

How Vulnerable are Prairie Communities' Water Supplies?

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Presentation at the 60th Annual National Conference of the
Canadian Water Resources Association
Saskatoon, Saskatchewan 26 to 28 June 2007



Outline

- Objectives
- Methodology
- Adaptation Strategies Implemented
- Drought Impacts
 - Bio-physical
 - Socio-Economic
- Conclusions

Objectives

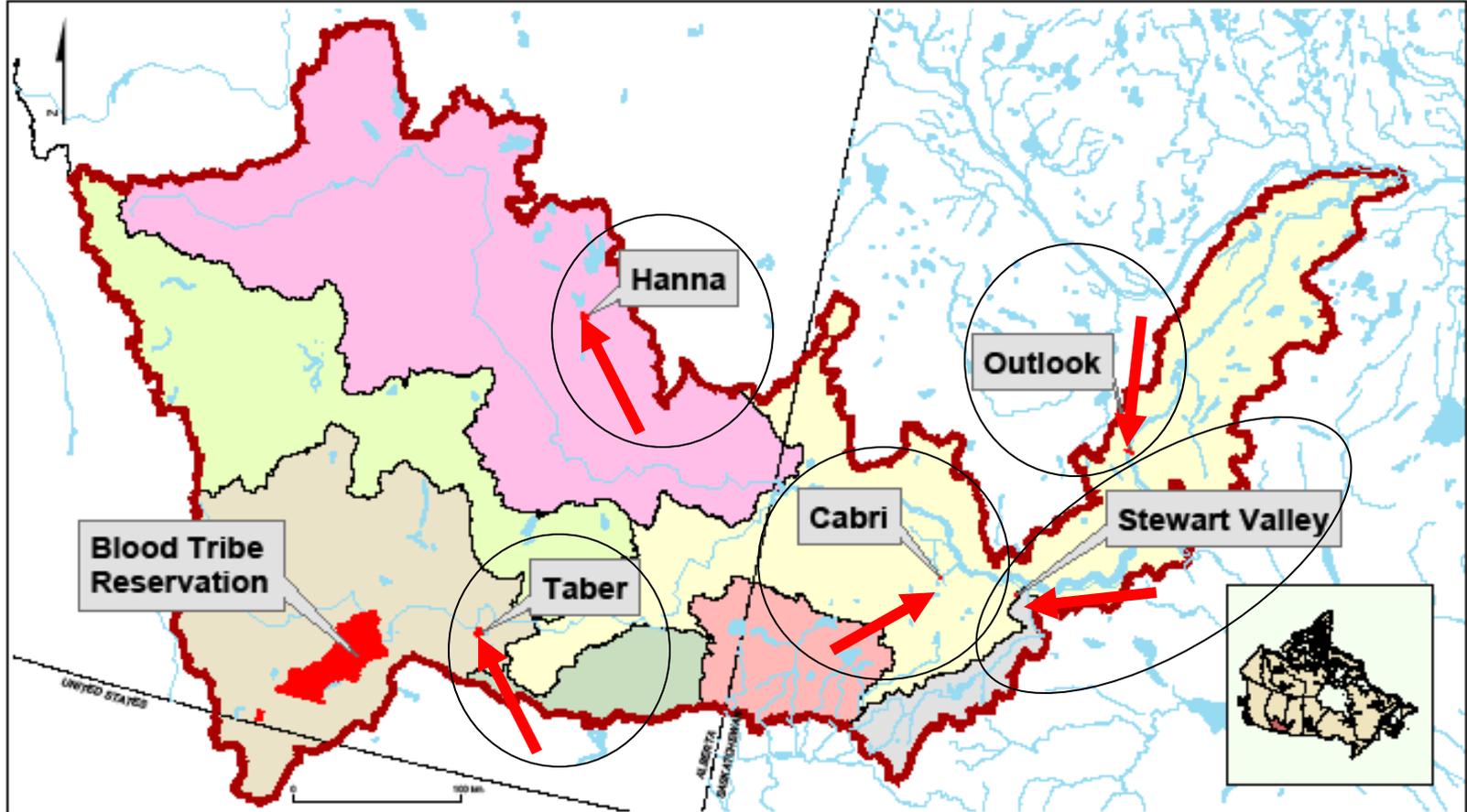
- To investigate the bio-physical and economic impacts of the 2001 and 2002 droughts on various rural communities in the South Saskatchewan River Basin.
- To investigate the nature of adaptation measures taken and the success of the adaptation options used.

Methodology

- Use secondary data-based research, including assessment of historical pattern of droughts in the region with emphasis on **2001** and **2002**, and the associated **bio-physical and economic impacts**.
- Use primary data research (interviews and focus groups) conducted by other researchers of the IACC project to help describe **adaptation strategies**.

Selected Communities in the South Saskatchewan River Basin (SSRB).

(Map prepared for the IACC project - November 2005)



SSRB Sub-Basin

- Bigstick Lake
- Bow River
- Oldman River
- Red Deer River

- Seven Persons Creek
- South Saskatchewan River
- Swift Current Creek
- SSRB

Adaptation Strategies

- 
- Fellow researchers went to the communities to talk with people about the droughts of 2001 and 2002.
 - Many impacts and adaptation strategies were identified

Community Adaptations

CABRI		STEWART VALLEY		OUTLOOK		TABER		HANNA	
Successful	Not Successful	Successful	Not Successful	Successful	Not Successful	Successful	Not Successful	Successful	Not Successful
Water conservation strategies -Pumped water into reservoir from the river	Drilled holes outside the community to tap into the “Judith Aquifer” but were not successful					-some people tried to reduce their overall water consumption -water restrictions were imposed on town residents	-urban vs rural water users in who should be conserving more water	-many residents conserved water on their own	

Grain Producers Adaptations

CABRI		STEWART VALLEY		OUTLOOK		TABER		HANNA	
Successful	Not Successful	Successful	Not Successful	Successful	Not Successful	Successful	Not Successful	Successful	Not Successful
<ul style="list-style-type: none"> -Found secondary water sources such as municipal wells -Crop insurance -Educational programs on water conservation -Continuous cropping appears to have helped the potential impact of soil erosion -Seed earlier to advantage from available moisture -grasshopper management 	<ul style="list-style-type: none"> -Crop insurance barely covered the cost of production 	<ul style="list-style-type: none"> -Crop Insurance -Hail Insurance -Zero till helps manage moisture in fields 	<ul style="list-style-type: none"> Couldn't collect crop insurance because yield was too high 	<ul style="list-style-type: none"> -purchases of new equipment and other items are kept to a minimum -use minimum tillage -got off farm income when drought of 1988 occurred -crop insurance -hail insurance -off farm income 	<ul style="list-style-type: none"> Irrigation – no one appears to be making a fortune irrigating so why go into it? 	<ul style="list-style-type: none"> -extensive irrigation network -water allocation levels were reduced due to the low water levels in 2001 -moved water allocation amounts to higher commodity priced crops (e.g., sugar beets). -transferred (sold) water allocation to neighbouring farmers -examining ways to increase on-farm storage -technological improvements to the irrigation systems (converting canals to pipeline, low flow pivots etc) have increased water conservation and improved water usage -irrigation district ditch riders check to make sure only the amount of water allocated is the amount of water used -fill dugouts once or twice a year from either irrigation canals or river -crop insurance and other government programs -off-farm income 	<ul style="list-style-type: none"> -crop insurance – called disaster “act of god” so would not pay compensation 	<ul style="list-style-type: none"> -more Chemical Fallow in region -seeded more drought tolerant crops -crop insurance -getting out of grain production -want another pipeline from the Red Deer River installed to increase stable water supply for agricultural community but there is a moratorium on expanding water transfers 	<ul style="list-style-type: none"> -government programs -irrigation – expensive -irrigation – expansion limited due to limited access to water sources -grasshopper management

Why were these adaptation strategies necessary?



Bio-Physical Impacts of the Drought



NO SWIMMING, CAR WASHING
BOATING OR WATER HAULING
ALLOWED ANYWHERE ALONG
THIS BODY OF WATER
BY ORDER TOWN OF CABRI

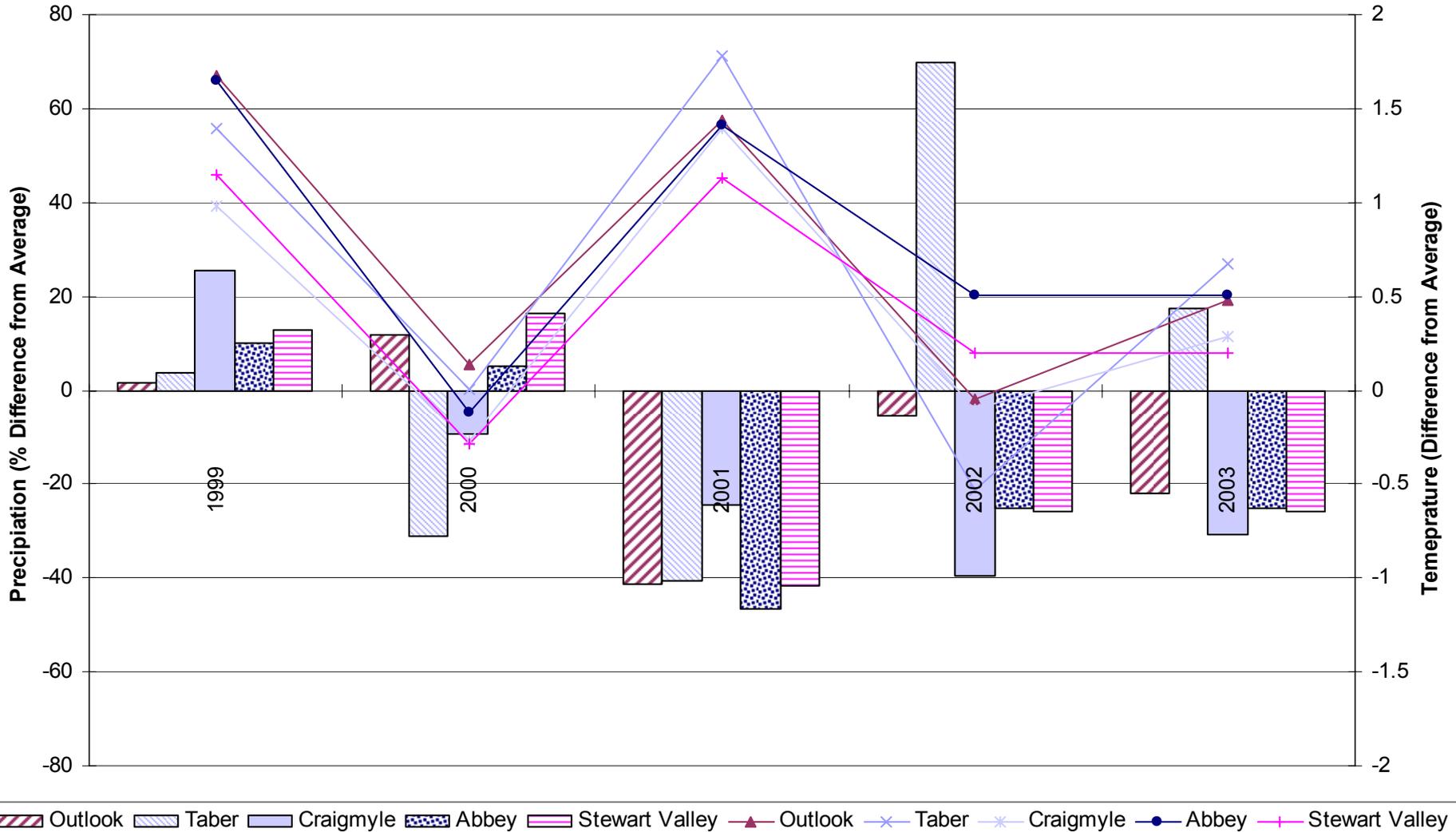
DANGER
OPEN
WATER

NO HUNTING
OR
TRESPASSING

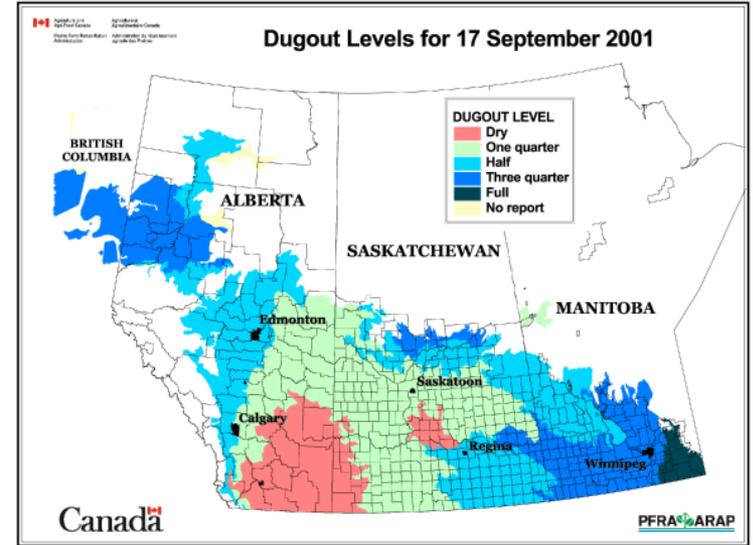
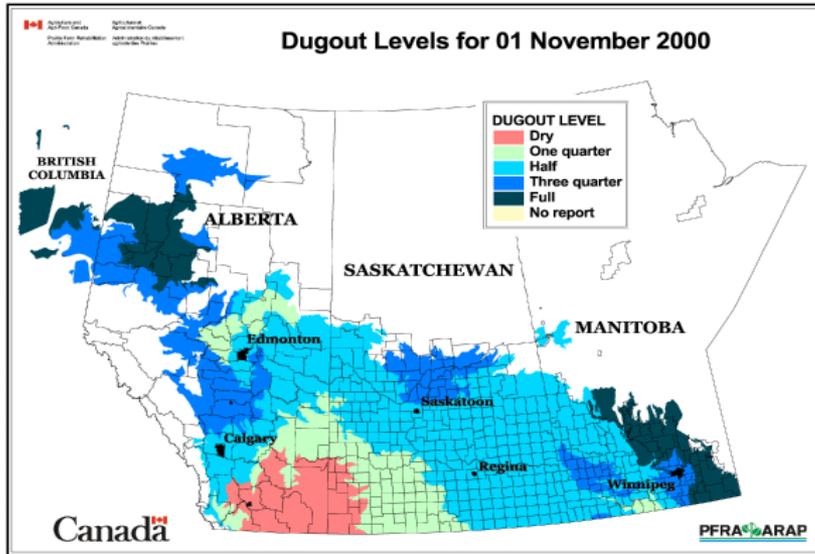
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Climate

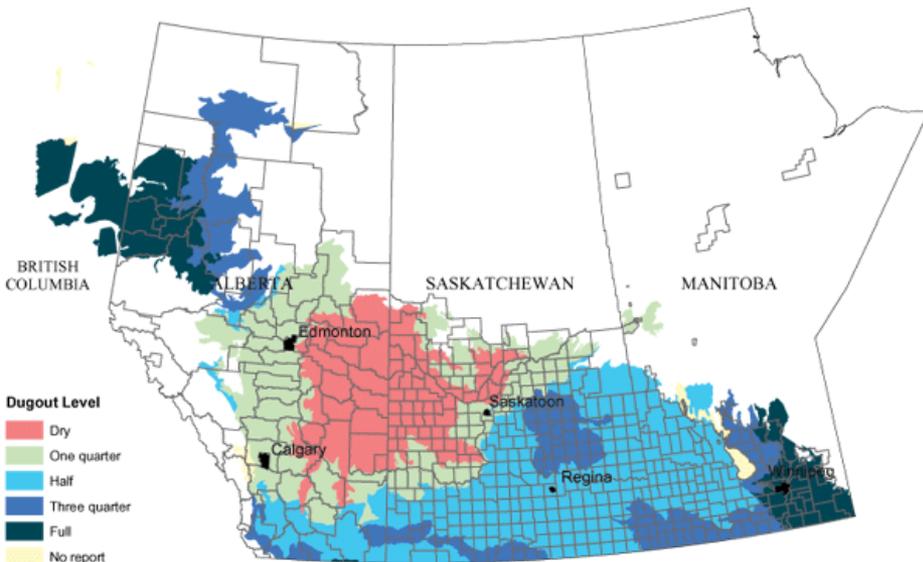
Annual Temperature and Precipitation (1999-2003)



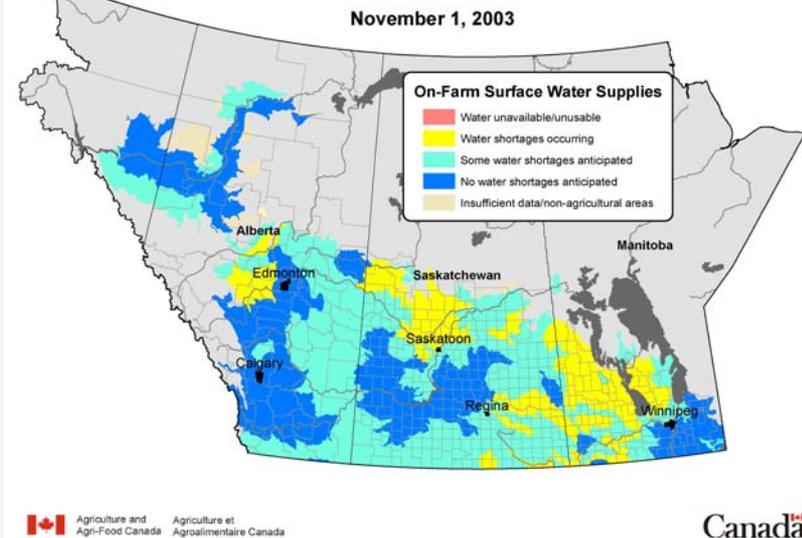
Dugout Levels



Dugout Levels for 28 October 2002



On-Farm Surface Water Supplies

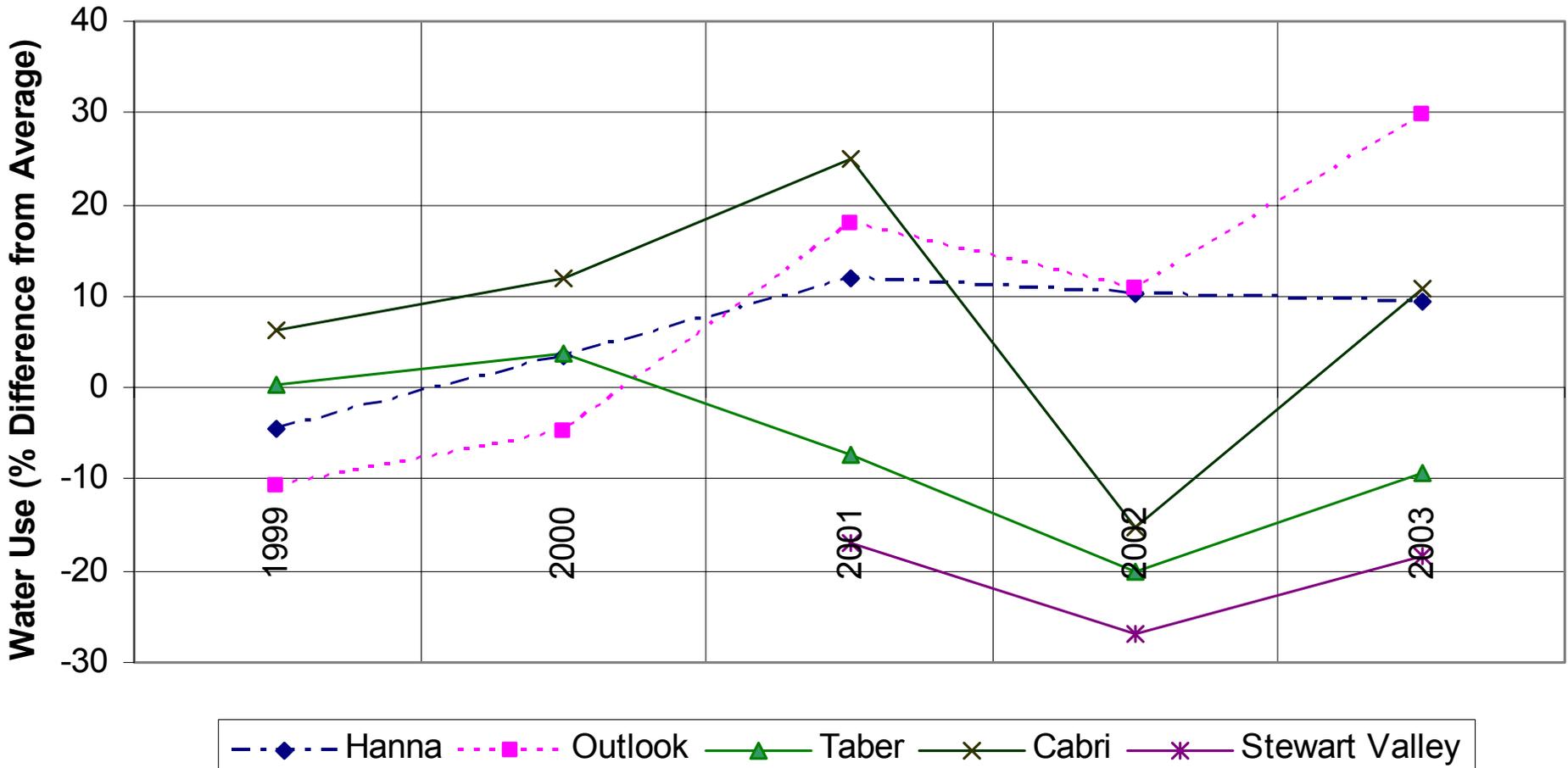


Potable Water Supplies

- **Taber** – St. Mary's Reservoir and canal system in the summer and from the Chin Reservoir and reservoir south of Barnwell in the Winter – problem in 2001
- **Hanna** – Red Deer River via a pipeline
- **Cabri** – Holding Reservoir - water obtain from overland flow from Antelope Creek and via pipeline from South Saskatchewan River – problem in 2001
- **Stewart Valley** – Groundwater Wells
- **Outlook** – Directly from the South Saskatchewan River

Water Use

Water Use (1999-2003)



Socio-Economic Impacts of the Drought

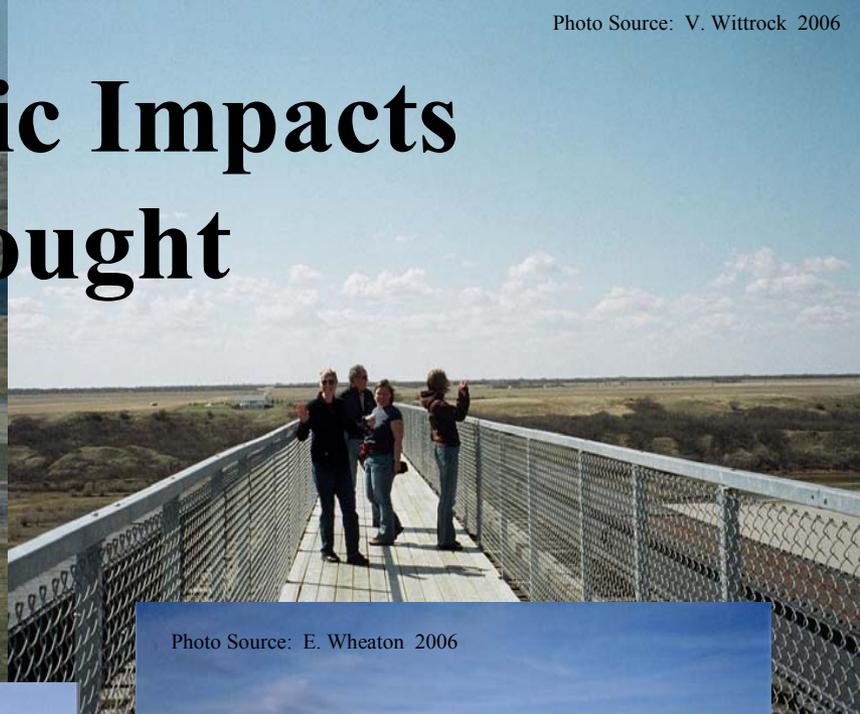
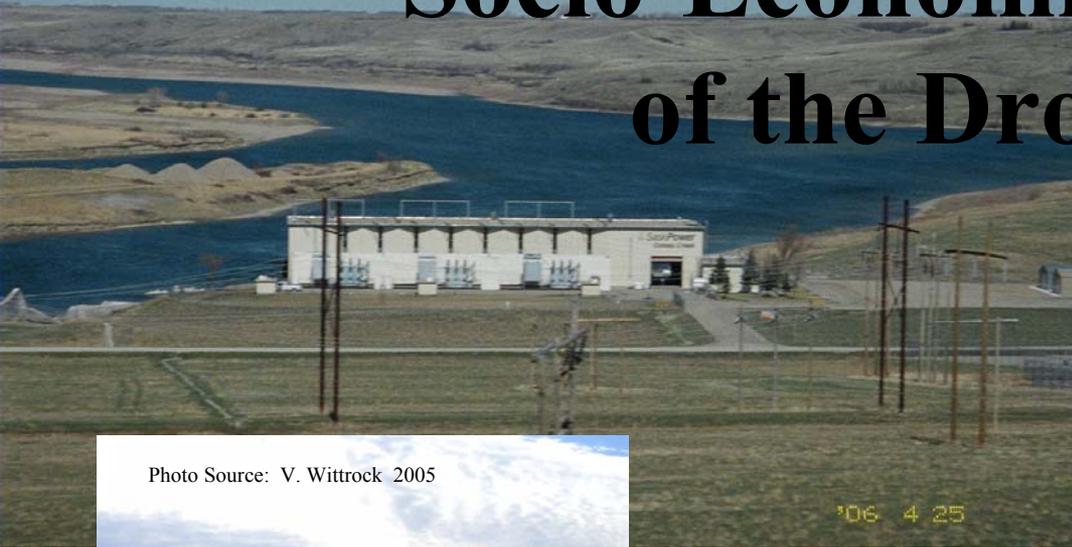


Photo Source: V. Wittrock 2005



Photo Source: E. Wheaton 2006

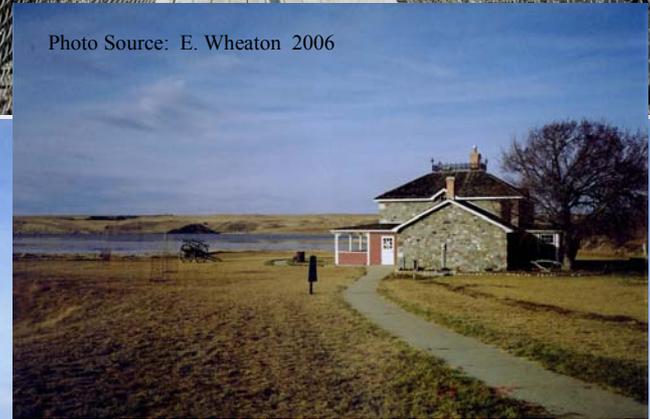
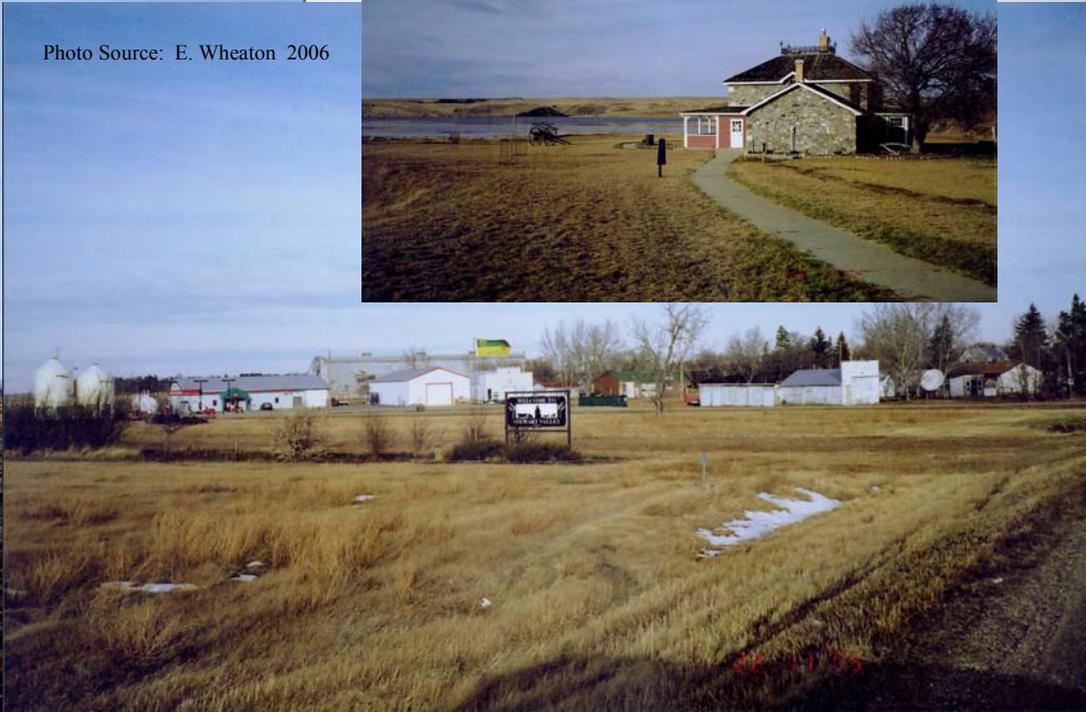
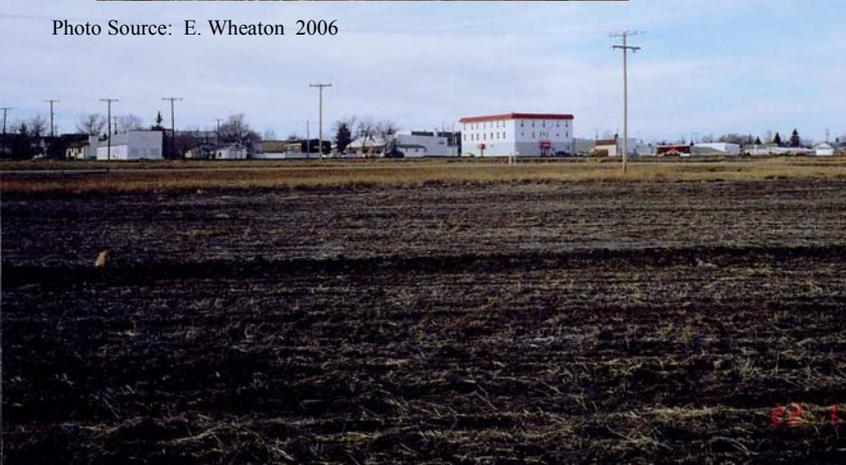


Photo Source: E. Wheaton 2006

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Population Trends

– Saskatchewan Communities

- Cabri and Stewart Valley are smaller communities with a population of 483 and 101, respectively in 2001.
- Both communities facing a declining population base over the last decade.
- Outlook is a regional service center with a 2001 population of 2,029 people. Since 1996 there has been an increase in the Town population.

Population Trends

– Alberta Communities

- Relative to Saskatchewan communities, Hanna is a slightly bigger rural community with a population of 2,986 people.
- Population of Hanna has been slowly declining since 1996, although loss is not sizeable.
- Taber is a major center for agricultural processing industries, and had a population of 7,671 people.
- Population in Taber has been increasing steadily since 1991, although it has flattened out during the 2001 to 2006 period.

Industry Trends

– Saskatchewan Communities

- Cabri and Stewart Valley are mainly agricultural communities, although Cabri has a thriving oil and gas industry also.
- Relative employment in agriculture is 16% for Cabri and 73% for Stewart Valley.
- Few farm service businesses are also located in Cabri, but not in Stewart Valley.

Industry Trends

– Alberta Communities

- Hanna is a major retail center in the region, although services like construction, mining, and accommodation and food are also important.
- In the region surrounding it, agriculture is the dominant industry.
- Taber being a major regional processing center, next to Lethbridge, has agri-food processing employing around 11% of total workforce of the town, which is followed by retail trade, and mining (oil and gas).

Crop Production and Revenue

- In Cabri and Stewart Valley, main crops are Durum Wheat, followed by lentils, beans and chickpeas.
- In both rural municipalities regions, yields during 2001 and 2002 were depressed, resulting in a loss of \$14.3 million in 2001 and \$7.3 million in 2002.
- We are awaiting further data from Alberta Agriculture to estimate economic cost of the droughts of 2001 and 2002 on the communities of Hanna and Taber.
- We hypothesize that Taber, being located in an irrigated production area, would suffer far less than the community of Hanna.

Livestock Production and Revenue

- Data for the RMs surrounding Cabri and Stewart Valley were not available, and therefore, data for a larger region (CAR 3BN) were used. These trends suggested for a higher culling rate for cows during 2001 and 2002.
- Although this has short-run gains but a heavy cost to livestock enterprises in the future.
- No data on livestock production changes available for the drought period for Alberta.

Conclusions

- Communities had differing levels of exposure to drought.
- Each of the communities have adapted to water shortages by implementing water use restrictions (Taber, Cabri), piping potable water (Hanna, Cabri), allowing rural users access to river water (Outlook), utilizing groundwater (Stewart Valley)
- Adaptation strategies differed between communities ... depending on the need.
- Adaptation tended to be reactive.

How vulnerable are the communities?

Depends...

