

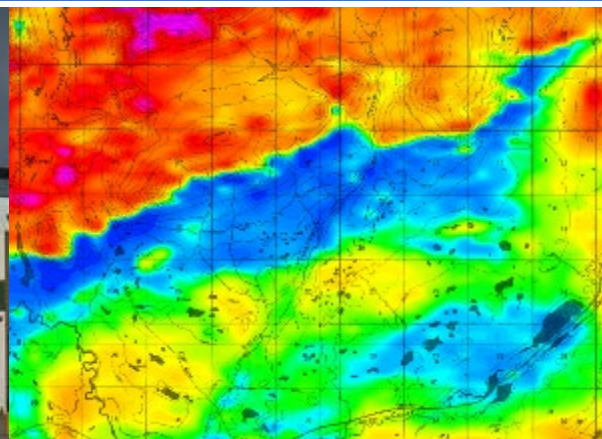


2021 Alaska Mining Industry Update

Melanie Werdon & Evan Twelker
Alaska Division of Geological & Geophysical Surveys



AME Roundup
January 31, 2022



2020 FRASER INSTITUTE REPORT

ALASKA

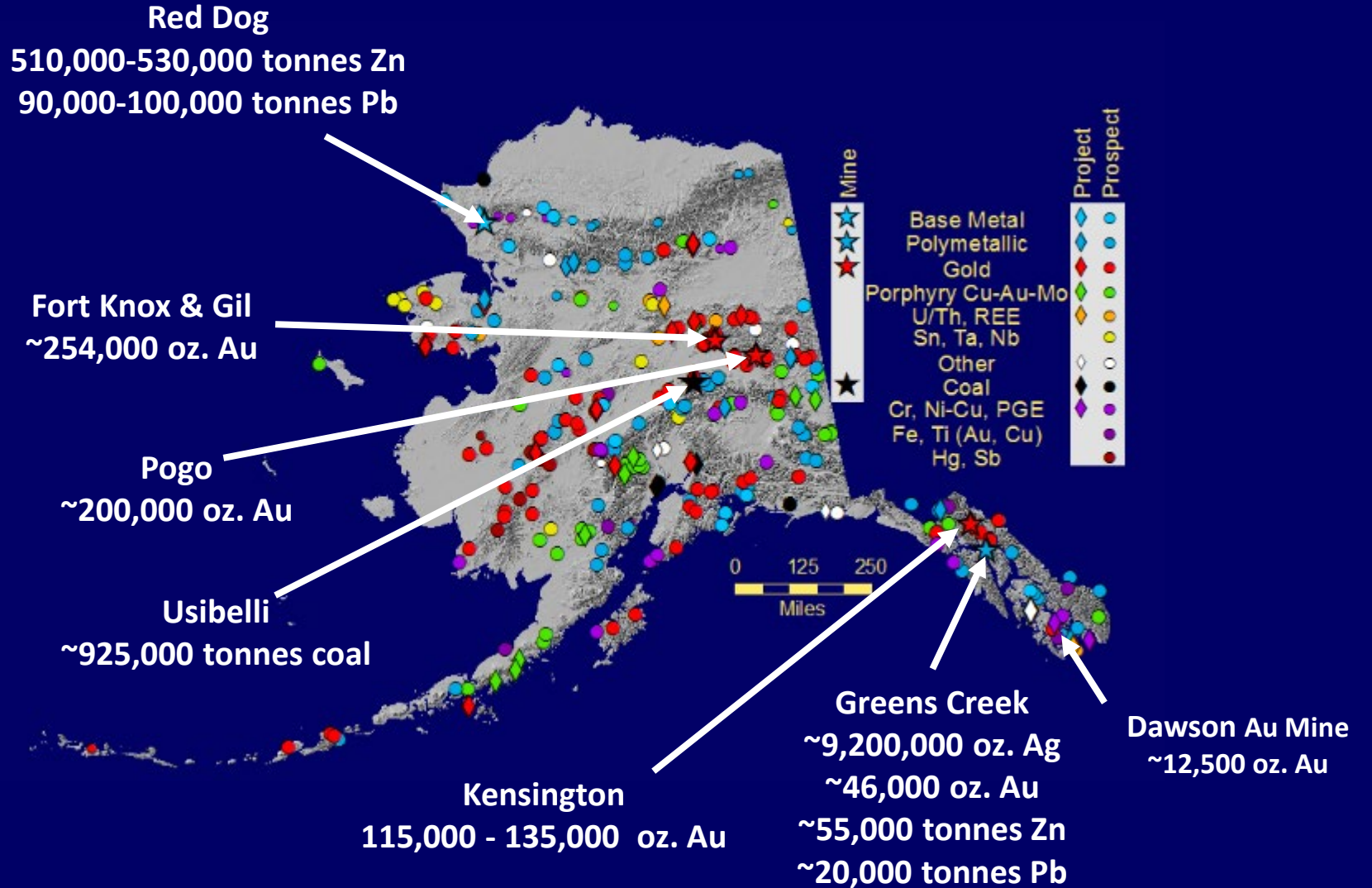
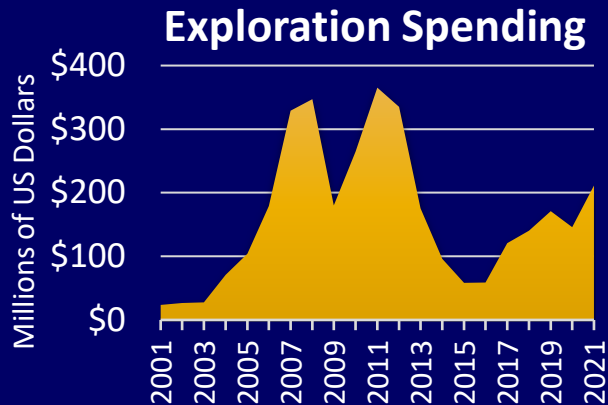
- 5th-highest Investment Attractiveness globally; 3rd among U.S. states
- Outstanding mineral potential
- Mining-friendly regulatory & fiscal policies
- Attractive geological databases



2021 PRODUCTION FORECAST

- 7 lode mines (1 new)
- 1 coal mine
- ~ 150 placer gold mines
- ~ 52 exploration projects

	2021 Production Est.
Zn	565-585,000 tonnes
Pb	110-120,000 tonnes
Au	624-644,000 oz.
Ag	~15,200,000 oz.



\$211 million estimated exploration spending (up 45% over 2020)

KINROSS - FORT KNOX MINE + GIL SATELLITE

Open-pit gold mine; intrusion hosted

Reserves & Resources (Dec. 31, 2020)	Million Tonnes	Au g/T	Ounces Au (million)
P&P reserves	230.0	0.3	2.471
Measured & Indicated	267.0	0.3	2.589
Inferred	128.1	0.3	1.057
Total	625.1	0.3	6.117

- 2021 production forecast: ~254,000 oz. Au

Gilmore (West-Pit) Expansion

- Replaced resource base
- Extends mine life through 2027
- 2022-2027 annual production: ~250,000 oz.
- Jan. 2021 – 1st gold bar pour from 172.4-MT-capacity Barnes Ck. heap leach pad

Gil Satellite-Ore Pits **NEW MINE IN ALASKA**

- ~13 km east of Fort Knox; haul ore to mill using existing road network
- First blast, Sept. 2021
- First production before year-end 2021
- Adds 80-100 jobs
- Produce ~160,000 oz. Au over 2-year mine life
- \$5.5M to explore west of Gilmore, extend Gil ore, regional exploration; convert Gil resources to reserves



**Gilmore
Expansion**



Barnes Creek Heap Leach Pad

Data from Kinross, 2021



First blast – Gil Satellite Ore

KINROSS/CONTANGO ORE – MANH CHOH (PEAK)

Planned open-pit; Au-Ag-Cu skarn, Tetlin tribe native land

Kinross purchased 70% interest for US\$93.7 million

Contango ORE retains 30% interest

- Kinross to receive management & toll milling fees for Contango's share of milling
- One-year construction
- Truck ore ~370 km to Fort Knox mill
- Will add ~220,000 oz. Au/year to Fort Knox production
- Production 2024 – 2029

2020 Program (US\$3.6 million):

- Initiated permitting
- Water & rock geochemical sampling

2021 Program (US\$18 million):

- Initiated feasibility study (FS)
- FS & initial permitting by EOY 2022
- Metallurgical and geotechnical infill drilling
- Engineering & environmental studies for permitting
- Exploration



Metric	Kinross Estimate (100% basis)
First production	2024
Life of mine	4.5 years
Total production (Au eq. oz.)	~1 million
Average AISC (Au eq. oz.)	~\$750/oz
Mined gold grade	~6 gpt
Initial capital expenditures	~\$110 million

Dec. 31, 2020	Million Tonnes	Au g/T	Ounces (million)	Ag g/T	Ounces (million)
Measured	0.331	6.4	0.068	16.7	0.178
Indicated	6.110	4.0	0.778	14.1	2.762
Inferred	0.941	2.7	0.081	16.1	0.486
Total	7.382	3.9	0.927	14.5	3.426

NORTHERN STAR - POGO MINE

Underground, shear zone/quartz vein-hosted gold

Estimated 2021 Production: ~200,000 oz Au

- FY2022 Guidance: 220,000-250,000 oz Au
- Increasing Au production to 300,000 oz/yr by 2023
- Endowment ~ 11 M oz, and expanding resource

2021 Drilling:

- Underground: resource definition and conversion across Liese, South Pogo, and Fun Zone vein systems in underground mining areas
- Surface exploration: resource definition drilling in Goodpaster zone and Central Gap prospect

2021 Activities:

- Completed mill expansion, from ~1.0 to 1.3 M tonne/year capacity
- Replaced primary conveyor belt that transports ore from underground to processing plant
- Mill bottlenecks removed; throughput increasing

March 31, 2021	Million Tonnes	Au g/T	Ounces (million)
Reserves	5.852	8.0	1.498
Resource	22.897	9.4	6.907
Total	28.749	9.12	8.405



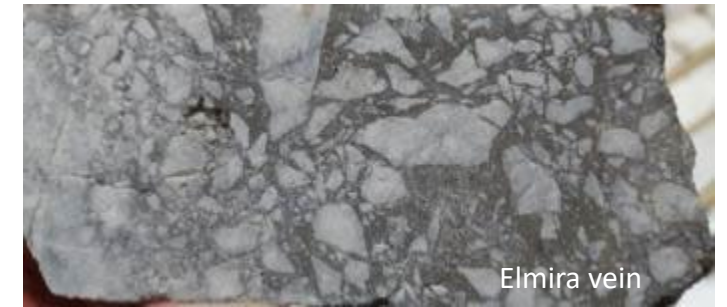
COEUR - KENSINGTON MINE

Underground mesothermal gold quartz-vein system

- Expected production (2021): 115,000-130,000 oz. Au
- Current mine life (reserves) through 2023
- Mining Kensington, Jualin, Raven veins:

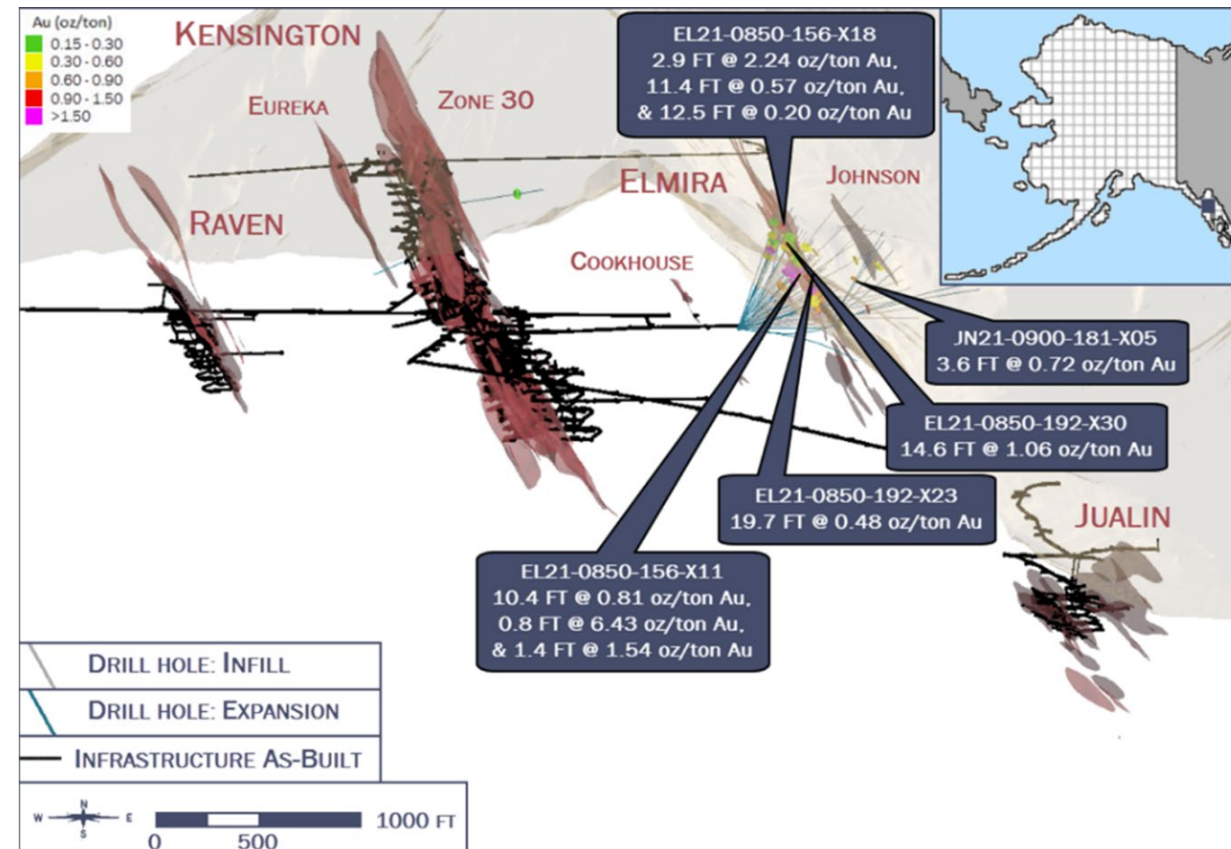
~US\$13M 2021 drilling program

- Infill drilling Elmira and Upper Kensington veins
- Expansion drilling at Elmira, Johnson, Jualin, Raven veins
 - Elmira (4.5 m of 36.3 g/t gold) vein
 - Johnson (1.1 m of 24.7 g/t gold) vein
- Exploration drilling at Big Lake, Gold King, Comet targets
- Extend mine life; identify growth opportunities
- Elmira development drift; refine vein shapes; maiden reserve in 2022;
- Plan to start mining Elmira in 2023



Dec. 31, 2020	Million Tonnes	Au (g/T)	Au Ounces (million)
Reserves	1.520	6.78	0.331
Measured & Indicated	3.260	7.22	0.830
Inferred	1.449	7.72	0.394
Total	6.230	7.08	1.555

Data from Coeur Mining, 2021



HECLA - GREENS CREEK MINE

Volcanogenic massive sulfide deposit, Southeast Alaska

Dec. 31, 2020	Million Tonnes	Zn %	Pb %	Au g/T	Ag g/T
Reserves	8.145	7.3	2.8	2.8	387
Measured & Indicated	8.069	8.3	3.0	3.1	403
Inferred	1.603	7.0	2.5	2.8	413
Total	17.817	7.7	2.9	2.9	397

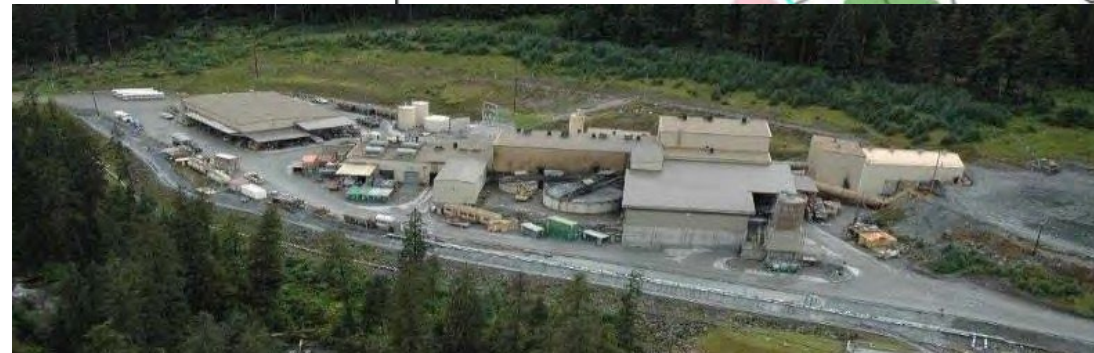
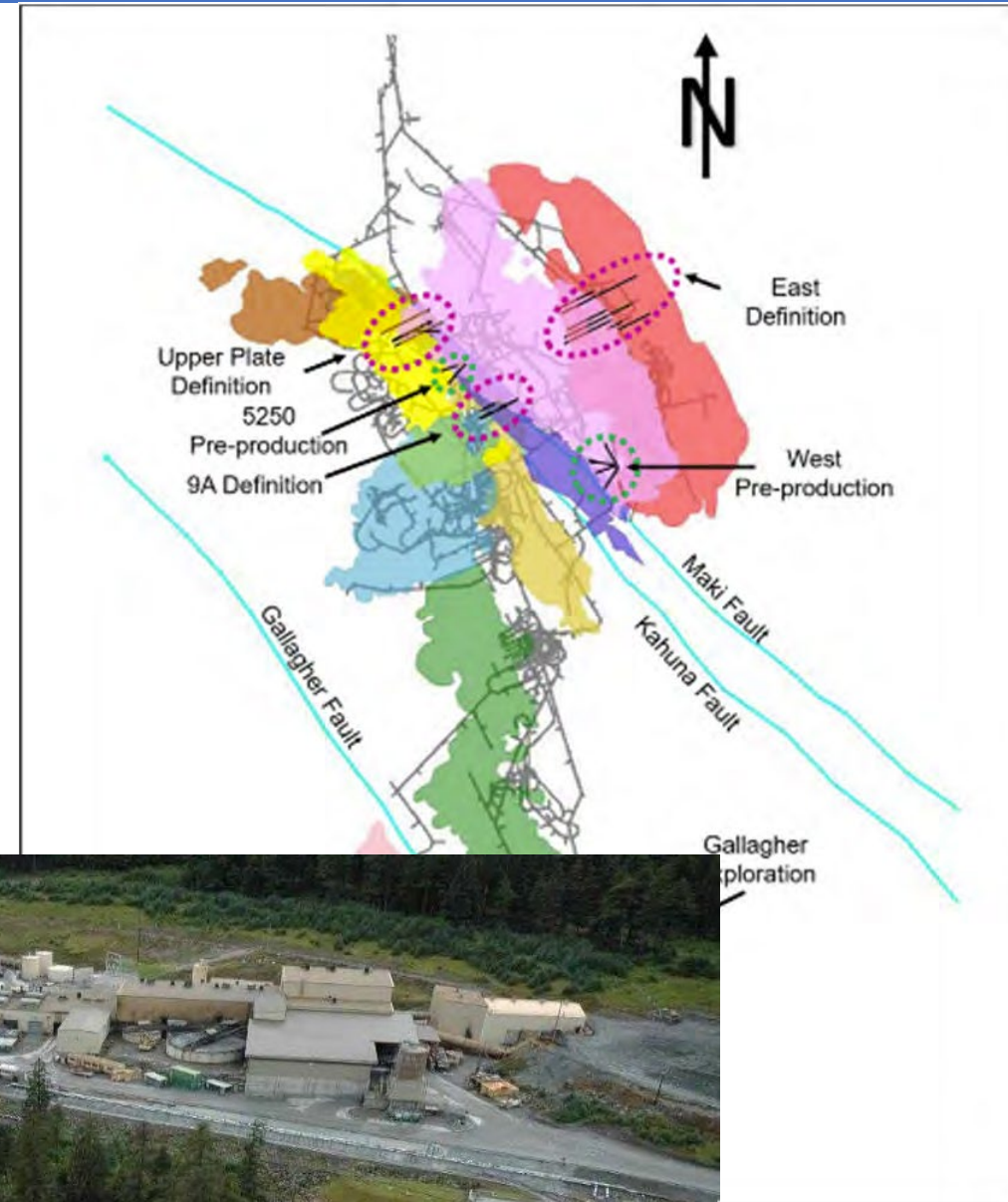
2021 Production estimates:

9.2 M oz. Ag; 46,089 oz. Au; 55,000 tonnes Zn; 20,000 tonnes Pb

- Mine life from only reserves is expected to be to 2031.
- Leading the way for Hecla because of low costs per ounce silver.
- In 2020, began accessing the East Ore Zone and Upper Plate reserves at shallow depths in the mine with nearby infrastructure.

Exploration:

- Expanding and upgrading resources in the Upper Plate, 9A, and Northwest West ore zones
- Surface drill testing the Lil'Sore and 5250 targets



TECK - RED DOG MINE

Sediment-hosted Zn-Pb-Ag deposit

Open pit; Began operating in 1989

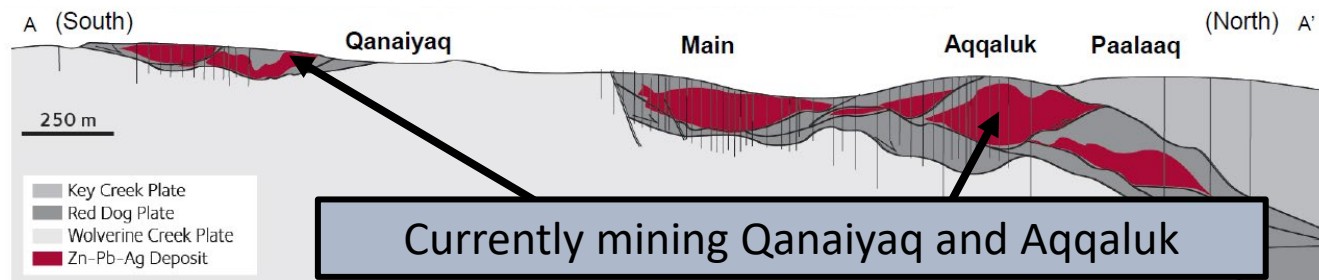
Underlying landowner: NANA Regional Corp.

2021 Production Estimates:

510,000 to 530,000 tonnes Zn;

90,000 to 100,000 tonnes Pb

- VIP2 mill-upgrade project was commissioned in 2020
- Expected to improve throughput by ~15%
- Advanced grinding control realized a ~9% increase in production rates
- Increased spending on tailing-related projects



Dec. 31, 2020	Million Tonnes	Zn %	Pb %	Ag g/T
Reserves	46.0	12.9	3.6	67.5
Measured & Indicated	8.5	7.7	5.3	92.0
Inferred	9.1	12.5	4.5	88.3
Total	63.6	12.1	4.0	73.5

RED DOG AREA EXPLORATION

Aktigiruuq/Anarraaq

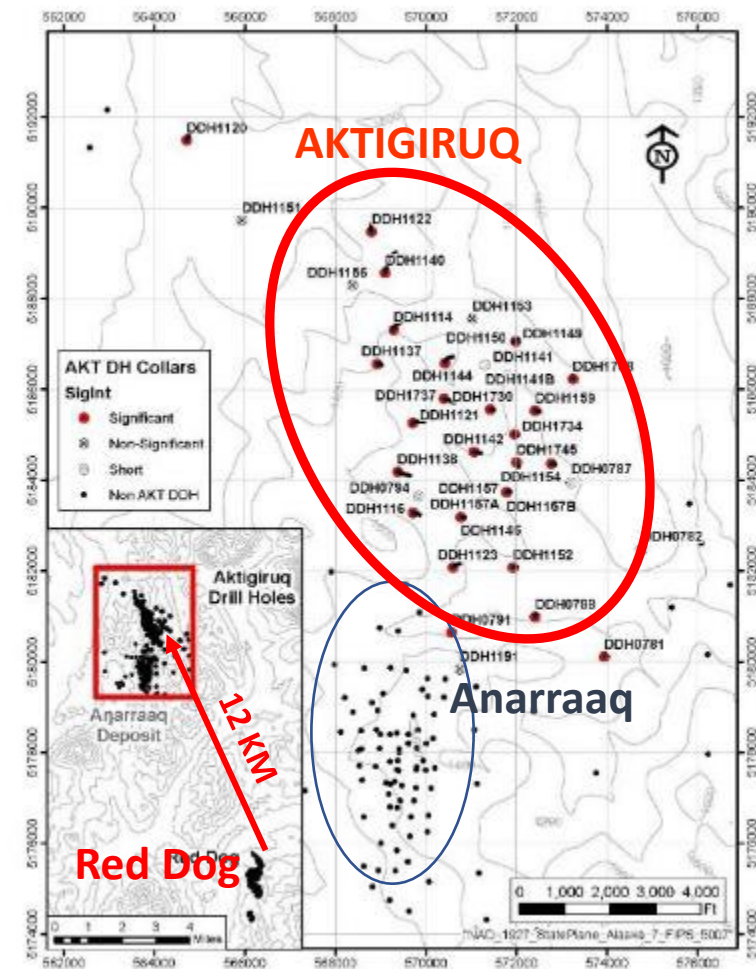
Sediment-hosted massive sulfide deposits

- Anarraaq inferred resource (Dec 2016): 19.44 M T @ 14.4% Zn, 4.2% Pb, 73 g/T Ag
- Aktigiruuq exploration target (Sept. 2017): 80-150 M tonnes @ 16-18% Zn+Pb
- Significant potential mine-life extension in Red Dog District

2017-2019 program:

- 2016 drilling - 54.6 m @ 16.8% Zn, 3.63% Pb (DDH1737)
- Applied for permit to build road
- Resource-definition drilling at Aktigiruuq and Anarraaq
- Ore bodies are 400 to 1,000 m below surface

- Drilling and exploration fieldwork resumed in 2021

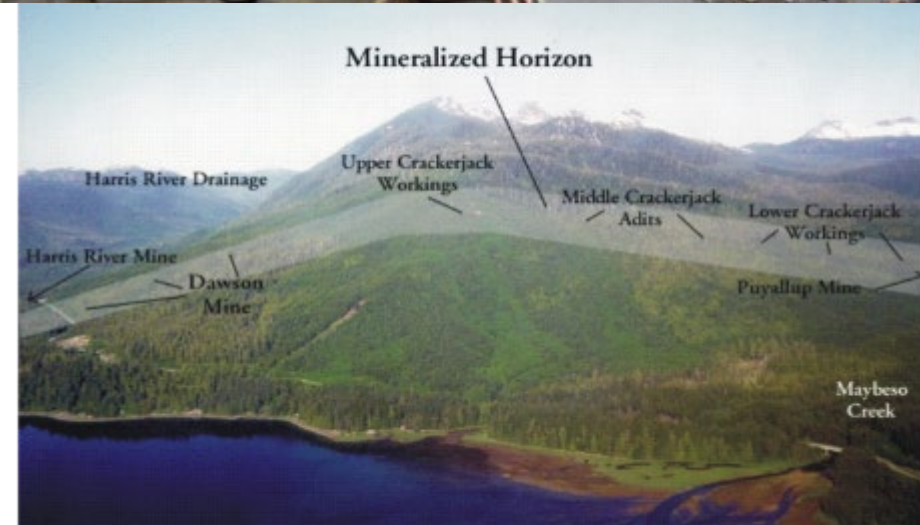


SUNDANCE MINING GROUP – DAWSON MINE

- 2.4-km-long, N-S-oriented, orogenic gold vein-fault system
- Mining Humboldt vein system
- Vein thickness: 0.6 m to 1.2 m (up to 1.8 m)
- Initiated production in April 2019; 50 employees
- Room-and-pillar, updip-jackleg-slusher underground mine
- Mill ~150 short tons/day (est.); gravity separation
- Average mill feed grade 2021 is 0.68 oz. Au/ton
- 2021 recovery averaging 86.5%
- Production: 12,400 oz. Au (as of Nov. 29, 2021)

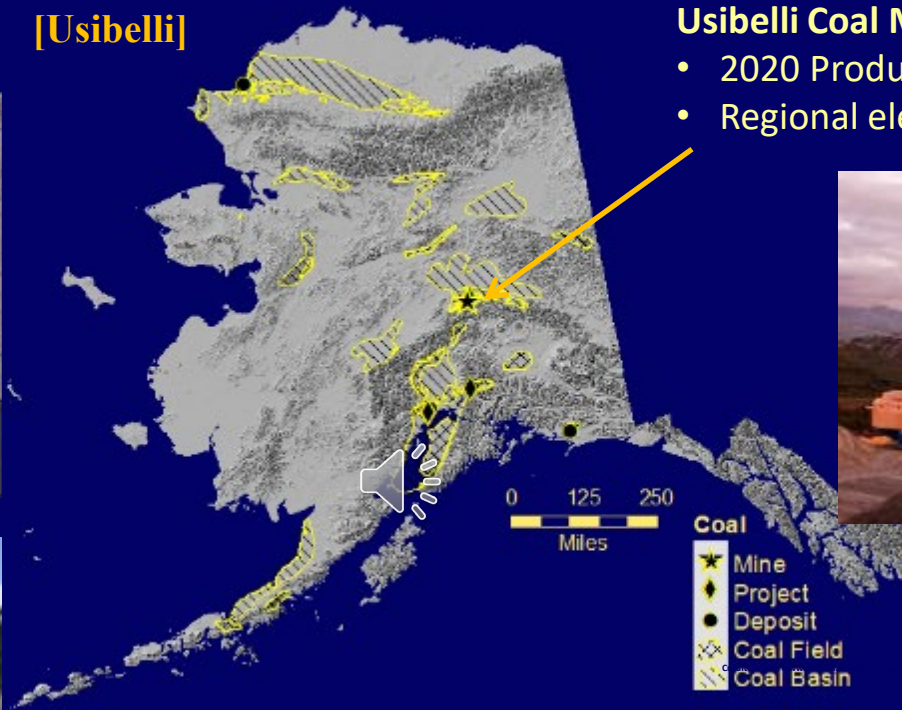
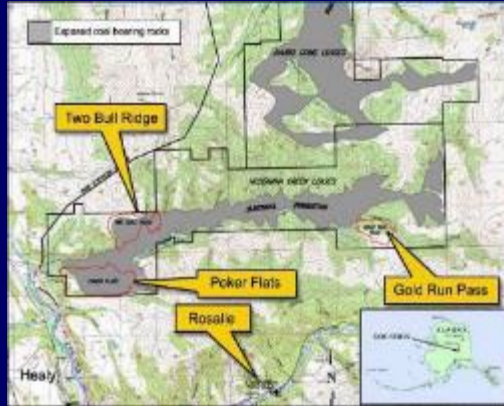


Data from Sundance Mining Group, 2021



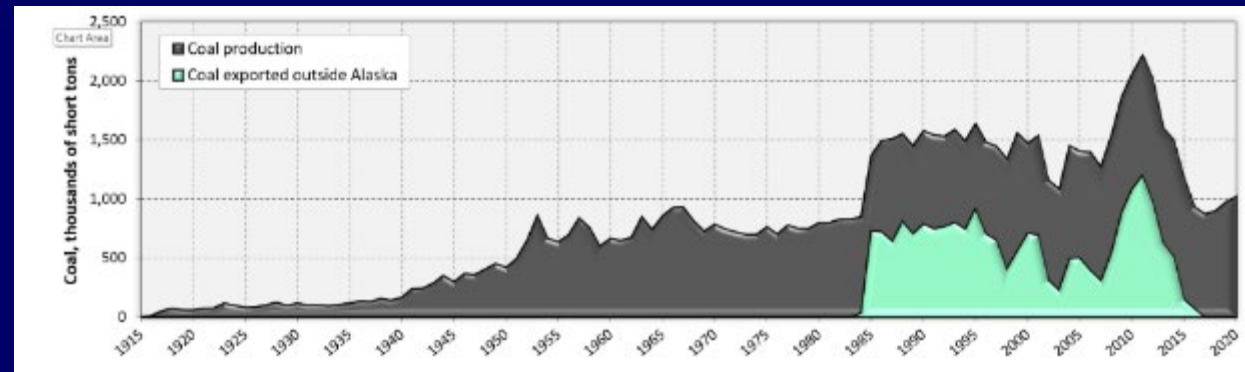
USIBELLI MINE

Usibelli Coal Mine [Usibelli]



Usibelli Coal Mine:

- 2020 Production ~925,300 tonnes
- Regional electrical generation



DONLIN GOLD - DONLIN

Proposed open-pit gold mine; structurally controlled, intrusion related

[50% Barrick Gold Corp./50% NovaGold Resources Inc.]

Underlying ownership: Calista Corp. & Kuskokwim Corp.

2020 Program – US\$40M:

- 85 holes, 23,400-m DDH program in ACMA & Lewis areas

2021 Program – US\$38M:

- 79 holes, 24,200-m DDH program in ACMA area & Divide zone

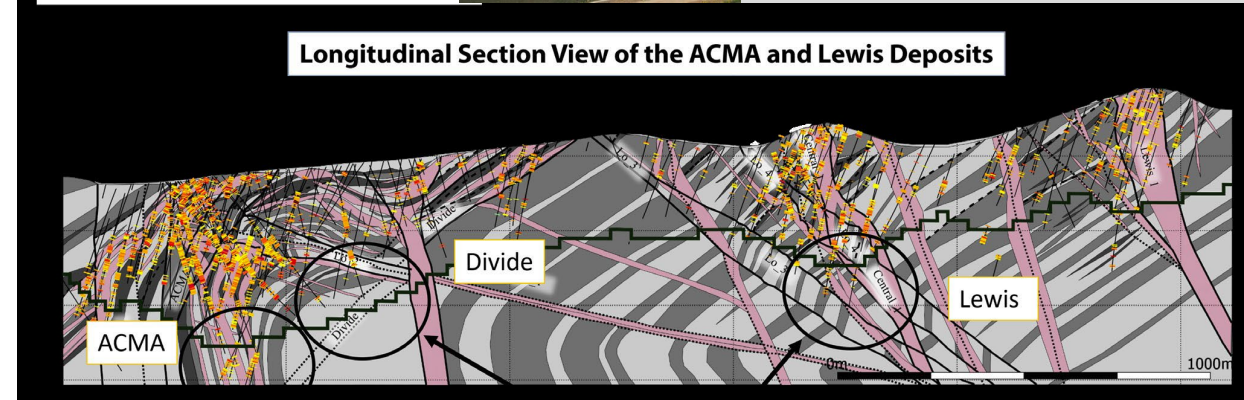
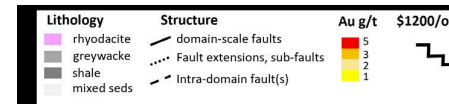
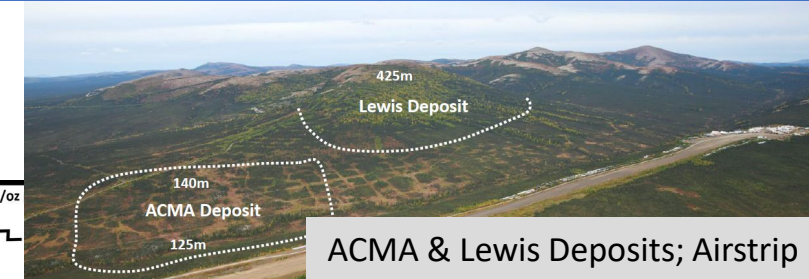
- Significant high-grade intercepts point toward potential feeder zones

DC-1970: 92.02 m grading 7.8 g/T Au

DC21-1963A: 40.97 m grading 10.5 g/T Au

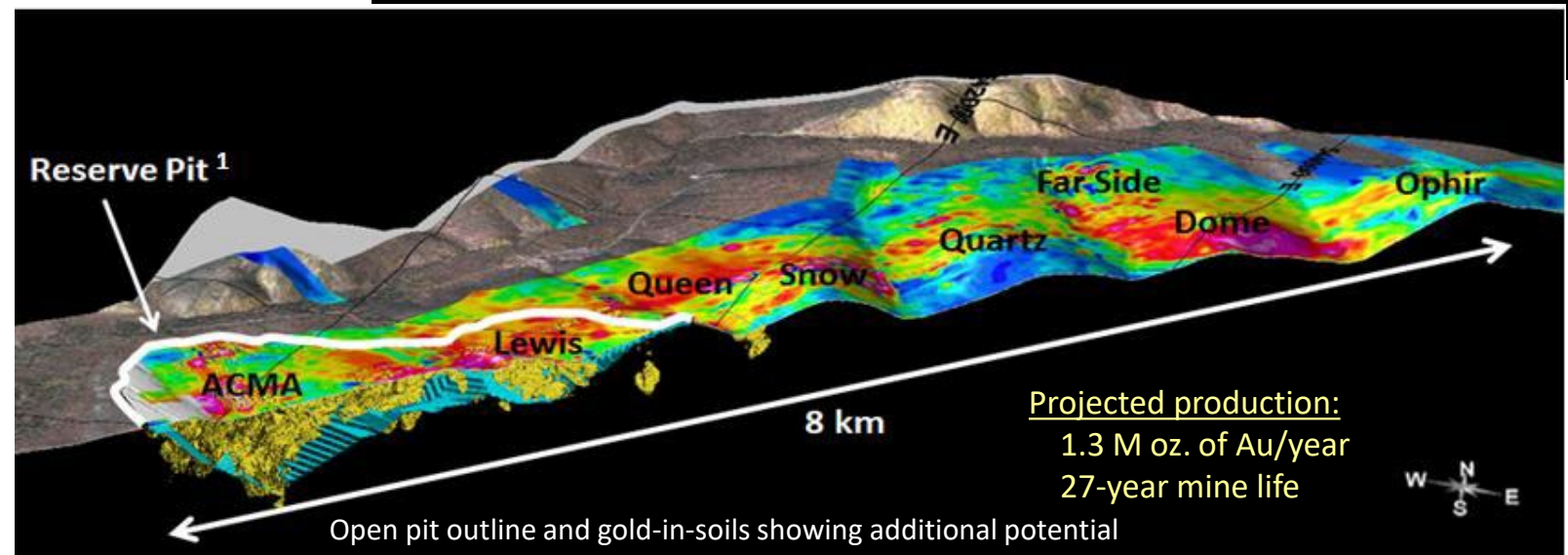
DC-1969: 47.78 m grading 9.0 g/T Au

- June 1, 2021 updated NovaGold NI 43-101 report



June 2021	Million Tonnes	Au (g/T)	Ounces (million)
Proven & Probable	504.8	2.09	33.9
Resources, inclusive of reserves*			
Measured & Indicated*	541.3	2.24	39.0
Inferred	92.2	2.02	5.99
Total	633.6	2.21	45.0

Data from Donlin Gold, 2021



INTERNATIONAL TOWER HILL - LIVENGOOD

Metasediment-hosted, intrusion-related gold

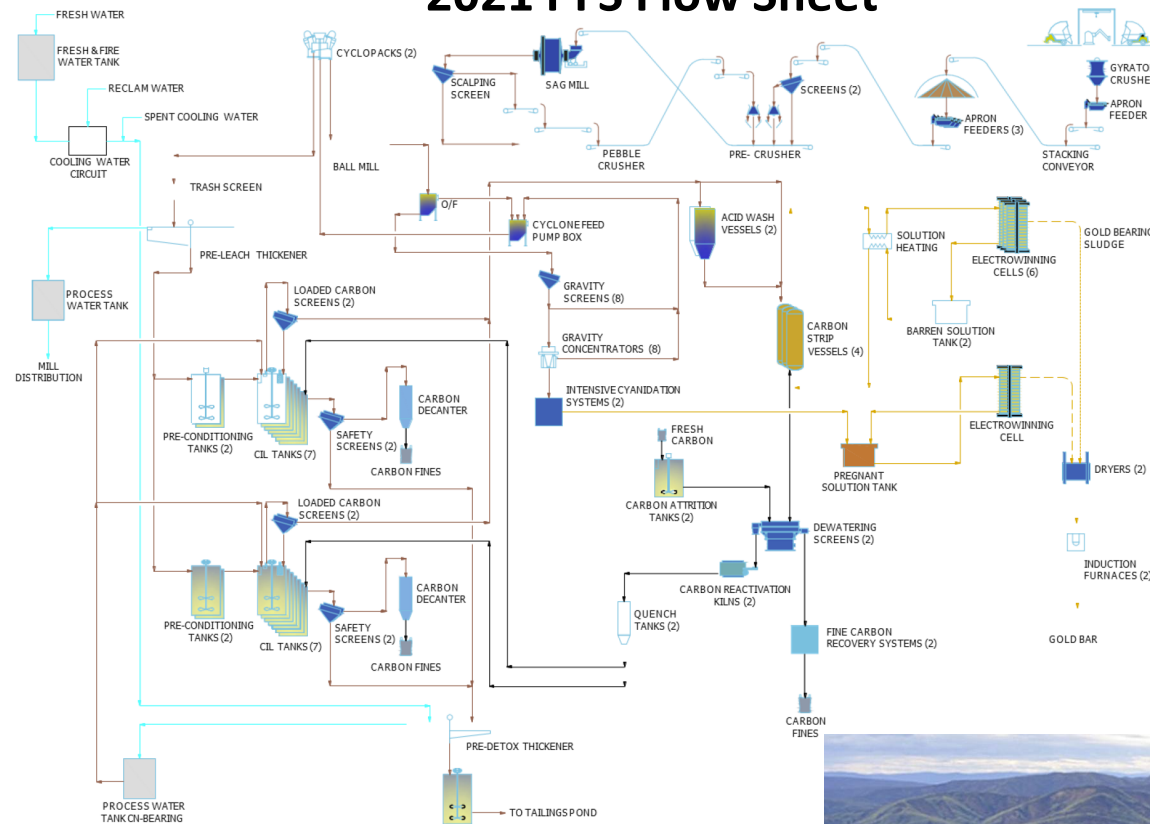
2021 program (US\$5.6M):

- Released PFS
- Waste-rock geochemical characterization
- Baseline environmental work

Oct. 2021 PFS:

- 6.43 M oz. of Au over 21-yr mine life
- 306,200 oz./yr. LOM
- 1.2 strip ratio, 65,000 tonnes/day
- CAPEX(initial) = US\$1.93B
- AISC production = US\$1,171/oz. Au
- Whittle & BBA collaboration on project optimization
- Detailed geological model
- Conservative resource modelling
- Robust metallurgical test work
- First-principles approach on engineering

2021 PFS Flow Sheet



Aug. 20, 2021	Million Tonnes	Au g/T	Ounces (million)
Proven/Probable	430	0.65	9.0
Measured, Indicated & Inferred***	705	0.60	13.6

***Inclusive of reserves



PEBBLE LIMITED PARTNERSHIP - PEBBLE

Porphyry Cu-Mo-Au-Ag (Re, Pd) Deposit

2021 program:

- Continue environmental baseline studies; engineering studies
- Inspection, containment, and permanent closure of select drill holes and monitoring wells to comply with State regulations

2022: USACOE ROD under appeal



Dec. 2017	Million Tonnes	Cu Billion pounds	Cu (%)	Au (g/T)	Mo (ppm)	Ag (g/T)
Measured	527	4	0.33	0.35	178	1.7
Indicated	5,929	53	0.41	0.34	246	1.7
Inferred	4,454	25	0.25	0.25	226	1.2
TOTAL	10,910	82	0.34	0.30	235	1.5

-2020 October: 2.6M kg Re (M&I) and 1.6M kg Re (Inferred)

PEA (Sept. 2021):

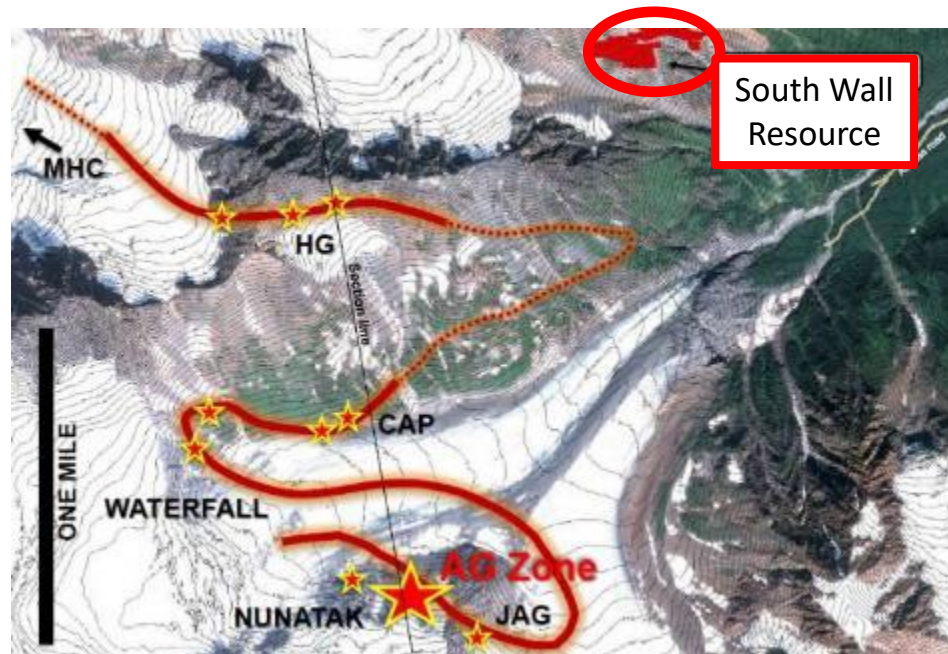
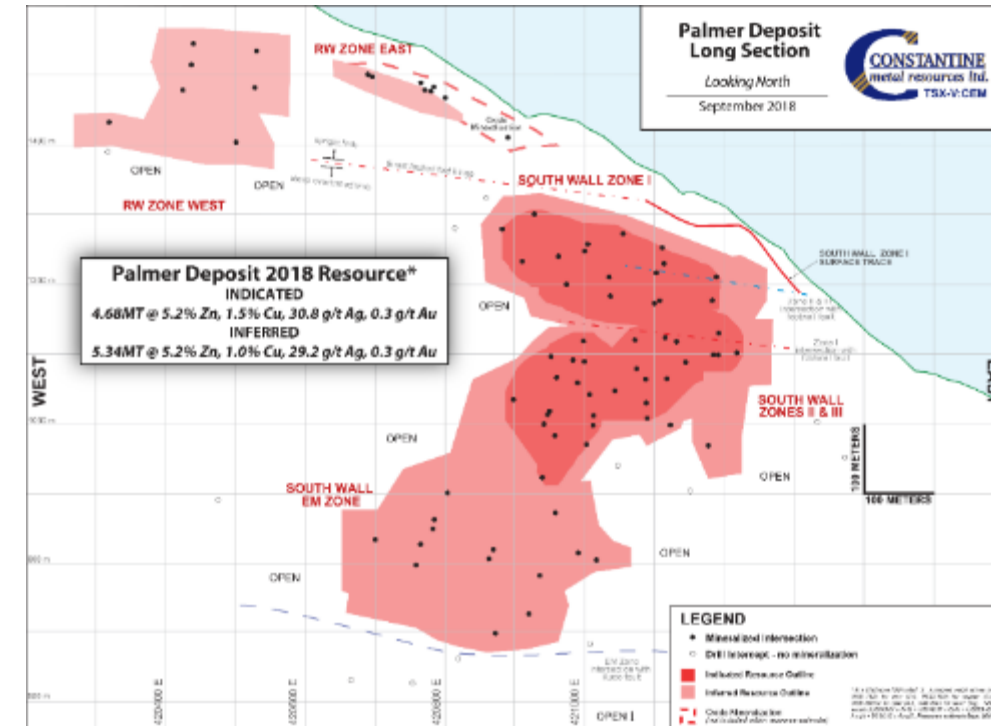
- Open-pit mine; ~20-year mine life; 180,000 T/day
- Long-term metal prices: IRR=15.8% & NPV(7%)=US\$2.3B
- LOM metal production: 6.4 B lbs. Cu, 7.3 M oz. Au, 300 M lbs. Mo, 37 M oz. Ag, 230,000 kg Re
- Ave. annual production: 320 M lbs. Cu, 363,000 oz. Au, 1.8 M oz. Ag, 15 M lbs. Mo, 12,000 kg Re
- Evaluates expansion scenarios and onsite gold plant

CONSTANTINE/DOWA - PALMER

Volcanogenic massive sulfide, SE Alaska

[Constantine Metal Resources Ltd. (51%) & Dowa Metals & Mining Alaska Ltd. (49%)]

Dec. 2018	Million Tonnes	Cu %	Zn %	Ag g/T	Au g/T	Barite %
Indicated	4.68	1.49	5.23	30.0	0.30	23.9
Inferred	9.6	0.59	4.95	69.3	0.39	27.7
Total	14.3	0.89	5.04	56.6	0.36	26.5



2021 program (US\$8.8M):

- 8 DDH, 2,917 m
- Infill drilling down-dip inferred South Wall Cu-Zn-Ag-Au resource
- Geotech./enviro. drilling for planned UG exploration program & advancing project to feasibility
- 6.7 line-km seismic survey & 12 sonic holes; depth to bedrock & stratigraphy Glacier Ck. valley

AMBLER METALS - ARCTIC

Volcanogenic massive sulfide, Northwest Alaska

[50% Trilogy Metals Inc./50% South 32 Limited]

Aug. 2020	Million Tonnes	Cu %	Zn %	Pb %	Au g/T	Ag g/T
Probable Reserves	43.4	2.2	3.1	0.54	0.47	35

2020 Feasibility Study

- 3-year payback at US\$3.00/lb. Cu
- After-tax NPV(8%) of US\$1.1B
- 27% IRR
- 12-year mine life

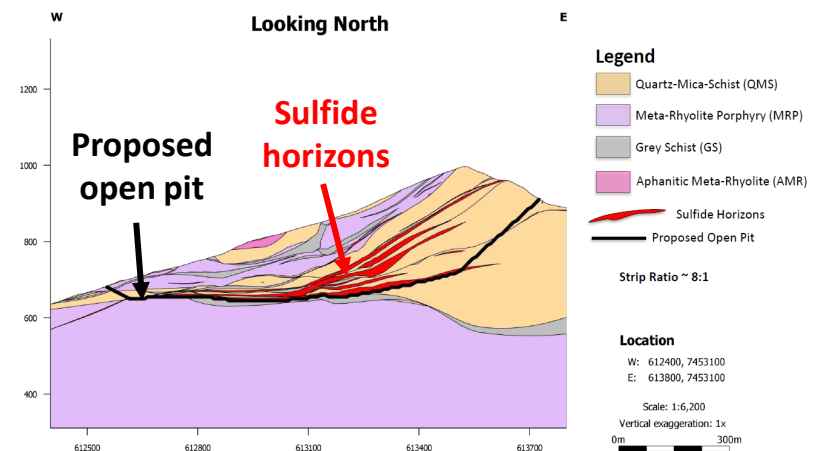
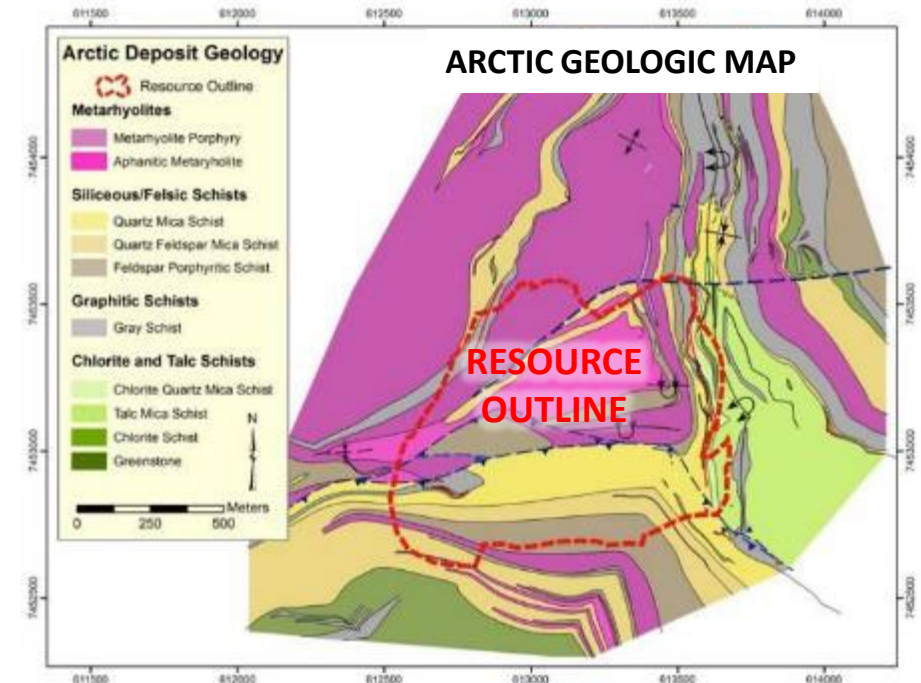
2021 program (US\$27 M):

- 18 holes, 4,131 m, infill & metallurgical drilling at Arctic
- 6 holes, 2,325 m for near-Arctic exploration, mapping & sampling
- Exploration on 3 new VMS-prospective claim blocks elsewhere

Ambler Mining District Industrial Access Road project

- Final EIS issued March 27, 2020 for Ambler Access Road
- Jan. 2021 AIDEA received "Rights-of-Way" from BLM & NPS
- Feb. 2021 Development Funding Agreement with AIDEA (US\$13M detailed engineering for road)

Data from Trilogy Metals, 2021



GRAPHITE ONE – GRAPHITE CREEK

Graphite Creek, Seward Peninsula, Alaska

Graphite:

- Large-flake graphite deposit in USA
- Naturally exhibits morphological characteristics of already processed material
- Geophysics indicates 18 km of potential

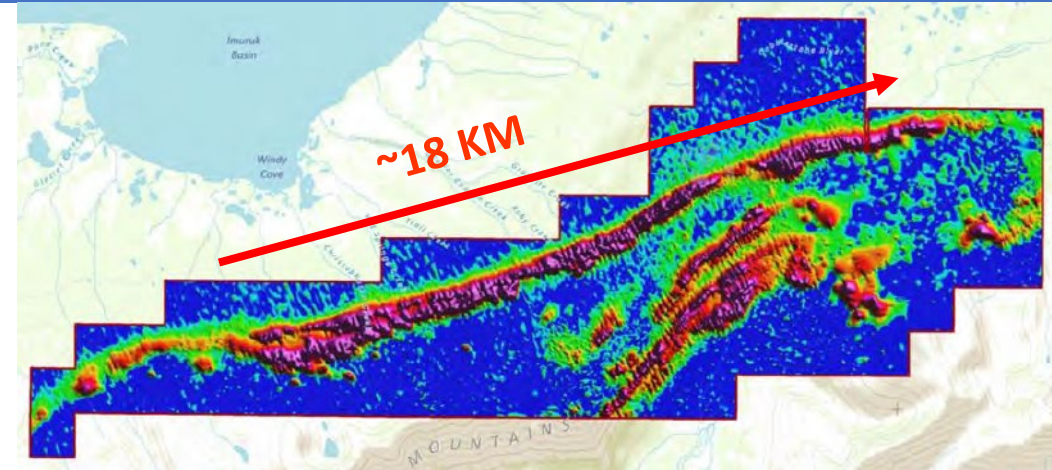
March 2019 5% cut-off	Tonnes (Million)	Cg %	Graphite (Tonnes)
Measured	1.69	8.0	135,171
Indicated	9.26	7.7	715,363
Inferred	91.89	8.0	7,342,883
Total	102.84	8.0	8,193,417

2021 program:

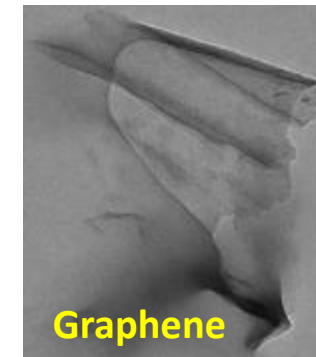
- 8 holes, 1,695 m HQ core in resource area
- Core drilling for geotechnical & groundwater investigations
- 5 holes, 357 m sonic drilling in dry tailings/waste-storage area

Ongoing work:

- PFS scheduled for release in Q1 2022
- Update resource model in 2022 FS
- R&D on graphite-products (battery grade anode for EV and energy storage sectors, fire suppressant, synthetic diamond dust and gemstones, graphene, industrial graphite, etc.)

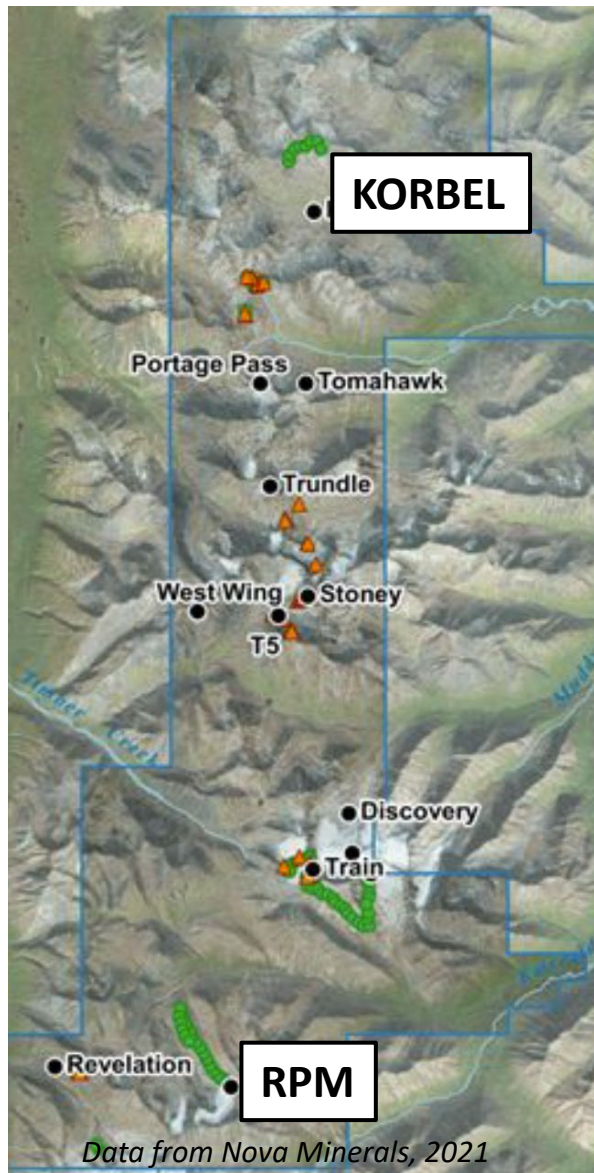


~18 km of potential revealed by Time-Domain EM Survey (red=conductive graphitic units)



NOVA MINERALS – ESTELLE PROJECT

Intrusion-hosted Au system



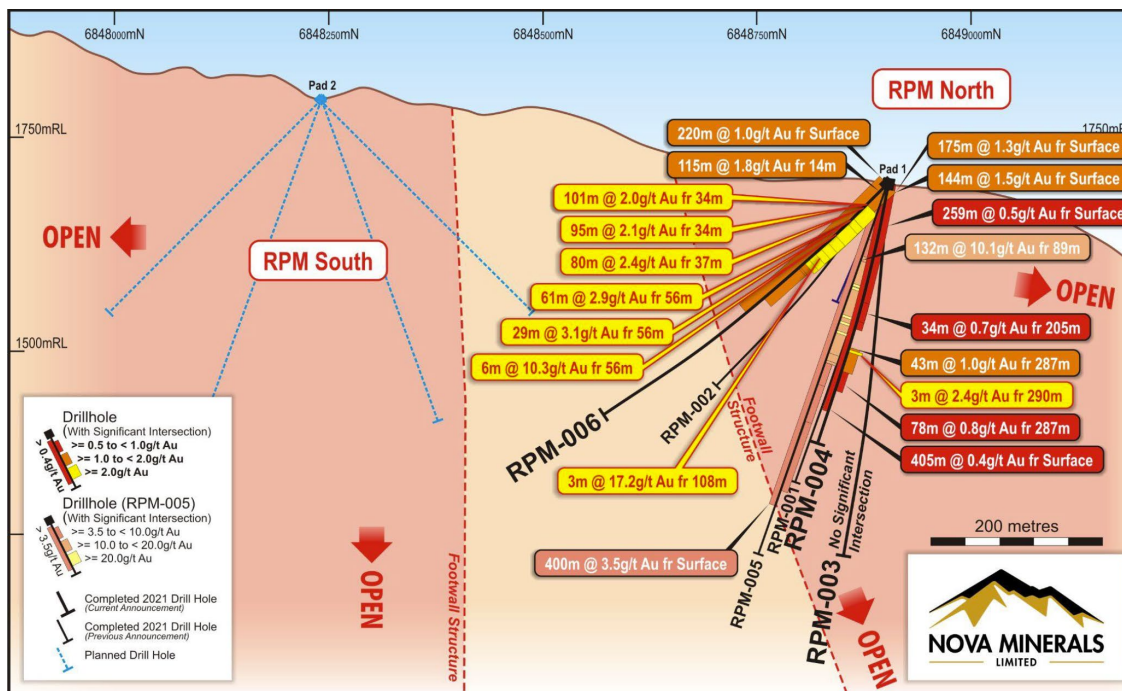
2021 Program:

- XRT ore-sorting study shows up to 10X upgrade
- New Korbel Main mineral resource estimate
- Maiden resource at RPM
- Commissioned on-site prep lab (7,500 samples/mo.)

Drilling:

- Planned 80,000 m
- High-grade gold in Korbel feeder structure
- RPM North: 400 m @ 3.5 g/T Au; incl. 132 m @ 10.1 g/T Au

Dec. 2021	Tonnes (millions)	Au (g/T)	Ounces (million)
Korbel Main	876	0.3	8.1
RPM North	23	2	1.5
Global Ind.+Inf Resource	899	0.3	9.6



HIGHGOLD MINING – JOHNSON TRACT

High grade Au-Cu-Zn-Ag-Pb polymetallic deposit, Alaska Peninsula

JT Resource (June 2020)	Million Tonnes	Au Eq (g/T)	AuEq Ounces (million)
Indicated	2.14	10.93	0.75
Inferred	0.58	7.16	0.134
Total	2.72	10.1	0.88

2021 Program (US\$8.2M):

-3 rigs, 20,000 m planned; 10,000 m completed as of Sept. 7

JT deposit infill drilling

-DDH JT21-125: 56.6 m @ 18.69 g/T Au, 2.43% Zn, 0.47% Cu

Difficult Creek prospect

-6.4 m @ 578 g/T Au and 2,023 g/T Ag

-Geological mapping, sampling

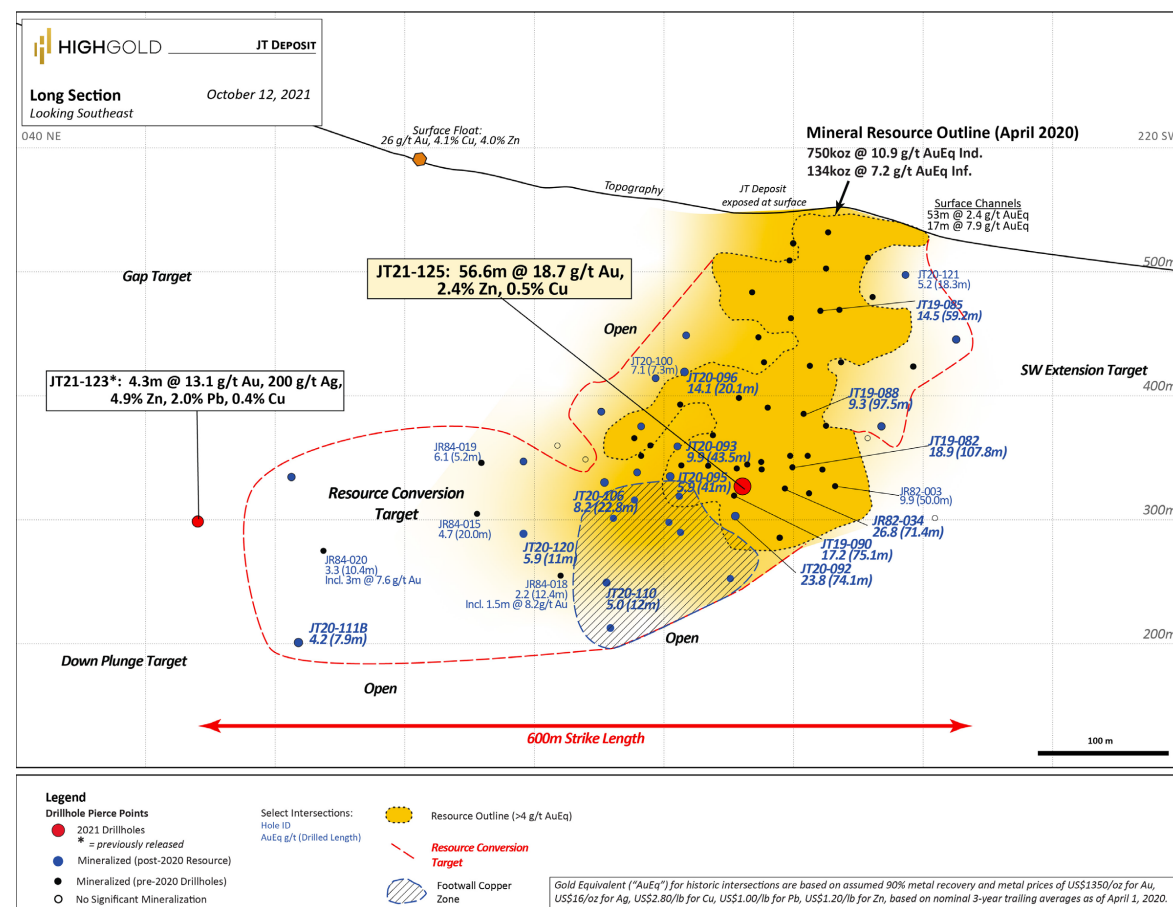
-Airborne and ground geophysical surveys

-Phase 1 metallurgical program & QEMSCAN studies

-Released NI43-101 report August 9, 2021

-Updating resource in early 2022; drilled 30,000 m since

maiden resource



FREEGOLD - GOLDEN SUMMIT; SHORTY CREEK

Intrusion-related gold system - Fairbanks District

Golden Summit

+500,000 oz past production underground; grades >1 oz. Au/T
 +6.75 M oz. placer Au recovered from streams draining project area

2021 Program:

Objectives:

- Testing connection between high-grade Cleary Hill Au-vein system & Dolphin intrusion-hosted Au system
- Determine orientation and extent of mineralization; remains open
- 3 drill rigs, 68 DDH, 38,000 m completed; ave. depth 600 m

Select results:

- DDH GS2107: 231.3 m @ 1.22 g/T Au (N Dolphin contact)
- DDH GS2111: 106.7 m @ 0.97 g/T Au (Tolovana Vein)
- DDH GS2127: 9.6 m @ 0.74 g/T Au (Cleary Vein)
 2.2 m @ 30.39 g/T Au (Wyoming Vein)
 3 m @ 36.8 g/T Au (Wackwitz Vein)
- DDH GS2017: 1.7 m @ **588 g/T Au**

Shorty Creek

- 3,400 m DDH program completed
- Assays pending

Dolphin Resource (Jan. 2016)	Million Tonnes	Au Eq (g/T)	Ounces (million)
Indicated	61.5	0.69	1.36
Inferred	71.5	0.69	1.58
Total	132	0.69	2.94

Plan to update resource calculation in 2022 once 2021 DDH program completed; will incorporate drilling conducted in 2017 and 2020 as well



DDH GS2127 intersected 2.2 m @ 30.39 g/T Au (Wyoming Vein)

AVIDIAN GOLD – GOLDEN ZONE

Breccia Pipe:

Aug. 2017	Tonnes	Au (g/T)	Ounces Au
Indicated	4,187,000	1.99	267,400
Inferred	1,353,000	0.83	35,900
Total	5,540,000	1.71	303,300

Mayflower Extension Zone (MEZ):

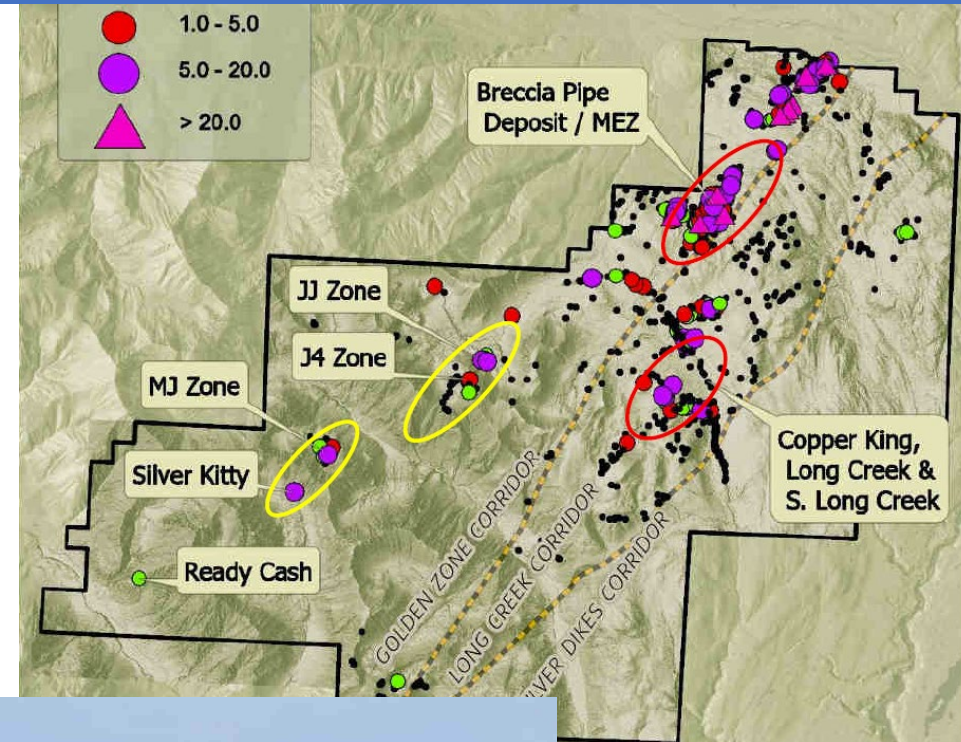
-800-m-wide, NE-trending, gold-bearing structural zone NE of Breccia Pipe

2021 Program:

- 27 RC holes; 3,288 m; assays pending
- MEZ, Copper King, & Long Creek areas
- MEZ – Resource-expansion; now drill-defined to 600 m; open
- Copper King/Long Creek skarn; 2019 drilling yielded 9.1 m @ 8.71 g/T Au, 80.8 g/T Ag, 3.57% Cu
- 1,200 line-km drone magnetic survey
- Recon. mapping/sampling JJ-J4-MJ & Silver Kitty targets

Intrusion-related gold system Hosted by:

- Intrusions (68 Ma)
- Skarns
- Conglomerate
- Structural zones

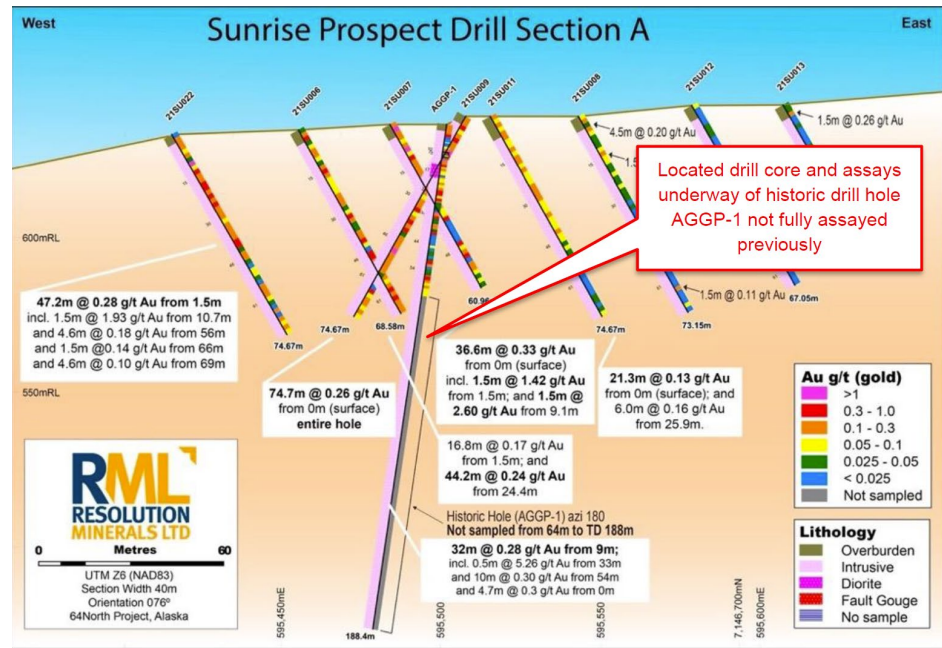


RESOLUTION MINERALS – 64 NORTH

Pogo-style Au veins, Fort-Knox-style, & Porphyry systems

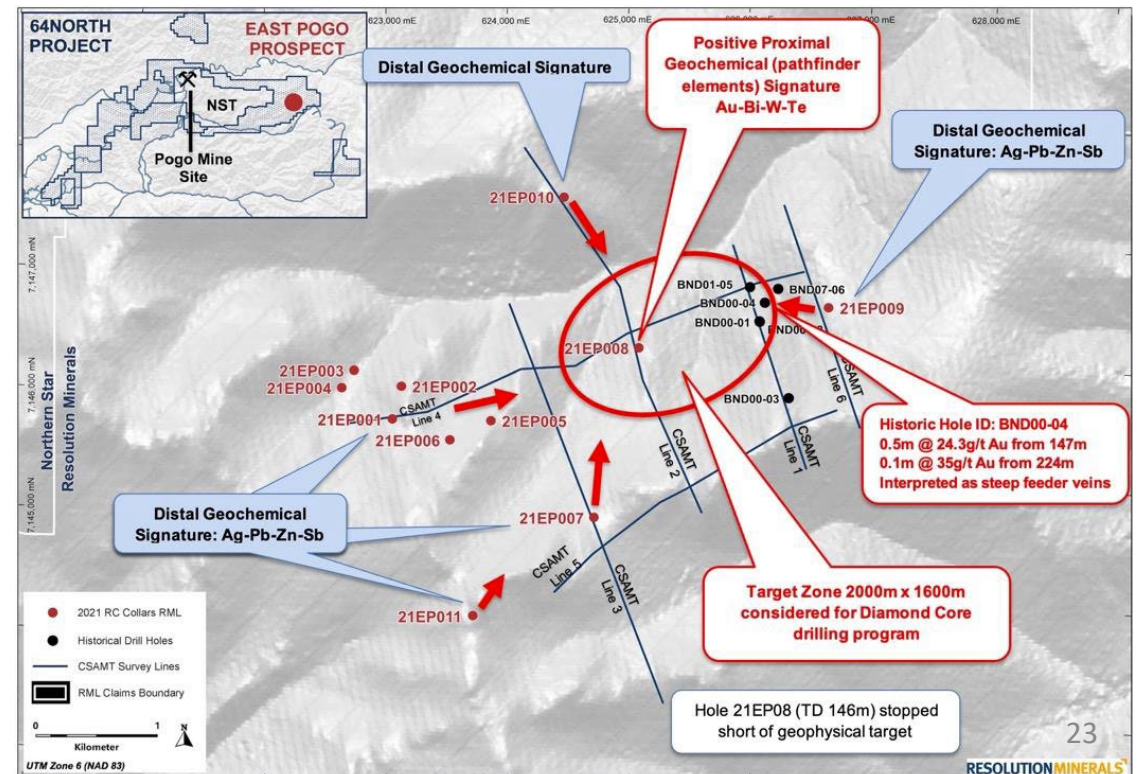
2021 Program:

- Regional exploration
- Tourmaline Ridge prospect trenching
- Sunrise prospect - re-analyzed historical core



East Pogo prospect:

- 12 RC holes, 1,663 m
- Testing geophysical anomalies
- Intersected altered host rocks, abundant quartz-sulfide veining; using geochemistry to vector drilling



SAM ALASKA LLC – NAOSI/MON/UNCLE SAM

Joint venture of Koza Ltd. (USA) Inc. (operator and majority interest) and Great American Minerals Exploration, Inc. (GAME)

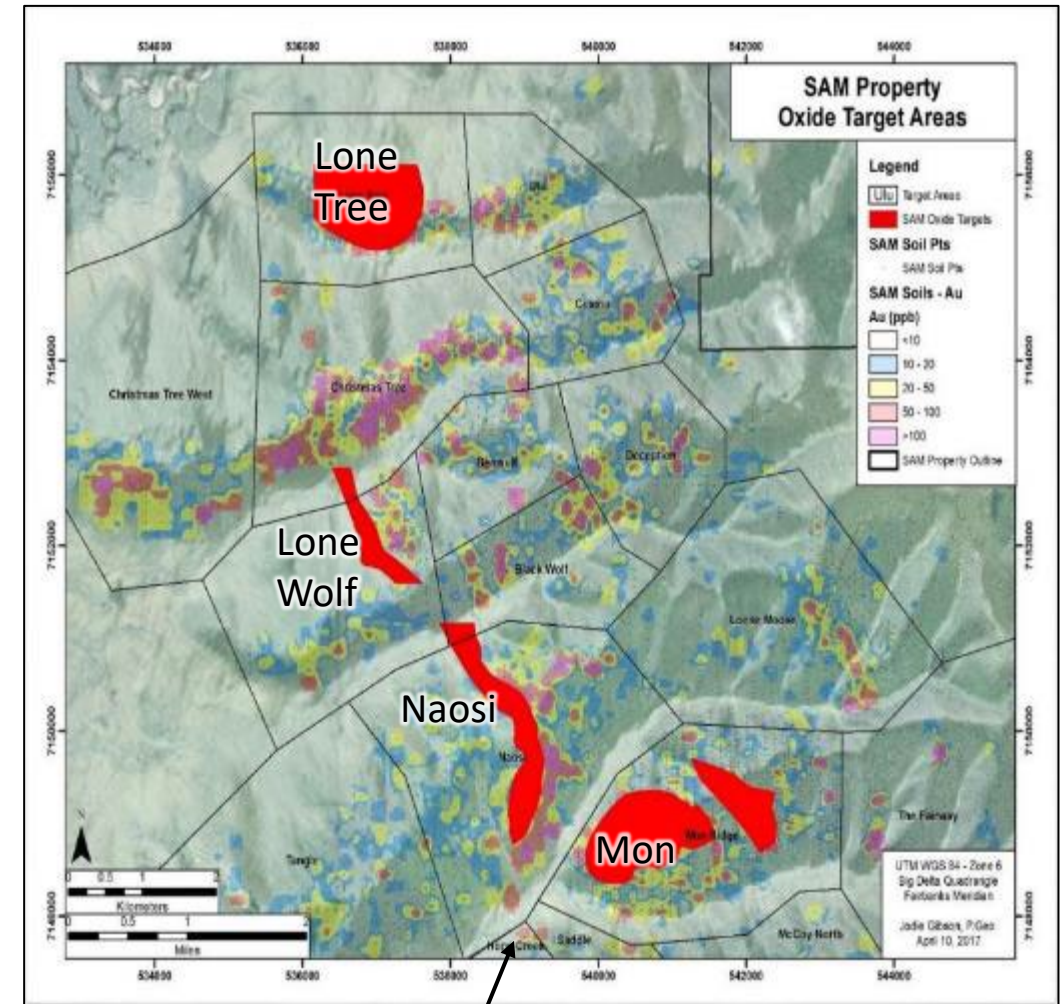
2021 Program:

- 10,590 m resource upgrade and exploration program:
 - Naosi (58 RC, 10 DDH); Mon East (71 RC)
 - Lone Tree (7 DDH); Hope Creek (4 DDH)
- Initial metallurgical studies completed at Naosi.
- PEA for Naosi in progress
- Road access to site completed

Table 12: Mineral Resource Statement*, Naosi Gold Project (Naosi + Satellite Deposits), USA, SRK Consulting (Canada) Inc., January 22, 2021

Classification	Cut-off Grade (Au g/t)	Zone	Quantity		Grade			Contained Metal		
			Tonnes (000s)	Gold (g/t)	Silver (g/t)	Au-Eq* (g/t)	Gold Ounces (000s)	Silver Ounces (000s)	Au-Eq* Ounces (000s)	
Indicated										
Oxide	0.35	Naosi	10,612	1.69	27.18	2.09	576	9,274	712	
Sulphide	0.50		6,101	2.15	28.03	2.56	421	5,498	502	
Total Indicated	0.40		16,714	1.85	27.49	2.26	997	14,772	1,213	
Inferred										
Oxide	0.35	Naosi	8,444	1.02	14.19	1.23	277	3,852	334	
		Lone Wolf	641	1.05	1.62	1.07	22	33	22	
		Mon Ridge	4,052	1.54	15.31	1.76	200	1,994	229	
Sulphide	0.50	Naosi	1,996	1.18	22.11	1.50	75	1,419	96	
Total Inferred	0.37		15,133	1.18	15.00	1.40	575	7,298	682	

* Mineral resources are not mineral reserves and do not have demonstrated economic viability. All figures are rounded to reflect the relative accuracy of the estimates. Composites were capped where appropriate. Reported within a conceptual pit shell at cut-off grade of 0.35 g/t gold and 0.50 g/t gold for the oxide and sulphide mineralization, respectively. Cut-off grades based on price of US\$1,500 per ounce of gold and US\$22.00 per ounce of silver, gold recovery of 75 and 90 percent for oxide and sulfide mineralization, respectively and silver recovery of 25 and 90 percent for oxide and sulfide mineralization, respectively.



Hope Creek

TECTONIC METALS – TIBBS

Data from Tectonic Metals, 2021

Three styles of Au mineralization:

- Pogo-style high-grade Au-quartz veins (Gray Lead);
- Intrusion-hosted dissem. sulfides & stockwork Au+qtz+stib.+aspy veins (Michigan, Upper/Lower Trench)
- Fort Knox-style intrusion-hosted sheeted Au-quartz-bismuthinite veins (Jorts, Hilltop)

2021 Program:

Phase I:

-7 DDH, 803 m; oriented core

Gray Lead:

- TBDD21-006: 6.89 m @ 5.67 g/T Au
- TBDD21-007: 5.15 m @ 12.45 g/T Au

Michigan Zone:

- TBDD21-001: 6.12 m @ 7.69 g/T Au

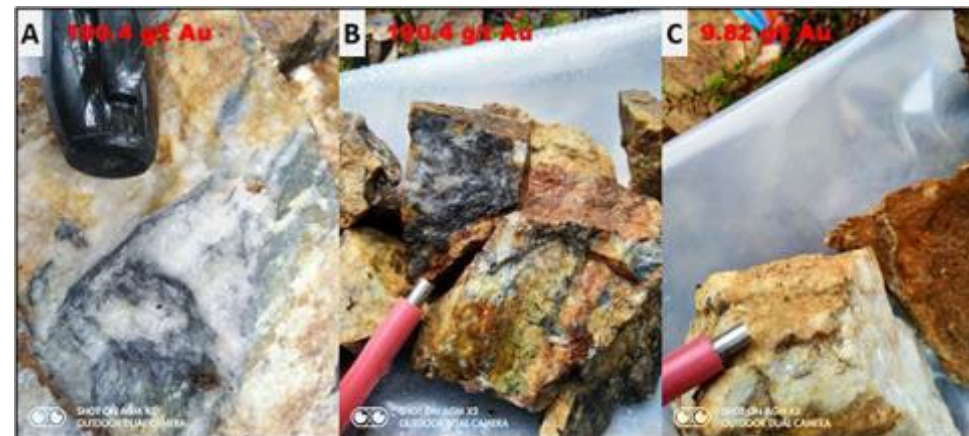
Phase II:

- 23 holes, 4,215 m; 5 DDH & 18 RC
- 6 targets

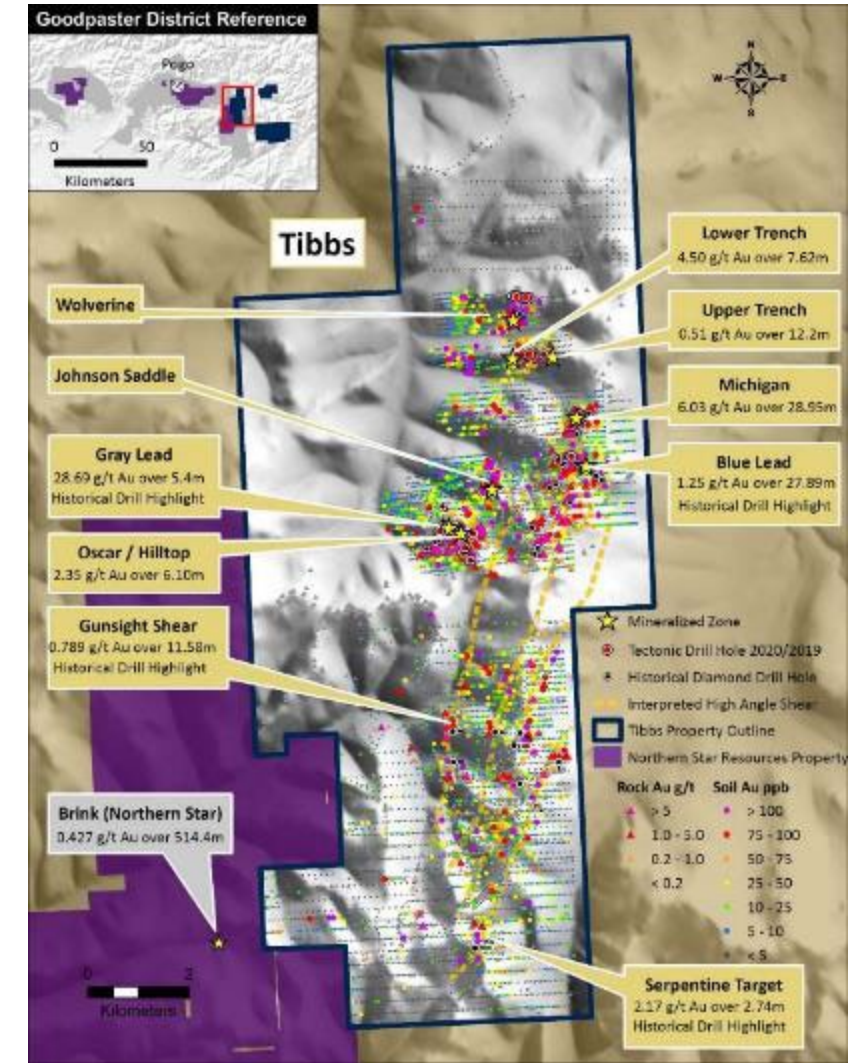
- Geologic mapping & rock sampling
- TITAN DCIP/MT geophysical survey

West Trench prospect:

- 600-m-long Au-in-soil anomaly
- Rock grab sample 190.4 g/T Au in Pogo-style quartz-sulfide vein



West Trench prospect: veins with 190.4 and 9.82 g/T Au



KENORLAND MINERALS – HEALY

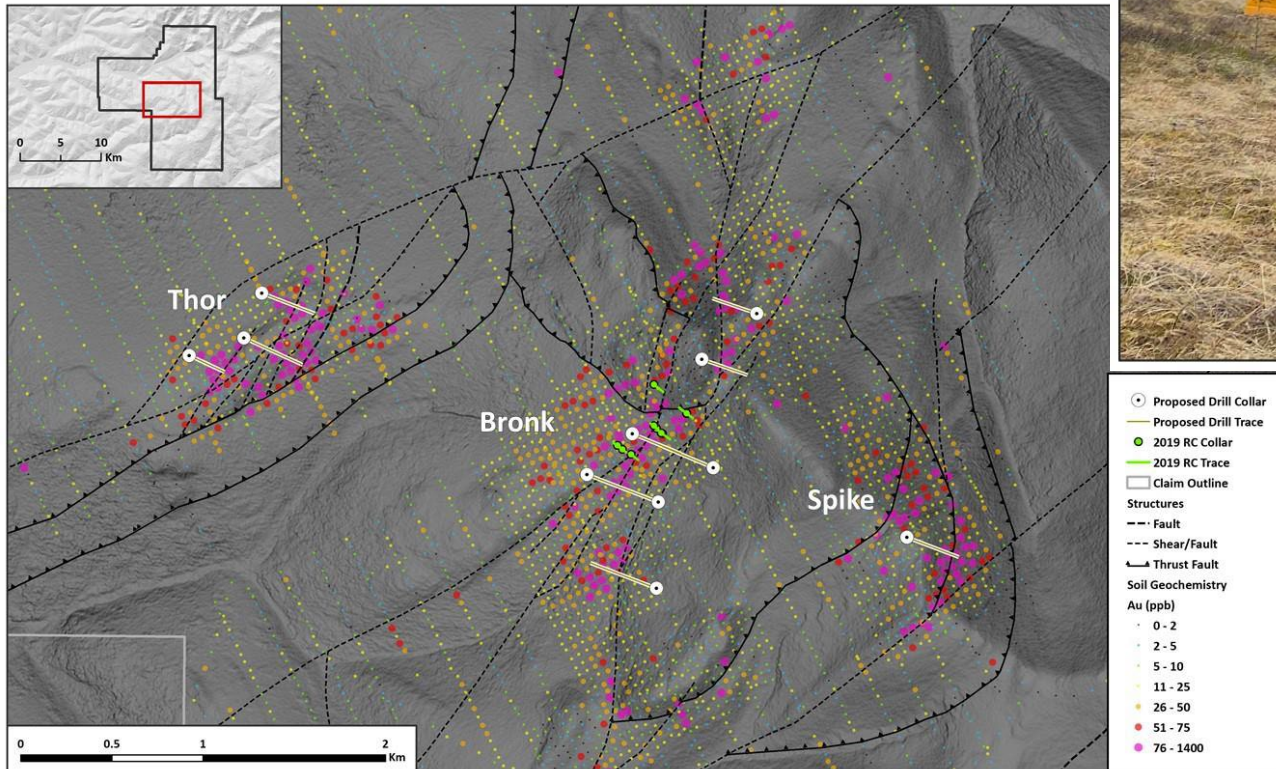
Pogo-style, Au-vein system

2021 Program:

- More than 10 DDH holes; > 5,000 m
- Drilling at Thor, Bronk, & Spike geochemical anomalies

Bronk:

- 2021: assays pending
- 2019: 49.4 m @ 0.42 g/T Au



POLARX – CARIBOU DOME

Caribou Dome: Sediment-hosted copper, central Alaska Range

Data from PolarX, 2021

JORC Resource	Million Tonnes	Au (g/T)	% Cu
Zackly (Main)	3.4	2.0	1.2
Caribou Dome	2.8		3.1

2021 program:

- 8 holes, 1,259 m DDH
- 3 holes for metallurgical sampling
- New basalt-hosted copper discovery (Keweenawan type)
- Massive sulfides, disseminated, vein- and amygdule-hosted



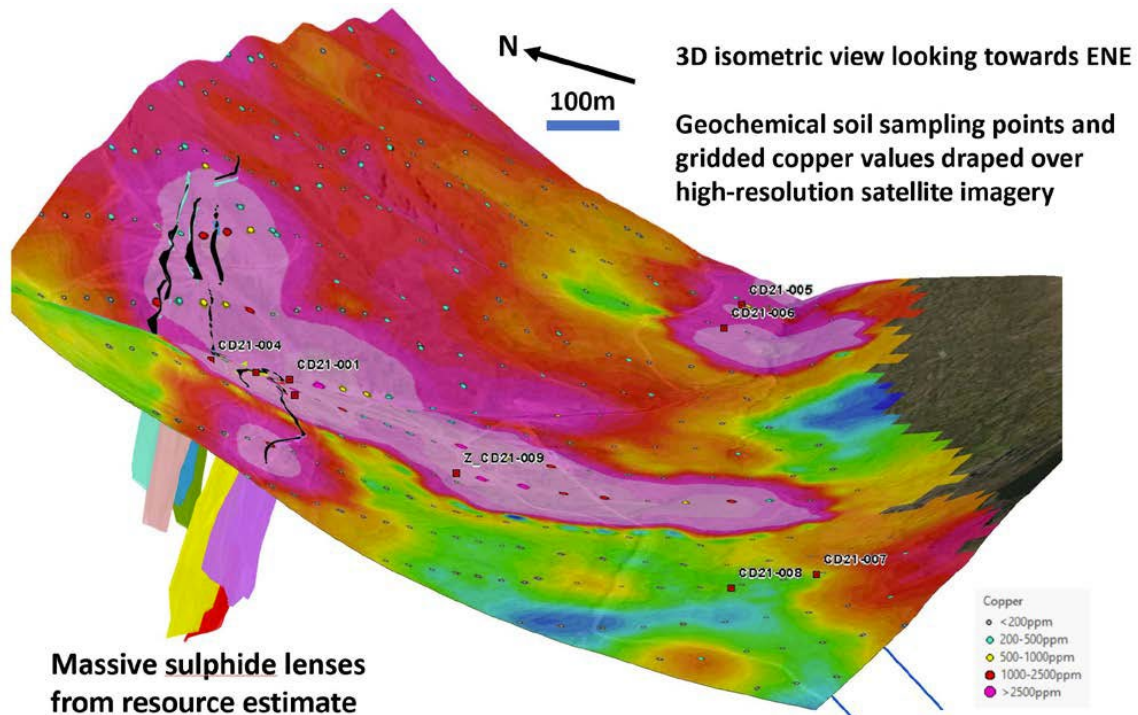
Native copper in vesicles (DDH CD21-008)



Native copper in quartz vein (DDH CD21-007)



Native copper in andesite's groundmass (DDH CD21-006)



GRANDE PORTAGE – HERBERT GOLD

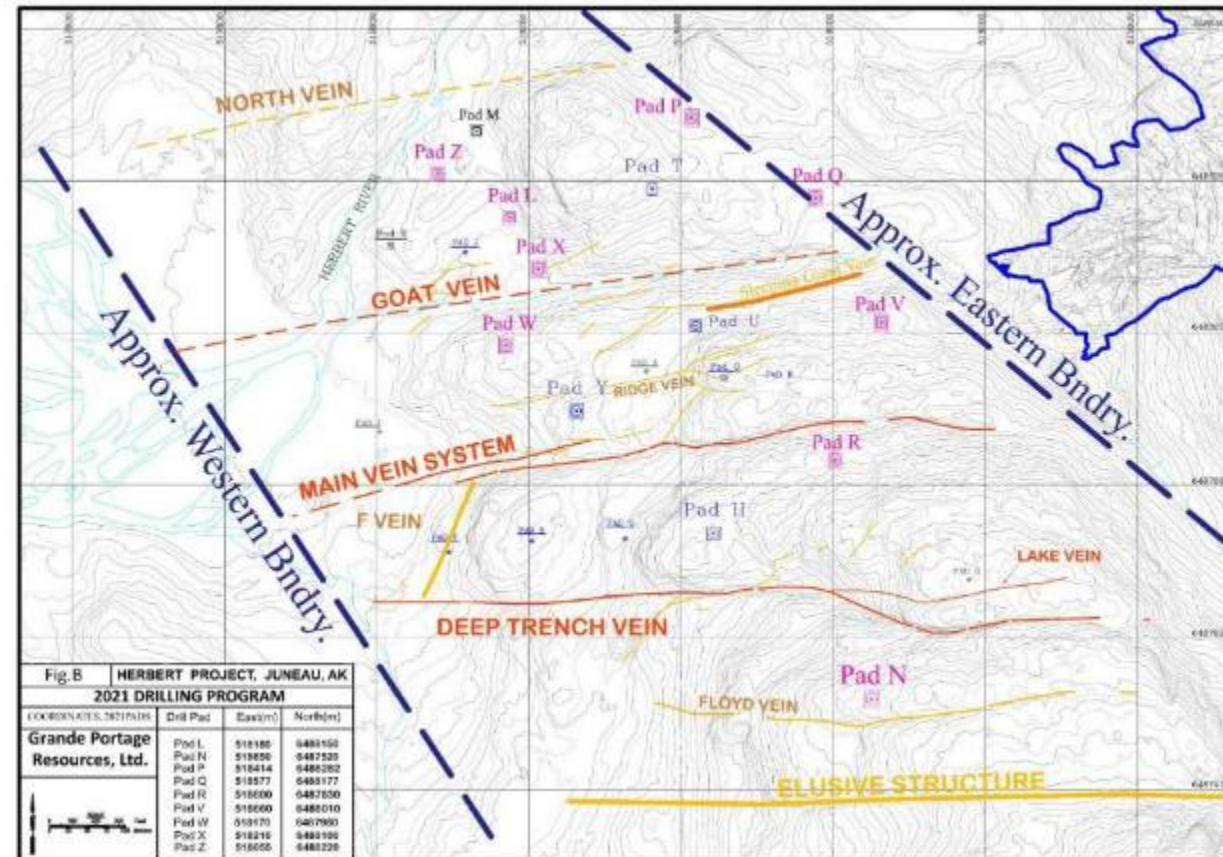
Mesothermal gold vein system, SE Alaska

- Large “ladder-vein” system
- Gold hosted in East-West quartz veins within larger, district-scale, NW-trending shear zone

2021 program:

- May 12, 2021 New resource estimate
- 2 rigs, 16 DDH, 8,150 m; step-out & infill drilling
- Focused on Primary veins, and Sleeping Giant and Ridge veins
- Acid-generating potential of waste rock found to be low, due to high carbonate, low sulfide content

Resource (May 2020)	Million Tonnes	Au (g/T)	Oz Au (million)	Ag (g/T)	Oz Ag (million)
Indicated	3.637	10.23	1.1968	5.87	0.6867
Inferred	1.138	8.91	0.3259	4.63	0.1693
Total	4.775	9.92	1.5227	5.57	0.8560



Data from Grand Portage, 2021

BLACKWOLF COPPER & GOLD - NIBLACK

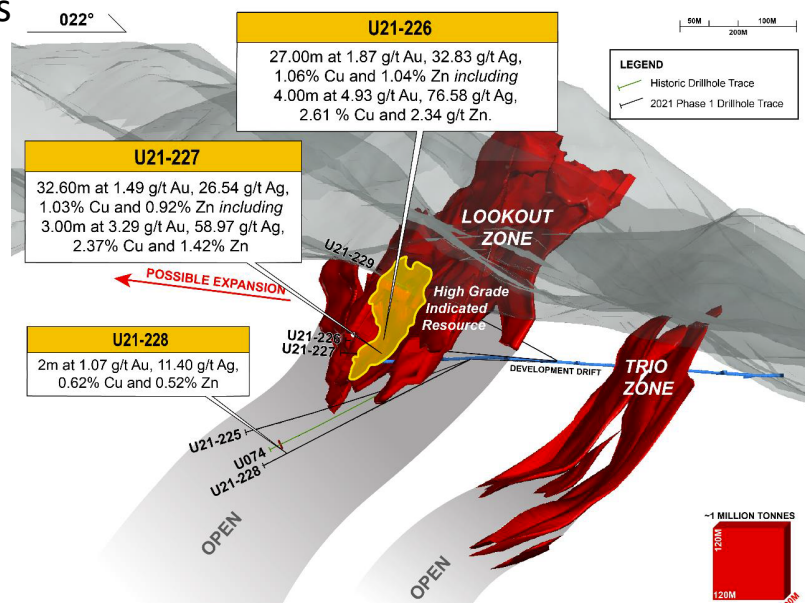
Volcanogenic massive sulfide - Southeast Alaska

Blackwolf Copper and Gold Ltd. (formerly Heatherdale Resources)

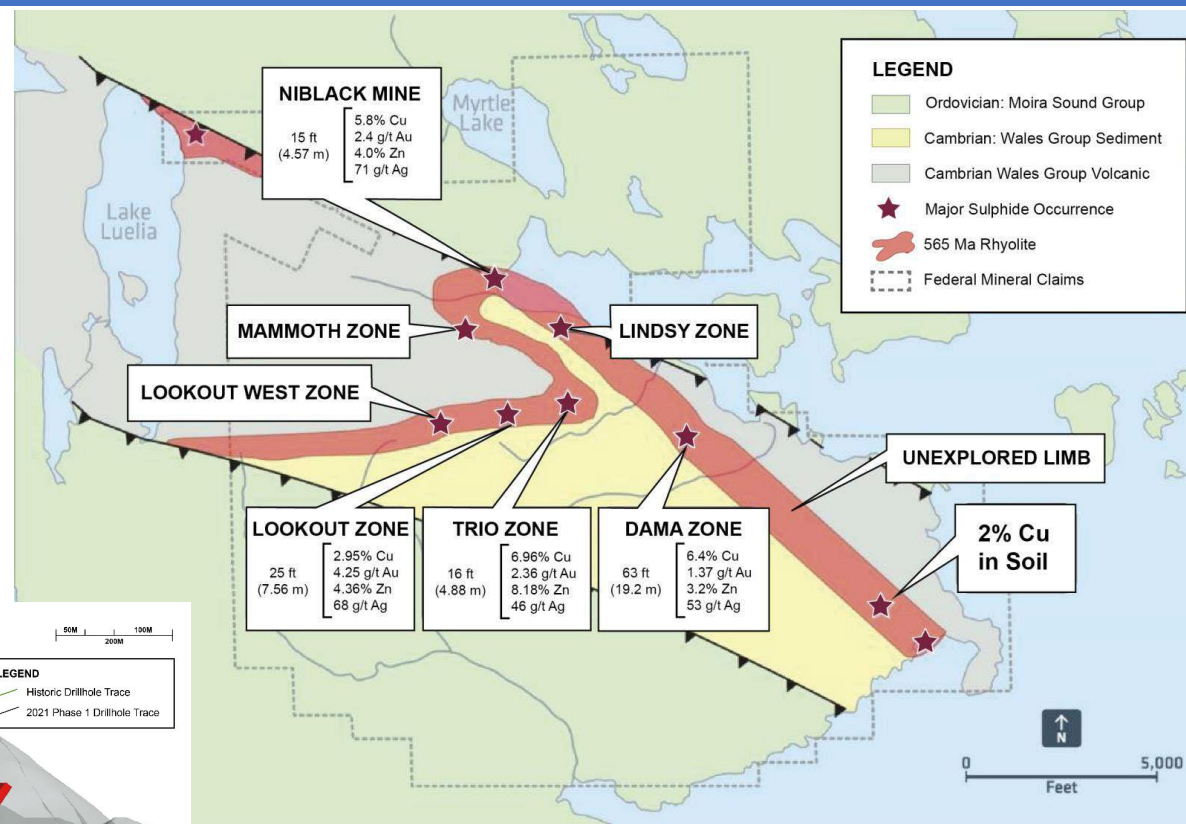
2021 Program:

- Reviewed historical metallurgical results
- Commenced Phase I metallurgical-optimization program
- Rehabilitated 1 km historical UG workings
- 5 DDH holes, 1,810 m
- Lookout deposit (underground resource expansion and exploration)
U21-227: 32.60 m @ 1.03% Cu, 1.49 g/T Au, 26.54 g/T Ag, 0.92% Zn
- Resource update planned for Q4 2021
- Staked Casey VMS & other prospects

Hyder area, Golden Triangle



Data from Blackwolf, 2021



Resource (2011)	Million Tonnes	Cu %	Au g/T	Zn %	Ag g/T
Indicated	5.64	0.95	1.75	1.73	29.52
Inferred	3.39	0.81	1.11	1.29	16.56
Total	9.03	0.9	1.59	1.56	25.98

WESTERN ALASKA MINERALS – ILLINOIS CREEK DISTRICT

2021 Program:

Illinois Creek mine:

- New resource of 10.14 M tonnes @ 0.21% Cu, 0.91 g/T Au, 34.66 g/T Ag
- Resource includes In-situ and historical heap leach pad resources
- 8 holes; 1,200 m
- Drilling tested E & S extensions of the resource

Honker Gold:

- Low- to intermediate-sulfidation vein system
- 6 holes, 600 m

Last Hurrah:

- Oxide and Carbonate Replacement
- 2 holes, 600 m

Waterpump Creek:

- Oxide and Carbonate Replacement
- 9 holes, 850 m
- 8.1 m @ 23.5% Zn, 16.1% Pb, 540 g/T Ag

Round Top:

- Porphyry copper (\pm Mo, Ag, Zn, Pb)
- Initial resource estimation underway



Illinois Creek combined In-situ & leach pad resource (Feb.2021)

Class	Tonnes (Mt)	AuEq (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	AuEq (koz)	Au (koz)	Ag (Moz)	Cu (Mlbs)
Indicated	8.7	1.33	0.90	34.4	0.21	373	253	9.6	40
Inferred	3.3	1.44	0.99	36.2	0.21	152	104	3.8	15

WHITE ROCK MINERALS – RED MTN./LAST CHANCE

Data from White Rock Minerals, 2021

2021 Program:

Red Mtn. VMS Project

Dry Creek VMS: 4 holes; drilled down-dip extensions to resource

JORC Inferred resource: 9.1 M tonnes @ 157 g/T Ag, 5.8% Zn, 2.6% Pb, 0.9 g/T Au

Hunter VMS: 1 hole

Keevy VMS Trend: CSAMT & fixed-loop EM surveys

Kiwi: 2,000-m-long soil anomaly; drilled 2 test holes

-Massive sulfide rock chips w/up to 16% Cu, 8% Zn, 316 g/T Ag

Jack Frost: 400-m-long soil anomaly; drilled 1 test hole

-Massive sulfide rock chips w/up to 14% Zn, 20% Pb, 285 g/T Ag

Last Chance Gold Project

-30 sq. km of Au anomalies in stream sediments

Pepper prospect Au discovery: 1-km strike; open

-Rock chip grab sample w/up to 6.5 g/T Au, 27 g/T Ag (+As, +Sb)

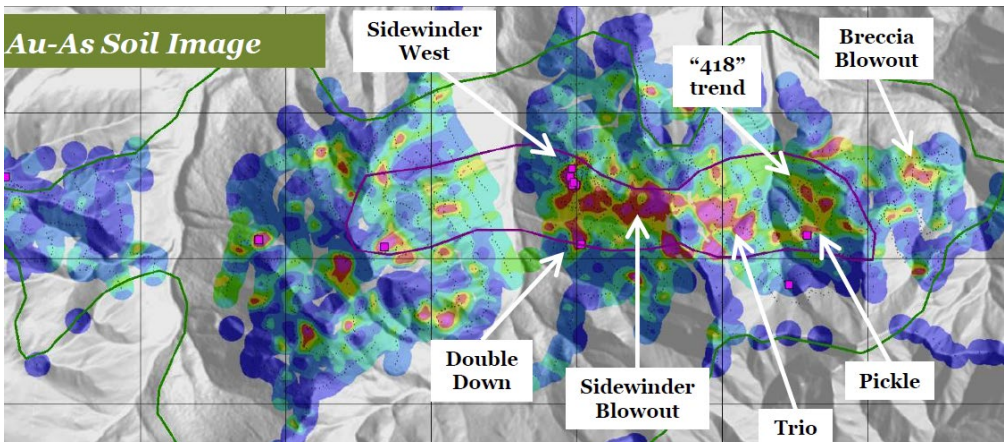
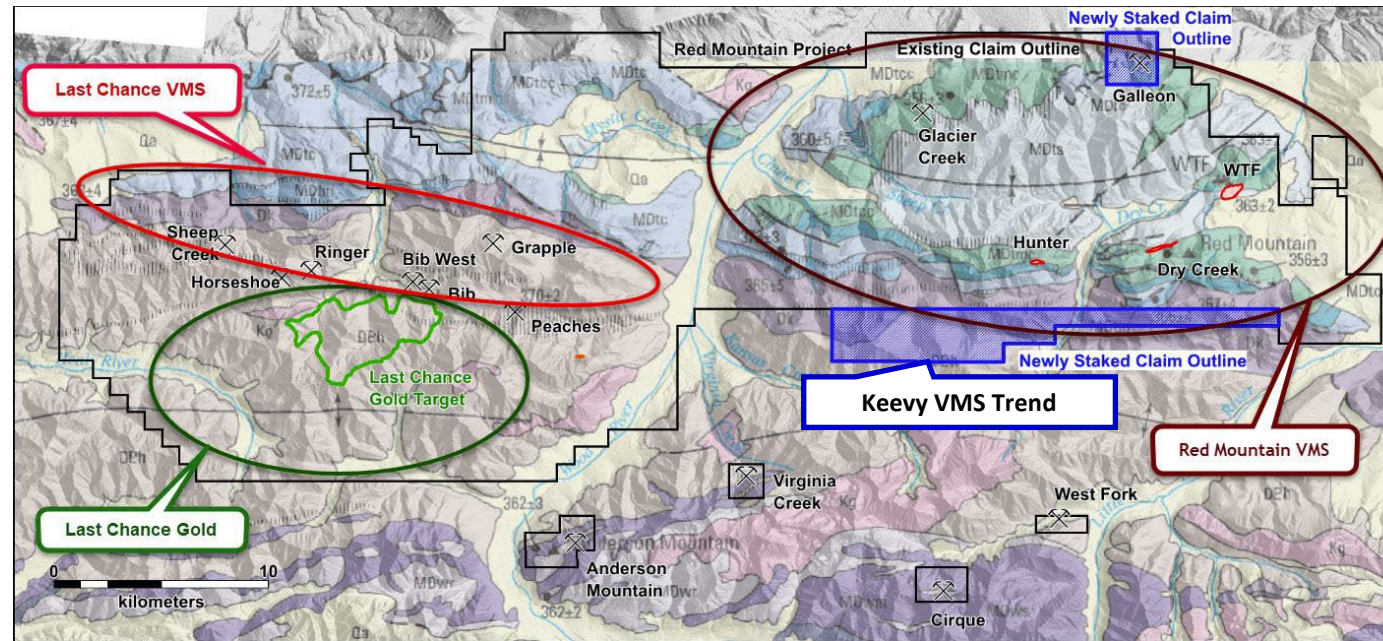
VMS Base/Precious Metals & Orogenic/Intrusion(?) Au Northern Alaska Range



Zn+Pb-rich massive sulfide;
Jack Frost prospect



Cu-rich massive sulfide;
Kiwi prospect



HELIOSTAR – UNGA PROJECT

Epithermal Au-Ag veins, Aleutians

-Surface outcrops of high-grade Au-Ag veins

2021 Program: 2 RC & 1 DDH rigs

SH-1 resource expansion (? DDH):

-Results pending

Historical Apollo-Sitka mine (23 RC):

-SKRC21-02: 4.57 m @ 7.98 g/T Au; 10.67 m @ 8.65 g/T Au

-APSRC21-02: 3.05 m @ 88.3 g/T Au

Aquila target (13 RC):

-AQRC21-01: 7.62 m @ 2.45 g/T

-District-scale exploration

Zachary Bay Porphyry Target, Aleutians

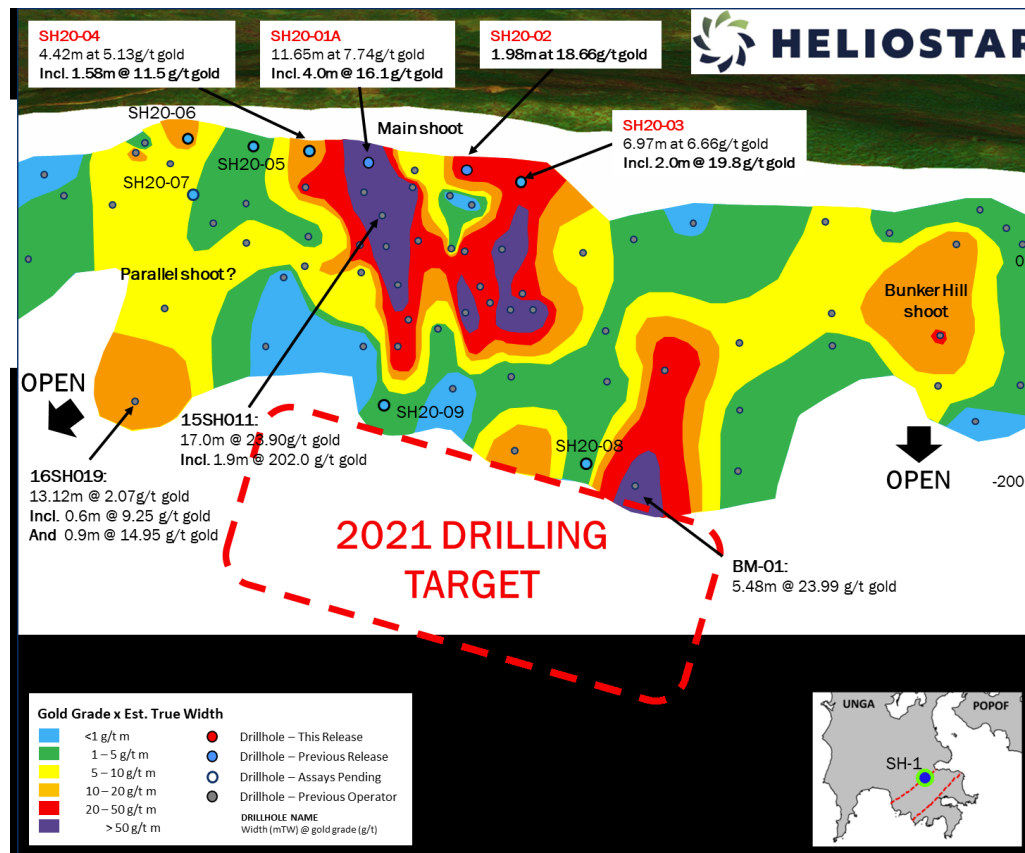
Zachary Bay target (2 RC):

-Early reconnaissance exploration

-Intersected Au & Cu mineralization over significant widths

-ZBRC21-01: 71.63 m @ 0.44 g/T AuEq

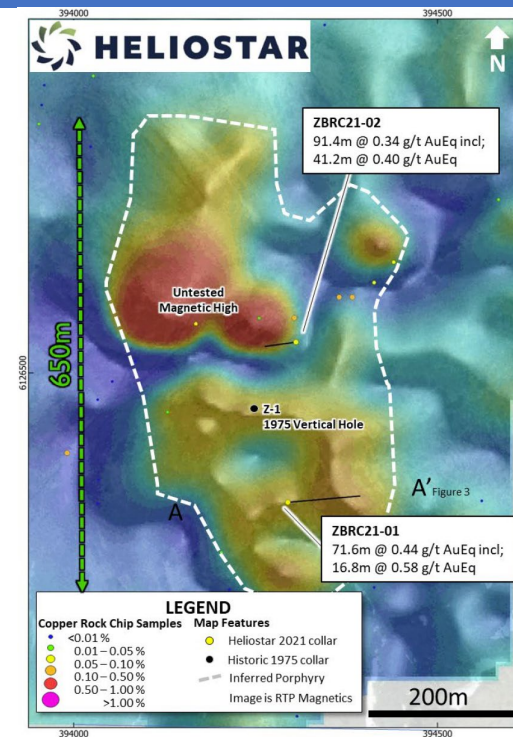
SH-1 Zone – Resource-expansion drilling plan



-Maiden resource SH-1 Zone (formerly Shumagin Zone):

Avg. grade of 13.8g/t Au; and Avg. grade of 35.4g/t Ag

Resource (Feb. 2020)	Tonnes	Au (oz.)	Ag (oz.)
Inferred	866,015	384,318	986,321

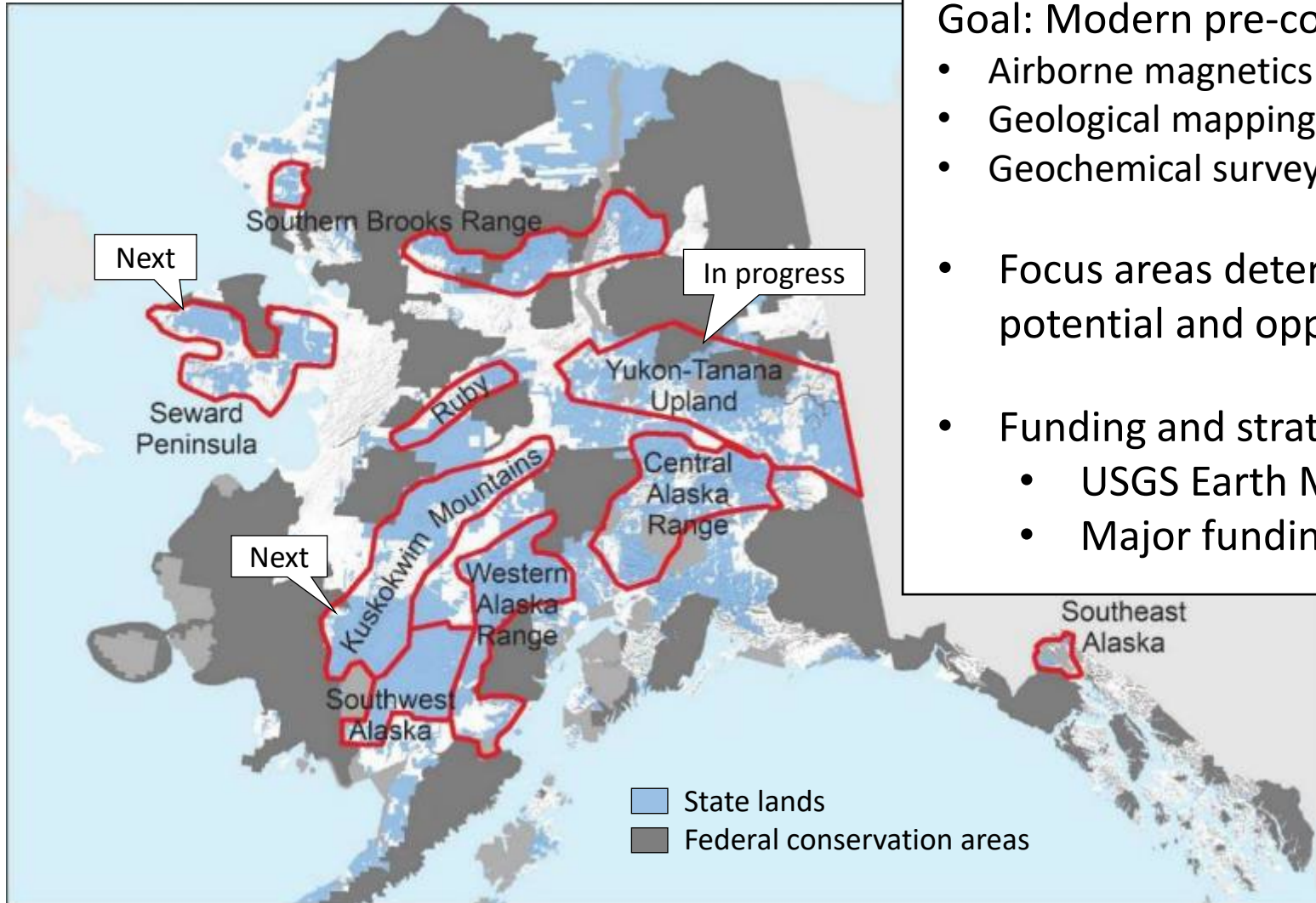


Zachary Bay magnetic map & porphyry-style veining



Data from HelioStar Metals, 2021

ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS (DGGS) 2021



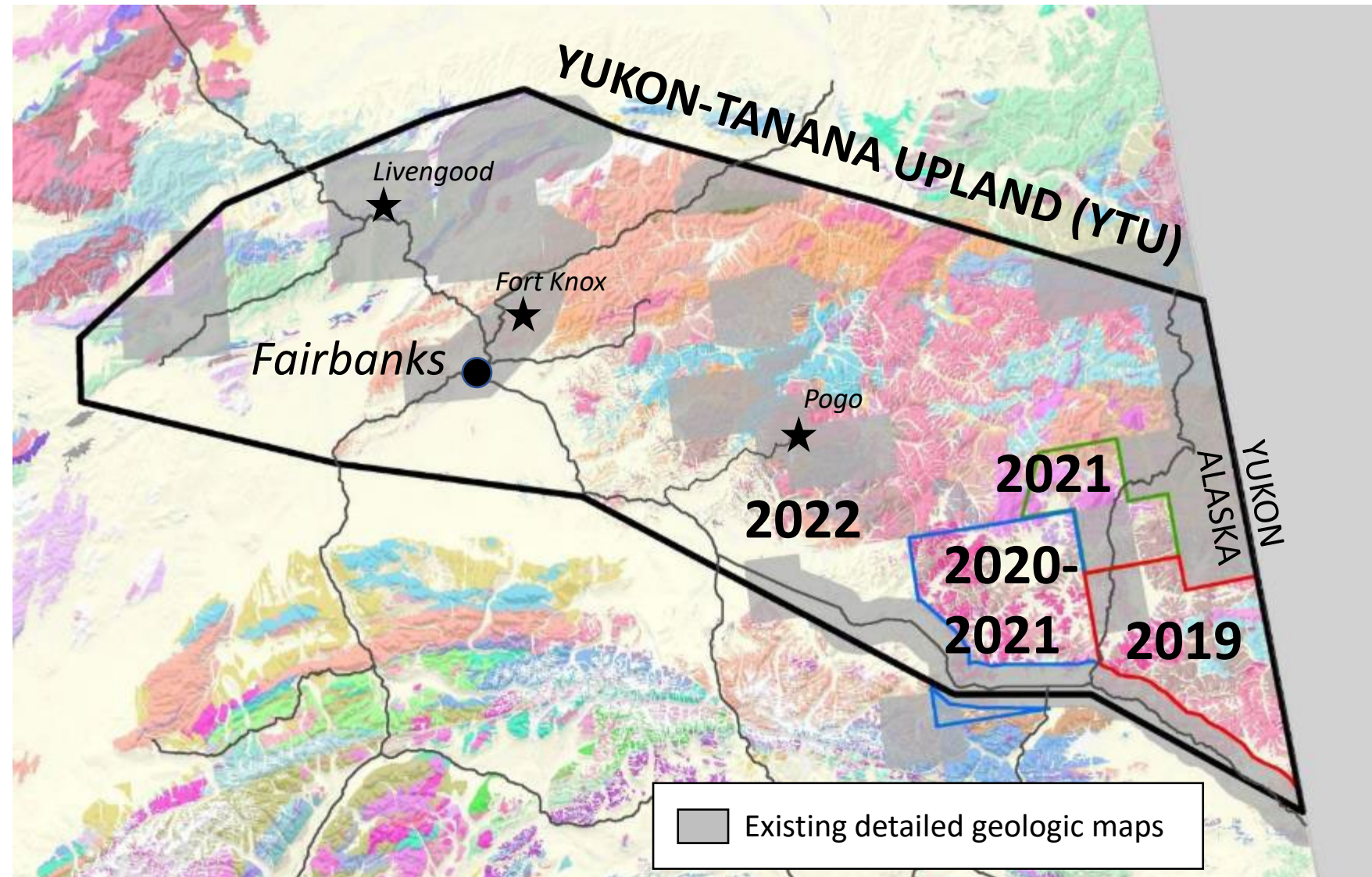
Goal: Modern pre-competitive data for Alaska's mineral belts:

- Airborne magnetics ± radiometrics
- Geological mapping (1:100,000 scale)
- Geochemical surveying
- Focus areas determined by critical and conventional mineral potential and opportunity for mineral entry
- Funding and strategic direction:
 - USGS Earth MRI program & State of Alaska
 - Major funding increase in recent U.S. infrastructure bill

Data type	Percent completed
Magnetic	33 %
Radiometric	3 %
Electromagnetic	16 %
Geology	32 %
Geochemistry	17 %

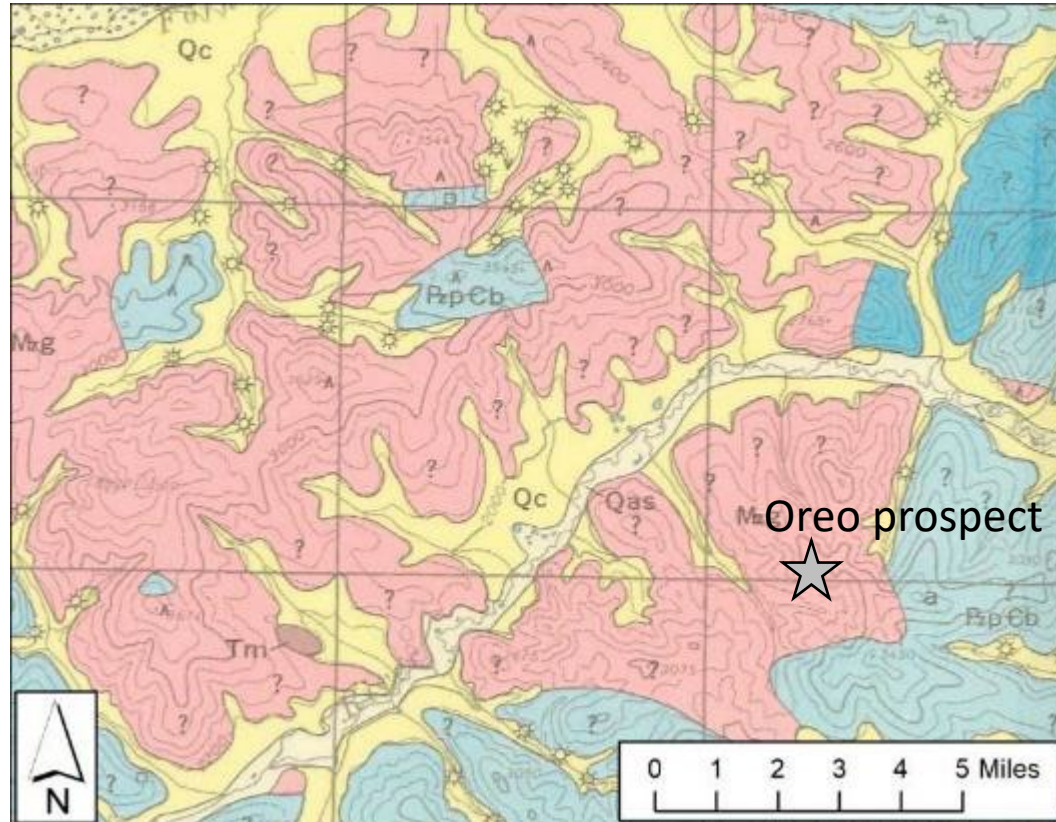
EARTH MRI GEOLOGIC MAPPING

- Initial focus area: Yukon-Tanana Upland
- 1:100,000 scale geologic mapping progressing from the Yukon border towards the northwest
- First geologic map published in 2021
- Expanded funding: Develop a second mapping team to double output



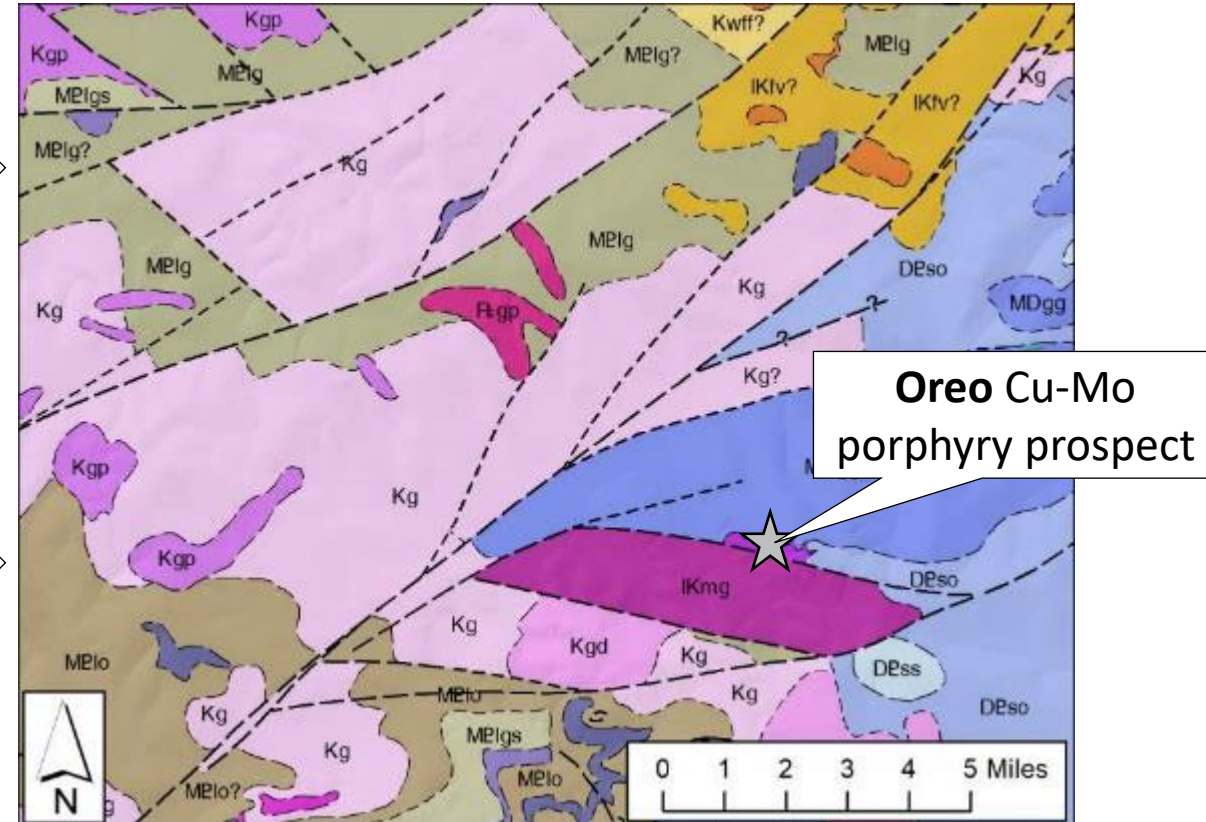
GEOLOGIC MAPPING – BEFORE / AFTER

Existing 1960's reconnaissance mapping:



Mzg = undifferentiated Mesozoic granitic rocks
 PzPCb = undifferentiated gneiss and schist
 “?” = Area not visited

DGGS 2019 map of the same area:



Breaks out many different intrusive units, each with different mineral potential
 Faults are now mapped (may control mineralization)

EARTH MRI GEOPHYSICAL SURVEYS

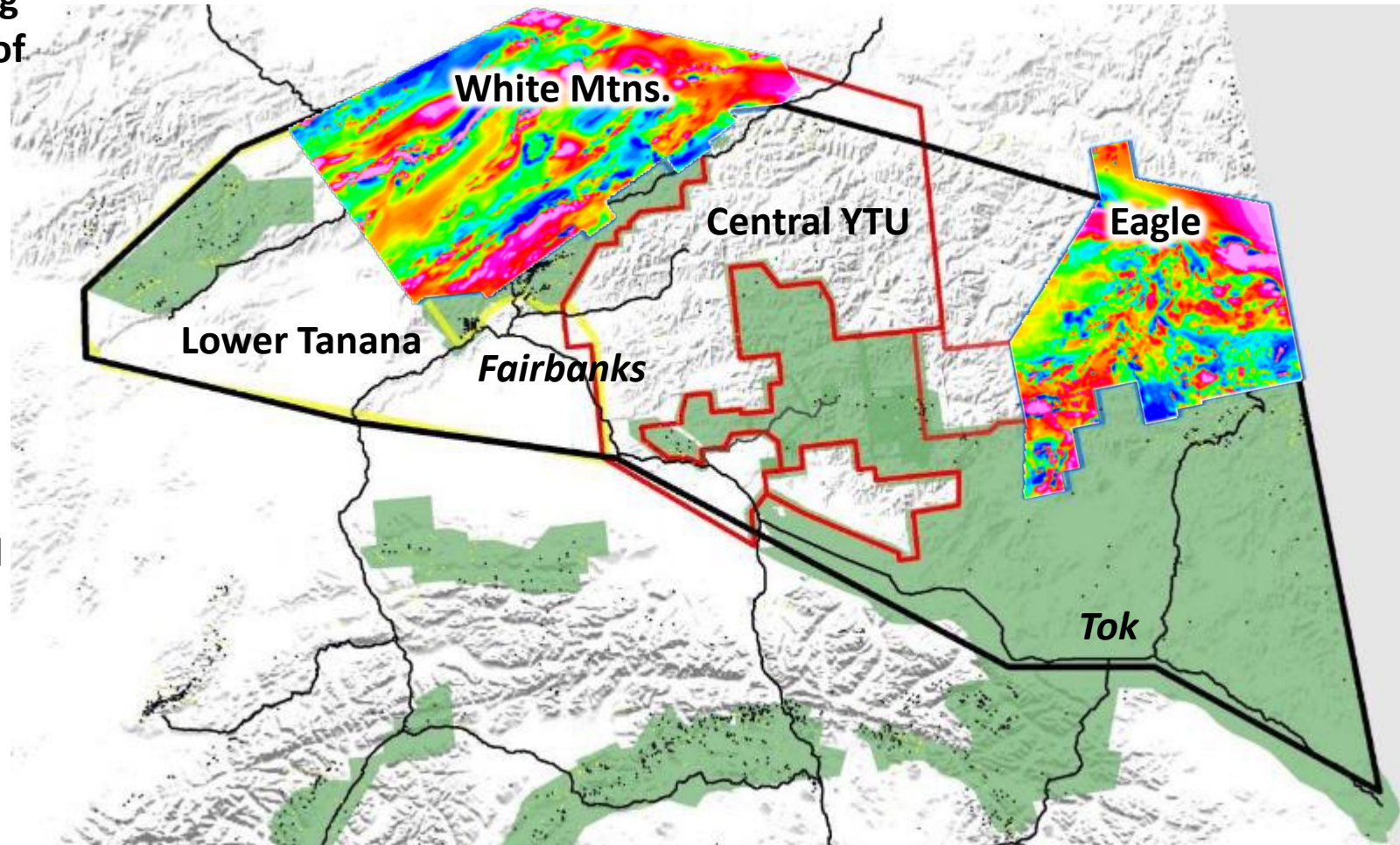
DGGS and USGS are flying modern, fixed-wing aeromagnetic data over prospective regions of Alaska
400m line spacing, ~300m ground clearance

Eagle and White Mountains blocks
Flown by MPX (Canada)
Now Published

Central YTU & Lower Tanana
MAGSPEC (Australia) flying in 2022
Has faced issues with COVID and international travel

Next regions: **Kuskokwim Mountains**
Seward Peninsula

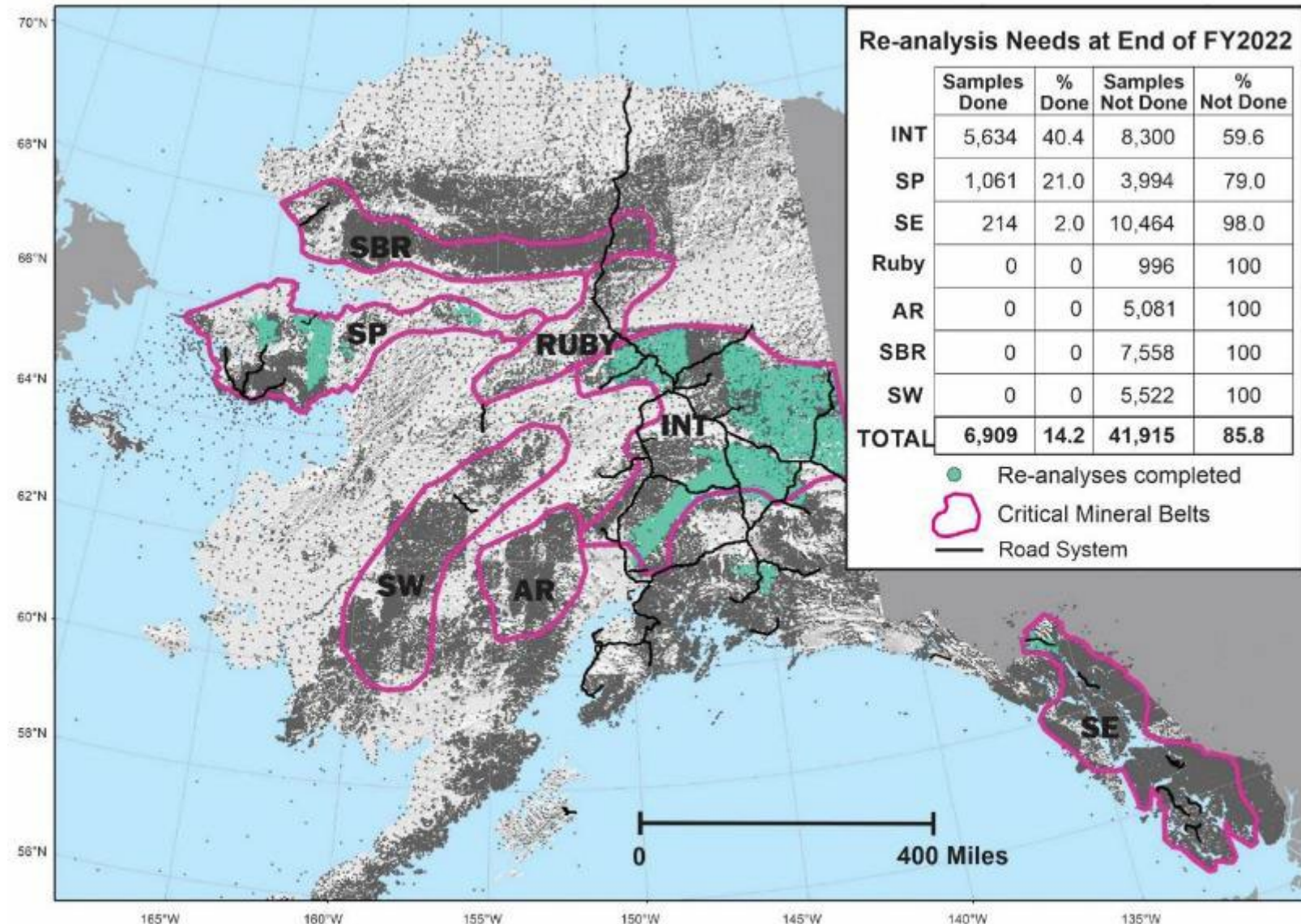
Airborne EM may be possible in the future, depending on funding



Prior completed surveys shown in green

STREAM SEDIMENT SAMPLES

- USGS and DGGS are reanalyzing archived stream sediment samples with modern, high-sensitivity methods
- Focusing on Alaska's critical mineral belts
- Ongoing, accelerating program
- Visualize data with new **Exploration Geochemistry Web App** via DGGS website



ALASKA INFORMATION AND DATA

Division of Geological & Geophysical Surveys

<http://dggs.alaska.gov/>



- Geochemistry
- Geophysics
- Geology Maps
- Elevation Data
- Mineral Report
- Mineral Occurrences

Geologic Materials Center

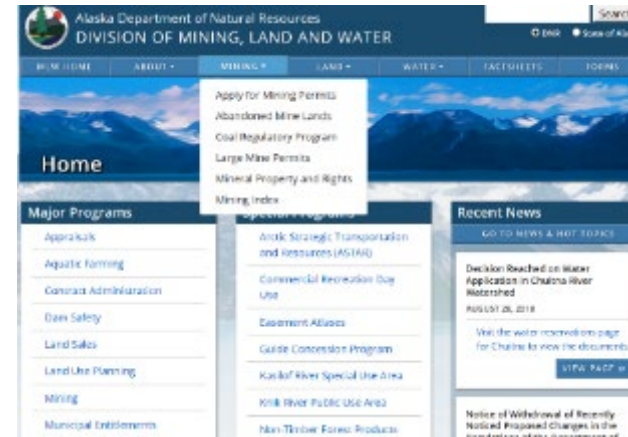
<http://dggs.alaska.gov/gmc/>



- Core Repository
- Indoor core viewing
- Surface samples
- Geochemistry pulps
- Online Inventory
- Confidential storage and viewing

Division of Mining, Land & Water

<http://dnr.alaska.gov/mlw/>



- Land status
- Mining claims
- Mine Permitting
- Mine Regulation

Office of Project Management and Permitting

<http://dnr.alaska.gov/opmp/>

- Project and mine permit coordination

Check our website for the Annual Mineral Report and a digital copy of this presentation

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