

Southern Ontario Hydrogeological Region of Canada



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ABSTRACT

Groundwater is important to the quality of life enjoyed by residents of southern Ontario and to the health of its economy and ecosystems. It is a significant source of water supply for agriculture, industry, and municipal and rural users. Nevertheless, water supply and quality issues have concerned residents since the Walkerton tragedy put the public spotlight on safety, security and sustainability of water supply. Government calls to protect water in the Great Lakes basin and to systematically map groundwater aim to address emerging conflicts in water demand from urban, industrial and agricultural users, and for aquatic habitats.

The Southern Ontario region covers 72,000 km², bounded by the Canadian Shield and the Great Lakes. Underlying sedimentary rocks, deposited as ancient sea beds, form deep sedimentary basins, covered with unconsolidated, mainly glacial, sediments up to 200 m thick.

About 1.3 million people use groundwater from private wells and 1.9 million from municipal supplies. High groundwater use occurs in agriculture, ~30%, in domestic and municipal use ~25%, and industry may use up to 35%. About one-half of total stream flow in southern Ontario is from base flow due to groundwater discharge. Surface aquatic habitats depend on groundwater where discharge maintains conditions for cold water fish such as brook trout. Such knowledge is raising awareness that surface water is inextricably linked to groundwater systems.

We review the climate, physical setting and hydrogeological framework necessary to understanding groundwater flow and resources of southern Ontario. The region's gentle topography, well-drained soils, warm growing season, and abundant rainfall make it well suited to support extensive agriculture and woodlands. The region's industrial intensity and population density both affect land use and surface hydrology. Despite the proximity of Great Lakes surface water, groundwater is a pivotal resource for agriculture and potable water use in inland areas, with about 90% of rural areas.

A key recommendation of the Walkerton Inquiry report, released in 2002, was that science-based source protection plans be developed for all watersheds in Ontario. Thus, the above groundwater topics must be linked to groundwater science and considered in the management of the region's water resources