

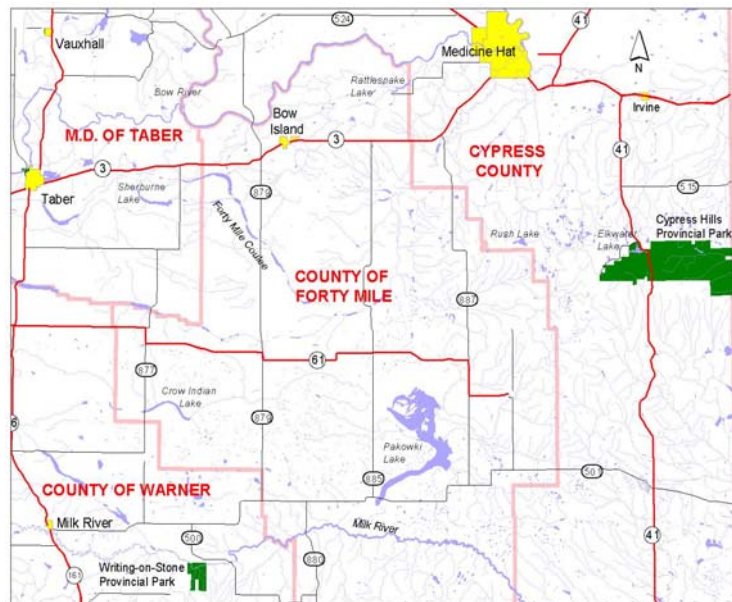


COUNTY OF WARNER and COUNTY OF FORTY MILE Hydrogeological Assessment of an area near Aden, Alberta

In response to water supply concerns in Alberta's Warner and Forty Mile counties, and the additional adverse effects of recent drought conditions in Southeastern Alberta, a Groundwater Office Study for the Aden area was carried out using extra funding provided to the Rural Water Development Program (RWDP), an initiative administered by Agriculture and Agri-Food Canada's Prairie Farm Rehabilitation Administration (PFRA). Aqua Terre Solutions Inc. (Aqua Terre) was contracted to carry out the study and was directed to obtain a better understanding of site-specific groundwater development opportunities in the study area, which lies along the Canada-United States border and includes Township 1 Ranges 8-12 W4M.

Objective

The main objective of the study was to look for groundwater sources that could yield quantities of water that would provide for the needs of the entire rural agricultural community. In addition, the consultant identified specific site locations that were judged to have a higher probability for the development of a groundwater supply capable of providing at least 35 cubic metres per day (m^3/day), which is approximately five imperial gallons per minute (igpm), and with water quality meeting a total dissolved solids (TDS) concentration of less than 2,000 milligrams per litre (mg/L). These locations could be suitable sources for local pasture pipelines, or if the yield was high enough, may be suitable locations for a tank loader for water hauling, or for local water distribution via pipeline. A water quality of 2,000 mg/L would require in-house treatment for domestic supply, but be suitable for stock watering.



Location Map

Water Well and Water Quality Data

The study depended upon available water well and water quality data. No field work was carried out to collect new data. Approximately 230 water well records from the provincial groundwater database were examined in this study. Most of the water wells are located in the west and central parts of the study area. Few wells appear to have been drilled in the Pinhorn Grazing Area in Ranges 8 and 9.

The breakdown of wells with useful information is as follows: 54 per cent had useful lithology data, 30 per cent had useful well yield data, and 15 per cent had useful water quality data.

Study Findings

The principal aquifer units for the study area include:

- Milk River Aquifer (regional aquifer)
- Foremost
- Oldman
- Surficial units (located mainly along the creeks)

Approximately 80 per cent of the wells are completed in bedrock at relatively shallow depths. Based on limited data, Aqua Terre estimated long-term yields to typically range from 30 to 60 m³/day, with one anomalously high value of 6,500 m³/day. Higher well yields are generally from wells completed in the Milk River Aquifer.

The few wells (less than about 20) completed in the surficial deposits, are generally located along creeks. Reported well yields vary from less than five to 65 m³/day (<1 to 10 igpm). Borneuf (1976) reports that potential well yields of up to 100 m³/day may be possible from gravel deposits along Breed Creek.

Groundwater quality in the study area is generally acceptable, with groundwater samples from bedrock sources generally containing less than 1,500 mg/L in TDS, and between 1,000 and 2,000 mg/L TDS from the surficial deposits. Sodium concentrations varied from 250 to 950 mg/L, which exceeds the drinking water objective of 200 mg/L. Iron is reported by a local well driller to be a rising concern.

Aqua Terre concluded that surficial aquifers associated with the creeks in the study area and bedrock aquifers (Milk River, and to a lesser degree, the Foremost and Oldman formations) are considered most likely to yield more than 35 m³/day (over about 5 igpm), with a water quality of less than 2,000 mg/L TDS. Consult the main report (referenced below) for more details.

For additional information, contact:

Terry Dash
AAFC-PFRA Calgary
Phone (403) 292-5719
Fax (403) 292-5659
Email dasht@agr.gc.ca

Ryan Davison
AAFC-PFRA Medicine Hat
Phone (403) 526-2429
Fax (403) 526-0358
Email davisonr@agr.gc.ca

Vic Brown
AAFC-PFRA Lethbridge
Phone (403) 327-4340
Fax (403) 382-3198
Email brownv@agr.gc.ca

Or visit the AAFC-PFRA website at www.agr.gc.ca/pfra/alberta_e.htm

Report Aqua Terre Solutions Inc, March 2002, County of Forty Mile \ Warner County – Aden Area – Groundwater Assessment Twp 1 Rges 8 to 12 W4M Southern Alberta. Prepared for Agriculture and Agri-Food Canada.