Chapter 1.

Introduction

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A. PURPOSE AND RATIONALE

Irrigation has become an integral component of the social and economic fabric of southern Alberta. The benefits of irrigation go well beyond the direct impacts of diversifying, stabilizing and increasing agricultural productivity at the farm level. Irrigation benefits extend to the suppliers of supporting goods and services; to Alberta's rapidly growing agri-processing industry; and to the domestic, municipal, industrial and recreational water users, and wildlife conservationists who rely on irrigation infrastructure for their water supplies.

The irrigated area in southern Alberta has been steadily increasing. Expansion is important to the health of the irrigation industry, however, irrigation places a high demand on the limited water resources of southern Alberta. Irrigation water users recognize they must be pro-active on water conservation and environmental matters. The additional demands that irrigation expansion places on the water resources and the environment must be addressed, with the objective of preserving these assets for future Albertans. Water management decisions should be based on the best practical science and technology, long range planning, and local knowledge.

In May 1990, the province announced the need to limit the amount of water to be allocated for irrigation purposes in the South Saskatchewan River Basin (SSRB). In September 1991, guidelines were established under the *South Saskatchewan Basin Water Allocation Regulation* which considered the water supplies available and the needs of irrigation and all other consumptive and instream uses (Alberta Environment 1991). Recognizing the limitations of the data and the uncertainties related to water requirements for various purposes when the 1991 *Regulation* guidelines were established, the province committed to a review in 2000.

A study of irrigation district water requirements and opportunities was initiated in 1996 as a cooperative effort of the Alberta Irrigation Projects Association (AIPA), representing the 13 irrigation districts in Alberta, the Irrigation Branch of Alberta Agriculture, Food and Rural Development (AAFRD), and the Prairie Farm Rehabilitation Administration (PFRA) of Agriculture and Agri-Food Canada. The Irrigation Water Management Study was carried out to provide a comprehensive, scientifically sound analysis of current and future water management within the irrigation districts. There were six objectives of the study.

- Identify and quantify current irrigation water requirements and the state of current irrigation water management.
- Quantify changes in water use and water management efficiencies during the 1990s.
- Quantify possible future irrigation water use.
- Assess the risks, impacts and possibilities of irrigation area expansion.
- Develop leading-edge computer tools to assess current and future irrigation water use and management opportunities.
- Assess the potential contribution of irrigation expansion to the provincial economy.

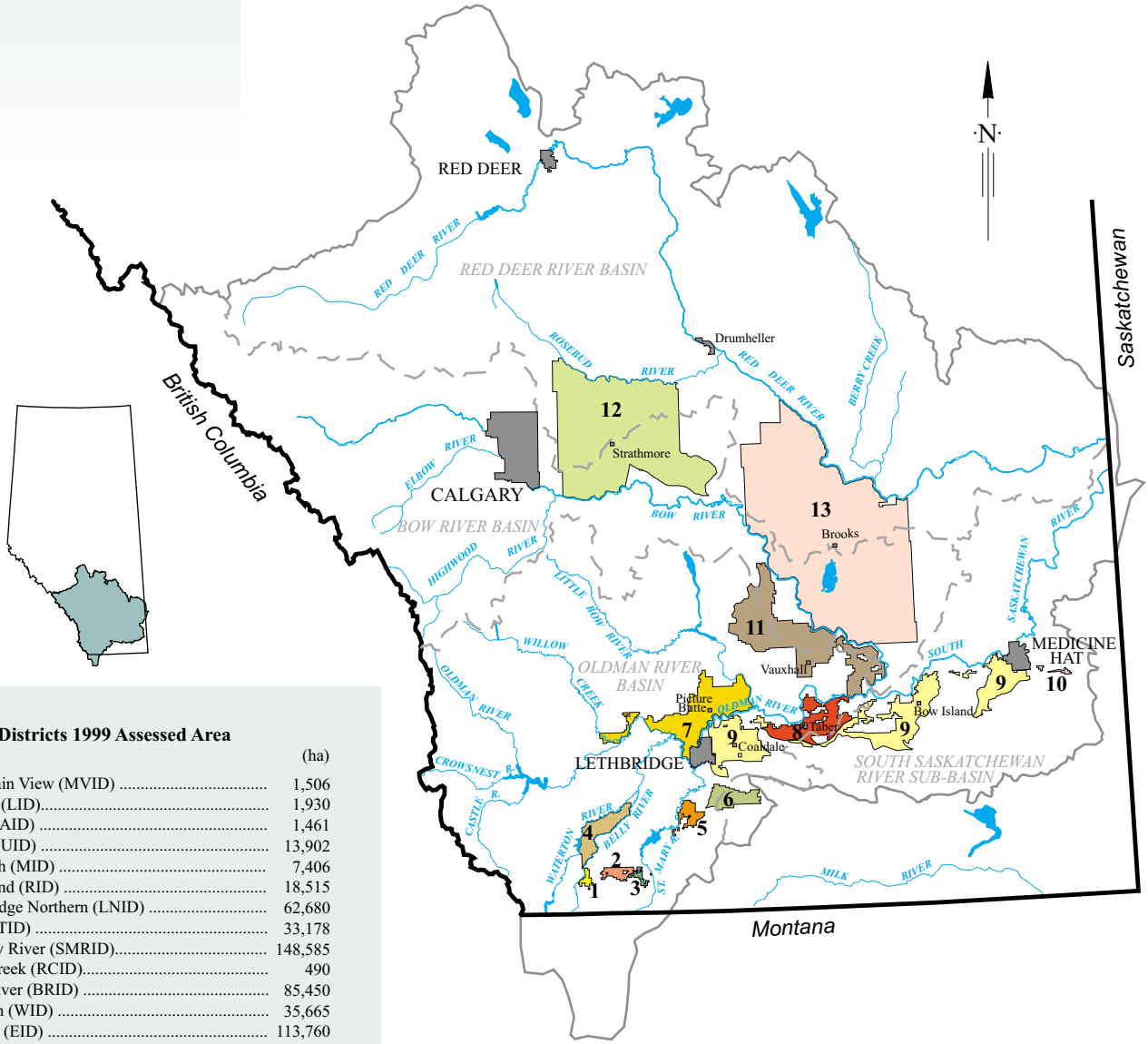
The results of this study provide a statement on the state of the irrigation industry in Alberta, and on prospects for the future. The information will be used in the province's SSRB water management planning process under the Water Act.

B. APPROACH

The Irrigation Water Management Study involved more than four years of field research, data collection, organization and analysis, focusing on five component study areas:

- On-farm water use;
- Distribution system characteristics;
- Irrigation demand model development;
- Impacts of irrigation water shortages; and
- Analysis of current and future irrigation scenarios.

The study focused on water requirements and management in the 13 irrigation districts (Figure 1). Water requirements for uses other than district irrigation, such as domestic, municipal, industrial, private irrigation, recreational and instream uses, were not specifically addressed in this project. However, in the analysis of current and future scenarios, the most recent AENV projections of the requirements for these other uses were included.



Irrigation Districts 1999 Assessed Area

		(ha)
1	Mountain View (MVID)	1,506
2	Leavitt (LID)	1,930
3	Aetna (AID)	1,461
4	United(UID)	13,902
5	Magrath (MID)	7,406
6	Raymond (RID)	18,515
7	Lethbridge Northern (LNID)	62,680
8	Taber (TID)	33,178
9	St.Mary River (SMRID)	148,585
10	Ross Creek (RCID)	490
11	Bow River (BRID)	85,450
12	Western (WID)	35,665
13	Eastern (EID)	113,760

Total Assessed = 524,528

Figure 1. Irrigation districts within the South Saskatchewan River Basin of southern Alberta.

Work was carried out by staff of the irrigation districts, AAFRD, AENV and consultants. Funding for instrumentation and consultant studies was cost-shared by AAFRD, PFRA and the irrigation districts, through their umbrella organization, the AIPA. AENV is continuing to review and update requirements for non-irrigation uses.

Although this project does not specifically address private irrigation, the information and databases developed are applicable to private irrigation projects. Information on crop mixes, agro-climatic conditions and water requirements is being used for water management planning within private irrigation blocks.

C. ABOUT THE SUMMARY REPORT

The 5-volume report, **Irrigation in the 21st Century**, consists of this Summary Report (Volume 1), and four technical volumes. This volume reviews the irrigation district water requirements and the results of the Irrigation Water Management Study. It has been prepared to serve three purposes.

- To promote a better public understanding of the current state of the irrigation industry in Alberta, the role it plays in the province's economy, and the ways irrigation can continue to contribute to economic growth and an improved quality of life.
- To provide input to the province's SSRB water management study being led by AENV, and to future basin planning activities under the Water Act.
- To provide current databases and analytical tools for the individual irrigation districts to use in operations and planning, including the need to assess opportunities for growth within their respective districts.

Chapter II of this report provides background information on the development of the irrigation industry in Alberta, and the events and circumstances leading to this study. Chapter III describes the objectives and scope of the overall study and its components and the methodology used. Chapter IV summarizes the findings of each component of the research program. The approach and assumptions used in simulation modelling, and the scenarios modelled, are discussed in Chapter V. The results of simulation modelling for various expansion and water management scenarios are presented in Chapter VI. Chapter VII discusses the benefits of irrigation development to the province. A list of the references cited in this report follows Chapter VII. This Summary Report draws heavily on technical reports on various components of the Irrigation Water Management Study. These reports were prepared by AAFRD staff and consultants, and are included in Volumes 2 to 5. The technical reports themselves include references that are not repeated in this Summary Report.

Appendix A of this Summary Report contains tables with results of the simulation modelling. Appendix B contains graphics on simulation modelling that are supplemental to the body of the report.

Abbreviations and acronyms used in this volume are shown in brackets following first use of the full name and may be repeated from time to time. Where names of government agencies have changed during the years, the current name has been used. For instance, the acronym AAFRD could refer to the former department, Alberta Agriculture, or the current department, Alberta Agriculture, Food and Rural Development. A list of acronyms appears at the end of the volume.

SI units (metric) are used throughout the report. Some readers may be more familiar with imperial units. Conversions of the most commonly used units are shown here. A table of conversion factors for all units used in this report is provided on the inside back cover. The significant digits are carried to avoid round-off error in the myriad of computations that were carried out.

Metric Conversions

- **Length or depth**
  1 kilometre (km) = 0.621 miles
  1 millimetre (mm) = 0.0394 inches
- **Area**
  1.0 hectare (ha) = 2.47 acres
- **Volume**
  1.0 cubic decametre (dam^3)
  = 0.81 acre feet
- **Rate of flow**
  1.0 cubic metre per second (m^3/s)
  = 35.315 cubic feet per second