

Project Profile

Project Name:	Understanding the controls on the distribution and flow pathways of springs in the Upper Halfway, Lower Halfway and Graham River Watershed areas in North East British Columbia
Project Number:	EI-2016-01
Proponent:	Department of Earth Sciences, Simon Fraser University
Funding Envelope:	Environmental Impacts
Timeframe:	May 25, 2015 to January 31, 2017

Project objectives

The overall objective of this project is to understand the controls on where springs occur and the extent of the catchments feeding those springs. This will be achieved through the development of a GIS based tool that utilizes the primary geological and hydrogeological factors and relationships that influence spring occurrence in the region. The primary hydrogeological factors, including groundwater flow paths, origin of recharge, catchment extent, and residence time of spring water will be derived by using water chemistry (chemical composition and isotopes) and the hydrogeology and flow characteristics of selected springs.

Project description

This project will involve a study of springs in the Upper Halfway, Lower Halfway and Graham River Watershed areas in North East BC. Elements of the study will include a predictive GIS model to identify the spatial distribution of zones with high likelihood of spring occurrence, and field work to identify, inventory, measure flow, and sample springs in the area. The analysis will bring together data regarding groundwater chemistry/age, geology, faults, seismic data, topography, etc., to develop a conceptual model(s) for spring sources, flow pathways and feeder catchments. Delineation of the catchments will then be used to develop maps indicating the areas vulnerable to impacts on spring water quality and resource.

The project will provide a database and a delineation of springs and spring catchments that can be used to support the regulation of oil and gas activities in the vicinity of springs. The spring inventory can be used to support the development of a geospatial data layer for springs in the Northeast Water Tool (NEWT) or Water Portal. The characterization of the groundwater flow paths will provide data to support the characterization of aquifers or aquifer areas/capture zones within the BC Aquifer Maps and/or the Capture zones in the BC LWRD Warehouse. This research will also provide guidance to identify conditions when capture zones or aquifers supplying springs may be considered for designation as “identified” under the *Water Act* (or *Water Sustainability Act*).

Project background

Springs are an important source of domestic water supply in some areas of North East BC, and their use is significant in the Peace River Region. Springs in this region, however, may not be well documented with respect to their locations, flow rates, and usage. Moreover, knowledge regarding source aquifer characteristics and hydrogeological processes is often unavailable. Such knowledge may be useful to inform the regulation and management of these water resources.

Project approach

The study will be conducted in two parts:

- The first part of the study proposes to identify the physical and hydrogeological influences for spring occurrences in low gradient terrain; and
- The second part will chemically and isotopically characterize a select number of springs to further understand the (regional/local) hydrogeology and apply this to define vulnerability.

Project deliverables

The deliverables from this project include the following:

1. Spring Inventory/Survey (desktop and field) including locations, flow and water quality data.
2. Technical document describing the construction and use of the GIS tool for identifying the potential for spring occurrence.
3. Spring vulnerability maps for the study area identifying locations and catchments for springs.
4. Summary Report of project outcomes.