

# Tracer based analysis of groundwater and surface water interactions in the Jock sub-watershed, Ontario, Canada

## **Abstract**

Groundwater and surface water interactions are a poorly understood phenomena, owing in large part to the difficulty of assessing groundwater resources (Tetzlaff and Soulsby, 2008). Recent studies have demonstrated that tracer based assessments coupled with hydrometric measurements and terrain analysis can provide valuable information regarding groundwater and surface water interactions at the catchment scale (Soulsby et al., 2004, 2006, 2007; Tetzlaff and Soulsby, 2008; Capell et al., 2012). The Jock sub-watershed is located within the City of Ottawa, its headwaters are dominated by thin soils, fractured bedrock and wetlands. The lower portion is predominately agricultural owing to the deposition of fine textured glaciomarine sediments. The Jock was used as a case study to examine how groundwater and surface water interactions vary throughout the subwatershed spatially and temporally. Groundwater contributions to streamflow were assessed using tracer based end member mixing analysis (EMMA). Results from the EMMA will be compared against topographic indices and other terrain variables to determine how watershed characteristics influence groundwater and surface water interactions spatially and temporally. Baseflow analysis will also be conducted to determine how well traditional models capture baseflow variability in a complex and heterogeneous landscape. These results will help inform the Rideau Valley Conservation Authority (RVCA) on groundwater dynamics and resources within the catchment, to aid in development of management and monitoring policies for predicted climate change scenarios.