Customer Success Story

Aquafor Beech Limited

Watershed Studies in Ontario, Canada

The metropolitan area of Greater Sudbury, located within a striking geologic basin thought to have been created by meteoritic impact approximately 1.8 billion years ago, is home to over 300 lakes, ponds and waterways. The earliest settlers to the region some 130 years ago capitalized on the region's nickel-copper ore deposits, launching an industry that would play a significant historic and economic role in the area for decades to come. Several years ago, the City of Greater Sudbury elected to take action to address a diverse set of environmental concerns. Extensive watershed and subwatershed studies were initiated for several of the city's lakes and waterways because of the effort.

The primary objective of the subwatershed studies was to gather baseline data on the region's natural resources, perform relevant analyses, and develop appropriate management strategies. Specifically, the community hoped to learn how to wisely guide future urban and residential growth, manage flooding and stormwater runoff, optimize ground and surface water quality, as well as enhance the region's natural beauty and quality of life.

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A Lake of Many Uses

Ramsey Lake is valued by the Greater Sudbury community for a variety of reasons: the lake is a primary source of drinking water for the city's residents; it is a popular recreational destination, and increasingly, it serves as a focal point for the region's identity and long-term viability. In other words, many believe that a healthy lake system will drive a vibrant and thriving community. But land area in the subwatershed of Lake Ramsey is poised for significant growth and several large commercial and residential developments are planned for the lake's shoreland zones. Greater Sudbury's natural environment, including Ramsey Lake, is a defining feature of the City's image and appeal, and the conflicts between urban development, industry, and the desire to protect natural areas are ongoing and challenging for the community.

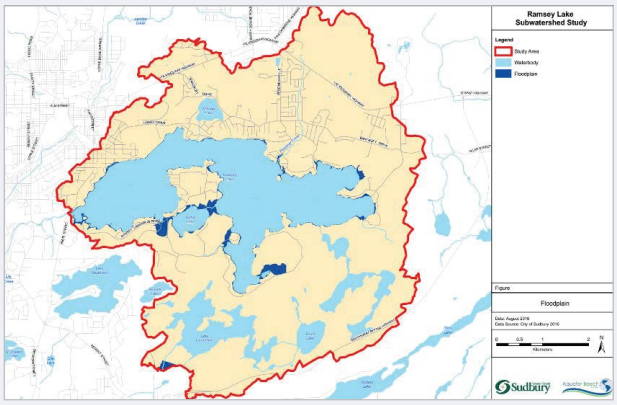
In addition to compromised water quality in specific creeks due to a history of mining and urbanization, flooding in specific areas has been and continues to be a recurring problem.

About Aquafor Beech Ltd.

Multi-disciplinary environmental consulting firm Aquafor Beech Ltd. with offices in Mississauga, Kingston, London and Guelph, Ontario, was hired to perform a number of the studies, including hydrologic and hydraulic analyses of the Lake Ramsey subwatershed.

Aquafor conducted a study to develop a Subwatershed Management Plan to protect, maintain and enhance the surface water, groundwater, and natural resources of Ramsey Lake and its tributaries through environmentally sound policy and management actions.

Project contact and engineer at Aquafor Beech, Golmar Gol, notes that she used two principal software applications to model the major and minor flood profiles of Ramsey Lake's subwatershed. PCSWMM was used to perform the hydrologic modelling work and GeoHECRAS was used to develop the hydraulic models and flood maps.



Modelling a Variable Landscape

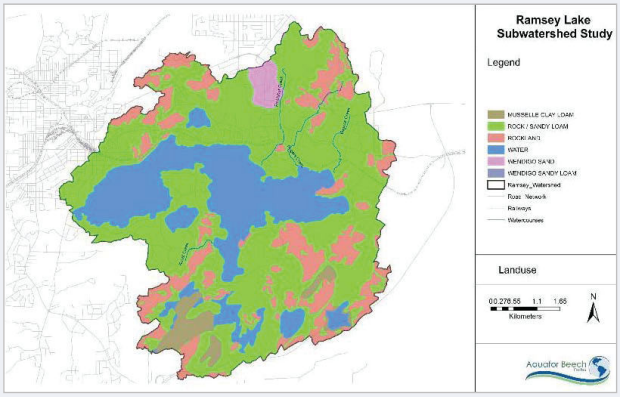
Due to the urbanized character of much of the land area, the model needed to incorporate multiple culverts, road crossings and other structural elements to generate accurate flood profiles for different storm events. These flood maps formed the basis for the quantification of flood hazards and identification of limitations in the existing storm water drainage systems. Modelling results also helped to formulate recommended flood and stormwater mitigation strategies.

The resulting report, Ramsey Lake Subwatershed Study and Master Plan (February 2020), presented several scenarios for the subwatershed with a variety of management alternatives.

These consisted of a range of measures, from conveyance control options to end-of-pipe solutions and restoration strategies. Principal recommendations focused on retrofitting existing stormwater management facilities and implementing low impact development strategies to curb polluted runoff from existing and future development.

GeoHECRAS is User-Friendly and Compatible with Other Software

Golmar notes that GeoHECRAS is extremely user-friendly in terms of being able to import a broad variety of data from a variety of sources, manipulate cross-sections and structural elements, and run multiple hydraulic simulations efficiently. The compatibility of GeoHECRAS with GIS and other applications like PCSWMM makes the pre- and post-processing aspects of model construction with subsequent analysis of results cost-effective and timesaving. Use of the GeoHECRAS Scenario Manager made it possible to create effective visuals for purposes of presenting management alternatives to the public.



Greater Sudbury is in the process of implementing some of the management strategies for the Lake Ramsey subwatershed, but the community's work is far from over. Aquafor Beech continues to play an important role in the region's environmental planning initiative and to use GeoHECRAS in the hydraulic analyses and assessments of the subwatersheds of Whitewater Lake and Whitson River.

Connect with CivilGEO

Call us 24x7 toll free 800-488-4110 (US and Canada)

CivilGEO, Inc.
708 Heartland Trail
Suite 3000
Madison, WI 53717-2174
USA

Tel (US): 608-729-5100
Fax (US): 608-729-5101

General: info@civilgeo.com
Sales: sales@civilgeo.com
Support: support@civilgeo.com

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www.civilgeo.com

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