



British Columbia Mine Tailings Map

Research Methodology

Notes on research process, data categories and sources

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Map Description and Research Process

This map is designed to provide local communities, First Nations, and other users with information about the location of, and risks associated with, tailings waste across the province of British Columbia. Tailings are a form of mine waste, leftover after the commodity of value has been extracted. Typically, tailings waste is stored permanently aboveground in a tailings storage facility (TSF); these facilities pose risk of catastrophic failure, like the [2014 Mount Polley mine tailings dam failure](#).

The map is built from a database that compiles tailings-related information, created by SkeenaWild Conservation Trust and the BC Mining Law Reform network. Research to create the first iteration of this database was conducted from May 24, 2021 to June 4, 2022. The list of sites for inclusion was finalized February 28, 2022, and the following months were spent performing quality control, fact-checking, and developing the map application. (Despite this lengthy and rigorous research to ensure the most accurate data, the map may still contain inaccuracies—please see the subsection "Discrepancies with Other Sources" below).

The map provides risk-related information about existing and not yet fully reclaimed TSFs at mines that are Operating, Closed, and under Care and Maintenance. The map also provides data on Proposed mine sites that will contain TSFs, some of which are under construction or greenlit for construction, and some that are still pursuing approval. The map does not include information on mine sites where no TSF is present, or where documentation indicates historical TSFs have been remediated to eliminate failure potential.¹

The map builds on the format that the B.C. government (the Province) has adopted in its regulatory oversight (e.g., in its 2021 table of [TSF Code Requirements Compliance Status](#)), such that each pin on the map identifies a mine site where at least one tailings facility exists. Importantly, this means that each site identified on the map may contain multiple TSFs. (There are additionally some cases where the Province regulates each tailings facility at a mine site separately, such as Highland Valley Copper, where 5 separate TSFs are all regulated as separate sites; the map has followed suit at these sites.) As of June 4, 2022 (based on the site list finalized February 28, 2022), the map identifies a total of 75 sites where at least one TSF exists, and 11 sites where at least one TSF is proposed, for a total of 86 sites.

Tailings Storage Facilities in the Province are typically constructed using dams, often multiple dams.² As of June 4, 2022, the map identifies a total of at least 172 dams currently retaining tailings across B.C., and another at least 21 tailings dams proposed. This is a minimum number, as the number of tailings dams was not publicly reported for all sites.

Data Categories

Many important details regarding TSFs across B.C. are not publicly reported consistently and/or in a standardized manner. Accordingly, information is presented on the map based on: a) the information's importance for communicating risk to the surrounding environment and communities, and b) the information's relatively consistent availability in public reporting. The following information for each site is presented on the map:

- Project Name
- Project Photo—an aerial photograph of each TSF site (see the [Data Sources](#) document for photo sources and copyright information)
- Site Status ('Operating'; 'Care & Maintenance'; 'Closed'; 'Proposed')³
- Number of Dams—the total number of dams (either existing or proposed) retaining tailings on site
- Maximum Dam Height (m)—the height of the tallest dam (either existing or proposed) retaining tailings on site
- Dam Failure Consequence ('Low'; 'Significant'; 'High'; 'Very High'; 'Extreme'; 'Under Review'; 'Unclear')—the highest consequence of dam failure assigned to any single dam (either existing or proposed) retaining tailings on site⁴
- Watershed—the minor watershed (third-order watershed, developed for the 1:50,000 [BC Freshwater Atlas](#)) in which the site's GPS coordinates are located
- Commodity ('Precious Metal'; 'Base Metal'; 'Coal')—the primary commodity produced on site
- Owner
- Upstream Dam Present (Yes/No/Unknown)—whether there is at least one tailings dam built or proposed to be built using upstream construction methods on site⁵
- Current Storage (Entire Site) (m³)⁶—the total volume of tailings currently stored on site (i.e., across all TSFs, if there are multiple TSFs present),⁷
- Capacity (Largest Facility) (m³)—the design storage capacity of the largest (greatest volume) TSF on site, when built to its fully permitted size (unless marked by a "*"⁸)⁹

Please consult the [Key Term Definitions](#) document for definitions of key terms related to the data categories displayed on the map.

Data Sources

In collecting site-specific information displayed on the map, primary sources were of the following types: a) B.C.'s public-facing mining inventories, databases, and project information sites, b) independent expert reports commissioned by the Province of B.C., and c) company disclosures. These primary sources are as follows:

- [BC MINFILE Mineral Inventory](#)
- [BC 2021 TSF Code Requirements Compliance Status Table](#)
- [BC Mine Information \(BCMI\) site](#)
- [BC Permitted Metal and Coal DSI Report Summary Table](#)
- [EAO Project Information Centre \(EPIC\) site](#)
- [BC Geological Survey 2021 Provincial Overview](#)
- [Mount Polley Independent Expert Report—Appendix I](#)
- [The Global Tailings Portal](#)

Please consult the [Data Sources](#) document for descriptions of each primary source.

When necessary, additional documents were procured via public sources to assist with populating site-specific data. These types of sources included: government reports (e.g., Chief Inspector of Mines Annual Reports); mine engineering reports; mine company and/or government presentations; mine company press releases, memos, and/or NI 43-101 technical reports; and United Nations reports. Lastly, direct communication with the B.C. Ministry of Energy, Mines, and Low Carbon Innovation, and an independent expert [analysis regarding tailings dam construction methods](#)¹⁰ were also conducted to address missing or unclear information.

A number of spatial layers were also added to the map to provide information regarding minor watersheds, principal drainages and salmon habitat potentially affected by tailings. These layers were procured from B.C., Yukon, and US government databases. Additional information regarding these links can be found in the [Data Sources](#) document.

Discrepancies with Other Sources

Rigorous research was employed to ascertain the most recent and accurate data for sites on the map; in cases where conflicting data were encountered across different sources, the clearest and most recently published information was privileged. However, mine plans and facility designs often change as they move through initial permitting, and even through operations, and these changes are not always clearly publicized or documented in key sources. Accordingly, there may be cases, particularly for Proposed sites, where the data on the map do not reflect that site's most recent design. (Contact information is provided below if you believe you have identified an error.)

As of June 4, 2022 (based on the site list finalized February 28, 2022), the map presents a site count that differs from the one found in the [BC 2021 TSF Code Requirements Compliance Status Table](#). The map provides data on 86 mine sites containing at least one TSF (75 existing and 11 proposed), whereas B.C.'s 2021 TSF Compliance Table lists 70. This difference from B.C.'s reporting is the result of the following factors:

- **11 Proposed TSF sites** have been listed on the map, whereas the Province's TSF Compliance Table does not list 'Proposed' sites. These sites were included on the map to give users a clear account of the emerging TSF landscape in B.C.
- **5 Closed sites** and **1 Care and Maintenance site** are included on the map that are not in B.C.'s 2021 TSF Compliance Table, but are listed in the Mount Polley Independent Expert Report (Appendix I). Clear evidence that tailings facilities at these 6 sites have been remediated to eliminate failure potential could not be sourced. These sites have accordingly been plotted on the map, pending clarification from the Province.
- **One site is excluded** from the map that was listed in B.C.'s 2021 TSF Compliance Table (Cassiar-McDame) because the Table clearly indicates that this site does not actually meet the definition of a TSF.

Contact Information

If you would like a more detailed breakdown of how information was sourced for a specific site, believe you have identified errors in the data, or have any other enquiries regarding the map, please reach out to tailings@reformbcmining.ca.

Endnotes

- 1 The map also provides information on a number of historic/legacy sites where it is unclear whether they have been fully remediated. These sites have been included until documentation can be obtained demonstrating a remediation plan has been completed. All such sites have been referred to the B.C. Ministry of Energy, Mines, and Low Carbon Innovation for clarification and comment.
- 2 There are also cases reported on the map where tailings have been deposited in natural lakes or mined-out open pits. These are still considered to be TSFs, though they do not have constructed dams associated with them.
- 3 Note that 'Status' often refers to the status of the entire mine site, not the TSFs themselves. Some mines may have multiple TSFs at various stages of life (some active, some inactive and reclaimed, some inactive and not fully reclaimed, etc).
- 4 See this guide for detail on how [Dam Failure Consequence Classifications](#) are assigned in B.C.
- 5 Upstream construction involves progressively raising the dam on top of the existing tailings in the facility. Upstream tailings dams have a higher rate of stability issues compared to other types of tailings dams, and are banned in other jurisdictions but still legal in B.C.
- 6 In some cases, source documents reported current tailings storage in tonnes, not m³. When converting tonnes to m³, average tailings density was assumed to be 2.0 tonnes/m³.
- 7 Based on the availability of information, only the volume of solid tailings stored on site has been reported, not including any water ponded on top of the tailings. However, neither volume of stored tailings nor volume of stored tailings and water are consistently reported via company disclosure or government sources. Accordingly, there may be cases in which the Current Storage figure reported on the map does actually include both solid tailings plus ponded water.
- 8 Based on the availability of information, the maximum volume that the largest TSF at each site is designed to store has primarily been reported. However, due to a lack of standardized reporting, there are some exceptions. When present, an asterisk (*) indicates that the Capacity listed refers to the combined design storage capacity of all TSFs at that site.
- 9 As with Current Storage, the design storage capacity has been primarily reported for tailings, not including ponded water. However, there may be cases in which the Capacity reported on the map does actually include both solid tailings plus ponded water, due to inconsistencies in company and/or government reporting.

- 10 This expert report was commissioned by map creators to address cases where tailings dam construction type was unclear. The report was written by Dr. Steven Emerman, an internationally recognized expert on tailings dams and author of [Safety First: Guidelines for Responsible Mine Tailings Management](#).