

# Alaska's Mining Industry

## Strong growth in jobs, wages, and production value

**A**laska's mining industry<sup>1</sup> has been a stand-out over the last decade for its job and wage growth, and the production value of its minerals climbed from less than \$1 billion in 2001 to \$3.5 billion in 2011. The gains have come from new mines as well as expanded operations at existing mines, and increasing exploration and development spending suggest more growth in the future.

Production values rose substantially in 2006 when zinc prices doubled, and surges in gold and

<sup>1</sup>Mining as an industry classification includes oil and gas as well as minerals, but for this article, "mining" excludes oil and gas.

silver prices helped drive values to a record high in 2011. (See Exhibit 1.)

The state's most high-value concentrates are zinc, gold, lead, and silver, with zinc and lead as its two leading exports. (See Exhibit 2.) Alaska's other mined minerals include sand and gravel for building roads, a variety of gemstones and semiprecious stones, and coal. (See the sidebar on page 9 for a list of products and their industrial uses.)

### Mining's geology and geography

The state's vast acreage and complex geologic history have created the perfect recipe for mineral deposits in every region of the state.

Generations of mountain formation, volcanic activity, and an ideal blend of temperature, pressure, and liquid in the earth's crust laid the foundation for large mining operations in all of the state's economic regions except Southwest and the Gulf Coast, although those areas have some mining history as well. Many out-of-the-way towns were founded on historic mines, such as Homer coal seams and Nome, the quintessential gold rush town.

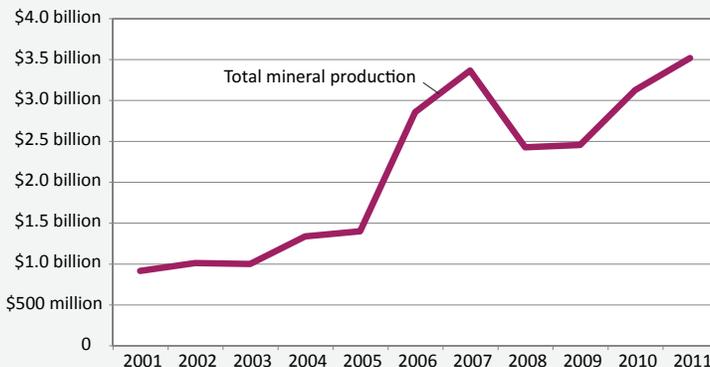
### A century of ups and downs

The Klondike Gold Rush was old news by 1913, when the mine inspector for the Territory of Alaska reported to the U.S. Department of the Interior:

*"During the year there was an oversupply of labor in all but the most remote parts of the Territory. This condition was due in part to the prominence given to Alaskan affairs by the press of the States, which led people to believe that there was work in abundance."*

## 1 Estimated Production Hits \$3.5 Billion

Alaska minerals, 2001 to 2011



Source: Alaska Department of Natural Resources, Division of Geologic and Geophysical Surveys

## 2 Zinc is Alaska's Highest-Value Mineral Export

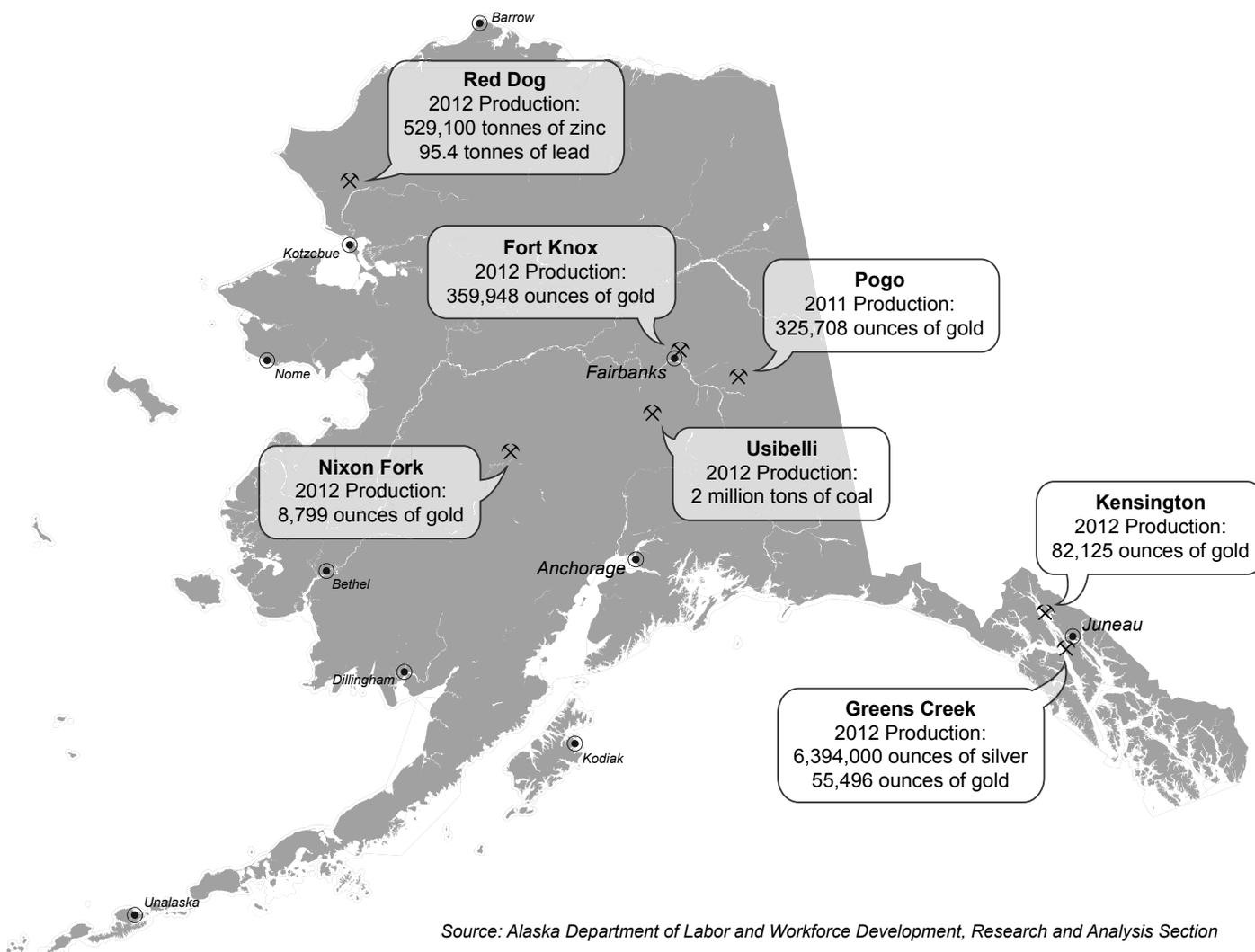
Select minerals, 2009 to 2012

Rank	Description	2009 value	2010 value	2011 value	2012 value
1.	Zinc ores and concentrates	\$610 million	\$877 million	\$972 million	\$807 million
2.	Lead ores and concentrates	\$160 million	\$402 million	\$495 million	\$442 million
9.	Copper ores and concentrates	\$64 million	\$37 million	\$199 million	\$169 million
14.	Precious metal ores/concentrates, exc silver	—	\$20 million	\$142 million	\$108 million
18.	Gold, nonmonetary, unwrought	\$151 million	\$213 million	\$266 million	\$82 million

Source: U.S Census Bureau, <http://www.census.gov/foreign-trade/statistics/state/data/ak.html>

### 3 Alaska's Major Mines

Amount and type of production



The three years that followed were the most productive in Alaska's pre-Prudhoe Bay history, a record we are approaching for 2012.

The number of miners in Alaska peaked in 1916 at 8,590, with wages ranging from \$3 per shift minus a \$1 board charge in Southeast to \$5 per shift with free board in Nome during the high season.

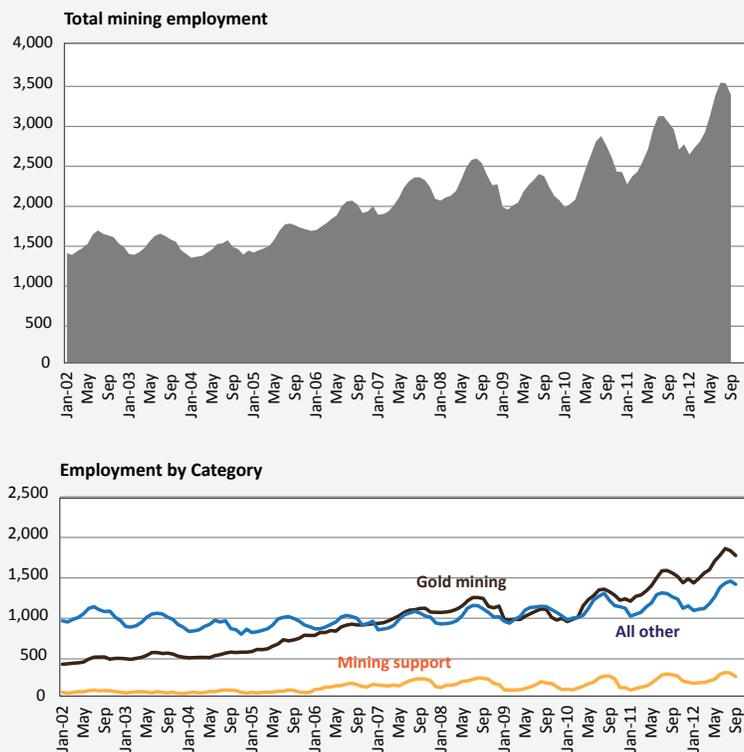
As the century went on, mine disasters, fixed gold prices, and global war took a toll on the industry. By statehood in 1959, the mining workforce dwindled to 1,700, and with the beginning of the petroleum era in the 1960s, Alaska mining employment remained depressed until the recent upturn began in 2006.

In 2012, Alaska ranked sixth in the United States for production value behind Nevada, Arizona, Minnesota, Florida, and California and was responsible for 4.58 percent of domestic nonfuel mineral production value.

Most of Alaska's production comes from six main mines, shown in Exhibit 3. A seventh, Nixon Fork, began to ramp up commercial production in 2011.

Mining's economic reach extends outside these large operations as well. The Department of Natural Resources' Division of Geologic and Geophysical Surveys also reports on placer and non-employer mining operations — "mom and pop" Alaska mines — which lends some insight into

## 4 Growth in Monthly Mining Employment Alaska, 2002 to 2012



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

economic activity not reported in the Department of Labor’s jobs data. Alaska has 45,000 active state mining claims, 441 state prospecting sites, and 8,745 federal claims as of 2010. In 2010, 225 placer operations produced 69,318 ounces of gold. Recreational mining employment and guiding isn’t tracked, but it’s a niche activity for visitors and locals enjoying Alaska’s outdoors.

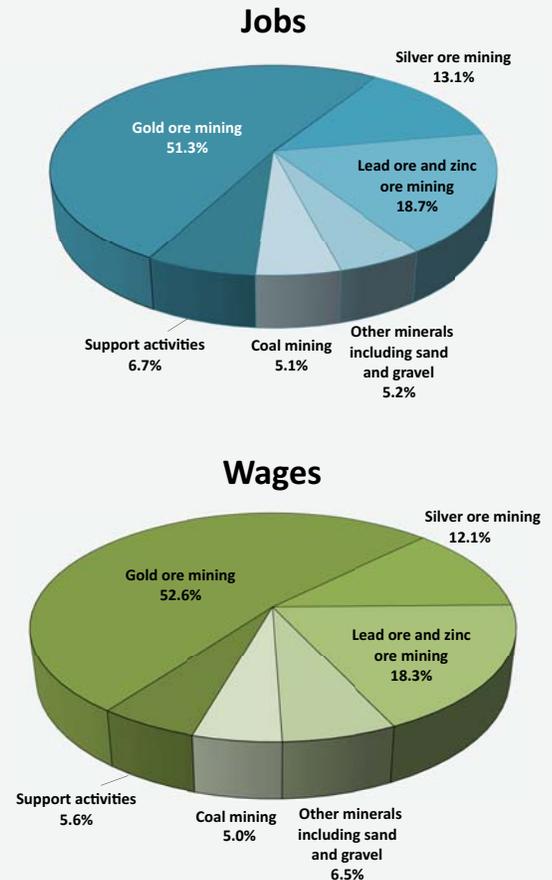
### Jobs double in a decade

Mining jobs hovered around the 1,500 level until 2005 before beginning a strong growth streak that pushed industry jobs past the 3,500 mark in July 2012. (See Exhibit 4.)

Alaska metal mining employment makes up 5.5 percent of the U.S. total, and 10.4 percent of all U.S. gold jobs are in Alaska. Gold mines provide over half the state’s mining jobs and wages, and are responsible for most of the industry’s growth in the past few years. (See exhibits 4 and 5.)

Two new operations, Kensington Mine in South-

## 5 Jobs, Wages by Mineral Alaska mining, 2011



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

east Alaska and Nixon Fork in Interior Alaska, contributed much of the job growth.

### Wage growth and high pay

Mining’s share of private-sector wages grew from 1.2 to 2.1 percent between 2002 and 2011. Firms paid over two-and-a-half times more in total wages in 2012 than they paid in 2002, or 175 percent more when adjusted for inflation. (See Exhibit 6.)

Average wages also increased 22 percent from 2002 to 2011, significantly more than the 8 percent growth for private-sector wages overall. (See Exhibit 7.) Adjusted for inflation, average wages in the early 2000s were over \$80,000 a year — well above the state average — and reached \$98,000 by 2011.

Part of the wage increase is likely due to seasoned miners earning raises and bonuses, making payrolls more “top heavy” until those workers retire. Among resident miners, 15 percent were over age 55 in 2011, and close to 40 percent were over 45. (See Exhibit 8.)

One reason for the high average pay is the difficulty of the job and the special demands of working in remote locations. Many of the occupations require highly skilled workers who operate specialized machinery or heavy equipment. (See Exhibit 9.)

### Mining workforce characteristics

Most resident mining workers are male. Women made up just 12.4 percent of Alaska’s mining workforce in 2011 and received 9.4 percent of resident wages. (See Exhibit 8.)

Much of the state’s mining workforce also commutes to remote work sites. Though some of today’s large mines are close to populated Railbelt areas, many jobs are far-flung. (See Exhibit 10.) Like North Slope oil workers, mining workers often live on-site in firm-provided lodging and work atypical shifts ranging from two weeks to several days.

Because of relatively low-cost commuting and remote company housing, towns are neither viable nor necessary near modern mines. In 2011, just 41 percent of mine workers were residents of the borough or census area where they worked.

### Greater demand for labor

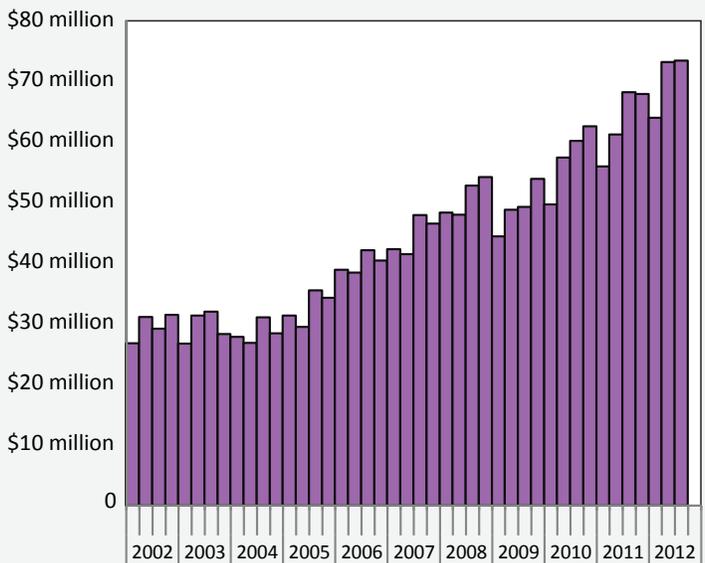
With increased mining activity, the need for skilled employees has increased and so has the number of nonresidents hired to fill those jobs.

The early 2000s were marked by a steady share of nonresident workers at around 20 percent, but the rate jumped in 2005 and has remained elevated ever since. In 2011, 35 percent of mining workers were nonresidents. Although the percentage of nonresident workers has increased, the number of resident jobs has also increased, so Alaskans are filling some of the additional demand for workers.

One of the most frequently cited reasons for hiring nonresidents in mining and other industries

## 6 Total Wages by Quarter

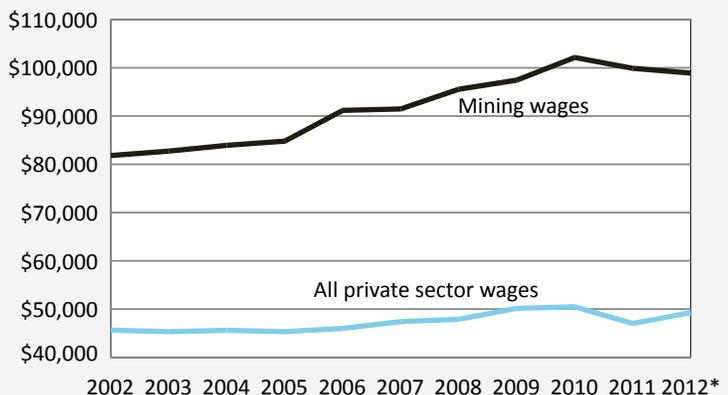
### Alaska mineral mining, 2002 to 2012



Note: All values are in 2012 dollars.  
Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

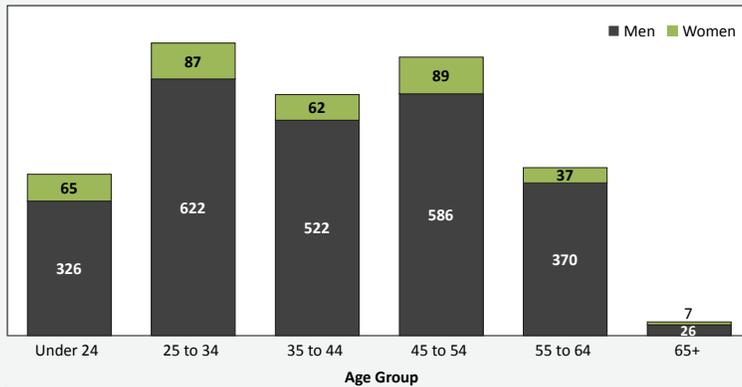
## 7 Average Wages Rise

### Alaska mining vs. all private, 2002 to 2012



\*Preliminary  
Note: All values are in 2012 dollars.  
Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

## 8 Resident Mining Workers by Age, Sex Alaska, 2011



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

is the lack of workers in the state who are trained and willing to fill the vacancies. Another likely explanation for the relatively high nonresident rate is that mining companies are often based in other states and countries and benefit from using

their existing workers rather than rehiring locally.

## Government work

Although most mining is private-sector, it creates government jobs in Alaska as well. State universities, state geologists, and federal departments are responsible for surveying and geologic analysis in Alaska. Agencies that map Alaska's natural resources provide public information crucial for mining and exploration firms.

Mining creates jobs in regulation as well as research. Like construction and fishing, mining affects public resources such as air and water and is therefore regulated, requiring unbiased state and federal scientists, land managers, and resource specialists.

Regulation becomes more complicated when mining takes place on public property, creating a bigger workload for those who issue permits, enforce environmental compliance, litigate over rights, and collect taxes.

## 9 Top 20 Occupations in Mining Alaska, 2011

	Total wages	Number of workers	Percent nonresident	Average monthly wage	Occupational outlook, all industries (see key below)
Mining Machine Operators, All Other	\$34,315,000	600	33%	\$5,063	growth moderate, openings moderate
Miners, Except Drillers and Machine Operators	\$33,726,000	419	55%	\$4,726	growth strong, openings moderate
Extraction Workers, All Other	\$14,833,000	258	45%	\$4,726	growth strong, openings moderate
Millwrights	\$18,938,000	205	34%	\$5,488	growth strong, openings low
Construction Laborers	\$5,360,000	161	17%	\$3,859	growth moderate, openings very high
Mining and Geo Engineers, Incl Mining Safety Engrs	\$8,796,000	134	46%	\$8,623	growth strong, openings low
Earth Drillers, Except Oil and Gas	\$4,288,000	124	66%	\$4,298	growth low, openings low
Mechanics, Mine Machinery	\$10,642,000	111	36%	n/a	n/a
Mine Cutting and Channeling Machine Operators	\$5,572,000	86	72%	n/a	growth strong, openings low
Plant and System Operators, All Other	\$5,544,000	71	11%	\$5,928	growth moderate, openings low
1st-Line Supervisors of Mechanics, Installers, Repair	\$7,738,000	68	26%	\$6,371	growth low, openings high
Excavating and Loading Machine and Dragline Oper	\$2,734,000	65	46%	\$5,309	growth moderate, openings moderate
Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	\$4,548,000	62	13%	\$4,493	growth strong, openings low
Mobile Heavy Equipment Mechanics, Except Engines	\$4,900,000	61	36%	\$5,433	growth moderate, openings high
Electricians	\$5,436,000	60	47%	\$6,003	growth low, openings very high
Maintenance Workers, Machinery	\$4,154,000	51	22%	\$4,734	growth low, openings moderate
Heavy and Tractor: Trailer Truck Drivers	\$2,149,000	47	4%	\$4,171	growth low, openings very high
Drilling and Boring Mach Tool Setters, Oper and Tenders, Metal and Plastic	\$1,711,000	41	63%	n/a	growth moderate, openings low
Geoscientists, Except Hydrologists and Geographers	\$3,011,000	41	49%	\$8,697	growth low, openings high
Laborers and Freight, Stock, and Matl Movers, Hand	\$1,900,000	40	18%	\$2,853	growth low, openings very high

Openings	
Very high	300 openings or more in this occupation
High	At least 130 but fewer than 300 openings in this occupation
Moderate	At least 80 but fewer than 130 openings in this occupation
Low	Fewer than 80 openings in this occupation

Employment growth	
Robust	21% growth or more over the 10-year forecast
Strong	At least 15% but less than 21% growth
Moderate	At least 10% but less than 15% growth
Low	Less than 10% growth over the 10-year forecast

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

## Alaska's historical mined minerals

Name/ Symbol	Mineral Summary
<b>Gold (Au)</b>	Gold has been mined in Alaska since the 1880s. Sixty-six percent of U.S. gold is used for jewelry, and other uses include electronics, currency, and dental applications.
<b>Lead (Pb)</b>	Minor amounts of lead have been mined in Alaska since the 1880s. Except for a brief swell in the late 1920s, production growth started in 1989. Most lead is used in acid-lead batteries, which power a variety of equipment types. It is also used for ammunition and alloys such as bronze. Environmental concerns have led to a reduced role for lead in gasoline, paint additives, solder, and pipes.
<b>Zinc (Zn)</b>	Zinc production had a brief stint in Alaska from 1947 to 1949. Then, the 1989 opening of the Red Dog Mine raised production levels. Over half of domestic zinc is used for galvanizing. Zinc is also an important component in alloys such as bronze and brass.
<b>Copper (Cu)</b>	Copper production started in 1901 and peaked in 1916 with the help of the Kennecott Mine near McCarthy, slowly petering out by the 1960s. Production was minimal between 1996 and 2002. The bulk of copper is in construction and electronics, but it is also used for machinery and consumer products.
<b>Antimony (Sb)</b>	Used in flame retardants and shrapnel alloys, antimony production was reported from 1914 to 1918 and again in 1937. Also used in lead-acid batteries and plastic, antimony continued to be mined sporadically in Alaska until the mid-1980s.
<b>Chromium (Cr)</b>	Chromium is an ingredient in stainless steel and was produced in Alaska from 1942 to 1943 and 1954 to 1957 in minimal amounts.
<b>Platinum (Pt)</b>	Platinum was dredge-mined in Southwest Alaska and is a byproduct of copper mining. It is used in vehicles as a catalyst for air pollution abatement. Platinum's properties make it useful for many chemical and electronic technologies. It is also made into jewelry.
<b>Tin (Sn)</b>	Tin production was first reported in Alaska in 1902 and halted in 1993. Tin was used for tin cans, containers, and electronics. Other uses include construction, vehicles, and solder.
<b>Mercury (Hg)</b>	Some production of mercury, a transition metal, was reported from 1940 to 1973, though not in high economic amounts. This toxic metal was historically used in thermometers, batteries, cosmetics, and paint. Due to EPA restrictions, mercury is now mostly used for chlorine caustic soda. It occurs as a byproduct of gold mining and was once used by miners to separate gold from placer gravels.
<b>Silver (Ag)</b>	Silver is used for photography supplies, a declining market. Emerging medical and hygiene applications have put silver in clothing and bandages, and other demand stems from the manufacture of coins, jewelry, and soldering alloys. Alaska was the top silver producing state in the U.S. in 2012.
<b>Coal</b>	Coal is composed of mostly carbon, oxygen, and hydrogen and occurs in a variety of forms depending on metamorphic grade and volatile concentration. Usibelli Coal Mine produces subbituminous coal that is used as fuel for electricity generation. Alaska has produced coal in every decade since the 1880s and produces approximately 2 billion tons per year.

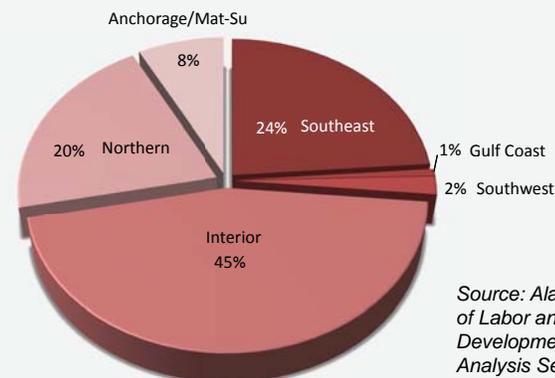
Sources: Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys; United States Geological Survey, Mineral Commodity Summaries 2009; and Alaska Department of Labor and Workforce Development, Research and Analysis Section

## Exploration spending way up

Until 2003, exploration expenditures in Alaska were around \$25 to \$35 million annually. Those figures have increased dramatically in recent years, and DNR's Division of Geological and Geophysical Surveys estimates 2011 exploration expenditures at \$365 million, a tenfold increase in just eight years.

Mineral prices are volatile, though, so nothing is certain in terms of future industry growth. Gold prices soared during the 2007-09 recession as purchasers rushed to it as a safe investment. Production of gold drove much of the recent surge in Alaska employment as well, but mines have long

## 10 Most Mining Jobs are Remote Alaska regions, 2011



Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

planning stages — it can take decades from discovery of an ore deposit to commercial production — so the exact effect high prices had on that growth is unclear. The outlook for Alaska’s mining economy can’t be solely tied to large and recent market fluctuations.

Much of Alaska’s mineral potential is in industrial minerals such as zinc, copper, and even the lesser-known “rare earth elements.” Despite the recession’s impact on the global economy, demand has grown for minerals used in a variety of consumer goods, from toasters to smart phones.

