



WATER RESOURCES

Source Water Protection

Water Budget and Stress Assessment Modeling

Client: Trent Conservation Coalition (TCC), Ontario

The Trent Conservation Coalition needed to develop a detailed water budget and stress assessment in order to better manage water within the Trent River system, Bay of Quinte and a portion of the Lake Ontario basin. The water budget was to be used in determining vulnerable areas susceptible to future water shortage. The project brought together data and information from a large number of sources collected over many years to develop a continuous hydrologic model, with groundwater consideration, capable of quantifying watershed processes and assisting in future decision support.

Greenland International Consulting Ltd. and XCG Consultants Ltd. were contracted to develop sub-watershed water balances and carry out a water stress assessment for a 15,000 km² drainage area. This was accomplished using CANWET™ v.3 with an array of spatial data layers and temporal databases. Sub-watersheds were delineated using topographic data and stream networks. Continuous water balance models were setup, calibrated and validated to represent all inputs and outputs into each sub-system and the larger system.

This process involved:

- quantifying the impacts of vertical and lateral groundwater flows across catchment boundaries due to complex geological formations
- working with limited or incomplete data
- estimating evapotranspiration on a monthly time step from land, lake and reservoir sources
- accounting for agricultural and municipal water takings and other human impacts
- accounting for more than 100 hydraulic control structures and dams within the river system
- determining areas with potential for water quantity stress
- evaluating future conditions and likely stresses in the watershed due to human development and climate change

