


PNWER 2016

An aerial photograph of a river valley. The river winds through a lush green forest. In the background, there are large, rugged mountains with patches of snow under a cloudy sky. The right side of the image is partially obscured by a light blue semi-transparent overlay.

Collaboration: the key to watershed management

Dr. P. Kim Sturgess
C.M., P.Eng., FCAE
CEO

Alberta WaterSMART

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Climate is water... water is climate

“The strong link between climate change and water has contributed to the view that if mitigation is about carbon, then adaptation is about water.”

Alberta Climate Dialogue 2014



Mitigation

is about
greenhouse gas
is global
is a trigger
takes time

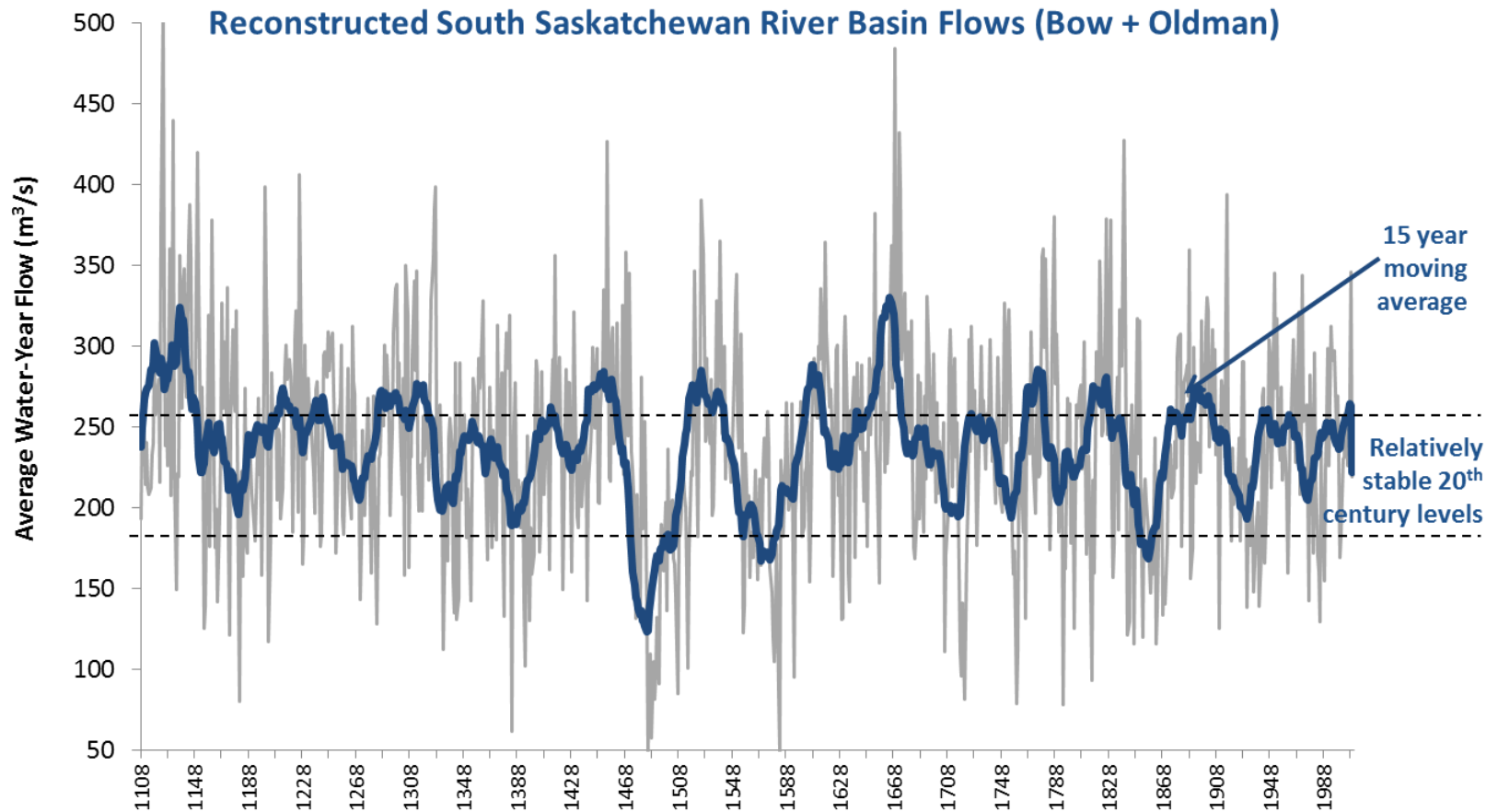


Adaptation

is about water
must be local
is about action
is needed now

**Climate change will have a direct,
significant impact on water resources**

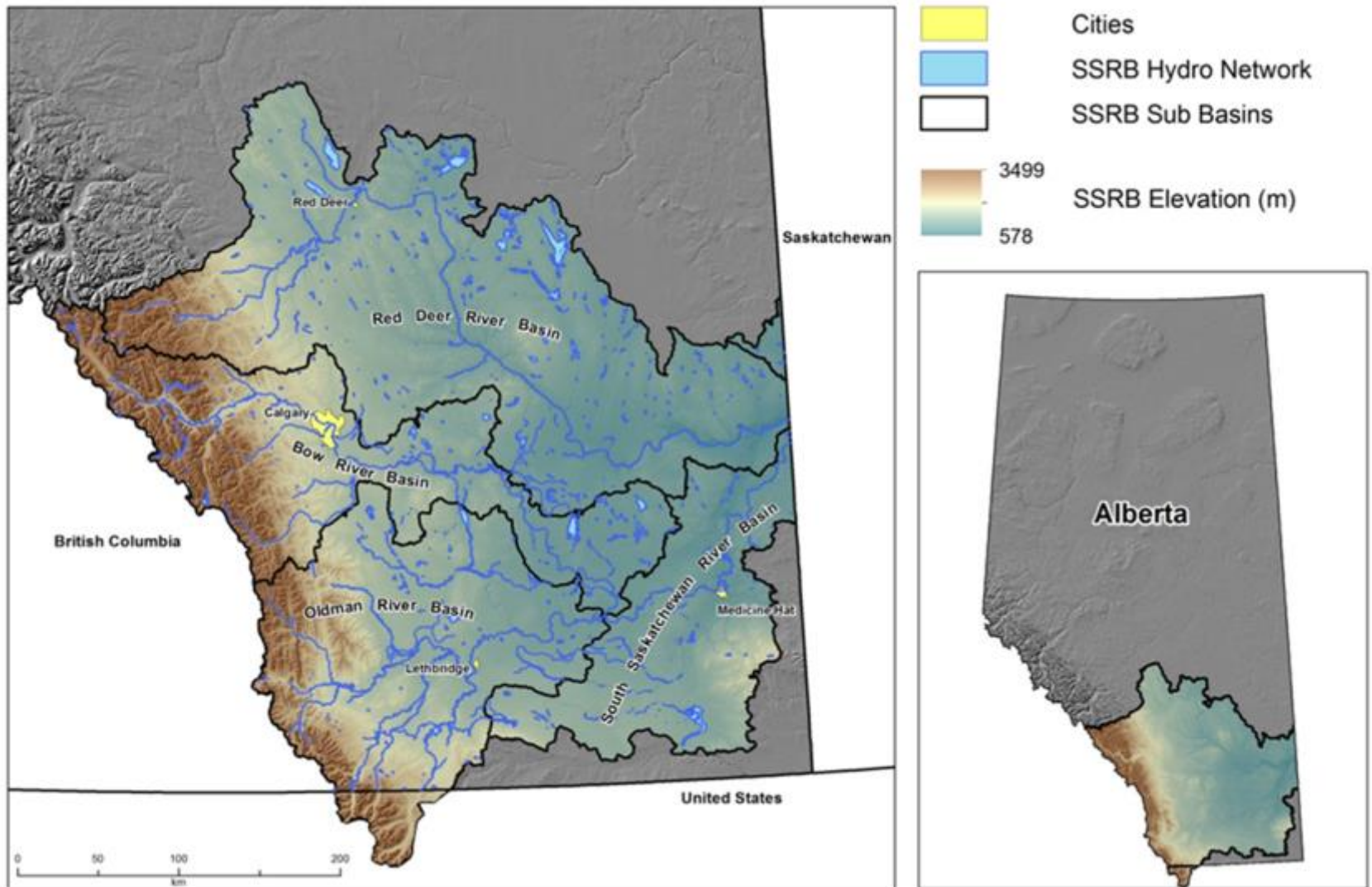
The South Saskatchewan has historically seen extremes



Source: Dr. David Sauchyn, Prairie Adaptation Research Collaborative, 2015

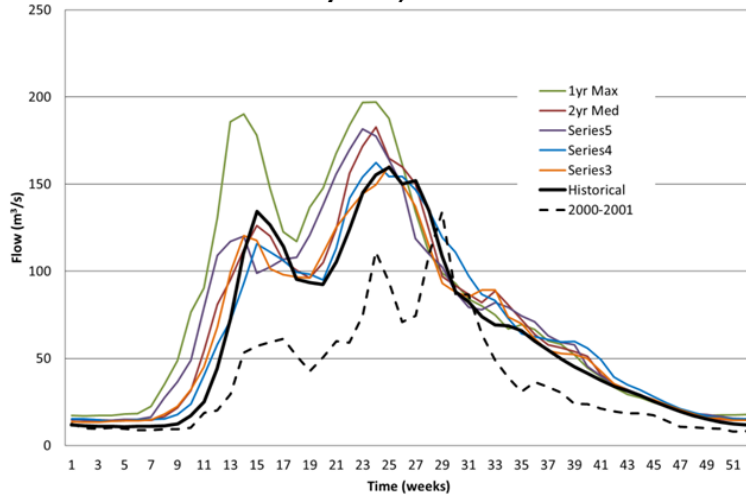
Reinforces the importance of adapting and building resilience now,
before more extreme events

SSRB: climate adaptation strategies



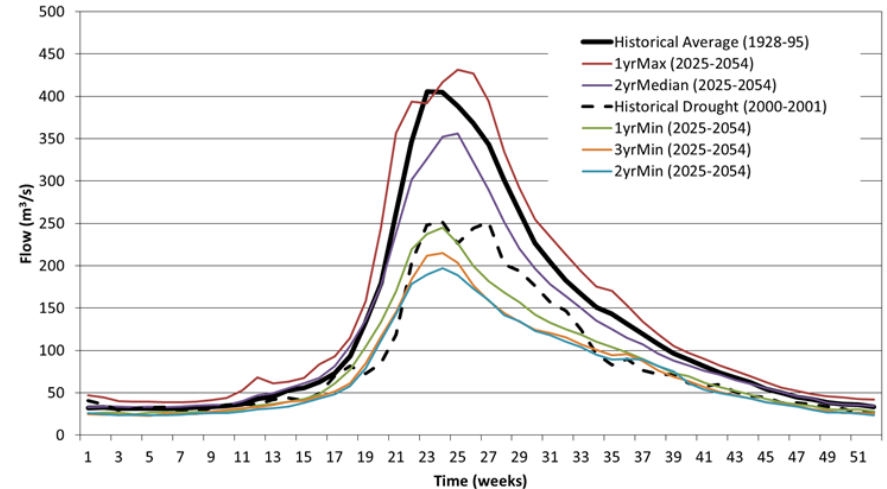
Climate Variability will play out differently in each basin

Red Deer Basin: wetter system, earlier melt

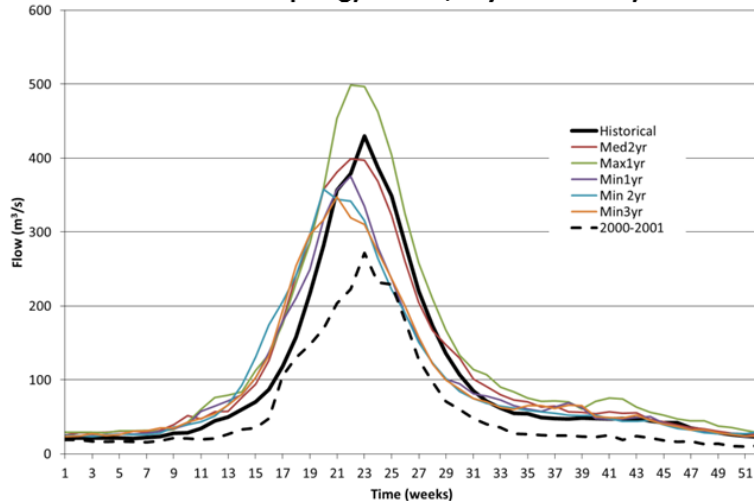


Climate Variability Scenarios Compared to 2000-2001 in each Basin

Bow Basin: dryer system overall



OSSK Basins: wetter spring/winter, dryer summer/fall



South Saskatchewan River Basin Adaptation Roadmap

Increasing degrees of adaptive capacity 



Already in progress

- Achieve CEP Plan targets
- Assign and transfer water allocations
- Share water within IDs
- Upgrade critical water management infrastructure
- Release functional flows (Oldman)
- Build flood defence berms where necessary
- Institute Ghost Reservoir flood operations agreement
- Develop large scale flood mitigation facility on the Elbow
- Replace Glenmore stop logs with operable gates

Level 1

- Institute a long term watershed management agreement with TransAlta for the Bow
- Raise winter carryover in irrigation serving reservoirs
- Further shortage sharing within and between IDs
- Develop shortage sharing frameworks by basin
- Restrict greenfield development in the floodplain
- Increase St Mary operating FSL by 1M
- Effectively implement Alberta's wetland policy
- Improve and resource forecasting
- Adjust Dickson Dam operations (for WCO, supply, functional flows)
- Advance conveyance opportunities (Room for the River)
- Advance natural detention opportunities (Room for the River)
- Apply land use best management practices
- Promote further municipal conservation

Level 2

- Redesign operations of all upstream Bow reservoirs for water supply purposes
- Expand and balance Chin Reservoir (Oldman)
- Build new SAWSP and Acadia off stream storage
- Pursue more extensive relocation and buyouts in floodplain
- Build series of new off stream storage in the Oldman basin
- Build series of new offstream storage in the Red Deer basin

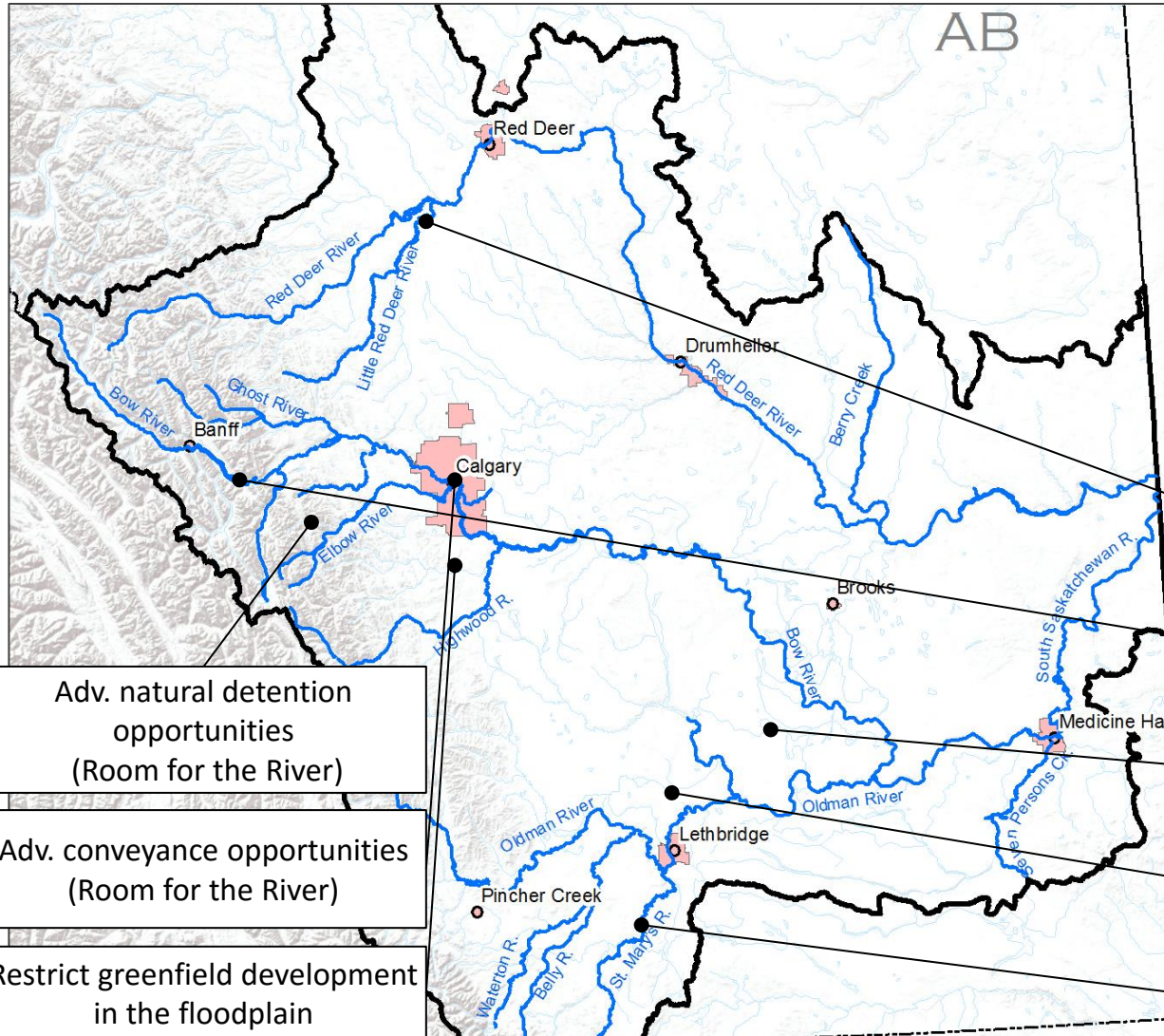
Level 3

- Build new storage low in the Bow basin (~Eyremore)
- Build new off stream storage in the WID (~Bruce Lake)
- Build new on stream storage in the Southern Tributaries (~Kimball)
- Build new on stream storage low in the Red Deer basin (~Ardley)
- Reduce minimum flows through municipalities as an exceptional measure

Blue highlights the most promising strategies within a level

SSRB Adaptation Roadmap Level 1

Challenges and opportunities are basin specific, and will vary compared to similar work in other parts of Alberta and the world



SSRB wide: develop shortage sharing frameworks by basin, improve resource forecasting, effectively implement Alberta's wetland policy, apply land use best management practices, promote further municipal conservation

Adjust Dickson Dam operations (for WCO, supply, functional flows)

Long term watershed management agreement with TA for the Bow

Raise winter carryover in irrigation serving reservoirs

Further shortage sharing within and between IDs

Increase St Mary operating FSL by 1M

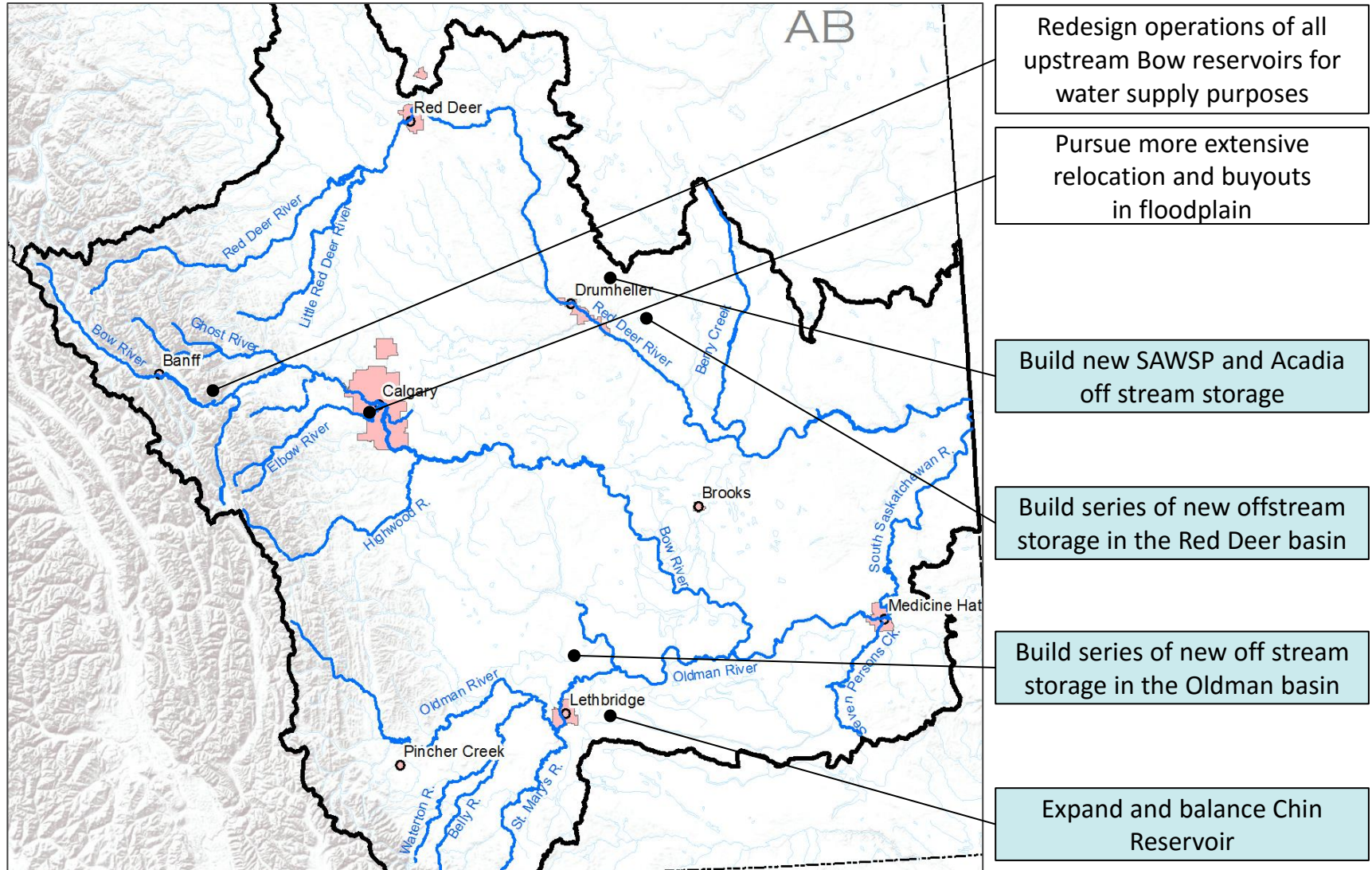
Adv. natural detention opportunities (Room for the River)

Adv. conveyance opportunities (Room for the River)

Restrict greenfield development in the floodplain

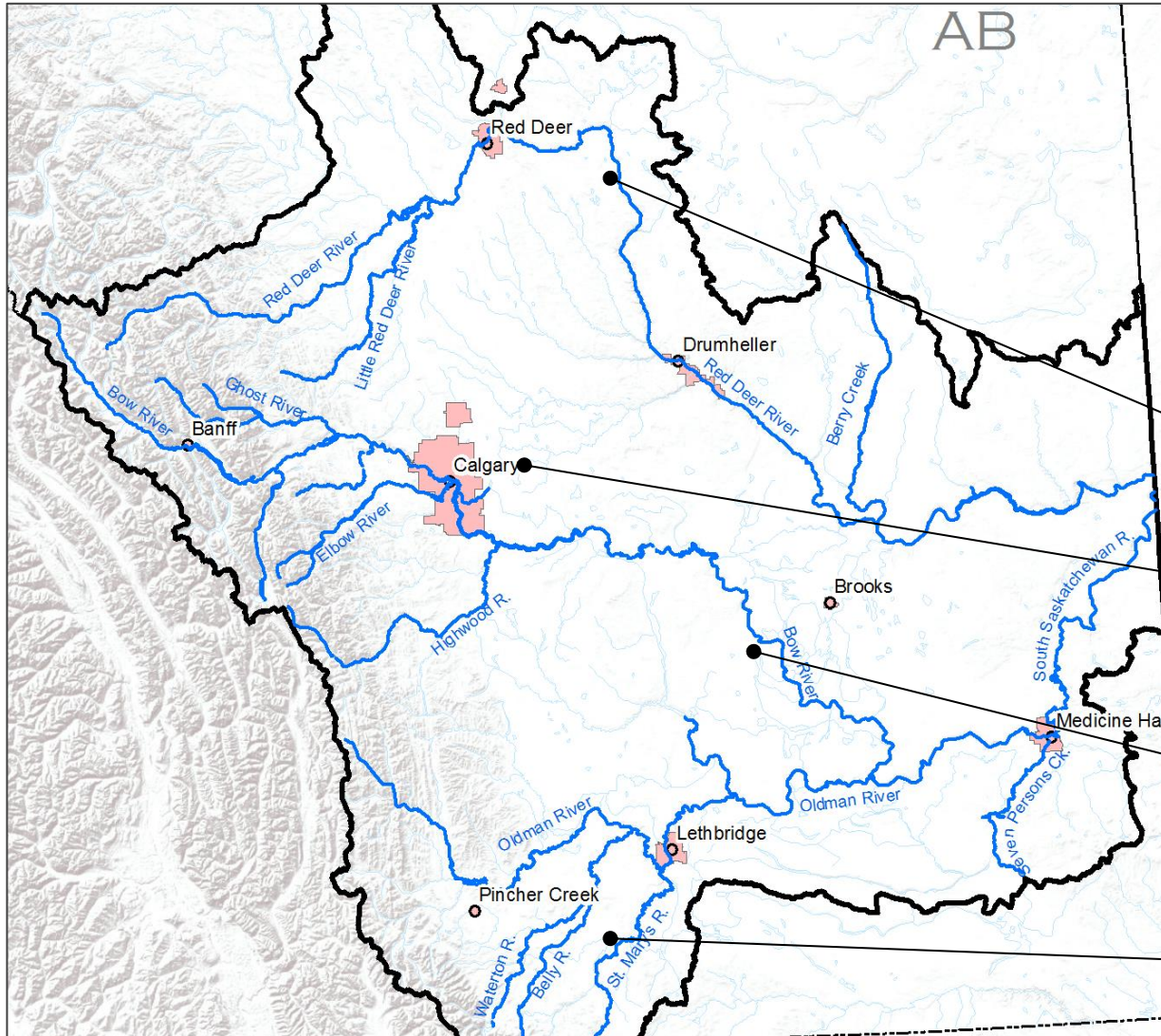
SSRB Adaptation Roadmap Level 2

Challenges and opportunities are basin specific, and will vary compared to similar work in other parts of Alberta and the world



SSRB Adaptation Roadmap Level 3

Challenges and opportunities are basin specific, and will vary compared to similar work in other parts of Alberta and the world



SSRB wide: reduce minimum flows through municipalities as an exceptional measure

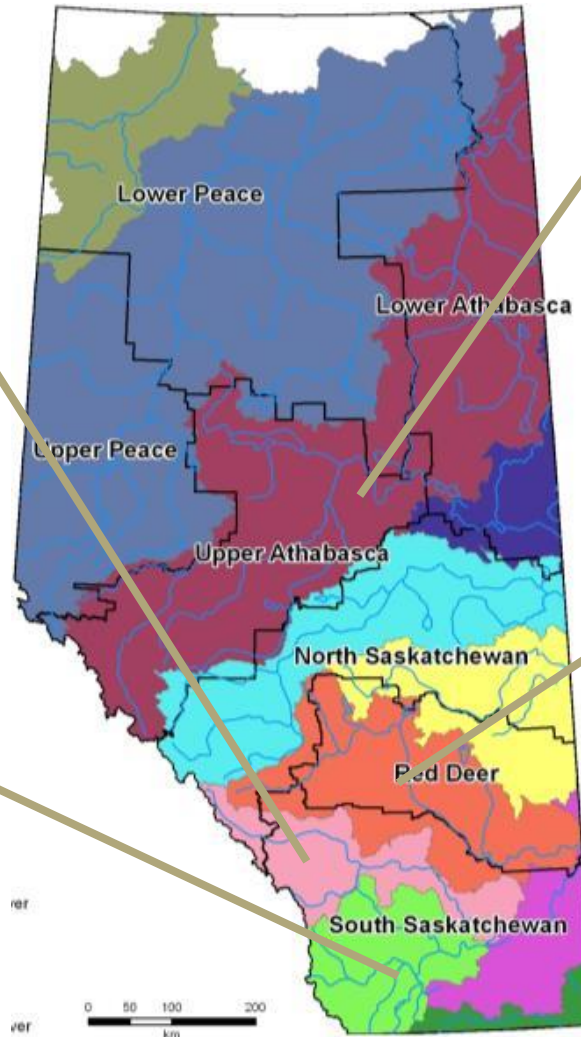
Build new on stream storage low in the Red Deer basin (~Ardley)

Build new off stream storage in the WID (~Bruce Lake)

Build new storage low in the Bow basin (~Eyremore)

Build new on stream storage in the Southern Tributaries (~Kimball)

1. Bringing together the best people for the job



These are Steering Committee members as the Athabasca is in the forming stage of the Working Group



Participation from



2. Provide a strong base of data and effective tools



Naturalized flow data, WRMM licence data, Reservoir operations



IDM demand data

Working Group Participants

Demand data, Operations



Climate variability data



Land use simulations

Interactive model of surface water quantity for each sub-basin...

~80 years of historic data + 30 years with climate variability

...with performance measures reflecting basin interests



3. Work collaboratively including live modelling sessions

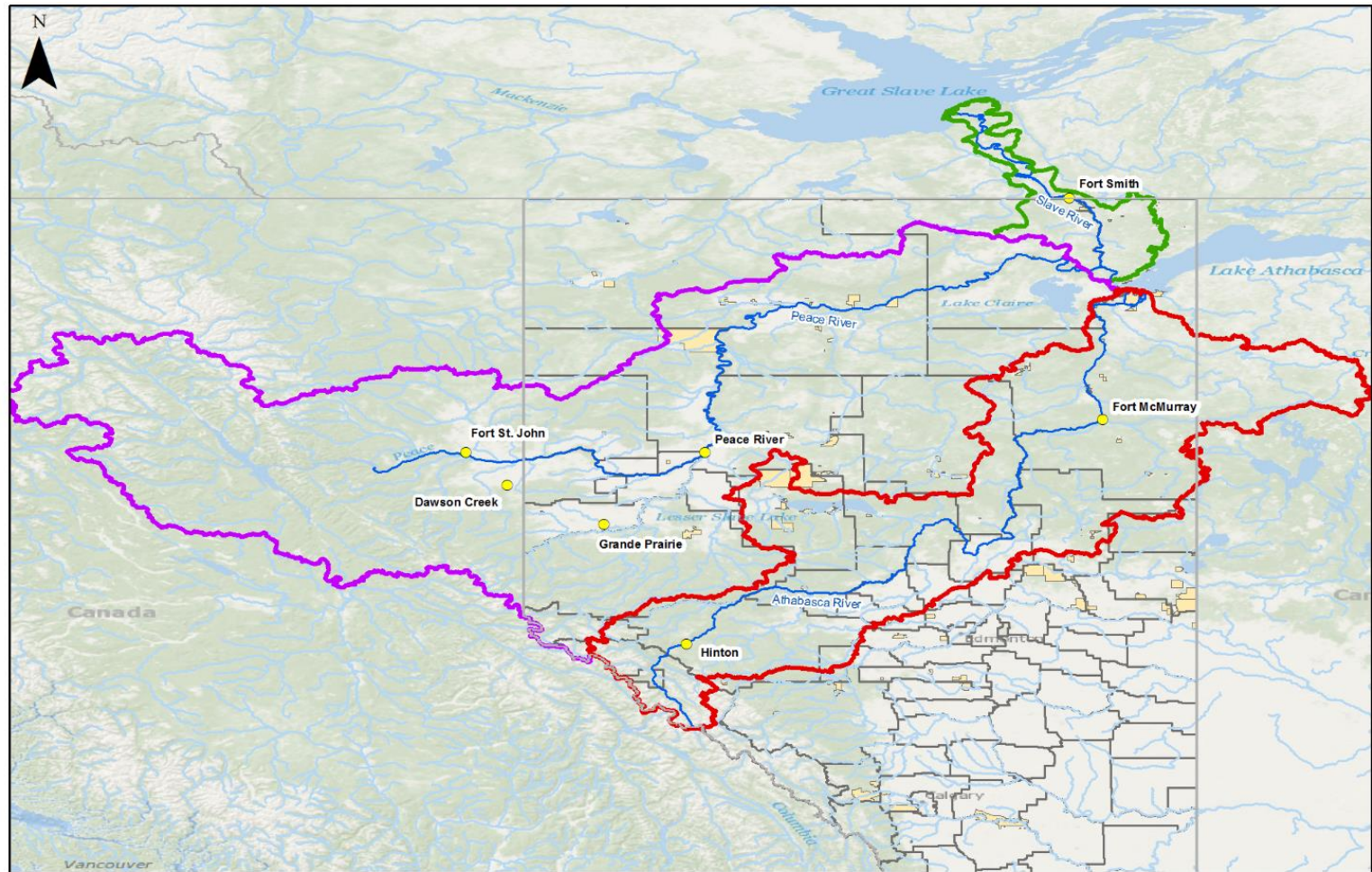
1. Participants build the tools => common understanding
2. Participants use the tools => builds trust and positive relationships for informed and transparent decision making, and
3. Participants apply the tools to explore and evaluate opportunities => proactive and implementable sustainable water management solutions



In Southern Alberta this process assessed:

- Impacts from increasing water demands, droughts, floods, and climate variability, and
- Adaptation strategies and management opportunities to meet growing demand for water and environmental interests.

A Climate Adaptation Roadmap for Northern Alberta



SITE MAP

- CITIES
- ATHABASCA RIVER BASIN
- PEACE RIVER BASIN
- SLAVE RIVER BASIN
- MAJOR RIVERS
- WATER NETWORK
- MUNICIPAL DISTRICTS AND COUNTIES
- INDIAN RESERVES

1:9,250,000

SCALE



CREATED ON:
JAN 29, 2015
BY ALBERTA WATERSMART

SOURCE:
GEOBASE, GEOGRATIS, ALTALIS
GCS: NORTH AMERICAN 1983



The Alberta Water-Energy-Food Nexus Project

A New Conversation About Water

Lindsay Kline, BAH, MPP
Research & Policy Analyst
July 2016

Thanks to our generous funders



Our starting point

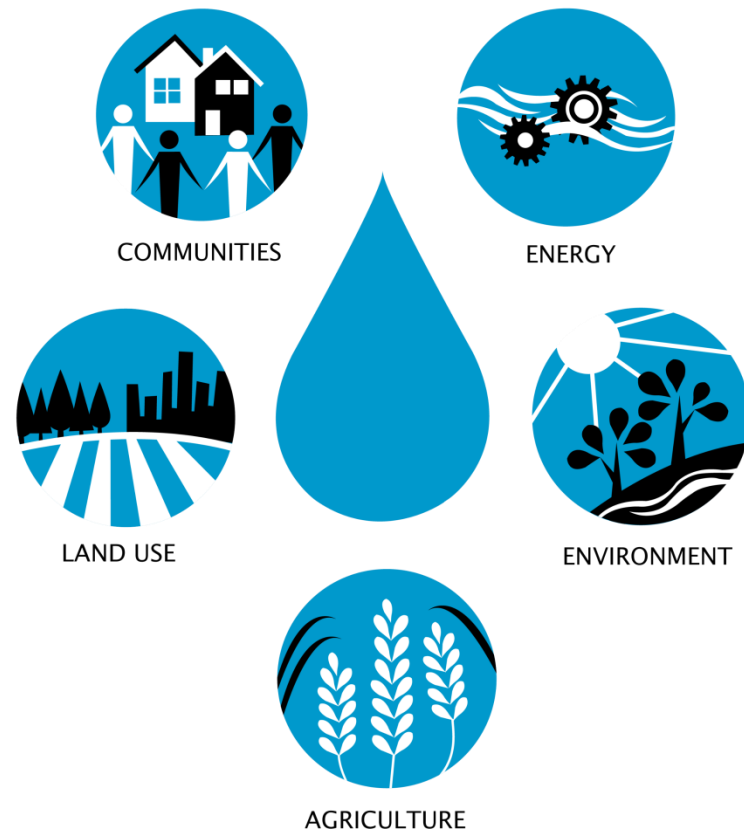


What is the Nexus?

The Nexus Concept describes the interconnectedness and interdependency of our global resources including water, food, and energy.

Organizations such as the World Economic Forum and United Nations have considered the impact of this concept on a global scale.

THE ALBERTA NEXUS

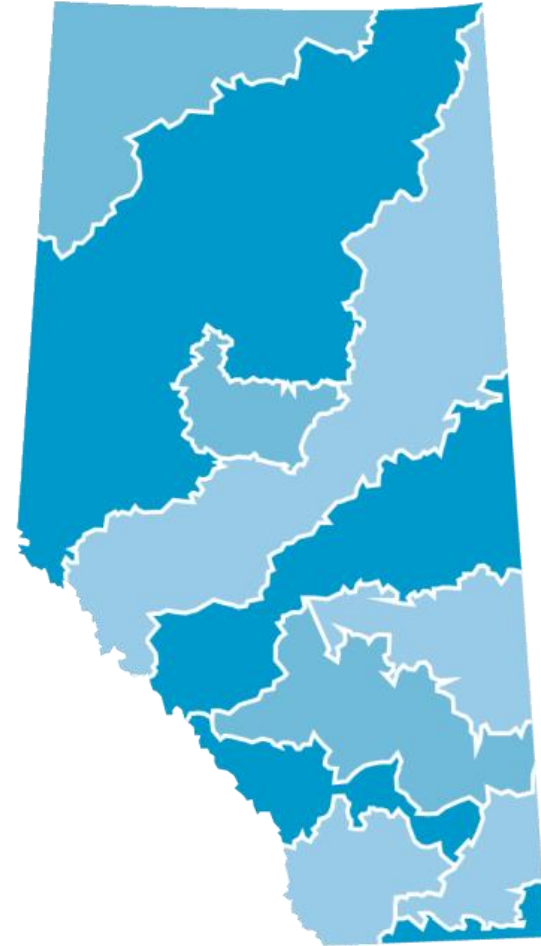


How does the Nexus apply to Alberta?



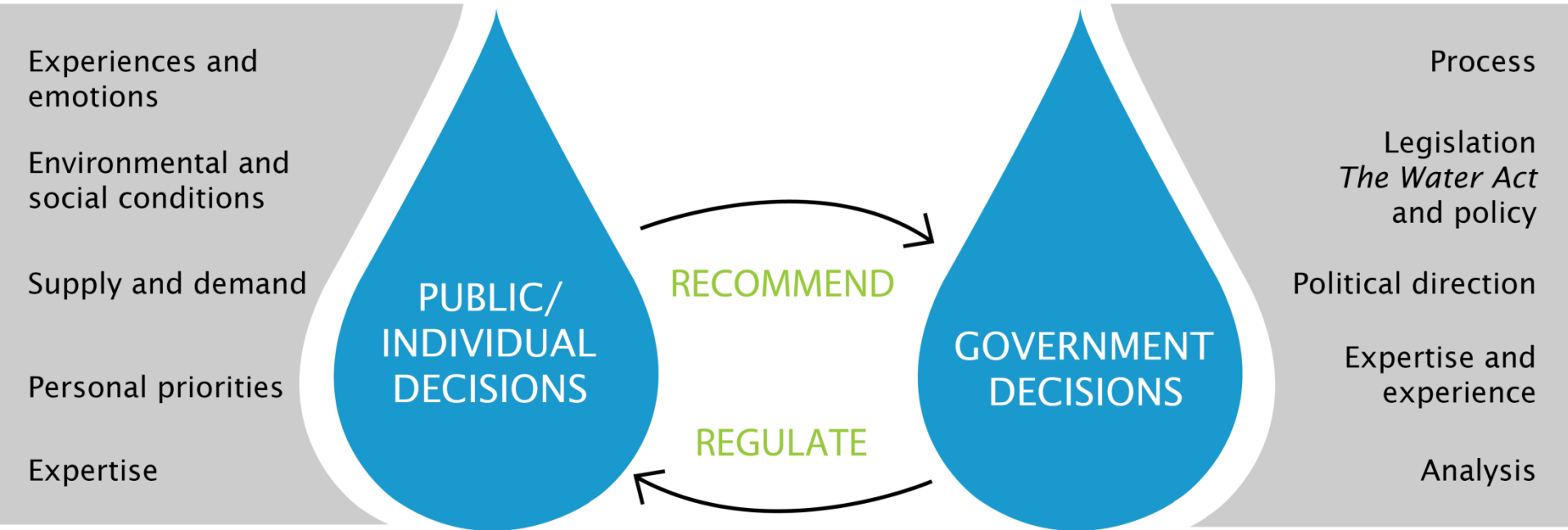
In the context of Alberta water resources, the Nexus can be recognized as the interconnectedness between communities, agriculture, energy, and land.

The Bow River Basin is an ideal watershed to begin this pilot.





Water decision making in the Bow River Basin



Central question



How will increasing demands converge in the Bow River Basin?

Sector case studies

Growth statistics

Assumptions

What is our water supply to 2030?



Alberta faces important water challenges including a growing economy, expanding population, and the increasing impact of this growth on the environment, especially in the face of climate change

Climate change is expected to reduce annual and seasonal flows in the Bow River over the next 20 years



Energy case study

Increased need for electricity generation further emphasized when viewed through the lens of the Bow River Basin

- 1.6 million people require 2,090 megawatts of generation capacity
- Climate Leadership Plan suggests an increase in natural gas production
- To produce enough natural gas to meet 2030 growth targets, 5 million cubic meters of water would be required!



"Electricity" by Richard Graham is licenced under CC BY 2.0

Agriculture case study



What could an increase in food demand mean for agricultural activity and associated water use in the Bow River Basin?

- 30% of crops in Alberta are cereal crops
- Water demand would be 320 million metres cubed to produce 600,000 tonnes of cereal crop. This would feed 1.3 million people!
- In reality, more specialty crops are grown in the Province with cereal being a rotation crop

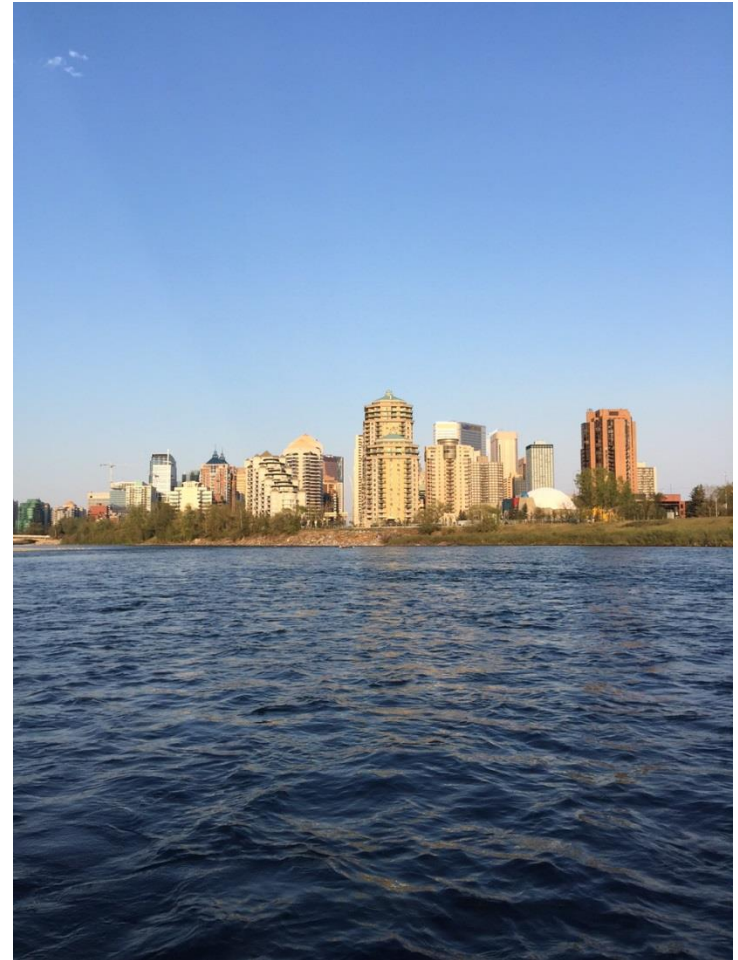




Municipal case study

By 2030, the Calgary Regional Partnership (CRP) Region will be home to 1.6 million people, an increase of half a million people from 2010. What does this mean for water demand in the region?

- Existing municipal water demand ranges from 301 to 450 liters per person per day
- City of Calgary projection is 350 liters per person per day by 2030
- CRP member municipalities' water licences are not enough to accommodate the growth projected in the region





What about the River?

Despite the water needs of each sector, water is always required for the environment. How can we ensure a healthy aquatic ecosystem in the Bow River Basin?

- Minimum water requirements include Water Conservation Objectives and water quality
- The Basin was closed in 2006 for applications to new water licences



Legal framework considerations



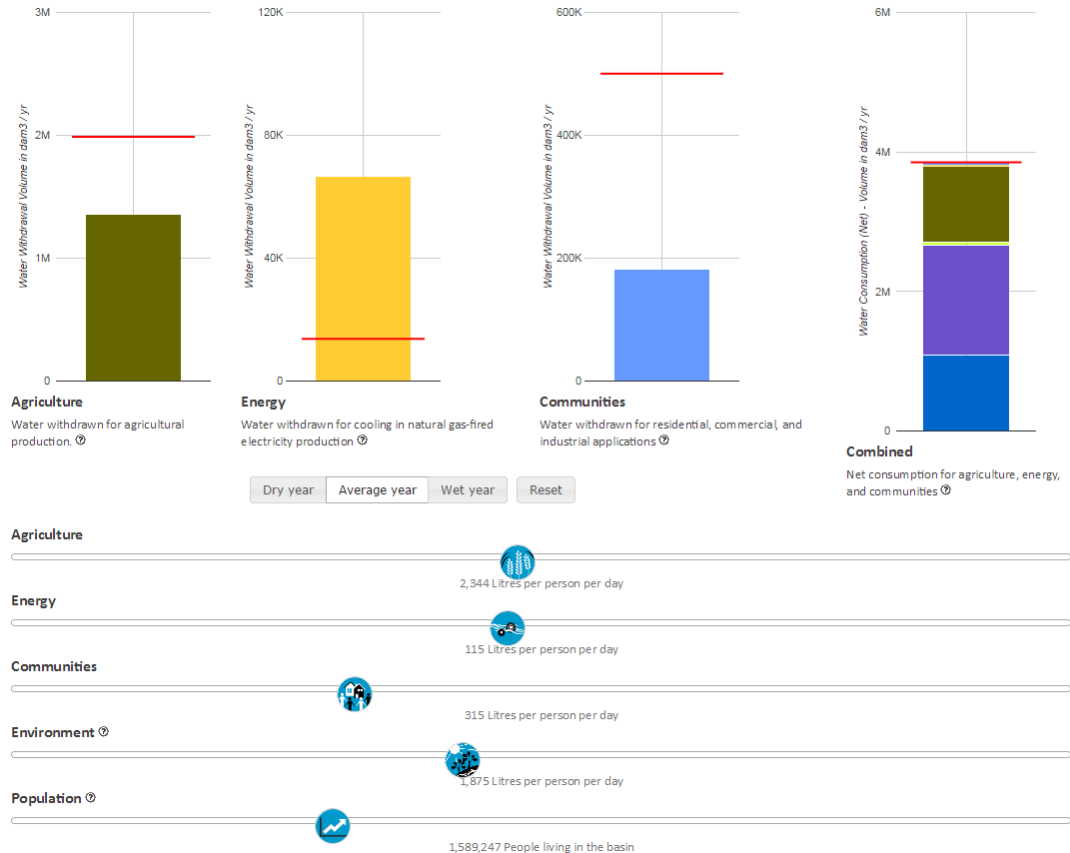
Alberta's Water Act is the legal framework that governs water use throughout the Province

- Senior water licences have priority
- The Basin was closed in 2006 for applications to new water licences
- Alberta must meet requirements to deliver water to Saskatchewan (apportionment)

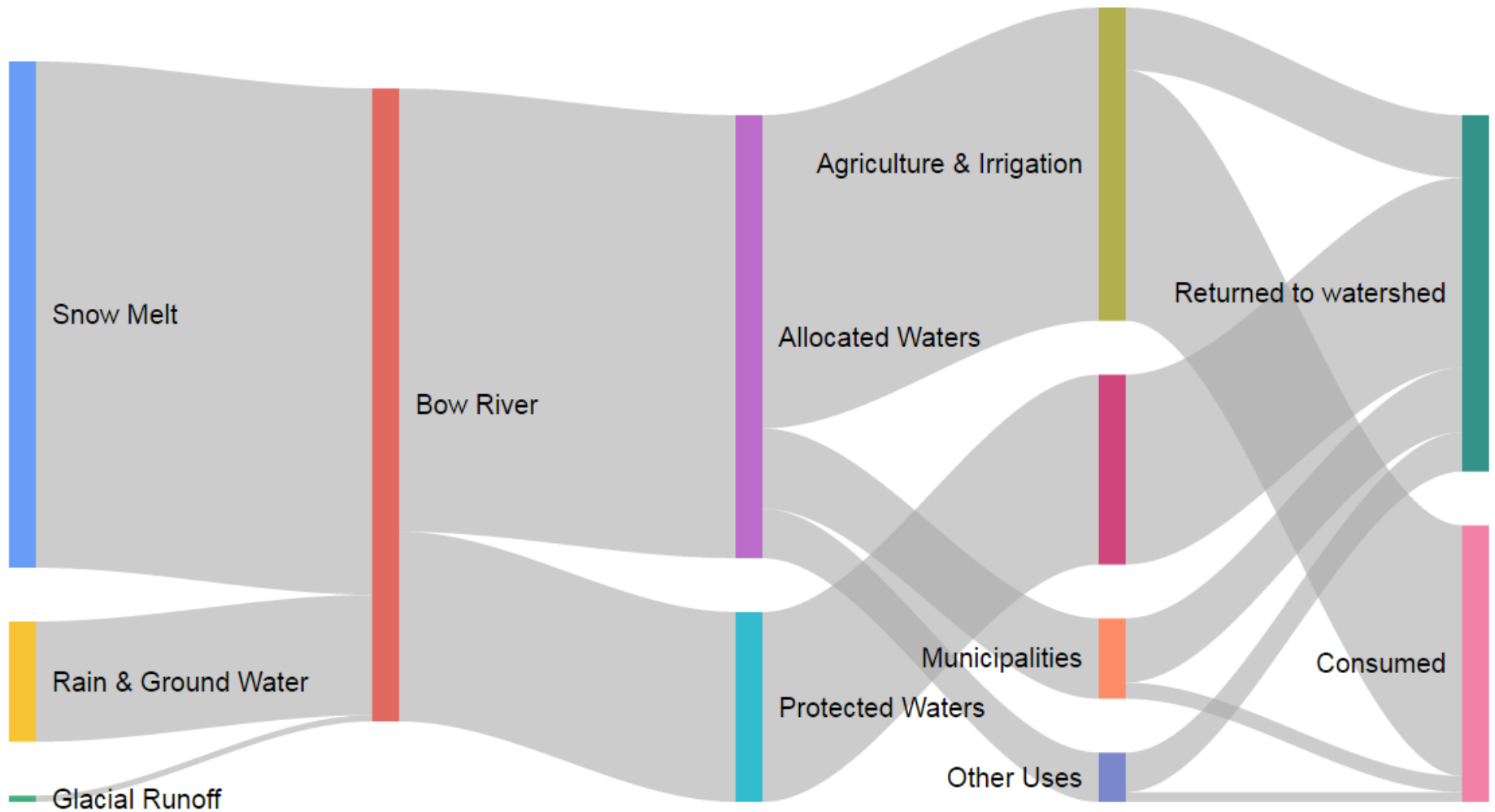
Simulating the converging demands



- Phase 1 provided the foundational knowledge and information to apply the Nexus Concept to the Bow River Basin
- Phase 2 developed sector-based case studies
- Narratives provide a basis for understanding how sector activities lead to water use
- Phase 3 is where the Nexus comes together and is piloted in the Bow River Basin



Complexity of the Nexus - Bow River Basin



What's next?



www.albertawater.com/nexus

Exciting future opportunities include:

- Add research on the social and economic impact of the Nexus
- Expand the Nexus concept to other basins or wider geographic areas in the Province
- Continue to update water supply forecasts considering the impacts of future climate change
- Apply the Nexus concept to other sectors in the Province
- Develop more simulations for the public to use
- Create an educational module for decision-makers that introduces the Nexus and trade-off decision-making

Collaboration is key



The Nexus concept highlights you need to have the right people in the room... or this happens:



Thank you

