

County of Stettler No. 6

Part of the Red Deer River and Battle River Basins
Parts of Tp 033 to 042, R 14 to 22, W4M
Regional Groundwater Assessment

Prepared for



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The Association of Professional Engineers,
Geologists and Geophysicists of Alberta

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1 PROJECT OVERVIEW

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

How a county 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 regional in nature, is the first step in fulfilling a commitment by the County toward the management of the groundwater resource, which is a key component of the well-being of the County, 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 County of Stettler No. 6, (b) the processes used for the present project and (c) the groundwater characteristics in the County.

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 are included as page-size drawings 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 is made up 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 County of Stettler No. 6. The regional groundwater assessment provides the information to assist in the management of the groundwater resource within the County. Groundwater resource management involves determining the suitability of various areas in the County 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 County.**

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 County of Stettler No. 6 have been assembled. Where practical, the data have been digitized. These data are then being used in the regional groundwater assessment for the County.

¹ See glossary

² See glossary

2 INTRODUCTION

2.1 Setting

The County of Stettler No. 6 is situated in east-central Alberta. This area is part of the Alberta Plains region. The County exists within the Red Deer River and Battle River basins. The southwestern boundary of the County is the Red Deer River and the northeastern boundary is the Battle River. The other boundaries follow township or section lines. The area includes some or all of townships 033 to 042, ranges 14 to 22, west of the 4th Meridian.

The ground elevation varies between 680 and 930 metres above mean sea level (AMSL). The topographic surface generally decreases toward the Battle River in the northeastern part of the County.

2.2 Climate

The County of Stettler lies within the transition zone between a humid, continental Dfb climate and a semiarid Bsk climate. 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 County is located in the Aspen Parkland region, a transition between boreal forest and grassland environments.

A Dfb climate consists of long, cool summers and severe winters. The mean monthly temperature drops below $-3\text{ }^{\circ}\text{C}$ in the coolest month, and exceeds $10\text{ }^{\circ}\text{C}$ in the warmest month. A Bsk climate is characterized by its moisture deficiency, where mean annual potential evapotranspiration exceeds the mean annual precipitation.

The mean annual precipitation averaged from two meteorological stations within the County measured 425 millimetres (mm), based on data from 1961 to 1990. The mean annual temperature averaged $2.7\text{ }^{\circ}\text{C}$, with the mean monthly temperature reaching a high of $16.6\text{ }^{\circ}\text{C}$ in July, and dropping to a low of $-13.4\text{ }^{\circ}\text{C}$ in January. The calculated annual potential evapotranspiration is 522 millimetres.

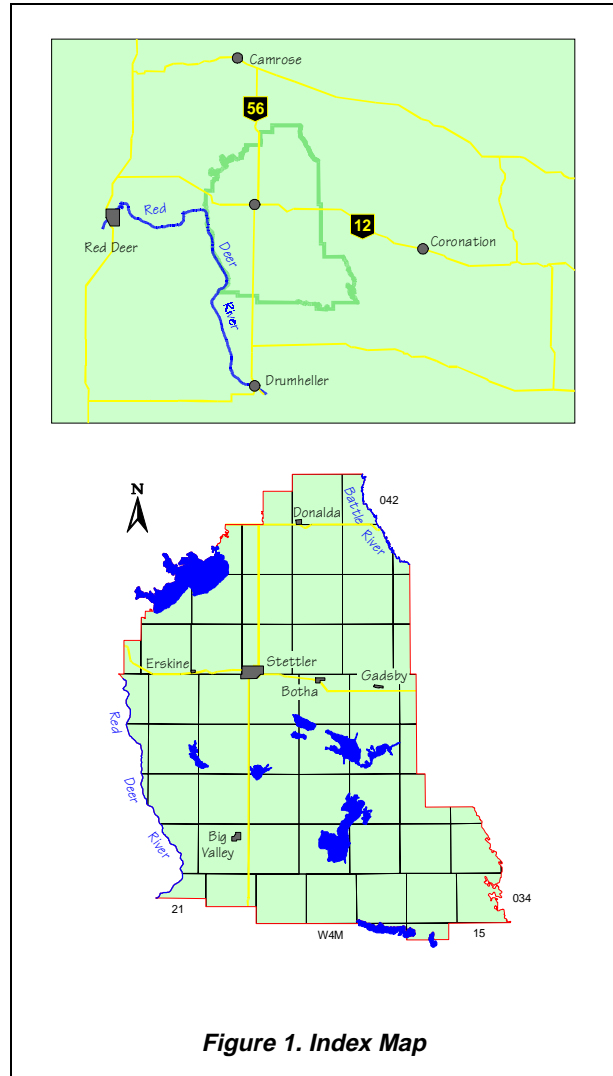


Figure 1. Index Map