



# British Columbia Geological Survey



Ministry of  
Energy, Mines and  
Low Carbon Innovation

Information Circular 2024-02

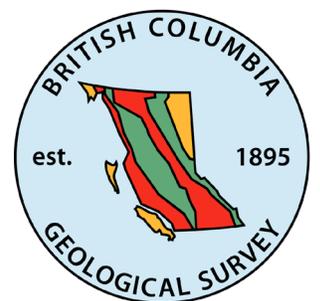


## The Survey

Founded in 1895, the British Columbia Geological Survey is the oldest scientific agency in the province. The Survey conducts research to establish the geological evolution and mineral resources of the province. Drawing on continuously advancing concepts and technologies, the Survey creates knowledge to guide societal decisions centred on the Earth sciences.

Survey maps, reports, and databases are freely available online, connecting the public, First Nations, local communities, the minerals industry, public safety agencies, environmental scientists, other research organizations, and government to the province's geology and mineral resources.

This information benefits decisions that balance the economy, the environment, and community interests.



## Mapping is the most fundamental form of geoscience research

British Columbia Geological Survey geoscientists undertake field mapping and laboratory projects to document, assess, and better understand the land base of the province.

Bedrock geology, surficial geology, geochemistry, and geophysical maps are used to

- estimate mineral and aggregate potential
- document geochemical patterns in rocks, soils, sediments, and waters
- unravel the geological evolution of the province to guide mineral exploration
- evaluate risks posed by natural hazards
- determine groundwater sources and flow paths
- establish geotechnical properties for construction and engineering projects

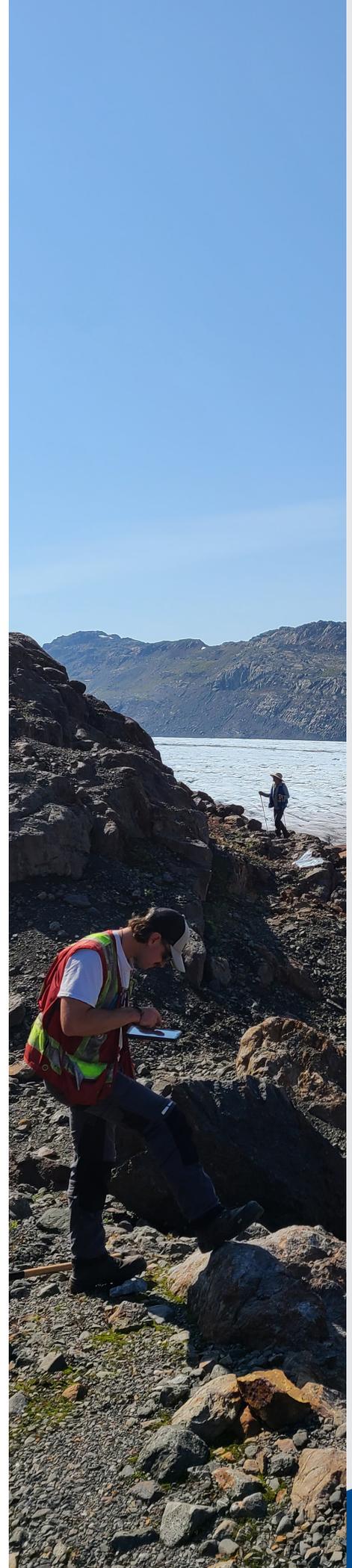
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## Survey structure

Survey geologists conduct research, curate historical data, provide easy online access to information, monitor industry activity, aid mineral exploration, attract global investment, and train the next generation of geoscientists.

The Survey is structured into three working groups.

- Cordilleran Geoscience Section
- Resource Information Section
- Mineral Development Office





## Cordilleran Geoscience Section

The Cordilleran Geoscience Section generates new geoscience with field-based bedrock and surficial geology mapping programs, regional geochemical surveys, targeted mineral deposit studies, and emerging technologies.

The Section manages the Survey's laboratory facilities. It also curates the provincial archive of field samples, permitting the Survey and its partners to re-examine legacy specimens as analytical techniques evolve.

## Cordilleran Geoscience Section geologists conduct field-based projects

- regional bedrock mapping with ancillary geochemical, geochronologic, and isotopic studies
- tectonics and metallogeny
- Quaternary and surficial geology; drift prospecting, till geochemistry, and indicator minerals
- deposit studies and mineral potential evaluations
- exploration methods, models, and predictive tools





## Resource Information Section

The British Columbia Geological Survey is the custodian of all provincial public geoscience data. It preserves, archives, and provides free web-based access to information gathered for more than 125 years. Since 1995, MapPlace, our database-driven geospatial web service, has provided open geoscience data and custom map-making tools to help decision makers from diverse disciplines reduce the costs of accessing and analyzing information.

The Survey is modernizing information systems to improve the operation of databases, applications, and geospatial web services. The modernization is part of transformation efforts to improve digital capabilities by completing a geoscience Spatial Data Infrastructure (SDI).



## Mineral Development Office

The Mineral Development Office (MDO) is the Vancouver base of the British Columbia Geological Survey. It links the more than 1100 global exploration and mining companies headquartered in Vancouver to provincial mineral and coal information.

The MDO distributes British Columbia Geological Survey data and provides technical information and expertise about mineral opportunities to the investment community. It also produces the annual Provincial Overview of Mining and Exploration volume.

## Exploration and mining

Exploration and mining are important to the provincial economy. In 2023, total exploration expenditures are estimated at \$643.5 million and the total forecast of mine production is estimated at \$5.9 billion.

As the steward of mineral and coal resources in the province, the Survey has an important role in stimulating activity, attracting investment, and providing continuous research based on a corporate memory that extends back more than 125 years.

The Survey reduces exploration costs by: providing the geological framework to identify areas with high mineral potential; increasing exploration efficiency by gathering regional information used for property-scale evaluation; and archiving exploration results so that projects can be advanced without duplicating previous work.

## Regional Geologists

Based in Smithers, Prince George, Cranbrook, Kamloops, and Vancouver, the Regional Geologists monitor exploration and mining activities in their jurisdictions.

The Regional Geologists also provide information on exploration trends, possible investment opportunities, land-use processes, First Nation capacity building, and public outreach.



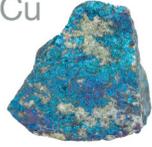
# Critical minerals

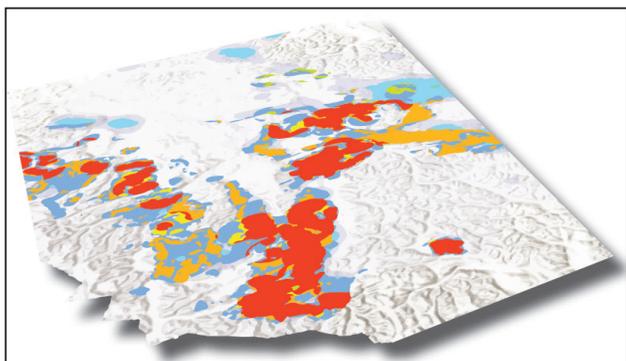
As society places more value on the transition to low-carbon energy, demand for minerals important for energy generation, storage, and transmission will increase.

British Columbia is developing its own Critical Minerals Strategy and BCGS is contributing geoscience information foundational for the strategy.

The Survey has compiled a critical minerals atlas as the initial step in evaluating the critical mineral endowment of the province and in building awareness of critical mineral opportunities for the exploration and mining industries.

The Survey also began field projects to assess opportunities in regions known to contain critical minerals.

Al  Aluminum	Co  Cobalt	Cu  Copper	Ge  Germanium		
In  Indium	Mg  Magnesium	Mo  Molybdenum	Ni  Nickel		
Nb  Niobium	<h2>Critical Minerals in British Columbia</h2> <p>An atlas of occurrences and producing mines, 2023</p>				
PGE  Platinum group elements	REE  Rare earth elements	Ag  Silver	Ta  Tantalum		
   <p>our nature. our power. our future.</p> <p>British Columbia Geological Survey Open File 2023-02</p>			<td>W  Tungsten</td> <td>Zn  Zinc</td>	W  Tungsten	Zn  Zinc



## Mineral potential modelling and land use

More than 30 years ago, the Survey initiated a study to assess the mineral potential of the entire province. This work continues today with a mineral potential modelling project that builds on increased knowledge about the geology of the province, better understanding of the processes that generate ore deposits, advances in geographic information systems (GIS), and increases in computer power.

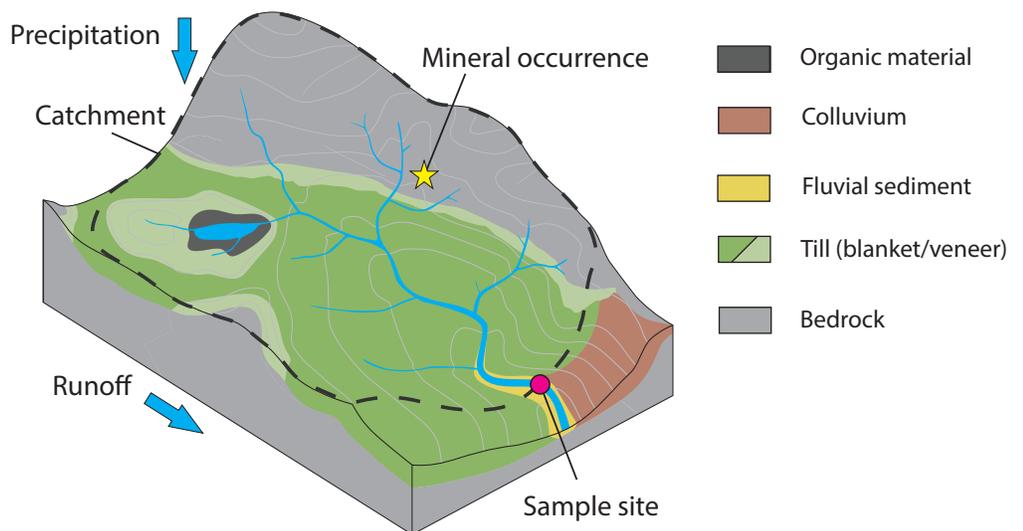
Adopting a mineral systems approach to identify areas favourable for mineral deposits, this new modelling will assist land-use conversations between multiple parties having diverse interests.



## Laboratory, sample archive, geochemical databases, geochronologic database

Survey staff work with field samples at our in-house laboratory and our upgraded sample archive.

The Survey maintains geochemical databases that include about 5 million determinations from more than 86,000 samples, and has a geochronologic database with almost 8,300 age determinations.





# Geological Fieldwork 2023

## A Summary of Field Activities and Current Research

### Publications

The British Columbia Geological Survey publishes Papers, Geoscience Maps, Open Files, GeoFiles, Information Circulars, and Digital Geoscience Data. All publications are available online, free of charge.

Geological Fieldwork, published each January, includes papers highlighting current field activities and research. The Provincial Overview of Exploration and Mining in British Columbia, also published each January, summarizes industry activities in the previous year.



## Partnerships

The Survey partners with federal, provincial, and territorial governments, universities, other national and international geoscience organizations, and the mineral exploration and mining industry. Please contact us to ask about partnerships.

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## Skills training

The Survey invests in the next generation of geoscientists by hiring and training student assistants, mentoring student research and supporting graduate students via numerous university partnerships.

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## Meetings

The British Columbia Geological Survey distributes maps and reports at regional, national, and international meetings. Survey staff regularly give presentations highlighting new developments in Cordilleran geology.



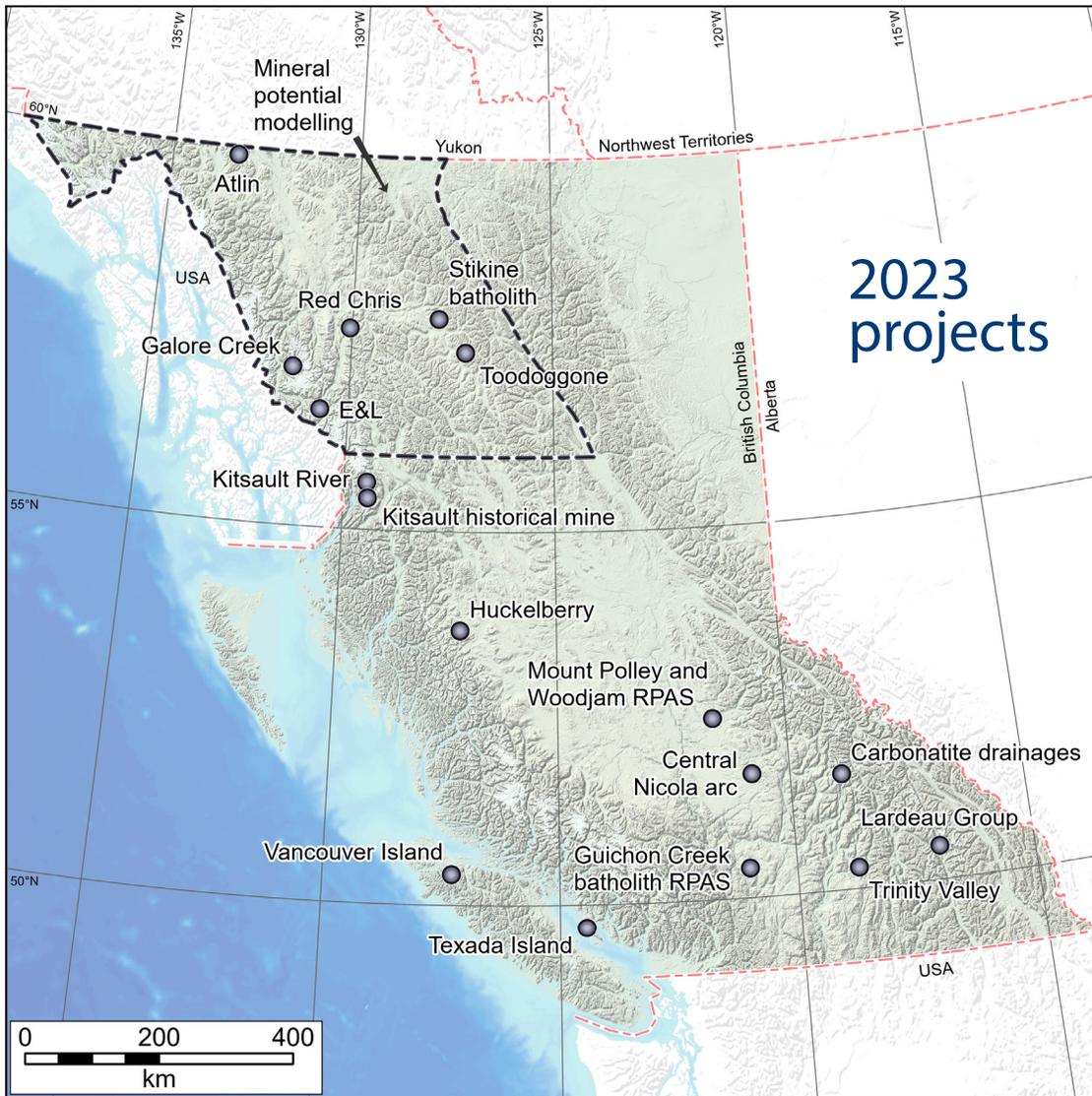
## Engagement

Through its engagement program, the Survey is connecting Indigenous Peoples, local communities, governments, the minerals industry, and the public to the geology and mineral resources of the province.

To strengthen relationships, Survey geologists meet with Indigenous communities to exchange knowledge about field projects, geology, and mineral potential.

By 'walking together' we are sharing traditional knowledge and western science to build common understanding of the natural history and geological resources in British Columbia.





In the northwest, framework geoscience bedrock mapping included a new study focussing on mafic and ultramafic rocks near Atlin and continued work in the Red Chris mine, Stikine batholith, Toodoggone, Galore Creek, and Kitsault River areas near volcanogenic massive sulphide, epithermal, and porphyry deposits. In the south, work continued to establish the transition from the Nicola arc eastward to Ancestral North America, examine volcanogenic massive sulphide deposits in the Lardeau Group, assess the geological relationships of Paleozoic, Mesozoic, and Cenozoic rocks near Trinity Valley, and evaluate geophysical and lidar data collected using ‘drones’ (RPAS) near Mount Polley and Guichon Creek.

New investigations of critical minerals began with fieldwork near the E&L Nickel mountain project, the historical Kitsault mine, the Huckelberry mine, and iron deposits on Vancouver Island and Texada Island. Geochemical signals from stream sediments sourced from carbonatites and related rocks are being assessed as guides to explore for rare earth element and other critical minerals in eastern British Columbia.

Work continues on capturing digital data from assessment reports and integrating geological map compilations into the BC Digital Geology database. As part of transformation efforts to improve digital capabilities, the Survey is modernizing core information systems to increase efficiency in updating databases and delivering services.



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