

Alaska Mining Industry Update

House Resources Committee



Presented by Melanie Werdon, Director
Division of Geological & Geophysical Surveys
Alaska Department of Natural Resources
January 19, 2024





Economic Benefits of Mineral Industry

- \$1 billion to 450+ local businesses for goods and services
- \$55 million in local-tax and \$131 million in state-government revenue for libraries, road repairs, airports, schools, public safety
- \$266 million in royalty payments to Alaska Native Corporations
- \$4.5 million in charitable contributions to ~280 non-profits
- \$2.7 million to University of Alaska and vocational schools for education and workforce development
- 11,400 total direct, indirect, and induced jobs
- 73% Alaska resident hire at large mines, with employees from 90 communities
- \$1 billion in wages statewide



Source: McKinley Research Group - 2022 update
1/19/2024

2023 Industry Summary - Notes



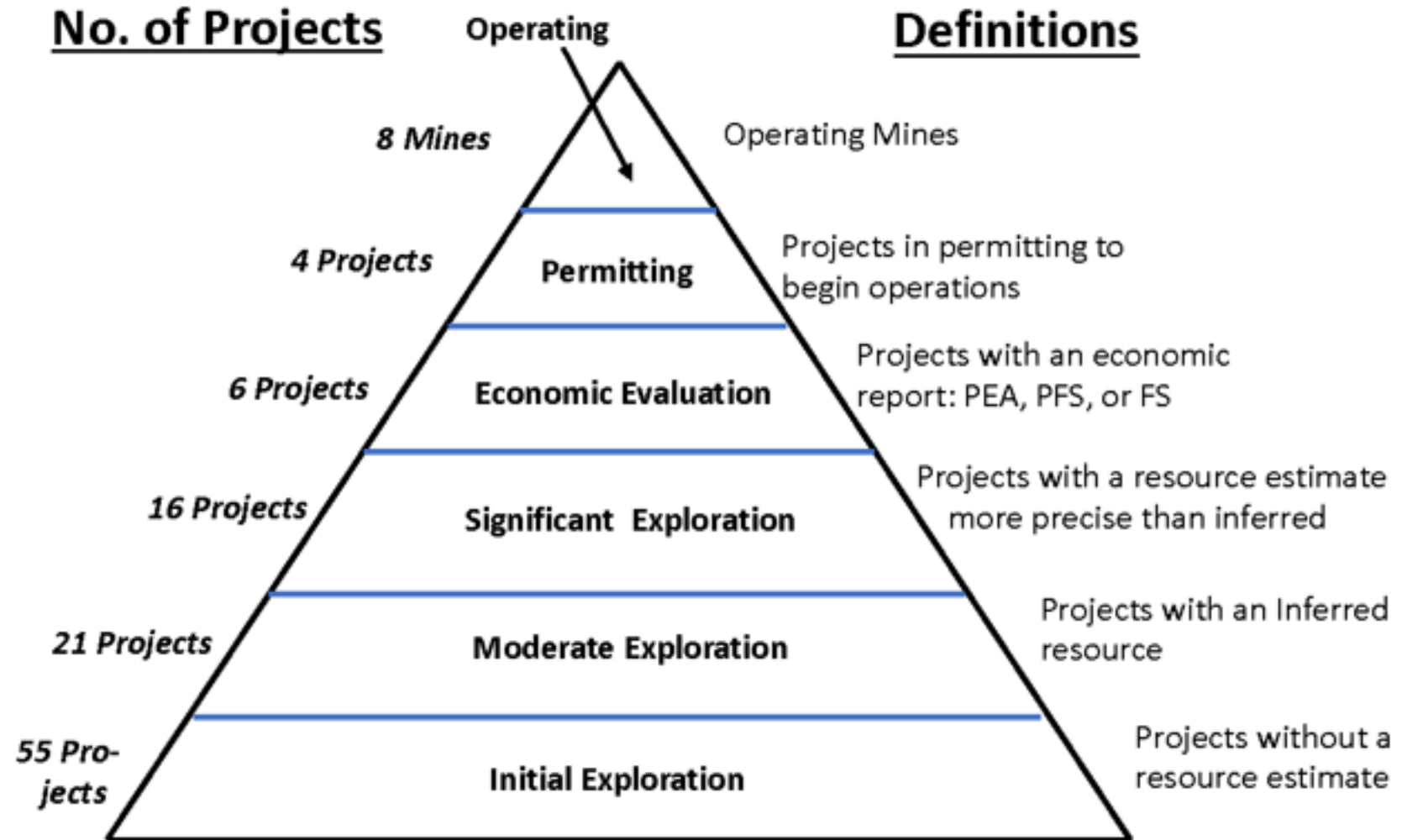
- Data and images courtesy of mining and exploration companies
- Presentation and interpretation of data is solely the author's responsibility
- Incomplete data for full-year 2023 picture - values are preliminary estimates
- Resource data is presented in metric units unless noted
- Not all active projects are discussed



Alaska Mine Development Pyramid



- Significant investment needed to move a project up the pyramid
- Large number of mineral exploration projects needed to overcome low odds of an eventual mine developing

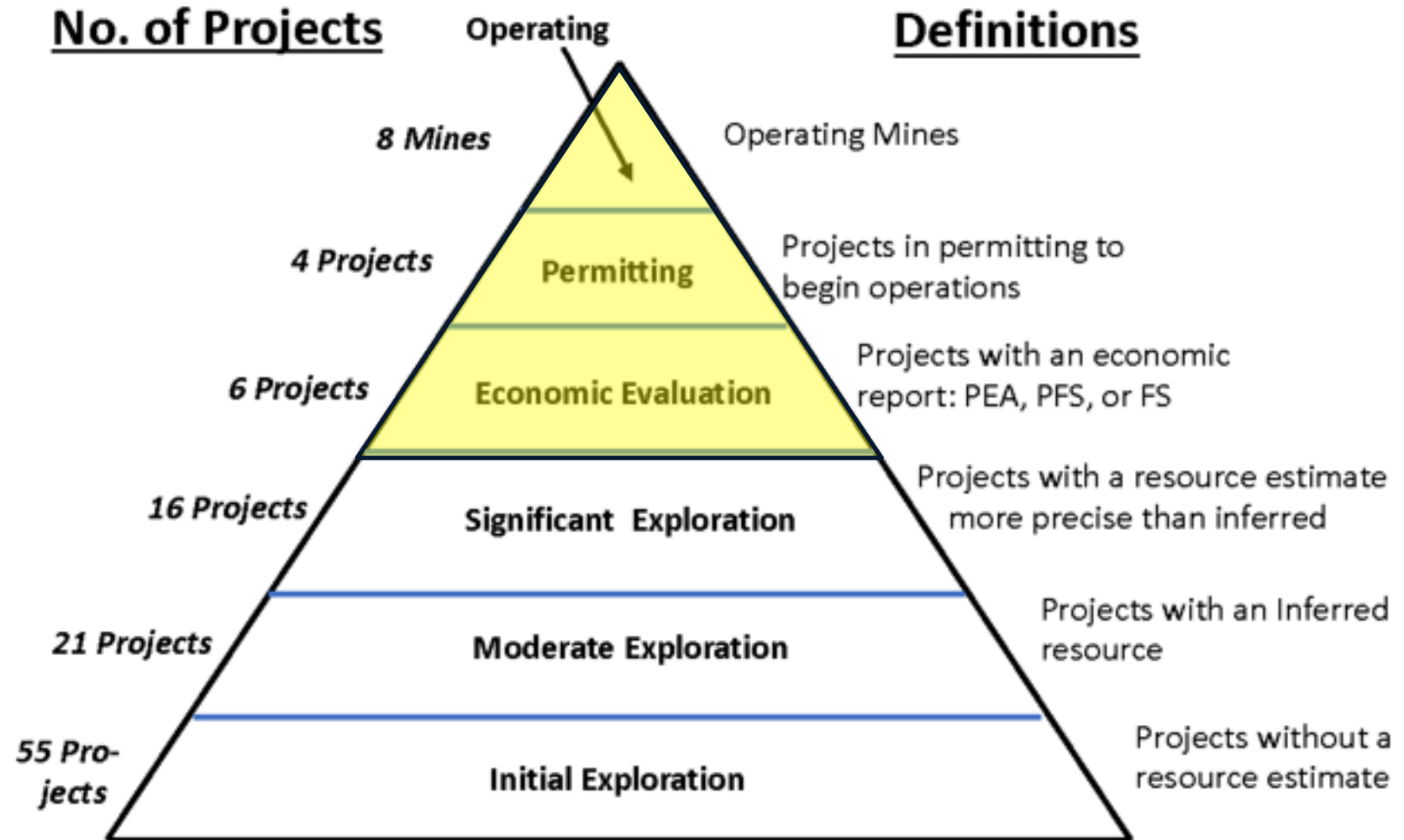


Credit: Loeffler and Watson



Alaska Mine Development Pyramid (continued)

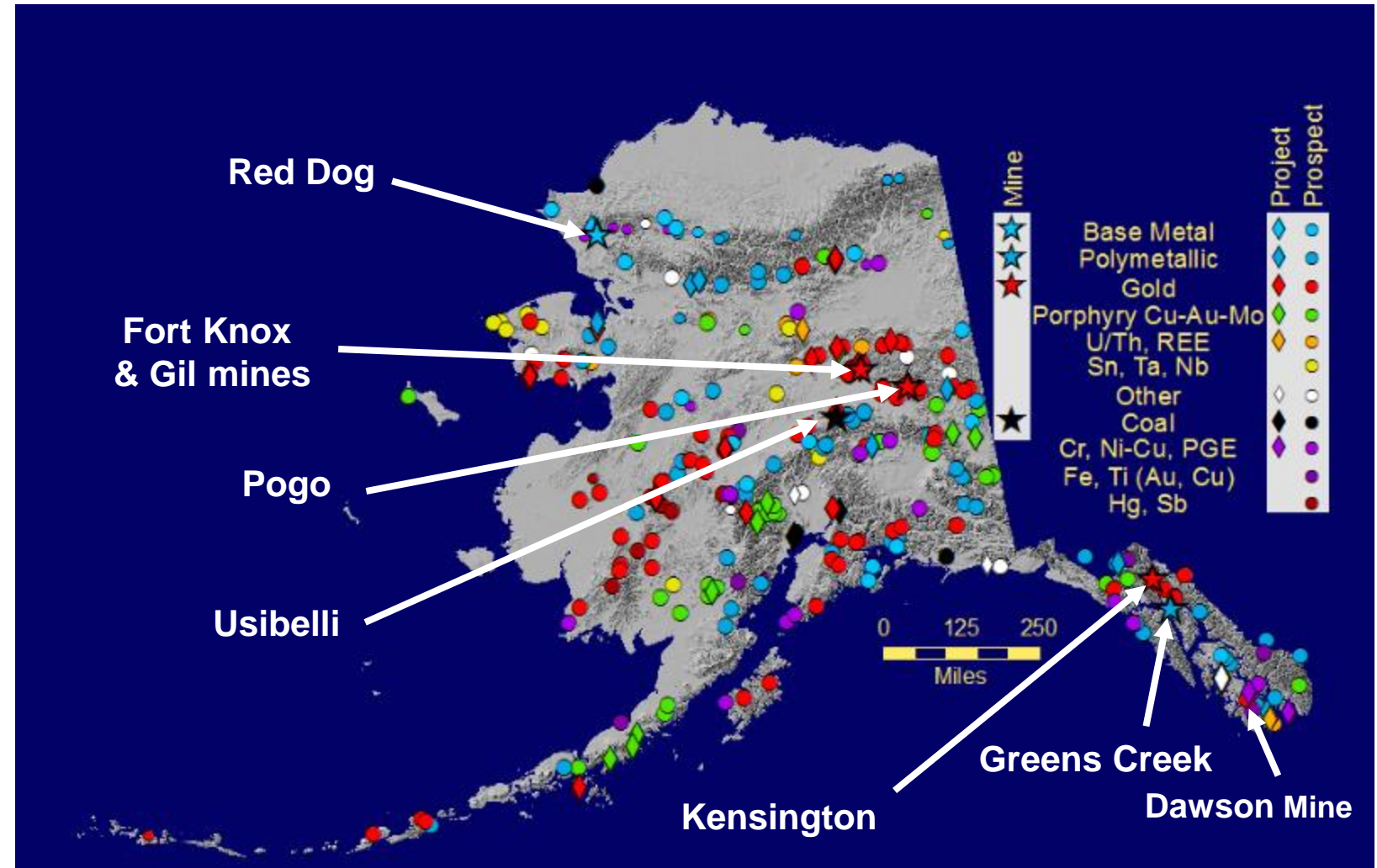
- This presentation will primarily cover Alaska mines and mineral projects in the upper part of the pyramid
- Will highlight a few exploration projects



2023 Alaska Mines and Exploration Summary



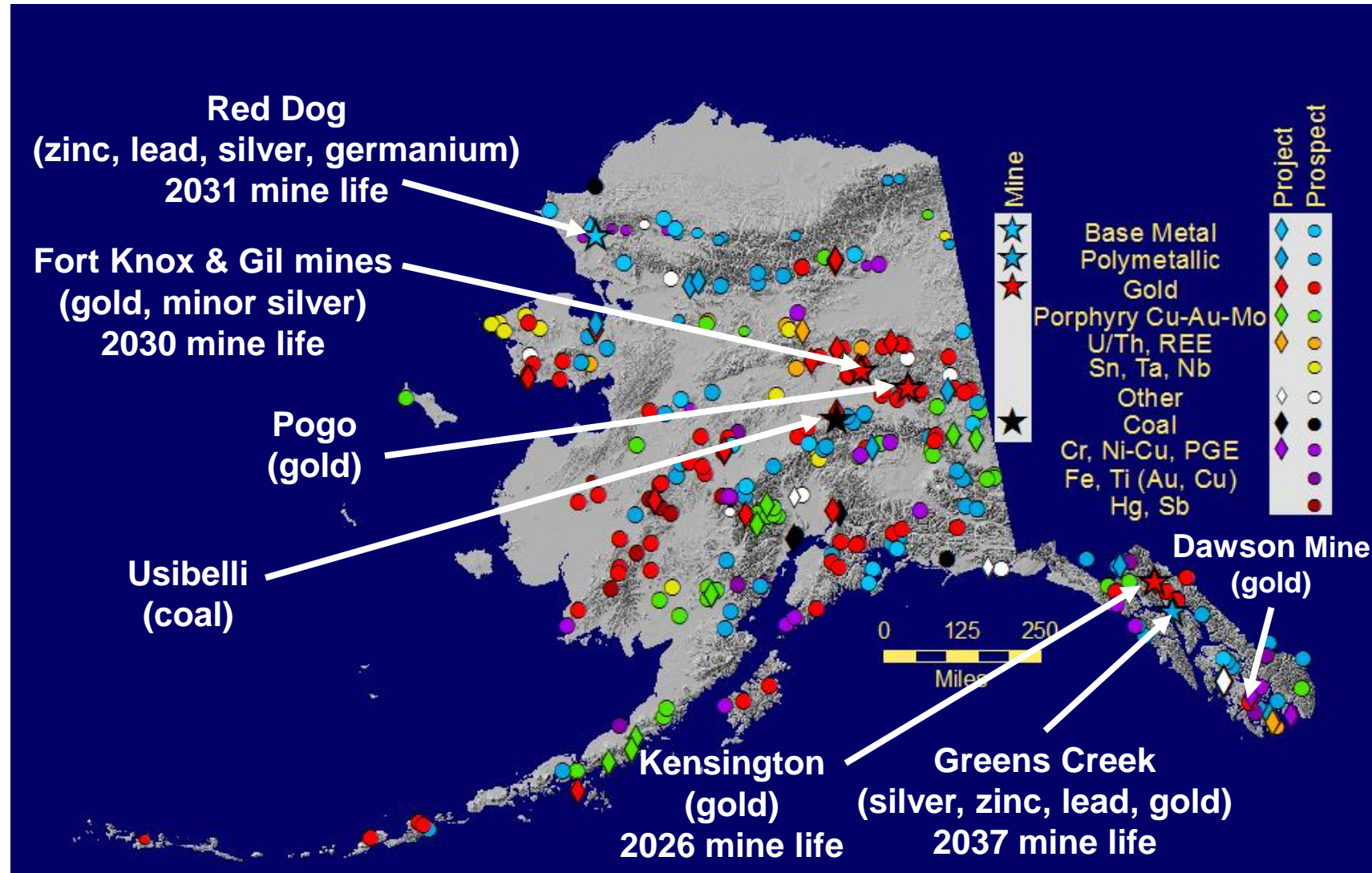
- 7 lode (hard rock) mines
- 1 coal mine
- ~145 placer gold mines
- ~50 significant mineral exploration projects



Alaska Mines - Announced Mine Lives



- Mine life is how long a mine will operate with currently known reserves and resources
- Not all mines have published mine lives
- Does not mean that mining will end by the announced date
- Routinely extended by resource drilling and development work

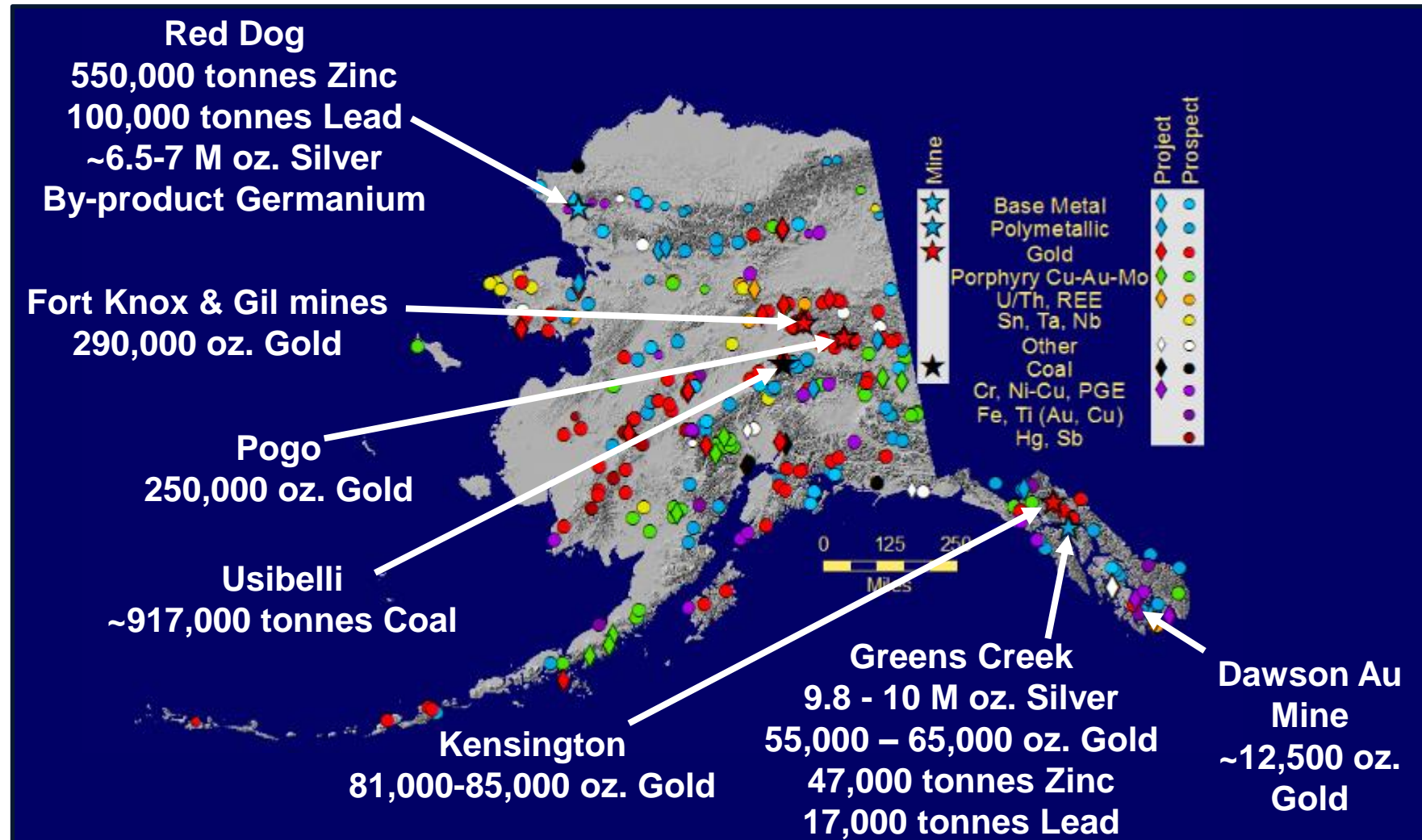




2023 Alaska Mines - Production Value

2023 mineral
production value =
~\$3.86 Billion

	2023 Mineral Production (Estimated)
Zinc (Zn)	590,000 - 600,000 tonnes (650,400-661,400 short tons)
Lead (Pb)	115,000 – 120,000 tonnes (126,800-132,300 short tons)
Gold (Au)	715,000 – 730,000 ounces (oz.)
Silver (Ag)	~17 million oz.
Coal	917,000 tonnes 1,010,000 short tons





Kinross Alaska - Fort Knox Mine

- Kinross poured their 9-millionth ounce of gold on 9/27/2023 at open-pit mine
- 730 employees and 300 contractors
- Expected 2023 production is 285,000-295,000 ounces of gold
- Gilmore (West-Pit) Expansion will extend mine life
- 2023 development work includes modifying mill in preparation for Manh Choh ore
- 3.3 million ounces of gold reserves and resources (as of 12/31/2022)



Data from Kinross, 2023

Kinross Alaska-Gil Mine (Fort Knox Satellite)



- Gil Mine is 9 miles east of Fort Knox Mine and a different ore type (schist versus granite)
- Ore trucked from open pit to Fort Knox mill
- Mining began in October 2021, with expected 2-year mine life, but mining continues
- Expected to produce ~160,000 ounces of gold over 2-year mine life
- Mine added 80-100 jobs to Kinross workforce



Data from Kinross Alaska, 2023

Coeur Alaska - Kensington Mine



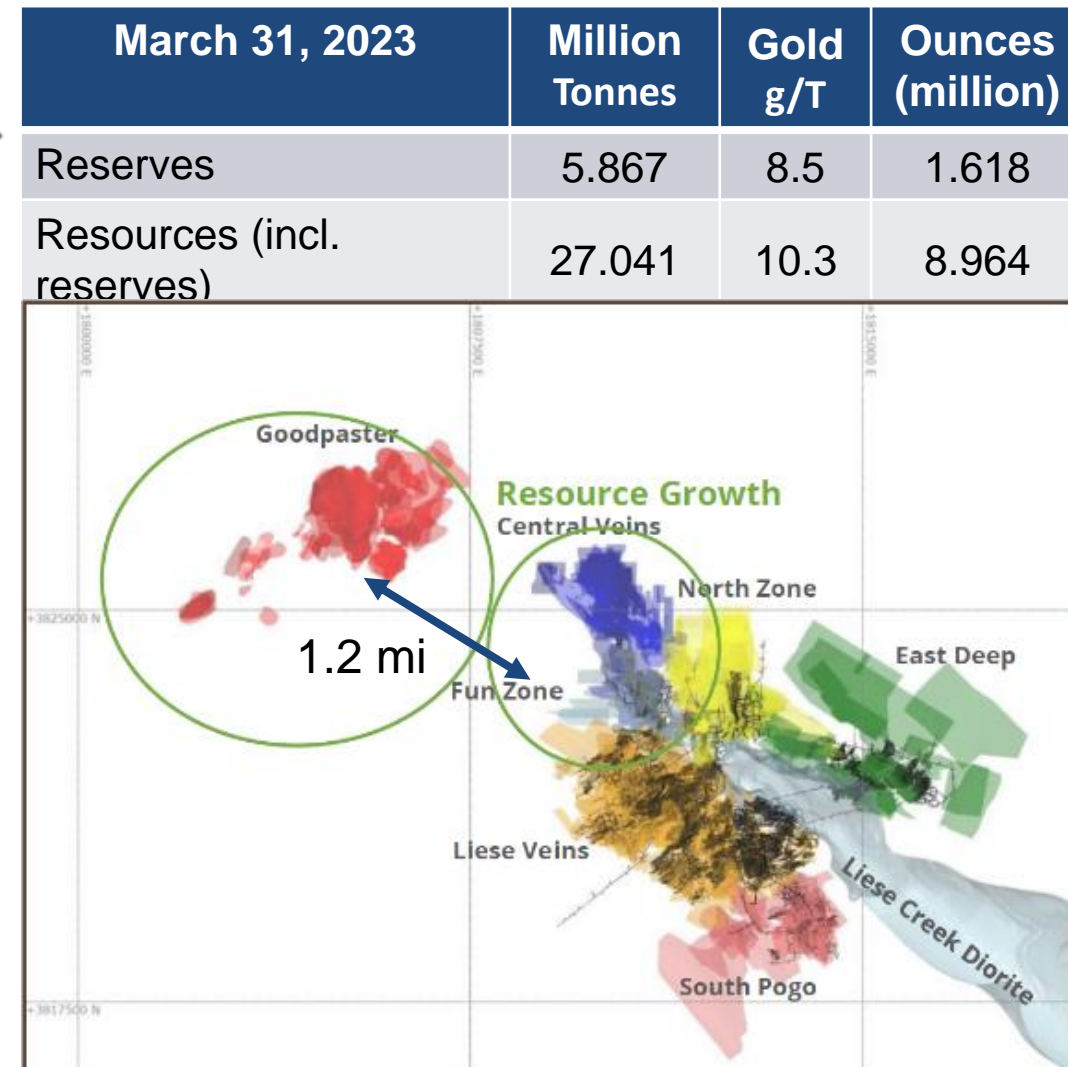
- Underground, quartz vein-hosted gold
- 386 employees
- 2023 expected production between 81,000 – 85,000 ounces of gold, with 58,103 ounces of gold produced through Q3 2023
- Mining Kensington, Jualin, Raven, Elmira veins
- New ore zone recently discovered
- Development and exploration drilling continues





Northern Star Resources - Pogo Mine

- Underground, quartz vein-hosted gold
- 650 employees
- ~4.8 million ounces gold mined since 2005
- 187,837 ounces of gold produced through Q3 2023; 250,000 ounces gold forecast for 2023
- Concentrated drilling at Goodpaster target northwest of mine, with 2022 announced resource of 1.1 million ounces of gold
- Focusing on optimization initiatives to reach 300,000 ounces of gold annual production





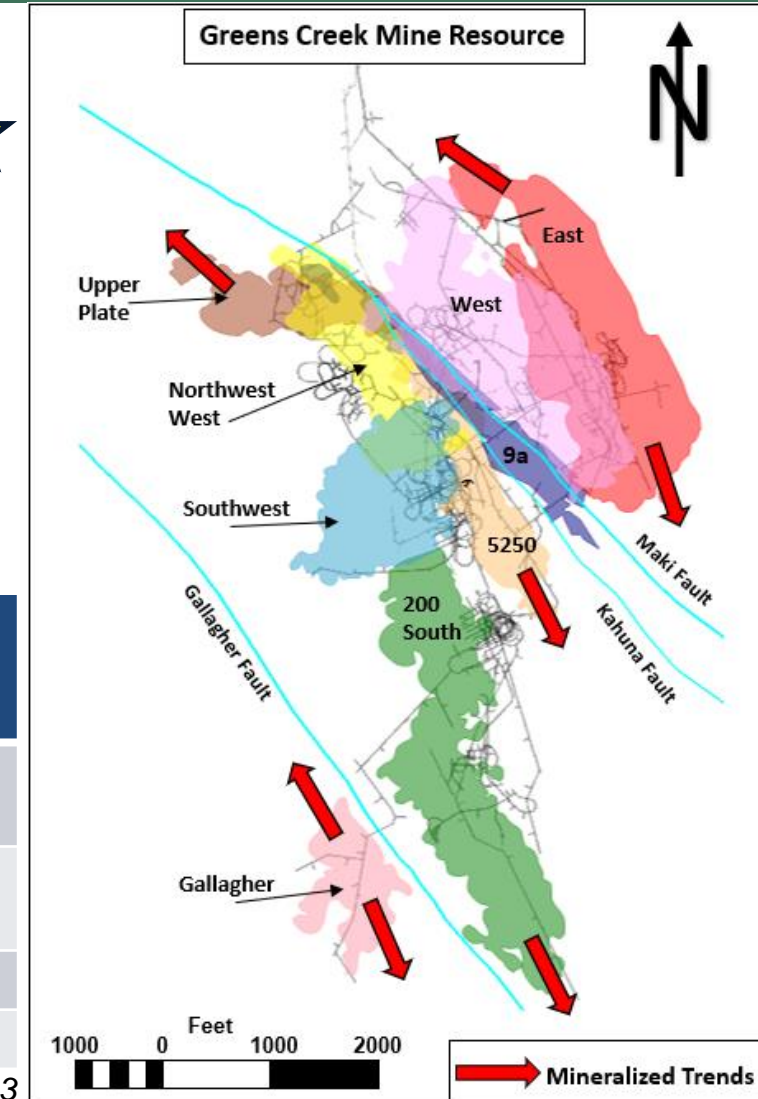
Hecla Mining - Greens Creek Mine

- Underground, polymetallic massive sulfide deposit
- 495 direct jobs
- 2023 expected production is 9.8 – 10.0 M ounces (oz.) silver; 55,000 – 65,000 oz. gold; 47,000 metric tonnes (T) zinc; 17,000 T lead
- Currently mining East Ore Zone and Upper Plate reserves
- Development and exploration drilling continues

Dec. 31, 2022	Million Tonnes	Zinc %	Lead %	Gold g/T	Silver g/T
P&P reserves	10.048	6.5	2.5	2.5	341
Measured & Indicated	7.639	8.0	2.9	3.1	403
Inferred	2.162	6.9	2.8	2.2	378
Total	19.849	7.1	2.7	2.9	369

Data from Hecla Mining Company, 2023

Alaska Mining Industry Update



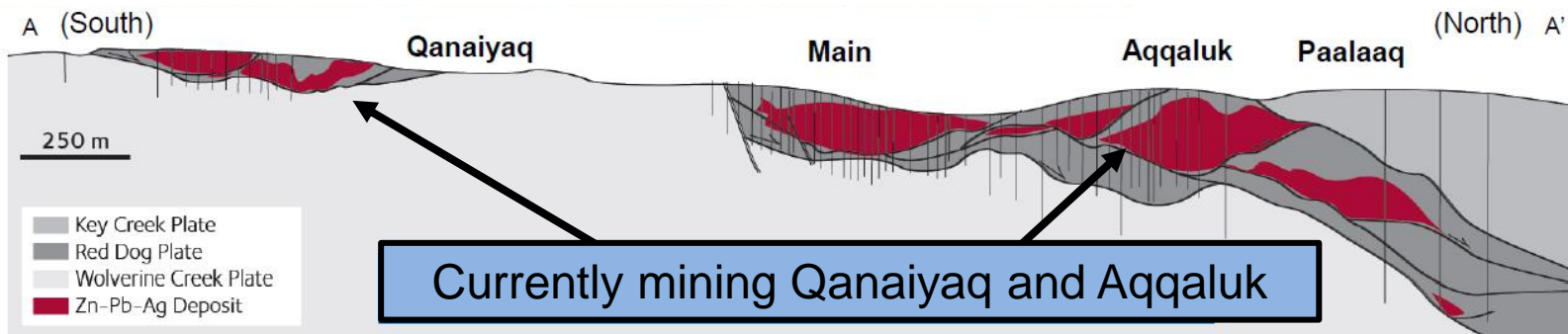
Teck Alaska - Red Dog Mine



- Open pit, polymetallic sulfide deposit
- 600 direct jobs and 700 contractors (52% of all workers are NANA shareholders)
- 2023 expected production is 545,000 – 575,000 tonnes zinc; 95,000 – 110,000 tonnes lead; ~7 million ounces silver, and byproduct germanium



Dec. 31, 2022	Million Tonnes	Zinc %	Lead %	Silver g/T
Reserves	38.5	12.4	3.6	66.2
Indicated	5.4	8.1	7.2	131.7
Inferred	8.7	12.8	4.6	90.0
Total	52.6	12.0	4.1	76.9



Sundance Mining Group - Dawson Mine



- Underground, gold-quartz vein system
- Near Hollis, Prince of Wales Island
- Initial production in 2019; 50 workers
- Mill averages ~150 short tons/day and uses gravity separation
- Produced 12,821 ounces of gold in 2021; gold production is similar in 2022 and 2023



Data from Sundance Mining Group, 2021-2023

Usibelli Coal Mine

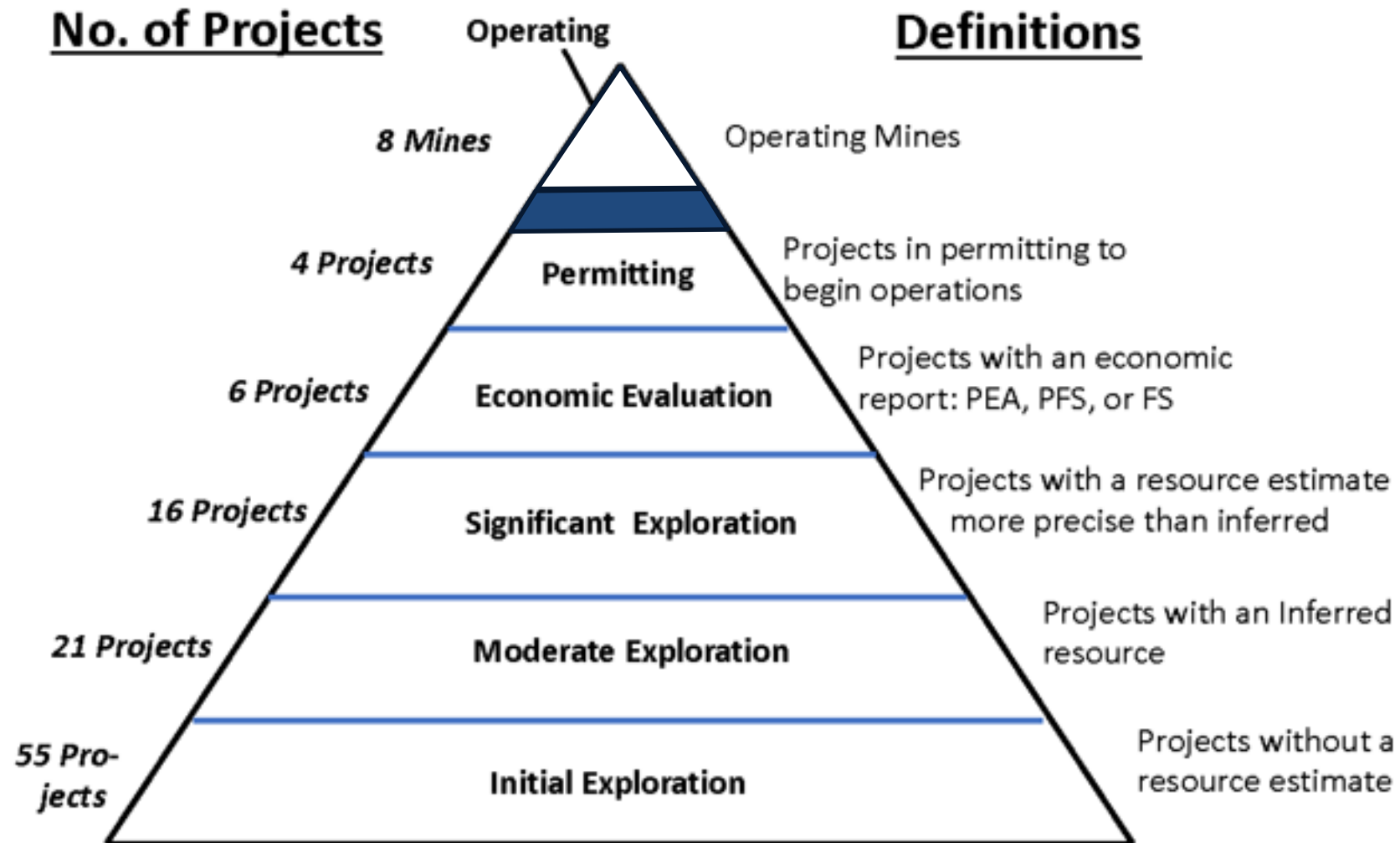


- Mining since 1943, with 2021-2023 yearly production of about 1,000,000 short tons of coal
- Regional Interior Alaska electricity generation
- 104-person workforce
- Early September 2023 met 1,000 days without a Lost Time Accident (>1,100 days and counting!)
- Researching potential to extract Critical Minerals and Rare-Earth Elements from coal and coal byproducts



Data from Usibelli Coal Mine, 2023

2023 Developments that Initiated Mining





Kinross/Contango ORE Manh Choh

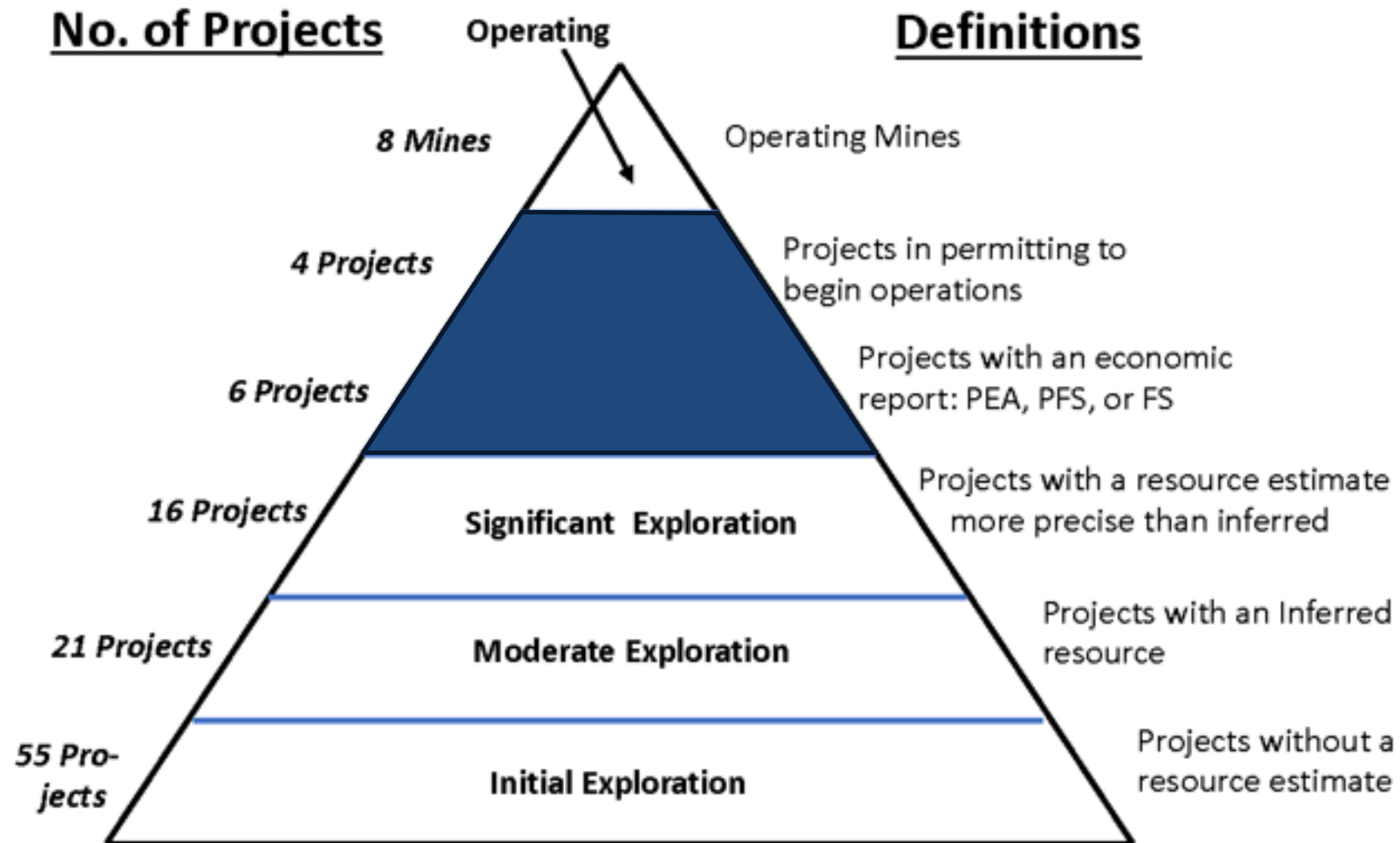


- Kinross 70% interest/ Contango ORE 30% interest
- Groundbreaking ceremony on August 29, 2023
- Trucking ore on state highway system from Tok to Fort Knox mill (225 miles)
- Planned production from 2024 to 2028 of 3,000 tons per day
- Created 280 direct and 205 indirect and induced construction-phase jobs in 2022-2033; anticipated to bring 500 direct and 450 indirect and induced mine operations-phase jobs in 2024-2028

Dec. 31, 2021	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

Data from Kinross, 2023

2023 Permitting to Economic Evaluation



Pebble Limited Partnership - Pebble



- First- or second-largest porphyry copper deposit in world
- Projected 20-year life-of-mine production: 6.4 billion pounds copper, 7.3 million ounces gold, 300 million pounds molybdenum, 37 million ounces silver, 254 short tons rhenium, and byproduct palladium
- January 2023 - U.S. EPA issued a Final Determination under the Clean Water Act Section 404(c) to prohibit and restrict the use of certain waters in the Bristol Bay watershed for use as disposal sites for dredge and fill discharge, which is needed to develop the deposit
- July 2023 State filed a motion with the Supreme Court to reverse EPA's decision; January 2024 Supreme Court declined to hear the case

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

Data from Pebble Limited Partnership, 2023



Donlin Gold - Donlin Project

- Barrick Gold Corp./NovaGold Resources Inc. (50/50 interests)
- Proposed open-pit gold mine; in permitting stage
- Mine life of 27 years, with annual production of 1.1 million ounces of gold
- Proposed \$34 million for 2023 field season for geotechnical and hydrologic fieldwork, permitting activities, and mine-optimization studies
- Lawsuit filed in April 2023 challenging issuing of permits and adequacy of 2018 environmental review by U.S. Army Corps of Engineers



June 2021	Million Tonnes	Au (g/T)	Ounces (million)
Proven & Probable Reserves	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, 2023

Ambler Metals - Arctic Project



- South32 Limited/Trilogy Metals Inc. (50/50 interest) in Ambler Mining District, with numerous copper-zinc-lead-silver-gold-cobalt prospects
- Arctic project, at the feasibility stage, is the most advanced-stage project in district (nearby Bornite project is at pre-feasibility stage)
- Calculated 13-year mine life with projected production of 149 million pounds of copper, 173 million pounds of zinc, 26 million pounds of lead, 32,538 ounces of gold and 2.8 million ounces of silver
- Mine project depends on the Ambler Access Project



Data from Ambler Metals, 2023

Ambler Access Project



- AIDEA is proposing to construct a 211-mile controlled-use industrial access road to connect the Ambler Mining District to the Dalton Highway at MP 161
- 2023 field season for pre-development studies (cultural resources, fish and engineering data) with \$19 million budget; 53 shareholder jobs out of 151 jobs
- Proposed corridor goes through Gates of the Arctic National Park (access guaranteed in ANILCA), across state and private (native corporation land), and across federal land managed by the U.S. Bureau of Land Management (BLM)
- BLM published a Final Environmental Impact Statement (EIS) and a favorable Record of Decision (ROD) in 2020, with Rights-of-Way (ROW) issued January 2021
- Due to ongoing litigation, the ROW's were remanded and BLM initiated a Supplemental EIS. The Final Supplemental EIS is expected 1Q 2024; ROD in 2Q 2024





Graphite One - Graphite Creek

- USA's largest large-flake graphite deposit, with more than 10 miles of potential extension
- Announced updated graphite resource March 2023
- Received \$4.7 million U.S. Department of Defense (DoD) grant to develop fire-suppressant foam
- Received \$37.5 million DoD matching grant to accelerate publishing a new feasibility study
- \$2.0 million investment by Bering Straits Native Corporation
- Aggressive exploration, with 57 core holes drilled in 2023; all holes with visible graphite (up to 27%)



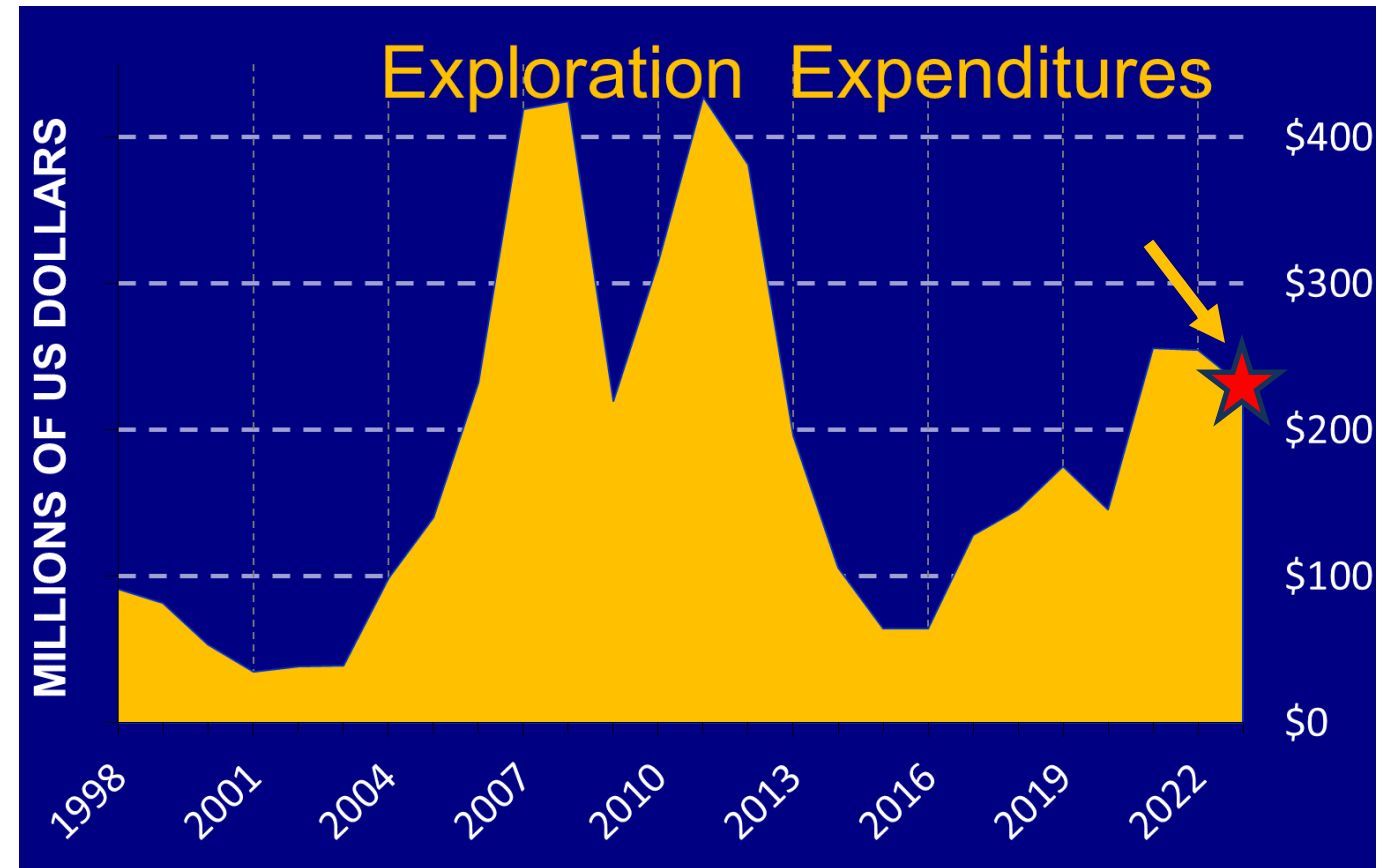
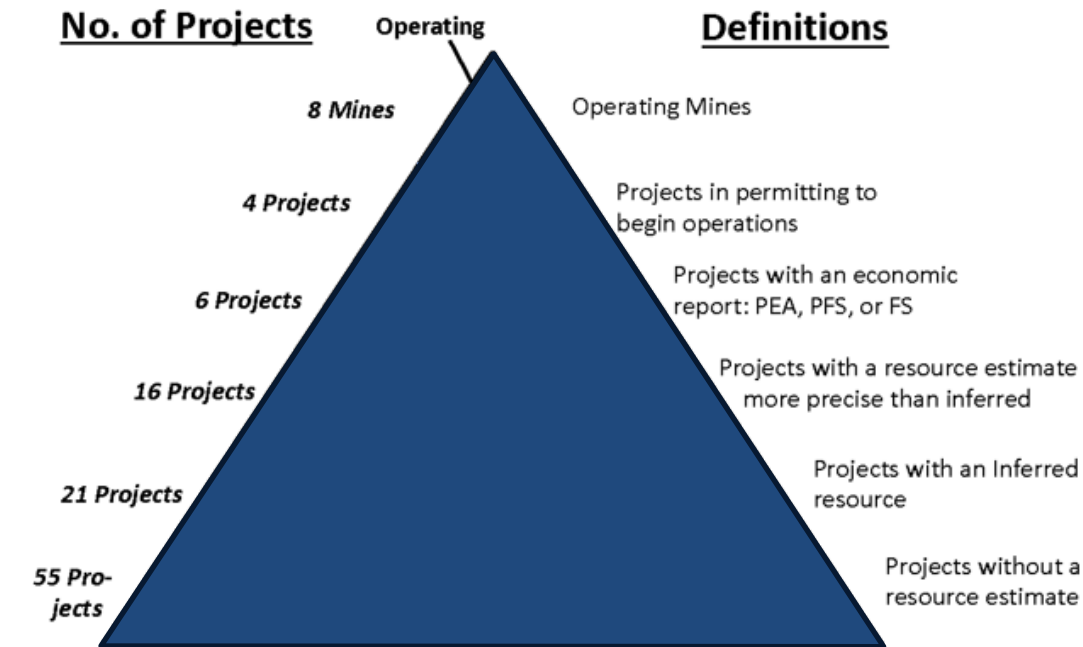
3/13/2023 News Release	Tonnes (Million)	Cg %	Graphite (M Tonnes)
Measured	5.63	5.75	0.32
Indicated	31.96	5.03	1.61
Inferred	243.70	5.07	12.34
Total	281.29	5.08	14.27

Data from Graphite One, 2023

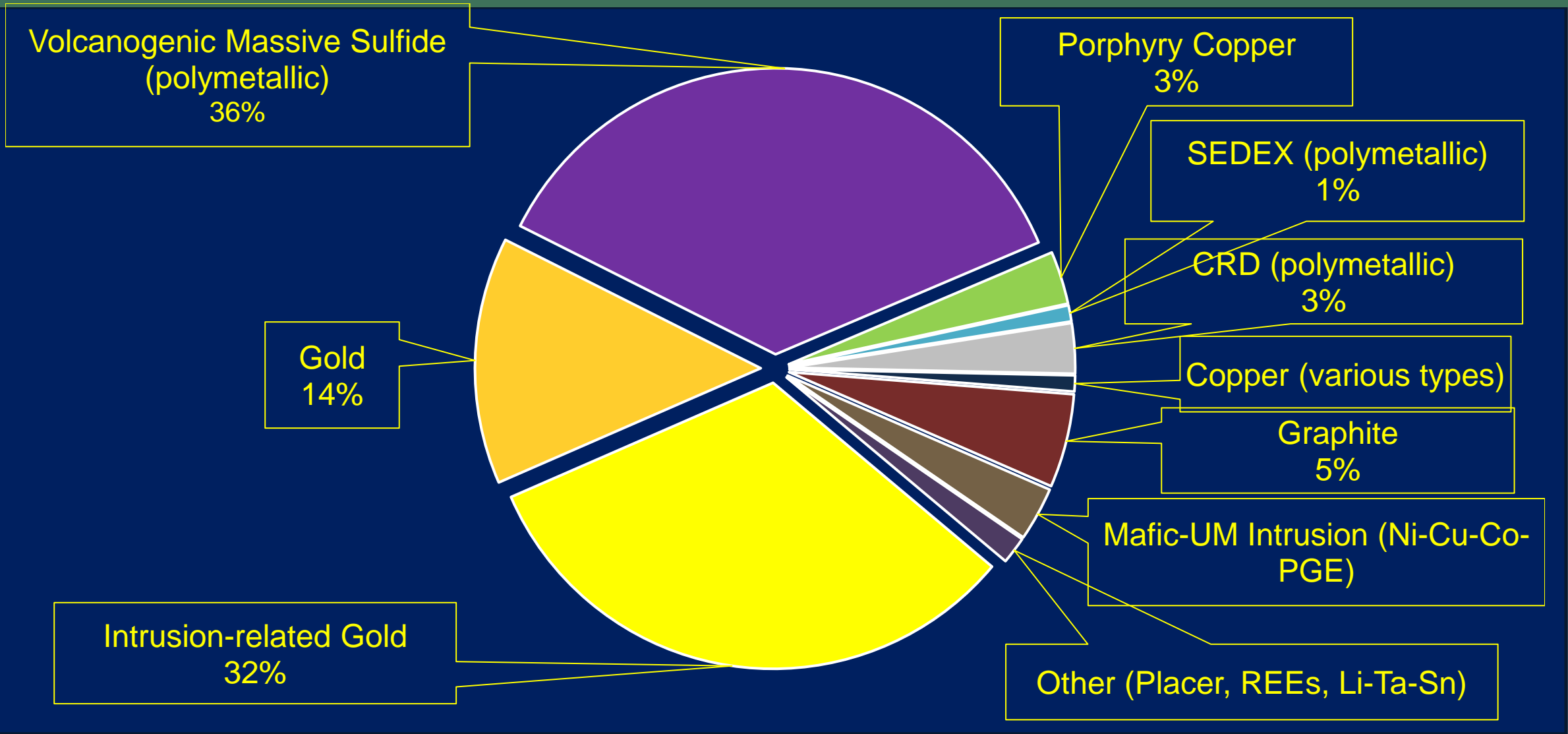
2023 Exploration Expenditures All Projects



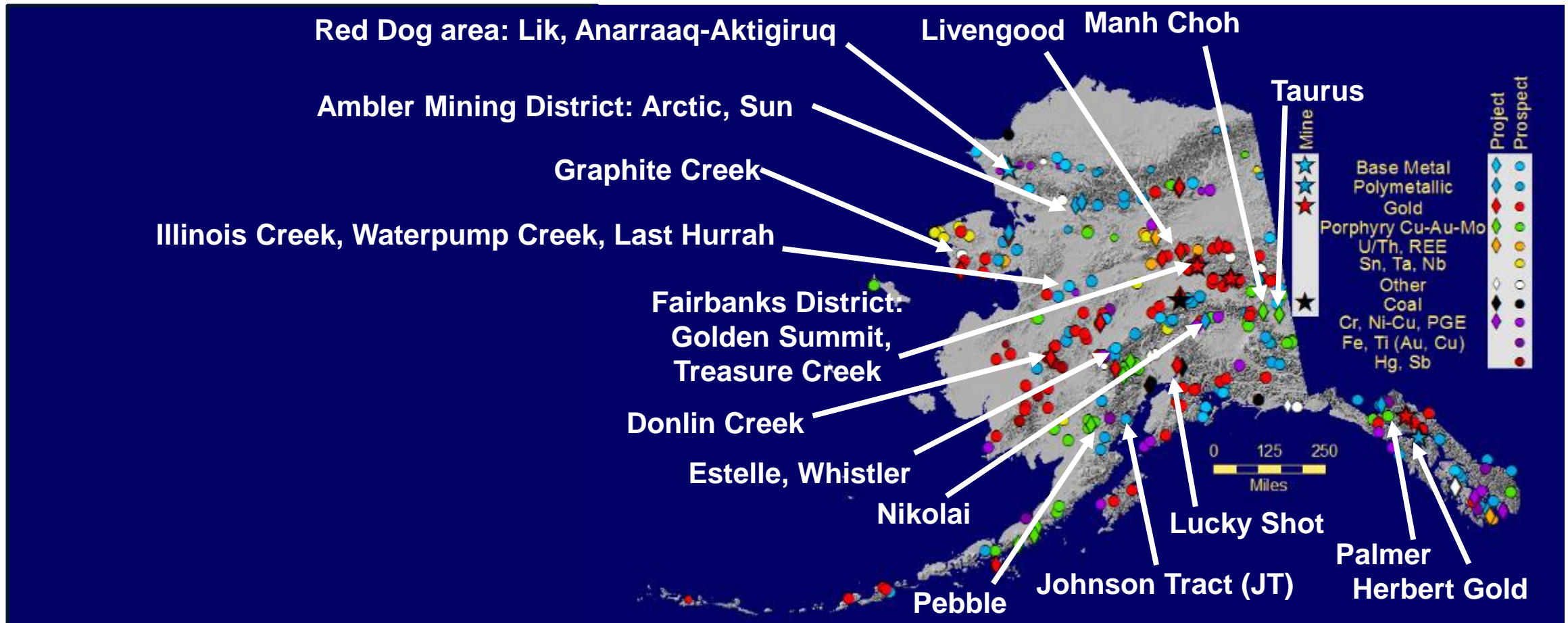
Estimated \$230 million for Alaska's 2023 mineral-exploration spending



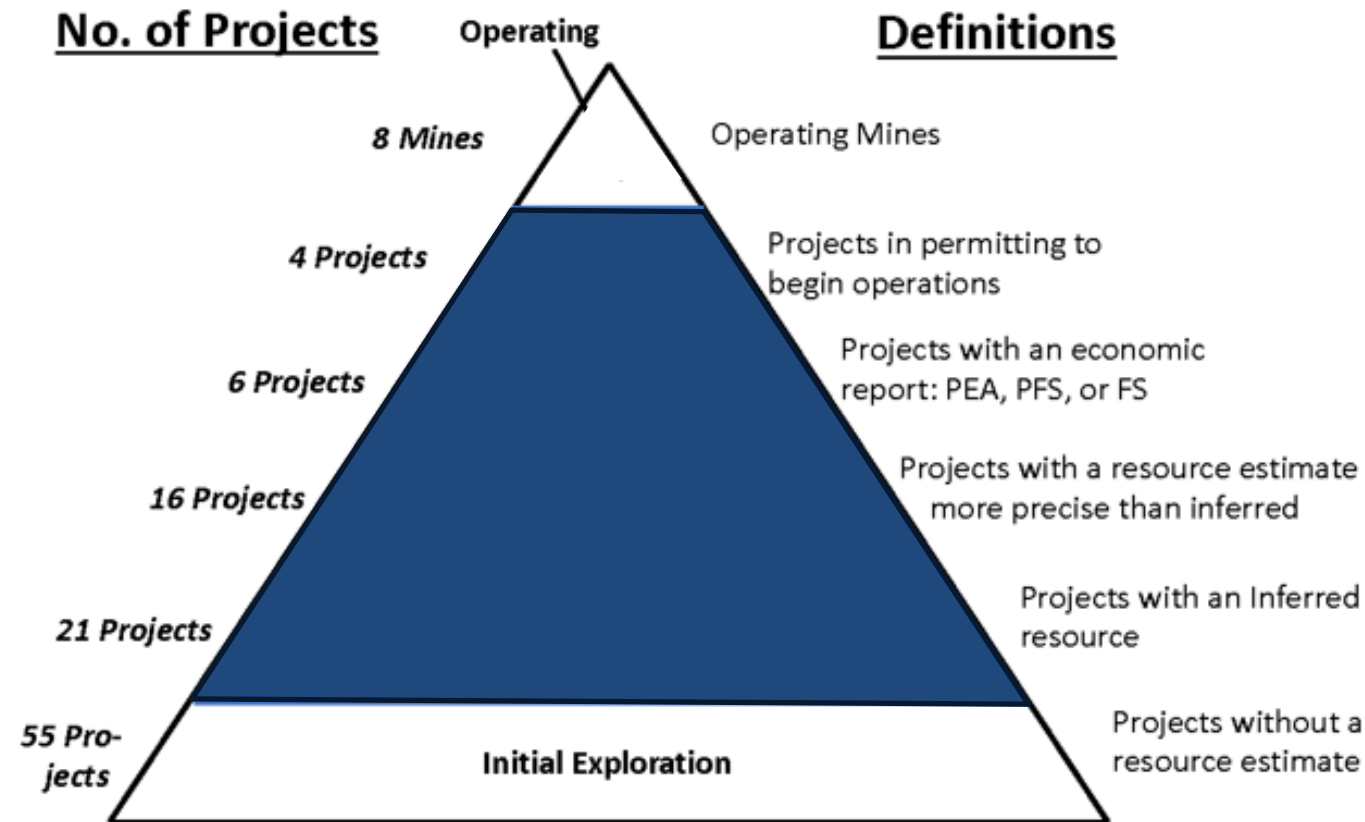
2023 Alaska Exploration by Deposit Type



2023 Advanced to Early Exploration



2023 Advanced to Early Exploration



Additional Significant Mineral Projects

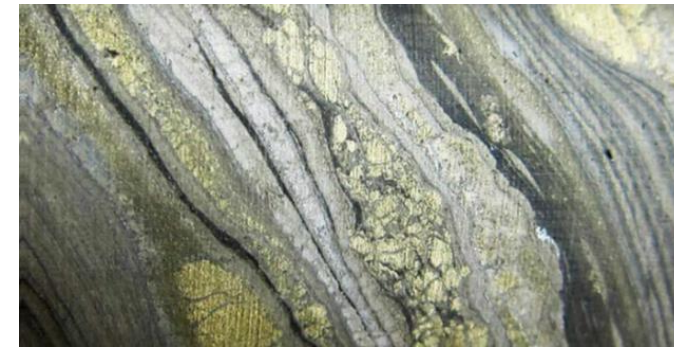


- Aktigiruaq/Anarraaq/Lik (zinc-lead-silver-germanium-barite), near Red Dog Mine
- Wishbone Hill (coal)
- Livengood (gold)
- Illinois Creek/Waterpump Creek/Last Hurrah (polymetallic)
- Golden Summit (gold), near Fort Knox Mine
- Estelle (gold) and Whistler (copper), proposed West Susitna Access Corridor
- Herbert (gold)
- Sun (polymetallic), Ambler Mining District
- Bornite (copper-cobalt-zinc), Ambler Mining District
- Lucky Shot (gold)
- Johnson Tract (polymetallic)
- Palmer (polymetallic)
- Pogo Mine area (gold)
- Nikolai project (nickel-copper-cobalt-palladium)

Teck – Red Dog Area Exploration



- Aktigiruaq + Anarraaq + Lik, near Red Dog; State land
- Sediment-hosted deposits with significant zinc, lead, silver, and barite resources; byproduct germanium
- 2023: conducted resource-definition drilling at all projects
- Primary focus is Aktigiruaq scoping-level studies for an underground mine leveraging existing mill and supporting facilities at Red Dog Mine
- DNR approved Plan of Operations for access road in 2022
- Waiting for unfinished Environmental Assessment and Final Decision from U.S. Army Corps of Engineers – federal Section 106 Process (cultural review)



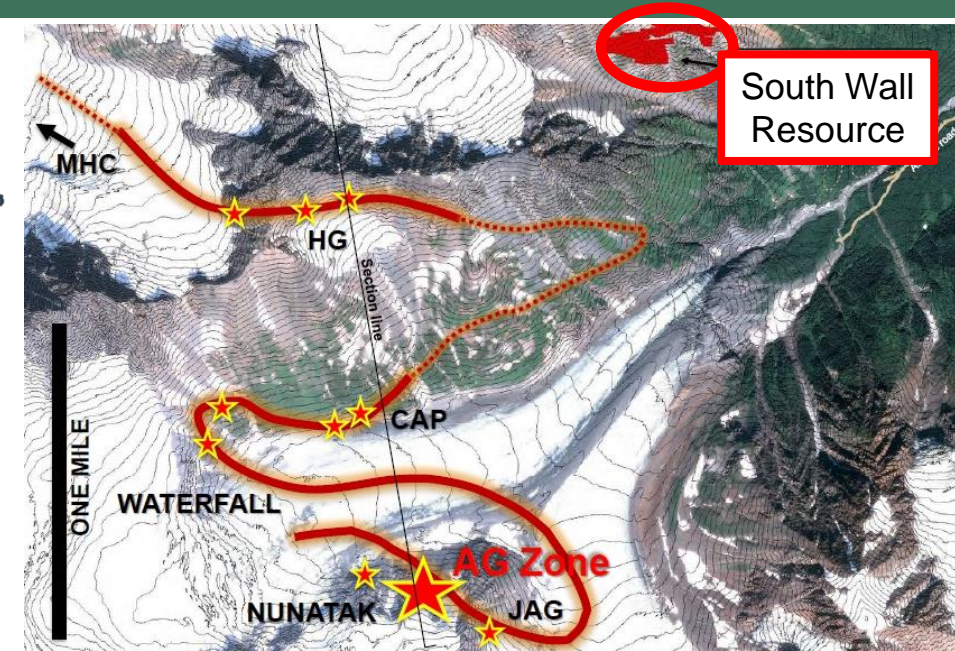
Data from Teck Alaska, 2023





DOWA-American Pacific - Palmer

- American Pacific Mining & Dowa Metals & Mining Alaska Ltd.
- Copper-zinc-silver-gold-barite deposit near Haines
- Preliminary Economic Assessment-stage project
- 2023: Drilled 27 holes to refine resource in the South Wall resource area; metallurgical studies
- Geotechnical and hydrology drilling, environmental baseline studies, and permitting
- Preparing for a Feasibility Study



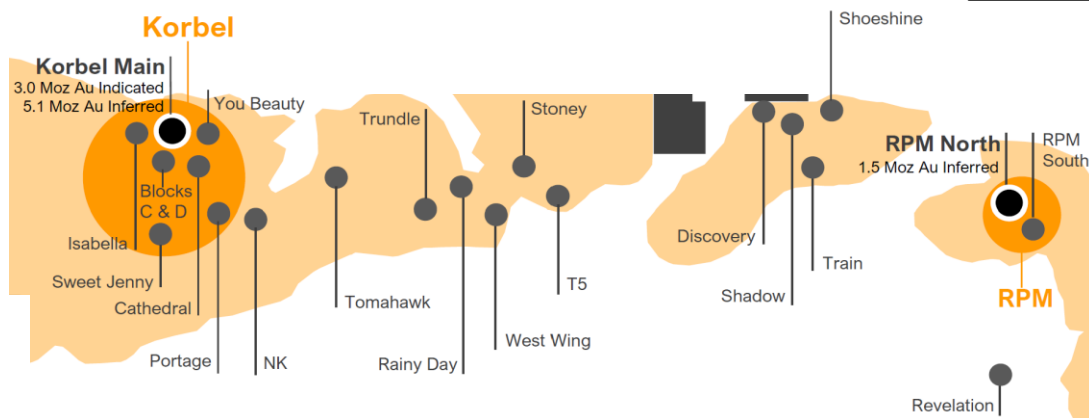
Dec. 2018	Million Tonnes	Cu %	Zn %	Ag g/T	Au g/T	Barite %
Indicated	4.677	1.49	5.23	30.8	0.30	23.9
Inferred	9.594	0.59	4.95	69.3	0.39	27.7
Total	14.3	0.89	5.04	56.6	0.36	26.5

Data from American Pacific Mining Corp., 2023



Nova Minerals – Estelle

- Gold-bearing quartz veins in plutonic rocks; state land in west-central Alaska Range
- Early-stage exploration project
- 2021-2023: Large drilling programs at Korbel and RPM deposits
- Updated mineral-resource estimate in March 2023
- Conducting regional exploration at other prospects



Alaska Mining Industry Update



Data from Nova Minerals, 2023

Division of Mining, Land and Water

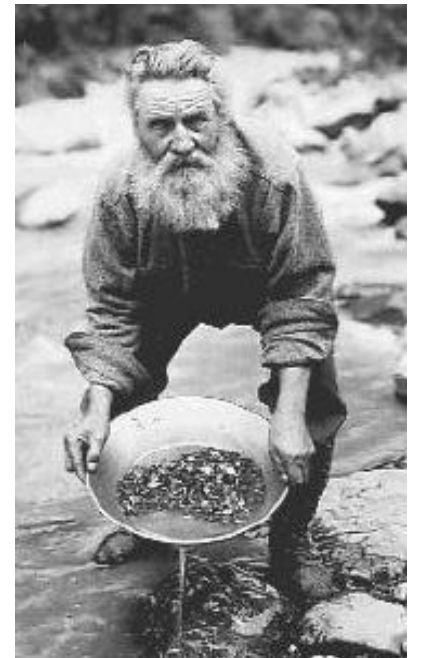
Mining Section



Mining Section Overview



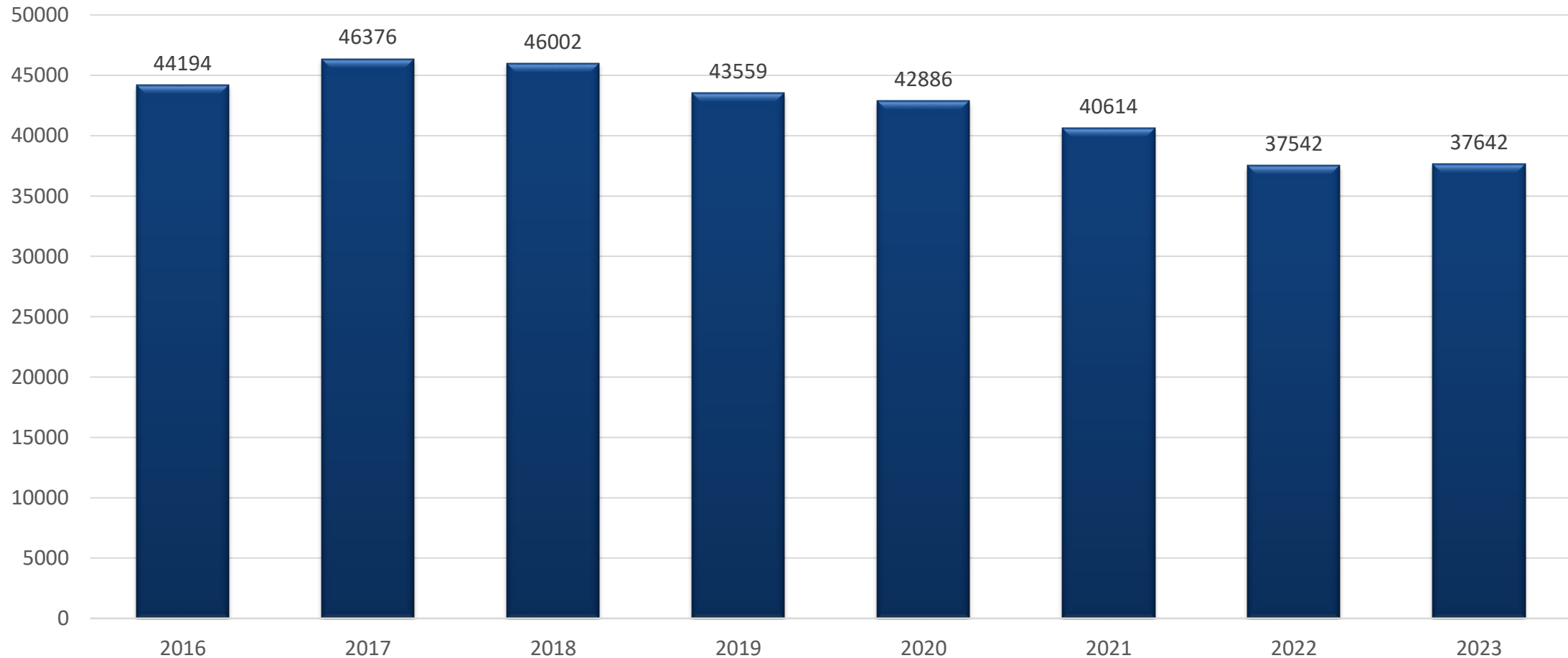
- Mineral Property Management
 - Manage 37,000+ mining claims for mineral exploration and development
 - 87 Offshore and 48 Mining Leases
- APMA (Application for Permits to Mine in Alaska)
 - 684 APMA's for hard rock exploration and placer mining
 - Approval of Plans of Operations for Upland, Offshore, & Millsite Leases
- Large Mines
 - Oversees statewide reclamation requirements and large mines
- Coal Permitting & Compliance
 - 36 Coal Leases
- Abandoned Mine Lands
 - Regulates reclamation and removes hazards from past mining operations



Mining Statistics



Number of Active Claims by Mining Year

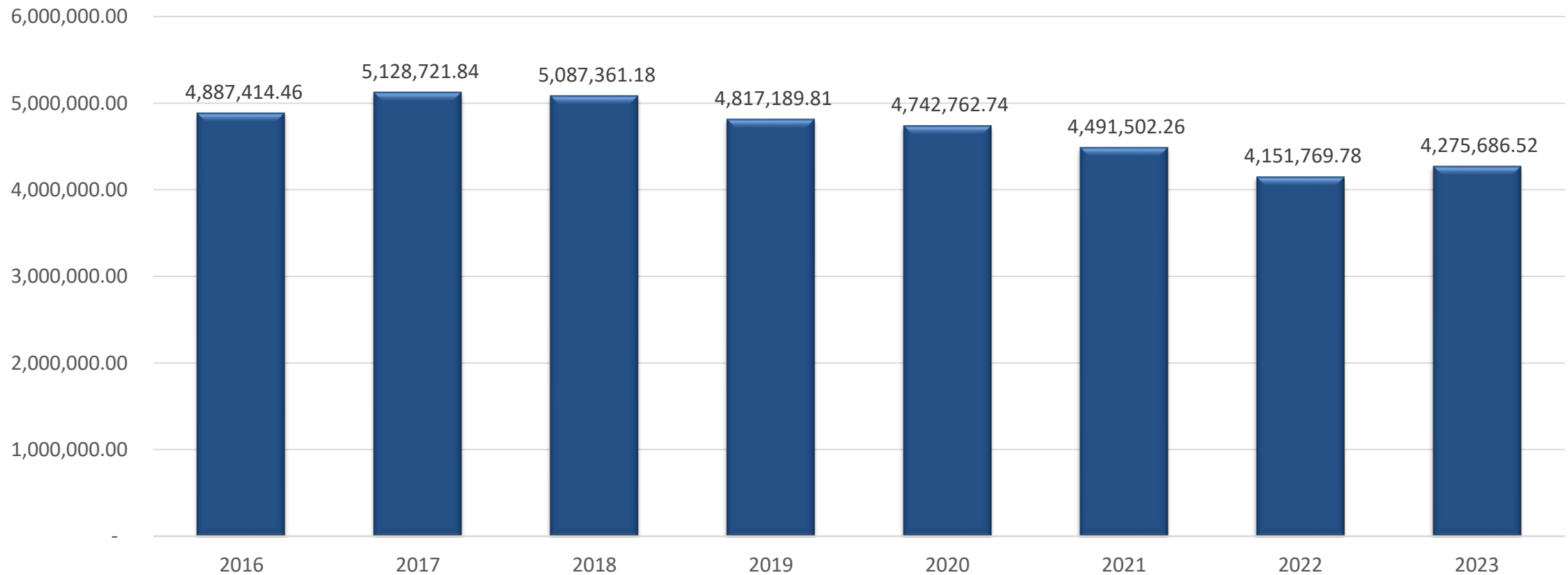


■ Active Claims (before abandonment)
Alaska Mining Industry Update

Mining Acreages



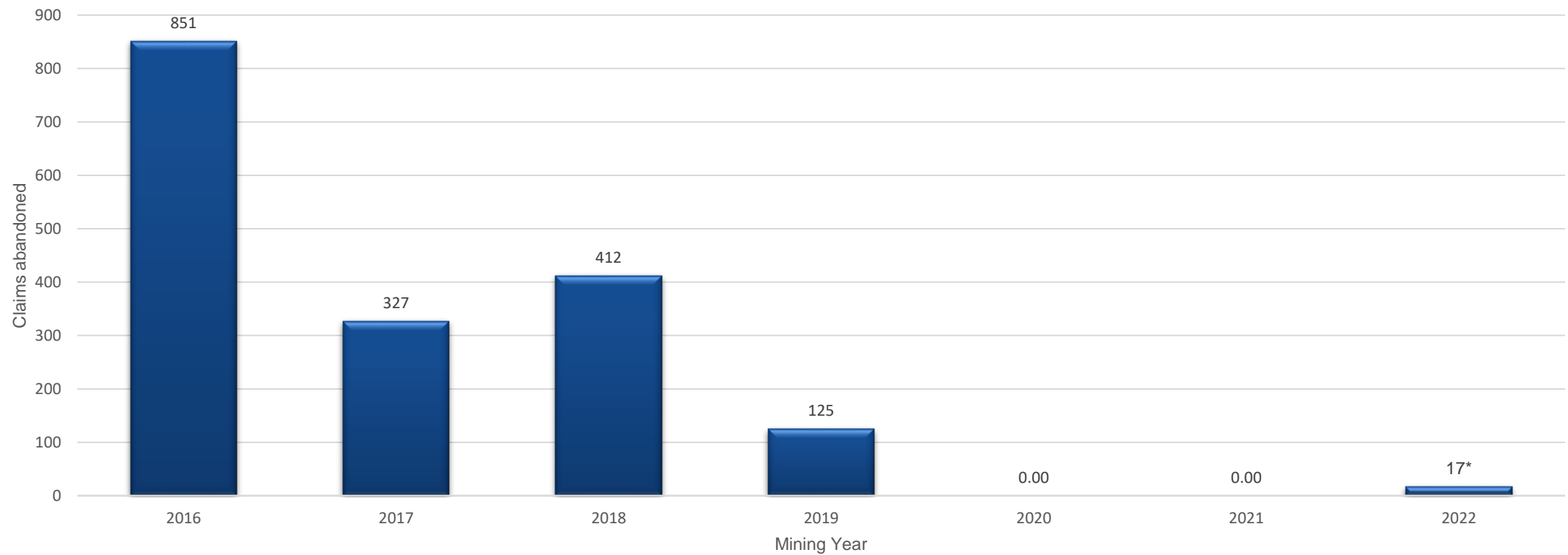
Average Acres of Active Claims by Year



Mining Abandonments



**Claims Abandoned for Missing Essential Facts
(by Mining Year)**

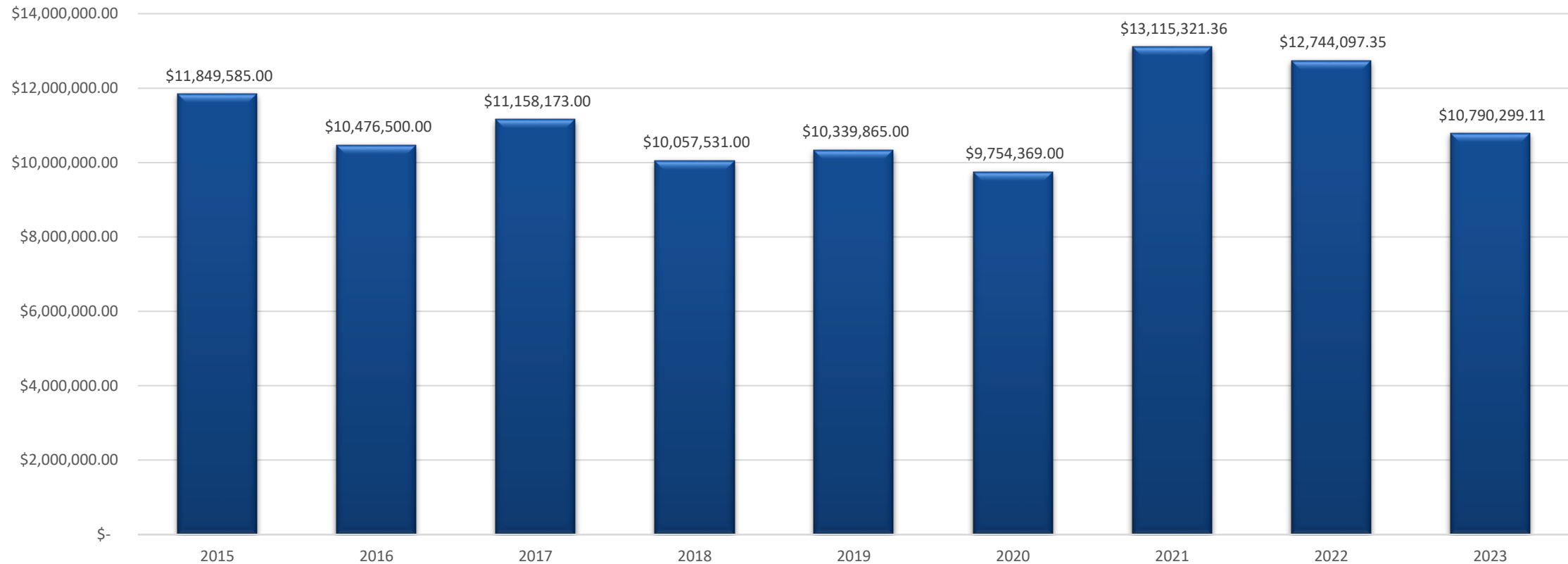


** Closed as non-responsive, not as abandoned by operation of law.*

Mining Revenue



State Mining Revenue



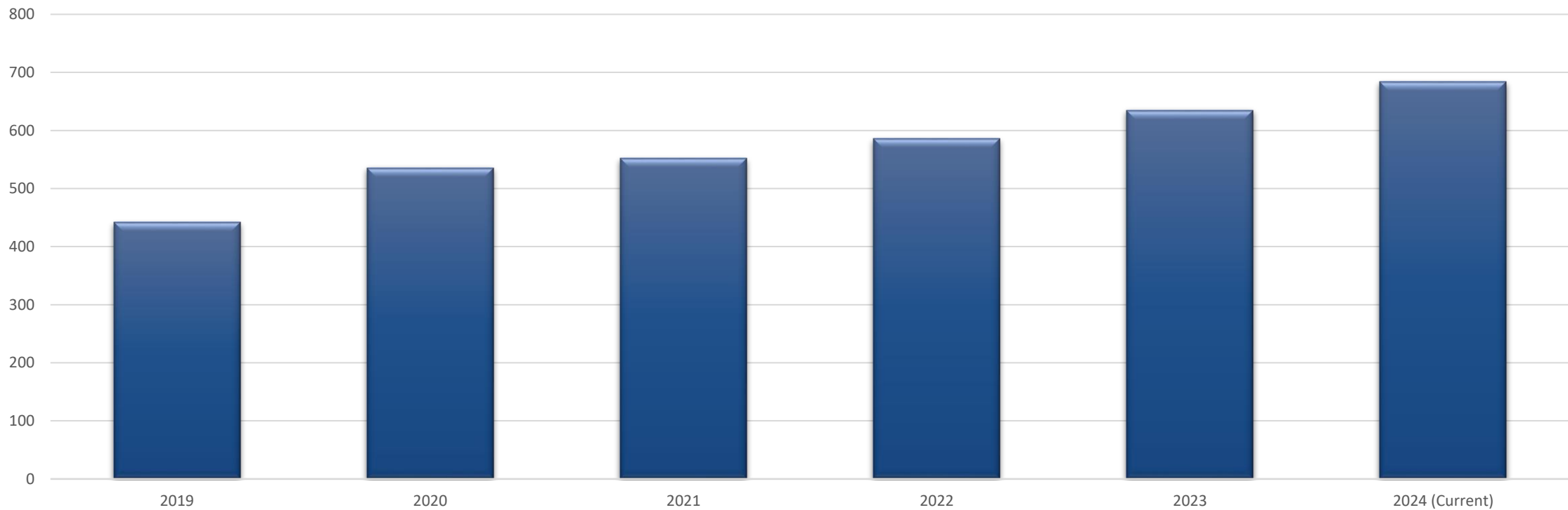
Twelker, Evan, Werdon, M.B., and Athey, J.E., 2022, Alaska's mineral industry 2020: Alaska Division of Geological & Geophysical Surveys Special Report 76, 75 p. <https://doi.org/10.14509/30848>

2021-2023 data provided by Financial Services Section. 2023 data is projected as of 12/29/2023

Permits to Mine in Alaska



Applications for Permits to Mine in Alaska



2024 numbers reflect increase in hard rock exploration permits by 10% (104).

Thank you!



Melanie Werdon, Director
(907) 451-5082
Melanie.Werdon@alaska.gov

