

South Saskatchewan River Irrigation District (SSRID)

Irrigation in SSRID & Proposed Asset Transfer

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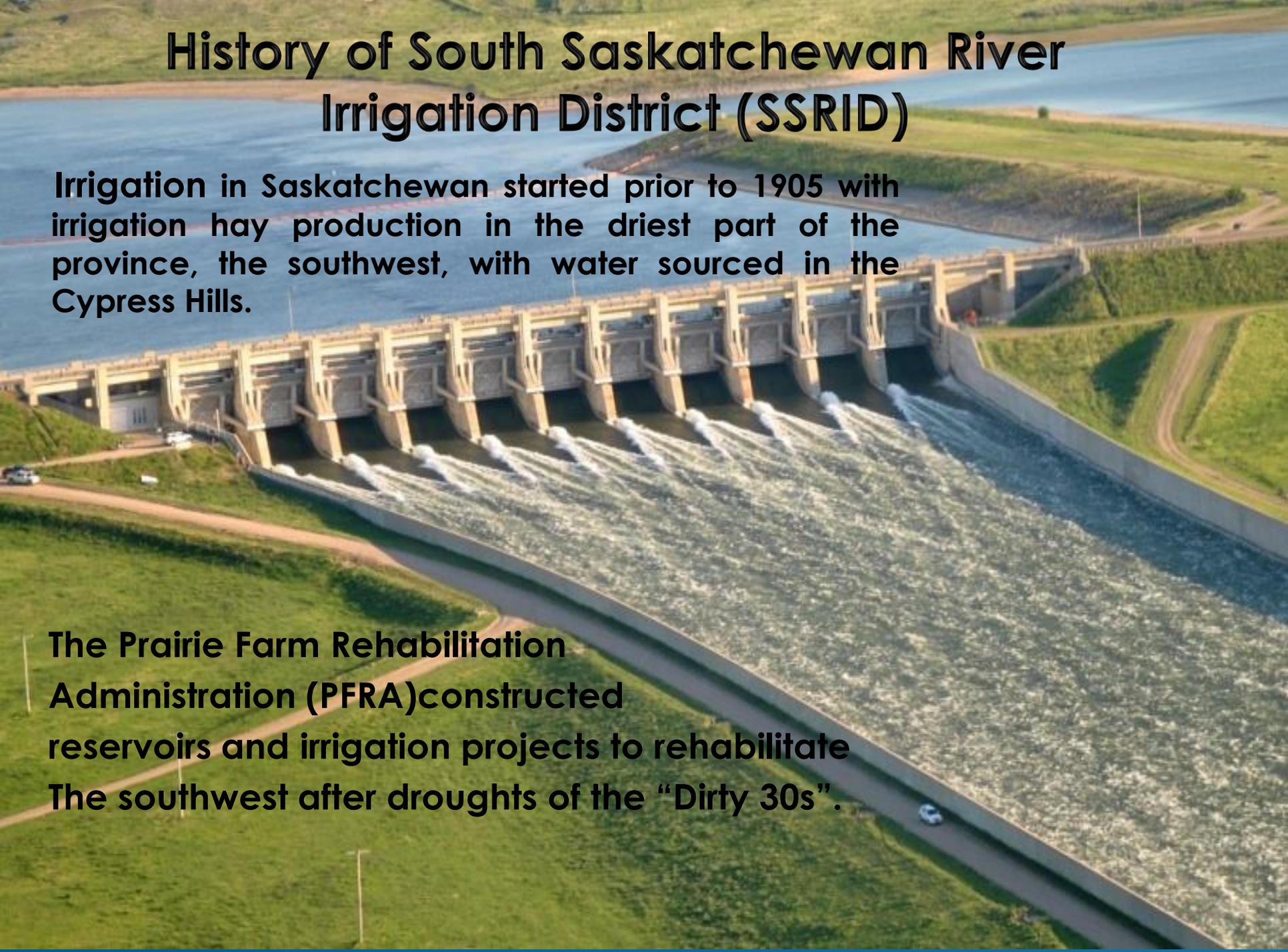
South Saskatchewan River Irrigation District

- Brief history of Irrigation in Saskatchewan
- Irrigation Today
- Irrigation potential in Saskatchewan
- Asset Transfer
- Infrastructure

History of South Saskatchewan River Irrigation District (SSRID)

Irrigation in Saskatchewan started prior to 1905 with irrigation hay production in the driest part of the province, the southwest, with water sourced in the Cypress Hills.

The Prairie Farm Rehabilitation Administration (PFRA) constructed reservoirs and irrigation projects to rehabilitate the southwest after droughts of the “Dirty 30s”.



The completion of the Gardiner and Qu`Appelle Dams formed Lake Diefenbaker in 1966. This accommodated for an irrigation capacity of 500,000 acres of irrigation and was formed to drought-proof Saskatchewan and provide the “critical mass” to support value-added processing.

The SSRID was started in 1976, we are the largest irrigation district in Saskatchewan with 41,000 irrigated acres that are supplied from Lake Diefenbaker. We have 485 km of canals, laterals and drains, 45 km of PVC gravity pipelines and 15 km of pressurized pipelines.



SSRID was originally designed to accommodate for flood irrigation but has since converted almost entirely to pivot irrigation in order to better conserve water and be more efficient.



30/09/2012

In 2006, the Canada Saskatchewan Water Supply Expansion Program (CSWEP) identified potential infill of 50,000 acres within existing irrigation districts.

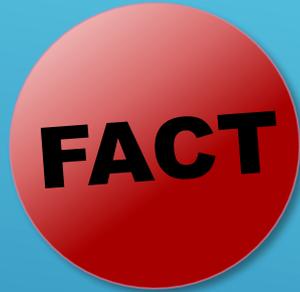
Potential irrigation expansion from Lake Diefenbaker is over 500,000 acres. This potential goal of irrigated acres needs to be a priority for future economics and sustainability for Saskatchewan.



Lake Diefenbaker

Volume

- Lake Diefenbaker has 9.4 million dam³
- 4.3 million dam³ is usable storage.



Area

- Lake Diefenbaker has the surface area of 43,000 hectares.

Size

- The Gardiner Dam is a 64 meter high by 5,000 meter wide earthen dam, which was the largest of its kind in the world when it was constructed

- Lake Diefenbaker provides 45% of Saskatchewan's population with drinking water.
- The spillway discharge capacity is 265,000 cfs.

Flow

Length

- Lake Diefenbaker is roughly 225 km long, with 800 km of shoreline.

Irrigation Today



World Wide

- Projections suggest that global food production will need to rise by 70% by 2050 to feed 9 billion people.
- Statistics show that 17% of the world's agricultural land base is irrigated; however, it produces 40% of the food.



SSRID Growth & Expansion

One of the most unique things about our district is the availability of potential irrigated acres and water supply. Many other districts are already at capacity of available water supply to accommodate for the demands required but there is still a substantial amount of untapped potential in SSRID. The District's irrigation demand only uses 2% of the total inflow into Lake Diefenbaker from the Saskatchewan River basin.

- Our System is not being utilized to its full capacity which shows the potential expansion we have available for Future irrigation and industrial users.

Large scale irrigation water supply systems provide opportunities for municipal, industrial, environmental, recreational and possibly emergency backup water supply.

Macrorie Irrigation District The Westside Irrigation Project

“Finish the Dream”



“The Dream”



When the South Saskatchewan Irrigation Project was completed, it was envisioned that the associated irrigation works (provincial responsibility) would carry water to approximately 450,000 acres of irrigable lands

Westside Irrigation Project

"The Dream"

The **Westside Irrigation Project** (WIP) is not really a new project

A complete distribution system was designed in the 1960's and was to be implemented in three phases:

Phase 1 – Construct main canal to the town of Conquest, install main pump station on Lake Diefenbaker (Coteau Bay), complete Conquest Reservoir and build gravity distribution for 30,000 acres

Phase 2 – expand pumping capacity, install two pumps at Conquest Reservoir, and build gravity distribution for an additional 23,000 acres

Phase 3 – Complete the Ardath Reservoir, upgrade pump capacity at Coteau Bay, construct new canal from Ardath reservoir to Delisle pond, install lift stations and build distribution for an additional 33,000 acres

Total 83,000 acres

Westside Irrigation Project

Phase 1 construction was initiated in 1969.



But:

Saskatchewan Provincial Election – June 23, 1971 elected NDP Government under Allan Blakeney

- ▶ Construction was ceased in 1973, after:
 - ▶ Earthwork and control structures on Westside Main Canal (WMC) had been completed to Conquest (42.2kms in length).
 - ▶ One of the three embankments (north embankment) required for the Conquest Reservoir was completed.
 - ▶ The west side pump station sub-structure was completed but no pumps installed.

Basically the completed works were abandoned.





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Westside Irrigation Project

The abandoned Westside Main Canal as it is today





Westside Irrigation Project

But:

In the 1980's, the farmers in the Macrorie Area petitioned for revival of the project.

They gained control and:

- ▶ The Ministry of Agriculture eventually installed a ditch plug in the abandoned canal at km. 23, and installed two pumps in the pump station substructure, effectively making a portion of the abandoned WMC a large reservoir with no outlet structure.
- ▶ Today the Macrorie Irrigation District irrigates 1019 Ha (3,190 acres) including recent expansion.
- ▶ No additional expansion is possible due to limited capacity of the pumps.
- ▶ Potential is much, much greater.



Macrorie Irrigation Project



The Study

Study Objective:

To lay the groundwork for a potential major water development initiative – to supply water for irrigation, municipal, rural domestic, recreational, wildlife, industrial and water security needs.

Questions to be answered?

How much land can be irrigated?

What is the cost?

What other benefits would the project provide?



The Study

Land Suitability Investigation:

Based on soil survey information, topographic maps, water well maps and geological information:

- ▶ Did not include heavy clay soils.
- ▶ Included quarter section salinity data based on municipal assessment data.
- ▶ Macrorie lands taken from a 1987 assessment of irritability.
- ▶ Not limited to gravity supply as (per original design).

Conclusion:

- ▶ Conservatively, 375,000 potential acres suitable for irrigation were identified within the study area
- ▶ 334,000 acres best served from an extension of the WMC

The Study

The analysis divided the Westside Irrigation Project into two Regions:

Southern Region included the RM of Fertile Valley, a portion of the RM of Milden, and the southern half of the RMs of Montrose and Harris – easily served from the existing WMC or from an extension of the WMC (approximately 133,711 acres incl. Macrorie Irrigation District)

Northern Region included the north half of the RMs of Montrose and Harris and the RMs of Vanscoy, Perdue and Eagle Creek (240,071 acres)

The majority of the North Region would be serviced most economically from an extension of the WMC.

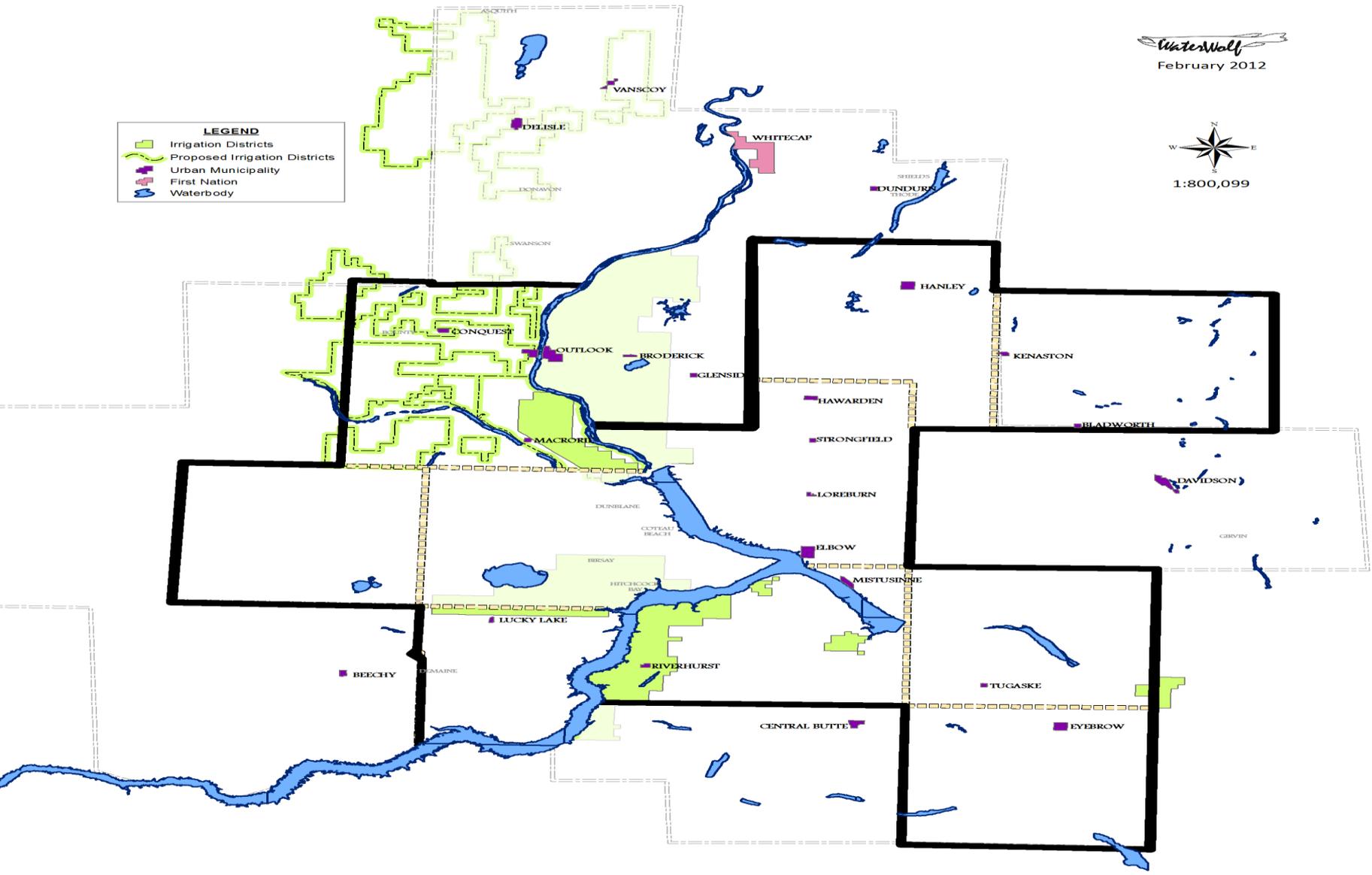
Irrigation Areas

WaterWolf
February 2012



LEGEND

- Irrigation Districts
- Proposed Irrigation Districts
- Urban Municipality
- First Nation
- Waterbody



The Study

Design Concept:

1. Rehabilitation, enlargement and extension of the existing WMC is only viable option due to required capacity (current design capacity of 21.2 m would not be adequate)
2. The main canal would require an appropriate number of control structures, syphons, bridges, crossings, drain inlets, cross drains, wasteways, etc.
3. Route would follow natural land contours modified to reduce land severance and physical obstacles (farmsteads, etc.)



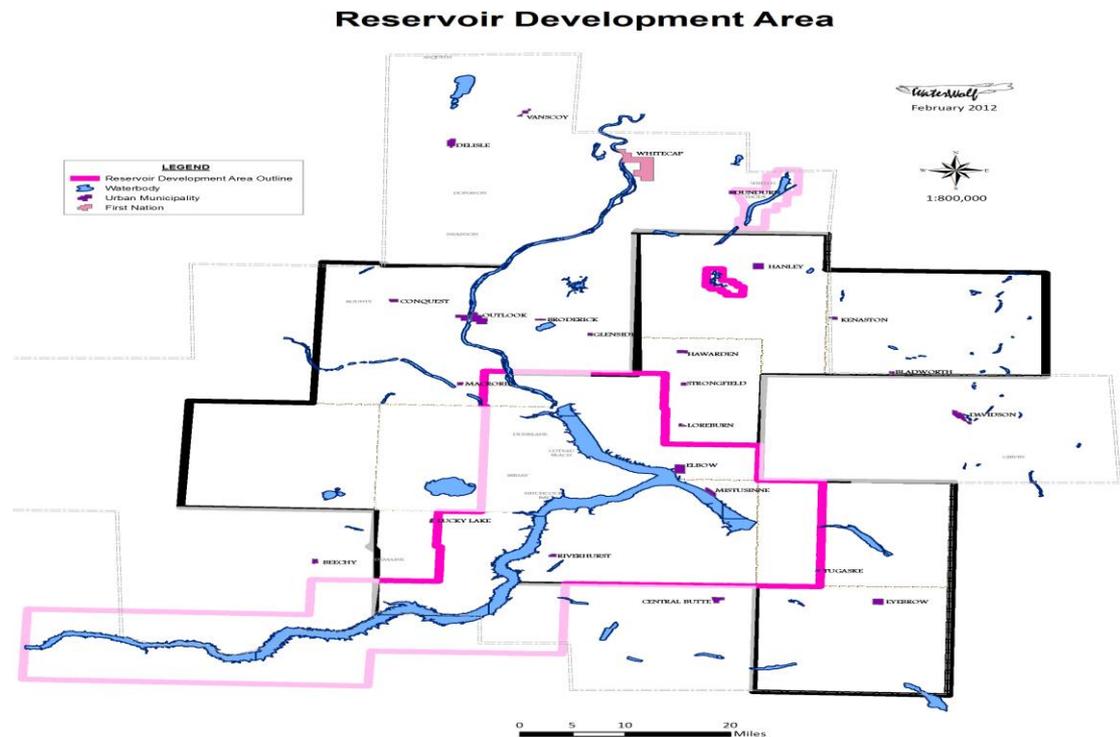


The Study

Reservoirs:

A number of reservoirs were considered in previous designs including:

- ▶ Anerley Lakes
- ▶ Goose Lake
- ▶ Rice Lake
- ▶ Eaglehill Creek Reservoir
- ▶ Conquest Reservoir
- ▶ Ardath Reservoir
- ▶ Delisle Reservoir



The study examined the potential reservoirs and benefits.

The Study

Cost:

Project Capital Cost	
	Excluding on-farm
331,742 acres from Lake Diefenbaker	\$ 1.7 Billion (\$ 5,274/acre)

The Study

Economics (irrigation component):

- ▶ Anticipated benefits accruing include:
 - ▶ increased crop yields;
 - ▶ production of higher valued crops;
 - ▶ stabilized yields; and
 - ▶ increased forage production with associated increases in cow calf, dairy and cattle feeding enterprises.
- ▶ Present value of increased on-farm activities would average from \$3,500 to \$4,200 acre.
- ▶ Project is economically sound...Expanded irrigation production will contribute to the critical mass necessary to attract and develop specialized agricultural production and agricultural processing.

The Study

Respondents to a questionnaire prepared as part of the study indicated:

- ▶ Irrigation development was needed and viewed positive.
- ▶ Saskatchewan agricultural economy will only keep pace with other provinces if such initiative such as this project are implemented.



The Study

Other Benefits:

5. Secure quality water supply for Municipalities, Cities and Industry and reduces impacts of wet/dry cycles.
6. While the Husky Oil pipeline burst is still fresh in everyone's mind, the WMC would be a Secure Quality Water Supply from Lake Diefenbaker to the City of Saskatoon, which would be supplied upstream from the pipeline crossings across the South Saskatchewan River.

Example:

Based on the City of Saskatoon records, the maximum Daily Pumping by the City per any day in 2016 was **220,000** cubic meter. This equates to a daily flow rate of 2.5 cubic meter/sec.

Any of the proposed reservoirs would have an average of two month water available as water security to the City of Saskatoon.

As an example – Conquest proposed size was 11,700 acre feet or equivalent to Saskatoon use for 65 days at maximum Daily Pumping Rates recorded.



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The Study

Most important:

The communities and industries supported by the irrigation and related will become a template of what a strong vibrant community can achieve ----- because of water.

Dying communities become rejuvenated.

Quality of Life



Why Irrigation?

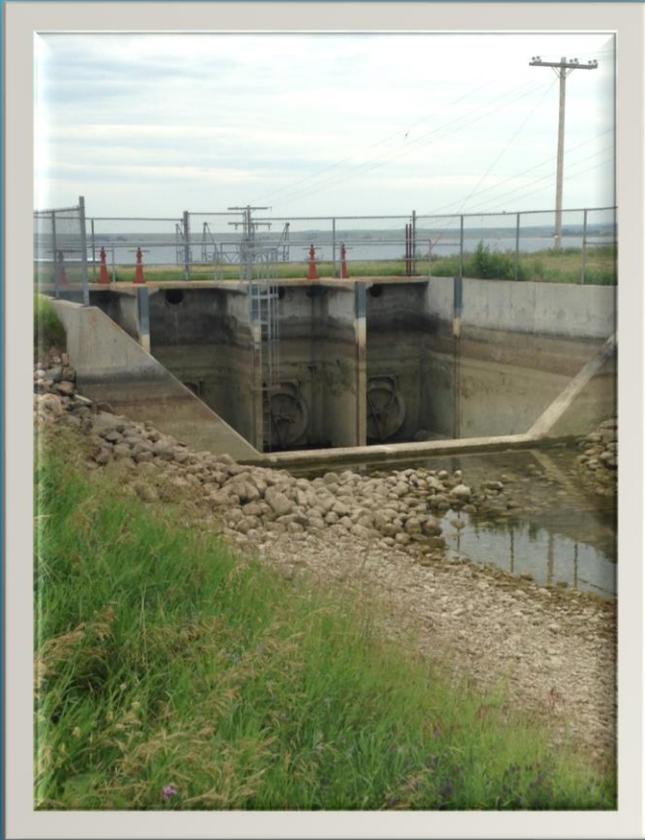
Saskatchewan

Changing one acre from dry land farming to irrigation adds over \$500 per acre per year to agricultural output, as well as increasing employment by 4 to 6 times.

~ 4% of the average inflow is lost to evaporation.

Adding 500,000 acres of irrigation from Lake Diefenbaker would require less than 20% of its average annual inflow.

Infrastructure



Irrigation Rehabilitation Program (IRP) and Asset Transfer

The Operations and Maintenance (O&M) of the district has become very difficult due to the aging infrastructure that requires rehabilitation or replacement. The past two seasons have required substantial rehabilitation throughout the whole district which tells us that we are in a critical situation in the district.

The urgency of additional funds towards an Irrigation Rehabilitation Program (IRP) is upon the district now. Our operations manager for SSRID has been seeing a substantial increase of failing infrastructure this past year. It has become apparent that the past rehab and replacement throughout the district can no longer be accomplished adequately without an increase to our Replacement fund.

The staff at SSRID has been repairing (Duct taping) the infrastructure in the district for ~ 50 years and (Duct tape over Duct tape) will not work anymore.

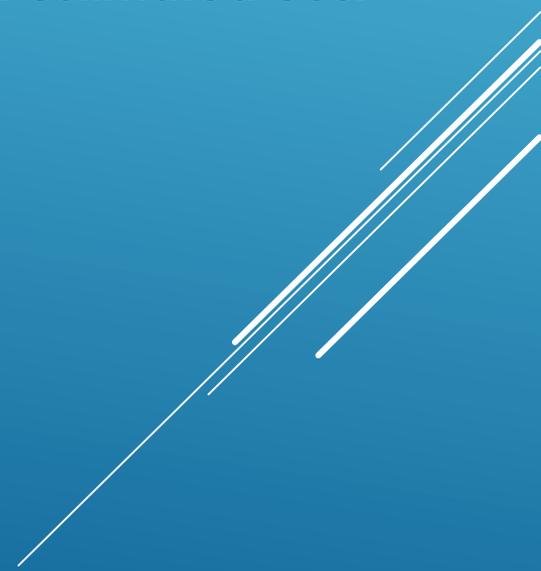




The required amount of rehabilitation in our district will take long term planning and budgeting well into the future but we need to start addressing these issues now, and continue with a long-term IRP commitment for the future of all district members and the future of a sustainable irrigation district.

The data compiled by the Ministry of Agriculture engineers for the assessment of our district infrastructure took ~2 years with multiple concerns regarding the inspection criteria. At that time, SSRID requested an independent engineering firm be hired to inspect the infrastructure so there would be no bias opinion. MPE engineering was then hired to inspect and compile a cost structure for our infrastructure.

The results of this analysis resulted in a required rehabilitation for our district of approximately 80% of our infrastructure at an estimated cost of \$151million.



With an estimated cost of \$150 million to rehab the district over a 100-year cycle, this would require an increase to the SSRID replacement fund of \$1.5 million per year or an additional \$36.60/ac.

The experience of our senior staff, new technologies and hopefully a good government partnership we could rehabilitate our district well into the future at a much lower cost. This commitment will require an IRP in conjunction with Government funding.

The yearly amount of funds to adequately rehabilitate the district will be ~\$600k to \$750k per year. The present offer from the Ministry of Agriculture (MOA) is \$42.00 per acre which equates to \$1,764,000.00 per year and is more than adequate, but this is only guaranteed for a 5 year term. An additional District commitment above the present \$4.00/ac would be required into the future of approximately \$11.00/ac towards the replacement fund for a yearly commitment of ~\$630,000.00.

Asset Transfer

The Saskatchewan Ministry of Agriculture (MOA) owns a substantial amount of District irrigation infrastructure and SSRID is under an agreement with the MOA to Operate and Maintain the District. The Water Security Agency controls all the water rights to the district which SSRID also has an agreement to Operate & Maintain.



THE DIFFICULT PROCESSES IN ACHIEVING WATER SUPPLY FOR SSRID

1. **Acquire a Water Supply Agreement from the Water Security agency (WSA) which includes, determining a water allocation adequate for existing and potential irrigated acres.**
2. **Determine the ~ power costs to run the pumps at the eastside pump station, which is owned by the WSA and they require full recovery on pumping costs.**
3. **Negotiate an Operation & Maintenance agreement including a schedule along the main supply canal (WM1) with WSA.**
4. **Water supply to landowners from SSRID is done through a water supply agreement which typically last 10 years. We are not allowed to sell the water rights to parcels of land like Alberta.**
5. **Industry water supplied by SSRID infrastructure has to go through an approval process from WSA for the water rights.**
6. **All new infill or drainage projects have to be approved by the District, Ministry of Agriculture and Water Security Agency. The timeline for all approvals can take up to 1 year.**

Conclusion

Overall, the future of our district is a bright one. Despite the policy and regulatory challenges, we are moving forward with plans for expanding our service area and our stakeholders.

More accessible water supplies will allow us to attract both agricultural and industrial customers to our district and will allow those customers to have better access to the resources they need to grow or manufacture their products. This will help form the cornerstone of the economy in southern Saskatchewan well into the future.

Brian Bartel

Manager

South Saskatchewan River Irrigation District (SSRID)

