



# the FOSSIL WATER report

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## June Floods in Southern Alberta

Three intense rainstorms this past June provided a humbling reminder of nature's command of the prairie landscape despite the generally arid climate.

More than a metre of rain fell in some areas – much more than most of the province receives in an entire year. On June 19th, during the second storm, rainfall ranged from 50 millimetres (2 inches) to more than 450 millimetres (18 inches) in localized areas in the mountains and foothills feeding 10 river basins. The flooding prompted 16 municipalities to declare states of emergency including Calgary and Edmonton.

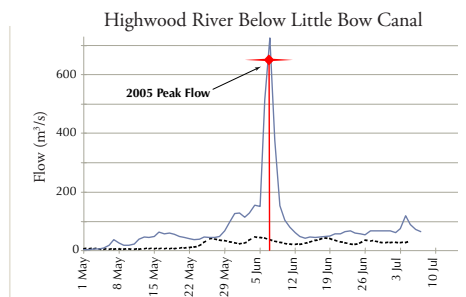
In Southern Alberta, rain-swollen rivers overflowed - the heaviest-hit areas included the Highwood, Sheep and upper Oldman rivers. The Town of High River was one of the communities severely affected after the Highwood River burst its banks. Over 1,000 residents were forced to leave their homes - thousands more were on evacuation standby, and dozens of homes were flooded.

Like many river communities, the Towns of Turner Valley, Black Diamond and Okotoks, were overwhelmed by floodwaters. Residents watched as the Sheep River overflowed its banks causing flooding in residential, commercial and business areas. In Black Diamond, the Sheep River peaked at approximately 456 m<sup>3</sup>/s. Downstream, in the Town of Okotoks; floodwaters from Three Point Creek joined the Sheep River, causing it to crest at over 900 m<sup>3</sup>/s as it passed the town. At its peak, the flow in this small tributary was estimated to be equal to the floodwaters of the Bow River.

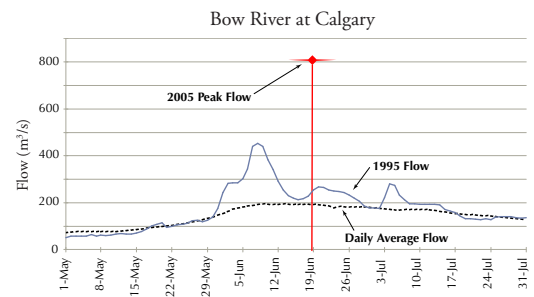
The effects of the floods will be experienced for many years to come. Surface water flows affected drinking water supplies for a number of the 600,000 Albertans that are still serviced by private or unregulated systems. Boil water restrictions are still in place for a number of these systems. Numerous drainage control structures were overtopped and eroded – the Insurance Bureau of Canada estimated the total losses at \$400 million, making the June floods the most expensive disaster in Alberta's history. Fortunately, insightful forecasting by Alberta Environment played a key role in prompting early evacuations, while quick response by local health authorities helped mitigate health issues brought on by contaminated water supplies, mold and sewage-related problems.

### Quick Facts

- Precipitation in the Sheep River Basin June 2005
- From June 1-5 110mm of rain saturated ground areas
- 1st Flood Event June 6-9 Rainfall (245mm)
- 2nd Flood Event June 16-19 Rainfall (369mm)
- 3rd Flood Event June 27-29 Rainfall (456mm)
- Total rainfall 1180 mm (approximately 45 inches)



Source: Alberta Environment Date



Date



# COMPANY NEWS Canada Olympic Park Operations Review

Canada Olympic Park represents one of western Canada's most diverse, multi-season recreational complexes that combines family fun and entertainment with a commitment to excellence in winter sport. Fossil Water recently assisted the park with a review of its ongoing operations and identified opportunities for operational efficiencies and improvements. The work was completed as part of a larger assignment carried out by Earth Tech Canada.

# Conservation Efforts Help Reverse Decline of Ogallala Aquifer

The Ogallala aquifer is one of the largest groundwater aquifer systems in the world, covering 174,000 square miles underground across the high plains region in the United States. Deeper waters within the aquifer date back 10,000 years ago, making it a significant source of fossil water for irrigation and consumption.



Approximately 20 percent of the irrigated land in the United States is in the region. Irrigation withdrawals in 1990 were > 14 billion gallons per day. In 1990, the aquifer supplied 2.2 million people with drinking water and irrigation withdrawals totalling >14 billion gallons per day.

At that time, the Ogallala aquifer contained an estimated 3.3 billion acre-feet of water. Recently, its volume was estimated at just under 3 billion acre-feet, representing a 10% decline in total stored volume over the past 15 years. The aquifer gets replenished mainly from playa lakes which are periodically flooded. Recent studies have estimated an average recharge rate for the entire region of approximately 0.5 of an inch per year.

Water level declines exceeding a foot per year were recorded throughout the 1940s. During the late 1950s (at the peak of irrigation development) some wells indicated as much as five feet of decline in a single year. The rate of decline started slowing in the mid-1970s, but continues its general decline to the present day:

Average Decline in Feet Per Year	1969-1979	1979-1989	1989-1999
	1.40	0.82	0.55

Activity to preserve and protect this precious groundwater resource is occurring on multiple fronts.

The Playa Lakes Joint Venture was established in 1989 with a mission to conserve the playa lakes that represent the primary source of recharge to the aquifer. The PLJV is a partnership of state and federal agencies, conservation groups and companies and is the seventh of 13 habitat joint ventures across the US. Since 1990, the PLJV and its partners have completed hundreds of conservation projects worth nearly \$50 million to protect more than 100,000 acres of wildlife habitat and support research, outreach and conservation partnerships throughout the region.

The US Geological Survey launched a comprehensive study of the Ogallala aquifer in 1999. The program includes studies of chemistry, temperature and recharge rates to establish the baseline data needed to support the development of policy and legislations. In addition, research is underway at multiple institutions to study mechanisms for protecting and recharging the Ogallala to ensure it can continue to support the region's population and ecosystem.

Source: US Geological Survey High Plains Regional Groundwater Study (used with permission of lead investigator Bret Bruce)





## FOSSIL WATER

### About the Fossil Water Report

The Fossil Water Report is published monthly as a service to our clients and partners. Each issue will focus on three areas:

- (i) trends that are important to water managers in western Canada
- (ii) perspectives from our active projects
- (iii) news and views regarding fossil water resources around the world.

If you would like to receive copies of our report, please contact us.

### About Fossil Water Corporation

Fossil Water Corporation provides turnkey water and wastewater solutions to the energy and development sectors. Our goal is to become part of our client's competitive advantage by delivering innovative solutions that consider the full life-cycle of our clients' projects.

Our name comes from our commitment to treat water as a non-renewable resource – we seek to unlock the hidden value in this precious resource.

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