



Beaver River Watershed Alliance

About Us and Our Projects

“The Little Watershed That Can...”

March 15, 2011

Agri-Environmental Partnerships of Alberta
AgForum, Nisku, AB



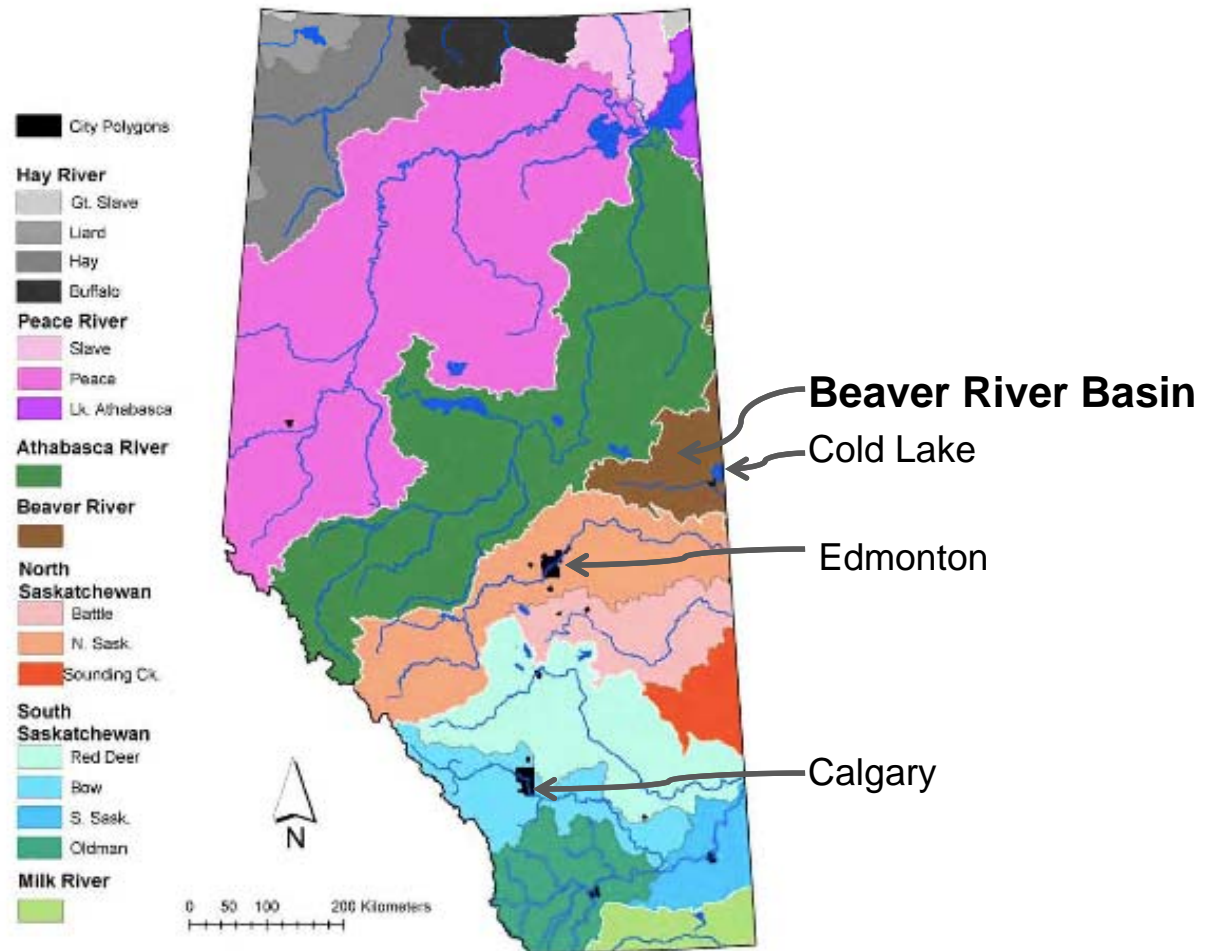
Overview



- Beaver River Watershed - Geography
- Beaver River Watershed Alliance
- BRWA Guiding Principles
- BRWA Projects and Activities
- Current BRWA Partnerships

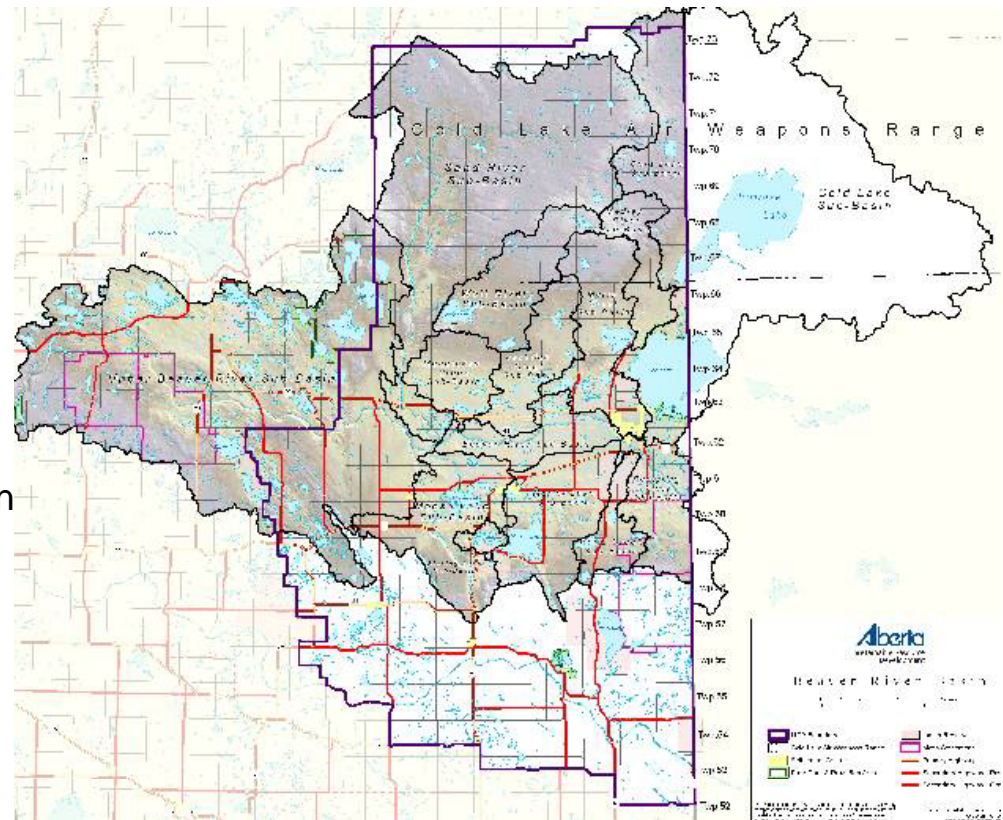
Beaver River Watershed - AB

Watersheds of Alberta



Beaver River Watershed - Profile

- Watershed area: ~ 22,000 km²
- Population: ~38,000
- Major urban centres: Bonnyville (5,600) and Cold Lake (12,000)
- 4 counties, 4 Summer Villages, 1 MD, 1 Town, 1 City, 1 Village, 14 Hamlets
- 3 Métis Settlements and 4 First Nation Reserves
- Beaver River length: 491km (307 mi)
- Originates from Beaver Lake near the town of Lac La Biche and extends eastward towards Saskatchewan emptying into the Hudson's Bay at Churchill.
- Average discharge: 653,000,000 m³/year (at AB/SK border)
- Main tributaries:
 - Amisk (Little Beaver) River
 - Moose Lake River
 - Sand River
- Main economic activities include:
 - Agriculture
 - Oil and Gas
 - Recreation



- 2000+ lakes including lakes within the Lakeland Provincial Recreation Area (e.g. Touchwood, Pinehurst, Seibert, Spencer) while the lower part includes lakes within the Cold Lake Air Weapons Range (e.g. Primrose Lake)
- 12 Water Stewardship Groups, some with Society Status and others without



Beaver River Watershed Alliance



- The BRWA is a Watershed Planning and Advisory Council (WPAC) and an independent standing committee of the Lakeland Industry & Community Association (LICA)
- Our main purpose is to develop an ***Integrated Watershed Management Plan***
 - This is accomplished in part by the completion of a State of the Watershed Report, which has been completed for the lower part of the basin – ***Cold Lake Beaver River State of the Watershed Report*** (2006)
- We, along with nine other provincial WPACs, are mandated by the Government of Alberta to carry out the three goals of ***Water for Life: Alberta's Strategy for Sustainability*** (2003):
 1. Healthy aquatic ecosystems
 2. Safe, secure drinking water supply
 3. Reliable, quality water supplies for a sustainable economy



BRWA Guiding Principles



- We will integrate the *Water for Life* goals with the following Guiding Principles:
- **Vision:**
'The Beaver River Watershed is ecologically healthy and environmentally sustainable.'
- **Mission:**
'The Beaver River Watershed Alliance will maintain or improve the ecology of the Beaver River Watershed while respecting the diverse values of the watershed community. This will be achieved through broad community engagement, sound scientific study, education, and the support of implementing sustainable water management and land use practices.'

BRWA Process

- The BRWA operates on a consensus model (rather than by vote)
 - *Any member has the ability to block consensus until a mutually agreeable decision is reached*



- Our role is to act in an *advisory capacity* and not to advocate for specific issues



BRWA Steering Committee Structure

- BRWA steering committee is an independent, standing committee of LICA, with participation from both LICA and non-LICA members
- BRWA steering committee comprises 17 seats:

Elected

Agriculture
Community¹ (x 2 seats)
Forestry
Non Gov't Organization
Water Stewardship Group

Appointed

Alberta Environment
Federal Government
First Nations
Health Authority
Lakeland Industry & Community Assn.
Métis
Oil and Gas (x 2 seats)
Rural Municipal Government
Urban Municipal Government
Provincial Government

¹ individuals who reside or own property within the Beaver River basin



2010-11 Steering Committee



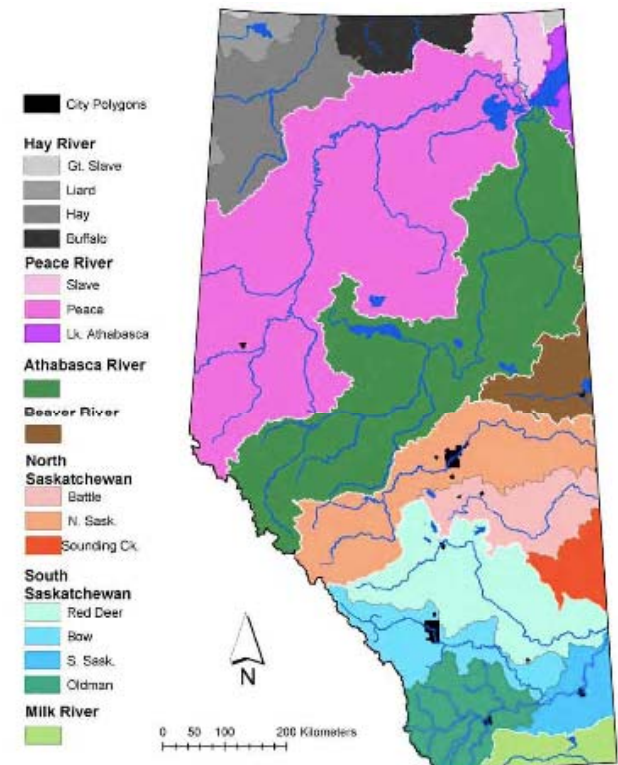
- **Gordon Graves** and **Bill Fox** – Agriculture
- **Joe Prusak** – Alberta Environment (Northern Region)
- **Ajaz Quraishi** and **Harold Ross** – Community I
- **Delano Tolley** – Community II
- **Keith Schick** – Federal Government
- **tba** and **Irvin Kehewin** – First Nations
- **Adolph Porcina** - Forestry
- **Kathryn Wiebe** and **Robert Deresh** – Lakeland Industry & Community Association
- **Susan Dahlseide** – Métis
- **Kellie Nichiporik** – Non-Government Organization
- **Roxane Bretzlaff** and **Brad Braun** – Oil and Gas I
- **Stephanie Lundgreen-Nielsen** and **Monte Moore** – Oil and Gas II
- **Jordan Walker** and **Dwayne Latty** – Provincial Government
- **Don Sinclair** and **Mike Krywiak** – Rural Municipal Government
- **Dave Lozinski** – Urban Municipal Government
- **Georges Binette** and **Kay Lee Kinch** – Watershed Stewardship Group

BRWA and other WPACs

- Currently there are ten WPACs in Alberta:

- Athabasca Watershed Council (2009)
- Battle River Watershed Alliance (2007)
- Beaver River Watershed Alliance (2007)
- Bow River Basin Council (2003?)
- Lesser Slave Lake Watershed Council (2008)
- Milk River Watershed Council Canada (2005)
- North Saskatchewan Alliance (2005)
- Oldman Basin Council (2004)
- Red Deer Watershed Alliance (2005)
- South East Watershed Alliance (2008)
- Peace River is forming a WPAC

Watersheds of Alberta



- Each are at different stages of developing *State of the Watershed Reporting* and *Integrated Watershed Management Plans*



WPACS, WSGs and AWC??!



Three partnerships are identified in the *Water for Life Strategy*:

- Provincial Water Advisory Council (PWAC)
 - Alberta Water Council (AWC)
 - examines provincial-scale water policy issues and provide solutions or recommendations for improvement
- Watershed Planning and Advisory Councils (WPACs)
 - evaluate and undertake planning on a watershed scale
- Watershed Stewardship Groups
 - Encompass all groups and individuals undertaking local, on the ground actions to improve their local water body or watershed

All complement one another in their initiatives and share information, but there is no reporting relationship.



WSGs in the Beaver River Basin



There are about 12 known WSGs in the watershed and include:

- Crane Lake Advisory and Stewardship Society (CLASS)
- Ernestina Lake Society
- Kehewin Lake
- Lac La Biche County watershed planning section
- Marie Lake Air and Watershed Society (MLAWS)
- Minnie Lake Conservation Society (MLCS)
- Missawawi Lake Homeowners' Association (MLHA)
- Moose Lake Watershed Society (MLWS)
- Muriel Lake Basin Management Society (MLBMS)
- Skeleton Lake Stewardship Association (SALSA)
- Summer Village of Bonnyville Beach
- Summer Village of Pelican Narrows

Water Stewardship Groups Show & Share Day – Aug 6, 2011

Aquatic Ecosystem Health Assessment Program (AEHAP)

(formerly Aquatic Health Ecosystem Monitoring Project (AHM))

- A key mandate of the Alberta government's Water for Life Strategy and thus for the BRWA.
- All water-related ecosystems, rivers, streams, lakes, wetlands and groundwater have a balance of living and non-living entities that helps the system to function in a healthy way.
- We would like to find out where we are at with respect to healthy aquatic ecosystems within our watershed and what does a healthy aquatic ecosystem mean and what does it look like for our watershed. How healthy would we like it to be? What are we willing to trade off for maintaining or improving it? Do we need to maintain it or can we sacrifice some (or a lot of) ecosystem health for economic growth. What areas are showing stress? Which areas require monitoring? Mitigation? This is where we look forward to getting input from the community.
- **What we are doing to date:**
 - **Historical Fish Survey (completed 2008)** – anecdotal
 - **AEHA Program Plan (completed 2010)**
 - **Two-year Fish Based Index of Biological Integrity (IBI) – 2009-11**
 - An extensive fish-based Index of Biological Integrity (IBI) – formulas are determined which can be used when making assessments on aquatic ecosystem health using fish catches as one means of measurement. We also hope to have other types of IBIs, such as invertebrates, plant and bird IBIs, as well as water quality indices to provide other types of metrics. Fish can indicate certain changes while birds, plants, etc. can indicate others.
 - **Basin Characterization and Assessment**
 - Delineate subwatersheds in Upper Basin, map and describe land uses affecting watershed health, identify and assess ecosystem structures and functions, complete a videography of the Beaver and Amisk Rivers.



Projects & Activities



Wetland Inventory (2009-10)

- Partnership with Ducks Unlimited, LICA and AENV mapping nearly all of Beaver River watershed.
- Mapping included medium resolution data and imaging, classified land cover and enhanced wetland classification.
- Information from this inventory is being used toward **AEHA** work as well as the **State of the Basin Report** and the **Integrated Watershed Management Plan** for the Beaver River basin.

Groundwater Database System (on hold)

- Includes data from over 8500 wells (8000 domestic and 600 industrial) spanning nearly 60 years. Scattered and hard to access data is now available in one database. New data is added as available. When funding becomes available, the database will be up and running again.

Lakeland Area Uranium Study (2009-11)

- Excessive levels of uranium were detected (2008) two shallow groundwater wells in the Beaver River basin.
- Purpose of the is to examine the source(s) and reason(s) for elevated uranium levels.
- Initial work included a literature review, model development and field work that included well assessments, installing monitoring wells and taking sediment samples.
- Further study involved a more detailed mineralogical and porewater analysis for both uranium and arsenic (as arsenic is prevalent in the Beaver River basin) – which minerals carry the uranium and arsenic and how are these dissolved into the adjacent porewaters?
- Results to date indicate uranium is naturally in overlying glacial sediments in the basin and not due to industrial or other human activities. (Other studies have shown this is true for arsenic also.)

Community Groundwater Monitoring Program

Domestic Well Water Quality Survey

- Purpose is to increase the residents' understanding of water quality and health issues in the basin and to assist those who are unable to get this kind of testing done.
- Domestic well sampling program testing for
 - 18 routine chemicals (e.g. nitrates, fluoride, calcium)
 - 23 trace metals ('A to Z' – arsenic to zinc (and e.g. copper, lead, manganese)
 - arsenic speciation analysis (arsenic +3 (arsenite) and arsenic +5 (arsenate))
- Alberta Health and Wellness did such testing in 2009 on 151 wells and the BRWA did the same on 47 additional wells in 2010.
- Approximately 50% of wells tested for higher than acceptable levels of arsenic based on the Canadian Drinking Water Guidelines and several wells are showing elevated levels of uranium (don't have an exact number yet).
- Ties in with well maintenance and stewardship and education and the Healthy Water Workshops (incorporating the Working Well Workshops from Agriculture and Agrifoods Canada).
- This program has been and is an excellent public participation and education opportunity and addresses concerns the public have about water quality (e.g. arsenic in drinking water).



Projects & Activities



Community Groundwater Monitoring Program cont'd

- **Shallow Well Water Quality and Livestock Health**
- Purpose is to test shallow wells (drilled and dug) and dugouts for elevated arsenic and uranium and analyze tissue from cattle consuming this water to determine animal health and potential effects on human health from consumption of the meat.
- Tissue that has been recommended for analysis would be: hair, bone and organs (e.g. liver and/or kidney) to assess animal health, while meat, fat and blood testing to assess effects on human health of those eating meat.
- Livestock agriculture is a significant part of the economic activity that takes place in the Beaver River watershed. Since dug wells are a preferred and relatively inexpensive way for livestock to be watered, we assume that there are quite a few of these in the watershed. We are aware that there are also shallow wells in the area.
- Several studies related to shallow groundwater quality in the Beaver River basin, have brought to our attention that shallow wells could be at risk for elevated levels of both arsenic and uranium (Arsenic Study, 2000 Domestic Well Water Surveys completed in 2009 and 2010; Lakeland Uranium Study)
- Arsenic and uranium are naturally occurring in this area in shallow sediments.
- Alberta Health and Wellness does not include wells and other water sources in their testing that are a) not used for human drinking water and/or cooking purposes, b) dug wells and c) dugouts.

Winter Lake Level Study (2008-12)

- Initiated by Alberta Environment to study interactions between surface water and groundwater in 11 lakes in the Beaver River Basin and determine the role of groundwater in lake levels. Results will provide information to the public about declining lake levels and groundwater use.
 - The following lakes were chosen for the study on the basis that *surface water inflows/outflows* and *licensing/domestic usage* are clearly understood or negligible:

Beaver	Chicken Hill	*Garner	Herald
Upper Mann	Lower Mann	*Minnie	Missawawi
*Muriel	*North Buck	*Skeleton	
- Water levels were measured during winter freeze-up (data loggers were installed before freezing and data is collected when the loggers are retrieved in the spring melt).
- An isotope analysis was carried out in August 2010 on at two sites at each of the **five* lakes to verify the winter data logger results collected in 2008-2009, using the isotope Radon-222. Radon-222 is used as a tracer of groundwater contributions to lakes as it occurs in high concentrations as a dissolved gas in groundwater but decays rapidly (half-life of 3.8 days) once discharged to surface water bodies. Radon-222 concentration in surface water bodies can therefore be indicative of the amount of active groundwater input and exchange with lakes.
- Study concluded that differences between radon measurements in the various lakes is attributed to differential rates of groundwater interaction at each site. Garner and Muriel Lakes display the highest degree of groundwater interaction; North Buck has the weakest interaction; and Skeleton and Minnie lakes display intermediate levels of groundwater interaction. Sampling additional lakes and more sites within each lake would provide more conclusive results.



Projects & Activities



Watershed Enhancement Program

Many of our projects are research orientated that give us valuable information about the watershed that we can share with our stakeholders and the public. We also feel it is important that the BRWA engages in 'action' activities that enhance areas of the watershed indicating stress.

- **Creek Restoration** – 2011 (partnering with the Moose Lake Watershed Society (MLWS))
 - Cattle are currently accessing the banks and bed of a creek flowing into Thin Lake River which in turn flows into Moose Lake. Purpose is to provide an offsite watering system while fencing off the creek from the cattle.. Due to it's proximity to the highway (28) it has good potential as a demonstration site.
- **Partial Wetland Restoration** – 2011-12 (MLWS, MD of Bonnyville and BRWA partnership)
 - Wetland shared by two property owners one of which is interested in the restoration on his side. This provides an excellent research opportunity to monitor both a remediated and damaged part of the same wetland and is again a good educational site for restored vs. unrestored wetland.
- **Island Bay Park (proposed) Enhancement** – start in 2011 (MLWS and BRWA partnership)
 - Cleanup dumpsites (trash, fridges, tires, etc.) – public volunteer opportunities. Remove berms on undesignated trails created by ATV users. Work with ATV groups to create designated quad trails.
- **Tributary and Outlet signage at Moose Lake** – 2011-12 (MLWS and BRWA partnership)
 - Creates awareness of Moose lake and its inflows and outflow areas. Scout where to place sign and develop sign designs in 2011. Install signs in 2012.
- **Fishing Line Recycling Stations** – 2011-12
- **Cigarette Butt Disposal Stations** – 2011-12



Projects & Activities



State of the Watershed Reporting (2010-12)

- BRWA is process of having a draft completed end of March 2011 with the final report to be completed in March 2012.
- Incorporate and update the information in the existing Cold Lake - Beaver River Basin Water Management Plan (2006) which covers the lower part of the Beaver River basin and obtain new data for the upper part of the basin to make one comprehensive State of the Watershed Report.
- Core indicators are being used – can be measured repeatedly over time and space and between watersheds. Thus, data can be compared over time within the Beaver River watershed, but also with data from other watersheds. These core indicators are commonly used by all WPACs.
- Indicators that are unique to the Beaver River Watershed will also be used
- Data and learnings from our all of our projects are feeding into the SoW reporting.

Integrated Watershed Management Plan (2011-13) (from NSWA IWMP)

- Information from the SoW will provide the basis from which the IWMP will be developed.
- The BRWA will be starting a Terms of Reference for this project shortly pending funding.
- An IWMP:
 - Develops strategies to sustain drinking water, aquatic ecosystems and economies for future generations
 - Identifies land-use practices and other human impacts that affect water resources and develops strategies to reduce negative impacts
 - Identifies critical gaps in watershed knowledge (as does a SoW) and identifies agencies or programs to address them
 - Consults with stakeholders and the public to guide the planning and implementation



Projects & Activities



Future Water-Agriculture Projects:

- **Comparison of impacts on riparian areas from zero, medium and conventional tilling practices**
- **Impacts of herbicide and/or pesticide spraying runoff by agriculture and oil/gas on surface water quality**
- **Examining damage to creek/river beds by livestock**



Outreach Activities



- Alberta Lake Management Society (ALMS) LakeWatch Program - Lake Sampling
- Walking With Moose – Youth program involving grade 5/6 students at a growing number of schools throughout the basin. 2011 will have about 6 different schools involved and student teachers at Portage College.....
- Healthy Water Workshops (incorporating the Agriculture and Agrifoods Canada Working well Workshop)
- Presentation to municipal, First Nations and Métis Councils and other interested organizations
- Water Stewardship Show & Share (held every two years)
- Youth interactive calendar
- EcoDays – partnering with local water stewardship groups on public education days, e.g. Crane Lake EcoDay, Skeleton Lake Stewardship Association
- Summer Lakeside Chats
- Great Canadian Shoreline Cleanup – Jessie Lake
- LICA Education and Information Committee Lecture Series (Water)
- Trade shows in the Beaver River Basin

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- **How can organizations like AEPA partner with the BRWA?**
 - Funding
 - In-kind support e.g. guiding us to technical expertise if not available at AEPA
 - Let us know your agriculture-water concerns and areas where there may be information gaps and knowledge needs and see if we can tie in with an existing project or create a project that would address the issue and/or provide insight from which all can benefit.



BRWA Partnerships



Financial and In-kind

Lakeland Industry & Community Association

Alberta Environment

Alberta Conservation Association

Alberta Health and Wellness

Ducks Unlimited Canada

Alberta Toxicology Centre



Thank You!

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