

Impact of Drought on Water Supplies in Alberta

**Presentation to the
Drought Research Initiative
Workshop # 2**

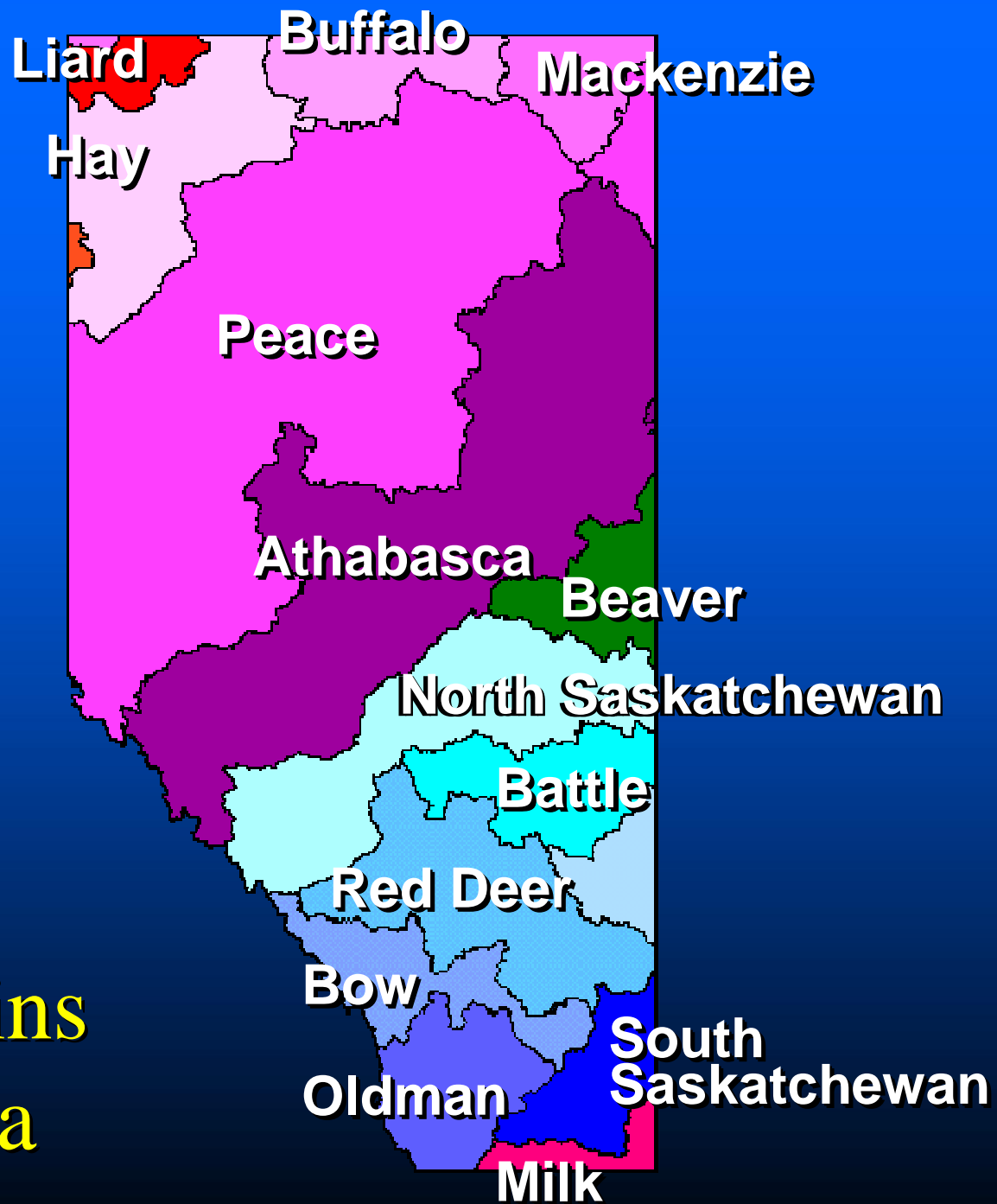
**Winnipeg, Manitoba
January 11, 2007**

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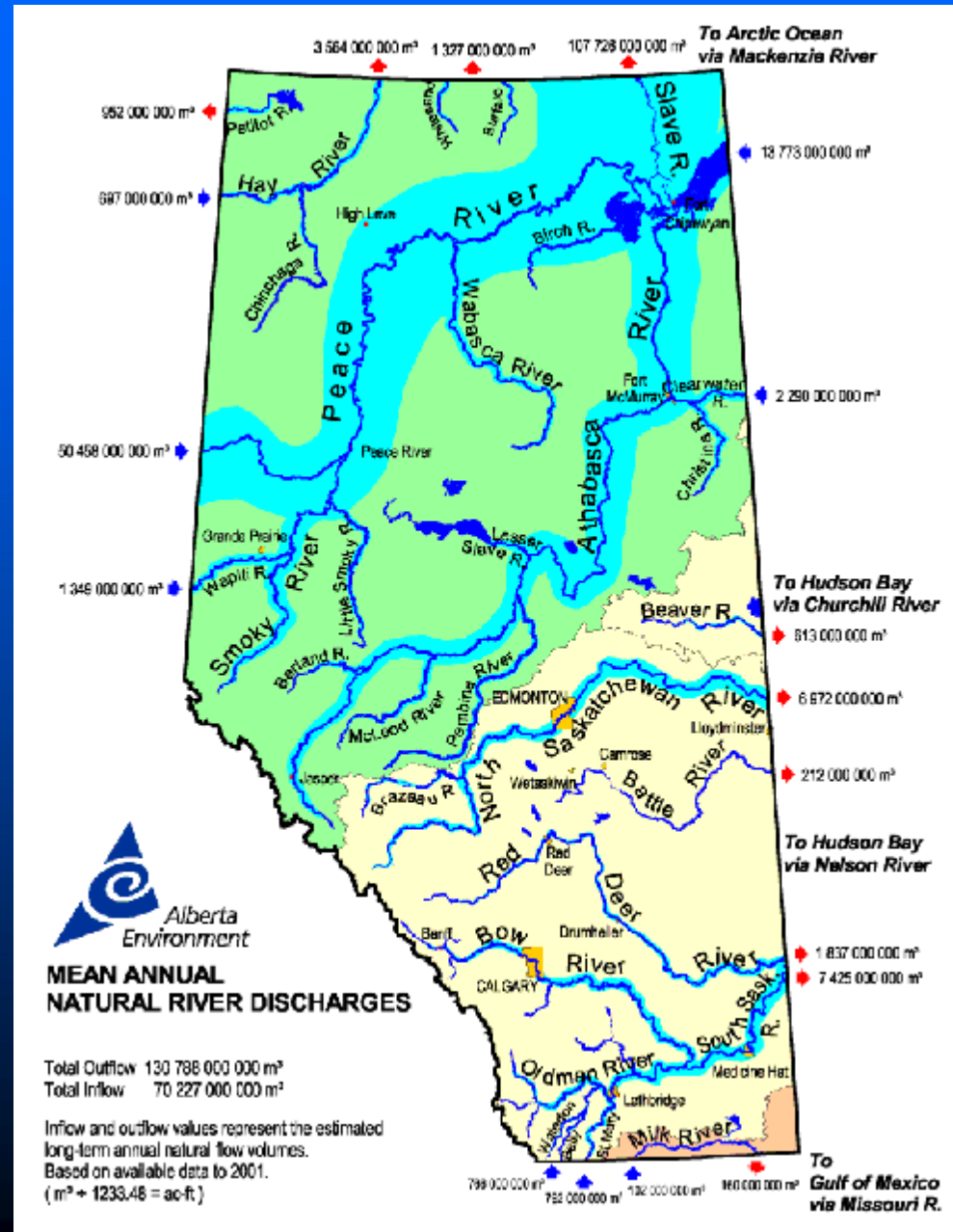
Southern Alberta – September 2001

**Major
River Basins
in Alberta**



Alberta River Basin Flow Volumes

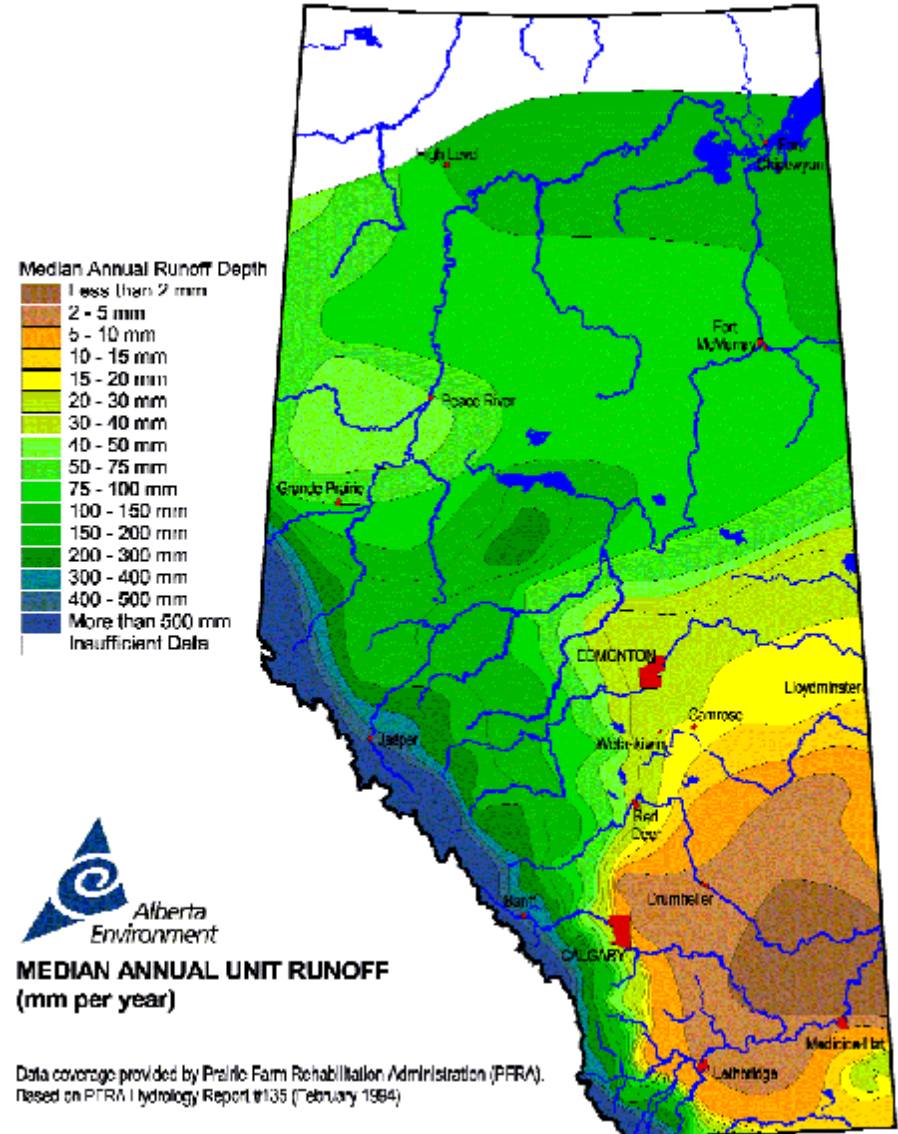
- Where does Alberta's water go?
 - 87% flows north
 - 13% flows east
 - 0.1% flows south
- Water supply is not balanced with the distribution of population or development



Water Supply Concepts – The Alberta Context

- **Alberta Water Numbers (averaged over the Province)**
 - Precipitation: ~510 mm (ranges from 300 mm to more than 1000 mm)
 - Evaporation: ~650 mm (ranges from 550 mm to 800 mm)
 - Runoff: ~90 mm, or about 60.6 billion m³
 - Average annual precipitation exceeds average evaporation/evapotranspiration demand in most of Alberta.
- **Bottom Line: Alberta is relatively dry (semi-arid climate overall)**
 - Has only 2% of Canada's water resources

Median Annual Runoff



Impacts of drought in Alberta

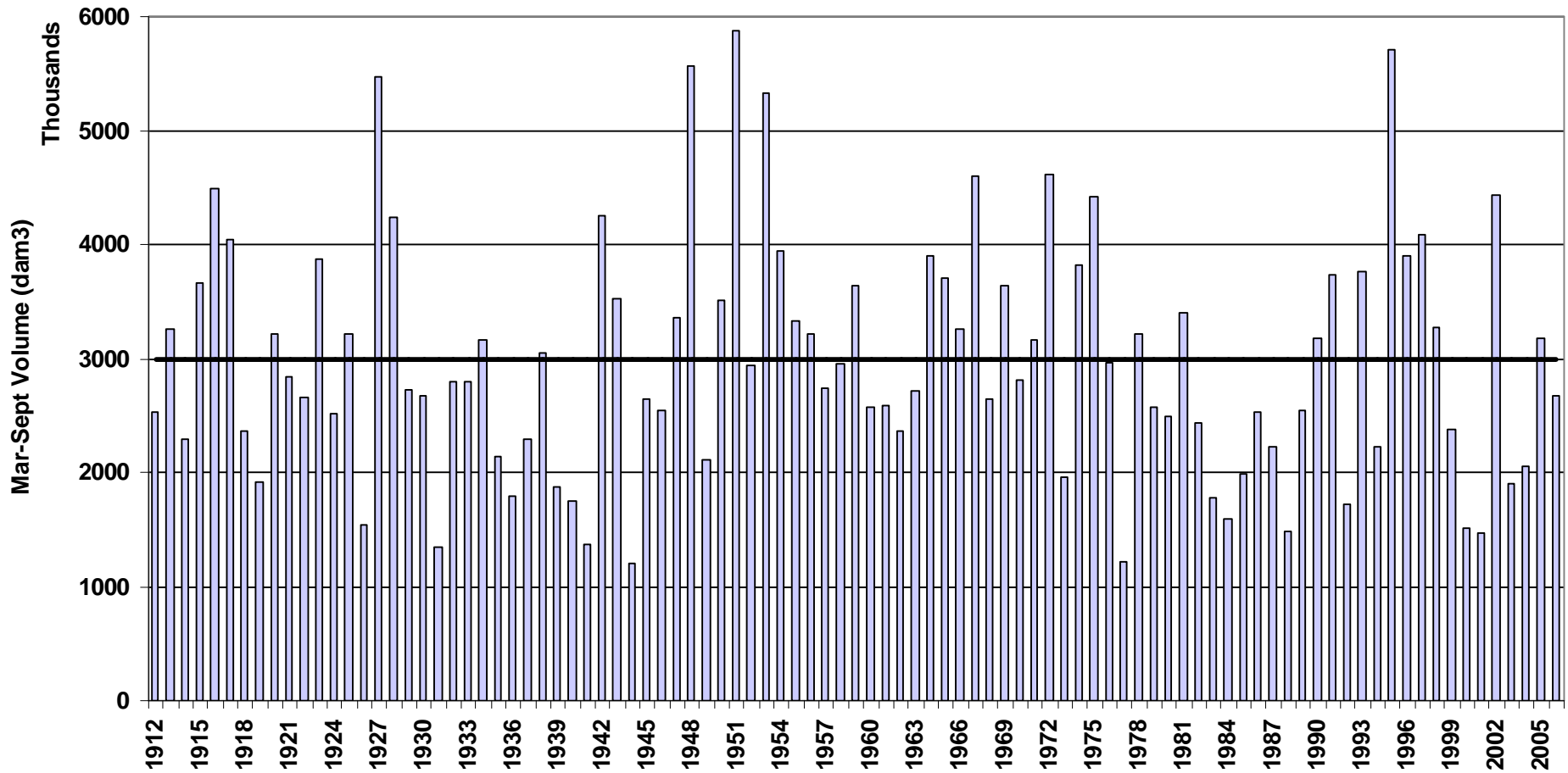
- Water supply: Primarily concerned with droughts in mountains/foothills
- Water demand: Primarily concerned with drought in prairie areas

However:

- Water demand is typically is inverse to supply
- Precipitation thus river volumes are extremely variable
- Water resources are fully allocated in portions of the province, thereby putting increased pressure on forecasting supplies

River Volume Variability

Oldman River at Lethbridge
March to September Natural Flows 1912-2006



Water Supply Forecasting

- **Current conditions reporting assesses snowpack, precipitation and soil moisture conditions and their impact for runoff potential**

08-2001

- **Runoff forecasts and current conditions are updated monthly and published in the Water Supply Outlook for Alberta (20 forecast points)**

- **Runoff forecast used by others to plan allotment of reservoir water supplies for irrigation, hydroelectric, and community & municipal purposes and reservoir operations**

09-2002

Alberta
AGRICULTURE, FOOD AND
RURAL DEVELOPMENT

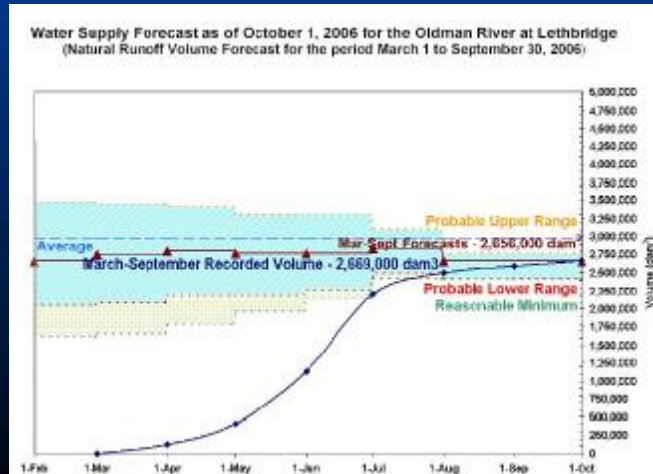
Water Supply Forecasting

- In drier than normal years since 2000, the capability of forecasting supply has been pretty good

The average percentage difference between the March to September forecasts and recorded natural runoff:

<u>Basin</u>	<u>2006</u>	<u>2004</u>	<u>2003</u>	<u>2002</u>	<u>2001</u>
Milk	+13.9%	+6.7%	+13.0%	-52.8%	+4.2%
Oldman	+2.7%	+2.4%	+7.8%	-115.0%	+4.5%
Bow	+10.2%	-5.2%	+5.2%	+4.0%	+7.6%
Red Deer	+5.0%	-5.6%	-25.0%	+16.0%	+5.3%
North Saskatchewan	-5.4%	-4.1%	-11.4%	+7.0%	+3.8%

Issue really is: how do we forecast and manage demand!

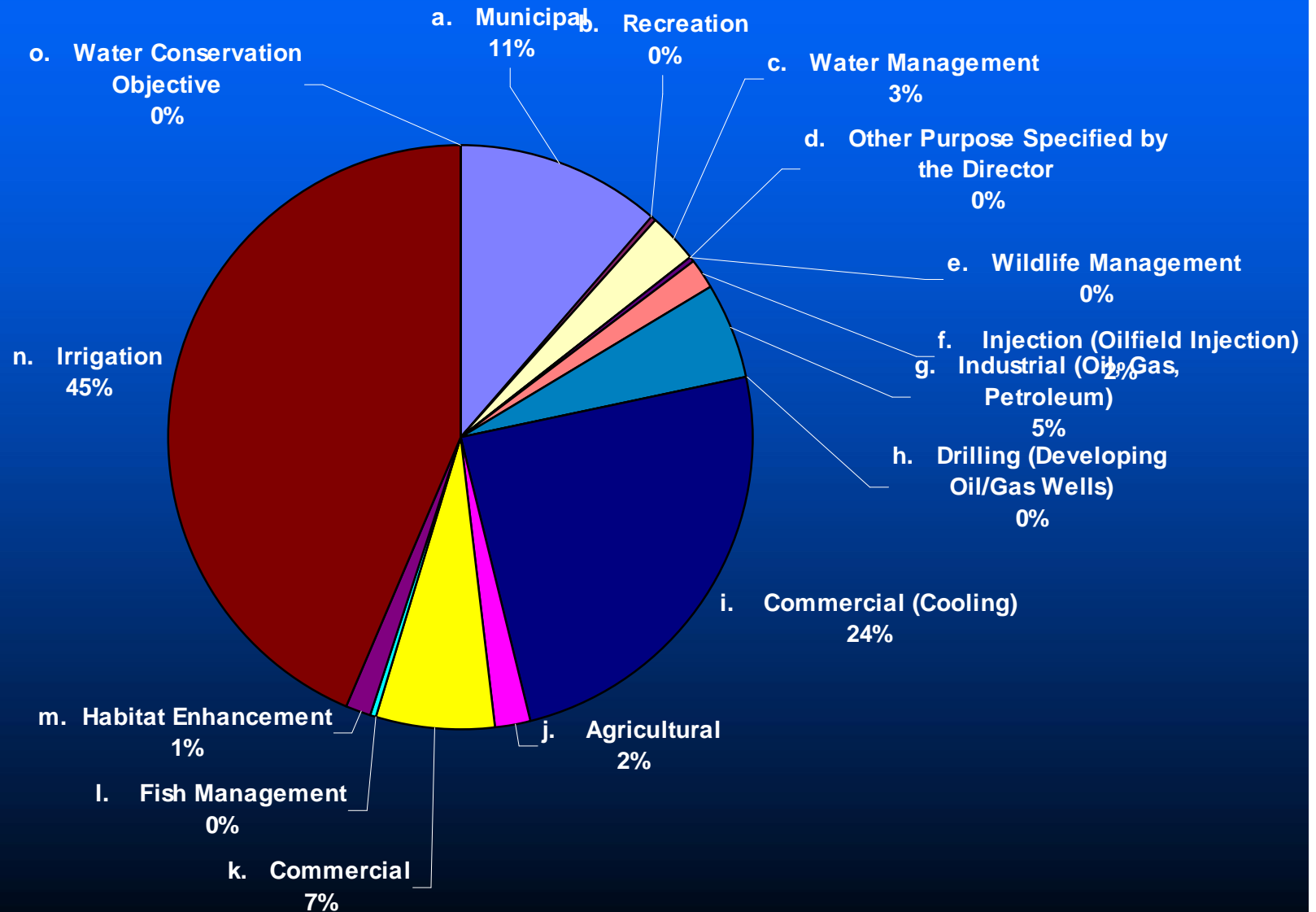


Water Supply Reservoirs

- Large amount of water infrastructure located in South Saskatchewan River basin
 - Reservoirs are located close to the mountains to supply water for irrigation and cities
- Reservoirs supply water to users during periods of high demand
 - Peak irrigation high demand occurs in the summer (June-August)
 - Peak supply occurs in May and June
- Forecasts provide irrigation operators with future runoff expectations to produce supply scenarios for farmers, communities and other stakeholders

Water Allocation in Alberta

Water Allocations in Alberta by Specific Purpose (Surface plus Groundwater, based on existing licences as of 2006)



What can drought forecasting do?

Improved drought forecasting capabilities would:

- Improve water management planning by impacting the operation of reservoirs
- Allow decision makers to decide how the water available should best be used (ex. Oldman River Water Sharing Agreement in 2001 and 2002)
- Key for managing drought is preparation and planning

Current Initiatives for Drought Planning

- Water Strategy – planning/allocation
- South Saskatchewan River Basin review – water licenses closed
- Improved monitoring of drought conditions
 - Agriculture Financial Services Corporation, Alberta Agriculture and Alberta Environment cost sharing on 67 new meteorological sites to be installed in 2007