

Sustainable Irrigation Development in Alberta

**Irrigation and the Environment Workshop
"Challenges and Opportunities"**

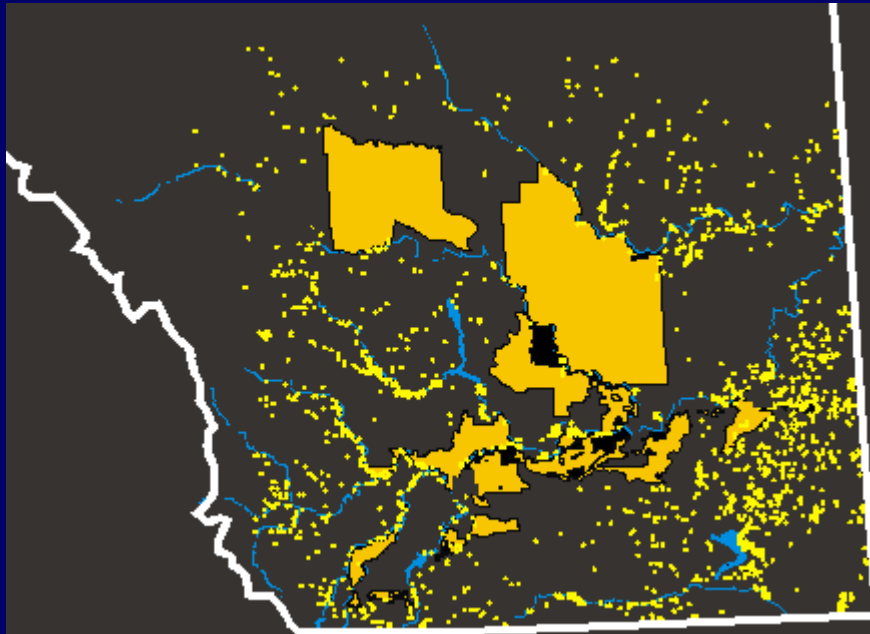
March 22 - 23, 2006

Saskatoon, Saskatchewan

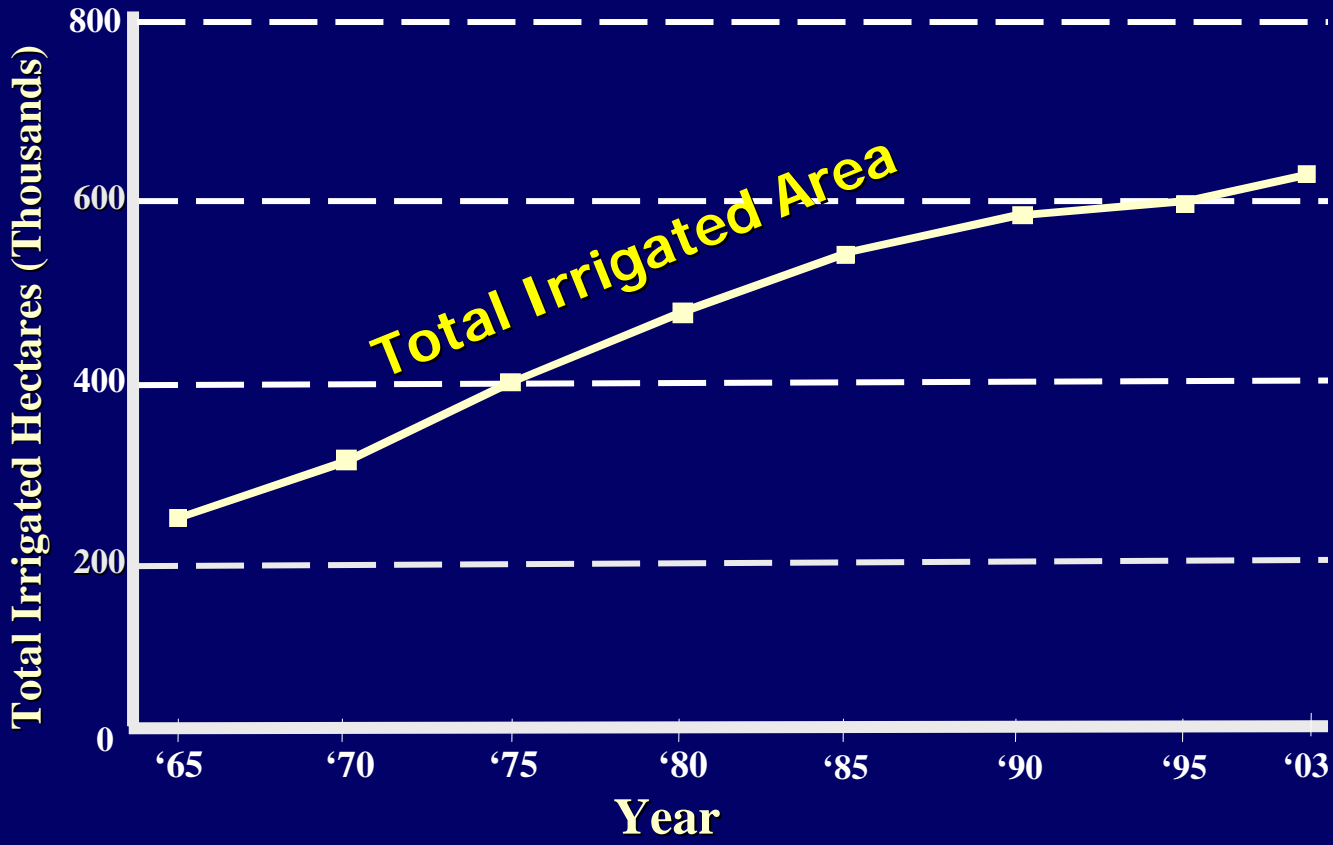


Irrigation in Alberta

- About 640,000 ha of land is irrigated in both organized districts and private schemes.
- Most of that is located in the South Saskatchewan River Basin.



Alberta's Irrigation Growth



Water Storage Reservoirs

On-stream Reservoirs = 5

Off-stream Reservoirs = 50

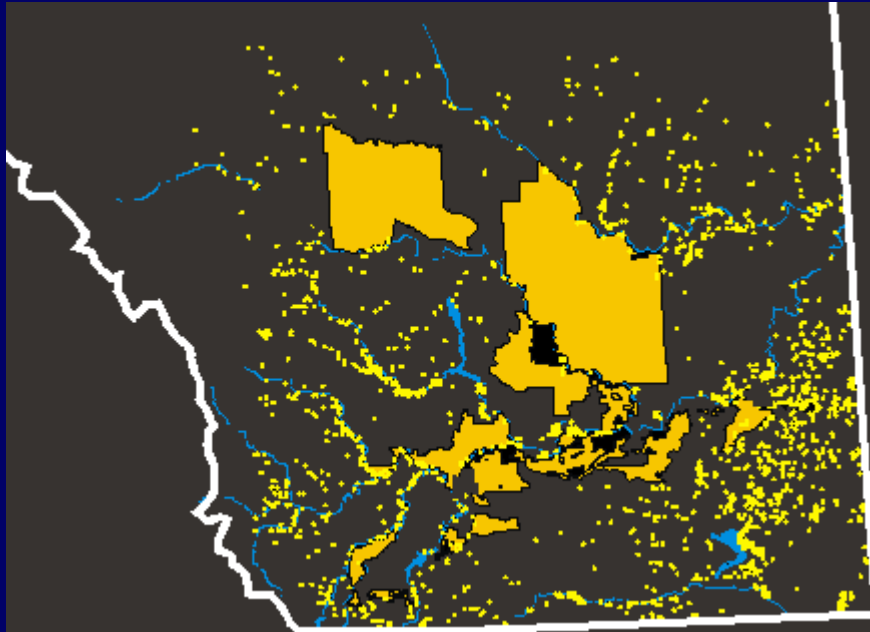
Total Storage ~ 3.0 M dam³



Irrigation Expansion Potential

Irrigation District expansion will utilize existing water license allocations.

- ❑ Irrigation Districts could expand by 10-20% (50,000-100,000 ha)
- ❑ An additional 50,000 ha in private projects could be developed.

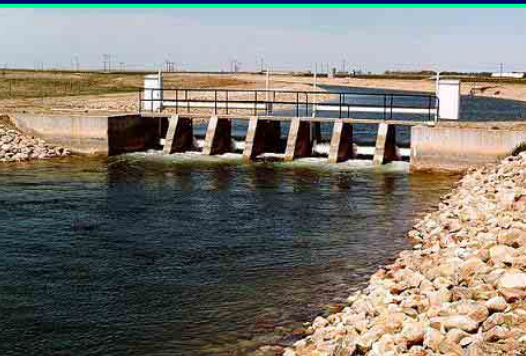


Irrigation Efficiency

Today we use 30% less water to grow a crop than we did 25 years ago.



Irrigation Conveyance Systems



Irrigation Efficiency Gains

On-Farm



4.5% of gross diversion

Reservoir Evaporation



0% of gross diversion

Conveyance Works



1.2% of gross diversion

Return Flow

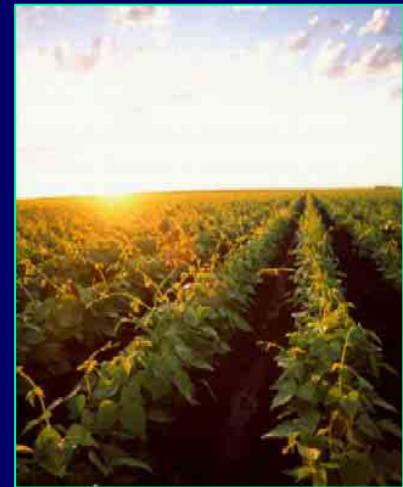


14% of gross diversion

Total Potential Gain ~ 20%

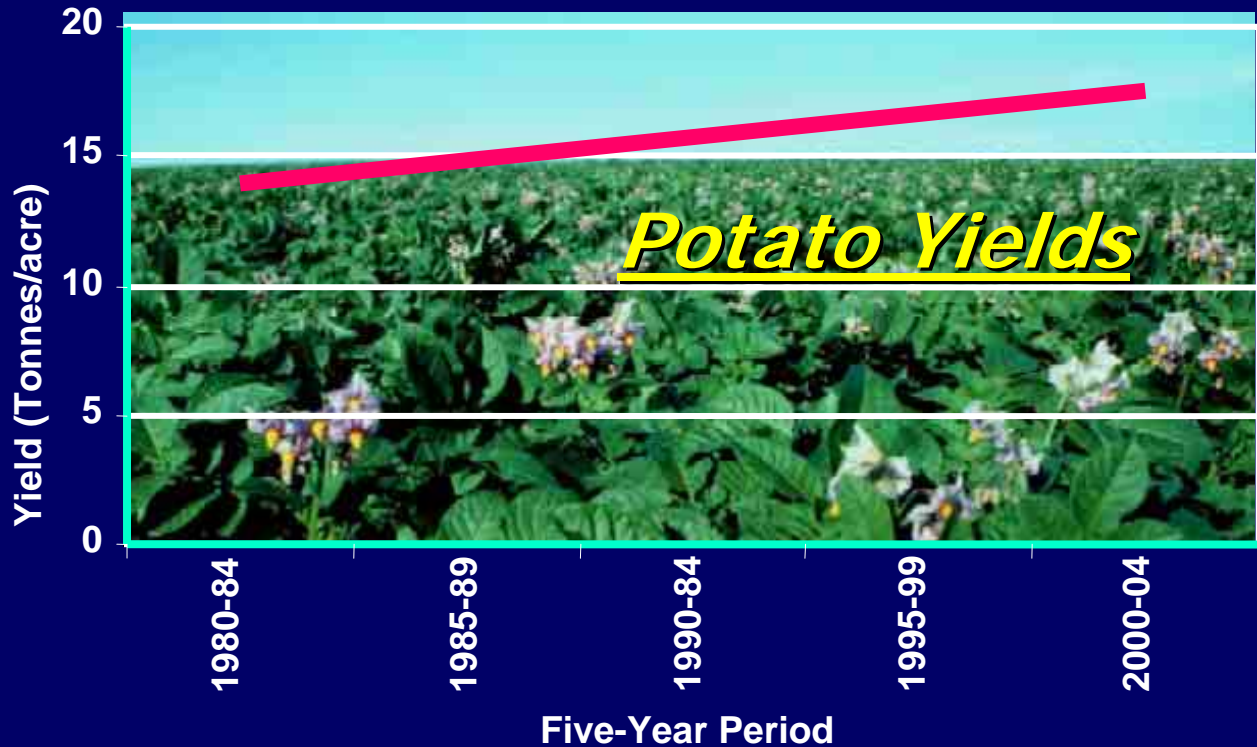
Salinity and Waterlogging

- ❑ 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.



Irrigation Intensification

- Increase Crop Production
 - Increase yield
 - Increase cropping intensity



Increasing Cropping Intensity



Double cropping of Silage Barley could be common within the next decade.



3 Cereal crops every 2 years is possible now.



Value Adding



1-2 jobs



5-10 jobs



5-10 jobs



20-50 jobs



200-1000 jobs



Ready-to-eat meals

> 1000 jobs

Irrigation Expansion

Private Projects

Red Deer Basin

- SAWSP – 10,000 ha
- Acadia – 10,000 ha

Bow River Basin

- Siksika Nation – 6,000 ha
- Little Bow/Highwood – 8,000 ha*

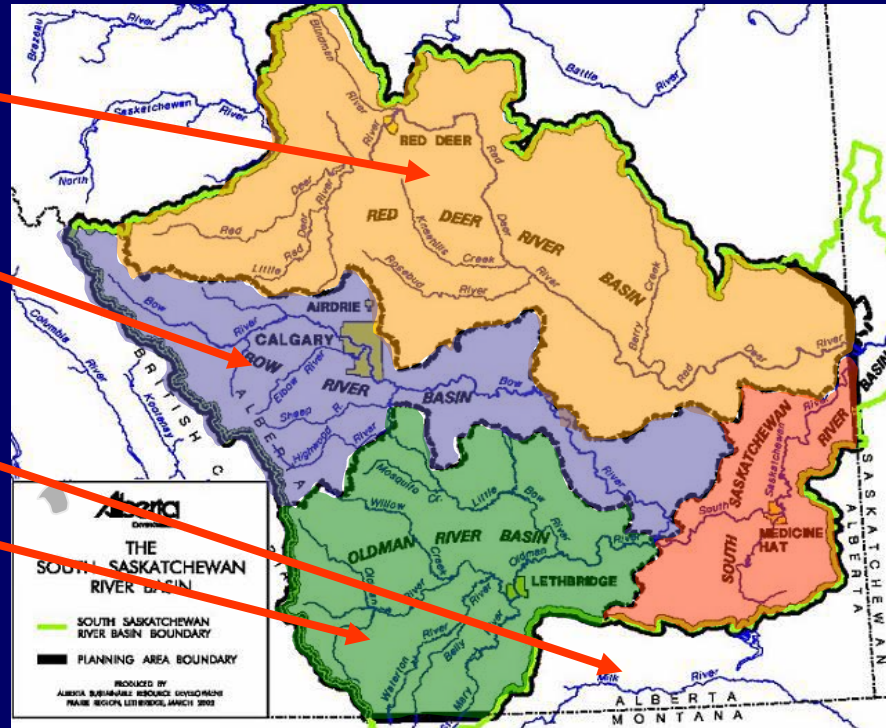
Milk River Basin

- 6,000 ha

Oldman River Basin

- Keho/Barons – 4,000 ha*
- Piikani Nation – 6,000 ha
- Pine Coulee – 5,200 ha*
- Western Oldman – 2,400 ha
- Oldman Reservoir – 6,000 ha

* *Construction planned, ongoing, or completed*



Environmental Challenges

Alberta's "Water For Life Strategy"

Three key outcomes:

- Safe, secure drinking water supply;
- Healthy aquatic ecosystems;
- Reliable, quality water supplies for a sustainable economy.



Number 1 Environmental Issue

Protection of the aquatic ecosystem.



Issues

Water Supply

Water Quality

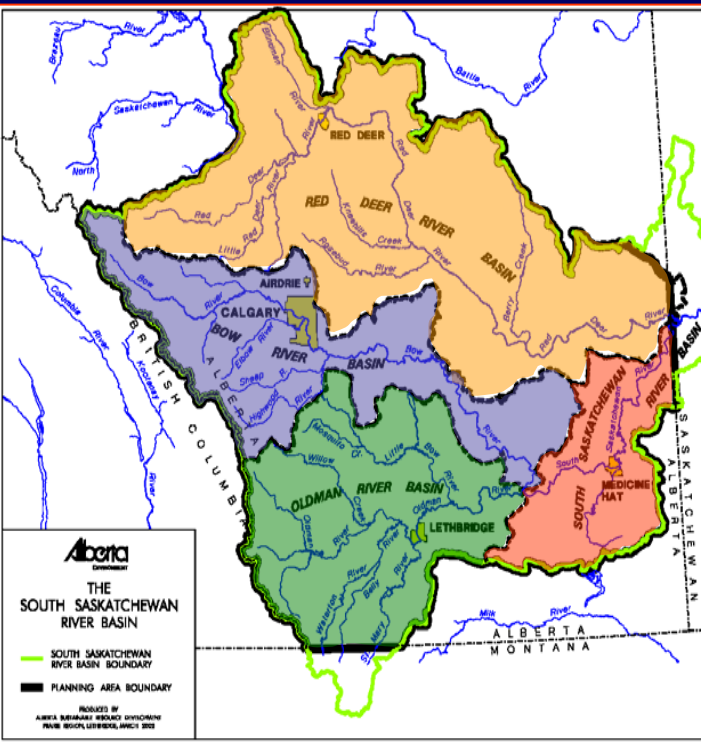
Water Supply:

Water Use in the South Sask River Basin

- Total natural flow – 9.2 million dam³/yr.
- Apportionment – 4.6 million dam³/yr (50% of natural flow) must go to Saskatchewan

Use	Withdrawn Dam ³ /yr	% of Natural Flow	Consumed Dam ³ /yr	% of Natural Flow
Irrigation	2.6 Million	28	2.0 Million	22
Stock Water	142,000	1.5	99,000	1.1
Other Agric.	61,000	0.7	12,000	0.1
Municipal	375,000	4.1	91,000	1.0
Industrial	145,000	1.6	69,000	0.8
Water Mgt.	132,000	1.4	32,000	0.3
Total	3.5 Million	38	2.3 Million	25

SSRB Water Management Review



Recommendations

- ❑ Minimum water conservation flows be established for all rivers.
- ❑ The Bow and Oldman Basins be closed.
- ❑ Red Deer water allocations be capped.

New Storage?

- ▣ Alberta presently sends about 75% of the SSRB's natural flow to Saskatchewan.
- ▣ As a result, there is some potential for additional storage in Alberta.
- ▣ However, new storage reservoirs will not likely be used to support irrigation expansion.



Water Quality

Agriculture's Impact on Water Quality

- Excess nutrients and bacteria are entering our surface and ground water resources as a result of agricultural management practices.
- Irrigation represents the most intensive agricultural management in Alberta.





Livestock manure is considered to be the main agricultural contributor to water quality degradation.

Most of Alberta's livestock feeding industry is associated with irrigation.

Irrigation's Additional Impact

Intensive management of special crops is also having an impact on water quality.



Pipelines

Replacement of surface canals with pipelines will minimize nutrient losses to surface water.



An Emerging Water Quality Issue

□ Food Safety

- Food retailers are beginning to express concern about the quality of irrigation water used to grow crops.



Conclusions

- Water supply issues will be the main issue facing the irrigation industry in the next decade.
- Water quality issues (both surface and groundwater) may be the more important long-term issue facing both dryland and irrigated agriculture.