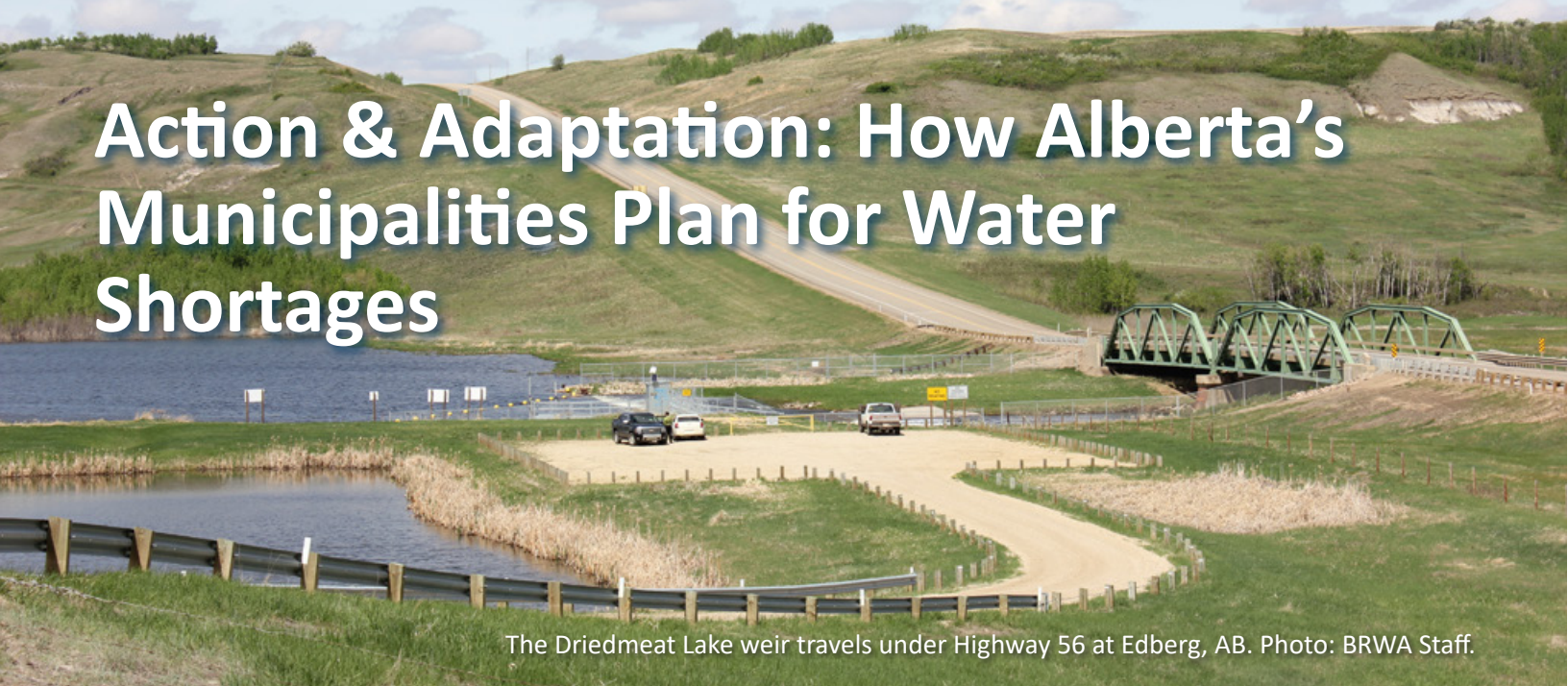


# Action & Adaptation: How Alberta's Municipalities Plan for Water Shortages



The Driedmeat Lake weir travels under Highway 56 at Edberg, AB. Photo: BRWA Staff.

As dry conditions persisted across the Alberta late into 2023, the province called on municipalities to take action. Environment and Parks Minister Rebecca Schulz wrote a frank letter to municipal leaders about our current drought and urged them to undertake four key tasks. Among these tasks, Schulz asked them to “develop a water shortage plan so your municipality is prepared to respond if water availability decreases”.

The NSWA wanted to hear from a municipality who already had completed a Water Shortage Response Plan (WSRP), so we invited City of Camrose Manager of Engineering, Jeremy Enarson, to speak at our Watershed Wednesday Webinar in early March. Enarson told us more about their WSRP, its catalyst, and some of the processes used and lessons learned by the municipality while putting it in place.

## **CAMROSE & DRIEDMEAT LAKE: GROWING CITY AND INCREASING WATER ALLOCATIONS**

Like many smaller municipalities in the eastern part of the North Saskatchewan watershed, the City of Camrose sits within a prairie-fed watershed (i.e. the Battle River) that relies on runoff and precipitation for its water supply. The city is known for its agricultural surroundings, but this city of almost 20,000 is also a hub for industry, health, and retail services to a surrounding rural population.

In 2012, the City of Camrose was approached by Cargill to build a new canola crushing plant in the region. At the same time, the City approached the Province to request an additional water license to support future City growth, as well as the proposed Cargill facility. One of the conditions for the water license being approved by the Province was that the City had to create a Water Shortage Response Plan (WSRP). With a population of approximately 19,000 residents at the time, Cargill's additional water usage would be the equivalent of an additional 3,460 rise in population.



*Camrose's water is pumped 14km north from Driedmeat Lake to the City's water treatment plant. The Cargill facility can be seen on the horizon southeast of the City. Photo: BRWA Staff.*



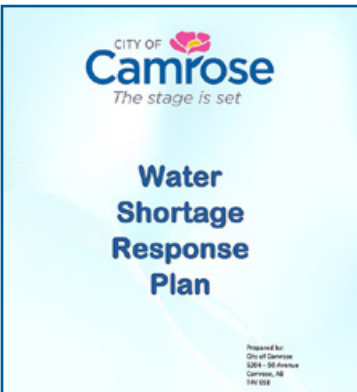


## ASSESSING RISK & PRELIMINARY CERTIFICATE

Enarson says that AEP (now EPA) hydrologist, Terry Chamulak, had already done extensive work on the Battle River prior to being hired for the study of Driedmeat Lake. Chamulak’s reports looked at various scenarios in which the City of Camrose could increase its future water demand due to growth and still allow for the water withdrawals needed for the Cargill facility. Enarson says, “At that time, the City resumed discussions with the Province for a prior application for an additional water license.” He adds that although the discussions were positive, “the Province noted that this newest license would be quite junior and would likely have some significant water restrictions imposed on it”. The City was eventually granted a Preliminary Certificate, which Enarson describes as a “promissory note for the new license”.

The temporary license accounted for a population increase to 34,000 in Camrose, while still providing enough water for Cargill’s needs. Before the preliminary certificate would roll into the new license, however, there were two main conditions the City needed to satisfy:

1. Construction of a pump station to push the additional raw water from Driedmeat Lake to the City (which was constructed between 2014 and 2016).
2. Development of a water shortage response plan, which is a document that would help the City prepare for potential water shortages in the future in the event of a prolonged drought.



Top: New pump station finished in 2016. Below: Camrose’s Water Shortage Response Plan.

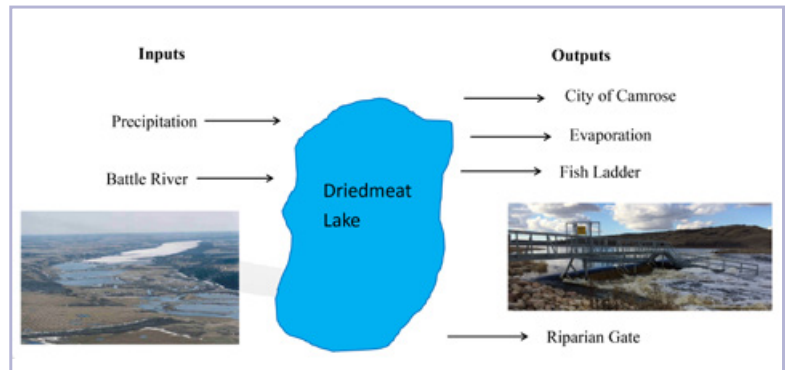
## WATER SHORTAGES: MAKING A PLAN

The main purpose of a Water Shortage Response Plan (WSRP) is to help municipalities consider the possible risks and options needed to deal effectively with drought or problems with water availability.

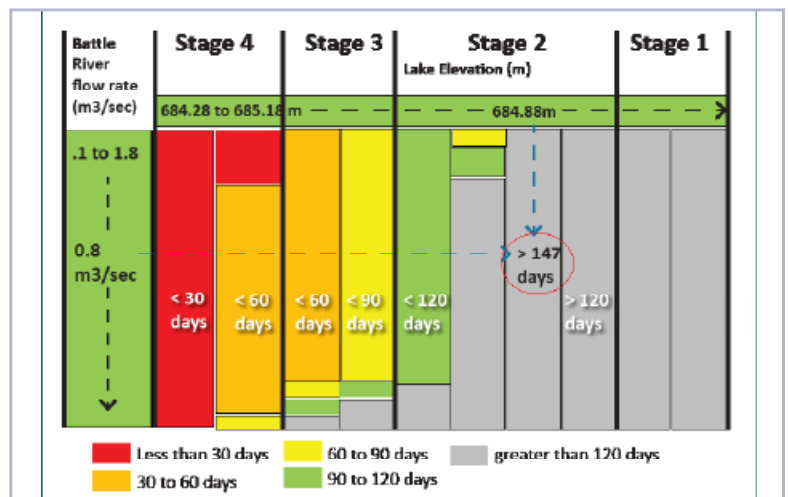
Unlike bigger municipalities, Enarson points out that the City of Camrose has limited capacity for extensive computer models or hiring outside consultants. Enarson says, “Rather than using a more sophisticated computer model, we felt that an Microsoft Excel-based approach that models the flows going into and out of Driedmeat Lake would provide a sufficient level of accuracy for the purpose that we needed.”

Enarson says that of all of the factors that impact the amount of water available in the lake, the three main factors that impact the outcome of the spreadsheet are: the City’s water use, the elevation in the lake, and the flow entering the lake from the Battle River. He says that based on these factors, the City is able calculate the amount of water remaining in the lake, as well as the rate at which the lake is emptying (or filling). Enarson says, “Using these estimates, we can determine when the City should potentially move from Stage 1 of the plan into one of the more restrictive stages.”

The City’s four “distinct water conservation stages” are mainly derived from the data, but ultimately give the City (through the delegated authority given to the City Manager) the right to guide and declare



Schematic of Driedmeat Lake inputs and outputs. Inputs: upstream flow from the Battle River and precipitation. Outputs: withdrawals, evaporation and downstream flow through the fish ladder and riparian gate (installed on the weir by the province in 2009). Slide: Jeremy Enarson.



The above spreadsheet is a simplified version of the one created by the City, which considers 3 main factors: The flow of the Battle River as it enters Driedmeat Lake, the elevation of Driedmeat Lake, and municipal demand. Based on Jeremy Enarson’s slide.

what stage the city is in. Other considerations would be technical issues, season, forecast, among other variables.

In the event that the numbers hit the “zero day” mark, Enarson notes that this wouldn’t mean the lake was empty. Instead, he says it indicates the point when “the Province would effectively cut off the City’s fourth and newest water license, and we would be limited to the water allocation outlined in the 3 older licenses”.

Stages	Available Water Storage	Water Reduction Target	Restrictions
1 - Watch	> 120 days	0 - 5%	Increasing mandatory water restrictions (limits to lawn watering, sprinklers and water features, car washing, golf course greens, cleaning of buildings or ground surfaces)
2 - Warning	60 - 120 days	5 - 15%	
3 - Critical	30 - 60 days	15 - 25%	
4 - Emergency	< 30 days	25 - 33%	

*The 4 Stages of Camrose’s Water Shortage Response Plan with examples of mandatory water restrictions. Based on slide from Jeremy Enarson.*

Only twice has the City moved to one of the higher stages of the WSRP. The September 2017 event occurred just as “temperatures were already cooling off and outdoor water use was declining, [so] the City Manager deemed that there was limited value in moving into Stage 2 of the Plan,” according to Enarson . Enarson adds that many of the restrictions were for outdoor use, so would have had little impact given grass and other plants were already moving into dormancy. However, Enarson explains that when water levels within Driedmeat Lake declined in late summer 2018, “the City Manager authorized the City to move into Stage 2 of the WSRP.” The Stage Two (Warning Stage) restrictions were relatively short lived, but “remained in effect until winter freeze-up.”

Plentiful spring runoff and seasonal rainfall allowed the City to move back into Stage 1 the following spring (2019) and the City has remained there until the present time.

### MOVING FORWARD: ADAPTING THE PLAN



*Driedmeat Lake. Photo credit: BRWA Staff.*

Enarson points out that the City’s WSRP was created four years before the Alberta Water Council released its guide “Building Resiliency to Multi-Year Drought in Alberta” in 2021. With that in mind, he says that some aspects for an updated review to the plan would consider “multi-year droughts, water sharing agreements, and expanding some of the water restrictions.”

### WHERE TO START

Hydrologist Terry Chamulak says that municipalities can hire a “qualified water supply specialist such as a hydrology consultant” to address the key objectives of their WSRP. He says these may include:

- Assessing the municipal water supply risk and impacts during a low flow year or multi-year drought [physical data collection]
- Identifying monitoring thresholds that would trigger a response plan implementation and identify contingencies
- Creating recommendations to improve the available water supply and reduce risk such as adding off-site storage [water use reduction and alternative sources]

To learn more about steps to take when preparing a WSRP, see the links below.

#### LINKS

Read EPA Minister Rebecca Schulz’s letter to Alberta Municipal Leaders:

<https://www.alberta.ca/system/files/epa-letter-to-elected-municipal-leaders-from-minister-schulz.pdf>

Watch Jeremy Enarson’s Presentation from March 6, 2024:

<https://www.youtube.com/watch?v=8Bge2F30sok>

Alberta Water Council’s info on multi-year drought:

<https://www.awchome.ca/projects/building-resiliency-multi-year-drought-6/>

2021 Building Resiliency to Multi-Year Drought in Alberta

[https://www.awchome.ca/\\_projectdocs/?file=67689fe0c3c-4df3e](https://www.awchome.ca/_projectdocs/?file=67689fe0c3c-4df3e)