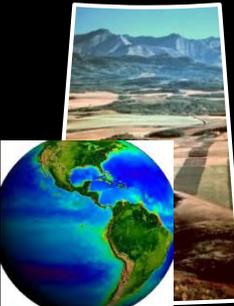


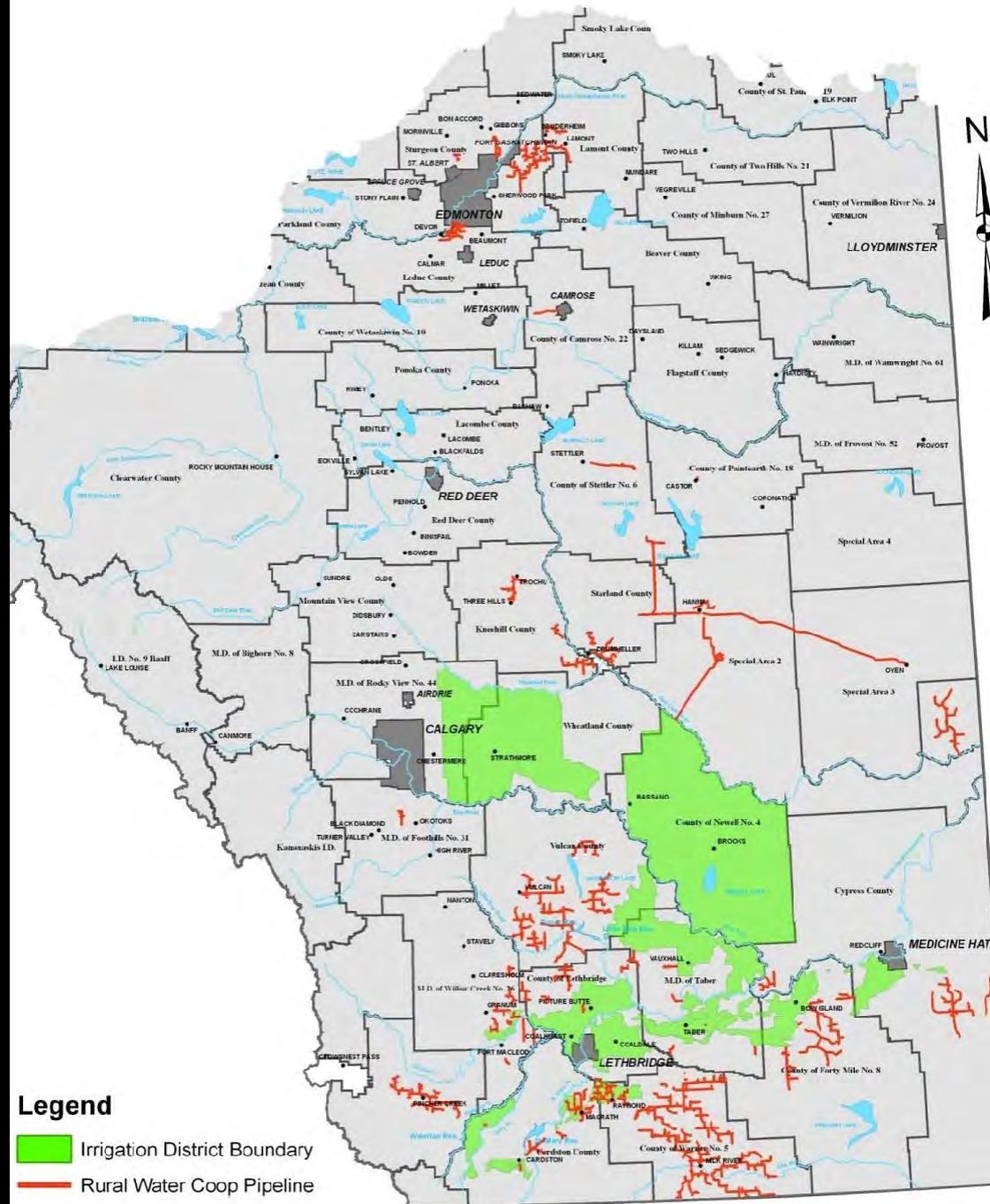
Managing the Challenges



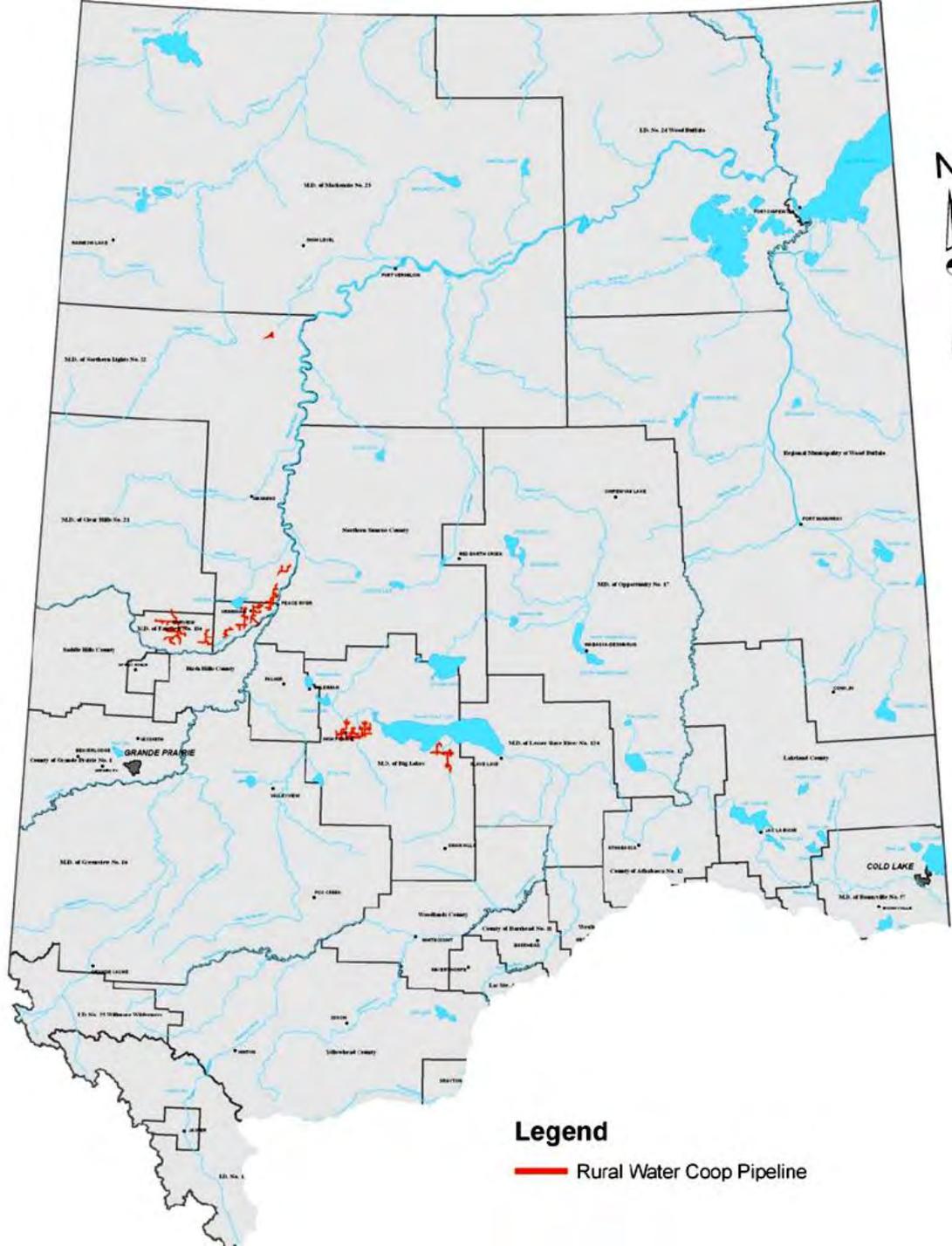
Rural Water Supply

- ❑ **Permanent regional water supply pipelines would provide an assured supply of water to producers and rural residents in water-short areas.**

Rural Water Co-ops Southern Alberta



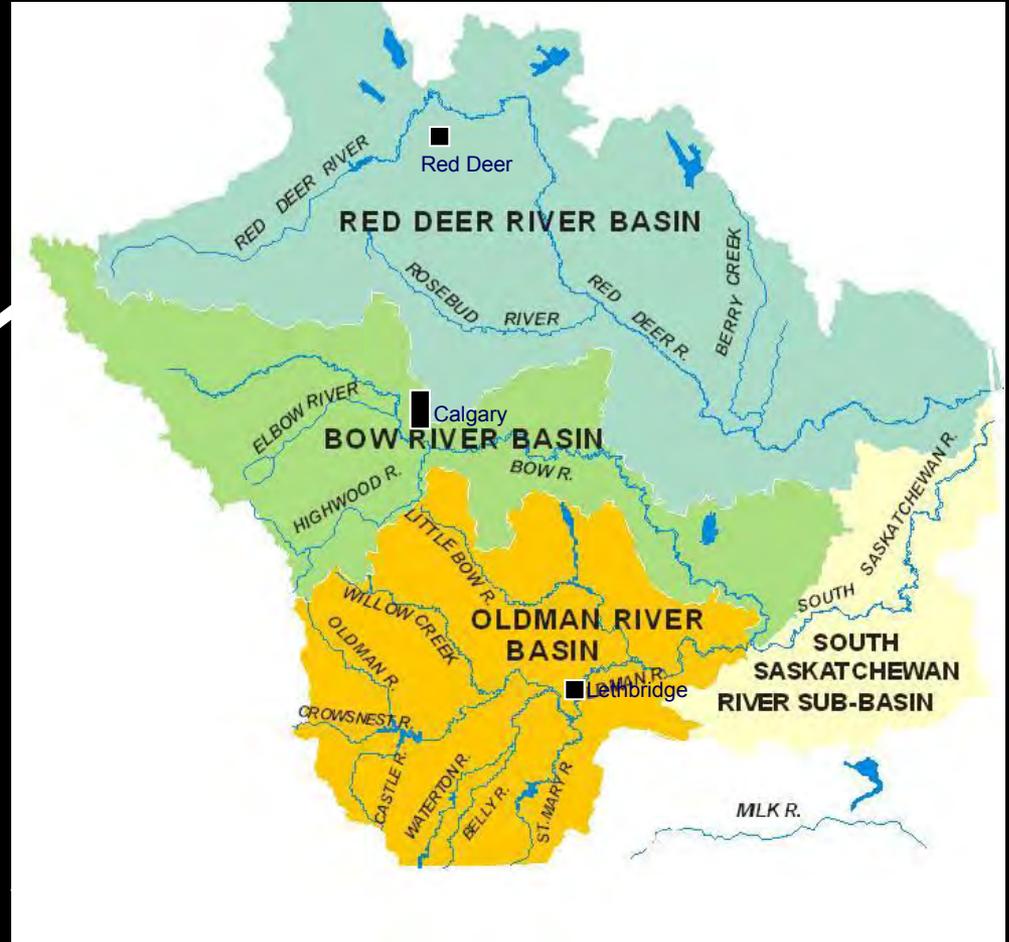
Rural Water Co-ops Northern Alberta



South Saskatchewan River Basin

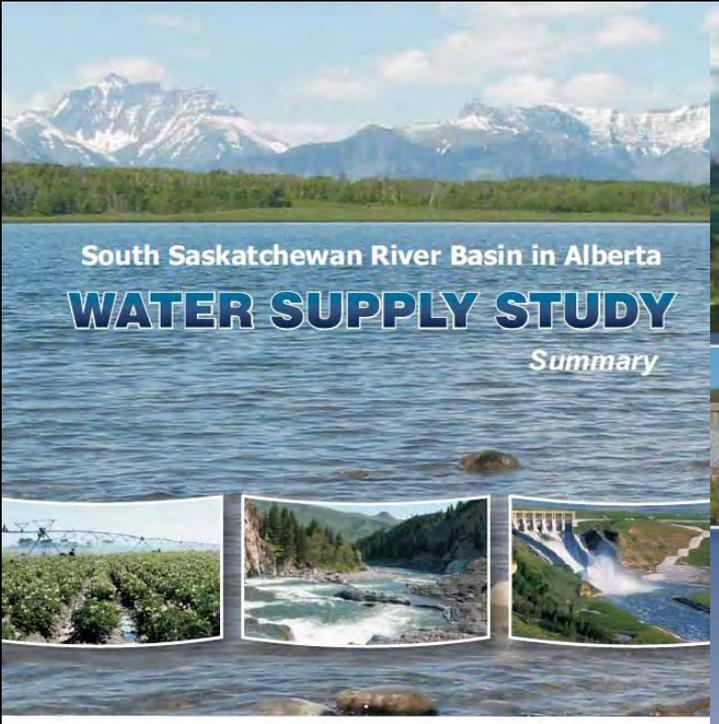
**A Water Management
Template for Alberta**

South Saskatchewan River Basin





South Saskatchewan River Basin



South Saskatchewan River Basin in Alberta
WATER SUPPLY STUDY
Summary

SSRB Water Supply Study Steering Committee
Lethbridge, Alberta

January 2010



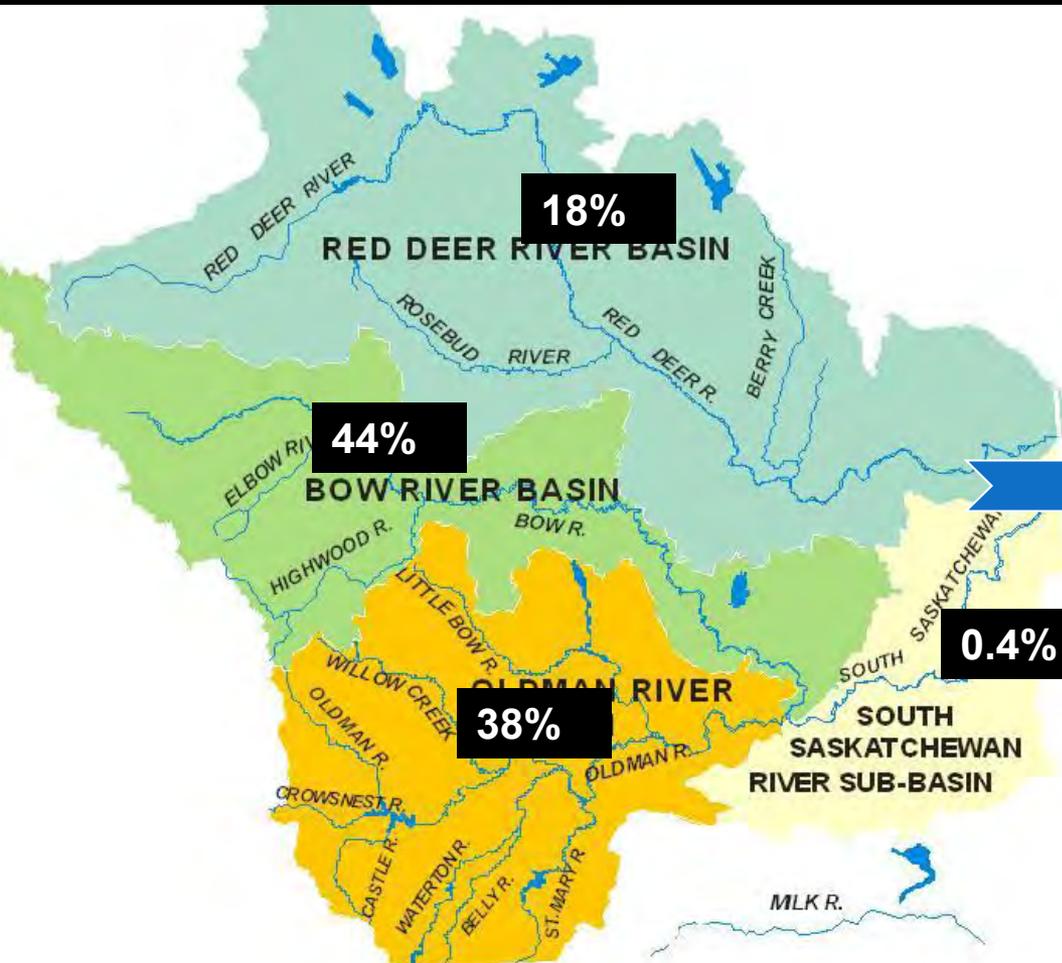
OLDMAN RIVER

State of the Watershed Report

SUMMARY

2010

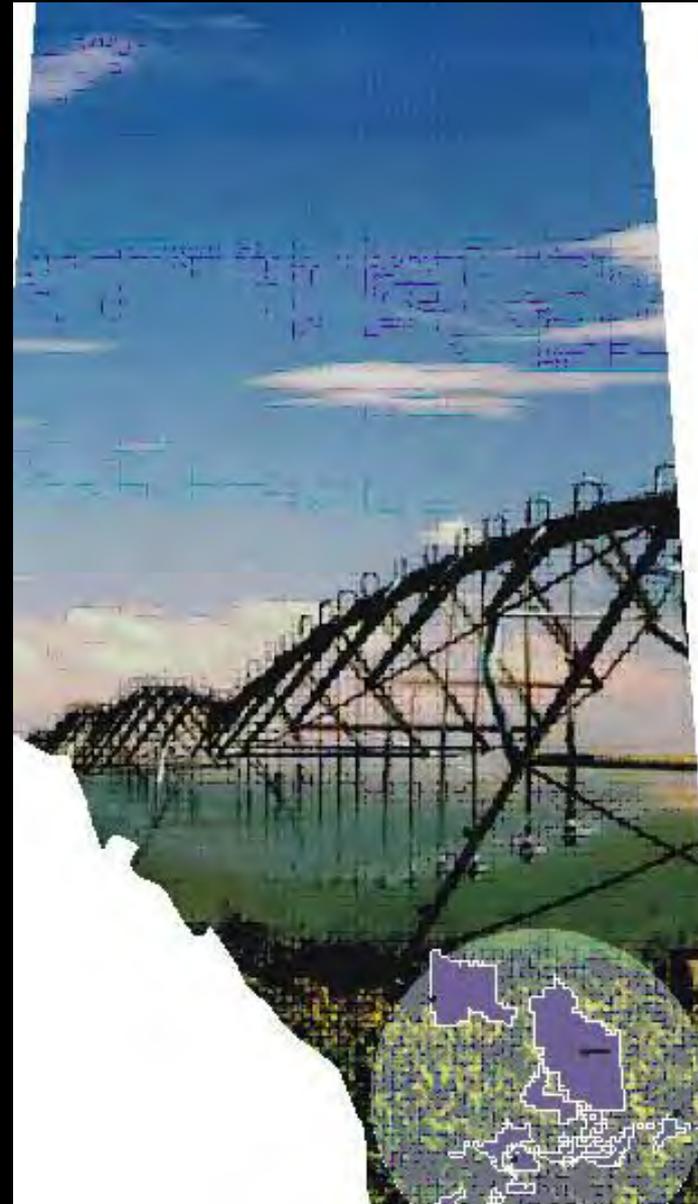
Sub-Basin Flow Contributions



- ❑ Average potential annual flow is about 7.7 million acre-feet.
- ❑ 50% of this must flow to Saskatchewan.

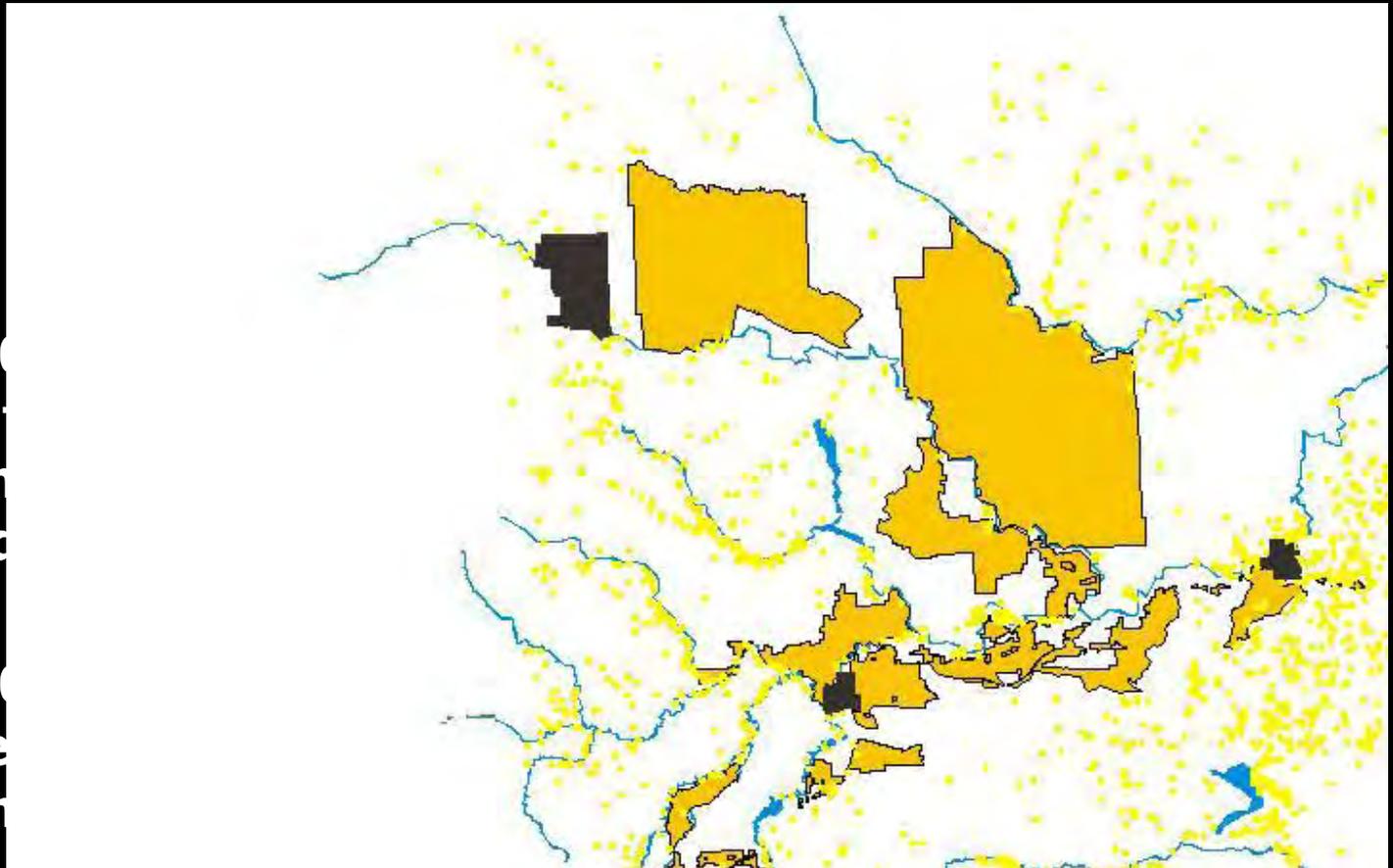
Irrigation in Alberta

- ❑ **About 640,000 ha of land is irrigated in both organized districts and private schemes.**
- ❑ **This accounts for 60% of Canada's total.**
- ❑ **Most of the irrigation takes place in the SSRB.**



Irrigation in Alberta

- About 52% of the irrigated area is located in organized irrigation districts.
- About 12% is in private development.



Water Storage Reservoirs

Are critical to an assured water supply during the irrigation season.



On-Stream



Off-Stream



On-stream Reservoirs = 5
Off-stream Reservoirs = 50
Total Storage ~ 2.5 M ac-ft.

Irrigation Conveyance Systems



**Conveyance Works
>8000 km
57% Open channel
43% Buried pipeline**



Conveyance System Improvements



From this . . .

. . . to this!



On-Farm Application Efficiencies

❑ 1965	34%
❑ 1980	58%
❑ 1990	60%
❑ 1995	65%
❑ 2010	74%
❑ Future	80%

Woods – ARD, 2010



A large center pivot irrigation system is shown in operation over a lush green field. The system's metal structure, including a central pivot point and multiple arms extending outwards, is visible. Water is being distributed through the system, creating a misty spray over the crops. The background shows a clear sky and a flat horizon.

Irrigation Efficiency

The irrigation industry currently uses 30% less water to grow a crop than 25 years ago.

Salinity Control

- ❑ **40% of the world's irrigation area is affected by excess salt.**
- ❑ **In the '70s and early 80's, 17-20% of the Alberta's irrigated land was affected by excess salt.**
- ❑ **Today, less than 1-2% is affected.**



SSRB Water Supply Study

□ Current Water Supply

- On Average, Alberta passes 80% of the apportionable flow to Saskatchewan (required to pass 50%).**
- This suggests that water may be available for additional use in Alberta.**

SSRB Water Supply Study

□ Current Water Demand

- Actual surface water use in the SSRB is estimated to be about 54% of the total volume allocated for use.**
- This is about 22% of the median natural flow of the South Saskatchewan River.**

SSRB Water Supply Study

Future Water Demand

- ❑ **By 2030 water use could increase by 53%.**
 - ❑ **Assumes a 32% expansion by irrigation districts in the Bow River Basin; and**
 - ❑ **A 19% expansion in the Oldman Basin.**

- ❑ **This expansion would increase water deficits to WCOs, junior private irrigation users and junior non-irrigation users.**

- ❑ **Climate change will likely have a significant impact on potential expansion.**

SSRB Water Supply Study

- ❑ **Storage Reservoir Management**
 - ❑ **Modifying operations of existing storage reservoirs could reduce or eliminate water deficits in the Red Deer and Bow Basins.**
 - ❑ **Glennifer Reservoir – Red Deer**
 - ❑ **TransAlta Reservoirs - Bow**

SSRB Water Supply Study

□ New Storage Reservoirs

- Additional on-stream storage of >800,000 acre-feet may be possible in the SSRB.**
- On-stream storage is preferable to off-stream storage in order to capture winter runoff that may occur with climate change.**

Planning to construction of a new on-stream reservoir will require 15-20 years.

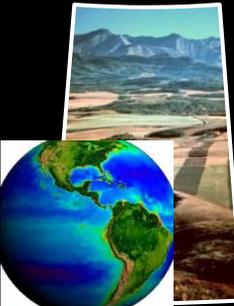
Water fight looms in Alberta

Stelmach ready for opposition of green groups

By Renata D'Aliesio, Calgary Herald November 8, 2010

“Premier Ed Stelmach says the province will have to store more water in parched southern Alberta to promote job and industrial growth, even if the controversial practice -- which could include more dams -- doesn't sit well with some environmental groups”.

Climate Change



Climate Change

- **The agricultural industry has always adapted to changing climatic conditions on the prairies.**
- **However, accelerated changes in our climate will require faster adaptation than ever before.**

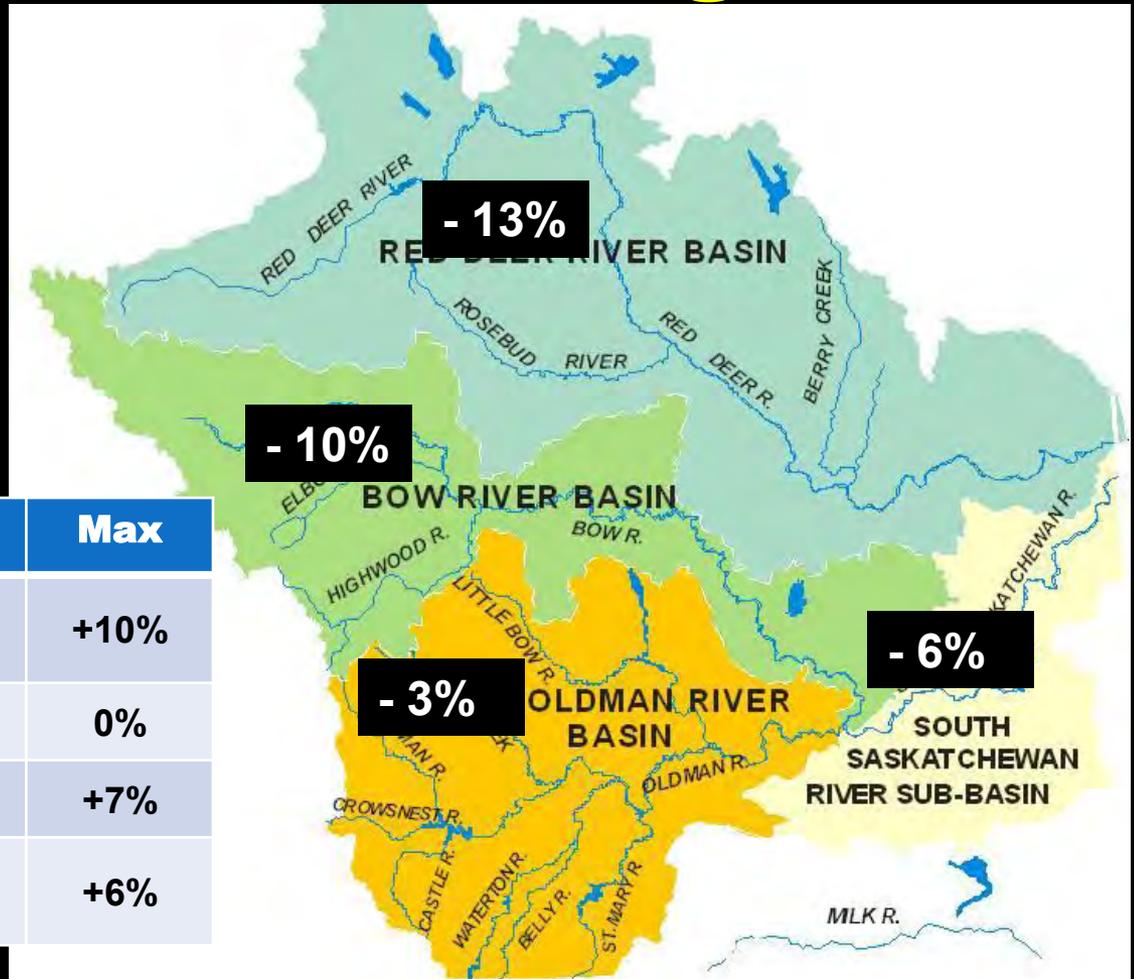
SSRB Water Supply Study

Climate Change

□ Future Water Supply

- Reduction in stream flows will likely occur as a result of Climate Change.**
- Reduction in glacier area in the Bow River Basin give rise to concerns about the sustainability of the Bow River in late summer/fall.**

Changes in Natural Flow due to Climate Change



River	Site	Min.	Mean	Max
Red Deer	Red Deer	-30%	-13%	+10%
Bow	Calgary	-19%	-10%	0%
Oldman	Leth.	-14%	-3%	+7%
South Sask	Med. Hat	-17%	-6%	+6%

Climate Change and Crop Water Demands

- ❑ **Based on current climate change predictions, additional water needs will be most pronounced in forages and root crops.**



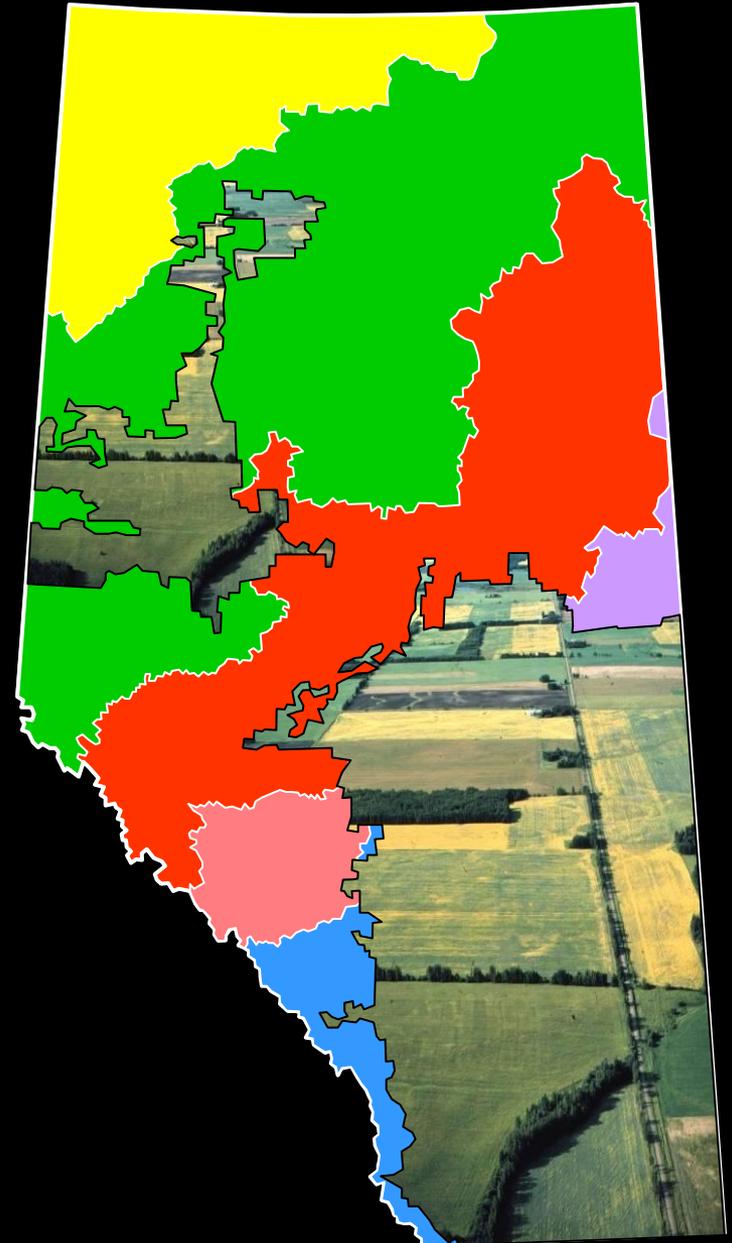
Alfalfa



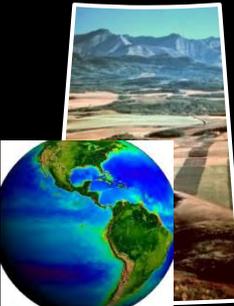
Potatoes

Climate Change and Crop Water Demand

- ❑ **A 2° C increase will require 28% more water for alfalfa.**
- ❑ **A 4° C increase in temperature will require 63% more water.**
- ❑ **An additional 425,000 acre-feet of irrigation water will be required within the irrigation districts (~20% more water than is currently diverted).**



Water Quality





Environment



Economic Drivers



Societal Values

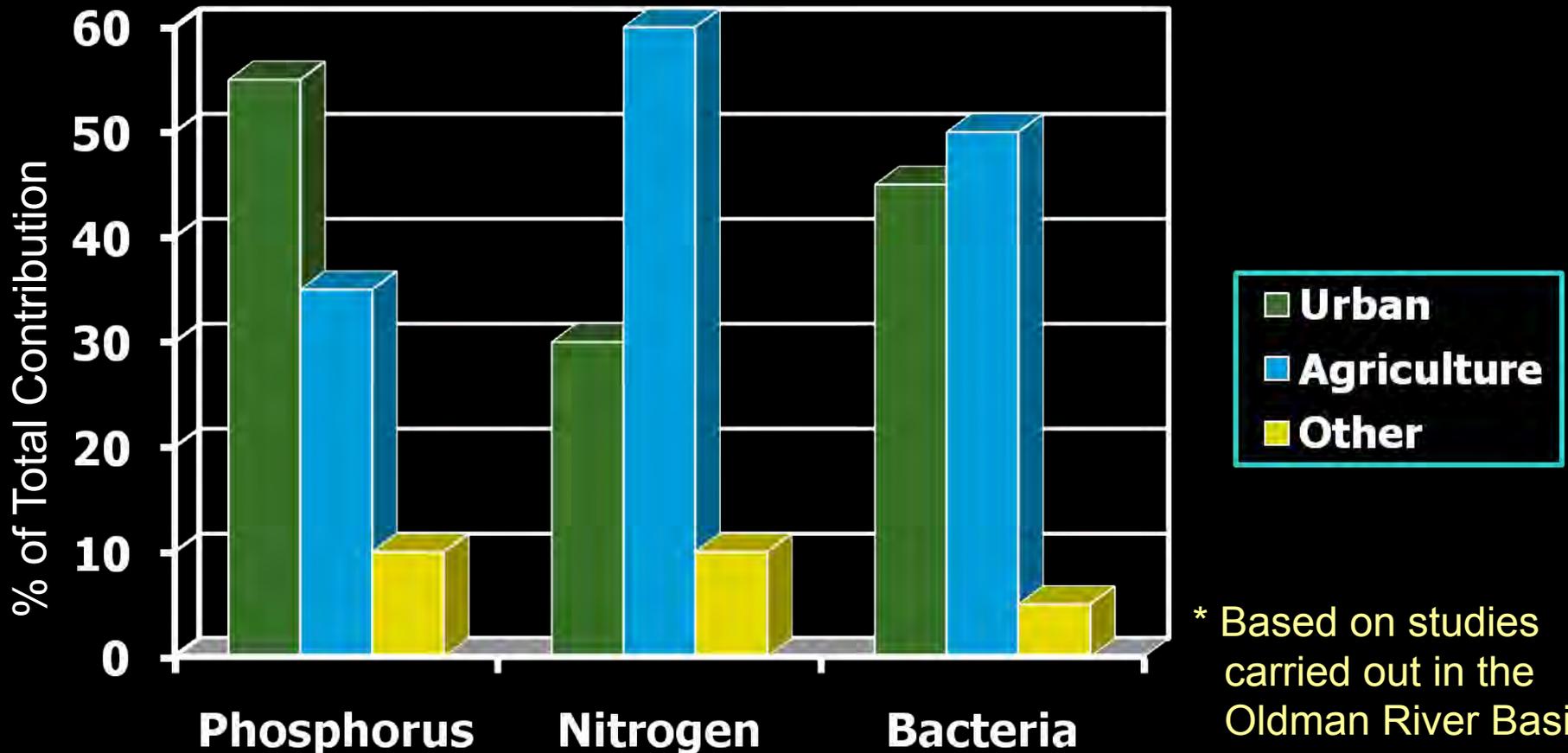


Water Quality - Agriculture's Impact

- ❑ **Agriculture is a significant contributor to water quality degradation in Alberta.**
- ❑ **Livestock manure is considered to be the main agricultural contributor to water quality degradation.**

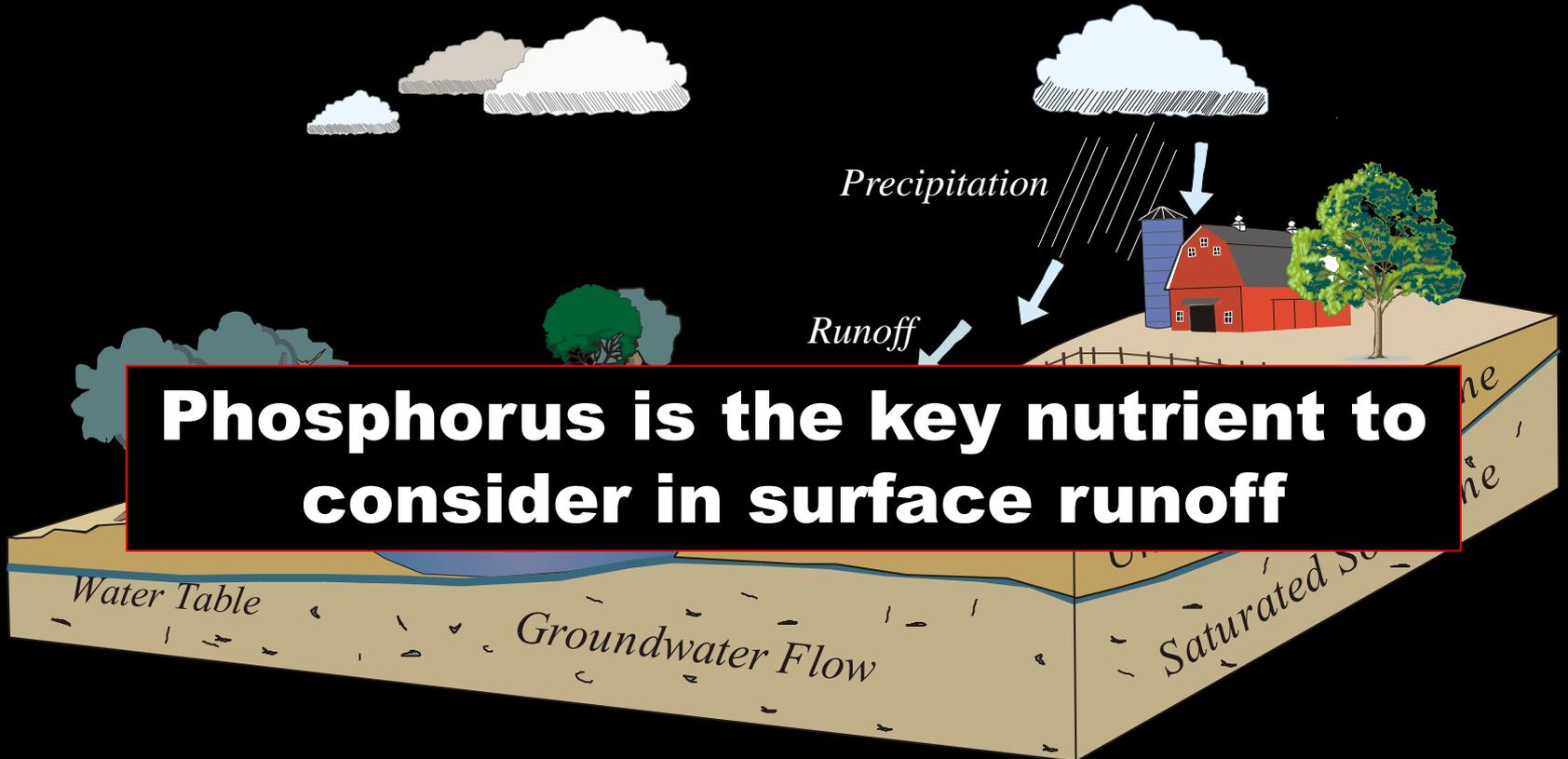


Sources of Key Water Quality Contaminants*

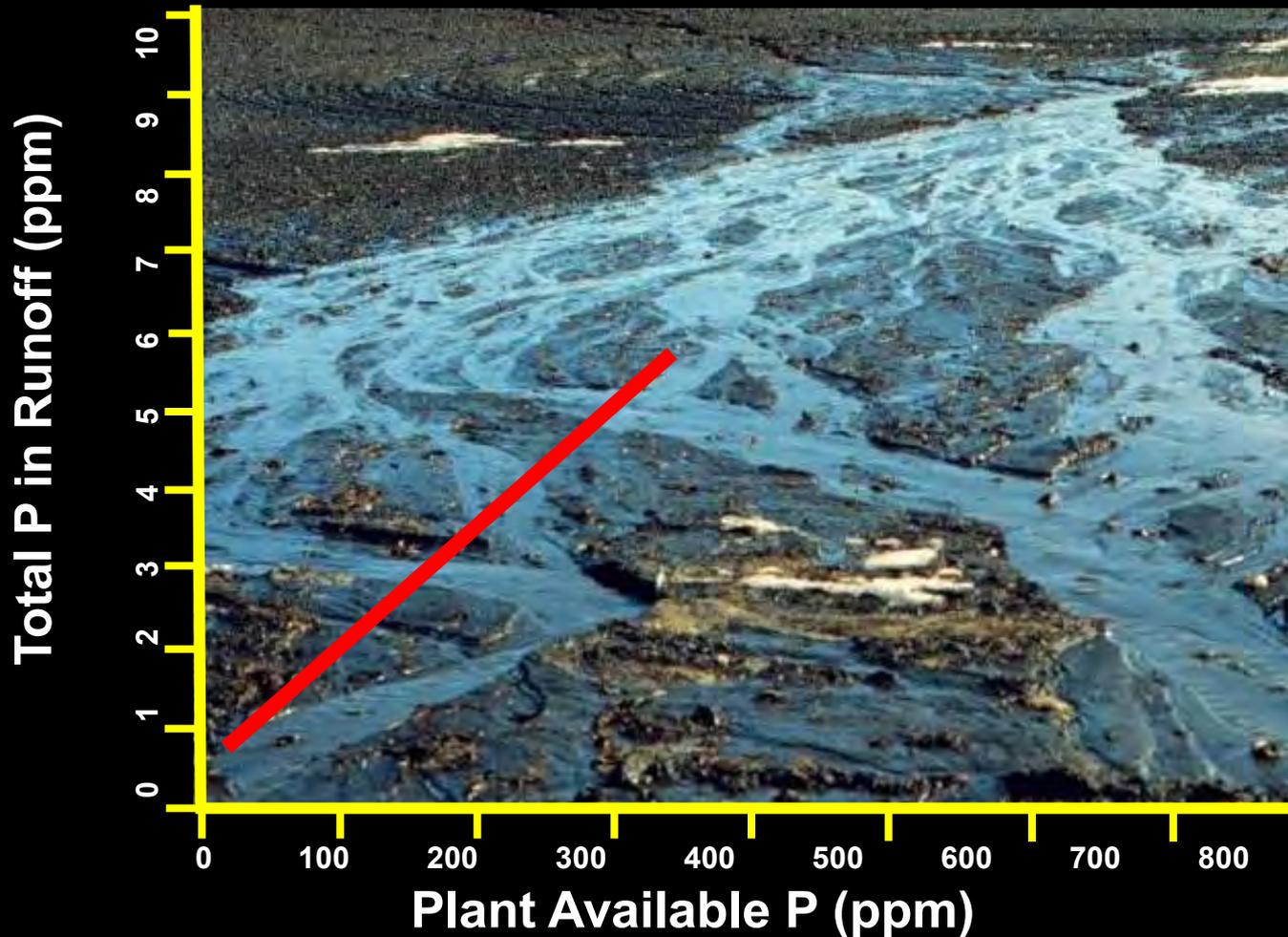


* Based on studies carried out in the Oldman River Basin.

Surface Runoff



Relationships of Phosphorus (P) in Soil and Runoff Water



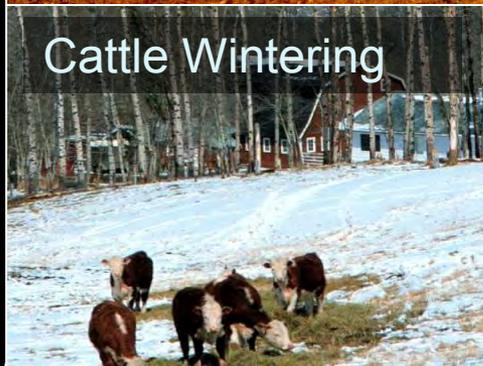
Nutrient Losses



Manure Spreading



Cattle Wintering



Direct Access



Fertilizer

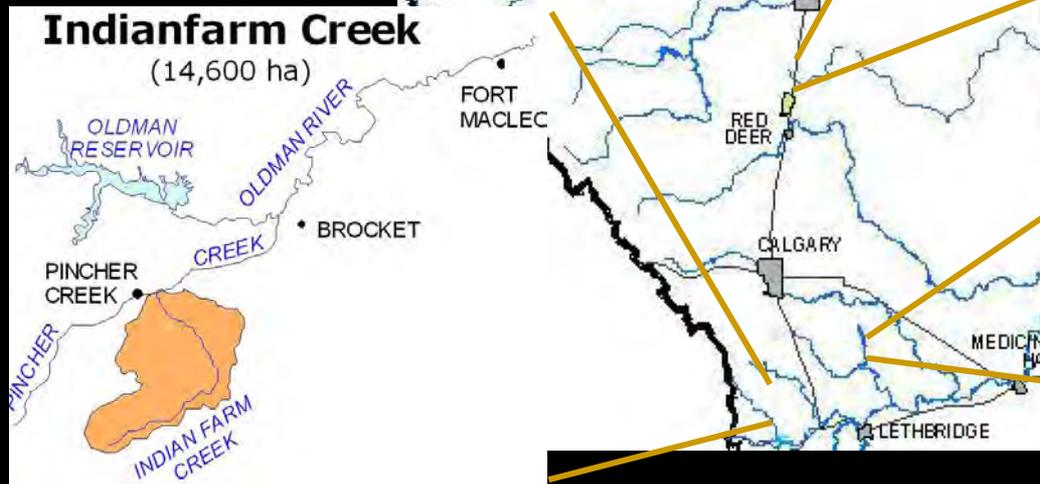
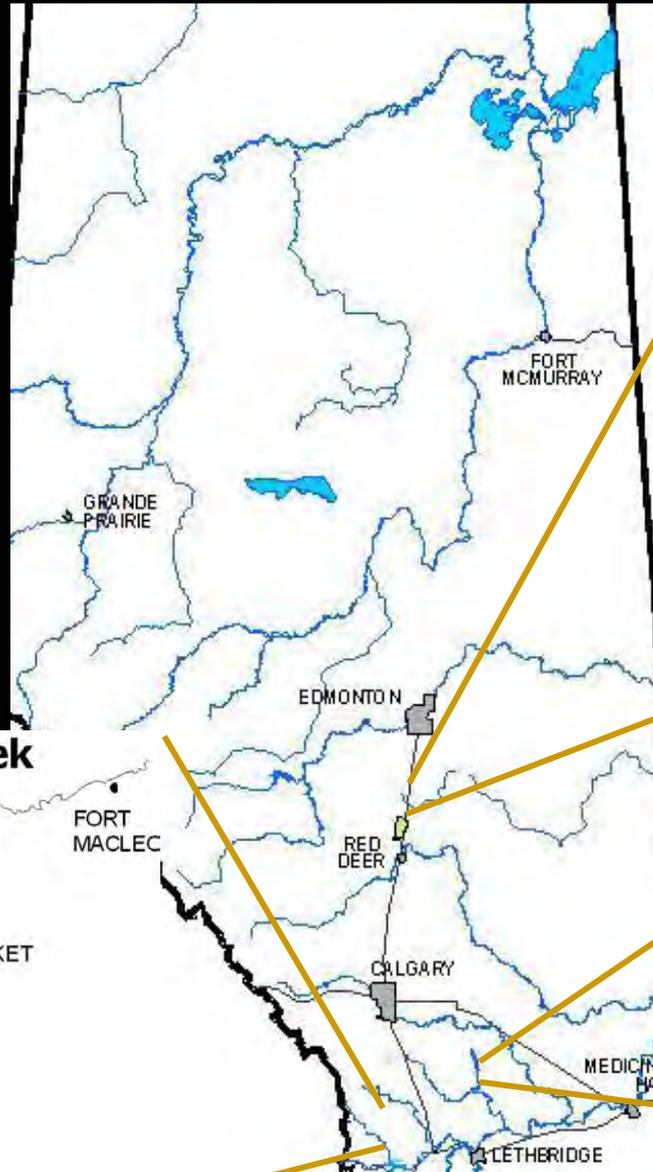


Finding Solutions

- **Both government and industry have been working together to resolve this issue.**
- **Our current focus is testing solutions that are practical – and will resolve the problem in all agricultural regions of the province.**

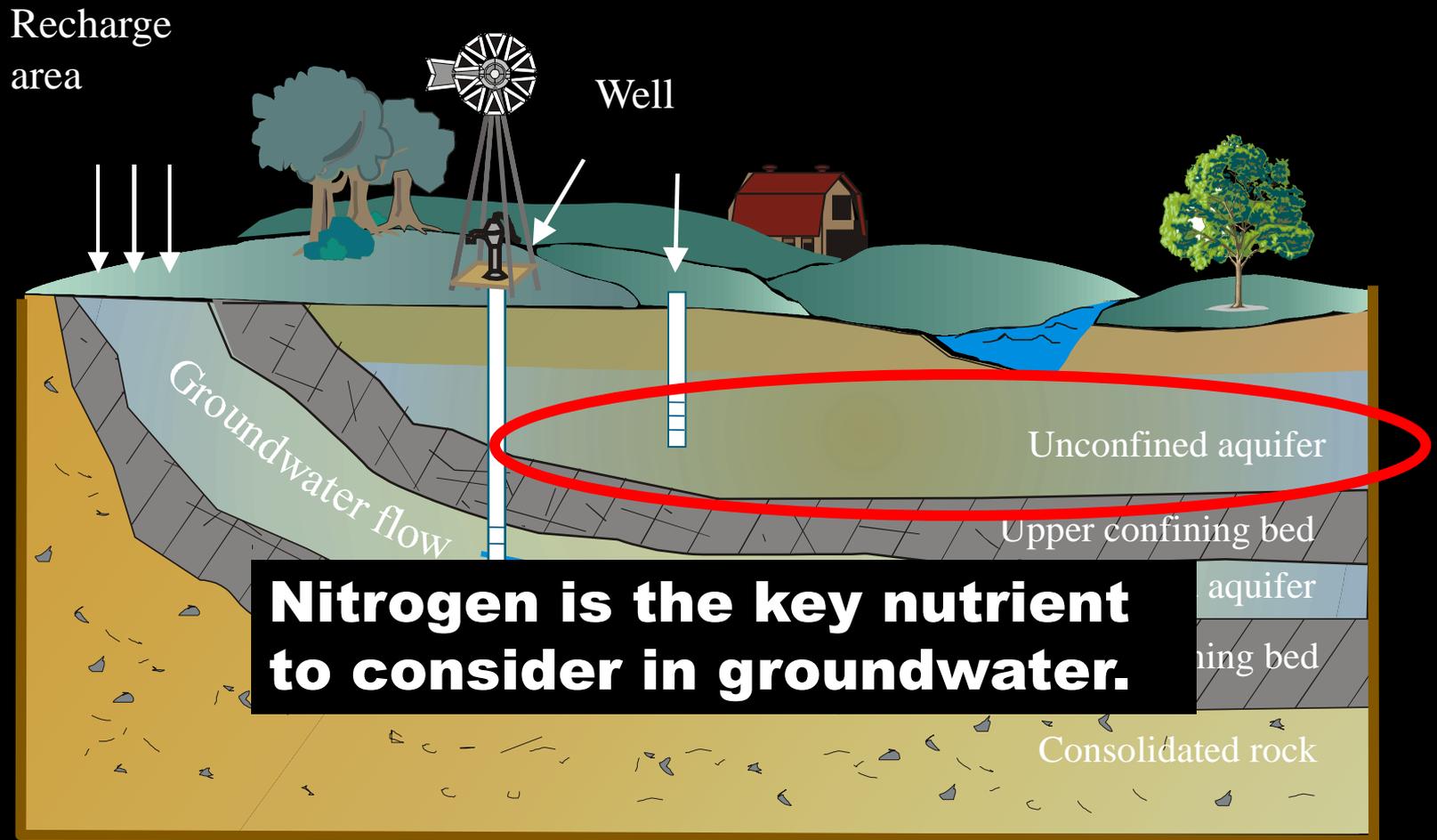
Finding the Solutions

BMP Study Watersheds



Battersea

Impacts on Groundwater Quality

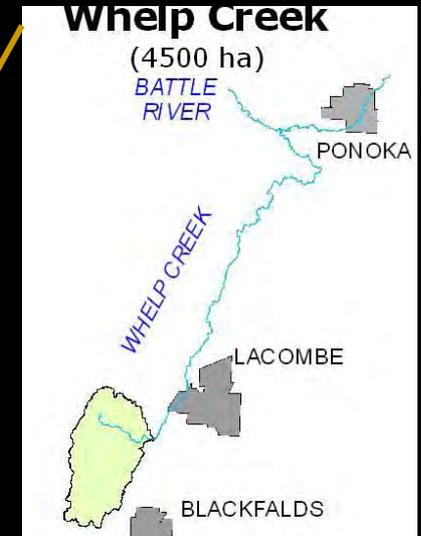
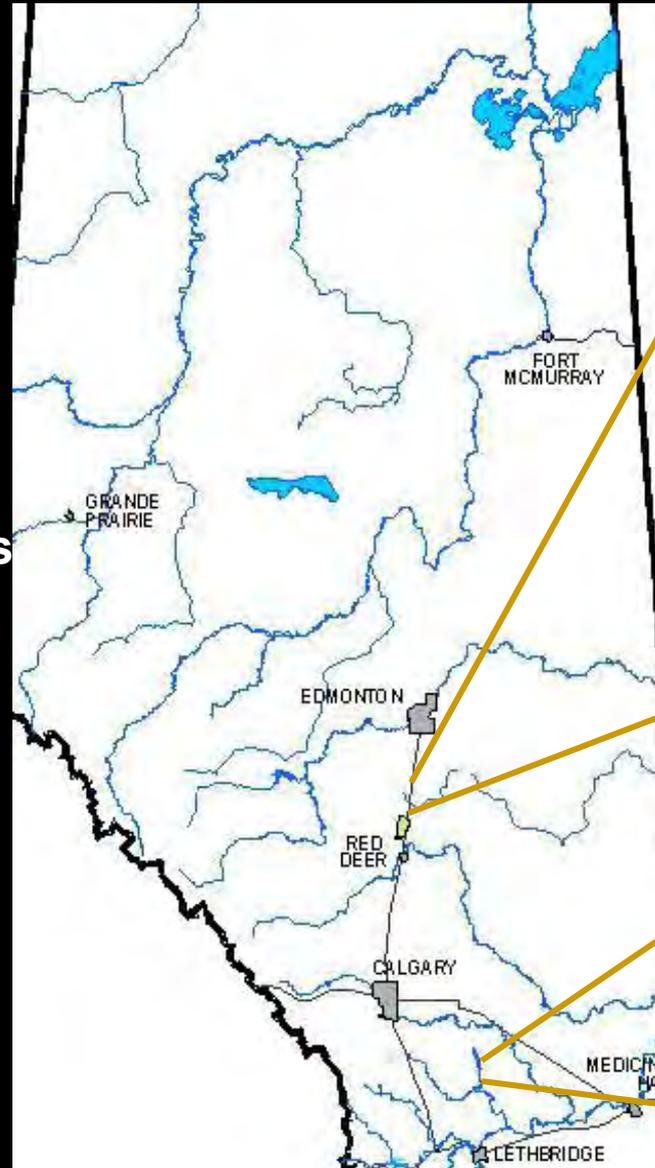


Study to Assess Impact of Confined Feeding Operations and Manure Spreading on Groundwater Quality



Groundwater Research Sites

- ❑ The groundwater sites are in the same watersheds as the BMP research.
- ❑ BMPs for surface and groundwater quality protection are expected to be the same.



Battersea

Summary

- **Future water shortages will force many countries to import increasing amounts of raw and processed food products.**
- **Canada and Alberta, with relatively abundant water supplies, can become “agricultural powerhouses” - with good water management leadership.**
- **Adapting to future climate change impacts on water supply must be a high priority.**
- **Agricultural practices that minimize environmental impacts not only improves industry’s social license in Alberta, but increases market access to the world.**
- **Continued industry leadership to improve water use efficiency, increase productivity, and mitigate environmental impacts is required.**

