Alaska's Mineral Industry 2012

Special Report 68

ALASKA DEPARTMENT OF NATURAL RESOURCES

Division of Geological & Geophysical Surveys

in cooperation with

ALASKA DEPARTMENT OF COMMERCE, COMMUNITY, AND ECONOMIC DEVELOPMENT

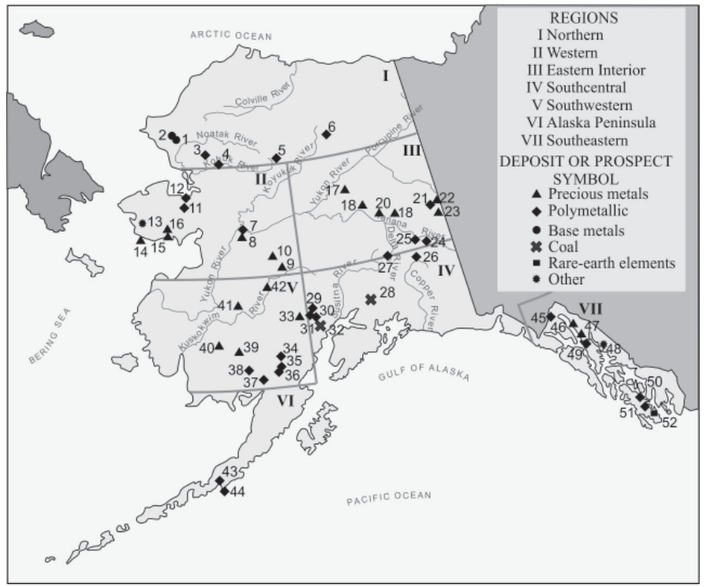
Division of Economic Development

I Northern Region
1. Red Dog Mine area—Teck Alaska Inc.
2. Lik—Zazu Metals Corp.
3. Baird Mountain—Tintina Resources Inc.
4. Upper Kobuk (Bornite-Ambler)—NovaCopper Inc.
5. Sun—Andover Mining Corp.
6. East Wiseman—Doyon Limited

II Western Region
7. Round Top/Honker—Western Alaska Copper & Gold Co.
8. Illinois Creek—Silver Predator Corp.
9. Nixon Fork Mine—Fire River Gold Corp.
10. Mystery Mountains—Newmont Exploration Ltd.
11. Kugruk—Tintina Resources Inc.
12. Anugi-Fairhaven—NANA Regional Corp.
13. Graphite Creek—Graphite One Resources Inc.
14. Nome Offshore—Placer Marine Mining Inc.
15. Bluff—Millrock Resources Inc.
16. Council—Millrock Resources Inc.

III Eastern Interior Region
17. Livengood
    a. Livengood (Money Knob)—International Tower Hill Mines Ltd.
    b. McCord Creek—Liberty Gold Corp.
    c. Shorty Creek—Bluestone Resources Inc.
18. Fairbanks District
    a. Fort Knox and district—Kinross Gold Inc.
    b. Golden Summit—Freegold Ventures Ltd.
    c. West Ridge—Teryl Resources Corp.
    d. Gil—Kinross Gold Inc.
19. Pogo—Goodpaster mining district
    a. Pogo—Sumitomo Metal Mining Pogo LLC
    b. Money Rock/West Pogo—Alix Resources Corp.
20. Stone Boy (Monte Cristo)—Sumitomo Metal Mining/Stone Boy Inc.
21. LWM and 40 Mile—Full Metal Zinc Ltd.
22. Rolling Thunder—Full Metal Minerals Ltd.
23. Fortymile (Napoleon)—Millrock Resources Inc.
24. Tetlin—Contango ORE Inc.
25. Delta—Heatherdale Resources Ltd.

IV Southcentral Region
26. Chisna—Corvus Gold Inc./Ocean Park Ventures Corp.
27. MAN—Pure Nickel Inc.
28. Chickaloon coal—Riversdale Alaska LLC
29. Whistler—Kiska Metals Corp.
30. Estelle—Millrock Resources Inc.
31. Cristo—Millrock Resources Inc.
32. Linc UCG—Linc Energy



V Southwestern Region
33. Terra—WestMountain Gold Inc./Corvus Gold Inc.
34. Big Chunk—Liberty Star Uranium & Metals Corp.
35. Pebble—The Pebble Limited Partnership (Northern Dynasty Minerals Ltd./Anglo American PLC)
36. Pebble South—The Pebble Limited Partnership/Full Metal Minerals Ltd.
37. Audn—Millrock Resources Inc./Vale Exploration USA Inc.
38. Humble (Kemuk)—Millrock Resources Inc.
39. Shotgun—TNR Gold Corp.
40. Nyac—Nyac Gold LLC and Calista Corp.
41. Donlin Creek—Donlin Creek LLC (Barrick Gold Corp./NOVAGOLD Resources Inc.)
42. Vinasale—Freegold Ventures Ltd.

VI Alaska Peninsula Region
43. Pyramid—Antofagasta Minerals PLC/Full Metal Minerals Ltd.
44. Unga—Redstar Gold Corp./Full Metal Minerals Ltd.

VII Southeastern Region
45. Palmer—Constantine Metal Resources Ltd.
46. Kensington/Jualin—Coeur Alaska Inc.
47. Herbert Glacier—Grand Portage Resources Ltd./ Quaterra Resources Inc.
48. Port Snettisham—Arrowstar Resources Ltd.
49. Greens Creek Mine—Hecla Mining Co.
50. Salt Chuck—Pure Nickel Inc.
51. Niblack—Heatherdale Resources Ltd.
52. Bokan Mountain/Dotson Ridge—Ucore Rare Metals Inc.

Figure 7. Selected exploration projects in Alaska, 2012.

SPECIAL REPORT 68
ERRATA

Page 10: Additional exploration projects Round Top/Honker and Kugruk were added in the Western Region, and numbering of the projects changed accordingly. The Western region map area was revised.

Page 10: Previous #16 (Fairbanks District). Teryl Ventures is no longer a partner with Kinross Gold Inc. on the Gil property. Kinross bought Teryl's portion of the property in 2011 and Kinross controls 100 percent of the Gil property. The relevant text in the Exploration Section of the report is correct.

Page 20: The following text replaces the last paragraph of the Western exploration section on page 20 of SR 68. Exploration expenditures and employment information from the Round Top and Honker projects were not included in the 2012 estimates.

Inside back cover: Total gold production in Alaska by mining district has been revised with correct numbers and the map changed accordingly.

Page 20

The following text replaces the last paragraph of the WESTERN EXPLORATION section on page 20:

Western Alaska Copper & Gold Co. conducted two separate exploration programs in 2012, with total exploration expenditures of $450,000. In July, high resolution helicopter aeromagnetic and radiometric surveys were flown for the Round Top porphyry copper-silver-gold (±molybdenum) deposit (392 line-miles at 328-foot line spacing over an area of 30 square miles) and the Honker gold deposit (86 line-miles at 328-foot line spacing over an area of 4.6 square miles). The geophysical survey extended the footprint of the Round Top intrusive complex to encompass an 11.6-square-mile area and defined drill targets associated with structures, skarn/replacement mineralization, and porphyry-style alteration. At Honker the geophysical survey defined several larger structures and lithologic contacts that will aid plans for future drilling. In addition to the geophysical survey, a soil geochemical sampling program of over 1,050 samples covered the entire Round Top claim block of 88 state 160-acre claims (or 14,080 acres). The soil survey delineated a copper-silver-gold-lead-zinc-molybdenum zoning pattern associated with the known exposures of mineralized intrusive rocks at Round Top and also defined several previously unknown anomalies. Many of the soil geochemical anomalies are coincident with aeromagnetic and radiometric anomalies, and the findings are corroborated by the original surface outcrop discovery and drilling by Anaconda Minerals Co. in the 1980s.

At least 77 individuals or companies reported placer gold exploration across the region. Most of the operations were on the Seward Peninsula, in particular, dredge sampling the beach placers offshore of Nome.

	Mining districts[a]	2012 Production (in refined troy ounces) Total production	Placer	Lode
1	Lisburne district	0	0	0
2	Noatak district	7,800	7,800	0
3	Wainwright district	0	0	0
4	Barrow district	0	0	0
5	Colville district	0	0	0
6	Canning district	0	0	0
7	Sheenjek district	0	0	0
8	Chandalar district	68,838	51,438	17,400
9	Koyukuk district	374,433	374,433	0
10	Shungnak district	15,000	15,000	0
11	Kiana & Selawik districts	40,607	40,607	0
12	Fairhaven district (Candle subdistrict)	349,701	349,701	0
13	Fairhaven district (Inmachuk subdistrict)	253,765	253,765	0
14	Serpentine district	4,478	4,478	0
15	Port Clarence district	42,358	42,358	0
16	Kougarok district	190,222	190,222	0
17	Nome (Cape Nome) district	5,030,054	5,030,054	0
18	Council district	1,047,042	1,020,042	27,000
19	Koyuk district	84,402	84,402	0
20	Hughes district	380,244	380,244	0
21	Kaiyuh district	149,703	5,400	144,303
22	Anvik district[b]	7	7	0
23	Marshall district	124,506	124,506	0
24	Bethel district	42,953	42,953	0
25	Goodnews Bay district	31,200	31,200	0
26	Aniak district	613,054	613,054	0
27	Iditarod district	1,564,731	1,561,801	2,930
28	McGrath district	354,238	133,307	220,931
29	Innoko district	754,204	754,048	156
30	Ruby district	478,008	478,008	0
31	Kantishna district	99,307	91,401	7,906
32	Hot Springs district	602,322	602,322	0
33	Melozitna district	14,564	14,564	0
34	Rampart district	204,842	204,842	0
35	Tolovana district	540,436	540,436	0
36	Yukon Flats district	0	0	0
37	Circle district	1,112,990	1,112,990	0
38	Black district	2	2	0
39	Eagle district	52,152	52,152	0
40	Fortymile district	596,124	596,124	0
41	Chisana district	144,519	78,019	66,500
42	Tok district	288	288	0
43	Goodpaster district	2,137,589	2,050	2,135,539
44	Fairbanks district	14,161,933	8,250,405	5,911,528
45	Bonnifield district	101,291	94,591	6,700
46	Richardson subdistrict of Fairbanks district[c]	121,704	119,404	2,300
47	Delta River district	10,990	10,990	0
48	Chistochina district	185,962	185,962	0
49	Valdez Creek district	530,509	528,928	1,581
50	Yentna district	203,482	203,482	0
51	Redoubt district	105	105	0
52	Bristol Bay Region	1,570	1,570	0
53	Kodiak district (53b)–Alaska Peninsula Region (53a)	112,408	4,808	107,600
54	Homer district	17	17	0
55	Hope & Seward districts	135,193	70,193	65,000
56	Anchorage district[d]	415	415	0
57	Willow Creek district	667,841	58,841	609,000
58	Prince William Sound district	137,801	101	137,700
59	Nelchina district	14,912	14,912	0
60	Nizina district	148,500	148,500	0
61	Yakataga district	18,041	18,041	0
62	Yakutat district[e]	13,200	2,200	11,000
63	Juneau district (partial)	82,539	82,539	0
64	Juneau (64a) & Admiralty (64b) districts	9,369,160	81,490	9,287,670
65	Chichagof district	770,000	0	770,000
66	Petersburg district	15,000	15,000	0
67	Kupreanof district	0	0	0
68	Hyder district	219	219	0
69	Ketchikan district	62,002	4,002	58,000
70	Bering Sea Region	0	0	0
71	Aleutian Islands Region	0	0	0
	Unknown (undistributed)[f]	29	29	0
	TOTAL	**44,371,507 (1380 tonnes)**	**24,780,763**	**19,590,744**

SPECIAL REPORT 68
ERRATA

Total gold production in Alaska by mining district, 1880–2012

[a]Mining district names and boundaries revised slightly from those defined by Ransome and Kerns (1954) and Cobb (1973). Sources of data: U.S. Geological Survey, U.S. Bureau of Mines, and Alaska Territorial Department of Mines records 1880-1930; U.S. Mint records 1930-1969; State of Alaska production records 1970-2012. Entries of "0" generally mean no specific records are available.
[b]Included in Marshall district.
[c]Not included in total for Fairbanks district.
[d]Most placer gold production included in Willow Creek district.
[e]Includes lode production from Glacier Bay area and placer production from Lituya Bay area.
[f]Production that cannot be credited to individual districts due to lack of specific records or for reasons of confidentiality.

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by
J.E. Athey, L.A. Harbo, P.S. Lasley, and L.K. Freeman

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Division of Economic Development

Front cover photo: View toward the northwest of Teck American/Millrock Resources' discovery hole in the RPM prospect. The site is part of the Estelle property, a 135-square-mile block of State of Alaska mining claims in the western Alaska Range, which is prospective for both intrusive-related gold and porphyry copper–gold mineralization. Results from this hole averaged 0.060 ounce per ton gold over 72 feet in a 335-foot interval that averaged 0.030 ounce per ton gold. See page 24 for description of the Estelle exploration program. Photo provided by Millrock Resources Inc.

Back cover photo (top): Fort Knox Mine pit with a dusting of snow. Photo provided by Jenny Wynne, Water Section of Division of Mining, Land and Water (DMLW), Department of Natural Resources (DNR).

Back cover photo (center left): Coeur Alaska's facilities at the Kensington Mine, with Lions Head Mountain in the background. Photo provided by Coeur Alaska Inc.

Back cover photo (center middle): Eureka Creek placer operation in the Tofty area, Hot Springs mining district. Photo provided by Jenny Wynne, Water Section of DMLW, DNR.

Back cover photo (center right): DNR Commissioner Dan Sullivan at the Hot Springs pluton during the July 2012 tour of the Division of Geological & Geophysical Surveys' (DGGS) Ray Mountains geologic mapping project in interior Alaska near the Dalton Highway. The Ray Mountains project is part of DGGS's Strategic and Critical Minerals Assessment project, a state-funded capital-improvement project to evaluate Alaska's potential for strategic and critical minerals. Photo provided by Shane Lasley.

Back cover photo (bottom): Miners scaling underground at Kensington Mine. Photo provided by Coeur Alaska Inc.

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EXECUTIVE SUMMARY

Alaska's Mineral Industry 2012 is the 32nd annual report produced by the Division of Geological & Geophysical Surveys (of the Department of Natural Resources) and the Division of Economic Development (of the Department of Commerce, Community, and Economic Development).

The total reported value of Alaska's mineral industry decreased slightly in 2012 to $4,113.6 million, less than 1 percent lower than its $4,138.7 million value in 2011. Alaska's mineral industry continued to demonstrate its strength and size based in part on the great mineral potential of the state and its strategic location. Mineral exploration expenditures in 2012, $335.1 million, were down about 8 percent from the 2011 level of $365.1 million. This marked the eighth consecutive year with exploration expenditures exceeding $100 million.

Development expenditures in Alaska in 2012 increased by almost 26 percent, to approximately $342.4 million, from the significantly under-reported value of $271.9 million in 2011. This was the ninth consecutive year development expenditures exceeded $200 million. Mineral production volumes remained strong, decreasing by only 2 percent in 2012. The estimated gross wholesale (first market) value of mineral production in 2012 decreased to $3,436.1 million, from $3,507.7 million in 2011.

Mineral industry employment rose in 2012 to 4,366 full-time-equivalent jobs, an increase of 416 jobs (11 percent) from the 2011 total of 3,950. Production employment in 2012 saw a 10 percent increase, while development employment increased almost 27 percent. Production jobs increased from 2,993 in 2011 to 3,283 in 2012. Development jobs increased from 422 in 2011 to 535 in 2012. Exploration jobs increased from about 535 jobs in 2011 to 548 in 2012, a 2 percent increase. According to Department of Labor and Workforce Development (DLWD), in the ten-year period from 2003 through 2012, mining activities employment, not including oil-and-gas-related jobs, grew by 1,577 jobs, or 107 percent. In the same period, mining wages have grown by more than 18 percent, which is the highest wage growth of any industry in Alaska. The Alaska industry also created an estimated 4,700 indirect jobs.

Estimated revenues in 2012 to the State of Alaska and municipalities from mineral-industry-specific fees, rent, sales, royalties, and taxes amounted to more than $124.8 million.

Mineral exploration expenditures in Alaska during 2012 were at least $335.1 million. Exploration was distributed across Alaska, but almost $154 million (or 46 percent of the exploration funds) was spent in southwestern Alaska and $90 million was spent in the eastern interior region. Thirty-one projects reported exploration expenditures of $1 million or more and 33 additional projects expended at least $100,000. Most exploration funds, approximately 90 percent, were from Canadian sources.

Exploration was conducted in Alaska during 2012 for a wide variety of metals and mineralization styles. Exploration for gold, grouped with other precious metals, and deposits with a mixed group of metals (polymetallic, including copper–gold–porphyry systems) each accounted for about 45 percent of total exploration expenditures. Copper–gold–molybdenum porphyry systems were the major exploration target in 2012, with slightly less than $123 million in expenditures. More than $112 million was spent on granite/intrusion-related gold exploration, almost $25.6 million was spent on various gold–quartz vein projects, and $45.6 million was spent on base-metal-rich, polymetallic massive-sulfide projects. More than $24 million was spent on exploration for PGE–nickel–copper, rare-earth element, coal, placer gold, and graphite deposits, including significant expenditures exploring for iron–titanium-rich beach placer deposits.

Three advanced exploration projects, Pebble, Livengood, and Donlin Creek, accounted for almost 59 percent of the exploration expenditures in 2012. Lode exploration employment tracked exploration expenditures closely. Placer exploration employment was highest in the eastern interior region, however placer exploration expenditures were highest in the western region due to Placer Marine Mining Inc.'s $6 million project exploring for placer gold off the coast of Nome.

Prospecting sites and mining claims were staked across all regions of Alaska. New mining claims staked during 2012 included 5,116 new state claims and 202 new state prospecting sites. State claim staking decreased by 25 percent in 2012, while staking of state prospecting sites increased by 12 percent.

As part of the Strategic and Critical Minerals Assessment project, a state-funded capital-improvement project to evaluate Alaska's potential for strategic and critical minerals, the Alaska Division of Geological & Geophysical Surveys (DGGS) conducted geologic mapping and minerals-related studies in the Ray Mountains–Dalton Highway area in interior Alaska and contracted helicopter-borne geophysical surveys for the Farewell and Aniak–Iditarod areas of southwestern and western Alaska.

Reported and estimated development expenditures in 2012 totaled approximately $342.4 million. Development expenditures were reported for 51 projects in 2012. Significant development expenditures were noted at Fort Knox Mine, Greens Creek Mine, Pogo Mine, Kensington Mine, Red Dog Mine, and Nixon Fork Mine. Based on expenditures, Fort Knox Mine was the largest mineral development project in Alaska in 2012.

The total value of mineral production in Alaska during 2012 is estimated at $3.44 billion, slightly below the 2011 estimated value of $3.51 billion. The 2012 estimate represents a decrease in value of approximately $71.6 million, or 2 percent, from the 2011 estimate. Metals (gold, silver, copper, lead, and zinc) account for $3,295.52 million (almost 96 percent of the total); coal and peat for $72.48 million (2.1 percent of the total); and industrial minerals for $68.07 million (2.0 percent of the total). Gold leads all mineral product values, with almost 45 percent of the total, followed by zinc at 33.16 percent, silver at 11.16 percent, lead at 6.83 percent, coal and peat at 2.11 percent, and industrial minerals at 1.98 percent. The decreased mineral production value in 2012 compared with 2011 resulted primarily from lower production volumes of zinc and a lower value for zinc, silver, copper, and lead in 2012 compared with 2011. The price for gold increased 6.2 percent in 2012.

Alaska currently has six large lode mines. Teck Resources Ltd.–NANA's Red Dog Mine produced 529,157 tons of zinc, 95,282 tons of lead, and 5.89 million ounces of silver. Coeur's Kensington underground gold mine complex near Juneau produced 82,125 ounces of gold in 2012. Hecla Mining Co.'s Greens Creek Mine near Juneau produced almost 6.4 million ounces of silver in 2012, along with 55,496 ounces of gold, 64,249 tons of zinc, and 21,074 tons of lead. Kinross Gold's Fort Knox Mine near Fairbanks produced 359,948 ounces of gold, and Sumitomo's Pogo Mine produced 315,886 ounces of gold. Usibelli Coal Mine produced more than 2 million tons of coal. Placer gold production, from an estimated 312 operators, was about 100,000 ounces.

CONTENTS

CONTENTS

APPENDICES

FIGURES

CONTENTS

PHOTOS

CONTENTS

TABLES

Alaska's Mineral Industry 2012

J.E. Athey[1], L.A. Harbo[2], P.S. Lasley[3], and L.K. Freeman[4]

INTRODUCTION

The diversity and quantity of Alaska's mineral wealth is a strong draw for exploration and mining companies worldwide. The mineral potential of the state is evident by past production from multiple historically significant deposits: placer gold from the Fairbanks and Nome mining districts; copper from the Jumbo, Bonanza, Erie, Mother Lode, and Green Butte mines in the Kennecott district; gold from the Alaska–Juneau (A–J) and Treadwell mines near Juneau; and placer platinum from the Goodnews Bay mining district. Alaska's world-class deposits currently in production are Red Dog, Greens Creek, Pogo, and Fort Knox mines. The Pebble, Donlin Gold, and Money Knob deposits indicate that there are still extremely large mineral deposits to be developed in Alaska. Undoubtedly, other Alaska mineral deposits remain to be discovered.

Economically viable projects are possible in Alaska through a partnership of industry and the State—industry investment in Alaska's favorable geology and the State's commitment to responsible, responsive public land stewardship. Strategically located along the Pacific Rim, Alaska offers prospective land, sanctity of title, a state-sponsored geological and geophysical mapping program, a reasonable permitting process, capable workforce, exploration incentives, and inventive infrastructure equity-sharing programs. More than 190 million acres of federal, state, and Native lands are open for mineral-related activities and mining, which, in turn, allows the minerals industry to be a driving force in the state's economy through significant local employment, infrastructure, and government revenue. It is the policy of the State of Alaska to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest.

The Alaska minerals industry continues to demonstrate its health even though base metal prices and venture capital investment were down in 2012. Table 1 and figure 1 show the estimated value of exploration and development investments in the industry and the estimated 'first market value' (estimated gross value of mineral products at first wholesale) of mineral production in Alaska between 1981 and 2012. For purposes of this report, Alaska has been divided into seven geographic regions, shown in figure 2.

Exploration expenditures, a sign of industry interest and production values to come, were down 8 percent from $365.1 million in 2011 to $335.1 million in 2012. Development expenditures in Alaska totaled $342.4 million. This marked the ninth consecutive year development expenditures were above $200 million and the eighth that exploration expenditures exceeded $100 million. Mineral production volumes remained strong. The estimated first market value of mineral production decreased from $3.5 billion in 2011 to $3.4 billion in 2012, a two percent decrease.

Table 1. Reported annual exploration and development expenditures of the mineral industry and the estimated first market value of mineral production in Alaska (in millions of dollars), 1981–2012. Average annual values are given for 1981–1985, 1986–1990, 1991–1995, and 1996–2000. Individual year totals are provided for 2001–2012.

Year	Exploration Expenditures	Development Expenditures	Estimated First Market Value
1981–1985	$ 37.5	$ 36.3	$ 204.7
1986–1990	$ 36.2	$ 109.6	$ 288.6
1991–1995	$ 33.2	$ 55.3	$ 520.1
1996–2000	$ 49.4	$ 158.7	$ 917.4
2001	$ 23.8	$ 81.2	$ 917.3
2002	$ 26.5	$ 34.0	$ 1,012.8
2003	$ 27.6	$ 39.1	$ 1,000.7
2004	$ 70.8	$ 209.1	$ 1,338.7
2005	$ 103.9	$ 347.9	$ 1,401.6
2006	$ 178.9	$ 495.7	$ 2,858.2
2007	$ 329.1	$ 318.8	$ 3,367.0
2008	$ 347.3	$ 396.2	$ 2,427.1
2009	$ 180.0	$ 330.8	$ 2,455.6
2010	$ 264.4	$ 293.3	$ 3,126.8
2011	$ 365.1	$ 271.9 *	$ 3,507.7
2012	$ 335.1	$ 342.4	$ 3,436.1

Source: Alaska's Mineral Industry reports published annually by DGGS/DCCED.
*2011 total missing significant expected data
See Exploration, Development, and Production sections for further details.

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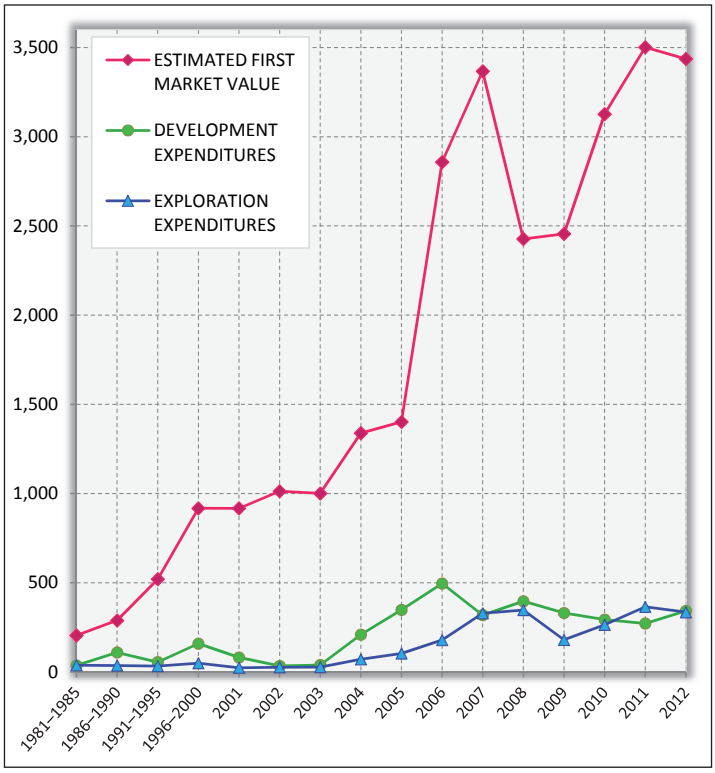


Figure 1. Exploration and development expenditures and estimated first market value for the mineral industry, 1981–2012.

Past-year statements issued by mining companies, including press releases and corporate annual and financial reports, as well as phone interviews, replies to questionnaires, and permitting paperwork, are factored into the exploration, development, and production values. Due to inevitable incomplete reporting, the numbers compiled in this report are minimum estimates of the value of Alaska's mineral industry. Average metal prices are calculated for the first market values and are from the daily London PM closing price for gold, and from the average weekly spot price on the London Metal Exchange for the other metals. It is important to note that these prices are used to calculate the estimated first market value of metals produced in the state, but do not take into account the costs of mining or transportation or smelter charges and penalties. Coal prices are estimated from average coal prices for similar grade material around the Pacific Rim. Industrial material prices are based on regional rates provided by some operators.

Please note that the formatting and presentation of data in some tables differ from previous editions of this report, reflecting changes in data collected and accounting practices by the mining industry. Whenever possible, the authors have worked to maintain consistency of data for seamless year-to-year comparisons. Most changes are described in footnotes in the affected tables. As the authors modernize this annual report by taking advantage of digital data and technological advances, future efforts will also include substantial changes in the data sources used to compile the exploration, development, and production information, and presentation of the economic data in the report.

This report is a cooperative project between the Alaska Division of Geological & Geophysical Surveys (DGGS) and the Division of Economic Development in the Department of Commerce, Community, and Economic Development (DCCED), with additional support from the Division of Mining, Land & Water (DMLW) and the Department of Labor and Workforce Development (DLWD). The agencies involved in producing this report have renewed their commitment to produce a reliable commentary on mineral industry activity in Alaska, which is vital for informed decision-making by state and local governments, the Legislature, land managers, industry, Native corporations, and the public.

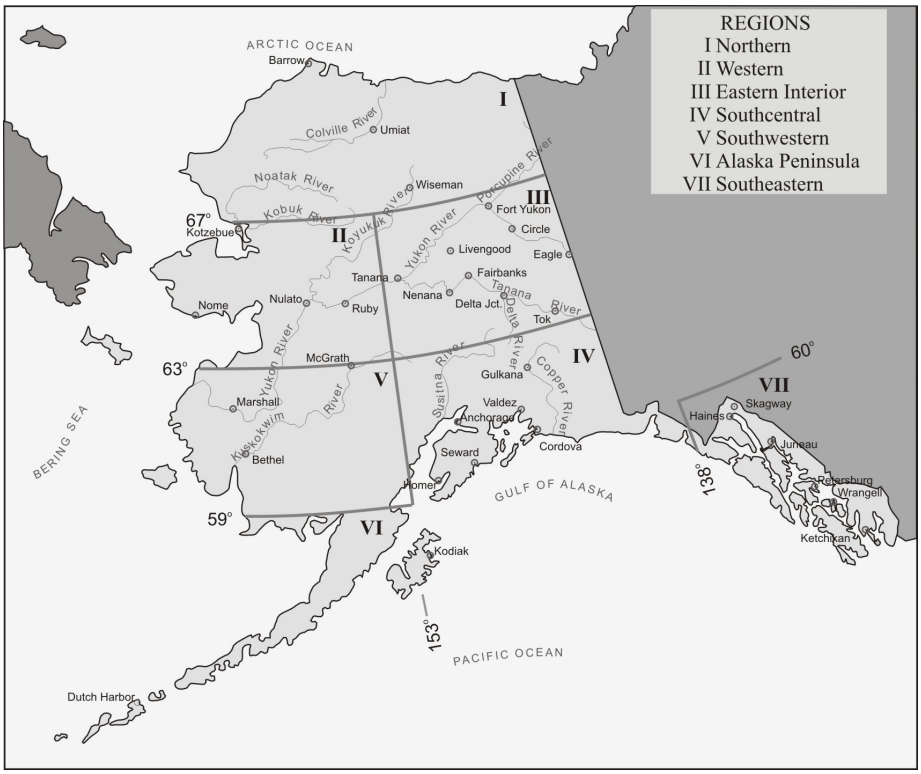


Figure 2. Regions of mineral activity as described in this report.

EMPLOYMENT

Employment data was collected from two different sources and is presented as such. Initial reporting below stems from values compiled from more than 122 questionnaires, 545 Affidavits of Labor submitted to the state, and other sources. The data obtained from the questionnaires is used throughout this report. Additional wage and salary employment data described further below is from the DLWD website[5] and Mali Abrahamson (DLWD; written commun., 2013). There is no direct correlation between the two sets of employment figures. For example, the DLWD 2012 mining employment and wage statistics are based on 119 reporting units (companies) consisting of one coal, 58 metal ore, and 30 nonmetallic-mineral quarrying units. The DLWD data referred to here also includes part-time jobs, which are not converted to full-time equivalents, and does not include the self employed, such as the majority of placer operators. Their employment data may not include indirect jobs in the exploration and development phases of mining. Jobs in these mining phases are often grouped by DLWD in the engineering, environmental, or construction industries. Consequently, mining's contributions to employment and earnings in Alaska is likely underestimated.

Figures 3 and 4 display employment in various sectors of Alaska's mineral industry as reported to DGGS via questionnaires completed and returned by the minerals and mining industry in Alaska, and other sources mentioned above. Table 2 lists estimated employment in the Alaska minerals industry for the past 9 years.

Total reported minerals industry employment in 2012 is 4,366 full-time-equivalent jobs, an increase of about 416 jobs (11 percent) from the estimated 2011 total of 3,950. Production employment in 2012 saw about a 10 percent increase, while development employment increased almost 27 percent. Production jobs increased from 2,993 in 2011 to 3,283 in 2012. Development jobs increased from 422 in 2011 to 535 in 2012. Exploration jobs increased from about 535 jobs in 2011 to 548 in 2012, a 2 percent increase.

Mineral production employment in 2012 increased across all sectors except base metals. Lode gold mining jobs increased approximately 11 percent in 2012, adding 121 jobs to the economy. Placer gold mining employment increased by nine percent in 2012, with a reported gain of 38 full-time-equivalent jobs from the 439 jobs estimated for 2011. The higher placer employment value, which is estimated from the number of Annual Placer Mining Applications (APMAs) submitted to the state, may reflect increased reporting, and not necessarily new jobs, due to new rules in 2012 requiring operators in the Nome area to submit APMAs for "recreational-size" and other suction-dredge operations. The polymetallic mining sector saw a six percent increase in employment, with a reported gain of 22 jobs from the 364 jobs estimated for 2011. Full-time-equivalent jobs decreased in the base-metals sector by 56 jobs, or approximately 10 percent, from 2011 to 2012, likely reflecting the lower base metal prices in 2012. Significant employment increases in the rock sector (up 114 percent) and sand and gravel sector (up 38 percent), calculated from the higher production reported in that sector for 2012, added a total of 149 jobs to the economy.

According to the Department of Labor & Workforce Development, the average monthly wage paid for mining in Alaska during 2012 was $8,242, compared with an average monthly wage for all industries in Alaska of $4,175 during the

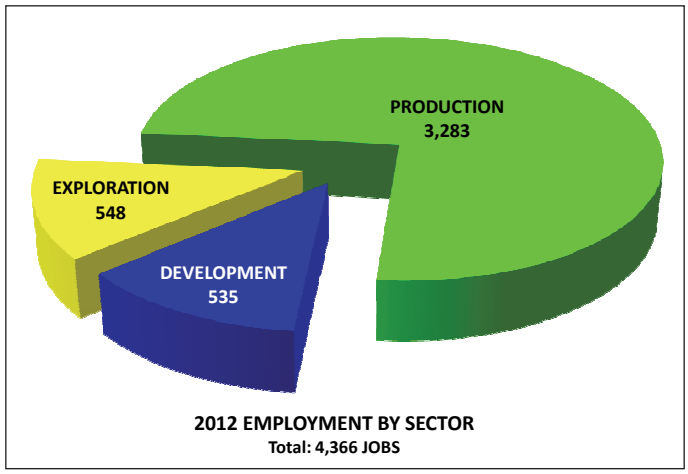


Figure 3. Alaska's mineral industry employment by sector, 2012.

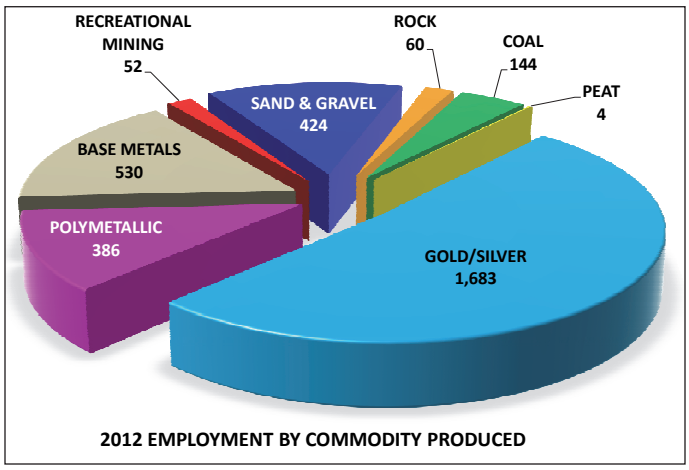


Figure 4. Alaska's mineral industry employment by commodity produced, 2012.

[5]State of Alaska Department of Labor and Workforce Development, Research and Analysis Section, Quarterly Census on Employment and Wages (QCEW), last accessed on September 27, 2013. http://labor.alaska.gov/research/qcew/ee12.pdf

Table 2. Estimated Alaska mineral industry employment, 2004–2012[a], as reported via questionnaire administered by DGGS for this report and other sources.

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Gold/silver mining									
Placer	64	86	242	208	282	399	405	439	477
Lode	433	411	704	808	739	832	1,008	1,085	1,206
Polymetallic mining	265	250	245	276	317	321	350	364	386
Base metals mining	508	449	457	457	475	413	550	586	530
Recreational mining	175	175	45	54	30	36	35	41	52
Sand and gravel	567	400	337	284	277	286	313	307	424
Rock	475	148	104	124	93	83	11	28	60
Coal[b]	90	95	95	102	110	117	140	140	144
Peat[b,c]	4	6	11	11	7	--	3	3	4
Tin, jade, soapstone, ceramics, platinum	--	--	--	--	--	--	--	--	--
Production (total of above categories)	**2,581**	**2,020**	**2,240**	**2,324**	**2,330**	**2,487**	**2,815**	**2,993**	**3,283**
Mineral development	**283**	**498**	**848**	**735**	**516**	**371**	**537**	**422**	**535**
Mineral exploration	**184**	**303**	**435**	**499**	**546**	**422**	**520**	**535[d]**	**548**
TOTAL	**3,048**	**2,821**	**3,523**	**3,558**	**3,392**	**3,280**	**3,872**	**3,950**	**4,366**

[a]Reported man-days are calculated on a 260-day work year to obtain average annual employment unless actual average annual employment numbers are provided.
[b]Coal and peat employment numbers are combined in 2009.
[c]This figure does not include all of the man-days associated with peat operations; most of those man-days are included in sand and gravel numbers.
[d]Average of 520–550 range reported for 2011.
-- = Not reported.
See Exploration, Development, and Production sections for further details.

same period. The average monthly wage for metal mining in Alaska during 2012 was $8,422, according to DLWD. Mining jobs in Alaska have higher earnings than any other industry except oil and gas. The average annual wage in 2012 for mining employees was $98,909, and the average annual wage for employees in mineral mining support activities was $81,775. Mining jobs earn about twice as much as the average job in Alaska, which earns $50,097 per year. DLWD reports that mining wages in Alaska totaled $281,419,661 in 2012, while mining support firms paid $16,763,868.

The agency reported that the total mining and support activities employment was 3,050 positions in 2012, up from 2,717 in 2011, with total employment in all industries in Alaska during 2012 at 333,952 jobs. The average 2012 non-oil-and-gas-related mining employment was 2,845, up from 2,535 in 2011. Of these 2,845 jobs, metal mining employment increased from 2,258 in 2011 to 2,513 in 2012, while coal and other mineral mining employment rose from 277 to 332 (photo 1). Support activities employment increased to 205 in 2012, up from 182 in 2011.

DLWD data shows that nonmetallic mineral product manufacturing provided 276 jobs, including an average of 262 jobs in cement and concrete manufacturing for 2012. Primary metal manufacturing provided 18 jobs, while metal and mineral merchant wholesalers provided an average of 118 jobs during 2012.

Mining is a high growth sector for Alaska. In the ten-year period from 2003 through 2012, non-oil-and-gas-related mining employment grew by 1,577 jobs, or 107 percent. Mining jobs accounted for four percent of the total statewide employment growth of 37,000 jobs during the same interval. Even though mining jobs are less than one percent of all jobs in Alaska, in the last decade they contributed 3.6 percent of Alaska's total wages, or $201 million. In 2003, average annual wages in the industry were just under $66,000; adjusted for inflation, mining wages have grown by more than 18 percent since then—the highest compared to any other industry—and helped nudge Alaska's total annual wage growth higher.[6]

Seventeen boroughs or census areas reported non-oil-and-gas mining employment in 2012. The City and Borough of Juneau and the Fairbanks North Star Borough continued to vie for the most mining employment with 769 and 752 jobs, respectively. Although more drilling and support activity occurred in the Juneau area, both boroughs added about 145 jobs in 2012. Anchorage, the Denali Borough, Northwest Arctic Borough, and the Southeast Fairbanks Census area all

[6]Alaska Department of Labor and Workforce Development, 2013, Alaska Economic Trends, May 2013: Alaska Department of Labor and Workforce Development, vol. 33, no. 5, p. 5, http://labor.alaska.gov/trends/may13.pdf.

had more than 100 mining jobs. Large operators Greens Creek, Red Dog, Pogo, Fort Knox, and Usibelli Coal mines were among the largest private employers in their respective boroughs.

The Alaska mining industry also created an estimated 4,700 indirect jobs, according to a 2012 study prepared for the Alaska Miners Association Inc. by McDowell Group Inc.[7] Mining companies strengthen Alaska's local economies by employing Alaska residents from more than 120 Alaska communities and by purchasing supplies and services from hundreds of Alaska businesses.

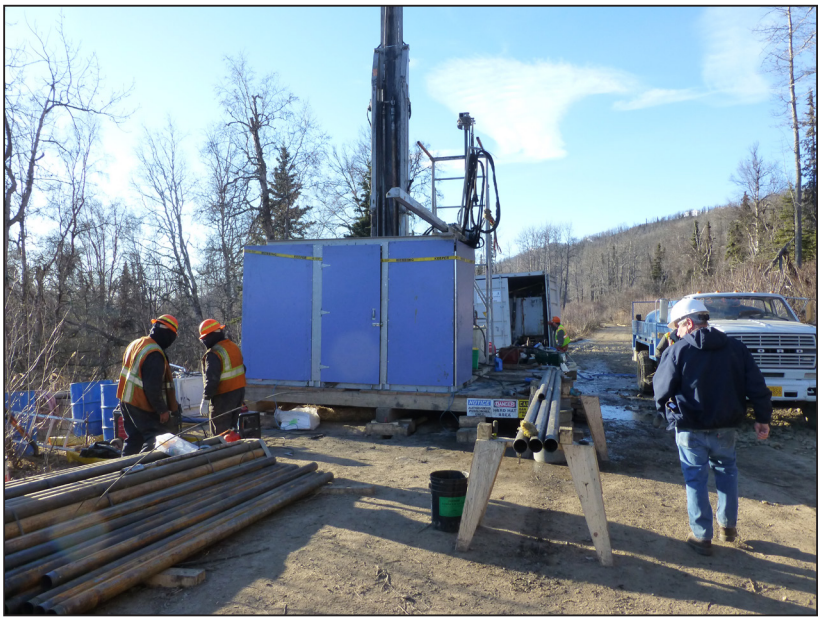


Photo 1. Riversdale Alaska LLC drilled 4,704 feet in 2012, conducting exploration on their Chickaloon coal project. They also had a large airborne-geophysical program in 2012. Photo provided by Rick Fredericksen, Mental Health Trust Land Office.

GOVERNMENT REVENUES FROM ALASKA'S MINERAL INDUSTRY

The minerals industry pays revenues to the State of Alaska through a number of instruments. Those instruments include State claim rentals; production royalties; annual labor; coal land rentals; coal royalties; material (rock, sand, and gravel) sales from lands managed by State of Alaska, Alaska Mental Health Trust Land Office, and State Pipeline Coordinator's Office (SPCO); miscellaneous fees; State fuel taxes; corporate income taxes; and mining license taxes. Municipalities also receive revenues from the minerals industry for property taxes, payments in lieu of taxes (PILT), severance taxes, and sales taxes. The estimated minimum total revenues paid to the State and municipalities for 2012 amounted to more than $124.8 million. The 2012 figure is a six percent increase from $117.6 million paid in 2011. Table 3 provides an itemized listing of estimated revenues paid to the State and municipalities. These revenues are incomplete and serve only as a minimum. Estimated revenues to the State of Alaska and municipalities from mineral-industry-specific fees, rent, sales, royalties, and taxes are shown in figure 5. Figure 6 charts the trend in revenue collected by the State of Alaska and municipalities from the mineral industry from 2005 through 2012.

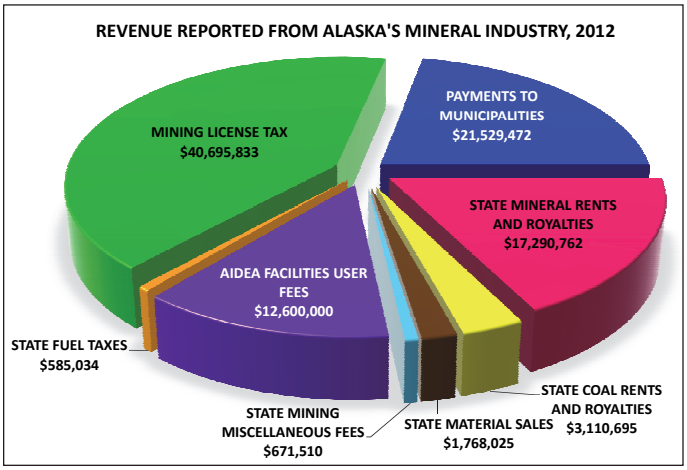


Figure 5. Revenue reported from Alaska's mineral industry, 2012.

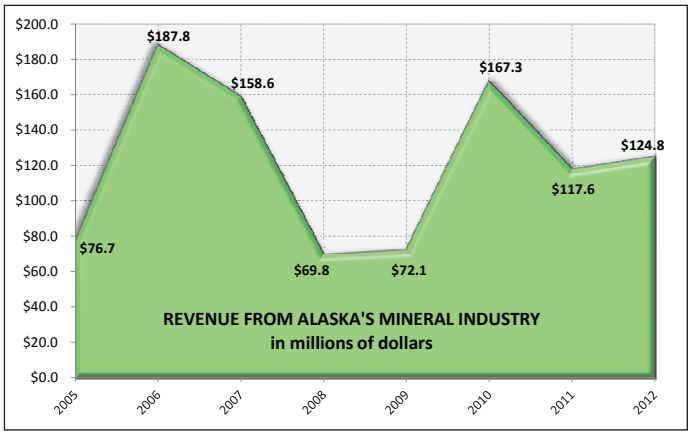


Figure 6. Revenue from Alaska's mineral industry, 2005–2012.

Estimated state mineral and coal rents and royalties amounted to $20,401,457 for 2012, compared with $17,738,715 for 2011, an increase of 15 percent. Table 3 provides a detailed breakdown of these payments. The State of Alaska mining laws grant the holder of a mining claim exclusive right to the locatable minerals in the ground covered by that mining claim. State mining claims have recording, rental, and other fees associated with them. Mining claim location certificates and recording fees must be recorded

[7]The McDowell Group, 2012, The Economic Benefits of Alaska's Mining Industry: The McDowell Group, https://dl.dropboxusercontent.com/u/2335359/AMA%20mcdowell%20reports/mining2013web%281%29.pdf

Table 3. Reported and estimated revenues paid to the State of Alaska and municipalities by Alaska's mineral industry, 2007–2012. See footnotes for reporting sources and dates.

	2007	2008	2009	2010	2011	2012
State mineral rents and royalties[a,b]						
State claim rentals	$ 4,649,795	$ 4,626,038	$ 6,280,295	$ 7,770,763	$ 8,498,714	$ 7,951,103
Production royalties[c]	800,548	1,519,471	1,840,060	1,591,643	5,416,473	8,982,259
Annual labor	163,279	380,169	482,858	157,848	760,484	357,400
Subtotal	**$ 5,613,622**	**$ 6,525,678**	**$ 8,603,213**	**$ 9,520,254**	**$ 14,675,671**	**$ 17,290,762**
State coal rents and royalties[b]						
Rents	253,376	248,841	395,975	266,041	446,415	189,204
Royalties[c]	1,443,050	1,550,737	1,840,572	2,235,138	2,616,629	2,921,491
Bonus	--	--	--	--	--	--
Subtotal	**$ 1,696,426**	**$ 1,799,578**	**$ 2,236,547**	**$ 2,501,179**	**$ 3,063,044**	**$ 3,110,695**
State material Sales						
Mental Health[d]	24,835	37,734	170,996	109,027	90,116	1,876
Division of Land[b]	2,615,810	2,818,107	4,323,601	200,659	1,239,637	1,735,404
State Pipeline Coordinator's Office[e]	57,056	182,237	179,875	5,910	309,600	30,746
Subtotal	**$ 2,697,701**	**$ 3,038,078**	**$ 4,674,472**	**$ 315,596**	**$ 1,639,353**	**$ 1,768,025**
State mining miscellaneous fees[b]						
Filing fees	1,750	2,750	1,787	407,006	3,763,652	5,604
Penalty fees	24,005	18,876	115,819	43,405	238,115	532,959
Exploration incentive app filing fee	--	--	--	--	--	--
Bond pool payment	43,909	39,429	70,548	76,426	64,702	65,201
Surface mine investment interest	56,125	62,799	45,752	25,890	20,491	--
Surface coal mining app fee	10,458	3,024	1,800	23,502	7,534	2,200
APMA mining fees	20,877	23,811	19,519	19,873	30,741	45,055
Subtotal	**$ 100,999**	**$ 144,015**	**$ 272,272**	**$ 615,964**	**$ 4,130,634**	**$ 671,510**
Other Fees						
AIDEA - Facilities use fees[d]	16,218,000	16,190,000	15,918,000	14,807,000	13,500,000	12,600,000
State Fuel Taxes[e]	726,563	428,214	877,952	126,452	741,071	585,034
State corporate income tax[f]	61,331,540	12,981,369	(2,558,970)	81,790,274	15,020,036	26,577,348
Mining License Tax[g, h, i]	54,408,227	16,044,139	29,725,100	43,338,119	44,480,076	40,695,833
Subtotal	**$ 132,684,330**	**$ 45,643,722**	**$ 43,962,082**	**$140,061,845**	**$ 73,741,183**	**$ 80,458,215**
State Total	**$ 142,793,078**	**$ 57,151,071**	**$ 59,748,586**	**$153,014,838**	**$ 97,249,885**	**$ 103,299,207**
Payments to Municipalities[j]	$ 15,827,501	$ 12,599,399	$ 12,387,540	$ 14,238,251	$ 20,378,242	$ 21,529,472
TOTAL	**$ 158,620,579**	**$ 69,750,470**	**$ 72,136,126**	**$167,253,089**	**$ 117,628,127**	**$ 124,828,679**

[a]Updated 2008, 2009, and 2010 information. Includes upland lease and offshore lease rentals. Figures are reported by calendar year by the Alaska Department of Natural Resources.
[b]Updated 2008, 2009, and 2010 information. Figures are reported by calendar year by the Alaska Department of Natural Resources.
[c]Updated 2008, 2009, and 2010 information. Reported on a cash basis; payments actually received during the given year.
[d]AIDEA figures are reported by fiscal year.
[e]State fuel taxes updated for 2010 and 2011.
[f]2009, 2010, 2011, and 2012 updated.
- Only subchapter C corporations pay income tax.
- This report may not reflect 100% of the returns received in a year.
- The amount of corporate income tax reported in each fiscal year is the amount of tax actually received and may not agree with the amount reported on a corporation's tax return. This is due primarily to timing differences.

[g]Includes metals, coal, and materials for 2007-2011. Mining License Tax was not collected on materials in 2012.
[h]Mining license tax has been adjusted to reflect actual receipts for the succeeding fiscal year for the period 2003 to 2010; see note for income tax above.
[i]2011 and 2012 numbers are preliminary and are subject to revision.
[j]Payments to Municipalities reported for 2011 and 2012 include property taxes for mining companies reported by:
- The Municipality of Anchorage Property Appraisal Division Public Inquiry Search, http://www.muni.org/pw/public.html
- The Fairbanks North Star Borough Assessing Property Search, http://www.co.fairbanks.ak.us/Assessing/propsearch.aspx
- Kenai Peninsula Borough Property Tax Division, http://ak-kenai.manatron.com/Tabs/ViewPayYourTaxes.aspx
- Matanuska-Susitna Borough Real Property Search, http://www.matsugov.us/myproperty/
- Personal communication with the City and Borough of Juneau
- Personal communication with the Northwest Arctic Borough
- Personal communication with the City of Nome
- Personal communication with the Denali Borough

-- Not reported

in the recording district office in which the claim is located within 45 days of the posting date. Recording fees change from time to time, and the nearest recorder's office should be contacted for current fees. For contact information, please see the resources listed at the end of this section. Rental fees under regulation 11 AAC 86.215 are shown in table 4, and must be paid according to the instructions on the back of the certificate form.

Alaska Statute directs DNR to revise the annual rental rates to match the changes in the Consumer Price Index (CPI) for Anchorage as compiled by the U.S. Department of Labor. The statute requires DNR to make the revisions every ten years, so the more than 60 percent increase in 2009 represents the ten-year increase to the CPI. The first rental payment covers the period from the date of posting the claim to the following September 1. Annual labor must be performed on a mining claim each year. The rate to locate a 160-acre prospecting site for 2 years is $255. The annual lease rate for coal properties is $3 per acre. Rental payments may be credited against royalties to the extent that they do not exceed the royalties.

In 1989, the Alaska State Legislature enacted a new production royalty law, Alaska Statute 38.05.212, which requires holders of state mining properties to pay a production royalty on all revenues received from minerals produced from state land. The production royalty requirement applies to all revenues received from minerals produced from a state mining claim or mining lease during each calendar year. Payment of royalty is in exchange for and to preserve the right to extract and possess the minerals produced. The production royalty is 3 percent of the net income as determined under the Mining License Tax Law AS 43.65 and regulation 15 AAC 65. Department of Natural Resources regulations 11 AAC 86.760–796 provide details regarding the production royalty requirements.

The state sells rock, sand, and gravel from its lands, at a prescribed rate, for use in construction. Land management agencies involved in those sales include Mental Health Trust Land Office (MHTLO), Division of Mining, Land & Water (DMLW), and the State Pipeline Coordinator's Office (SPCO). Sale of these materials generated $1,768,025 in 2012. Other common mineral commodities that could be involved in this category include riprap, limestone, slate, peat, and any other substances from the ground that are not designated under Alaska mining law as locatable minerals, for example, gold, silver, or other metals (by mining claim) or energy minerals such as coal, oil, or gas (by lease). Materials are measured and sold by the cubic yard. The price charged for materials depends on the type or size of the sale, but prices are based on a competitive or fair market price of material in the area.

Claim- and leaseholders on State-owned land are also assessed miscellaneous fees. Miscellaneous fees comprise filing fees, penalties, exploration incentive application fees, bond pool payments, surface coal mining application fees, and Annual Placer Mining Application (APMA) fees. These amounted to $671,510 in 2012. The anomalously high fee revenue generated in 2011 ($4,130,634) is attributed to filing fees for Nome offshore leases. Due to high activity in the east and west Nome public mining areas, any persons operating dredges there in 2012 were required to submit an APMA regardless of the size of the dredge.[8]

Fuel tax collected by the State for 2012 amounted to $585,034, compared with $741,071 during 2011. The motor fuel tax is $0.08/gallon and is collected for all fuel for mining operations. Fuel used for heating and stationary power plants is not taxable, and mining operations may submit an application for refund of the full amount. Off-highway fuel use for equipment and vehicles, mobile power plants, pumps, and unlicensed vehicle operation is partially refundable through the application process.

The Mining License Tax was established by statute (AS 43.65) to collect taxes on net income from mining operations after a 3.5-year initial production grace period granted to taxpayers to help return their initial investment. The rates on mining net income are as follows: No tax if net income is

[8]See http://dnr.alaska.gov/mlw/mining/nome/Nome_Dredgers_Resource_Guide_ver1.pdf for Nome dredging information.

Table 4. Alaska state annual claim rental rates by size and maturity. Rental rates were adjusted in 2009 in accordance with the Consumer Price Index for Anchorage as prescribed by statute AS 38.05.211. Rental fees are regulated under 11 AAC 86.215.

Years Since Claim Location Established	Quarter Section Size Claim 160 acres	Traditional Quarter–Quarter Section Size Claim 40 acres	Rental for all Leases (per acre fee)
0–5	$ 140	$ 35	$ 0.88
6–10	$ 280	$ 70	$ 1.75
11 or more	$ 680	$ 170	$ 4.25

RESOURCES RELATED TO THE MINERALS INDUSTRY IN ALASKA

DEPARTMENT OF NATURAL RESOURCES

- Recording Fees http://dnr.alaska.gov/ssd/recoff/fees_RO.cfm
- Public Information Center http://dnr.alaska.gov/commis/pic/
- State Uniform Commercial Code (UCC) Documents Search http://dnr.alaska.gov/ssd/recoff/

Division of Mining, Land & Water

- Mining Applications and Forms http://dnr.alaska.gov/mlw/forms/
- Fact Sheets http://dnr.alaska.gov/mlw/factsht/
- Annual Placer Mining Application (APMA) 2013 http://dnr.alaska.gov/mlw/forms/13apma/index.cfm
- Annual Rental http://dnr.alaska.gov/mlw/factsht/mine_fs/annualre.pdf
- Leasing State Land http://dnr.alaska.gov/mlw/factsht/lease_land.pdf
- Land Lease & Contract Payment Information http://dnr.alaska.gov/mlw/factsht/lease_contract_payment_info.pdf
- DNR Production Royalty Form http://dnr.alaska.gov/mlw/forms/mining/royalty_fm.pdf
- Production Royalty http://dnr.alaska.gov/mlw/factsht/mine_fs/producti.pdf
- Exploration Incentive Credit Program http://dnr.alaska.gov/mlw/factsht/mine_fs/explore.pdf

Division of Geological & Geophysical Surveys

- Publications On-Line http://dggs.alaska.gov/pubs/
- Interactive Maps http://maps.dggs.alaska.gov/
- Geologic Map Index of Alaska: Online Map Search Tool http://maps.dggs.alaska.gov/mapindex/
- Alaska Geologic Data Index: Unpublished Geology-Related Data http://maps.dggs.alaska.gov/agdi/
- Geologic Materials Center http://www.dggs.alaska.gov/gmc/index.php
- WebGeochem: Geochemical Sample Analysis Search http://www.dggs.alaska.gov/webgeochem/
- Minerals Report Questionnaire http://www.dggs.alaska.gov/minerals_questionnaire

Alaska's Minerals Data and Information Rescue in Alaska (MDIRA) Project Websites

- MDIRA Portal Home Page http://akgeology.info/
- Alaska Mining Claims Information System http://akmining.info/
- Land Records Web Application http://dnr.alaska.gov/Landrecords/
- State Recorder's Office Search http://dnr.alaska.gov/ssd/recoff/searchRO.cfm
- Alaska Resource Data Files http://ardf.wr.usgs.gov/
- USGS Alaska Geochemical Database (NURE, RASS, PLUTO, etc.) http://pubs.usgs.gov/ds/637/
- Guide to Alaska Geologic and Mineral Information http://www.dggs.alaska.gov/pubs/id/3318
- State Geo-Spatial Data Clearinghouse http://www.asgdc.state.ak.us/

DEPARTMENT OF COMMERCE, COMMUNITY, AND ECONOMIC DEVELOPMENT

- Minerals Information http://commerce.alaska.gov/dnn/ded/DEV/MineralsDevelopment.aspx
- Community and Regional Information http://www.dced.state.ak.us/cra/DCRAExternal
- Alaska Industrial Development and Export Authority (AIDEA) http://www.aidea.org
- AIDEA Supports Mining http://www.aidea.org/Programs/ProjectDevelopment/27yearsofMiningSupport.aspx

DEPARTMENT OF REVENUE

- Mining License Tax http://www.tax.alaska.gov/programs/programs/index.aspx?60610
- Motor Fuel Tax Claim for Refund http://www.tax.alaska.gov//programs/programs/forms/index.aspx?60210
- Motor Fuel Tax Regulations http://www.tax.alaska.gov//programs/documentviewer/viewer.aspx?203s
- Alaska Motor Fuel Tax Instructions http://www.tax.alaska.gov/programs/documentviewer/viewer.aspx?1889f

$40,000 or less; $1,200 plus 3 percent if over $40,000; $1,500 plus 5 percent if over $50,000; and $4,000 plus 7 percent if over $100,000. On May 24, 2012, Governor Parnell signed House Bill 298 into law. This legislation, with a retroactive effective date of January 1, 2012, exempts quarry rock, sand, and gravel, and marketable earth mining operations from the mining license tax. Anyone who mines quarry rock, sand, and gravel, and/or marketable earth exclusively is no longer required to obtain a mining license or file a mining license tax return for activities conducted on or after the effective date. The total Mining License Tax collected for 2012 was $40,695,833, compared with $44,480,076 in 2011. Mining License Tax returns are confidential and cannot be reported by individual/entity.

The State of Alaska assesses corporate income taxes on all corporations having net income from mining operations in the state. The total corporate income tax collected by the State during 2012 from mining operations was $26,577,348, up 77 percent from $15,020,036 in 2011. Corporate income taxes are confidential and cannot be reported for individual corporations. The corporate income tax rate is set by statute and is summarized in table 5.

Municipalities were paid a total of $8,386,136 by mining companies for property taxes in 2012, with the two largest payments going to the City and Borough of Juneau and the Fairbanks North Star Borough for a combined total of almost $6.7 million. Red Dog Mine paid more than $13 million in PILT to the Northwest Arctic Borough in 2012. Mining companies contributed $110,898 in severance tax to the Denali Borough through the extraction of coal, rock, sand, and gravel for sale, profit, and for commercial use. In 2012, the Alaska Industrial Development and Export Authority (AIDEA) was paid annual user fees of $12.6 million for use of the State-owned roads and ports: the De Long Mountain Regional Transportation System by Teck Alaska Inc., operator of the Red Dog Mine; and for use of the Skagway Ore Terminal by Minto Explorations Ltd., a subsidiary of Capstone Mining Corp. (formerly Sherwood Copper Corp.).

Table 5. State corporate income tax rate.

Net Income	Base Tax	Plus %	Of Amount Over
<$10,000	$ --	1%	$ --
10,000–20,000	100	2%	10,000
20,000–30,000	300	3%	20,000
30,000–40,000	600	4%	30,000
40,000–50,000	1,000	5%	40,000
50,000–60,000	1,500	6%	50,000
60,000–70,000	2,100	7%	60,000
70,000–80,000	2,800	8%	70,000
80,000–90,000	3,600	9%	80,000
>$90,000	$ 4,500	9.40%	$ 90,000

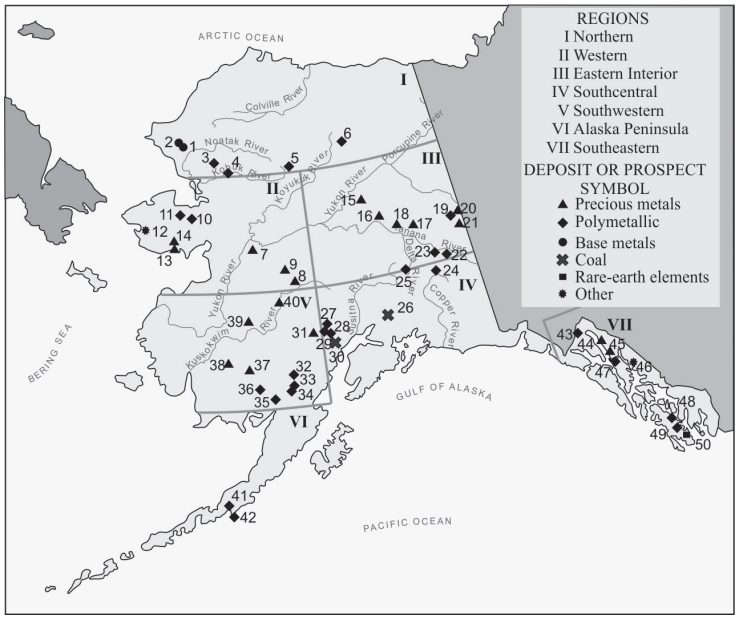
EXPLORATION

Mineral exploration expenditures in Alaska during 2012 were at least $335.1 million, down 8 percent from the $365 million in exploration expenditures reported in 2011. Soft mineral commodity prices in 2012 and global economic uncertainty increased investor risk aversion, thereby increasing the competition inherent in acquiring venture capital for mineral exploration. Despite these challenges, exploration projects continued to span the state. Figure 7 shows the location of the most significant exploration projects in Alaska during the year. Thirty-one projects reported exploration expenditures of $1 million or more and 33 additional projects expended $100,000 or more. Most Alaska exploration funds, approaching 90 percent, were from Canadian sources, and according to Natural Resources Canada, Canadian-headquartered mineral exploration companies accounted for 37 percent of 2012 exploration budgets worldwide.[9]

Figure 8 is a graph of total mineral exploration expenditures in Alaska from 1956 through 2012. Annual exploration expenditures are shown with raw values (not adjusted for inflation) and adjusted values (inflation-adjusted to 2012 dollars). Exploration expenditures over the last decade have exceeded any previous era of mineral exploration in Alaska during the past 50 years. Companies explored for a wide variety of mineral deposits in Alaska during 2012. Table 6 details exploration expenditures by commodity for the past three decades, while figure 9 presents the 2012 data graphically.

Exploration was conducted in Alaska for a diverse set of metals and mineralization styles during 2012. Gold, grouped with other precious metals, remained a major exploration commodity with more than 45 percent of total exploration expenditures, but exploration expenditures for deposits with a mixed group of metals (polymetallic) were also very strong and accounted for just less than 45 percent of total exploration expenditures. Platinum-group-element (PGE) exploration expenditures in 2012 were $4.9 million. Figure 10 shows 2012 Alaska exploration expenditures by deposit type. Copper–gold porphyry systems (grouped with polymetallic deposits in table 6) were the major exploration target in 2012, with $122.9 million in expenditures. More than $112.1 million was spent on

[9]Natural Resources Canada, Canada is a Global Mineral Exploration and Mining Giant, last accessed September 28, 2013. http://www.nrcan.gc.ca/media-room/news-releases/2013/6907.



I Northern Region

1. Red Dog Mine area—Teck Alaska Inc.
2. Lik—Zazu Metals Corp.
3. Baird Mountain—Tintina Resources Inc.
4. Upper Kobuk (Bornite–Ambler)—NovaCopper Inc.
5. Sun—Andover Mining Corp.
6. East Wiseman—Doyon Limited

II Western Region

7. Illinois Creek—Silver Predator Corp.
8. Nixon Fork Mine—Fire River Gold Corp.
9. Mystery Mountains—Newmont Exploration Ltd.
10. Anugi–Fairhaven—NANA Regional Corp.
11. Graphite Creek—Graphite One Resources Inc.
12. Nome Offshore—Placer Marine Mining Inc.
13. Bluff—Millrock Resources Inc.
14. Council—Millrock Resources Inc.

III Eastern Interior Region

15. Livengood
    a. Livengood (Money Knob)—International Tower Hill Mines Ltd.
    b. McCord Creek—Liberty Gold Corp.
    c. Shorty Creek—Bluestone Resources Inc.
16. Fairbanks District
    a. Fort Knox and district—Kinross Gold Inc.
    b. Golden Summit—Freegold Ventures Ltd.
    c. West Ridge—Teryl Resources Corp.
    d. Gil—Kinross Gold Inc./Teryl Resources Corp.
17. Pogo—Goodpaster mining district
    a. Pogo—Sumitomo Metal Mining Pogo LLC
    b. Money Rock/West Pogo—Alix Resources Corp.
18. Stone Boy (Monte Cristo)—Sumitomo Metal Mining/ Stone Boy Inc.
19. LWM and 40 Mile—Full Metal Zinc Ltd.
20. Rolling Thunder—Full Metal Minerals Ltd.
21. Fortymile (Napoleon)—Millrock Resources Inc.
22. Tetlin—Contango ORE Inc.
23. Delta—Heatherdale Resources Ltd.

IV Southcentral Region

24. Chisna—Corvus Gold Inc./Ocean Park Ventures Corp.
25. MAN—Pure Nickel Inc.
26. Chickaloon coal—Riversdale Alaska LLC
27. Whistler—Kiska Metals Corp.
28. Estelle—Millrock Resources Inc.
29. Cristo—Millrock Resources Inc.
30. Linc UCG—Linc Energy

V Southwestern Region

31. Terra—WestMountain Gold Inc./Corvus Gold Inc.
32. Big Chunk—Liberty Star Uranium & Metals Corp.
33. Pebble—The Pebble Limited Partnership (Northern Dynasty Minerals Ltd./Anglo American PLC)
34. Pebble South—The Pebble Limited Partnership/Full Metal Minerals Ltd.
35. Audn—Millrock Resources Inc./Vale Exploration USA Inc.
36. Humble (Kemuk)—Millrock Resources Inc.
37. Shotgun—TNR Gold Corp.
38. Nyac—Nyac Gold LLC and Calista Corp.
39. Donlin Creek—Donlin Creek LLC (Barrick Gold Corp./NOVAGOLD Resources Inc.)
40. Vinasale—Freegold Ventures Ltd.

VI Alaska Peninsula Region

41. Pyramid—Antofagasta Minerals PLC/Full Metal Minerals Ltd.
42. Unga—Redstar Gold Corp./Full Metal Minerals Ltd.

VII Southeastern Region

43. Palmer—Constantine Metal Resources Ltd.
44. Kensington/Jualin—Coeur Alaska Inc.
45. Herbert Glacier—Grand Portage Resources Ltd./ Quaterra Resources Inc.
46. Port Snettisham—Arrowstar Resources Ltd.
47. Greens Creek Mine—Hecla Mining Co.
48. Salt Chuck—Pure Nickel Inc.
49. Niblack—Heatherdale Resources Ltd.
50. Bokan Mountain/Dotson Ridge—Ucore Rare Metals Inc.

Figure 7. Selected exploration projects in Alaska, 2012.

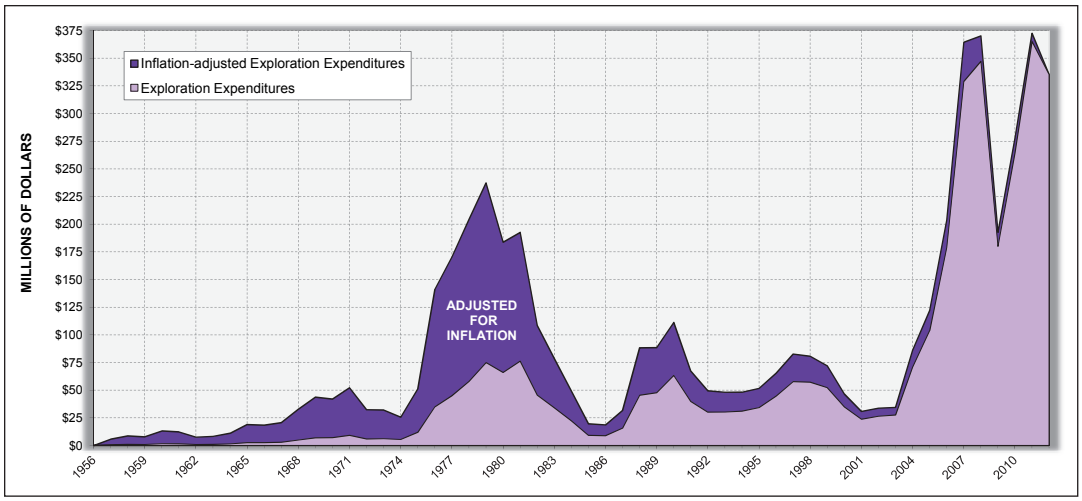


Figure 8. Alaska mineral exploration expenditures, 1956–2012. Curve in background is adjusted for inflation for 2012 dollars.

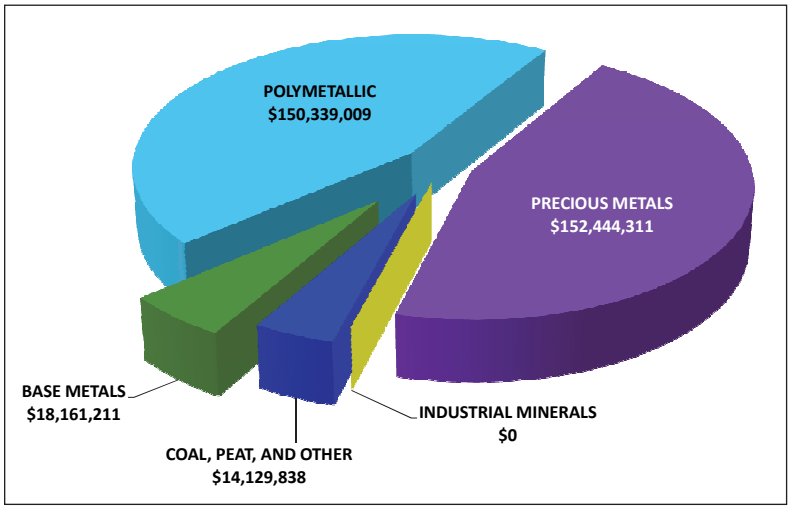


Figure 9. Exploration expenditures by commodity, 2012.

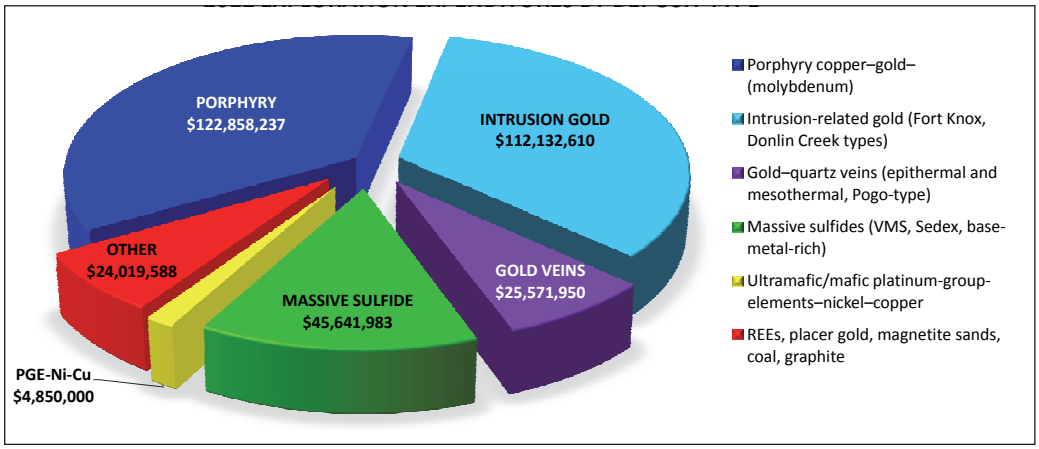


Figure 10. Exploration expenditures by deposit type, 2012.

granite/intrusion-related gold deposits, and almost $25.6 million was spent on various gold–quartz vein deposits. Exploration expenditures of $45.6 million for base-metal-rich, polymetallic massive-sulfide deposits were down from $49.9 million in 2011. About $24 million was spent on rare-earth elements, coal, placer gold, and graphite exploration, including significant expenditures exploring for iron–titanium-rich beach placer deposits.

Analysis of 2012 mineral exploration expenditures indicates that 36.7 percent of funds were spent for porphyry copper–gold–molybdenum deposits, 33.5 percent of funds were used to explore for intrusion-related gold deposits, 13.6 percent were for various types of massive sulfide deposits, 8.0 percent were for gold vein deposits, and the remainder were for a wide variety of deposit types. These percentages do not significantly differ from the 2011 values except for a 6 percent drop in intrusion-related gold expenditures.

Exploration was distributed across Alaska, as shown in table 7, but almost $154 million (46 percent of the exploration funds) was spent in southwestern Alaska and more than $90 million was spent in the eastern interior region (fig. 11). Exploration expenditures increased in the northern and southwestern regions of the state during 2012, with the southwestern region showing the highest percentage increase at seven percent. Exploration expenditures in the eastern interior region decreased the most, from 31 percent of the total exploration in 2011 to 27 percent in 2012. Lode exploration employment tracked exploration expenditures closely. Placer exploration employment was highest in the eastern interior region, however placer exploration

expenditures were highest in the western region due to Placer Marine Mining Inc.'s $6 million project exploring for placer gold off the coast of Nome.

Three advanced exploration projects, Pebble, Livengood, and Donlin Creek, accounted for almost 59 percent of the exploration expenditures in 2012. The Pebble copper–gold porphyry project in southwestern Alaska, with resources of 80.6 billion pounds of copper, 107.4 million ounces of gold, and 5.6 billion pounds of molybdenum, is a joint-venture project of Northern Dynasty Minerals Ltd. and Anglo American PLC, and was the largest exploration project in 2012. International Tower Hill's Livengood project, an intrusion-related gold deposit near Fairbanks in the eastern interior region, contains a measured and indicated resource of 1,028 million tons averaging 0.016 ounce per ton (16.5 million ounces) gold. Tower Hill Mines Inc., a subsidiary of International Tower Hill Mines Ltd., completed a $55.59 million program at Livengood in 2012. The Donlin Creek intrusion-hosted gold project in southwestern Alaska, with a 39-million-ounce measured and indicated resource, is operated through Donlin Gold LLC, a joint venture of Barrick Gold Corp., NOVAGOLD Resources Inc., and Calista Corp. Other significant 2012 exploration proj-

Table 6. Reported exploration expenditures in Alaska by commodity, 1981–2012. Exploration expenditures were estimated for three lode projects using their reported drilling footage and a project-cost-per-drill-foot ratio averaged from 24 projects with reported, complete data. Exploration expenditures were estimated for two placer projects using their reported employment and a project-cost-per-person-day ratio averaged from 568 projects with reported, complete data.

	Base metals	Polymetallic[a]	Precious metals[b]	Industrial minerals	Coal and peat	Other[c]	Total
1981	$ 28,262,200	N/A	$ 35,273,200	$ 10,300,000	$ 2,341,000	$ 127,000	$ 76,303,400
1982	31,757,900	N/A	10,944,100	--	2,900,000	15,300	45,617,300
1983	9,758,760	N/A	20,897,555	2,068,300	1,338,454	70,000	34,133,069
1984	4,720,596	N/A	14,948,554	270,000	2,065,000	279,500	22,283,650
1985	2,397,600	N/A	6,482,400	--	270,000	--	9,150,000
1986	1,847,660	N/A	6,107,084	170,000	790,000	--	8,914,744
1987	2,523,350	N/A	11,743,711	286,000	1,150,000	31,000	15,734,061
1988	1,208,000	N/A	41,370,600	160,200	2,730,000	--	45,468,800
1989	3,503,000	N/A	43,205,300	125,000	924,296	5,000	47,762,596
1990	5,282,200	N/A	57,185,394	370,000	321,000	97,000	63,255,594
1991	4,789,500	N/A	34,422,039	92,000	603,000	2,000	39,908,539
1992	1,116,000	3,560,000	25,083,000	25,000	425,000	--	30,209,000
1993	910,000	5,676,743	23,382,246	163,500	--	125,000	30,257,489
1994	600,000	8,099,054	18,815,560	225,000	2,554,000	810,000	31,103,614
1995	2,770,000	10,550,000	20,883,100	100,000	--	3,000	34,306,100
1996	1,100,000	11,983,364	31,238,600	400,000	--	--	44,721,964
1997	1,700,000	22,347,000	32,960,500	80,000	720,000	--	57,807,500
1998	1,000,000	13,727,000	42,441,000	12,000	87,000	--	57,267,000
1999	3,869,000	3,168,000	44,891,000	1,000	--	410,000	52,339,000
2000	8,545,000	3,933,000	21,579,000	58,500	--	736,100	34,851,600
2001	4,810,000	1,977,000	15,820,000	50,000	10,000	1,106,000	23,773,000
2002	1,700,000	5,162,000	17,342,000	185,000	--	2,113,000	26,502,000
2003	262,000	7,081,000	19,726,000	--	W	533,000	27,602,000
2004	3,100,000	40,237,000	26,954,000	213,000	50,000	258,000	70,812,000
2005	1,764,000	54,271,000	46,255,000	142,000	--	1,463,000	103,895,000
2006	5,069,000	81,073,000	89,793,000	20,000	2,394,000	580,000	178,929,000
2007	38,888,000	123,487,500	155,601,400	42,500	7,675,000	3,447,000	329,141,400
2008	30,116,000	163,030,000	134,885,000	--	W	19,238,000	347,269,000
2009	3,862,715	85,871,529	84,020,531	17,850	W	6,193,518	179,966,143
2010	6,392,519	122,955,321	125,364,382	19,000	6,520,200	3,104,199	264,355,621
2011	7,730,891	160,880,974	186,255,005	--	3,250,000	6,962,325	365,079,195
2012	18,161,211	150,339,009	152,444,311	--	W	14,129,838	335,074,369
TOTAL	**$ 239,517,102**	**$1,079,409,494**	**$1,598,314,572**	**$ 15,595,850**	**$ 39,117,950**	**$ 61,838,780**	**$ 3,033,793,748**

[a]Polymetallic deposits considered a separate category for the first time in 1992.
[b]Approximately $4.9M spent on platinum-group-element (PGE) exploration during 2012 ($4.4M in 2011, $8.1M in 2010, $4.1M in 2009, $3.2M in 2008, $3.0M in 2007, $1.4M in 2006, $4.4M in 2005,$3.4M in 2004, $2.4M in 2003, $650,000 in 2002, $2M in 2001). PGE exploration is included in the precious metal exploration total.
[c]Includes rare-earth elements, magnetite sands, and graphite.
N/A = Not available.
-- Not reported.
W = Withheld; data included in "Other" column.

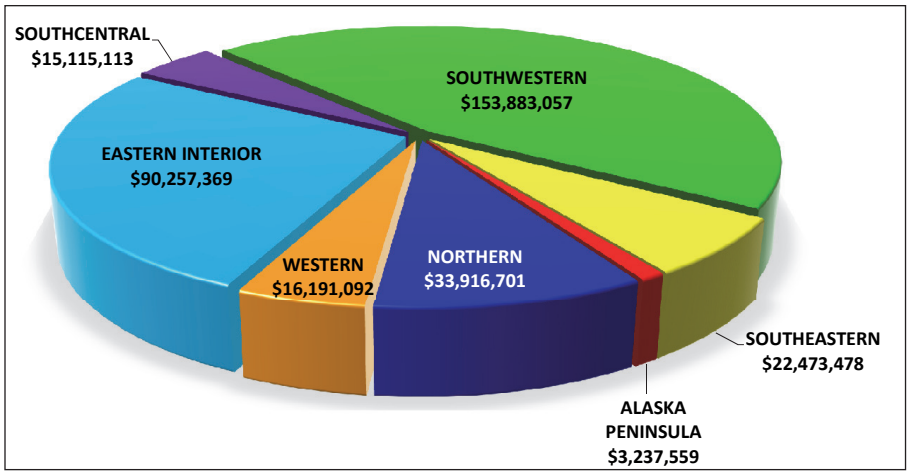


Figure 11. Exploration expenditures by region, 2012.

ects include the Niblack volcanogenic massive sulfide project in southeastern Alaska, NovaCopper's Upper Kobuk Mineral Projects (Arctic and Bornite), Kensington, and other projects featured in figure 7 and the regional exploration discussion.

Prospecting sites and mining claims were staked across all regions of Alaska. Table 8 summarizes the number of new and active (new plus existing) mining claims per year, from 1991 through 2012. The table lists the number of 20-acre federal mining claims, 160-acre state prospecting sites, and 40- or 160-acre state mining claims. New mining claims staked during 2012 included 5,116 new state claims (622,000 acres) and 202 new state prospecting sites (32,320 acres). State claim staking decreased by 25 percent in 2012, while staking of state prospecting sites increased by 12 percent. Totals of active state claims and state prospecting sites have remained relatively consistent over the past 3 or 4 years. Federal claim information was not available at the time this report was prepared.

The Alaska Division of Geological & Geophysical Surveys (DGGS) conducted geologic mapping and minerals-related studies in the Ray Mountains–Dalton Highway area in Interior Alaska as part of the Strategic and Critical Minerals Assessment project, a state-funded capital-improvement project to evaluate Alaska's potential for strategic and critical minerals (SCM, photo 2). SCMs are essential for our modern, technology-based society, and include rare-earth elements, platinum-group elements, antimony, barium, chromium, cobalt, fluorine, gallium, graphite, indium, niobium, rhenium, tantalum, titanium, tungsten, and yttrium. The U.S. is more than 70 percent dependent on imports for 13 of these 16 elements and elemental groups, and 100 percent dependent on imports for seven. This leaves the U.S. vulnerable to disruptions in the SCM supply chain.

Helicopter-borne geophysical surveys were contracted for the Farewell area in southeast McGrath and northwestern Lime Hill quadrangles, adjacent to the Styx River survey

Table 7. Reported exploration expenditures and employment in Alaska, 2012. See table 6 for an explanation of estimated exploration expenditures. Employment was estimated for 16 placer and 41 lode projects using their reported exploration expenditures and a project-cost-per-person-day ratio averaged from 568 and 18 projects, respectively, with complete data reported.

	Northern	Western	Eastern Interior	South-central	South-western	South-eastern	Alaska Peninsula	Total
Exploration expenditures								
Placer	$ 41,750	$ 6,819,915	$ 2,317,417	$ 307,563	$ 298,553	$ 104,552	$ 0	$ 9,889,750
Lode	33,874,951	9,371,177	87,939,951	14,807,550	153,584,504	22,368,926	3,237,559	325,184,618
TOTAL	**$ 33,916,701**	**$ 16,191,092**	**$90,257,369**	**$15,115,113**	**$ 153,883,057**	**$22,473,478**	**$ 3,237,559**	**$335,074,368**
Exploration employment								
Employment workdays	19,025	8,862	32,462	8,412	44,016	27,463	1,853	142,092
Placer	101	5,060	8,132	1,444	723	427	0	15,887
Lode	18,924	3,802	24,330	6,968	43,293	27,036	1,853	126,205
Workyears[a]	73	34	125	33	170	106	7	548
Placer	<1	19	31	6	3	2	0	61
Lode	73	15	94	27	167	104	7	487
Total companies reporting[b]	16	83	408	87	29	26	2	651[c]
Placer	8	76	387	78	19	19	0	587
Lode	8	7	21	9	10	7	2	64

[a]Based on 260-day workyear.
[b]Some companies were active in several areas.
[c]Reported values are largely compiled from questionnaire responses, internet research, and Affidavits of Labor.

released in 2008, and a series of three surveys in the Aniak–Iditarod area roughly centered around Flat, Alaska. Summaries of mineral-related mapping products and geophysical surveys completed, with both State and Federal funding, are provided in tables 9 and 10. Released geologic maps, geophysical data, and Alaska minerals information can be found at http://www.dggs.alaska.gov/ and http://AKGeology.info.

NORTHERN REGION

NovaCopper Inc., formed in 2012 as a spinoff of NOVAGOLD Resources Inc.'s Ambler project in Northwest Alaska, completed a $15.2 million exploration program in the Ambler mining district. In addition to 90,624 acres of state, federal, and patented mining claims blanketing a trend of volcanogenic massive sulfide prospects and deposits in the Ambler mining district, as part of the spinoff transaction, NovaCopper received $40 million in cash and NOVAGOLD founder Rick Van Nieuwenhuyse serves as the new exploration company's president and CEO.

Continuing the work initiated by NOVAGOLD, NovaCopper and NANA Regional Corp. created a partnership known as the Upper Kobuk Mineral Projects (UKMP). The

Photo 2. DGGS Ray Mountains geologic mapping. Photo provided by Shane Lasley.

Table 8. Summary of claim activity by acres, 1991–2012.

Year	State Claims				State Prospecting Sites (160 acres)		Federal Claims (20 acre sites)	
	New (Active) 40 acre[a]	New (Active) 160 acre	Total (Active) 40 acre[a]	Total (Active) 160 acre	New	Total	New	Total
1991	3,277	0	37,862	0	747	1,723	1,299	23,222
1992	2,640	0	36,250	0	454	1,472	695	20,254
1993	2,120	0	34,340	0	1,412	2,259	601	9,298
1994	4,057	0	34,400	0	802	2,378	341	8,495
1995	4,512	0	30,464	0	1,030	2,725	376	7,766
1996	9,489	0	36,602	0	2,082	3,687	681	9,346
1997	8,678	0	42,836	0	2,480	5,305	1,872	11,320
1998	9,786	0	49,816	0	3,194	7,148	427	11,033
1999	11,978	0	56,107	0	1,755	7,600	308	10,176
2000	4,560	614	54,393	614	1,143	5,675	523	7,805
2001	858	907	49,627	1,503	27	3,091	464	8,248
2002	745	826	44,056	2,179	61	2,138	261	8,100
2003	856	2,603	38,076	4,387	101	1,857	676	8,424
2004	1,070	3,533	34,380	7,719	59	1,484	66	8,313
2005	806	4,502	34,066	11,551	128	1,612	411	7,826
2006	1,111	5,747	33,864	16,249	103	1,646	457	8,068
2007	576	6,031	31,305	20,208	57	1,625	933	8,872
2008	1,333	2,565	23,033	13,519	24	651	3,001	11,732
2009	1,142	2,793	24,340	16,381	40	335	1,057	10,431
2010	1,446	6,132	24,805	20,389	88	441	332	8,413
2011[b]	1,932	4,893	24,319	21,970	180	273	284	8,438
2012[b]	1,638	3,478	24,673	20,810	202	409	--	--

Updated information provided by Chollada Jarupakorn and William Cole (Division of Mining, Land & Water, DNR), Jeff Jasper (Information Resource Management, DNR), and John Hoppe and Julie Capps (U.S. BLM). Table has been reorganized to conform with computer records available after 1990.

[a]Includes claim fractions varying from 1 to 39 acres.

[b]2011 and 2012 state claim and prospecting site totals are not directly comparable to previous years. Claim totals comprise Mining Claims (including "River Bottom Navigable" subtype) and Leasehold Locations whose claimants filed an Annual Affidavit of Labor, and claims initiated on state-selected land. Active claims on state-selected land totaled 1,067 in 2011 and 938 in 2012.

-- Not reported

352,900 acre UKMP combines NovaCopper's Ambler property with the Bornite project (photo 3) and a number of other mineral prospects across a carbonate-hosted copper–cobalt belt situated on Native lands that NANA brought to the partnership. Based on drilling completed by NOVAGOLD in 2011, NovaCopper announced in July an inaugural NI 43-101-compliant resource of 1.06 billion pounds of copper for the Ruby Creek zone at Bornite. This resource includes an indicated resource of 7.5 million tons averaging 1.19 percent (178.7 million pounds) copper and an inferred resource of 52.6 million tons of 0.84 percent (883.2 million pounds) copper. To continue the expansion of Bornite, NovaCopper's 2012 drill program at the UKMP focused primarily on the South Reef zone, which is separated from the Ruby Creek zone by a major northeast-trending fault. The 47,431 feet of drilling completed at Bornite in 2012 intersected long sections of high-grade copper at South Reef; highlights include: RC12-198 intersected four mineralized intervals totaling 278 feet (in a total interval of 339 feet) averaging 2 percent copper, including a higher grade zone of 28 feet grading 6.4 percent

Table 9. Detailed state airborne geophysical surveys and follow-up geologic ground-truth mapping as of December 2012.[a]

Survey Area	Survey Size	Resulting Products
Nome District western core area	494 sq. miles	Airborne geophysical survey; geologic map
Nyac District core area	183 sq. miles	Airborne aeromagnetic survey
Circle District core area	338 sq. miles	Airborne geophysical survey; geologic map
Valdez Creek District	78 sq. miles	Airborne geophysical survey
Fairbanks District	626 sq. miles	Airborne geophysical survey; geologic map
Richardson District	137 sq. miles	Airborne geophysical survey
Rampart/Manley–Tofty	1,017 sq. miles	Airborne geophysical survey; geologic map
Upper Chulitna District	364 sq. miles	Airborne geophysical survey; geologic map
Petersville–Collinsville District	415 sq. miles	Airborne geophysical survey; geologic map
Iron Creek District	689 sq. miles	Airborne geophysical survey; geologic map
Ruby District	591 sq. miles	Airborne geophysical survey/published geologic map[b]
Fortymile District	1,036 sq. miles	Airborne geophysical survey; geologic maps
Livengood District	229 sq. miles	Airborne geophysical survey; geologic maps (additional fieldwork in 2010)
Salcha River/North Pogo	1,032 sq. miles	Airborne geophysical survey; geologic maps
Southeast extension of Salcha River–Pogo	91 sq. miles	Airborne geophysical survey
Liberty Bell	276 sq. miles	Airborne geophysical survey; geologic map
Broad Pass	304 sq. miles	Airborne geophysical survey
Council	618 sq. miles	Airborne geophysical survey; geologic map
Goodpaster River	210 sq. miles	Airborne geophysical survey; geologic mapping (field work completed; map in prep.)
Liscum[c]	67 sq. miles	Airborne geophysical survey
Black Mountain	222 sq. miles	Airborne geophysical survey
East Richardson	224 sq. miles	Airborne geophysical survey
Northeast Fairbanks	404 sq. miles	Airborne geophysical survey; geologic mapping (field work completed; map in prep.)
Alaska Highway Corridor[d]	3,045 sq. miles	Airborne geophysical survey; geologic mapping (field work completed; map in prep.)
Bonnifield District	602 sq. miles	Airborne geophysical survey; geologic mapping (field work completed; map in prep.)
Styx River[e]	710 sq. miles	Airborne geophysical survey
Slate Creek–Slana River	442 sq. miles	Airborne geophysical survey; geologic mapping (field work completed; map in prep.)
Moran	653 sq. miles	Airborne geophysical survey; geologic mapping (field work completed; map in prep.)
Ladue	742 sq. miles	Airborne geophysical survey
Iditarod	852 sq. miles	Airborne geophysical survey
TOTAL 19 years $14.1 million	**16,691 sq. miles**	**2.92% of Alaska's total area**

[a]Projects funded by the Alaska State Legislature. Projects concentrate on state, Native, state-selected, and Native-selected lands and are managed by DGGS.
[b]DGGS published a geologic map of the Ruby–Poorman mining district based on mapping in 1984 by the Anaconda Minerals Co.
[c]Project funded through agreement with AngloGold Ashanti (USA) Exploration Inc.
[d]Project funded by the Alaska State Legislature as a $2 million Capital Improvement Project to assess the geologic hazards and resource potential along the proposed natural gas pipeline corridor between Delta Junction and the Canada border.
[e]Project partially funded through agreement with Anglo American Exploration (USA) Inc. under the DGGS Mineral Industry Sponsorship Program.
Note: Surveys listed above are complete except where noted. Additional areas will be scheduled for surveying at later dates contingent on future funding.

Table 10. Detailed federally funded airborne geophysical survey work as of December 2012.[a]

Survey Area	Survey Size	Resulting Products
Wrangell/Stikine[b]	1,111 sq. miles	Airborne geophysical survey
Koyukuk/Wiseman	533 sq. miles	Airborne geophysical survey
Ketchikan[c]	605 sq. miles	Airborne geophysical survey
Aniak	1,240 sq. miles	Airborne geophysical survey
Delta River	603 sq. miles	Airborne geophysical survey
Sleetmute	641 sq. miles	Airborne geophysical survey
Howard Pass–Misheguk Mountain	1,447 sq. miles	Airborne geophysical survey
Western Fortymile	250 sq. miles	Airborne geophysical survey
TOTAL 9 years $4.0 million	**6,430 sq. miles**	**1.1% of Alaska's total area**

[a]Projects funded mainly by U.S. Bureau of Land Management with contributions by DGGS, local and state governments, and private corporations. Projects concentrate mainly on federal land. Data are released through DGGS.
[b]Major funding came from BLM and the City of Wrangell.
[c]Major funding came from BLM and Ketchikan Gateway Borough. Sealaska Corp., Alaska State Mental Health Trust Land Office, the City of Coffman Cove, and the City of Thorne Bay also contributed funds. Sealaska Corp. also contributed previously acquired geophysical data.

copper; RC12-201 intersected four mineralized intervals totaling 369 feet (in a total interval of 466 feet) averaging 2.4 percent copper, including a higher grade zone of 41 feet grading 9.5 percent copper; RC12-202 intersected three mineralized intervals totaling 164 feet (in a total interval of 188 feet) averaging 3 percent copper, including a higher grade zone of 26 feet grading 12 percent copper; and RC12-209 intersected a continuous 402-foot interval averaging 2.44 percent copper. A cut-off grade of 0.5 percent copper was used to calculate all of the results. Based on drilling through the end of 2012, the South Reef mineralized zone has been defined over an area measuring 2,600 feet by 800 feet and remains open to the north, northeast, and southwest. The results of the drilling will be incorporated into an initial resource for South Reef.

Two known mineralized occurrences approximately 4 miles west of Bornite—Aurora Mountain and Pardner Hill—are in broad areas of hydrothermal dolomite and anomalous soil geochemistry. To prioritize future drill targets in this area, NovaCopper carried out a 37-line-mile induced polarization survey, 16-line-mile soil sampling program, and geologic mapping.

NovaCopper's 2012 work on the Ambler portion of the Upper Kobuk Mineral Projects focused on engineering and metallurgical testing conducted as part of a preliminary economic assessment on the potential of building an open-pit mine at the Arctic VMS deposit. Arctic has an indicated resource of 21.4 million tons averaging 4.05 percent (1.73 billion pounds) copper, 5.8 percent (2.49 billion pounds) zinc, 1.74 ounces per ton (37.23 million ounces) silver, and 0.028 ounce per ton (501,000 ounces) gold. Additionally, the deposit has an inferred resource of 12.6 million tons averaging 3.47 percent (873 million pounds) copper, 4.84 percent (1.22 billion pounds) zinc, 1.4 ounces per ton (17.15 million ounces) silver, and 0.23 ounce per ton (235,000 ounces) gold.

A preliminary economic assessment completed by SRK Consulting in April 2011 and updated for NovaCopper in 2012 investigated a 4,400-ton-per-day underground operation at Arctic producing 1.7 billion pounds of copper, 2 billion pounds of zinc, 291 million pounds of lead, 266,000 ounces of gold, and 22 million ounces of silver over a 26-year mine life. Also on the Ambler portion of the UKMP, NovaCopper completed 5,748 feet of drilling at Sunshine, a VMS prospect approximately 7.5 miles to the west of the Arctic deposit. Drilling at Sunshine has identified substantial widths of massive sulfide mineralization in the same stratigraphic horizon as Arctic.

Andover Mining Corp. completed a $3.1 million exploration program at its Sun VMS property, located in the Ambler mining district approximately 30 miles east of the Arctic deposit. The 2012 program included both resource definition and exploration drilling across the 36,800-acre Sun property. One of the primary objectives of the 20-hole program at Main Sun is to ensure that the drill density inside the deposit will support a resource calculation. SUN 12-29, one such hole, intersected three zones of mineralization. Starting at a depth of 236 feet, hole 29 intersected 28 feet grading 1.5 percent copper, 9 percent zinc, 1.6 percent lead, 1.93 ounces per ton silver, and 0.006 ounce per ton gold; beginning at 330 feet this hole also intersected 20 feet grading 2.7 percent copper, 6.5 percent zinc, 1.3 percent lead, 3.40 ounces per ton silver, and 0.012 ounce per ton gold; and finally, beginning at 427 feet, this hole intersected 7.5 feet averaging 1.7 percent copper, 1 percent zinc, 0.26 percent lead, 1.42 ounces per ton silver, and 0.004 ounce per ton gold.

S.W. Sun, a faulted and offset extension of Main Sun, was also targeted in 2012. Results include SUN 12-34, which intersected 12 feet averaging 1.02 percent copper, 2.36 ounces per ton silver, 6.45 percent zinc, 2.13 percent lead, and 0.006

Photo 3. The camp at the Upper Kobuk Mineral Projects is set up next to the historical buildings at Bornite, a high-grade copper deposit previously explored by Kennecott Exploration Co. Photo provided by NovaCopper Inc.

ounce per ton gold. Sun 12-38, a step-out to the northeast of known S.W. Sun mineralization, intersected 7.5 feet averaging 1.2 percent copper, 1.59 ounces per ton silver, 2.83 percent zinc, 0.49 percent lead, and 0.009 ounce per ton gold. While a larger drill focused on the Main Sun and S.W. Sun deposits, a portable rig tested outlying targets. Sal, one such prospect, lies about 5 miles west of Main Sun. Strong alteration and iron staining in the prospective rock package of the region have been mapped for some 650 feet along strike at Sal before being lost beneath cover. The discovery hole at Sal intersected 6.9 feet (true width) averaging 0.69 percent copper, 2.99 percent zinc, 0.84 percent lead, 0.58 ounce per ton silver, and 0.004 ounce per ton gold. The Stu prospect, about 1,600 feet southwest of Sal, also occurs as strongly altered rock and gossan. STU12-01, the Stu discovery hole, intersected 26.6 feet (true width) of mineralization averaging 0.49 percent copper, 2.75 percent zinc, 0.71 percent lead, 0.978 ounce per ton silver, and 0.006 ounce per ton gold. Andover also added claims to its Smucker property, a VMS prospect area on the opposite end of the UKMP approximately 60 miles west of the Sun property.

Teck Alaska Inc. continued a multi-year exploration program targeting large, high-grade, sediment-hosted zinc deposits in the area surrounding Red Dog Mine. The company reports that it has drilled 32 exploration holes in the larger Red Dog area during 2011 and 2012. Highlights from 2011 include 75 feet grading 18.1 percent zinc and 5.9 percent lead, and 31 feet grading 25.9 percent zinc and 2.9 percent lead. In 2012, Teck completed approximately 13,000 feet of drilling at Noatak, a large block of State of Alaska mining claims west of the Red Dog Mine. Anarraaq–Aktigiruq, roughly 8 miles northwest of Red Dog, is among the high-priority targets Teck is pursuing on the Noatak claims. Teck discovered the deposit in 1999, subsequently establishing an inferred resource of about 19 million tons grading 15.8 percent zinc, 4.8 percent lead, and 2.1 ounces per ton silver. In addition to exploration drilling, Teck's multi-year regional exploration program in the larger Red Dog area includes regional dataset expansion through geology, geochemistry, and geophysics. Teck also completed infill drilling in the immediate area of Red Dog Mine, located on Native land leased from NANA Regional Corp. The company has not

reported any results from the exploration or infill drilling completed in 2012.

Zazu Metals Corp. continued to advance studies needed for potential future permitting and development of Lik, a sediment-hosted zinc project about 14 miles northwest of Red Dog Mine. Zazu's 2012 program included environmental baseline studies, evaluation of the costs and design of a road connecting the deposit to the transportation system currently servicing Red Dog, refining resource estimates and pit models, and metallurgical studies. The ore body at Lik is divided into two deposits separated by a fault—the near-surface Lik South and the deeper Lik North. Lik South has an indicated resource of 20.7 million tons grading 8.08 percent zinc, 2.62 percent lead, and 1.54 ounces per ton silver, plus an inferred resource of 1.4 million tons grading 6.8 percent zinc, 2.12 percent lead, and 1.02 ounces per ton silver. Lik North contains an additional inferred resource of 5.7 million tons grading 9.65 percent zinc, 3.25 percent lead, and 1.49 ounces per ton silver.

A Preliminary Economic Assessment (PEA) completed by Scott Wilson Roscoe Postle Associates Inc. in 2010 indicates that mining the near-surface Lik South deposit is viable. The PEA envisions a 5,500 ton-per-day mine and mill with an 8-year mine life. In September, Zazu completed a multi-year process to transfer the Lik deposit federal claims to State of Alaska control. Teck Resources Limited is a 50 percent joint venture partner at the Lik project. Zazu has the exclusive right to increase its interest to 80 percent by spending a total of $25 million on the project by 2018.

Tintina Resources Inc. completed a 6,200 foot drill program at its Baird copper–zinc project, a 70,160 acre property between Teck Resources' Red Dog zinc mine and the Ambler mining district (photo 4). The 2012 drilling focused on Omar, Deadfall, and Frost—three targets in a 116-square-mile area with copper, zinc, cobalt, lead, and silver mineralization. The Omar target exhibits mineralization over a 2.5-by-1.25-mile area with coincident copper and zinc soil and rock chip anomalies. Historical drilling at Omar intersected 74.8 feet averaging 3.99 percent copper, 20 feet averaging 9.37 percent copper, and 24 feet averaging 2.95 percent copper. The Deadfall target consists of a 2.5-mile-long zinc and copper anomaly. Although no drilling has been completed on this target, channel sampling of outcrops has identified significant bedrock mineralization. Tintina is earning a 60 percent joint venture interest in the 9,600 acre Omar claim block from Teck Resources Ltd. The Deadfall, Frost, and Peak targets lie on 60,560 acres of state mining claims.

In May, NyacAU LLC and Goldrich Mining Co. formed **Goldrich NyacAU Placer LLC,** a joint-venture company to mine placer gold deposits at the 36-square-mile Chandalar property approximately 190 miles north of Fairbanks. Goldrich contributes to the partnership a land package that covers 22,840 acres of the Chandalar mining district, including a 250,000 ounce drill-tested placer gold deposit on Little Squaw Creek and a multitude of gold-bearing streams with the potential to increase the resource. NyacAU, a private mining company with more than two decades of placer mining experience, is investing approximately $8.9 million to get the new placer mining venture into production. Approximately $5 million of the funds will go toward start-up costs and the remaining $3.9 million are being spent on mining equipment. Work completed during 2012 includes stockpiling topsoil for future mining reclamation, stripping overburden, building a

Photo 4. Tintina Resources Inc. completed a 6,200-foot drill program at its Baird project in northwestern Alaska. This hole (OM12-003) was drilled at Omar, a prospect with numerous copper sulfide occurrences. Photo provided by Tintina Resources Inc.

closed recirculating water pond system to minimize water use and protect the environment, and constructing a gold recovery plant. With mine construction completed in 2012, the Chandalar partners are expecting to recover 8,500 ounces of placer gold in 2013, 10,000 ounces in 2014, and more in years to follow. Goldrich's primary exploration focus is on the more than 30 lode prospects identified on the Chandalar property. Goldrich intends to follow up on significant gold and silver mineralization encountered during 2011 drilling at Aurora and Rock Glacier, two lode prospects at the headwaters of Little Squaw Creek. Due to lack of funding, Goldrich deferred lode exploration for 2012.

Doyon Ltd. completed 3.5 miles of induced polarization surveys on six lines in the east Wiseman area, which hosts metal-bearing occurrences located on 443,520 acres of Native land adjacent to the Dalton Highway in the Brooks Range. Types of mineralization present in the area include volcanogenic massive sulfide, copper skarn, and porphyry copper.

Eight individuals and companies reported limited placer gold exploration activities at various properties across the region. Much of the exploration was conducted in the Wiseman area and consisted of prospecting by panning or small-scale sluicing.

WESTERN REGION

Placer Marine Mining Inc., a joint venture between AngloGold Ashanti Ltd. and De Beers, completed a $6 million exploration program on its large marine placer properties off the coast of Nome. Placer Marine Mining picked up its Nome offshore properties during a lease sale sponsored by the Alaska Department of Natural Resources in 2011. These tracts start about a mile offshore and extend to about the 3-mile-limit of state-owned land and for some 20 miles parallel to the shoreline. While the Nome beaches and nearshore marine gold deposits have been continuously worked and reworked for more than a century, the depth of the icy water covering the deposits leased by Placer Marine Mining has prevented individuals and small-scale operations from dredging there.

One semi-successful attempt at a larger commercial operation to mine the marine placers in these deeper waters was carried out by Western Gold Exploration and Mining Co. Limited Partnership (WestGold) in the late 1980s. From 1986 through 1990, WestGold recovered just over 118,000 ounces of gold from the submerged placer deposit. During its five-season tenure off the coast of Nome, WestGold drilled 2,479 holes in a part of the area now leased by Placer Marine Mining, adding to approximately 700 holes previously drilled by Shell Oil Co. and Asarco. To further the understanding of its leased property, Placer Marine Mining began its 2012 program with a 100-day geophysical program that involved a detailed bathymetric (the underwater equivalent of topographic) mapping program and a 925-line-mile seismic survey. The company also contracted Denali Drilling, a company that also did sampling for WestGold, to drill 146 holes during a 40-day program. To confirm historical drilling, 130 holes of the program tested two claim blocks previously sampled by WestGold. In general these holes were drilled on 325-foot centers along lines spaced 650 feet apart. The remaining 16 holes explored a previously untested area suggested by the seismic surveys carried out earlier in the season. Each drill site was tested with two holes to increase the confidence in the data. Results from the drill program have not been released. The company plans to continue work on the Nome Offshore Project in 2013 and believes it will have collected the geological and environmental data needed to advance the project into permitting by mid 2014.

Millrock Resources Inc. and **Kinross Gold Corp.** completed 4,033 feet of drilling at the Council gold project, a 900-square-mile land package about 55 miles northeast of Nome (photo 5). The 2012 Council exploration program included core drilling at two prospects, Elkhorn and Upper Ophir. The Elkhorn prospect is sited along a possible northwest-trending fault zone in schist and marble of the Nome Group. Previous soil sampling at Elkhorn defined a zone of anomalous gold and arsenic over a strike of 4.5 miles. Elkhorn drilling in 2012 consisted of seven core holes totaling 3,091 feet, with four of the holes intersecting gold mineralization. COU12-023, the discovery hole at Elkhorn, intersected 23 feet averaging 0.075 ounce per ton gold occurring in a 46-foot interval averaging 0.042 ounce per ton gold. Geology of the Upper Ophir prospect area consists primarily of schist and marble of the Nome Group, similar to that at Elkhorn. An arsenic anomaly was the focus of the drilling program, which targeted a zone of graphitic schist overlying marble. Two core holes totaling 942 feet were drilled and both encountered gold mineralization. Hole COU12-025 intersected an interval averaging 0.032 ounce per ton gold over 25 feet.

In January 2012 Cedar Mountain Exploration Inc. announced it had entered into an option agreement to acquire the Graphite Creek project, a property that covers graphite outcrops trending along the slopes of the Kigluaik Mountains, approximately 40 miles north of Nome. To better reflect its focus, Cedar Mountain changed its name to **Graphite One Resources Inc.** The renamed company began its $4.4 million exploration program at Graphite Creek in April with an airborne electromagnetic survey over the entire land package. This geophysical program identified highly conductive graphite layers along a 10.5 mile strike. The geophysical anomaly extended beyond the bounds of Graphite One's original land position, prompting the company to stake an additional

Photo 5. Drilling at the Council project on the Seward Peninsula. Photo provided by Millrock Resources Inc.

17 claims. Graphite Creek is characterized as a graphitic carbon deposit with mineralization exposed at surface, and primarily hosted by garnet–biotite–quartz schist that contains coarse, crystalline flake graphite in disseminations and high-grade graphite segregations and lenses. According to a technical report written for Cedar Mountain in November 2011, the Graphite Creek project was initially estimated to contain at least roughly 6.6 to 22 million tons of crystalline-flake graphite in 220 million tons of mineralized material averaging 3 to 10 percent graphite, based on observing the outcrop on the property. A 13,940-foot drill program completed at Graphite Creek in 2012 intersected thick, graphite-enriched zones (photo 6). Hole 12GC001, drilled just northeast of the project's namesake creek, intersected 1,351 feet grading 2.1 percent graphite. This intercept includes 420 feet averaging 4.1 percent and 137 feet grading 6.7 percent graphite. Hole 12GC002, drilled about 1,000 feet to the southwest, intersected 1,159 feet grading 2.7 percent graphite. This intercept includes 542 feet averaging 4.23 percent, and 69 feet averaging 10.1 percent graphite. Stepping out approximately 5,000 feet to the northeast, hole 12GC004 intersected 780 feet of 2.66 percent graphite, including 448 feet averaging 4 percent and 133 feet averaging 6.35 percent graphite. The company also systematically drilled a 7,000-foot section of the deposit. 12GC010, the northeasternmost hole drilled, intersected 711 feet averaging 3.13 percent graphite, including 71 feet averaging 11 percent graphite. 12GC003, drilled at the southwest extent of the current resource, intersected 770 feet averaging 2.18 percent graphite, including 203 feet averaging 3.52 percent graphite. Based on the results of Graphite One's 2012 drill program, an NI-43-101-compliant inferred resource of 130.3 million tons averaging 5.78 percent graphitic carbon, or 6.8 million tons of graphite, was calculated for Graphite Creek. This ranks Graphite Creek as the fourth largest graphite deposit in the world with an NI 43-101-compliant or equivalent resource. The resource calculation incorporates 17 of the holes drilled in 2012. An 18th hole, drilled 1.4 miles west of the inferred resource, tested the expansion potential of the deposit. This hole, 12GCH008, intersected 171 feet averaging 6.09 percent graphite. Graphite One reported that a western extension suggested by this hole, in conjunction with surface sampling and the geophysical signature, could conceptually add 9.9 to 38.9 million tons of graphite to the resource.

Tintina Resources Inc. did not report any exploration activity at its Kugruk project about 70 miles north of Nome. Copper–iron skarns, silver–lead–zinc prospects, and placer gold-enriched drainages have been identified across this 177,280-acre property.

NANA Regional Corp. carried out soil and rock sampling and geologic mapping on State of Alaska and Native land in the NANA region of western Alaska (Anugi-Fairhaven). Commodities sought include gold, silver, copper, zinc, lead, and iron.

At least 76 individuals or companies reported placer gold exploration across the region. Most of the operations were on the Seward Peninsula, in particular, dredge sampling the beach placers offshore of Nome.

EASTERN INTERIOR REGION

Tower Hill Mines Inc., a subsidiary of International Tower Hill Mines Ltd., completed a $55.59 million work program focused primarily on completing a feasibility study for the Livengood gold project approximately 70 miles northwest of Fairbanks. A number of trade-off studies and project design alternatives were evaluated, including various grinding circuits, heap leaching, and various reagent additions. The company said a large mill followed by a gravity gold circuit and a conventional carbon-in-leach circuit is the scenario to be included in the feasibility study. A 199-hole, 51,610-foot geotechnical drill program was completed at Livengood in 2012. This program—which utilized core, sonic, and auger drilling methods—evaluated facility sites to obtain the technical

information required for use in sub-arctic engineering design. The pump testing of large-diameter water wells required for hydrogeological modeling was also completed. Metallurgical test work and engineering studies to advance the feasibility study are underway.

Gold mineralization at Livengood occurs in two styles: as multi-stage fine quartz veins commonly found in or near intrusive dikes and sills; and as disseminated mineralization in volcanic, intrusive, sedimentary, and mafic–ultramafic rocks without a clear quartz vein association (photo 7). Four principal stages of alteration are currently recognized: an early biotite stage followed by albite–black quartz, followed by a sericite–quartz, and finally a carbonate stage. Arsenopyrite is associated with all alteration stages and gold correlates strongly with the arsenopyrite, but it is not clear whether gold was introduced during all four stages or preferentially during one or more stages. Mineralization is interpreted to be intrusion-related, consistent with other gold deposits of the Tintina Gold Belt, and has a similar arsenic–antimony geochemical association. Mineralization is controlled partly by lithologic units, but fold-thrust architecture appears to be an important factor in providing pathways for magma and hydrothermal fluid. Local fault and contact limits to mineralization have been identified, but overall the deposit has not been closed off in any direction. The resource area at Livengood covers the most significant portion of the region of anomalous gold in surface soil samples, but still represents only about 25 percent of the geochemical anomaly area.

Photo 6. Drilling at the Graphite Creek property, part of a $4.4 million exploration program in 2012. Photo provided by Graphite One Resources Inc.

At a 0.006 ounce per ton gold cut-off grade, seen as an economic cut-off for Livengood, the Money Knob deposit at Livengood contains a measured and indicated resource of 1,028 million tons averaging 0.016 ounce per ton (16.5 million ounces) gold. Focused on developing the identified resource, Tower Hill is spending minimal time and money on exploring the upside potential of the 56-square-mile Livengood land package. Geotechnical and condemnation drilling conducted in 2012 continues to intersect gold beyond the confines of the Money Knob resource area, including one hole (MK-12-290) that cut 12.5 feet grading 0.201 ounce per ton gold roughly a mile northeast of the deposit. Hole MK-12-281, drilled nearly 2 miles southwest of Money Knob, cut 9.1 feet averaging 0.08 ounce per ton gold; MK-12-285, nearly one mile east of the deposit, cut 6.6 feet averaging 0.101 ounce per ton gold; and MK-12-288, nearly a mile west of Money Knob, cut 10 feet averaging 0.072 ounce per ton gold. A feasibility study for the Livengood project is scheduled to be completed in mid 2013.

Photo 7. Niton XRF "guns" in reverse-circulation drilling chip sample bags, testing for mineralization at the Livengood project in interior Alaska. Photo provided by International Tower Hill Mines Ltd.

Endurance Gold Corp. continued to advance exploration at its McCord Creek property, a block of 49 Alaska state mineral claims covering more than 7,800 acres immediately adjoining the eastern border of International Tower Hill Mines' Livengood property. In May 2012, Endurance announced it had optioned McCord Creek to Liberty Gold Corp., which completed a $160,000 program that included soil and rock sampling. Through 2012, 439 soil samples and 73 rock samples

were collected from the McCord Creek property. Programs carried out in 2011 and 2012 identified seven multi-element soil anomalies associated with elevated gold values. Endurance Gold completed minimal exploration on its Vana property, which consists of 22 Alaska state mineral claims adjacent to Tolovana Hot Springs Dome, 19 miles southwest of the Livengood property.

In October, **Bluestone Resources Inc.** acquired the Shorty Creek gold property about 2.5 miles from International Tower Hill Mines' Livengood project. Bluestone purchased the 38,400-acre gold property during a bankruptcy auction selling off certain assets of Tri-Valley Corp. and Select Resources Corp. Inc.

Fairbanks Gold Mining Inc., (FGMI) a subsidiary of Kinross Gold Corp., conducted exploration in and around Fort Knox Mine, with the goal of identifying additional reserves that can further expand the existing pit or lead to development of another operation (photo 8). For 2012, Fort Knox had reserves of 262 million tons averaging 0.014 ounce per ton gold, or 3.6 million contained ounces. The company said the reserves support a mine life of 8 years. FGMI also completed drilling, trenching, and reclamation at the Gil Project about 5 miles east of Fort Knox. Kinross, which held a longstanding partnership with junior explorer Teryl Resources Corp. at Gil, bought full ownership of the property in 2011.

Freegold Ventures Ltd. completed a 46,907-foot drill program focused on upgrading and expanding the Dolphin–Cleary Hill resources at its Golden Summit project during 2012 (photo 9). Golden Summit blankets 80 known gold occurrences, including three historically productive gold operations. Combined, these historical mines—Cleary Hill, Hi Yu, and American Eagle—produced more than 450,000 ounces of gold from ore that averaged about 1.6 ounces per ton gold. Although portions of these high-grade vein systems remain, Freegold is focused on outlining large bulk tonnage targets more analogous to the Fort Knox Mine approximately 5 miles to the southeast. The 45 holes drilled by Freegold Ventures in 2012 focused on infill drilling to upgrade and expand this resource and extend the deposit's known resources northeast toward the Cleary Hill area, a zone with extensive drilling but without a resource calculation. Highlights include hole GSCL-1201, drilled in the heart of the Cleary Hill Mine area, which returned a near-surface intercept of 20.5 feet grading 0.086 ounce per ton gold and a deeper intercept of 336.9 feet averaging 0.033 ounce per ton gold; hole GSDL-1201, in the 1,300-foot gap between Dolphin and Cleary Hill, which returned 1,030.5 feet grading 0.020 ounce per ton gold, including 435.4 feet grading 0.035 ounce per ton gold; and GSDL-1218, testing the depth potential of the Dolphin deposit, which cut 1,742.5 feet grading 0.017 ounce per ton gold, including 296.9 feet grading 0.032 ounce per ton gold. According to a resource estimate published in October 2012, at a cutoff grade of 0.01 ounce per ton, the Dolphin/Cleary Hill zone at Golden Summit contains an NI 43-101-compliant indicated resource of 69.02 million tons averaging 0.021 ounce per ton (1.46 million ounces) gold; and an inferred resource of 211.56 tons averaging 0.020 ounce per ton (4.1 million ounces) gold.

Teryl Resources Corp. completed a five-hole, 2,500-foot drill program at its West Ridge project, approximately 6 miles west of the Fort Knox Mine. The company reports that holes WRC-1204 and WRC-1205 intersected prospective quartz veining and related intense hydrothermal alteration, however returned only sporadic gold assay results. The best intercept was 10 feet of 0.032 ounce per ton gold in hole WRC-1205.

In September, **Miranda Gold Corp.** announced Agnico-Eagle had terminated its exploration agreement on the Ester Dome gold property, approximately seven miles west of Fairbanks. Miranda subsequently terminated its underlying lease on the property.

Photo 8. Fairbanks Gold Mining Inc. conducted exploration at the Fort Knox Mine and nearby properties to attempt to keep the haul trucks busy past the mine's current projected life. Photo provided by Jenny Wynne, Water Section of DMLW, DNR.

Sumitomo Metal Mining Pogo LLC—a joint venture between Japanese firms Sumitomo Metal Mining Co. (85 percent) and Sumitomo Corp. (15 percent) to operate the Pogo Mine—announced that the underground operation had produced its two-millionth ounce of gold on July 31, 2012. The first 2 million ounces of gold produced at Pogo primarily were mined from the Liese zone, three flat-lying, parallel quartz veins that carry high-grade gold. The gold mineralization at the Liese zone

Photo 9. With overnight temperatures dipping to -40°F, Freegold Ventures Ltd. launched its 2012 drill program at Golden Summit in mid January. Grid power, cell phone service, and access by paved highway 25 miles north of Fairbanks all contribute to Freegold Ventures' ability to conduct winter drilling at this gold property. Photo provided by Shane Lasley.

ends abruptly where it comes in contact with a gold-barren body of diorite to the northeast. In March, Sumitomo Metal Mining announced the discovery of East Deep, a zone of mineralization beyond the diorite that shares many characteristics with the Liese zone. The Pogo geology team believes the Liese and East Deep zones were once a contiguous body of mineralization that became separated when the diorite split the two zones as it intruded along the Liese Creek fault about 95 million years ago, or about 12 million years after the zones were mineralized. In March, Sumitomo Metal Mining announced that the East Deep deposit contained approximately 1.28 million ounces of gold, and it is included in the Pogo Mine's resource and reserve estimates of 13.59 million tons averaging 0.366 ounce per ton (4.97 million ounces) gold. To accelerate the start of production from East Deep, Sumitomo Metal Mining completed access drives from the underground workings at Liese during 2012. The company also completed 67,770 feet of surface exploration drilling in 33 holes, focused primarily on East Deep, which Sumitomo Metal Mining reported to be open to the northeast, north, and west. Additionally, the company completed 6,650 feet of underground exploration drilling and 120,165 feet of underground definition drilling at the Pogo Mine.

Sumitomo Metal Mining and **Stone Boy Inc.** contracted Pathfinder Mineral Services to continue exploration on the Monte Cristo Creek portion of the Stone Boy gold project, approximately 37 miles west of the Pogo Mine. Sumitomo Metal Mining said 27 of 29 holes drilled from 2008 through 2010 have confirmed the presence of a gold–silver–antimony mineralized zone at Monte Cristo. Highlights from past drilling include: Hole DH-35 intersected 26 feet averaging 0.227 ounce per ton gold, 0.574 ounce per ton silver, and 0.1 percent antimony; DH-55 intercepted 4 feet averaging 0.851 ounce per ton gold, 0.939 ounce per ton silver, and 0.36 percent antimony; and second intercept in DH-55 cut 74.9 feet averaging 0.122 ounce per ton gold, 1.404 ounces per ton silver, and 0.17 percent antimony. No assay results were reported from the 28,700 feet of exploratory drilling completed in 2012.

Alix Resources Corp. completed 4,836 feet of drilling on its West Pogo–Money Rock project, 2 miles west of the Pogo Mine. The West Pogo portion of the project is under an exploration agreement with Corvus Gold Corp., in which Alix Resources can earn a 60 percent interest. Alix Resources acquired the Money Rock claims through an agreement signed in 2009 and added to this property through subsequent staking. Alix Resources reports that four holes drilled in 2012 tested a rock and soil gold anomaly that extends some 3,000 feet across both the West Pogo and Money Rock portions of the project. Three of these holes intersected 5.25 to 10.5 feet of mineralization exceeding 0.029 ounce per ton gold.

Contango ORE Inc.—an Alaska-focused mineral spinoff of Houston, Texas-based Contango Oil & Gas Co.—completed 42,646 feet of drilling in 56 holes at its Tetlin gold–copper project 16 miles southeast of the eastern Alaska crossroads town of Tok (photo 10). Contango contracted Avalon Development Corp. to design and execute the $6.2 million exploration program. The 675,000 acres of prospective ground known as the Tetlin property were leased by Contango from the Tetlin Village Council. The company staked approximately 50,000 additional acres of State of Alaska mining claims adjacent to the original Tetlin lease.

The Chief Danny prospect, a 9-square-mile region of the Tetlin lease that hosts five prospective gold–copper zones, was the target of 50 holes of the 2012 drill program. Contango ORE began this drilling at the Discovery zone before moving to the Peak zone, a geochemical–geophysical target some 1,650 feet to the northeast. TET1216, the Peak zone discovery hole, cut multiple zones of gold–copper–silver mineralization

from surface to 374 feet. Highlights from the hole include: 84.5 feet averaging 0.229 ounce per ton gold, 0.686 ounce per ton silver, and 0.05 percent copper from a depth of 65.5 feet; 22 feet averaging 0.102 ounce per ton gold, 0.461 ounce per ton silver, and 0.54 percent copper from a depth of 175 feet; 45 feet averaging 0.081 ounce per ton gold, 0.041 ounce per ton silver, and 0.05 percent copper from a depth of 212 feet; and 107 feet averaging 0.109 ounce per ton gold, 0.076 ounce per ton silver, and 0.11 percent copper from a depth of 267 feet.

The grades and thicknesses improved over the next two holes drilled into the Peak zone: TET1217 intercepted 161 feet averaging 0.328 ounce per ton gold, 0.631 ounce per ton silver, and 0.09 percent copper; and TET1218 intercepted 192 feet averaging 0.422 ounce per ton gold, 0.266 ounce per ton silver, and 0.24 percent copper. Particularly high-grade copper mineralization was encountered at the southeastern extent of the 2012 drilling at the Peak zone. TET1238 intercepted 120 feet averaging 0.009 ounce per ton gold, 2.091 ounces per ton silver, and 1.11 percent copper; and TET1260 intersected two copper enriched zones—107 feet averaging 0.002 ounce per ton gold, 0.838 ounce per ton silver, and 1.34 percent copper; and 194 feet averaging 0.001 ounce per ton gold, 0.257 ounce per ton silver, and 0.37 percent copper. The mineralization at Peak is schist hosted and has relatively high sulfide content. In addition to gold, copper and silver, cobalt sometimes is present in the assays. Like intrusive-related gold deposits found in the Tintina gold belt, the gold found at Peak zone has a strong correlation with bismuth. The deposit also demonstrates some similarities to porphyry copper deposits. The copper–gold mineralization at the Peak zone has a strong correlation with both a high magnetic and a high conductivity response. The 2012 drilling extended the strike of the gold–copper mineralization at the Peak zone to approximately 1,700 feet.

Photo 10. Contango ORE Inc.'s Tetlin project near Tok. Core in the picture was part of a 192-foot interval that returned 0.42 ounces of gold per ton, 0.27 ounces of silver per ton, and 0.243 percent copper in hole TET1218 in the Peak zone. Photo provided by Avalon Development Corp.

In addition to drilling, Contango ORE completed geologic mapping and geochemical sampling at the Chief Danny, Taixtsalda, and MM prospect areas of the Tetlin property, and other nearby targets.

Three companies were active with small lode exploration programs in the Fortymile mining district. **Millrock Resources Corp.** completed a minimal exploration program of soil sampling and geologic database compilation at its Fortymile gold property. Similarly, **Full Metal Minerals Ltd.** completed a minimal exploration program of soil sampling and geologic mapping at its Rolling Thunder project, a regional program seeking gold mineralization similar to the White Gold District in the Yukon Territory. **Full Metal Zinc Ltd.** conducted soil sampling, trenching, and mapping at its 40 Mile lead–zinc–silver project.

Placer gold exploration activities, including prospecting, sampling, trenching, drilling, and geophysical surveys, were reported by 387 individuals and companies, and work was performed in most mining districts across the region.

SOUTHCENTRAL REGION

Teck American Inc. and **Millrock Resources Inc.** conducted a $1.74 million exploration program at the Estelle property during 2012. Estelle, which consists of 135 square miles of State of Alaska mineral claims in the Kahiltna terrane about 110 miles northwest of Anchorage, is prospective for both intrusive-related gold and porphyry copper–gold mineralization. Oxide, the northernmost prospect at Estelle, includes three main known mineralized areas: Oxide North, Oxide Valley, and Oxide Ridge. Following up on a hole that encountered 1,512 feet averaging 0.011 ounce per ton gold during drilling completed by the partners in 2011, Teck and Millrock completed four additional holes at Oxide Valley during 2012. Hole SE12-04, drilled to the southeast of the 2011 discovery, intersected 136 feet averaging 0.033 ounce per ton gold. An induced polarization survey conducted at Oxide Valley during 2012 revealed a northwest–southeast-trending zone of high chargeability. The highest chargeability occurs southeast of drill hole SE12-004, providing a vector to possible higher grade mineralization to the southeast where mineralization is open both along strike and downdip. Millrock indicated that this area is the planned target for follow-up drilling at Oxide. The 2012 drill program also tested a geochemical anomaly at the RPM showing, about 15 miles south of Oxide. SE12-008, the discovery hole at RPM, averaged 0.060 ounce per ton gold over 72 feet in a 335-foot interval

averaging 0.030 ounce per ton gold. Hole SE12-007 drilled at West Wing, a prospect about midway between Oxide and RPM, intersected 23 feet averaging 0.029 ounce per ton gold. Copper values ranging from 0.10 to 0.46 percent are also present in the core. Since entering into an option agreement with Millrock in 2010, Teck has earned a 65 percent interest in Estelle by expending $3.6 million, and through dilution of Millrock's interest based on a loan agreement for its portion of exploration expenditures during 2012.

Millrock also targeted gold–copper mineralization with a small prospecting program at its Cristo property, a block of 56 State of Alaska mineral claims approximately 10 miles east of Estelle (photo 11).

Kiska Metals Corp. completed a $300,000 work program at its Whistler project, a block of 884 State of Alaska mining claims east of and adjacent to the Estelle property. This work included metallurgical, engineering, and environmental studies. Porphyry copper–gold mineralization is the primary target at Whistler. The Whistler deposit, toward the northern end of the 26-mile-long Whistler property, hosts an indicated resource of 87.3 million tons grading 0.015 ounce per ton gold, 0.058 ounce per ton silver, and 0.17 percent copper; and an inferred resource of 160.7 million tons grading 0.012 ounce per ton gold, 0.051 ounce per ton silver, and 0.15 percent copper. The 2012 metallurgical testing of composite samples from the Whistler deposit returned concentrates averaging 25.4 percent copper, with recoveries averaging 91.9 percent for copper and 70.4 percent for gold. Kiska Metals also compiled and reinterpreted geologic data for the Whistler Deposit. This work resulted in a revised model that is expected to be important for targeting future exploration drilling at the deposit.

Pure Nickel Inc. and **Itochu Corp.** completed a $4.2 million exploration program at the MAN Alaska nickel–copper–platinum-group-element project, approximately 250 miles northeast of Anchorage. This program, consisting of 7,326 feet of drilling and 30 line-miles of induced polarization surveys, has led to the discovery of platinum–palladium–gold–copper–nickel mineralization across a wide swath of the central portion of the 181.5-square-mile property. This zone, known as Eureka, is a subset of the 21-mile-long Alpha mafic–ultramafic complex that trends east–west across the central portion of the MAN project. The Eureka zone occurs as disseminated sulfide mineralization that straddles the contact between gabbroic and ultramafic rocks in the northern half of the Alpha complex. The zone was first recognized in 2010 drill holes PNI-10-35 and PNI-10-36. Hole 35 intersected 105 feet grading 0.005 ounce per ton platinum–palladium–gold, 0.1 percent copper, and 0.23 percent nickel. Hole 36 intersected 541 feet grading 0.008 ounce per ton platinum–palladium–gold, 0.13 percent copper, and 0.28 percent nickel. 2012 drill hole PNI-12-063 helped confirm the continuity of the mineralization with a 266-foot interval grading 0.009 ounce per ton platinum–palladium–gold, 0.06 percent copper, and 0.10 percent nickel. Pure Nickel reported that all previously drilled holes that intersected the Eureka zone stratigraphy en-

Photo 11. Millrock's Cristo property, with Hayes Glacier in the background. Photo provided by Millrock Resources Inc.

countered disseminated sulfide mineralization with similar grades. Widely spaced drilling encountered the Eureka zone along a strike length of 4.5 miles.

A $1 million exploration program carried out at **Corvus Gold Inc.'s** Chisna property during 2012 focused on surface prospecting and mapping of the Jolly Green target, where initial ridge and spur soil sampling conducted in late 2011 revealed a significant copper, gold, silver, molybdenum, and tungsten anomaly. During the 2012 exploration season, Corvus continued with surface prospecting and mapping (photo 12). High-grade, structurally controlled copper mineralization was found at the Jolly Green target and continues for 2,300 feet of strike in a north–northwest trend. Assay highlights from rock samples collected at Jolly Green include 3.69 ounces per ton gold, 3.76 ounces per ton silver, and 0.4 percent copper from H271989; 0.71 ounce per ton gold, 3.30 ounces per ton silver, and 0.8 percent copper from H262391; and 0.82 ounce per ton gold, 5.78 ounces per ton silver, and 5.1 percent copper from H262393. Corvus said West Green copper porphyry-style mineralization found to the west of Jolly Green will be a target of further exploration. Jolly Green and West Green are among several copper and gold prospects identified across the Chisna property, which consists of 1,106 State of Alaska claims and 65,900 acres of land leased from the Ahtna Corp.

Photo 12. Copper-oxide supergene halos around a shear at the Chisna property. Photo provided by Corvus Gold Inc.

approximately 230 miles northeast of Anchorage. Ocean Park Ventures Corp., which entered into an agreement during 2009 to earn a joint venture interest in Chisna, withdrew from the joint venture in September 2012.

Placer gold exploration was reported by 78 individuals or companies in the region, including prospecting, trenching, and sampling by pan, dredge, and small-scale sluice.

SOUTHWESTERN REGION

With a 2012 program of $107 million in expenditures, the Pebble copper–gold–molybdenum project continued as the largest exploration-stage project in Alaska. **The Pebble Partnership,** a 50–50 joint venture between Northern Dynasty Minerals Ltd. and Anglo American plc, reported that the objective of this work is to collect the necessary data to complete a project description and initiate permitting in 2013. The project description is expected to include details of the Pebble mine plan, a transportation corridor linking the deposit and Cook Inlet some 85 miles to the east, a deep-water port site at Cook Inlet, and power generation. Work at the porphyry copper project included geotechnical and exploration drilling; environmental studies focused on fish and marine resources, water quality, and groundwater hydrology; engineering analysis; and workforce and business development initiatives. During 2012, the Pebble Partnership completed 24,900 feet of core and 10,800 feet of reverse circulation drilling at the project. As a result of this program, more than 1 million feet of exploration and delineation drilling has been completed at the Pebble deposit, the culmination of 24 years of drilling by Cominco, Northern Dynasty Minerals, and the Pebble Limited Partnership. Between 1988 and 2012, a total of 1,065 core holes have been drilled at the porphyry copper deposit. According to the most recent calculation, completed in 2010, the Pebble porphyry deposit contains a global resource (measured, indicated, and inferred) of 80.6 billion pounds of copper, 107.4 million ounces of gold, and 5.6 billion pounds of molybdenum.

The Pebble Partnership also has an option agreement with Full Metals Minerals Ltd. to earn a 60 percent interest in the Pebble South property by spending $3 million on exploration over three years. The 85,750-acre Pebble South property borders the Pebble claims to the south and west. Geochemical and geophysical surveys have delineated 11 prospects at Pebble South.

Liberty Star Uranium & Metals Corp. contracted Anchorage-based MBGS LLC to carry out the 2012 exploration program at Big Chunk, a copper–gold–molybdenum project approximately 9 miles north of the Pebble deposit. MBGS reported an $890,000 exploration program at Big Chunk that included 1,700 feet of core drilling. In November, Liberty Star

signed a binding loan settlement agreement with Northern Dynasty Minerals that would close out a $4.6 million debt, including interest, that Liberty Star owed to Northern Dynasty. In exchange for the settlement, Liberty Star agreed to the transfer of 199 Alaska mining claims from the southern block of Big Chunk to a subsidiary of Northern Dynasty. Liberty Star, through its Alaska subsidiary Big Chunk Corp., retains 229 state mining claims in the south block of Big Chunk claims and all 184 state claims that make up the north block.

Millrock Resources Inc. drilled four holes at Humble, a porphyry copper–gold prospect approximately 85 miles west of the Pebble deposit. Originally known as Kemuk, the Humble project was first discovered as a result of an aeromagnetic survey flown for Humble Oil and Refining Company in 1959. Humble Oil completed 16 holes at this prospect. Core stored at the Geologic Materials Center in Eagle River, Alaska, provided Millrock geologists with an opportunity to see the mineralization encountered by Humble Oil. In 2010, a subsidiary of Kinross Gold Corp. entered into an option for a joint venture agreement with Millrock on the Humble project. Exploration under this agreement included property-wide geochemical and geophysical surveys. Millrock reported that the 2012 drill program intersected porphyry mineralization. Kinross dropped its option on the Humble project in December.

As part of a strategic alliance with **Vale Exploration USA Inc., Millrock** carried out extensive stream-sediment sampling, mapping, and prospecting in southwestern Alaska. Through the course of the program, known as the Q4P strategic alliance, Vale invested $1.4 million for research and reconnaissance exploration for porphyry copper–gold deposits. This work led to the discovery of five prospects. Of these five prospects, Vale selected Audn for additional work, triggering an option agreement on the porphyry copper–gold–molybdenum prospect approximately 55 miles southwest of the Pebble deposit. In May, Geotech Ltd. flew a ZTEM survey over the Audn property, resulting in multiple chargeability anomalies, which was followed by the collection of 1,750 soil samples over the geophysical anomalies. Vale terminated its option on the Audn property late in 2012.

Donlin Gold LLC, the operating company equally owned and supported by subsidiaries of NOVAGOLD Resources Inc. and Barrick Gold Corp., budgeted $33.6 million to advance the Donlin Gold intrusive-related project in the Kuskokwim region of southwestern Alaska. In August, Donlin Gold announced it had submitted a plan of operations and wetlands permit application to federal and state regulators, formally initiating the permitting process. Based on 33.9 million ounces of proven and probable gold reserves, a 59,000-ton-per-day mill at Donlin Gold is projected to recover an average of 1.1 million ounces of gold annually at a cash-cost of $585 per ounce during its initial 27-year mine life. By feeding the mill higher grade ore at the outset, the massive project is scheduled to produce 1.5 million ounces of gold annually at an average cash-cost of $409 per ounce during the initial five years of operation. This increased gold production during the onset of operations will help reduce the payback period for the estimated $6.7 billion in capital costs needed to build the mine. Donlin Gold's measured and indicated resource (inclusive of reserves) is 596 million tons averaging 0.064 ounce per ton (39 million ounces) gold. Additionally, the deposit contains an inferred resource of 101 million tons averaging 0.058 once per ton (6 million ounces) gold. It is expected to take about four years to complete the permitting process and, if the partners decide to move ahead with development, construction will take about as long.

TNR Gold Corp. completed a $1.5-million drill program seeking to expand an intrusion-related gold system at its Shotgun project, in the Kuskokwim region approximately 110 miles south of Donlin Gold. When TNR Gold optioned Shotgun from NOVAGOLD Resources in 2002 the property had a historical resource of 980,000 ounces of gold from a zone known as Shotgun Ridge. Hole 06-43, drilled at Shotgun Ridge in 2006, intersected 691 feet averaging 0.038 ounce per ton gold, including 90 feet grading 0.067 ounce per ton gold. TNR reported that this hole encountered feeder zones, opening the gold resource to depth. A geophysical orientation survey conducted in 2011 revealed previously unknown structures in the Shotgun Ridge deposit that are interpreted to correlate with geology and mineralization identified in drilling. A three-hole program carried out in 2012 targeted mineralization to depth along the southwest-dipping feeder zones identified in hole 06-43. SR12-56, drilled approximately 150 feet northwest of and parallel to hole 43, intersected 794 feet averaging 0.037 ounce per ton gold. Holes 12-57 and 12-58 were drilled approximately 100 feet west of 06-43. Hole 12-57 intersected 686 feet averaging 0.030 ounce per ton gold; hole 12-58 intersected 272 feet averaging 0.0246 ounce per ton gold. TNR reported that the geology, sulfide mineralization, and structural features encountered in the three holes are similar to that found in 06-43. TNR Gold also completed a three-dimensional induced polarization–resistivity survey at the property in 2012. Two grids were designed to extend the 2011 geophysical survey at Shotgun Ridge. A third grid was centered on a surface geochemical gold anomaly at the Winchester prospect, an intrusion-related system about 10 miles south of Shotgun Ridge.

Nyac Gold LLC tested its Saddle Mountain prospect with an 11,765-foot drill program (photo 13).The Nyac Gold property, composed of 50,775 acres of Native lands leased

from Calista Corp., is approximately 75 miles east of TNR Gold's Shotgun property. The Saddle Mountain prospect includes a 7.5-acre hydrothermal breccia pipe in Jurassic andesitic volcanics that is coincident with a roughly circular aeromagnetic anomaly. The 8,000-foot-diameter anomaly is interpreted to represent an underlying Cretaceous pluton. Surface quartz vein samples collected from the breccia pipe prior to 2012 have yielded up to 1.729 ounces per ton gold with anomalous silver and mercury values. In addition to seeking the lode source for the estimated 700,000 ounces of alluvial gold historically produced in the Nyac valley, Nyac Gold LLC also operates a placer mine on the property. The company actively mined Shamrock Creek during 2012 but did not report any exploration at the placer operation.

Calista Corp. reported a small exploration program on Native lands in the Nyac area during 2012.

Freegold Ventures Ltd. conducted a $1.6 million exploration program at Vinasale, an intrusive-related gold project at the northern end of the Kuskokwim region, approximately 16 miles south of the community of McGrath. During the exploration season, Freegold completed 13 core drill holes for a total of 11,238 feet. According to a resource estimate published in March, the Central zone at Vinasale has an inferred resource of 54.3 million tons averaging 0.032 ounce per ton (1.74 million ounces) gold. Highlights of six holes drilled in the Central zone during 2012 include: VM1208 intersected 111 feet averaging 0.032 ounce per ton gold; VM1210 intersected 96 feet averaging 0.048 ounce per ton gold; and VM1213 intersected 280 feet averaging 0.044 ounce per ton gold. Five holes targeting geochemical and geophysical targets at the Northeast zone, about 4,000 feet northeast of the Central zone, encountered lower grade gold mineralization. The remaining two holes tested an area midway between the Central and Northeast zones. The 2012 program also included reconnaissance-level rock and soil geochemistry in the Central zone, Northeast zone, and outlying areas.

WestMountain Gold Inc. completed a $3 million exploration program at the Terra gold project in 2012. The company optioned the property from Corvus Gold Inc. in 2010. At the time, an inferred resource of 472,000 tons averaging 0.356 ounce per ton (168,000 ounces) gold and 0.675 ounce per ton (318,000 ounces) silver had been calculated for the Ben Vein at Terra. With the goal of expanding this resource, WestMountain completed 3,781 feet of drilling with four holes during 2012. This drilling, combined with a similar program conducted in 2011, has extended the strike length of the Ben Vein by 650 feet and intersected high-grade intervals that correlate with projected strikes and dips of parallel high-grade veins. The company interpreted the drill-tested portion of Ben Vein to be open to the north and at depth. An updated resource that incorporates the 2011 and 2012 drilling will be completed in 2013. WestMountain Gold's 2012 program at Terra also set up and tested a two-ton-per-day mill and gravity recovery system to bulk sample vein material from the project. After completing the setup of this pilot plant, WestMountain fed 25 tons of material through the mill at the end of the 2012 field season. This sample of two vein systems, Ben and Fish Creek, produced 75 ounces of gold and 23 ounces of silver. With a head grade of roughly 5 ounces of gold per ton and 9 ounces of silver per ton, the gravity circuit recovered about 60 percent of the gold and less than 15 percent of the silver contained in the test material. Upgrades to the mill are expected to improve the rate of recovery. WestMountain anticipates the completion of a scoping study on underground mining at Terra to be completed in 2013. WestMountain also completed surface sampling and mapping at Camp Creek, a bulk-tonnage gold prospect roughly a mile southeast of Ben Vein. A traverse of soil samples taken at 98-foot spacing returned values averaging 401 parts per billion gold with a high of 3,190 parts per billion gold over a 1,500-foot-long surface exposure. Rock samples collected from the Camp Creek area contained elevated lead, molybdenum, and bismuth values.

Photo 13. Drilling on Nyac Gold's Saddle Mountain property, leased from Calista Corp. Photo provided by Nyac Gold LLC.

Nineteen individuals or companies reported limited placer gold exploration work in the southwestern region, including prospecting and pan and trench sampling.

SOUTHEASTERN REGION

At its Kensington gold mine, **Coeur d'Alene Mines Corp.** (Coeur Mining Inc.) completed 143,796 feet of core drilling primarily devoted to in-fill drilling of Block K and the Raven veins. The Kensington deposit consists of multiple, gold-bearing mesothermal, quartz, carbonate, and pyrite veins and discrete quartz-pyrite veins hosted in Cretaceous diorite. Native gold in quartz veins is associated with pyrite and various gold–telluride minerals. To improve its understanding of the Kensington deposit, Coeur invested $3.9 million in its definition drilling program in 2012. Drilling at the Raven vein, approximately 2,000 feet from the main underground workings at Kensington, identified 151,000 tons with initial proven and probable reserves of 50,400 ounces of gold. The average of 0.33 ounce per ton gold is approximately 51 percent higher than the overall average reserve grade at Kensington. Another $4.1 million was spent on drilling outlying exploration targets such as Kensington South, the Ann Trend, Elmira, and the historical Jualin mine on the Kensington and adjacent Jualin properties. Assay results from drilling at the Kensington South zone demonstrate the potential for Kensington-style mineralization from this large, underexplored zone to the south of the main Kensington deposit. A helicopter-borne aeromagnetic survey was conducted to help identify future drill targets. At the end of 2012, Kensington's proven and probable reserves totaled 1.0 million ounces of gold, compared with 1.3 million ounces in 2011. Additional measured and indicated resources totaled 526,000 ounces of gold and inferred resources totaled 172,000 ounces of gold.

Hecla Mining Co. completed a $5.74 million exploration program at Greens Creek during 2012, which resulted in the extension of mineralization at the Southwest Bench, Gallagher, 200 South, 5250, and 9a zones. Much of the focus of drilling at Greens Creek during the second half of 2012 was on 200 South, where in-fill drilling has confirmed and extended a baritic ore-bearing upper limb that averages 25 feet thick and a lower limb of massive base metal and baritic ore that averages 18 feet thick. Intercept highlights include 50 feet grading 35.9 ounces per ton silver, 0.08 ounce per ton gold, 11.2 percent zinc, and 4.9 percent lead; 19 feet grading 65.8 ounces per ton silver, 0.49 ounce per ton gold, 7 percent zinc, and 3.5 percent lead; and 39 feet grading 29.7 ounces per ton silver, 0.18 ounce per ton gold, 9.1 percent zinc, and 3.5 percent lead. The drill-intersected massive base metal and white baritic ore is expected to extend 200 South some 200 feet to the south. Additional surface drilling at the Southwest Bench intersected mineralization; highlights include 73 feet grading 17.6 ounces per ton silver, 0.17 ounce per ton gold, 5.3 percent zinc, and 18.4 percent lead; 55 feet averaging 18.7 ounces per ton silver, 0.23 ounce per ton gold, 10.7 percent zinc, and 26.8 percent lead; and 19.7 feet grading 54.9 ounces per ton silver, 0.1 ounce per ton gold, 8.9 percent zinc, and 20.5 percent lead. Drilling of the Gallagher, 5250, and 9a zones also encountered mineralization. Surface drilling at Killer Creek defined a 150-foot-wide zone of stockwork veins with intervals returning assay results of up to 1.5 ounces per ton silver and 5.4 percent copper. Killer Creek is anticipated to be the target of a surface drill program in 2013.

In April 2012, **Grande Portage Resources Ltd.** reported an inaugural resource for its Herbert Glacier project, a mesothermal, quartz–gold vein system about midway between the Kensington and Greens Creek mines. Based on 65 core holes and four trenches completed at Main and Deep Trench, an inferred resource of 1.73 million tons averaging 0.142 ounce per ton gold, a total of 245,145 ounces, was calculated for Herbert Glacier. In July, Grande Portage initiated a 28,888-foot infill drill program focused primarily on testing the strike extent of Deep Trench and Main as well as other parallel vein targets (photo 14). Highlights from initial drilling at Deep Trench include hole 12E-1, which intersected 11 feet averaging 0.519 ounce per ton gold; hole 12G-5, which intersected 18.8 feet averaging 0.593 ounce per ton gold; and hole 12G-3, which intersected 10.3 feet averaging 0.456 ounce per ton gold. Drilling at the eastern edge of the Deep Trench resource area encountered a new high-grade zone, where hole DDH 311A intersected 26.5 feet averaging 1.749 ounces per ton gold. Drilling has delineated the Deep Trench vein 1,300 feet, and the vein can be traced at surface over a strike length of 3,300 feet. DDH 12O-1, the first hole drilled at Main in 2012, intersected 0.404 ounce per ton gold over a 10.2 foot intercept. DDH 12O-1 is a 150-foot eastward step-out on Main, indicating the vein remains open in this direction. Grande Portage observed visible gold in a sheared quartz vein in 2012 drill core from the Goat Creek vein, which runs parallel to the north of the Main vein. Hole 12J-3, drilled at the Goat Creek vein, graded 2.318 ounces per ton gold over 6.7 feet. Seven holes drilled from a single pad at Goat Creek intersected gold mineralization. The Goat Creek vein can be traced on surface for approximately 3,200 feet.

Heatherdale Resources Ltd. completed a $5.2 million program at its Niblack copper–gold–zinc–silver project on Prince of Wales Island approximately 27 miles southwest of Ketchikan. This work included a 15,576 foot surface drill program focused on expanding the Trio deposit, one of six known volcanogenic massive sulfide zones at Niblack. According to the resource calculated late in 2011, the Lookout deposit

has an indicated resource of 6.22 million tons averaging 0.051 ounce per ton gold, 0.95 percent copper, 1.73 percent zinc, and 0.862 ounce per ton silver. Additionally, Lookout and the nearby Trio contain an inferred resource of 4.33 million tons averaging 0.039 ounce per ton gold, 0.81 percent copper, 1.29 percent zinc, and 0.587 ounce per ton silver. The 2012 helicopter-supported drill program was designed to delineate extensions to the defined resources identified at both the Trio and Lookout deposits. With the first set of holes encountering favorable geology and mineralization at Trio, Heatherdale focused the balance of the drilling on delineation and extension of the mineralization at this zone. Drilling indicates that the stratigraphy flattens to the south, providing the potential for continuing to extend the known edges of the Trio mineralization with surface drilling. In addition to drilling, Heatherdale began to investigate options for the mill and other mine infrastructure. Initial results indicate there will be both economic and logistical advantages to direct shipping material from an underground mine at Niblack to an offsite location for mill processing. Two of the three locations identified for a mill and tailings storage facility are industrial sites near Ketchikan. In August, Niblack entered into a memorandum of understanding with the Ketchikan Gateway Borough to study the suitability of the Gravina Island Industrial Complex as a potential site for the mill and tailings facility. With its location across a narrow passage from Ketchikan, the proposed Gravina Island mill site is accessible by regular ferry service to transport mill workers from the Southeast Alaska town to the site. In addition to the advantage of a local workforce, if the processing facilities were positioned at the industrial park, the lower cost hydroelectricity available there is expected to help offset some of the costs of transporting the ore.

Ucore Rare Metals Inc.'s 2012 program focused primarily on completing a preliminary economic assessment (PEA) for its Bokan Mountain/Dotson Ridge rare-earth-element (REE) project on Prince of Wales Island approximately 40 miles southwest of Ketchikan. A mine plan completed in April determined that blasthole stoping with a mining rate of 1,650 tons per day is the most appropriate method for the project. The most recent resource calculation for Dotson Ridge, published in 2011, estimates the deposit hosts an inferred resource of 5.8 million tons averaging 0.65 percent total rare-earth oxides. Some 40 percent of the rare earths in the resource are the higher value heavy rare-earth oxides. An important geologic characteristic of the Dotson deposit is that the REE mineralization is concentrated in a swarm of steeply dipping veins. The stark contrast between REE-enriched veins and barren rock allows for the use of an x-ray sorter to eliminate much of the barren material before it drops into the grinder. During 2012, Ucore continued the testing of an x-ray transmission sorter to reject non-REE-bearing material ahead of the mill. Results from three one-ton bulk samples show that 46 percent of the feed could be rejected as waste before entering the mill circuit, with 93 percent of rare-earth oxides retained in the materials reporting to the mill. A larger size sorter, using a 20-ton bulk sample extracted from three sites at Bokan Mountain in June, has affirmed and slightly improved the results. With this reduction in mill feed, Ucore reported that all tailings can be stored underground, leaving no tailings on surface at the time of mine closure. Ucore's 2012 work also included the testing of an innovative process that uses nanotechnology to separate the REEs at Bokan Mountain. This process, known as solid phase extraction, has successfully separated high-purity individual rare-earth oxides.

In October, the United States Department of Defense contracted with Ucore to further this metallurgical work at Bokan. This program is focused on the possibility of Bokan as a source of critical heavy rare earths for the Department of Defense. A completed PEA, released by Ucore in November, estimates it will cost $221 million to develop the mine at Bokan

Photo 14. Drilling at the Herbert Glacier quartz–gold vein system. Photo provided by Grande Portage Resources Ltd.

Mountain. In addition to building the typical infrastructure and facilities needed to produce a concentrate, the upfront capital expenditure includes funds to build a solid-phase-extraction separation plant capable of producing market-ready rare-earth oxides and a contingency of $25 million. The mill and state-of-the-art processing facility are anticipated to recover 81.6 percent of the rare earths, averaging 2,480 tons of rare-earth oxides per year during the first five years of full production, including an annual output of 105 tons of dysprosium oxide, 15 tons of terbium oxide, and 568 tons of yttrium oxide.

Pure Nickel Inc. completed 5,764 feet of drilling at its Salt Chuck project, on Prince of Wales Island approximately 45 miles northwest of Ketchikan. The historical Salt Chuck Mine produced some 30,700 tons of ore, reported by U.S. government summaries (1948) to average 0.95 percent copper, 0.057 ounce per ton palladium, 0.033 ounce per ton gold, and 0.154 ounce per ton silver. The mine was the largest producer of palladium in the USA during its era of production.

Pure Nickel's 2012 drill program focused on previously untested soil and induced polarization anomalies in the North Pole Hill area of the property, approximately a mile northwest of the historical mine. Although the soil anomaly indicated a palladium target at North Pole Hill, the six holes drilled there in 2012 encountered high-grade gold mineralization in a previously unidentified structure. NPH-12-04, the gold discovery hole, intersected 8.5 feet grading 0.850 ounce per ton gold, 0.412 ounce per ton silver, and 0.79 percent copper, including 1.1 feet averaging 3.732 ounces per ton gold, 1.682 ounces per ton silver, and 2.78 percent copper. NPH-12-09, drilled 1,800 feet southwest of the discovery hole, intersected 18 feet averaging 0.035 ounce per ton gold. The geochemical and geophysical anomaly tested in 2012 extends almost 5,000 feet along strike to the east and west, and a second gold-in-soil anomaly splays southward and continues an additional 5,600 feet. The induced polarization anomalies extend to the limits of the geophysical surveys. In addition to gold–copper mineralization, broad zones of anomalous palladium concentrations were encountered at greater depths in the westernmost drill holes. NPH-12-02 intersected 164 feet averaging 0.004 ounce per ton palladium, and NPH12-04 intersected 143 feet averaging 0.003 ounce per ton palladium.

In February, Gulfside Minerals Ltd. entered into an option agreement with Pacific Rim Mineral LLC to acquire up to a 100 percent interest in the Port Snettisham iron property, about 30 miles southeast of Juneau. Changing its name to **Arrowstar Resources Ltd.** in March, the company initiated a $350,000 program that included reconnaissance of the historical data, collecting and analyzing beach and iron sand samples, collecting and analyzing rock chip samples, a ground-based magnetic study, and mineralogy and petrology studies to analyze the presence of the titanium and vanadium mineralization in the magnetite. An initial review identified three high-magnetic signature areas over a 3,300 foot distance, with the largest area having a magnetic signature greater than 78,000 nanoTeslas (nT) over an area about 2,500 feet square. A significant magnetite outcrop near the shore measured 71,500 nT. Arrowstar has identified five drill-hole targets on this large high-magnetic anomaly in addition to two targets close to the shore.

Constantine Metal Resources Ltd. completed a minimal program of maintenance, geologic work, and technical consulting at its Palmer volcanogenic massive sulfide project, about 35 miles northwest of Haines.

Nineteen individuals or companies reported limited placer gold exploration, including prospecting, trenching, bulk sampling, and data compilation.

ALASKA PENINSULA REGION

Full Metal Minerals Ltd. and **Antofagasta Minerals S.A.** completed 11,250 feet of drilling in 13 holes at the Pyramid copper–gold–molybdenum project (photo 15). The 2012 program is the third drilling season funded by Antofagasta Minerals, which has earned the Chile-based mining company 51 percent interest in the project. Under a leached cap up to 300 feet thick, Pyramid hosts a supergene-enriched blanket that extends to depths of up to 750 feet and is dominated by chalcocite and local covellite mineralization. Hypogene mineralization underlies this blanket in most areas. Drilling expanded the known extent of the near-surface supergene copper mineralization blanket approximately 1,150 feet to the west and northwest. PY12-023, the westernmost hole completed on the property, intersected primarily supergene copper mineralization from 33 feet to the end of the hole at 928 feet. It returned 895 feet averaging 0.27 percent copper, 0.001 ounce per ton gold, and 0.001 percent molybdenum. Several hydrothermal centers have been identified in oval-shaped phyllic and potassic alteration zones mapped over an area 7,550 feet by 4,600 feet. Hole PY12-027, about 5,750 feet east of PY12-023, returned 157 feet averaging 0.32 percent copper, 0.002 ounce per ton gold, and 0.02 percent molybdenum. Hole PY12-018, in the potassic center of Pyramid, intersected 1,128 feet grading 0.11 percent copper, 0.001 ounce per ton gold, and 0.036 percent molybdenum. Hole PY12-019, about 1,000 feet southeast of PY12-018, intersected a high-grade zone averaging 1.01 percent copper, 0.005 ounce per ton gold, and 0.009 percent molybdenum over 138 feet. This zone occurs in a 230-foot interval averaging 0.7 percent copper, 0.004 ounce per ton gold, and 0.008 percent molybdenum. Coupled with work from 2010 and 2011, the 2012 drilling at Pyramid helped span an area approximately 5,900 feet east–west and

3,450 feet north–south. Ground magnetic and geological mapping surveys were also completed at Pyramid during 2012.

Pyramid is but one prospect on 1.4 million acres of Native-corporation-owned lands covered under an exploration agreement between Full Metal and Aleut Corp. The Unga–Popov property, an epithermal gold project in the Shumagin Islands about 25 miles south of Pyramid, is another. This property includes two historical resources: Apollo, with 308,000 tons averaging 0.809 ounce per ton gold and 2.792 ounces per ton silver; and Centennial, which has some 6.6 million tons grading 0.044 ounce per ton gold. **Redstar Gold Corp.** can earn a 60 percent interest in Unga–Popov by completing $5 million of exploration by August 2015. Redstar completed a minimal geologic program at Unga–Popov property during 2012.

Photo 15. Looking south over the Pyramid copper–gold–molybdenum project on the Alaska Peninsula. Full Metal Minerals Ltd. and Antofagasta Minerals S.A. completed 11,250 feet of drilling in 13 holes at the Pyramid project in 2012. Photo provided by Full Metal Minerals Ltd.

DEVELOPMENT

The development sector of the mining process, as used in this report, refers to building infrastructure or activities that facilitate production of mineral products. Development expenditures refer to actual expenditures at mines as well as sustaining capital. Sustaining capital includes equipment replacement and rebuilding, facility upgrades, and other expenditures that must be amortized or depreciated in accordance with tax laws.

Reported and estimated development expenditures in 2012 were approximately $342.4 million. A total of 51 projects reported development expenditures for 2012. Significant development expenditures were noted at Fort Knox Mine, Greens Creek Mine, Pogo Mine, Kensington Mine, Red Dog Mine, and Nixon Fork Mine. Based on expenditures, Fort Knox Mine was the largest mineral development project in Alaska in 2012. Ongoing capital maintenance and development expenditures continued at Fort Knox, Greens Creek, Pogo, Kensington, Red Dog, and Usibelli mines (photo 16). The Chuitna coal project continued the permitting process. Placer mines and sand and gravel operations also reported development expenditures. Development employment in 2012 is estimated at 535 full-time-equivalent employees.

Table 11 shows development investment and regional employment; figure 12 graphically portrays 2012 development expenditures by region. Table 12 compares investment by commodity in 2012 with that of the previous 30 years. Figure 13 shows the locations of selected development projects. Development activity was reported in every region except the Alaska Peninsula in 2012. Figure 14 graphs mineral development expenditures by commodity, from 1982 through 2012.

NORTHERN REGION

Total development expenditures in the region in 2012 amounted to nearly $39.6 million, reported by four projects—Teck Cominco at Red Dog Mine plus three placer projects. Total full-time-equivalent employment associated with these expenditures for 2012 was not provided by companies and is estimated at 47 full-time-equivalent positions.

Red Dog Mine

Teck reported capital expenditures of approximately $35.2 million in 2012.

WESTERN REGION

Development expenditures were reported for lode and placer projects in the western region. Fourteen projects reported expenditures amounting to more than $36.6 million in 2012. Total 2012 employment associated with these expenditures was 107 full-time-equivalent employees.

Nixon Fork Mine

The Nixon Fork Mine, an underground gold and copper mine 30 miles northeast of McGrath, is owned by **Fire River Gold Corp.** The project reported significant development expenditures in 2012.

Photo 16. Coal seams #3 and #4 are exposed in this spectacular natural outcropping of coal-bearing rocks north of Hoseanna Creek at Usibelli Coal Mine Inc. near Healy, Alaska. Photo by Chris Arend, provided courtesy of Usibelli Coal Mine.

EASTERN INTERIOR REGION

Total construction and other capital expenditures credited to the eastern interior region in 2012 amounted to $161.8 million (exclusive of coal expenditures; photo 17). Coal expenditures shown as withheld are reflected in the total statewide expenditures.

The eastern interior region showed the highest regional development spending in 2012, with 20 projects reporting development activity. Eastern interior mine development projects included lode gold, placer gold, coal and rock, sand, and gravel projects. Estimated employment allocated to development in the region in 2012 amounted to 224 full-time-equivalent positions.

Table 11. Reported mineral development expenditures and employment in Alaska by commodity and region, 2012.

	Northern	Western	Eastern Interior	South-central	South-western	South-eastern	Alaska Peninsula	Total
Development Expenditures								
Base metals	$35,234,500	$ --	$ --	$ --	$ --	$ --	$ --	$ 35,234,500
Polymetallic	--	--	--	--	--	62,184,000	--	62,184,000
Precious metals								
Placer[a]	4,358,000	347,510	965,935	902,800	--	--	--	6,574,245
Lode	--	36,299,161	155,775,000	--	--	36,994,000	--	229,068,161
Coal and peat	--	--	W	W	--	--	--	0
Industrial minerals	--	--	--	5,050,870	40,000	50,000	--	5,140,870
Other	--	--	--	--	--	150,000	--	150,000
TOTAL	**$39,592,500**	**$36,646,671**	**$161,791,805**	**$942,800**	**$50,000**	**$99,328,000**	**$ --**	**$338,351,776**
Development Employment								
Employment								
Workdays	12,243	27,711	58,342	3,345	15	37,366	0	138,992
Workyears[b]	47	107	224	13	0	144	0	535
Number of companies reporting[c]	4	14	20	9	1	3	0	51

[a]Some companies reported development work but did not report an amount for the expenditure; these companies are listed as reporting, but the amounts spent are unknown and are not included in the development expenditures total.
[b]Based on 260-day work year. Total based on non-rounded numbers. Full-time-equivalent employees per year.
[c]Some companies are active in more than one area/commodity.
- - = No expenditures reported.
W = withheld. Data included in state total.

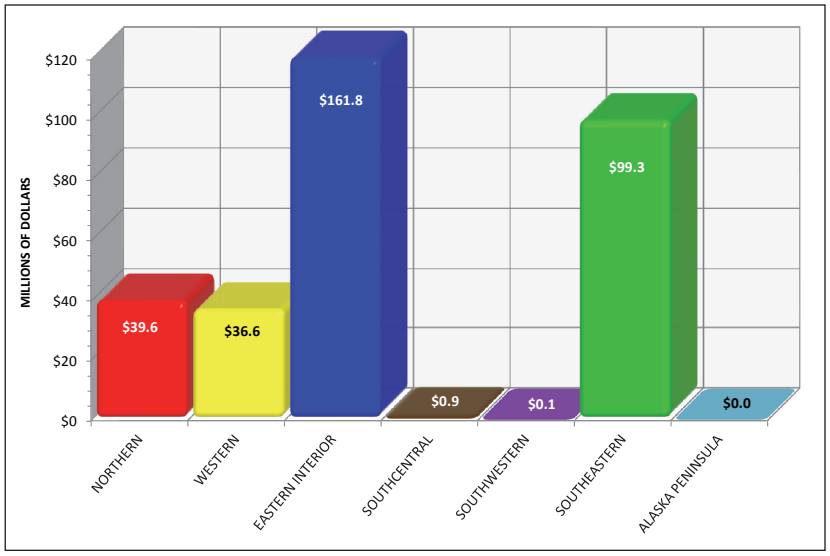
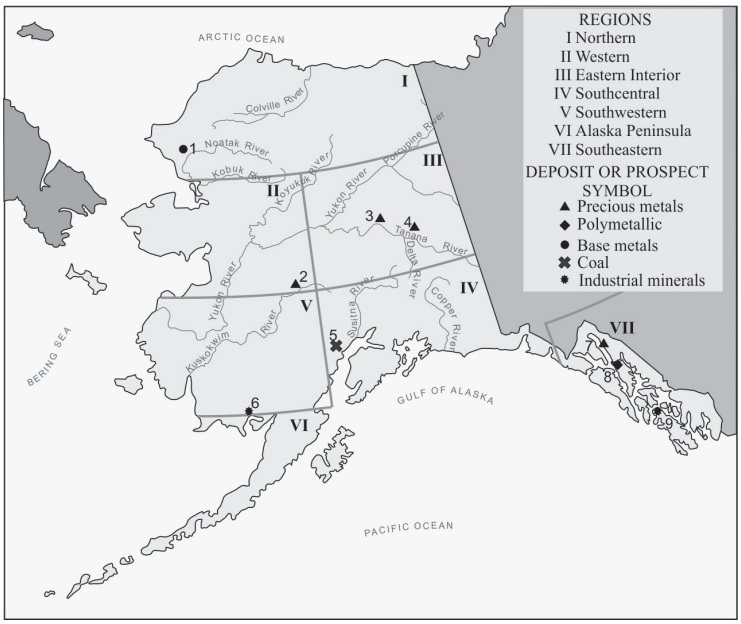


Figure 12. Development expenditures in Alaska by region, 2012.

Table 12. Reported mineral development expenditures in Alaska by commodity, 1982–2012.

Year	Base metals	Polymetallics	Precious metals	Gem-stones[a]	Industrial minerals	Coal and peat	Total
1982	10,270,000	N/A	19,320,000		4,251,000	7,750,000	41,591,000
1983	19,500,000	N/A	7,112,500		1,000,000	250,000	27,862,500
1984	10,710,500	N/A	15,058,555		579,000	27,000,000	53,348,055
1985	13,000,000	N/A	16,890,755		1,830,000	2,400,000	34,120,755
1986	3,260,800	8,000,000	12,417,172		124,000	530,000	24,331,972
1987	38,080,000	48,000,000	13,640,848		188,000	342,000	100,250,848
1988	165,500,000	69,000,000	40,445,400		- -	- -	274,945,400
1989	118,200,000	411,000	6,465,350		7,000,000	2,196,000	134,272,350
1990	- -	4,101,000	7,136,500		30,000	3,079,000	14,346,500
1991	- -	8,000,000	14,994,350		262,000	2,318,000	25,574,350
1992	80,000	4,300,000	23,151,300		404,000	1,655,000	29,590,300
1993	- -	10,731,136	15,103,000		433,500	1,400,000	27,667,636
1994	10,000,000	5,000,000	27,392,850		5,000	2,545,000	44,942,850
1995	11,200,000	9,590,000	127,165,750		426,000	200,000	148,581,750
1996	60,000,000	60,100,000	273,042,000		495,000	400,000	394,037,000
1997	133,880,000	7,300,000	26,299,000		500,000	410,000	168,389,000
1998	28,000,000	5,600,000	15,602,000		5,355,000	850,000	55,407,000
1999	12,500,000	2,500,000	15,864,000		400,000	2,575,000	33,839,000
2000	100,000,000	16,400,000	24,699,000		611,000	- -	141,710,000
2001	43,800,000	3,300,000	32,719,000		300,000	1,040,000	81,159,000
2002	- -	5,700,000	26,655,000		250,000	1,450,000	34,055,000
2003	- -	- -	38,839,332		315,000	- -	39,154,332
2004	17,700,000	6,215,000	177,440,081		4,991,434	2,760,000	209,106,515
2005	28,000,000	16,700,000	301,011,469		856,500	1,350,000	347,917,969
2006	31,200,000	26,183,280	420,759,203		1,566,000	15,985,000	495,693,483
2007	41,374,880	30,766,902	239,931,040		1,320,500	5,385,000	318,778,322
2008	45,000,000	24,000,000	319,702,594		205,113	7,260,000	396,167,707
2009[a]	29,000,000	17,500,000	277,020,142	225,250	270,000	6,800,000	330,815,392
2010	42,000,000	16,300,000	225,793,300	200,000	- -	9,000,000	293,293,300
2011	48,590,865	41,657,000	170,931,851	250,000	902,480	9,560,000	271,892,196
2012	35,234,500	62,184,000	235,642,406	- -	5,290,870	4,021,544	342,373,320
TOTAL	**$ 1,096,081,545**	**$509,539,318**	**$ 3,168,245,748**	**$ 675,250**	**$40,161,397**	**$120,511,544**	**$4,935,214,802**

[a]Gemstone development category added in 2009.
N/A = Figures not available prior to 1986
- - Not reported



I Northern Region

1. Red Dog Mine—Teck Alaska Inc.

II Western Region

2. Nixon Fork Mine—Fire River Gold Corp.

III Eastern Interior Region

3. Fort Knox Mine—Fairbanks Gold Mining Inc./ Kinross Gold Inc.
4. Pogo Mine—Sumitomo Metal Mining Pogo LLC

IV Southcentral Region

5. Chuitna Coal Project—PacRim Coal LP

V Southwestern Region

6. Industrial minerals

VI Alaska Peninsula Region

No development reported

VII Southeastern Region

7. Kensington—Coeur Alaska Inc.
8. Greens Creek Mine—Hecla Mining Co.
9. Calder Limestone—Columbia River Carbonates

Figure 13. Selected development projects, 2012.

Fort Knox Mine

Fort Knox Mine near Fairbanks is owned and operated by **Fairbanks Gold Mining Inc.,** a wholly owned subsidiary of Kinross Gold Corp. Fort Knox Mine includes the main Fort Knox open-pit gold mine, the mill and tailings storage facility, and the Walter Creek Valley Fill Heap Leach Facility. The True North open-pit mine is currently being reclaimed.

Capital expenditures at Fort Knox Mine were approximately $114.7 million in 2012.

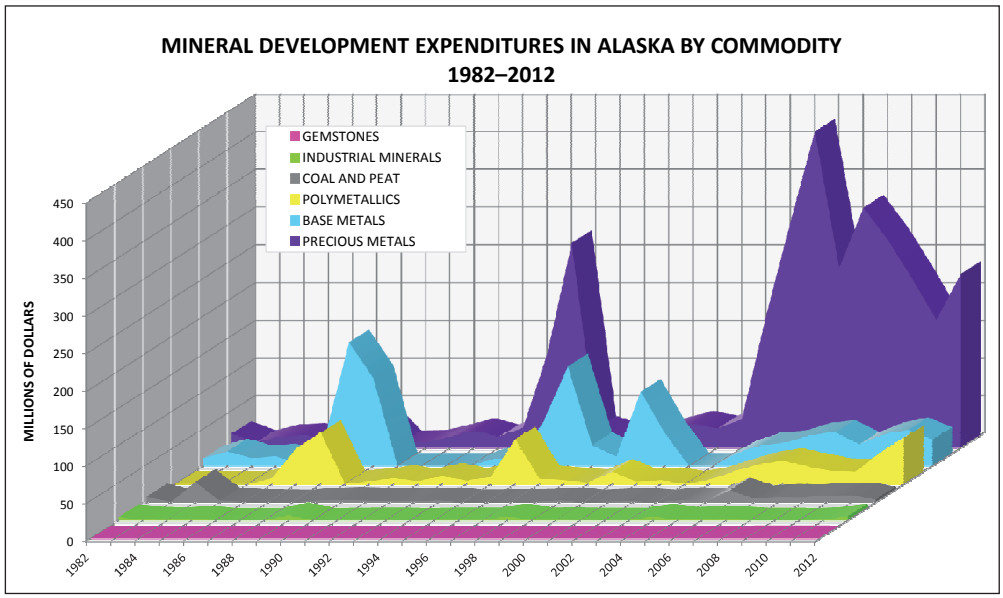


Figure 14. Mineral development expenditures in Alaska by commodity, 1982–2012.

Pogo Mine

Sumitomo Metal Mining Pogo LLC (SMM Pogo) operates the Pogo Mine on behalf of owners Sumitomo Metal Mining Co. Ltd. (85 percent) and Sumitomo Corp. (15 percent). Development activity remained high at the underground Pogo Mine north of Delta Junction in 2012.

SOUTHCENTRAL REGION

Development expenditures totaling $942,800 (exclusive of coal expenditures) were reported for nine projects in 2012. Coal expenditures shown as withheld are reflected in the total statewide expenditures. Estimated development employment in the southcentral region was 13 full-time-equivalent positions in 2012.

Photo 17. Usibelli Coal Mine Inc. continues to develop a road into the Jumbo Dome Mine area, which will provide ultra-low-sulfur subbituminous coal to its customers during the next two decades. Photo provided courtesy of Usibelli Coal Mine.

Chuitna Coal Project

PacRim Coal LP continued environmental, permitting, and engineering work on the Chuitna Coal project west of Anchorage on the north side of Cook Inlet (photo 18).

SOUTHWESTERN REGION

One industrial minerals project reported development expenditures of $50,000 in 2012.

ALASKA PENINSULA REGION

No development activity was reported by this region in 2012.

Photo 18. Chuitna Coal project. Photo provided by Dan Graham, PacRim Coal LP.

SOUTHEASTERN REGION

In the southeastern region, one polymetallic, one lode gold, and one industrial minerals project reported a total of $99.3 million in development expenditures in 2012.

Greens Creek Mine

Greens Creek Mine, an underground silver, zinc, lead, and gold mine on Admiralty Island near Juneau, is owned by **Hecla Greens Creek Mining Co.,** a wholly owned subsidiary of Hecla Mining Co. Hecla reported 2012 capital expenditures of $62.2 million at Greens Creek. Hecla reported that its investment in Greens Creek in 2012 was the largest capital investment in the company's history.

Kensington Mine

Kensington Mine is owned and operated by **Coeur Alaska Inc.** (Coeur), a wholly owned subsidiary of Coeur d'Alene Mines Inc. The mine is near Berners Bay and Lynn Canal, to the north of Juneau. Capital expenditures at Kensington in 2012 were $37.0 million (photo 19).

Photo 19. Concrete silo in the underground paste plant at Kensington Mine. Photo provided by Coeur Alaska Inc.

PRODUCTION

The total value of mineral production in Alaska during 2012 is estimated at $3.44 billion, slightly below the 2011 estimated value of $3.51 billion. The 2012 estimate represents a decrease in value of approximately $71.6 million or 2 percent from the 2011 estimate. Figure 15 shows the selected production projects for 2012. Note that the industrial minerals and peat sectors reflect severe reporting shortfalls. Several major rock, sand, and gravel producers declined to contribute their production numbers, which are consequently not included, and estimates are assumed to be lower than actual production totals. Metals (gold, silver, copper, lead, and zinc) account for $3,295.52 million (almost 96 percent of the total); coal and peat for $72.48 million (2.1 percent of the total); and industrial minerals for $68.07 million (2.0 percent of the total). No reports were received for gemstone production in 2012. Table 13 shows the estimated mineral production and its associated value for 2010–2012.

Allocation of value of production for 2012 by commodity is shown in figure 16. Gold leads at 44.75 percent of the total followed by zinc at 33.16 percent, silver at 11.16 percent, lead

I Northern Region

1. Red Dog Mine area—Teck Alaska Inc.—zinc, lead, silver (germanium, indium, cadmium)
2. Placer gold mines—various operators—gold
3. Prudhoe Bay and Kuparuk pits—various operators—sand and gravel

II Western Region

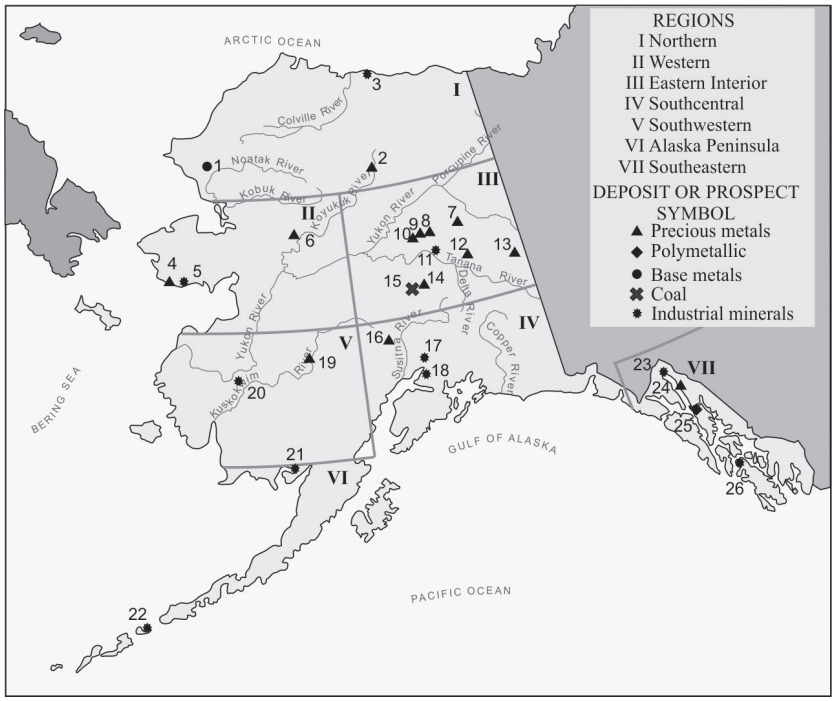
4. Nome placer gold mines—various operators—gold, sand, and gravel
5. Industrial minerals—various operators—rock
6. Placer gold mines—various operators—gold

III Eastern Interior Region

7. Placer gold mines—various operators—gold
8. Fort Knox Mine—Fairbanks Gold Mining Inc.—gold
9. Fairbanks district—Earthmovers of Fairbanks Inc.—gold
10. Fairbanks district—Polar Mining Inc.—gold, silver, screened aggregate
11. Brown's Hill Quarry—Brice Inc.—rock and aggregate
12. Pogo Mine—Sumitomo Metal Mining Pogo LLC—gold
13. Placer gold mines—various operators—gold
14. Placer gold mines—various operators—gold
15. Usibelli Coal Mine—Usibelli Coal Mine Inc.—coal

IV Southcentral Region

16. Placer gold mines—various operators—gold
17. Palmer/Wasilla—various operators—sand and gravel
18. Industrial minerals—various operators—rock



V Southwestern Region

19. Placer gold mines—various operators—gold
20. Yukon/Kuskokwim region—various operators—sand and gravel

VI Alaska Peninsula Region

21. Dillingham—Knik Construction Inc.—rock
22. Akutan Airport—Kiewit Pacific Co.—rock

VII Southeastern Region

23. Industrial minerals—various operators—rock, sand, and gravel
24. Kensington—Coeur Alaska Inc.—gold
25. Greens Creek Mine—Hecla Mining Co.—silver, gold, lead, zinc
26. Columbia River Carbonates—Calder Limestone—rock

Figure 15. Selected production projects, 2012.

Table 13. Estimated mineral production in Alaska, 2010–2012.[a]

	Production Quantities			Estimated Values[b]		
	2010	2011	2012	2010	2011	2012
Metals						
Gold (ounces)[c]	914,462	848,945	921,240	$ 1,119,785,870	$ 1,334,134,078	$ 1,537,530,843
Silver (ounces)	13,991,297	11,683,967	12,313,877	282,523,457	410,340,935	383,573,574
Copper (tons)[d]	--	0.53	7.20	--	4,221	51,675
Lead (tons)	146,480	113,649	126,234	284,171,225	247,755,147	234,795,240
Zinc (tons)	667,539	696,793	647,481	1,312,390,330	1,379,649,213	1,139,566,560
Platinum (ounces)	--	5,000	--	--	8,609,300	--
Subtotal				**$2,998,870,882**	**$3,380,492,894**	**$3,295,517,893**
Gemstones and semi-precious stones						
Gemstones and semi-precious stones					$ 2,303,950	$ 3,200,000
Subtotal					**$ 2,303,950**	**$ 3,200,000**
Industrial Minerals						
Sand and gravel (million tons)	7.0	5.9	7.8	$ 47,988,416	$ 38,703,040	$ 52,309,962
Rock (million tons)	0.3	0.5	1.1	4,312,785	6,368,290	15,761,430
Subtotal				**$ 52,301,201**	**$ 45,071,330**	**$ 68,071,392**
Coal and Peat						
Coal (tons)[e]	2,061,000	2,220,000	2,018,759	$ 73,307,757	$ 78,905,674	$ 72,483,355
Peat (cubic yards)[e]	78,184	80,378	121,786			
Subtotal				**$ 73,307,757**	**$ 78,905,674**	**$ 72,483,355**
TOTAL				**$3,126,783,790**	**$ 3,507,669,898**	**$3,436,072,640**

[a]Production data from DGGS questionnaire, phone interviews with mine and quarry operators, DOT&PF, and municipalities, regional corporations, and federal land management agencies.
[b]Values for selected metal production were based on average prices for each year (unless other values were provided by the operator).
[c]2012 lode production was 821,199 ounces; placer production was estimated 100,041 ounces.
[d]No copper production in Alaska in 2010.
[e]Coal and peat production values are combined in 2010, 2011, and 2012.

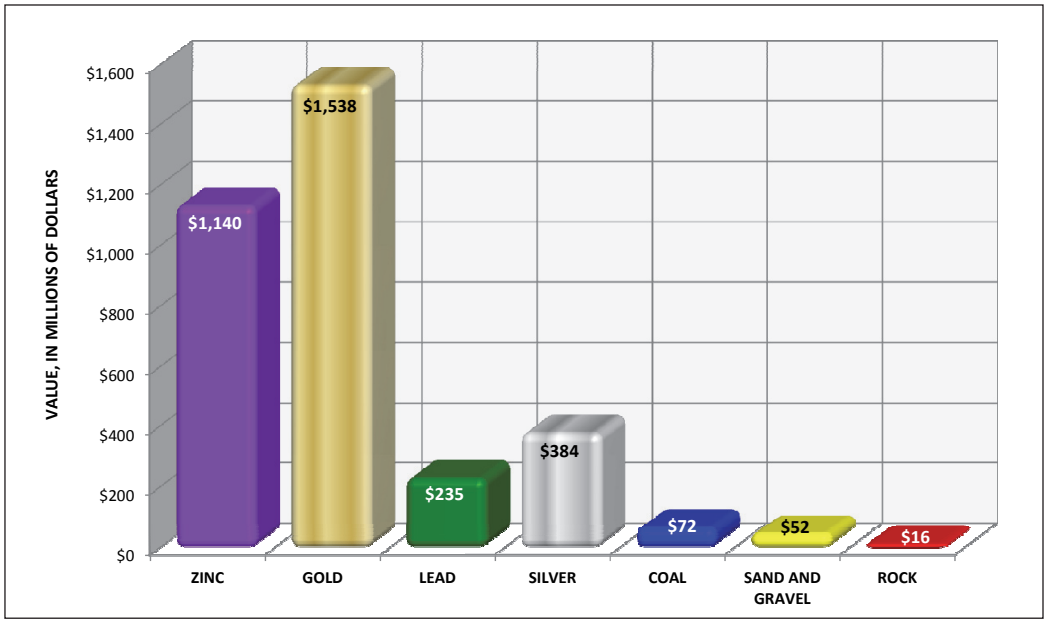


Figure 16. Estimated 2012 mineral production in Alaska by commodity.

at 6.83 percent, coal and peat at 2.11 percent, and industrial minerals at 1.98 percent.

Table 14 shows the average annual metal values used in this report over the last 17 years; figure 17 shows the values graphically to facilitate trend visualization. Some respondents reported actual unit values received for production; in cases where actual values were available, they were used in place of the average values in the table. In general, however, metal values were computed from weekly averages on the London Metal Exchange, and do not take into account mining, shipping, smelting, and other costs incurred by the producer.

The decreased mineral production value in 2012 resulted primarily from lower production volumes of zinc and a lower value for zinc in 2012 compared with 2011. The average price of gold was higher in 2012 than in 2011; the average prices of silver, copper, lead, and zinc were all lower in 2012 than in 2011. The price for gold increased 6.2 percent; the price for silver decreased 11.3 percent, the price of copper decreased 9.5 percent, the price of lead decreased almost 14.7 percent, and the price of zinc decreased 11.1 percent.

The production estimates included in this report are from questionnaires returned to DGGS by miners and mining companies, Native organizations, government agencies, municipalities, and service companies. The information returned on questionnaires is complemented by telephone queries, emails, faxes, and information gleaned from annual reports, 10-K reports, and news releases by producers. Additional information was derived from State of Alaska Annual Placer Mining Applications (APMAs) submitted to the Division of Mining, Land & Water. Appendix B lists Alaska metal producers for 2012.

The authors are grateful to the Mental Health Trust Land Office, the Department of Transportation & Public Facilities, the Division of Mining, Land & Water, the Northwest Arctic Borough, the Denali Borough, the City and Borough of Juneau, the Kenai Peninsula Borough, the U.S. Forest Service, the U.S. Bureau of Land Management, Native regional corporations, and the many large and small Alaska mining operations that contributed data to this report.

Tables 15 and 16 show gold production by region of the state, and placer production by small, medium, and large-sized producers. Six placer operations were estimated to have achieved a "large-sized" rating in 2012, each producing in excess of 2,500 ounces of gold. Total placer gold production in Alaska in 2012 was estimated to be approximately 100,000 ounces. The eastern interior was the biggest placer producer in 2012, producing an estimated 44,385 ounces (photo 20), followed by the Western region at 44,037 ounces. The northern region produced an estimated 4,576 ounces, the southcentral region produced an estimated 3,386 ounces, and the southwestern region produced an estimated 3,266 ounces. An estimated

Table 14. Average metal prices, 1996–2012.

	Gold $/oz	Silver $/oz	Copper $/lb	Lead $/lb	Zinc $/lb
1996	387.60	5.19	1.03	0.37	0.49
1997	330.76	4.91	1.03	0.28	0.59
1998	293.88	5.53	0.75	0.24	0.46
1999	278.70	5.20	0.71	0.23	0.49
2000	279.10	4.96	0.82	0.21	0.51
2001	271.04	4.37	0.71	0.22	0.40
2002	310.06	4.61	0.41	0.21	0.35
2003	363.38	4.88	0.81	0.23	0.38
2004	409.72	6.67	1.29	0.40	0.47
2005	444.74	7.32	1.61	0.43	0.63
2006	603.46	11.55	3.02	0.58	1.47
2007	695.39	13.38	3.24	1.17	1.47
2008	871.96	14.99	3.12	0.94	0.84
2009[a]	972.35	14.67	2.35	0.78	0.75
2010[a]	1,224.53	20.19	3.42	0.97	0.98
2011[a]	1,571.52	35.12	3.99	1.09	0.99
2012[a]	1,668.98	31.15	3.61	0.93	0.88

[a]2009, 2010, 2011, and 2012 gold and silver prices come from Kitco; copper, lead, and zinc from British Columbia Ministry of Energy and Mines.

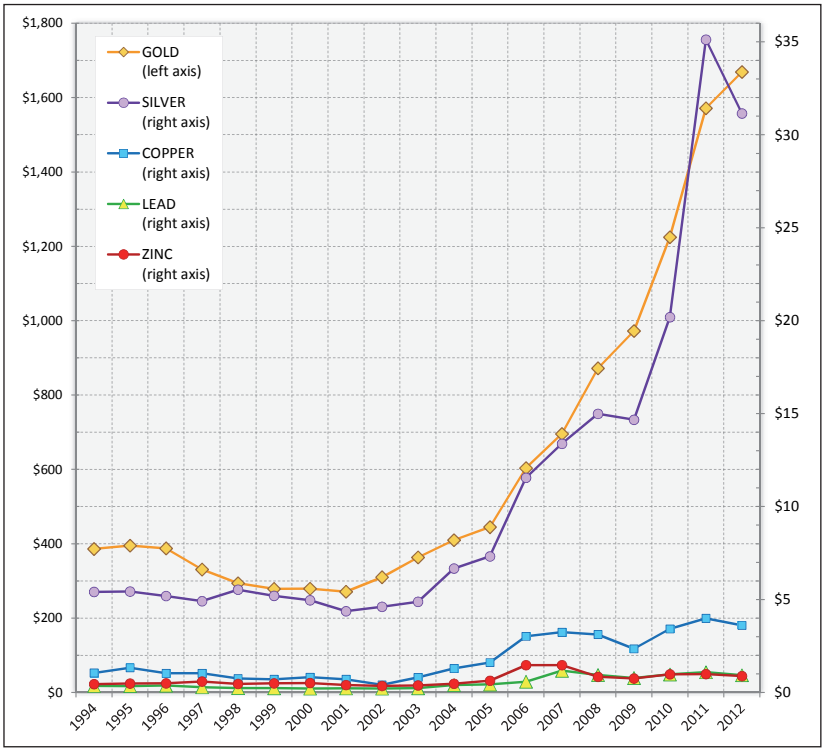


Figure 17. Average annual metal values, 1994–2012.

Table 15. Reported refined gold production, number of operators, and industry employment in Alaska, 2010–2012.[a,b]

Region	Number of operators			Production in ounces			Number of employees[b]		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Northern	16	22	22	2,595	4,181	4,576	37	36	33
Western	47	69	93	21,107	21,224	44,037	107	145	184
Eastern Interior	120	156	148	766,486	650,931	720,219	1,021	1,056	1,104
Southcentral	28	36	34	3,978	10,616	3,386	48	49	50
Southwestern	14	13	15	8,197	16,673	11,010	38	45	54
Alaska Peninsula[c]	1	2	1	0	0	1	1	2	1
Southeastern[d]	5	5	4	112,100	145,304	138,011	541	604	659
TOTAL	**231**	**303**	**317**	**914,463**	**848,929**	**921,240**	**1,793**	**1,937**	**2,085**

[a]2011 production includes 770,228 ounces of gold from hardrock mines and 78,701 ounces of gold from placer sources. 2012 production includes 821,199 ounces of gold from hardrock mines and 100,041 ounces of gold from placer sources.
[b]Includes recreational mining numbers (operators, ounces, employees) and is calculated on the basis of full-year employment.
[c]Production from this single source is combined with southwestern production for confidentiality purposes.
[d]Includes numbers in all categories from Greens Creek Mine, which is a polymetallic producer with a strong gold component.

Table 16. Production for selected Alaska placer gold mines, 2005–2012.

	2005	2006	2007	2008	2009	2010	2011	2012
Mine Size								
Small[a]	50	177	153	169	485	190	271	283
Medium[b]	20	21	19	24	16	35	20	23
Large[c]	1	3	2	2	2	2	6	6
TOTAL	**71**	**201**	**174**	**195**	**503**	**227**	**297**	**312**
Production in Ounces[d]								
Small	6,783	23,343	19,755	19,601	23,916	17,358	22,222	24,073
Medium	17,822	22,144	23,366	27,298	20,680	23,160	20,295	29,483
Large	--[e]	14,895	10,728	9,860	15,654	28,800	36,200	46,485
TOTAL	**24,605**	**60,382**	**53,849**	**56,759**	**60,250**	**69,318**	**78,717**	**100,041**

[a]<650 ounces of gold per year.
[b]650–2,500 ounces of gold per year.
[c]>2,500 ounces of gold per year.
[d]Does not include recreational production before 2006.
[e]2005 production combined with "Medium" producers.

390 ounces of placer gold were produced in the southeastern region, and approximately one ounce of placer gold was produced in the Alaska Peninsula region. An estimated 312 placer mines operated in Alaska in 2012, compared with an estimated 298 operations in 2011. Figure 18 graphs historical gold production in Alaska, from 1880 through 2012, and its corresponding value in the year it was produced.

Tables 17 and 18 show the value and regional importance of sand and gravel and rock production. The value of the composite rock, sand, and gravel sector based on 2012 reports is approximately $68.1 million; however, this sector is noted for reporting shortfalls. Figure 19 shows historical production of sand and gravel in Alaska since 1950. Industrial minerals employment in 2012 is estimated to be 484 full-time-equivalent employees based on reported production.

Sand and gravel production reported for 2012 amounted to almost 7.8 million tons produced by approximately 424 full-time-equivalent employees. Rock production reported for 2012 was 1,050,763 tons produced by an estimated 60 full-time-equivalent employees. Sizeable reporting shortfalls for both sand and gravel production and for rock production are noted. Several large rock, sand, and gravel producers declined to contribute non-mandatory information. As a result, rock, sand, and gravel estimates are incomplete and serve only as a minimum.

The Alaska export value of mineral ores and concentrates, metal ores and concentrates, and coal was $1,618 million in 2012. The total exports include copper–gold concentrates from the Minto Mine in Yukon that were shipped through the terminal in Skagway (table 19 and figure 20). Figure 21 shows historical production and exports of coal in Alaska since 1915.

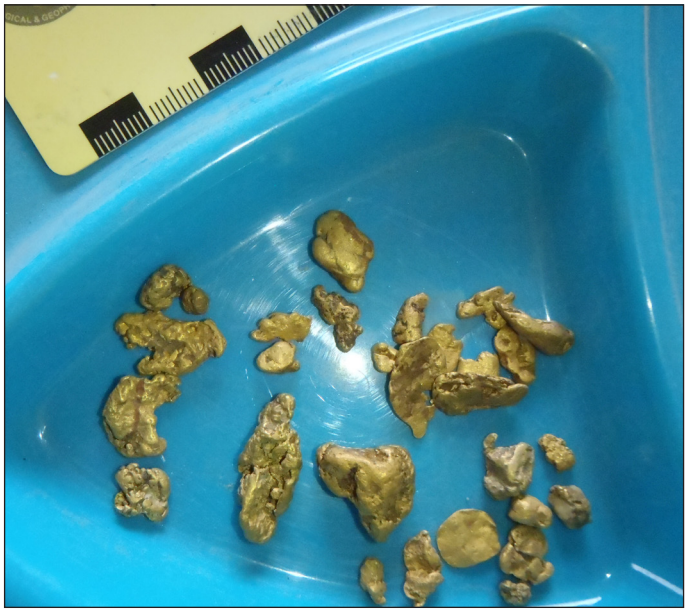


Photo 20. Clean-up at Jubilee placer mine on Prospect Creek, eastern interior. Photo provided by Larry Freeman.

Reported peat production for 2012 was 121,786 bank cubic yards, produced by an estimated four full-time-equivalent employees. There are assumed to be significant reporting shortfalls in this category.

NORTHERN REGION

The 2012 value of minerals production in the northern region is estimated to be $1.427 billion, with corresponding employment of 631 full-time-equivalent positions. Red Dog Mine dominated the production value and employment numbers. Placer gold, sand and gravel, rock, and peat production were also noted in the region. In the northern region, production was noted by 19 commercial and three recreational placer operations, 24 sand and gravel operations, two rock operations, and three peat producers.

Approximately 33 full-time-equivalent positions were used in the placer mining operations, and approximately 4,576 ounces of placer gold were produced.

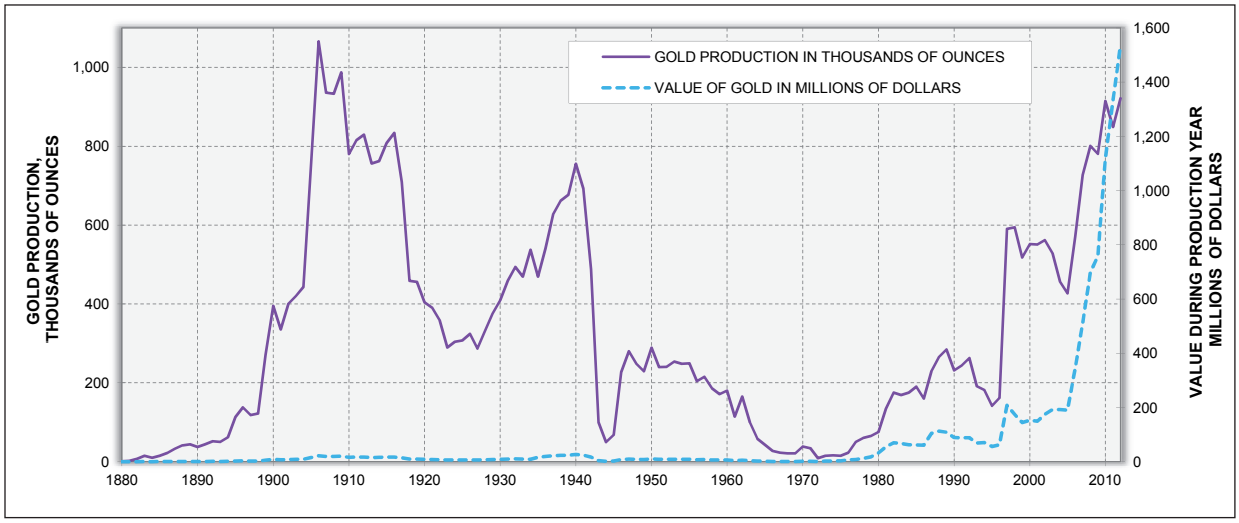


Figure 18. Historical gold production in Alaska, 1880–2012, and corresponding market value.

Table 17. Reported sand and gravel production and industry employment in Alaska by region, 2012.

Region	Companies and agencies reporting[a]	Tons	Estimated unit value ($/ton)[b]	Total Value	Estimated number of employees
Northern	24	1,851,961	6.7	$ 12,408,140	95
Western	14	600,081	6.7	4,020,540	34
Eastern Interior	37	3,751,066	6.7	25,132,141	204
Southcentral	32	1,404,180	6.7	9,408,006	79
Southwestern	9	46,167	6.7	309,320	3
Alaska Peninsula	2	1,867	6.7	12,510	1
Southeastern	5	144,672	7.0	1,019,305	8
TOTAL	**123**	**7,799,994**		**$52,309,962**	**424**

[a]From returned questionnaires, telephone surveys, follow-up fax questionnaires, and e-mails to probable producers, etc. Data were also returned from DML&W, USFWS, USBLM, USFS, regional corporations, and others.
[b]Values are based on estimates from producers, from historical records, etc.

Table 18. Reported rock production and industry employment in Alaska by region, 2012.[a]

Region	Companies and agencies reporting	Tons	Estimated unit value ($/ton)[b]	Total Value	Estimated number of employees
Northern	2	23,883	15	$ 358,245	1
Western	1	213,000	15	3,195,000	12
Eastern Interior	6	406,179	15	6,092,685	23
Southcentral	3	7,976	15	119,633	1
Southwestern	3	916	15	13,740	0
Alaska Peninsula	1	123,980	15	1,859,693	7
Southeastern	4	274,829	15	4,122,435	16
TOTAL	**20**	**1,050,763**	**15**	**$15,761,431**	**60**

[a]Includes shot rock, crushed stone, D-1, riprap, and modest quantities of ornamental stone.
[b]Values are based on estimates from producers, from historical records, etc.

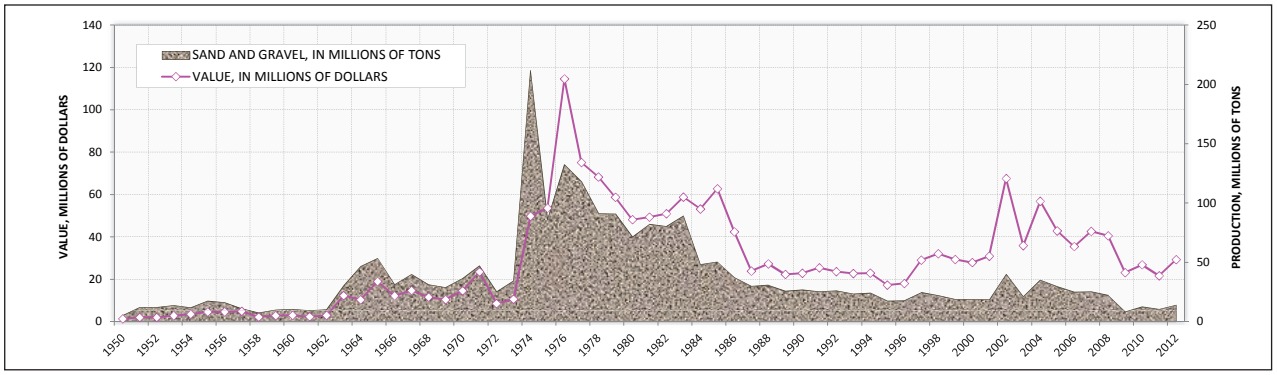


Figure 19. Sand and gravel production in Alaska, 1950–2012.

Table 19. Alaska international mineral export values (millions of dollars).

	Mineral Ores and Concentrates[a]	Canada Copper Ores Through Skagway Terminal[b]	Precious Metal Ores and Concentrates[c]	Coal[d]	Total Value of Exports
1996	249	- -	> $1	27	276
1997	369	- -	> $1	26	395
1998	317	- -	> $1	8	325
1999	359	- -	> $1	15	374
2000	293	- -	1	16	310
2001	329	- -	3	17	349
2002	380	- -	47	9	436
2003	413	- -	84	4	501
2004	505	- -	110	14	629
2005	511	- -	132	14	657
2006	1,094	- -	110	10	1,214
2007	1,269	16	132	5	1,406
2008	691	103	144	23	858
2009	853	64	153	33	1,039
2010	1,336	37	214	25	1,575
2011	1,809	199	267	31	2,107
2012	1,502	169	84	32	1,618

Source: U.S. Census Bureau, Origin of Movement Series.
[a]HS 26 Mineral Ores: Zinc ores and concentrates, lead ores and concentrates, copper ores and concentrates, precious metals ores and concentrates (gold), zirconium ore (only in 2009), and miscellaneous ores.
[b]Value of Canada copper ores moving through Skagway that are included in Mineral Ores and Concentrates values.
[c]HS 71 Precious Metals: Primarily gold, occasionally platinum, occasionally small amounts of diamonds.
[d]HS 27 Coal

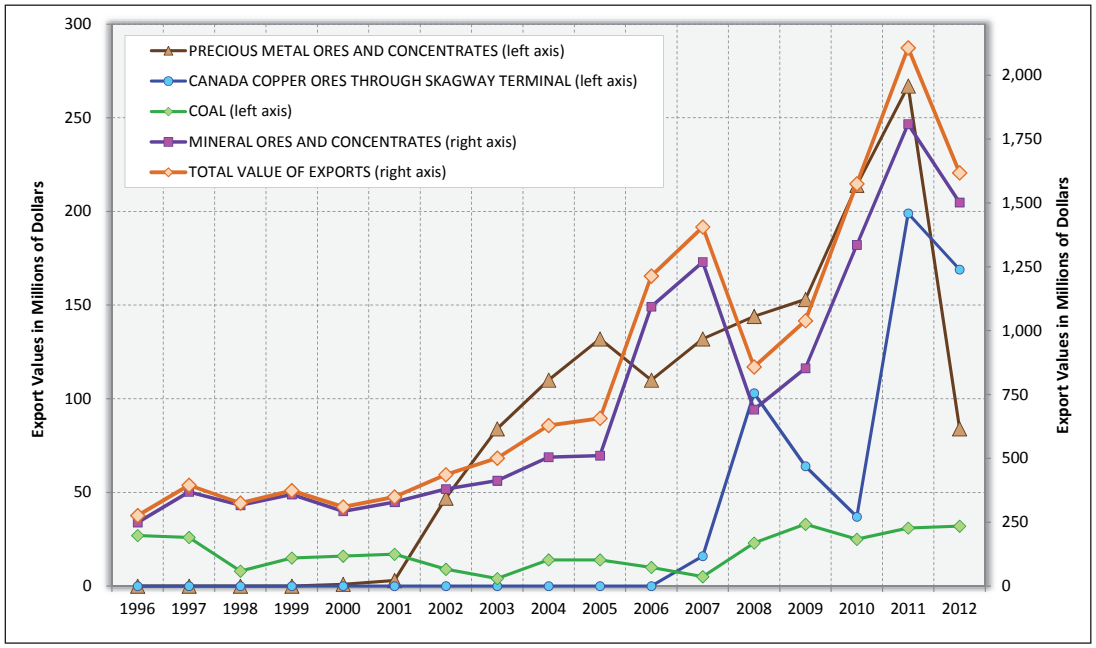


Figure 20. Alaska international mineral export values (millions of dollars), 1996–2012.

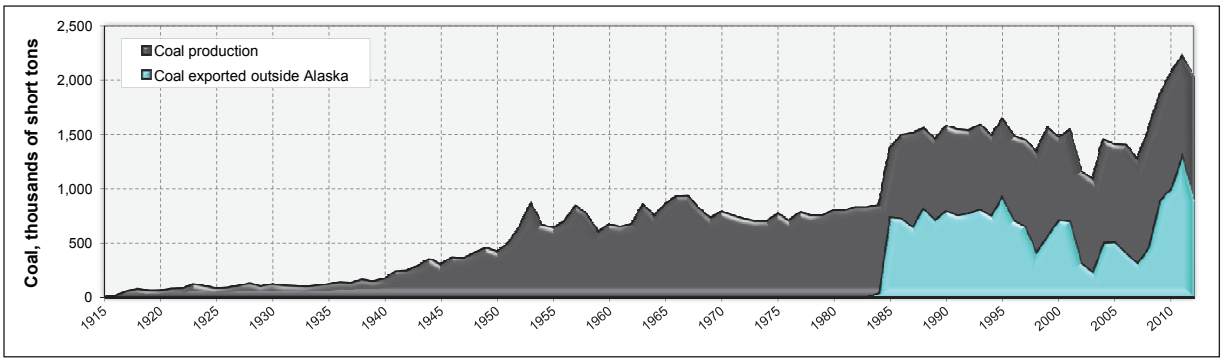


Figure 21. Alaska coal production and exports, 1915–2012.

Red Dog Mine

One of the world's largest zinc mines, both in terms of reserves (table 20) and annual zinc production (table 21), Red Dog Mine produces lead and zinc concentrates that are trucked to a port on the coast for shipping during the summer. Red Dog dominates Alaska's mineral production value, accounting for approximately 41 percent of the entire value of Alaska's mineral production in 2012. The mine is 100 percent owned and operated by **Teck Resources Ltd.** under an agreement with NANA Regional Corp.

Red Dog Mine milled 3,941,000 tons of ore in 2012 and produced 583,232 tons of zinc in concentrate, 105,160 tons of lead in concentrate, and was credited with an estimated 5.8 million ounces of silver. Zinc production at Red Dog was lower in 2012 than in 2011 due to milling rates being lowered to reduce silica in the zinc concentrate and due to lower ore grades. Lead production at Red Dog was higher in 2012 than in 2011 due to improved recoveries.

WESTERN REGION

Ninety-three placer operations, including 38 recreational in nature, reported production in the region for 2012. Estimated production for 2012 was 44,037 ounces of gold. Placer gold employment in 2012 was estimated to be 184 full-time-equivalent positions.

Sand and gravel production in the western region in 2012 was reported to be 600,081 tons from 14 operations. Employment was estimated to be 34 full-time-equivalent jobs. Significant reporting shortfalls are noted in this area.

Rock production in the western region in 2012 was reported to be 213,000 tons reported by one operation with an estimated employment of 12 full-time equivalent employees. Significant reporting shortfalls are assumed in this area.

No peat production was reported in this region in 2012.

EASTERN INTERIOR REGION

As in previous years, of the seven geographic regions used for this report, the eastern interior region again had the largest number of mining operations during 2012. Fort Knox Mine was the largest gold producer in the region, followed by Pogo Mine. Total gold production from the region was an estimated 720,219 ounces. Lode (hardrock) production was 675,834 ounces. Placer production from 146 operations was an estimated 44,385 ounces (photo 21). Nine of the 2012 operations were considered recreational in size. The employment estimate for placer operations is 229 full-time-equivalent positions.

Sand and gravel production in 2012 totaled 3.75 million tons from 37 operations in 2012. Estimated employment for these operations was approximately 204 in 2012. Rock production of 406,179 tons was reported by six operations in 2012, with an estimated employment of 23 full-time-equivalent positions. Peat production of 53,782 bank cubic yards was reported in 2012 with an estimated full-time-equivalent employment of two. Reporting shortfalls in the sand and gravel, rock, and peat sectors are noted.

Table 20. Reserves and resources by category at Red Dog Mine as of December 31, 2012 (Teck Resources Ltd. Website).

Class	Metal	Category	Tonnes (millions)	Grade (g/tonne)	Grade (percent)
Reserves	Zinc	Proven			
		Probable	51.30		15.7
	Lead	Proven			
		Probable	51.30		4.0
	Silver	Proven			
		Probable	51.30	71.00	
Resources	Zinc	Indicated	4.40		24.7
		Inferred	0.30		10.6
	Lead	Indicated	4.40		6.2
		Inferred	0.30		3.3
	Silver	Indicated	4.40	127.00	
		Inferred	0.30	66.00	

Fort Knox Mine

Fort Knox Mine produced 359,948 ounces of gold in 2012 compared with 289,794 ounces in 2011 (table 22). Mining activity at Fort Knox produced 28.59 million

Table 21. Red Dog Mine production statistics, 1989–2012.[a]

	Tons Milled	Ore Grade Zinc (%)	Ore Grade Lead (%)	Ore Grade Silver (oz/ton)	Total Tons Concentrate Produced[b]	Contained Tons Zinc	Contained Tons Lead	Million Ounces Silver[c]	Employees
1989	33,300	20.4	7.6	3.6	8,532	--	--	--	228
1990	996,700	26.5	8.5	3.6	443,600	191,981	31,187	1.6	350
1991	1,599,300	22.5	6.6	2.8	521,400	234,510	43,815	1.46	331
1992	1,582,000	19.9	6	2.9	474,900	231,363	15,960	1.38	349
1993	1,874,600	18.4	5.7	2.8	539,800	255,149	24,788	1.51	376
1994	2,339,500	18.8	5.7	2.8	658,000	328,160	32,775	1.84	391
1995	2,485,900	19	5.8	2.8	753,600	358,676	55,715	3.62	397
1996	2,312,600	18.7	5	2.8	765,300	357,680	65,886	4.3	417
1997	2,127,000	20.3	5.2	2.9	799,400	373,097	69,284	4.27	479
1998	2,752,587	21.4	5.2	2.7	1,015,773	490,461	80,193	5.2	466
1999	3,282,788	21.3	5.2	2.7	1,207,160	574,111	97,756	6.21	539
2000	3,365,508	21	4.7	2.5	1,211,539	585,030	91,557	5.84	536
2001	3,560,430	19.8	5	2.5	1,215,837	570,980	105,000	5.9	559
2002	3,489,600	21.1	5.4	2.7	1,366,480	637,800	118,880	6.75	560
2003	3,476,689	21.7	6.2	3.1	1,410,892	638,569	137,679	7.7	388
2004	3,249,613	22	6	3.0	1,337,545	610,900	128,970	7.22	508
2005	3,402,831	21.7	5.6	3.0	1,330,717	626,112	112,766	1.97	449
2006	3,569,280	20.6	6.1	3.0	1,378,384	614,538	136,135	7.62	457
2007	3,726,910	20.2	6.1	3.1	1,428,014	633,511	146,152	11.55	459
2008	3,306,934	20.1	6	3.1	1,273,885	567,911	135,143	7.5	475
2009	3,729,119	20.9	5.9	3.1	1,445,870	642,096	144,954	8.12	413
2010	3,937,456	18.2	5.4	3.1	1,300,694	593,043	121,144	6.78	550
2011	4,048,000	19.1	5.0	3.0	1,182,060	572,208	84,033	5.19	586
2012	3,941,000	18.2	4.6	3.0	1,134,415	529,157	95,282	5.89	530

[a]Revised slightly from Special Report 51, Alaska's Mineral Industry 1995, based on new company data.
[b]Totals for years 1990 through 1995 include bulk concentrate.
[c]Estimate calculated at 56 ounces per ton of lead metal produced to from 1990 to 2004 and 2006, as reported credit for 2005, net of treatment charges, calculated at 3.1 oz/ton of ore for 2007.

tons of ore in 2012 (photo 22). Mill throughput in 2012 was 14,550,000 tons. Gold reserves at Fort Knox were more than 3.6 million troy ounces at the end of 2012 (table 23).

Pogo Mine

Pogo Mine produced 315,886 ounces of gold in 2012 compared with production of 325,708 ounces in 2011 (table 24). In 2012, a total of 815,922 tons of ore were mined, and the mill processed 875,351 tons (photo 23). Pogo Mine poured its two-millionth ounce of gold in July 2012. Pogo's one-millionth ounce was poured in October 2009.

Photo 21. Paul and Company placer operation, mining on Fairbanks Creek, five miles northwest of the Fort Knox gold mine. Photo provided by Rick Fredericksen, Mental Health Trust Land Office.

Usibelli Coal Mine

Usibelli Coal Mine Inc. continued production of subbituminous coal from its site near Healy with an output of more than 2,018,000 tons of coal in 2012.

SOUTHCENTRAL REGION

Placer gold production of 3,386 ounces was noted by 34 operators in the southcentral region in 2012. One operation was considered recreational in size. Sand and gravel production in the southcentral region was 1.4 million tons reported by 35 producers, with an estimated 79 full-time-equivalent employees. Rock production in the southcentral region was reported as 7,976 tons by three producers, with less than one full-time-equivalent employee. Peat production was reported as 2,542 bank cubic yards by two producers, with less than one full-time-equivalent employee. Extreme reporting shortfalls are noted in these sectors.

SOUTHWESTERN REGION

Placer gold production in the southwestern region amounted to 3,266 ounces in 2012. Fourteen operators, thirteen commercial and one recreational, reported placer gold production, with an estimated full-time-equivalent employment of 29.

Table 22. Fort Knox Mine production statistics, 1996–2012.

	Tons Mined (ore + waste)			Tons milled (ore)			Production	
	Fort Knox	True North[a]	Total	Fort Knox	True North[a]	Total	(ounces)	Employees
1996	16,684,000	NA	16,684,000	769,700	NA	769,700	16,085	243
1997	32,380,000	NA	32,380,000	12,163,151	NA	12,163,151	366,223	249
1998	33,294,000	NA	33,294,000	13,741,610	NA	13,741,610	365,320	245
1999	30,350,000	NA	30,350,000	13,819,010	NA	13,819,010	351,120	253
2000	35,600,000	NA	35,600,000	15,000,000	NA	15,000,000	362,929	253
2001	25,957,900	8,448,400	34,406,300	13,282,614	2,377,386	15,660,000	411,220	360
2002	24,583,500	11,461,000	36,044,500	11,887,200	3,371,800	15,259,000	410,519	360
2003	30,597,940	12,707,100	43,305,040	11,473,000	3,611,682	15,084,682	391,831	316
2004	44,187,000	3,763,000	47,950,000	12,917,966	1,675,854	14,593,820	338,334	427
2005	63,248,000	--	63,248,000	14,384,842	--	14,384,842	329,320	411
2006	51,070,000	--	51,070,000	14,839,297	--	14,839,297	333,383	406
2007	45,940,000	--	45,940,000	14,021,400	--	14,021,400	338,459	399
2008	46,300,000	--	46,300,000	15,110,000	--	15,110,000	329,105	449
2009	27,585,000	--	27,585,000	17,884,000	--	17,884,000	263,260	500
2010	42,400,000	--	42,400,000	14,560,000	--	14,560,000	349,729	525
2011	34,550,000	--	34,550,000	14,880,000	--	14,880,000	289,794	522
2012	63,120,000	--	63,120,000	14,550,000	--	14,550,000	359,948	565

[a]True North Mine started production in 2001 and suspended production in 2004.
-- = Not reported.
NA = Not available.

Table 23. Reserves at Fort Knox as of December 31, 2012.

	Tons	Grade	Gold (ounces)
Proven	126,893,000	0.0120	1,510,000
Probable	135,175,000	0.0155	2,099,000
Total	**262,068,000**		**3,609,000**

Photo 22. Fairbanks Gold Mining Inc., a subsidiary of Kinross Gold Corp., mined 63.1 million tons of ore and waste from the Fort Knox pit in 2012. The mill throughput was 14.55 million tons for the year, and 33.34 million tons of ore were placed on the heap leach. Photo provided by Judy Patrick Photography.

Photo 23. Road to Pogo. Photo provided by Jenny Wynne, Water Section of DMLW,

Table 24. Pogo Mine production statistics, 2006–2012

	Tons Ore Mined	Tons Ore Milled	Ounces of Gold Recovered	Head Grade Recovery (%)	Gold (oz/ton)	Employees[a]
2006	447,129	338,000	113,364	85.0	0.395	477
2007	715,665	715,400	259,820	84.4	0.430	339
2008	882,400	818,237	347,219	83.8	0.506	285
2009	944,823	930,836	389,808	88.2	0.475	272
2010	900,585	947,189	383,434	89.6	0.452	300
2011	892,725	929,020	325,708	89.6	0.392	310
2012	815,922	875,351	315,886	89.7	0.402	335

[a]Includes contractor employees; calculated as 11 hour days, 260 employee-days per year.

Sand and gravel production was reported at 46,167 tons by nine operations with three full-time-equivalent jobs. Rock production was reported at 916 tons by three producers with less than one full-time-equivalent job. No peat production was reported for the region for 2012. Reporting shortfalls in each of these areas is noted.

Photo 24. Greens Creek Mine. Photo provided by Hecla Mining Co.

ALASKA PENINSULA REGION

Minor recreational placer gold production was reported in the region in 2012. Sand and gravel production of 1,867 tons was reported by two operations with less than one full-time-equivalent position assigned. Rock production of 123,980 tons was reported by one operator with seven full-time-equivalent employees. Peat production of 14,972 bank cubic yards was reported by one operator in 2012, with less than one full-time-equivalent position.

SOUTHEASTERN REGION

Placer gold production of 390 ounces was reported by two commercial operators with an estimated three full-time-equivalent employees. Sand and gravel production of 144,672 tons was reported by five operators with eight full-time-equivalent employees. Rock production totaling 274,829 tons was reported by four operators with 16 full-time-equivalent employees assigned to the effort. No peat production was reported in the region in 2012.

Greens Creek Mine

Greens Creek Mine, one of the world's largest primary silver mines (photo 24), is owned by **Hecla Mining Co.** through its wholly owned subsidiary, Hecla Greens Creek Mining Co. Greens Creek produces a silver–gold doré and sulfide concentrates containing zinc and lead. The mine reported proven and probable reserves of more than 7.8 million tons of ore containing silver, gold, lead, and zinc as of December 31, 2012 (tables 25 and 26).

In 2012, Greens Creek milled 789,569 tons of ore and produced nearly 6.4 million ounces of silver, 55,496 ounces of gold, 64,249 tons of zinc, and 21,074 tons of lead. This compares with 2011 when Greens Creek milled 772,069 tons of ore and produced nearly 6.5 million ounces of silver, 56,818 ounces of gold, 66,050 tons of zinc, and 21,055 tons of lead.

Table 25. Reserves and resources by category at Greens Creek Mine as of December 31, 2012 (from Hecla Co. 2012 Annual Report).

Class	Tons	Grade			
		Silver (oz/ton)	Gold (oz/ton)	Lead (%)	Zinc (%)
Proven Reserves	12,000	9.3	0.10	2.7	7.8
Probable Reserves	7,845,600	12.0	0.09	3.4	9.0
Mineralized Material	448,600	5.9	0.12	3.2	7.0
Other Resources	3,784,500	11.4	0.10	2.4	6.2
TOTAL	**12,078,700**				

Kensington Mine

Kensington Mine resumed full production ahead of schedule in April 2012 following a temporary reduction in mining and milling activities to allow for the completion of several underground and surface improvement projects (photos 25 and 26). Kensington produced 82,125 ounces of gold in 2012 compared with 88,420 ounces in 2011.

Table 26. Greens Creek Mine production statistics, 1989–2012.

			Contained Metal					
	Tons Milled	Tons Concentrate	Tons Zinc	Tons Lead	Tons Copper[a]	Ounces Gold	Ounces Silver	Employees
1989	264,600	--	187,007	9,585	--	23,530	5,166,591	235
1990	382,574	--	37,000	16,728	--	38,103	7,636,501	265
1991	380,000	--	41,850	16,900	--	37,000	7,600,000	238
1992	365,000	113,827	40,500	16,500	--	32,400	7,100,000	217
1993[b]	77,780	--	9,500	3,515	--	7,350	1,721,878	217
1994[c]	--	--	--	--	--	--	--	--
1995[c]	--	--	--	--	--	--	--	--
1996[b]	135,000	43,000	9,100	4,200	193	7,480	2,476,000	265
1997	493,000	--	46,000	19,000	1,300	56,000	9,700,000	275
1998	540,000	--	58,900	22,700	1,300	60,572	9,500,000	275
1999	578,358	--	68,527	25,503	1,400	80,060	10,261,835	275
2000	619,438	--	84,082	31,677	1,400	128,709	12,424,093	275
2001	658,000	--	63,903	22,385	1,400	87,583	10,900,000	275
2002	733,507	217,200	80,306	27,582	1,600	102,694	10,913,183	262
2003	781,200	--	76,200	24,800	--	99,000	11,707,000	295
2004	805,789	--	69,115	21,826	--	86,000	9,707,000	265
2005	717,600	--	58,350	18,600	--	72,800	9,700,000	265[d]
2006	732,176	--	59,429	20,992	--	62,935	8,865,818	245[e]
2007	732,227	--	62,603	21,029	--	68,006	8,646,825	276[f]
2008	734,910	--	58,224	18,562	--	67,269	7,145,711	336[g]
2009	790,871	--	70,379	22,253	--	67,278	7,459,170	321[h]
2010	800,397	--	74,496	25,336	--	68,838	7,206,973	343[i]
2011	772,069	--	66,050	21,055	--	56,818	6,498,337	364[j]
2012	789,569	--	64,249	21,074	--	55,496	6,394,235	386[k]

[a]No copper credits in 1989–1993 and 2003–2009.
[b]Partial-year production.
[c]No production in 1994 and 1995 due to mine closure.
[d]Fifteen of these employees were assigned to development effort.
[e]Fifty employees were assigned to development and reported in that section's employment.
[f]Forty-five employees were assigned to development and reported in that section's employment.
[g]Nineteen employees were assigned to development and reported in that section's employment.
[h]Eighty-five employees were assigned to development and reported in that sector's employment.
[i]Seventy-nine employees were assigned to development and reported in that sector's employment.
[j]Nineteen employees were assigned to development and reported in that sector's employment.
[k]Thirty-nine employees were assigned to development and reported in that sector's employment.
-- = Not reported.

Photo 25. Water-quality sampling at Kensington Mine. Photo provided by Coeur Alaska Inc.

Photo 26. Haul truck entering the Kensington Mine through the Jualin portal. Photo provided by Coeur Alaska Inc.

RECREATIONAL MINING

Recreational mining continued to attract attention in 2012, in part due to the increased price of gold. Production allocated to recreational mining was 573 ounces in 2012 compared with 254 ounces in 2011. Employment allocated to this sector was 52 full-time-equivalent employees in 2012, compared with 42 in 2011. This data is likely incomplete due to reporting shortfalls.

DRILLING

Various types of drilling are a necessary and important component of most mining projects. Drilling was conducted during all phases of mining (exploration, development, and production) on various projects across Alaska during the year (photo 27). Table 27 lists companies with a significant drilling program in Alaska during 2012; tables 28 and 29, and figure 22 summarize drilling activity in the state during 2012 by region and type of drilling.

Drilling totals for 2012 are 1,104,325 feet of core drilling and drilling for coal, 14,182 feet of reverse-circulation drilling, and 13,282 feet of placer churn/auger drilling. Placer churn/auger drilling may be under-reported, but yearly total footage for placer operations has varied widely over the past decade. Development drilling, especially at Alaska's large lode mines, is also likely under-reported. Blast-hole drilling during production at Alaska's large lode mines is not tracked, but likely exceeds several million feet, easily exceeding the footage drilled in all other aspects of mining.

About 35 percent of the 2012 drilling footage was from exploration and development projects in the southeastern region of Alaska and about 34 percent of the drilling footage for the year was from exploration and development projects in

Table 27. Companies reporting significant drilling programs in Alaska, 2012.

Andover Mining Corp.
Coeur Alaska Inc.
Contango ORE Inc.
Fire River Gold Corp.
Freegold Ventures Ltd.
Full Metal Minerals Ltd.
Grande Portage Resources Ltd.
Graphite One Resources Inc.
Heatherdale Resources Ltd.
Hecla Mining Co.
International Tower Hill Mines Ltd.
Linc Energy
Millrock Resources Inc.
NovaCopper Inc.
Pathfinder Mineral Services LLC
Pebble Limited Partnership (Northern Dynasty Minerals Ltd. and Anglo American PLC)
Pure Nickel Inc.
Riversdale Alaska LLC
Sumitomo Metal Minining Pogo LLC
Teck Resources Ltd. (Teck Alaska Inc.)
Tintina Resources Inc.
WestMountain Gold Inc.

eastern interior Alaska. The eastern interior and southwestern regions had all of the hardrock rotary drilling in Alaska and 41 percent of the hardrock core drilling in Alaska. Rotary drilling in 2012 decreased dramatically (by 92 percent), but this low number may be due to under-reporting or operators' reports not differentiating between core and rotary drilling. The 2012 total drilling footage increased about 5 percent from the 2011 value, and 2012 was the third highest drilling year recorded.

Table 28. Drilling footage by region in Alaska, 2012.[a]

Type of drilling	Northern	Western	Eastern Interior	South-Central	South-western	South-eastern	Alaska Peninsula	Total
Placer subtotal	--	12,490	792	--	--	--	--	10,427
Coal subtotal	--	--	--	7,704	--	--	--	7,704
Hardrock core[b]	91,925	132,102	381,076	17,614	60,071	389,018	10,633	1,082,439
Hardrock rotary	--	--	3,382	--	10,800	--	--	14,182
Hardrock subtotal	91,925	132,102	384,458	17,614	70,871	389,018	10,633	1,096,621
TOTAL (feet)	**91,925**	**144,592**	**385,250**	**25,318**	**70,871**	**389,018**	**10,633**	**1,117,607**

-- = Not reported.
[a]Drill footages do not include sand and gravel drilling.
[b]Hardrock drill footages undifferentiated by type (core or rotary) were included in the "Hardrock core" total.

Table 29. Drilling footage reported in Alaska, 1982–2012. Exploration drilling was estimated for four lode projects using their reported drilling footage and a project-cost-per-drill-foot ratio averaged from 24 projects with reported, complete data.

Year	Placer Exploration	Placer Thawing	TOTAL PLACER	TOTAL COAL	Hardrock Core[a]	Hardrock Rotary[a]	TOTAL HARDROCK	TOTAL FEET DRILLED
1982	30,000	94,000	124,000	80,000	--	--	200,000	404,000
1983	23,000	30,000	53,000	12,000	--	--	180,500	245,500
1984	31,000	98,000	129,000	25,700	--	--	176,000	330,700
1985	46,000	34,000	80,000	8,700	--	--	131,700	220,400
1986	32,400	227,000	259,400	28,800	--	--	50,200	338,400
1987	50,250	130,000	180,250	19,900	95,600	19,500	115,100	315,250
1988	152,000	300,000	452,000	26,150	223,630	130,230	353,860	832,010
1989	97,250	210,000	307,250	38,670	242,440	89,790	332,230	678,150
1990	78,930	105,000	183,930	18,195	648,600	112,355	760,955	963,080
1991	51,247	130,000	181,247	16,894	205,805	110,850	316,655	514,796
1992	6,740	65,000	71,740	12,875	211,812	148,022	359,834	444,449
1993	25,216	--	25,216	--	124,325	127,990	252,315	277,531
1994	21,000	--	21,000	8,168	347,018	91,692	438,710	467,878
1995	27,570	--	27,570	--	363,690	51,795	415,485	443,055
1996	61,780	--	61,780	8,500	524,330	134,527	658,857	729,137
1997	38,980	--	38,980	13,998	523,676	180,834	704,510	757,488
1998	33,250	--	33,250	2,300	505,408	45,670	5-51,078	586,628
1999	6,727	--	6,727	--	369,863	78,934	448,797	455,524
2000	15,480	--	15,480	--	418,630	127,638	546,268	561,748
2001	1,100	--	1,100	36,151	240,318	75,750	316,068	353,319
2002	1,250	--	1,250	--	385,290	103,612	488,902	490,152
2003	10,108	--	10,108	2,000	270,456	100,178	370,634	382,742
2004	107,526	--	107,526	--	415,628	36,024	451,652	559,178
2005	3,360	--	3,360	--	592,497	41,780	634,277	637,637
2006	8,759	--	8,759	7,500	765,363	54,173	819,536	835,795
2007	19,575	--	19,575	50,539	830,478	268,112	1,098,590	1,168,704
2008	1,216	--	1,216	26,869	874,634	250,278	1,124,912	1,152,997
2009	1,244	--	1,244	W	403,275	260,059	663,334	664,578
2010	10,427	--	10,427	11,601	688,911	216,768	905,679	927,707
2011	3,150	--	3,150	W	883,272	175,181	1,058,453	1,061,603
2012	13,282	--	13,282	7,704	1,082,439	14,182	1,096,621	1,117,607

[a]Core and rotary drilling not differentiated prior to 1987.
-- = Not reported.
W = withheld for confidentiality in 2011; included in hardrock rotary.

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The booklet's design, layout, and cover are by Joni Robinson (DGGS); graphic illustrations were created and updated by Larry Freeman and Jennifer Athey; and Paula Davis (DGGS) updated the graphs and charts and edited the final version. Evan Twelker (DGGS) provided additional editing and verification of calculations. DCCED's Division of Economic Development and DGGS provided funds for printing.

Photo 27. A 50-hole drill program completed at Contango ORE Inc.'s Tetlin project during 2012 focused on Peak, a newly discovered zone of gold–copper–silver mineralization about 16 miles southeast of the eastern Alaska crossroads town of Tok. Photo provided by Avalon Development Corp.

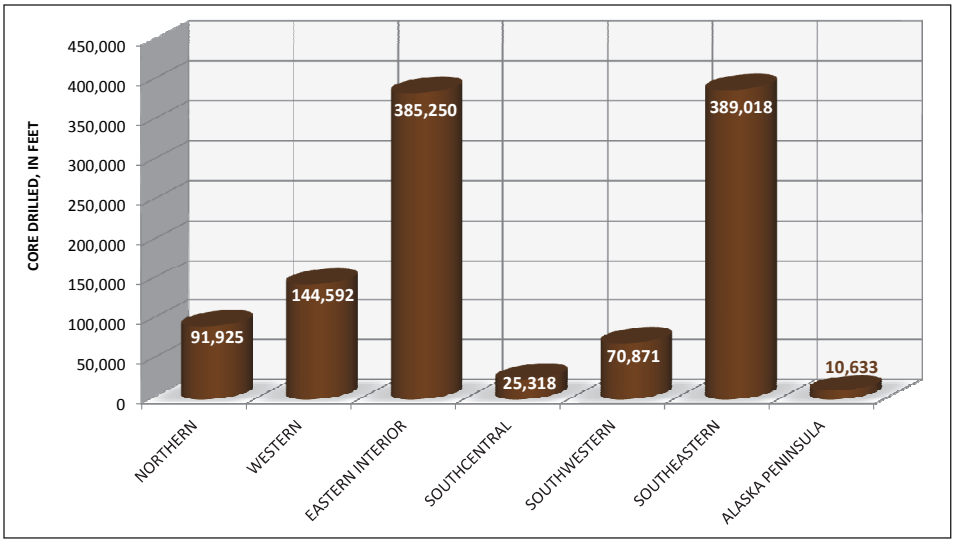

Figure 22. Total feet of core drilled in Alaska in 2012, by region.

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APPENDIX A
U.S. Customary Units/Metric Units Conversion Chart

To convert from:	To:	Multiply by:
	Weight/Mass/Ore Content	
ounces (avoirdupois)	grams	28.350
ounces (troy)	grams	31.1035
pounds	kilograms	0.4536
short tons	metric tons	0.9072
grams	ounces (avoirdupois)	0.03527
	ounces (troy)	0.03215
kilograms	pounds	2.2046
metric tons	short tons	1.1023
parts per million (ppm)	parts per billion (ppb)	1,000
parts per million (ppm)	ounces per ton	0.0292
parts per million (ppm)	grams/metric tons (tonnes)	1.00
	Length	
miles	kilometers	1.6093
yards	meters	0.9144
feet	meters	0.3048
	centimeters	30.48
	millimeters	304.80
inches	centimeters	2.54
	millimeters	25.4
kilometers	miles	0.6214
meters	yards	1.0936
	feet	3.2808
millimeters	feet	0.00328
	inches	0.03937
centimeters	inches	0.3937
	Area	
square miles	square kilometers	2.590
acres	square meters	4,046.873
	hectares	0.4047
square yards	square meters	0.8361
square feet	square meters	0.0929
square inches	square centimeters	6.4516
	square millimeters	645.16
square kilometers	square miles	0.3861
square meters	acres	
0.000247		
	square feet	10.764
	square yards	1.196
hectares	acres	2.471
	square meters	10,000.00
square centimeters	square inches	0.155
square millimeters	square inches	0.00155
	Volume	
cubic yards	cubic meters	0.7646
cubic feet	cubic meters	0.02832
cubic inches	cubic centimeter	16.3871
cubic meters	cubic yards	1.3079
	cubic feet	35.3145
cubic centimeters	cubic inches	0.06102
gallons (U.S.)	liters	3.7854
liters	gallons (U.S.)	0.2642
milliliters	ounces (fluid)	0.03381
ounces (fluid)	milliliters	29.5735

SOURCE: ***Minerals Today,*** **February 1993, U.S. Bureau of Mines.**
Temperature conversions:
From degrees Fahrenheit to degrees Celsius, subtract 32 and multiply by 5/9.
From degrees Celsius to degrees Fahrenheit, multiply by 9/5 and add 32.

Appendix B

Companies and individuals reported to be producing metal in Alaska, 2012

OPERATOR	CREEK, RIVER, OR MINE	DISTRICT	TYPE[a]
	NORTHERN REGION		
Allen Post	Near Prospect Creek	Koyukuk–Nolan	O/P Placer
Brandon and Larry Niles	Marion Creek	Koyukuk–Nolan	Placer Exploration
Colby Graden	South Fork Koyukuk River	Koyukuk–Nolan	Placer Exploration
Compass Mining Inc./John Hall	Linda Creek	Koyukuk–Nolan	O/P Placer
Daniel Even	Gold Creek	Koyukuk–Nolan	O/P Placer
David Smith	Smalley Creek, John River	Koyukuk–Nolan	S/D – Large
Doug Jones	Minnie	Koyukuk–Nolan	O/P Placer
Fryar Gold Mining Group Venture	Prospect	Koyukuk–Nolan	Placer Exploration
James Wicken	Gold Creek	Koyukuk–Nolan	O/P Placer
Jim Olmstead	Gold Creek	Koyukuk–Nolan	O/P Placer
John Bonacor	Gold Creek	Koyukuk–Nolan	O/P Placer
John and Christy Perkins	Marion Creek	Koyukuk–Nolan	O/P Placer
Johnathan Jurco	Gold Creek	Koyukuk–Nolan	S/D – Recreation
Larry Weisz	Hammond River	Koyukuk–Nolan	O/P Placer
Lloyd Swenson	Slate Creek	Koyukuk–Nolan	O/P Placer
LNT Mining	South Fork Koyukuk, Eagle, Ironside creeks	Koyukuk–Nolan	O/P Placer
LSC Mining/Thomas Hagan and Lonnie Kincanon	Slate Creek	Koyukuk–Nolan	O/P Placer
Michael Hoffman	South Fork Koyukuk	Koyukuk–Nolan	SD Recreation
Paradise Valley Inc.	Flat, Birch, Oregon, Agnes	Koyukuk–Nolan	O/P Placer
Stewart Brandon	Myrtle Creek	Koyukuk–Nolan	Placer Exploration
Teck Cominco Alaska Inc.	Red Dog Mine	Lisburne	O/P HR
William Nordeen	Emma Creek	Koyukuk–Nolan	O/P Placer and S/D – Recreation
	WESTERN REGION		
Adam Kerner	Norton Sound	Cape Nome	S/D – Large
Alan Balodis	Norton Sound	Cape Nome	S/D – Recreation
Anderson & Sons Mining/Ralph Anderson	n/a	Cape Nome	O/P Placer
Arlo Harrigan	Norton Sound	Cape Nome	S/D – Large
AuruMar Alaska Inc.	Norton Sound	Cape Nome	Placer exploration
Barbara Halls	Norton Sound	Cape Nome	O/P Placer
Beaton Path Mining LLC/Tim Beaton	Nugget, Wilson creeks	Gold Hill–Melozitna	O/P Placer and placer exploration
Benjirmen Kilgore	Norton Sound	Cape Nome	S/D – Recreation
Billy Howell Jr.	Norton Sound	Cape Nome	S/D – Large
Brad Branson	Bering Sea	Cape Nome	S/D – Recreation
Bradley James Kelly	Norton Sound	Cape Nome	S/D – Recreation
Brian Atherton	Norton Sound	Cape Nome	S/D – Recreation and S/D – Large
Bron Sanders	Norton Sound	Cape Nome	S/D – Large
Bruce Harborth	Norton Sound	Cape Nome	S/D – Recreation
Charles Bernard Trainor	Peluk Creek	Cape Nome	S/D?
Christian Broce	Norton Sound	Cape Nome	S/D – Recreation
Clifton McHenry and Randall Smith	Norton Sound	Cape Nome	S/D – Large
Conrad Hall	Golden Fork tributary of Bear Creek	Melozitna	Placer exploration
Craig Coggins	Norton Sound	Cape Nome	S/D – Large
Curtis Roche	Offshore Nome public beach	Cape Nome	S/D – Recreation
Dan Inman	Bering Sea	Cape Nome	S/D – Recreation
Daniel Murphy	Norton Sound	Cape Nome	S/D – Large
David Fair	Norton Sound	Cape Nome	S/D – Recreation
Dell Robison	Norton Sound	Cape Nome	S/D – Recreation
Donald Mullikin	Garfield Creek	Kougarok	O/P Placer
Dry Creek Valley LLC	Gold Run Creek	Fairhaven	O/P Placer
Dry Creek Valley LLC	Norton Sound	Cape Nome	S/D – Large
Ed Hanosek	Norton Sound	Cape Nome	S/D – Recreation
Frank McFarland and Eli Mendenhall	Bering Sea	Cape Nome	S/D – Large
Gold Diggers/Shawn Pomrenke	Cape Nome	Cape Nome	S/D – Large
Golden Angle LLC/Paul Cheong	Golden, Gay creeks	Melozitna	O/P Placer
Ian Foster	Norton Sound	Cape Nome	S/D –Recreation
Igor Sudarkin/Pacifica	Norton Sound	Cape Nome	S/D – Large
Ira Sweazea	Norton Sound	Cape Nome	S/D – Large and S/D – Recreation
James Cardwell	Bering Sea	Cape Nome	S/D – Large
James Jell	Norton Sound	Cape Nome	S/D – Recreation

[a]O/P = Open pit; HR = Hardrock; U/G = Underground; S/D = Suction Dredge – Large – Greater than a 6" nozzle.

OPERATOR	CREEK, RIVER, OR MINE	DISTRICT	TYPE[a]
Jan Siks and Jim Hatadis	Kougarok River	Kougarok	S/D – Recreation
Jeff and Margaret Darling	West Creek	Cape Nome	O/P Placer
Jeff Martinez	Norton Sound	Cape Nome	S/D – Recreation
Jim Tweto/Three Ungalik Sisters	Bonanza Creek, Ungalik River	Koyuk	O/P Placer
John Godsey	Norton Sound	Cape Nome	S/D – Recreation
John Mehelich	Norton Sound	Cape Nome	S/D – Large
John Searchy dba JS Mining Co. LLC	Bering Sea	Cape Nome	S/D – Recreation
Joseph John Turri	Norton Sound	Cape Nome	S/D – Large
Joshua Taylor	Spruce Creek	Innoko–Tolstoi–Ophir	O/P Placer
Jozef Krol	Norton Sound	Cape Nome	S/D – Large
K & S Leasing, Inc./Norman Stiles	Nome Offshore	Cape Nome	S/D – Large
Keith Albrecht	Norton Sound	Cape Nome	S/D – Recreation
Ken Kerr	Norton Sound	Cape Nome	S/D – Large
Kenneth Scott	Norton Sound	Cape Nome	S/D – Recreation
Kenneth Takak	Tubutulik River	Koyuk and Nome/Council	S/D – Recreation
L. Glen LeBaron	Norton Sound	Cape Nome	S/D – Recreation
L & H Mining/ Andrew Lee and Robert Hehnlin	Norton Sound	Cape Nome	S/D – Large
Lonnie Fausett	Norton Sound	Cape Nome	S/D – Recreation
Lonnie Kincanon, Thomas Hagan, Steve Elliot	Kelly Pup	Koyukuk–Nolan	O/P Placer
Mark Gumaer	Dick Creek	Serpentine	O/P Placer
Michael Garrett	Norton Sound	Cape Nome	S/D – Recreation
Michael Georgeson	Norton Sound	Cape Nome	S/D – Recreation
N.B. Tweet & Sons, LLC/N.B. Tweet	Washington Creek	Kougarok	O/P Placer
NASMIN LLC	Casadepaga River	Cape Nome	Placer exploration
Nome Gold Alaska Corp.	Monroeville Beach, Little Creek	Cape Nome	O/P Placer
Pacifica/Igor Sudarkin	Norton Sound	Cape Nome	S/D –Large
Palmerosa – IDSA, LLS/Thomas Palmer II	Bering Sea	Cape Nome	S/D – Large
Paradise Valley Mining Co. LLC.	Tripple Creek	Cape Nome	O/P Placer
Randall Smith	Norton Sound	Cape Nome	S/D – Large
Rayson LLC/Gary Gustafson	Norton Sound	Cape Nome	S/D – Large
Rex Isaacson	Norton Sound	Cape Nome	S/D – Recreation
Richard Goodson and Clyde Miles	Norton Sound	Cape Nome	S/D – Large
Richard Redmond	Macklin Creek	Kougarok	O/P Placer
Richard Wideman, Richard Wideman Jr. III, Mark Wideman	Norton Sound	Cape Nome	S/D – Recreation
Ryan Fausett	Nome public beach	Cape Nome	S/D – Recreation
Samuel Galegor	Norton Sound	Cape Nome	S/D – Recreation
Samuel "Kelly" Thomas	Sweepstakes Creek	Koyuk	O/P Placer
Scott Meisterheim	Norton Sound	Cape Nome	S/D – Recreation
Steve Phillips	Norton Sound/Bering Sea	Cape Nome	S/D – Recreation
Spencer Phillips	Norton Sound	Cape Nome	S/D – Recreation
Subsistence Placers	Norton Sound	Cape Nome	S/D – Large
Susan Nowland	Norton Sound	Cape Nome	S/D – Recreation
Taiga Mining Company Inc./Jerry Birch	Alohetta, Comeback, Comstock, Holiday, Aloha, and Clear creeks	Koyukuk–Hughes	O/P Placer
Ted Maschal	Norton Sound	Cape Nome	S/D – Recreation
Terry Shires	Norton Sound	Cape Nome	S/D – Recreation
Vernon Adkinson	Norton Sound	Cape Nome	S/D – Large
Victor Loyer	Near Candle Creek	Fairhaven	O/P Placer
Wayne Gibson/Golden Angle LLC	Golden, Gay creeks	Melozitna	O/P Placer
Walter Rehm	Norton Sound	Cape Nome	S/D – Recreation
Wesley DeVore	Norton Sound	Cape Nome	S/D – Large
William Fitzhugh	Nome public beach	Cape Nome	S/D –Recreation
William Gilroy III	Bering Sea	Cape Nome	S/D – Recreation
Zeke Tenhoff	Norton Sound	Cape Nome	S/D – Recreation and S/D – Large
	EASTERN INTERIOR REGION		
AK Team GS LLC	Uhler Creek	Fortymile	O/P Placer
Alaska Log Works Inc./Bronk Jorgensen	45 Pup, Buckskin creeks	Fortymile	O/P Placer
Andy Miscovich	Wolf Creek	Fairbanks	O/P Placer
Benchmark Gold LLC/D. Harvey Bickell	Near Walker Fork	Fortymile	O/P Placer
Bergelin Family Limited Partnership	Deadwood Creek	Circle	Placer exploration
Billy Lance Sr.	Jack Wade Creek	Fortymile	O/P Placer
Brad Sundstrom	Boulder Creek	Circle	O/P Placer
Brian Asplund	Deadwood Creek	Circle	O/P Placer
Bruce Herning	Palmer Creek	Fairbanks	S/D – Recreation
Buckeye Land and Minerals, Inc.	Olive Creek	Tolovana–Livengood	O/P Placer

[a]O/P = Open pit; HR = Hardrock; U/G = Underground; S/D = Suction Dredge – Large – Greater than a 6" nozzle.

OPERATOR	CREEK, RIVER, OR MINE	DISTRICT	TYPE[a]
Cannon Resources, LLC	Gold King Creek	Bonnifield	O/P Placer
Cannon Resources, LLC	Unnamed tributary of Fish Creek	Bonnifield	O/P Placer
Charles "Dick" Hammond	Chicken Creek	Fortymile	O/P Placer
Charles Zimmerman	Killarney Creek	Hot Springs	O/P Placer
Chris Groppel	Tenderfoot Creek	Richardson	O/P Placer
Conrad Hall	Golden Fork tributary of Bear Creek	Rampart	O/P Placer
Curtis Roche	Norton Sound	Cape Nome	S/D – Recreation
Cy Bras	Canyon, Hall creeks	Fortymile	O/P Placer
Dale Mattila	Thistle Creek	Bonnifield	O/P Placer
Dave Likins	Fortymile River	Fortymile	O/P Placer
Dave Scothorn	Totatlanika River	Bonnifield	O/P Placer
David Hatch and Sonya Simon	Dome Creek	Fortymile	O/P Placer
David Jacobs	Eva, Wilson, Moose creeks	Bonnifield	O/P Placer
David Smith and Alan Wildman	Bonanza, Rebel creeks	Circle	O/P Placer
DDC Mining	Boulder Creek	Hot Springs	Placer exploration drilling in 2012
Dean Race	Gilliland Creek	Fortymile	O/P Placer
Dean Willis	Crooked Creek	Circle	O/P Placer
DEPEM/Donald Stein	Gilmore, Tom creeks	Fairbanks	O/P Placer
Dexter Clark	Fox Creek	Fairbanks	O/P Placer
Don Glassburn	Gold Dust Creek	Circle	O/P Placer
Duane Ellingson	Birch Creek	Circle	O/P Placer
Donald Smithwick	Crooked Creek	Fortymile	O/P Placer
Dwight Hjorth	Sheep, Tatlanika creeks	Bonnifield	O/P Placer
Dyton Gilliland	Jack Wade Creek	Fortymile	O/P Placer
Earl Vegoren	Rainy Creek	Delta River	O/P Placer
Earth Movers of Fairbanks, Inc.	Cleary Creek	Fairbanks	O/P Placer
Eddie True	Liberty Creek	Fortymile	O/P Placer
Elton McGhan	Kal Creek	Fortymile	O/P Placer
Eric Kile	Canyon Creek	Fortymile	O/P Placer
Ernest Johnson	Rhode Island Creek	Hot Springs	O/P Placer
Esther and Siegunde Daack	Chicken Creek	Fortymile	O/P Placer
Fairbanks Excavation	Smallwood Creek	Fairbanks	O/P Placer
Fairbanks Gold Mining Inc.	Fort Knox Mine	Fairbanks	O/P HR
Ferguson Placer	Walker Fork	Fortymile	O/P Placer
Fred Cornelius	Fox Creek	Fairbanks	O/P Placer
45 Pup Gold Company LLC/ Bronk Jorgensen	45 Pup, Buckskin creeks	Fortymile	O/P Placer
Frank Morrison III	Big Eldorado Creek	Fairbanks	O/P Placer
Gene Hume	Switch Creek	Circle	O/P Placer
George Seuffert Jr.	Faith Creek	Circle	O/P Placer
Geoquest/Michael Busby	Myers Fork	Fortymile	O/P Placer
Gerald and Kathryn Pitcher	Deadwood Creek	Circle	O/P Placer
Gold Adventures LLC/ James Gilmore	Boulder Creek	Hot Springs	O/P Placer
Guy Matthews and Micheal Williams	McArthur Creek	Chisana–Nabesna	O/P Placer
Herning Exploration and Mining	Palmer Creek	Fairbanks	S/D – Recreation
Ian Miller	Cherry Creek	Fortymile	O/P Placer
Jack Barnes and Chrystine Pacheco	Baby/Kal Creek, Squaw Gulch	Fortymile	O/P Placer
Jackson Mining Company/Roy Traxler	Totatlanika River	Bonnifield	O/P Placer
James, Karin, and Daniel Bailey	Gold Dust Creek	Circle	Placer exploration
James and Linda Baisdon	Easley Creek	Circle	Placer exploration
James Decker	Sheep, Tatlanika creeks	Bonnifield	O/P Placer
James Kimbro	Fortymile River	Fortymile	S/D – Large
James Stepp	Bottom Dollar	Circle	O/P Placer
James Stone/Pacific Mining Co.	Porcupine Creek	Circle	Placer exploration
James Treesh	No name – Branch of Cherry Creek	Fortymile	O/P Placer
Jason Dobson	Rhode Island and Gold Run	Hot Springs	O/P Placer
Jason Minekome	Walker Fork Fortymile River	Fortymile	O/P Placer
Jeff Owen	Walker Fork, Davis Creek	Fortymile	O/P Placer
Jeffrey and Laura Thimsen	Upper Woods Creek	Fortymile	O/P Placer
Jim Holmes	Dome Creek	Fairbanks	O/P Placer
Jim Whary	Mosquito Fork	Fortymile	O/P Placer
Jim Swearingin	Main Fortymile River	Fortymile	S/D – Recreation
Joe Garule	Chicken Creek	Fortymile	O/P Placer
John Barker	Liberty Creek	Fortymile	O/P Placer
John Bergelin	Deadwood Creek	Circle	Placer exploration
John King	Little Boulder Creek	Hot Springs	O/P Placer
John and Dawn Lines/Aurora Mining	North Fork Harrison Creek	Circle	O/P Placer
John McClain	Kokomo Creek	Fairbanks	O/P Placer

[a]O/P = Open pit; HR = Hardrock; U/G = Underground; S/D = Suction Dredge – Large – Greater than a 6" nozzle.

OPERATOR	CREEK, RIVER, OR MINE	DISTRICT	TYPE[a]
John Schwartz	Our Creek	Fortymile	Placer exploration
Joseph and Monica Mitchell	Fortymile River	Fortymile	Placer exploration
Judd Edgerton	Napoleon Creek	Fortymile	O/P Placer
Keith Clark	Shamrock Creek	Fairbanks	Placer exploration, S/D – Recreation
Keith Wright	Boulder Creek	Circle	O/P Placer
Kenneth Hanson	Faith Creek	Circle	O/P Placer
Kenneth and Marianne Campbell	Jack Wade Creek	Fortymile	S/D – Recreation
Kenneth Monzulla and Paul Roderick	Nugget Creek	Fairbanks	O/P Placer
Larry Crouse	Fox Gulch	Fairbanks	O/P Placer
Lawrence Ostnes	Totatlanika River	Bonnifield	O/P Placer
Les Underwood	Porcupine Creek	Circle	O/P Placer
MacKinan Productions/Harry Colburn	Walker Fork	Fortymile	O/P Placer
Mark Funk	Goldstream Creek	Fairbanks	O/P Placer
Michael Fulton and Doug Marks	Butte Creek	Circle	O/P Placer
Million Dollar Mining/Micheal Sweetsir	Glenn Gulch	Ruby	O/P Placer
Michael Williams and Guy A. Matthews	McArthur Creek	Fortymile	O/P Placer
Mickey Jones and Gary L. Freeland	Mosquito Fork	Fortymile	O/P Placer
Mike Gibson	Sourdough Creek	Circle	O/P Placer
Mikhail Baburkin	Jack Wade Creek	Fortymile	O/P Placer
Miller Creek Mining Co./Fred Wilkinson	Ketchem Creek	Circle	O/P Placer
Mitch Loveless	No stream	Fairbanks	Placer exploration
MSR Inc./Steve Bargabos and John Emmi	Birch Creek	Circle	O/P Placer
Mudminers, LLC/Doug Baker	Sullivan Creek, Miller Gulch	Hot Springs	O/P Placer
Nelson Mining Co./Larry Nelson	Livengood Creek	Tolovana–Livengood	O/P Placer
Northwest Gold LLC/ Todd Tanner and Dan Blackard	Cripple Creek	Fairbanks	O/P Placer
Olson Placer	Ketchum Creek	Fairbanks	O/P Placer
Patrick West	Bonanza Creek	Circle	O/P Placer
Paul & Co./Paul Manuel	Fairbanks Creek	Fairbanks	O/P Placer
Paul and Teresa Hunstiger	Fortymile River	Fortymile	S/D – Large
Polar Mining/Daniel May	Goldstream Creek	Fairbanks	O/P Placer
R & M Mining/Raymond Lester and Mike Lester	Birch Creek	Circle	O/P Placer
Raleigh Cline	Eagle Creek	Fortymile	O/P Placer
Randy Powelson	Fox Creek	Fairbanks	O/P Placer
Raymond Meder	Flume Creek	Fairbanks	O/P Placer
Richard Loud	North Fork and South Fork Harrison Creek	Circle	O/P Placer
Richard Swenson and Kelly Williams	Doric Creek	Hot Springs	O/P Placer
Richard Ott	Omega Creek	Hot Springs	O/P Placer
Richard Wilder and Karen Wilder	Little Boulder Creek	Hot Springs	O/P Placer
Richardson Shield LLC/Alan Las	No Grub Creek	Fairbanks	O/P Placer
Ricky Nix and Donald Sprague	Mogul, Seventymile River, Broken Neck	Fortymile	S/D, Recreation
Ricky Blue/Kevin Stowell	Glenn, Moosemary, Boston, Eureka creeks	Hot Springs	O/P Placer
Robert Cook	Gold Dust Creek	Circle	O/P Placer
Robert Emerson	No stream on property	Fairbanks	O/P Placer
Robert Hare	Gold Dust Creek	Circle	O/P Placer
Robert Wener	Warner Creek	Fortymile	Placer exploration
Robin and Wanda Severson	Willow Creek	Fortymile	O/P Placer
Roger Larson	Fortymile River	Fortymile	S/D – Large
Ron Roman	Last Chance Creek	Fairbanks	O/P Placer
Roy Frasier	Bottom Dollar Creek	Circle	O/P Placer
Sam and Donna Skidmore	Vault Creek	Fairbanks	O/P Placer
Sam and Roberta Koppenberg	Hunter Creek	Rampart	O/P Placer
Scott Thomas	Deadwood Creek	Circle	O/P Placer
Scotty Wyers	Hilltop Placer	Richardson	Placer exploration
Seuffert Mining Company/George Seuffert, Jr.	Chicken Creek	Fortymile	O/P Placer
Seuffert Mining Company/George Seuffert, Jr.	Portage Creek	Circle	O/P Placer
Sheldon and Janne Maier	Montana Creek	Fortymile	O/P Placer
Silverado Gold Mines Inc.	Head of Eagle Creek drainage	Fairbanks	Hardrock Exploration
Silver Jim Stroer	Confederate Creek	Fortymile	O/P Placer
Slate Creek Mining/Steve Adams	Slate Creek	Rampart	O/P Placer
Stanley Gelvin	Crooked Creek	Circle	O/P Placer
Steve Adams	Slate Creek	Rampart	O/P Placer
Steve Marley	Ptarmigan Creek	Circle	O/P Placer
Sumitomo Metal Mining Pogo LLC	Pogo Mine	Goodpaster	U/G HR

[a]O/P = Open pit; HR = Hardrock; U/G = Underground; S/D = Suction Dredge – Large – Greater than a 6" nozzle.

OPERATOR	CREEK, RIVER, OR MINE	DISTRICT	TYPE[a]
Theodore Payment	Wilson Creek	Fortymile	O/P Placer
Thor Jorgensen/Alaska Log Works	Franklin Creek	Fortymile	O/P Placer
Tillicum Resources Inc./Fred Cornelius and Gerald Erickson	Fox Creek	Fairbanks	O/P Placer
Timothy Kelly/Kelly Mining	North Fork Creek	Hot Springs	O/P Placer
Todd Tanner and Dan Blackard	Chena Ester Ditch	Fairbanks	O/P Placer
TonoGold Resources Inc./Alan Las	No Grub Creek	Fairbanks	O/P Placer
Viktor Kravets	Sourdough	Circle	O/P Placer
Voytilla Mining/Earl Voytilla	Ester Creek	Fairbanks	O/P Placer
William Angell	Fortymile River	Fortymile	S/D – Reclamation
William Bohan	O'Connor Creek	Fairbanks	Placer exploration
William and Walter Bohan	Ottertail Creek	Fairbanks	O/P Placer
William Aldridge	Poker Creek	Fortymile	O/P Placer
William Miller	Jack Wade Creek	Fortymile	S/D – Recreation
Yella Metal Exploration and Mining/Jack Barnes	Baby Creek, Kal Creek	Fortymile	O/P Placer and S/D
	SOUTHCENTRAL REGION		
Brent Starkenburg	Near Cache Creek	Yentna–Cache Creek	O/P Placer
Brian Berkhahn	Mills Creek	Hope	S/D – Large
Bruce Waldron	Red Fox Creek	Valdez Creek	Placer exploration
Cal Myrick	Canyon Creek	Hope	S/D – Recreation
Daniel Hartman	Cache Creek	Yentna–Cache Creek	O/P Placer
Daniel Rodrigue	Tyone Creek	Valdez Creek	O/P Placer
Darlene McMahan, Joseph and Verna Paluba Living Trust, Charles M. Selman Trust	n/a	Valdez Creek	O/P Placer
Daniel Dempsey and David Dempsey	Mineral Creek	Prince William Sound	O/P Placer
David Herren and Jason Cooper	43 Pup Creek	Circle	O/P Placer
David Howland	Dry Channel	Chistochina	O/P Placer
Douglas Weathers	Cache Creek	Yentna–Cache Creek	Placer exploration
Earle Foster	Willow Creek	Willow Creek– Hatcher Pass	Placer exploration
Fred Wilkes and Robert Bradford	Bird Creek	Yentna–Cache Creek	O/P Placer
GMAPA Inc.	Porcupine Creek	Chistochina	O/P Placer
Golden Bonanza Corporation	Valdez, Timberline, Sunny Gulch, White, Roosevelt, Craig, Surprise creeks	Valdez Creek	Placer exploration
Gordon Bartel and Robert Haines	Mills Creek	Yentna–Cache Creek	O/P Placer
Gordon Wolff	Peters Creek	Yentna–Cache Creek	O/P Placer
James Albrecht	Lower Ruby	Yentna–Cache Creek	O/P Placer
James McCall	Lower Ruby	Yentna–Cache Creek	O/P Placer
Joe Bradley	Mills Creek	Yentna–Cache Creek	O/P Placer
John Godsey and Randy Horne	Corea Creek	Homer	S/D – Large
John Pipkin	Slate Creek	Valdez Creek	Placer exploration
Kenneth Lee	Cache Creek	Yentna–Cache Creek	O/P Placer and S/D – Recreation
Larry Salhaney	Bench Creek	Valdez	Exploration, SD – Large, SD – Recreation
Mark Anzivino/M.A. Mining.	Lower Valdez	Valdez Creek	O/P Placer
Mark Cizek	Nugget Creek	Yentna–Cache Creek	O/P Placer
Matt Branson	Cache Creek	Yentna–Cache Creek	O/P Placer
Michael Kingsbury	White Creek	Valdez Creek	O/P Placer
North American Mining LLC/Steve Sneed	Peters, Willow, Little Willow, Cottonwood creeks	Yentna–Cache Creek	O/P Placer
Patricia McKenzie	Canyon Creek	Hope–Sunrise & Seward	S/D – Recreation
Raymond Caldwell	Near Tenas Lake	Valdez Creek	O/P Placer
Richard Peterson	Willow Creek	Nelchina	O/P Placer
Robert Applebee	Bear Creek	Hope–Sunrise & Seward	O/P Placer and Hardrock Exploration
Ron Gries	Jack Creek	Chitina	Placer exploration
Russell Hoffman	Ruby Creek	Chistochina	O/P Placer
Stephen Fuller	Caribou Creek	Yentna–Cache Creek	O/P Placer
Steve and Patricia Lankford	Albert Creek	Nelchina	O/P Placer
Steve Sneed	Cottonwood Creek	Yentna–Cache Creek	O/P Placer
Steven Priddle and John Chamberlain	Roosevelt Creek	Valdez Creek	O/P Placer
Timothy Green	Eagle Creek	Chistochina	O/P Placer
Tod Bauer	Dry , Cottonwood, Peters creeks	Yentna–Cache Creek	O/P Placer
Van Swan	Colorado, Butcher creeks	Hope–Sunrise & Seward	Placer exploration

[a]O/P = Open pit; HR = Hardrock; U/G = Underground; S/D = Suction Dredge – Large – Greater than a 6" nozzle.

OPERATOR	CREEK, RIVER, OR MINE	DISTRICT	TYPE[a]
	SOUTHWESTERN REGION		
Daniel Plano	Anvil Creek	Innoko–Tolstoi–Ophir	O/P Placer
David "Larry" Wilmarth	Chicken Creek	Iditarod	O/P Placer
Doug Clark	Ganes Creek and tributaries	Innoko–Tolstoi–Ophir	O/P Placer
Jeannine Faulkner	Ophir Creek	Aniak–Tuluksak	O/P Placer
Jeffrey Star	Crooked Creek	Ruby	Placer exploration
L.E. Wyrick	Granite Creek	Aniak–Tuluksak	O/P Placer
Little Creek Mine/Paul Sayer	Bedrock Creek	Innoko–Tolstoi–Ophir	O/P Placer
Mark Matter	Marvel Creek	Aniak–Tuluksak	O/P Placer
Max and Catherine Agoff dba Prince Creek Mining	Prince Creek	Iditarod	O/P Placer
Metallogeny, Inc.	Poorman Creek	Ruby	Placer exploration
Moore Creek Pay–to–Mine LLC	Moore Creek	Innoko–Tolstoi–Ophir	O/P Placer and S/D – Recreation
Mystery Creek Resources, Inc.	Nixon Fork Mine	McGrath	U/G Gold
Neil Rosander	Cripple Creek	Innoko–Tolstoi–Ophir	O/P Placer
Northwest Mining LLC/Timothy Green	Eagle Creek	Chistochina	O/P Placer
Pan Pacific Resources/Joshua Taylor	Spruce Creek	Innoko–Tolstoi–Ophir	O/P Placer
Peter Snow	Yankee Creek	Innoko–Tolstoi–Ophir	O/P Placer
Robert Magnuson Jr.	Madison Creek	Innoko–Tolstoi–Ophir	O/P Placer
Rosander Mining Company Inc.	Colorado Creek, Cripple Creek	Innoko–Tolstoi–Ophir	O/P Placer
Lyman Resources in Alaska, Inc./Spencer and Carolyn Lyman	Crooked Creek	Iditarod	O/P Placer
Strandberg & Sons/Sigvald Strandberg	Montana, Creston, Colorado creeks	Innoko	Placer exploration
	SOUTHEASTERN REGION		
Coeur Alaska Inc.	Kensington Gold Mine	Berners Bay	U/G HR
Hecla Greens Creek Mining Company	Greens Creek Mine	Juneau & Admiralitys	U/G HR
Mark Sebens	Porcupine Creek	Juneau & Admiralitys	O/P Placer
	ALASKA PENINSULA REGION		
Wayne Murphy	Beach sands – Kodiak	Kodiak–Unga Island	O/P Placer

[a]O/P = Open pit; HR = Hardrock; U/G = Underground; S/D = Suction Dredge – Large – Greater than a 6" nozzle.

APPENDIX C

Primary metals production in Alaska, 1880-2012[a,b]

Year	Gold[c]		Silver		Mercury		Antimony		Tin		Lead		Zinc		Platinum[e]		Copper		Chromium	
	(oz)	(m$)	(oz)	(t$)	(flask[d])	(t$)	(lb)	(t$)	(lb)	(t$)	(tons)	(t$)	(tons)	(t$)	(oz)	(t$)	(lb)	(m$)	(tons)	(t$)
1880–1899	1,153,889	$23.9	496,101	$329.0	--	--	--	--	--	--	250	$17.0	--	--	--	--	--	--	--	--
1900–1909	6,673,173	137.9	1,324,580	779.5	--	--	--	--	304,000	$112.2	369	32.8	--	--	--	--	29,549,486	$4.8	--	--
1910–1919	7,209,094	149.0	7,058,235	5,107.5	--	--	2,760,000	W	1,640,000	805.9	3,565	470.2	--	--	914	$116.5	515,253,817	109.9	2,200	W
1920–1929	3,373,336	69.8	6,407,375	5,160.8	117	$7.6	W	W	317,800	163.9	7,961	1,084.1	--	--	5,750	484.9	643,576,929	93.3	--	--
1930–1939	5,345,205	150.8	3,250,173	1,889.8	31	2.3	1,616,000	$228.3	1,024,400	502.1	10,791	914.3	--	--	102,615	5,427.1	184,522,000	19.5	--	--
1940–1949	3,137,447	109.8	794,842	577.0	3,094	724.3	2,062,080	311.1	319,200	230.3	3,096	405.2	678	$0.5	225,285	12,623.3	433,700	0.2	7,409	$250.9
1950–1959	2,297,827	80.6	321,669	292.9	18,185	4,370.0	2,663,520	3,697.6	1,144,000	1,310.5	177	38.6	--	--	107,927	9,403.9	106,000	0.1	21,442	1,975.8
1960–1969	751,870	26.6	59,300	70.7	13,996	3,098.0	228,800	267.8	--	--	40	9.9	--	--	111,556	13,618.5	352,000	0.1	--	--
1970–1979	324,906	55.8	54,700	250.5	4,040	1,694.0	1,473,000	1,714.0	166,000	949.0	20	8.0	--	--	41,604	6,826.0	--	--	8,000	1,200.0
1980	75,000	32.0	7,500	111.0	--	--	--	--	120,000	984.0	31	29.0	--	--	--	--	--	--	--	--
1981	134,200	55.2	13,420	111.3	W	W	--	--	106,000	700.0	--	--	--	--	900	200.0	--	--	--	--
1982	175,000	69.9	22,000	198.0	--	--	--	--	198,000	1,365.0	--	--	--	--	W	W	--	--	--	--
1983	169,000	67.6	33,200	332.0	--	--	22,400	45.0	215,000	1,100.0	--	--	--	--	W	W	--	--	--	--
1984	175,000	62.1	20,000	159.0	5	1.5	135,000	225.8	225,000	400.0	--	--	--	--	W	W	--	--	--	--
1985	190,000	61.2	28,500	171.0	27	10.0	65,000	98.0	300,000	650.0	--	--	--	--	--	--	--	--	--	--
1986	160,000	60.8	24,000	134.4	12	2.8	45,000	67.5	340,000	890.0	--	--	--	--	W	W	--	--	--	--
1987	229,707	104.5	54,300	391.0	--	--	--	--	288,000	460.0	--	--	--	--	W	W	--	--	--	--
1988	265,500	112.8	47,790	282.0	W	W	--	--	300,000	950.0	--	--	--	--	25	13.8	--	--	--	--
1989	284,617	108.7	5,211,591	27,300.0	--	--	--	--	194,000	672.0	9,585	7,700.0	19,843	29,400.0	--	--	--	--	--	--
1990	231,700	89.2	10,135,000	50,675.0	--	--	--	--	57,000	200.0	44,220	30,954.0	181,200	253,680.0	--	--	--	--	--	--
1991	243,900	88.3	9,076,854	39,110.0	--	--	--	--	6,800	22.1	69,591	33,403.7	278,221	278,221.0	15	5.3	--	--	--	--
1992	262,530	88.5	9,115,755	34,913.0	--	--	--	--	1,500	5.9	68,664	31,585.0	274,507	301,957.7	--	--	--	--	--	--
1993	191,265	68.6	5,658,958	24,333.0	--	--	--	--	21,000	50.6	38,221	13,759.6	268,769	236,516.7	3	1.2	--	--	--	--
1994	182,100	70.3	1,968,000	10,391.0	--	--	--	--	--	--	36,447	25,512.9	329,003	296,102.7	5	2.1	--	--	--	--
1995	141,882	56.0	1,225,730	6,655.0	--	--	--	--	--	--	58,098	34,428.6	359,950	345,552.0	1	0.4	--	--	--	--
1996	161,565	62.6	3,676,000	19,078.0	--	--	--	--	--	--	70,086	52,284.0	366,780	361,646.0	2	0.8	780,000	0.8	--	--
1997	590,516	207.3	14,401,165	70,710.0	--	--	--	--	--	--	88,560	49,593.0	419,097	494,888.0	--	--	3,440,000	3.5	--	--
1998	594,191	174.6	14,856,000	82,154.0	--	--	--	--	--	--	102,887	49,386.0	549,348	505,400.0	--	--	3,800,000	2.9	--	--
1999	517,890	144.3	16,467,000	85,628.0	--	--	--	--	--	--	125,208	57,596.0	643,642	630,769.0	--	--	4,200,000	3.0	--	--
2000	551,982	154.1	18,226,615	90,404.0	--	--	--	--	--	--	123,224	51,754.0	669,112	682,494.0	--	--	2,800,000	2.3	--	--
2001	550,644	149.3	16,798,000	73,408.0	--	--	--	--	--	--	127,385	56,049.0	634,883	507,907.0	--	--	2,800,000	2.0	--	--
2002	562,094	174.3	17,858,183	82,326.0	--	--	--	--	--	--	146,462	61,514.0	718,103	502,674.0	--	--	3,200,000	2.3	--	--
2003	528,191	191.9	18,589,100	95,300.0	--	--	--	--	--	--	162,479	64,279.0	714,769	536,348.0	--	--	--	--	--	--
2004	456,508	192.3	16,947,270	113,056.9	--	--	--	--	--	--	150,796	120,636.8	680,015	651,432.2	--	--	--	--	--	--
2005	427,031	189.9	11,670,000	85,382.0	--	--	--	--	--	--	131,366	115,230.0	684,462	862,108.0	--	--	--	--	--	--
2006	570,129	344.1	16,489,394	190,415.9	--	--	--	--	--	--	157,128	183,629.3	673,967	2,002,971.4	--	--	--	--	--	--
2007	726,933	511.1	20,203,985	270,402.1	--	--	--	--	--	--	167,181	389,532.2	696,115	2,048,451.6	--	--	87,627	0.3	--	--
2008	800,752	698.2	14,643,735	219,496.4	--	--	--	--	--	--	153,705	287,428.4	626,135	1,055,220.1	--	--	--	--	--	--
2009	780,657	759.1	15,617,436	229,159.3	--	--	--	--	--	--	167,204	260,838.2	712,496	1,068,744.0	--	--	--	--	--	--
2010	914,462	1,119.8	13,991,297	282,523.5	--	--	--	--	--	--	146,480	284,171.2	667,539	1,212,390.3	--	--	--	--	--	--
2011	848,945	1,334.1	11,683,967	410,340.9	--	--	--	--	--	--	113,649	247,755.2	696,793	1,379,649.2	5,000	8,609.3	1,058	0.0	--	--
2012	921,240	1,537.5	12,313,877	383,573.6	--	--	--	--	--	--	126,234	234,795.2	647,481	1,139,566.6	--	--	14,327	0.0	--	--
Other[f]	--	--	--	--	1,438	--	--	--	--	--	--	--	--	--	71,946	17,091.9	--	--	--	--
TOTAL	**43,881,879**	**$9,944.4**	**316,842,597**	**$2,993,083.1**	**40,945**	**$9,910.5**	**11,070,800**	**$6,655.1**	**7,287,700**	**$12,523.5**	**2,611,160**	**$2,746,824.3**	**12,512,908**	**$17,384,090.0**	**673,548**	**$57,333.1**	**1,394,916,944**	**$245.1**	**39,051**	**$3,426.7**

[a] From published and unpublished state and federal documents. Where state and federal figures differ significantly, state figures are used.

[b] Please refer to previous editions of this appendix for year-to-year production information for years 1900 to 1979.

[c] Gold production adjusted to be consistent with mining district production totals.

[d] 76-lb flask.

[e] Crude platinum; total production of refined metal is about 575,000 oz.

[f] Not traceable by year.

W = withheld

-- = Not reported

t$ = thousands of dollars

m$ = millions of dollars

APPENDIX D

Production of industrial minerals, coal, and other commodities in Alaska, 1880-2012[a,b]

	Coal		Sand and gravel		Rock[c]		Barite		Other[d]
Year	short tons	m$	short tons	m$	short tons	m$	short tons	t$	$
1880–1899	19,429	$0.1	--	--	7,510	$0.0	--	--	--
1900–1909	33,214	0.2	--	--	15,318	0.2	--	--	$246,403
1910–1919	210,806	1.2	--	--	50,014	0.3	--	--	2,014,788
1920–1929	937,860	5.2	--	--	494,417	2.7	--	--	2,523,754
1930–1939	1,222,797	5.5	42,332	$0.0	689,676	2.8	--	--	899,767
1940–1949	3,189,026	20.2	1,758,504	0.7	286,341	1.3	--	--	27,124,158
1950–1959	6,632,641	59.7	65,804,686	55.1	1,843,560	5.2	--	--	25,443,427
1960–1969	7,849,000	58.8	163,315,000	176.7	2,034,000	4.2	225,000	$1,200.0	34,143,000
1970–1979	7,405,000	89.0	489,522,000	1,004.9	47,930,000	137.4	502,000	8,217.0	77,501,000
1980	800,000	16.0	40,000,000	86.0	3,700,000	15.4	50,000	2,000.0	97,500
1981	800,000	17.6	46,000,000	88.2	4,200,000	19.3	--	--	256,000
1982	830,000	18.0	45,000,000	91.0	3,400,000	15.6	--	--	150,000
1983	830,000	18.0	50,000,000	105.0	5,270,000	25.0	--	--	242,000
1984	849,161	23.8	27,000,000	95.0	2,700,000	16.0	--	--	875,875
1985	1,370,000	39.7	28,184,080	112.1	2,500,000	12.0	--	--	559,000
1986	1,492,707	40.1	20,873,110	75.8	4,200,000	20.3	--	--	384,800
1987	1,508,927	42.4	16,696,374	42.7	1,805,000	11.6	--	--	388,400
1988	1,551,162	44.3	17,264,500	48.8	3,600,000	24.7	--	--	389,000
1989	1,452,353	41.5	14,418,000	39.9	2,914,000	20.3	--	--	1,492,000
1990	1,576,000	45.0	15,013,500	40.8	3,200,000	22.1	--	--	400,000
1991	1,540,000	39.0	14,160,011	45.5	3,000,000	22.5	--	--	462,000
1992	1,531,800	38.3	14,599,746	42.2	2,900,000	23.0	--	--	430,000
1993	1,586,545	38.1	13,162,402	40.6	3,561,324	26.2	--	--	465,000
1994	1,490,000	36.8	13,518,321	41.0	3,843,953	27.0	--	--	459,500
1995	1,640,000	41.3	9,847,550	30.9	2,811,152	22.1	--	--	182,500
1996	1,481,000	38.0	9,890,463	32.2	3,000,045	23.6	--	--	200,000
1997	1,446,000	38.1	13,800,000	51.9	3,200,000	20.0	--	--	217,000
1998	1,339,000	35.2	12,363,450	57.3	1,636,200	14.0	--	--	215,000
1999	1,560,000	41.1	10,600,000	52.4	1,640,000	18.0	--	--	190,000
2000	1,473,355	38.8	10,600,000	49.9	5,200,000	36.6	--	--	203,000
2001	1,537,000	48.1	10,360,000	55.2	3,091,000	27.2	--	--	205,000
2002	1,158,000	37.4	22,412,000	120.7	3,152,000	31.4	--	--	200,000
2003	1,088,000	38.1	11,868,001	64.1	861,382	10.4	--	--	175,000
2004	1,450,000	50.8	19,576,092	101.5	7,312,050	106.2	--	--	2,732,554
2005	1,402,174	49.1	16,620,009	76.5	2,803,172	22.6	--	--	809,642
2006	1,397,500	48.9	13,953,465	63.4	2,369,738	23.8	--	--	1,057,500
2007	1,273,004	44.6	14,163,676	76.1	2,211,954	25.5	--	--	1,085,500
2008	1,538,000	53.8	12,461,685	72.4	2,485,820	39.5	--	--	1,159,502
2009	1,861,714	65.2	7,072,037	41.4	1,837,090	27.2	--	--	3,678,930
2010	2,061,000	72.1	6,977,297	48.0	290,852	4.3	--	--	2,303,950
2011	2,220,000	77.7	5,862,851	38.7	499,722	6.4	--	--	3,200,000
2012	2,018,759	70.7	7,799,994	52.3	1,050,762	15.8	--	--	--
Other	--	--	--	--	2,300,000 [e]	W	79,000	W	--
TOTAL	**74,652,934**	**$1,627.1**	**1,312,561,135**	**$3,316.8**	**151,898,052**	**$929.8**	**856,000**	**$11,417.0**	**$194,762,450**

[a] From published and unpublished state and federal documents. Where state and federal figures differ significantly, state figures are used.

[b] Please refer to previous editions of this appendix for year-to-year production information for years 1900 to 1979.

[c] Building-stone production figures for 1880–1937 are for the southcentral and interior regions of Alaska only.

[d] Includes 2.4 million lb U_3O_8 (1955–1971); 505,000 tons gypsum (1905–1926); 286,000 lb WO_3 (intermittently, 1916–1980); 94,000 lb asbestos (1942–44); 540,000 lb graphite (1917–1918 and 1942–1950); and undistributed amounts of zinc, jade, peat, clay, soapstone, miscellaneous gemstones, and other commodities (1880–1993).

[e] Marble quarried on Prince of Wales Island, southeastern Alaska (1900–1941).

m$ = million dollars

t$ = thousand dollars

-- = not reported

W = withheld

	Mining districts[a]	Production (in refined troy ounces)		
		Total	Placer	Lode
1	Lisburne district	0	0	0
2	Noatak district	7,800	0	0
3	Wainwright district	0	0	0
4	Barrow district	0	0	0
5	Colville district	0	0	0
6	Canning district	0	0	0
7	Sheenjek district	0	0	0
8	Chandalar district	137,677	51,438	17,400
9	Koyukuk district	740,027	374,433	0
10	Shungnak district	30,000	15,000	0
11	Kiana & Selawik districts	81,207	40,607	0
12	Fairhaven district (Candle subdistrict)	699,142	349,701	0
13	Fairhaven district (Inmachuk subdistrict)	507,485	253,765	0
14	Serpentine district	8,784	4,478	0
15	Port Clarence district	84,715	42,358	0
16	Kougarok district	378,597	190,222	0
17	Nome (Cape Nome) district	10,045,036	5,030,054	0
18	Council district	2,094,069	1,020,042	27,000
19	Koyuk district	168,778	84,402	0
20	Hughes district	715,510	380,244	0
21	Kaiyuh district	299,406	5,400	144,303
22	Anvik district[b]	14	7	0
23	Marshall district	249,012	124,506	0
24	Bethel district	85,905	42,953	0
25	Goodnews Bay district	62,400	31,200	0
26	Aniak district	1,220,302	613,054	0
27	Iditarod district	3,128,904	1,561,801	2,930
28	McGrath district	683,499	133,307	220,931
29	Innoko district	1,503,236	754,048	156
30	Ruby district	955,985	478,008	0
31	Kantishna district	198,614	91,401	7,906
32	Hot Springs district	1,195,993	602,322	0
33	Melozitna district	27,719	14,564	0
34	Rampart district	407,250	204,842	0
35	Tolovana district	1,079,969	540,436	0
36	Yukon Flats district	0	0	0
37	Circle district	2,216,393	1,112,990	0
38	Black district	5	2	0
39	Eagle district	104,281	52,152	0
40	Fortymile district	1,173,142	596,124	0
41	Chisana district	289,034	78,019	66,500
42	Tok district	569	288	0
43	Goodpaster district	3,317,698	2,050	2,135,539
44	Fairbanks district	27,283,122	8,250,405	5,911,528
45	Bonnifield district	195,736	94,591	6,700
46	Richardson subdistrict of Fairbanks district[c]	242,712	119,404	2,300
47	Delta River district	21,510	10,990	0
48	Chistochina district	369,498	185,962	0
49	Valdez Creek district	1,050,934	528,928	1,581
50	Yentna district	405,573	203,482	0
51	Redoubt district	210	105	0
52	Bristol Bay Region	3,140	1,570	0
53	Kodiak district (53b)–Alaska Peninsula Region (53a)	224,816	4,808	107,600
54	Homer district	33	17	0
55	Hope & Seward districts	270,360	70,193	65,000
56	Anchorage district[d]	657	415	0
57	Willow Creek district	1,335,669	58,841	609,000
58	Prince William Sound district	275,591	101	137,700
59	Nelchina district	29,669	14,912	0
60	Nizina district	297,000	148,500	0
61	Yakataga district	36,083	18,041	0
62	Yakutat district[e]	26,400	2,200	11,000
63	Juneau district (partial)	165,028	82,539	0
64	Juneau (64a) & Admiralty (64b) districts	18,317,435	81,490	9,287,670
65	Chichagof district	1,540,000	0	770,000
66	Petersburg district	30,000	15,000	0
67	Kupreanof district	0	0	0
68	Hyder district	438	219	0
69	Ketchikan district	124,003	4,002	58,000
70	Bering Sea Region	0	0	0
71	Aleutian Islands Region	0	0	0
	Unknown (undistributed)[f]	58	29	0
	TOTAL	86,143,828 (2,679 tonnes)	24,772,963	19,590,744

Total gold production in Alaska by mining district, 1880–2012

[a]Mining district names and boundaries revised slightly from those defined by Ransome and Kerns (1954) and Cobb (1973). Sources of data: U.S. Geological Survey, U.S. Bureau of Mines, and Alaska Territorial Department of Mines records 1880-1930; U.S. Mint records 1930-1969; State of Alaska production records 1970-2006. Entries of "0" generally mean no specific records are available.

[b]Included in Marshall district.

[c]Not included in total for Fairbanks district.

[d]Most placer gold production included in Willow Creek district.

[e]Includes lode production from Glacier Bay area and placer production from Lituya Bay area.

[f]Production that cannot be credited to individual districts due to lack of specific records or for reasons of confidentiality.