Mineral Occurrence Revenue Estimation and Visualization Tool

A cooperative project between the University of Alaska – Fairbanks (UAF) and the Michigan Tech Research Institute (MTRI)

www.mtri.org/mineral_occurence.html www.mtri.org

Under a cooperative project between MTRI and UAF, we have created a flexible and map-based Mineral Occurrence Revenue Estimation and Visualization (MOREV) tool for existing and planned Alaska and Canadian railroads, including the proposed Alaska-Canada Rail Link. Estimates of carbon emissions for multi-modal shipping of mineral commodities are included in a flexible tool module.

MOREV uses existing high-quality geospatial data on metallic and non-metallic mineral resources, and other commodities for Alaska, Yukon, and British Columbia to estimate potential future revenues under pre-defined and user-generated scenarios within the existing and future railroad corridors in the region.

Fig. 2 (above): The Alaska Railroad, part of the network, along with proposed ACRL routes, that the tool uses for a multi-modal shipping network for mineral and related freight.

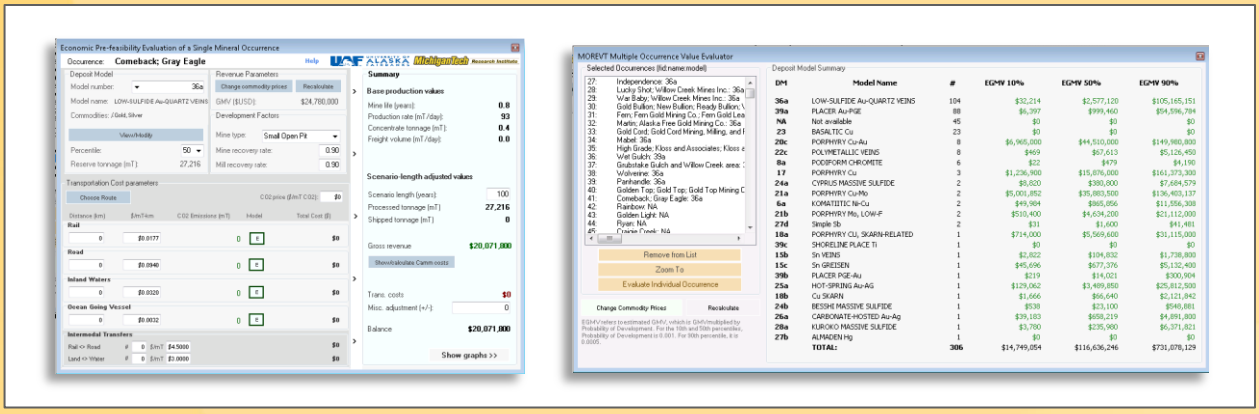
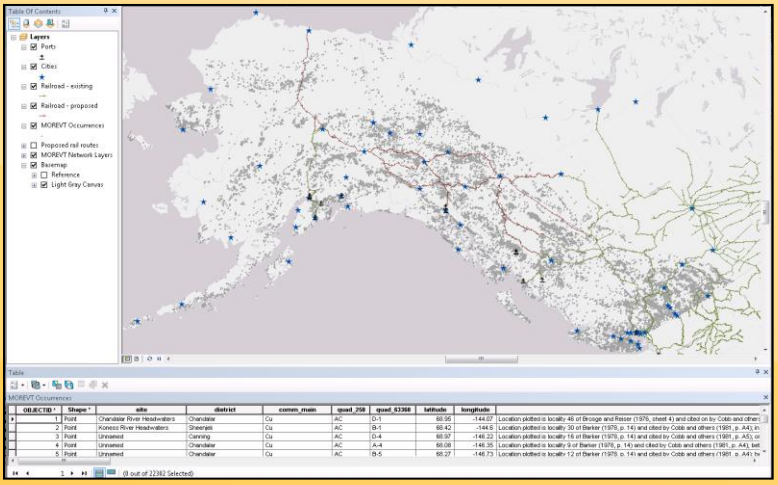


Fig. 1 (above): Example of the MOREV tool input tables, used to calculate revenue scenarios and transportation carbon emissions.



Within the tool, users are able to select particular resource types and locations to retrieve what the estimated extractable resource amounts, rail freight, and associated revenue would be if an operational railroad existed nearby. Potential railroad routes can be displayed and customized by users to quickly evaluate the enhanced economic feasibility of currently stranded resources.

Fig. 3 (left): The GIS interface to the MOREV tool, showing mineral deposit locations in Alaska, Yukon, and B.C.

Mineral Occurrence Revenue Estimation and Visualization Tool

A cooperative project between the University of Alaska – Fairbanks (UAF) and the Michigan Tech Research Institute (MTRI)

www.mtri.org/mineral_occurence.html www.mtri.org

The revenue estimation equations and relationships underlying the tool are based on expert input from a wide variety of stakeholders in the Alaska-northwest Canada region. Present military and future national security usage, including natural disaster preparedness, of a trans-continental railroad system will also be also modeled. A web-mapping version of the tool to help users understand the tool's functionality is being developed. A site-specific desktop GIS version, for detailed, in-depth analysis, is now available by contacting Colin Brooks, Dr. Paul Metz, or Dr. Robert Shuchman (see below).

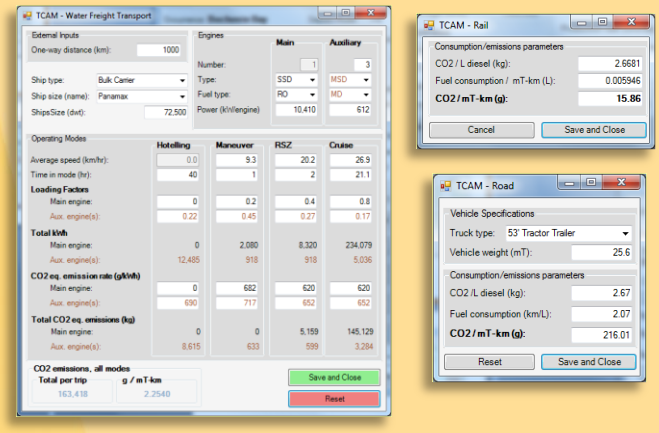


Fig. 4 (above): Examples of the detailed emissions tables used to calculate potential carbon emissions related to mineral freight shipping.

This project is part of a larger cooperative international investigation linking Alaska and Canada rail systems involving the University of Alaska, Michigan Technological University, and the University of Calgary.

Collaborators:
UAF - Dr. Paul Metz, Mark Taylor, P.E.
MTRI - Dr. Robert Shuchman, Colin Brooks, Helen Kourous-Harrigan, Eric Keefauver, Michael Billmire, Richard Dobson, Nathaniel Jessee, and Michelle Wienert
Project Consultant – Leon Van Wyhe

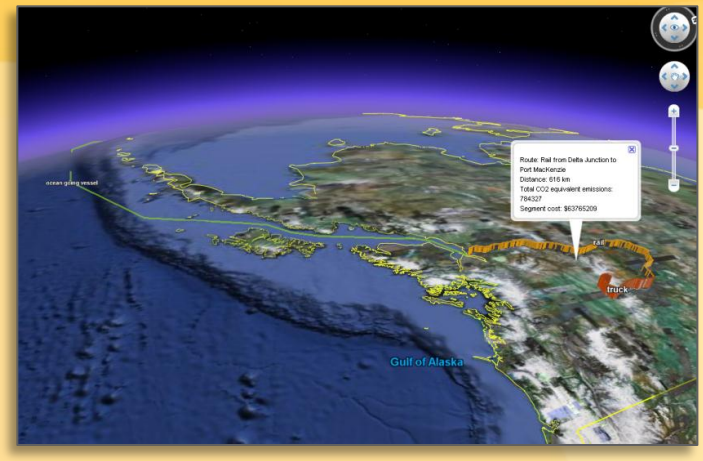


Fig. 5 (above): An example of displaying a revenue & shipping scenario in Google Earth using the tool's visualization capabilities.

Transportation Carbon Accounting Module (TCAM):

With the recent increased focus on energy efficiency and carbon accountability, the revenue estimation tool also incorporates carbon accounting to help users minimize carbon footprints. This includes calculating carbon footprints of user-selected multi-modal networks to ship mineral and supporting freight to continental and international destinations.

Fig. 6 (right): The Fort Knox Gold mine near Fairbanks, AK – the potential revenue impacts of developing new resources such as these will be easier to calculate with the MOREV tool.

Michigan Tech Research Institute
3600 Green Ct., Ste. 100 • Ann Arbor, MI 48105 • USA • 734.913.6840 (p) • 734.913.6880 (f) • www.mtri.org

Colin Brooks
Research Scientist, MTRI
(734)913-6858
cnbrooks@mtu.edu

Dr. Paul Metz
Professor, UAF
(907)474-6749
ffpam@uaf.edu

Dr. Robert Shuchman
MTRI Co-Director
(734) 913-6860
shuchman@mtu.edu