

## The Role of Groundwater in Alberta's Tight Water Supply Environment

Daniel R. Brown, Golder Associates Ltd.

With the growth in Alberta's population, as well as agricultural and natural resource development, water has become an increasingly stressed and valuable commodity. With historically limited access to copious aquifers, the majority of the province's water supply has come from Alberta's rivers. In some areas, notably in the south, demand has exceeded supply and the provincial government has stopped taking new applications for diversion of surface water (or groundwater that contributes to it) in the South Saskatchewan River basin. The result is a water supply focus that is shifting to groundwater.

The heavy use of water for enhanced oil recovery ("water flood" methods) and as a source of steam for SAGD methods in the Athabasca oil sands area has created a dramatically increased demand for surface water and groundwater sources. Public and regulatory concern has resulted in Alberta Environment's Water Conservation and Allocation Policy, which requires that priority be given to saline groundwater supplies over fresh water use.

This presentation will provide a summary of the current groundwater supply-demand scenario in Alberta and the issues at play. It will also discuss where groundwater is plentiful and may be the answer for continued, sustainable development.

Points to be discussed will include:

- How much groundwater recharge occurs in Alberta annually?
- Where is the province groundwater rich? Supply vs. Demand
- "Underground Rivers" - Alberta's valuable buried channel aquifers
- Groundwater – Surface Water Interaction; when is a groundwater diversion a surface water diversion?
- The role of groundwater in energy development
- The Water Conservation and Allocation Policy
- The role of saline vs. fresh groundwater supply in resource development
- Sustainable aquifer yield; what does it mean in the Alberta context?

**Dan R. Brown, M.Sc., P.Geol., P.Geo.**

Mr. Brown is a Golder Principal and Senior Hydrogeologist in the company's Calgary office and specializes in physical hydrogeology, regional groundwater studies, and the sustainable management of groundwater supplies. His experience includes groundwater supply development, regional water resource evaluation, groundwater vulnerability mapping and risk assessment, and contaminated site investigation. Since transferring to Calgary with Golder over seven years ago, Mr. Brown has worked in a senior capacity on numerous oil sands EIA and operational projects, as well as conducting municipal water supply and regional groundwater studies in Alberta and B.C.

Mr. Brown has managed comprehensive groundwater resource investigations in a wide variety of hydrogeologic environments. In many cases, the projects have included managing a multidisciplinary team, as well as involvement in public consultation and/or provision of evidence at quasi-judicial regulatory hearings. Examples include the investigation and securing of the Walkerton, Ontario municipal groundwater supply and the development of regional groundwater mapping, modelling and protection strategies for the aquifers of the County of Oxford, Ontario and the Whisky Valley Aquifer in southern Alberta.

Mr. Brown was also the hydrogeology component lead for the recent (2008) Water Supply Assessment for Alberta project for Alberta Environment. This project involved extensive assessment of groundwater-surface water interaction on a provincial scale, including calculating and mapping groundwater recharge for the province based primarily on the interpretation of available surficial geology data. The project also included a discussion of sustainable groundwater yield in the Alberta context.