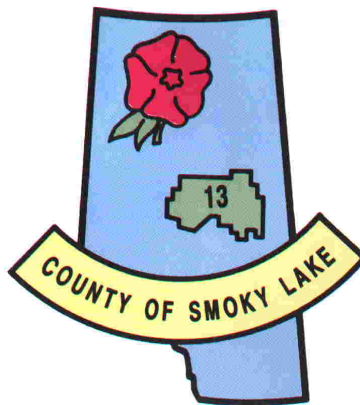


Smoky Lake Region

Part of the North Saskatchewan River Basin
Parts of Tp 057 to 064, R 11 to 19, W4M
Regional Groundwater Assessment

Prepared for



In conjunction with



Agriculture and
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Canada 

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The Association of Professional Engineers,
Geologists and Geophysicists of Alberta

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- A HYDROGEOLOGICAL MAPS AND FIGURES
- B MAPS AND FIGURES ON CD-ROM
- C GENERAL WATER WELL INFORMATION
- D MAPS AND FIGURES INCLUDED AS LARGE PLOTS

1 PROJECT OVERVIEW

“Water is the lifeblood of the earth.” - Anonymous

How a Region takes care of one of its most precious resources - groundwater - reflects the future wealth and health of its people. Good environmental practices are not an accident. They must include genuine foresight with knowledgeable planning. Implementation of strong practices not only commits to a better quality of life for future generations, but creates a solid base for increased economic activity. **This report, even though it is preliminary in nature, is the first step in fulfilling a commitment by the Region toward the management of the groundwater resource, which is a key component of the well-being of the Region, and is a guide for future groundwater-related projects.**

1.1 About This Report

This report provides an overview of (a) the groundwater resources of the Smoky Lake Region, (b) the processes used for the present project and (c) the groundwater characteristics in the Region.

Additional technical details are available from files on the CD-ROM provided with this report. The files include the geo-referenced electronic groundwater database, grid files used to prepare distribution of various hydrogeological parameters, the groundwater query, and ArcView files. Likewise, all of the illustrations and maps from the present report, plus additional maps, figures and cross-sections, are available on the CD-ROM. For convenience, poster-size maps and cross-sections have been prepared as a visual summary of the results presented in this report. Copies of these poster-size drawings have been forwarded with this report, and page-size copies are included in Appendix D.

Appendix A features page-size copies of the figures within the report plus additional maps and cross-sections. An index of the page-size maps and figures is given at the beginning of Appendix A.

Appendix B provides a complete list of maps and figures included on the CD-ROM.

Appendix C includes the following:

- 1) a procedure for conducting aquifer tests with water wells;
- 2) a table of contents for the Water Well Regulation under the Environmental Protection and Enhancement Act; and
- 3) additional information.

The Water Well Regulation deals with the wellhead completion requirement (no more water-well pits), the proper procedure for abandoning unused water wells and the correct procedure for installing a pump in a water well.

1.2 The Project

It must be noted that the present project is a regional study and as such the results are to be used only as a guide. Detailed local studies are required to verify hydrogeological conditions at given locations.

The present project consists of five parts as follows:

- Module 1 - Data Collection and Synthesis
- Module 2 - Hydrogeological Maps
- Module 3 - Covering Report
- Module 4 - Groundwater Query
- Module 5 - Training Session

This report represents Modules 2 and 3.

1.3 Purpose

This project is a regional groundwater assessment of the Smoky Lake Region. The regional groundwater assessment provides the information to assist in the management of the groundwater resource within the Region. Groundwater resource management involves determining the suitability of various areas in the Region for particular activities. These activities can vary from the development of groundwater for agricultural or industrial purposes, to the siting of waste storage. **Proper management ensures protection and utilization of the groundwater resource for the maximum benefit of the people of the Region.**

The regional groundwater assessment includes:

- Identification of the aquifers¹ within the surficial deposits² and the upper bedrock;
- Spatial definition of the main aquifers;
- Quantity and quality of the groundwater associated with each aquifer;
- Hydraulic relationship between aquifers; and
- Identification of the first sand and gravel deposits below ground level.

Under the present program, the groundwater-related data for the Smoky Lake Region have been assembled. Where practical, the data have been digitized. These data are then being used in the regional groundwater assessment for the Region.

¹ See glossary

² See glossary

2 INTRODUCTION

2.1 Setting

The Smoky Lake Region is situated in central Alberta. This area is part of the Alberta Plains region. The Smoky Lake Region includes the County of Smoky Lake No. 13, the Buffalo Lake and Kikino Metis settlements, and all of White Fish Lake I.R. 128 and Saddle Lake I.R. 125. The Region exists within the North Saskatchewan River basin. The majority of the southern boundary of the Region is the North Saskatchewan River. The area includes some or all of townships 057 to 064, ranges 11 to 19, west of the 4th Meridian.

The Region boundaries follow township or section lines. The exception is the southern boundary. The ground elevation varies between 535 and 735 metres above mean sea level (AMSL). The topographic surface generally decreases toward the northern and southern parts of the Region.

2.2 Climate

The Smoky Lake Region lies within the Dfb climate boundary. This classification is based on potential evapotranspiration values determined using the Thornthwaite method (Thornthwaite and Mather, 1957), combined with the distribution of natural ecoregions in the area. The ecoregions map (Strong and Legatt, 1981) shows that the Region is located in both the Low Boreal Mixedwood region and the Aspen Parkland region. This vegetation change is influenced by increased precipitation and cooler temperatures, resulting in additional moisture availability.

A Dfb climate consists of long, cool summers and severe winters. The mean monthly temperature drops below -3°C in the coolest month, and exceeds 10°C in the warmest month.

The mean annual precipitation averaged from three meteorological stations within the County measured 445 millimetres (mm), based on data from 1958 to 1993. The mean annual temperature averaged 1.7°C , with the mean monthly temperature reaching a high of 16.4°C in July, and dropping to a low of -14.8°C in January. The calculated annual potential evapotranspiration is 507 millimetres.

