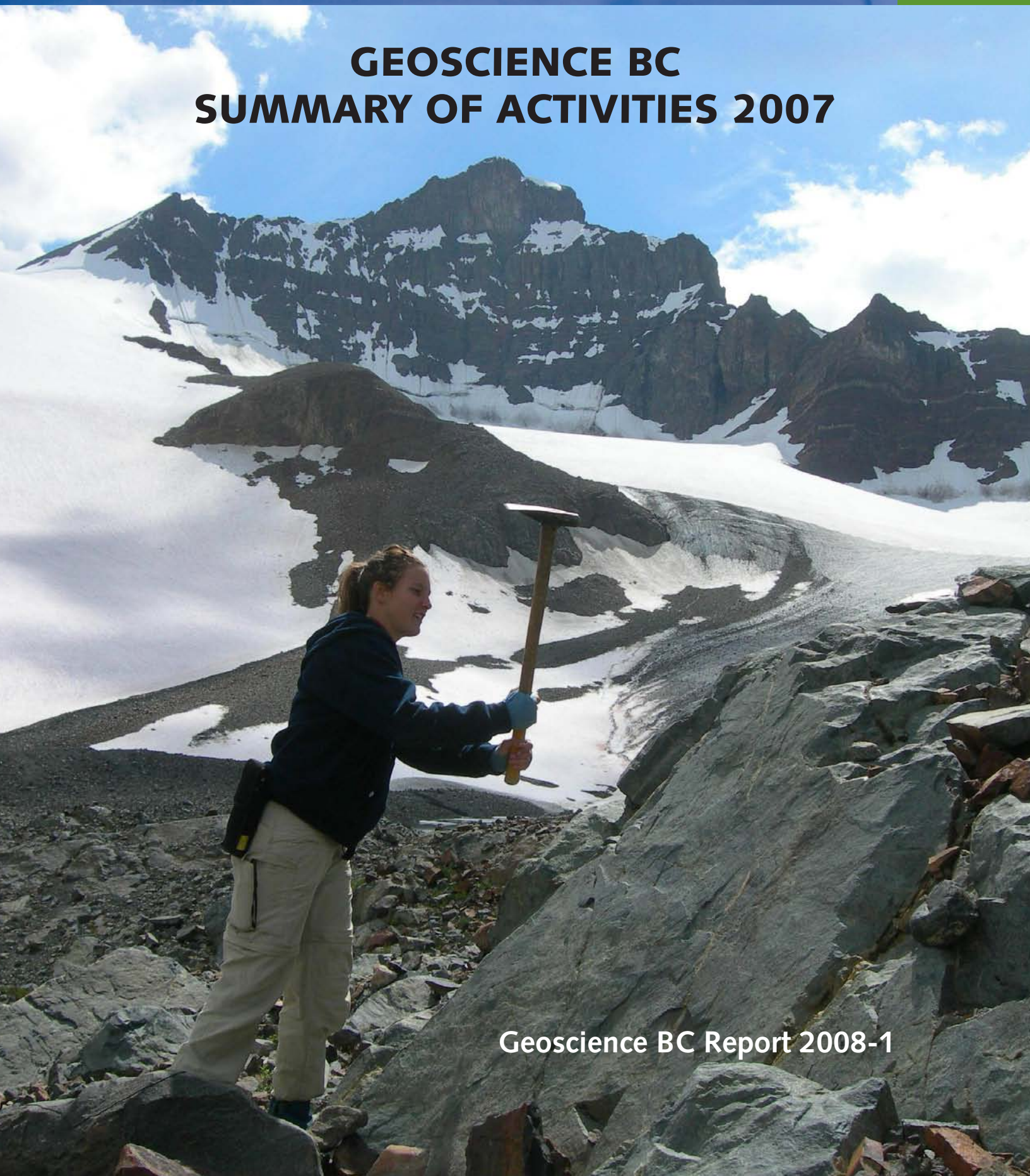




GEOSCIENCE BC SUMMARY OF ACTIVITIES 2007





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Cover photo: Erin Looby collecting andesite samples in the shadow of RCAF peak.

Photo credit: Lucy Hollis, 2007

Foreword

Geoscience BC Overview

Geoscience BC (GBC) is a unique, industry-led, industry-focused, not-for-profit geoscience organization. Since its inception in April 2005 with a start-up grant from the Provincial Government of British Columbia, GBC has pursued its mandate of attracting new exploration investment to British Columbia through a combination of GBC-led initiatives and funding of partnership projects. The majority of GBC's partnership projects are identified through an annual Request for Proposals (RFP) process. Geoscience BC-led geophysical and geochemical surveys have been developed by GBC staff and the Project Team, and undertaken by means of contracts awarded through a call for bids, or sole-sourced where specific technical expertise was required.

Geoscience BC obtains industry input into project planning through our Project Team of highly respected consultants and our Technical Advisory Committee of dedicated industry volunteers and government geoscientists, who advise GBC's Board on project priorities and review proposals received in response to the RFPs.

To date, GBC has supported 35 partnership projects with an investment of \$5.8 million, which has been matched by almost \$5.4 million in partners' funds. These projects include mineral deposit studies and mapping projects, geochemical studies, examinations of Chilcotin basalt cover in interior BC, development of a physical rock properties database, and numerous oil and gas-related projects in the intermontane basins.

Geoscience BC is committed to the development of the next generation of exploration geoscientists. GBC's contributions to partnership projects based at academic institutions exceed \$1.6 million to date. All of these projects have involved training and education opportunities for graduate and/or undergraduate students. Many of GBC's partnership projects with government also include training for geoscience students. In 2007, GBC awarded ten \$5000 scholarships to geoscience graduate students across Canada and in Australia, who are working on exploration-related geoscience research projects in BC.

Geoscience BC has also supported extensive additions to the Province of British Columbia's geological, geochemical and geophysical databases (*see* listing below of data and reports released in 2007). Figures 1 and 2 illustrate the locations of GBC-supported geochemical and geophysical surveys.

Geoscience BC's QUEST Project, initiated in June 2007 and partnered with the Northern Development Initiative

Trust, represents an additional \$5 million investment in new minerals-related geoscience data (*see* below and papers in this volume).

Geoscience BC Summary of Activities 2007

Geoscience BC is pleased to present the results of 2007 geoscience studies and surveys in this first edition of the *Geoscience BC Summary of Activities*. The volume is divided into three sections and contains a total of sixteen articles, prepared by industry consultants and contractors, university-based researchers and government geoscientists.

QUEST

The first section of the volume contains two brief overview papers on the geophysical and geochemical surveys underway as part of Geoscience BC's QUEST (QUesnellia EXploration STRategy) Project in central BC. The QUEST Project is a \$5 million program of new geoscience data collection and compilation designed to stimulate exploration interest and investment in BC's interior, specifically in the highly prospective Quesnel Terrane, where the bedrock is obscured by glacial cover.

Barnett and Kowalczyk (from BW Mining and PK Geophysics, respectively), members of GBC's Project Team, outline the survey design for the QUEST airborne geophysical surveys. They include an overview of existing publicly available regional geophysical datasets (airborne magnetic and ground gravity) from the Geoscience Data Repository at Natural Resources Canada, and an outline of the rationale for new airborne electromagnetic (EM) and airborne gravity geophysical surveys for the project area. In addition, they include a preliminary perspective view of stacked sections from a small area of the EM survey, illustrating some of the possible bedrock features observed in the data.

Jackaman and Balfour (the former from Noble Exploration Services and a member of GBC's Project Team, the latter a private consultant based in Cranbrook) provide a summary of the QUEST geochemical program, which covers an area of more than 95 000 km². The program includes a new reconnaissance Regional Geochemical Survey of NTS sheet 0930 (a 10 500 km² area), infill lake sediment sampling over an area of 19 000 km² from north of Quesnel to Mount Milligan, and reanalysis of almost 4500 stream and almost 500 lake sediment pulps from government archives of regional geochemical samples stored in Ottawa (by the Geological Survey of Canada) and Victoria (by the BC Geological Survey).

Mineral Projects

The second section of the volume contains nine papers on mineral exploration-related geoscience projects supported by Geoscience BC.

Andrews and Russell, from the University of British Columbia (UBC), provide an update on their investigations of cover thicknesses across the Southern Interior Plateau. They summarize their work to date on the Chilcotin Group basalts, and information from the provincial water well database, to help constrain the thickness of both Quaternary drift and basalt cover in the interior.

Blevings et al., also from UBC, summarize their work on understanding the controls on copper and gold mineralization along the contacts between the northeastern Coast Belt

and the Coast Plutonic Complex in the Taseko Lakes region. Their paper includes short summaries of previous project work; new descriptions of several important mineral occurrences in the study area; and outline plans for additional work to constrain the pressure, temperature and age of the mineralization and develop a metallogenic model for the region. This work forms part of an M.Sc. thesis by the first author.

Fecova et al., from Simon Fraser University (SFU) and UBC, provide a summary of new geological mapping in the Nootka Sound area and their studies of new mafic-ultramafic layered intrusions identified during the course of their mapping and mineral deposit investigations in the area. This work, being completed as part of an M.Sc. thesis by the first author, has generated considerable new industry interest in this area of Vancouver Island.

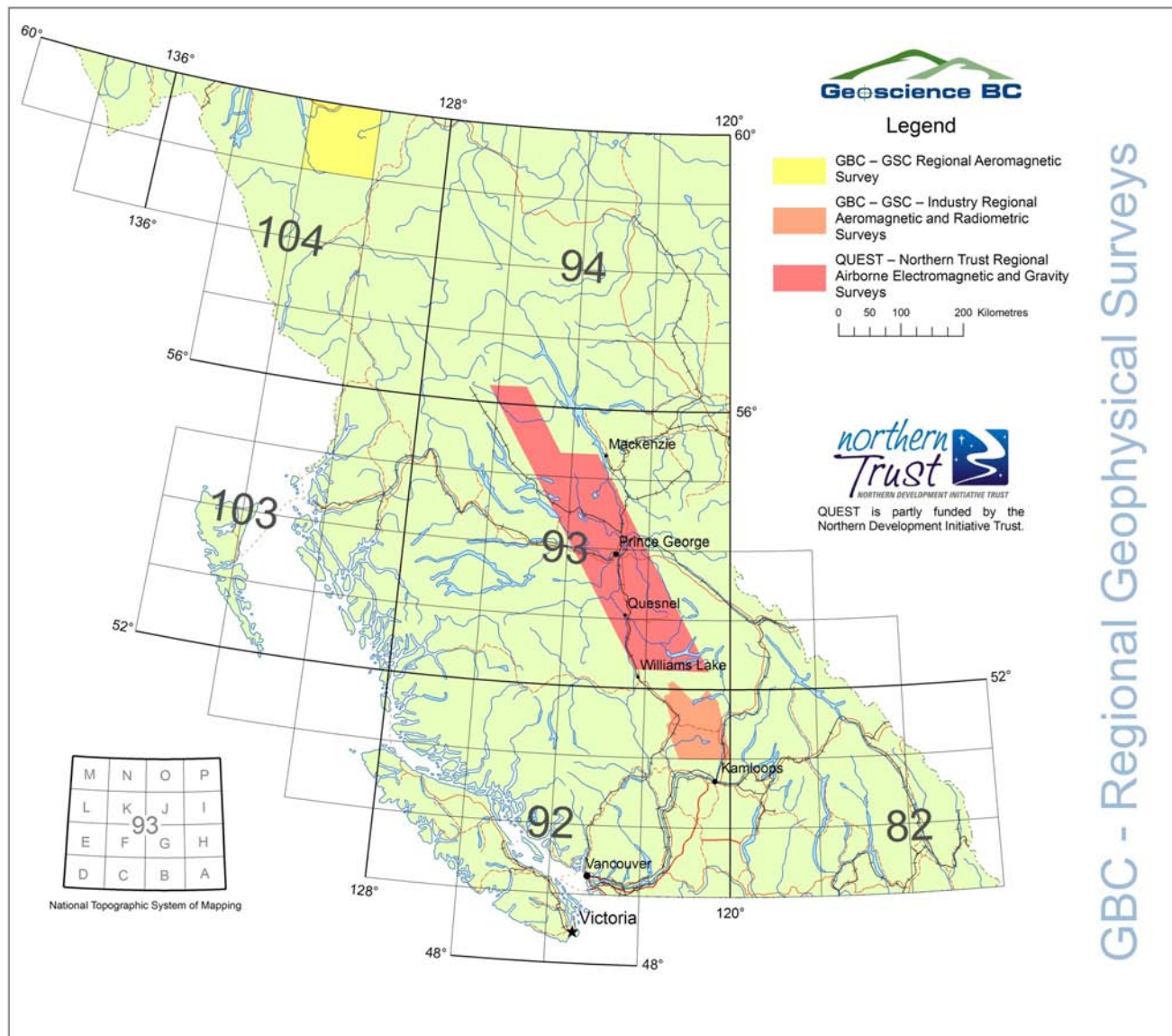


Figure 1. Locations of Geoscience BC-supported airborne geophysical surveys undertaken since April 2005.

Hart et al., from the University of Western Australia, with colleagues from the United States Geological Survey and UBC, provide critical new geochronological information for the Bralorne-Pioneer camp in the Bridge River mining district of southwestern BC. Their investigations of the timing of gold introduction and relationships to other mineralizing and intrusive events in the area have important implications for our understanding of the metallogeny of the region.

Hollis et al., from UBC, are also undertaking mineral deposit studies in the Taseko Lakes area (*see* Blevings et al.), examining the porphyritic intrusions and related copper showings in the region. This project, being undertaken as an M.Sc. by the first author, aims to develop a geological framework for the formation of the showings and their relationship to models of porphyry deposit formation.

Kilby and Kilby continue to provide leading-edge public access and analysis tools for remote-sensing imagery as applied to mineral exploration in BC. Their paper presents a summary of the Hyperspectral Demonstration Project, undertaken on behalf of Geoscience BC in 2007 to provide samples of airborne hyperspectral images over eight exploration and mining sites in BC. The new imagery will be made available through the MapPlace website of the BC Ministry of Energy, Mines and Petroleum Resources (MEMPR). The new imagery will be incorporated into the Image Analysis Toolbox and can be utilized with the Landsat, ASTER and other datasets on MapPlace.

Ruks and Mortensen, from UBC, have undertaken an intensive examination of the geological setting of volcanogenic massive sulphide (VMS) occurrences and their relationship to exhalitive iron formation in the Sicker Group of the Port

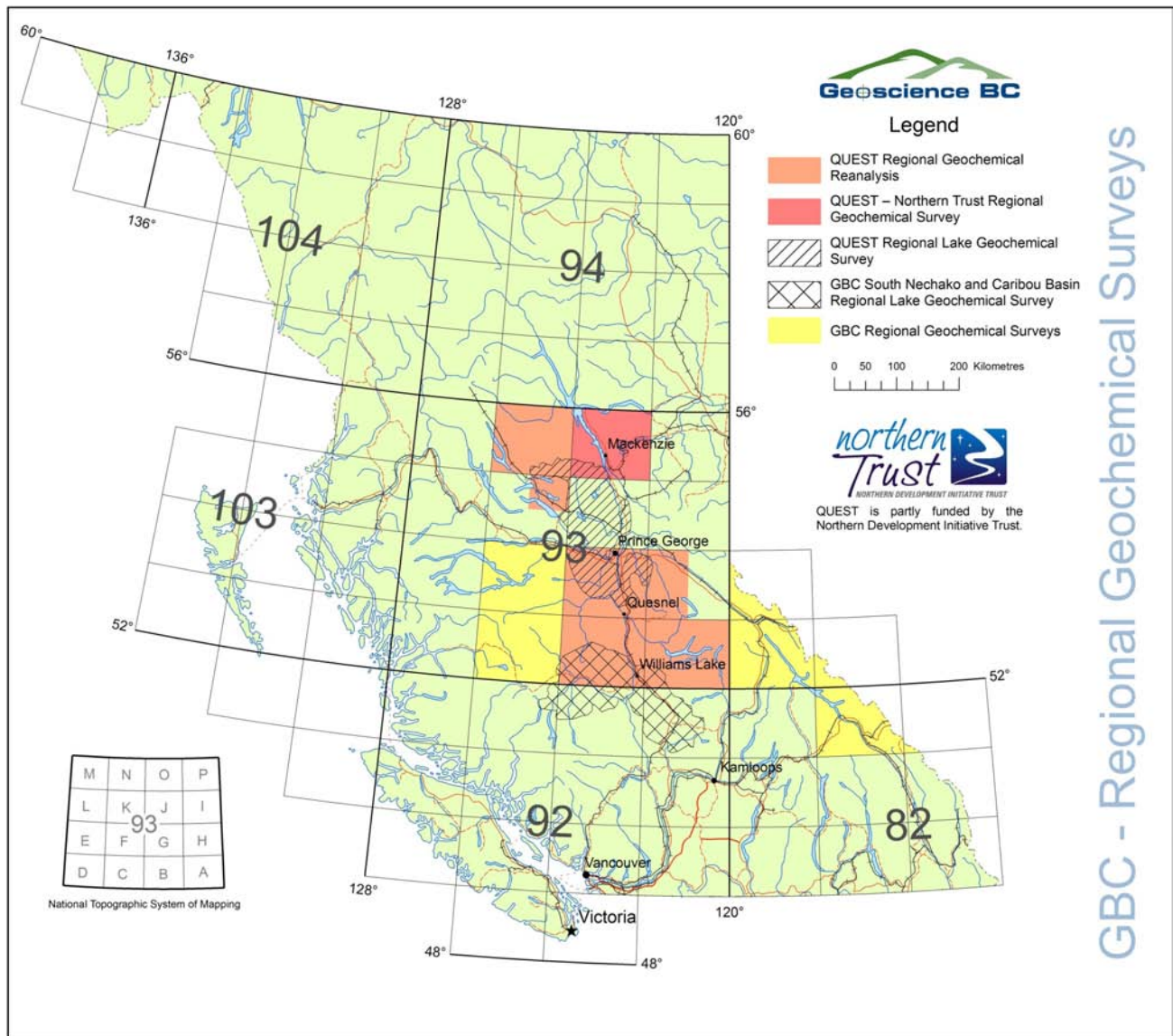


Figure 2. Locations of Geoscience BC-supported regional geochemical surveys undertaken since April 2005.

Alberni area on southern Vancouver Island. They report two new sulphide occurrences identified during the course of their mapping, and the implications of their mapping work for VMS exploration in the area. The first author is pursuing Ph.D. studies at UBC.

Smith et al., from University of Nevada–Reno (UNR), and colleagues at Adanac Molybdenum Corporation are examining the potential linkages between gold-depleted porphyry molybdenum deposits and ‘intrusion-hosted’ gold deposits. Their studies are focused on the Adanac Molybdenum property in the Atlin area. The paper presents detailed rock descriptions and whole-rock and trace-element geochemistry of a representative sample suite from the Adanac deposit, and represents part of the first author’s graduate work at UNR.

Tosdal et al., from the Mineral Deposits Research Unit (MDRU) at UBC, and colleagues from the Centre for Excellence in Ore Deposits Research (CODES) at the University of Tasmania and from industry report on a component of the CODES-MDRU Alkalic Porphyry Project. This paper summarizes the hydrothermal breccias observed in ore zones of the silica-undersaturated alkali copper-gold porphyry mineralization at Mount Polley, between Williams Lake and Quesnel in the Quesnel Terrane. This project includes contributions from numerous graduate students, including the second author, who is undertaking an M.Sc. at MDRU, and the third author, who is pursuing a Ph.D. at CODES.

Oil and Gas Projects

The third section of this volume comprises five papers summarizing Geoscience BC–supported contributions to oil and gas exploration geoscience projects in BC.

Cassidy et al., from the Geological Survey of Canada (GSC) and the University of Victoria (UVic), are undertaking a passive seismic study of the Nechako Basin to help assess the hydrocarbon and mineral potential of the basin and develop a better understanding of the crustal architecture in this region. Seven seismic stations were deployed in 2006, and results will complement planned active-source seismic and magnetotelluric studies planned and underway in the area. This research is being undertaken as part of an M.Sc. thesis by the third author.

Gagnon and Waldron, from the University of Alberta, are continuing their investigations of the evolution of the Bowser Basin in northwestern BC. They are concentrating on providing new detailed stratigraphic observations of the Hazelton Group–Bowser Lake Group transition, exhibited in a continuous exposure across the Ashman Ridge section, located approximately 40 km west of Smithers. Their aim is to develop a clearer understanding of this stratigraphic transition, which has implications for both mineral and hy-

drocarbon exploration. The first author is presently pursuing Ph.D. studies.

Hayward and Calvert, from SFU, have re-evaluated the stratigraphy and structure of the southeastern Nechako Basin from a reinterpretation of the Canadian Hunter 1980s seismic reflection profiles, including tomographic velocity modelling. They are integrating the seismic interpretations with relevant geological and geophysical data, including well logs, geology and potential-field data, to create new, more detailed interpretations of the basin. The results of this work will provide key constraints on collection and interpretation of new seismic data.

Mustard et al., from SFU, the University of Wisconsin–Eau Claire (UWEC) and the GSC, report on the second year of their study of the Jackass Mountain Group and its potential as a hydrocarbon reservoir system in the Nechako Basin. Their work aims to develop a better understanding of regional facies patterns and basin architecture within the Nechako Basin. Their paper presents a summary of the 2007 field observations and an overview of their regional sampling program and future work. This project is supporting M.Sc. theses by the third and fourth authors at SFU, and a B.Sc. project next year at UWEC.

Spratt et al., from Geoscience BC, GSC and MEMPR, have re-examined 20-year old magnetotelluric (MT) data from within the Nechako Basin and initiated new MT data collection in the south-central part of the basin. Their work indicates that the MT method may be an important tool for understanding shallow structures and mapping the boundaries of the basin and structures within the basin. The 2007 survey has collected both audiomagnetotelluric (AMT) and broadband magnetotelluric (BBMT) data from within the Nechako Basin.

Geoscience BC Publications 2007

New Geoscience BC data sets and reports released in 2007 include:

- twenty-three technical articles in the joint *Geological Fieldwork 2006* volume, copublished with the BC Geological Survey;
- **high-resolution airborne magnetic data for the Jennings River area (NTS 104O)**, funded by GBC and managed by and jointly released with Natural Resources Canada (NRCan);
- **airborne gamma-ray spectrometric and magnetic data for the Bonaparte Lake area (parts of NTS 092P and 093A)**, released in partnership with NRCan’s Targeted Geoscience Initiative III, Candorado Operating Company Limited, Amarc Resources Limited and GWR Resources Limited;
- **‘Skeena Arch Metallogenic Data and Map, Compilation of NTS Map Sheets 093E, L, M; South**

Half of 094D, East Half of 103I and Southeast Corner of 103P by D.G. MacIntyre;

- **‘A Comparative Assessment of Soil Geochemical Methods for Detecting Buried Mineral Deposits – 3Ts Au-Ag Prospect, Central British Columbia’** by S.J. Cook and C.E. Dunn;
- **‘Regional Drainage Sediment and Water Geochemical Data, South Nechako Basin and Cariboo Basin, Central British Columbia (parts of NTS 092N, O, P, 093A and B)’**, by W. Jackaman, which contains new lake sediment and water data covering more than 16 000 km² of previously unsurveyed ground in central BC;
- **‘Geoscience BC Mountain Pine Beetle Data Repository Version 1.0’** by W. Jackaman, which compiles publicly available multimedia regional geochemical information for the core of the Mountain Pine Beetle Infestation Area of BC;
- **‘Halogens in Surface Exploration Geochemistry: Evaluation and Development of Methods for Detecting Buried Mineral Deposits’** by C.E. Dunn, S.J. Cook and G.E.M. Hall; and
- four new 1:50 000 scale bedrock geology maps, available from the Geological Survey of Canada: **‘Geology,**

Tahtsa Peak (93 E/12), British Columbia’; **‘Geology, parts of Chikamin Mountain and Troitsa Lake (93 E/06 and 11), British Columbia’;** **‘Geology, Tsaytis River (93 E/05), British Columbia’;** and **‘Geology, Kitlope Lake (east part) (93 E/04), British Columbia’;** all by J.B. Mahoney, J.W. Haggart, R.L. Hooper, L.S. Snyder, G.J. Woodsworth.

Acknowledgments

Geoscience BC would like to acknowledge our Technical Advisory Committee of volunteers from the mineral and oil and gas exploration industries, our project proponents, and our government geoscience partners in the BC Geological Survey and the Resource and Development Geoscience branches for all their contributions to this volume and other Geoscience BC projects. RnD Technical is also acknowledged for their high-quality work in editing and assembling this volume.

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