

Alaska-Canada Rail Link –

More than a century in the making

Benefits and Opportunities for the Mining Sector, Economy &
Communities

Alaska-Canada Rail Link Phase II

- Working group includes:
 - Institute of Northern Engineering, University of Alaska Fairbanks
 - Michigan Tech Research Institute & Railway Engineering Program
 - Van Horne Institute

Background

- Interest in closing the gap in North American Railway Grid dates back to early 1900's.
- Current ACRL Phase II project builds on two recent studies:
 - *Rails to Resources to Ports Pre-Feasibility Study (2007)*
 - *Alberta to Alaska Railway Pre-Feasibility Study (2015)*
- Step One: Review the reasons why the extension to Canada in the 2007 project did not move forward.

Note: Alaska has committed approximately \$400 million to construct a 30-mile extension to Port Mackenzie.

2007 Rail to Resources to Ports



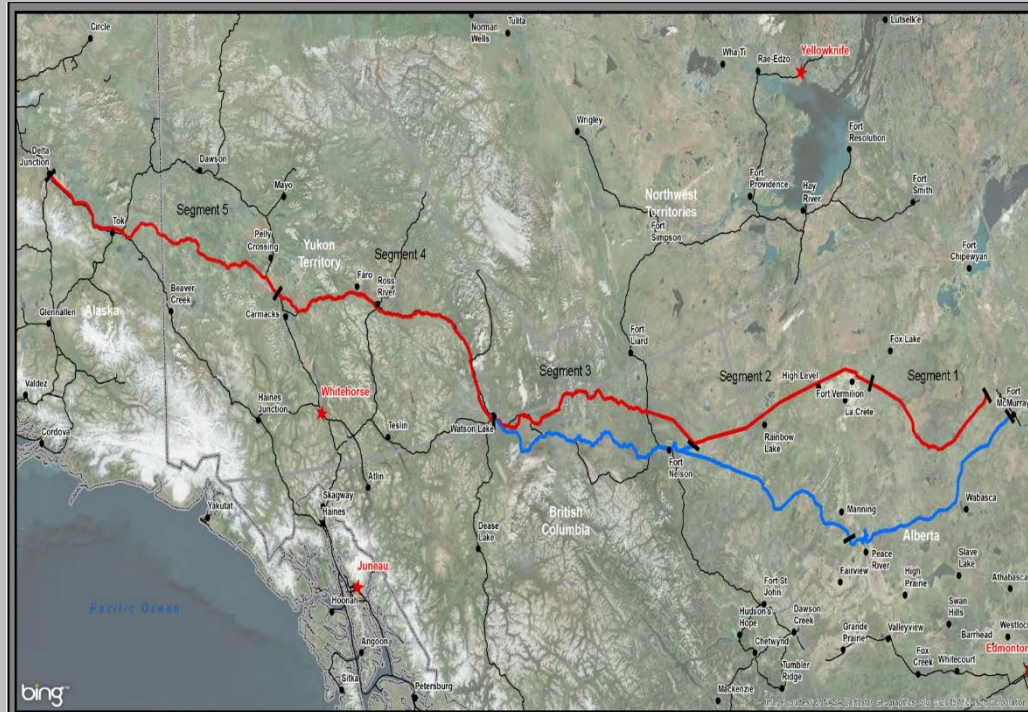
- Too many routes, high perceived risk & cost;
- Lack of revenue certainty, heavy reliance on the future & still uncertain Crest mine;
- Weak assessment of other revenue sources (eg., other mines, consumer & construction supplies, containers, etc.);
- Significant gap between costs & anticipated revenues;
- Absence of user/beneficiary support;

2007 Rail to Resources to Ports (cont'd)



- Insufficient analysis of socio-economic benefits and links to decision-maker priorities & policy objectives;
- Omission of impact assessment on competing facilities & transport services.

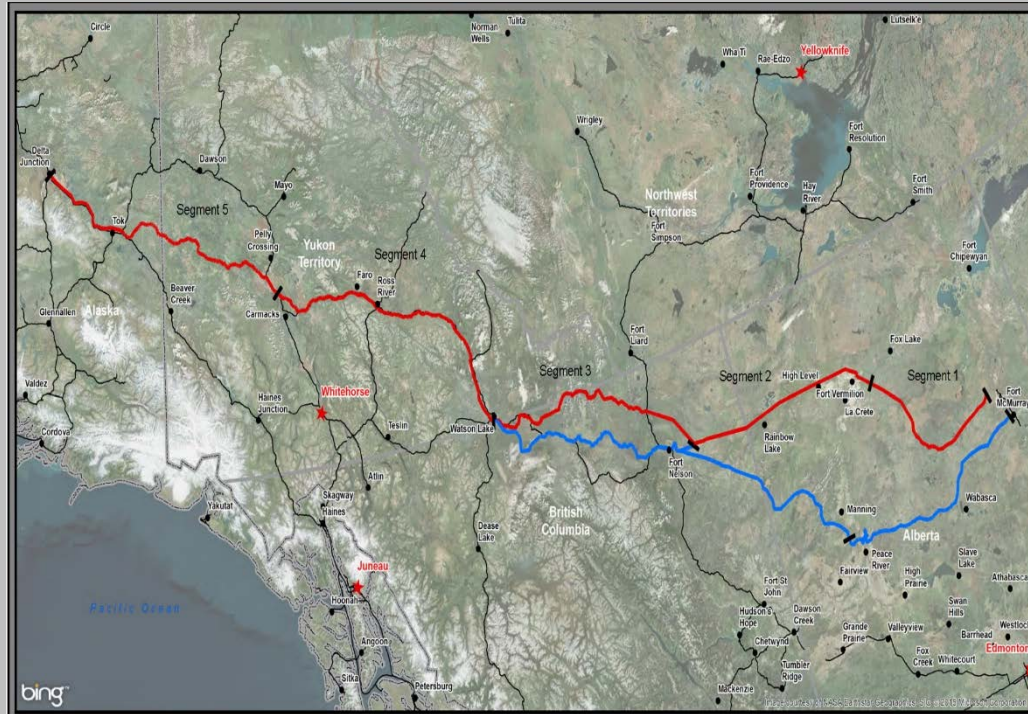
2015 Alberta to Alaska vs 2007 Rail to Resources to Ports



— Preferred Route
— Alternative Route

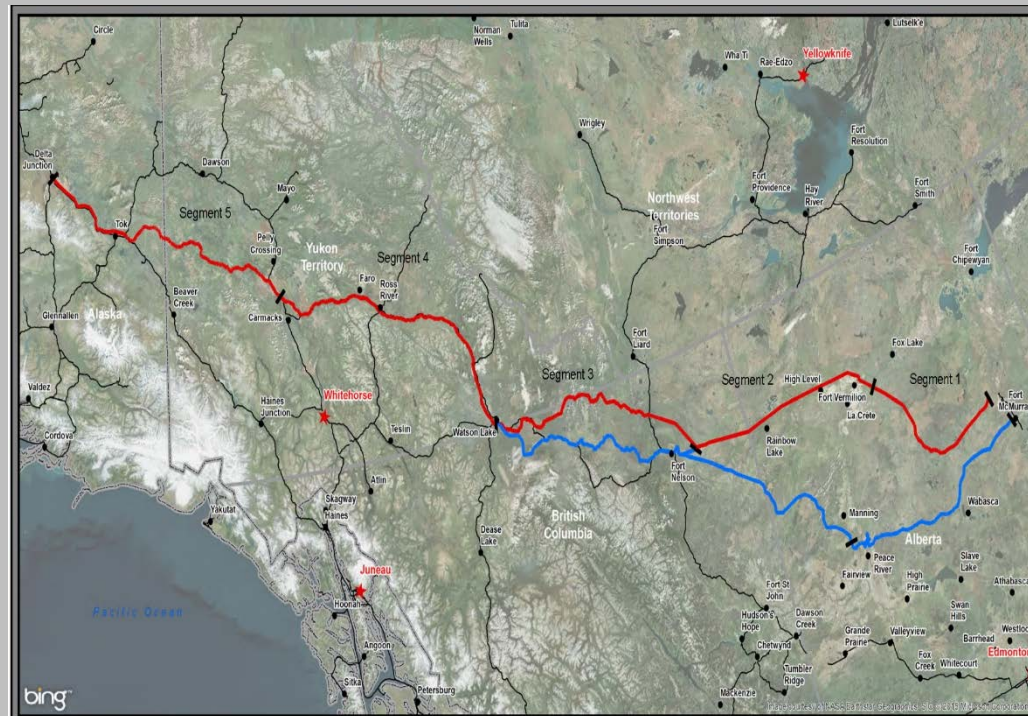
- Different preferred route;
- Focus primarily on bitumen transport & handling;
- Combined investment in rail & bitumen handling facilities, rolling stock & equipment;
- Added:
 - More detailed information on mineral volume & revenue;
 - First Nations consultation.

2015 Alberta to Alaska - Conclusions



- Total cost to tidewater \$28-34 billion;
- Assuming 1.0-1.5 million barrels per day carried, reasonable return on investment achievable at cost comparable to 2015 rail transport to west coast;
- Additional \$10-11 billion from mineral pre-tax NPV cash flow over 30 yrs. but timing unknown.

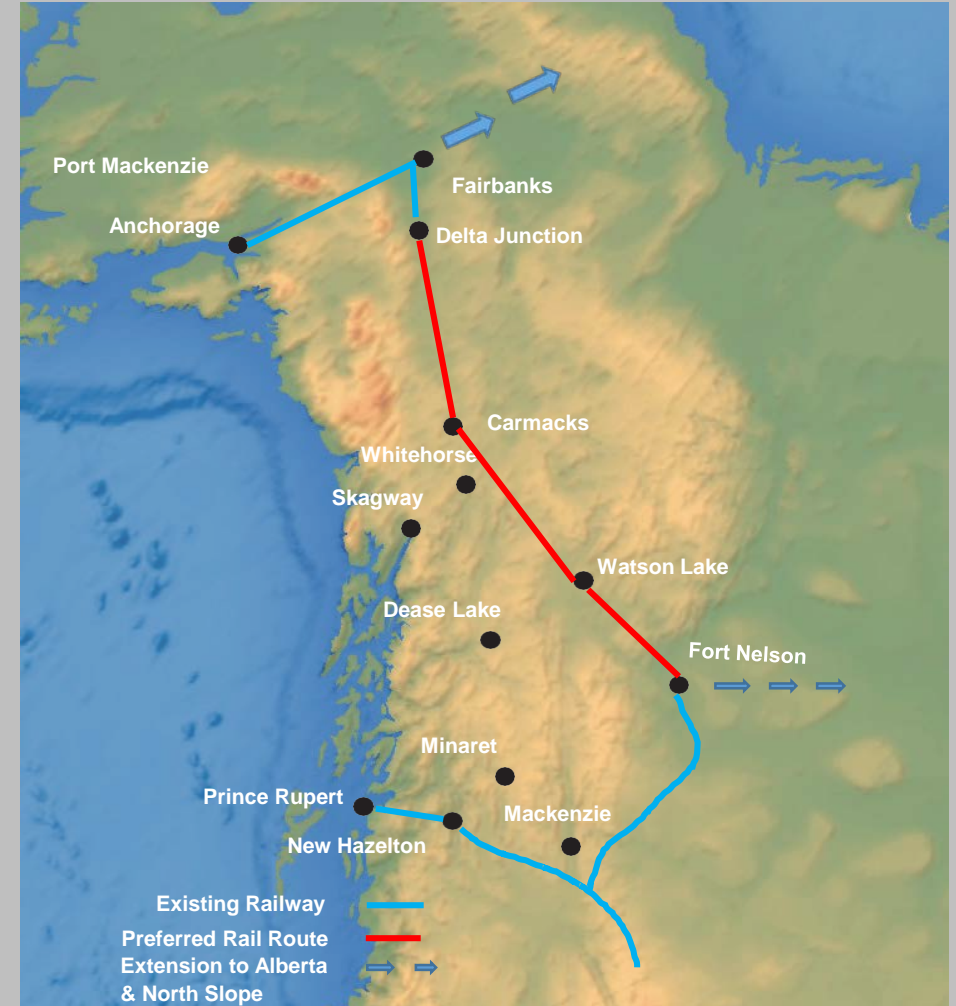
2015 Alberta to Alaska



- Concerns raised about 2007 study largely remain:
 - Reliance on single revenue source;
 - Weak assessment of other revenue sources;
 - Absence of user/beneficiary support;
 - Insufficient analysis of socio-economic benefits & links to priorities & policy objectives;
 - Omission of impact assessment on competing facilities/services.
- Adds significant cost, approvals, risk and complexity by co-mingling rail & bitumen facility construction & handling.

ACRL Phase II vs Previous Studies

- Focuses only on rail construction/operation between Delta Junction & Fort Nelson;
- 500 miles shorter;
- Estimated cost \$13-15 billion;
- Assumes separate approval, funding & financial viability on own merits of:
 - Mine accesses to mainline;
 - Rail extension to Alberta;
 - Bitumen loading & handling facilities.



ACRL Phase II vs Previous Studies (cont'd)

- Recognizes, supports and complements Alberta to Alaska, etc. but does not include or justify these investments;
- Leaves open potential financial participation in ACRL Phase II from beneficiaries.

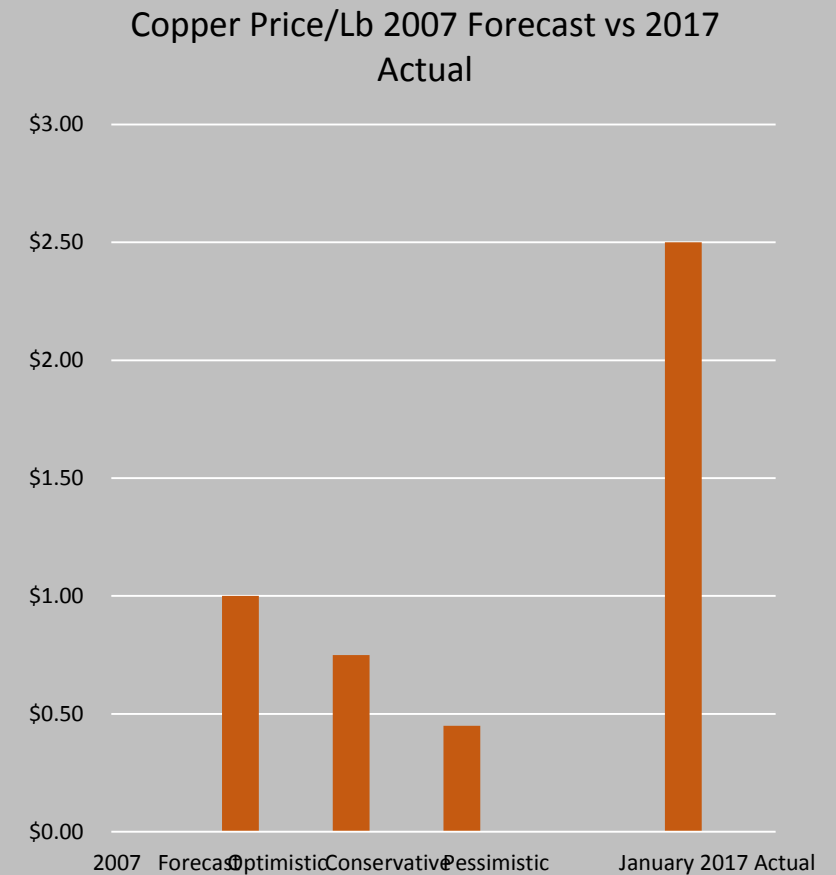


ACRL Phase II - Objectives

- Update & augment tonnage & revenue estimates of:
 - Mineral exports.
 - Imports of construction materials & equipment, community supplies and container freight.
- Identify potential impacts to competing facilities & transport services;
- Engage industry stakeholders to improve insight on timing & cost factors;
- Secure industry support for project;
- Assess GDP, employment, tax, lower cost of living, emergency contingency & security benefits of ACRL.

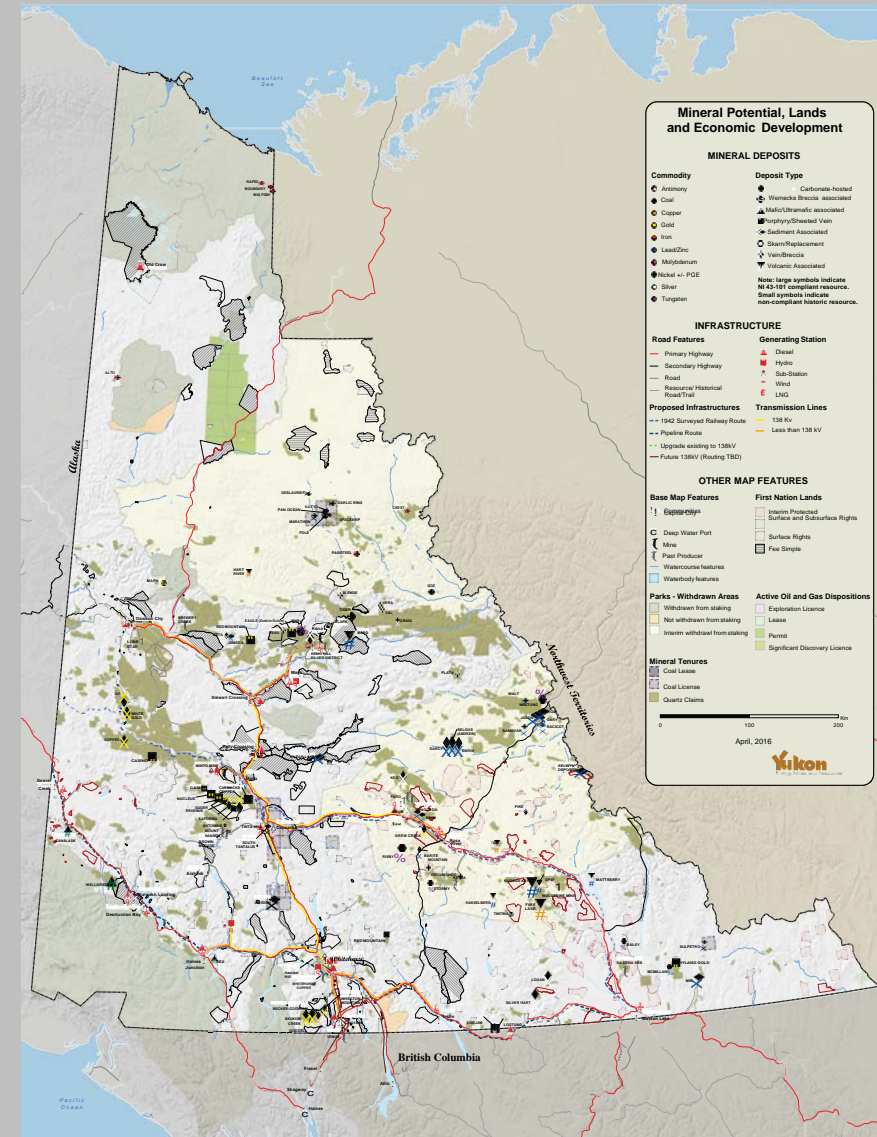
ACRL Phase II – Mining Changes since 2007

- 10 yrs of active exploration has resulted in significant new resource finds and expanded reserves, including:
 - Casino
 - Selwyn
 - Wellgreen
 - Mactung, etc.
- Initial review suggests shippable annual mineral tonnage increase is six-fold 2007 estimate.
- Commodity prices are significantly higher than expected.



ACRL Phase II – Mining Sector

- 1,700+ known metallic mineral occurrences within 50 miles of ACRL;
- Plus larger potential for industrial minerals & coal;
- Value of metallic minerals only is \$333- 659 billion (depending on commodity prices);
- Combined mineral concentrates & solid fuel is estimated to generate 43 million tonnes of freight per year.



ACRL Phase II – Benefits to Mining being explored

- Reduction in transportation costs compared to freight trucking & personnel air transport.
- Reduction in road capital & maintenance costs.
- Improved viability for smaller & lower grade mine deposits due to capital & operating cost savings.
- Reduced environmental impact due to smaller footprint, less intrusion & uncontrolled access to undeveloped areas = lower cost & time for social license & EA approvals.
- Creates opportunities for LNG shipments from NE BC at reasonable cost.



Transportation Operating Costs for Northern Projects*

Mines	Gold	Zinc-Copper	Diamond
	<i>Percentage of Annual Operating Costs (%)</i>		
Total Capital Costs Due to Remote and Northern Location	51.2	61.0	14.0
of which:			
Logistics and transport ¹	13.8	10.1	13.4
Power/fuel	8.8	x	7.9
Additional wage bill	2.9	x	6.1
General and administration	3.6	6.4	x
Maintenance/mining operations	3.4	6.4	x
Other/unspecified ²	4.6	x	4.0
Northern factor	1.59	1.30 ³	1.46

1 For the zinc-copper mine, this includes flight operations, road maintenance, shipping and trucking. For the diamond mine includes personnel transport and logistics and transportation.

2 For the gold mine, this includes environmental, procurement and IT expenses. For the diamond mine, this includes subsistence supplies, municipal services and Aboriginal community relations.

3 The estimate for the zinc-copper mine is based upon a feasibility study, whereas the data from the diamond and gold mines are based on actual experience in the north.

*From "Levelling the Playing Field: Supporting Mineral Exploration and Mining in Remote and Northern Canada (2015 – by a consortium of industry associations)

http://mining.ca/sites/default/files/documents/Levelling_the_Playing_Field.pdf

Transportation Cost Savings

- Current rail tariff for freight ranges from \$0.06 to \$0.10 per tonne mile (varies by volume & terrain) vs. \$1.00 for trucking = savings of \$0.90 to \$0.96 per tonne mile.
- Current gravel access road capital costs are approx. \$2.2 million per mile – therefore a 50-mile reduction in access road = \$110 million.
- Current maintenance costs for gravel access roads are approximately \$40,250 per mile annually – therefore a 50-mile reduction in access road = \$60.4 million NPV savings over 30 years.
- Additional maintenance savings to common roads & highways.

Benefits to Economic Viability of Mines

- Due to high transportation & energy costs, only the highest and largest mineral deposits – the upper 90 percentile of their type in the world - have become viable (many only marginally so) & developed in Alaska & Yukon.
- “Levelling the Playing Field: Supporting Mineral Exploration and Mining in Remote and Northern Canada (2015 – by a consortium of industry associations)* demonstrated:
 - *“the mining premium associated with operating in a remote and northern location is directly linked to the infrastructure deficit in these regions.”*

[*http://mining.ca/sites/default/files/documents/Levelling_the_Playing_Field.pdf](http://mining.ca/sites/default/files/documents/Levelling_the_Playing_Field.pdf)

Benefits to Economic Viability of Mines (cont'd)

- Lower transport & energy costs means that:
 - Medium-sized deposits (those in 50 percentile and higher of their type worldwide) can and will be developed.
 - Marginal production is increased so that less valuable sections can be profitably developed, extending mine life.
- This results in increase job opportunities & an overall boost to the Yukon and national economies.



Environmental Benefits

- Smaller development footprint than access roads.
- Maintains controlled access into undeveloped areas eliminating unauthorized access, hunting and other concerns.
- By providing a reliable & lower travel risk (eg., during extreme cold & snow) means of access from nearby communities for local workers, it could also reduce space & cost for employee housing & support services & make hiring more attractive.
- Rail has also been proven to have lower GHG impacts than road transport.
- All of the above, lower social license and EA approval costs & time.



Lower Cost Energy

- Transporting LNG by rail from NE BC would result in a significant reduction in truck volumes:
 - One rail car carries approximately 1,500 m³ LNG
 - vs
 - 40-50 m³ in a single tanker truck.
- Transportation to Whitehorse presently account for 39% to 63% of total LNG cost*.



* Source: Yukon Energy 2015

Other Benefits

- Shipping distance/to from Asia is 2.5 days shorter via Port Mackenzie than other west coast ports.
- Distance from middle North America to Port MacKenzie, Alaska vs through Seattle is 750 miles shorter & should take 150 hours or less vs 14 days via current rail/barge systems.
- These advantages open opportunities for new suppliers, logistics providers & other industries.
- Cost savings for Yukon and Eastern Alaska residents in community goods supply.

What Next?

- We welcome your feedback and input.
- Forming a mining advisory committee to ensure your interests are properly reflected.
- Developing an up-to-date information package on the costs & benefits of the ACRL.
- Distributing this report to decision-makers, stakeholders & potential rail customers & investors.
- Seeking potential financial participation for the next phase of project development.
- We ask for your support in moving forward.