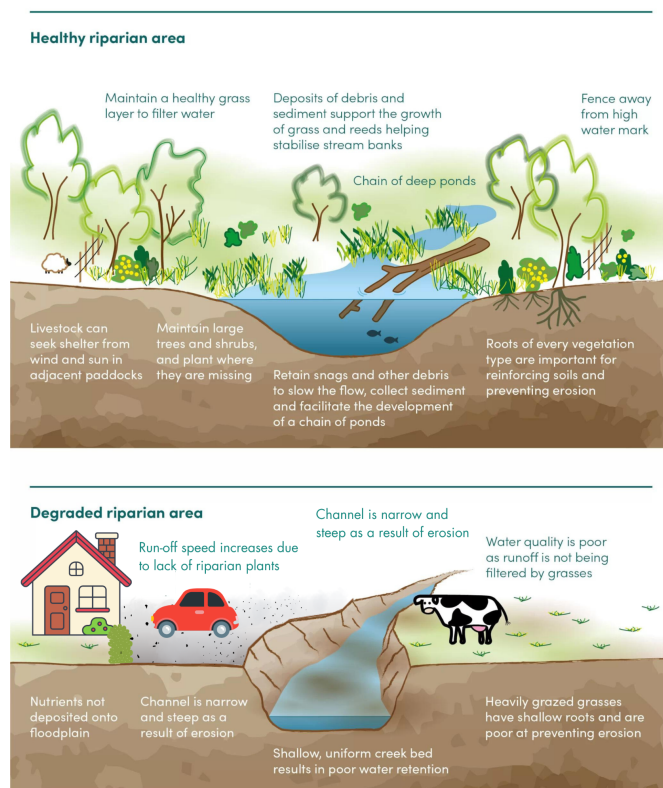


Photo caption: Management of riparian areas and the surrounding landscape can have cumulative effects on watercourses. This example focuses on potential impacts from overgrazing and residential development in riparian areas, but these are just small pieces of the cumulative puzzle influencing drought conditions. Image modified from [Sustainable Farms](#).

Water management for fish and wildlife

The water in Alberta's creeks, rivers, and reservoirs is closely monitored and managed by the Government of Alberta. In the Oldman Watershed Council's (OWC) [last installment of this blog series](#), we explored current drought conditions and how drought is managed in the province. But, do our water management plans also consider the needs of fish and wildlife?

Provincially, the Alberta [Water for Life Strategy](#) identifies healthy aquatic ecosystems as one of its three key goals for water sustainability. In 2007, the Government of Alberta also developed [Water Conservation Objectives](#) (WCOs) for each sub-basin in the South Saskatchewan River Watershed, including the Oldman River. These WCOs are designed to guide water usage, aiming to maintain sufficient water in aquatic systems for their health and sustainability, while also meeting human demands; this balance is often referred to as [environmental flows](#). In 2003, research on sustainable water level thresholds in the South Saskatchewan River Watershed was conducted under the Government of Alberta's [Environmental Flows Program](#) (EFP). The EFP study focused on key branches of the watershed, such as the Oldman River, Belly River, St. Mary River, Waterton River, and others. Experts assessed aspects like water quality, riparian vegetation, fish habitat, and channel maintenance flows to determine how much water could be diverted for human use without harming these environmental processes. Today, numerous surface water monitoring stations across the province [track water levels and flows](#), which help to issue water shortage advisories and address other water quantity concerns.

How can I help ecosystems be more resilient to drought impacts?

Above all, it is crucial to consider human impacts at the watershed level. Water retention in creeks or rivers is not just a local issue; it is the cumulative result of various factors like low precipitation, land-use changes, in-stream modifications, riparian habitat loss, and more, across the entire watershed. To effectively mitigate drought impacts, we must extend our focus beyond the creek bed and consider the entire ecosystem.

In urban areas, incorporating native vegetation is an excellent approach—ranging from city-level urban planning to individual residential yards. In the Bow River Watershed, the City of Calgary has spearheaded an impressive initiative with their [Renaturalization Project](#), transforming areas previously overrun by non-native plants into spaces filled with native grasses, shrubs, and wildflowers. More locally, the City of Lethbridge is undertaking notable efforts to rejuvenate cottonwood forests in the Oldman River valley. The City completed the first year of this project in 2023, where they harvested cuttings from mature cottonwood trees, rooted them, and planted them around the Helen Schuler Nature Centre and Fort Whoop-Up. We're eager to see the progress of this inspiring project!

For urban dwellers, think about integrating native plants into your yard or replacing traditional lawn grass with a [prairie urban garden](#). Such choices not only conserve water but bring numerous

other benefits, like storing carbon or providing pollinator habitat. Let's rethink our aesthetics for urban spaces: while manicured green lawns and uniform hedges are common, there's also beauty in the rustling of dry native grasses in the prairie wind, the vibrant hues of wildflowers, or the tang of sun-ripened saskatoon berries—and imagine having all of that in your own yard!

In rural settings, implementing beneficial [range and riparian management](#) practices can significantly help during droughts by preserving native vegetation and enhancing water storage. Replanting willows or cottonwoods can be an effective strategy where native vegetation has been lost. Sometimes, more comprehensive solutions are necessary, especially if a stream has become severely downcut (narrow and deep), preventing water from reaching the riparian area and supporting woody plants on the bank. In such cases, process-based approaches like beaver dam analogues can be a vital initial step in restoring natural water levels before undertaking willow or cottonwood planting. At OWC, we've had the honor of working with numerous ranchers and farmers who possess a remarkable land ethic, striving to leave the land better than they found it. In 2023, OWC collaborated directly with 21 producers on riparian restoration projects, and we're excited to continue expanding these efforts in the future!



Photo caption: Beaver dam analogues, and eventually beavers themselves, healing channel incisement (also called downcutting) and improving habitat for woody riparian species (source: [Goldfarb, 2018](#)).

Final thoughts - we are all part of the 'natural' ecosystem

With all this in mind, I invite readers to think about their actions on a cumulative watershed scale and to reflect on the myriad of organisms that inhabit the Oldman Watershed. Droughts have ebbed and flowed across the prairies for centuries, yet our actions and changes in land use can

amplify their effects. Managing water quantity for the benefit of fish and wildlife, by ensuring environmental flows, is a crucial aspect of in-stream water resource management. When it comes to land-use decisions, embracing natural infrastructure represents a resilient and sustainable response to environmental variances, such as low precipitation. We are all part of this interconnected watershed and play a role in its stewardship.



Photo caption: (a) OWC staff and volunteers planting willows on a wetland in Lethbridge County. (b) A beaver dam analogue (BDA) constructed on a dry creek. This creek was surrounded by more upland-associated woody species, like buckbrush, but willows and other riparian plants are missing; hopefully, the BDA will help retain surface water and recharge groundwater storage, eventually facilitating willow re-establishment.

To keep up to date on the drought situation visit abwater.ca, where OWC will be providing new information regularly.