

Alaska Mineral Industry 2013

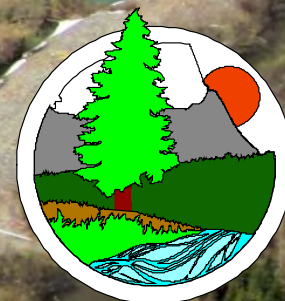
Preliminary Summary



Larry Freeman – Alaska Department of Natural Resources
Division of Geological & Geophysical Surveys

www.dggs.alaska.gov – lawrence.freeman@alaska.gov

Photo credit: Rich Flanders – Nyac Gold LLC



Northwest Mining Association – 119th Annual Meeting – December 2-6, 2013 – Reno, Nevada

Alaska Mineral Industry – 2013



- Acknowledgements:
 - NWMA for the invitation to present
 - Companies and individuals who provided content
 - Dave Szumigala of Kinross Gold, Inc. , Curt Freeman Avalon Development Corp. and Shane Lasley of North of 60 Mining News
 - Alaska DNR DML&W and OPMP staff
- All information is preliminary and incomplete:
 - Production data based on 2nd and 3rd 1/4 reports
 - Exploration reports are based on press releases, websites, presentations, rumors, black magic
- Forward Looking Statements are par for the course
- No editorial or peer review of the content



2013 Alaska Minerals Overview



- Increased metal production / lower value
- Six major mines & >300 small placer mines
- One coal mine
- Advanced exploration projects include Cu-Au-Mo, Au, polymetallic, REE, Coal & graphite
- Exploration down due to reduced funding



Photo Credit Pure Nickel Inc – www.purenickel.com



2013 Production “Facts”



- Production (prelim. est.)
 - 973,800 ounces Gold
 - 5 % increase
 - 7,476,400 ounces Silver
 - 6 % increase
 - 113,400 tons Lead
 - 1 % decrease
 - 597,900 tons Zinc
 - 3 % increase
- Gross Value: \$ 2. 9 billion
 - 6% decrease



Photo credit SMM Pogo LLC



2013 Alaska Exploration



- 7 Major Projects
- ~ 6 Advanced Projects
- Drilling numbers too early to tally
- 67 Hard Rock Exploration Permits (down from 84 in 2012)
- 2 Advanced Coal Projects



**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 East Bethel
- 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. Dominantly State- and Native-interest lands surveyed.

Nome west, Circle, Valdez Creek, Nyac, 1994
Fairbanks, Richardson, 1995
Rampart/Manley, 1996, 1997
Chulitna, Petersville, 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, Iditarod, 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
Southern Delta
River, 2003
Southern
NPR-A, 2006
Western Fortymile, 2008

 FY2014 Survey Areas

**DGGS GEOPHYSICAL SURVEYS
TO BE RELEASED 2013 and 2014**

A - Kuskokwim area, southwest Alaska
B - Farewell area, southcentral Alaska

<http://www.dggs.alaska.gov/geophysics/index.php>



State interest lands
shown in light blue.

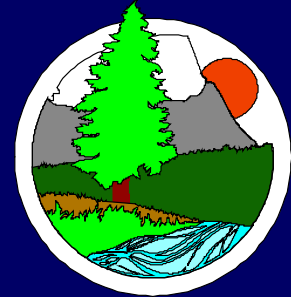
DGGS ALASKA AIRBORNE GEOPHYSICAL/GEOLOGICAL MINERAL INVENTORY

Locations of Styx & Wrangellia Projects



2013 Styx River Mapping Project & Mineral Assessment Area

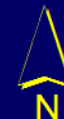
<http://www.dggs.alaska.gov/pubs/id/26803>



2013 Wrangellia Mineral Assessment Area

<http://www.dggs.alaska.gov/pubs/id/26821>

0 100 200 300 400 500 Miles



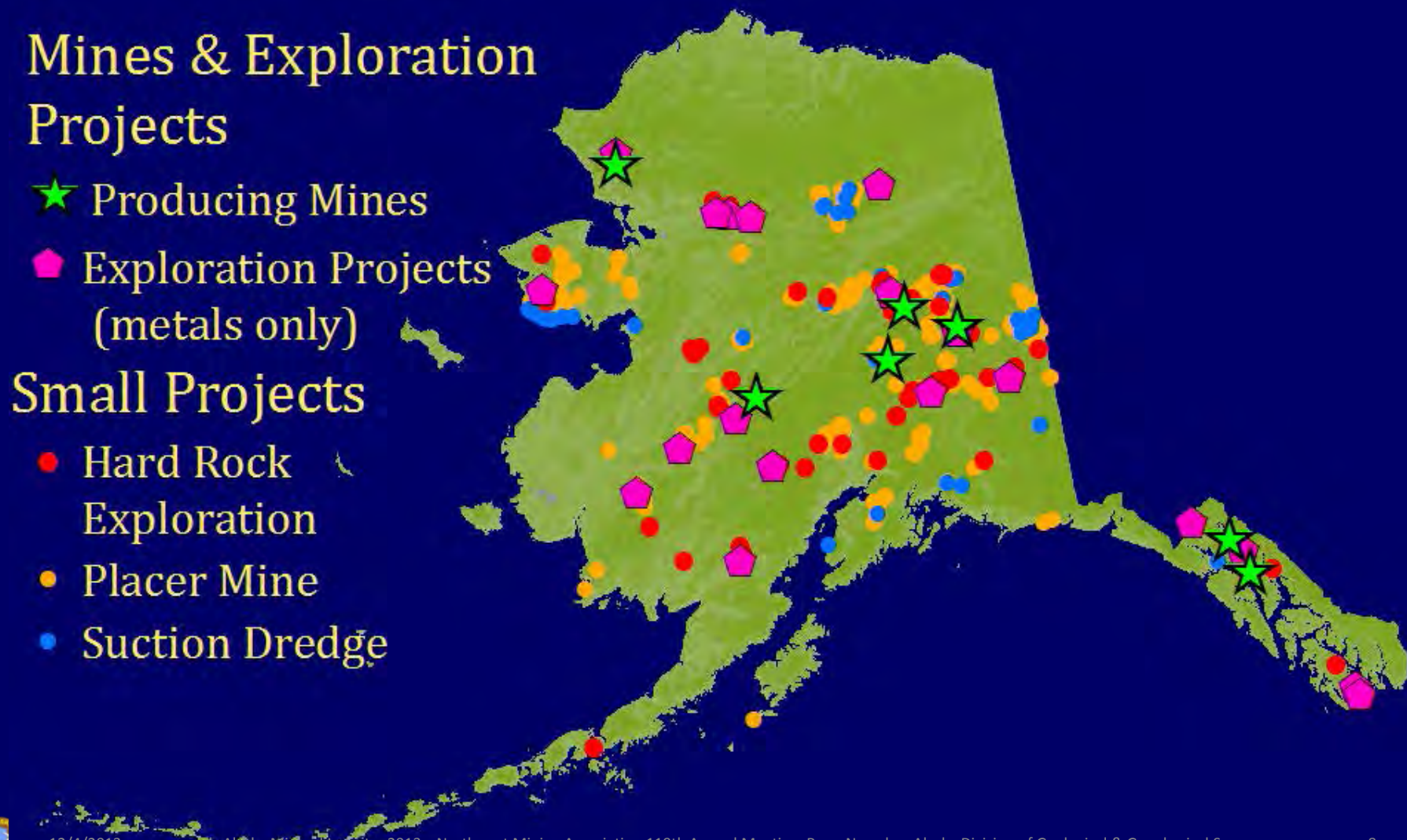
2013 Alaska Minerals Tour

Mines & Exploration Projects

- ★ Producing Mines
- ◆ Exploration Projects (metals only)

Small Projects

- Hard Rock Exploration
- Placer Mine
- Suction Dredge

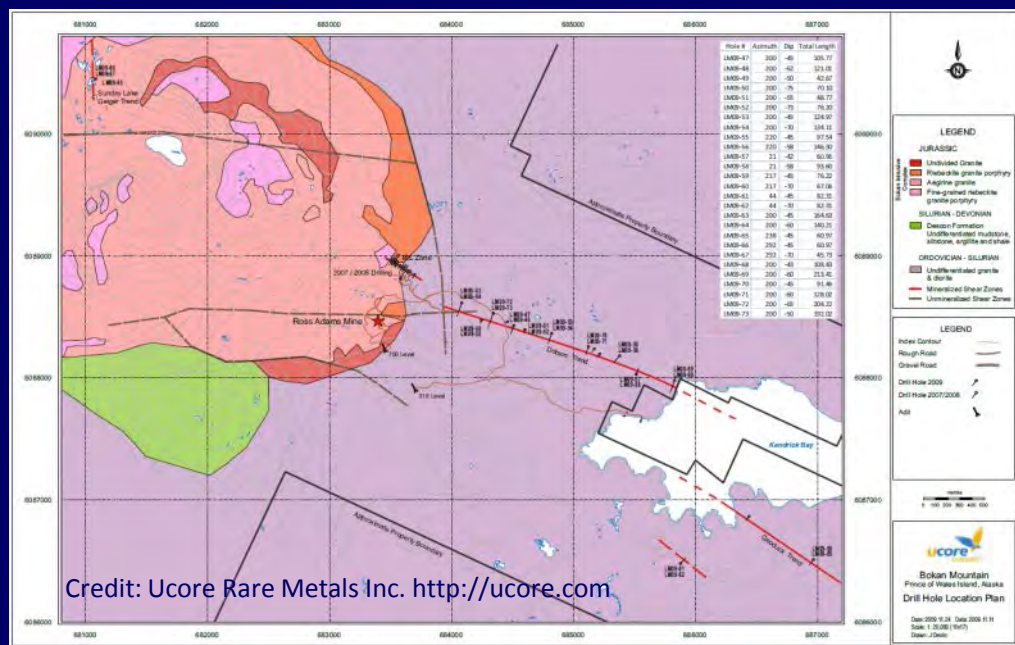


Bokan – Dotson Ridge – REE



- Ucore Rare Metals Inc.
- Resource Update:
 - Inferred 2.0 M tonnes @ 0.61% TREO
 - Indicated 2.9 M tonnes @ 0.61% TREO
 - 66.3 M lbs TREO
- USFS Permit for camp & drilling

<http://ucore.com>



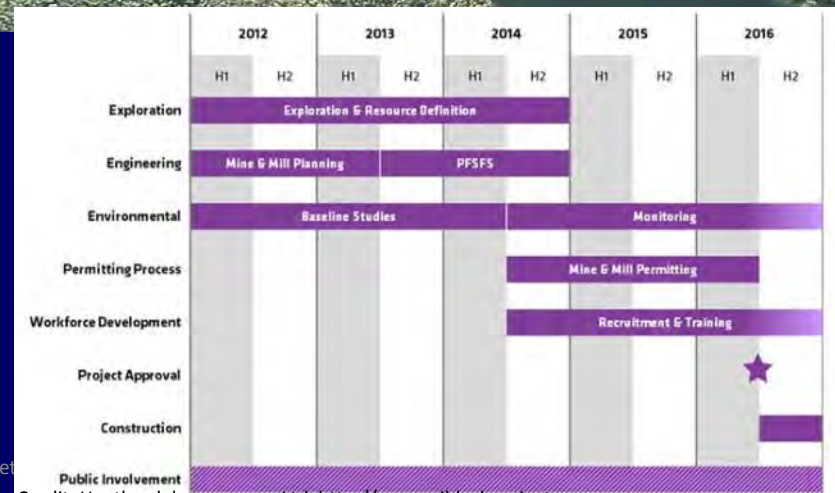
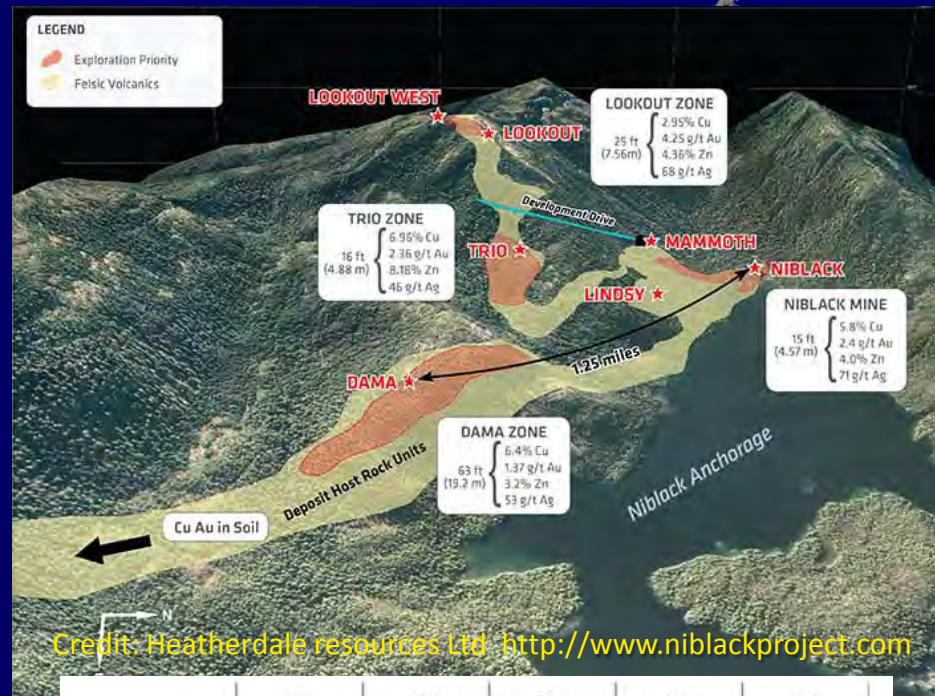
Credit: Ucore Rare Metals Inc. <http://ucore.com>

Niblack –Polymetallic VMS

- Heatherdale Resources Ltd
- 5.6 M tonnes @ 0.95% Cu, 1.75 g/t Au, 1.73% Zn, 29.52 g/t Ag (Indicated)
- 3.4 M tonnes @ 0.81% Cu, 1.32 g/t Au, 1.29% Zn, 20.10 g/t Ag (Inferred)
- MOU with AIDEA to study mill site near Ketchikan

<http://www.niblackproject.com>

Indicated & Inferred resources grades based on US\$50 net smelter return cutoff, as estimated in November 2011 by D. van der Heever, Pr.Sci.Nat.



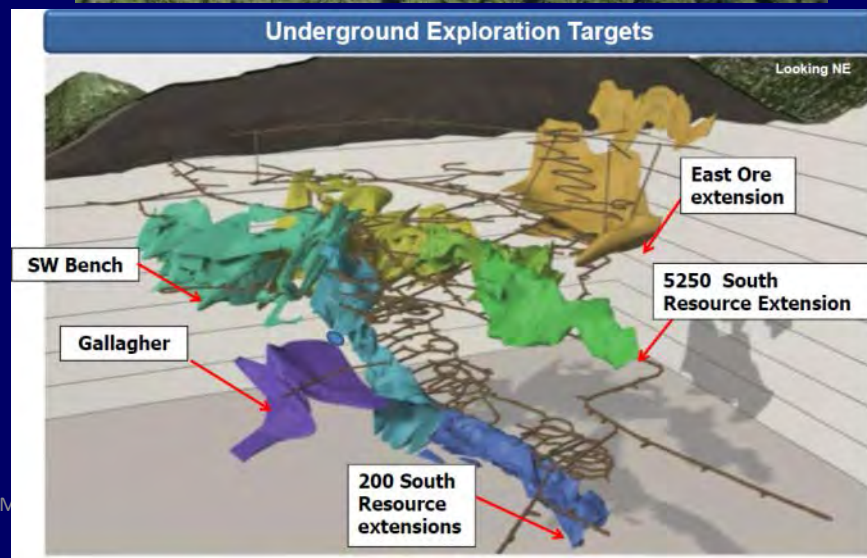
Greens Creek – Polymetallic VMS



- Hecla Mining Company
- 2013 $\frac{3}{4}$ Production
 - 5.6 M oz Ag
 - 42,735 oz Au
 - 15,155 tons Pb
 - 42,977 tons Zn
- P&P Reserve 7.86 M tons
 - 94.5 M oz Ag
 - 0.72 M oz Au
 - 267,740 tons Pb
 - 702,300 tons Zn
- USFS Permit for tailings expansion

<http://www.hecla-mining.com>

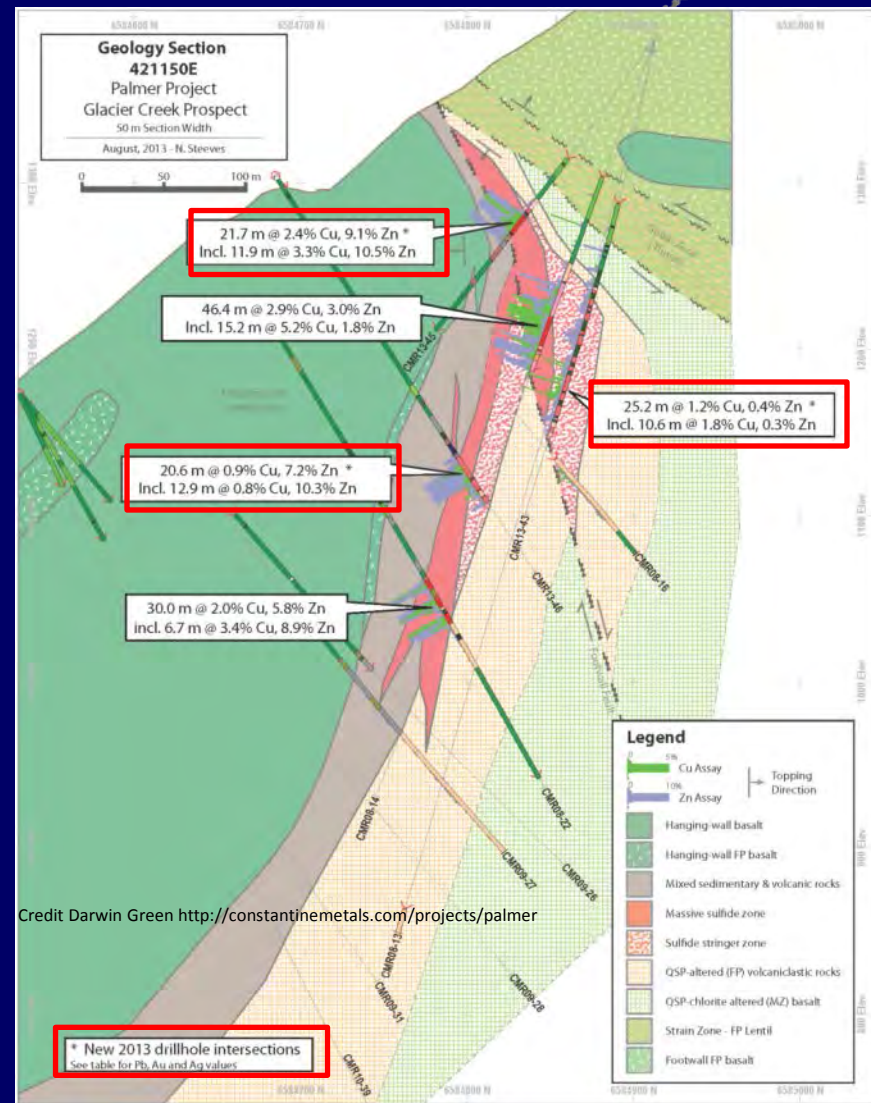
Proven and probable reserves as of December 31, 2012



Palmer –Polymetallic VMS

- Constantine Metal Resources Ltd – Dowa Metals and Mining Company Ltd
- Inferred resource 4.75 M tonnes @ 1.84% Cu, 4.57% Zn, 0.28% Pb, 0.28 g/t Au, 29.1 g/t Ag
- 2013 Exploration
 - 10 hole, 3750 meter drill program
 - 7 holes w/ significant mineralization
- Five >20 meter thick intersections

<http://constantinemetals.com/projects/palmer>



Herbert Glacier – Vein Au



- Grande Portage Resources Ltd/Quaterra Resources Inc
- Feb 2013 Initial 43-101 Inferred Resource:
 - 1.57 million tonnes
 - 245,145 oz of gold
 - 4.86 g/t
 - Exploration upside
- Plan for 2014 Drilling

<http://www.grandeportage.com/s/herbertgold.asp>



DDH-11E-2 Credit: Grande Portage resources Ltd
http://www.grandeportage.com/i/pdf/GPG_Presentation.pdf



Surface quartz veining at Ridge vein. Credit: Grande Portage Resources Ltd
<http://www.grandeportage.com/s/photoindex.asp?ReportID=482537>

Kensington – Vein Au



- Coeur Mining Inc
- 2013 ½ Production
127,987 tons – 48,368
oz Au
- P&P reserves : 1.0 M oz
Au
- M & I resources 526,000
oz Au

<http://www.coeur.com/operations/kensington-alaska>



Credit: Coeur Mining, Inc. <http://coeur.com>



Credit: Coeur Mining, Inc. <http://coeur.com>

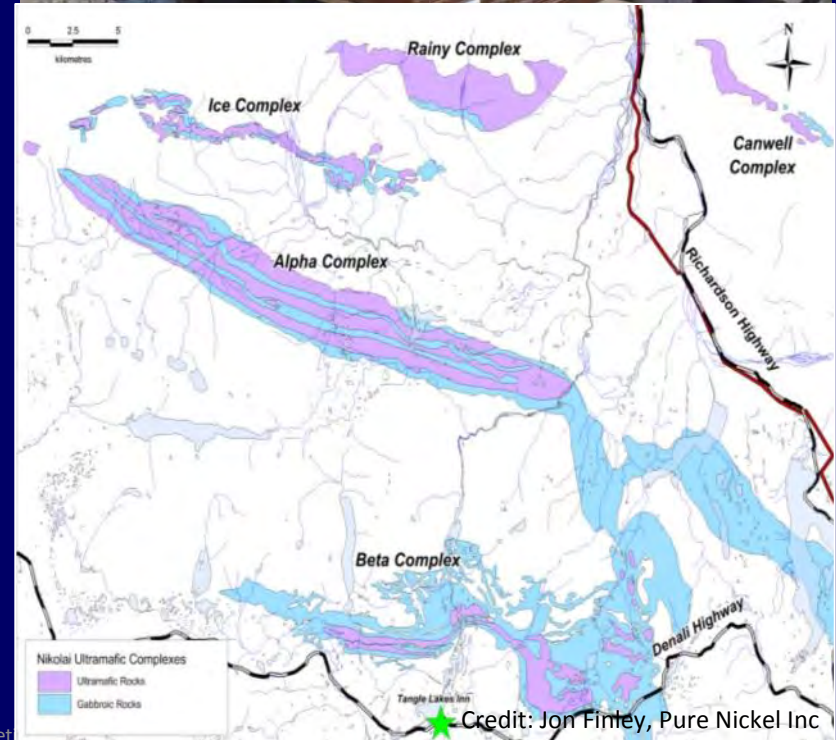


MAN – Mafic-Ultramafic – Cu-Ni-PGE



- Pure Nickel Inc/ITOCHU
- Eureka Zone – Alpha MUM complex
- 2013 – 8 hole / 2991 m drill program
- 15 km strike, 120-250 m-thick disseminated sulfide
 - 123 -212 ppb Au+Pt+Pd
 - 0.05-0.16% Cu
 - 0.17-0.24% Ni

<http://www.purenickel.com/s/NewsReleases.asp?ReportID=609291>



Credit: Jon Finley, Pure Nickel Inc

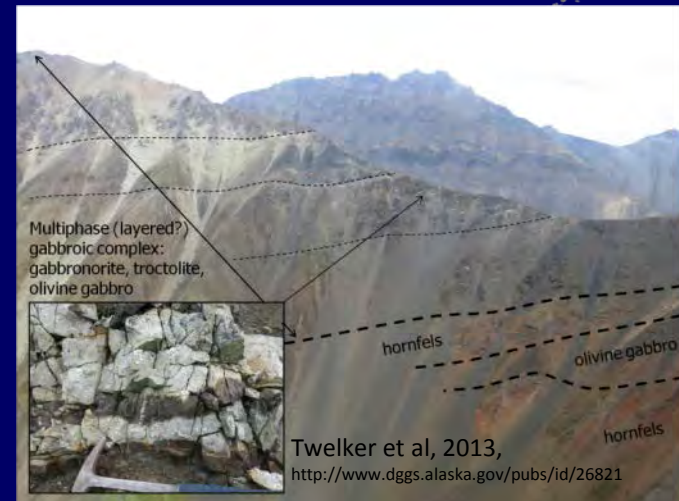


Nikolai – MUM – Ni-Cu



- MMG Limited
- Multiphase or layered mafic-ultramafic sill complex ?
- Geochemical - Aerial Magnetic-TEM target
- 2013 – Initial 6 hole / 1,118 m drill program
- No results released

<http://www.mmg.com/en/Investors-and-Media/Reports-and-Presentations/>

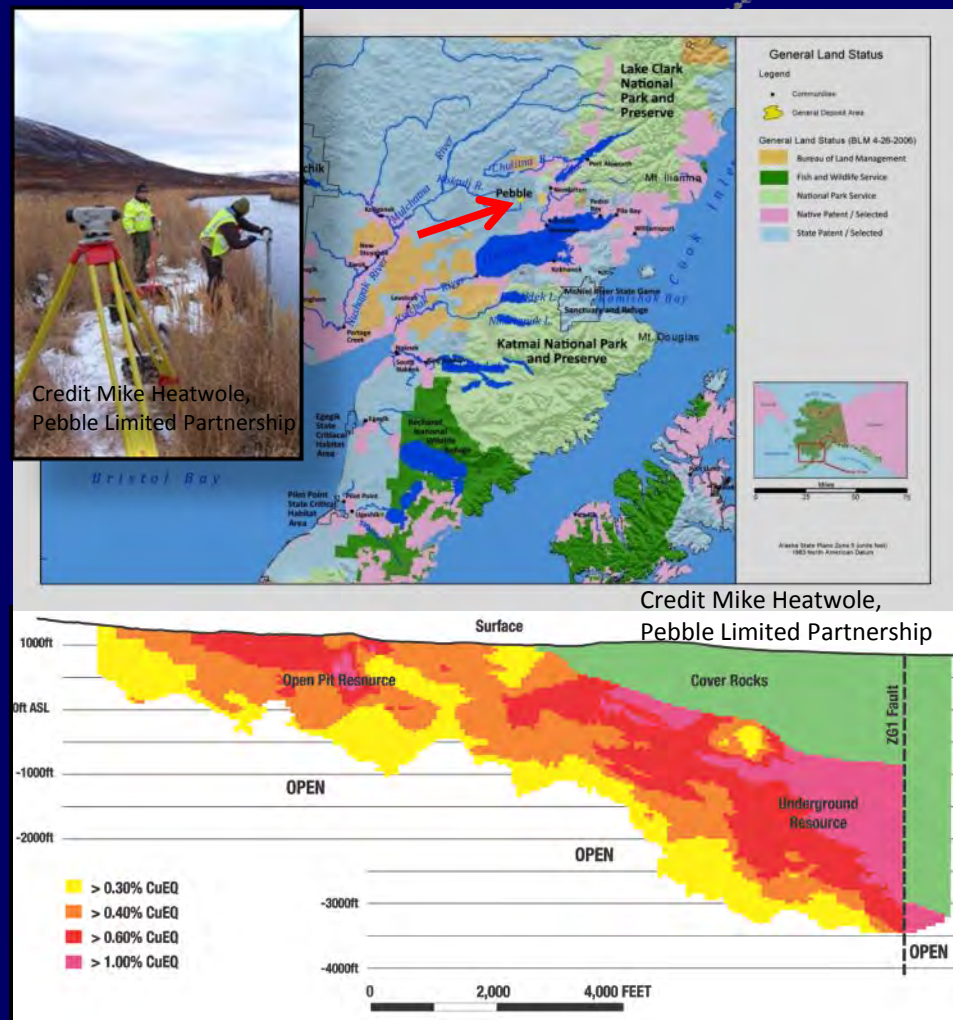


Pebble – Porphyry Cu-Mo-Au



- Pebble Limited Partnership – Northern Dynasty Minerals Ltd
- Total Resource:
 - 80.6B lbs. Copper
 - 5.6B lbs Molybdenum
 - 107.4M ounces Gold
- Drilling/Environmental/Engineering/Outreach
- 90 % Poised for permitting

<http://www.pebblepartnership.com/>



Terra – Intrusion/vein Au



- WestMountain Gold INC
 - Indicated resource: 428,000 tonnes containing 168,000 oz Au, 318,000 oz Ag
 - Bulk Sample Program
 - Mill Construction
 - Open cut 360 tons
 - Processed 75 tons recovered 325 oz Au
 - 2013 – 5 holes / 875 m drill program
 - Constructed 5000 ft runway
- [http://: westmountaingold.com](http://westmountaingold.com)



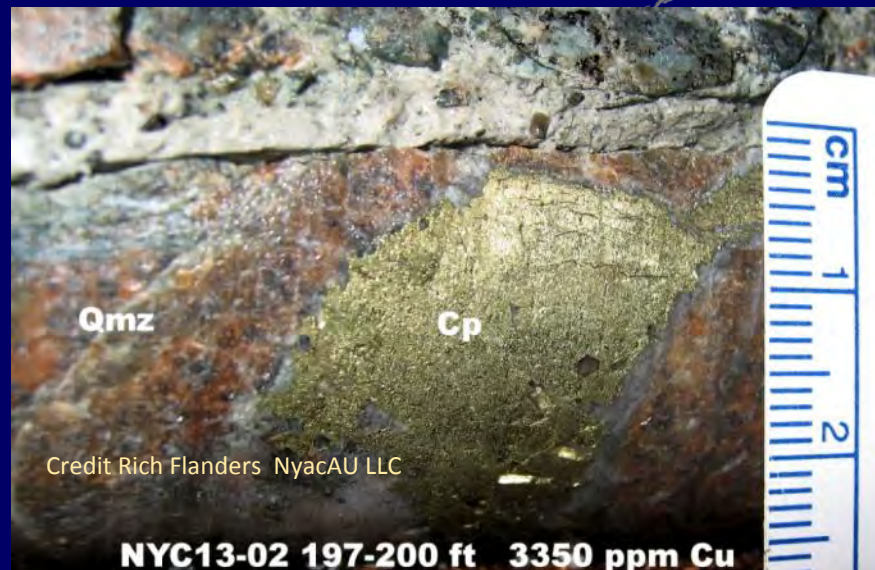
Credit WestMountain Gold LTD,
[http://: westmountaingold.com](http://westmountaingold.com)

Nyac – Placer & Intrusion Au



- NyacAU LLC
- Placer mining in Shamrock Creek
- 2013 – 6 hole / 8248 ft drill program
- Intercepts 50 feet 0.505 ppm Au and 260 feet 0.280 ppm Au in mineralized red quartz mozonite.

Flanders, personal communication



Credit Rich Flanders NyacAU LLC

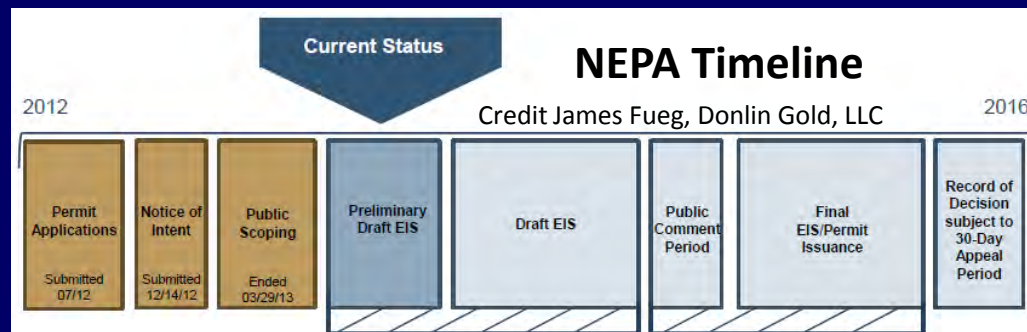


Donlin – Intrusion Au



- NovaGold Resources - Barrick Gold Corporation
- Calista & Kuskokwim Native Corporations
- 33.9 M oz Au
- 27 + year mine life
- 1.1 M oz/year
- Two ports, pipeline, etc.

<http://www.donlingold.com>



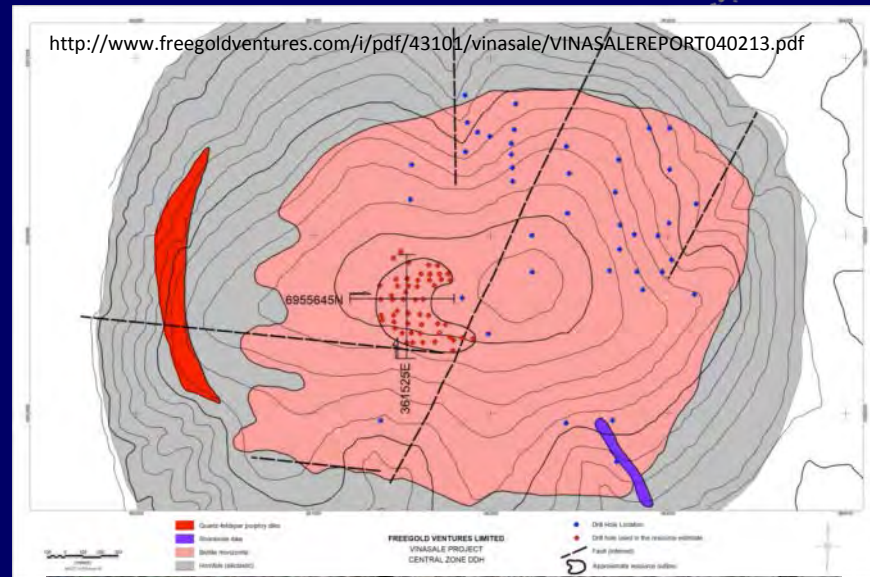
Vinasale – Intrusion Au



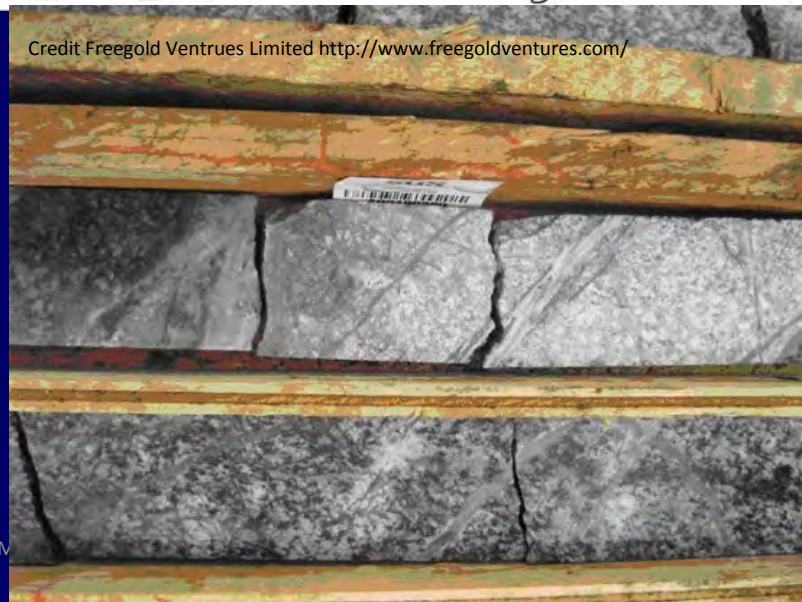
- Freegold Ventures Limited – Doyon Limited lease
- Updated NI 43-101
 - 3.4 M tonnes, 162,000 oz Au (Indicated)
 - 53.5 M tonnes, 1.8 M oz Au (inferred)

<http://www.freegoldventures.com>

March NI43-101 – Included 2012 drill results and 0.5 grams/tonne open pit cut-off



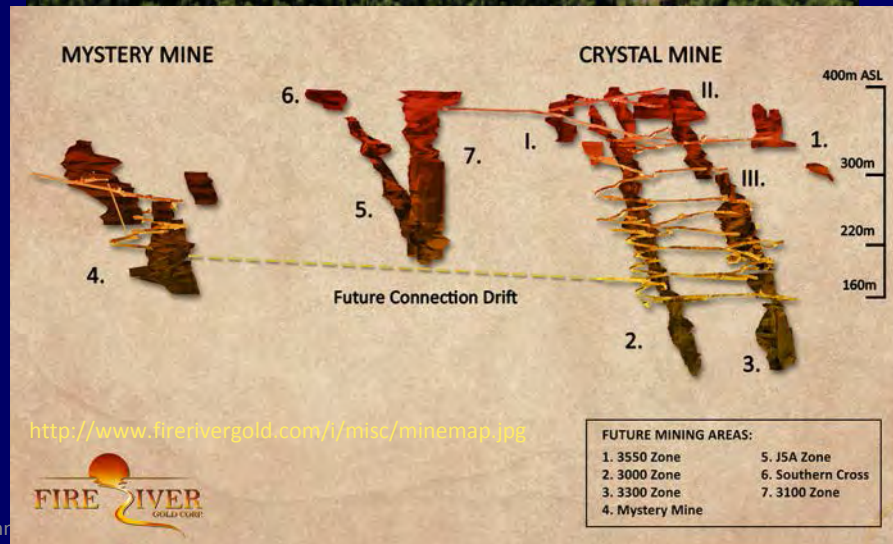
Credit Freegold Ventures Limited <http://www.freegoldventures.com/>



Nixon Fork – Cu-Au Skarn



- Fire River Gold Corp
 - ¼ 2013 production: 13,638 oz Au
 - Drilled 6,038 meters exploration and definition drilling
 - Ceased operations by June
 - Currently in caretaker status
 - In default to lender
- <http://www.firerivergold.com>

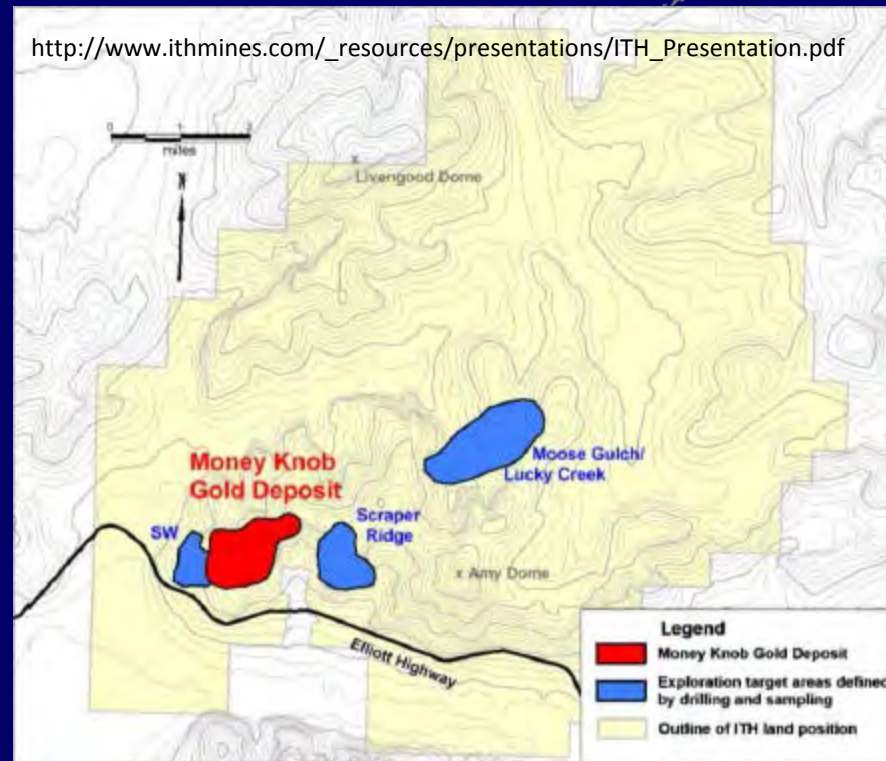


Livengood – Intrusion Au



- International Tower Hill Mines Ltd
- 20 M oz Au (Indicated + Inferred) Resource
- Feasibility Study
 - \$1,500/oz Au basis
 - 10 M oz Au Reserve (P&P)
 - \$ 1,474/ oz Au cost

<http://www.ithmines.com>



Golden Summit – Intrusion/vein Au



- Freegold Ventures Limited
- Dolphin-Cleary NI43-101 Resource:
 - 79.8 M tonnes, 1.68 M oz Au (indicated)
 - 248.1 M tonnes, 4.84 M oz Au (inferred)
- 3,472 meter drill program (winter)
- 3-hole, 1,667 meter drill program (summer)

<http://www.freegoldventures.com>

Resource published in June after winter drilling, before summer drilling.



Credit Fregold Ventrures www.freegoldventures.com



Credit Fregold Ventrures www.freegoldventures.com

Fort Knox – Intrusion Au



- Kinross Gold Corporation
- 2013 $\frac{3}{4}$ Production 318,0929 oz Au, 78,000 more than same period 2012
- Near pit drilling
- 2nd Carbon in column plant
- Reclamation of True North Pit complete

<http://www.kinross.com>



Fort Knox Main Pit



Reclamation at True North



Pogo – Vein Au



- Sumitomo Metal Mining Co. Ltd.
- 2013 Production 348,199 oz Au (Projection)
- Expansion of dry stack tailings to 20 M tons
- 2150 Portal for East Deep zone exploration

<http://www.smm.co.jp/E/csr/environment/pogo/>

2013 – 20 M ton Capacity



2013 – 2150 East Deep Portal

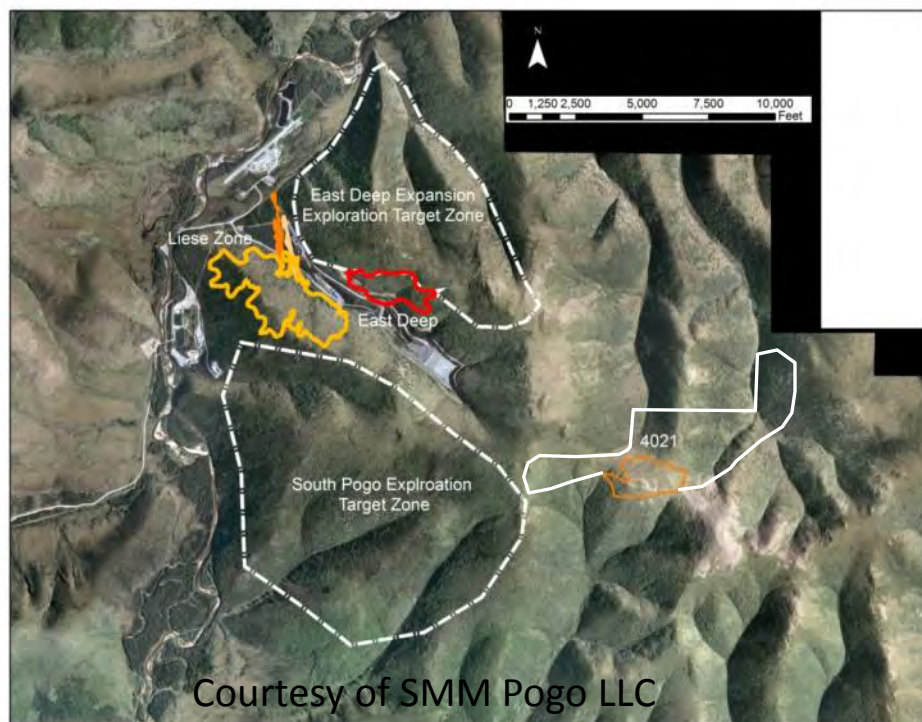


Photos courtesy of SMM Pogo LLC

Pogo – Vein Au – Exploration



- Surface Drilling:
- 110,000 feet helicopter & road
- Near mine targets
- Underground Drilling
- 30,000 feet (as of Nov1 – in progress)
- Exploration follow-up from mine development



<http://www.smm.co.jp/E/csr/environment/pogo/>

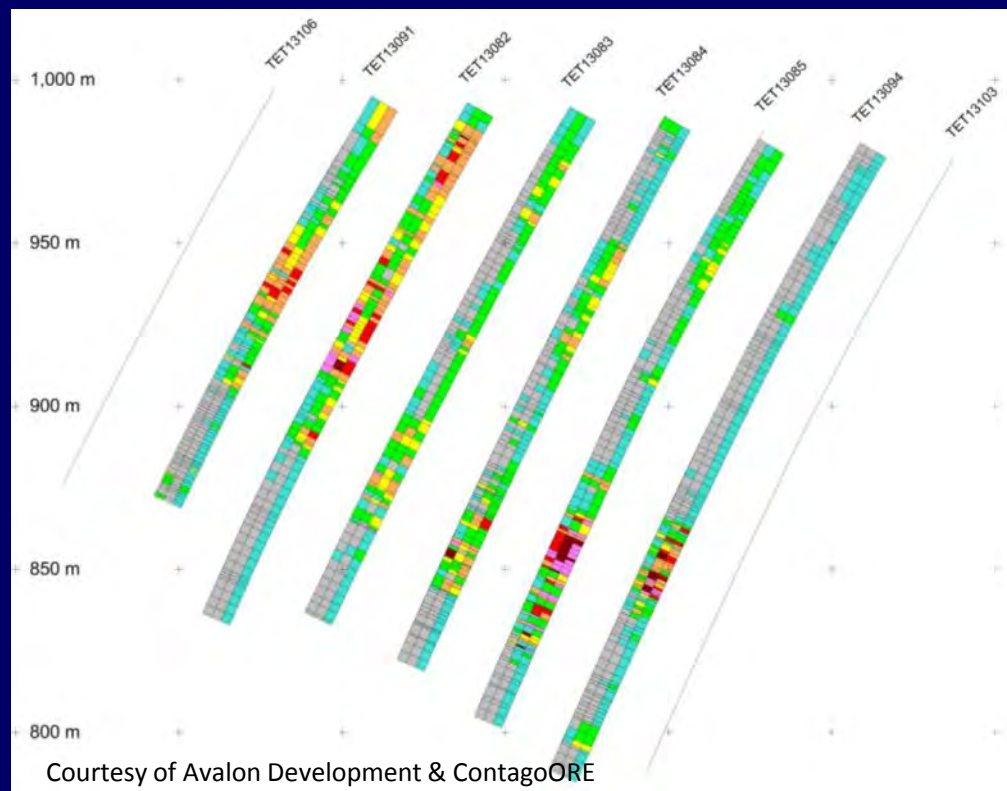


Tetlin – Cu-Au-Ag Skarn



- Contango ORE, Inc.
Tetlin Native lease
- 14,625 meters of drilling
- Intercepts up to 40.5 meters of 0.483 oz/t Au, 36.1 ppm Ag, 0.732 % Cu
- Pending Resource Announcement

<http://http://www.contangoore.com>



Courtesy of Avalon Development & ContangoORE

Chandalar – Placer & Vein Au



- Goldrich NyacAU Placer LLC
- Resource
 - 10.5 M cu. yds
 - 250,000 oz
- New permitted mine plan
- Drilling, stripping, plant relocation
- Produced 330 oz Au in 110 hours



<http://www.goldrichmining.com/chandalar-property-photos.html>

<http://www.goldrichmining.com/properties/chandalar-gold-district.html>

Resource is not classified – SEC does not consider it a reserve



Sun – Polymetallic VMS

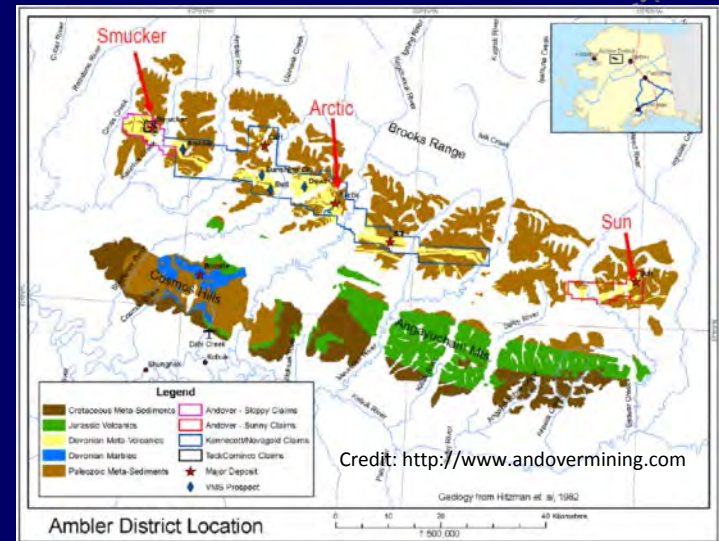


- Andover Mining Corp.
- Initial NI 43-101 Resource:

	Sun & S.W. Sun	Cu %	Zn %	Pb %	Ag g/Mt	Au g/Mt
Indicated	2.165 Mt	1.42	4.11	1.06	57.6	0.21
Inferred	11.648 Mt	1.14	3.91	1.37	76.8	0.24

- Based on 19, 131 meters of drilling, 97 holes
- AIDEA “Ambler Road to Resources”

<http://www.andovermining.com>

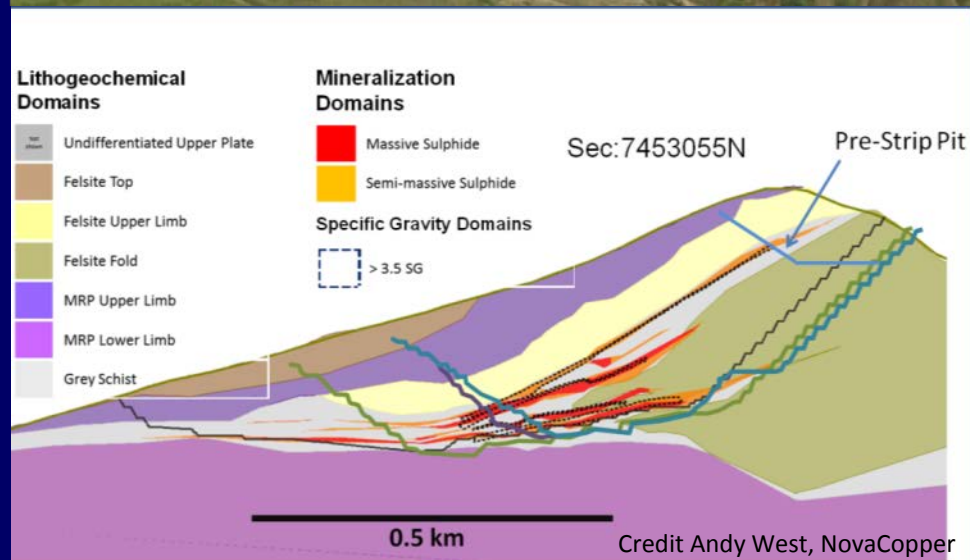


Arctic – Polymetallic VMS



- UKMP – NovaCopper /NANA partnership
- PEA for open pit:
 - 12 year mine life total production
 - 125 M lbs copper
 - 152 M lbs zinc
 - 24 M lbs lead
 - 2.5 M oz silver
 - 29,000 oz of gold

www.novacopper.com

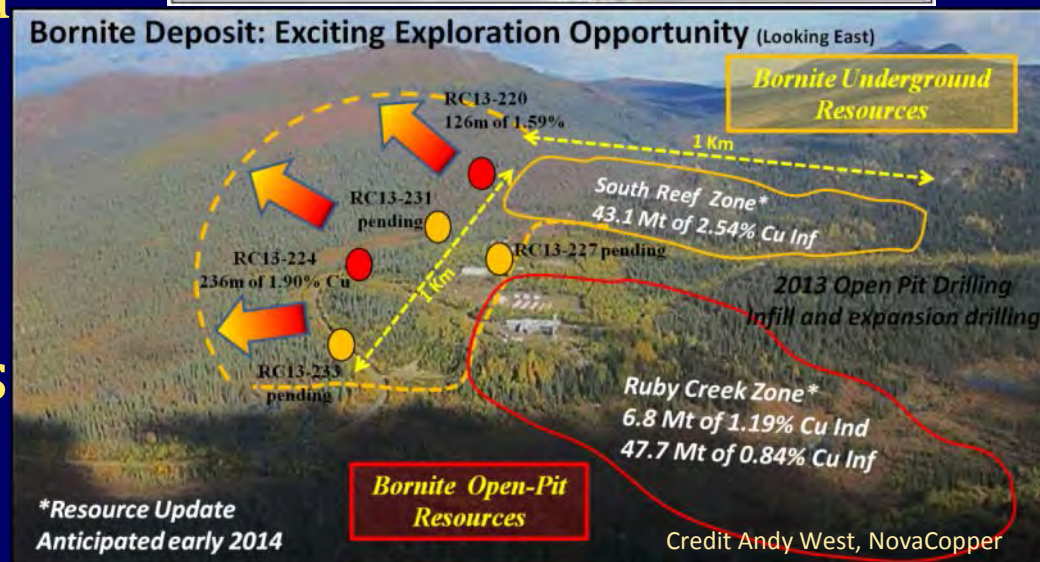
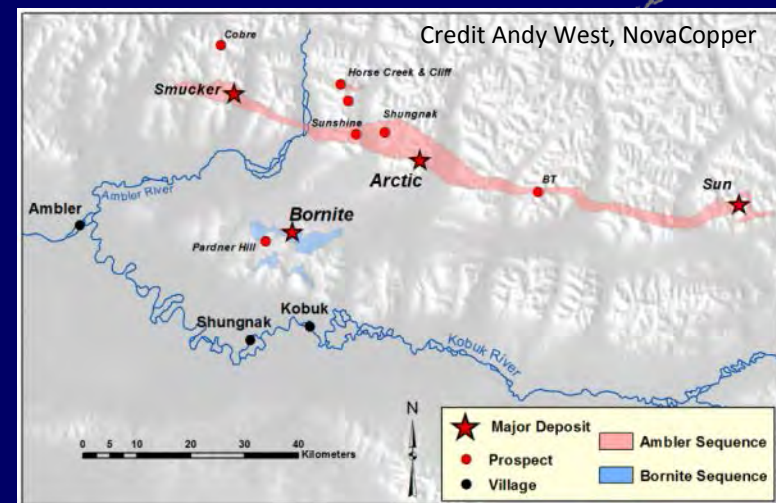


Bornite – Carbonate Cu-Sulfide Breccia



- UKMP – NovaCopper/ NANA partnership
- Initial NI 43-101 South Reef Resource:
 - 43.1 M T @ 2.54 % Cu
 - 2.4 B lbs Cu *adds to*
 - 1.1 B lbs Cu Ruby Creek Resource(2012)
- 2013 Drilling success

www.novacopper.com



Red Dog – Sedex Zn-Pb-Ag



- Teck Resources / NANA Partnership
 - First full year of 100% Aqqaluk ore feed
 - $\frac{3}{4}$ 2013 Production:
 - 409,400 tonnes Zinc
 - 71,300 tonnes Lead
 - Up 11 % from 2012
 - AIDEA Port Facilities
- www.teck.com



Credit : Teck Resources Limited / www.teck.com

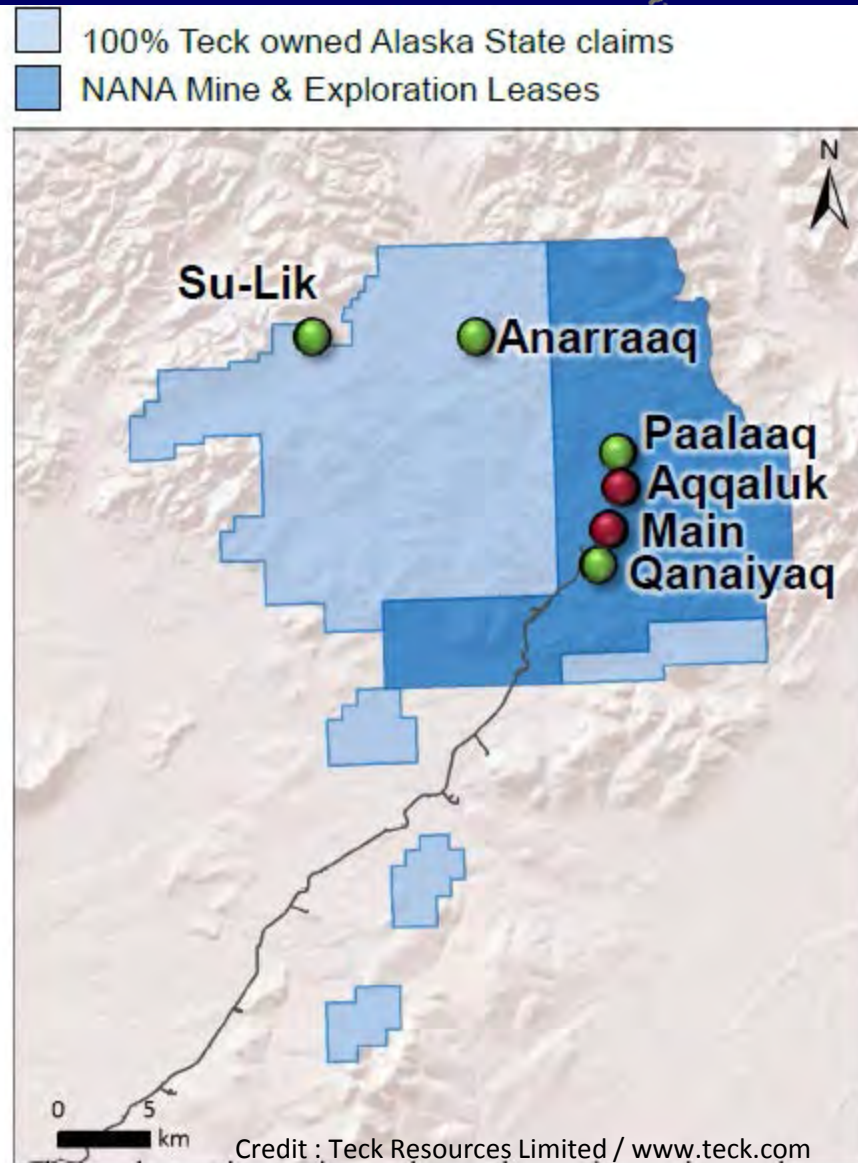
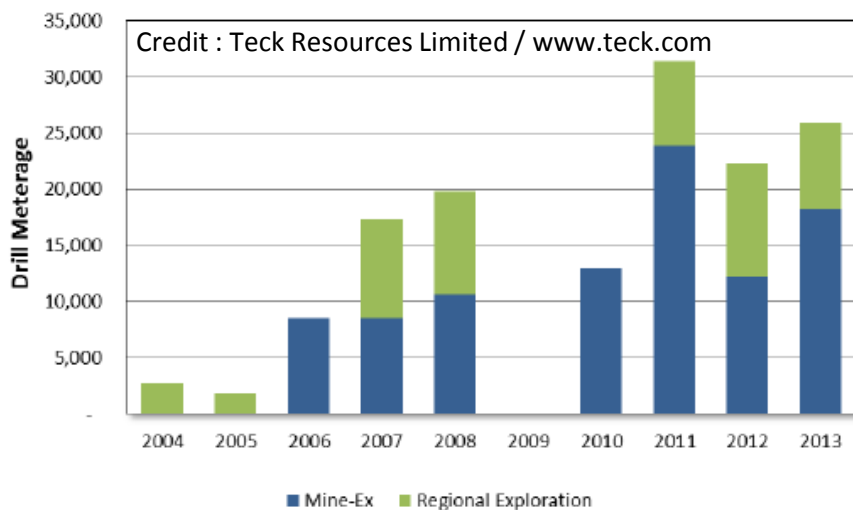


Red Dog – Exploration



- Over 25,000 M drilled in 2013
- District focus on Paalaaq & Qanaiyaq

Red Dog District Drilling - 2004-2013

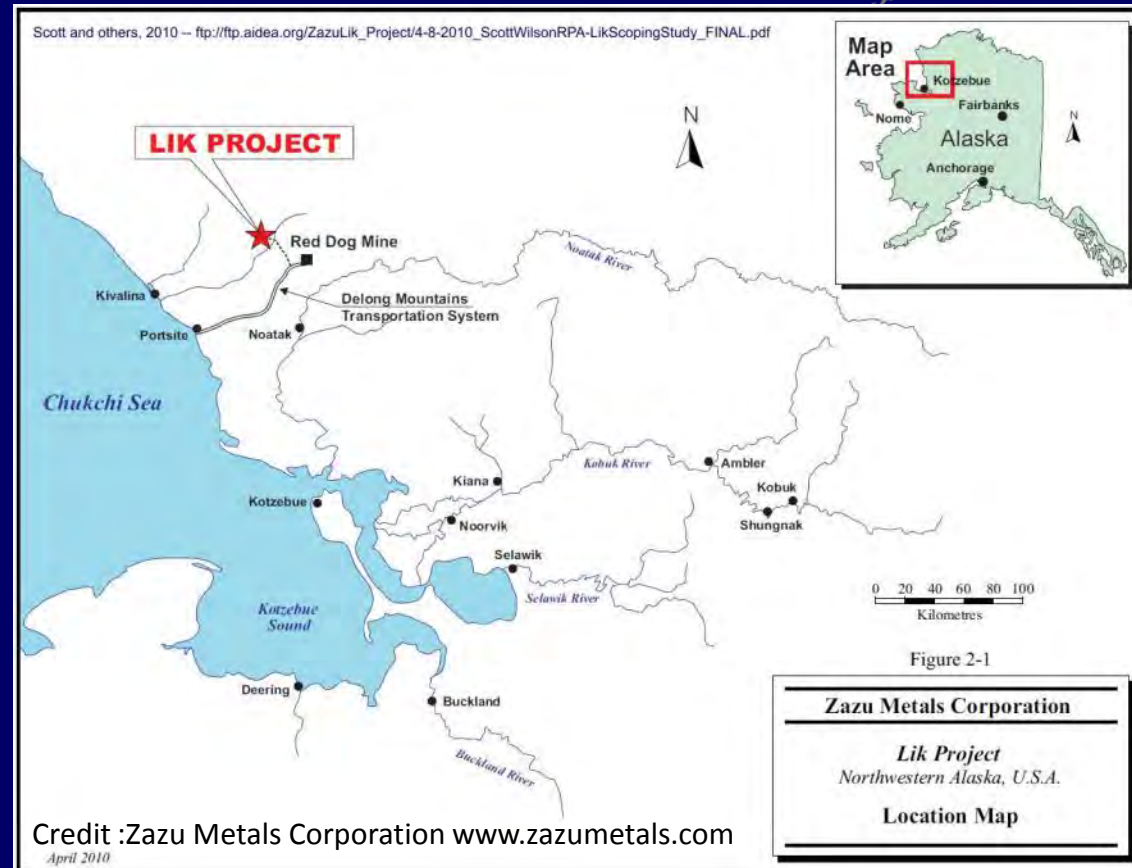


Lik – Sedex Zn-Pb-Ag



- Zazu Metals Corporation
 - Indicated/Inferred
 - 4.6 B lbs Zinc
 - 1.5 B lbs Lead
 - 11 M oz Silver
- Engineering & Environmental
- MOU w/AIDEA for Transport/Port studies

www.zazumetals.com

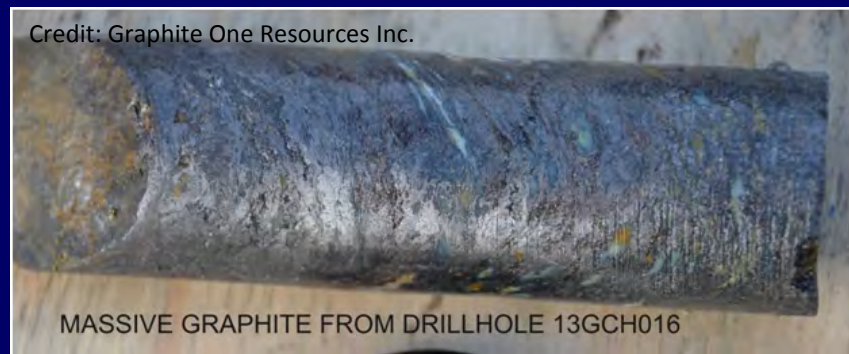
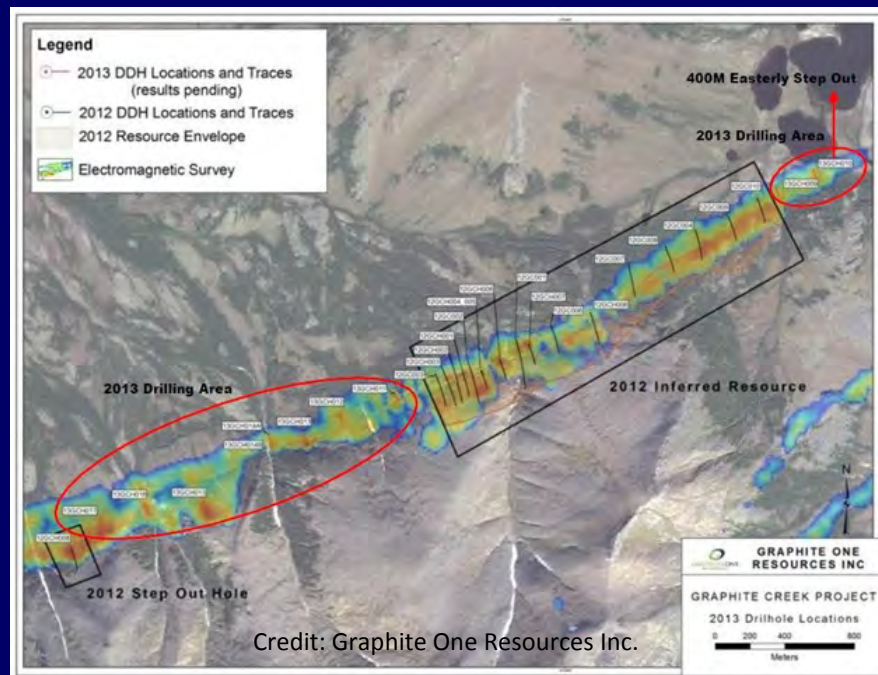


Graphite Creek



- Graphite One Resources Inc
 - 43-101 inferred resource:
164.5Mt @ 4.61% Cg
- 2013 – 10 hole / 1,023 m drill program
- Extended resource
- High purity concentrate
- MOU with OPMP

www.graphiteoneresources.com/

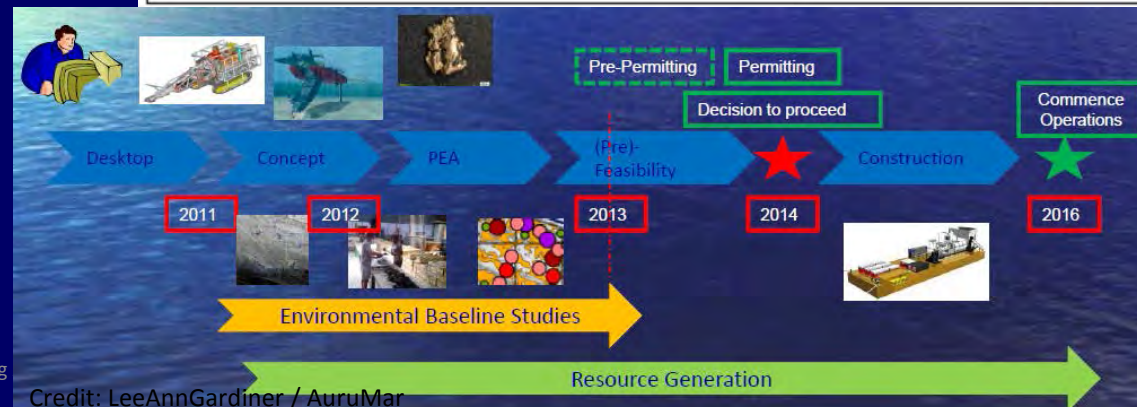
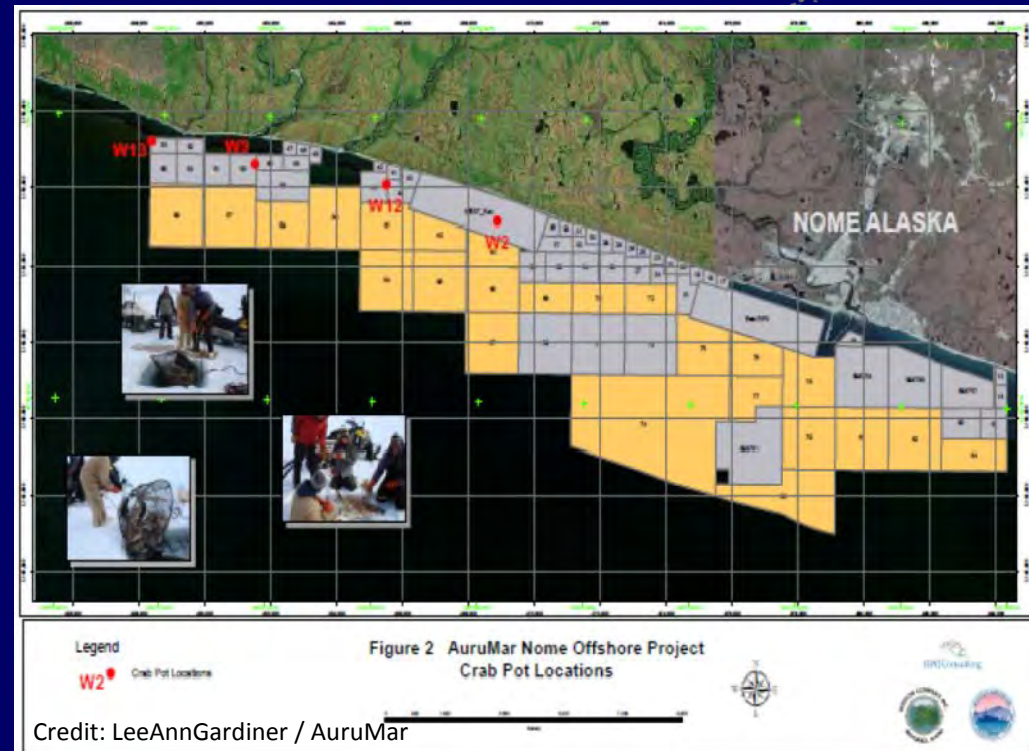


Nome Offshore Placer Au



- AuruMar – PMM
DeBeers - AngloGold Ashanti
- 26 offshore tracts -
68 km²
- Exploration
- Environmental –
Marine resources
Studies

<http://www.aurumar.co.za>



Nome Offshore & Beach Placer Au

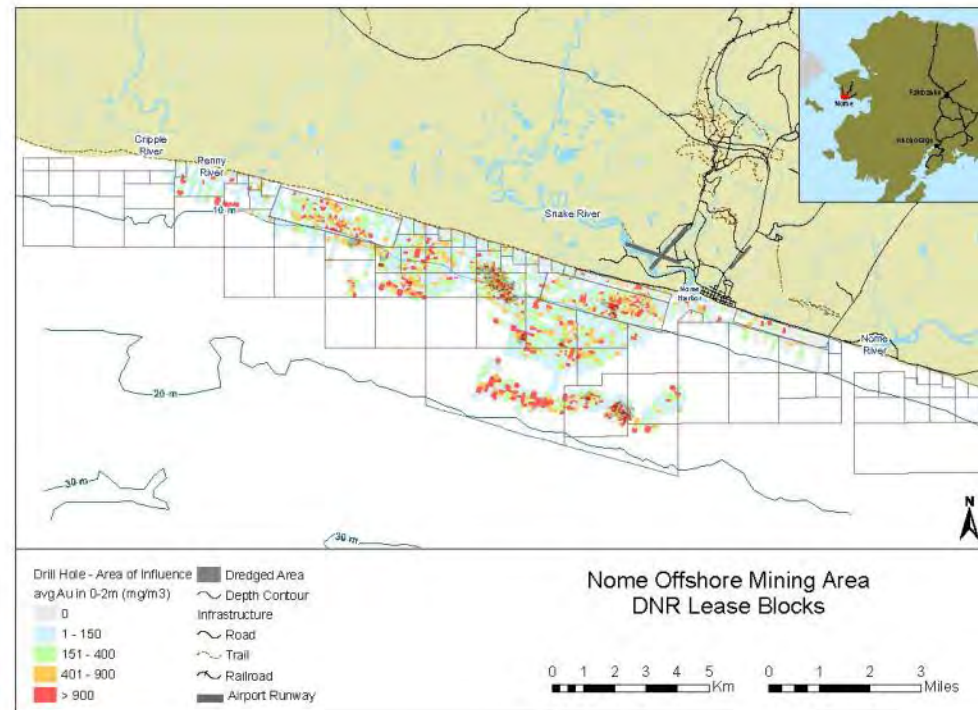


- 2013 – 203 Permits Issued:
- 142 Nome Recreation Area
- 46 Offshore Lease Tracts /Claims
- 15 Combination Lease & Recreation

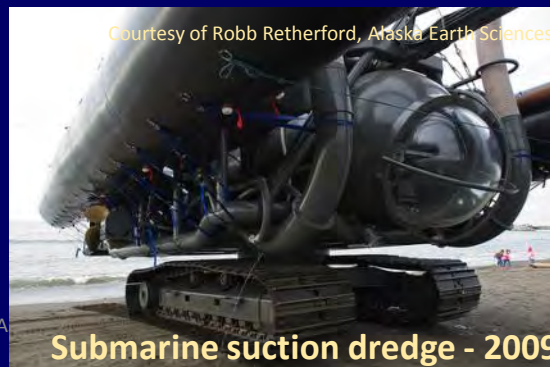
Courtesy of Rob Retherford, Alaska Earth Sciences



Courtesy of Rob Retherford, Alaska Earth Sciences



Courtesy of Robb Retherford, Alaska Earth Sciences



Courtesy of Rob Retherford, Alaska Earth Sciences

