

**ANNUAL REPORT**  
**TO**  
**DECEMBER 31, 1987**  
Technical Report A.4

Prepared for:

CANADA-SASKATCHEWAN SOUTH SASKATCHEWAN RIVER BASIN STUDY

Prepared by:

CANADA-SASKATCHEWAN SOUTH SASKATCHEWAN RIVER BASIN STUDY  
Moose Jaw, Saskatchewan

**ANNUAL REPORT  
TO  
DECEMBER 31, 1987**

**CANADA - SASKATCHEWAN  
SOUTH SASKATCHEWAN RIVER BASIN STUDY**

# SOUTH SASKATCHEWAN RIVER BASIN STUDY

Room 205 - W.G. Davies Building  
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June 30, 1988

The Honourable Tom McMillan  
Minister of the Environment  
Government of Canada  
Room 582, Confederation Building  
House of Commons  
Ottawa, Ontario  
K1A 0A6

The Honourable H. J. Swan  
Minister Responsible for the  
Saskatchewan Water Corporation  
Room 302  
Legislative Building  
Regina, Saskatchewan  
S4S 0B3

Dear Mr. McMillan and Mr. Swan:

We are pleased to present the second annual report of the Study Board for the Canada-Saskatchewan South Saskatchewan River Basin Study. This report describes the progress made and the expenses incurred during 1987.

With a considerable emphasis on organizing the study in 1986, efforts during 1987 were devoted to the basin planning process. The Study made a concerted effort to overcome information gaps in several key areas, including water use and water quality. In addition, 1987 saw considerable progress made in establishing a model capable of simulating the hydrology of the basin. At the same time a comprehensive public involvement program was initiated. Such involvement is essential for effective implementation of the final product--the basin framework plan.

All of this was accomplished within the fiscal resources of the sponsoring agencies. Expenditures to the end of 1987 totalled some \$460,000. Approximately one half has been spent running the Study Office with the remainder being spent on technical studies in water quality, quantity, use and in public involvement. With a total study budget of \$1.6 million, approximately \$1.14 million remains.

Yours sincerely,



R.A. Halliday  
Study Board Co-Chairman  
Environment Canada



W.L. Dybvig  
Study Board Co-Chairman  
Saskatchewan Water Corporation

RAH/WLD/crr  
Enclosure

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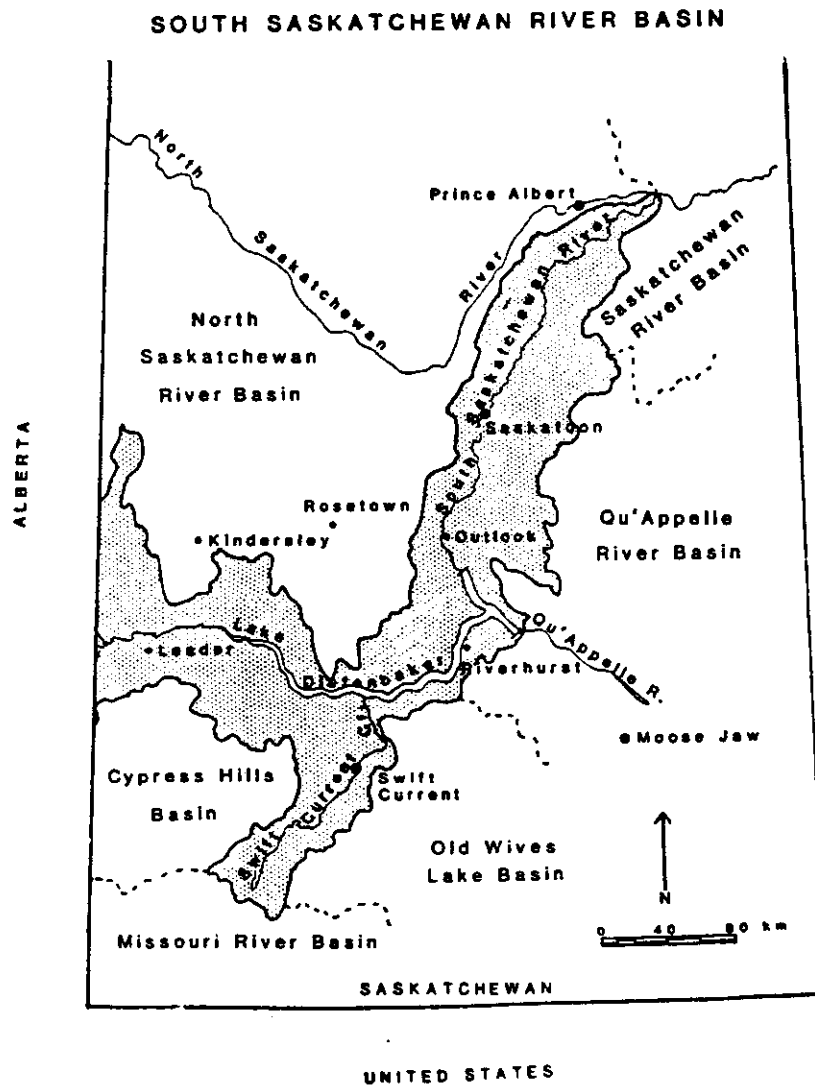
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## I INTRODUCTION

The South Saskatchewan River, shared by the provinces of Alberta and Saskatchewan, has its headwaters in the Rocky Mountains of southwestern Alberta. The easterly course of the river takes it through southern Alberta and southwestern Saskatchewan, one of Canada's most arid regions. The river then follows a northeasterly course to join the North Saskatchewan River near Prince Albert to form the Saskatchewan River (Figure 1), which then flows into Manitoba.

Figure 1



The South Saskatchewan River is vitally important to all three prairie provinces. The water resources of the basin support economic growth in each of the provinces. Recognizing the importance of the South Saskatchewan River, Alberta Environment completed a major basin study in 1984. The study evaluated future water management options which would meet the growing water uses within the province, while meeting downstream commitments to Saskatchewan as a first priority. The study concluded that after the year 2000, if maximum development occurs, only 57 percent of the natural flow, on average, would be passed on to Saskatchewan.

Given the conclusions of the Alberta basin study, as well as the occurrence of three severe drought years during the past ten years, the Saskatchewan Water Corporation and Environment Canada developed a proposal to conduct a water management study for the basin in Saskatchewan. In May, 1986, the Canada-Saskatchewan South Saskatchewan River Basin Study Agreement (Appendix 1) was signed. Under the \$1.6 million cost-shared agreement, the two parties undertook to:

- document current and emerging water management issues;
- assess the water and related resources of the basin; and,
- develop a framework plan for the future management of the water resources of the basin.

The South Saskatchewan River Basin Study is intended to provide essential information to guide water management and development decisions in the interests of all water users dependent upon the water resources of the basin.

The Study is scheduled for completion by December 31, 1989.

## II ORGANIZATION

The Study Board, established under the terms of the agreement, is responsible for administering the study. In 1987, there was a change to the Study Board. W.L. Dybvig replaced R.L. Kellow as the Saskatchewan Water Corporation representative. R.A. Halliday remained as the representative for Environment Canada (Figure 2).

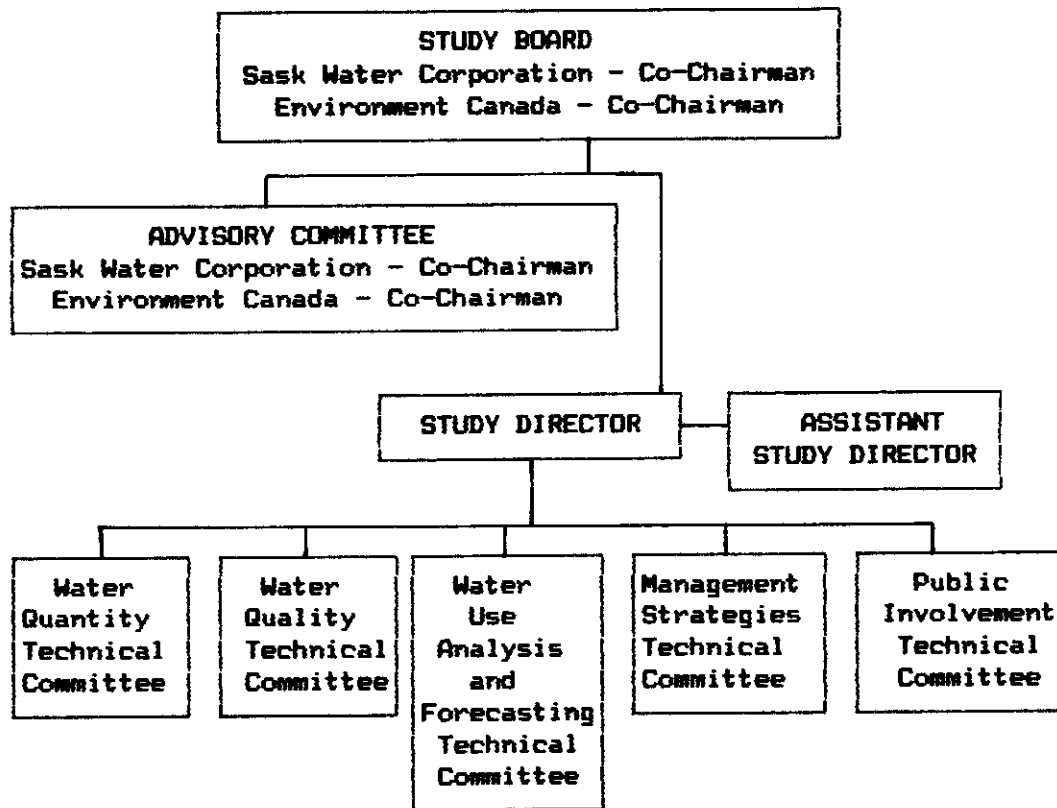
The Study Director, reporting directly to the Study Board, is responsible for overseeing the planning, communication, scheduling, co-ordination, budget control and other day-to-day matters associated with the study. The Study Director also chairs the Technical Committees established for each of the study components. He is assisted in his responsibilities by the Assistant Study Director and the Study Office secretary.

An Advisory Committee, consisting of senior officials from provincial and federal departments, provides policy advice to the Board.

The Technical Committees assist the Study Office in defining the need for technical studies to be undertaken by consultants and in reviewing the results of these studies as they become available.

Members of the Technical and Advisory Committees for 1987 are listed in Appendix 2.

Figure 2





### III PROGRESS BY STUDY COMPONENT

#### A. STUDY OFFICE ADMINISTRATION

During 1987, the Study Office continued to produce the required monthly and quarterly progress reports for the Study Board. Expenditure forecasts to December 31, 1987 and to March 31, 1988 were provided for Sask Water and Environment Canada respectively.

The Study Board approved the draft 1987 budget submitted in December 1986. The budget was later revised downward to accommodate the reduced level of financing available from Sask Water.

Brad Fairley took over the responsibilities of Assistant Study Director from Esther Kienholz at the beginning of January. Another change in the Study Office staff took place near the end of 1987. Linda Cheyne, the Study Office secretary, left in December on a six-month maternity leave. Carol Regimbald began working in the study office half-time at the beginning of December under Ms. Cheyne's supervision and took over secretarial responsibilities full-time at the end of the month.

#### B. STUDY OFFICE PLANNING/COORDINATION/COMMUNICATION

An overall Study Plan which was first presented to the Study Board and the Advisory Committee in December of 1986, was reviewed, revised and approved by the Study Board in May, 1987. The 1987 Annual Work Plans for each Study component received approval early in 1987. They were revised in July when a final budget was established and revised again when additional monies were made available in September.

Two contracts were undertaken during 1987 in support of the Study Office's planning function.

James C. MacPherson Consultants of Saskatoon was hired to document the legal and administrative arrangements for water resources management within the South Saskatchewan River Basin. The final report is expected early in 1988. The information contained in the report will assist in developing an effective inter-agency implementation plan, one of the three major components of the basin framework plan.

The second contract was awarded to M-R-2 McDonald & Associates to write a computer program to support the numerical interpretation method for multiple objective analysis. This technique and the supporting computer software will assist the Management Strategies Technical Committee in evaluating alternate basin management strategies.

The Study Office initiated a formal problem analysis which was intended to eventually define water management objectives for the basin. The first and possibly longest stage of the problem analysis process, the identification of issues, was completed in the fall of 1987. This

involved a thorough review of background material and an exhaustive consultation with government and the public. Issues identification was used as the starting point for the Objectives Setting Survey which is in the Public Involvement Component.

In conjunction with the Saskatchewan Branch of the Canadian Water Resources Association, the Study Office sponsored a one day introductory seminar on multiple objective analysis in December 1987. The Study Office intends to use this technique in the study. The session was well received by those in attendance, more than half of who are associated with the study.

The 1988 Annual Work Plans for each Study Component were prepared early in December of 1987. The plans, which are based on an assumed budget of \$500,000, were approved by the Study Board on December 23rd, 1987.

### C. WATER QUANTITY

The major emphasis for 1987 was the development of a computer model capable of simulating the hydrology of the basin. The model will be a vital component of future work in evaluating alternative basin management strategies.

With the aid of the report from the Information Base Study completed early in 1987, the Water Quantity Technical Committee evaluated the various water management models available to the study. The Committee recommended Alberta Environment's Water Resources Management Model (WRMM) as the model most suitable for the basin study. The Committee also recommended that Saskatchewan Power Corporation's HYDSIM model and Environment Canada's Water Use Analysis Model (WUAM) play supporting roles for simulation of hydro-electric production and water use respectively. Sask Water was engaged to carry out the modelling using the WRMM while the other agencies were engaged to carry out the modelling using their in-house models. All three simulation models employ the same structural representation of the basin and the same data input files. All of the models are expected to be up and running in early 1988.

The need for a drought frequency analysis for the basin was also identified. Information on the occurrence of drought events will assist the Study in conducting a risk analysis for drought in order to propose strategies for dealing with this difficult and recurring problem within the basin. As a first step in this endeavor, the National Hydrology Research Centre (NHRC) in Saskatoon was engaged to provide a frequency analysis of meteorologic drought conditions in the basin. A draft report was reviewed by members of the Water Quantity Technical Committee. This work will eventually form one part of a larger project that will define and analyze both flood and drought events and provide the basis for a risk analysis.

Although ground water is an important resource within the South Saskatchewan River Basin, the information describing it is limited. This

lack of information creates difficulties for managers, particularly when attempting to develop a plan for integrated management of water resources. Clifton Associates was hired to evaluate the information on the water resources of the basin and to make recommendations as to how ground water should be dealt with within the context of the basin study. A draft report was produced in December and was reviewed by the Water Quantity Technical Committee with supporting reviews by the Water Quality and Water Use Technical committees and a few experts outside the technical committee structure. The report, which will be finalized in 1988, will represent the basis for a recommendation from the Study Office to the Study Board as to how ground water should be dealt with in the context of the basin study.

#### D. WATER QUALITY

Work on the water quality component focused on three major tasks: review of the existing water quality data; developing a nutrient loading model for the Lake Diefenbaker reservoir; and developing water quality objectives.

The Water Quality Technical Committee decided that a systematic review of the major groups of water quality parameters would establish a baseline from which further water quality studies could be launched. The Study Office hired Saskmont Engineering to review the information on organic contaminants (e.g. pesticides, industrial effluents) in the basin. The final report, which was completed late in 1987, identified a number of organic compounds which could represent a concern in the basin. Furthermore, the report identified a number of compounds which, based on current information, are used in the basin, but which are not included in current monitoring programs. As follow-up to this report, the Committee is considering a review of current water quality monitoring programs in 1988.

Saskatchewan Research Council (SRC) was engaged under contract to carry out a review of current data for the other major categories of water quality variables, including major ions, metals, and physical characteristics. The contract was begun late in 1987 and will be completed in 1988.

In recognition of the fact that Lake Diefenbaker is a vital source of water, considerable effort was devoted to developing a model for determining the impacts of development on the concentration of nutrients--the most obvious threat to the lake. The Study Office engaged Saskatchewan Environment and Public Safety to develop a model which can be used to predict the trophic status of the lake. Staff from Saskatchewan Environment and Public Safety collected water quality samples which were analyzed in the laboratories of Environment Canada. In support of this modelling effort, Saskmont Engineering was contracted to prepare a land use map of the effective drainage basin using satellite imagery. In addition, SRC was contracted to review the available literature and determine the phosphorus loading factors associated with the different

land uses in the basin. These two studies, which were completed in 1987, played an important role in developing the Lake Diefenbaker Trophic State Model. All this work was coordinated by Saskatchewan Environment and Public Safety, which will provide the final refinements for the model in 1988.

There is considerable water quality data collected for the South Saskatchewan River Basin each year, but there has been no established procedure to determine if the water quality of the basin is changing with time. Saskatchewan Environment and Public Safety developed a trend analysis technique which was then applied to the water quality data for the basin. Where sufficient data existed for the application of this technique few trends were detected. Only chloride and sodium concentrations showed significant increases. However, based on current water quality guidelines, none of the values represent any hazard to users, including irrigation, which is the water use most sensitive to salts.

The Water Quality Technical Committee also carried out background work necessary for the development of water quality objectives for the basin. Most of this work was undertaken by the Committee. Environment Canada submitted a first draft of a paper reviewing methods for establishing ambient water quality objectives. The document, which was reviewed by the Committee late in 1987, should be completed early in 1988. This document, along with the review of existing water quality data and information on water use being generated by the Water Use Technical Committee, should put the Water Quality Technical Committee in a good position to begin the process of developing basin specific water quality objectives.

#### **E. WATER USE ANALYSIS AND FORECASTING**

The studies undertaken in 1986 revealed that detailed information on water use within the basin was lacking. Information on almost all sectors of use was generally poor. During 1987, the Water Use Analysis And Forecasting Technical Committee established its priorities for obtaining new water use data and filling some of the information gaps.

The sector of greatest concern was irrigation. With irrigation already representing an important use throughout the basin, and more large-scale irrigation projects within the basin imminent, it was decided that the study required a better understanding of water use patterns of irrigators. The Study Office retained Cochrane Lavalin to carry out a pilot study of irrigation water use in the basin. The study was intended to determine the best approach for field measurement of actual water use by irrigators in the basin and to determine the size of the sample that would be required in future studies to accurately estimate water use. The draft report was completed in 1987 with the final report expected early in 1988 to allow an early start on any follow-up studies.

A detailed survey of municipal and residential water use within the basin was completed in 1986. Using the 1986 residential survey data, a demand

model for residential water use in the basin was developed by the University of Saskatchewan. In 1987 the data base summarizing the municipal water use was expanded to include those municipalities which are physically outside the basin but which rely on basin water. This work will improve the accuracy of water use forecasts necessary for describing and evaluating alternate basin management strategies.

During 1986, the Water Use Analysis and Forecasting Technical Committee identified several information gaps regarding instream water users (i.e., those users who do not divert water from the watercourse). There was very little information available regarding the use criteria (e.g., preferred flow, depth, water quality) of these different types of users. The Study Office engaged Beak Associates Consulting to identify instream water users and criteria that apply to instream water use. The consultant assessed whether the existing information on instream water use was adequate to determine if the criteria were being met and, where necessary, developed work programs to provide the missing information. The report indicated that the information on hydro-electric power generation, ferry operation and waste assimilation was adequate, but recommended additional work on recreation and fisheries. The recommended follow-up work is planned for 1988.

Industrial water use was identified as another sector where there was little current information. The Committee decided that better information on industrial water use was required if it was to be properly addressed in this study. The Study Office contracted Stanley Associates Engineering to determine the current water use requirement of the industries using water from within the basin. The study was started late in 1987 with completion anticipated in 1988.

As noted in the Water Quantity Component, it was decided that the study would use Environment Canada's Water Use Analysis Model (WUAM) to supplement the WRMM modelling output with additional information on water use. Environment Canada began the process of configuring the model to the basin in 1987. The WUAM modelling is expected to be complete in early 1988.

Most of the work carried out during 1987 in the Water Use Analysis and Forecasting component focused on water use. However, work was also begun on the forecasting aspects. In order to develop accurate forecasts of water use within the basin, a clear understanding of the economic and demographic characteristics of the basin are essential. Sask Trends Monitor was hired late in 1987 to update the regional economic base information in the 1982 Water Demand Study carried out by the Prairie Provinces Water Board. The report will not be completed until the publication of the 1986 census data by Statistics Canada.

#### **F. PUBLIC INVOLVEMENT**

The objective of this component is to facilitate public involvement in the study. Such involvement is essential if the framework plan produced by

the basin study is to be successfully implemented. The Study Office engaged a consultant to provide coordination for the public involvement program.

Public information meetings were held in nine communities in the basin. These included Swift Current, Lucky Lake, Leader, Saskatoon, Eston, Riverhurst, Outlook, Rosthern, and Shaunavon. The meetings consisted of a presentation on the South Saskatchewan River Basin followed by a question and answer period during which the members of the public were invited to make their concerns known. The meetings were well received by those in attendance, and the informal discussions with the groups that did attend were very useful to the Study Office.

The Study Office identified approximately 40 different interest groups (e.g., water users' associations, regional park boards, recreation groups, conservation organizations) in the basin. They met with the groups or their representatives to explain the purpose of the Study and to listen to their special concerns and interests in the water resources of the basin. In order to ensure that municipalities were afforded the opportunity to make their concerns known, all eighty municipalities in the basin (both urban and rural) were invited to submit a brief to the Study Office outlining their concerns. Most of the larger communities responded. Responses ranged from the continued need to have assured access to a supply of good quality water for municipal use to a desire to have the recreational potential of the basin expanded.

In order to keep those who had expressed an interest in the Study up to date, the Study Office continued to distribute regular newsletters to the more than 500 groups or individuals on our mailing list. The newsletters included information on water resource management issues in the basin and updates on progress.

In an attempt to involve a wide range of interests in setting objectives for water management in the basin, the Study Office initiated an objective-setting survey. Eighty-nine individuals indicated a willingness to participate after representatives of all the government and non-government agencies with an interest in the basin study were approached. The participants represented an approximately equal split between representatives from water management agencies and the public. This survey provided the Study Office with an opportunity to begin the integration of contributions from the public with those from the participating government agencies. The first two rounds of a five round survey effort were completed in 1987. The objective setting survey is part of the formal problem analysis discussed above. It is scheduled for completion by April of 1988.

To assist in the determination of public awareness of water management issues, the Study Office investigated the feasibility of conducting an opinion survey of basin residents. As an initial step, Brystra Consultants was engaged to conduct a pilot study to design an appropriate survey instrument, determine an effective sampling program and estimate the costs required for such a survey. Pilot interviews were held in 1987

with the final report expected in 1988. Upon receipt of the final report, the Study Board will decide whether to proceed with such a survey.

#### **6. MANAGEMENT STRATEGIES**

The Management Strategies Technical Committee will be formed early in 1988. A list of potential committee members and terms of reference for the committee were prepared for the Study Board but were not finalized by the end of 1987. The Committee will be struck early in 1988.

#### IV. FINANCIAL REPORT

The 1987 budget was confirmed in July as \$360,000; split approximately \$140,000 (39%) for Study Office support and \$220,000 (61%) for contractual services. In September, the amount of funds available for contractual services was expanded. As a result, several new contracts were let during the last quarter of the year and the budget figures in Table 1 have been adjusted to account for budgeted amounts for these additional contracts.

The year end expenditure for Study Office support was \$164,000. The over-expenditure of \$24,000 was due to an accumulation of small variances throughout the year. The only notable over-expenditures among these were in the casual salary and benefits area and in the communications area, where a change in telephone billing practices and a postal strike resulted in unanticipated additional costs.

A total of 21 contracts and project authorizations were undertaken during the year. Several contracts came in well under budget. Five new contracts were initiated during the last quarter in an attempt to take advantage of additional funds made available in September. These contracts totalled \$64,000, but only about 60% of this work could feasibly be carried out before the end of the fiscal year which resulted in the spending of only \$39,000. The net result was that \$203,000 of the \$284,000 available for contract work in 1987 was spent.

The net result was a year end actual expenditure of \$164,000 (45%) for Study Office support and \$203,000 (55%) for contractual services for a total of \$367,000. Adding the 1986 expenditures, the Study costs to date are \$460,000, about \$35,000 under budget overall. Approximately \$1.1 million of the \$1.6 million committed to the Study under the Agreement remained at the end of the year.



TABLE I  
Summary of Expenditures to December 31, 1987

SOUTH SASKATCHEWAN RIVER BASIN STUDY  
BUDGET VS. ACTUALS  
By Major Study Component  
December 31, 1987

DESCRIPTION	ADMINISTRATION		WATER USE		QUANTITY		P. I. PROGRAM		TOTAL		
	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	VAR.
EMPLOYEE BENEFITS	112,652	128,306	2,000	4,280					114,652	132,596	(17,944)
TRAVEL	8,350	6,270							8,350	6,270	2,080
CONSULTING SERVICES	16,000	25,105	61,115	61,292	50,400	38,783	48,000	57,520	206,915	202,743	4,172
COMMUNICATIONS	7,750	10,959						360	7,850	13,569	( 5,739)
OFFICE SUPPLIES	2,800	3,340							2,800	3,340	( 540)
RENTALS	10,500	8,206							10,500	8,206	2,294
REPAIRS & MAINTENANCE	0	47							0	47	( 47)
CAPITAL EXPENDITURES	0	0							0	0	0
TOTAL EXPENDITURES	158,052	182,239	63,115	65,582	50,400	38,783	48,000	57,880	351,067	366,791	(15,724)
									31,500	22,313	

APPENDIX 1  
CANADA-SASKATCHEWAN

SOUTH SASKATCHEWAN RIVER BASIN STUDY AGREEMENT

THIS AGREEMENT made this 16<sup>th</sup> day of May, 1986

BETWEEN:

THE GOVERNMENT OF CANADA, represented herein by the Minister of the Environment (hereinafter referred to as "Canada")

AND

THE GOVERNMENT OF SASKATCHEWAN, represented herein by the Minister in charge of the Saskatchewan Water Corporation (hereinafter referred to as "Saskatchewan"),

WHEREAS the Canada Water Act encourages federal-provincial cooperation in the examination and resolution of water resource issues;

WHEREAS the Saskatchewan Water Corporation has among its powers pursuant to Section 16 of the Saskatchewan Water Corporation Act the responsibility to manage, administer, develop, control and protect the water and related land resources of Saskatchewan;

WHEREAS the South Saskatchewan River Basin is an interprovincial river basin, and is a primary source of reliable, high quality water for the plains region of Saskatchewan, a region of national significance;

WHEREAS the social and economic welfare of the people in the plains region of Saskatchewan depends to a considerable degree on the way in which the water and related resources of the South Saskatchewan River Basin are managed to serve diverse and often competing activities such as agriculture (livestock and irrigation), recreation, tourism development, fisheries, hydro-electric power generation, and domestic, municipal and industrial uses;

WHEREAS there is a need to protect and enhance the quality of the water resource in the South Saskatchewan River Basin;

WHEREAS the water resources of the South Saskatchewan Basin could be altered by future, major water resource development projects, including interbasin transfers which could have potential economic and environmental effects in Saskatchewan, as well as in Manitoba and the United States.

WHEREAS there is a need to develop a framework in which the social, economic and environmental effects of future projects and programs can be evaluated;

WHEREAS the Governments of Canada and Saskatchewan agree that a cooperative approach to planning and managing the water and related resources in the South Saskatchewan River Basin is necessary and desirable;

WHEREAS Her Excellency, the Governor in Council, by Order in Council P. C. 1986-2/512 dated February 27, 1986, has authorized the Minister of the Environment to execute this Agreement on behalf of Canada; and

WHEREAS His Honour, the Lieutenant Governor in Council, by Order in Council 1087/85 dated October 28, 1985, has authorized the Minister in charge of the Saskatchewan Water Corporation to execute this Agreement on behalf of Saskatchewan.

IT IS THEREFORE AGREED BETWEEN THE PARTIES HERETO AS FOLLOWS:

Section 1 - Definitions

1. In this Agreement, unless the context otherwise requires:
  - (a) "eligible costs" means directly related costs that have been approved and recorded by the Board as having been reasonably and properly incurred for the study;
  - (b) "Ministers" means the Minister of the Environment for Canada and the Minister in charge of the Saskatchewan Water Corporation;
  - (c) "study" means the South Saskatchewan River Basin Study as outlined in Schedule A;
  - (d) "Study Director" means the director appointed pursuant to Section 3.4; and
  - (e) "The Board" means the Canada-Saskatchewan South Saskatchewan River Basin Study Board established pursuant to Clause 3.1.

Section 2 - Purpose

- 2.1 The purpose of this Agreement is to provide for a study having the following objectives:
  - (a) document current and emerging water and related issues in the South Saskatchewan River Basin in Saskatchewan;
  - (b) carry out an assessment of the water and related resources of the South Saskatchewan Basin, and their current and future use;
  - (c) develop a framework plan for the conservation and management of the water in the South Saskatchewan Basin in Saskatchewan which allows for the evaluation of water resource projects.

Section 3 - Management and Coordination

- 3.1 This Agreement shall be administered by a Study Board consisting of one member appointed by the Minister of the Environment for Canada, and one appointed by the Minister in charge of the Saskatchewan Water Corporation.
- 3.2 Each Board member shall designate an alternate to assume responsibilities during periods of absence.
- 3.3 The Board shall:
  - (a) be responsible for the carrying out of the terms of reference of the study as set out in Schedule A, and be responsible for determining the manner in which the funds allocated to the study will be spent;
  - (b) keep minutes of its meetings and records of decisions taken at its meetings;
  - (c) report annually to the respective Ministers;
  - (d) provide a final report of the study with recommendations to the Ministers by December 31, 1989;
  - (e) carry out a program of public information;

- (f) determine eligible costs pursuant to this Agreement; and
  - (g) carry out such other related duties as the Ministers may direct.
- 3.4 Subject to the recommendation of the Board, the parties will establish:
- (a) a study office; and
  - (b) technical and advisory committees as required;
- and Saskatchewan will appoint a Study Director, and such other staff as may be required;
- 3.5 The parties to this Agreement may, on the recommendation of the Board, enter into contracts to carry out various aspects of the work associated with the study.

#### Section 4 - Financial Provisions

- 4.1 Total costs shall not exceed \$1,600,000, to be shared equally by Canada and Saskatchewan;
- 4.2 Canada and Saskatchewan shall bear the entire costs of the salary, travel, and related expenses of:
- (a) each of its members of the Board; and
  - (b) any other employee who, although engaged in an activity hereunder, does not have a specified portion of his workday, week, month or year assigned exclusively to the carrying out of this Agreement;
- and such costs shall not count against the limit stipulated under Clause 4.1.
- 4.3 Where Canada and Saskatchewan are supplying goods or services, such goods or services shall be supplied at cost.
- 4.4 The parties shall, with respect to the costs to which Clause 4.1 is applicable:
- (a) pay such costs as they come due; and
  - (b) submit, at least quarterly, progress claims to the other party for its share of the eligible costs incurred and paid for in the performance of work, as certified by a senior financial officer of that party, and in a mutually agreed manner.
- 4.5 The parties shall pay the progress claims submitted by the other party after the claims are certified by a senior officer of that latter party.
- 4.6 Payments to be made by Canada under this Agreement shall be paid by Canada to the Saskatchewan Water Corporation.
- 4.7 The provisions of this Agreement respecting the payment and reimbursement of eligible costs that are to be shared by Canada and Saskatchewan shall remain in effect until March 31, 1990.
- 4.8 Canada and Saskatchewan shall maintain adequate documentation and records of the costs that are to be shared by them and which are incurred pursuant to this Agreement and shall, upon request, make such records and documents available for examination by auditors of the other.

4.9 Any discrepancy in the documents and records of costs incurred under this Agreement disclosed by an audit under Section 4.8 shall be promptly adjusted between Canada and Saskatchewan.

Section 5 - Amendment

5.1 This Agreement may be amended by the Ministers with the exception of Clauses 4.1 and 7.1 which can only be amended with the approval of the Governor in Council for Canada and the Lieutenant Governor in Council for Saskatchewan.

Section 6 - Evaluation

6.1 Canada and Saskatchewan may undertake an evaluation of this Agreement. Where Canada or Saskatchewan undertake to make an evaluation of this Agreement, the other shall supply such information as may reasonably be necessary for such evaluation to be undertaken.

Section 7 - General

7.1 This Agreement shall take effect on the date of signing, and terminate on December 31, 1989.

7.2 Canada and Saskatchewan shall make available to the Board all reports and related available information from prior and current studies for use in the study.

7.3 Where Canada or Saskatchewan undertakes or is responsible for any portion of the study, it shall indemnify and save harmless the other, its officers, servants and agents, against all claims and demands of third parties in any way arising out of any work undertaken pursuant to this Agreement, except as such claims or demands relate to the act or negligence of any officer, employee or agent of the other.

7.4 No member of the Parliament of Canada or member of the Legislative Assembly of Saskatchewan shall hold, enjoy or be admitted to any share or part of any contract, agreement, commission or benefit arising out of this Agreement.

IN WITNESS WHEREOF, the Honourable Thomas McMillan, Minister of the Environment, has hereto set his hand on behalf of Canada; and the Honourable Eric Berntson, Minister in charge of the Saskatchewan Water Corporation, has hereto set his hand on behalf of Saskatchewan.

IN THE PRESENCE OF

GOVERNMENT OF CANADA

Marc Gervais  
Witness

Tom McMillan  
Minister of the Environment

GOVERNMENT OF SASKATCHEWAN

Marie Manzi  
Witness

Eric Berntson  
Minister in charge of the  
Saskatchewan Water Corporation

SCHEDULE A

STUDY COMPONENTS AND ANNUAL BUDGETS  
South Saskatchewan River Basin Study

<u>Study Component</u>	<u>Total Cost</u>	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>	<u>1988-89</u>	<u>1989-90</u>
1. <u>Water Quantity</u>	<u>\$125,000</u>	0	65,000	45,000	15,000	0

This component focuses on the quantitative aspects of water management in the Saskatchewan portion of the South Saskatchewan River Basin, in particular:

- . analysis and modelling of present and future supplies (incl. reservoir operations, Alberta supply scenarios);
- . developing future supply scenarios, to complement the water demand scenarios in component 3 (including concepts and costs of development projects, reservoir operating plans); and
- . evaluating the quantitative effects on the South Saskatchewan Basin in Saskatchewan of water management alternatives, including currently proposed alternatives by Alberta and any major interbasin transfers which have already been identified.

The cost is relatively modest because of a good water quantity data base, and extensive earlier supply studies by both federal and provincial agencies, as well as the Prairie Provinces Water Board.

<u>Study Component</u>	<u>Total Cost</u>	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>	<u>1988-89</u>	<u>1989-90</u>
2. <u>Water Quality</u>	<u>\$295,000</u>	0	135,000	105,000	55,000	0

This component deals with the qualitative aspects of water management in the basin, in particular:

- . basic data for identifying sources for, trends in, and causes of water quality change;
- . analysis of present water quality and future implications (e.g., of Alberta scenarios);
- . assessing future water quality, as part of the water supply and demand scenarios in components 1 and 3; and
- . evaluating quality implications of water management alternatives, both within and downstream of the basin (including management proposals, water quality objectives, project concepts and costs, to maintain or improve water quality).

The high cost of this component reflects the recentness of water quality management (hence, a limited data base and few basin-wide studies) and the increasing complexity and seriousness of water quality issues. Water quality is a special concern for Lake Diefenbaker, because of its critical location and role in the basin.

<u>Study Component</u>	<u>Total Cost</u>	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>	<u>1988-89</u>	<u>1989-90</u>
3. <u>Water Use Analysis and Forecasting</u>	<u>\$300,000</u>	0	180,000	80,000	40,000	0

The approach, of taking a balanced look at both supply and demand management, is a distinct departure from the traditional supply-oriented approach. This is a central component of the study, the first step toward planning for a more water-efficient economy. The component includes:

- . analysis of current and future water use by major water use sectors (irrigation, power, manufacturing, service industry, municipal); and
- . analysis of economic trends and projections, changing technology, climatic change, and economic value/pricing of water, as they may affect water use (both short- and long-term);

- . parallel analysis for instream uses and related uses (fisheries, wildlife, recreation, tourism), especially water quantity/quality aspects, economic value, downstream issues; and
- . development of a regional water supply/demand model for the South Saskatchewan River Basin (Saskatchewan portion) for evaluating supply/demand balances for various scenarios (economic, pricing, water quality and instream needs) and for evaluating management options in component 5.

<u>Study Component</u>	<u>Total Cost</u>	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>	<u>1988-89</u>	<u>1989-90</u>
4. <u>Public Involvement</u>	<u>\$170,000</u>	0	45,000	50,000	40,000	35,000

Public involvement is an essential input to the study. An understanding and enumeration of public views and concerns on water issues in the basin and adjacent basins is required for the development of alternative management strategies and formulation of recommendations.

<u>Study Component</u>	<u>Total Cost</u>	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>	<u>1988-89</u>	<u>1989-90</u>
5. <u>Water Management Strategies</u>	<u>\$105,000</u>	0	5,000	25,000	25,000	50,000

This is the crucial stage of the study: how the ever-increasing competition for a finite water resource can be dealt with, with due consideration to the economic, social environmental, technological, and institutional realities and changes.

The intent here is to integrate the results of the first four study components in alternative management strategies, both short- and long-term for the basin. Specific guidance is being sought among others, on:

- . future operation plans for Lake Diefenbaker;
- . the range of future growth opportunities;
- . need for establishing water use priorities;
- . implications of interbasin transfers;
- . measures to protect water quality; and
- . social response to the long-term prospects.

The strategies are not "blueprints for the future". The strategies will, however, provide a series of carefully developed views of the region's water future. Demands for water in the basin will continue to grow. The study will provide information on the nature of the water management choices that are necessary now, and in the future, to meet the challenge of supporting a larger economic base with a diminishing supply of high quality water.

<u>Study Component</u>	<u>Total Cost</u>	<u>1985-86</u>	<u>1986-87</u>	<u>1987-88</u>	<u>1988-89</u>	<u>1989-90</u>
6. <u>Study Management</u>						
- Study office, Director and support staff	\$ 530,000	10,000	140,000	140,000	140,000	100,000
- Final report production	75,000					75,000
<u>Sub-totals</u>	<u>\$ 605,000</u>	<u>10,000</u>	<u>140,000</u>	<u>140,000</u>	<u>140,000</u>	<u>175,000</u>
<u>Totals</u>	<u>1,600,000</u>	<u>10,000</u>	<u>570,000</u>	<u>445,000</u>	<u>315,000</u>	<u>260,000</u>

<u>All Components</u>							
<u>Cost sharing:</u>	Canada	\$ 800,000	5,000	285,000	222,500	157,500	130,000
	Saskatchewan	800,000	5,000	285,000	222,500	157,500	130,000

## APPENDIX 2

### **SOUTH SASKATCHEWAN RIVER BASIN STUDY TECHNICAL COMMITTEES MEMBERSHIP December 31, 1987**

#### **PUBLIC INVOLVEMENT**

Sharon Dominik, Environment Canada, Regina  
Rod McLean, Saskatchewan Water Corporation, Moose Jaw

#### **WATER QUALITY**

Diane Blachford, Environment Canada, Regina  
Wally Nicholaichuk, National Hydrology Research Center, Saskatoon  
Randy Munch, City of Saskatoon, Saskatoon  
Robert Ruggles, Saskatchewan Environment & Public Safety, Regina  
Bill Sawchyn, Saskatchewan Parks, Recreation & Culture, Saskatoon  
Ken Thomson, Environment Canada, Regina  
Patricia Tones, Saskatchewan Research Council, Saskatoon  
Ken Weagle, Saskatchewan Environment & Public Safety, Regina

#### **WATER QUANTITY**

Alex Banga, Saskatchewan Water Corporation, Moose Jaw  
Fred Martin, Prairie Farm Rehabilitation Administration, Regina Vipin  
Prasad, Saskatchewan Power Corporation, Regina  
Larry Wiens, Environment Canada, Regina

#### **WATER USE**

Jim Atcheson, Agriculture Canada, Regina  
David Donald, Environment Canada, Regina  
Glen Grismer, Meewasin Valley Authority, Saskatoon  
Mike Kowalchuk, Environment Canada, Regina  
Hasu Naik, Environment Canada, Regina  
George Pearson, Prairie Farm Rehabilitation Administration, Regina Vipin  
Prasad, Saskatchewan Power Corporation, Regina  
Jim Rogers, Environment Canada, Regina  
Robert Smith, Public Works Canada, Edmonton  
Larry Sukava, Saskatchewan Parks, Recreation & Culture, Saskatoon  
Don Tate, Environment Canada, Ottawa



APPENDIX 2 cont'd

**SOUTH SASKATCHEWAN RIVER BASIN STUDY**  
**ADVISORY COMMITTEE MEMBERSHIP**  
**December 31, 1987**

R. Bjonback	Chief, Water Planning & Management Branch Inland Waters & Lands Directorate Environment Canada
W. Dybvig	Manager, River Basin Planning Saskatchewan Water Corporation
D. Fast	Director, Water Quality Branch Saskatchewan Environment & Public Safety
H. Foerstel	Chief, Socio-Economic Division Inland Waters & Lands Directorate Environment Canada
W. Gunmer	Chief, Water Quality Branch Inland Waters & Lands Directorate Environment Canada
D. James	Analyst Western Diversification Office
S. Kramer	Assistant Deputy Minister Saskatchewan Agriculture
J. Lowe	Regional Director Agriculture Development Branch Agriculture Canada
B. Abrahamson	Chief, Planning for Engineering Service Prairie Farm Rehabilitation Administration
W. Pepper	Director, Integrated Resource Policy Saskatchewan Parks, Recreation & Culture
L. Talbot	Director, Community Planning Services Br. Saskatchewan Rural Development

APPENDIX 3

SOUTH SASKATCHEWAN RIVER BASIN STUDY  
LIST OF COMPLETED REPORTS  
December 31, 1987

These reports are available at the following government libraries:

Environment Canada, Regina, Sask.  
Saskatchewan Water Corporation, Moose Jaw, Sask.  
Saskatchewan Environment & Public Safety, Regina, Sask.  
National Hydrology Research Center, Saskatoon, Sask.

<u>TITLE OF REPORT</u>	<u>DATE COMPLETE</u>
A Satellite Survey of Land Use in the Effective Drainage Area of SSRB	October 31, 1987
Annual Report to December 31, 1986	November 1, 1987
Contaminant Organic Compounds in the Surface Waters of the SSRB - A Review	December 31, 1987
Framework Plan Working Definition	September 3, 1987
Information Base: Surface Water Hydrology and Water Use for SSRB Study	March 13, 1987
Instream Water Use - SSRB	December 31, 1987
Municipal & Residential Water Use Study	August 31, 1987
Municipal Water Use Survey	July 30, 1987
Phosphorous Loading from Non-Point Sources relevant to the Lake Diefenbaker Basin	September 30, 1987
Public Involvement Program Position Paper	October 30, 1986
Recreational Data Analysis Report	July 30, 1987
SSRB Recreation Survey: Data Collection & Data Base Development	November 30, 1986
Study Plan and Annual Work Plans - 1987	February 15, 1987

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TITLE OF REPORT

DATE COMPLETE

Study Proposal for the South  
Saskatchewan River Basin In Saskatchewan

April 30, 1986

Water Intake and Outfall Survey  
South Saskatchewan River Basin

December 30, 1987

Water Quality Trend Analysis and  
Data Base Summary

November 12, 1987