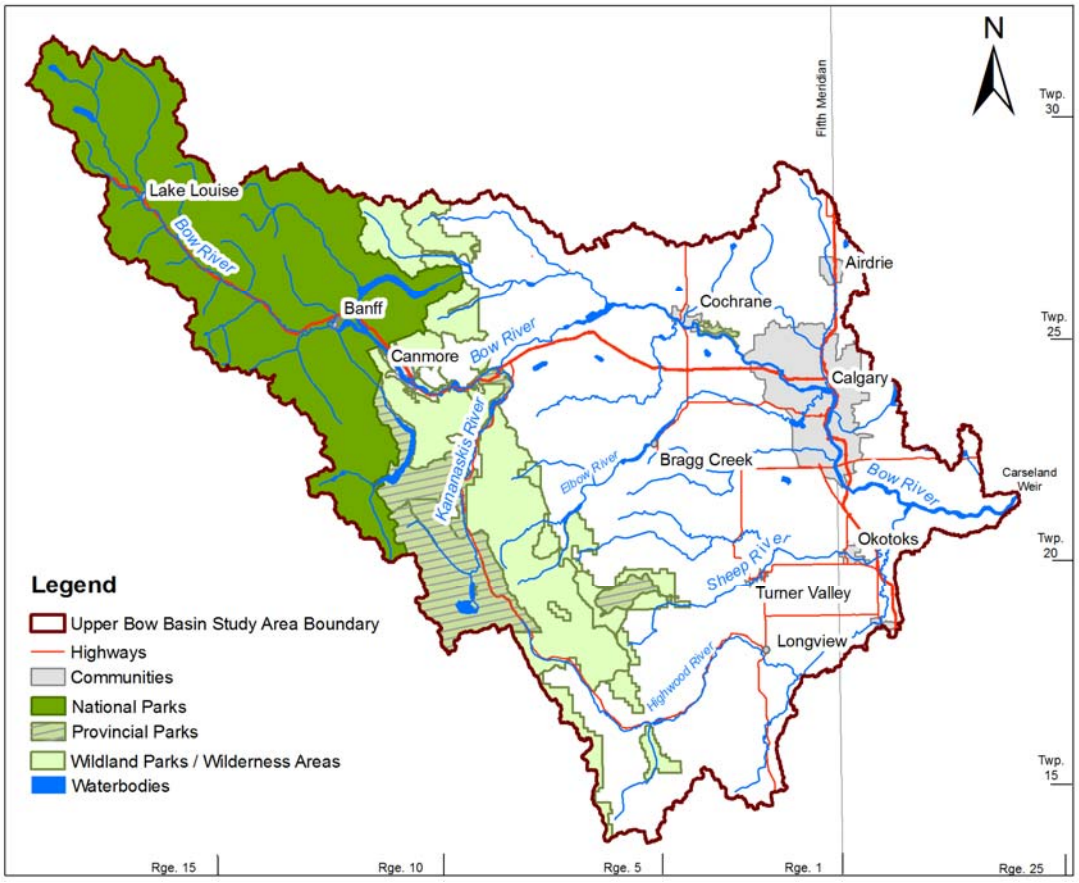
Our Water – Our Future



The Upper Bow River Basin

Past, Present, Future

Upper Bow River Basin Cumulative Effects Study

May 2010

BACKGROUND

The Upper Bow River Basin Cumulative Effects Study was commissioned by interested individuals and organizations[1] to explore the following questions and provide direction on measures that would protect our quality of life:

- Will our children and grandchildren be able to rely on the Bow River and its tributaries for clean drinking water?
- Will there be enough water to meet the future needs of industry, acreages, Calgary residents, ranchers, farmers, and fish?
- Will working farms and ranches remain?
- Will there be undisturbed natural areas that supply clean water and provide places in which our children and grandchildren can visit, hike, bike, and watch wildlife?
- Will groundwater levels remain stable, decline, or increase?

To accomplish this, the best available scientific and expert knowledge was assembled and applied using a computer simulation model called ALCES© (www.alces.ca). ALCES© was used to help visualize how changes over the last century and projected changes for the next two generations (70 years) compare to the baseline 'natural' conditions in the Upper Bow River basin (including all tributaries from the Carseland weir to the headwaters in the Rocky Mountains and foothills). It is hoped that this model can also be used as a planning tool for government and other decision-makers to explore alternative land-use management options.

SUMMARY of FINDINGS

Today, the Upper Bow River is the most densely populated river basin in the province and the once wild, free flowing Upper Bow River has become the province's most controlled river with numerous dams and water diversions. These changes have allowed our region to prosper, but have created unplanned and unexpected effects on water quality, groundwater, wildlife, fish, and natural areas.

The agriculture, energy, residential, and transportation sectors are the main human activities that have changed water and wildlife values in the basin over the last century. ALCES© simulations suggest that continued population growth and our demand for homes and resources will reduce agricultural lands and natural areas over the next two generations. If we don't change the way we manage our communities, agricultural lands, and roads, this will continue to impact water quality, water supply, wildlife and fish, and working farms and ranches.

Surface Water Supply

Water demand will increase in the Upper Bow River basin over the next two generations. With increasing water demand, withdrawals are projected to remove almost 20% of yearly flow under average conditions and up to 50% under low flow conditions. This suggests that in there will be enough surface water for all users upstream of the Carseland weir during average flow years. However, flows will become more variable and seasonal shortfalls are likely, particularly during dry years. Continued emphasis on water conservation will reduce risk of supply shortfalls.

[1] including Action for Agriculture, Advance Energy (Rod Keller), Alberta Sustainable Resource Development, Alberta Wilderness Association, BRBC, Bragg Creek Environmental Coalition, Calgary Regional Partnership, MD of Bighorn, Paul Thebeau, Town of Cochrane, Water Matters, Yellowstone to Yukon Conservation Initiative, Fritz Mueller (photographs), and Eric Lloyd (facilitator).

Water Quality

Our children and grandchildren will not be able to drink water directly from the Upper Bow River or its tributaries, and will need to set aside more tax or operating dollars for surface water management and treatment. Future generations will also be more likely to face local water quality problems. We can help protect surface and groundwater quality by reducing nutrient and sediment runoff from agricultural lands, communities, and roads with best practices like:

- improving sewage treatment at acreages, small towns, and recreational and industrial facilities to prevent contamination of shallow groundwater and nearby streams. Efficient delivery of regional water and wastewater services as proposed in the Calgary Metropolitan Plan[2] is a way to achieve this.
- ensuring that ranchers and farmers manage floodplains and riparian areas to reduce cattle damage of streams and wetlands. Voluntary stewardship programs such as Cows and Fish and Ranchers of the Jumpingpound have helped, but must be expanded;
- reintroducing native vegetation along streams in agricultural areas;
- locating industrial facilities, houses and yards away from streams, rivers, and wetlands to protect riparian buffers;
- using City of Calgary treated wastewater and storm water for irrigation rather than diverting surface water directly from the river;
- reducing fertilizer runoff or application rates for yards, golf courses, parks, and crops;
- improving retention and treatment of Calgary storm water run-off by continuing and expanding the existing City of Calgary storm water management initiative;
- improving management of rural and resource roads; and
- reducing the spread rate of cities, towns, and acreages by growing 'up' instead of 'out'. 'Compact urban nodes' and 'clustered rural lots' proposed in the Calgary Metropolitan Plan are examples of this.

Some of these options can and should be combined. For example, if municipal waste water or storm water can be used for irrigation or industrial purposes, any cost savings from reduced treatment could be used to restore urban and suburban wetlands and stream banks to improve run-off quality.

Groundwater Supply

Computer simulations suggest that we are slowly depleting shallow groundwater in the Upper Bow River basin and that this decline will continue over the next 70 years. This drawdown is happening for two reasons: 1) we are pumping groundwater from wells faster than it is being naturally recharged; and 2) we are building more 'hard' surfaces like roads and communities that reduce the groundwater recharge. The gap between withdrawal and recharge appears to be widening.

At a local scale this will likely mean groundwater depletion in many of the more heavily populated rural residential areas and significant planning challenges for municipalities and developers. This could also reduce the amount of water available in the Bow River and its tributaries during winter and summer low flow periods when groundwater inflow is important. Unfortunately, we currently have limited information about this unseen water source. Given its importance for future generations, we should begin to measure and manage it as carefully as we do our surface waters. Gaining better information on the amount and movement of shallow groundwater should be the first step.

[2] Calgary Metropolitan Plan. 2009. Prepared by the Calgary Regional Partnership.

CONCLUSIONS and NEXT STEPS

Phase 1 results demonstrated that agriculture, energy, residential, and transportation sectors are the main human activities that have changed water and wildlife values in the Upper Bow River Basin over the last century. They also show that continuing with 'business as usual' for the next 70 years will increase the risk of unintended or undesirable effects on these natural values and our quality of life. Finally, Phase 1 work demonstrated the potential value of a number of existing and proposed best practices identified by the Calgary Regional Partnership, Bow River Basin Council, and City of Calgary that we can take to protect our waters, wildlife, and natural areas for our children and grandchildren.

The Upper Bow River Basin Cumulative Effects Study recently received additional funding for Phase 2 investigations to explore these best management practices. Phase 2 work will evaluate the individual and combined benefits of improving residential development plans, forestry and energy footprint reduction, and reducing agricultural, residential, road, and recreational runoff. Phase 2 results will be available fall, 2010.

We hope that this work will help residents understand
our shared responsibility to take care of the Upper Bow River basin,
Our Water, and Our Future.

Background on The Upper Bow Basin Cumulative Effects Study (UBBCES)

The goal of the UBBCES is to apply the best available information to understand the potential cumulative effects that all types of land-use could have on water availability and inferred water quality of the Upper Bow Basin. Specifically, the intent is to apply this scientific information and local knowledge as an aid in the creation of a stewardship planning vision for the area. The specific objectives of the UBBCES study are to:

1. create awareness, inform and engage Calgary and up-stream area residents regarding cumulative effects of land-use on water quantity and quality;
2. consolidate scientific and expert knowledge that will inform and assist government and other land-use policy-makers; and
3. develop a planning tool for government and other decision makers to explore alternative land-use management options.

Supporters began discussing this study in March 2007, and had extensive dialogue with the Bow River Basin Council (BRBC), Calgary Regional Partnership, and City of Calgary to confirm that the UBBCES would complement their ongoing initiatives. Specifically, it was agreed that the UBBCES' priority should be to develop and deliver an education piece that would tell a compelling story about the direct effects of land-use on water. There was also general agreement that the goal of the UBBCES initiative was not to make policy but rather to inform and influence policy makers. It was also agreed that it would be valuable to make every effort to work with other project teams, particularly the Calgary Regional Partnership, to harmonize assumptions and develop suitable land-use scenarios.

UBBCES supporters include: Action for Agriculture, Advance Energy (Rod Keller), Alberta Sustainable Resource Development, Alberta Wilderness Association, BRBC, Bragg Creek Environmental Coalition, Calgary Regional Partnership, Eric Lloyd (facilitator), Fritz Mueller (photographs), MD of Bighorn, Paul Thebeau, Town of Cochrane, Water Matters, and Yellowstone to Yukon Conservation Initiative.

The UBBCES is coordinated by Eric Lloyd and directed by a Steering Committee comprised of Eric Lloyd, Mark Bennett, Harvey Buckley, Rick Butler, Danielle Droitsch, Howard Heffler, Wendy Francis, Joe Obad, Hugh Pepper, Shirley Pickering, and Colleen Shepherd. ALCES modeling was conducted by Terry Antoniuk, Cornel Yarmoloy, and Brad Stelfox.