Alaska's Mineral Industry 2013

Special Report 69

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

Alaska's Mineral Industry 2013

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

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Front cover photo: Underground loader removing ore at Kensington Gold Mine in southeastern Alaska about 45 miles north–northwest of Juneau. In 2013, Coeur Alaska Inc. had their best year of production since the Kensington Mine startup in 2010, producing a total of 114,821 ounces gold, adding to the 9.3 million ounces gold previously produced from the Juneau mining district. Photo provided by Coeur Alaska Inc.

Back cover photo (upper left): Fairbanks Gold Mining Inc. employees viewing the results of reclamation activities at True North Mine, a satellite operation of Fort Knox Mine north of Fairbanks, Alaska. Reclamation activities were completed at True North in 2013 and Fairbanks Gold Mining Inc. continues to monitor the site. Photo provided by Fairbanks Gold Mining Inc.

Back cover photo (upper right): View of the expanded dry stack tailing facility at Pogo Mine, located 38 miles northeast of Delta Junction in east-central Alaska. The tailing facility was expanded to accommodate new resources added by recent exploration. Photo provided by Sumitomo Metal Mining Pogo LLC.

Back cover photo (middle left): View of the present NovaCopper Inc. camp alongside the historical underground shaft headframe at the Bornite prospect, in the southern foothills of the Brooks Range in northern Alaska. As of the end of 2013, the total resource at Bornite stood at 3.47 billion pounds of copper, and will likely be expanded with the results of successful 2013 exploration. Photo provided by NovaCopper Inc.

Back cover photo (middle right): Geologist examining copper-mineralized outcrop at Millrock Resources Inc.'s Alaska Peninsula project on Bristol Bay Native Corp. lands. Photo provided by Phil St. George, Millrock Chief Exploration Officer.

Back cover photo (lower left): Mill operator pouring Fort Knox Mine's six-millionth ounce of gold produced, a significant proportion of the 14.6 million ounces gold produced in the Fairbanks mining district. Fort Knox is currently the leading gold producer in Alaska. Photo provided by Fairbanks Gold Mining Inc.

Back cover photo (lower right): Exploration drill rig at the Constantine Metal Resources Ltd.'s Palmer polymetallic volcanogenic massive sulfide property near Haines, Alaska. In 2013 Constantine and Dowa Metals & Mining Corp. of Japan announced a long-term exploration agreement, highlighting the importance of Alaska's mineral resources to Pacific Rim countries. Photo provided by Constantine Metal Resources Ltd.

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EXECUTIVE SUMMARY

Alaska's Mineral Industry 2013 is the 33rd 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). Published for one-third of a century in this format, the annual report endeavors to provide a consistent, factual snapshot of mineral industry activity in Alaska and also serves as the authoritative, historical record of mining in the state.

The total reported value of Alaska's mineral industry decreased in 2013 to $3,953.0 million, almost 4 percent lower than its $4,113.6 million value in 2012. The total value is a composite of the year's expenditures on exploration and development plus the estimated first market value of the commodities produced. Alaska's mineral production and development sectors remained strong despite the limited funding available for exploration projects. Mineral exploration expenditures decreased dramatically in 2013 to $175.5 million, down almost 48 percent from the 2012 level of $335.1 million. Exploration expenditures in this range were last seen in 2006 and 2009 at $178.9 million and $180.0 million, respectively. The drop in exploration expenditures reflects a worldwide decrease in exploration expenditures as well as the transition of the Donlin Gold project from exploration to development.

Development expenditures in Alaska in 2013 increased by almost 5 percent, to approximately $358.8 million, from $342.4 million in 2012. This was the tenth consecutive year that the amount of funds spent on mineral development exceeded $200 million. Mineral production values remained steady in 2013, decreasing by less than one percent from the 2012 value. The estimated gross wholesale (first market) value of mineral production in 2013 decreased slightly to $3,418.7 million, from $3,436.1 million in 2012.

Mineral industry employment declined in 2013 to 4,051 full-time-equivalent jobs, a decrease of 315 jobs (7 percent) from the 2012 total of 4,366. Production jobs increased by less than one percent from 3,283 in 2012 to 3,308 in 2013. Development jobs decreased from 535 in 2012 to 358 in 2013, although under-reporting accounts for a large portion of the 33 percent difference. Exploration jobs decreased from about 548 jobs in 2012 to 385 in 2013, an almost 30 percent decrease and loss of 163 jobs. As reported by the Alaska Miners Association, the Alaska mineral industry also created an estimated 4,600 indirect jobs in 2013.

A longer-term view of employment and wages from Department of Labor and Workforce Development data shows that the mineral industry is a high-growth sector for Alaska. In the ten-year period from 2004 through 2013, non-oil-and-gas mining employment grew by 1,522 positions or 112 percent, and contributed 4.5 percent of the total private-sector wage growth, equating to almost $200 million in wage growth. In the same time period, average annual wages in the industry have grown by more than 17 percent, which is the highest increase compared to any other major industry in Alaska.

Estimated revenues in 2013 to the State of Alaska and municipalities from mineral-industry-specific fees, rent, sales, royalties, and taxes amounted to more than 142.5 million.

Mineral exploration expenditures in Alaska during 2013 were at least $175.5 million. Exploration was distributed across Alaska, but almost $74 million (or 42 percent of the exploration funds) was spent in southwestern Alaska and $47 million was spent in the eastern interior region. Twenty projects reported exploration expenditures of $1 million or more and 21 additional projects expended at least $100,000.

Exploration was conducted in Alaska during 2013 for a wide variety of metals and mineralization styles; however, exploration expenditures for all commodities and deposit types except industrial minerals declined from 2012 to 2013. As a portion of all mineral exploration expenditures in Alaska, gold exploration declined about 10 percent, from 45 percent of total exploration in 2012 to 35 percent in 2013. Conversely, a mixed group of metals (polymetallic, including copper–gold porphyry systems) accounted for almost 59 percent of total exploration expenditures in 2013. Its share of Alaska's exploration increased significantly from 45 percent of all mineral exploration in 2012. Copper–gold–molybdenum porphyry systems continued as the major exploration target in 2013, with more than $77 million in expenditures. Exploration expenditures at the Pebble project accounted for more than 86 percent of all exploration conducted on porphyry deposits. More than

$33 million was spent on base-metal-rich, polymetallic massive-sulfide projects, almost $24.7 million was spent on granite/intrusion-related gold exploration, and $20.2 million was spent on various gold–quartz vein projects. More than $20 million was also spent on exploration for PGE–nickel–copper, tin-polymetallic, rare-earth-element, coal, placer gold, magnetite beach placer, and graphite deposits.

Seven hundred seventy-nine placer operations reported exploration expenditures totaling $16 million in 2013, an increase of 62 percent from $9.9 million in 2012. The highest number of placer operations reported exploration in the interior Alaska region; however, placer exploration expenditures and employment were highest in the western region due to two large marine placer operations, each with exploration expenditures of about $5 million.

Mining claims and prospecting sites covered approximately 3.9 million acres of Alaska in 2013, with 6,916 active Federal and 42,230 active State mining claims. New mining claims staked during 2013 included 3,777 new State claims, 28 new State prospecting sites, and 289 Federal claims. State 40- and 160-acre claimstaking decreased by 26 percent in 2013, while staking of State prospecting sites decreased by 86 percent. Nearly 55 percent fewer Federal claims were staked in 2013.

The State's Airborne Geophysical/Geological Mineral Inventory (AGGMI) Program celebrated its 20th year, with geophysical surveys covering a cumulative total of 17,985 square miles of Alaska (3.15 percent of Alaska's land). As part of AGGMI and 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 Styx River area and Wrangellia geologic belt in southwestern and central Alaska, and also contracted helicopter-borne geophysical surveys for portions of those areas. In late 2013, DGGS released airborne-geophysical data for three surveys centered around Flat, Alaska, and the Middle Styx and Dalzell Creek surveys in southwestern Alaska.

Reported and estimated development expenditures in 2013 totaled approximately $358.8 million, up almost 5 percent from $342.4 million in 2012. Development expenditures were reported for 53 projects in 2013. Significant development outlays (more than $5 million) were noted at Fort Knox Mine, Greens Creek Mine, Pogo Mine, Donlin Gold project, Kensington Mine, and the Nome offshore placer fields. Based on reported expenditures, Fort Knox Mine had the largest ongoing development project in Alaska. Ongoing capital maintenance and development expenditures continued at Nixon Fork, Fort Knox, Greens Creek, Red Dog, and Kensington mines. The Donlin Gold project made the transition from exploration to development with the initiation of the Preliminary Draft EIS (Environmental Impact Statement) process. Placer mines and sand and gravel operations also reported development expenditures.

The total value of minerals produced in Alaska during 2013 is estimated at $3.42 billion, down slightly from the 2012 estimated value of $3.44 billion. The 2013 estimate represents a decrease in value of approximately $17.6 million, or one-half of one percent, from the 2012 estimate. Metals (gold, silver, copper, lead, and zinc) account for $3,276 million (almost 96 percent of the total); industrial minerals for $85 million (2.5 percent of the total); coal for $56 million (1.6 percent of the total); and gemstones valued at $1.9 million.

Gold leads all mineral product values, with more than 45 percent of the total, followed by zinc at 33.9 percent, silver at 9.4 percent, lead at 7.2 percent, and appreciable copper. The decreased mineral production value in 2013 compared with 2012 resulted primarily from lower prices for gold, zinc, silver, and copper in 2013. The average 2013 price for gold dropped 15.4 percent from the previous year's average. The price of lead rose 4.3 percent.

Alaska currently has six large lode mines. Teck Resources Ltd.–NANA's Red Dog Mine produced 607,704 tons of zinc, 106,594 tons of lead, and an estimated 6.1 million ounces of silver. Coeur Alaska Inc.'s Kensington underground gold mine complex near Juneau produced 114,821 ounces of gold in 2013. Hecla Mining Co.'s Greens Creek Mine near Juneau produced more than 7.4 million ounces of silver in 2013, along with 57,457 ounces of gold, 57,614 tons of zinc, and 20,114 tons of lead. Kinross Gold's Fort Knox Mine near Fairbanks produced 428,822 ounces of gold, and Sumitomo's Pogo Mine produced 337,393 ounces of gold. Usibelli Coal Mine produced 1.6 million tons of coal. Placer gold production, from an estimated 295 operators statewide, was reported and estimated at 82,591 ounces.

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Alaska's Mineral Industry 2013

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

INTRODUCTION

The diversity and quantity of Alaska's mineral wealth is well regarded by exploration and mining companies worldwide, and the state is currently considered the top region of the world for mineral potential[4]. 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 mines in the Kennecott area; 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, Fort Knox, and Kensington mines. Alaska's annual zinc production equals five percent of zinc manufactured worldwide, and 64 percent of United States domestic consumption[5]. The Pebble, Donlin Gold, Money Knob, and Bornite deposits collectively represent a significant proportion of domestic resources of gold and copper[5] and indicate that there are still extremely large mineral deposits to be developed in Alaska. Significant newly-discovered resources at the Graphite Creek deposit and the Bokan Mountain rare-earth-element deposit promise domestic sources for twenty-first-century technologies. 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 continued to demonstrate its health even though metal prices and worldwide venture capital investment were down in 2013. 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 2013. For purposes of this report, Alaska has been divided into seven geographic regions, shown in figure 2.

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), 1981–2013. Average annual values are given for 1981–1985, 1986–1990, 1991–1995, and 1996–2000. Individual year totals are provided for 2001–2013.

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
2013	$ 175.5	$ 358.8	$ 3,418.7

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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[4]Wilson, Alana, and Cervantes, Miguel, 2014, 2013 Survey of Mining Companies: The Fraser Institute, Vancouver, British Columbia, 133 p.
[5]U.S. Geological Survey, 2013, Mineral commodity summaries 2013: U.S. Geological Survey, 198 p.

Exploration expenditures, a sign of industry interest and future production values, were down 48 percent, from $335.1 million in 2012 to $175.5 million in 2013. The decrease reflects a 29 percent decrease in worldwide exploration expenditures[6] accompanied by the transition of the Donlin Gold project from exploration to development. Development expenditures in 2013 in Alaska totaled $358.8 million, up five percent from 2012 levels. This marked the ninth consecutive year development expenditures were close to or above $300 million and that exploration expenditures exceeded $100 million. Production volumes in all metals increased over levels in 2012. Alaska gold production exceeded one million ounces in 2013, a milestone exceeded only by Alaska miners in 1906. Despite the higher production volume, the estimated first market value of mineral production decreased one percent, from $3.44 billion in 2012 to $3.42 billion in 2013, as a result of lower metal prices for nearly all commodities.

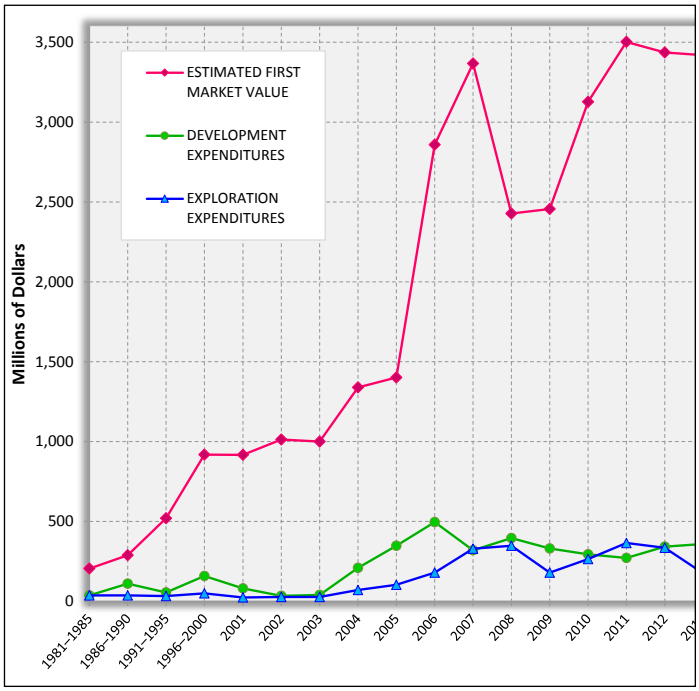


Figure 1. Exploration and development expenditures and estimated first market value for the mineral industry, 1981–2013.

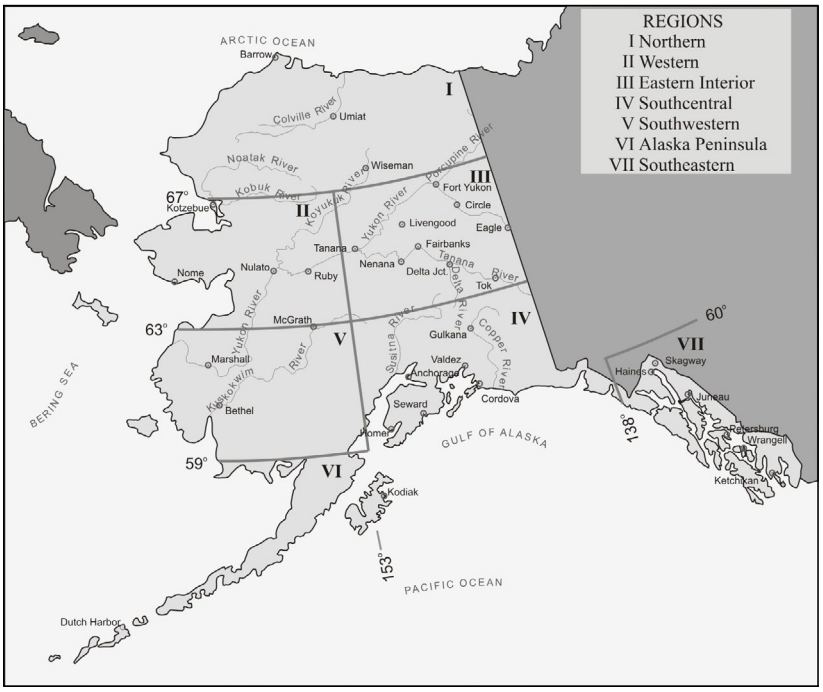


Figure 2. Regions of mineral activity as described in this report.

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, transportation, smelter charges, or 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 may 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 data consistency 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) in the Department of Natural Resources (DNR) and the Division of Economic Development in the Department of Commerce, Community, and Economic Development

[6]SNL Metals & Mining, 2014, World exploration trends 2014: SNL Metals & Mining, Charlottesville, VA, 8 p.

(DCCED), with additional support from the Division of Mining, Land & Water (DMLW/DNR), the Department of Labor and Workforce Development (DLWD), and the Department of Revenue (DOR). 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.

EMPLOYMENT

Employment data were collected from two different sources and are presented as such. Initial reporting below stems from values compiled from more than 134 voluntary questionnaires, 922 Affidavits of Labor submitted to the State, and other sources. Data obtained from these sources are used throughout this report and represent a minimum estimate of mineral industry employment in Alaska. Additional wage and salary employment data described further below are from the Alaska Department of Labor and Workforce Development (DLWD). There is no direct correlation between the two sets of employment figures. DLWD employment is based on wage records and includes part-time jobs but does not include the self-employed and working family members not covered under unemployment insurance. The majority of placer operators are self-employed and are therefore not counted in the DLWD data. Employment data may not include jobs in the exploration and development phases of mining at geological and engineering consulting firms, which are categorized in the engineering, environmental, or construction industries. Consequently, mining's contributions to employment and earnings in Alaska are likely underestimated by both datasets.

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 nine years.

Total reported minerals industry employment in 2013 is 4,051 full-time-equivalent jobs, a decrease of about 315 jobs (7 percent) from the estimated 2012 total of 4,366. Production employment in 2013 saw a slight increase (less than one percent), while reported development employment decreased more than 33 percent. Production jobs increased from 3,283 in 2012 to 3,308 in 2013. Development jobs decreased from 535 in 2012 to 358 in 2013. When reporting, several large operators did not differentiate production and development employment; consequently, some development employment is included in the production employment figures, and development employment is under-reported.

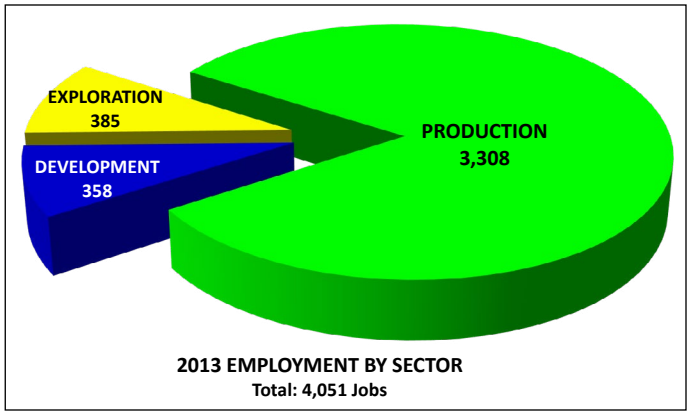


Figure 3. Alaska's mineral industry employment by sector, 2013.

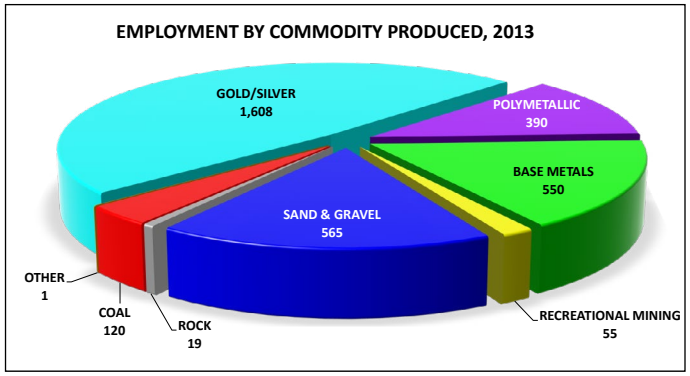


Figure 4. Alaska's mineral industry employment by commodity produced, 2013.

Exploration jobs decreased from about 548 jobs in 2012 to 385 in 2013, an almost 30 percent decrease and loss of 163 jobs. Placer exploration employment in 2013 accounted for a quarter of all mining exploration employment, compared with only 11 percent of all mining exploration employment in 2012. More placer operations reported exploration in the interior Alaska region; however, placer exploration expenditures and employment were highest in the western region due to two sizeable marine placer operations, each with exploration expenditures of about $5 million.

Mineral production employment in 2013 increased across all sectors except gold/silver, rock, and coal mining. Lode gold mining jobs decreased approximately 2.5 percent in 2013, a loss of 30 jobs from the state's economy. Placer gold mining employment decreased more than 9 percent in 2013, with a reported loss of 45 full-time-equivalent jobs from the 477 jobs estimated for 2012. The polymetallic mining sector saw a one percent increase in employment, with a reported gain of four jobs from the 386 jobs estimated for 2012. Full-time-equivalent jobs increased in the base-metals sector by 20 jobs, or almost 4 percent, from 2012 to 2013. Significant production decreases in the rock sector led to an estimated loss of 43 jobs, with employment down 72 percent from 2012. Coal production employment was also

Table 2. Estimated Alaska mineral industry employment, 2005–2013[a], as reported via returned questionnaires administered by DGGS for this report and other sources.

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Gold/silver mining									
Placer	86	242	208	282	399	405	439	477	432
Lode	411	704	808	739	832	1,008	1,085	1,206	1,176
Polymetallic mining	250	245	276	317	321	350	364	386	390
Base metals mining	449	457	457	475	413	550	586	530	550
Recreational mining	175	45	54	30	36	35	41	52	55
Sand and gravel	400	337	284	277	286	313	307	424	565
Rock	148	104	124	93	83	11	28	60	19
Coal[b]	95	95	102	110	117	140	140	144	120
Peat[b,c]	6	11	11	7	- -	3	3	4	- -
Tin, jade, soapstone, ceramics, platinum	- -	- -	- -	- -	- -	- -	- -	- -	1
Production (total of above categories)	**2,020**	**2,240**	**2,324**	**2,330**	**2,487**	**2,815**	**2,993**	**3,283**	**3,308**
Mineral development	**498**	**848**	**735**	**516**	**371**	**537**	**422**	**535**	**358**
Mineral exploration	**303**	**435**	**499**	**546**	**422**	**520**	**535[d]**	**548**	**385**
TOTAL	**2,821**	**3,523**	**3,558**	**3,392**	**3,280**	**3,872**	**3,950**	**4,366**	**4,051**

[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.

down almost 17 percent (24 jobs). Employment in the sand and gravel sector (up 33 percent), calculated from the higher production reported in that sector for 2013, added a total of 141 jobs to the economy.

The DLWD 2013 mining employment and wage statistics are based on 119 reporting units (companies) consisting of 61 metal ore, 35 coal and nonmetallic-mineral quarrying, and 23 mining-support activity units (DLWD, written communication, 2014). Some DLWD 2012 employment data have been updated, and calculations comparing 2013 to 2012 use these updated values. Among companies in 2013, mining and support activities provided 3,027 jobs, down one percent from 3,050 in 2012. Average wages for mining-sector jobs are second-highest among major industries in Alaska, with a 2013 annual average wage of $101,960, about twice as much as the average private-sector wage in Alaska, $50,339 per year. Total wages paid by non-oil-and-gas mining firms in 2013 was $293,739,031, while total wages paid by mining support firms was $12,885,334.

Non-oil-and-gas mining is a high growth sector for Alaska[7]. In the ten-year period from 2004 through 2013, employment grew by 1,522 positions, or 112 percent. This accounted for 4.5 percent of total statewide employment growth in the same interval. Even though mining jobs account for only 1.1 percent of all private-sector jobs in Alaska, in the last decade they contributed 4.5 percent of the total private-sector wage growth, or almost $200 million in wage growth. In 2004, average annual wages in the industry were more than $69,000; adjusted for inflation compensation has grown by more than 17 percent since then—the highest growth compared to any other major industry in Alaska.

DLWD data show that nonmetallic mineral product manufacturing provided 277 jobs, including an average of 261 jobs in cement and concrete manufacturing for 2013 (DLWD, written communication, 2014). Primary metal manufacturing provided 21 jobs, while metal and mineral merchant wholesalers provided an average of 126 jobs during 2013.

A supplementary labor and earnings indicator, the U.S. Census Bureau's "non-employer statistics" series, uses IRS tax return data to estimate the number of sole proprietorships, partnerships, and corporations that do not have employees. These data are captured by DLWD wage records, and may approximate wages drawn from small placer mines, which are often operated only by the business owner and working family members. In 2012, the most recent year available, there were 21 corporations, 167 individual proprietorships, and 36 partnerships without employees in the non-oil-and-gas mining industry, which together reported $18,348,000 in gross receipts, sales,

[7]State of Alaska Department of Labor and Workforce Development, Research and Analysis Section, Quarterly Census on Employment and Wages (QCEW), last accessed on October 5, 2014. http://labor.alaska.gov/research/qcew/ee13.pdf; http://labor.alaska.gov/research/qcew/ee04.pdf

commissions, and income from trades and businesses on annual business income tax returns.

Eighteen boroughs or census areas reported non-oil-and-gas mining employment in 2013. Juneau, Anchorage, Fairbanks North Star Borough, and the Southeast Fairbanks Census area each had more than 100 mining jobs. The City and Borough of Juneau and the Fairbanks North Star Borough continue to vie for top spot with 763 and 757 jobs, respectively.

The Alaska mining industry also created an estimated 4,600 indirect jobs, according to a 2013 study prepared for the Alaska Miners Association by McDowell Group Inc.[8] 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.

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; cash in lieu of annual labor payments; coal land rentals; coal royalties; lease sale bonus payment for coal and offshore locatable mineral leases; 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 2013 amounted to more than $142.5 million (photo 1). The 2013 figure is a 14 percent increase from $125.0 million paid in 2012. 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 2013.

Estimated State mineral and coal rents and royalties amounted to $20,940,976 for 2013, compared with $20,401,457 for 2012, an increase of 2.6 percent. Table 3 provides a detailed breakdown of these payments. 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.[9] State mining claims have recording, rental, and other fees associated with them. Mining claim location certificates and recording fees must be recorded 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 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. The rental rate to establish a 160-acre prospecting site for two years is $255. Annual labor must be performed on a mining claim each year, except that cash payment of the required annual labor amount may be made in lieu of actual labor performance. Annual labor requirements are $100 per 40-acre claim ($400 per 160-acre MTRSC claim) or $100 for each partial or whole 40 acres within a lease. The annual lease rental rate for coal properties is $3 per acre, subject to adjustment

Photo 1. Doré bar containing the six-millionth ounce of gold produced from Fort Knox Mine since production began in 1996. Government revenues from Fort Knox totaled $23.2 million, comprising Fairbanks North Star Borough property tax, State of Alaska mining tax, State of Alaska corporate income tax, and fees to the Alaska Mental Health Land Trust, among others. Photo provided by Fairbanks Gold Mining Inc. Revenue figure from "Fort Knox Update 2014", a presentation by Mark Huffington at the Alaska Miners Association 24th Biennial Mining Conference, April 7–14, 2014, Fairbanks, Alaska.

[8]Alaska Miners Association website, last accessed on October 5, 2014. http://alaskaminers.org/economic-impact/

[9]Fact sheets and forms with general information regarding locatable minerals are available at http://dnr.alaska.gov/mlw/mining/index.cfm, or through the DNR Public Information Center offices in Anchorage and Fairbanks.

Table 3. Reported and estimated revenues paid to the State of Alaska and municipalities by Alaska's mineral industry, 2008–2013. See footnotes for reporting sources and dates.

	2008	2009	2010	2011	2012	2013
State mineral rents and royalties[a,b]						
State claim rentals	$ 4,626,038	$ 6,280,295	$ 7,770,763	$ 8,498,714	$ 7,951,103	$ 7,507,976
Production royalties[c]	1,519,471	1,840,060	1,591,643	5,416,473	8,982,259	9,808,575
Annual labor	380,169	482,858	157,848	760,484	357,400	542,588
Subtotal	**$ 6,525,678**	**$ 8,603,213**	**$ 9,520,254**	**$ 14,675,671**	**$ 17,290,762**	**$ 17,859,139**
State coal rents and royalties[b]						
Rents	248,841	395,975	266,041	446,415	189,204	324,393
Royalties[c]	1,550,737	1,840,572	2,235,138	2,616,629	2,921,491	2,757,444
Bonus	- -	- -	- -	- -	- -	- -
Subtotal	**$ 1,799,578**	**$ 2,236,547**	**$ 2,501,179**	**$ 3,063,044**	**$ 3,110,695**	**$ 3,081,837**
State material Sales						
Mental Health	37,734	170,996	109,027	90,116	1,876	-7,854
Division of Land[b]	2,818,107	4,323,601	200,659	1,239,637	1,735,404	4,965,386
State Pipeline Coordinator's Office	182,237	179,875	5,910	309,600	30,746	340,786
Subtotal	**$ 3,038,078**	**$ 4,674,472**	**$ 315,596**	**$ 1,639,353**	**$ 1,768,025**	**$ 5,298,318**
State mining miscellaneous fees[b]						
Filing fees	2,750	1,787	407,006	136,500	5,604	3,350
Bid Bonus[d]	- -	- -	- -	6,861,626	194,085	- -
Penalty fees	18,876	115,819	43,405	238,115	532,959	205,453
Exploration incentive app filing fee	- -	- -	- -	- -	- -	- -
Bond pool payment	39,429	70,548	76,426	64,702	65,201	89,008
Surface mine investment interest	56,125	62,799	45,752	25,890	20,491	5,772
Surface coal mining app fee	3,024	1,800	23,502	7,534	2,200	22,800
APMA mining fees	23,811	19,519	19,873	30,741	45,055	32,953
Subtotal	**$ 144,015**	**$ 272,272**	**$ 615,964**	**$ 5,552,958**	**$ 865,595**	**$ 359,337**
Other Fees						
AIDEA - Facilities use fees[e]	16,190,000	15,918,000	14,807,000	13,500,000	12,600,000	11,986,000
State Fuel Taxes[f]	428,214	877,952	126,452	741,071	585,034	951,852
State corporate income tax[g]	12,981,369	-2,558,970	81,790,274	15,020,036	26,577,348	26,812,498
Mining License Tax[h]	16,044,139	29,725,100	43,338,119	44,480,076	40,695,833	46,787,690
State Total	**$ 57,177,906**	**$ 59,748,586**	**$ 153,014,838**	**$ 73,741,183**	**$ 80,458,215**	**$ 86,538,040**
Payments to Municipalities[i]	**$ 12,599,399**	**$ 12,387,540**	**$ 14,238,251**	**$ 20,378,242**	**$ 21,529,472**	**$ 29,412,224**
TOTAL	**$ 69,777,305**	**$ 72,136,126**	**$ 167,253,089**	**$ 119,050,451**	**$ 125,022,764**	**$ 142,548,894**

[a]Includes upland lease and offshore lease rentals. Figures are reported by calendar year by the Alaska Department of Natural Resources.
[b]Figures are reported by calendar year by the Alaska Department of Natural Resources.
[c]Reported on a cash basis; payments actually received during the given year.
[d]Bid bonus from the 2011 Nome offshore lease sale paid in 2011 and 2012. Filing fees for 2011 were updated.
[e]AIDEA figures are reported by fiscal year.
[f]In 2013, calculated on Fuel and Oil Expenditures from Mining Licenses Tax Form/Dept. of Revenue, assuming Alaska average fuel cost of $6.09. <http://commerce.alaska.gov/dnn/Portals/4/pub/Fuel_Price_Report_Jul_2013.pdf>
[g]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.
[h]Includes metals, coal, and material for 2005–2011. In 2012 and later, Mining License Tax was not collected on materials.
[i]Payments to Municipalities reported for 2013 did not include data directly from boroughs and municipalities, and should be considered a minimum estimate. Data was compiled from questionnaires and personal communication.

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

not more frequently than every ten years. Rental payments for locatable minerals and coal 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 locatable minerals produced from State land. The production royalty requirement applies to all revenues received from minerals produced from a State mining claim or locatable 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.

Coal royalties are based on the adjusted gross value of coal, and are set at:

(1) five percent for noncompetitive leases;

(2) no less than five percent for competitive leases where royalty is a bid variable; and

(3) no less than five percent nor more than 12 percent for competitive leases where royalty is not a bid variable.

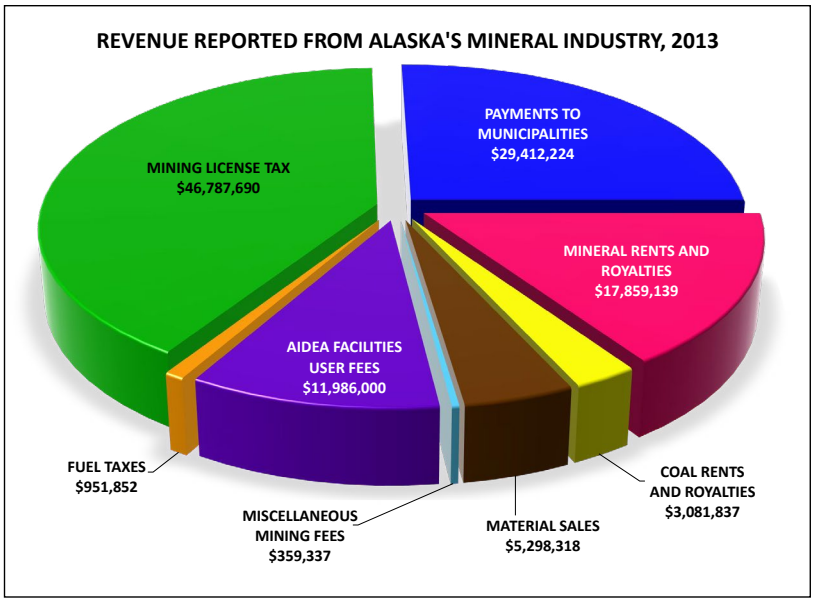


Figure 5. Revenue reported from Alaska's mineral industry, 2013.

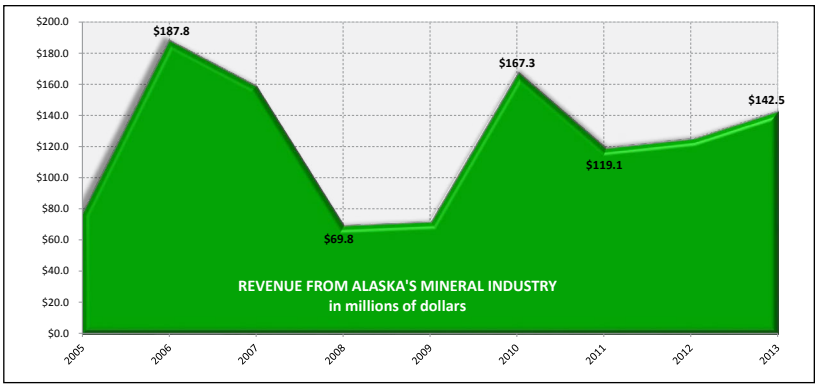


Figure 6. Revenue from Alaska's mineral industry, 2005–2013.

Coal royalties are adjustable no more frequently than every ten years. Adjusted gross value means gross value less reasonable beneficiation costs and transportation costs from the mine to the point of sale.

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 $5,298,318 in 2013. 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. Locatable minerals, for example, would include 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 representative regional sales prices are periodically determined by the commissioner for each type of material and for defined geographic regions, under procedures established by regulation.

Claim- and leaseholders on State-owned land are also assessed miscellaneous fees. Miscellaneous fees include filing fees, penalties, lease assignment fees, upland mining lease application fees, exploration incentive application fees, surface coal mining application fees, and Annual Placer Mining Application (APMA) fees. Miscellaneous fees amounted to $359,337 in 2013. Although bid bonus revenue is included in the miscellaneous fee category, these are actually payments from the competitive bid process, and not fees. The State received a total of approximately $7.6 million in winning bonus bids from the 2011 Nome offshore lease sale. About 12 of these have not been paid due to an ongoing court contest concerning bidder qualifications. Some of the bids were collected in 2011, and are reflected in the $6.9 million figure; the remainder of the uncontested bids were received in 2012. High activity in the east and west Nome public mining areas precipitated a requirement that anyone operating a dredge(s) in the Nome area after 2011 submit an APMA regardless of dredge size.[10]

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

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) 2014 http://dnr.alaska.gov/mlw/forms/14apma/
- 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
- Production Royalty http://dnr.alaska.gov/mlw/factsht/mine_fs/producti.pdf
- DNR Production Royalty Form http://dnr.alaska.gov/mlw/forms/mining/royalty_fm.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://dx.doi.org/10.14509/mapindex
- Alaska Geologic Data Index: Unpublished Geology-Related Data http://dx.doi.org/10.14509/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://dx.doi.org/10.14509/3318
- 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://commerce.alaska.gov/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?229s
- Alaska Motor Fuel Tax Instructions http://www.tax.alaska.gov/programs/documentviewer/viewer.aspx?5086f

Fuel tax collected by the State for mining operations in 2013 is estimated at $951,852, compared with $585,034 during 2012. 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. New mining operations, certified as such by the Department of Revenue, are exempt from the tax for a period of 3.5 years to help return their initial investment. The rates on mining net income are as follows: No tax if net income is $40,000 or less; $1,200 plus 3 percent of amount over $40,000; $1,500 plus 5 percent of amount over $50,000; or $4,000 plus 7 percent of amount 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 2013 was $46,787,690, compared with $40,695,833 in 2012. 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 2013 from mining operations was $26,812,498, as compared with $26,577,348 in 2012. 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 an estimated $29,412,224 by mining companies for property taxes and other payments in 2013. Two of the largest payments went to the City and Borough of Juneau and the Fairbanks North Star Borough for a combined total of more than $7 million. Red Dog Mine paid more than $11 million in PILT to the Northwest Arctic Borough in 2013. In 2013, the Alaska Industrial Development and Export Authority (AIDEA) was paid annual user fees of slightly less than $12 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

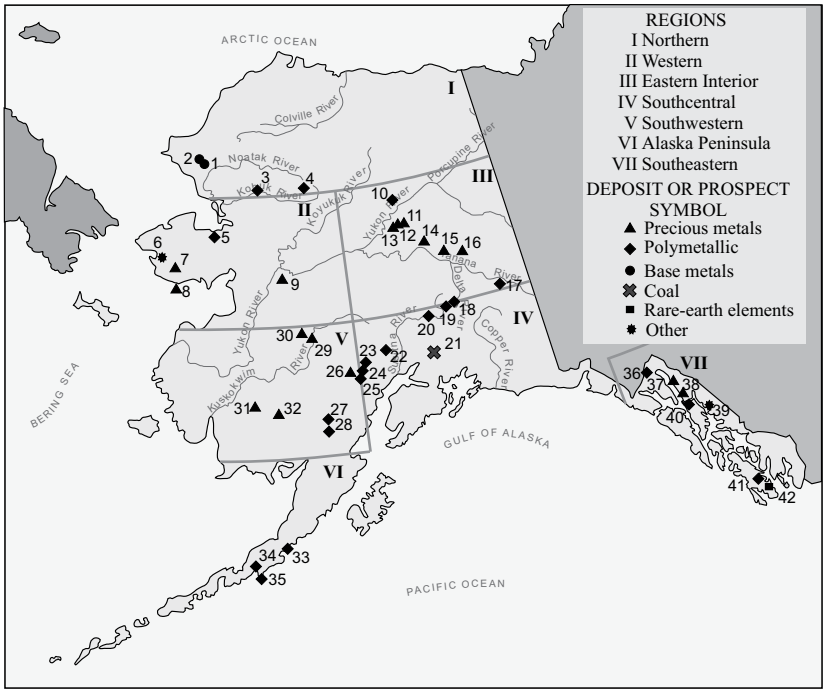
EXPLORATION

Mineral exploration expenditures in Alaska during 2013 were almost $175.5 million, down 48 percent from the $335.1 million in exploration expenditures reported in 2012. The drop in exploration expenditures reflects a worldwide decrease in exploration expenditures as well as the transition of the Donlin Gold project from exploration to development. Despite traditional industry challenges such as varying metal prices and acquiring venture capital, mineral exploration companies continued to invest in Alaska's favorable geology as prospective partners in Alaska's future through the creation of local jobs, infrastructure, and government revenue. Figure 7 shows the location of the most significant exploration projects in Alaska during the year.

Figure 8 is a graph of total mineral exploration expenditures in Alaska from 1956 through 2013. Annual exploration expenditures are shown with raw values (not adjusted for inflation) and adjusted values (inflation-adjusted to 2013 dollars). Exploration expenditures over the last decade have exceeded any previous era of mineral exploration in Alaska during the past 50 years. Table 6 details exploration expenditures by commodity for the past three decades, while figure 9 presents the 2013 data graphically.

Exploration was conducted in Alaska during 2013 for a wide variety of metals and mineralization styles; however, exploration expenditures for all commodities and deposit types except industrial minerals declined from 2012 to 2013. As a portion of all mineral exploration expenditures in Alaska, gold exploration declined about 10 percentage points, from 45 percent of total exploration in 2012 to 35 percent in 2013. Conversely, a mixed group of metals (polymetallic, including copper–gold–molybdenum porphyry systems) accounted for almost 59 percent of total exploration expenditures in 2013;

its share of Alaska's exploration increased almost 14 percentage points from 45 percent of all mineral exploration in 2012. Platinum-group-element (PGE) exploration expenditures in 2013 were $555,255. Figure 10 shows 2013 Alaska exploration expenditures by mineral deposit type. Copper–gold–molybdenum porphyry systems continued as the major exploration target in 2013, with more than $77 million in expenditures. Exploration expenditures at the Pebble project accounted for more



I. Northern Region

1. Red Dog Mine area—Teck Alaska Inc.
2. Lik—Zazu Metals Corp.
3. Upper Kobuk (Bornite–Ambler)—NovaCopper Inc.
4. Sun—Andover Mining Corp.

II. Western Region

5. Scout–Kuluu–Fairhaven—NANA Regional Corp.
6. Graphite Creek—Graphite One Resources Inc.
7. Divide—Altar Drilling Inc.
8. Nome Offshore—Placer Marine Mining Inc.
9. Illinois Creek—Plan B Minerals

III. Eastern Interior Region

10. Twenty Mile–Squaw Creek—MMG USA Exploration LLC
11. Livengood (Money Knob)—International Tower Hill Mines Ltd.
12. Elephant Mountain—Endurance Gold Corp.
13. Sawtooth Mountain—Doyon Limited
14. Fairbanks District
    a. Fort Knox and district—Fairbanks Gold Mining Inc.
    b. Golden Summit—Freegold Ventures Ltd.
    c. Fish Creek—Teryl Resources Corp.
    d. Gil—Kinross Gold Inc.
15. Stone Boy (Monte Cristo)—Sumitomo Metal Mining/ Stone Boy Inc.
16. Pogo—Goodpaster mining district
    a. Pogo—Sumitomo Metal Mining Pogo LLC
    b. Stone Boy (Brink)—Sumitomo Metal Mining/ Stone Boy Inc.
    c. Healy Claims—Newmont North American Exploration
17. Tetlin—Contango ORE Inc.

IV. South-central Region

18. MAN—Pure Nickel Inc.
19. Stellar—Millrock Resources Inc.
20. Nikolai—MMG USA Exploration, LLC
21. Chickaloon—Riverdale Alaska, LLC
22. Yenlo Hills—Diamond Gold Corp.
23. Whistler—Kiska Metals Corp.
24. Estelle—Millrock Resources Inc.
25. Copper Joe—Kiska Metals Corp.

V. Southwestern Region

26. Terra—WestMountain Gold Inc.
27. Big Chunk—Liberty Star Uranium & Metals Corp./ Northern Dynasty Minerals Ltd.
28. Pebble—The Pebble Limited Partnership
29. Vinasale—Freegold Ventures Ltd.
30. Ganes Creek–Ophir—Fairbanks Gold Mining Inc.
31. Nyac—Nyac Gold LLC
32. Shotgun—TNR Gold Corp.

VI. Alaska Peninsula Region

33. Alaska Peninsula—Millrock Resources Inc.
34. Pyramid—Full Metal Minerals Ltd.
35. Unga–Popov—Redstar Gold Corp.

VII. Southeastern Region

36. Palmer—Constantine Metal Resources Ltd.
37. Kensington/Jualin—Coeur Alaska, Inc.
38. Herbert Glacier—Grand Portage Resources Ltd.
39. Port Snettisham—Arrowstar Resources Ltd.
40. Greens Creek Mine—Hecla Greens Creek Mining Co.
41. Niblack—Heatherdale Resources Ltd.
42. Bokan Mountain/Dotson Ridge—Ucore Rare Metals Inc.

Figure 7. Selected exploration projects in Alaska, 2013.

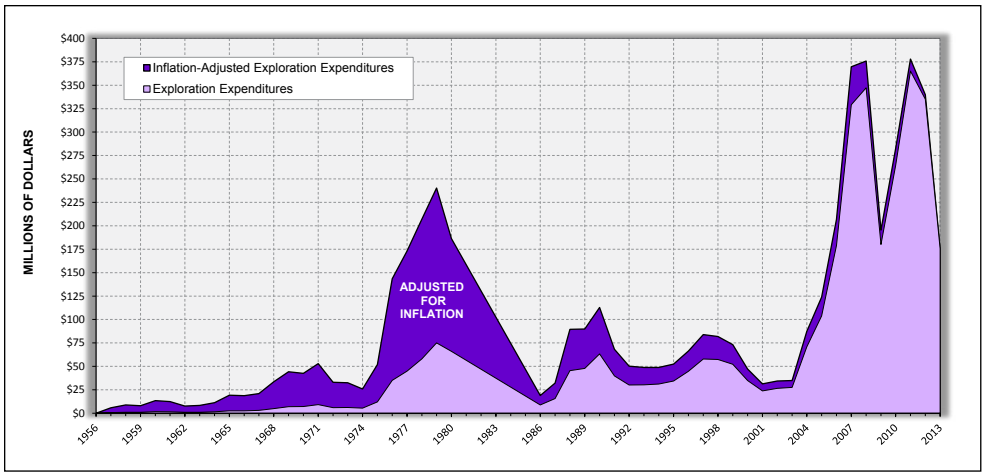


Figure 8. Alaska mineral exploration expenditures, 1956–2013. Curve in background is adjusted for inflation for 2013 dollars.

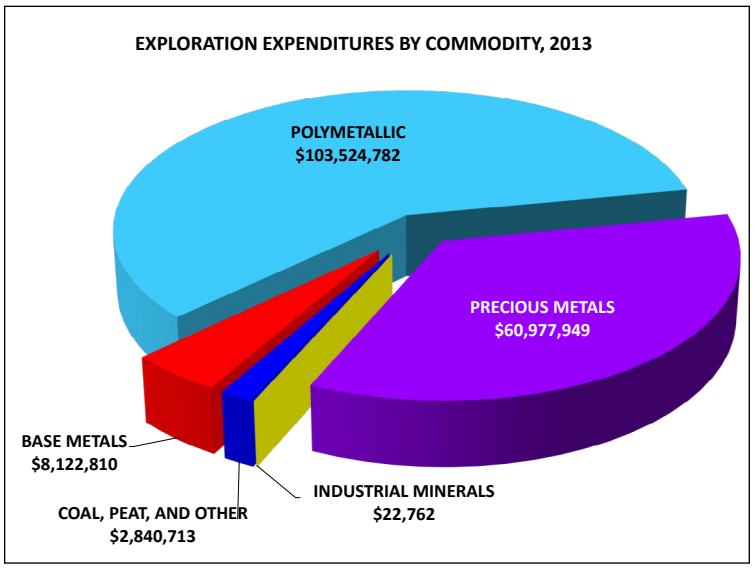


Figure 9. Exploration expenditures by commodity, 2013.

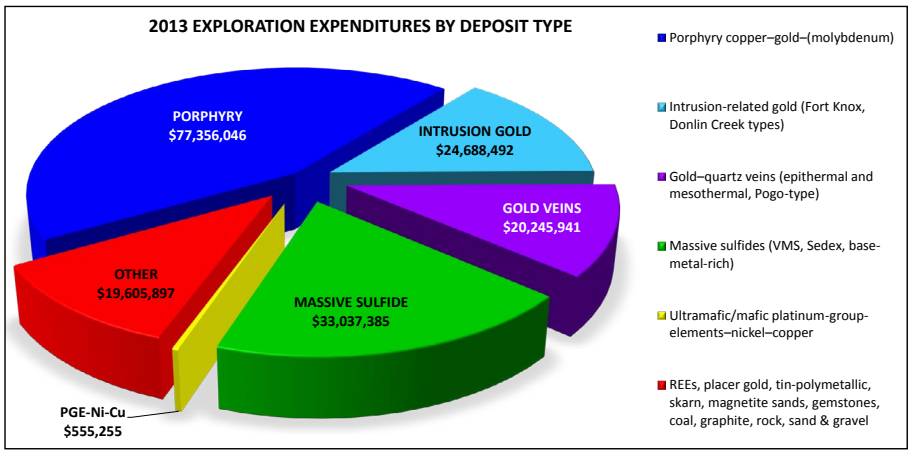


Figure 10. Exploration expenditures by deposit type, 2013.

than 86 percent of all exploration conducted on porphyry deposits. More than $33 million was spent on base-metal-rich, polymetallic massive-sulfide projects; almost $24.7 million was spent on granite/intrusion-related gold exploration, and $20.2 million was spent on various gold–quartz vein projects. More than $20 million was also spent on exploration for PGE–nickel–copper, Sn-polymetallic, rare-earth-element, coal, placer gold, magnetite beach placer, and graphite deposits.

Analysis of 2013 mineral exploration expenditures per deposit type indicates that 44.1 percent of funds were spent for porphyry copper–gold–molybdenum deposits, 18.8 percent were for various types of massive sulfide deposits, 14.1 percent of funds were used to explore for intrusion-related gold deposits, 11.5 percent were for gold vein deposits, and the remainder were for a wide variety of deposit types. Due to decreased exploration expenditures overall, large projects such as Pebble influenced the apparent change in targets in 2013. Perhaps significant, however, was the 19 percent relative decrease in exploration for intrusion gold deposits, with its share of 2013 exploration at 14.1 percent as compared to 33.5 percent of total exploration in 2012. Relative percentages of exploration expenditures for all other deposit types increased from 2012 to 2013.

Exploration was distributed across Alaska, as shown in table 7, but almost $74 million (42 percent of total exploration funds) was spent in southwestern Alaska and $47 million in the eastern interior region (fig. 11). Similarly, lode exploration expenditures were highest in the southwest region; however, the number of operators reporting exploration (at 52 percent) and employment related to lode exploration (at 39 percent) were highest in the eastern interior region. A total of 779 placer operations reported exploration expenditures of $16 million in 2013, an increase of 62 percent from $9.9 million in 2012. More placer operations reported exploration in the interior Alaska region; however, placer exploration expenditures (at 75 percent)

and employment (at 42 percent) were highest in the western region due to two sizeable marine placer operations, each with exploration expenditures of about $5 million. Twenty marine placer operations reported 24 full-time-equivalent jobs dedicated to exploration.

Twenty companies individually spent more than $1 million on mineral exploration in Alaska for a combined total of more than $164.3 million (almost 94 percent of 2013 exploration funds and 75 percent of exploration employment); an additional 21 companies spent more than $100,000 for a combined total of more than $5.6 million (3.2 percent of 2013 exploration funds and 6 percent of exploration employment). Two advanced exploration projects, Pebble and Livengood, accounted for almost 43 percent of the exploration expenditures in 2013 for a total of almost $75 million. 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 100 percent owned by Northern Dynasty

Table 6. Reported exploration expenditures in Alaska by commodity, 1981–2013. Exploration expenditures were estimated for three lode projects using their reported drilling footage and a project-cost-per-drill-foot ratio averaged from 16 projects with reported, complete data. Exploration expenditures were estimated for five placer projects using their reported employment and a project-cost-per-person-day ratio averaged from 736 projects with reported, complete data.

	Base metals	Polymetallic[a] metals[b]	Precious minerals	Industrial peat	Coal and	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
2013	8,122,810	103,524,782	60,977,949	22,762	W	2,840,713	175,489,016
TOTAL	**$ 247,639,912**	**$ 1,182,934,276**	**$ 1,659,292,521**	**$ 15,618,612**	**$ 39,117,950**	**$ 64,679,493**	**$ 3,209,282,764**

[a]Polymetallic deposits considered a separate category for the first time in 1992.
[b]Approximately $0.56M spent on platinum-group-element (PGE-Ni-Cu) exploration during 2013 ($4.9M in 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). Prior to 2013, PGE exploration was included in the precious metal exploration total. 2013 PGE-Ni-Cu exploration expenditures are included in the polymetallic category.
[c]Includes rare-earth elements, magnetite sands, rock, and graphite.
N/A = Not available.
- - Not reported.
W = Withheld; data included in "Other" column.

Table 7. Reported exploration expenditures and employment in Alaska, 2013. Lode values include coal, rock, sand, and gravel expenditures and employment. See table 6 for an explanation of estimated exploration expenditures. Employment was estimated for 37 placer and 27 lode projects using their reported exploration expenditures and a project-cost-per-person-day ratio averaged from 736 and 63 projects, respectively, with reported, complete data.

	Northern	Western	Eastern Interior	South-central	South-western	South-eastern	Alaska Peninsula	TOTAL
Exploration expenditures								
Placer	$ 395,358	$ 12,033,131	$ 2,112,813	$ 966,078	$ 301,665	$ 148,196	$ 45,800	$ 16,003,040
Lode	22,929,972	2,459,058	44,585,416	10,000	73,591,441	15,848,670	61,418	159,485,976
TOTAL	**$ 23,325,330**	**$ 14,492,189**	**$ 46,698,229**	**$ 976,078**	**$ 73,893,106**	**$ 15,996,866**	**$ 107,218**	**$ 175,489,016**
Exploration employment								
Employment workdays	10,333	11,861	37,566	4,274	18,235	17,534	197	100,000
Placer	907	10,261	8,168	4,274	703	269	146	24,728
Lode	9,426	1,600	29,398	0	17,532	17,265	51	75,272
Workyears[a]	40	46	144	16	70	67	<2	385
Placer	3	40	31	16	3	1	1	95
Lode	37	6	113	0	67	66	<1	290
Total companies reporting[b]	35	106	498	151	48	30	4	872[c]
Placer	31	98	448	151	27	22	2	779
Lode	4	8	50	0	21	8	2	93

[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.

Minerals Ltd., and was the largest exploration project in 2013. 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 884 million tons averaging 0.018 ounce per ton (15.7 million ounces) gold. Tower Hill Mines Inc., a subsidiary of International Tower Hill Mines Ltd., completed an almost $8.2 million program at Livengood in 2013. Donlin Gold LLC, a joint venture of Barrick Gold Corp., NOVAGOLD Resources Inc., and Calista Corp., has indicated that the Donlin Creek intrusion-hosted gold project in southwestern Alaska has entered the development phase. See the Development Section for more information on this deposit.

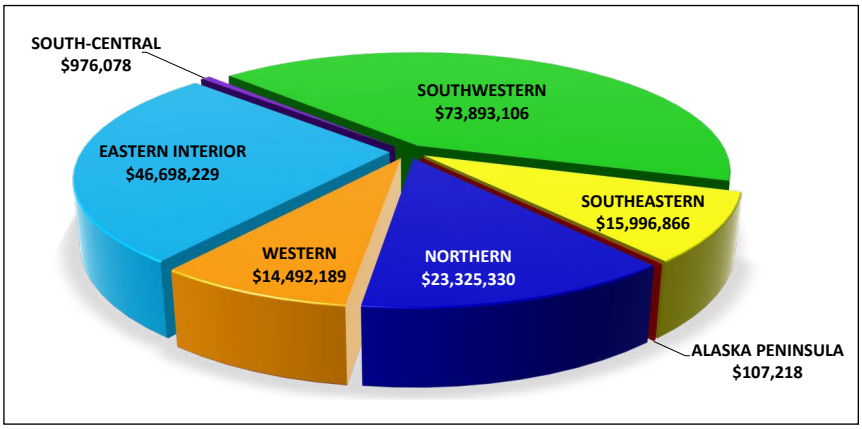


Figure 11. Exploration expenditures by region, 2013.

Operating mines in Alaska spent a combined total of more than $35.9 million on exploration to identify additional resources and increase mine life. Other significant 2013 exploration projects include NovaCopper's Upper Kobuk Mineral Projects (Arctic and Bornite), Contango ORE Inc.'s Tetlin project, WestMountain Gold Inc.'s Terra project in southwestern Alaska, and other projects featured in figure 7 and the regional exploration discussion.

Mining claims and prospecting sites covered approximately 3.9 million acres of Alaska in 2013, with 6,916 active Federal and 42,230 active State mining claims. Table 8 summarizes the number of new and active (new plus existing) mining claims per year, from 1991 through 2013. 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 2013 included 3,777 new State claims (409,680 acres), 28 new State prospecting sites (4,480 acres), and 289 Federal claims (5,780 acres). State 40- and 160-acre claimstaking decreased by 26 percent in 2013, while staking of State prospecting sites decreased by 86 percent. More than 54 percent fewer Federal claims were staked in 2013.

The State's Airborne Geophysical/Geological Mineral Inventory (AGGMI) Program celebrated its 20th year, with

geophysical surveys to date covering 17,985 square miles (3.15 percent) of Alaska's land. As part of AGGMI, the Alaska Division of Geological & Geophysical Surveys (DGGS) conducted geologic mapping and minerals-related studies in 2013 in the Styx River area in the western Alaska Range (photo 2). DGGS also contracted a helicopter-borne geophysical survey for the East Styx area, a 1,052-square-mile survey centered about 95 miles northwest of Anchorage.

DGGS initiated a multi-year project to study the western portion of the Wrangellia geologic belt using exploration geochemistry, geophysics, and targeted geologic mapping as part of the AGGMI/ Strategic and Critical Minerals Assessment project, a State-funded capital-improvement project to evaluate Alaska's potential for strategic and critical minerals (SCMs). SCMs are essential for our modern, technology-based society, and include rare-earth elements, platinum-group elements,

Photo 2. Mike Roberts of Kiska Metals Inc. describing the Whistler porphyry copper–gold–molybdenum deposit geology to DGGS geologic mapping project field crew working in the Styx River area. DGGS photo.

Table 8. Summary of claim activity by acres, 1991–2013.

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]	Totall (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	632	- -
2013[b]	1,622	2,155	24,883	17,347	28	209	289	6,916

Updated information provided by Jeff Jasper (DNR, Information Resource Management), Chollada Jarupakorn (DNR, Division of Mining, Land & Water, DNR), and John Hoppe (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]After 2010, 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, 938 in 2012, and 670 in 2013.

- - Not reported

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 critical 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. A 1,400-square-mile helicopter-borne geophysical survey was contracted in 2013 to support this project.

DGGS released airborne geophysical data for three surveys centered around Flat, Alaska, and the Middle Styx and Dalzell Creek areas in southwestern Alaska in late 2013. Summaries of mineral-related mapping products and geophysical surveys that have been 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. Online application Airborne GeophysWeb provides an interactive interface for Alaska airborne geophysical data at http://dx.doi.org/10.14509/gp.

NORTHERN REGION

Teck Resources Ltd. completed 23,659 feet of exploration drilling on approximately 135 square miles of State of Alaska and NANA Regional Corp. land in the Red Dog mining district. At the end of 2013, Teck reported 55 million tons of reserves at Red Dog with an average grade of 15.8 percent zinc, 4.1 percent lead, and 2.1 ounces per ton silver. The largest portion of the 2013 exploration program focused on Qanaiyaq and Paalaaq, potential sources of near-term higher-grade ore to supplement the reserves currently being mined from the adjacent Aqqaluk pit. Qanaiyaq, a near-surface deposit to the south of the mined-out Red Dog main deposit, has an indicated resource of 8.3 million tons with an average grade of 25.7 percent zinc, 6.9 percent lead, and 3.99 ounces per ton silver. Teck has not released a resource for Paalaaq, a deeper deposit immediately north of Aqqaluk. In addition to exploring NANA-owned lands immediately surrounding Red Dog Mine, Teck completed drilling at Noatak, a block of State claims bordering the west side of the Red Dog property. Anarraaq–Aktigiruq, roughly 8 miles northwest of Red Dog, is among the high-grade zinc–lead targets Teck is pursuing on the Noatak claims. Teck discovered the Anarraaq 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, but has not publicly released an update to this resource in recent years. Results from 2013 drilling in the Red Dog district were unavailable at the time of this report's publication.

Zazu Metals Corp. invested approximately $1.2 million on studies needed for potential future permitting and development of Lik, a sediment-hosted zinc project about 14 miles northwest of Red Dog Mine. In May, the company announced it has entered into a second cost reimbursement agreement with Alaska Industrial Development and Export Authority (AIDEA) for the continued funding of studies to evaluate the potential of using the De Long Mountain Transportation System (DMTS) to ship concentrates from a mine at Lik. DMTS is a 52-mile-long road with port and storage facilities, which currently services Red Dog Mine. Under the original agreement signed by Zazu and AIDEA in 2010, both parties began evaluating the possibility of AIDEA providing financing for the construction of a 20-mile spur road linking Lik to DMTS and upgrading the port facilities to handle the added traffic from shipping concentrates from a potential mine at Lik. The orebody 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 1.48 ounces per ton silver. Zazu intends to initially develop a larger open-pit mine at Lik South, followed by an underground operation at Lik North. A Preliminary Economic Assessment (PEA) completed 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 November 2013, Zazu retained JDS Energy and Mining Inc. to update the 2010 PEA prepared for Lik South. Teck is a 50 percent joint-venture partner at Lik. Zazu has the exclusive right to increase its interest to 80 percent by investing $25 million into the Lik project by 2018.

NovaCopper Inc. completed an $8.9 million field program at the Upper Kobuk Mineral Projects (UKMP), a partnership between NovaCopper and NANA Corp. that joins NovaCopper's Ambler property with copper-prospective lands owned by NANA. The 112,058 acres of State, Federal, and patented mining claims that make up the Ambler portion of UKMP feature Arctic and a number of other similar volcanogenic massive sulfide deposits and prospects stretching across some 70 miles of the Ambler Mining District. The 240,885 acres of NANA lands, which lie immediately to the south of the Ambler portion, feature Bornite and a number of carbonate-hosted copper prospects. In February, NovaCopper released an inaugural NI 43-101-compliant mineral resource estimate for the South Reef zone, part of the Bornite project. Based on 29 holes drilled by NovaCopper and 13 holes previously drilled by Kennecott, the 2013 estimate includes an inferred resource of 47.5 million tons averaging 2.54 percent copper, or 2.4 billion pounds of contained copper, at South Reef. This resource adds to the 2012 resource at Ruby Creek, another Bornite zone roughly

1,640 feet to the northwest, bringing the Bornite total to an indicated resource of 7.5 million tons grading 1.19 percent copper (179 million pounds copper) and an inferred resource of 100.1 million tons grading 1.64 percent copper (3.3 billion pounds copper). Combined with the 1.95 billion pounds of copper resource at the Arctic VMS deposit (see below) 16 miles northeast of Bornite, the total contained copper resource for the UKMP is 5.4 billion pounds.

NovaCopper's 2013 field program at Bornite included 26,712 total feet of drilling (photo 3). This program included 15,367 feet of drilling targeting near-surface, moderate-grade mineralization at the Ruby Creek zone; and 11,245 feet testing extensions of deeper and higher-grade mineralization at both the South Reef and Ruby Creek zones. Highlights from ten holes targeting the near-surface portion of Ruby Creek include: RC13-221, which cut five mineralized intervals over 751 feet

Table 9. Detailed state airborne geophysical surveys and follow-up geologic ground-truth mapping as of December 2013.[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
Dalzell Creek, Middle Styx, Southern Dishna River, Fox Hills, and Beaver Creek	1,267 sq. miles	Airborne geophysical survey; geologic mapping (field work completed; map in prep.)
TOTAL 20 years $16.0 million	**17,958 sq. miles**	**3.15% 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 2013.[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 from DGGS, local and state governments, and private corporations. Projects concentrate mainly on federal land. Data are released through DGGS.
[b]Major funding provided by BLM and the City of Wrangell.
[c]Major funding provided by BLM and Ketchikan Gateway Borough. Sealaska Corp., Alaska State Mental Health Land Trust Office, the City of Coffman Cove, and the City of Thorne Bay also contributed funds. Sealaska Corp. also contributed previously acquired geophysical data.

for a combined 406-foot composite interval with a weighted average grade of 1.23 percent copper comprising 33 feet of 0.85 percent copper, 41 feet of 0.98 percent copper, 85 feet of 1.18 percent copper, 55 feet of 1.13 percent copper, and 193 feet of 1.39 percent copper; RC13-219 cut a single 139-foot intercept with an average grade of 1.44 percent copper; RC13-218 intersected three mineralized zones over 1,019 feet, for a combined 242-foot composite interval with a weighted average grade of 1.2 percent copper comprising 46 feet of 0.84 percent copper, 77 feet of 0.94 percent copper, and 119 feet of 1.51 percent copper. Deep drilling to the north of South Reef and Ruby Creek during 2013 intersected an apparent link between the zones. RC13-220, the first hole to intersect this northern expansion area, cut 150 feet of 1.07 percent copper and 264 feet of 1.89 percent copper. The highest grade and longest intercepts came in RC13-224, which cut 753 feet of 1.73 percent copper and 22 feet of 7.70 percent copper. In addition to drilling, NovaCopper resampled and re-assayed 35,309 feet of Bornite drill core from 33 holes drilled by Kennecott between 1957 and 1975. NovaCopper said this program confirmed previously-known high-grade mineralization and extended the known limits of lower-grade mineralization. The results from the resampling and 2013 drilling will be incorporated into an updated resource estimate.

NovaCopper completed a Preliminary Economic Assessment (PEA) on the Arctic VMS deposit (16 miles north of Bornite), the other major deposit in the UKMP. The updated Arctic resource includes an indicated category of 26.2 million tons of 3.26 percent copper, 4.45 percent zinc, 0.76 percent lead, 0.02 ounce per ton gold, 1.55 ounces per ton silver, and an inferred category of 4.0 million tons of 3.22 percent copper, 3.84 percent zinc, 0.58 percent lead, 0.17 ounce per ton gold, and 1.21 ounces per ton silver for a total contained resource of 1.95 billion pounds of copper, 2.62 billion pounds of zinc, 444 million pounds of lead, 610,000 ounces gold, and 45.3 million ounces silver. The base case PEA mining scenario calls for an open pit mine with a life of 12 years, which would recover 1.5 billion pounds of copper, 1.8 billion pounds of zinc, 289 million pounds of lead, 30.5 million ounces silver, and 349,094 ounces gold. The PEA scenario requires a road connection with the Dalton Highway, and to that end NovaCopper has signed a Memorandum of Understanding (MOU) with AIDEA to investigate the viability of permitting and constructing a 211-mile-long Ambler mining district access industrial road extending west from the Dalton Highway to the Upper Kobuk Minerals Project and a number of other mineral prospects and deposits.

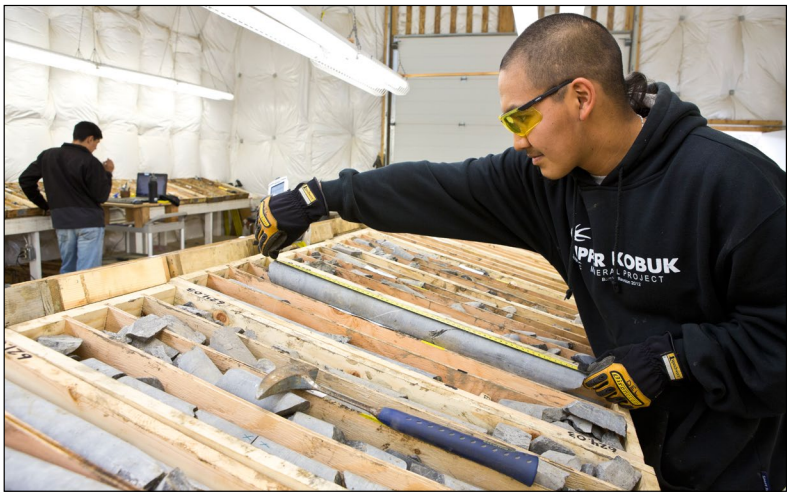


Photo 3. NovaCopper Inc. geotechnical staff measuring drill core from Bornite. NovaCopper drilled 26,712 total feet in 2013 under an agreement with NANA Corp. to explore combined State and Native lands as the Upper Kobuk Mineral Projects. Photo provided by NovaCopper Inc.

Andover Mining Corp. completed an initial NI 43-101 resource for the Sun polymetallic VMS deposit, indicating a combined indicated and inferred resource of 15.2 million tons containing 1.2 billion pounds of zinc, 360 million pounds of copper, 400 million pounds of lead, and 32.8 million ounces of silver. Andover also participated in an MOU with AIDEA on the Ambler mining district access study.

At least 31 individuals and companies completed placer gold exploration, representing more than $395,358 of spending in the northern region during 2013. Reported exploration work in this region equates to three full-time-equivalent positions.

WESTERN REGION

Graphite One Resources Inc. kicked off 2013 by filing an NI 43-101 technical report with an inaugural mineral resource at its Graphite Creek property approximately 40 miles north of Nome. Based on the results from 17 holes of an 18-hole drill program conducted during 2012, Graphite One calculated an inferred resource of 118.8 million tons averaging 5.78 percent graphitic carbon, containing approximately 6.8 million tons of graphite. The resource covers approximately 1.4 miles of an 11-mile trend identified by high-grade graphite outcrops and bands of coincident high-electromagnetic anomalies. A 2012 step-out hole to test the trend 1.4 miles southwest of the calculated resource intersected 581 feet averaging 3 percent graphitic carbon, including 171 feet grading 6.09 percent graphite.

Graphite One conducted a 10-hole, 3,356-foot drill program late in 2013 to test the southwest extension and extend the resources to the northeast (photo 4). The first two holes of this program were drilled approximately one-quarter mile northeast of the defined resource. Hole 13GCH009 cut 296 feet averaging 3.6 percent graphite; and hole 13GCH010 cut 335 feet averaging 3.3 percent graphite. The balance of the program focused on filling in the 1.4-mile gap between the deposit and the 2012 southwest step-out hole. Hole 13GCH011 cut 275 feet averaging 3.81 percent graphite, including 100 feet averaging 6.26 percent graphite; 13GCH012 cut 283 feet averaging 5.06 percent graphite, including 33 feet averaging 13.07 percent graphite; 13GCH013 cut 151 feet averaging 3.81 percent graphite, including 47 feet averaging 7.16 percent graphite; 13GCH015 cut 348 feet averaging 2.1 percent graphite, including 17 feet averaging 5.83 percent graphite; 13GCH016 cut 249 feet averaging 2.4 percent graphite, including 34 feet averaging 6.2 percent graphite; and 13GCH017 cut 416 feet averaging 2.5 percent graphite, including 46 feet averaging 7.2 percent graphite. Results of the drilling will be used to update the resource at Graphite Creek. In April, Graphite One reported that a first-pass beneficiation test demonstrated a leaching process capable of producing 99.2 percent graphitic carbon from a rough concentrate obtained from the Graphite Creek project. The company plans additional metallurgical work to develop a process to produce ultra-high-purity graphite from the deposit. Graphite One commissioned JDS Energy and Mining Inc. to complete engineering and logistics studies for Graphite Creek; the company plans to include the results of these studies in a preliminary economic assessment for Graphite Creek.

David Lajack and Altar Drilling Inc. completed a $569,000 exploration program at the Divide gold property approximately 30 miles north of Nome. The program included approximately 7,500 feet of drilling in eight holes. Drilling completed on the property in 2007 and 2008 intercepted values of 0.292 ounce per ton gold over 10 feet, 0.17 ounce per ton gold over 27 feet, and 0.09 ounce per ton gold over 50 feet. Results of the 2013 drill program are unavailable.

Photo 4. Late September drilling on the Graphite Creek project, 40 miles north of Nome. Graphite One Resources Inc. drilled 3,356 feet to test extensions of the resource containing 6.8 million tons of graphite inferred from the 2012 drill program. Photo provided by Graphite One Resources Inc.

NANA Regional Corp conducted a 23-day program of geologic mapping and surface sampling on the Scout and Kuluu properties in the Fairhaven district.

Plan B Minerals Corp., a privately-held company, took over the Illinois Creek Ag–Au property from Silver Predator Corp. and conducted a trenching and bulk sampling program in the historical open-pit mine. Additionally they

recalculated an unclassified resource, based on historical drilling, of 9.7 million tons containing 461,000 gold-equivalent ounces. The Illinois Creek deposit, 55 miles southwest of Galena, is a gossan zone on a deeply weathered, polymetallic, shear-hosted vein related to the Early Cretaceous Khotol pluton. Previous operators produced approximately 143,860 ounces of gold and 755,600 ounces of silver from 1997 to 2004.

At the Nixon Fork Mine, a gold–copper skarn deposit 33 miles northeast of McGrath, Fire River Gold Corp. reported drilling more than 10,954 feet of underground exploration drilling with "positive results" in both the Crystal and Mystery zones. Operations at Nixon Fork were suspended in June and Fire River Gold Corp. reported going into default to creditors in October. Nixon Fork drilling and associated expenditures described here are included in the Development Section statistics.

AuruMar (Pty.) Ltd., as the technical services provider to Placer Marine Mining Inc., a joint venture between AngloGold Ashanti Ltd. and De Beers Group, continued its exploration on a large tract of marine placer properties the company acquired in 2011 during a lease sale held by the Alaska Department of Natural Resources. These tracts start about a mile offshore and extend to approximately the three-mile-limit of State-owned land and for approximately 20 miles parallel to the shoreline. A $5.1 million exploration program completed by Placer Marine during 2013 to gain the information to begin mining the marine placer deposit. This program included a total of 61 six-inch cores obtained with a vessel-mounted sonic drill. Placer Marine also collected 214 surface-sediment samples as part of an orientation and ground-truth program to assist in the development of geologic maps and mineralization models. A large portion of the 2013 program included environmental baseline studies designed to supplement what is known about the marine environment in the Nome offshore placer lease area with site-specific data (photo 5). This work included sediment sampling, diver transects and photography, data analysis, salinity and temperature monitoring, and habitat studies. In July, Placer Marine published a preliminary economic assessment that identified a mining plan for the Nome Offshore project that the company believes represents a low-capital-risk solution for optimal mining of the marine gold placers. A mining system, processing plant, and operation support were included in the operation outlined in the preliminary environmental assessment.

In addition to Placer Marine, 19 individuals and companies reported exploration expenditures of more than $5,497,650 on marine placer gold leases and claims along the Seward Peninsula. At least another 78 individuals and companies invested a minimum of $1.41 million on exploration of nonmarine placer deposits across the larger western Alaska region. Estimated from person-days reported, this region supports 39 full-time-equivalent positions dedicated to exploration.

EASTERN INTERIOR

Contango ORE Inc., an Alaska-focused 2010 mineral spin-off of Houston, Texas-based Contango Oil & Gas Co., completed 47,073 feet of drilling in 69 holes at its Tetlin gold–copper project 16 miles southeast of the community of Tok in Alaska's eastern interior. This roughly 760,000-acre property includes approximately 676,200 acres of land leased from the

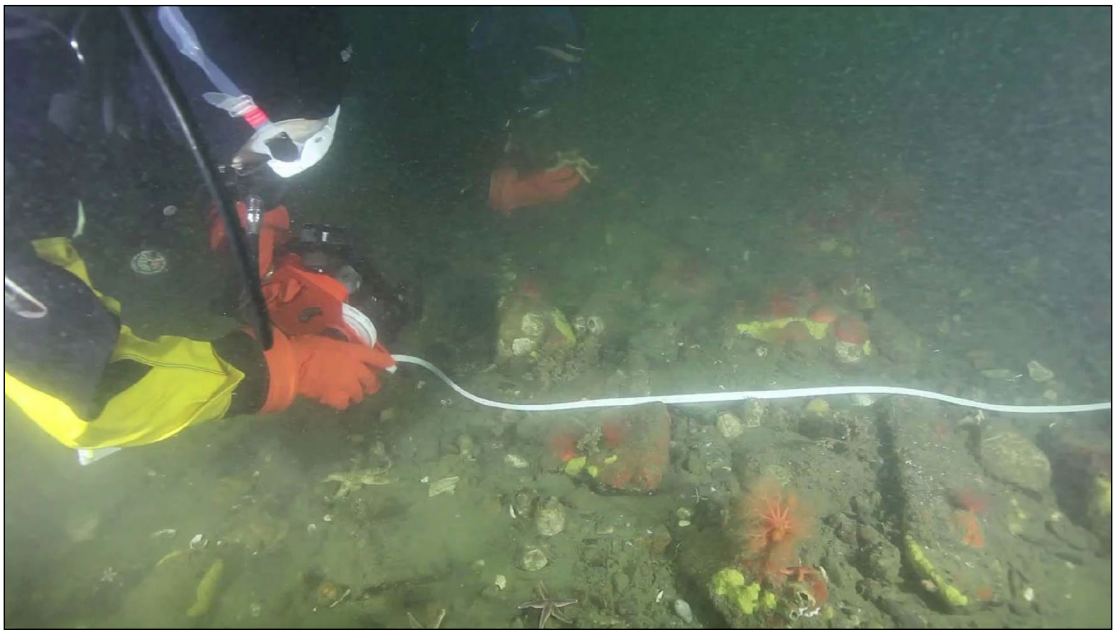


Photo 5. Contractors for AuruMar (Pty.) Ltd. conducting environmental baseline studies near Nome in Norton Sound on State offshore placer lease tracts held by Placer Marine Mining Inc. Photo captured from video presentation provided by AuruMar (Pty.) Ltd. and RWJ Consulting.

Tetlin Village Council plus 83,720 acres of State of Alaska mining claims. Contango ORE's 2013 exploration program focused primarily on drilling at the Peak Zone, a gold–copper–silver discovery made in 2012 during drilling on the Tetlin lease portion of the project. Highlights from the 2013 drilling at Peak include 212.6 feet grading 0.382 ounce per ton gold, 0.612 ounce per ton silver, and 0.482 percent copper in hole TET13062; 134.2 feet grading 0.483 ounce per ton gold, 1.16 ounces per ton silver, and 0.732 percent copper in TET13063; 318 feet grading 0.264 ounce per ton gold, 0.126 ounce per ton silver, and 0.093 percent copper in TET13110; and 442.3 feet grading 0.141 ounce per ton gold, 0.085 ounce per ton silver, and 0.084 percent copper in TET12117. TET13107, which was drilled parallel to mineralization, intersected 522.5 feet grading 0.204 ounce per ton gold, 0.192 ounce per ton silver, and 0.102 percent copper from surface. The mineralization at Peak is schist-hosted and has relatively high sulfide content (photo 6). Upon visiting Tetlin in September, noted economic geologist Richard Sillitoe concluded that the mineralization at Peak resembles a retrograde calcic skarn that shares a number of similarities with the Fortitude skarn in the Copper Canyon district of Nevada. In addition to drilling at the Peak zone, the 2013 program included exploration of other targets with a similar geophysical and geochemical signature. Some of these coincident geophysical and geochemical targets are in the Chief Danny region, a 9-square-mile prospect area that encompasses the Peak zone. Tors, a prospect about 5 miles east of Peak, and Chisana, a prospect about 7 miles farther east, were two of the leads that were tested. More than 1,400 auger soil samples were collected from Chief Danny, Tors, and Chisana in 2013—an effort that has refined drill targets at these prospects that stretch across the northern section of the Tetlin lease. Further afield, reconnaissance crews collected 368 stream-sediment and pan-concentrate samples across the Eagle property, a block of State of Alaska mining claims extending west from the 675,000-acre Tetlin lease. While rudimentary, the visible gold in pan concentrates and copper in stream sediments is reminiscent of the early work that led to the discovery of the Peak zone roughly 15 miles to the east. From 2010 through 2013, Tetlin saw 91,099 feet of drilling in 130 holes. Of the total, 52,526 feet in 78 holes pierced the mineralized body that makes up the Peak zone. Based on this drilling, an inaugural resource estimate for Peak was being calculated at the end of 2013.

Sumitomo Metal Mining Pogo LLC, a joint venture between Japanese firms Sumitomo Metal Mining Co. (85 percent) and Sumitomo Corp. (15 percent), invested $11 million on exploration at its Pogo Gold Mine near Delta Junction. This exploration program included 130,595 feet of core drilling that involved both surface and underground programs. Defining and expanding high-grade gold mineralization at East Deep, a near-mine zone of gold mineralization discovered in 2010, was the primary target of the 2013 exploration drilling at Pogo. Since the start of production in 2006, mining at Pogo has primarily been completed at the Liese zone—three flat-lying, parallel quartz veins that carry high-grade gold. East Deep is believed to be a continuation of the Liese zone that was separated by a gold-barren diorite roughly 95 million years ago. The North zone, which lies immediately north of Liese at the northeastern end of the diorite, consists of narrower but higher grade vertical veins that are believed to be feeders that provided a conduit to deliver the gold-mineralized fluids to the Liese zone and the East Deep zone to the southeast. Connections between the North and Liese zones have previously been established. Expanding East Deep northwest toward the North Zone was a primary target of the 2013 surface drill program, which included 105,999 feet of drilling in 59 holes. In addition to successfully expanding East Deep to the feeder zone, this drilling discovered two new North Zone veins—NZ3 and NZ4. The 2013 surface drilling also tested South Pogo, where 2012 drilling discovered SP1, a vein just south of the Liese zone (photo 7). Drilling in 2013 aimed to establish a structural and gold mineralization link between SP1 and

Photo 6. Drill core from the Peak zone, Tetlin project, after being sawn and sampled. Contango ORE Inc. drilled 47,073 feet at the Tetlin project in 2013. The Peak zone is a copper–gold–silver-bearing skarn zone, possibly related to a concealed porphyry copper system. Photo provided by Shane Lasley.

the nearby Liese zone, with its associated underground access. In addition to the surface drilling, 24,596 feet of definition drilling was completed from two exploration drifts SMM Pogo drove from the Liese zone underground workings through some 1,000 feet of diorite to East Deep. In addition to providing a platform for underground drilling, these drifts provided access for a 12,000-ton bulk sample of East Deep ore that was processed during the third quarter of 2013. Sumitomo Metal Mining Pogo received permits for East Deep in 2013, and mining of this expansion area was scheduled to begin in early 2014.

Photo 7. Helicopter-supported surface drill site at South Pogo, immediately adjacent to Pogo Mine, 38 miles northeast of Delta Junction. Sumitomo Metal Mining Pogo LLC drilled a total of 105,999 feet in road- and helicopter-supported surface drilling. Photo provided by Sumitomo Metal Mining Pogo LLC.

Stone Boy project partners, Sumitomo Metal Mining Co. Ltd. (95 percent) and Sumitomo Corp. (5 percent) invested approximately $2 million on continued exploration at land packages in the district around the Pogo Mine property during 2013. This exploration, carried out by Pathfinder Minerals Services, involved a total of 18,447 feet of drilling in 21 holes, as well as rock and soil sampling. Approximately $429,000 of the 2013 program was allocated to ongoing exploration at Monte Cristo, a group of claims roughly 40 miles west of the Pogo Mine. Pathfinder drilled 2,237 drill holes. In November 2013, Sumitomo Metal Mining and Sumitomo Corp. said they decided to pause exploration of the Naosi zone, a gold–silver–antimony prospect in the larger Monte Cristo properties of the Stone Boy project. Though Naosi drilling was put on hold, the partners said they intend to continue exploration of other zones in the Monte Cristo area as well as other properties in the larger Stone Boy project area as part of an ongoing effort to discover a new gold mine to follow Pogo. The Ink claims (also known as the Brink property), located approximately 20 miles southeast of Pogo Mine, were the target of the remaining $1.6 million of exploration on the Stone Boy Project. The program included 16,210 feet of drilling in 12 holes, resulting in 2,129 core samples. Pathfinder Minerals Services reports that results from the drilling indicate the presence of gold and pathfinder minerals associated with quartz veins cutting fine-grained granodiorite intrusive rocks. In addition to drilling, 787 soil samples and 48 rock samples were collected on the Ink claims during 2013.

Immediately south of the Stone Boy Ink claims, Newmont North America Exploration Ltd. completed at least $470,000 of early-stage exploration on its Healy claims. These claims, consisting of two claim blocks covering approximately 40 square miles, were staked by Newmont in 2012 and 2013. During 2013, Newmont field crews carried out geologic mapping and collected 4,306 soil and 326 rock-chip samples.

Fairbanks Gold Mining Inc., a subsidiary of Kinross Gold Corp., invested $8 million on exploration at its properties at and surrounding its Fort Knox Mine north of Fairbanks. This included 30,716 feet of reverse-circulation drilling and 16,400 feet of core drilling at the immediate Fort Knox property as well as 1,400 feet of reverse-circulation drilling, 12,000 feet of core drilling, and 3,463 feet of rotary air blast drilling at the adjacent Gil property. Kinross, which held a longstanding partnership with junior explorer Teryl Resources Corp. at Gil, bought full ownership of the property in 2011. Fairbanks Gold Mining Inc. also completed a trench sampling program in 2013 at its PB and NPB claims in the Circle mining district, roughly 80 miles northeast of Fort Knox.

Freegold Ventures Ltd. continued resource expansion drilling at its Golden Summit property approximately 5 miles northwest of Fort Knox Mine. An 11,392-foot winter drilling program that began in February focused on upgrading and expanding the Dolphin–Cleary Hill deposit at the Golden Summit property (photo 8). Highlights of gold content include: 552 feet grading 0.019 ounce per ton in hole GSDL 13-01; 1,013.5 feet grading 0.018 ounce per ton in GSDL 13-02, which includes a subinterval of 376.6 feet grading 0.03 ounce per ton; and 330 feet grading 0.028 ounce per ton gold in GSDL 13-09. In June, Freegold published an updated resource estimate for the Dolphin–Cleary zone that included an indicated resource

of 87.9 million tons averaging 0.019 ounce per ton (1.68 million ounces) gold; and an inferred resource of 273.4 million tons averaging 0.018 ounce per ton (4.84 million ounces) gold. The oxide portion of the deposit, which is contained largely within the upper 200 feet of the overall resource, has an indicated resource of 27.6 million tons averaging 0.016 ounce per ton (439,000 ounces) gold; and an inferred resource of 18.3 million tons averaging 0.014 ounce per ton (253,000 ounces) gold. Freegold's summer program at Golden Summit consisted of an additional 5,469 feet of drilling in three holes completed at the Dolphin–Cleary deposit area. Hole GSDL 13-11 intersected 1,885 feet grading 0.024 ounce per ton gold. Holes GSDL 13-12 and 13-13, drilled to test the deposit to the north where limited drilling has been done and multi-ounce gold-bearing veins crop out at surface, continued to tap higher-grade gold. GSDL 13-12 intersected 217 feet grading 0.051 ounce per ton gold, including 28 feet grading 0.219 ounce per ton gold.

Teryl Resources completed a seven-hole, 504-foot drill program at its Fish Creek property immediately northeast of Fairbanks Gold Mining Inc.'s Gil property. The drill program at Fish Creek included three holes seeking to verify and identify placer gold in the Fish Creek valley; four holes target lode gold sources on the property.

Tower Hill Mines Inc., a subsidiary of International Tower Hill Mines Ltd., completed an $8.19 million work program that included engineering, metallurgical, and environmental baseline studies for its Livengood gold project approximately 70 miles northwest of Fairbanks. In July 2013, International Tower Hill Mines released a feasibility study that outlines a 100,000-ton-per-day operation at Livengood averaging 577,600 ounces of gold annually over a 14-year mine life. The all-in costs to mine an ounce of gold at Livengood with the operation described in the feasibility study are estimated to be $1,474. During the second half of 2013, the Livengood development team focused on optimization of the feasibility study. Enhancing mill head grades in early years with a more aggressive stockpile management strategy than is assumed in the feasibility study is one of the primary areas of optimization being studied. According to a resource estimate updated for the feasibility study, Livengood has 884 million tons of measured and indicated resources grading 0.018 ounce per ton for 15.7 million ounces of gold. Additionally, the project has 293 million tons of inferred resources grading 0.015 ounce per ton gold.

Doyon Limited continued exploration at its Sawtooth Mountain gold property, completing a geophysical survey in 2013 (photo 9). This property is roughly 30 miles west of Livengood on lands owned by the Native corporation.

Endurance Gold Corp. completed a small reconnaissance prospecting and soil sampling program at its Elephant Mountain property approximately 45 miles southwest of Livengood.

Photo 8. Winter drilling at the Golden Summit project in the Fairbanks mining district. Freegold Ventures Ltd. successfully completed an 11,392-foot winter drilling campaign during 2013. Photo provided by Freegold Ventures Ltd.

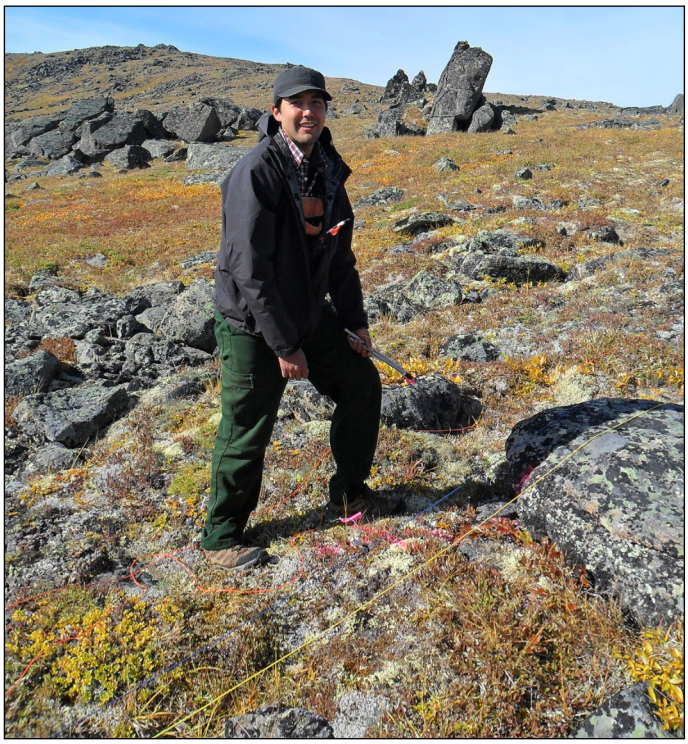


Photo 9. Technician working on geophysical survey on Doyon Limited's Sawtooth Mountain property. Doyon is an ANCSA corporation that owns surface and mineral estate to extensive prospective tracts in the eastern interior. Photo provided by John Woodman, Doyon Limited.

MMG USA Exploration LLC, a subsidiary of Australia-based MMG Ltd., invested approximately $550,000 on early-stage exploration at its Twenty Mile and Squaw Creek properties, two blocks of mining claims approximately 100 miles northwest of Fairbanks in the Melozitna mining district of eastern interior Alaska. The 2013 program included helicopter-borne versatile time-domain electromagnetic (VTEM) surveys, mapping, and rock sampling to evaluate the nickel–copper potential and magmatic sulfide potential of Triassic mafic sills.

Almost 500 individuals and companies reported placer gold exploration in the eastern interior. Together, this accounted for more than $2.1 million of spending on projects ranging from small pan prospecting programs on individual claims to drilling and bulk sampling in preparation for placer-mining operations. Work reported in this region equates to 31 full-time-equivalent positions dedicated to exploration.

SOUTH-CENTRAL REGION

Pure Nickel Inc. and Itochu Corp. completed a $3 million exploration program at the MAN nickel–copper–platinum-group-element project approximately 250 miles northeast of Anchorage. This program included 9,813 feet of drilling in eight holes, as well as prospecting and mapping at various locations across the 46,500-acre property. Seven holes targeted the Eureka zone, a subset of the 21-mile-long Alpha mafic–ultramafic complex that stretches east–west across the central portion of the MAN property (photo 10). Eureka consists of an interval of disseminated sulfide mineralization that straddles the contact between gabbroic and ultramafic rocks in the northern half of the Alpha complex. Highlights from 2013 drilling at Eureka include: 673.2 feet averaging 0.34 percent nickel equivalent (19 parts per billion gold, 61 parts per billion platinum, 122 parts per billion palladium, 0.09 percent copper, and 0.24 percent nickel) in hole PNI-13-069; 533.5 feet averaging 0.29 percent nickel equivalent (13 parts per billion gold, 49 parts per billion platinum, 104 parts per billion palladium, 0.08 percent copper, and 0.2 percent nickel) in hole PNI-13-072; and 833 feet averaging 0.27 percent nickel equivalent (11 parts per billion gold, 38 parts per billion platinum, 91 parts per billion palladium, 0.06 percent copper, and 0.2 percent nickel) in hole PNI-13-074. In November Pure Nickel reported that Itochu Corp. had decided to withdraw from the project, reverting full project ownership back to Pure Nickel. Itochu had invested roughly $23.5 million on exploration at MAN since 2008.

MMG USA Exploration LLC, a subsidiary of Melbourne, Australia-based MMG Ltd., spent approximately $1.58 million on early-stage nickel exploration across three large blocks of State of Alaska mining claims in Alaska's south-central region during 2013. These claim groups include Amphitheater, bordering Pure Nickel's MAN property to the south and west; Butte Creek, about 40 miles southwest of Amphitheater in the Watana Mountains; and Talkeetna–DGU, a block of claims roughly 30 miles farther southwest. Work on these properties, collectively known as the Nikolai project, included geophysical and geochemical surveys, including 1,129 line-miles of helicopter-borne versatile time-domain electromagnetic (VTEM) geophysical survey mapping, and 3,898 feet of core drilling in six holes. The Talkeetna–DGU property accounted for roughly half of the expenditures MMG reported for the Nikolai project in 2013.

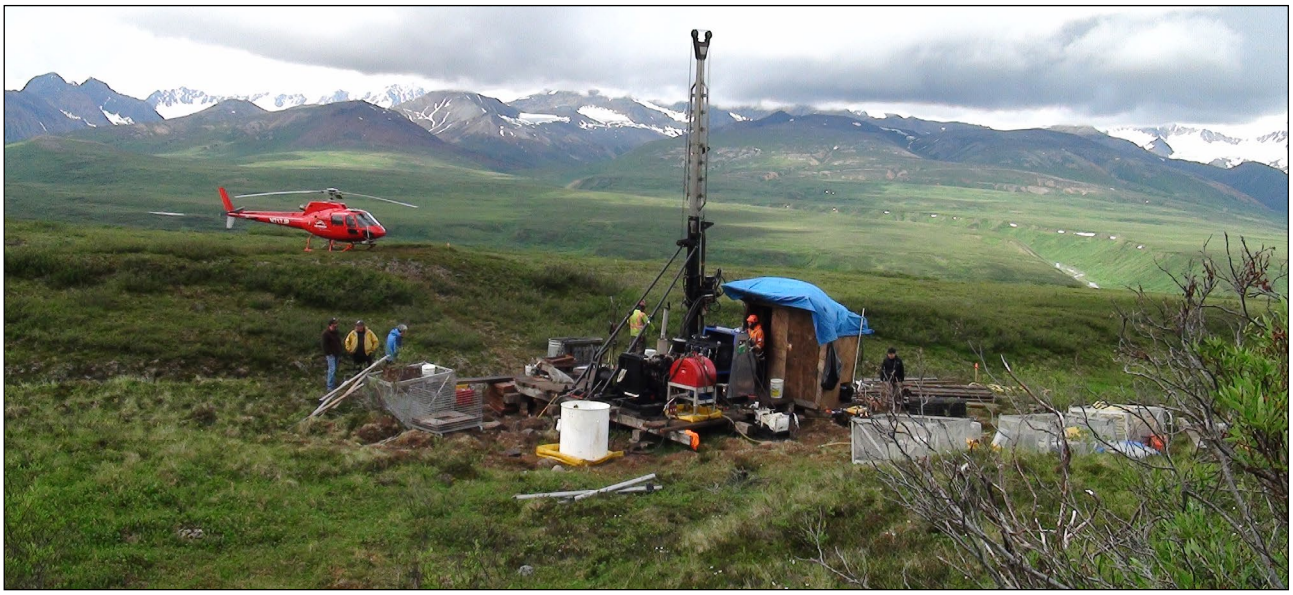


Photo 10. Drill site on the Alpha complex, MAN project, near Paxson, Alaska. During 2013, Pure Nickel Inc. drilled 9,813 feet exploring for nickel–copper–platinum-group-element mineralization hosted in the Alpha mafic–ultramafic complex. Photo provided by Pure Nickel Inc.

Millrock Resources Inc. carried out preliminary exploration of Stellar, a copper–gold project the company acquired through staking in 2012. Situated 8 miles north of the Denali Highway and 10 miles west of MMG's Amphitheater claims, the Stellar claim block covers the Zackly copper–gold skarn deposit; surrounding lands are considered prospective for porphyry copper–gold deposits. Approximately 40,000 feet of drilling in some 85 holes had previously been completed at Zackly, outlining a historical resource of 218,944 ounces of gold, 61.6 million pounds of copper, and 1.17 million ounces of silver contained in a skarn deposit of 1.41 million tons grading 0.132 ounce per ton gold, 2.19 percent copper, and 0.83 ounce per ton silver. The historical resource is in the main skarn zone, which has a strike length of approximately 3,280 feet. Additional known areas of skarn mineralization are reported to occur over a strike length in excess of 9,800 feet. To further its understanding of Stellar, Millrock acquired data from extensive geophysical and geological surveys historically completed at Stellar, as well as sample pulps and core from past drilling. In August, Millrock reported that a global copper miner, who was not named due to confidentiality, agreed to fund an approximately $300,000 exploration program in exchange for a first right of refusal to enter into an option and joint-venture agreement at Stellar. This work included an airborne geophysical survey that augmented a regional survey flown by the State of Alaska over the same area in 2013. The data from the DGGS survey was made public in early 2014 along with the regional Wrangellia survey data. The balance of the program involved a grid-based soil sampling program and a rock sampling program over a large portion of the property. Millrock said the geophysical/geochemical programs have identified seven copper and/or gold targets. The most advanced are Mars, a copper target 4 miles west of Zackly; Jupiter, a copper–gold target 1.1 miles north of Zackly; and North Moonwalk, a gold prospect 7.1 miles north of Zackly. In November, Millrock reported that the undisclosed mining company decided not to exercise its right to enter into an option at Stellar.

Millrock Resources and Teck American Inc., a subsidiary of Teck Resources Ltd., invested approximately $350,000 on geophysical and geological surveys at the Estelle project to better define induced polarization (IP) chargeability targets in the Oxide Valley prospect, which hosts closely-spaced gold-bearing extensional quartz veins. Estelle, which consists of 135 square miles of State of Alaska mineral claims in the Kahiltna Terrane and the Estelle plutonic complex about 110 miles northwest of Anchorage, is prospective for both intrusive-related gold and porphyry copper–gold mineralization. On reviewing the results of the 2013 field program, the joint-venture partners (Teck 64.8 percent, Millrock 35.2 percent) established a series of targets for future drilling at Estelle.

Kiska Metals Corp. completed a $1.1 million work program that primarily involved a review of its Whistler project, a block of 884 State of Alaska mining claims adjacent to the east margin of Estelle. The core asset of the Whistler property is the Whistler deposit, which has indicated resources of 80.2 million tons averaging 0.17 percent copper, 0.015 ounce per ton gold, and 0.057 ounce per ton silver, and inferred resources of 160.7 million tons averaging 0.15 percent copper, 0.012 ounce per ton gold, and 0.051 ounce per ton silver for a total contained resource of 769 million pounds copper, 3.12 million ounces gold, and 12.2 million ounces silver. During the third quarter, Kiska engaged Mine Development Associates to review geologic and drilling data generated at Whistler in preparation for future geologic modeling and resource estimates at the Whistler deposit and other prospects on the property, potentially including Raintree West, located less than a mile east of the Whistler deposit, and Island Mountain, 14 miles southwest of the deposit.

Kiska Metals also completed a reconnaissance exploration program at Copper Joe, a porphyry copper–gold–molybdenum prospect about 15 miles southwest of the Whistler property.

Riverdale Alaska LLC continued work on its Chickaloon coal project exploring for coking coal on Alaska Mental Health Trust lands. From January through August 2013, the company drilled seven boreholes for a total of 4,219 feet.

Diamond Gold Corp. reported a $100,000 exploration program at two nearby localities in the Yenlo Hills. At the Sable Elegance property the company reports a large area with gravels containing gem-quality tourmaline with coincident micro-sapphire and niobium–anomalous heavy-metal concentrates in Yenlo Creek. At the Fire Brick site just north of Yenlo Mountain the company reports they are driving an adit on an arsenopyrite vein in gabbro. The company indicates the vein contains gold, silver, copper, and palladium, but no values are reported.

At least 151 individuals and companies actively explored for placer gold in the south-central region during 2013, accounting for approximately $966,000 of spending during the year. These programs ranged from pan prospecting on individual claims to drilling and bulk sampling in preparation for future placer mining operations in the south-central region. Reported work in this region equates to 16 full-time-equivalent positions dedicated to exploration.

SOUTHWESTERN REGION

The Pebble Partnership spent $66.8 million on the Pebble copper–gold–molybdenum project during 2013, which included continued investment in exploration, environmental, and engineering programs (photo 11) to gather data for a prefeasibility study and project description to support the filing of permit applications under the National Environmental Policy Act (NEPA). This spending is less than the $80 million

budgeted by the Pebble Partnership at the beginning of the year and reflects the withdrawal of funding partner Anglo American plc, announced in September. To earn a 50 percent stake in Pebble, Anglo American had agreed to invest $1.5 billion in the project, of which the global-scale company had invested approximately $573 million since entering into the Pebble Partnership in 2007. The partnership agreement was structured so that Northern Dynasty Minerals Ltd. regained 100 percent ownership of Pebble upon the finalization of Anglo American's withdrawal in December.

The Pebble Partnership completed 6,195 feet of drilling in 29 holes at the project during 2013 to collect geotechnical data. Ongoing engineering studies to advance mine planning studies for the Pebble Project continued in 2013 including analysis of mining and processing plant designs, and potential infrastructure options associated with the mine. Development options and component alternatives were also considered. The Pebble Partnership also continued an active program of stakeholder outreach and engagement during 2013. In May, the company released "The Economic and Employment Contributions of a Conceptual Pebble Mine to the Alaska and United States Economies," a 69-page report authored by IHS Global Insight that forecasts developing a mine at Pebble could support more than 16,000 jobs nationwide during construction, including 4,725 jobs in Alaska, with an average annual wage of $63,500 per year. Once in operation, the proposed mine is forecast to support nearly 15,000 jobs nationwide, with 2,650 jobs in Alaska. The report also found that developing Pebble would contribute an estimated $136 million to $180 million annually in State taxes and royalties to Alaska and $29 million to $33 million each year in severance taxes to the Lake & Peninsula Borough. 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 expanded its land position in the Pebble Project area during 2013. In May 2013, the partnership paid Full Metal Minerals $750,000 to acquire full ownership of the 134-square-mile Pebble South property, which has 11 prospects indicated by geochemical and geophysical surveys.

Photo 11. Technicians conducting hydrologic surveys in the area around the Pebble project. The Pebble Partnership spent nearly $70 million in 2013 on geotechnical, environmental, and engineering studies to prepare documents for permitting. Photo provided by the Pebble Partnership.

Northern Dynasty accepted 47.9 square miles of Big Chunk claims, located to the north of the Pebble property, from Liberty Star Uranium and Metals Corp. as repayment for a loan made to Liberty Star. This adds to 23.8 square miles of Big Chunk claims purchased by Northern Dynasty in 2010.

WestMountain Gold Inc. continued exploration and development of Terra, a high-grade gold project approximately 125 miles west–northwest of Anchorage. One of the primary objectives of this investment was to upgrade a bulk-sample mill to a processing rate of 1–2 tons per hour. These improvements included the addition of a gold shaker table for free gold recovery, flotation cells, and new mill buildings. Upon completion of the upgrades, WestMountain tested the plant with 75 tons of material mined from the Ben and Fish Creek veins. During this second test run of the mill, the company recovered 300 ounces of gold. Roughly 65 tons of the 2013 bulk sample were mined from three benches at Ben Vein, measuring 30 feet of vertical height and 90 feet along strike; the remainder came from the Fish Creek Vein 4,900 feet northeast of the Ben Vein. According to a technical report published in February, the Ben Vein has an indicated and inferred resource of 941,199 tons containing 419,603 ounces of gold and 766 ounces of silver. WestMountain completed 2,870 feet of drilling during the 2013 season to test the open north and downdip extension of the Ben Vein. Outcropping veins have been discovered in four other zones—EH, SD, Fish Creek, and Ice—along a 5-mile region of the Terra property; prior drilling in the Fish Vein encountered intercepts with more than 3.75 ounces per ton gold. Soil sampling carried out roughly a mile southeast of Ben Vein has identified a gold anomaly in an area known as Camp

Creek. A traverse of soil samples taken at ~100 foot spacing returned values averaging 401 parts per billion gold and a high of 3,190 parts per billion gold over a 1,510-foot-long surface exposure. Coincident elevated lead, molybdenum, and bismuth values in rock samples collected from this area may indicate the presence of a porphyry system. WestMountain's 2013 program also upgraded infrastructure at Terra including expanding the airstrip to a size capable of landing a C-130 aircraft and building a pioneer road linking the camp to the Ben and Fish Creek veins.

In April, TNR Gold Corp. updated the resource for its Shotgun gold project approximately 110 miles south of Donlin Gold and about the same distance northeast of Pebble. Based on 34 diamond holes totaling 16,181 feet drilled between 1984 and 2012, the Shotgun Ridge deposit contains an inferred mineral resource of 22.85 million tons averaging 0.031 ounce per ton (705,960 ounces) gold. TNR Gold said the mineralization at Shotgun Ridge appears to be open both at depth and along strike. The company says it has identified unique geophysical anomalies in magnetics, resistivity, and chargeability that coincide with the known mineralization and also delineate targets in close proximity to the defined resource, which has never been drill tested. Ground geophysical surveys conducted in 2011 and 2012 helped TNR identify structural controls on mineralization at Shotgun Ridge. Drilling in 2012 confirmed the structural model of mineralization, with two holes returning mineralized intervals in excess of 685 feet: SR12-56 cut 794 feet averaging 0.036 ounce per ton gold; and SR12-57 cut 685.7 feet averaging 0.0297 ounce per ton gold. TNR has identified additional areas where similar mineralization may be present, and has acquired the mineral rights to these adjacent targets. The company is targeting a large-tonnage, low-grade porphyry system at Shotgun Ridge. TNR Gold said structural repeats, as interpreted from airborne magnetic data and ground geophysical surveys, provide encouraging targets for future drilling.

Fairbanks Gold Mining Inc. completed a $307,000 surface exploration program of mapping, soil and rock sampling, and trenching on a 26,640-acre block of State of Alaska mining claims in the Ganes Creek and Ophir area approximately 75 miles northeast of the Donlin Gold project.

In February 2013 Freegold Ventures Limited released an updated NI43-101 compliant resource, based on 2012 drilling, for the Vinasale intrusion-hosted gold deposit about 16 miles southwest of McGrath. The updated resource calculations indicate that the recent drilling added 226,000 ounces of gold to reach a new total of 1,962,000 ounces: 162,000 ounces contained in an indicated resource of 3.76 million tons, and 1,799,000 ounces contained in an inferred resource of 53.2 million tons. Northern Freegold holds a lease option on the property from Doyon Limited, an Alaska Native corporation.

Nyac Gold LLC conducted exploration on several lode targets on the Nyac property, which includes mineral rights leased from Calista Native Corp. as well as adjacent Alaska State mining claims. The company completed 9,576 feet of drilling on several targets (photo 12); the main target is the Saddle Mountain prospect, where they have encountered widespread mineralization associated with altered intrusive rock.

Donlin Gold LLC, an operating company equally owned and supported by subsidiaries of NOVAGOLD Resources Inc. and Barrick Gold Corp., did not complete any exploration at its Donlin Gold property during 2013. Instead, the company focused on supporting a draft environmental impact statement (EIS) being prepared with the U.S. Army Corps of Engineers,

Photo 12. Drill rig at the Spruce Creek prospect, Nyac property. Nyac Gold LLC drilled 9,576 feet in 2013. Photo provided by Richard Flanders.

scheduled to be complete in the third quarter of 2014. A decision on the final EIS and accompanying permits are needed to begin development at Donlin, slated for the end of 2015. For more information, see the development section of this report.

More than $300,000 was invested by at least 27 individuals and companies exploring for placer gold in southwestern Alaska. Calculated from person-days reported, this region supports 3 full-time-equivalent positions dedicated to exploration.

SOUTHEASTERN REGION

Hecla Mining Co. spent $5.3 million on underground and surface exploration on the Greens Creek Mine property on Admiralty Island near Juneau during 2013. Underground exploration drilling at Greens Creek focused on continued expansion of the Deep 200 South mineralized zone along trend to the south, and at the Southwest Bench, 5250, and East Ore zones. Definition drilling converted more than 700,000 tons of resource material to reserve in the Deep 200 South, 200 South, and Southwest Bench. At the end of 2013, Hecla reported 7.8 million tons of proven and probable reserves at Greens Creek, averaging 11.9 ounces per ton (92.52 million ounces) silver, 0.09 ounce per ton (713,000 ounces) gold, 8.7 percent (677,940 tons) zinc, and 3.3 percent (256,130 tons) lead. In addition to expanding reserves, Greens Creek underground exploration made significant progress expanding the potential of the 200 South, Deep 200 South, and NWW zones. Hecla reports that drilling at Deep 200 South cut some of the widest and highest-grade intercepts in recent history at the mine. The highest-grade silver intercept came in hole GC3770, which cut 0.8 feet averaging 360.83 ounces per ton silver, 0.22 ounce per ton gold, 19.96 percent zinc, and 11.19 percent lead. GC3705, also drilled at 200 South during 2013, cut 26.7 feet averaging 48.02 ounces per ton silver, 0.07 ounce per ton gold, 6.61 percent zinc, and 3.29 percent lead. GC3631 cut 39.2 feet averaging 44.27 ounces per ton silver, 0.04 ounce gold, 7.14 percent zinc, and 3.31 percent lead. Definition and exploration drilling of the Deep 200 South has defined three stacked folds of high-grade mineralization, which represents up to 600 feet of downdip continuity. In addition to underground drilling, Hecla's 2013 program included a 10-hole surface drill program at the Killer Creek area, which is less than a mile from the current Greens Creek mine infrastructure. The company said this drilling intersected broad mineralized zones with stringer veins locally grading up to 10 percent copper and 10.4 percent combined lead–zinc. In general, the northern holes tend to be more copper–gold rich, whereas the southeast area has higher zinc, lead, and silver. Hecla believes the stockwork veins intersected in this area are characteristic of a vent or source area for the mineralizing fluids for either the Greens Creek deposit or a completely separate sulfide deposit. Widely-spaced drilling at Killer Creek currently covers a 2,500-foot-square area and suggests zoned mineralization with the target remaining open in all directions.

Coeur Mining Inc.'s 2013 exploration program at its Kensington gold properties approximately 45 miles north of Juneau included three drill rigs completing 149,651 feet of core drilling. One rig was dedicated to definition drilling in the immediate area of mining at Kensington, while the remaining two were allocated to exploration targets at Kensington and the neighboring Jualin property. To increase reserves and expand known resources, the near-mine drill operation focused largely on Zone 10. Highlights from Zone 10 drilling include: Hole KX13-025, which cut 4.0 feet grading 0.296 ounce per ton gold; K13-026, which cut 4.0 feet averaging 0.108 ounce per ton gold, 4.0 feet averaging 0.277 ounce per ton gold, and 1.6 feet averaging 4.263 ounces per ton gold; and K13-029, which cut 3.4 feet averaging 0.463 ounce per ton gold, 4.0 feet averaging 0.129 ounce per ton gold, and 12.5 feet averaging 0.129 ounce per ton gold.

Surface drilling at Jualin, which hosts the historic Jualin gold mine, targeted the Number 4 vein, a zone of auriferous quartz and sulfide veining about 1,500 feet south of the mill. Coeur selected targets at Jualin that demonstrate the potential to produce zones of mineralization with grades higher than the current reserves. The company says a similar focus on higher-grade mineralization on the Kensington property during 2012 produced positive results. The Raven vein, one such target roughly 2,000 feet from the main underground workings at Kensington, identified initial proven and probable reserves of 151,000 tons averaging 0.33 ounce per ton gold, or about 51 percent higher than the overall average reserve grade at Kensington. Coeur drilled areas to the south of Raven vein during 2013. Kensington South and the Ann Trend were also drilled. At the end of 2013, Coeur Mining reported 6.0 million tons of proven and probable reserves at Kensington averaging 0.15 ounce per ton (902,000 ounces) gold. In addition, the property hosts 2.7 million tons of measured and indicated resources averaging 0.211 ounce per ton (566,000 ounces) gold and 1.0 million tons of inferred resource grading 0.259 ounce per ton (263,000 ounces) gold.

Following two years of minimal work at its Palmer property, Constantine Metal Resources Ltd. returned to the southeastern Alaska volcanogenic massive sulfide project north of Haines and completed $2.6 million of exploration during 2013. The exploration program was funded by Dowa Metals & Mining Co. Ltd., a Japan-based smelting and mining company that finalized a long-term agreement early in 2013 to earn a 49 percent interest in the Palmer property by investing $22 million over four years. The inaugural program under this agreement included 12,294 feet of drilling (ten holes) focused on expanding the Glacier Creek volcanogenic massive sulfide (VMS) deposit at the 16,000-acre Palmer property (photo 13). Five zones of mineralization have been discovered to date at Glacier Creek—RW East, RW West,

and South Wall 1, 2, and 3. The South Wall zones are parallel layers of nearly vertical VMS mineralization on the lower limb of a faulted anticlinal fold; the RW zones are the same strata and occupy the nearly flat upper limb of the fold. Based on 32 holes drilled at Glacier Creek through 2009, an inferred resource of 5.24 million tons averaging 1.84 percent copper, 4.57 percent zinc, 0.009 ounce per ton gold, and 0.846 ounce per ton silver has been calculated for Glacier Creek. This resource calculation does not include seven holes drilled into the deposit in 2010 in a program that expanded the breadth of the zones at both South Wall and RW, or seven holes of the 2013 drilling that cut significant massive sulfide mineralization at these zones. Two holes of the 2013 program penetrated the flat-lying RW zone; the balance intercepted the plunging zones at South Wall. Precious-metal-rich oxide mineralization was intersected at the RW zone in hole CMR13-50, including 123 feet of 3.59 ounces per ton silver and 0.018 ounce per ton gold. The intersection includes a partially unoxidized subinterval of 44.9 feet grading 0.51 percent copper, 4.97 percent zinc, 1.61 percent lead, 3.93 ounces per ton silver, and 0.021 ounce per ton gold. CMR13-45, the highest-grade of three holes drilled into South Wall Zone 1 during 2013, intersected 71.2 feet averaging 2.36 percent copper, 9.06 percent zinc, 0.13 percent lead, 0.84 ounce per ton silver, and 0.010 ounce per ton gold. At South Wall Zone 2, CMR13-46 cut 67.5 feet averaging 0.92 percent copper, 7.18 percent zinc, 0.25 percent lead, 1.32 ounces per ton silver, and 0.009 ounce per ton gold approximately 160 feet west and 160 feet updip of previous drilling. Constantine said the intersection in hole CMR13-46 significantly expands an area of thick Zone 2 mineralization, and opens the potential to increase tonnage between the base of Zone 1 and the currently defined top of Zone 2. Downhole geophysics has outlined a 1,300-square-foot conductive plate that continues downdip and along trend to the west of drilled mineralization of zones 2 and 3.

Photo 13. Helicopter-supported drilling at the Palmer Project near Haines, Alaska. Constantine Metal Resources Ltd. drilled 12,294 feet focused on resource expansion of the Glacier Creek prospect. Photo provided by Constantine Metal Resources Ltd.

The 2013 program on the Palmer property also included metallurgical testing. Working with metallurgists from Dowa, SGS Canada carried out locked-cycle flotation tests on a composite of 212 assay sample rejects from past drilling at the Palmer prospect. These samples, which represent a blend of all major ore types encountered during drilling of the South Wall resource area, had a head grade assay of 1.56 percent copper, 6.47 percent zinc, 28.5 ounces per ton silver, and 0.005 ounces per ton gold. The metallurgical testing returned copper recoveries of 89.6 percent to a concentrate containing 25.5 percent copper, and 84.9 percent of the zinc reported to a concentrate containing 59.1 percent zinc. The concentrates produced during testing captured 89.7 percent of the silver and 75 percent of the gold in the samples, with 73.7 percent of the silver and 61.5 percent of the gold reporting to the copper concentrate. Of particular importance to Dowa, which is seeking sources for concentrates for its smelters in Japan, is that the zinc concentrates produced from the locked-cycle tests had low impurities and no potential penalty or problematic elements. Palmer is 33 miles from Haines, a southeastern Alaska community with a deep-sea port.

Heatherdale Resources Ltd. invested $2.1 million during 2013 on Niblack, an advanced VMS exploration project on Prince of Wales Island. This work included a modest site program primarily focused on maintenance and environmental monitoring. In October 2013, Heatherdale signed a memorandum of understanding with the Alaska Industrial Development and Export Authority (AIDEA) to evaluate whether the authority will help develop a potential mineral processing plant and associated facilities at the Gravina Island Industrial Complex near Ketchikan. If developed, the Gravina Island facility would process ore from Niblack, a volcanogenic massive sulfide project

40 miles southwest of Ketchikan. Based on 373 holes drilled through November 2011, the Lookout deposit at Niblack 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 0.86 ounce per ton silver. An additional inferred resource of 4.33 million tons averaging 0.038 ounce per ton gold, 0.81 percent copper, 1.29 percent zinc, and 0.59 ounce per ton silver have been identified at Lookout and the adjacent Trio zone.

A $1.24 million work program completed by Ucore Rare Metals Inc. during 2013 focused primarily on metallurgical and geological studies on its Bokan Mountain–Dotson Ridge rare-earth-element (REE) project on Prince of Wales Island approximately 7 miles south of Niblack. At a 0.4 percent total rare-earth-oxide cut-off grade, the Dotson Zone deposit at Bokan Mountain hosts an indicated resource of 3.24 million tons averaging 0.61 percent total rare-earth oxides (TREO) and an inferred resource of 2.2 million tons averaging 0.61 TREO. Approximately 40 percent of the TREO reporting to the resource are classified as heavy rare-earth oxides. A preliminary economic assessment released January 2013 proposes a 1,650-ton-per-day underground mine, an 826-ton-per-day mill, and a state-of-the-art processing facility. This operation is anticipated to produce 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, 15.4 tons of terbium oxide, and 568 tons of yttrium oxide.

The REE mineralization at Dotson Ridge is concentrated in a swarm of steeply-dipping veins. Ucore is seeking to leverage this contrast between REE-enriched veins and barren rock through the use of an x-ray transmission (XRT) sorter to reject REE-barren material prior to milling. In June, Ucore received the results of a 22-ton bulk sample sent to a company in Germany to test this technique. According to the reports, this x-ray technique rejected 52 percent of the bulk-sample material while retaining 96.3 percent of the rare earths in the material that would be processed through the mill. As a result, the output grade from the sorter was 1.56 percent TREO, compared to 0.77 percent TREO in the unsorted sample. In the fall of 2013, Ucore sent a 33-ton sample of Dotson Ridge material to Germany for further x-ray sorter testing. The output from this second sample will provide feed for a pilot plant, the final stage of bulk-scale testing of the production circuit prior to the release of a bankable feasibility study for Bokan Mountain. Rather than an on-site, scaled-down version of the facilities being considered, the pilot plant will involve upscale bench testing of the various components planned for the operation. The XRT sorting is one portion of the pilot plant; the testing of a new technique of separating the 16 different rare-earth elements found in the Dotson Ridge deposit is another. Ucore is working with Montana-based IntelliMet LLC to pioneer this REE processing technique known as solid-phase extraction, a nanotechnology-based process for separating Bokan Mountain concentrates into individual rare-earth oxides. As part of an arrangement reached with the U.S. Department of Defense in late 2012, Ucore agreed to provide the Pentagon with the most up-to-date data on this research.

In February, Grande Portage Resources Ltd. and its joint-venture partner, Quaterra Resources Inc., provided an updated NI 43-101-compliant resource estimate for the Herbert Gold project. Situated about midway between the Kensington Mine and Juneau in the Juneau gold belt, Herbert Gold hosts a series of subparallel, gold-mineralized, mesothermal quartz veins. An indicated resource of 905,000 tons grading 0.201 ounce per ton gold (182,400 ounces) has been identified at the project's Deep Trench and Main veins. Additionally, an inferred resource of 56,880 tons averaging 0.225 ounce per ton gold (12,800 ounces) was calculated for Deep Trench and five other veins with limited drilling. The 2013 resource includes the results from 127 core drill holes and four trenches completed on the property through 2012. In addition to finalization of the updated resource estimate, Grande Portage completed geologic mapping and continued water sampling at Herbert Gold during 2013.

Arrowstar Resources Ltd. in June provided a preliminary technical report for its Port Snettisham iron ore project approximately 30 miles southeast of Juneau. The report covers preliminary information, historical results of previous work, and work undertaken by the company on a magnetite showing near Port Snettisham. The report also outlines some of Arrowstar's plans and work programs with the goal of eventually producing an NI 43-101-compliant resource estimate for the iron property. The company conducted mapping and sampling at Snettisham in May and filed permit applications for future drilling at the iron project.

Twenty-two operators reported spending more than $148,000 conducting placer exploration in the southeastern region.

ALASKA PENINSULA

During 2013, Full Metal Minerals Ltd. published an inaugural mineral resource estimate for the Pyramid copper–gold–molybdenum porphyry project, located on the Alaska Peninsula about 20 miles northwest of the community of Sand Point. At a 0.21 percent copper-equivalent cutoff, Pyramid has an estimated inferred resource of 1.338 billion pounds of copper, 74 million pounds of molybdenum, and 488,000 ounces of gold. This resource includes both hypogene and near-surface supergene-enriched copper mineralization. Under a leach cap that ranges from zero to 300 feet thick, the Pyramid deposit hosts a supergene enrichment blanket, dominated by chalcocite and minor covellite mineralization. This near-surface enrichment zone hosts 103.3 million tons averaging 0.4 percent

(822.9 million pounds) copper, 0.019 percent (29.7 million pounds) molybdenum, and 0.003 ounce per ton (277,000 ounces) gold. Underlying the supergene zone in most areas, the hypogene zone hosts 87.2 million tons averaging 0.30 percent (514.7 million pounds) copper, 0.020 percent (34.7 million pounds) molybdenum, and 0.002 ounce per ton (212,000 ounces) gold. The company states that two holes extend to 1,640 feet and that the hypogene zone remains open at depth and along strike, and that the higher-grade supergene-enriched mineralization also has room for expansion in several areas. This initial resource estimate for Pyramid is based on 30 drill holes totaling 24,557 feet completed by Full Metal and Antofagasta Minerals from 2010 to 2012. An additional 19 shallow holes totaling 5,551 feet completed by Quintana–Duval during the mid 1970s were included in the estimate.

Millrock Resources Inc. entered an "exploration and option to lease" agreement with Bristol Bay Native Corp. on a 1.68-million-acre tract of Native-owned land on the Alaska Peninsula. Extending from just north of Chignik Bay to Stepovak Bay, this property covers three known porphyry copper–gold occurrences on the Alaska Peninsula—Kawisgag, Bee Creek, and Mallard Duck Bay. Millrock reports the Kawisgag prospect, at the southern end of the project area, has drill-ready targets. Mineralization at Kawisgag includes disseminated and vein chalcopyrite, molybdenite, and pyrite. Mineralization at the Bee Creek prospect is hosted in hornfelsed sediments intruded by a multi-phase diorite intrusive rock containing mineralized veins and disseminated chalcopyrite, molybdenite, and pyrite. A broad, central, potassic alteration zone bordered by a discontinuous halo of phyllic alteration is exposed at surface. The prospect was initially explored by Bear Creek Mining with five holes drilled in 1976. In 2005 and 2006, Metallica Resources Inc. and Full Metal Minerals Ltd. carried out geochemical and geophysical surveys and drilled two holes. One of the holes intersected 387 feet averaging 0.31 percent copper, 0.009 percent molybdenum, and 0.004 ounce per ton gold. Millrock said mineralization, alteration, and anomalous copper values in soils and rocks extend over a broad area at the Bee Creek prospect. The Mallard Duck Bay prospect is a zone of hydrothermal alteration covering an area greater than 3 square miles. The zone has seen very limited exploration but mineralization appears to be associated with a diorite stock. A strong chargeability anomaly coincident with exposed mineralization in a potassic alteration zone was identified by prior workers, but never drilled. In addition to porphyry copper–gold–molybdenum systems, the Alaska Peninsula property is prospective for other intrusive-related deposits, base metal veins, and epithermal gold deposits. Millrock was in talks with a potential joint-venture partner for the Alaska Peninsula property at the end of 2013.

At the end of 2013, Redstar Gold Corp. finalized the purchase of 100 percent interest in the Shumagin gold property, part of the company's larger Unga project on the Alaska Peninsula. Shumagin consists of 16 patented Federal and six State of Alaska mining claims on Unga Island. The property covers the Shumagin vein, which has had no past production and contains a historical unclassified resource of 280,000 tons grading 0.80 ounce per ton gold and 3.7 ounces per ton silver. The property also covers the Apollo–Sitka high-grade vein systems, which produced approximately 150,000 ounces of gold between 1891 and 1922. The Unga project also includes Native corporation lands that cover extensions of the Shumagin and Apollo–Sitka veins systems on Unga and Popof islands. Additionally, the property encompasses the Centennial gold deposit on Popof Island and the Zachary Bay porphyry copper–gold system on Unga Island. Redstar said the consolidation of Shumagin and Unga–Popof into one project allows for comprehensive district-scale exploration of these properties.

DEVELOPMENT

The development sector of the mining process, as used in this report, refers to building infrastructure or conducting activities that facilitate production of mineral products. Development expenditures reflect 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 2013 were approximately $358.8 million with a total of 53 projects reporting expenditures. Significant development outlays (more than $5 million for 2013) were noted at Fort Knox Mine, Greens Creek Mine, Pogo Mine, Donlin Gold project, Kensington Mine, and the Nome offshore placer fields. Based on reported expenditures, Fort Knox Mine had the largest ongoing development project in Alaska. Ongoing capital maintenance and development expenditures continued at Nixon Fork, Fort Knox, Greens Creek, Red Dog, and Kensington; the Donlin Gold project made the transition from exploration to development with the initiation of the Preliminary Draft Environmental Impact Statement (EIS) process. Placer mines and sand and gravel operations also reported development expenditures.

Employment related to development in 2013 is estimated at 358 full-time-equivalent employees. This is much lower than 2012's estimated employment of 535 due to unreported devel-

opment project workforce at Greens Creek and Kensington mines. Development project personnel at these two mines are included with production employment figures.

Table 11 shows development investment and regional employment; figure 12 graphically portrays 2013 development expenditures by region. Table 12 compares investment by commodity 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 2013. Figure 14 graphs mineral development expenditures by commodity, from 1982 through 2013.

NORTHERN REGION

Three companies touted expenditures totaling $287,000 in the northern region in 2013, out of four companies reporting results. Teck Alaska Inc., a wholly-owned subsidiary of Teck Mining Co., operating the Red Dog Mine, reported 4,174 man-hours, or roughly 16 full-time-equivalent jobs devoted to development on projects such as lifts and other improvements on the tailing dams and diversion of Sulfur Creek around the expansion of the Aqqaluk pit.

Expenditures on placer development were reported at the Chandalar and Koyukuk–Nolan mining districts.

Table 11. Reported mineral development expenditures and employment in Alaska by commodity and region, 2013.

	Northern	Western	Eastern Interior	South-central	South-western	South-eastern	Alaska Peninsula	Total
Development Expenditures								
Base metals	$ W	$ 0	$ 0	$ 0	$ 0	$ 0	$ --	$ W
Polymetallic	0	0	0	0	0	57,119,121	--	57,119,121
Precious metals								
Placer[a]	286,584	9,671,717	854,812	63,559	W	500	--	10,877,172
Lode	0	23,655,670	178,697,511	0	W	15,800,000	--	218,153,181
Coal and peat	0	0	0	W		0	--	W
Industrial minerals	0	0	45,000	286,369	W	0	--	331,369
Other	0	0	0	295,000	0	0	--	295,000
TOTAL	**$286,584**	**$33,327,387**	**$179,597,323**	**$644,928**	**$ W**	**$72,919,621**	**$ --**	**$358,775,844**
Development Employment								
Workdays	4,253	21,350	41,320	13,191	12,880	12	--	93,006
Workyears[b]	16	82	159	51	50	0	--	358
Number of companies reporting[c]	4	11	20	11	3	4	--	53

[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 yea to calculate full-time-equivalent employees per year. Total based on non-rounded numbers.
[c]Some companies are active in more than one area/commodity.
- - = No expenditures reported.
W = Figures witheld for confidentiality purposes. Data are included in the state total.

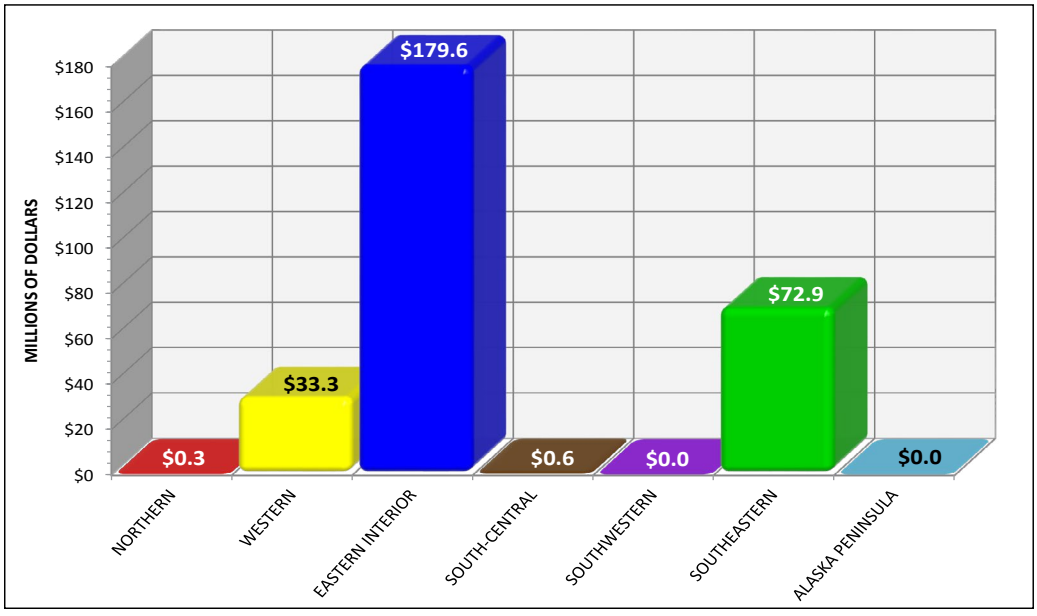


Figure 12. Development expenditures in Alaska by region, 2013.

Table 12. Reported mineral development expenditures in Alaska by commodity, 1982–2013.

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
2013	W	57,119,121	258,130,353	295,000	1,831,369	W	358,775,844
TOTAL	**$ 1,096,081,545**	**$566,658,439**	**$ 3,426,376,101**	**$ 970,250**	**$ 41,992,766**	**$120,511,544**	**$ 5,293,990,646**

[a]Gemstone development category added in 2009.
NA = Figures not available prior to 1986
- - Not reported
W = Figures withheld for confidentiality purposes. Withheld expenditures not included in individual commodities, but are incorporated into the state total.

WESTERN REGION

Eleven lode and placer projects in the western region reported development expenditures totaling more than $33.3 million for 2013. The majority of the expenses are attributed to the Nixon Fork Mine, which is in temporary closure status and under care and maintenance by full-time on-site employees of Mystery Creek Resources, the operator and subsidiary of Fire River, a wholly owned subsidiary of Fire River Gold Corp. Approximately 29 percent of development expenditures went toward multiple projects in the Nome Mining district due to increased work in the State offshore lease tracts. In 2013 employment is estimated at 82 full-time-equivalent employees.

EASTERN INTERIOR REGION

Construction and other capital expenditures credited to the eastern interior region in 2013 totaled almost $180.0 million, exclusive of coal expenditures. Twenty projects reported development activity in 2013, including placer, lode gold, coal, and rock, sand, and gravel projects.

Coal expenditures were not included in development totals for 2013, but Usibelli Coal Mine did report 1,000 work hours, contributing to the employment total of 159 estimated full-time-equivalent development jobs, the highest development employment among mining regions.

I. Northern Region
1. Red Dog Mine—Teck Alaska Inc.

II. Western Region
2. Nixon Fork Mine—Mystery Creek Resources Inc.

III. Eastern Interior Region
3. Fort Knox Mine—Fairbanks Gold Mining Inc.
4. Pogo—Sumitomo Metal Mining Pogo LLC

IV. South-central Region
5. Chuitna Coal Project—PacRim Coal LP

V. Southwestern Region
6. Industrial minerals—various
7. Donlin Gold project—Donlin Gold LLC

VI. Alaska Peninsula Region
No development reported

VII. Southeastern Region
8. Kensington—Coeur Alaska Inc.
9. Greens Creek Mine—Hecla Greens Creek Mining Co.
10. Industrial Minerals—various

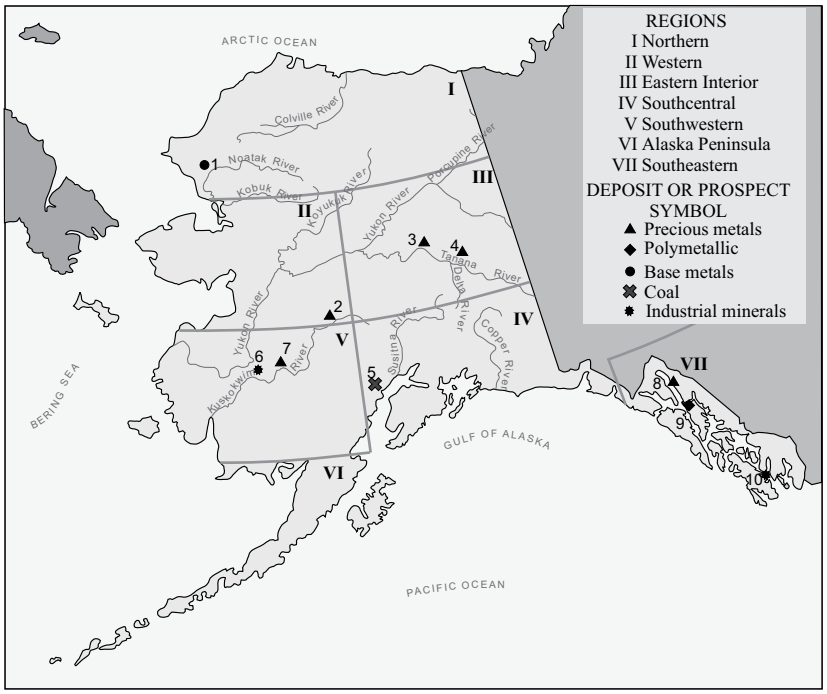


Figure 13. Selected development projects, 2013.

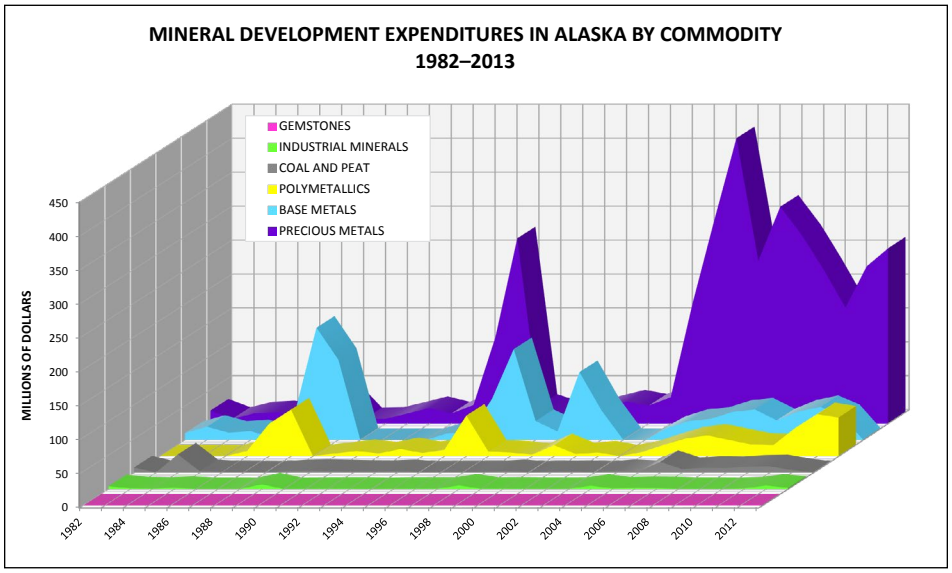


Figure 14. Mineral development expenditures in Alaska by commodity, 1982–2013.

Fort Knox Mine

Capital expenditures reported by Fort Knox Mine, owned and operated by Fairbanks Gold Mining Inc., a wholly-owned subsidiary of Kinross Gold Corp., totaled $63,270,255 on mine development, $24,645,920 on facilities and upgrades, and $42,781,336 on equipment purchases, replacements, and rebuilds. Major projects during 2013 included commissioning of a second Carbon-in-Column facility in the mill as well as completion of Stage 3 and continued construction of Stage 4 of the Walter Heap Leach. Both projects contributed to increased gold output at the mine during 2013.

Pogo Mine

Sumitomo Metal Mining Pogo LLC (SMM Pogo) operates Pogo Mine on behalf of owners Sumitomo Metal Mining Co. Ltd. (85 percent) and Sumitomo Corp. (15 percent). Major projects during the year focused on accommodating the enlarged resource base of the East Deep zone and included construction of the 2150 portal to access the zone (photo 14) and expansion of the dry stack tailings facility to a capacity of 20 million tons. Pogo expects to begin processing ore from the East Deep zone in 2014.

SOUTH-CENTRAL REGION

Development expenditures totaling $644,928 were reported for ten projects in the south-central region; development

expenditures were withheld by one company. The region supported an estimated 51 full-time-equivalent jobs associated with development. Development expenditures were noted for gold, sand and gravel, and gemstones in the region in 2013.

SOUTHWESTERN REGION

The southwestern region's development expenditures jumped significantly in 2013, resulting from the transition of the Donlin Gold project from exploration to development with the launch of the Preliminary Draft EIS process. Work is focused on permitting, environmental, and engineering work for the mine site and infrastructure required to develop the 33.9-million-ounce gold deposit near Crooked Creek along the Kuskokwim River. Proposed infrastructure includes a gas pipeline from Cook Inlet to the mine site (photo 15) and two port facilities to accommodate shipment of supplies by barge on the Kuskokwim River. The project is operated by Donlin Gold LLC, equally owned and supported by NOVAGOLD Resources and Barrick Gold Corp. Associated employment from three projects in the region totaled 50 full-time-equivalent jobs.

ALASKA PENINSULA REGION

No development activity was reported in this region in 2013.

SOUTHEASTERN REGION

Total expenditures for development at Greens Creek and Kensington mines and two other gold projects was reported to be $73.0 million in 2013, a 26 percent drop from the previous year. The two underground mines did not differentiate their development and production work hours; the result is that this region's development employment totals were significantly lower than those reported in 2012.

Hecla Greens Creek Mining Co., a subsidiary of Hecla Mining Co., invested $57.1 million, focused on underground mine development and rehabilitation, definition drilling, mining fleet replacement, and surface infrastructure improvements at Greens Creek Mine.

Coeur Mining's wholly-owned subsidiary, Coeur Alaska Inc., invested $15.6 million in total capital expenditures at the Kensington Gold Project in 2013, including minor surface construction, 60,314 feet of underground drilling, and underground mine development.

Photo 14. Sumitomo Metal Mining Pogo LLC established the 2150 Portal during 2013 to access the East Deep ore zone, a fault offset of the main Liese ore zone that has been discovered and delineated since 2010. Photo provided by Sumitomo Metal Mining Pogo LLC.

Photo 15. Geotechnical drill crew testing proposed alignment of a gas pipeline route through the Alaska Range to the Donlin Gold project site in southwestern Alaska. Donlin Gold LLC launched the Preliminary Draft Environmental Impact Study process for the project in early 2013. Photo provided by Donlin Gold LLC.

PRODUCTION

The total value of mineral production in Alaska during 2013 is estimated at $3.42 billion, slightly below the 2012 estimated value of $3.44 billion. The 2013 estimate represents a decrease in value of approximately $17.6 million, or one-half of one percent, from the 2012 estimate. Figure 15 shows selected projects that reported production for 2013. Note that the industrial minerals and peat sectors are likely underestimated because of reporting shortfalls. Several major rock, sand, and gravel producers declined to contribute their production numbers, which are consequently not included; estimates are assumed to be lower than actual production totals. Metals (gold, silver, copper, lead, and zinc) account for $3,276 million (almost 96 percent of the total); coal and peat add up to $56 million; and industrial minerals account for $85.1 million. The value of gemstones produced in 2013 totaled $1.9 million. Table 13 shows the estimated mineral production and its associated value for the period 2011–2013. It is noteworthy that 2013 metal production volumes for all metals increased from 2012, and that production of gold exceeded a historical milestone of one million ounces.

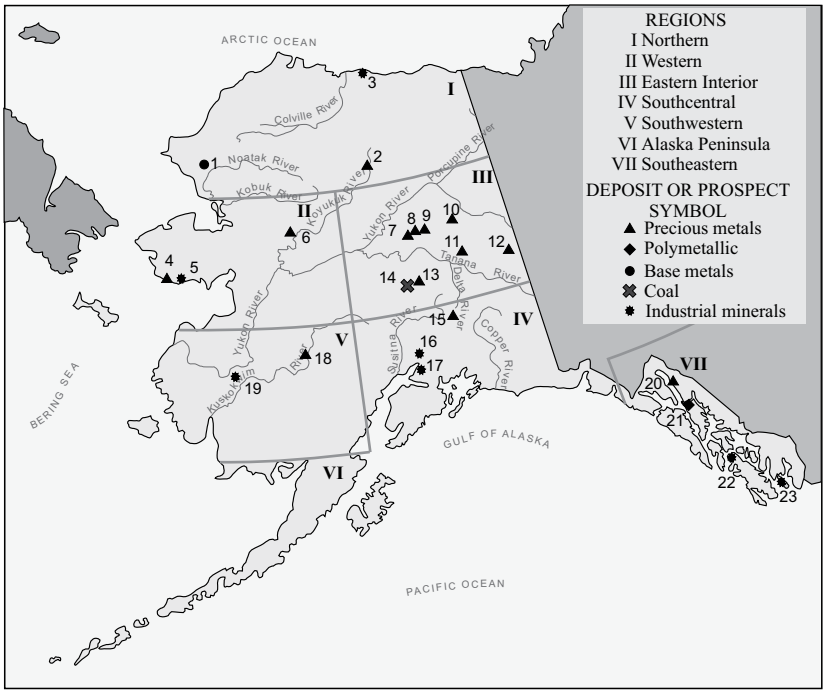
Allocation of value of production for 2013 by commodity is shown in figure 16. Gold leads at 45.4 percent, followed by zinc at 33.9 percent, silver at 9.4 percent, lead at 7.2 percent, industrial minerals at 2.5 percent, and coal at 1.6 percent.

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. Fairbanks district—Polar Mining Inc.—gold, silver, and screened aggregate
8. Fairbanks district—Earthmovers of Fairbanks Inc.—gold
9. Fort Knox mine—Fairbanks Gold Mining Inc.—gold
10. Placer gold mines—various operators—gold
11. Pogo Mine—Sumitomo Metal Mining Pogo LLC—gold
12. Placer gold mines—various operators—gold
13. Placer gold mines—various operators—gold
14. Usibelli Coal Mine—Usibelli Coal Mine Inc.—coal

IV South-central Region
15. Placer gold mines—various operators—gold
16. Palmer/Wasilla—various operators—sand and gravel
17. Industrial minerals—various operators—rock



V Southwestern Region
18. Placer gold mines—various operators—gold
19. Yukon–Kuskokwim region—various operators—sand and gravel

VI Alaska Peninsula Region
No production reported

VII Southeastern Region
20. Kensington—Coeur Alaska Inc.—gold
21. Greens Creek Mine—Hecla Greens Creek Mining Co.—silver, gold, lead, and zinc
22. Columbia River Carbonates—Calder Limestone—rock
23. Industrial minerals—various operators—rock and sand and gravel

Figure 15. Selected production projects, 2013.

Table 13. Estimated mineral production in Alaska, 2011–2013.[a]

	Production Quantities			Estimated Values[b]		
	2011	2012	2013	2011	2012	2013
Metals						
Gold (ounces)[c]	848,945	921,240	1,022,987	$ 1,334,134,078	$1,537,530,843	$ 1,551,921,325
Silver (ounces)	11,683,967	12,313,877	13,453,367	410,340,935	383,573,574	320,121,318
Copper (tons)	0.53	7.20	38.62	4,221	51,675	278,591
Lead (tons)	113,649	126,234	126,707	247,755,147	234,795,240	245,811,580
Zinc (tons)	696,793	647,481	665,318	1,379,649,213	1,139,566,560	1,157,653,320
Platinum (ounces)	5,000	- -	- -	8,609,300	- -	- -
Subtotal				**$ 3,380,492,894**	**$3,295,517,893**	**$ 3,275,786,134**
Gemstones and semi-precious stones						
Gemstones and semi-precious stones				$ 3,200,000		$ 1,900,000
Subtotal				**$ 3,200,000**		**$ 1,900,000**
Industrial Minerals						
Sand and gravel (million tons)	5.9	7.8	11.6	$ 38,703,040	$ 52,309,962	$ 79,589,173
Rock (million tons)	0.5	1.1	0.4	6,368,290	15,761,430	5,469,480
Subtotal				**$ 45,071,330**	**$ 68,071,392**	**$ 85,058,653**
Coal and Peat						
Coal (tons)[d]	2,220,000	2,018,759	1,600,000	$ 78,905,674	$ 72,483,355	$ 56,000,000
Peat (cubic yards)[d]	80,378	121,786	- -	- -	- -	- -
Subtotal				**$ 78,905,674**	**$ 72,483,355**	**$ 56,000,000**
TOTAL				**$ 3,507,669,898**	**$3,436,072,640**	**$ 3,418,744,786**

[a]Production data from DGGS questionnaires, 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]2013 lode production was 920,396 ounces; placer production was 82,591 ounces.
[d]Coal and peat production values are combined in 2011, 2012, and 2013.

Table 14 shows the average annual metal values used in this report over the last 18 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 2013 compared with 2012 resulted primarily from lower prices of gold and silver in 2013 compared to 2012. The average prices of gold, silver, copper, and zinc were all lower in 2013 than in 2012. Average price for gold decreased 15.4 percent; the price for silver decreased 23.6 percent, the price of copper decreased 8.0 percent, the price of lead increased 4.3 percent, and the price of zinc decreased 1.1 percent.

Tables 15 and 16 show gold (placer and lode) production by region of the state, and placer production by small, medium, and large-sized producers, respectively. Five placer operations achieved a "large-sized" rating in 2013, each producing in excess of 2,500 ounces of gold. Total statewide placer gold production in Alaska is estimated to be approximately 82,600 ounces. The eastern interior was the largest placer region, producing

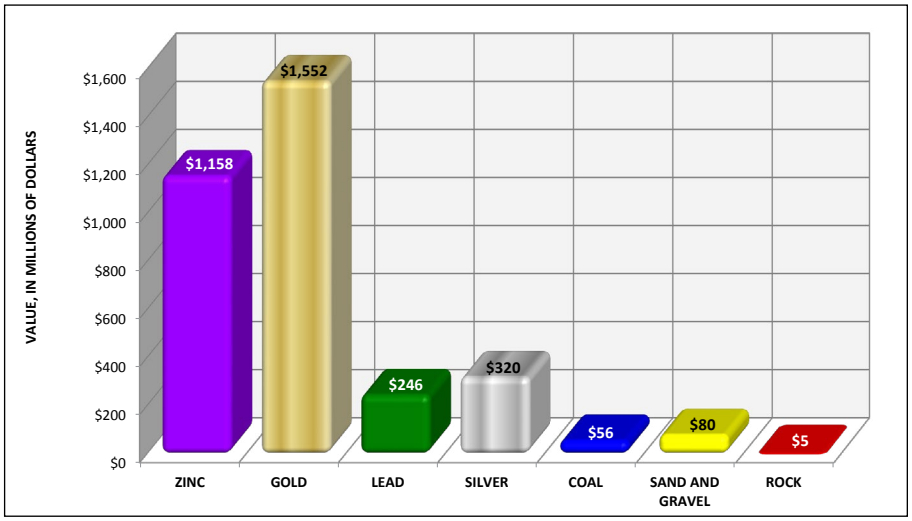


Figure 16. Estimated 2013 mineral production in Alaska by commodity.

an estimated 41,366 ounces, followed by the western region at 31,354 ounces. The northern region produced an estimated 4,897 ounces, the south-central region produced an estimated 2,414 ounces, and the southwestern region produced an estimated 1,569 ounces. An estimated 990 ounces of placer gold was produced in the southeastern region, and negligible placer gold was produced in the Alaska Peninsula region. An estimated 295 placer mines operated in Alaska in 2013, compared to an estimated 312 operations in 2012. Figure 18 graphs historical gold production in Alaska from 1880 through 2012, and its corresponding value in the year it was produced.

Table 14. Average metal prices, 1996–2013.

	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
2013[a,b]	1,411.23	23.79	3.32	0.97	0.87

[a]2009–2013 gold and silver prices come from Kitco; 2009–2012 copper, lead, and zinc from British Columbia Ministry of Energy and Mines.
[b]2013 copper, lead, and zinc prices from USGS Mineral Commodity Summaries, based on London Metal Exchange.

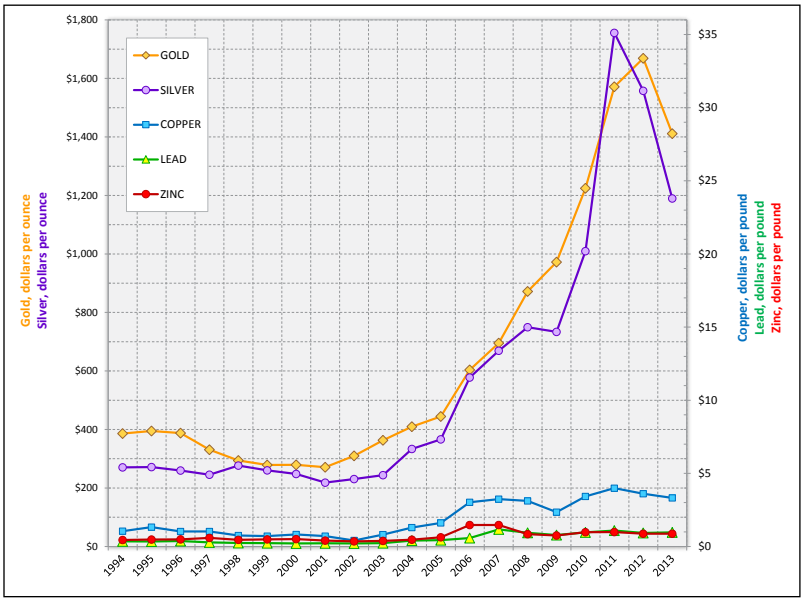


Figure 17. Average annual metal values, 1994–2013.

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 2013 reports is approximately $85.1 million; however, this sector is noted for incomplete reporting of its production. Figure 19 shows historical production of sand and gravel in Alaska since 1950.

Sand and gravel production reported for 2013 amounted to 11.6 million tons produced by approximately 565 full-time-equivalent employees, based on reported production. Rock production reported for 2013 was 364,632 tons produced by an estimated 19 full-time-equivalent employees. Sizeable reporting shortfalls for both sand and gravel production and 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 $1.54 billion in 2013. 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).

No peat production was reported in 2013. In comparison, production for 2012 was estimated at 121,786 cubic yards, produced by four full-time-equivalent employees. There are assumed to be significant reporting shortfalls in this category in 2013.

Production estimates included in this report are compiled from questionnaires returned to DGGS by miners and mining companies, Native organizations, government agencies, municipalities, and service companies. The information returned on questionnaires is supplemented 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.

NORTHERN REGION

The 2013 value of production in the northern region is estimated to be $1.458 billion, with corresponding employment of 903 full-time-equivalent positions. Red Dog Mine dominated the production value and employment numbers. Placer gold, sand, gravel, and rock production were also noted in the region. In the northern region, production was reported by 18 commercial and four recreational placer operations, and 23 sand and gravel operations.

Approximately 48 full-time-equivalent positions were used in northern region placer mining operations, and approximately 4,879 ounces of placer gold were produced.

Table 15. Reported refined gold production, number of operators, and industry employment in Alaska, 2011–2013.[a,b]

	Number of operators			Production in ounces			Number of employees[b]		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Region									
Northern	22	22	22	4,181	4,576	4,897	36	33	48
Western	69	93	91	21,224	44,037	40,438	145	184	178
Eastern Interior	156	148	140	650,931	720,219	800,401	1,056	1,104	1055
South-central	36	34	31	10,616	3,386	2,414	49	50	54
Southwestern	13	15	11	16,673	11,010	1,569	45	54	18
Alaska Peninsula[c]	2	1	1	0	1	0	2	1	1
Southeastern[d]	5	4	4	145,304	138,011	173,268	604	659	699
TOTAL	303	317	295	848,929	921,240	1,022,987	1,937	2,085	2,053

[a]2013 production includes 920,396 ounces of gold from hardrock mines and 82,591 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, 2006–2013.

	2006	2007	2008	2009	2010	2011	2012	2013
Mine Size								
Small[a]	177	153	169	216[d]	190	271	283	277
Medium[b]	21	19	24	16	35	20	23	13
Large[c]	3	2	2	2	2	6	6	5
TOTAL	**201**	**174**	**195**	**234[d]**	**227**	**297**	**312**	**295**
Production in Ounces[e]								
Small	23,343	19,755	19,601	23,916	17,358	22,222	24,073	18,225
Medium	22,144	23,366	27,298	20,680	23,160	20,295	29,483	18,641
Large	14,895	10,728	9,860	15,654	28,800	36,200	46,485	45,726
TOTAL	**60,382**	**53,849**	**56,759**	**60,250**	**69,318**	**78,717**	**100,041**	**82,591**

[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]2009 values were revised.
[e]Does not include recreational production before 2006.

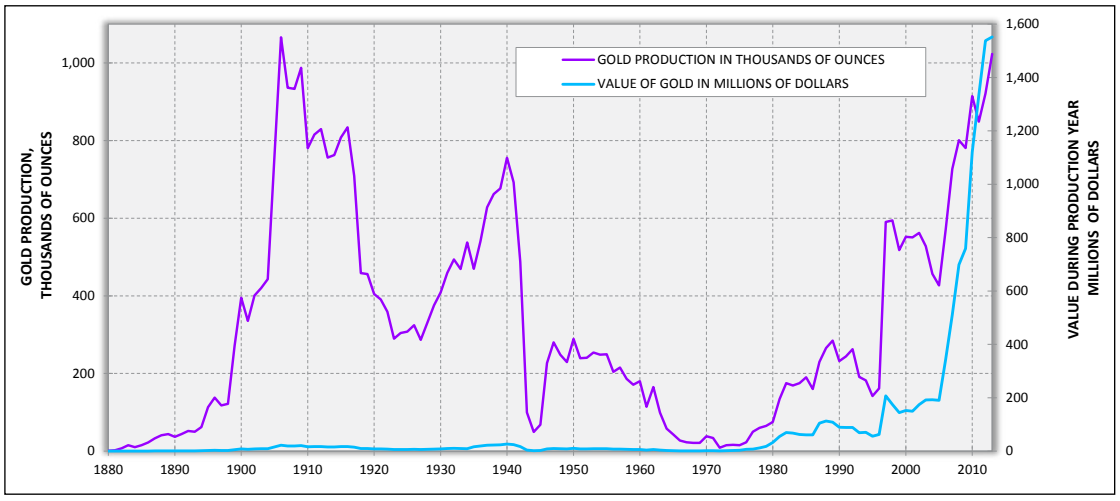


Figure 18. Historical gold production in Alaska, 1880–2013, and corresponding market value.

Red Dog Mine

Red Dog Mine is one of the world's largest zinc mines, both in terms of reserves (table 20) and annual zinc production (table 21), producing lead and zinc concentrates that are trucked to a port on the coast for shipping during the summer. The resources at Red Dog represent four percent of the world's and 95 percent of domestic zinc reserves. Red Dog dominates Alaska's mineral production value, accounting for approximately 41 percent of the entire value of Alaska's mineral production in 2013. The mine, operated by Teck Alaska Inc., is 100 percent owned and operated by Teck Resources Ltd. under a partnership agreement with NANA Regional Corp. In 2010 Teck reported 550 full-time jobs; 2013 employment at Red Dog is not publicly reported. Mill throughput reached a record high of 4.24 million tons in 2013 and, combined with improved recoveries, resulted in the higher zinc production. Lead production was up a little in 2013 at 106,594 tons, compared to 95,282 tons in 2012, due to higher recoveries from processing less weathered ore.

Table 17. Reported sand and gravel production and industry employment in Alaska by region, 2013.

Region	Companies and agencies reporting[a]	Tons	Estimated unit value ($/ton)[b]	Total Value	Estimated number of employees
Northern	23	6,247,650	6.7	$ 43,575,726	305
Western	15	1,380,293	6.7	9,252,960	34
Eastern Interior	45	2,749,051	6.7	18,418,643	156
Southcentral	31	943,543	6.7	6,321,737	53
Southwestern	2	0	6.7	0	0
Alaska Peninsula	1	0	6.7	0	0
Southeastern	3	301,508	7.0	2,020,107	17
TOTAL	**120**	**11,622,045**		**$ 79,589,173**	**565**

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

Table 18. Reported rock production and industry employment in Alaska by region, 2013.[a]

Region	Companies and agencies reporting	Tons	Estimated unit value ($/ton)[b]	Total value	Estimated number of employees
Northern	0			$	0
Western	0				0
Eastern Interior	6	238,537	15	3,578,048	13
Southcentral	4	48,392	15	725,880	3
Southwestern	0				0
Alaska Peninsula	0				0
Southeastern	4	77,704	15	1,165,553	3
TOTAL	**14**	**364,632**		**$ 5,469,480**	**19**

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

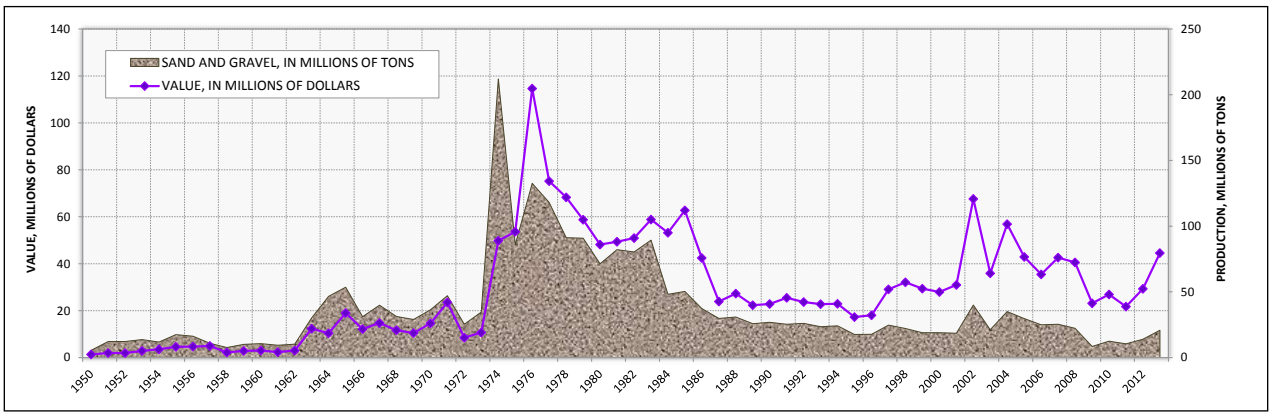


Figure 19. Sand and gravel production in Alaska, 1950–2013.

WESTERN REGION

The 2013 value of production in the western region is estimated to be $74.8 million, with corresponding employment of 212 full-time-equivalent positions. Mystery Creek Resources Inc., operating Nixon Fork Mine in the McGrath district, produced 9,084 ounces of gold, 77,240 pounds of copper, and 3,781 ounces of silver before closing temporarily in June 2013. Fire River Gold Corp., which wholly owns Mystery Creek Resources, went into default in October. The mine is in care and maintenance status and Mystery Creek Resources employees are on site full time to monitor facilities. The mine staff provide regular periodic reports to regulatory agencies. A 168,000-ounce gold resource in high-grade gold–copper skarn ore bodies remains at the mine.

Ninety placer operations, including 40 that were recreational in nature, reported production in the western region for 2013 (photo 16); estimated production was 31,354 ounces of gold. Placer gold employment for the year was estimated to be 143 full-time-equivalent positions.

Sand and gravel production in the western region in 2013 was reported to be 1,380,293 tons from 15 operations. Employment was estimated to be 34 full-time-equivalent jobs. Significant reporting shortfalls are noted in this area.

No rock production or employment was reported. Significant reporting shortfalls are assumed in this area.

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

	Canada Copper Mineral Ores and Concentrates[a]	Ores Through Skagway Terminal[b]	Precious Metals[c]	Total Value of Coal[d]	Mineral 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
2013	1,495	150	22	27	1,543

Source: U.S. Census Bureau, Origin of Movement Series. These figures may not represent the true value of Alaska exports in a given year due to transportation of commodities and timing of export documentation.
[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
[d]HS 27 Coal

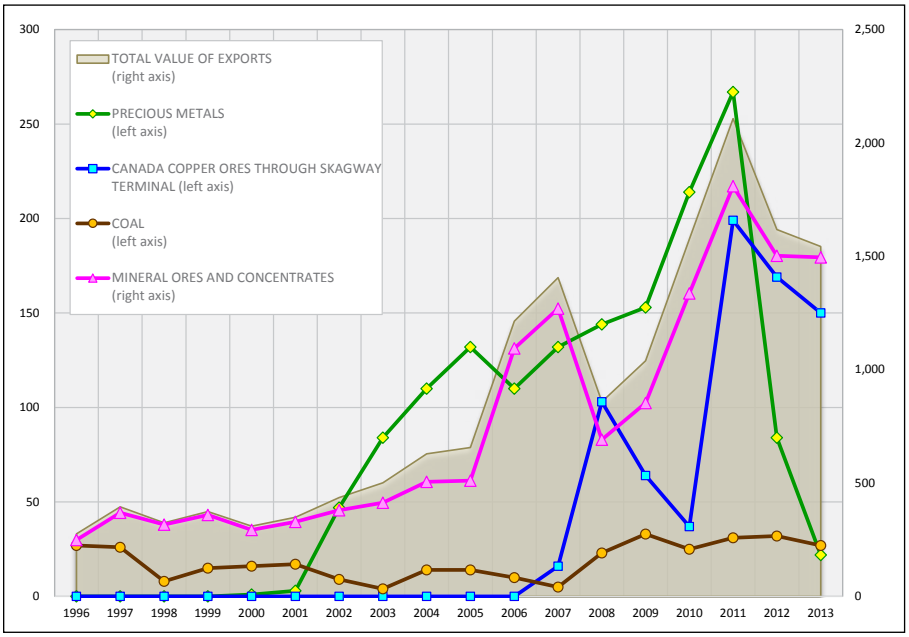


Figure 20. Alaska international mineral export values (millions of dollars), 1996–2013.

EASTERN INTERIOR REGION

The 2013 value of production in the eastern interior region is estimated to be $1.306 billion, with corresponding employment of 1,343 full-time-equivalent positions. 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 2013. Fort Knox Mine was the largest gold producer in the region, followed by Pogo Mine. Total eastern interior region gold production was an estimated 800,401 ounces. Lode (hardrock) production was estimated at 759,034 ounces. Placer production from 138 operations (eight of which were considered recreational in size) was an estimated 41,366 ounces (photo 17). The employment estimate for placer operations is 220 full-time-equivalent positions.

Sand and gravel production in 2013 totaled 2.75 million tons from 45 operations. Estimated employment for these operations was approximately

156 full-time-equivalent positions in 2013. Rock production of 238,537 tons was reported by six operations in 2013, with an estimated employment of 13 full-time-equivalent positions. 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, 2013 (Teck Resources Ltd. Website).

Class	Metal	Category	Tons (millions)	Grade (oz/ton)	Grade (percent)
Reserves	Zinc	Proven			
		Probable	50.05		15.8
	Lead	Proven			
		Probable	50.05		4.1
		Silver	Proven		
		Probable	50.05	2.12	
Resources	Zinc	Indicated	8.27		25.7
		Inferred	0.22		10.7
	Lead	Indicated	8.27		6.9
		Inferred	0.22		3.4
	Silver	Indicated	8.27	4.00	
		Inferred	0.22	2.01	

Fort Knox Mine

Fort Knox Mine, operated by Fairbanks Gold Mining Inc., a wholly-owned subsidiary of Kinross Gold Corp., recovered a total of 428,822 ounces of gold (421,641 gold equivalent ounces) in 2013, and in December, achieved a milestone of 6 million ounces total production since 1996. Mining activity at Fort Knox involved moving 63,280,000 tons of ore and waste, and mill throughput was 13,960,000 tons (table 22). Approximately 66 percent of the gold is recovered from the milled ore; the remainder is recovered from the heap leach operation. At the end of 2013, Kinross reported proven and probable reserves of 2.86 million ounces of gold in 201.8 million tons of ore averaging 0.014 ounce per ton (table 23). In addition to reserves, the company reports measured and indicated resources of 86.15 tons averaging 0.013 ounce per ton for 1.15 million ounces at Fort Knox. Fort Knox employment was 629 full-time-equivalent employees for 2013, an

Table 21. Red Dog Mine production statistics, 1989–2013.[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	6.0	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	19.0	5.8	2.8	753,600	358,676	55,715	3.62	397
1996	2,312,600	18.7	5.0	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	21.0	4.7	2.5	1,211,539	585,030	91,557	5.84	536
2001	3,560,430	19.8	5.0	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	22.0	6.0	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	6.0	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
2013	4,243,899	17.0	3.9	NA	NA	607,704	106,594	6.1[d]	550[e]

[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.
[d]Because zinc and lead production at Red Dog increased 4-6% in 2013, silver production is estimated at 6.1 million oz.
[e]Value reported by Department of Natural Resources
- - = No concentrate produced
NA = not available

Photo 16. Jack-up marine placer dredge operating in the Nome offshore lease area. Placer mining by several operators near Nome contributed to the production of an estimated 31,354 ounces of gold from placers in the western region during 2013. Photo provided by Rob Retherford, Alaska Earth Sciences Inc.

Photo 17. Aerial view of a Boundary, Alaska, placer mine employing best practices. Statewide, placer mines are estimated to have produced approximately 82,600 ounces, and they have an important economic benefit to rural communities. Photo provided Ferguson Placer Inc.

Table 22. Fort Knox Mine production statistics, 1996–2013.

	Tons Mined (ore + waste)			Tons milled (ore)			Ounces Gold Produced	Employees
	Fort Knox	True North[a]	Total	Fort Knox	True North[a]	Total		
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
2013	63,280,000		63,280,000	13,960,000		13,960,000	428,822	629

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

increase of 64 positions. The 2013 year was completed without a lost-time accident (photo 18). Fairbanks Gold also closed out reclamation activities at the True North mine, a satellite operation of Fort Knox, but continues geotechnical and environmental monitoring at the site.

Table 23. Reserves at Fort Knox as of December 31, 2013.

Reserves	Tons	Grade (oz/ton)	Gold (ounces)
Proven	92,377,149	0.001	1,109,000
Probable	109,466,106	0.016	1,752,000
Total	**201,843,255**		**2,861,000**

Photo 18. Ongoing safety programs at Fort Knox Mine near Fairbanks resulted in 1.8 million consecutive hours worked without a lost-time accident, with zero lost-time accidents during 2013. Photo provided by Fairbanks Gold Mining Inc.

Pogo Mine

Sumitomo Metal Mining Pogo LLC, a joint venture between Sumitomo Metal Mining Co. Ltd. (85 percent) and Sumitomo Corp. (15 percent), operating the Pogo Mine, recovered 337,393 ounces of gold and 32,000 ounces silver in 2013 (table 24). Pogo reported having 329 full-time, non-contract workers on site during 2012, with a payroll of $38.5 million. Employment for 2013 is not publicly available. The mine is an underground cut-and-fill operation on a set of en-echelon stacked quartz veins known as the Liese zone, and is expected to start mining on a recently discovered and delineated offset of the Liese zone called the East Deep. Resources in the latter half of 2013 were 13.5 million tons averaging 0.366 ounces per ton for a contained resource of 4.97 million ounces gold; about half the resource is in the reserve category and the remainder is in the resource category.

Usibelli Coal Mine

Usibelli Coal Mine Inc., in production since 1943, continued production of low-sulfur, subbituminous coal from its Two Bull Ridge site near Healy, with an output of more than 1,600,000 tons of coal in 2013 (fig. 21). The majority of the coal is used for in-state electrical power generation, while a significant proportion is exported through the Alaska Railroad Corp.-owned coal export facility at Seward to Chile and Asia. Usibelli has approximately 140 million tons of reserves on State leases.

Table 24. Pogo Mine production statistics, 2006–2013

	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
2013[b]	--	--	337,393[c]	--	--	--

[a]Includes contract employees; calculated as 11-hour days, 260 employee-days per year.
[b]Only recovered metal values were publicly available for 2013.
[c]32,000 ounces silver were also recovered.
-- Not available

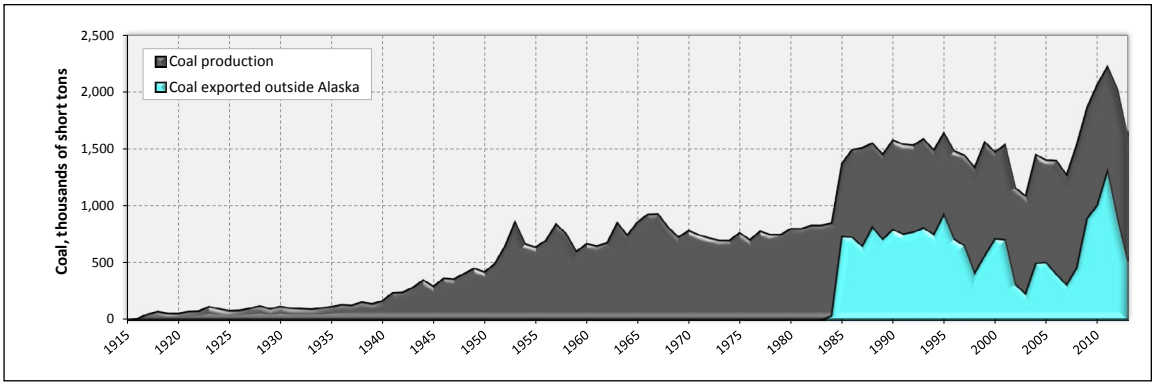


Figure 21. Alaska coal production and exports, 1915–2013.

SOUTH-CENTRAL REGION

The 2013 value of production in the south-central region is estimated to be $13.0 million, with corresponding employment of 112 full-time-equivalent positions. Placer gold production of 2,414 ounces (a 29 percent decrease from 2012) was reported by 31 operators in the south-central region in 2013; seven of those operations reporting were considered recreational in size. Sand and gravel production in the south-central region was 943,543 tons reported by 31 producers, with an estimated 53 full-time-equivalent employees. Rock production in the south-central region was reported as 48,392 tons by four producers, with three full-time-equivalent employees. Severe reporting shortfalls are noted in these sectors, and peat production was reported in 2011 and 2012 but not in 2013.

SOUTHWESTERN REGION

The 2013 value of production in the southwestern region is estimated to be $2.6 million. Placer gold production in the southwestern region amounted 1,569 ounces in 2013—a drop of 86 percent from the 2012 production level of 11,010 ounces. Eleven operators—ten commercial and one recreational—reported placer gold production, with an estimated full-time-equivalent employment of 18 positions.

No sand and gravel, rock, or peat production was reported for 2013; for comparison, 2012 production was reported at 46,167 tons by nine operations, with three full-time-equivalent jobs.

ALASKA PENINSULA REGION

Minor recreational placer gold production was reported in the Alaska Peninsula region in 2013. Sand and gravel, rock, and peat production was reported the previous year, but not in 2013. Production is suspected but not reported in each of these commodities.

SOUTHEASTERN REGION

The 2013 value of production in the southeastern region is estimated to be $564.5 million, with corresponding employment of 718 full-time-equivalent positions. Placer gold production of 990 ounces was reported in 2013 by two operators with an estimated three full-time-equivalent employees. Hard-rock mines produced a total of 172,278 ounces of gold. Sand and gravel production of 301,508 tons was reported by three operators with 17 full-time-equivalent employees. Rock production totaling 77,704 tons was reported by four operators with three full-time-equivalent employees assigned to the effort.

Greens Creek Mine

Greens Creek Mine, one of the world's largest and lowest-cost primary silver mines, 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. As of December 31, 2013, the mine reported proven and probable reserves of slightly less than 7.8 million tons of ore containing 92.5 million ounces silver, 713,000 ounces gold, 512 million pounds of lead, and 1.36 billion pounds of zinc. Measured and indicated resources were reported at 767,300 tons containing 9.39 million ounces silver, 72,000 ounces gold, 50.0 million pounds of lead, and 111.4 million pounds of zinc (table 25). In 2013 Greens Creek milled 805,322 tons of ore and produced nearly 7.5 million ounces of silver, 57,457 ounces of gold, 57,614 tons of zinc, and 20,114 tons of lead worth an estimated $397 million (table 26). These totals reflect increased production in most commodities compared with 2012 when Greens Creek milled 789,569 tons of ore and produced 6.4 million ounces of silver, 55,496 ounces of gold, 64,249 tons of zinc, and 21,074 tons of lead. The mine reported 306 total employees as of September 18, 2013, and does not differentiate between employees engaged in production and development.

In September 2013 the U.S. Forest Service issued a Record of Decision providing for expansion of the dry-stack tailing facility at Greens Creek.

Kensington Mine

Kensington Mine, operated by Coeur Alaska Inc., a wholly-owned subsidiary of Coeur Mining Inc., produced $162 million worth of minerals in 2013 in a full year of production, processing

553,717 tons of ore. This full-year operation resulted in a record 114,821 ounces of gold produced, an increase of 40 percent from 2012. At the end of the year the Kensington mine had proven and probable reserves of 6.02 million tons at a grade of 0.15 ounces per ton containing 902,000 ounces gold; measured and indicated resource of 2.69 million tons at 0.211 ounces per ton gold, containing 566,000 ounces gold; and inferred resources of 1.01 million tons at 0.259 ounces per ton containing 263,000 ounces gold. The mine reported 300 total employees as of December 1, 2013, and does not differentiate between employees engaged in production and development.

Table 25. Reserves and resources by category at Greens Creek Mine as of December 31, 2013 (from Hecla Co. 2013 Annual Report).

Class		Grade			
	Tons (oz/ton)	Silver (oz/ton)	Gold (%)	Lead (%)	Zinc (%)
Proven and Probable Reserve	7,797,000	11.9	0.09	3.3	8.7
Measured and Indicated Resources	767,000	12.2	0.09	3.3	7.3
Inferred Resources	2,385,000	13.3	0.09	2.7	6.5
TOTAL	**10,949,000**				

Table 26. Greens Creek Mine production statistics, 1989–2013.

			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]
2013	805,322	- -	57,614	20,114	- -	57,457	7,448,347	390[l]

[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.
[l]All employees were assigned to the production sector.
- - = Not reported.

RECREATIONAL MINING

Recreational mining continued to attract attention in 2013, despite the lower price for gold. Production allocated to recreational mining was 884 ounces in 2013, compared with 573 ounces in 2012. Employment allocated to this sector was 55 full-time-equivalent employees in 2013, compared with 52 in 2012. These data are based on time worked by 63 operators as reported in Alaska Placer Mining Applications for suction dredges with 6 inch or smaller nozzles. The data are likely incomplete due to reporting shortfalls and do not take into account other types of recreational mining activities.

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 and reported by 45 operators. Table 27 lists companies with a significant drilling program in Alaska during 2013; tables 28 and 29 and figure 22 summarize drilling activity in the state during 2013 by region and type of drilling.

Drilling totals for 2013 are 933,194 feet of core drilling (photo 19), including drilling for coal and miscellaneous placer; 17,800 feet of reverse-circulation (rotary) drilling; and 17,986 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. Exploration drilling totaled 568,461 feet (36 operators reported almost 59 percent of drilling statewide); development drilling totaled 357,314 feet (six operators reported 37 percent of total drilling); and production drilling totaled 43,205 feet (three operators reported 4.5 percent of total drilling). Development and production drilling, especially at Alaska's large lode mines, is likely under-reported. Blast-hole drilling during production at Alaska's large lode mines is not tracked.

About 45 percent of the 2013 drilling footage was from projects in the eastern interior region of Alaska and about 37 percent of the drilling footage for the year was from southeastern Alaska. Hardrock rotary drilling was only reported in the eastern interior region; this number is under-reported, as many operators do not differentiate between core and rotary drilling. The

Table 27. Companies reporting significant drilling programs in Alaska, 2013.

Coeur Alaska Inc.
Constantine Metal Resources Ltd.
Contango ORE Inc.
David Lajack (Altar Drilling Inc.)
Fire River Gold Corp. (Mystery Creek Resources Inc.)
Freegold Ventures Ltd.
Graphite One Resources Inc.
Hecla Mining Co.
Kinross Gold Corp. (Fairbanks Gold Mining Inc.)
NovaCopper Inc.
Nyac Gold LLC
Pathfinder Mineral Services LLC
Pebble Limited Partnership
Sumitomo Metal Minining Pogo LLC
Teck Resources Ltd. (Teck Alaska Inc.)
WestMountain Gold Inc.

Table 28. Drilling footage by region in Alaska, 2013.[a]

Type of drilling	Northern	Western	Eastern Interior	South-central	South-western	South-eastern	Alaska Peninsula	Total
Coal subtotal	- -	- -	W	- -	- -	- -	- -	W
Placer subtotal	360	11,784	3,342	2,500	- -	W	- -	17,986
Hardrock core[b]	97,039	44,271	413,791	- -	18,838	359,255	- -	933,194
Hardrock rotary	- -	- -	17,800	- -	- -	- -	- -	17,800
Hardrock subtotal	97,039	44,271	431,591	- -	18,838	359,255	- -	950,994
TOTAL (feet)	**97,399**	**56,055**	**434,933**	**2,500**	**18,838**	**359,255**	**- -**	**968,980**

- - = 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.
W = Figures witheld for confidentiality purposes; included in hardrock rotary.

Table 29. Drilling footage reported in Alaska, 1982–2013.

Year	TOTAL Placer Exploration	Placer Thawing	TOTAL PLACER	TOTAL COAL	Hardrock Core[a]	Hardrock Rotary[a]	TOTAL HARDROCK	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	551,078	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
2013	17,986	- -	17,986	W	933,194	17,800	950,994	968,980

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

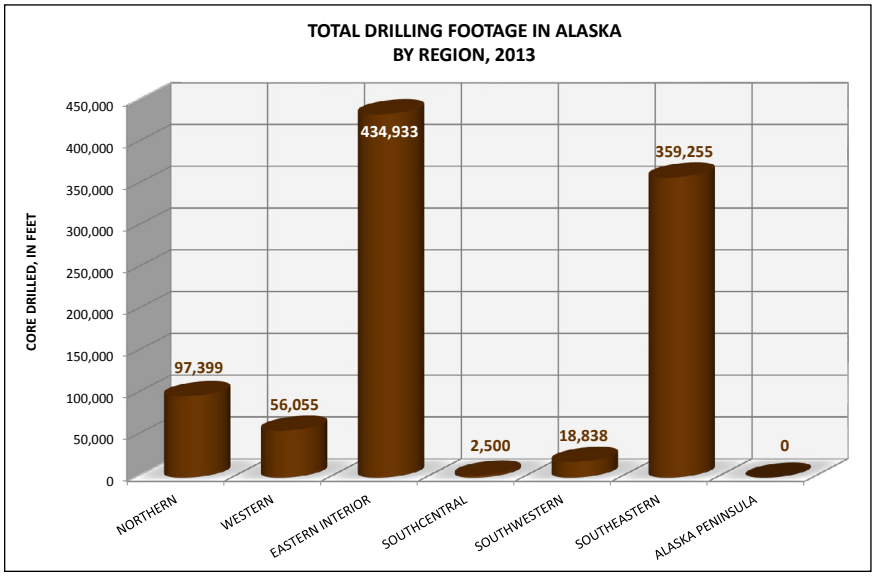


Figure 22. Total feet of core drilled in Alaska in 2013, by region.

2013 total drilling footage decreased more than 13 percent from the 2012 value. Decreased drilling overall reflects the 2013 trend of fewer projects and smaller project budgets, although development and production drilling contribute significantly to the drilling value, as they do to the health of the mining industry in Alaska in general.

Photo 19. Driller placing core from one of the eight holes drilled at the MAN property operated by Pure Nickel Inc. in south-central Alaska. Fewer feet were drilled in Alaska in 2013 than in 2012, but the total is still much higher than historical levels prior to 2006. Photo provided by Pure Nickel Inc.

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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, 2013

Operator	Region	Creek, River, or Mine	District	Type of Operation
Timothy Shorey	Northern	Minnie Creek	Koyukuk–Nolan	Placer exploration
Chester and Earl Bell and John Wayne	Northern	Emery Creek	Koyukuk–Nolan	Open-pit placer
John Bonacor and Orlen and Kenny Leslie	Northern	Gold Creek	Koyukuk–Nolan	Open-pit placer
Doug Jones	Northern	Minnie Creek	Koyukuk–Nolan	Open-pit placer
Stewart Brandon	Northern	Myrtle Creek	Koyukuk–Nolan	Placer exploration
Jim Olmstead	Northern	Gold Creek	Koyukuk–Nolan	Open-pit placer
James Wicken	Northern	Gold Creek	Koyukuk–Nolan	Open-pit placer
Bill Fejes	Northern	Boulder Creek	Koyukuk–Nolan	Placer exploration
Eric Pyne Boreal Resources Inc.	Northern	California Creek, Jim Pup Creek	Koyukuk–Nolan	Open-pit placer
Graden Colby and Nathan Taylor	Northern	South Fork Koyukuk River	Koyukuk–Nolan	Placer exploration
Fred Tracy and Brant Clayton	Northern	Gold Creek	Koyukuk–Nolan	Open-pit placer
Joe Coup and Anna Guildersleve	Northern	South Fork Koyukuk River, Eagle Creek	Koyukuk–Nolan	Open-pit placer
Lloyd Swenson	Northern	Slate Creek	Koyukuk–Nolan	Open-pit placer
Daniel Matthew Even	Northern	Gold Creek	Koyukuk–Nolan	Open-pit placer
LNT Mining LLC	Northern	South Fork Koyukuk River, Eagle Creek, Iron Side	Koyukuk–Nolan	Open-pit placer
Greg Clayton Davis Creek LLC	Northern	Davis Creek	Koyukuk–Nolan	Open-pit placer
Goldrich Mining Co.	Northern	Various	Chandalar	Open-pit placer
Allen Post Jubilee Mine	Northern	Prospect Creek (near)	Koyukuk–Nolan	Open-pit placer
Michael Hoffman	Northern	South Fork Koyukuk River	Koyukuk–Nolan	Suction dredge (4"), recreation
Thomas Zarrilli	Northern	Chicken Creek tributary	Koyukuk–Nolan	Suction dredge, recreation
James and Lorna Lounsbury	Northern	Union Gulch	Koyukuk–Nolan	Suction dredge (2.5"), recreation
Jonathan Jurco	Northern	Gold Creek	Koyukuk–Nolan	Suction dredge (6"), recreation
Teck Cominco Alaska Inc.	Northern	Red Dog Mine	Lisburne	Open-pit hardrock
Wayne Miller and Terry McLean	Western	Goldbottom Creek	Cape Nome	Open-pit placer
Jeffrey Starr	Western	Crooked Creek	Ruby–Poorman	Placer exploration
Richard Redmond	Western	Macklin Creek	Kougarok	Open-pit placer and suction dredge
William Fitzhugh	Western	Nome Beach	Cape Nome	Suction dredge (6"), recreation
Dennis Delila Barron	Western	Goose Creek and Quartz Creek	Cape Nome	Open-pit placer
Tim Beaton Beaton Path Mining LLC	Western	Nugget Creek, Wilson Creek	Gold Hill–Melozitna	Open-pit placer and placer exploration
Samuel "Kelly" Thomas	Western	Sweepstakes Creek	Koyuk	Open-pit placer
Mark Gumaer	Western	Dick Creek	Serpentine	Open-pit placer
Ronald MacLaren MacIsh Mining LLC	Western	Chapman Creek/Koyukuk River	Koyukuk–Hughes	Open-pit placer
Richard Schimschet	Western	Nome Offshore	Cape Nome	Suction dredge, recreation
Jim Tweto Three Ungalik Sisters LLC	Western	Bonanza Creek and Ungalik River	Koyuk	Open-pit placer
Jon Peckenpaugh Peckenpaugh Mining Inc.	Western	Quartz Creek	Kougarok	Open-pit placer
Richard Thomas Nevak Mining Ltd.	Western	Mud Creek	Fairhaven	Open-pit placer
Victor Loyer	Western	Candle Creek (near)	Fairhaven–Inmachuk	Open-pit placer
Jeff and Margaret Darling	Western	Boulder Creek	Cape Nome	Suction dredge, recreation
Robert Magnuson	Western	Madison Creek	Innoko–Tolstoi–Ophir	Open-pit placer
Dry Creek Valley LLC	Western	Gold Run Creek	Fairhaven–Inmachuk	Open-pit placer
Phoenix Offshore Mining, Inc.	Western	Nome Offshore	Cape Nome	Jack-up dredges
Paul Sayer Little Creek Mine	Western	Bedrock Creek	Innoko–Tolstoi–Ophir	Open-pit placer
N.B. Tweet N.B. Tweet & Sons LLC	Western	Kougarok River	Kougarok	Open-pit placer
Phoenix Offshore Mining Inc.	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Paradise Valley Mining Co. LLC	Western	Tripple Creek	Cape Nome	Open-pit placer
Nome Gold Alaska Corp.	Western	Monroeville Beach	Cape Nome	Open-pit placer
Jerry Birch Taiga Mining Co., Inc.	Western	Alohetta Creek	Koyukuk–Hughes	Open-pit placer
Bron Sanders	Western	Norton Sound	Cape Nome	Suction dredge, large (8")
M.L. Henry	Western	Norton Sound	Cape Nome	Suction dredge, large (two 10")

Operator	Region	Creek, River, or Mine	District	Type of Operation
Billy Turnbow	Western	Bering Sea	Cape Nome	Suction dredge, large (8")
Adam Kerner	Western	Norton Sound	Cape Nome	Suction dredge, large (8")
William Fitzhugh	Western	Norton Sound	Cape Nome	Suction dredge, large (10", 6")
Joseph Krol	Western	Norton Sound	Cape Nome	Suction dredge, large (8")
Bradley Kelly	Western	Norton Sound	Cape Nome	Suction dredge, large (8", 6")
Liberty Mining, LLC	Western	Norton Sound	Cape Nome	Suction dredge, large (8")
Floyd Ehmann Dry Creek Valley LLC	Western	Norton Sound	Cape Nome	Suction dredge, large (8")
Richard Markley	Western	Norton Sound	Cape Nome	Suction dredge, large (7")
Richard Goodson (Clyde Miles co–operater in 2012)	Western	Norton Sound	Cape Nome	Suction dredge, large (8", 6")
James Cardwell and James Hansen	Western	Bering Sea	Cape Nome	Suction dredge, large (8")
David Peirce Blue Water Gold Alaska Inc.	Western	Norton Sound, Penny River, Cripple Creek	Cape Nome	Suction dredge, large (two 10")
Sam Slivkoff	Western	Norton Sound	Cape Nome	Suction dredge, large (8")
Ken Kerr	Western	Norton Sound	Cape Nome	Suction dredge, large (8", 5")
Ken Kerr	Western	Norton Sound	Cape Nome	Suction dredge, large
Gary Gustafson Rayson LLC	Western	Norton Sound	Cape Nome	Suction dredge, large, (10", two 12", two barge-based excavator dredges, 12",17.5")
Vernon Adkison	Western	Norton Sound	Cape Nome	Suction dredge, large (two 8")
Liberty Mining LLC	Western	Norton Sound	Cape Nome	Suction dredge, large (10", 8")
John Mehelich (Johnny Wilson taking over APMA in 2014)	Western	Norton Sound	Cape Nome	Suction dredge, large (10")
David McCully Bering Sub Sea Mining LLC	Western	Bering Sea	Cape Nome	Suction dredge, large (10")
Thomas Palmer Palmerosa—IDS, LLS	Western	Bering Sea	Cape Nome	Suction dredge, large
Shawn Pomrenke dba Gold Diggers	Western	Cape Nome	Cape Nome	Suction dredge, large (barge-mounted backhoe)
Igor Sudarkin Pacifica	Western	Norton Sound	Cape Nome	Suction dredge, large (two 10", two 6")
Craig Coggins	Western	Norton Sound	Cape Nome	Suction dredge, large (20", 8")
Norman Stiles K & S Leasing Inc.	Western	Nome Offshore	Cape Nome	Suction dredge, large (two 10", two 8")
Daniel Rhea	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Benjirmen Kilgore	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Mark Sackett	Western	Norton Sound	Cape Nome	Suction dredge, recreation
Michael Doucette	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Brad Bronson	Western	Bering Sea	Cape Nome	Suction dredge (6"), recreation
Ryan Swanson	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Kenneth Takak	Western	Tubutulik River	Koyuk	Suction dredge (4"), recreation
Kevin Bopp	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Walter Rehm	Western	Norton Sound	Cape Nome	Suction dredge (5"), recreation
Steve Phillips	Western	Norton Sound/Bering Sea	Cape Nome	Suction dredge (two 6"), recreation
Spencer Phillips	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Jimmie Eckroth	Western	Norton Sound	Cape Nome	Suction dredge, recreation
Daniel Calabrese	Western	Norton Sound	Cape Nome	Suction dredge, recreation
LeGrand Glen LeBaron	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Alexie Klutchnikov	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Jan Siks and Jim Hatadis	Western	Kougarok River	Kougarok	Suction dredge, recreation
Ted Maschal	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Richard Wideman, Jr., Richard Wideman, III, Mark Wideman, and Dustin Wideman	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Rudd Van Dyne	Western	Norton Sound	Cape Nome	Suction dredge (5", 6"), recreation
Susan Nowland	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Geordie Krapf and C. Britt Ward	Western	Norton Sound	Cape Nome	Suction dredge (two 6"), recreation
Curtis Roche	Western	Offshore Nome Public Beach	Cape Nome	Suction dredge, recreation
Ian Foster	Western	Nome Offshore	Cape Nome	Suction dredge (6"), recreation
Greg Jackson	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Rex Isaacson	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Jeff Martinez	Western	Nome Public Beach	Cape Nome	Suction dredge, recreation
Lonnie Fausett	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation

Operator	Region	Creek, River, or Mine	District	Type of Operation
Reese Madden	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Kenneth Scott	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Ira Sweazea	Western	Norton Sound	Cape Nome	Suction dredge (6", 4"), recreation
Richard Goodson	Western	Bering Sea	Cape Nome	Suction dredge, recreation
Ryan Fausett	Western	West Nome Public Beach	Cape Nome	Suction dredge (6"), recreation
Grant Wilkins	Western	Norton Sound	Cape Nome	Suction dredge (6", 8"), recreation
Scott Koehler	Western	Bering Sea	Cape Nome	Suction dredge recreation
James Jell	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
John Searchy JS Mining Co. LLC	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Ed Hanousek	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Christian Broce	Western	Norton Sound	Cape Nome	Suction dredge (6"), recreation
Keith Albrecht	Western	Nome West Beach	Cape Nome	Suction dredge (6"), recreation
Chris Thornton	Western	Bering Sea	Cape Nome	Suction dredge (6"), recreation
David Herren and Jason Cooper	Eastern Interior	45 Pup Creek	Circle	Suction dredge (6", 5", 4", 3"), recreational hand-panning equipment
Bob Dykes and Joe Czreski	Eastern Interior	Twelvemile Creek	Circle	Placer exploration
Joe Czreski	Eastern Interior	Twelvemile Creek	Circle	Placer exploration
Mark Farrar	Eastern Interior	Boulder Creek	Circle	Open-pit placer
St. George Ventures	Eastern Interior	Pups of Uhler Creek	Fortymile	Open-pit placer
Robert Hiltunen	Eastern Interior	Near Goodpaster River	Goodpaster	Open-pit placer
Roy Frazier	Eastern Interior	Bottom Dollar Creek	Circle	Suction dredge (4"), recreation
Scotty Wyers	Eastern Interior	Hill Top Placer Creek	Richardson	Placer exploration
Dale, Connie, and Jake Mattila, Dwayne Husnold, Matt Nast	Eastern Interior	Thistle Creek	Bonnifield	Suction dredge (6"), recreation
Frank Morrison III	Eastern Interior	Big Eldorado Creek	Fairbanks	Open-pit placer
Mark Funk	Eastern Interior	Goldstream Creek	Fairbanks	Open-pit placer
Jim Godsby	Eastern Interior	Liberty Creek	Fortymile	Open-pit placer
Raymond Meder	Eastern Interior	Flume Creek	Fairbanks	Open-pit placer
Gerald and Kathryn Pitcher	Eastern Interior	Deadwood Creek	Circle	Open-pit placer
Rob Goreham	Eastern Interior	Deadwood Creek	Circle	Open-pit placer
Mike Patrick	Eastern Interior	Fortymile River Left Limit	Fortymile	Open-pit placer
Patrick West	Eastern Interior	Bonanza Creek	Circle	Open-pit placer
James and Linda Baisdon	Eastern Interior	Easley Creek	Circle	Placer exploration?
John Barker	Eastern Interior	Liberty Creek	Fortymile	Open-pit placer
HMBE LLC	Eastern Interior	Crooked Creek	Circle	Open-pit placer
Morris Wolters Arctic Mining LLC	Eastern Interior	Crooked Creek	Circle	Open-pit placer
Walter and William Bohan	Eastern Interior	Ottertail Creek	Fairbanks	Open-pit placer, suction dredge (large), suction dredge (small), recreation
Conrad Hall	Eastern Interior	Golden Fork Tributary of Bear Creek	Rampart	Open-pit placer
Tom Cauthen dba TLD Mining Co.	Eastern Interior	Flat Creek	Circle	Open-pit placer
Jeno Gelencser and Sandra Daly	Eastern Interior	Bottom Dollar Creek	Circle	Open-pit placer
John King	Eastern Interior	Little Boulder Creek	Hot Springs	Open-pit placer
Silver Jim Stroer	Eastern Interior	Confederate Creek	Fortymile	Open-pit placer
Ronald and Analyn Bingham	Eastern Interior	Tenderfoot Creek	Fairbanks	Open-pit placer
A.J. Davis	Eastern Interior	Cherry Creek	Fortymile	Open-pit placer
Kenneth and Teresa Ann Hanson	Eastern Interior	Faith Creek	Circle	Open-pit placer
Donald Smithwick	Eastern Interior	Crooked Creek	Eagle	Open-pit placer, suction dredge
Brad Sundstrom	Eastern Interior	Boulder Creek	Circle	Open-pit placer
Richard Swenson and Kelly Williams	Eastern Interior	Doric Creek	Hot Springs	Open-pit placer
Theodore Payment	Eastern Interior	Wilson Creek	Fairbanks	Open-pit placer
Robin and Wanda Severson	Eastern Interior	Willow Creek	Fortymile	Open-pit placer
Randy Powelson	Eastern Interior	Fox Creek	Fairbanks	Open-pit placer
Bruce Harris	Eastern Interior	Wildcat Creek	Fairbanks	Open-pit placer
Coleen Nilsson DDC Mining LLC	Eastern Interior	Boulder Creek	Hot Springs	Placer exploration
Raleigh Cline	Eastern Interior	Eagle Creek	Fortymile	Open-pit placer
Jack Phipps	Eastern Interior	Ptarmigan Creek	Circle	Open-pit placer
David Smith and Alan Wildman	Eastern Interior	Bonanza Creek and Rebel Creek	Circle	Open-pit placer
Christine and Ryan Smith	Eastern Interior	Stack Pup Creek	Circle	Open-pit placer
Robert Wener	Eastern Interior	Warner Creek	Fortymile	Open-pit placer
Keith Clark	Eastern Interior	Shamrock Creek	Fairbanks	Suction dredge (4"), recreation

Operator	Region	Creek, River, or Mine	District	Type of Operation
Cecil Cox	Eastern Interior	Robinson Creek	Fortymile	Open-pit placer
Larry Crouse	Eastern Interior	Fox Gulch	Fairbanks	Open-pit placer
Eric Kile	Eastern Interior	Woods Creek, Canyon Creek	Fortymile	Open-pit placer
Billy Lance, Sr.	Eastern Interior	Jack Wade Creek	Fortymile	Placer exploration
Charles Zimmerman	Eastern Interior	Killarney Creek	Hot Springs	Open-pit placer; suction dredge for exploration
Robert Cook	Eastern Interior	Gold Dust Creek	Circle	Open-pit placer
Paul Manuel Paul & Co.	Eastern Interior	Fairbanks Creek	Fairbanks	Open-pit placer
Jeffrey and Laura Thimsen	Eastern Interior	Upper Woods Creek	Fortymile	Open-pit placer
Van Swan	Eastern Interior	Colorado Creek, Butcher Creek	Hope–Sunrise & Seward	Placer exploration
Fred Wilkinson dba Miller Creek Mining Co.	Eastern Interior	Ketchem Creek	Circle	Open-pit placer
Greg Wolters Glacier Mining LLC	Eastern Interior	Porcupine Creek	Circle	Open-pit placer
Brian Asplund	Eastern Interior	Deadwood Creek	Circle	Open-pit placer
Gene Hume	Eastern Interior	Switch Creek	Circle	Open-pit placer
Bronk Jorgensen 45 Pup Gold Company LLC	Eastern Interior	45 Pup Creek and Buckskin Creek	Fortymile	Open-pit placer
Alan Las Richardson Shield LLC	Eastern Interior	No Grub Creek, The Lost Mine Creek	Fairbanks	Open-pit placer
John and Dawn Lines dba Aurora Mining	Eastern Interior	North Fork Harrison Creek	Circle	Open-pit placer
Donald and Fawn Glassburn	Eastern Interior	Gold Dust Creek	Circle	Open-pit placer
Dean Race Niagara Inc.	Eastern Interior	Gillilland Creek	Fortymile	Open-pit placer
Michael Busby dba Geoquest	Eastern Interior	Chicken Creek and Myers Fork	Fortymile	Open-pit placer
Chris Groppel	Eastern Interior	Tenderfoot Creek	Richardson	Open-pit placer
Joe Garule (claim owner: Charles Hammond)	Eastern Interior	Chicken Creek	Fortymile	Open-pit placer
Ian Miller	Eastern Interior	Wade Creek	Fortymile	Suction dredge
Richard Ott	Eastern Interior	Omega Creek	Hot Springs	Open-pit placer
Sam and Donna Skidmore	Eastern Interior	Vault Creek	Fairbanks	Open-pit placer
Charles "Dick" and Robin L. Hammond	Eastern Interior	Stonehouse Creek	Fortymile	Open-pit placer
Elton McGahan	Eastern Interior	Kal Creek	Fortymile	Open-pit placer
Michael Fulton and Doug Marks	Eastern Interior	Butte Creek	Circle	Open-pit placer
James Treesh	Eastern Interior	No–name – near Cherry Creek	Fortymile	Open-pit placer
Jack Barnes and Chrystine Pacheco dba Yella Metal Exploration and Mining	Eastern Interior	Baby/Kal Creek, Squaw Gulch	Fortymile	Open-pit placer
James Decker	Eastern Interior	Moose Creek	Bonnifield	Open-pit placer
Sheldon and Janine Maier	Eastern Interior	Montana Creek	Fortymile	Open-pit placer
Dexter Clark	Eastern Interior	Fox Creek	Fairbanks	Open-pit placer
David Jacobs	Eastern Interior	Eva Creek, Wilson Creek	Fairbanks	Open-pit placer
James Stone Pacific Mining Co.	Eastern Interior	Porcupine Creek	Circle	Placer exploration
Earl Voytilla Voytilla Mining	Eastern Interior	Ester Creek	Fairbanks	Open-pit placer
Jim Roland	Eastern Interior	Moose Creek	Bonnifield	Open-pit placer
Robert Hare	Eastern Interior	Gold Dust Creek	Circle	Open-pit placer
Mickey Jones and Gary Freeland	Eastern Interior	Mosquito Fork	Fortymile	Open-pit placer
George Seuffert, Jr. Seuffert Mining Co.	Eastern Interior	Deadwood Creek	Circle	Open-pit placer
Richard Sherlund Sherlund Mining LLC	Eastern Interior	Ketchum Creek	Circle	Open-pit placer
James Bailey (Bailey Family – James, Karin, Daniel)	Eastern Interior	Gold Dust Creek	Circle	Placer exploration
Harry Colburn Mackinaw Productions	Eastern Interior	Walker Fork	Fortymile	Open-pit placer
Terry Russell	Eastern Interior	Boulder Creek	Hot Springs	Open-pit placer
David Howland	Eastern Interior	Dry Channel Creek	Chistochina	Open-pit placer
Raymond and Mike Lester R & M Mining	Eastern Interior	Birch Creek	Circle	Open-pit placer
Doug Baker Mud Miners LLC	Eastern Interior	Sullivan Creek	Hot Springs	Open-pit placer
MSR Inc.	Eastern Interior	Bottom Dollar Creek	Circle	Open-pit placer
Bronk Jorgensen 45 Pup Gold Company LLC	Eastern Interior	Ingle Creek	Fortymile	Open-pit placer

Operator	Region	Creek, River, or Mine	District	Type of Operation
Mikhail Bakurkin and Fedor Kuzmin	Eastern Interior	Jack Wade Creek	Fortymile	Open-pit placer
Jeff Owen	Eastern Interior	Walker Fork	Fortymile	Open-pit placer
James Stepp	Eastern Interior	Bottom Dollar Creek	Circle	Open-pit placer
Kib Cannon Cannon Resources LLC	Eastern Interior	Gold King Creek	Bonnifield	Open-pit placer
Larry Nelson dba Nelson Mining Co.	Eastern Interior	Livengood Creek	Tolovana–Livengood	Open-pit placer
Cy Bras	Eastern Interior	Canyon Creek, Hall Creek	Fortymile	Open-pit placer
Kenneth Monzulla and Paul Roderick	Eastern Interior	Nugget Creek	Fairbanks	Open-pit placer
Ryan Eiden	Eastern Interior	Portage Creek	Circle	Open-pit placer
Jerry Hassel	Eastern Interior	Ready Bullion Creek	Fairbanks	Open-pit placer
Doug Baker Mud Miners LLC	Eastern Interior	Miller Gulch	Hot Springs	Open-pit placer
Stepovich Family Properties LLC	Eastern Interior	Fish Creek	Fairbanks	Open-pit placer
Samuel Eaves Mammoth Mining LLC	Eastern Interior	Gertrude Creek, Livengood Creek	Tolovana–Livengood	Open-pit placer
Les Underwood	Eastern Interior	Porcupine Creek	Circle	Open-pit placer
Robert Curry (2014 APMA reclamation statement signed for KMM Co.)	Eastern Interior	Ober Creek	Delta River	Open-pit placer
Ryan Eiden	Eastern Interior	Bottom Dollar Creek	Circle	Open-pit placer
George Seuffert, Jr. Seuffert Mining Co.	Eastern Interior	Faith Creek	Fairbanks	Open-pit placer
Scott Thomas	Eastern Interior	Deadwood Creek	Circle	Open-pit placer
Stanley Gelvin	Eastern Interior	Crooked Creek	Circle	Open-pit placer
Dwight Hjorth	Eastern Interior	Sheep Creek, Tatlanika Creek	Bonnifield	Open-pit placer
Andy Miscovich	Eastern Interior	Wolf Creek	Fairbanks	Open-pit placer
Ron Roman	Eastern Interior	Last Chance Creek	Fairbanks	Open-pit placer
Joe Super, Lessee (Earl Vegoren claim)	Eastern Interior	Rainy Creek	Delta River	Open-pit placer
Marc Stringfellow Golden Angle LLC	Eastern Interior	Deadwood Creek	Circle	Open-pit placer
Paul Manuel Paul & Co.	Eastern Interior	Fairbanks Creek	Fairbanks	Open-pit placer
Ron Timroth AK Team GS LLC	Eastern Interior	Uhler Creek	Fortymile	Open-pit placer
William Aldridge	Eastern Interior	Poker Creek	Fortymile	Open-pit placer
Dean Willis	Eastern Interior	Crooked Creek	Circle	Open-pit placer
Judd Edgerton	Eastern Interior	Napoleon Creek	Fortymile	Open-pit placer
Jason Dobson	Eastern Interior	Gold Run Creek	Hot Springs	Open-pit placer
James Bush Buckeye Land and Minerals Inc.	Eastern Interior	Olive Creek	Tolovana–Livengood	Open-pit placer
Steve Olson Olson Placer	Eastern Interior	Ketchem Creek	Circle	Open-pit placer
Earth Movers of Fairbanks, Inc.	Eastern Interior	Cleary Creek	Fairbanks	Open-pit placer
Daniel May Polar Mining Inc.	Eastern Interior	Goldstream Creek	Fairbanks	Open-pit placer
Fairbanks Excavation	Eastern Interior	Smallwood Creek	Fairbanks	Open-pit placer
Todd Tanner and Dan Blackard (Cody Ducenberry operator in 2012)	Eastern Interior	Chena Ester Ditch	Fairbanks	Open-pit placer
William Massengale Mastodon Mining LLC	Eastern Interior	Chicken Creek	Fortymile	Suction dredge (8", 5"), recreation
Dean Race	Eastern Interior	South Fork Fortymile River	Fortymile	Suction dredge, large (four 10", two 8", four 6")
Jesse Haley–Fence and Joell Stine	Eastern Interior	Fortymile River	Fortymile	Suction dredge, large (8")
Timothy Ruppert	Eastern Interior	Little Moose Creek	Bonnifield	Suction dredge (5")
Jim Swearingin	Eastern Interior	Main Fortymile River	Fortymile	Suction dredge (6", 5"), recreation
Paul and Teresa Hunstiger Southside Prospectors	Eastern Interior	Fortymile River	Fortymile	Suction dredge (6", 4"), recreation
Paul and Teresa Hunstiger Southside Prospectors	Eastern Interior	Fortymile River	Fortymile	Suction dredge, recreation
Ricky Nix and Don Sprague	Eastern Interior	Mogul Creek, Seventymile River, Broken Neck Creek	Fortymile	Suction dredge (6", 5", 4"), recreation
Daniel Gross, Allen Geiger, Donald Davidson III, Jennifer Bryant, Timothy Kloehn	Eastern Interior	North Fork Fortymile River	Fortymile	Suction dredge (two 6"), recreation
William Miller	Eastern Interior	Jack Wade Creek	Fortymile	Suction dredge (6", 4"), recreation
Dyton Gilliland	Eastern Interior	Jack Wade Creek	Fortymile	Suction dredge (6", 5"), recreation

Operator	Region	Creek, River, or Mine	District	Type of Operation
Fairbanks Gold Mining Inc.	Eastern Interior	Fort Knox Mine	Fairbanks	Open-pit hardrock
Sumitomo Metal Mining Pogo LLC	Eastern Interior	Pogo Mine	Goodpaster	Underground hardrock
Tom and Sharon Hron	South–central	Lake Creek	Yentna–Cache Creek	Open-pit placer
Nevada Star Resource Corp	South–central	Eureka Creek, Fish Lake, Fourteenmile Lake, other lakes and tributaries	Delta River, Chistochina, Valdez Creek	Hardrock exploration
Gray Wolf Management	South–central	Off Nakochna River	Yentna–Cache Creek	Hardrock exploration
Daniel Hartman	South–central	Cache Creek	Yentna–Cache Creek	Open-pit placer
Craig Walker and David Sewel	South–central	Daisy Creek	Valdez Creek	Open-pit and placer exploration
James Albrecht	South–central	Lower Ruby Creek	Yentna–Cache Creek	Open-pit placer
Joe Bradley	South–central	Mills Creek	Yentna–Cache Creek	Open-pit placer
Birch Yuknis	South–central	Pass Creek	Yentna–Cache Creek	Open-pit placer
Clearwater Mountain Mining	South–central	White Creek	Valdez Creek	Open-pit placer
Burke Waldron	South–central	Red Fox Creek	Valdez Creek	Placer exploration
Ron Gries	South–central	Jack Creek	Chisana–Nabesna	Placer exploration
Kenneth Lee KenWin Enterprises	South–central	Cache Creek	Yentna–Cache Creek	Open-pit placer and suction dredge (5"), recreation
Philip Nute	South–central	Ernestine Creek	Nelchina	Open-pit placer
Gordon Bartel and Robert Haines	South–central	Mills Creek	Yentna–Cache Creek	Open-pit placer
Mark Anzivino	South–central	Off Lower Valdez Creek	Valdez Creek	Open-pit placer
Gordon Wolff	South–central	Peters Creek	Yentna–Cache Creek	Open-pit placer
Carl Wilbur	South–central	Yacko Creek	Nelchina	Open-pit placer
Daniel Rodrigue	South–central	Tyone Creek	Valdez Creek	Open-pit placer
Steve and Patricia Lankford	South–central	Albert Creek	Nelchina	Open-pit placer
Russell Hoffman	South–central	Ruby Creek	Chistochina	Open-pit placer
Mark Cizek	South–central	Cache Creek, Nugget Creek	Yentna–Cache Creek	Open-pit placer
Samuel Turner and Terek Hamdy	South–central	Cache Creek	Yentna–Cache Creek	Open-pit placer
Michael Kingsbury	South–central	White Creek	Valdez Creek	Open-pit placer
Brian Berkhahn	South–central	Mills Creek	Hope	Suction dredge (7.5", 5.5"), recreation
James Van Note, James Williams, and Genevieve Josephson	South–central	Mineral Creek	Prince William Sound	Suction dredge (3", 4.5" 5.5"), recreation
Estill DeWitt New Recovery Systems Inc.	South–central	Alfred Creek	Willow Creek–Hatcher Pass	Suction dredge (3", 4"), recreation
Matthew Branson	South–central	Cache Creek	Yentna–Cache Creek	Suction dredge, recreation
Joe Van Note	South–central	Mineral Creek	Prince William Sound	Suction dredge (5"), recreation
Wanda McGrath	South–central	Willow Creek	Willow Creek–Hatcher Pass	Suction dredge (2"), recreation
Cal Myrick	South–central	Canyon Creek	Hope–Sunrise & Seward	Suction dredge, recreation
Kate Toohey Crow Creek Mine	South–central	Crow Creek	Anchorage	Suction dredge (5") and sluice boxes, recreation
Jeannine Faulkner	Southwestern	Ophir Creek	Aniak–Tuluksak	Open-pit placer
Peter Snow	Southwestern	Yankee Creek	Innoko–Tolstoi–Ophir	Open-pit placer
Mark Matter	Southwestern	Marvel Creek	Aniak–Tuluksak	Open-pit placer
L.E. Wyrick	Southwestern	Granite Creek	Aniak–Tuluksak	Open-pit placer
Spencer and Carolyn Lyman Lyman Resources in Alaska Inc.	Southwestern	Crooked Creek	Iditarod	Open-pit placer
Max and Catherine Agoff	Southwestern	Prince Creek	Iditarod	Open-pit placer
David Wilmarth	Southwestern	Chicken Creek	Iditarod	Open-pit placer
Joshua Taylor Pan Pacific Resources LLC	Southwestern	Innoko River	Innoko–Tolstoi–Ophir	Open-pit placer
Alfred Johnson Moore Creek Pay to Mine LLC	Southwestern	Moore Creek	Innoko–Tolstoi–Ophir	Open-pit placer and suction dredge (6", 4"), recreation
Doug Clark Clark–Wiltz Mining Ganes Creek Recreational	Southwestern	Ganes Creek and tributaries	Innoko–Tolstoi–Ophir	Open-pit placer
Monty and Travis Handy	Southwestern	Wattamus Creek	Goodnews Bay	Suction dredge (6" or less), recreation
Wayne Murphy	Southeastern	Beach Sands – Kodiak	Kodiak–Unga Island	Open-pit placer
Mystery Creek Resources, Inc.	Southeastern	Nixon Fork Mine	McGrath	Underground hardrock
John Schnabel Big Nugget Mine	Alaska Peninsula	Porcupine Creek	Porcupine	Open-pit placer
Fred Hurt	Alaska Peninsula	Porcupine Creek	Juneau & Admiralty Is	Open-pit placer
Coeur Alaska, Inc.	Alaska Peninsula	Kensington Gold Mine	Berners Bay	Underground hardrock
Hecla Greens Creek Mining Company	Alaska Peninsula	Greens Creek Mine	Juneau & Admiralty Is	Underground hardrock

APPENDIX C

Primary metals production in Alaska, 1880-2013[a,b]

Year	Gold[b]		Silver		Mercury		Antimony		Tin		Lead		Zinc		Platinum[d]		Copper		Chromium	
	(oz)	(m$)	(oz)	(t$)	(flask[c])	(t$)	(lb)	(t$)	(lb)	(t$)	(tons)	(t$)	(tons)	(t$)	(oz)	(t$)	(lb)	(m$)	(tons)	(t$)
1880–99	1,153,889	$23.9	496,101	$329.0	--	--	--	--	--	--	250	$17.0	--	--	--	--	--	--	--	--
1900–09	6,673,173	137.9	1,324,580	779.5	--	--	--	--	304,000	$112.2	369	32.8	--	--	--	--	29,549,486	$4.8	--	--
1910–19	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
1920–29	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	--	--
1930–39	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	--	--
1940–49	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
1950–59	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
1960–69	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	--	--
1970–79	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	--	--
2013	1,022,987	1,551.9	13,453,367	320,121.0	--	--	--	--	--	--	126,707	245,811.6	665,318	1,157,653	--	--	77,240	0.3	--	--
Other[e]	--	--	--	--	1,438	--	--	--	--	--	--	--	--	--	71,946	17,091.9	--	--	--	--
TOTAL	**44,904,866**	**$11,496.3**	**330,295,964**	**$3,313,204.1**	**40,945**	**$9,910.5**	**11,070,800**	**$6,655.1**	**7,287,700**	**$12,523.5**	**2,737,867**	**$2,992,635.9**	**13,178,226**	**$18,541,743.3**	**673,548**	**$57,333.1**	**1,394,994,184**	**$245.3**	**39,051**	**$3,426.7**

t$ = thousands of dollars m$ = millions of dollars -- = Not reported W = withheld

[a] From published and unpublished state and federal documents. Where state and federal figures differ significantly, state figures are used. Please refer to previous editions of this appendix for year-to-year production information for years 1900 to 1979.

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

[c] 76-lb flask.

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

[e] Not traceable by year

APPENDIX D

Production of industrial minerals, coal, and other commodities in Alaska, 1880-2013[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	--	--	--
2013	1,600,000	56.0	11,622,045	79.6	364,632	5.5	--	--	1,900,000
Other	--	--	--	--	2,300,000[e]	W	79,000	W	--
TOTAL	**76,252,934**	**$1,683.1**	**1,324,183,180**	**$3,396.4**	**152,262,684**	**$935.3**	**856,000**	**$11,417.0**	**$196,662,450**

[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–present).

[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	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	70,278	52,878	17,400
9	Koyukuk district	377,890	377,890	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)	254,265	254,265	0
14	Serpentine district	4,498	4,498	0
15	Port Clarence district	42,358	42,358	0
16	Kougarok district	190,992	190,992	0
17	Nome (Cape Nome) district	5,040,299	5,040,299	0
18	Council district	1,047,042	1,020,042	27,000
19	Koyuk district	84,456	84,456	0
20	Hughes district	399,171	399,171	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	31,202	31,202	0
26	Aniak district	613,220	613,220	0
27	Iditarod district	1,565,136	1,562,206	2,930
28	McGrath district	363,322	133,307	230,015
29	Innoko district	756,033	755,877	156
30	Ruby district	478,008	478,008	0
31	Kantishna district	99,307	91,401	7,906
32	Hot Springs district	603,707	603,707	0
33	Melozitna district	14,570	14,570	0
34	Rampart district	204,845	204,845	0
35	Tolovana district	542,241	542,241	0
36	Yukon Flats district	0	0	0
37	Circle district	1,118,466	1,118,466	0
38	Black district	2	2	0
39	Eagle district	52,157	52,157	0
40	Fortymile district	599,733	599,733	0
41	Chisana district	144,521	78,021	66,500
42	Tok district	288	288	0
43	Goodpaster district	2,474,983	2,051	2,472,932
44	Fairbanks district	14,610,935	8,277,766	6,333,169
45	Bonnifield district	102,053	95,353	6,700
46	Richardson subdistrict of Fairbanks district[c]	121,749	119,449	2,300
47	Delta River district	11,732	11,732	0
48	Chistochina district	186,269	186,269	0
49	Valdez Creek district	532,062	530,481	1,581
50	Yentna district	204,020	204,020	0
51	Redoubt district	105	105	0
52	Bristol Bay Region	1,570	1,570	0
53	Kodiak district (53b)–Alaska Peninsula Region (53a)	112,409	4,809	107,600
54	Homer district	17	17	0
55	Hope & Seward districts	135,230	70,230	65,000
56	Anchorage district[d]	460	460	0
57	Willow Creek district	667,841	58,841	609,000
58	Prince William Sound district	137,802	102	137,700
59	Nelchina district	15,014	15,014	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	9,542,338	82,390	9,459,948
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	**45,394,403 (1,412 tonnes)**	**24,863,263**	**20,531,140**

Total gold production in Alaska by mining district, 1880–2013

[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 1970–2013. 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.
NOTE: Map and table are significantly revised from the incorrect version originally included in Alaska's Mineral Industry 2012 (Special Report 68). An errata sheet for SR 68 is included in the downloadable PDF at <http://dx.doi.org/10.14509/25621>.