



**BRBC**

# Preserving Our Lifeline

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the waters of the bow river basin

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## BRBC at the 2023 Kainai Ecosystem Protection Association Summit

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On July 19<sup>th</sup> – 21<sup>st</sup>, along with fellow BRBC staff and volunteers, I attended the 8<sup>th</sup> annual Kainai Ecosystem Protection Association (KEPA) Summit on the Blood Reserve in Southern Alberta.

Our participation in this unique opportunity was made possible through the generous support of the BRBC. Why did the BRBC support our attendance? The reasons became very clear as we settled into an immersive three days of learning about Indigenous culture and conservation efforts from the Kainai Nation (Blood Tribe). From speeches and prayers to informal chats and ceremonial dance, each day was rich in tradition and sharing. We travelled to Standoff (Alberta), Choteau (Montana), and Waterton Lakes National Park, where we learned about Blackfoot ways of knowing, history and values.

As co-chair of the [BRBC Science Committee](#), I've been a part of



BRBC members and staff at the KEPA Summit (left to right: Flora Giesbrecht, Brooke Kapeller, Pablo Pina, Wendell Koning). Not pictured but also in attendance for part of the summit was BRBC Board Chair, Steve Meadows.

many discussions on how the committee might authentically connect with Indigenous Peoples and incorporate traditional knowledge in the work that we do. We discussed, for example, extending meeting invitations to Indigenous representatives or asking them to present to us in some way.

As the three days of the summit unfolded, my mindset on this began to shift. I realized it is not about extending invitations to

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“our” meetings, where the onus of effort is placed on Indigenous people to respond, prepare for, and attend a meeting. Instead, it is about us making the time and effort to visit traditional territories, to be together and learn together. The KEPA Summit was an opportunity for us to do exactly that.

### Day One

We arrived at the new and awe-inspiring [Mi'kai'sto Red Crow Community College](#) on the Blood Reserve land. Along with opening ceremonies and a pipe offering, we heard Blackfoot songs and prayers. The Chief and Elders spoke, a panel discussion on stories of the Blackfoot Confederacy was held, and we were welcomed.

Following a delicious fry bread taco lunch we learned about the [Kainai linnii Rematriation Project](#), which is reintroducing bison (linnii) back to their ancestral grasslands. This is significant both culturally and environmentally – important to both the Kainai people and their way of life, and to the native grasslands. For centuries, bison were a keystone species on the land; their intermittent grazing supported plant diversity and, subsequently, animal diversity (e.g., there was a greater diversity of bird species during the time of the buffalo). Expansive woody plant species were kept in check, allowing a range of grasses to flourish. The day's learnings also included an introduction to various media on the Kainai, [Blackfoot and Blackfeet](#) nations.

### Day Two

Blood Reserve site tours were offered to summit participants. One tour was to a future bison paddock at the north end of the Reserve. There, participants gained a deeper appreciation of the bison's importance to the landscape. A walk with Justin Bruised Head revealed how native plants are used by the Blackfoot people. Following lunch, tour members met Api'soomahka (William Singer III) and were welcomed to [Naapi's Garden](#). Api'soomahka shared his work on medicines and cultivation of native plants as folks walked among the grasses and forbs.

The tour I opted to join this day included a drive down to Choteau, Montana, where we were met by area members of the Blackfeet Nation. From there, after just over an hour's travel, we arrived at their traditional territory. With the Rocky Mountains as our backdrop, we spent the day on land stewarded by members of the Blackfeet Nation since time immemorial. We viewed teepee rings left by previous generations, buffalo jumps, and the cairns built to direct movement and eventually stampede the buffalo over the buffalo jumps. These cairns were built and used for millennia – even before horses were introduced! We absorbed as much as we could through listening, discussing, and participating in prayers and a tobacco ceremony. In the



Sitting with Mike Bruised Head in Montana. Photo: Wendell Koning.

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distance, an extensive herd of buffalo moved past us – and while these were domestic buffalo, they were impressive nonetheless! While this land is no longer Blackfeet Reserve land, the land remains traditional territory and we learned that there are positive interactions between the Blackfeet Nation and current landowners. It was a day to soak up the rangeland experience and pre-settler ways of life on traditional territory. Do I remember facts and figures from the day? Some. More important, as I walked, observed and listened, were the insights I gained from a culture that has long respected the land.

Day two in Standoff came to a close with a traditional feast, live music and dancing!

### Day Three

On this day, which was also [National Indigenous Peoples Day](#), we gathered in the Town of Waterton, situated within [Waterton-Glacier International Peace Park](#). In the Blackfoot language, Paahtómahksikimi (BUCK-toe-MOCK-sick-ih-mee) is the traditional name for Waterton Lake and means the inner sacred lake within the mountains. The day began with presentations on nature therapy; local archaeology and Indigenous artifacts (e.g., arrowheads and ancient cooking tools); and University of Montana research on plants, animals, and traditional foods of the Blackfeet.

During the day, we were privileged to be able to attend a



KEPA Summit attendees participating in a Round Dance to celebrate the renaming of Vimy Peak along the lakeshore in Waterton National Park. Photo: Wendell Koning.

reclaiming ceremony of Vimy Peak, a very impressive mountain that was named after the battle for Vimy Ridge in WWI (the Canadian army was pivotal in securing the ridge). As part of this reclaiming, the mountain was renamed Crow Chief Mountain, after a Blackfoot soldier who fought at Vimy Ridge. The mountain continues to commemorate the battle at Vimy Ridge, but now also serves to honour this Blackfoot soldier and acknowledges the service of Indigenous Peoples in both world wars. Notably, despite such service, Indigenous Peoples at that time were not allowed to vote and were confined to reserves unless given special permission by settler government representatives.

At the end of the reclaiming ceremony, we participated in a Round Dance with members of the

Crow Chief family, the Chief, many Parks Canada staff, and all KEPA Summit attendees. Before parting ways on this final day, we enjoyed a traditional feast of bison stew, bannock, Saskatoon berries, and berry soup. We were well fed over the three days!

This fall I will continue my role as co-chair of the BRBC Science Committee with a new appreciation and understanding of Blackfoot culture and conservation efforts in Southern Alberta. This experience has shown me how it is possible to learn and share with Indigenous Peoples in authentic and meaningful ways, and across common interests like land stewardship. I look forward to attending the KEPA Summit again next year, and hope that many more members of the BRBC will join me.

# Atmospheric Rivers 101

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In 2021, British Columbia's Fraser Valley areas of Hope, Merritt and Princeton were severely affected by an atmospheric river weather system. It flowed through the air from the tropics of the Pacific Ocean and across the southwest corner of the province over a period of two days. It brought with it strong winds and heavy rains, and caused widespread flooding and landslides, resulting in property damage, loss of livestock, injuries, and one death.

What is an atmospheric river? An atmospheric river is a band of warm, moisture-laden air many hundreds of kilometres long and hundreds of kilometres wide that borders a large cyclonic low-pressure system. Atmospheric rivers are known to follow preferential aerial pathways of moisture as they cross over vast regions, regardless of jurisdictions or topographic watersheds. Upwind landforms and activities govern evapotranspiration. This is the moisture input given to atmospheric river systems that can influence precipitation downwind via atmospheric circulation. At the same time, reforestation can also enhance water availability through these atmospheric connections. Through the hydrological cycle, this aerial influence can affect the quantity of surface water and groundwater, and thus it can impact water availability in a region.

How far can an atmospheric river travel? Some atmospheric rivers

travel long distances from their points of origin. For example, South America's Amazon region provides moisture as far away as the Midwestern U.S., which receives 50 per cent of its rainfall from water evaporating in the Amazon basin. China is also affected by a very high potential for altered precipitation patterns, which are driven by upwind land-use and landscape features as far away as eastern Europe and the jungles of Southeast Asia.

When atmospheric rivers fail to materialize, droughts often follow. Forest fires present an example of an upwind landscape change that can affect atmospheric rivers. Soils in forested landscapes typically become hydrophobic (i.e., they repel water) after severe fires, which can then impact the overall hydrological cycle.

In addition, there is a recent study from the National Oceanic and Atmospheric Administration

(NOAA) using data generated by regional climate models and published in the journal, *Climate Dynamics*, which suggests that climate change will likely alter atmospheric rivers in ways that will make managing water more difficult. "These high-resolution simulations showed something we hadn't seen before, which was decreased future precipitation amounts across many mountainous regions of the western United States," says lead author Mimi Hughes, a research scientist in NOAA's Physical Sciences Laboratory.

As more weather events are influenced by atmospheric river systems, we can expect to see more studies added to this growing meteorological field.

For more information and background reports/reference materials, please contact the author at [s.constance@toxserv.com](mailto:s.constance@toxserv.com).



# The South Saskatchewan River Operational Model: A 15-Year Collaborative Journey

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The South Saskatchewan River Basin (SSRB) is vital for Alberta's environmental, social and economic viability. This river basin supports municipalities, manufacturers, tourism, resource extraction and processing, and agriculture. The SSRB encompasses four sub-basins (Figure 1): the Bow River sub-basin, the Oldman River sub-basin, the Red Deer River sub-basin and the South Saskatchewan River sub-basin. Overall, it represents a total area of 112,000 km<sup>2</sup> and supports approximately 1.88 million Albertans.

Water use in the SSRB is carefully managed to ensure water needs are met while maintaining the ecological health of the river system. Sustainable population growth and economic development in the SSRB requires balancing people's needs with the needs of the environment, within the context of changing water flows due to a changing climate. It is critical for water users, water managers, and decision makers to understand how development decisions may impact water availability and to identify opportunities for better water management within the basin.

The South Saskatchewan River Operational Model (SSROM) was developed to enable users to examine and assess strategies for

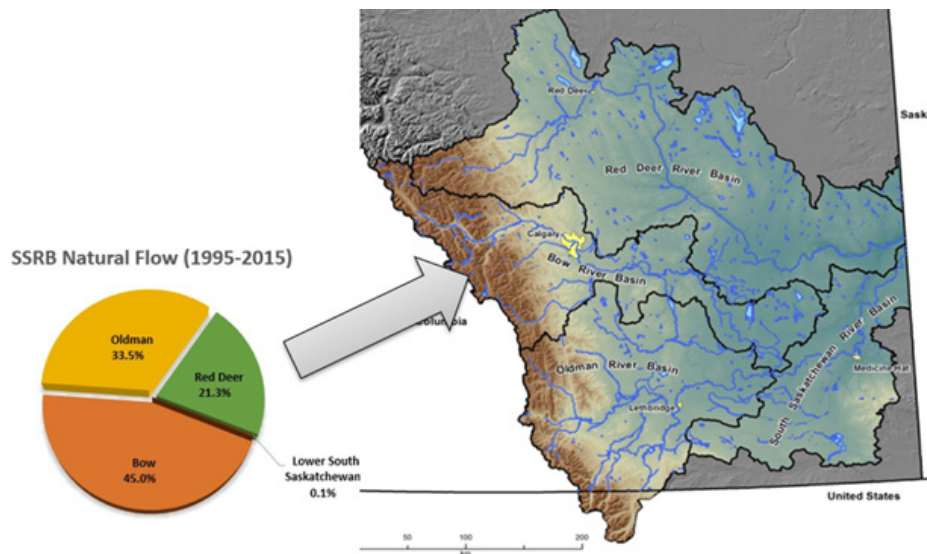


Figure 1: South Saskatchewan River Basin, including natural flow by sub-basin. Image: WaterSMART.

supporting continued sustainable development, while adapting to climate variability in the basin. SSROM provides a comprehensive view of the impacts of adaptation strategies across the entire SSRB, rather than in individual watersheds or sub-basins.

SSROM is a mass-balance model built on [Hazen and Sawyer's OASIS software](#), a water resources modelling platform used for planning exercises, which integrates hydrology (developed in the [RAVEN](#) framework), physical characteristics, and the operating rules of the system itself. The model incorporates Government of Alberta (GoA) licence data from the Water Resources Management Model.

Where possible, large municipalities, irrigation districts and infrastructure operators

directly provided data for incorporation into the SSROM. The model is intended to evaluate hypothetical scenarios, such as new infrastructure projects or changes to basin flow. Its "base case" reflects infrastructure and operations as they exist in the SSRB today, providing a baseline for comparing different modelling scenarios.

### *What is collaborative modelling?*

Watershed management and climate adaptation issues are complex and cannot be appropriately addressed by a single initiative or sector, making collaboration essential. To enable collaboration, the SSROM was developed using the

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Computer Aided Negotiation collaborative process and was designed to engage diverse groups of participants in water management and utilization. The group that is engaged in the collaborative work using SSROM has expanded over the past 15 years to include representation from Watershed Planning and Advisory Councils, municipalities, provincial government, non-governmental organizations, industry, agriculture, and Indigenous rights holders.

The use of this collaborative process allows a wide range of participants to bring forward their unique knowledge, advice, insights and datasets, in turn producing active conversations regarding potential adaptations to allow for continued development and growth in the SSRB. The process does not seek to achieve consensus, but to explore practical strategies for water management based on the

best available information. This consequently provides a platform for participants to communicate and build relationships, while respecting the views and opinions of others. By bringing together knowledgeable and experienced water managers and users in the basin, the entire collaborative group learns through first-hand experience the impacts of water management decisions.

#### History of SSROM

SSROM is an amalgamation of over 15 years of collaborative modelling in the SSRB, facilitated by WaterSMART Solutions Ltd. (WaterSMART), Hazen and Sawyer (formerly HydroLogics), and MacDonald Hydrology Consultants Ltd.

Development of the SSROM began in 2005 as an academic exercise to assess options and strategies for the Bow River

sub-basin. This work led to the development of the Bow River Operational Model (BROM) in 2010 and a collaborative exercise to assess the impacts of drought in the Bow River sub-basin. Building on this work and seeing the value in applying this collaborative modelling process to the creation of other water management decision support tools, the Oldman-South Saskatchewan River Operational Model (OSSROM) was developed between 2012 and 2013, followed by the Red Deer River Operational Model (RDROM) in 2014. The initial work primarily focused on understanding the basin under drought conditions; however, the Bow River basin floods in 2013 triggered a significant effort to transform the existing models from low-flow to high-flow conditions, along with an adjustment of the time scales to allow for these flood conditions to be assessed in a meaningful way. This work was completed in approximately four months, highlighting the value of the existing relationships that had been established through the previous collaborative processes.

In 2015, the individual sub-basin models were integrated into SSROM, covering the entire SSRB. This combined model was then used by the collaborative group, facilitated by WaterSMART, to develop the [Adaptation Roadmap for Sustainable Water Management in the SSRB](#) (Roadmap). This Roadmap, published in January 2016, put forth numerous adaptation strategies for the SSRB

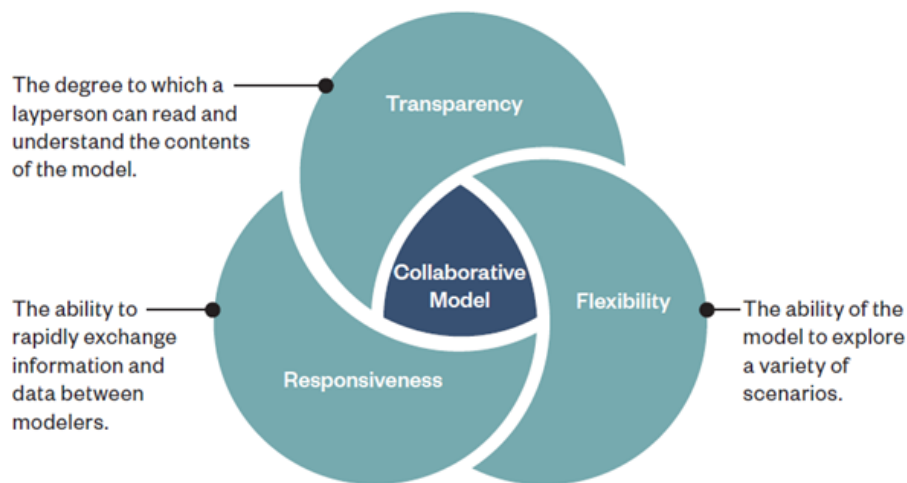


Figure 2: Requirements for Collaborative Modelling. Image: Hazen and Sawyer.

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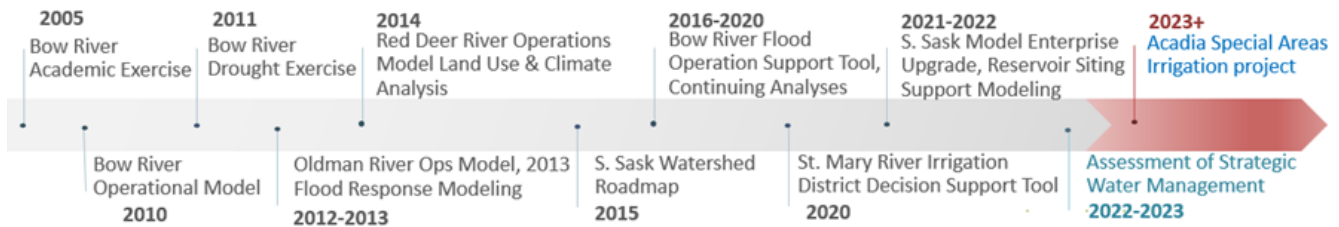


Figure 3: SSROM Development Timeline. Image: WaterSMART.

that were deemed beneficial for water management and climate adaptation. These strategies included operational changes, water sharing agreements, reservoir expansions, and new on-stream and off-stream reservoirs. As of 2023, over twenty of the adaptation strategies put forth in the Roadmap have been implemented or are currently in progress.

Projects successfully implemented include:

- The Springbank SRI dam project, which is currently under construction and provides protection to the city of Calgary from flooding on the Elbow River.
- The agreement between GoA and TransAlta to draw down the Ghost Reservoir during flood season to protect downstream communities.
- Raising winter off-stream reservoir levels in irrigation districts, which allows more water to remain in the river during key times of the year.
- Additional voluntary water sharing agreements between irrigation districts to help protect food supplies during droughts.

Projects that are currently progressing include:

- The Chin Reservoir Expansion Project in the St. Mary River Irrigation District, to create an additional 103,500 acre-feet of storage using only an additional 40,000 acres, not counting acres from other efficiency gains.
- The development of a new irrigation project in the Acadia and Special Areas region to create 108,000 acres of irrigable land.
- The exploration of a new storage reservoir in the Bow River sub-basin, at Eyremore.

### 2022 SSROM Update

Over the last two years, SSROM has undergone a comprehensive update to ensure that the model is accurately representing the SSRB as it currently operates. The update includes migrating onto updated OASIS software and completing a review and update of all modeling data. This updated data includes water licences, assets and operational changes (including some recommended in the Roadmap). This resulted in a new “base case” for

comparisons of future operational or infrastructure improvements, current as of the time of development, which will be made publicly available via the Alberta WaterPortal in 2023.

### Exploring Opportunities: Sustainable Management of Water in the SSRB

The success of the 2016 Roadmap reflects the dedication of water users in the SSRB to progress strategies that promote responsible water management and sustainable economic growth in the basin. As growth occurs and new data becomes available, it will be necessary to revisit and update the Roadmap to identify additional water management projects that can ensure long-term water security for our communities. Therefore, a new collaborative project is underway to identify further water management strategies using updated data and considering changes in the basin in recent years. This project aims to build on the successes of the previous Roadmap and continue developing solutions to ensure

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sustainable management of our water resources.

The 2023 Assessment of Strategic Water Management Project officially commenced in December 2022, convened by the Alberta Irrigation Districts Association. The goal of this project is to identify and assess water management adaptations in the SSRB that will support continued economic development in the face of a changing climate. The collaborative group is working to assess promising water management adaptation options within the lens of basin development, these options will also be assessed under climate change scenarios (including those recently developed by the GoA). Including a selection of climate change scenarios will allow for a more fulsome assessment of options to determine the viability

of suggested adaptations under unknown future conditions.

Participants gathered to discuss evaluation (or performance) metrics to judge the performance of alternative operations or infrastructure, based on their desired outcomes. Participants provided insight and knowledge of the basin to identify projects and adaptations that would be of interest.

Collaborative Working Group meetings were held in February, April and July 2023 with adaptation options identified and modelled by the project team. Efforts are progressing on testing the adaptation options against future climate scenarios in preparation for a future Collaborative Working Group meeting.

The project is expected to last throughout the 2023 calendar year and will culminate in an updated water management roadmap for the SSRB. It is funded by Alberta Innovates, the Canadian Agricultural Partnership administered by the GoA, Results Driven Agricultural Research, the Irrigation Districts, municipalities and various industry partners. Over thirty-five entities are collaborating on this project. Collaborators include: WPACs, municipalities, irrigation districts, NGOs, economic development organizations, industry, and First Nations communities.

Please contact Alison Regan ([alison.regan@watersmartsolutions.ca](mailto:alison.regan@watersmartsolutions.ca)) for background reports and more information on this project.

## My Summer as a BRBC Watershed Planning GIS Technician

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I'm Alejandro Caguao, and I spent this past summer working as a Geographic Information Systems (GIS) technician with the Bow River Basin Council (BRBC). This opportunity came through a college connection and offered an exciting prospect to apply my GIS skills. Seeking a rewarding position where I could utilize my expertise, the BRBC was a

perfect fit. An additional benefit was being able to delve into water management – an industry I had been interested in even prior to joining the BRBC.

While I had some reservations prior to the interview (including the challenge of actually locating the office), the experience turned out to be engaging and informative. My interview with Mike Murray and Brooke Kapeller was a learning experience in and of itself, and highlighted the

potential enjoyment the job could bring. The moment I received the call confirming my selection, my excitement soared as I envisioned myself contributing to the State of the Watershed Report.

My first month was a blend of networking, newfound knowledge, and invigorating meetings and events. As I gained a deeper understanding the BRBC's identity

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and work, I was astounded by the high level of collaboration it fostered among diverse parties. The first week was especially memorable as I was introduced to the BRBC team, Board members and partners. During this time, I was assigned to write an article about the Science Forum held at SAIT, culminating in a convivial gathering at Loco Lou's. The Science Forum brought together an array of partners who have conducted studies within the Bow Basin, offering further insight into the BRBC's role in uniting government entities, dedicated individuals, universities, and retirees passionate about the basin's welfare. The first week concluded with a welcoming lunch with the Board, where I gained valuable insights into water management and also practiced my Spanish with Pablo Pina! My understanding of water management, a complex subject with multifaceted considerations, increased with each meeting and event I attended, as I learned new concepts and gained an appreciation for the extensive efforts required to manage water within such a vast watershed.

Undoubtedly, the highlight of the summer was crafting online content for the Upper Fish Creek State of the Watershed Report. This endeavor involved using ArcGIS Online Experience Builder, a software tool boasting remarkable capabilities for visualizing and presenting geographical data. The project incorporated knowledge gained during my studies and greatly expanded my GIS skills. My contribution encompassed researching open data from



Bow Glacier hike in August. Left to right: Mike Murray, Alejandro Cagua, and Brooke Kapeller with her dog Ellie.

diverse government sources, the Alberta Biodiversity Monitoring Institute, and industry. Extensive coding was required to automate GIS workflows, generating diverse maps for both the Upper Fish Creek report and the State of the Watershed report. Amid report creation, I also gained experience manipulating online images and logos, often using Photoshop.

Volunteer activities also played a role in my summer experience, allowing me to represent the BRBC at various events. One standout event was the Mayor's Environmental Expo, where I had the privilege of enlightening enthusiastic Junior High students about watershed work conducted by the BRBC. The Elbow River Watershed Partnership's AGM bus tour was another highlight, affording staff and partners

insights into numerous water management projects in the Elbow River Watershed.

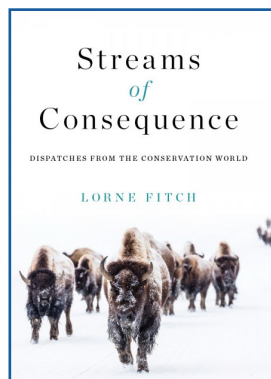
This summer delivered valuable lessons and opportunities that will stay with me throughout my career journey. Collaborating with Medini Prasai, Mike Murray, Brooke Kapeller, Alesia Cameron, Joe Fowler and Andrea Czarnecki, alongside the BRBC's Board of Directors and diverse partners, has been a true honour. This experience has equipped me with the necessary tools to excel in my field, all the while knowing I'm contributing to a fulfilling legacy for future generations. I extend my gratitude to the staff for their patience, trust, and support during my time with the BRBC. I look forward to staying involved through future committee activities and workshops.

New Book by Lorne Fitch

*Streams of Consequence*  
*Dispatches from the Conservation World*

It is with great pleasure that the BRBC brings a new book to your attention, "[Streams of Consequence](#)," by Lorne Fitch. One of Alberta's foremost environmental conservationists and wildlife biologists, Lorne is also renowned for his clear and compelling writing. Over many years, Lorne has championed the value of our precious natural landscapes and all that inhabit them, and encouraged many aspiring young professionals to dedicate at least some of their time to local environmental groups and causes, including a few BRBC members. In this book, he presents a collection of stories rooted in Alberta and anchored by his deep understanding of biodiversity and natural processes. If you or someone you know is looking for some inspirational reading, this is the book for you!

The book is currently available for pre-order and will be on bookstore shelves October 17<sup>th</sup>. Proceeds will be donated to environmental causes.



## BRBC Quarterly Educational and Networking Forum

Triwood Community Association  
2244 Chicoutimi Drive, NW  
Calgary

September 13<sup>th</sup>, 9:00 am – 3:00 pm  
(8:30 am, sign in)

### FORUM SPEAKERS

**Kenneth Clogg-Wright, CSA Group**  
Standards-based Solutions for Supporting Safe and Resilient Communities

**Christine O'Grady**  
**Advancing Canadian Water Assets**  
Guidance Framework for Pilot Testing of Industrial Water Reuse Technologies (WaterSMART/ACWA Report)

**Daniel Struthers, Parks Canada**  
Habitat Restoration and Reintroduction of Westslope Cutthroat Trout to Cascade Creek in Banff National Park

**Ken Coles, Farming Smarter**  
Farming Smarter, What Canada Needs to Sustain its Farms

**Alesia Cameron, BRBC**  
Climate Adaptation in the Bow Basin

**Steve Herman, WaterSMART**  
Study of Water Impacts of Hydrogen Development in Alberta

To register, please visit [this link](#).

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The opinions expressed in the articles in this newsletter are those of the author/s and do not necessarily reflect the views of the BRBC.



If you would like to submit an article for upcoming newsletters, please contact Andrea Czarnecki at: [aczarnecki@brbc.ab.ca](mailto:aczarnecki@brbc.ab.ca)