Arm River valley, Saskatchewan
Swift Current Creek valley, Saskatchewan
Saskatchewan Highways and Transportation

Explanation of significant differences between budget and actual:

1. Unexpected landslides at various locations resulting from wet summer conditions.
2. Increased costs on various tendered construction contracts.
3. Carry-over of various construction projects to 2001-02 fiscal year.
4. Increased winter gravel crushing and haul
5. Positions transferred.
The Lesueur landslide occurred on 3 September 1963 on the outside of a meander of the North Saskatchewan River in northeast Edmonton. The displaced volume was 0.76 Mm$^3$ of Pleistocene deposits and underlying Upper Cretaceous mudstones. The trigger of the landslide is believed to be accelerated erosion of the slope toe caused by dumping of mine waste on the inside of the meander. Surveys in 1964, 1971, 1992, 1995, 1997, and 1998 have documented continued slope movements.
North Saskatchewan River, Edmonton
Police Point Landslide
Annual frequency of dust storms, 1977-85
(Wheaton and Chakravarti, 1990)

Fig. 1. Spatial variation of the average annual frequency of dust storm days, Canadian Prairies (1977–1985). (Study area stations are included. Wheaton and Chakravarti (1990).
Dust storm 'blackout' causes 8-vehicle crash, closes major Alberta Highway

CARSTAIRS, Alta., May 19, 2001 (CP) - Alberta motorists got a horrifying glimpse of the Dirty 30s Saturday when a dust storm caused a multi-vehicle accident on a major highway. Police said dust blown by 100 km/h winds severely reduced visibility on Highway 2 about 50 km north of Calgary and triggered a 15-vehicle pileup. Eight people were treated in the Didsbury, Alta., hospital then released, said Innisfail RCMP.

RCMP Constable Barry Neely of Didsbury said that … "Somebody is losing some topsoil somewhere," he said.

Dust piling up in houses during unusually dry May
Edmonton Journal, Thursday 17 May 2001
"Drought and desertification threaten the livelihood of over 1 billion people in more than 110 countries around the world."

Kofi Aman

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**Secretariat of the United Nations Convention to Combat Desertification**

**Starting Points**

- What is UNCCD and Desertification? - Knowledge Base
- Parties to the Convention: Country Database
- Documents: Frequently requested

**Current Top News and Focal Areas**

- List of Participants
- Reports, Presentations, Official Documents

**Other News and Updates**

- Joint UNCCD/UNFCCC/CBD calendar
- Newsletter, "Down to Earth", November 2002
- Vacancy announcements

**Press Releases**

- Press Review, February 2003

**Rome, 27/11/2002:** Sharing of best practices expected to accelerate rehabilitation of degraded land. More...

**Making a Difference:** Stories from local communities

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*Last modified: Mar 15, 2003 09:55:40. Best VIEWED with Netscape 4.5+ or Internet Explorer 4.5+ at 800x600x24.*

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“Land degradation in arid, semi arid and dry/sub-humid areas, resulting from various factors, including climatic variations and human impact” (UNEP, 1994).
“Land degradation in arid, semi arid and dry/sub-humid areas, resulting from various factors, including climatic variations and human impact” (UNEP, 1994).
Landsat 7, July, 2000
Change in the area of cropland at risk of tolerable levels of water erosion between 1981 and 1996

McRae et al. 2000
Reduction (%) in the risk of wind erosion in the Prairie Provinces between 1981 and 1996

- Prairies
- Saskatchewan
- Manitoba
- Alberta

Legend:
- Yellow: Total
- Blue: Tillage practice
- Red: Cropping system

McRae et al. 2000
Climate Variability

Short term: (years) rises and falls about the trend line

Reference Period

Temperature

Climate Change

Long term: multidecadal to century trends
Aridity Index: P/PET

- **Semiarid**: $P/PET < 0.5$
- **Dry subhumid**: $0.5 \leq P/PET < 0.65$
Aridity Index (P/PET), 1961-90
Temperature Projections for 21st Century
Aridity Index (P/PET), 1961-90
Climate Variability

Short term: (years) rises and falls about the trend line

Reference Period

Climate Change
Long term: multidecadal to century trends
Major North American Droughts

Source: Elaine Wheaton

Palmer Drought Severity Index of -3 and less – Summer – JJA
Data: Skinner 2003
### Saskatoon (1908-2002)

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### Edmonton (1883-2002)

<table>
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<td>1898</td>
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<td>1885-87</td>
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<tr>
<td>1961</td>
<td>1949-50</td>
<td>2000-02</td>
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</table>
Dust, Regina, May 22, 2002
Very severe wind and water erosion is dominated by infrequent occurrences of when highly erosive events impact exposed soil. Such events may only happen once during the farming lifetime of an individual farmer, making it difficult to justify the expense and inconvenience of many soil conservation practices.

Severe and widespread erosion could still occur during extreme climatic events and especially during a period of years with back-to-back droughts.
Saskatchewan Wheat Yields, 1908-2002

source: Statistics Canada
Climate Variability

Short term: (years) rises and falls about the trend line

Reference Period

Climate Change
Long term: multidecadal to century trends
earlywood \hspace{1cm} \text{late wood}

\hspace{1cm} \text{one tree ring}
Widespread dune activity induced by late 18th century dryness
Wolfe, et al. 2001
Extreme rainfalls in southern Saskatchewan

Buffalo Gap, May 30, 1961
• one-hour: 258 mm

Parkmanm, August 3-4, 1985
• six-hour: 267 mm
• 12-hour: 362 mm
• 24-hour: 381 mm

Vanguard, July 3, 2000
• eight-hour: 334-387 mm

Note: all data from bucket surveys
Extreme precipitation events are likely to become more frequent.
Increasing Drought Frequency

Central North America

Return Period (years)

Length of Dry Spell (days)

Today

~2070

Kharin and Zwiers 2000
Web Resources

- Landslides
  http://gsc.nrcan.gc.ca/landslides/index_e.php
- Sand Dune & Climate Change Studies in the Prairie Provinces
  http://gsc.nrcan.gc.ca/climate/sanddune/index_e.php
- Palliser Triangle Global Change Project
  http://gsc.nrcan.gc.ca/climate/palliser/index_e.php
- Geoscientific insights into the Red River and its flood problem in Manitoba
  http://gsc.nrcan.gc.ca/floods/redriver/index_e.php
- The Health of our Soils
  http://www.agr.gc.ca/nlwis-snite/index_e.cfm?s1=pub&s2=hs_ss&page=intro
- United Nations Convention to Combat Desertification
  http://www.unccd.int/
- Prairie Adaptation Research Collaborative
  http://www.parc.ca/