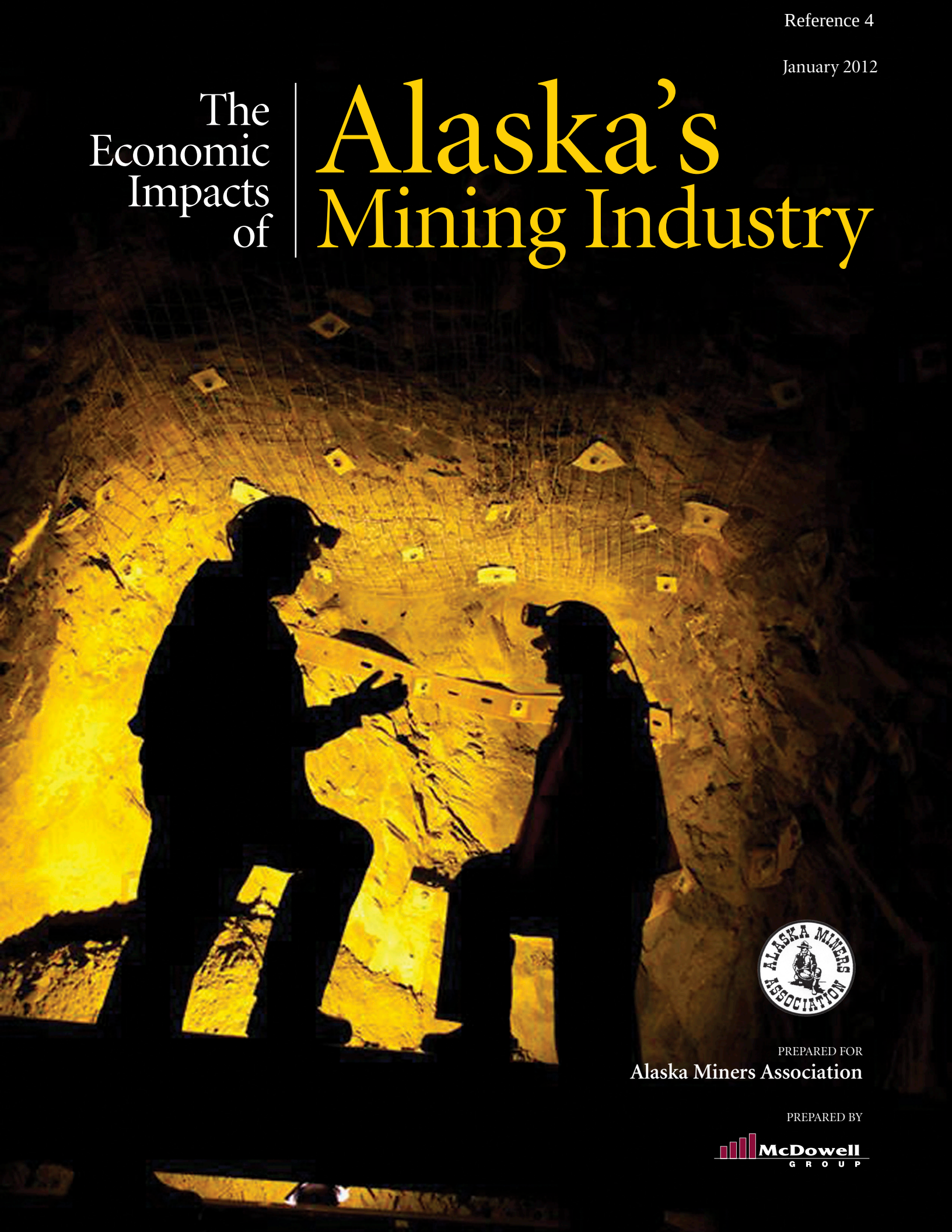
Reference 4

January 2012

The Economic Impacts of Alaska's Mining Industry



PREPARED FOR

Alaska Miners Association

PREPARED BY

McDowell GROUP

The Economic Impacts of Alaska's Mining Industry

Prepared for:

Alaska Miners Association

Prepared by:

Juneau • Anchorage

Juneau Office
9360 Glacier Highway, Suite 201
Juneau, Alaska 99801
(907) 586-6126

Anchorage Office
1400 West Benson Blvd, Suite 350
Anchorage, Alaska 99503
(907) 274-3200

www.mcdowellgroup.net

January 2012

Table of Contents

Executive Summary

The purpose of this study is to measure the economic impact of Alaska's mining industry, which includes exploration activity, mine development and mineral production. The industry produces zinc, lead, copper, gold, silver, coal, as well as construction materials, including rock, sand and gravel. The role of Alaska's mining industry in the state's economy has grown substantially over the past 10 years. In fact, Alaska's hard-rock mining industry employs more full-time, year-round workers today than at any time over the past 50 years. New discoveries coupled with high metal prices have pushed investment in exploration and mine development to record levels. More important than this, however, is the economic benefit this growth offers Alaska and Alaskans. This study examines the direct, indirect, and induced economic impacts of the mining industry in 2010, with some references to 2011. Key findings are summarized below.

Mining Industry Expenditures

Exploration

- Mineral exploration expenditures in Alaska in 2010 totaled approximately $264.4 million. Since 1981, $2.3 billion has been spent in Alaska on mineral exploration programs.
- In 2010, there were 81 significant exploration projects in Alaska, including 34 with expenditures each over $1 million. Just over half of 2010 exploration expenditures (52 percent) were made in Southwest Alaska. The preliminary estimate for 2011 is $300 million.
- Exploration occurred throughout Alaska, though most of the expenditures were focused on six advanced exploration projects: Chuitna (coal), Wishbone Hill (coal), Donlin (gold), Pebble (copper, gold, and molybdenum), Livengood (gold), and Niblack (copper, gold, zinc and silver).

Development

- In 2010, mine development investment in 25 different projects in Alaska totaled an estimated $293.3 million. Significant development expenditures were noted at Red Dog Operations, Fort Knox, Pogo, Rock Creek, Greens Creek, and Kensington mines, and the Chuitna Coal project. Kensington Mine had the most development expenditures in 2010.
- In 2010, 77 percent of the development expenditures were made on gold mining ventures.
- Since 1981, mining companies have invested $2.9 billion on development of Alaska mining projects.
- The preliminary estimate for 2011 development spending is $175 million.

Operations (Production)

- In 2010, Alaska had six major mines in operation, along with at least 227 much smaller, mostly gold placer mines. Greens Creek, Red Dog Operations, Fort Knox, Pogo, and Kensington are Alaska's five major metal mines. Usibelli Coal Mine is Alaska's only operating coal mine. In 2011, Nixon Fork Mine (gold and copper) came back into production, with the mill starting up in July. Alaska's gross mineral production value was $3.1 billion in 2010.
- The preliminary estimate for 2011 gross production value is $3.6 billion.
- In 2010, 227 placer gold mines in Alaska produced 69,318 ounces of gold. Just over half of Alaska's active placer mines are located in the Eastern Interior region. In 2010, the two largest placer mines accounted for 42 percent of all placer production.
- A total of 121 sand and gravel operations, located throughout Alaska, reported activity in 2010.
- In 2010, $1.3 billion worth of minerals were exported to world markets, representing 31 percent of Alaska's total exports of $4.2 billion.

Mining Industry Employment

- Direct mining industry employment in Alaska averaged approximately 4,100 jobs in 2010, accounting for $297.4 million in total annual personal income. This includes workers engaged in production (metals, coal and construction materials), exploration activities, or mine development during 2010. This employment also includes self-employed miners (often found in placer mines).
- Including direct, indirect and induced employment, Alaska's mining industry accounted for approximately 8,200 jobs and $565 million in annual personal income in 2010.
- According to Alaska Department of Labor and Workforce Development, Alaska's metal mines reported annual average employment of 2,000 workers in 2010. These workers had an average annual wage of $100,140 in 2010, more than double the state's all-sector average wage of $47,700.
- Half of Alaska's mining jobs are with gold or silver projects and 20 percent work on base metal ventures. The remaining workforce is found in poly-metallic projects (13 percent), sand and gravel (11 percent), coal (5 percent), recreational mining (1 percent), and rock and peat (both under 1 percent.)

Employment Outlook

- Several advanced exploration projects have potential to dramatically increase Alaska's mining employment over the next several years:
    - Chuitna Coal project on the west side of Cook Inlet will likely create 300 to 350 jobs.
    - Wishbone Hill Coal project will likely employ 100 workers once in production.

- Livengood Gold project, just north of Fairbanks, will likely create 500 mining jobs.
- Donlin Gold project in Southwest Alaska will likely result in 1,000 jobs during mine operations.
- Niblack Project in Southeast Alaska will likely create 200 or more jobs.
- Pebble Project in Southwest Alaska would require an operations labor force of 800-1,000.

Alaska Resident and Rural Alaskan Hire

- Mining industry employees live in 26 out of Alaska's 29 borough and census areas and in at least 120 Alaska communities:
  - Red Dog Operations' employees live in Anchorage, as well as within the Northwest Arctic region villages of Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Selawik, and Shungnak.
  - Donlin Gold employs residents from several Yukon-Kuskokwim communities, where wage paying jobs are scarce.
  - Nearly half (44 percent) of all Pebble Limited Partnership employees live in Southwest Alaska communities, including Iliamna, Newhalen, Kokhanok, Togiak, and others located elsewhere in the Lake & Peninsula, and Bristol Bay boroughs.
  - Of Greeks Creek Mine employees living in Alaska, two-thirds live in Juneau, while the remaining third live in other rural Southeast Alaska communities and elsewhere in Alaska. Kensington Mine also employs workers that reside throughout the Southeast region.
  - Pogo Mine employees reside in 26 Alaska communities.
  - All of Usibelli Coal and Fort Knox workers reside in Alaska.
- According to the Alaska Department of Labor and Workforce Development, 71 percent of mining industry jobs were held by Alaska residents in 2009 (most current information available). While lower than the private sector industry state average resident hire of 78 percent, the industry still has a higher resident participation rates than other key Alaska industries.
- Many of the employment opportunities are high skill jobs for which there are not yet sufficient available resident workers.
- Because of rotation schedules and remote camp operations, many in the industry reside in different boroughs or census areas than where they work. These types of operations allow employees to live in all regions of Alaska, including Alaska's rural regions where few if any other employment opportunities are available.
- The mining industry supports training and workforce development, offering transferable (and often highly marketable) skills in a rapidly growing industry in Alaska and worldwide.

Purchases of Goods and Services

Production Spending

- Alaska's six producing mines in 2010 spent approximately $620 million in support of their operations, of which approximately 70 percent ($500 million) was spent with Alaska vendors providing a wide variety of goods and services.
- Approximately 600 Alaska vendors supplied goods and services to Alaska's operating mines.
    - Of the producing mines' top Alaska vendors, it is estimated that about one-third of the total Alaska spending on goods and services was made with wholesale and retail trade businesses (32 percent), followed by utilities (power) (18 percent), fuel (16 percent), construction firms (15 percent), and transportation firms (13 percent).

Exploration Spending

- Approximately 500 Alaska-based vendors supplied goods and services to Alaska's advanced exploration projects.
    - Professional services made up almost one-third of that in-state spending (31 percent), followed by services (15 percent), transportation (13 percent), and drilling firms (10 percent).

Mining Payments to Local and State Government

Local Government

- Mining companies are the most significant taxpayers in the Northwest Arctic Borough, Fairbanks North Star Borough, Denali Borough, City & Borough of Juneau, and the City of Nome. In 2010, local government tax payments totaled an estimated $14 million, including:
    - Fort Knox paid $4.7 million in property taxes to the Fairbanks North Star Borough, making the mine the largest single property taxpayer in the Borough.
    - Greens Creek Mine paid $1.4 million and Kensington paid $670,000 in property taxes to the City & Borough of Juneau. These two mines are the two largest private property tax payers in the City & Borough of Juneau.
    - Red Dog Operations paid $6.7 million in payment in lieu of taxes (PILT) to the Northwest Arctic Borough and is the Borough's single most important source of revenue. The Borough has no sales tax or property tax revenues. Since 1989, Red Dog Operations has contributed more than $94 million in PILT payments to the Northwest Arctic Borough.
    - Usibelli Coal Mine pays taxes to the Fairbanks North Star Borough, Matanuska-Susitna Borough, and Denali Borough.
    - Alaska Gold Company paid just over $48,000 in real property taxes to the City of Nome.

- In certain jurisdictions, mining companies pay sales taxes on their local purchases of goods and services. For example in Juneau, one mine, Greens Creek Mine paid an estimated $277,320 in sales taxes in 2010.

- Most local governments also receive payments, such as property taxes, where there is production of locally-owned or leased rock quarries, and sand and gravel pits.

State Government

- The mining industry pays a wide variety of taxes, rent, royalties and fees to the State of Alaska, including $43.3 million in mining license fees in 2010. In total, the mining industry paid the State of Alaska $54.9 million in rents, royalties, and fees in 2010.

- A portion of Alaska's mining industry rents and royalty payments are earned on behalf of the Alaska Permanent Fund. If state leases were issued on or before December 1, 1979, 25 percent of these payments are earned for the Permanent Fund; after December 1, 1979, these earnings grow to 50 percent. In 2010, the Permanent Fund earned $5.4 million from the mining industry and $6.8 million was earned in 2011.

- Mining-related activity is an important source of revenue for the Alaska Railroad Corporation. In 2010, the railroad earned approximately $17.9 million from movement of coal destined for Alaska or export markets (14 percent of the railroad's total operating revenue). The railroad also earned $7.3 million (or 5.7 percent of total revenue) moving rock, sand, and gravel.

- In FY2010, the mining industry paid $29.3 million to the Alaska Industrial Development and Export Authority for use of the DeLong Mountain Regional Transportation System and the Skagway Ore Terminal.

- In 2010, the mining industry paid $1 million to the Alaska Mental Health Trust for rents and royalty payments, and construction materials sales on Trust lands.

Mining Industry Partnerships with ANCSA Corporations

Alaska's Native corporations generally benefit from Alaska's mining industry, in the form of jobs for shareholders, business partnerships, and all benefit through 7(i) and 7(j) royalty sharing payments.

Business Development Opportunities

- Two NANA subsidiaries – NMS and NANA Lynden Logistics – play major roles in Red Dog Operations. Other subsidiaries, including NANA/Major Drilling, DOWL HKM, NANA Oilfield Services, NMS Security, NANA WorleyParsons, NANA/Pacific, NMS Training Systems, and NMS Staffing all provide services to Red Dog Operations and others in Alaska's mining industry.

- Chuilista Services, a subsidiary of Calista Corporation, was created to participate in the opportunity to provide camp structures, equipment and personnel in support of the Donlin Gold exploration program.

- Coeur Alaska works with Central Council Tlinglit & Haida Indian Tribes of Alaska and the Berners Bay Consortium, which includes Goldbelt, Inc., Kake Tribal Corporation, and Klukwan, Inc., to provide training, employment and contracting opportunities for Alaska Natives at Kensington Mine.

- Through POWTEC, Heatherdale Resources has trained and employed some 36 local people over the past three years at its Niblack exploration project.

- Pebble Limited Partnership works directly with several village corporations, including Iliamna Development Corporation (IDC), a wholly owned for-profit subsidiary of Iliamna Natives Limited. IDC provides Pebble Limited Partnership with site support services, including food services, housekeeping, transportation, waste disposal (incinerator) and other services, as well as leased space and buildings.

Alaska Native and Shareholder Hire

- At Red Dog Operations, 56 percent of the year-round jobs are filled by NANA shareholders, including jobs with Teck Alaska, NANA Lynden and NMS.

- In 2010, 83 percent of the onsite jobs at Donlin Gold were filled by Calista shareholders.

- Since 2005, Calista Corporation has employed from 12 to 16 shareholders and local residents, including up to four interns, to staff exploration on its Nyac exploration project.

Royalty Payments

- ANCSA corporations are mandated to annually redistribute among all 12 regional corporations 70 percent of net revenue earned on subsurface developments of their lands. These regional corporations then distribute payments to their respective village corporations.

    - As part of a lease agreement, Red Dog Operations pays a net smelter return royalty to NANA, which totaled $146.3 million in FY2010. Of the 2010 royalty payment, NANA redistributed $82 million to the other 11 ANCSA corporations.

    - Since 1989, NANA has received more than $596 million in proceeds from Red Dog Operations, of which $341 million has been distributed to the other ANCSA corporations in 7(i) payments. Half of these 7(i) payments were then redistributed to each village corporation in the form of a 7(j) payment.

    - While some royalties have already been paid to Calista Corporation (and lease payments to The Kuskokwim Corporation), the long-term benefit for Calista Corporation will come from royalties once Donlin Gold is in operation.

ANCSA Mining Potential

- Most of Alaska's ANCSA corporations are evaluating the mineral potential of their lands, ranging from gravel operations to gold, silver, copper, nickel, lead, zinc, platinum, tungsten, manganese, strategic minerals, jade, limestone, and coal deposits.

Other Measures of Economic Impact

- Mining offers additional benefits to the Alaska economy, including:
    - Development of workforce skills that are often transferable to sectors of the economy other than mining.
    - Direct support for student performance (scholarships and internships) and endowments for faculty and research at the University of Alaska.
    - Public and private infrastructure investment that has broad benefit beyond the primary use of a mining venture.

Alaska's Mineral Endowment and the Future of Mining in Alaska

- Although Alaska is effectively unexplored, there are 7,200 known mineral occurrences, not including coal or industrial/construction materials deposits. With this resource potential, and with exploration expenditures in the state totaling $1.3 billion between 2006 and 2010, the mining industry clearly sees a bright future in Alaska. Further, with strong base and precious metals prices, international market conditions are right for further growth in Alaska's mining industry, thus bringing even greater economic benefit to Alaskans.
- With 44 million acres of privately-held land, much of which was selected for its mineral potential, ANCSA corporations and their shareholders will play a key role in future development of the mining industry in Alaska.

Summary of the Mining Industry's Statewide Economic Impact, 2010

Direct Employment and Payroll	
Direct mining industry employment in Alaska	4,100
Direct mining industry payroll in Alaska	$297.4 million
Total Employment and Payroll (direct, indirect and induced)	
Total employment attributable to the Alaska mining industry	8,200
Total payroll attributable to the Alaska mining industry	$565.1 million
Investment	
Total exploration investment in Alaska, 1981-2010	$4.6 billion
Exploration expenditures	$264 million
Development expenditures	$293 million
Government Revenue	
Payments to state government	$109 million
Rents, royalties, taxes	$55 million
Facilities use fees to AIDEA	$29 million
Mining commodity movement to AKRR	$25 million
Payments to local governments	$14 million
Payments to Native (ANCSA) corporations	$146 million
Payments to Alaska Mental Health Trust	$1 million

Map of Alaska's Mining Activity

Introduction

Purpose

Alaska's mining industry is not well understood in terms of its local, regional and statewide economic impact. While the industry has a long history in Alaska, and currently plays a critical role in several local and regional economies around the State, modern mining is a small and developing industry relative to Alaska's major private sector basic industries of oil, seafood, and tourism. The purpose of this study is to describe Alaska's mining industry, its various components and activities, and its impact on Alaska's economy. The study also provides a basis for better understanding of the tremendous future that mining may provide.

Scope

To conduct the analysis, McDowell Group made direct inquiries to Alaska's major mining players (including exploration companies), requesting data on employment, spending, resident hire, shareholder hire, vendor spending, payments to local and state governments, and other activities. Data was also compiled from various public sources, including Alaska departments of Labor and Workforce Development (DOLWD), Natural Resources (DNR), Commerce, Community and Economic Development (DCCED), and the federal Bureau of Economic Analysis (BEA).

This report begins with an overview of the mining industry, including a description of the mining cycle, from exploration through reclamation. A summary of Alaska's mine production activity and advanced exploration projects is also provided.

There is no one public source of data regarding mining employment and payroll. This report also addresses the strengths and deficiencies of the Bureau of Economic Analysis, Alaska Department of Labor and Workforce Development, and Department of Natural Resources, Division of Geology and Geophysical Survey employment data. McDowell Group also provides employment (annual average and W2 tax form data) and payroll information reported directly by the mining companies. A discussion of multiplier effects is presented with estimates of how Alaska's mining industry indirectly affects employment and payroll statewide.

Other measures of economic impacts are discussed, including the industry's payments to local and regional governments, state government, and to Alaska Native corporations.

The economic impact analysis is based on 2010 data; however, some preliminary 2011 information is also presented.

Mining Industry Profile

The mining industry, and the minerals and metals it produces, are an essential component of the average American's way of life. According to the Mineral Information Institute, nearly 5.9 billion tons of minerals and energy fuels had to be produced in 2010 to supply the needs of the U.S., averaging 38,052 pounds of minerals per year for each American.[1] For instance, based on statistics from the U.S. Geological Survey, each year every American used:

- 8,509 pounds of stone to make roads, buildings, bridges, and other construction uses
- 5,599 pounds of sand and gravel to make concrete, asphalt, roads, blocks, and bricks
- 12 pounds of copper in buildings, electrical and electronic parts, plumbing, and transportation
- 11 pounds of lead for transportation, batteries, electrical, communications, and TV screens
- 6 pounds of zinc to make paint, rubber, skin creams, rust resistant metals, and for use in nutrition and health care; and,
- 6,792 pounds of coal to produce energy.[2]

Mining is more than just extracting mineral resources from the earth; it involves reconnaissance exploration, prospect assessment, advanced exploration, pre-development engineering and environmental research, mine construction, production, final reclamation and post-reclamation monitoring. This chapter describes the various phases of the mining "cycle" of activity and some Alaska projects in each phase of this cycle.

The beginning of the mining cycle is exploration, or more specifically, reconnaissance exploration – typically a regional program aimed at defining areas that may be prospective for a specific mineral, and then discovering previously unrecognized mineral deposits with economic potential.

Following discovery comes more focused exploration, sometimes termed target exploration or advanced exploration. This is a process where the deposit is sampled to determine grade and tonnage and the feasibility of profitable mining. It is this stage of mineral resource development that is the most complex. Dozens of constantly changing economic, financial and technical forces influence mine feasibility. Low grades, small tonnages, metallurgical recovery, infrastructure or high costs may mean that a deposit never advances beyond the assessment stage, or it may sit idle for many years until rising metal prices or technological advances help turn the project into a profitable venture.

Many mineral prospects are drilled and sampled, but only one in a thousand ever becomes a mine. For those few prospects where detailed sampling indicates profit potential, the next step is mine permitting followed by mine development (construction). This is when the ore body is prepared for mining, an ore processing mill is constructed and the support infrastructure is developed. In large-scale mine development projects, hundreds of millions of dollars, sometimes billions of dollars, are invested and hundreds of workers employed over a period of several years as the mine is readied for production.

[1] Mineral Information Institute, http://www.mii.org/pdfs/baby.pdf.
[2] Mineral Information Institute, http://www.mii.org/pdfs/percapita.pdf.

Because mineral deposits are finite resources, mining companies are constantly active at all the different stages of the mineral cycle: performing reconnaissance exploration in many areas, drilling and sampling a prospect in another area, perhaps developing a new mine in yet another. Long before one deposit is depleted and the mine closes, the successful mining company is prepared to begin production at other deposits. This is the mineral cycle.

Following is a more detailed description of mineral exploration, mine development and production, with information on Alaska projects at various stages of the mineral cycle.

Reconnaissance Exploration and Advanced Exploration

Mineral exploration has become increasingly sophisticated in recent years, with reconnaissance exploration programs often beginning with analysis of satellite or high altitude aerial photographs covering broad areas. Depending on the target minerals, airborne geophysical surveys are employed over large tracts of land. Geochemistry plays an important role in mineral exploration today. Chemical analysis of stream sediment and soil samples allow mining companies to preliminarily test mineral potential without actually sampling the underlying bedrock.

With discovery comes the sometimes lengthy and costly process of determining if a prospect can be profitably and safely mined. Drilling, sampling, engineering, metallurgical analysis, financial analysis, and baseline environmental analysis are all part of the effort to determine if profitable and environmentally responsible mining is possible. Modern mines are designed from the start to prepare for ultimate closure.

Ore grade, tonnage, and mineral/metal prices are critical in determining mine feasibility. But so are costs: the cost of preparing the ore body for mining, building a mill (concentrator), mining a ton of ore, and crushing, grinding, and refining a product from that ton of ore. Inherent in all these costs are labor, electric power, shipping supplies to the mine site, tax burdens, acquiring the necessary permits to develop a mine, and the cost to reclaim the mine after closing down production.

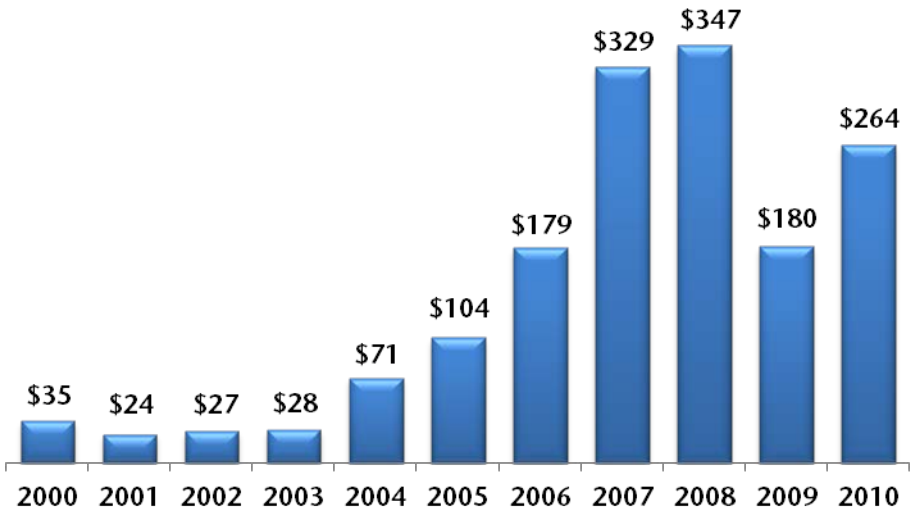
Exploration in Alaska

Each year, millions of dollars are spent in Alaska searching for and evaluating mineral deposits. According to the State of Alaska's Division of Geological and Geophysical Surveys (DGGS), exploration expenditures in Alaska in 2010 totaled approximately $264.4 million. Since 1981, mining and exploration companies have spent $2.3 billion in Alaska on mineral exploration programs.

In 2010, there were 81 significant exploration projects in Alaska, including 34 projects each with expenditures for the year of over $1 million. Most of this exploration funding came from Canadian and other international sources. Mining ventures explored for gold, copper, nickel, silver, lead, zinc, platinum, diamonds, molybdenum, and coal (as well as construction minerals).

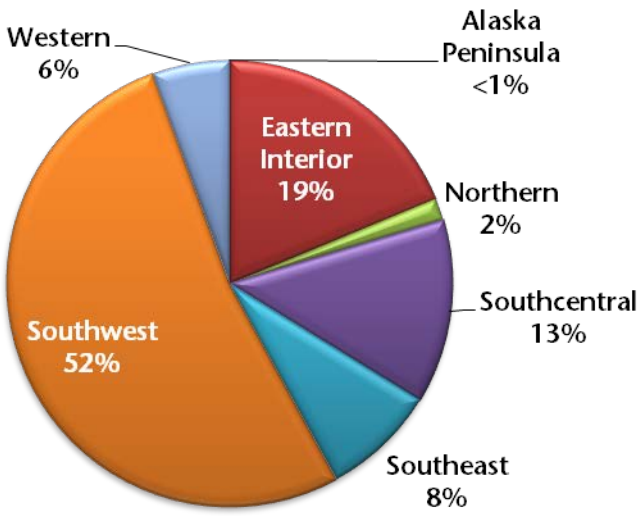
Increased exploration expenditures in Alaska generally followed worldwide trends. With the increase in mineral commodity prices in 2010, there was expanded venture capital available for mineral exploration. As exploration heated up in 2010, supply shortages in available helicopters, drill rigs, other equipment, and professional support were noted. These trends have continued into 2011 with exploration expenditures reaching $300 million.

Exploration Expenditures in Alaska, 2000 – 2010 ($million)



Source: *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.

Exploration Expenditures in Alaska, by Region, 2010



Source: *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.

Exploration occurred throughout Alaska, though most of the expenditures were focused on six advanced exploration projects:

- Chuitna Coal, a coal project currently in the permitting process stage, located in Southcentral Alaska
- Wishbone Hill, a coal project currently in the feasibility study state, located in Southcentral Alaska
- Donlin Gold project located in Southwest Alaska
- Pebble copper-gold-molybdenum porphyry project in Southwest Alaska
- Livengood gold project located in Interior Alaska
- Niblack volcanogenic massive sulfide poly-metallic project in Southeast Alaska

CHUITNA (COAL)

PacRim Coal LP is developing the Chuitna Coal Project, located 45 miles west of Anchorage on the western side of Cook Inlet. The project targets development of 300 million tons of sub-bituminous coal (though the area's coal fields contain an estimated 1 billion tons of sub-bituminous coal). A supplemental environmental impact statement is under review. The current project design includes a minimum 25-year mine life with a production rate of up to 12 million metric tons a year, employing 300 to 350 workers.[3]

WISHBONE HILL (COAL)

The Wishbone Hill area, located near Sutton, has a long history of coal mining dating back to the early 1900s. Usibelli Coal Mine (UCM) has worked to develop Wishbone Hill since 1997 and has maintained all necessary permits and leases. In 2010, UCM initiated a feasibility study (completed in November 2011), including a study of the construction of an exploration trail to the property, limited confirmation drilling and sampling, analysis of transportation options, updates to project permits, and gathering of environmental information. The study is based on 6 million tons of reserves identified in Mine Areas 1 and 2, with 500,000 tons produced annually for approximately 12 years. Depending on the results of the study, the earliest the mine could be operational is 2012.[4]

According to a study produced by the University of Alaska Anchorage, approximately 93 new direct jobs will be created during the mine's operation with a total employment impact of 145 direct, indirect, and induced jobs and a total payroll of $7.8 million.[5]

[3] http://dnr.alaska.gov/mlw/mining/largemine/chuitna/index.htm.

[4] http://www.usibelli.com/wishbone-brochure-web.pdf.

[5] *Socioeconomic Impacts of Potential Wishbone Hill Coal Mining Activity*, ISER, UAA, June 2010, http://www.iser.uaa.alaska.edu/Publications/wishbone_hill_impacts_final.pdf.

DONLIN GOLD

The Donlin Gold Project is a joint venture between NovaGold and Barrick Gold Corporation. The advanced gold exploration project is located approximately 280 miles by air from Anchorage in Southwest Alaska, about 12 miles north of the Kuskokwim River near the small community of Crooked Creek. The Donlin Gold property is under lease agreements with Calista Corporation for the sub-surface rights and The Kuskokwim Corporation for the surface rights. In 2010, there was an average of about 28 workers employed on the project. Should the mine be developed, preliminary estimates for Donlin Gold's operations could total 1,000 jobs. A mine life of 27 years is anticipated.[6] Donlin Gold has the potential to become one of the world's largest gold-producing mines.[7]

In 2010, approximately $43 million was spent on completing studies, including an assessment of the potential to bring natural gas to the project. Feasibility analyses have been completed, and pending board approval, the permitting process could be initiated for the Donlin Gold project by April 2012. The permitting process will likely take at least three years. Once the permits are in hand, construction is expected to take four years and $6.7 billion, including $834 million for a natural gas pipeline from Cook Inlet to the mine.

PEBBLE PROJECT (COPPER-GOLD-MOLYBDENUM)

Since 2002, more than $400 million has been spent on the Pebble Project in southwestern Alaska to study a potential world-class copper deposit, carry out baseline environmental and socio-economic studies, and perform geotechnical work and project engineering. Northern Dynasty Minerals and Anglo-American PLC (which operate in Alaska as the Pebble Limited Partnership) own the Pebble Project. Approximately $132 million of this investment has been made in environmental and socioeconomic research and analysis. In 2010, Pebble Limited Partnership spent $73 million to advance the project. Studies are currently underway to determine feasible operating models, investment requirements, and potential labor needs. Should mine development prove feasible, a capital investment of several billion dollars would be required. Estimates suggest an operating labor force of 800-1,000 workers would be required.

The project is already having a substantial economic impact in Alaska and in the Bristol Bay and Lake & Peninsula regions. A number of Alaskans were employed in some capacity on the project, ranging from scientific and engineering services to camp support personnel. On average, Pebble Limited Partnership directly employed 40 people in 2010. Approximately 496 individuals from more than 50 different companies worked on the project in 2010. Of the total 2010 workforce, 74 percent were Alaskans, including 134 people from 17 local Bristol Bay/Lake & Peninsula communities.[8]

[6] McDowell Group estimates.
[7] "NovaGold Year-End Financial Results and Project Update, http://www.novagold.net/index.asp.
[8] Pebble Limited Partnership email correspondence.

LIVENGOOD (GOLD)

The Livengood gold deposit is located 70 miles north of Fairbanks. The property has been prospected, explored and placer mined by several companies and private individuals since the first discovery in 1914. In 2006, International Tower Hills acquired the property from Anglo Gold. Drilling programs since 2007 have expanded the deposit to become one of the largest new discoveries of gold in Alaska. Approximately 4.9 million ounces of gold are indicated or inferred.[9] It is expected that more ounces will be defined by further drilling.

In 2009, baseline environmental studies began, including studies of surface water quality, stream fauna, fish tissue chemistry, and wetlands delineation. In June 2010, pre-feasibility studies were initiated. These studies are expected to be completed by early 2012.[10] If the mine is developed, 500 production jobs are expected.

NIBLACK (COPPER-GOLD-ZINC-SILVER-LEAD)

The Niblack deposit supported historic underground mining operations from 1905 to 1908, producing about 20,000 tons of ore. Active exploration began again in the 1970s, with ramped up activity in 2005 when Niblack Mining Company acquired the historic gold producer, which is located 27 miles southwest of Ketchikan on Prince of Wales Island. In 2008, CBR Gold Corporation acquired the property and in 2009, Heatherdale Resources Ltd. (an affiliate of Hunter Dickinson) attained the right to retain a 51 percent interest by expending $15 million and an option to acquire up to a 70 percent interest by spending an additional $10 million and completing a feasibility study.[11] Before Heatherdale's involvement, prior operators spent $41 million on the property. Since 2009, Heatherdale has spent $27 million (about $1.2 million each month), and drilled an additional 185,000 feet to develop a new resource estimate. Heatherdale recently negotiated a 100 percent friendly acquisition of its joint venture partner.

According to the most recent estimates, the Niblack deposit contains 4.1 million tons of indicated resource containing 103 million pounds of copper, 308,000 ounces of gold, 207 million pounds of zinc, and 5.1 million ounces of silver. Resource estimates also include another 2.5 million tons of inferred resource containing 67 million pounds of copper, 142,000 ounces of gold, 126 million pounds of zinc, and 2.1 million ounces of silver.[12]

Currently, the on-site infrastructure includes 1.5 miles of road, 3,300 feet of underground development, a water treatment plant, and a dock and barge camp. In 2011, two drill rigs were operating year-round. Thirty-six employees (including contractors) live on-site, with 17,000 person-days accumulated since August 2009. As of August 2011, 73 percent of Niblack's hires were Alaskan.[13] Preliminary economic assessments indicate Niblack may have a minimum 10-year mine life.

[9] Resource estimation summary April 2011 (at 0.3g/t gold cutoff). http://www.ithmines.com/project/livengood_alaska/.
[10] Approximately $37.5 million is expected to be spent in 2011 for the continuation of exploration, definition and condemnation drilling and for technical studies to produce the pre-feasibility study. http://www.ithmines.com/project/livengood_alaska/.
[11] http://www.cbrgoldcorp.com/project_areas/united_states/niblack/.
[12] http://www.heatherdaleresources.com/hdr/Home.asp.
[13] Patrick Smith, Heatherdale Resources, presentation to RDC of Alaska conference, November 17, 2011.

OTHER EXPLORATION PROJECTS

Significant spending (more than $1 million) on exploration was made on a number of other projects in 2010 and 2011, including Whistler Project (Kiska Metals Corporation), MAN Project (Pure Nickel Inc.), Chisna Project (Ocean Park Ventures), Kugruk Project (TintinaGold Resources, Inc.), Palmer Project (Constantine Metal Resources Ltd.), Lucky Shot (Harmony Cold Corporation), Bokan Mountain (Ucore Rare Metals Inc.), 40 Mile Project (Full Metal Minerals), Tetlin (Contango ORE Company), Bluff Project (Millrock Resources Inc.), Ambler Project (NovaGold Resources), Vinasale Project (Freegold Ventures), Raintree West Project (Kiska Metals Corporation), Council Project (Millrock Resources Inc.), Kelley Creek (Cedar Mountain Exploration), and Big Chunk (Northern Dynasty Minerals Limited). Information is provided below on a selected group of exploration projects and the nature of their activity during the 2010 exploration season. Most of these projects had activity in both 2010 and 2011.

Exploration Activity, by Selected Alaska Projects, 2010

Project/Deposit	Company	Nature of Work	Camp	Workers	Season
Chisna	Corvus Gold	Drilling, geophysics, surface mapping	Yes	30	May-September
Ambler*	NovaGold Resources	Fieldwork & drilling	Yes	18	June-September
Golden Summit*	Freegold Ventures	Geophysical	No	10	May-October
Groundhog*	Kennicott Exploration	Ground geophysical, geologic mapping	No	12	July-August
Palmer	Constantine Metal Resources	Diamond drilling, geophysical survey (surface & down holes)	No	20-25	May-Mid September
MAN*	Pure Nickel	Drilling & geophysical	Yes	25	June-mid-September
Bokan Mountain*	Ucore Rare Metals	Drilling, geological mapping, underground permitting	Yes	20-40	Late July-October
40 Mile/Rolling Thunder/Tanacross*	Full Metal Minerals	Drilling & surface exploration (mapping, sampling)	Yes	22	May-September
Whistler*	Kiska Metals Corporation	Geophysics, drilling	Yes	50	March-October
Unga*	Full Metal Minerals	Drilling & surface exploration (mapping, sampling)	Yes	15	May-September
Circle*	Full Metal Minerals	Drilling & surface exploration (mapping, sampling)	Yes	9	May-September
Pyramid*	Full Metal Minerals/ Antofagasta	Drilling & surface exploration (mapping, sampling)	Yes	24	May-September
Bluff*/Estelle*/Humble*/ Moosehorn*/Council*/ Uncle Sam*/ MonteCristo*/Revelation* Napoleon*/40 Mile*	Millrock Resources	Prospecting, geological surveying, geochemical surveying, geophysical surveying, diamond drilling	Yes (Bluff/ Council/ Monte Cristo/ Revelation)	30	May-October

* Indicates there was also exploration activity in 2011.
Source: Individual exploration company data.

Mine Development and Construction

Millions of dollars spent on regional exploration and millions more spent on assessing a handful of prospects may finally identify a mineral property that can be profitably mined. Ten or more years may elapse between discovery and development, but 15 years is more typical (for example, the Greens Creek Mine near Juneau was discovered in 1975, and went on-line in 1989.) Some prospects see decades of intermittent assessment work, conducted by a succession of different owners, before final development occurs. New technology, expanded reserves, new mining models, and changing market conditions often help turn once uneconomic deposits into successful mines.

The process of mine construction involves the building of a mill or concentrating plant – a facility to separate the valuable metals from the surrounding rock. These facilities typically include mechanical (crushing, grinding, gravity separation) and/or chemical processes to separate the metals from the rock. In some cases a "concentrate" is produced, which is shipped to a smelter where final processing occurs and a metal product is generated. The Greens Creek Mine, for example, produces three types of concentrates containing silver, gold, zinc, and lead. These concentrates are shipped to several smelters around the world for final processing. Other mines produce a final or near-final metal product on site.

The mine construction effort also includes support facilities, which may involve transportation infrastructure (roads, docks, or airstrips, depending on the location of the mine), tailing disposal facilities, power generating plants if no outside power source is available, and office and lab structures for the mine's managers, engineers, and geologists. For remote mines, facilities are required to house and feed the mine's workforce.

Mine development includes the process of preparing the ore body for mining: for underground mines, driving tunnels from the surface (adits), sinking shafts, driving access and ventilation raises, and accessing ore blocks with crosscuts and other tunnels. For surface mines, development may include stripping overburden and removing overlying waste rock. Mine development expenditures also include the purchase of mining equipment such as drills, loaders, trucks, etc.

Major mine development can be very costly and even more so in Alaska, where climate, lack of infrastructure and vast distances pose special challenges. For example, nearly a billion dollars have been invested in initial and subsequent development of the Red Dog mine, including the transportation infrastructure. Half a billion has been invested in the Fort Knox Mine, near Fairbanks.

Mine development often continues after production has begun. Developing additional ore bodies, expanding mill facilities, and other investments may be made to enhance or prolong mine operations.

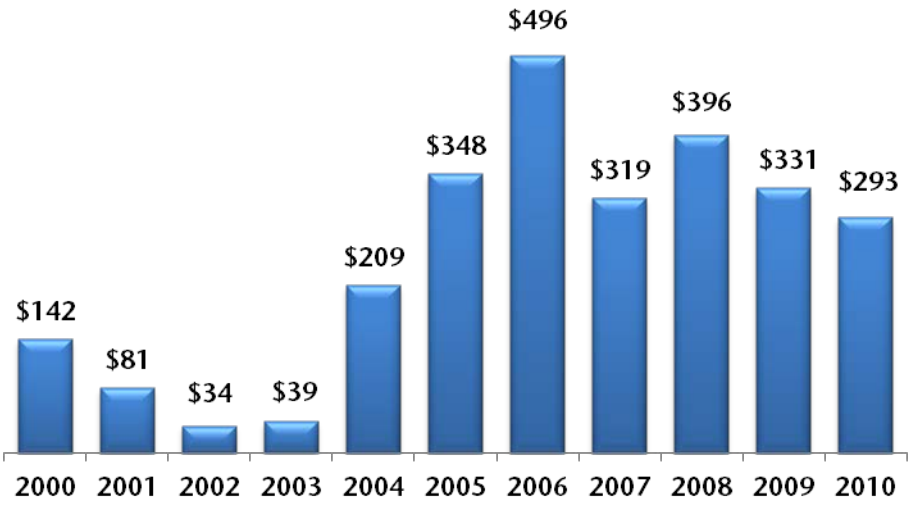
Alaska Mine Development Projects

In 2010, mine development investment in Alaska totaled an estimated $293.3 million. Twenty-five projects reported development expenditures in 2010. Significant development expenditures were noted at Red Dog Operations, Fort Knox, Pogo, Rock Creek, Greens Creek, and Kensington mines and the Chuitna Coal project. Kensington Mine was the largest development project in 2010. Placer mines across Alaska also reported maintenance and development expenditures.[14] Examples of other major capital projects include:

- Red Dog Operations – $20 million for tailings dams and $22 million on other sustaining capital projects.
- Fort Knox – $88 million to complete construction of the second stage of its heap leach facility and start construction on the third stage, complete a new access road, completed construction of its maintenance shop, excavation of the tailings dam, improvements to the mill, and reclamation work at True North.
- Pogo – Improvements to the all season access road, demolition of the old exploration camp and construction of a new core shack and other mine improvements.
- Greens Creek – $16 million to rehabilitate, replace, and enhance surface and underground equipment and infrastructure.

Investment in mine development in Alaska can be variable year to year, depending on if a new mine is being constructed, or if most investment is related to enhancements at existing mines. Since 1982, mining companies have invested $4.3 billion on development of Alaska mining projects.[15] The preliminary estimate for 2011 development spending in Alaska is $175 million.

Mine Development Expenditures in Alaska, 2000 – 2010 ($million)

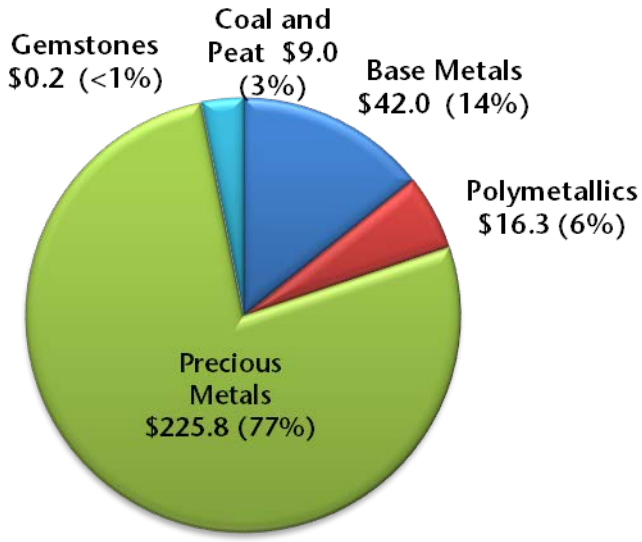


Source: *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.

[14] *Special Report 65, Alaska's Mineral Industry,* DGGS/DCCED.
[15] Ibid.

In 2010, 77 percent of the development expenditures were made on gold operations (see figure below).

Mine Development Expenditures in Alaska, by Commodity, 2010 ($million)



Source: *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.

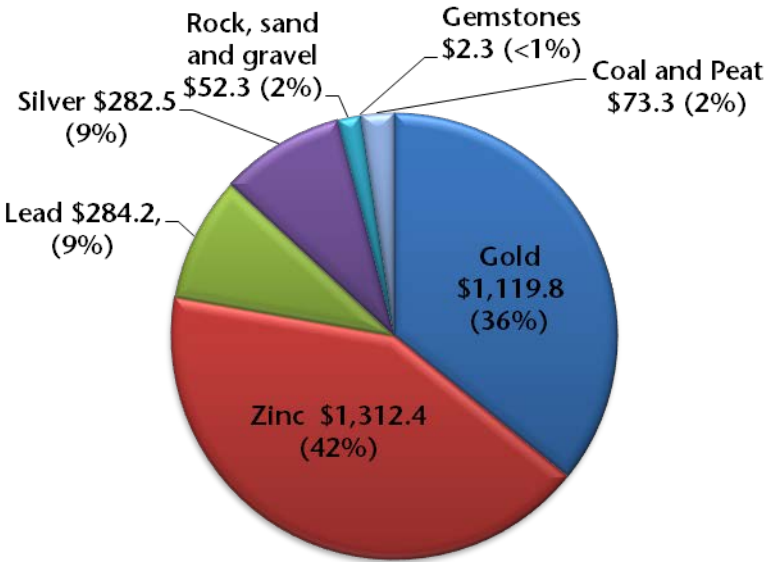
Production (Mine Operations)

With mine development and construction complete, production can begin. The production phase of the mineral cycle can last from a few years to several decades, depending on production rates, the size of the ore body and market conditions. The life of a mine can be longer or shorter than anticipated. Increasing metal prices, improved technology, lower costs of production factors such as fuel or electric power can all add years to the life of a mine. Conversely, technical difficulties, falling metal prices, or increasing production costs can force temporary closure or prematurely end the life of a mine.

Operating Mines in Alaska

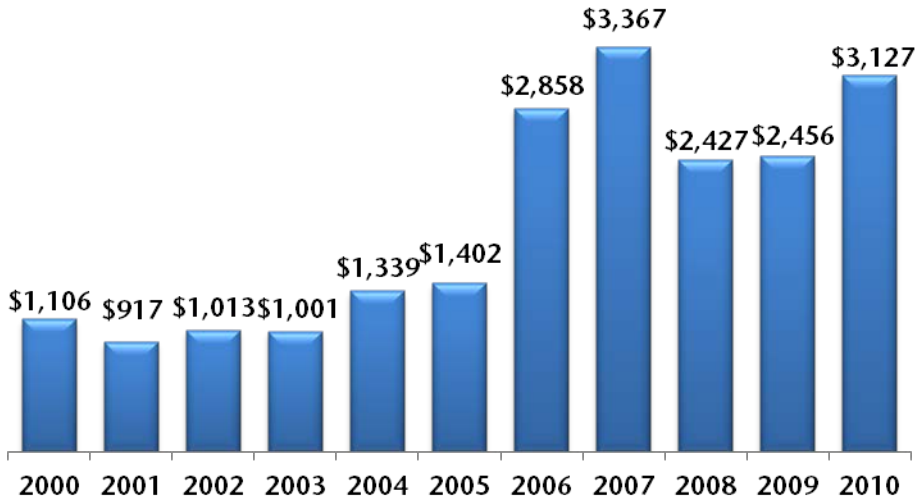
Zinc accounts for close to half of mineral production value in the state (42 percent in 2010). Gold ranks second in terms of production value (36 percent of the total in 2010), while lead and silver production each accounted for about 9 percent of the total Alaska minerals production value. All metals combined accounted for 95 percent ($3.0 billion) of the total value of mineral production in 2010. Including non-metal mining, the gross production value of Alaska's mining industry in 2010 was $3.1 billion. The preliminary estimate for 2011 is $3.6 billion.

Mining Production Value in Alaska, by Commodity, 2010 ($million)



Source: *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.

Mining Production Value in Alaska, 2000 – 2010 ($million)



Source: *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.

These estimates of the value of Alaska mineral production are based on global prices for refined metal products. The value of Alaska's production as it leaves the state is lower, because much of metal is contained in concentrates rather than a refined form. Export data provides a partial measure (not all of Alaska's precious metal production is exported) of the value of Alaska mineral production as it leaves Alaska.

In 2010, $1.3 billion worth of minerals were exported to world markets, representing 31 percent of Alaska's total exports of $4.2 billion.[16]

[16] International Trade Administration, U.S. Department of Commerce.

In 2010, Alaska had six major mines in operation, along with another 200 much smaller, mostly gold placer mines. Greens Creek, Red Dog Operations, Fort Knox, Pogo and Kensington are Alaska's five major metal mines. Usibelli Coal Mine is Alaska's only operating coal mine.

Metal Mines

Greens Creek Mine

Greens Creek is an underground silver, gold, lead, and zinc mine located on Admiralty Island, 15 miles southwest of Juneau. The Greens Creek mill produces three separate concentrates, which are shipped to various smelters around the world for further processing. The mine has sufficient reserves for at least ten more years of operations. Since the mine began operating in February of 1989, Greens Creek has defined new reserves each year to replace thoses mined. Most mine employees live in Juneau and commute via boat and bus to the mine on a daily basis. The Greens Creek Mine, owned by Hecla Mining Company, employed an annual average of 338 workers with total estimated annual payroll of $32.7 million in 2010.

In 2009, Greens Creek was the U.S.'s 20th largest gold mine, sixth largest producer of lead, and second largest producer of zinc and silver.[17]

Red Dog Operations

Red Dog Operations is an open-pit zinc, lead, and silver mine located 90 miles north of Kotzebue and 55 miles inland from the Chukchi Sea. It is the world's largest zinc producer, both in terms of reserves and annual zinc production. Red Dog Operations is owned and operated by Teck Resources, and is located on property owned by NANA Regional Corporation. Red Dog Operations directly employs an average of 471 year-round workers (not including contractors), with approximately $35.8 million in total annual wages. In 2010, Red Dog began mining the Aqqaluk deposit which is adjacent to and adjoins the main deposit, extending the mine's proven and probable reserves and its mine life to 2031.

Construction of Red Dog Operations began in 1986 with production commencing December 1989. The mine required construction of a 60-mile access road from a port site on the Chukchi Sea. While ore is mined year-round, the concentrate produced is stored for shipment at the port and shipped during the summer months when waters are ice-free and navigable. Red Dog Operations is the most capital-intensive mining project in Alaska with original construction costs and subsequent investments totaling more than $550 million, plus an additional $265 million invested by Alaska Industrial Development and Export Authority (AIDEA) in the road and port.[18]

In 2009, Red Dog Operations was the U.S.'s top producing mine for silver, zinc, and lead.[19] According to NANA Regional Corporation, Red Dog's production represented 73 percent of US zinc production in 2010 and 4.4 percent of global zinc production.[20]

---

[18] Email correspondence, Brenda Applegate, AIDEA, December 5, 2011.
[19] U.S. Department of Interior, U.S. Geological Survey *2009 Mineral Yearbook.*
[20] PowerPoint presentation by Lance Miller, NANA to the Resource Development Council of Alaska, October 20, 2011.

During the 2010 shipping season (ending in October), Red Dog Operations shipped 1.1 million tons of zinc concentrate and 259,043 tons of lead concentrates.[21] Teck expects Red Dog Operation's 2011 production to be approximately 612,000 tons of zinc concentrate and 94,000 tons of lead in concentrate. Approximately two-thirds of the mill feed will be from the Aqqaluk deposit.[22]

Fort Knox

Fairbanks Gold Mining Inc. (a wholly-owned subsidiary of Kinross Gold Corporation) operates the Fort Knox Mine, which opened in 1996. Fort Knox is an open-pit gold mine located about 24 miles northeast of Fairbanks. It is Alaska's second largest gold mining operation in terms of annual gold production. Fort Knox has proven and probable reserves sufficient to feed the mill until 2015.

Construction of the Fort Knox Mine and mill was completed at a total cost of approximately $375 million. Since initial mine development, over half a billion dollars has been invested in the mining project. In 2010, Fort Knox spent over $88 million on completion of their heap leach, carbon-in-column plant, a new mobile maintenance shop and new equipment.[23] Fort Knox had an annual average direct employment of 502 workers in 2010, making it the fifth largest private sector employer and the tenth largest employer overall in the Fairbanks North Star Borough (FNSB). In 2009, Fort Knox was the U.S.'s eight largest gold mine in terms of output.[24] In 2010, Fort Knox reached the 5 millionth ounce of gold production.

All Fort Knox employees live in the FNSB with total payroll at $45.3 million in 2010. Fort Knox spent $171.4 million with approximately 400 private sector vendors in Alaska, representing 62 percent of its total spending on goods and services (both in and outside Alaska) in 2010.[25] In a recent study by McDowell Group, it was estimated that Fort Knox Mine-related direct and indirect employment statewide totaled 1,050 jobs in 2010 with a total payroll of $86 million.

Pogo Gold Mine

Pogo Mine is an underground gold operation about 90 miles southeast of Fairbanks in the Delta Junction area. The Pogo deposit was discovered in 1994, with production starting in 2006 following an investment in mine development of over $350 million. In 2009, the mine reached a production milestone of one million ounces of gold. Sumitomo Metal Mining Co. Ltd. and Sumitomo Corporation purchased Teck Resources Ltd.'s 40 percent interest in the Pogo Gold Mine in 2009. Sumitomo Mining now owns 85 percent and Sumitomo Corporation owns 15 percent of Pogo. The mine employed an annual average of 311 workers paying $36 million in wages and salaries in 2010.

Pogo was the seventh largest gold mine in the U.S. in 2009.[26]

---

[21] *Special Report 65, Alaska's Mineral Industry,* DGGS/DCCED.
[22] Ibid.
[23] Email correspondence with Lorna Shaw, Fort Knox Mine (September 28, 2011).
[24] U.S. Department of the Interior, U.S. Geological Survey *2009 Mineral Yearbook.*
[25] McDowell Group, *Socioeconomic Impacts of the Fort Knox Mine,* October 2011.
[26] Ibid.

Kensington Mine

Coeur Alaska, a subsidiary of Coeur d'Alene Mines Corporation, operates the Kensington Gold Mine, located about 45 miles north of Juneau in Southeast Alaska. Juneau is the principal service and supply center for the underground mine and home to most of the operation's labor force. The company started developing the mine in 2005 and after permitting-related delays started production in July 2010. The mine employed an annual average of 148 workers (not including contractors) with a payroll of $15 million in wages and salaries in 2010. After the mine ramps up to full production, it expects to employ 200 full-time, year-round workers. Coeur's total investment in the Kensington project through 2010 is more than $330 million. In 2010, capital expenditures at Kensington were $93 million. Kensington has an anticipated mine life of ten years with potential for defining additional reserves.

In the fall of 2011, Coeur d'Alene Mines announced it will reduce ore production at the Kensington gold mine by up to 50 percent for six months to allow for new construction that will improve efficiency and consistent performance at the mine.[27] Projects that are planned include completing the underground paste backfill plant, conducting more definition and exploration drilling, and completing the construction of several surface facilities such as a new dormitory and dining facilities.

Nixon Fork Mine

Mystery Creek Resources, a subsidiary of Fire River Gold Corporation, reopened the underground Nixon Fork Gold Mine, near McGrath. Production started in July 2011 and will be at full production levels by the end of 2011. Mining and development activities are at full capacity, which includes 90 on-site employees. A $3 million surface drill exploration program will occur on the 11,000 acre Nixon Fork property in 2012 and will serve to expand the current resource and identify additional mining targets.[28]

Previous owners included Nevada Goldfields Inc. (1993-1999) and St. Andrew Goldfields Ltd. (2003-2008). Between 2004 and 2008, St. Andrew Goldfields Ltd. spent more than $50 million on upgrades to the processing facilities. In 2009, Fire River Gold Corporation purchased the mine for $3 million. Fire River Gold plans on producing 50,000 ounces of gold per year. Currently, the mine life is approximately four years.

PLACER MINING

"Placer mining" is defined as a type of mining that removes valuable minerals such as gold, platinum, and precious stones from unconsolidated detrital material. Placer deposits are formed when the host rock is eroded over millions of years, and minerals are transported and concentrated by rivers and streams.

Archeological records have shown that Alaska Natives were the earliest miners in Alaska, extracting copper, marble and other materials. But placer mining is the oldest form of mining by Western inhabitants in Alaska. The first placer coal was mined on the Kenai Peninsula during the later 1840s and 1850s by the Russians. The earliest gold prospectors were also the Russians who discovered gold at Hope and on the Russian River in 1849.

[27] http://www.alaskajournal.com/Alaska-Journal-of-Commerce/AJOC-November-6-2011/Kensington-Mine-near-Juneau-will-curtail-production-to-make-improvements/.
[28] http://www.firerivergold.com/s/NewsReleases.asp?ReportID=491762&_Type=News-Releases&_Title=Fire-River-Gold-Corp.-Report-on-Nixon-Fork-Mine-Project.

The first significant discovery of placer gold was near Juneau with later discoveries along the Yukon River near Rampart, Fortymile River, and Circle. At the turn of the 20th century, placer deposits were discovered at Nome and Fairbanks. With the introduction of large-scale cold water thawing, hydraulic stripping, and mechanized excavation, Alaska became a leading gold producing state with a yield of nearly 750,000 ounces of gold in 1940, most of which came from placer mines.

However, gold mining was shut down during World War II by Presidential Order. After the war, the industry failed to recover due to rising operating costs and fixed gold prices. Most placer mining was discontinued by the 1960s. With the lifting of gold ownership restrictions and abandoning of a fixed price in the 1970s, gold production rose dramatically. By 1982, there were more than 500 placer mines statewide (including recreational mines) producing 174,900 ounces of gold worth $70 million.

The fluctuation of gold prices continues to affect the level of gold placer production in Alaska. For instance, gold prices saw a marked improvement in the late 1970s peaking at over $800 per ounce in 1980, followed by a gradual but fluctuating decline to $256 per ounce in 2001. With the fall in prices, the number of operating family-run placer mines dropped to 42. However, for the past several years, the price of gold has steadily improved, averaging $1,224.53 per ounce by 2010.[29] By that year, it was estimated there were 227 placer gold mines in Alaska producing a total of 69,318 ounces of gold (compared to 234 mines operating in 2009.)[30] Just over half of the state's active placer mines (120 placer operations) are located in the Eastern Interior region. In 2010, the two largest placer mines accounted for 42 percent of all placer production.

ALASKA'S NON-METAL MINES

Usibelli Coal Mine

Usibelli Coal Mine, operating continuously since 1943, is located in Interior Alaska near the community of Healy and is Alaska's only operating coal mine. The mine produced an all-time high of 2 million tons of coal in 2010, with much of that production used to generate about 40 percent of Interior Alaska's electricity from six power plants. Half of Usibelli's coal production is exported to overseas markets, primarily South Korea, setting a record 1.1 million tons of coal exported in 2011. The mine employed 127 workers in 2010 and 138 workers in 2011.

Rock, Sand and Gravel

Rock, sand and gravel deposits are being mined in most Alaska communities, supporting road, airstrip, and other commercial, industrial, and residential construction projects throughout Alaska. Some of the operations are quite small, ranging from small gravel pits serving village communities to large quarries and gravel pits found closer to the larger population centers along the Alaska Railbelt. For instance, some of the larger gravel pit operations are found in Anchorage, Palmer, Wasilla, and Fairbanks.

Annual rock, sand and gravel production is often a reflection of trends within the construction market. For example, production dipped in the mid-1980s and mid-1990s, and peaked in the late 1990s, reflecting booms and declines in Alaska's housing, industrial and commercial construction markets.

[29] www.Kitco.com.

[30] *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED. 2010 estimates provided by the DGGS and DCCED.

It was estimated that 7.0 million tons of sand and gravel was processed in 2010.[31] With an estimated average value of $6.85 per ton, the total value of sand and gravel production was $48 million. There were 121 sand and gravel operations reporting activity in 2010; it is difficult to know a complete count as many of the operations are small and infrequently operated.

Rock production in Alaska in 2010 was estimated to be greater than 0.3 million tons.[32] This includes shot rock, crushed stone, D-1, riprap, and modest quantities of ornamental stone. With an estimated unit value of $14.38 per ton, the total value was estimated to be at least $4.3 million in 2010.

RECREATIONAL MINING

"Recreational mining" is defined as amateur, casual, short-term mining for placer gold using non-mechanized equipment, such as a gold pan or a small, backpackable sluice box, metal detector or rocker-box. In specific areas, small suction dredges and/or metal detectors may be used. It is typically conducted on private and public properties designated for such purposes and may involve a fee. Recreational mining opportunities are expanding rapidly and are documented throughout most of Alaska.[33] Generally, after paying the state mining license tax, the visiting miners are allowed to keep the gold they find or participate in a venture where recovered gold is split equally amongst the participants.

Recreational mining operations range from gold-panning activities attracting several thousand tourists spending $15 and a few hours to find some gold flakes to operations where a few hundred people spend as much as $2,750 per week (including equipment, room and board) for as long as two months looking for more significant rewards for their efforts.

Based upon interviews with recreational mine operators, at least 800 people traveled to Alaska to primarily participate in recreational mining, amounting to at least 1,000 miner-weeks of annual recreational mining at the remote pay-to-mine camps. Several thousand miner-weeks are also estimated to occur at highway accessible sites near Anchorage and Fairbanks. No attempt has been made to estimate the number of recreational miners visiting Federal and State designated gold panning areas, but it is likely to exceed the number visiting commercial sites.

Though no specific data is available, the total economic impact of recreational mining in Alaska likely exceeds several million dollars, including payments to private owners and spending on transportation, accommodations, food, services and supplies.

[31] *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.

[32] Ibid.

[33] The Recreational Miners Association website at www.recminer.com includes information for 17 recreational mining sites in Alaska. Several of these are free sites located on State and Federal lands withdrawn from mineral entry (claim staking) and available for recreational use while the others are commercial locations located on private property or permitted mining claims that charge for the right to mine.

Mine Closure and Reclamation

Mine reclamation is the process of returning an area to a physically and chemically stable condition and converting mined or otherwise industrially developed land to some other useful function. In remote areas, the goal is most often to create productive ecosystems. In more urbanized areas, the goal might be to convert land to other industrial, commercial or recreational uses. The process of mine reclamation can include grading and stabilizing the landscape, placing topsoil, and generating re-vegetation. Mine reclamation can also involve long-term commitments by mining companies to monitor environmental conditions in the reclaimed areas. Occupations commonly employed during reclamation include: engineers, arborists, horticulturalists, biologists, landscape architects, heavy equipment operators, and various construction trades.

Reclamation occurs at all phases of a mine's life, including the exploration, development, operational, and closure phases.

Below are some Alaska examples of reclamation in each of these phases.

EXPLORATION RECLAMATION

All exploration work at the Pebble Project is supported by helicopter. Before drilling begins, a wooden platform is put in place to put the drill on. The helicopter sets the drill rig on the wooden platform. After drilling is complete, the helicopter removes the drilling rig and reclamation of each drill site begins.

Below is a side-by-side before and after photo of reclamation of an exploratory drill hole at Pebble Project. The photo on the left shows a drill site shortly after the drilling rig was lifted off and the reclamation crew completed its initial work. The photo on the right shows the same site after reclamation has begun.

Pebble Project Drilling Activity Reclamation-Before (left) and After (right)

Source: Pebble Limited Partnership.

CONTEMPORANEOUS RECLAMATION

Often reclamation occurs contemporaneously while the mine is in operation. For example, at the Usibelli Coal Mine near Healy, re-contouring and replanting of mined-out areas is an on-going, routine part of the operations of the mine. Another example is reclamation of Valdez Creek at the Denali Mine. Back in the 1980s and early 1990s, Cambior USA conducted surface mining operations with contemporaneous reclamation of the mined area, encompassing an area approximately 2 miles long, 1,200 feet wide, and 180-300 feet deep. Valdez Creek was diverted around the mine area in a channel designed to allow passage of grayling. Reclamation included immediate backfilling of the mined area as mining progressed, contouring surface to as close as possible original grade and elevation, construction of stream channels, and re-vegetation of the affected areas. With regulatory approval, the final pit area was converted to a lake. The lake now provides wetlands and deep pool habitat that did not exist before operation of the mine.[34] Final reclamation was completed one year after mining ceased.

CLOSURE RECLAMATION

Mine closure involves reclamation. For example, Fairbanks Gold Mining, Inc. terminated production at its True North Mine near Fairbanks in 2004. A decision was reached in 2009 to not continue with any additional mining at the property. Final reclamation of the site began in the summer of 2009. By the end of 2010, 148.6 acres were graded, 52 acres had growth media placement and 269.5 acres were scarified, seeded and fertilized.[35]

True North Reclamation, Aerial Seeding

Source: http://dnr.alaska.gov/mlw/mining/largemine/fortknox/pdf/fgmi2010ar.pdf.

[34] Bureau of Land Management, Case File CF AA078902.
[35] http://dnr.alaska.gov/mlw/mining/largemine/fortknox/pdf/fgmi2010ar.pdf.

Employment and Payroll in Alaska's Mining Industry

This section provides analysis of Alaska's mining industry employment and payroll effects, based on three categories:

- **Direct** employment and payroll, including employees of mining and exploration companies
- **Indirect** employment and payroll, including employees of businesses which provide goods and services to mining and exploration companies
- **Induced** employment and payroll, including jobs and income created when mine workers spend their payroll dollars.

The mining industry directly or indirectly creates thousands of jobs and millions of dollars in payroll throughout the Alaska economy. These jobs and payroll occur in the following sectors of the mining industry:

- Production
    - Metals
    - Coal
    - Construction materials (rock, sand, gravel)
- Exploration
- Development
- Other (self-employed placer miners, recreational mine operators, etc.)

In addition to jobs in these key segments of the industry, mining also indirectly creates employment and income in the state as mining-related businesses and their employees purchase goods and services in Alaska. This analysis of employment and payroll in Alaska's mining industry begins with an overview of available employment data for the industry. Following that is an analysis of the indirect impacts of the mining industry.

Direct Employment and Payroll

Published Sources of Employment and Payroll Data

There are three sources of mining industry employment data for Alaska: the U.S. Bureau of Economic Analysis (BEA), the Alaska Department of Labor and Workforce Development (DOLWD) and an annual report jointly produced by the state Division of Geological and Geophysical Surveys (DGGS) and the Department of Commerce, Community and Economic Development (DCCED). These various sources' estimates on mining employment and payroll are presented below.

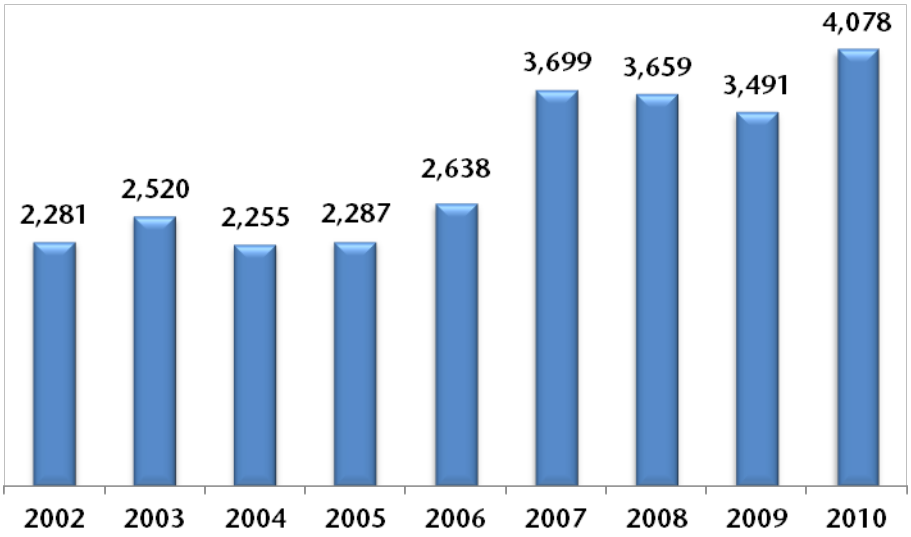
BUREAU OF ECONOMIC ANALYSIS (BEA)

The most current federal government accounting of mining employment in Alaska indicates 4,078 full and part-time workers were employed in the industry in 2010. Bureau of Economic (BEA) analysis data also indicates mining industry labor income totaled $279.4 million in 2010. This employment includes workers engaged in production (metals, coal and construction materials) and mining company employees engaged in exploration and mine development. This data also includes sole-proprietors and self-employed, such as those commonly found in placer mining.

This employment count does not include numerous contract workers employed in camp support services, transportation, certain professional services, construction of mine facility development projects, or public sector employees whose work is primarily connected to the mining sector (such as positions at Alaska Department of Natural Resources.)

According to BEA data, mining industry employment jumped 40 percent between 2006 and 2007. Employment held steady in 2008 and then dropped 5 percent in 2009. This decline was not unexpected; the global recession significantly constrained exploration around the world (including Alaska) and declining base metal prices pressured mines to cut costs wherever possible. By 2010, the industry had recovered with employment at its highest level in over 40 years, close to doubling mining employment in 2004 (BEA data is only available back to 1969.)

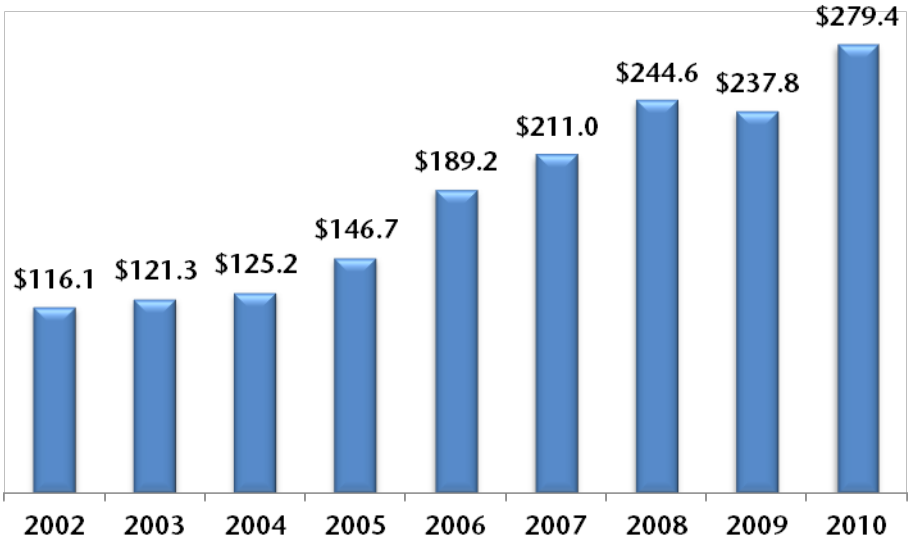
Full and Part-time Private Employment in Alaska's Mining Industry, 2002 to 2010



Source: Bureau of Economic Analysis.

Except for a slight dip in 2009 (commensurate with a corresponding decline in employment), personal income has steadily increased at a faster rate than employment. By 2010, total annual personal income has more than doubled since 2004. On average, including full-time and part-time private sector workers and self-employed in the mining sector, the personal income per worker in 2010 was $68,514.

Total Annual Personal Income in Alaska's Mining Industry, 2002 to 20010, $Millions



Source: Bureau of Economic Analysis.

ALASKA DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT (DOLWD)

DOLWD compiles wage and salary employment data from Quarterly Contribution Reports, which all Alaska employers are required to submit for purposes of calculating employment security taxes. These reports provide a count of all workers employed each month, as well as their total quarterly wages. In the DOLWD data, there is no distinction between full-time and part-time employment.

DOLWD categorizes employment according to the North American Industry Classification System (NAICS). Industry sectors that encompass the mining industry include:

- Coal
- Metal Ore
    - Metal ores mining
    - Gold ore and silver ore mining
    - Lead ore and zinc ore mining
    - All other metal ore mining
- Non-metallic Mineral, Quarrying
    - Crushed and broken limestone mining and quarrying
    - Other crushed and broken stone mining and quarrying
    - Construction sand and gravel mining
    - All other non-metallic mineral mining
- Mining Support Activities

- Metal mine drilling
- Non-metallic mine drilling

Mining-related activity falls into several other NAICS categories as well, though it is combined with non-mining employment. This includes the professional services sector, where a number of mineral exploration firms are classified. These firms typically work under contract for mining companies, therefore their employment could be considered indirect.

Some of the types of businesses and professionals engaged in exploration projects include:

- Geological exploration services
- Drilling services
- Camp support services
- Helicopter support services
- Construction services
- Scientific and other professional research services

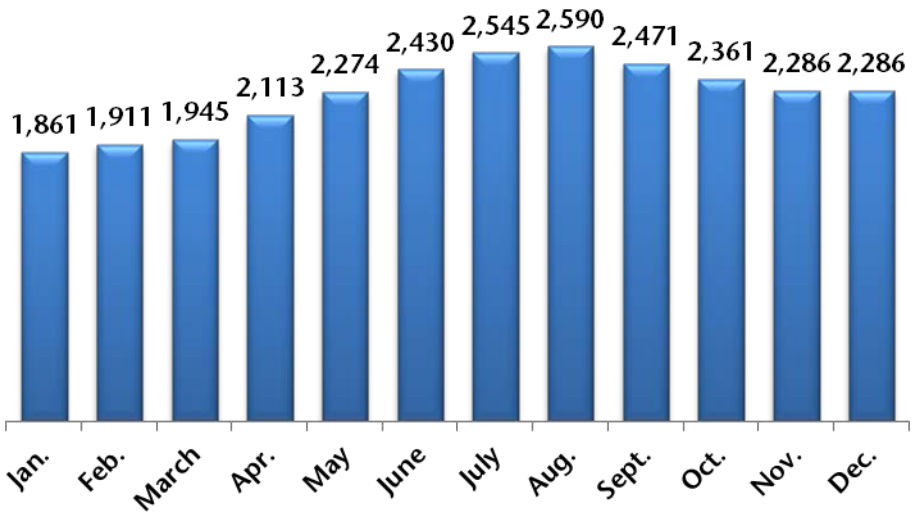
Of these services, DOLWD provides mining specific data only for drilling services. However, even this is only a partial measure as some drilling jobs are included in the construction sector.

There is also other direct mining industry employment that is not captured at all in DOLWD data. Notably, DOLWD data does not include self-employed "proprietors." In the mining industry this could include small-scale placer mining operations. It could also include any individual working under contract, such as an exploration geologist.

According to DOLWD data, metal mining employed an average of 1,968 wage and salary workers in 2010, compared to 1,767 workers during 2009, an increase of 11 percent. Alaska's metal mining industry generates some of the highest paying jobs in Alaska, with an average annual wage of $100,140 in 2010, more than double the state average of $47,700 for all sectors of the economy. Only the oil industry generates higher annual wages than the mining industry in Alaska. Including coal mining and non-metallic mineral mining or quarrying activity, mining employment in 2010 averaged 2,256 employees with an average annual wage of $96,859.

Below is a graph showing the seasonality influence of Alaska's monthly mining activity (largely associated with exploration) on total employment.

Monthly Employment in Alaska's Mining Industry, 2010



Source: Department of Labor and Workforce Development.

DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS AND DEPARTMENT OF COMMERCE, COMMUNITY AND ECONOMIC DEVELOPMENT (DGGS/DCCED)

DGGS/DCCED provides a broader measure of mining industry employment in Alaska. In its report, *Alaska's Mineral Industry 2010*, DGGS/DCCED estimated mining industry employment at 3,872 full-time equivalent jobs, an increase of 592 jobs (or 18 percent) from the 2009 total of 3,280.[36] This estimate includes both direct and some indirect employment, as conventionally defined. It is based on survey data collected from approximately 160 businesses, agencies, and individuals in Alaska that are engaged in some aspect of mining in the state.

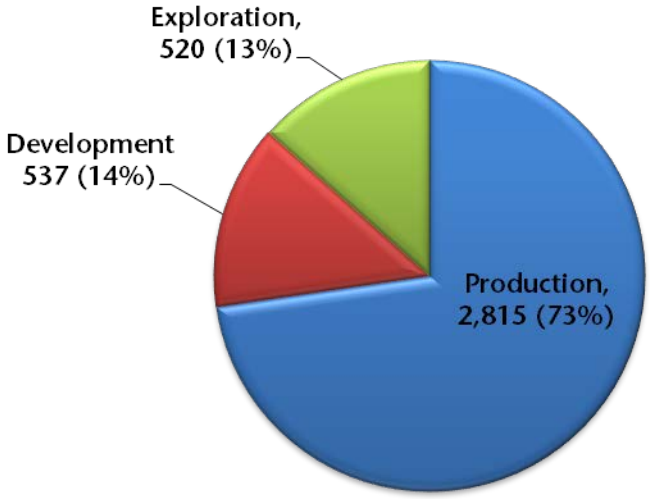
The DGGS/DCCED estimate includes production employment such as that reported by DOLWD as well as a broad range of contract employment in drilling, camp support, and other professional and trade services. The DGGS/DCCED estimate also includes construction materials handling employment that is likely captured by DOLWD in the construction sector rather than in the mining sector. Finally, it includes the smaller operations, including many placer operations, which do not report employment to DOLWD.

The best comprehensive estimate available for exploration program employment in Alaska is provided by DGGS. In 2010, DGGS estimated 520 annual average, full-time equivalent jobs in exploration. Though data is not available, peak employment is clearly much higher as most exploration activity occurs during the summer.

The chart below shows DGGS/DCCED's breakout of employment by exploration, development, and production categories.

[36] *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.

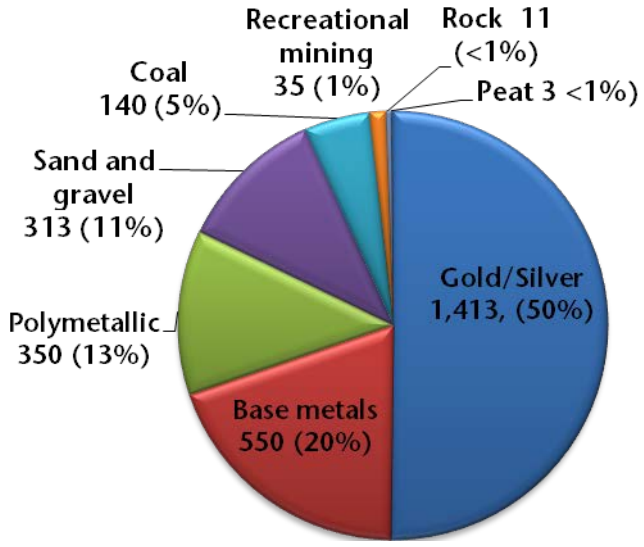
Mining Employment by Activity, Full-Time Equivalent, 2010



Source: DGGS/DCCED. Exploration employment is based on 423 companies reporting and on a 260-day workyear. Development employment is also based on a 260-day workyear.

DGGS/DCCED also provides a breakout of mining employment by production sector (estimating 2,815 total production employment in 2010.) Gold and silver mining represents the largest source of production employment followed by base metals and then poly-metallic mining.

Mining Production Employment by Category, 2010



Source: DGGS/DCCED.

Total Direct Mining-Related Employment

As discussed above, there are three sources of employment data for Alaska's mining industry. Of the three, BEA data offers the most complete account of direct mining activity employment, as it also includes self-employed workers.

As such, in 2010, it is estimated there were about 4,100 private sector workers directly employed in Alaska's mining sector with a direct payroll impact of $297.4 million.

Other Mining-Related Employment

There are a wide variety of other jobs indirectly linked to Alaska's mining industry: for example, regulatory and research jobs in state and federal government that directly serve the mining industry. These include jobs with the US Bureau of Land Management, the US Geological Survey, and the USDA Forest Service. In State government, there are personnel within the Department of Natural Resources tasked with conducting mining industry-related research. The University of Alaska's Mineral Industry Research Laboratory conducts basic and applied research to facilitate the development of Alaska's mineral and energy resources. The UAF College of Engineering and Mines through the Department of Mining and Geological Engineering also supports Alaska's mining industry. Mining industry-related employment in Alaska also includes jobs at mine training centers such the Mining and Petroleum Training Services in Juneau and Fairbanks. In this study, these jobs are assumed to be included in the mining industry's indirect employment, which is discussed below.

Indirect Benefits of Mining for Alaska's Business Sector

This section describes how Alaska businesses, other than mining companies, benefit from mining activity in the state. In-state spending with Alaska firms by mining companies in support of their mining and mine development projects is one way hundreds of Alaska businesses benefit from mining activity. Partnerships and other relationships with Alaska corporations that own mineral property rights are other important avenues for funneling the economic benefits of mining to Alaska businesses and therefore to individual Alaskans.

Purchases of Goods and Services in Support of Mining

PRODUCING MINE SPENDING

Alaska's six largest mines (Usibelli, Greens Creek, Red Dog, Fort Knox, Pogo, and Kensington) spent an estimated $620 million in 2010.[37] This amount varies year-to-year, depending on the level of capital investment (including construction activity) at each mine. Approximately 70 percent ($500 million) of these goods and purchase were made with approximately 600 Alaska businesses and organizations on a broad variety of goods, services and charitable contributions.

Of the producing mines' top Alaska vendors, it is estimated that about one-third of the total Alaska spending on goods and services was made with wholesale and retail trade businesses (32 percent), followed by utilities (power) (18 percent), fuel (16 percent), construction (15 percent), and transportation firms (13 percent).

[37] A seventh mining operation, Nixon Fork, restarted its mill in July 2011.

ADVANCED EXPLORATION SPENDING

Alaska's advanced exploration projects purchased goods and services from approximately 500 Alaska-based vendors, many of which did not necessarily provide goods or services to the producing mines. Professional services (such as engineering, environmental services, consulting, etc.) made up almost one-third of that in-state spending (31 percent), followed by services (15 percent, such as camp support services), transportation (helicopter support, marine and air transportation) (13 percent), and drilling and mine support firms (10 percent).

Indirect and Induced Employment and Payroll

Multiplier Effects

The direct employment figures above do not include all of the jobs in Alaska that are linked to mining. The non-payroll spending by mining companies and employees creates additional economic activity in Alaska, sometimes described as the "multiplier effect." Mining-related spending flows through the Alaska economy in a variety of ways, creating additional spending, employment and payroll. For example:

- **As described above, mining companies collectively purchase several hundred million dollars worth of goods and services** from hundreds of Alaska businesses located throughout the state. Regional centers such as Anchorage, Fairbanks and Juneau provide many of the goods and services that can be provided in-state, but businesses in smaller communities also benefit from local purchases, especially in support of remote exploration programs.

  The multiplier effect of mining purchasing in Alaska is not as high, however, as in other regions of the U.S. The multiplier effect is greater when the spending made locally is made for goods that are also locally (or regionally) produced. In Alaska, there are few manufacturers of goods used in the mining sector. In comparison, a similar mine spending the same amount in California will have larger multiplier effect, because more goods purchased are locally or regionally produced.

- **Mining creates jobs for other Alaska residents.** Mining provides a stable source of employment, particularly in producing mines, and considerably higher wage rates than the average job in Alaska. With higher wages and more disposable income, spending by mining employees creates more induced activity than most other sectors in Alaska (only the oil and gas industry pays a higher average salary.)

- **Royalties paid to regional ANCSA corporations** provide a remarkable example of how mining can benefit every area of the state. In 2010, $146.3 million in royalties were paid to NANA Corporation for its ownership interest in Red Dog Operations, of which $82 million was redistributed to all other Alaska Native regional and village corporations through the provisions of the Alaska Native Claims Settlement Act[38], with half of this going to the regional corporation under Section 7(i) and half to the village corporations under 7(j).

[38] NANA Annual Report 2010

- **Tax revenue paid to the State of Alaska** supports state government activity throughout the state, including payroll for state workers, and program support (such as education funding). The mining industry paid approximately $43.3 million in mining license tax to the State of Alaska in 2010 (all state revenues from the mining industry are described in detail later in this report). The Mining License Tax is a mining-specific tax not paid by other industries.

- **Taxes paid to local governments** are an important source of revenues for several jurisdictions in Alaska. In 2010, approximately $14.2 million in local government revenue was generated through property tax payments and payments in lieu of taxes made by Alaska's mining industry. Fort Knox paid $4.7 million in property taxes to the Fairbanks North Star Borough, making it the Borough's largest single property tax payer. Greens Creek Mine, which paid $1.4 million in property taxes to the City & Borough of Juneau, is the largest property tax payer in the Borough. Red Dog Operations' payment in lieu of taxes (PILT) to the Northwest Arctic Borough totaled $6.7 million, by far the single largest source of revenue for the Borough. These payments support local government jobs, payroll and public services in the communities closest to the mining operations.

- **Infrastructure development** has supported communities and economies statewide. The Fort Knox Mine offers a specific example of how infrastructure benefits extend well beyond the mining industry. Because the Fort Knox Mine is a major purchaser of Golden Valley Electric Association (GVEA) power, other GVEA customers enjoy lower electric power rates. Earlier research by GVEA estimated a savings of 7 percent for residential consumers and 10 percent for commercial consumers because of the large steady base load from the miners. Lower cost power frees up household spending for local purchase of other goods and services.

All of these factors together mean that the mining industry has significant multiplier effects throughout the Alaska economy.

Input-output models provide industry multipliers. IMPLAN™, a widely-used input-output model for analyzing the economic impact of industrial and commercial development projects, provides statewide multipliers for several mining and mining-related sectors, as illustrated in the following table.

IMPLAN™ Employment and Payroll Multipliers for the Alaska Mining Industry

Sector	Employment Multiplier	Payroll Multiplier
Coal mining	1.74	1.72
Lead and zinc mining	1.94	1.96
Gold and silver mining	2.10	1.93
Rock quarrying	1.92	1.92
Sand and gravel mining	1.47	1.70
Construction of industrial buildings	1.63	1.41

For example, an employment multiplier of 1.74 means that for every coal mining job in the economy, 0.74 of an additional job is created in the state. Similarly, for every coal mining payroll dollar, with a multiplier of 1.72, an additional $0.72 in payroll is generated in the support sector. These multipliers should be considered conservative, as published IMPLAN™ data does not capture all the economic effects of mining in Alaska, such as Red Dog's royalty payments to NANA, which are widely distributed throughout the state.

Other components of the mining industry have somewhat lower multipliers. For example, mining of sand and gravel has an employment multiplier of 1.47. Seasonal exploration programs may also have lower multipliers than producing mines, as the proportion of non-residents in the labor force is likely to be higher than in producing mines.

Some states have significantly higher mining industry multipliers than Alaska; however those states have businesses that produce the materials consumed in mining, such as explosives, chemical reagents used in ore processing, and other supplies, materials and equipment.

Total Employment and Payroll Effects

If an average employment multiplier of 2.0 is assumed (slightly lower than the metal mining multiplier, to account for lower multipliers in construction materials mining), total direct and indirect mining industry employment in Alaska included approximately 8,200 jobs. With a labor income multiplier of 1.9, total direct, indirect and induced labor income in 2010 was approximately $565.1 million.

Economic Output

Economic output – a measure of total spending – is another indicator of the total economic impact of mining in Alaska. The total value of mineral production in Alaska was $3.1 billion in 2010. However this estimate of value overstates economic impact in Alaska because it is based on refined commodity prices, not the value of the concentrates that are produced by and exported from Red Dog Operations and Greens Creek, for example. In terms of economic impacts, a more relevant measure of the value of Alaska mineral production would be the value of concentrates that are produced by Alaska mines, plus the value of dore gold bars produced in Alaska and exported for further refining, and the value of construction materials (sand, gravel and rock) produced and used in Alaska. Though this kind of measure is not available from any published sources, a proxy value is if the export value of concentrates and gold are exported from Alaska.

In 2010, Alaska's producing mines spent approximately $620 million on goods and services to support their operations, $457 million in labor costs (payroll plus the costs of benefits and other loading factors), and $314 million in royalties and taxes. The total value of Alaska mineral production therefore was $1.4 billion in 2010. Applying an Alaska output multiplier of 1.6 to this total indicates in-state economic activity of approximately $2.2 billion.

Alaska Resident Hire in the Mining Industry

According to DOLWD, in 2009 (the most recently published data available), the percent of nonresident workers in the metal mining industry was 29 percent. This figure includes only reported metal mining employment and does not include mine development, exploration, coal or unreported construction materials employment.

Alaska Nonresident Workers, by Selected Industry, 2009

	Percent Alaska Nonresident Workers
Seafood Processing	75%
Accommodations and Food Services	41
Oil and gas support	30
Metal Mining	**29**
Oil and gas extraction	23
All private sector industries	**22%**
All industries	**19%**

Source: DOLWD

DOLWD's methodology for calculating workforce residency is based on Permanent Fund Dividend (PFD) applications, which produces a conservative estimate of "resident" employment. A new resident to Alaska must reside in the state for a full calendar year before he or she is eligible to apply for a PFD. A new Alaska resident who arrived in the state in March of 2010, for example would not be eligible to apply for a PFD until the 2012 application period. As a result, this person could actually reside in Alaska for nearly two years before being recorded as an Alaska resident. New hires from outside Alaska and intra-company transfers, therefore, may actually reside in Alaska (as indicated in W2 tax form data), but not yet be identified as a resident by DOLWD.

Based on 2010 W2 data provided by the producing mines, Alaska's largest mining employers have high percentages of residents in their work forces, particularly the long-established mines. For example, in 2010, 100 percent of the Usibelli Coal Mine and Fort Knox Gold Mine work force were Alaska residents. Newer mines (such as Kensington and Pogo) or mines with recent workforce expansion (i.e., Greens Creek) have comparatively higher non-resident participation because the lack of skilled in-state miners requires that they draw skilled workers from outside the state.

Important Source of Jobs for Rural Alaskans

Alaska's mining industry supports mostly year-round jobs for residents from more than 120 communities throughout Alaska, half of which are found in rural Alaska (off the road system) where few other jobs are available.

In 2009, DOLWD was able to identify mine workers living in 26 of Alaska's 29 boroughs and census areas.[39] However, if one were to include gravel operations and rock quarries (that are found throughout Alaska), undoubtedly mining supports workers living in all areas of the state. Because of rotation schedules and camp setups, many mine workers reside in areas different from where they work.

According to Red Dog Operations, in 2010, 169 of their Alaska resident workers lived in Anchorage. The remaining 113 Alaska resident workers lived in Northwest Arctic Borough communities, including Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Selawik, and Shungnak. These figures do not include contractors working at Red Dog, including those that are NANA subsidiaries.

Donlin Gold has a similar impact on small rural communities, employing residents from several Yukon-Kuskokwim communities, including Aniak, Kalskag, Crooked Creek, Sleetmute, Stony River, Bethel, Russian Mission, Akiachak, Mountain Village, Lime, Pilot Station, Nunapitchuk, Scammon Bay, and Tuluksak.

In 2010, 80 percent of Pebble Limited Partnership's workers were Alaskans. Forty-four percent of all workers lived within the Southwest Alaska region, including the communities of Iliamna, Newhalen, Kokhanok, Togiak, and others located elsewhere in the Lake & Peninsula and Bristol Bay boroughs.

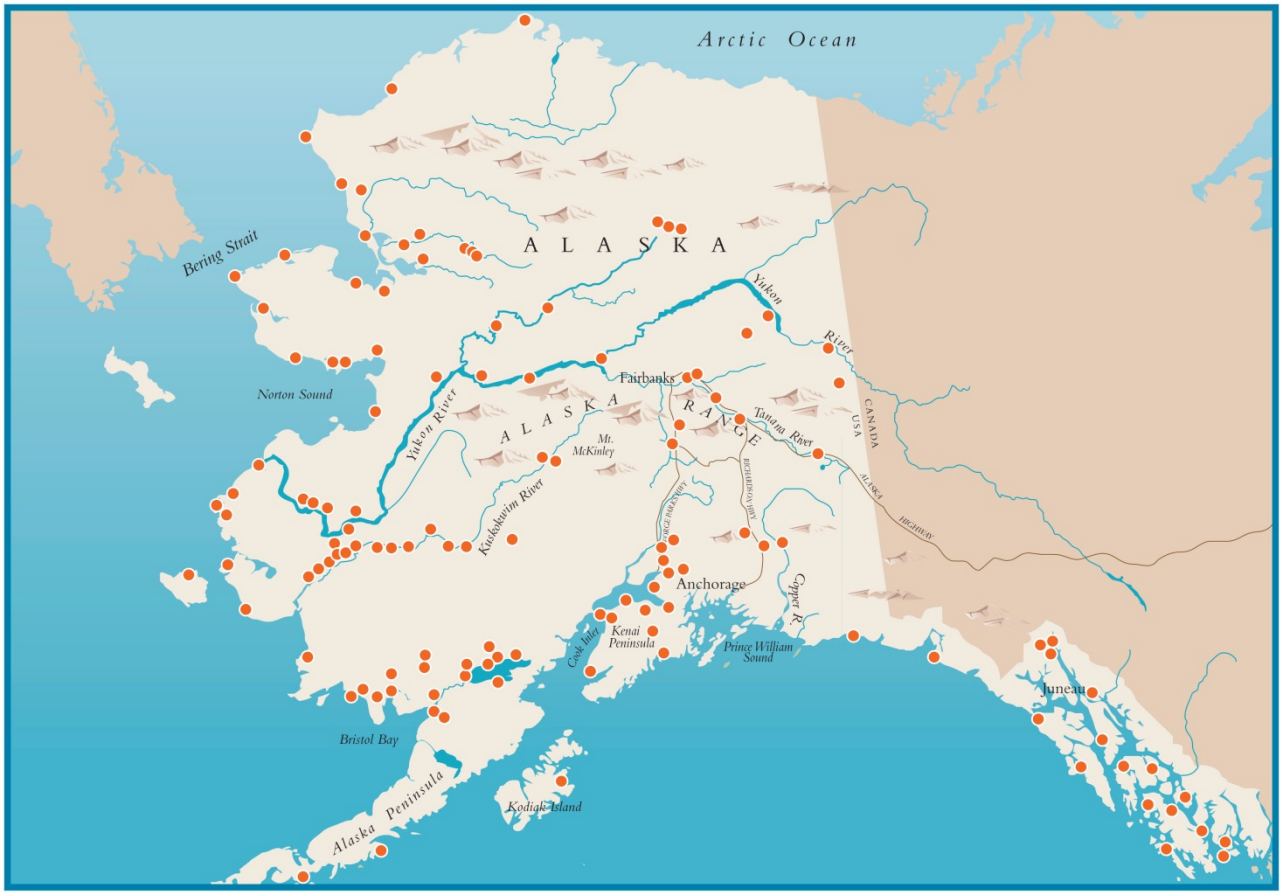
While most of Greens Creek Mine Alaska employees reside in Juneau, other Alaska employees live in other rural communities, including Angoon, Coffman Cove, Craig, Gustavus, and Hoonah.[40] Along with Greens Creek employee locales, Kensington Mine also employs people from Kake, Angoon, and Metlakatla.[41]

Pogo Mine employees live in 26 different Alaska communities, from as near to the mine as Delta Junction to as far as Petersburg.[42]

A map of Alaska follows; the orange dots denote communities where mining sector employees live.

[39] DOLWD, *Alaska Economic Trends,* October 2010. p. 6.
[40] Data provided by Hecla Greens Creek Mine.
[41] Data provided by Kensington Mine.
[42] Data provided by Pogo Mine.

Map of Alaska, Communities Where Mining Employees Live



Source: McDowell Group

Payments to Local and State Government

The mining industry has a broad range of economic impacts in addition to jobs and income. The industry generates revenue for state and local governments, as well as for public and private landowners and business interests. It offers training and skill development for Alaskans to gain careers that can have lifetime benefits within the industry and in other sectors of the economy. Mining helps build infrastructure that can support communities and other industries. These and other benefits are described below.

The potential for the mining industry to generate revenues for state and local governments depends to a large degree on the location of the mine and the tax structure in local jurisdictions. The table below outlines the land ownership and local jurisdiction for Alaska's largest producing mines and potential mines.

Largest Producing Mines and Selected Advanced Exploration Projects
State and Local Government Tax Obligations

Mine/Project	Land Owner	Subject to Mining License Tax	Subject to State Royalty	Local Tax Jurisdiction	Subject to Local Tax or PILT
Producing Mines					
Usibelli Coal	State	Yes	Yes	Denali Borough	Yes
Greens Creek	Private	Yes	No	City & Borough of Juneau	Yes
Red Dog Operations	Private	Yes	No	Northwest Arctic Borough	Yes
Fort Knox	State/Mental Health Trust	Yes	Yes	Fairbanks North Star Borough	Yes
Pogo	State	Yes	Yes	None	No
Kensington	Private/Federal	Yes	Yes	City & Borough of Juneau	Yes
Nixon Fork	Federal	Yes	No	None	No
Advanced Exploration Projects (Projected Obligations)					
Chuitna Coal Project	State/Mental Health Trust/Private/ Borough	Yes	Yes	Kenai Peninsula Borough	Yes
Wishbone Hill	State/Mental Health Trust/Private	Yes	Yes	Mat-Su Borough	Yes
Donlin Gold	Private	Yes	No	None	No
Livengood	Federal/State/ Mental Health Trust	Yes	Yes	None	No
Pebble Project	State	Yes	Yes	Yes	Yes
Niblack	State/Federal	Yes	Yes	None	No

While most mining projects pay either a property tax or a payment in lieu of taxes to a local government, most are on private or federal land and therefore not subject to state royalty payments. As described above, in addition to state royalties and property tax payments, a number of other fees and taxes are imposed on the mining industry. This includes mining license fees, annual mining claim rentals, severance taxes on coal produced from state land, severance taxes on gravel production, and other miscellaneous fees. Of course, mining firms also pay corporate income taxes to the State of Alaska.

State of Alaska Payments

The mining industry generates revenues to the State of Alaska through a number of mechanisms, such as license fees, rental, royalties, material sales, and other fees. These revenues are described below.

Mining License Tax

The state collected $43,338,119 in mining license tax in 2010. This is a tax on the net income of all mining property in the state irrespective of land ownership status, capping at 7 percent, less exploration and other credits. Except for sand and gravel operations, new mining operations are exempt from the mining license tax for a period of 3.5 years after production begins. The Alaska Department of Revenue forecasts mining license taxes to reach $48.5 million in FY2012. This is a tax imposed only on mining.

Annual Claim Rental

In FY2010, the mining industry paid $7,201,705 in annual claim rentals.

The Annual Rental law (AS 38.05.211) requires locators and holders of State mining locations to pay an annual cash rental. The requirement applies to mining claims, leasehold mining leases, offshore mining leases and prospecting sites on state land. For all traditional mining claims (40 acres), the annual rental amount is $35 per year for the first five years, $70 per year for the second five years, and $170 per year thereafter. For quarter section mining claim (160 acres), the annual rental amount is $140 per year for the first five years, $280 per year for the second five years, and $680 per year thereafter. For all leases, the annual rent is $.88 per acre per year for the first five years, $1.75 per acre for the second five years, and $4.25 per acre per year thereafter. It is noted that an acre is approximately 208 by 208 feet. For prospecting sites, there is a one-time upfront requirement of $255, which covers the two-year term of the site.

Production Royalty

In FY2010, the production royalty payment from minerals on state land was $1,299,554.

The Production Royalty law (AS 38.05.212) requires holders of state mining locations to pay a production royalty on all revenues received from minerals produced on state land. The production royalty is 3 percent of net income as determined under the Mining License Tax Law (AS 43.65), and regulations (15 AAC 65). A production royalty return must be filed and all required royalty payments must be made by anyone:

1) Owning, leasing, and operating a mining property

2) Owning a mining property and receiving lease fees, royalty payments based on production, or a combination of lease fees and royalty payments from the property

3) Leasing a mining property from another person and operating the property and

4) Possessing a mineral interest, whether an economic or production interest, in a producing property, including royalty, receiving lease fees, working or operating interests, net profits, overriding royalties, carried interests in, and production payments.

Annual Labor

The FY2010 payment in lieu of annual labor from mining and exploration companies was $157,848.

The payment in lieu of annual labor is based upon the premise that when prospecting and the discovery of a locatable mineral, and the staking of a mineral location, annual labor must be performed each year in the further development of the locatable minerals so that it can be mined. Every year, a minimum of $100 or $400 worth of labor or improvements must be performed on or for the benefit or development of each mining claim on leasehold location on state land. Every year $100 worth of labor or improvements must be performed on each partial or whole 40 acres of each mining lease. The holder of a mining claim, leasehold location, or mining lease may make a cash payment to the state equal to the value of labor required ($100 or $400 per claim).

Coal Rents and Royalties

The state received $2,378,860 in rents and royalties from coal mining in Alaska in FY2010.

The standard rate for coal royalties on state lands for new leases is 5 percent of gross value. For coal leases in existence on June 18, 1982, the royalty rate at the next time of adjustment will be five percent of the adjusted gross value. This allows for certain costs to be deducted.

Material Sales

In FY2010, the state earned $315,596 from sales of sand, gravel, rip rap, rock, limestone, slate, peat, and other substances mined from State of Alaska ground that are not applied for through the location (mining claim) system or leasing.

There are three types of materials sales from which the state receives payments:

1) Limited Material Permit, where there is no filing or application fee

2) "Limited" and small "negotiated" sales where the price charged is set by the Alaska Department of Natural Resources based generally on the fair market sales price of material in the area

3) "Negotiated" and "competitive" sales where the amount charged for larger material sales (>25,000 cubic feet) is based on a site-specific appraisal or an abbreviated appraisal. A "competitive" sale price is initially set by an appraisal, but may be raised during an auction if more than one person or company competes for the material.

Permanent Fund

The Alaska Constitution was amended in 1977 to establish a permanent investment fund into which, "at least 25 percent of all mineral lease rentals, royalties, royalty sale proceeds, federal mineral revenue sharing payments and bonuses received by the state" are to be deposited annually.[43] This 25 percent applied to state mining leases issued on or before December 1, 1979. Mines operating with state leases issued after December 1, 1979 pay 50 percent. In 2010, $5.4 million of the state rents and royalty payments by Alaska's mining industry was earned for the Alaska Permanent Fund. In 2011, $6.9 million was earned for the Fund.[44]

Other State Mining Fees

In FY2010, $585,463 was collected in various other mining fees.

These fees include filing, penalty, bond pool payment, surface mining application, and Annual Placer Mining Application fees.

State Fuels Tax

Alaska levies a motor fuel tax on motor fuel sold, transferred or used within Alaska. Fuel tax collected by the state from mining companies for 2010 amounted to $2.1 million.

Corporate Net Income Tax

The mining sector actually had a credit (presumably because companies may have overpaid) of $2,558,970 with the State of Alaska in corporate net income tax collections in FY2010.[45] In FY2011, the State of Alaska collected $81.8 million in corporate income tax from Alaska's mining sector.[46]

All corporations doing business in Alaska must file a tax return. The corporate net income tax payment is a reflection of a corporation's profitability. The State of Alaska levies a corporate net income tax based on federal taxable income with certain Alaska adjustments. Multi-state corporations apportion income on a "water's edge" basis using the standard apportionment formula of property, payroll, and sales. Tax rates are graduated from 1 to 9.4 percent in increments of $10,000 of taxable income. The maximum rate (9.4 percent) applies to taxable income of $90,000 and higher.

[43] AS 37.13.010.

[44] Per email communication with Cristin Cowles-Brunton, DNR, January 11, 2012.

[45] Total collections may not exactly match the Department of Revenue's Revenue Sources Book figures due to timing issues. Negative amounts indicate that refunds exceeded payments for the fiscal year.

[46] Alaska Department of Revenue.

State of Alaska General Fund Direct Revenue from Mining, 2010

	Amount Paid
State mineral rents and royalties	
Annual claim rentals	$7,201,705
Production royalties	$1,299,554
Annual labor	$157,848
Sub Total	**$8,659,107**
State coal rents and royalties	
Royalties	$2,235,138
Rents	$143,722
Sub Total	**$2,378,860**
State material sales	
Division of Land	$200,659
State Pipeline Coordinators Office	$5,910
Alaska Mental Health Land Trust	$109,027
Sub Total	**$315,596**
State mining miscellaneous fees	
Filing fees	$407,006
Bond pool payment	$91,677
Penalty fees	$43,405
Surface coal mining application fee	$23,502
Annual Placer Mining Application fees	$19,873
Sub Total	**$585,463**
Mining license payments	$43,338,119
State fuel taxes*	$2,182,158
Corporate net income tax collections	($2,558,970)
TOTAL	**$54,900,333**

* DCCED estimates this amount based on aggregate responses from a small number of companies responding to a request for this information. Source: Alaska Department of Natural Resources, Alaska Department of Revenue, Alaska Industrial Development and Export Authority, DCCED.

In summary, the mining industry paid approximately $54.9 million in taxes, rents, royalties, and miscellaneous fees to the General Fund of the State of Alaska in 2010.

Other State Payments

The mining industry is also an important source of revenue to quasi-government organizations such as the Alaska Railroad and the Alaska Industrial Development and Export Authority.

ALASKA RAILROAD

The Alaska Railroad is owned by the State of Alaska. In 2010, freighting coal destined for Alaska users and export markets represented $17.9 million (or 14 percent) of the Alaska Railroad Corporation's total operating revenue. The movement of rock, sand, and gravel represented $7.3 million (or 5.7 percent) of total revenue.[47] In 2011, the mining industry paid approximately $28 million to the Alaska Railroad Corporation – $21 million for moving coal and $7 million for moving sand and gravel.[48]

ALASKA INDUSTRIAL DEVELOPMENT AND EXPORT AUTHORITY

Teck Alaska, as the operator of Red Dog Mine, pays a toll for use of the state-owned DeLong Mountain Regional Transportation System, the 52-mile road and port that serve the Red Dog Mine. The Alaska Industrial Development and Export Authority (AIDEA) owns the DeLong Mountain Transportation System and Teck Alaska payments go to AIDEA's general fund to repay the bonds issued for construction of the transportation system and provides a return on AIDEA's equity investment in the port and road. The initial construction of the DeLong system was $180 million with a subsequent upgrade of $85 million for a total cost of $265 million. By the end of June 2011, the state had received more than $342 million from Red Dog Operations for use of the system.

In 1990, AIDEA purchased the Skagway Ore Terminal. The facility includes a warehouse and shipping operation for base metal concentrates exported from the Yukon Territory to international markets. While the terminal was not in use for several years, Minto Explorations Ltd., a subsidiary of Capstone Mining Corporation, shipped 28,690 dry metric tons of copper concentrate through the terminal in 2008. In FY2010, the mining industry paid $29.3 million to AIDEA for use of the DeLong Mountain Regional Transportation System and the Skagway Ore Terminal. In FY2011, AIDEA received $41.1 million for use of these state-owned facilities.[49]

Other Payments to State of Alaska
Quasi-Government Organizations, 2010

	Amount Paid
User fees to AIDEA	$29.3 million
Coal and RSG freight revenue (AKRR)	$25.2 million
TOTAL	**$54.5 million**

Source: Alaska Industrial Development and Export Authority, Alaska Railroad Corporation.

Combining payments to AIDEA and Alaska Railroad Corporation with the tax, royalty, and fee obligations, the mining industry paid approximately $109.4 million to the state of Alaska in 2010.

[47] Email correspondence from Barbara Amy, Alaska Railroad Corporation, November 2, 2010.
[48] Email correspondence from Barbara Amy, Alaska Railroad Corporation, November 23, 2011.
[49] Email correspondence from Brenda Applegate, AIDEA, December 5, 2011.

Payments to Local Governments

The mining industry paid an estimated $14 million to local governments in 2010. There are several ways the mining industry provides direct payment to local governments, including property taxes, sales tax, severances taxes, payments in lieu of taxes (PILTs), and rents or production revenue from rock, sand, and gravel production on local government lands.

Property Tax

Mining companies represent some of the largest property taxpayers in the City & Borough of Juneau, Fairbanks North Star Borough, and the City of Nome. In 2010:

- Fort Knox Gold Mine paid the Fairbanks North Star Borough $4.7 million in real property and business property taxes in 2010, making the mine the largest single property taxpayer in the Borough. In 2011, Fort Knox paid $5.6 million in real property and business property taxes.
- Greens Creek Mine paid $1,365,950 in property taxes to the City & Borough of Juneau in 2010.
- Kensington Mine paid $670,000 in property taxes to the City & Borough of Juneau. In 2011, Kensington paid the City & Borough of Juneau $1.2 million in property taxes.
- Greens Creek and Kensington mines are the two largest private property tax payers in the City & Borough of Juneau.
- Usibelli Coal Mine paid $35,000 in property taxes for its Wishbone Hill property to the Matanuska-Susitna Borough. It also paid $3,500 in property taxes to the Fairbanks North Star Borough.
- Alaska Gold Company paid $48,221 in real property taxes to the City of Nome. The company ranked amongst Nome's top largest property tax payers.

These are direct payments by mines to local governments. These figures do not include property tax payments made by mine employees. For example, a 2008 study conducted by McDowell Group for Hecla Greens Creek Mining Company found that the Greens Creek employees paid approximately $430,000 in property taxes. A 2011 study conducted by McDowell Group for Fairbanks Gold Mining Corporation estimated Fort Knox Gold Mine employees paid approximately $1 million in property taxes in 2010.

Payment in Lieu of Taxes (PILT)

Local government payments can also include payment in lieu of taxes (PILT), such as that which is stipulated in an agreement between Teck Alaska (operator of the Red Dog Mine) and the Northwest Arctic Borough. In FY2010, Teck Alaska's PILT payment to the Borough totaled $6.7 million, and represented 52 percent of the Borough's total General Fund revenues. Red Dog Operations is the Borough's single most important source of revenue. The Borough receives no sales tax or property tax revenues.

In FY2011, the Borough received $8.9 million in PILT from Teck Alaska.[50] Since 1989 when mining began at Red Dog Operations, the mine has contributed more than $103 million in PILT to the Northwest Arctic Borough.

Severance Tax

In the Denali Borough, Usibelli Coal Mine pays a severance tax of $0.05 per ton of coal. The Borough also receives other severance tax payments for limestone and gravel operations. In 2010, mining companies paid $106,588 in severance taxes to the Denali Borough.[51] In FY2011, severance tax paid to the Denali Borough totaled $107,367.[52]

Sales Tax

In certain jurisdictions, mining companies pay sales taxes on their local purchases of goods and services. For example, in Juneau, Greens Creek Mine paid an estimated $277,320 in sales taxes in 2010.

Rock, Sand, and Gravel Production

Most local governments also receive payments for the production of locally-owned or leased rock quarries, and sand and gravel pits. It is assumed these payments to local governments are relatively small. While there is no data available providing these revenues by community, one estimate placed the statewide total at approximately $250,000 annually.

Payments to Alaska Mental Health Trust Authority

In 1956, the US Congress passed the Alaska Mental Health Enabling Act, transferring the responsibility of providing mental health services from the federal government to the Territory of Alaska. To establish the Alaska Mental Health Trust, the state selected a million acres of land to provide funds for the development of the mental health services. In 1994, a legal settlement reconstructed the Trust with 500,000 acres of original Trust lands and 500,000 acres of replacement land. The Trust contracts with the Alaska Department of Natural Resources to manage the Trust's land. These lands are managed separately from other State of Alaska lands.

Most Trust mineral lands are located in Interior and Southeast Alaska, with active exploration and mining taking place in Interior Alaska. For example, Fort Knox Gold Mine, where about 1,000 ounces of gold is produced daily, is located on Trust land north of Fairbanks. Recent exploration in the Livengood area will lead to additional exploration on 9,000 acres of Trust land in that area. The Trust hopes interest will be renewed in a 180,000 block of Trust land in the Salcha area, northwest of the significant mine development activities near Delta Junction (the Pogo Mine), as well as for its land in the McGrath and Haines areas.[53]

[50] Email correspondence with Northwest Arctic Borough (December 6, 2011).
[51] Email correspondence with Denali Borough (November 30, 2010).
[52] Email correspondence with Denali Borough (December 5, 2011).
[53] http://www.mhtrustland.org/index.cfm?section=Minerals-and-Materials&page=Minerals-and-Materials.

The Trust has over 20,000 acres under coal lease to Chuitna Coal project and over 2,000 acres in the Healy and Sutton areas for coal exploration and development. In January 2012, the Trust awarded a bid to Riverdale Alaska, LLC, to lease almost 10,000 acres in the Chickaloon coal mining district. Riverdale submitted a bonus bid of $3 million.[54]

In 2010, the mining industry paid $1 million to the Alaska Mental Health Trust for rents and royalty payments, and construction material sales.

[54] http://www.mhtrustland.org/documents/MatSu%20Valley%20coal%20lease%20announcement%20news%20release%20glj%201_5_12.pdf.

Benefits to Alaska Native Corporations

All Alaska Native corporations benefit from mining industry activity – in jobs for shareholders, in 7 (i) and (j) royalty sharing payments, or through business partnerships. Forming relations with the mining industry has provided business development opportunities for ANCSA corporations.

ANCSA Corporation Business Development Opportunities

ANCSA Corporations have taken the opportunity to develop businesses that serve the mining sector. Below are a few examples.

NANA

Two NANA subsidiary operations play major roles in Red Dog Mine operations. NMS provides meals and lodging services for mine employees, and NANA Lynden Logistics provides transportation and logistics support for the mine, including transporting materials and supplies to and from the mine and trucking zinc concentrate from the mine to the port. NANA subsidiaries also provide drilling through NANA/Major Drilling, soils testing by DOWL HKM, oil products through NANA Oilfield Services, security through NMS Security, engineering by DOWL HKM, NANA WorleyParsons, and NANA/Pacific, training by NMS Training Systems, and temporary workers through NMS Staffing.

Calista Corporation

At Donlin Gold, Chiulista Services, Inc. provides remote camp facility leasing and management, as well as camp services, including cooking, housekeeping, and janitorial services. It also provides exploration and remote camp temporary personnel such as heavy equipment operators and mechanics, construction trades, geotechs, diamond core drillers and helpers, survey personnel and others. Chiulista Services was incorporated in 1996 when Calista Corporation had the opportunity to provide camp structures, equipment and personnel in support of the Donlin Gold exploration program. Since then, Chiulista Services has steadily expanded its client base and business volume.

Berners Bay Consortium

Coeur Alaska works with Central Council Tlinglit & Haida Indian Tribes of Alaska and the Berners Bay Consortium (Goldbelt, Inc., Kake Tribal Corporation, and Klukwan, Inc.) to provide training, employment, and contracting opportunities for Alaska Natives at Kensington Mine. During the construction phase of Kensington, nearly 50 percent of the approximately 400 construction jobs were held by Alaska Natives or those employed by Alaska Native subcontractors. Berners Bay Consortium Human Resource Development Corporation is working with the University of Alaska Southeast, the Alaska Department of Labor and Workforce Development, and the Tlingit-Haida Central Council to recruit, train and place Alaska Native tribal members and other Alaska residents in jobs at the Kensington Mine.[55]

[55] http://www.bernersbay.com/.

POWTEC

Since the outset of its involvement with Niblack in 2009, Heatherdale Resources has maintained a significant commercial partnership with the Prince of Wales Tribal Enterprise Consortium (POWTEC LLC) – an on-island limited liability company owned by the Craig Tribal Association and the Organized Village of Kasaan – for the provision of Human Resources recruitment and administrative services. Through POWTEC, Heatherdale Resources has trained and employed some 36 local people over the past three years.[56]

Iliamna Development Corporation

Pebble Limited Partnership works directly with several village corporations, including Iliamna Development Corporation (IDC), a wholly owned for-profit subsidiary of Iliamna Natives Limited. IDC provides Pebble Limited Partnership with site support services, including food services, housekeeping, transportation, and waste disposal (incinerator) services. IDC also provides automotive, helicopter and heating fuels to support Pebble's operation and uses its barge transportation business for some freight and fuel transport. Additionally, Pebble Limited Partnership leases some of IDC's buildings and property for their site operations.

Pedro Bay Corporation, Alaska Peninsula Corporation, Kijik Corporation, Igiugig Native Corporation, and Tenalian Incorporated also have business relationships with Pebble Limited Partnership. It is through Pebble Limited Partnership's relationships with IDC and these other village corporations that Pebble achieves many of its local hire goals.

Alaska Native and Shareholder Hire

Red Dog Mine and the Donlin Gold Project are both situated on Alaska Native lands. These two mines are examples that demonstrate a key benefit of mining that often happens in remote areas where employment opportunities are limited.

At Red Dog Operations, approximately 56 percent of the year round jobs are filled by NANA shareholders, including Teck Alaska, NANA Lynden and NMS jobs.

The successful Calista Corporation and Donlin Gold exploration shareholder hire agreement (signed in 1995 by Calista Corporation and then owner, Placer Dome) is a case study in the benefits of resident hire during the exploration phase. While no specific goals were laid out, Calista shareholders and their descendants were given a hiring preference for the Donlin Gold project. This policy has been successful. In 2010, 83 percent of the onsite jobs at Donlin Gold were filled by Calista shareholders.

At its Nyac project, since 2005, Calista Corporation has employed from 12 to 16 shareholders and local residents each year, including up to four interns, to staff exploration.

[56] Email correspondence with Patrick Smith, Heatherdale Resources, November 23, 2011.

Royalty Payments

Alaska Native Claims Settlement Act (ANCSA) corporations are major private holders of land and sub-surface mineral interests in Alaska. Much of these lands have significant mineral potential, including a number of historic mining districts, such as the Ambler district, numerous placer gold areas, and rock, sand, and gravel deposits.

ANCSA corporations can lease their land to mining companies. As part of some lease arrangements, the mining industry makes direct payments (royalties) to Native corporations.

Additionally, under a clause referred to as Section 7(i) in the 1971 Alaska Native Claims Settlement Act, ANCSA corporations are mandated to annually redistribute 70 percent of their net revenue earned on subsurface developments of lands given to them by the settlement among the 12 regional corporations (the 13th Region is not included) based on shareholder enrollment. Net revenue from rock, sand and gravel extractions is exempted from 7(i) payments. The purpose of this clause was to create an opportunity to share the wealth between those regions rich in natural resources and those which are not.

Red Dog Operations

NANA Corporation is an example of the very significant economic potential of relationships between the mining industry and ANCSA corporations. Red Dog Mine is operated by Teck under an agreement with the property owner, NANA Regional Corporation. As owner of the Red Dog property, NANA Corporation earns royalties on the net earnings on the mine. Through most of the mine's life, NANA was earning royalties equal to 4.5 percent of net smelter returns. However, with full recovery of certain capital expenditures by year-end 2007, NANA now earns a royalty equal to 25 percent of net production from the mine. NANA's share of net production will increase by increments of 5 percent every five years, up to a maximum of 50 percent. The high grades of the ore body underpinned this unique agreement.

In FY2010, NANA received $146.3 million. Of the 2010 royalty payment, NANA redistributed $82 million to the other 11 ANCSA corporations as part of its 7(i) payment requirements. In 2008, when metal prices were very high, Red Dog Operations paid NANA $212 million in royalties, of which $122 million was redistributed. Since 1989, NANA has received more than $596 million in net proceeds from Red Dog Operations, of which $341 million has been distributed to the other ANCSA corporations. During FY2011, NANA received $169.9 million in net proceeds from Red Dog Operations and distributed $82.0 million to other ANCSA corporations.[57]

[57] Per email communication with Shelly Wozniak, NANA Regional Corporation, January 13, 2012.

Donlin Gold Project

Donlin Gold is another example of mining's relationship with ANCSA corporations. The joint venture of NovaGold and Barrick Gold Corporation has entered into exploration and mining lease agreements with Calista Corporation for the sub-surface rights and The Kuskokwim Corporation for the surface rights. While some pre-production royalties have been paid by Donlin Gold to Calista and lease payments to The Kuskokwim Corporation, the major effort has been to collaborate with business development opportunities to utilize Calista's and Kuskokwim's subsidiaries. Both organizations have or are in the process of negotiating contracts for construction, transportation, catering, and supply services.

The long-term benefit for Calista Corporation would come from royalties once the mine is in production (it was recently announced that Calista will receive an 8 percent royalty from mining profits). As with Red Dog royalties, the majority of Donlin Gold royalty revenues would be distributed to other ANCSA regional corporations.

Other Alaska Native Corporate Mining Interests

Every ANCSA region within Alaska has some form of mining potential, ranging from gravel operations to gold, silver, copper, nickel, lead, zinc, platinum, tungsten, manganese, strategic minerals, jade, limestone, and coal deposits. Below is a sample of how some ANCSA corporations are evaluating the mining potential in their regions.

Calista Corporation

Calista has other mineral development initiatives, in addition to Donlin Gold, including the Nyac gold property, and placer leases on Crooked Creek and the Tuluksak River. Calista continues to promote other properties such as its Goodnews Bay platinum operation and the Stuyahok property. In 2010, approximately $2 million in royalties were paid by mining companies to Calista Corporation for all of its mineral interests. A similar amount was earned in 2011.[58]

Sitnasuak Native Corporation/Solomon Native Corporation

Alaska Gold Company's (NovaGold) properties include three projects located near Nome, Alaska: Rock Creek, Big Hurrah and Nome Gold. Alaska Gold Company has exploration and mining lease arrangements with Bering Straits Native Corporation, Sitnasuak Native Corporation and Solomon Native Corporation for mining and surface use. Currently, Alaska Gold Company is soliciting offers for the sale of its Rock Creek project.

NANA Regional Corporation

NANA has been conducting geological work for gold and base metals in the Fairhaven mining district. In 2010 and 2011, they prepared 750 samples of soil, rock and water and defined favorable targets by mid-summer 2011, and staked state mining claims in September 2011. NANA has also been active in the Upper Kobuk Mineral Project, an advanced mineral exploration project in the Ambler mining district where known deposits of copper, zinc, lead, silver and gold exist. Working with NovaGold, NANA constructed a new

[58] Email correspondence from Jeff Foley, Calista Corporation, December 1, 2011.

exploration camp in 2011 with 40 employees, of which 50 percent are NANA shareholders. In 2011, they core drilled at both the Arctic and Bornite deposits in the area.

The Aleut Corporation (TAC)

There has been a resurgence of mining exploration in the Aleut region, particularly on Unga and Popof Islands, close to Sand Point. Redstar Gold Corporation has identified wide zones of rich, high-grade gold vein mineralization, as well as near surface-gold-silver mineralization in the Unga Project that consists of the Shumagin Property and the Unga-Popof Property.[59] The sub-surface rights are leased from The Aleut Corporation (TAC).

Full Metal Minerals' Pyramid Porphyry Project, also located near Sand Point, was drilled in 2011. Results suggest a significant new copper-gold-molybdenum porphyry discovery. The 2011 exploration program was funded by Antofagasta Minerals (which is currently earning 51 percent in the property.) Full Metal Minerals has an exploration agreement with and option to lease a 100 percent interest in mineral rights from TAC, and has been granted surface rights from Shumagin and Tanadgusix (TDX) corporations (Alaska Native village corporations.)[60]

During TAC's 2011 fiscal year, their gravel sales totaled $392,000. Gravel sales are derived from the material management agreements between the Corporation and four village corporations in the Aleut region that have quarry operations (Shumagin Corporation, King Cove Corporation, TDX Corporation, and Ounalashka Corporation).[61]

Arctic Slope Regional Corporation (ASRC)

ASRC has been engaged in evaluating its coal resources in the Western Arctic since the late 1980s.[62] Four trillion tons of high quality bituminous and subbituminous coal – one-ninth of the world's known coal resources, and one-third of the U.S. resource – are estimated to lie within ASRC's region. Approximately 2 billion tons of high rank bituminous coal has been identified and located six miles from tidewater on the Chukchi Sea. ASRC estimates that through additional drilling, it can identify an additional 50 to 100 million tons in this one deposit. ASRC is seeking a development company to explore and develop these coals deposits.

[59] Redstar press release, November 2011.
[60] Full Metal Minerals press release, September 29, 2011.
[61] http://www.aleutcorp.com/images/stories/11916_annual_report_webres.pdf.
[62] http://www.asrc.com/Lands/Pages/Coal.aspx.

Additional Mining Industry Benefits

Mining offers some additional benefits to the Alaska economy, including the development of workforce skills to support mining (and other support sectors), and public and private infrastructure that has broader benefit beyond the primary use of a mining venture.

Workforce Development

The mining industry can offer long-term, year-round employment. Many of the jobs are rural-based, offering transferable skills in a rapidly growing industry. Direct job training is available in management, engineering and science (geologists, metallurgists, environmental scientists, etc.); technical specialties (surveyors, drafters, computer technicians, instrumentation technologists, lab technicians, environmental, etc.); mine and mill work (millwrights, electricians, diesel mechanics, plumbers, maintenance planners, metallurgical samplers, machinists, welders, industrial mechanics, operators, drillers, laborers, etc.); and administrative and support staff (accountants, purchasing agents, in-house trainers, employee relations personnel, payroll clerks, secretaries, health workers, cooks, security guards, warehouse workers, etc.).

There are a number of institutions and organizations in Alaska currently providing training support for and with the mining industry. Notable is the University of Alaska's Mining and Petroleum Training Service (MAPTS) program and the University of Alaska Southeast (UAS) Center for Mine Training.

University of Alaska's Mining and Petroleum Training Service (MAPTS)

University of Alaska's Mining and Petroleum Training Service (MAPTS) has trained over 10,000 mining students since the program began in 1970. In 2010, MAPTS held 201 classes for 2,251 students – in excess of 2,000 were there for mine-related training, both for miners new to the industry and those attending classes for retraining.

MAPTS provides standardized training that meets the requirements for the State of Alaska and the Mine Safety and Health Administration (MSHA). Working with clients in the mining industry, MAPTS custom designs programs for individual mine employers.

With its main office located in Soldotna, the program also offers classes through UAS in Juneau and in Anchorage through UAA. MAPTS' Juneau courses include a 6-week new miner training program in underground hard rock mining and includes an equipment simulator. The Anchorage program offers MSHA certification for both metal and sand and gravel training. The Soldotna campus offers students a wide range of courses including OSHA, EPA and DEC training. Next year, in association with UAF, MAPTS will offer training in surface mining. The program is mobile as well – 38 percent of classes were taught in communities off the road system.[63]

[63] Per phone conversation with Dennis Steffy, Director, MAPTS, October 3, 2011.

UAS Center for Mine Training

The UAS Center for Mine Training is a partnership between UAS and MAPTS. Administered by UAS Career Education, the program encourages students to pursue workforce training leading to an Occupational Endorsement for Mine Mechanics and an Associate of Applied Science in Power Technology/Diesel. The Center is the future location of a new state-of-the-art underground mine simulator.

Other workforce development support can be found through the following agencies and programs throughout Alaska:

- Alaska Department of Labor and Workforce Development
- UAF's College of Engineering & Mines, College of Rural Alaska, and Cooperative Extension Service
- UA – Bristol Bay Campus
- Works Alaska
- Alaska Department of Commerce, Community, and Economic Development
- Alaska Resource Education
- Alaska Vocational and Technical Education Center
- Bristol Bay Economic Development Corporation
- Delta Mine Training Center
- Kawerak, Inc.
- Kotzebue Technical Center
- Lake & Peninsula Borough
- Mine Safety and Health Administration
- Southwest Alaska Vocational Technical Center
- Construction Academies
- Various Regional Training Centers
- Various tribal organizations

The training and experience Alaskans (particularly rural Alaskans) gain from working in the mining industry makes them more employable in other projects around the state; for example, in the oil and construction industries, in environmental monitoring activities, and in a broad range of other sectors of the economy. Skills gained on-the-job or through mine training make residents better able to fill positions that may come available in their communities (jobs that might otherwise be filled by non-residents,) or in other remote jobs that might allow them to maintain rural residence while working rotational shift schedules (i.e., week-on, week-off). Also, the skills learned in many cases are in demand throughout the world; having these skills can greatly increase personal opportunities.

Educational Support

The mining industry is also active in promoting student performance and interest in areas of study where the mining sector has employment needs, for instance, engineering, geology, environmental sciences, and the building and construction trades.

For example, Pebble Limited Partnership's scholarship program has awarded 60 scholarships since the fall of 2010, totaling $153,400.[64] In 2009, 99 students received over $120,000 in post-secondary scholarships from Red Dog.[65]

In December 2010, Fort Knox Mine started the Mining Engineering Research Endowment (MERE) at the University of Alaska Fairbanks (UAF) with an initial gift of $25,000. In 2011, Fort Knox pledged an additional $990,000 over the next three years. The Endowment will be used to support graduate student research projects in the UAF Masters of Engineering and Doctorate programs. Pebble Limited Partnership has offered similar support to the University of Alaska Anchorage's engineering program.

Pebble Limited Partnership gave $100,000 to the University of Alaska Anchorage (UAA) to cover a portion of the salary and research start-up expenses for a Professor of Economic Geology at UAA. All of the recent UAA Geology graduates who have entered the job market have stayed in Alaska to work in the field. Other recent contributors to the professorship include International Tower Hill, Kiska Metals, and Millrock Resources.[66]

Helca Greens Creek Mining Company recently gave $300,000 to UAS to fund a three-year Career Pathways in Mining program at the new UAS Center for Mine Training.[67] The gift will also fund scholarships, job shadows, a mining academy, and tools and equipment.

Infrastructure Development

Alaska's mining industry has also played a historical role in the development of important infrastructure, including the development of the Alaska Railroad, Richardson Highway, Steese Highway, Hatcher Pass, the road into Denali National Park, and even the settlement of Anchorage. Though initially developed for mining-related purposes, this infrastructure now has obvious value to non-mining interests.

There are other examples of mining infrastructure serving other community, business and industrial interests:

- In 2005, Alaska Electric Light and Power Company (AELP) extended a transmission line to the Greens Creek Mine on Admiralty Island. That extension will ultimately make it possible to transmit power to the community of Hoonah on Chichagof Island, which now must rely on costly diesel power generation. Without the economies of scale offered by Greens Creek, it is unlikely that the extension to Hoonah would be economically feasible. Also, a guaranteed usage agreement with Greens Creek contributed to AELP's ability to raise funding for its Dorothy Lake power generating station.[68]

[64] Pebble Project Newsletter, September/October 2011, p 2.
[65] http://reddogalaska.com/Generic.aspx?PAGE=Red+Dog+Site%2fSkills+and+Training&portalName=tc.
[66] http://greenandgold.uaa.alaska.edu/faq.php.
[67] http://uas.alaska.edu.pr/archive-files/2011/greens-creek.html.
[68] Per telephone conversation with Tim McCloud, AEDP, January 10, 2012.

- Goldbelt Corporation, an ANCSA corporation, has received permits and is expecting to build a marine terminal at Cascade Point that will be used to transport miners across Berners Bay area north of Juneau, supporting operations of the Kensington mine.

- In 1990, AIDEA purchased the Skagway Ore Terminal. The shipping of mineral concentrates from the terminal occurred intermittently until 1998, when soft zinc prices forced the closure of Yukon's major zinc mines.[69] Construction of the Skagway Ore Terminal Reactivation Improvements began in early 2007. By October, the first shipment of Minto/Capstone concentrates from Yukon was moving through the terminal. In 2008, 14,000 square feet of additional storage capacity was added.

  AIDEA is currently working with Selwyn Chihong Mining Ltd on development of a plan to double the size of the existing Concentrate Storage Building and to provide a new ship loader. Designs call for a retractable ship loader that would allow cruise ships to use the ore dock when ships are not being loaded.

- The State Department of Transportation and Public Facilities is considering preliminary cost estimates and summaries of engineering and environmental issues to build a road to the Ambler mining district in Northwest Alaska. Several routes are being considered. While the primary motive for a road to the region is to allow minerals development, communities in the region need a road to lower high living costs, i.e., fuel, groceries and other supplies.[70] Much of the $1.25 million the state appropriated in its FY 2012 budget will be used to assess the effects a road could have on local subsistence resources. The Governor's proposed FY 2013 budget includes $4 million to provide all-season access for exploration and development of mineral resources within the Ambler Mining District. The project will define an optimal corridor, proceed with permitting and environmental work, and establish a right-of-way. A public-private partnership will be explored to proceed with financing and construction.

[69] AIDEA, Project Fact Sheet: Skagway Ore Terminal (July 6, 2011).
[70] "Initial reports on Ambler mining area road due soon." *Alaska Journal of Commerce*, September 25, 2011, p. 13.

Alaska's Mineral Development Potential

While Alaska has a rich mining heritage spanning over 100 years, and the industry today plays an important role in local and regional economies, the future of mining in Alaska holds the promise of a very rich mineral endowment.

Over the past 125 years, Alaska's mining industry has produced 40.4 million ounces of gold, 263.2 million ounces of silver, 9.8 million tons of zinc, and significant quantities of lead, copper, tin, and platinum. The industry has also produced 70.4 million short tons of coal, and over 1.3 billion tons of sand and gravel.[71] Fifty different mining districts have historically each produced more than 10,000 ounces of gold. Six districts have produced more than one million ounces of gold, ranging from the Nome district in western Alaska to the Juneau district in Southeast. However, most of the 58 mining districts have only had placer gold production; lode sources of the placer mines have not yet been found.

Despite all of its historical mineral production, according to the United States Geological Survey, "Alaska is still a frontier region with respect to basic geologic, geochemical, and geophysical data. From the mid 1970's until the early 1990's, the USGS funded a large effort to gather and publish such data in Alaska and to use it to assess undiscovered mineral resource potential. Even at the reconnaissance scale of 1:250,000, less than half of the state has been covered to date."[72]

Recent studies have attempted to quantify the value of Alaska's untapped mineral resource potential. For example, the *Economic Analysis of Rail Link, Port MacKenzie to Willow, Alaska* measured the metallic mineral development potential for a 120-mile wide rail corridor from Port Mackenzie to the Alaska/Canada border.[73] This corridor contains 887 known mineral occurrences (about 12 percent of the known mineral occurrences in Alaska). Based on certain assumptions about future mineral commodity prices, probabilities of mine development, and mining and mineral processing recovery rates, a gross metal value of future mine production of from $9 billion to as much as $83 billion was identified.

There are 7,200 known mineral occurrences recorded in the Alaska Resource Data Files, not including coal or industrial/construction materials deposits.[74] With this resource potential, and with exploration expenditures in Alaska totaling $1.3 billion between 2006 and 2010, the mining industry sees a bright future in the state. Further, with base and precious metals at record or near-record levels, international market conditions are right for further growth in Alaska's mining industry bringing greater economic benefit for Alaskans.

With 44 million acres of privately-held land, much of which was selected for its mineral potential, ANCSA corporations and their shareholders will play a key role in future development of the mining industry in Alaska. Of course, the future of mining in Alaska depends on the state remaining an attractive investment environment, one with stable regulatory and tax regimes and a supportive political environment.

---

[71] Appendix E and F, *Special Report 65, Alaska's Mineral Industry*, DGGS/DCCED.
[72] http://minerals.usgs.gov/alaska/economic/index.html.
[73] Prepared by Paul Metz, Ph.D., University of Alaska Fairbanks, for the Matanuska-Susitna Borough, February 2007.
[74] http://ardf.wr.usgs.gov/.