



# *Pacific NorthWest Economic Region*

Matt Morrison, Executive Director  
Airships to the Arctic  
December 5, 2011





*Pacific NorthWest  
Economic Region*

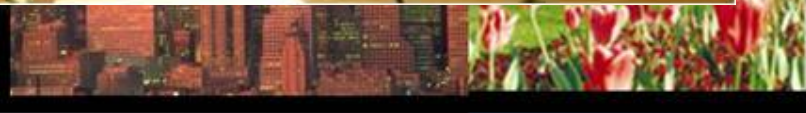
PNWER is a statutory, public-private partnership chartered in 1991 by the U.S. States of Alaska, Washington, Idaho, Montana, Oregon and the Canadian Provinces of British Columbia , Alberta, Saskatchewan and the Yukon and Northwest Territories.



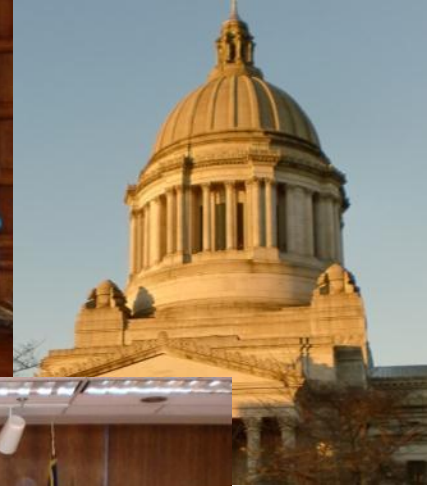
# Regional Voice in Ottawa & Washington D.C.



**PNWER makes annual officer visits to each state and provincial capital, and to Ottawa and Washington, DC**



# State/Provincial Capital Visits



***PNWER meets with state and provincial leadership on a regular basis to discuss important regional issues.***



# Regional GDP at a Glance



## PNWER Region (GDP/Pop.)

<u>State/Prov.</u>	<u>GDP*</u>	<u>Population</u>
WA	322,778	6,549,224
AB	291,300	3,735,086
BC	191,006	4,551,853
OR	161,573	3,782,991
ID	52,747	1,545,801
AK	47,912	686,293
SK	41,296	1,049,701
MT	29,885	974,989
NWT	4,124	41,464
YK	2,026	34,157
<b>Total</b>	<b>1,144,647</b>	<b>22,901,559</b>

***If Pacific Northwest Economic Region  
were a separate country, it would rank  
14th in total GDP***

\*2009 population & GDP in \$US Million

Data provided by PNWER – Pacific Northwest Economic Region

# Recent Successes



- **Arctic Caucus formed by Alaska, Yukon, NWT**
- Support of international rail connection
- Facilitation of Enhanced Drivers License
- Legislative Energy Horizon Institute
- 2010 Olympics and Border Symposium
- Support several disaster resilience initiatives in the region



# PNWER Arctic Caucus



- Founded in 2009
- A forum for PNWER Northern Jurisdictions to enhance collaboration amongst themselves and with other members
- Lead by leadership from Alaska, Yukon and Northwest Territories
- First Leadership Forum held in Barrow, Alaska 2010 and 2011 in Yellowknife, NWT
- Dedicated to Sustainable Economic development of the Arctic







# Identified Issues



- Gaps in Infrastructure
- Sustainable Development of Arctic Communities
- Gas Pipeline development
- United Nations Convention on the Law of the Sea
- Transmission/Local Energy Development
- Telecommunication Development
- Joint Tourism/Marketing
- Training/Workforce Development



# Caucus Next Steps



- Work with Federal Government partners in Washington, D.C. and Ottawa on Arctic Caucus Issues
- Implementing and Executing Yellowknife Action Items
- Whitehorse, Yukon Arctic Caucus meeting in Spring 2012



# Natural Resources in the Arctic

- Natural Resources are a key economic strength
- Mineral, Gas and Oil deposits are abundant in the Arctic North but most are inaccessible with current infrastructure
- Developing rail or roads (including ice-roads) to reach deposits is very expensive and often not feasible
- Examples of current transportation infrastructure and potential Natural Resource wealth in the Arctic North



# Pacific Northwest Economic Region - Arctic Caucus - Demonstration Map



**Legend**

- Communities of the Arctic Caucus
- Roads and Highways**
- Road Classification:**
- Expressway / Highway
- Arterial
- Winter
- Provincial / State Boundaries



ALASKA

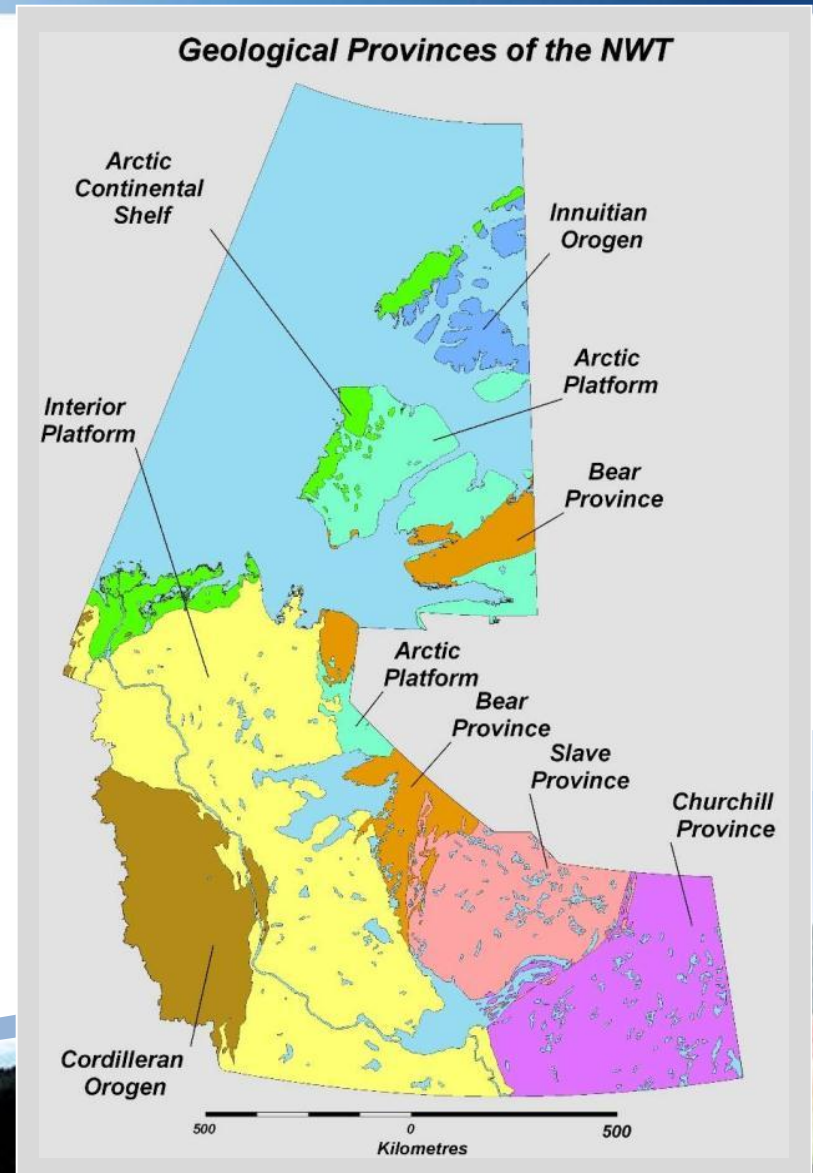
YUKON

NORTHWEST TERRITORIES

Pacific Ocean

# NWT Mineral Potential

- \$38 Billion in Mineral Resources mined in past 75 years
- 8 geological provinces
  - Each with signature mineral commodities & deposits
- Diverse mineralogy
  - Gold, silver, diamonds, lead, zinc, uranium, tungsten, rare earths, cobalt, bismuth, nickel, copper, etc.
- Under-mapped & under-explored
- Signals great mining potential



### Mineral Legend

- Base Metal
- Diamonds
- Gold
- Ni - Cu - PGM
- Uranium
- Natural Gas Wells
- Oil Wells
- Highway
- Seasonal Winter Road
- Oil/Gas Pipeline
- Operating Property
- Exploration Property
- Hydromet





**BHP Ekati Diamond Mine, NWT – Produces 10% of Global Supply**

# NWT Potential \$3b in investment next 5-10 years

Mining Project Name (Operator)	Commodity	Expected Production	Expected Jobs	Expected Capital Costs (\$C millions)
Yellowknife Gold Project (Tyhee)	Gold	2014	238	170
NICO (Fortune)	Gold, Copper, Cobalt, Bismuth	2013	150	200
Thor Lake (Avalon Rare Metals)	Rare Earth Metals	2014	200+	228+313
Prairie Creek (Canadian Zinc)	Silver, Zinc, Lead, Copper	2013-14	220	60
Gahcho Kue (De Beers)	Diamonds	2015	360	745
Pine Point (Tamerlane)	Zinc, Lead	2013	225	135
Courageous Lake (Seabridge)	Gold	2016-17	400	1,200
<b>TOTAL</b>			<b>1,800 jobs</b>	<b>\$ 3 billion</b>

Note: This data is taken from public information that represents best case scenarios. Actual project timing and opportunities are subject to market prices & conditions, regulatory approvals and timing, investor approval, etc.





# DeBeers' Gahcho Kue Diamond Project





# Avalon Rare Metals Nechalacho Project





# Canadian Zinc's Prairie Creek Mine



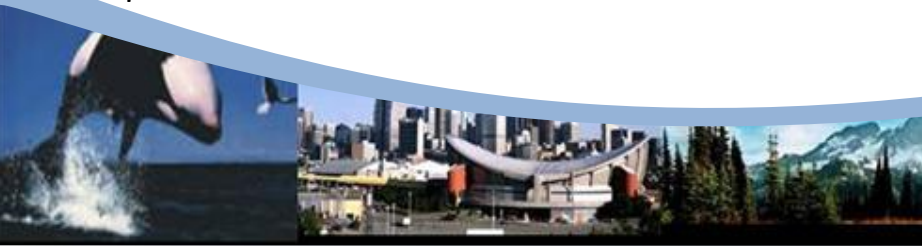
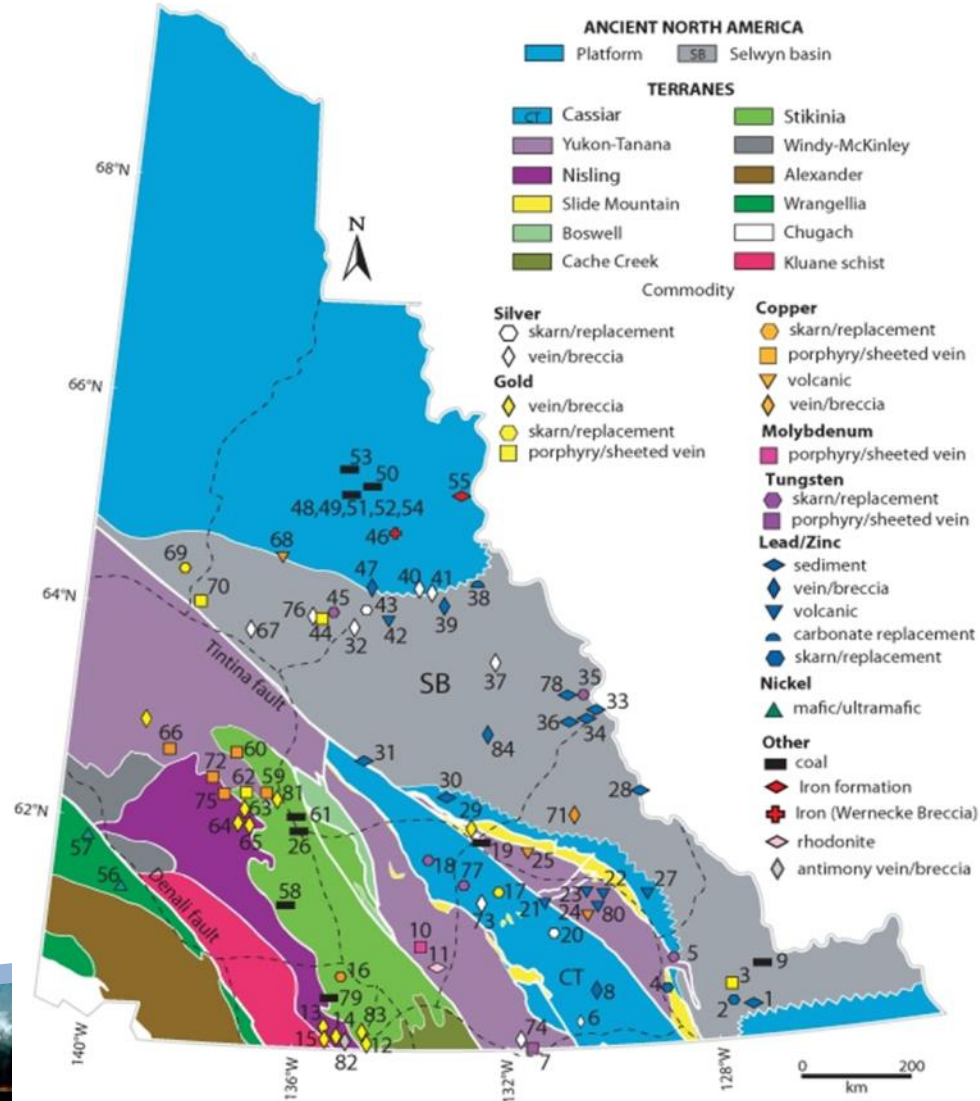


# Fortune Minerals Nico Project



# Yukon Mineral Potential

- Yukon is rich in mineral potential and diversity.
- There are significant deposits of gold, silver, copper, lead, zinc, nickel, tungsten, molybdenum, iron and coal.
- Yukon's 2,600 known mineral occurrences are on mining claims covering less than 9 per cent of the territory's total area.
- Terrane map (General geology) of Yukon shows varied Yukon geology and the distribution of known mineral deposits color-coded to commodity.
- New mineral production 2011 value of production is forecast at approximately \$560 million.



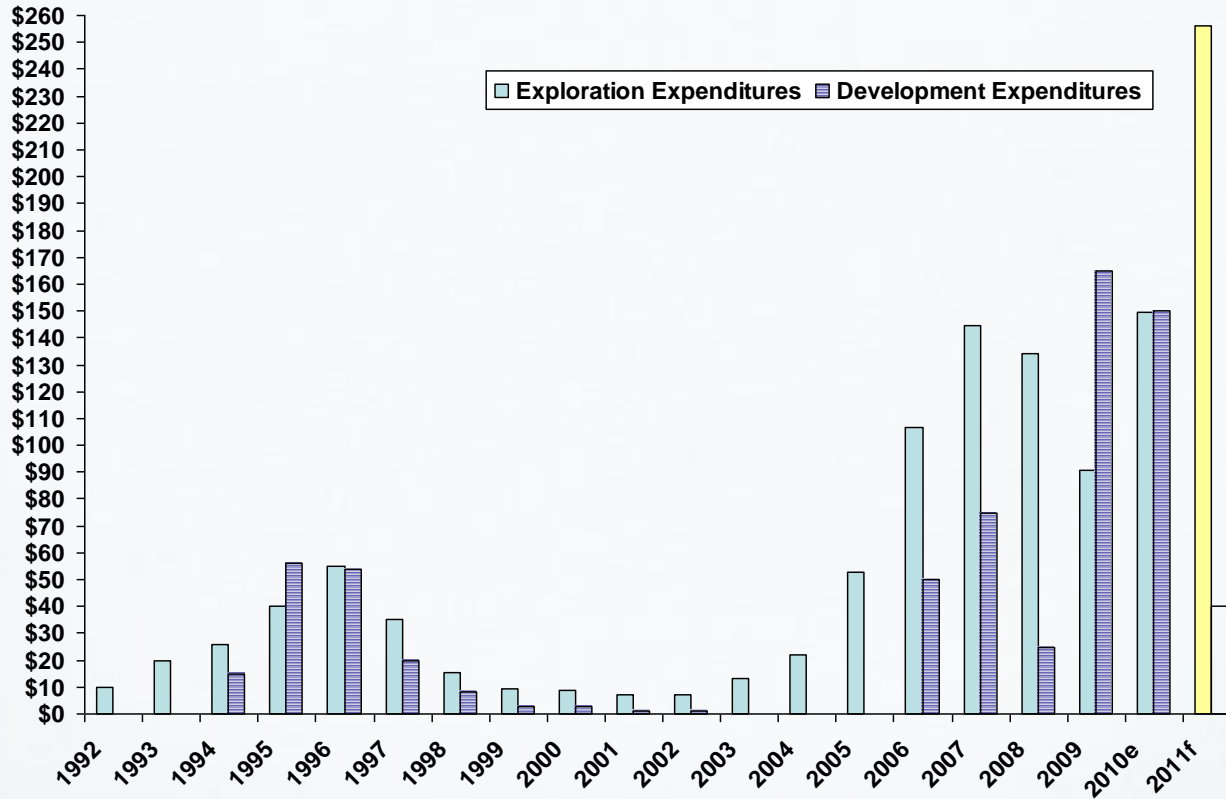
# YESAA -Yukon Environmental Socio-economic Assessment Act

- Provides a 'one window' approach for all projects requiring environmental assessment;
- Harmonized federal and territorial processes, and includes Yukon First Nations;
- Timelines are part of YESAA legislation; and
- Government of Yukon provides project coordinators to help navigate through the system.

# Mining

## Mineral Exploration and Mine Development

### Yukon Mineral Exploration and Mine Development Expenditures (\$ millions)



**UNSURVEYED CANDIDATE AREAS (TRIANGLES) OF STATE, STATE-SELECTED, & NATIVE LANDS (NOT IN ORDER OF PRIORITY)**

- 1 DeLong Mountains
- 2 Baird Mountains
- 3 Candle
- 4 Nome North
- 5 Marshall
- 6 Shotgun Hills
- 7 Sleetmute
- 8 Pebble area
- 9 Jurassic Arc
- 10 Arctic (Ambler schist belt)
- 11 Upper Kobuk River
- 12 Wiseman
- 13 Chandalar
- 14 W. Melozi
- 15 Shaw Creek/Upper Salcha
- 16 Delta
- 17 60-Mile Butte
- 18 Bonnifield South
- 19 Paxson/McLaren
- 20 Gold Hill
- 21 Farewell
- 22 Yentna
- 23 Skwentna
- 24 Yenlo Hills
- 25 Willow Creek
- 26 King Mountain
- 27 Boulder Creek
- 28 Sheep Mountain
- 29 Tonsina/Tiekel
- 30 Haines/Klukwan
- 31 Chichagof

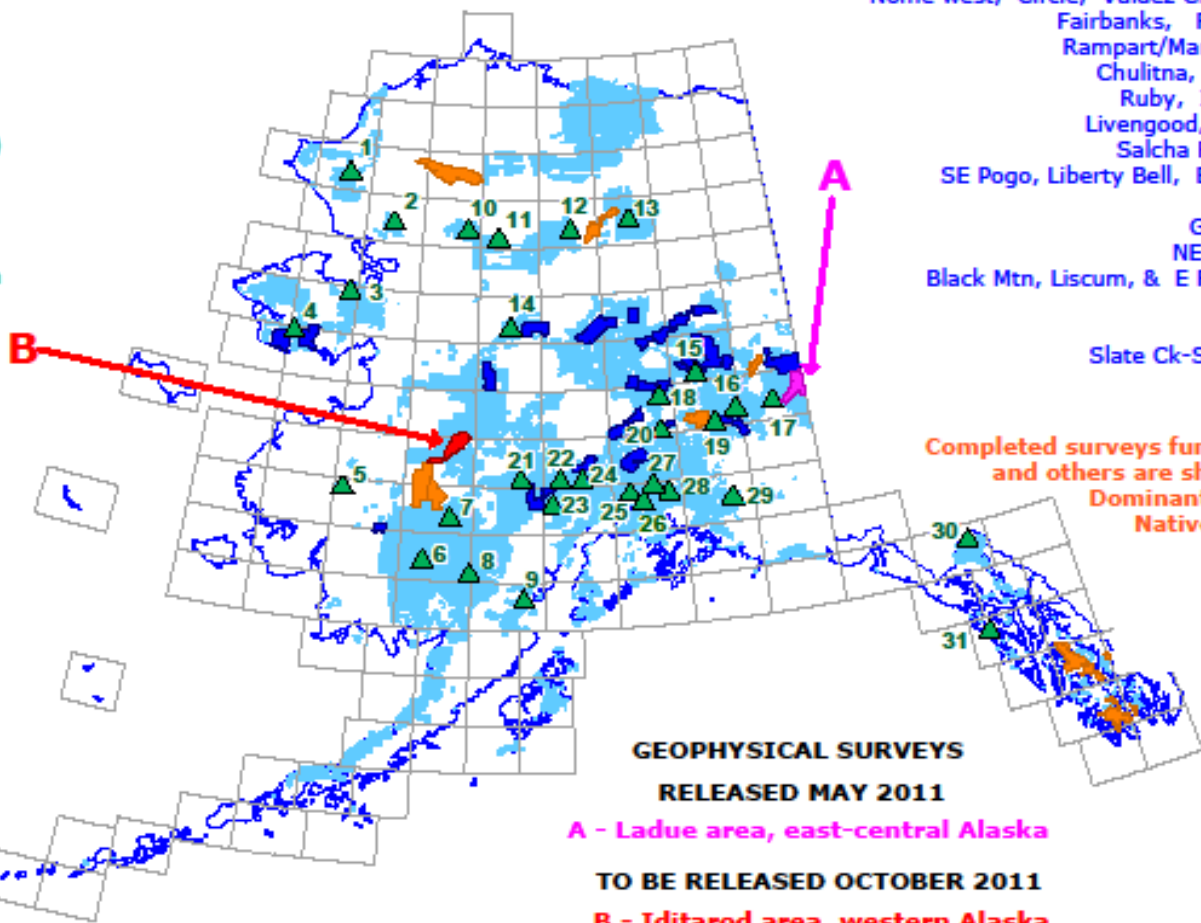
**GEOPHYSICAL SURVEY TRACTS & RELEASE DATES**  
**All surveys shown managed by Alaska Division of Geological & Geophysical Surveys (DGGS).**

Completed surveys funded by Alaska State Legislature are shown in blue or magenta. Dominantly State- and Native-interest lands surveyed.

- Nome west, Circle, Valdez Creek, Nyac, 1994  
 Fairbanks, Richardson, 1995  
 Rampart/Manley, 1996, 1997  
 Chulitna, Petersburg, 1997  
 Ruby, Iron Creek, 1998  
 Livengood, Fortymile, 1999  
 Salcha River/Pogo, 2000  
 SE Pogo, Liberty Bell, Broad Pass, 2002  
 Council, 2003  
 Goodpaster, 2005  
 NE Fairbanks, 2006  
 Black Mtn, Liscum, & E Richardson, 2006  
 Bonnifield, 2007  
 Styx River, 2008  
 Slate Ck-Slana River, 2009  
 Moran, 2010  
 Ladue, 2011

Completed surveys funded by US BLM and others are shown in orange. Dominantly Federal- and Native-interest lands surveyed.

- Stikine, 1997  
 Koyukuk, 1998  
 Ketchikan, 1999  
 Aniak, 2001  
 Sleetmute, 2003  
 Delta River, 2003  
 southern NPR-A, 2006  
 western Fortymile, 2008



**GEOPHYSICAL SURVEYS  
 RELEASED MAY 2011**

**A - Ladue area, east-central Alaska**

**TO BE RELEASED OCTOBER 2011**

**B - Iditarod area, western Alaska**

State interest lands shown in light blue.

[www.dggs.alaska.gov](http://www.dggs.alaska.gov)  
[Laurel.Burns@alaska.gov](mailto:Laurel.Burns@alaska.gov)

**DGGS ALASKA AIRBORNE GEOPHYSICAL/GEOLOGICAL MINERAL INVENTORY**

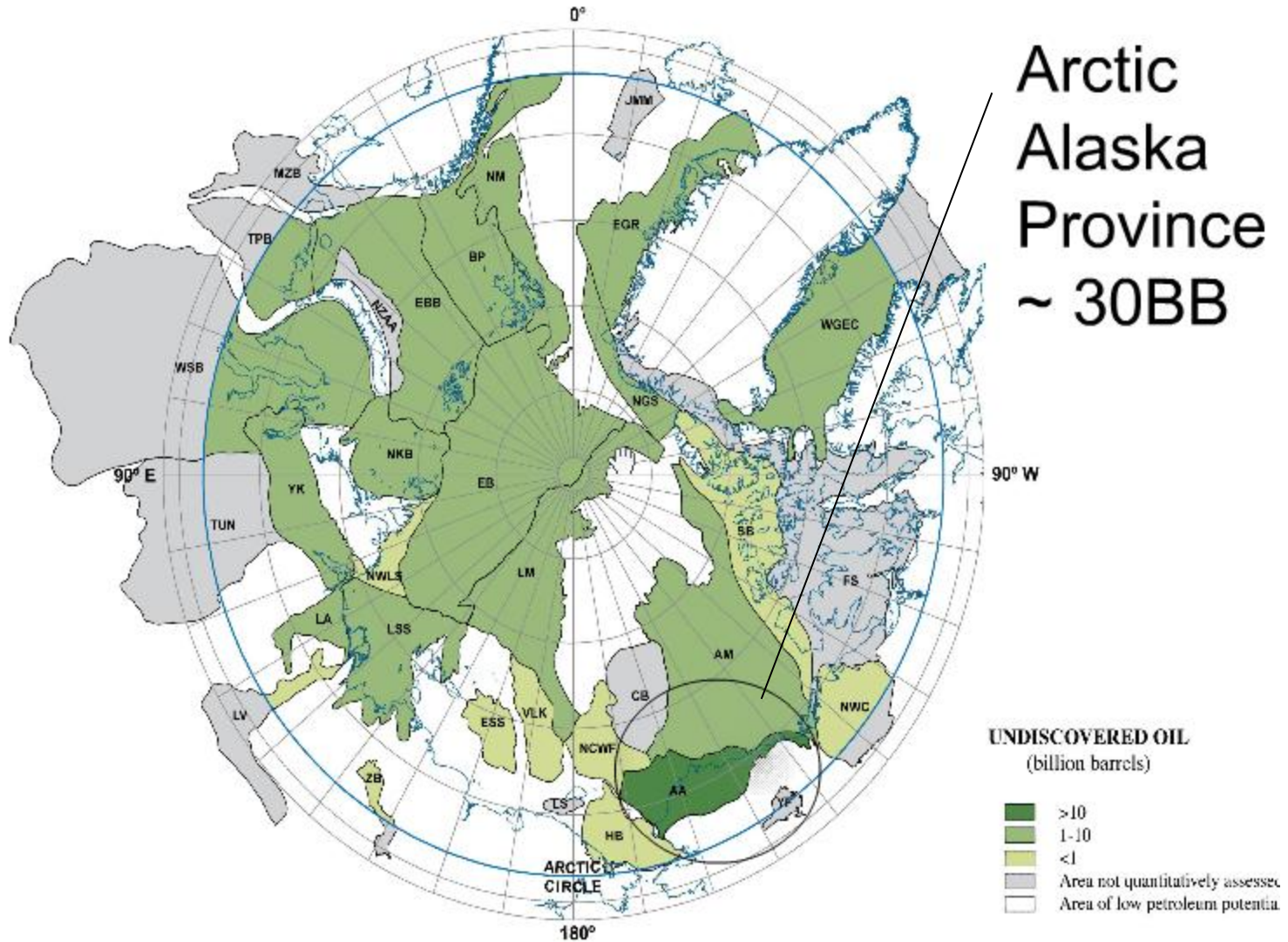


# Arctic Gas and Oil Activity

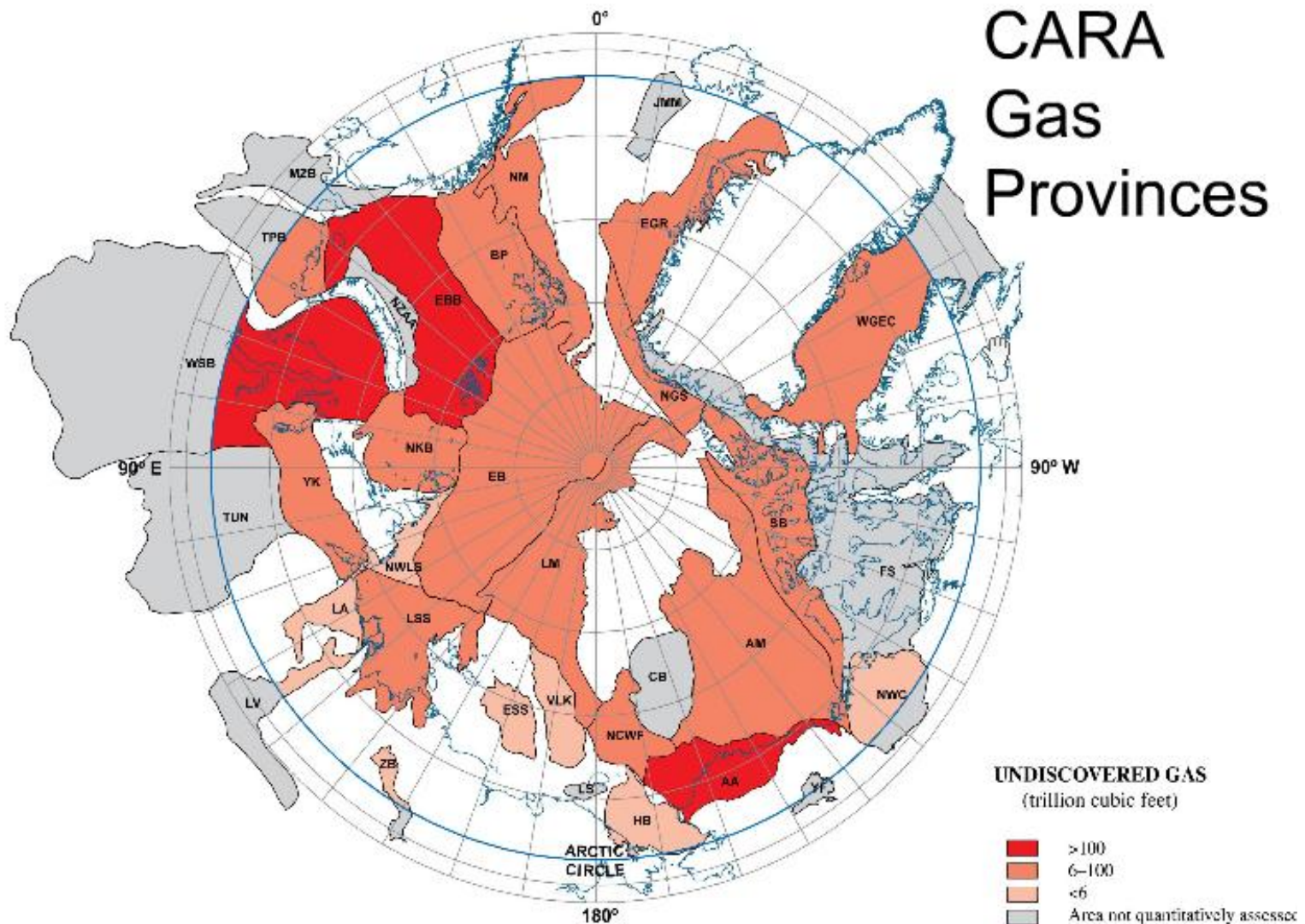
- Alaska
- Yukon
- Northwest Territories



# USCG study results – Estimated Oil reserves in the Arctic



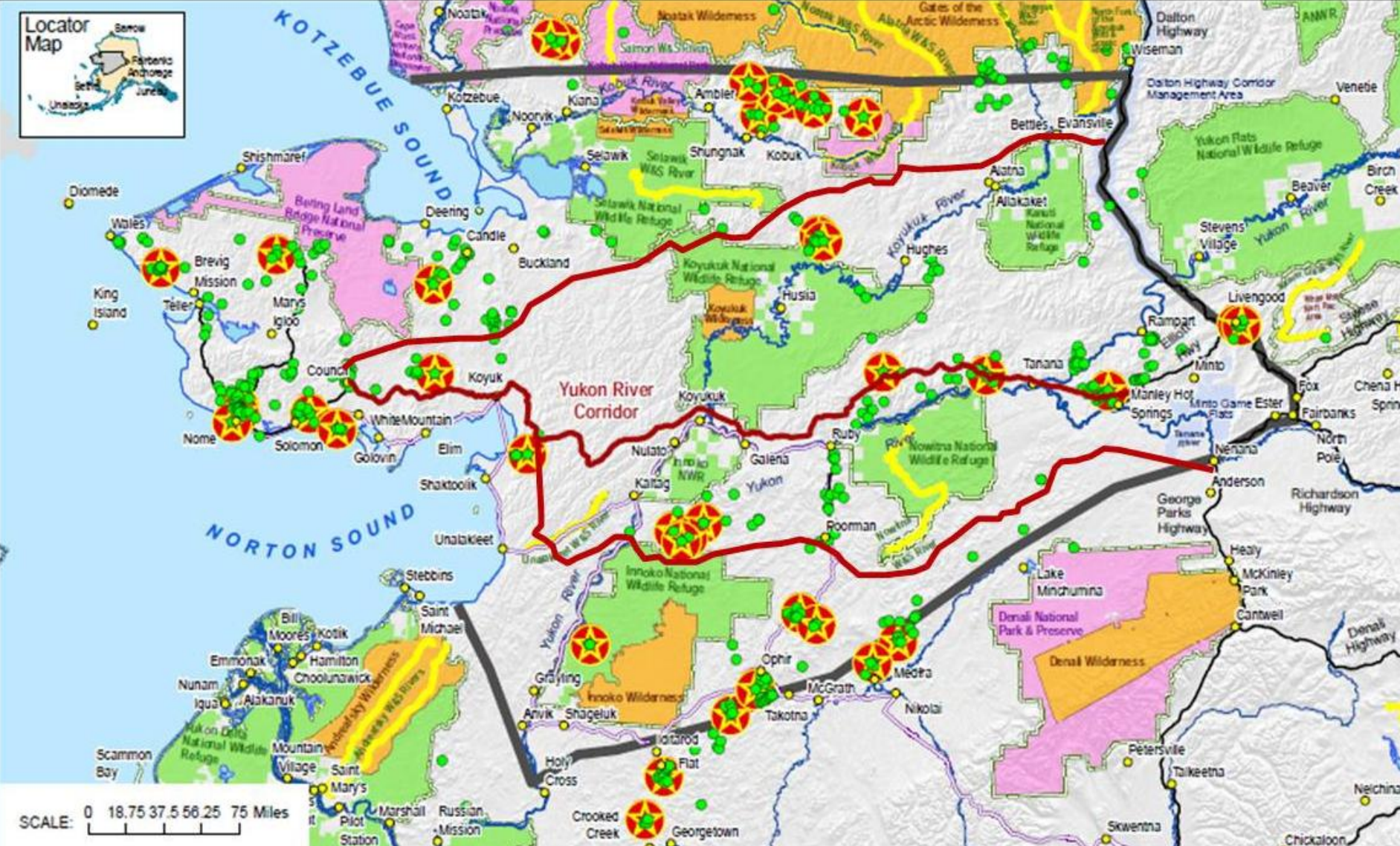
# USCG study results – Estimated Gas reserves in the Arctic



# Case Studies Costs of Infrastructure Development

- In the Ambler mining region in Northwest Alaska several mineral deposits have been discovered but would require substantial investment in roads or rails before they are accessible
- Cheapest estimated is a road that cuts through a wild life reserve. Cost: \$430 million
- Other estimates for more practical routes range from \$520 million to \$990 million. Annual maintenance would start at \$9 million.
- Rail lines are even more expensive with estimates ranging from \$1.25 billion to \$2 billion.





SCALE: 0 18.75 37.5 56.25 75 Miles

- Communities
- Study Area
- Recommended Corridor Alternative
- Significant Mineral Occurrence
- Lesser Mineral Occurrence
- National Park Service
- U.S. Fish & Wildlife Service
- Other Controlled Use/Management Area
- Wild & Scenic Rivers
- National Wilderness Preservation System
- Iditarod Trail
- Major Lakes
- Major Rivers
- Existing Roads

STATE OF ALASKA  
Department of Transportation and Public Facilities  
NORTHERN REGION

WESTERN ALASKA ACCESS PLANNING STUDY  
**RECOMMENDED CORRIDOR**

Prepared By Allied GIS

DATE: January 14, 2010

**Figure E1**

Data Sources Minerals: C.C. Hawley & M.K. Vant, February 2009 Land Status: Alaska Dept. of Natural Resources 2008

# Ambler

**1.5B**

lbs Copper  
Measured & Indicated <sup>1</sup>

**2.2B**

lbs Zinc  
Measured & Indicated <sup>1</sup>

**0.5M**

ozs Gold  
Measured & Indicated <sup>1</sup>

**32M**

ozs Silver  
Measured & Indicated <sup>1</sup>

**940M**

lbs Copper  
Inferred <sup>1</sup>

**1.3B**

lbs Zinc  
Inferred <sup>1</sup>

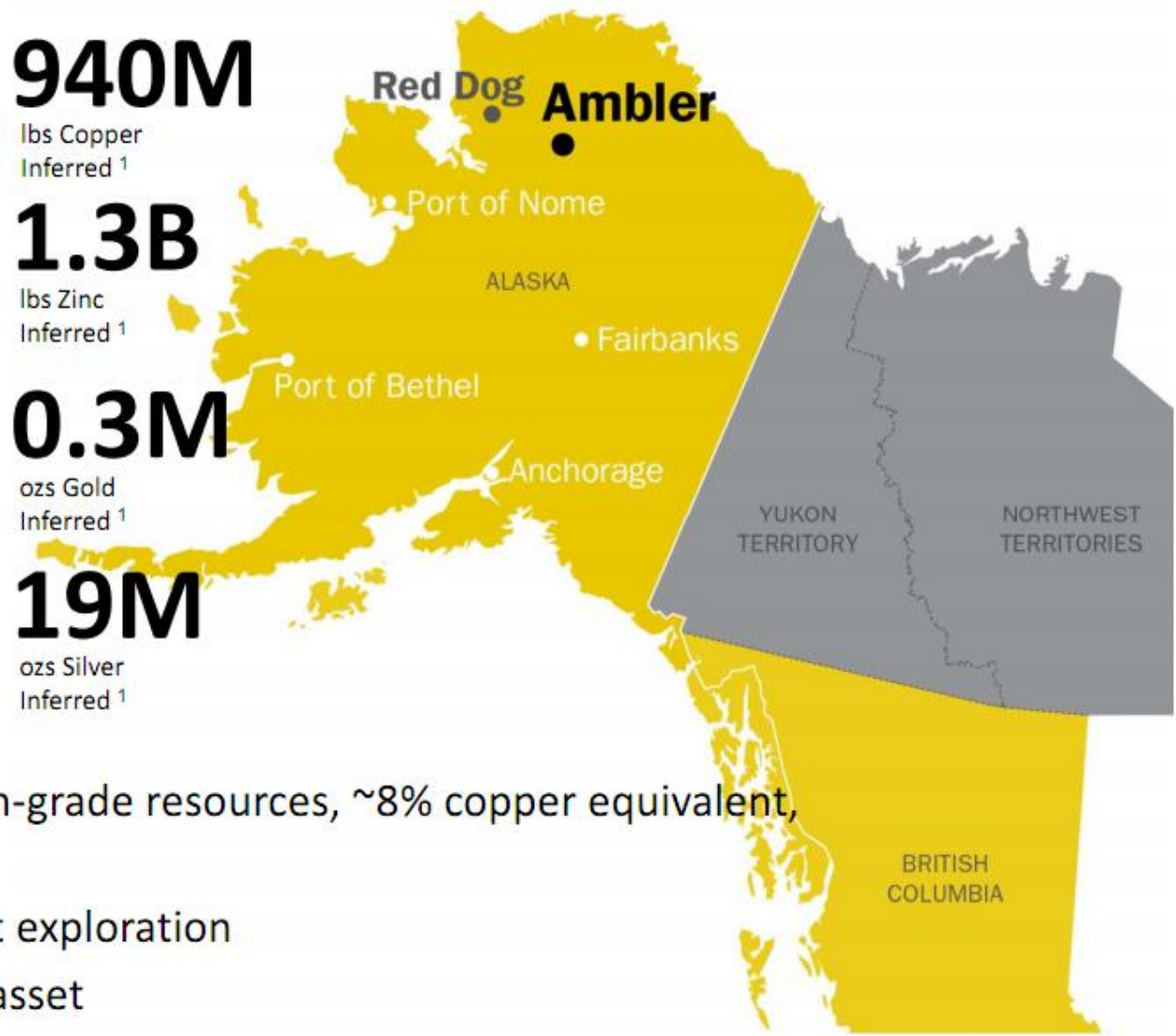
**0.3M**

ozs Gold  
Inferred <sup>1</sup>

**19M**

ozs Silver  
Inferred <sup>1</sup>

NovaGold owns 100%  
Alaskan Native Partner: NANA

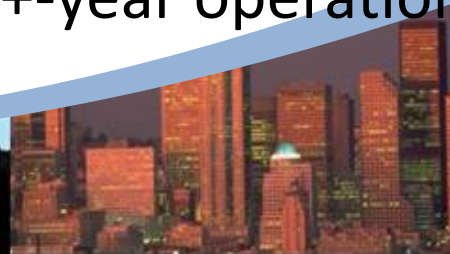


- Underground, high-grade resources, ~8% copper equivalent, 25 year mine life
- PEA, active district exploration
- Building a 3<sup>rd</sup> key asset

1) See "Cautionary Note Concerning Reserve and Resource Estimates" and "Reserve & Resource Table" with footnotes.

# Potential of Donlin Mine

- Donlin Gold is in the top 1% of global gold deposits, and one of just a handful of projects worldwide that will produce more than one million ounces of gold annually, when in production.
- Major infrastructure requirements for the Donlin Gold mine include a river port, an access road connecting the port to the mine site, an airstrip, the mine and plant site area, the tailings facility, and the power-generating facilities.
- The Donlin Gold project would provide up to 3,000 jobs during the 3-4 year construction phase, and up to 1,000 jobs throughout the estimated 25+-year operational phase.



# Donlin Gold

50/50 Partnership with Barrick  
Alaska Native Group: Calista, TKC

## 33.6M

ozs Gold  
Proven & Probable <sup>1</sup>

## 4.3M

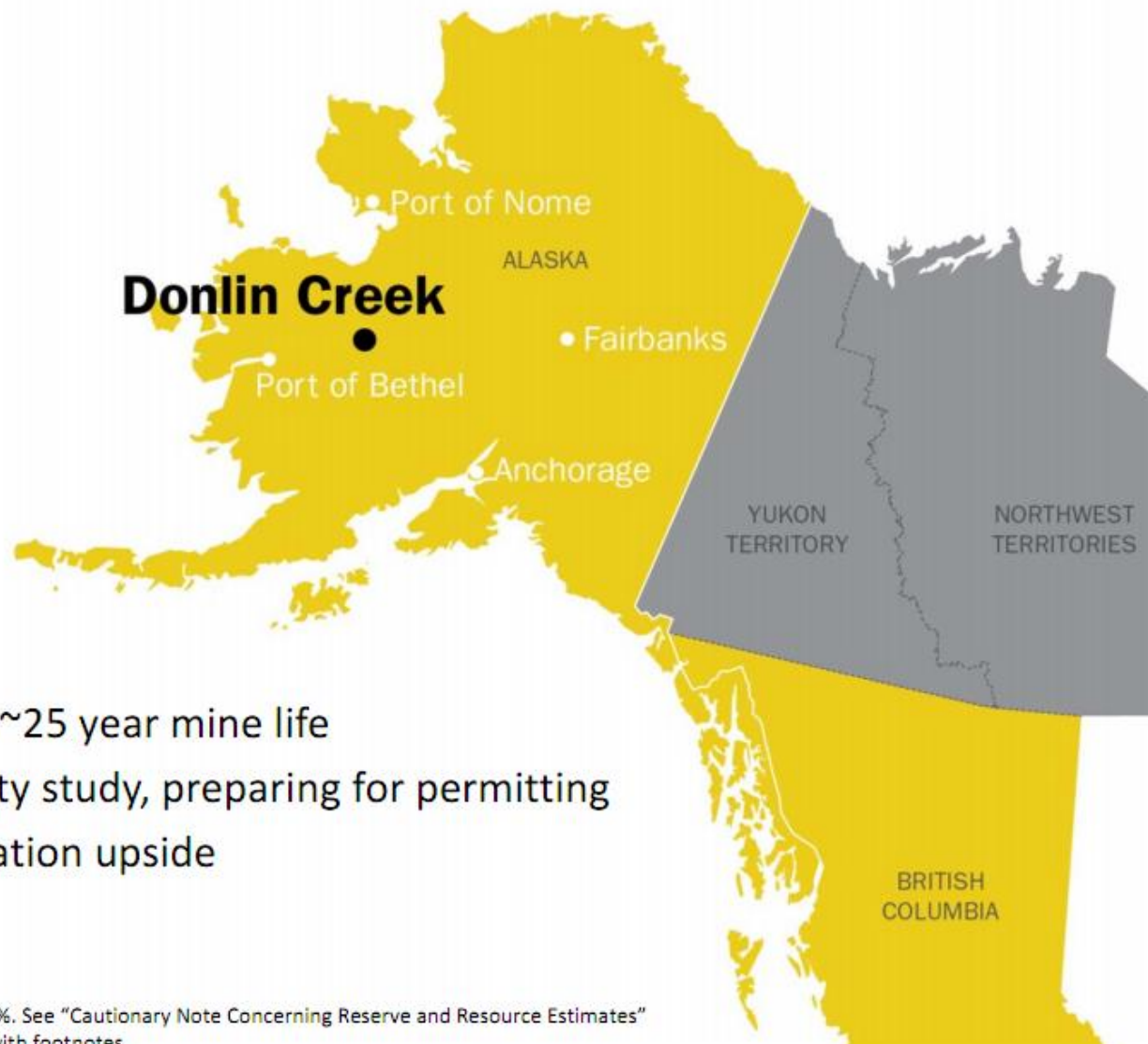
ozs Gold  
Measured & Indicated <sup>1</sup>

## 4.4M

ozs Gold  
Inferred <sup>1</sup>

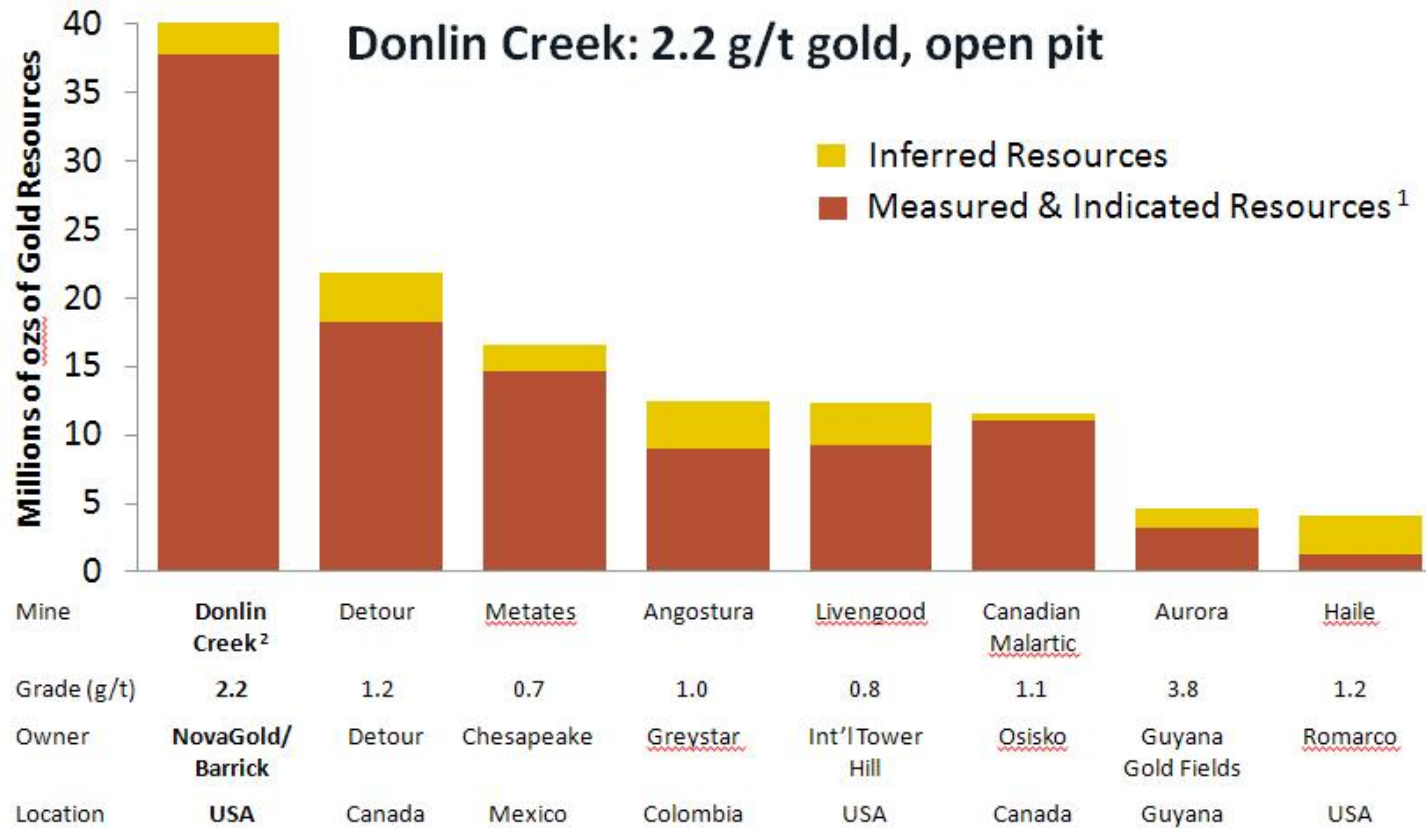
- Open pit, 2.2 g/t, ~25 year mine life
- Finalizing feasibility study, preparing for permitting
- Significant exploration upside

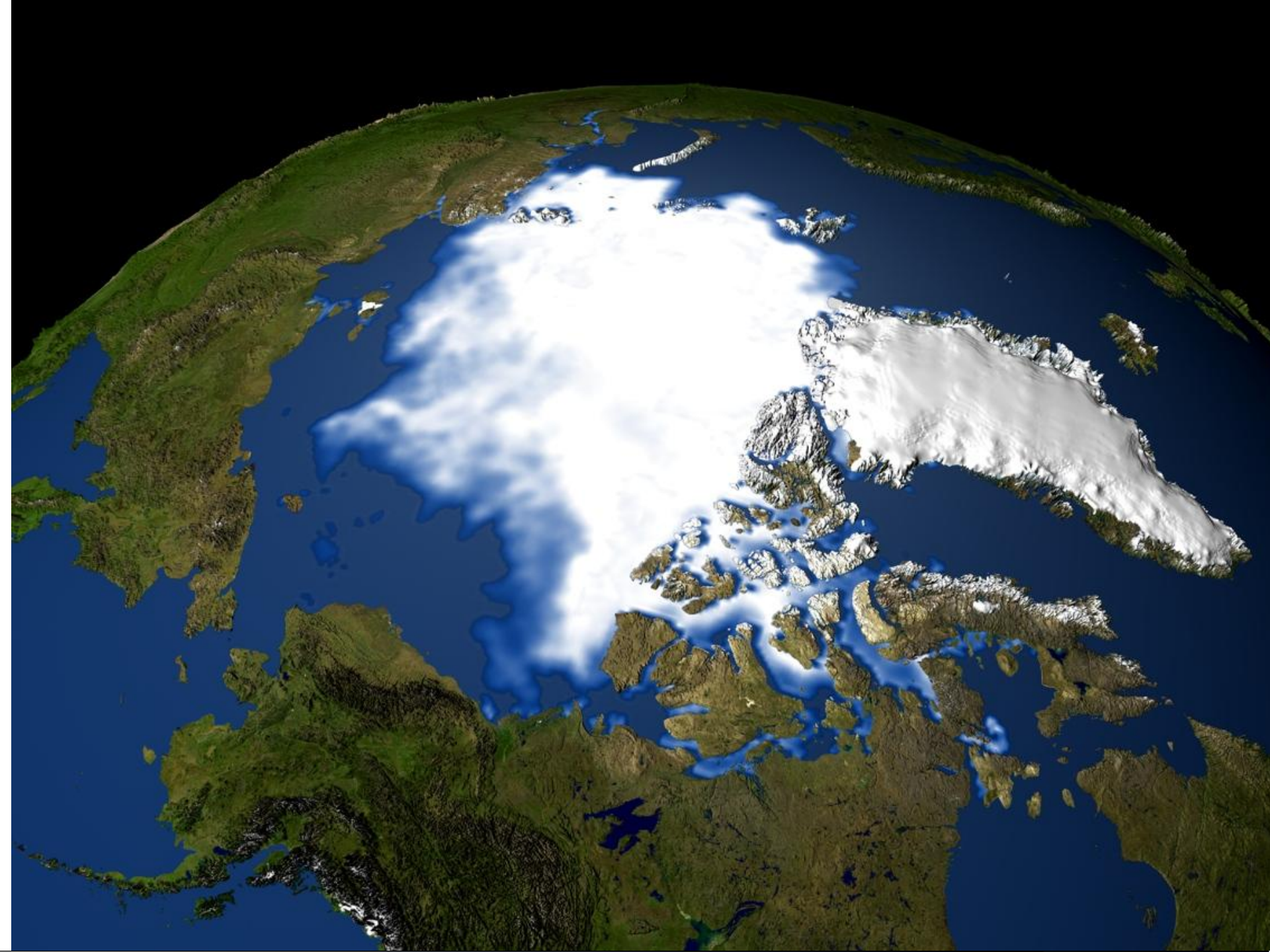
1) At 100% basis. NovaGold owns 50%. See "Cautionary Note Concerning Reserve and Resource Estimates" and "Reserve & Resource Table" with footnotes.





# Potential of Alaska/Donlin Mine





# Conclusion

- Huge Potential for future development in the North
- Current transportation infrastructure limitations are the most significant barrier to development
- Environmental impacts of transportation infrastructure are a major barrier to development
- Innovative Solutions to transportation are key to future development in the Arctic



# Pacific NW Economic Region

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