Mining in the Boreal Ecosystem

Measuring Mining's Historical Footprint across Alaska

Background & Purpose

Commercial mining began in Alaska almost 150 years ago and has played a significant role in Alaska's history. Mining has occurred from Bering Sea beaches, throughout the state's vast Interior to Southeast's coastal rainforest. Land and resource managers have expressed a need to identify, map, and characterize cumulative mining impacts at watershed scales. Previous mapping attempts have used data surrogates such as mining claims which overestimate actual mining footprints and miss older mines. This project aims to provide state, federal, and tribal partners a digital, spatial inventory of past and present mining related land disturbance across Alaska and neighboring Canada. This dataset provides land and natural resource managers with information to guide future monitoring, restoration, and conservation efforts.

While primary mining activities (such as digging, crushing, sluicing, etc.) create most of the landscape disturbance, associated infrastructure such as buildings and roads are also included in this dataset.

Which Alaskan watersheds have the biggest footprints?

Cumulative impacts at a Watershed Scale

1 **Headwaters Little Chena River**
6,688 acres

2 **Headwaters Goldstream Creek**
5,693 acres

3 **Lignite Creek-Nenana River**
4,866 acres

4 **Crooked Creek (Beaver Creek - Yukon River)**
4,862 acres

5 **Headwaters Tuluksak River**
4,162 acres

6 **Vault Creek-Chatanika River**
4,004 acres

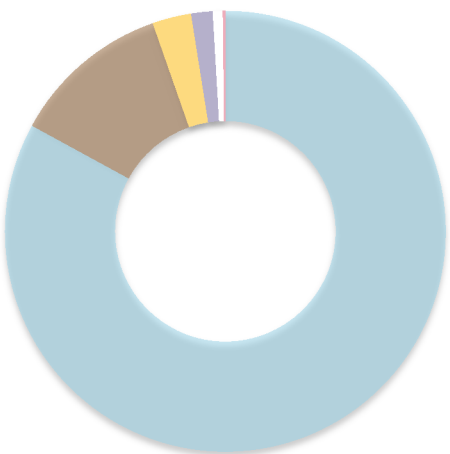
7 **Snake River**
3,996 acres

8 **Baker Creek**
3,499 acres

9 **Headwaters Tolovana River**
3,456 acres

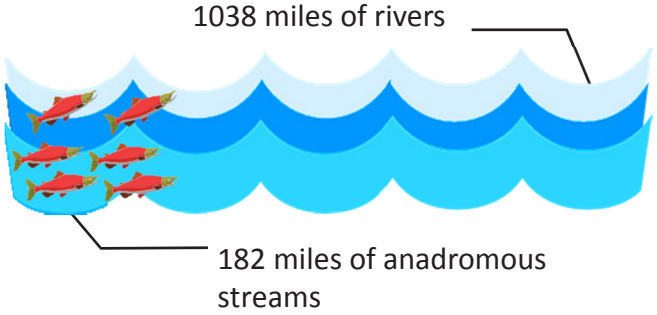
10 **Headwaters Kahiltna River**
3,294 acres

Who manages these mining footprints across Alaska?



Counting Where it Counts:

Measuring River Miles along Mines

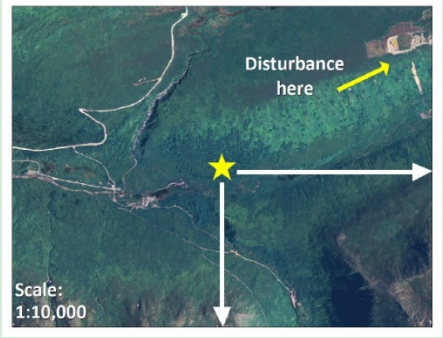


Methods

1) Identify Mine Sites

Published by the U.S. Geological Survey, the Alaska Resource Data File (ARDF) inventories historic mines, prospects, and mineral occurrences across Alaska. The ARDF was queried based on the site type attribute, identifying over 1600 potential mining sites.

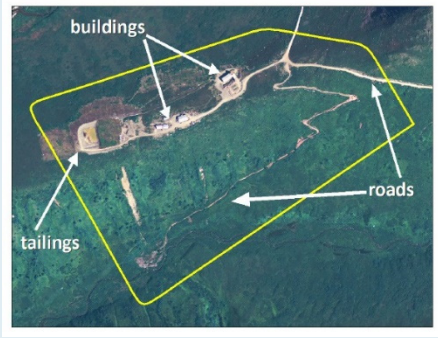
In Canada, provincial and territorial government mining claims and mine site datasets were used to locate potential sites.



2) Locate Mining Footprint

Using the best available digital imagery layers (primarily GeoNorth Ortho WMS and ESRI Global imagery service) viewed at a scale of 1:10,000, land disturbances such as removed vegetation and tailings piles can usually be seen (resolution of 2.5 meter pixels or less).

A 24" computer monitor displayed at this scale allows for an approximately 2 mile search radius at which to detect land disturbance with coarse scale source locations.



3) Digitize Footprints

Visible mining footprints were digitized, delineating the overall disturbance related to the mine which included tailings, roads, and buildings. This "footprint" is a snapshot in time based upon the best available imagery. The image vintages varied across the project's overall extent but were generally from 2010 to 2016.

This dataset is not comprehensive as it does not include material sites (sand and gravel) and it may omit disturbance obscured by poor imagery or sites not included in the original source files.

Dataset, Maps, and more: http://accs.uaa.alaska.edu/landscape-ecology/anthropogenic-footprint/

Source Datasets:

Alaska Resource Data File (ARDF): https://mrdata.usgs.gov/ardf/

BC MinFile - BC Ministry of Energy and Mines, http://www.empr.gov.bc.ca/MINING/GEOSCIENCE/MINFILE/Pages/default.aspx

Geomatics Yukon – Mineral, Placer, and Quartz Claims ftp://ftp.geomaticsyukon.ca/GeoYukon/Mining/

GeoNorth Ortho WMS - Alaska Statewide Ortho Image Basemap. Available: http://www.geonorthis.com/AGCServices

LiDAR / IfSAR Hillshaded Relief WMS - DGGS Staff, 2013, Elevation Datasets of Alaska: AK Div. of Geological & Geophysical Surveys Digital Data Series 4. http://maps.dggs.alaska.gov/elevationdata/. http://doi.org/10.14509/25239

Alaska Hydrography Database. http://akhydro.uaa.alaska.edu/data/ak-hydro/

Anadromous Waters Catalog – AK Dept . of Fish & Game – https://www.adfg.alaska.gov/sf/SARR/AWC/

Watershed Boundary Dataset. – USGS HUC10 Watersheds https://nhd.usgs.gov/wbd.html

Atlas of Canada 1,000,000 Hydrology - SubSub Drainage areas – http://geogratis.gc.ca/api/en/nrcan-rncan/ess-sst/30b33615-6dda-51a5-a9dd-308802714a28.html?pk_campaign=recentItem published May 2018

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