

IRRIGATION

Lake Diefenbaker's Unfinished Business



PAST...

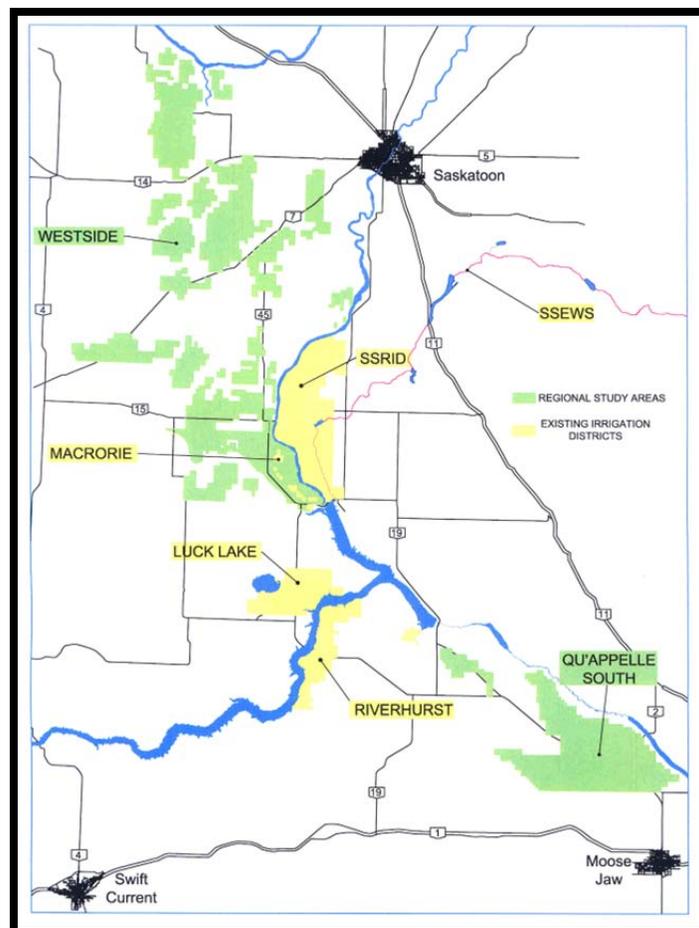
- In 1967, the Gardiner Dam and Lake Diefenbaker were completed on the South Saskatchewan River in the centre of Saskatchewan's agricultural region. *"The project is to provide facilities for the irrigation of approximately 500,000 acres of land in central Saskatchewan and in the Qu'Appelle Valley and to provide other benefits to the area including a source of hydroelectric power, a source of rural and urban water supply, flood control and recreation facilities."* (Appendix A, July 25, 1958 Memorandum of Agreement)
- The regional water infrastructure on the east side of the South Saskatchewan River was completed with the East Side Pump Station, M1 Canal and Saskatoon Southeast Water Supply system canals to serve municipal (e.g. Lanigan), industrial (e.g. potash mines), recreational (e.g. Blackstrap Lake), environmental (e.g. Indie Marshes) and agricultural (e.g. the South Saskatchewan River Irrigation District No. 1) needs.
- In 1973, the Province decided to stop construction of the irrigation infrastructure on the west side of the South Saskatchewan River which would have provided Lake Diefenbaker water as far north as Delisle and Asquith.

PRESENT...

- Irrigation from Lake Diefenbaker currently stands at 20 per cent of the original plan due to the lack of infrastructure "extending the shores." The present irrigated area is as follows:

South Saskatchewan River Irrigation District No.1 (SSRID)	37,000 acres
Saskatoon South East Water Supply system (SSEWS)	18,000 acres
Macrorie Irrigation District (MID)	2,389 acres
Luck Lake Irrigation District (LLID)	10,770 acres
Riverhurst Irrigation District (RID)	12,900 acres
Grainlands Irrigation District (GID)	2,237 acres
Other irrigation	26,583 acres
TOTAL	109,879 acres

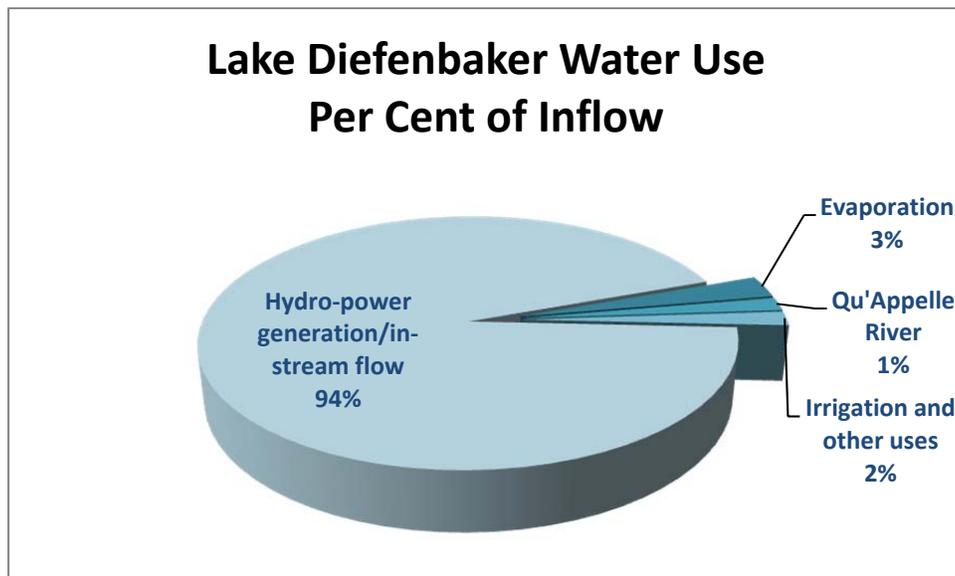
- In 2006, studies were completed under the Canada-Saskatchewan Water Supply Expansion Program identifying 50,000 acres of irrigation infill in SSRID, LLID and RID at an average cost per acre of \$2,000. To date, infill capacity for 11,000 acres has been constructed under Canada's Economic Action Plan and Saskatchewan's Farm and Ranch Water Infrastructure Program (FRWIP).
- Two major expansion studies were also done under the Canada-Saskatchewan Water Supply Expansion Program identifying the scale of irrigation that was originally planned for Lake Diefenbaker:
 - The Westside Irrigation Project (the area originally planned between Lake Diefenbaker and Delisle and Asquith): 377,000 acres requiring 600,000 acre-feet of water annually; and
 - The Qu'Appelle South Irrigation Project (an upland canal from Lake Diefenbaker to Buffalo Pound Lake serving the Regina-Moose Jaw corridor): 110,000 acres requiring 285,000 acre-feet annually.
- The average per-acre cost of expansion is estimated at \$5,000 (similar to the present selling price of irrigated land in the Lethbridge area of Alberta).
- In 2008, based upon the expansion studies, the Saskatchewan Irrigation Projects Association (SIPA) completed its study: *A Time To Irrigate: the Economic, Social and Environmental Benefits of Expanding Irrigation in the Lake Diefenbaker Region*. SIPA calculated that the returns from an investment of \$3 billion over 40 years, at a five-per-cent discount rate, would be over 4:1 from the increased agricultural production and 15:1 including the returns from value-added activities. The project would create up to 384,000 person-years of employment and would contribute as much as \$35 billion to provincial GDP.



FUTURE...

CLIMATE CHANGE/FOOD SECURITY

- “How to feed nine billion people in 2050 is one of the biggest challenges of our era. Global food production must rise by at least 70 per cent by 2050. Without strong adaptation and mitigation measures, climate change might reduce food crop yields 16 per cent worldwide and by 28 per cent in Africa over the next fifty years. It is likely that price and yield volatility will continue to rise as extreme weather continues, further impacting livelihoods and putting food security at risk. Agriculture, including fisheries and forestry, have contributed to climate change but can be the solution to its challenges.” (United Nations Food and Agriculture Organization, 2012)
- “One of the most certain projections is that extra water will be available in winter and spring and summers generally will be drier as the result of earlier spring runoff, and a longer warmer summer season of water loss by evapotranspiration. Much of the observed and projected warming in Saskatchewan is during winter and spring, such that the frost-free growing season is getting longer and expected to get significantly longer as the climate warms. A longer warmer growing season will favor diversification of prairie agriculture and higher crop, pasture and forest productivity. However, higher productivity will be limited by available soil moisture.” (Prairie Adaptive Research Collaborative, 2009)
- “Canada may be one of only a few countries able to produce significant food surplus in the future” (McGill Conference on Global Food Security 2011). Saskatchewan is in a unique position to contribute to global food supplies and, at the same time, to increase its own resilience to climate change through irrigation expansion from Lake Diefenbaker.



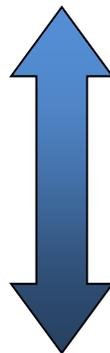
WATER SUPPLY

- The South Saskatchewan River flows are apportioned between Alberta, Saskatchewan and Manitoba under the 1969 Master Agreement on Apportionment administered by the Prairie Provinces Water Board (PPWB). Under this agreement, Alberta must pass half of the “natural” flow to Saskatchewan who, in turn, must pass half to Manitoba. “Natural” flow is calculated as the flow with no abstraction of water.
- In 2006, Alberta closed the South Saskatchewan River and its southern tributaries to any further allocations of water as 61 per cent of the flow in the basin had been allocated.

- Alberta typically consumes about 22 per cent of the flow, irrigation being its largest user, and passes 81 per cent to Saskatchewan (return-flows accounting for the difference between allocation and consumption).
- Water consumption from Saskatchewan’s Lake Diefenbaker, including evaporation (the single largest “consumer”), is typically 6.3 per cent of the flow, irrigation and other uses accounting for two per cent.
- Irrigation expansion of 500,000 acres (the Westside plus Qu’Appelle projects) would increase water consumption from Lake Diefenbaker by 900,000 acre-feet per year to 17 per cent of the flow.

COMPETING USES FOR WATER

- The Lake Diefenbaker Operating Plan is used by the province to balance municipal, industrial, agricultural, recreational, environmental and flood-control needs.
- Up to 94 per cent of the typical yearly inflow to Lake Diefenbaker passes downstream through the Coteau Creek power station and on to the Nipawin and E.B.Campbell stations. Hydro-power generation may impact the lake level by up to 30 feet in any one year.
- Lake Diefenbaker’s surface area is about 100,000 acres. Withdrawing 900,000 acre-feet for 500,000 acres of irrigation expansion would impact the lake level by nine feet.
- SaskPower estimates that 9 feet of water in Lake Diefenbaker produces 300,000 megawatt-hours of hydro-power worth \$21 million per year.
- Irrigated crop production increases agricultural output by over \$500 per acre per year more than dryland. Expanding irrigation to the originally planned 500,000 acres would output an additional \$250 million per year and, in addition, would create the “critical mass” to support value-added processing.



**LAKE DIEFENBAKER
HYDRO-POWER
30 FEET**



**LAKE DIEFENBAKER
500,000 ACRES OF IRRIGATION
9 FEET**

SUMMARY

Saskatchewan has water; Saskatchewan has choices.