



An overview

Geoscience BC is an independent, non-profit organization that generates earth science in collaboration with First Nations, local communities, governments, academia and the resource sector. Our independent earth science enables informed resource management decisions.

Our **independence** builds **trust**. Our **open data** informs **good decisions**.



Proportion Geoscience BC Search Phase II project funding that went directly to local economies



Every \$1 spent on public earth science creates \$5 of investment[†]

\$8.7 billion



Gross mining revenue in BC, 2016²

\$4.9 billion



Oil and gas revenue and capital spending in BC, 2015³

FREE



The cost of Geoscience BC data made available to British Columbians

>\$22m



Investment leveraged from additional sources

>160



Projects completed by Geoscience BC since 2005

70



Project partners including independent consultants, consulting companies and universities since 2005



Bringing long-term benefits to BC

Geoscience BC's work brings investment to BC. For example, in June 2017 Gray Rock Resources acknowledged that Geoscience BC research had been essential in the development of its Hot Bath property near Dease Lake. Our work was also critical in the life extension of the Huckleberry Mine in west central BC.

Our work

Revealing BC's mineral potential and responsible development

Communities, the resource sector and others tell us there is a need to build a diverse economy for BC while also protecting the environment. Geoscience BC's work to reveal BC's exceptional mineral resources is important in making that possible.

Our Search projects map large areas of the province's bedrock geology from the air. This information is vital for the exploration sector to focus its efforts and is used by Indigenous groups when planning appropriate activity in their territories. Summer 2017's Search Phase III has support from community leaders and is funded in part by the Northern Development Initiative Trust. They know this work will boost the regional economy and that it has the potential to meet increasing demand for minerals needed for renewable energy.

Other projects build detailed understandings in areas that have seen mining activity in the past. For example, Bridge River west of Lillooet is the most prolific gold producing camp in BC's history. New results from work we have funded is changing the understanding of how and when gold was emplaced – providing a guide to exploration both there and across the province.

It's not just about finding minerals: we are involved in the complete lifecycle of mines. A strategic partnership with the Canada Mining Innovation Council (CMIC) is creating a new 'water hub'. This brings government, industry and other water data from mining activity into one central place, improving decisions and monitoring.

Geoscience BC produces solid, publicly-available earth science that helps to build a stronger economy

Joel McKay, CEO, Northern Development Initiative Trust

Geoscience BC research is becoming a useful part of the toolkit Nak'azdli Whut'en uses

Councilor Harold Prince, Natural Resources, Nak'azdli Whut'en

Responsible development... depends on modern and updated geoscience data

Dr Norm Keevil, Chairman of the Board, Teck Resources

Geoscience BC consistently identifies and addresses important earth and environmental issues in BC

Dr Michael Whiticar, Professor, Biochemistry School of Earth and Ocean Sciences, University of Victoria



Evidence for balanced energy decisions

Three concerns regarding oil and gas extraction in BC are the use of water, potential earthquakes and greenhouse gas emissions.

Geoscience BC has overseen more than 50 energy projects focusing on providing new scientific information on these issues for use by industry, local communities and Indigenous groups. This has included mapping natural gas resources in northeastern BC to provide a base for informed decision-making.

Water

Using helicopters mounted with sensing equipment, we are mapping groundwater in northeastern British Columbia.

We have also conducted work to identify sites deep underground that may be suitable for the disposal of water used in hydraulic fracturing.

Our new data and understanding of deep saline groundwater in northeastern BC has helped companies involved in hydraulic fracturing to reduce their reliance on surface water. As a result, they have invested \$150 million in the construction of water treatment plants in the region.

Earthquakes

To understand the level of and to reduce the risk of low-magnitude earthquakes resulting from oil and gas activity, we have partnered with academic experts, industry organizations and communities.

In an initial project, six state-of-the-art seismograph stations were installed throughout northeastern BC. There are now 13 stations integrated into the Canadian Seismograph Network to monitor these events.

We have four current projects looking at how to better understand, minimize and predict man-made earthquakes.

Greenhouse gas emissions

We believe a truly evidence-based approach is the best way to reduce greenhouse gas emissions from oil and gas operations in British Columbia.

Using the latest technology adapted from NASA's Mars Rover project, we are in the process of working with University of Victoria scientists to use drone-mounted equipment to measure greenhouse gas emissions from well sites. This will help to improve existing predictive models and to better understand emissions. It will be used to reduce leaks of greenhouse gases such as methane (known as 'fugitive emissions').

Ultimately, this information can be used to better manage and regulate oil and gas activity in northeastern BC.

Geoscience BC's ... geothermal study was a significant stimulus for the Terrace economy

Carol Leclerc, Mayor of Terrace

Building the case for geothermal

The concept of using geothermal as part of an energy mix to heat and power BC has been in discussion for many years. Accelerating the development of geothermal is an important part of Geoscience BC's work.

Our initial work looked at the economic viability of geothermal energy in British Columbia, and was produced in collaboration with BC Hydro. This was followed by studies looking at the potential for 'direct use' geothermal to be used for commercial and industrial heating and drying needs across the province.

These projects have resulted in 'heat maps' of the province and a better understanding of geothermal potential. An additional road map designed for use by communities considering using geothermal energy has also been developed along with a series of webinars providing hands-on information.

Innovation: bringing new concepts to life

Geoscience BC's projects grow new ideas in earth science research and move concepts closer toward application and commercialization.

This has been the case with several geochemistry projects. In 2009 research around the Kwanika project and Mount Milligan mine validated a concept that certain soils can be used to detect copper and gold mineralization. This has led to development of commercial laboratory procedures and adoption of this sampling method by the resource sector.

Another new project is evaluating the replacement of hazardous chemicals with water for testing steel-making coal samples. Called the Roben Jig process, the technology is portable and requires significantly smaller samples for testing, lowering the costs associated with coal quality evaluation.

Our project in the Horn River Basin helped to identify water sources deep underground that may be appropriate for industrial uses. As a result, a major natural gas operator in the area invented a new skid-mounted water treatment plant.



Geoscience BC's research on groundwater, safe fluid disposal and seismicity has been invaluable

Tim McMillan, President & CEO, Canadian Association of Petroleum Producers (CAPP)

Independence builds trust

Geoscience BC's structure as an independent society allows us to be dynamic, responsive and efficient. It allows us to build unique relationships with all levels of government, communities, Indigenous groups and the resource sector that are based on trust and backed by good science.

We are governed by a volunteer Board of Directors. Support for the Board on technical matters is provided by volunteer Technical Advisory Committees (TACs) for minerals and mining, oil and gas and geothermal.

Our Board of Directors represents a broad range of interests – from community and Indigenous leaders to resource sector representatives. Our TACs are experts from industry, academia and government who identify, review and recommend proposals.

We welcome proposals and review project suggestions from communities, Indigenous communities and others.

Our funding

Geoscience BC's core funding is from the Province of British Columbia, with \$10 million announced in January 2017.

We use this funding as a lever to secure additional resources. Since our creation in 2005, we have leveraged more than \$22 million for projects from other sources.

We gratefully acknowledge the financial support of the Province of British Columbia.

Open data to inform good decisions

Geoscience BC is committed to making project data and information available for all to use.

Reports from every project conducted since 2005 are available for free on our website. In addition, our website is home to our free Earth Science Viewer map application. This integrates our data with other open data sources, such as the provincial mineral tenure database, and allows anyone to locate our projects.

Input from Indigenous communities

Geoscience BC continues to develop agreements with leaders from Indigenous communities keen to use our earth science data.

We recognize that we have a role to play in making sure Indigenous communities understand and are involved in our work. This starts with building respectful relationships, and includes providing communities with support to interpret our data when needed.

We value community involvement in our projects, and encourage contractors to hire local where possible. For example, members of the Tsay Keh Dene Nation were hired to work on a project through the summer of 2017.

In another example, Fort Nelson First Nation has been actively involved in water monitoring work in the Northeast for more than five years: initial training for some of their water monitors was provided by one of our projects.

Our geothermal research in central BC's Nazko area came as a direct result of requests from Nazko First Nation for information to help the community to transition from diesel to cleaner energy sources.

1. Prospectors and Developers Association of Canada (2010) *Government geoscience to support mineral exploration: public policy rationale and impact*
2. PwC (2017) *Building for the future: The Mining Industry in British Columbia 2016*
3. CAPP (2017) *Oil and natural gas priorities a prosperous British Columbia*



1101-750 West Pender Street,
Vancouver, BC V6C 2T7

t: 604.662.4147

e: info@geosciencebc.com

w: www.geosciencebc.com