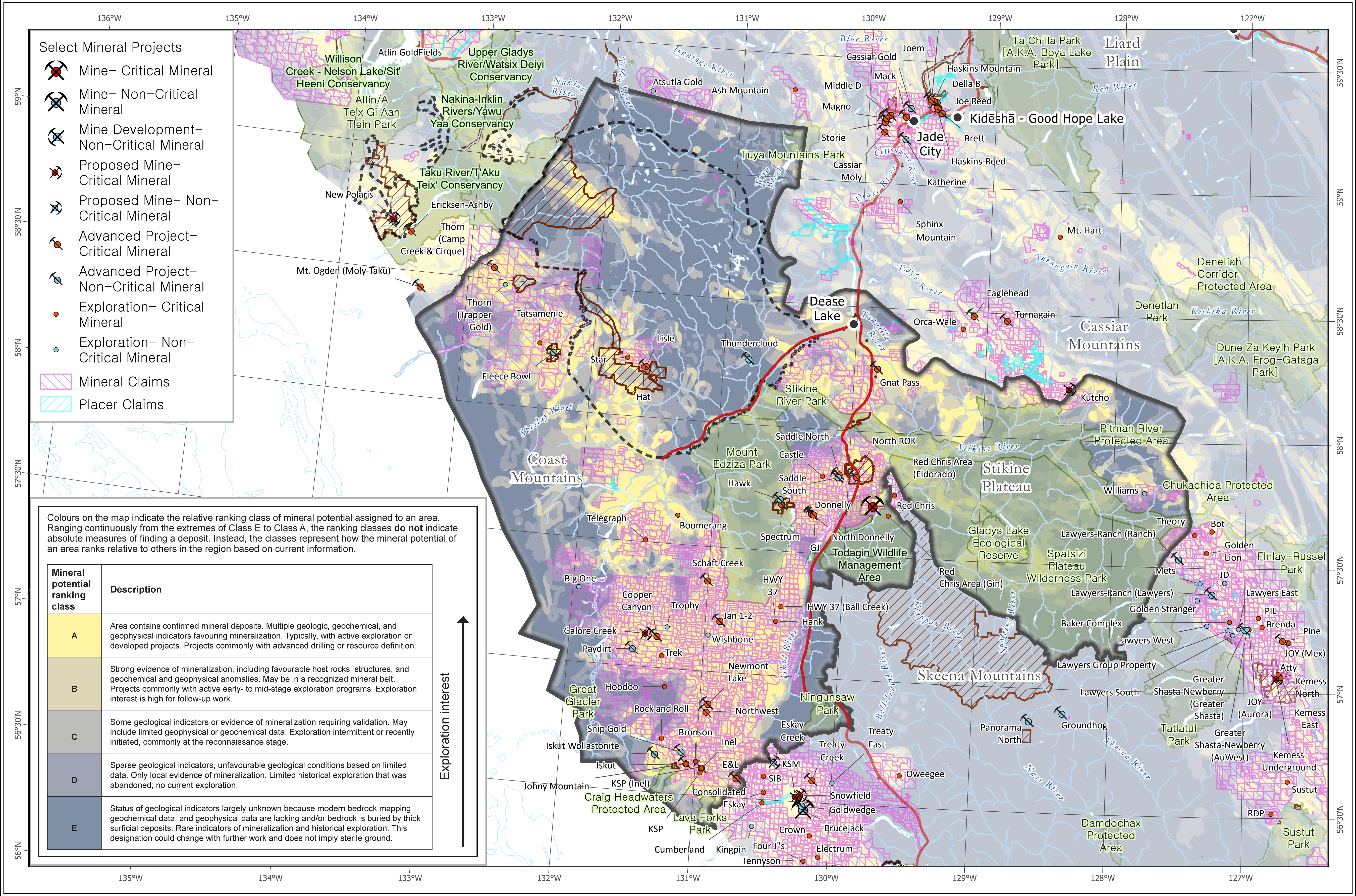
Ministry of Mining and Critical Minerals

Tahltan Land Use Planning area mineral potential map for porphyry, volcanogenic massive sulphide (VMS), and magmatic mafic-ultramafic deposits



Colours on the map indicate the relative ranking class of mineral potential assigned to an area. Ranging continuously from the extremes of Class E to Class A, the ranking classes **do not** indicate absolute measures of finding a deposit. Instead, the classes represent how the mineral potential of an area ranks relative to others in the region based on current information.

Mineral potential ranking class	Description
A	Area contains confirmed mineral deposits. Multiple geologic, geochemical, and geophysical indicators favouring mineralization. Typically, with active exploration or developed projects. Projects commonly with advanced drilling or resource definition.
B	Strong evidence of mineralization, including favourable host rocks, structures, and geochemical and geophysical anomalies. May be in a recognized mineral belt. Projects commonly with active early- to mid-stage exploration programs. Exploration interest is high for follow-up work.
C	Some geological indicators or evidence of mineralization requiring validation. May include limited geophysical or geochemical data. Exploration intermittent or recently initiated, commonly at the reconnaissance stage.
D	Sparse geological indicators; unfavourable geological conditions based on limited data. Only local evidence of mineralization. Limited historical exploration that was abandoned; no current exploration.
E	Status of geological indicators largely unknown because modern bedrock mapping, geochemical data, and geophysical data are lacking and/or bedrock is buried by thick surficial deposits. Rare indicators of mineralization and historical exploration. This designation could change with further work and does not imply sterile ground.

Exploration interest

Tahltan– BC Land Stewardship Planning Area

12 Month Tenure Pause Area (Northwest ELUA*, and select No Registration Reserves)

Existing No Registration Reserves

Parks & Protected Areas

Highway

Communities

*Environment and Land Use Act

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0 10 20 30 40 50
Kilometres

Date Created: 2025–11–10

NAD 1983 BC Environment Albers

Area of Interest

BRITISH COLUMBIA | Ministry of Mining and Critical Minerals

Descriptive notes, Tahltan Land Use Planning area mineral potential map for porphyry, volcanogenic massive sulphide (VMS), and magmatic mafic-ultramafic deposits

Mineral potential modelling

Land-use decisions and co-management of natural resources need high-quality information. Along with many other considerations, information about the possibility of a mineral deposit being discovered in a particular area will help guide decisions by government, Indigenous rights holders, and the exploration and mining industry. Mineral potential modelling is a tool that supports informed land-use decisions by integrating our current geological knowledge of mineral systems with data such as geological maps, geophysical and geochemical surveys, and known mineral occurrences to identify areas with high resource potential. Mineral potential information considers exploration and mining interests, while fostering transparency in making forward-looking decisions in resource and land-use planning.

Building on province-wide work carried out in the 1990s, current mineral potential modelling at the British Columbia Geological Survey (BCGS) is assisting land-use conversations between diverse parties. The current modelling takes advantage of new data from bedrock mapping completed since the 1990s, recent mineral discoveries, improved exploration techniques, and a better understanding of the geologic processes leading to mineralization. In addition, developments in high-level programming languages and exponential increases in computing power have led to significant advances in applying geographic information system (GIS) platforms and using computerized statistical methods to model mineral potential. BCGS mineral potential modelling uses multiple geological features as stand-ins to represent complete mineral systems and create maps that portray the relative ranking of mineral potential (prospectivity).

Depending on the purpose of the modelling and the data available, a variety of methods can be used to model the mineral potential of an area. Current BCGS modelling uses a long-standing method referred to as 'weights of evidence'. Many different types of geologic data are considered (e.g., bedrock maps, fault maps, geochemistry, mineral occurrences), and computer algorithms used to identify statistical associations or patterns that might represent conditions favourable to mineralization. An advantage of this method is that the inputs that most influenced the final result are readily understood. Although the mineral potential modelling presented in this map is BCGS's current best interpretation based on a well-established method, using different computer algorithms with the same inputs could lead to slightly different results.

Mineral systems and commodities

This map combines mineral potential modelling for three mineral systems: porphyry; volcanogenic massive sulphide (VMS); and magmatic mafic-ultramafic.

Porphyry systems form when one tectonic plate slides beneath another to depths where high temperatures cause melting. The hot buoyant magmas generated by this melting scavenge metals, rise into the overlying crust to re-solidify at relatively shallow levels to form 'igneous intrusions' that get chemically altered by circulating hot waters. In addition to copper and molybdenum, both of which are on the Canadian critical minerals list, porphyry deposits may contain appreciable gold and silver. They may contain minor amounts of critical metals that could be recoverable as by-products such as bismuth, lithium, niobium, platinum group elements (PGE), rare earth elements (REE), rhenium, tantalum, tellurium, tin, and tungsten. The Red Chris mine and the KSM, Galore Creek, and Schaft Creek projects are examples of porphyry deposits in northwestern BC.

Volcanogenic massive sulphide (VMS) deposits are accumulations of metal-bearing sulphide minerals precipitated at sites of volcanism on the floors of ancient and modern seas. The deposits form where metal-rich fluids heated by volcanic processes rise, discharge, and mix with seawater to precipitate minerals that typically contain zinc, copper, lead, silver, and gold. Potential secondary critical companion metals include bismuth, cobalt, gallium, germanium, indium, antimony, tin, tellurium, and thallium. The Eskay Creek project and former Granduc mine are examples of VMS deposits in northwestern BC.

Magmatic mafic-ultramafic deposits form where melts high in magnesium and low in silica cool in magma chambers where minerals crystallize and settle. These deposits may host economic concentrations of nickel, copper, and the platinum group elements (PGE) and may have potentially recoverable companion metals such as vanadium, titanium, chromium, and scandium. Deposits containing nickel, cobalt, and manganese are also produced by the hydration of iron- and magnesium-bearing minerals in ultramafic rocks in a process called serpentinization. The Turnagain project in northwestern BC and Polaris project in northeastern BC are examples of magmatic mafic-ultramafic deposits.

Critical minerals

Critical minerals are the foundation upon which the transition to a low-carbon economy is being built. These minerals are required for electric vehicles, mobile phones, solar panels, wind turbines, electrical transmission lines, batteries, and to manufacture medical devices and products for national defense. Critical minerals are defined by different jurisdictions for different reasons, typically serving an essential purpose or at risk of supply disruption. The Canadian critical minerals list identifies 34 minerals, several of which are currently or have been mined in BC. Some, such as copper and molybdenum, are the primary metal being mined; others are 'companion metals' that are economically significant enough to be reported in resource and reserve estimates but would not be mined on their own.

Relative ranking classes: How to read this map

This map uses a relative ranking scheme to depict the probability of a deposit being found in a particular area. It must be emphasized that the different mineral potential classes **do not** indicate an absolute measure of finding a deposit in an area but just depict how the area ranks with respect to others in the region. For example, some areas may be given a Class E designation only because of inadequate information. This designation could be incorrect and might change with further work on the ground or advances in understanding mineral systems.

Limitations of this map

This map only applies only to porphyry, volcanogenic massive sulphide, and magmatic mafic to ultramafic sulphide mineral systems, which are of particular significance in the region, and other mineral systems and deposit types have not been considered. For example, placer deposits and aggregate resources could be important for the region but are not part of the current model.

This map is restricted to the current state of publicly available geoscience data and to a single modelling technique. Changes are to be expected as new data or new datasets become available, advancements in mineral system research are made, and different techniques are applied.

The map has limited utility to estimate mineral potential at depth because most of the data are derived from near-surface geology, and the map lacks information to support assigning a monetary value to any area.

Further information

Hickin, A.S., Orovan, E.A., Brzozowski, M.J., McLaren, K., Shaw, K.L., and Van der Vlugt, J., 2023. Critical minerals in British Columbia: An atlas of occurrences and producing mines, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File 2023-02, 102 p.

Hickin, A.S., Ootes, L., Orovan, E.A., Brzozowski, M.J., Northcote, B.K., Rukhlov, A.S., and Bain, W.M., 2024. Critical minerals and mineral systems in British Columbia. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 13-51.

Wearmouth, C., Czertowicz, T., Peters, K.J., and Orovan, E., 2024. Mineral potential modelling at the British Columbia Geological Survey: Renewed methods with application to northwestern British Columbia. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-02, 28 p.

Wearmouth, C.D., Peters, K.J., Czertowicz, T.A., and Orovan, E.A., 2024. Mineral potential modelling results for northwestern British Columbia, a comparison between past and current work at the British Columbia Geological Survey. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 79-95.

Wearmouth, C., Czertowicz, T., Peters, K.J., and Orovan, E., 2024. Preliminary mineral potential maps for the porphyry, volcanic massive sulphide, and magmatic mafic-ultramafic mineral systems, northwestern British Columbia. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File 2024-05, 1:800,000 scale.

Wearmouth, C., Czertowicz, T.A., Peters, K.J., 2024. Preliminary mineral potential maps for the SEDEX and MVT mineral systems, northeastern British Columbia. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File 2024-011, 1:500,000 scale.

See also:
Mineral potential modelling at the British Columbia Geological Survey. BCGS Information Circular 2025-07.