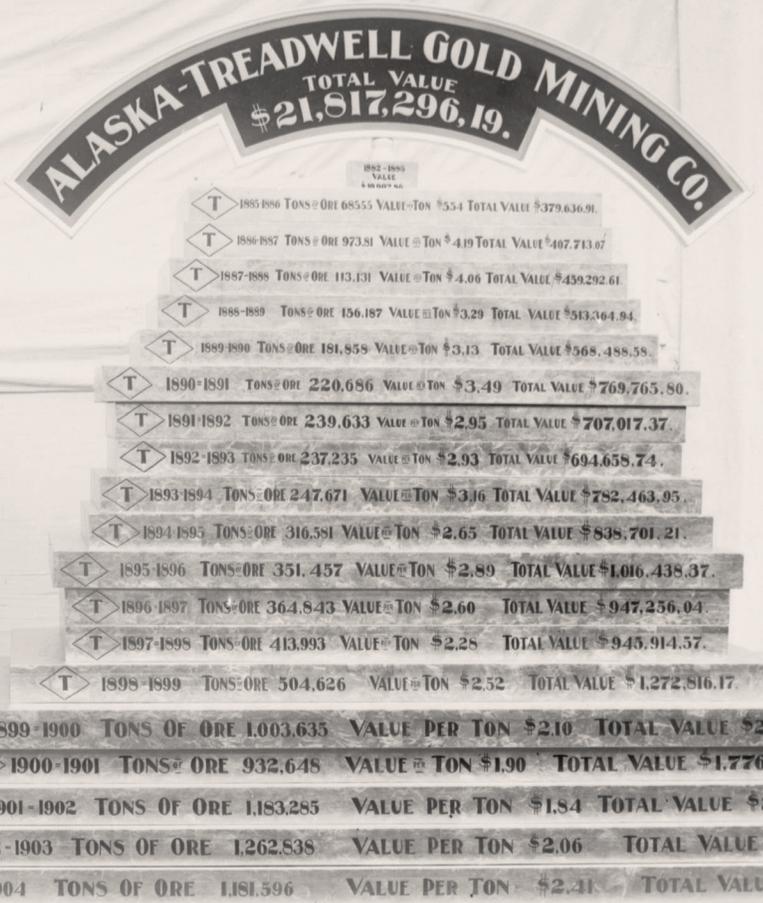
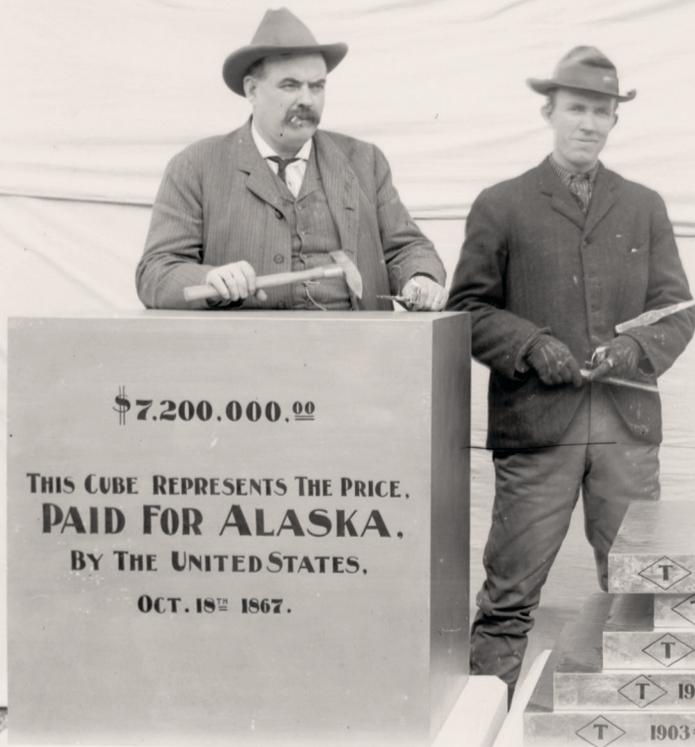


ALASKA ECONOMIC TRENDS

MAY 2019



METAL MINING in ALASKA

ALSO INSIDE
How wages grew amid job losses

FROM THE COMMISSIONER

Management tip: Employee engagement boosts productivity

By Dr. Tamika L. Ledbetter, Commissioner

Engaged employees are productive employees, and workers often cite poor leadership as a major reason for their discontentment and disengagement at work.

Good managers understand employees are their greatest asset, and they know productivity depends on helping workers realize the importance of what they do. Because employees who feel deeply connected to their work tend to perform better, leaders must be able to communicate how each task supports the organization's mission or bottom line and that each employee's contribution is vital to the organization's success.

Creating this culture of engagement in the workplace requires managers to lead by example. Leadership is not what you do, but the embodiment of who you are. The most effective and credible managers are those who inspire their teams by demonstrating their own commitment to professional development and self-improvement.

Private companies and public agencies alike would be wise to evaluate the leadership competency of their managers if they observe less-than-stellar worker performance. Giving managers the skills



they need to engage workers and lead more effectively will help them coach their teams to higher levels of performance.

As commissioner of this amazing department, I want to challenge every supervisor to consider how cultivating each employee's engagement and commitment can vastly improve their unit's productivity.

I believe improving overall performance starts with building management and supervisory skills. During my tenure, I will focus on executive-level leadership training. I encourage division directors to prioritize ongoing training, professional development, and mentorship and to foster the same commitments in their own leadership teams.

I'm confident that if we embrace this challenge, it will lead to even greater productivity, and the result will be more Alaskans benefitting from our improved services.

Contact Dr. Tamika L. Ledbetter, Commissioner, at (907) 465-2700 or commissioner.labor@alaska.gov.



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ON THE COVER:

This exhibit shows the value and production of Treadwell Mines from 1885 to 1904, at a total value of \$21,817,296.19, and a visual comparison to Alaska's total purchase price. The man on the left is Joseph C. MacDonald, Treadwell's superintendent from 1901 to 1904. Photo courtesy of Alaska State Library Winter and Pond Photo Collection

ALASKA
DEPARTMENT of LABOR
and WORKFORCE
DEVELOPMENT

Governor
Michael J. Dunleavy

Commissioner
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ALASKA ECONOMIC TRENDS

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Trends is a nonpartisan, data-driven magazine that covers a range of economic topics in Alaska.

ON THIS PAGE: The background image for 2019 is an aerial photo of rivers near Circle by Dr. Travis Nelson, who teaches at the Center for Pediatric Dentistry in Seattle. Nelson visited Alaska in May 2010 to provide dental care to children in Venetie, Circle, and Fort Yukon.

Metal Mining in Alaska

Small, high-value industry with a long history here is growing

By **SARA TEEL**

Mining is a colorful part of Alaska's past. There are ghost town tours of Kennecott Mine, Skagway exists and thrives because of its gold rush history, and Treadwell Mine tailings created Sandy Beach in Juneau. But mining is also an important part of Alaska's current economy and will almost certainly play a growing role in its future.

For more than a century, Alaska has produced a variety of minerals, especially metals produced from hard rock. Today, Alaska only produces gold, silver, lead, and

zinc in large quantities. In fact, Alaska was the top silver producer in the U.S. in 2017, and zinc and lead were the state's top two foreign exports. (See the sidebar on page 7 for a list of all metals ever produced in the state and those we're likely to mine in the future.)

The main metal mines

Alaska has five large-scale metal mines in production: Pogo, Red Dog, Kensington, Greens Creek, and Fort Knox. (See Exhibit 1.) Another 205 mostly small placer operations reported gross operating income in 2017.

Types of metal mines and typical extraction techniques in Alaska

Metallic ores include ferrous (iron-containing) ores such as steel; nonferrous ores such as copper, tin, lead and zinc; and precious metals such as gold, silver, and platinum. This article excludes nonmetallic minerals (sand and gravel) and energy minerals (coal and petroleum).

Many lodes are difficult to access and require ground level or underground mining to reach targeted deposits using drilling or explosives. The mined rock often contains other material, so extracting the desired metal mechanically or chemically often requires crushing or pulverizing the rock.

Large mines in Alaska are mainly open pit or underground. Open pit mines extract rock or minerals relatively close to the surface through an open pit or burrow. This results in a large telescoping hole, the depth of which depends on the amount of recoverable ore and its profitability. Open pits are used to access vertical ore deposits.

Underground mines access ore deposits buried deeper in the earth when the value of the ore exceeds the incurred cost.

Miners use a range of techniques to extract the ore, often employing multiple methods over the life of a mine. The choice depends on the ore's characteristics (such as mineral type, thickness, dip, grade, and uniformity) as well as the depth, safety, cost, and likely recovery of the mineral.

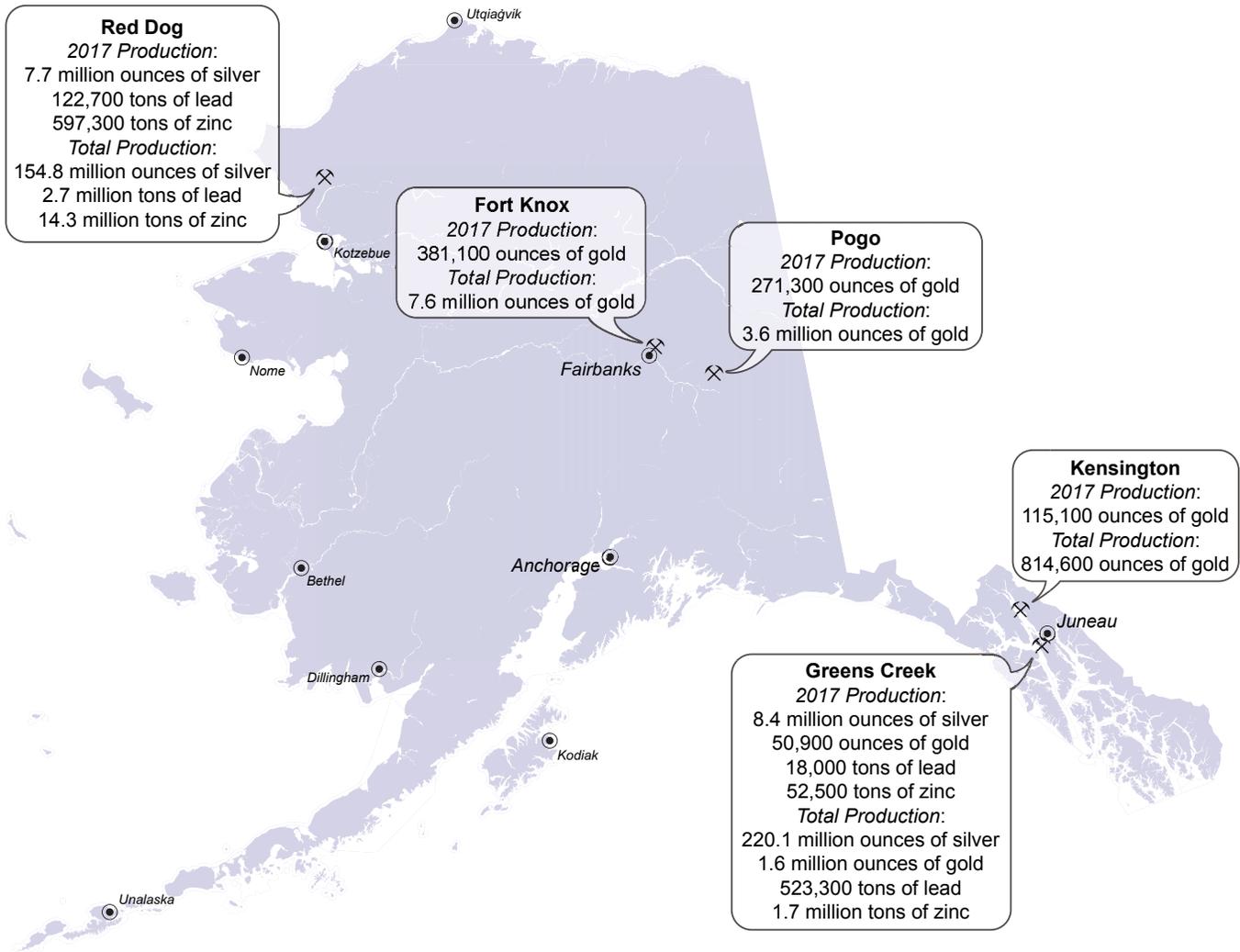
Common methods used in Alaska are:

- **Stoping:** The process of extracting the desired ore or other mineral from an underground mine, leaving behind an open space called a stope. The stope may be artificially supported or backfilled.
- **Cut-and-fill:** Also used in underground mining, usually for steep ore deposits. The ore is mined horizontally from the bottom, and then the gap is backfilled with waste rock, sand, or tailings. This becomes a platform for the layers above.
- **Drift-and-fill:** This variation of cut-and-fill is used for wider ore deposits.
- **Truck-and-shovel/truck-and-loader:** In open pit mines, workers unearth material with shovels or loaders, then transport it by truck.

Another notable type of mining is placer, which is usually associated with gold. Placer mines use water to excavate, transport, concentrate, and recover minerals, utilizing differences in density. Placer mining is the oldest form of mining in Alaska and these mines can range from mom-and-pop outfits to large operations, although most are small. Well-known placer mining methods are dredging and panning.

1 Alaska's Main Metal Mines and Their Production

2017



Source: Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys: Alaska's Mineral Industry 2017

(See the sidebar on the previous page for mine types and the extraction techniques used in Alaska.)

- Fort Knox Mine, 20 miles outside of Fairbanks, is Alaska's largest surface gold mine. It was discovered in 1984 and has been producing continuously since 1996. Fort Knox is an open pit mine that uses a truck-and-shovel operation.
- Pogo Mine is an underground gold mine about 130 miles from Fairbanks. Discovered in 1994, the mine began producing in 2006. Pogo is a cut-and-fill operation.
- Red Dog Mine, 82 miles from Kotzebue, has one of the largest open-pit zinc deposits in the world. Red Dog also produces lead and, to a lesser extent, silver. It was discovered in 1968 and has been producing since 1989. Red Dog is a truck-and-loader operation.
- Greens Creek Mine, on Admiralty Island about 18 miles from Juneau, is in the Tongass National Forest. It's an underground mine that produces silver, zinc, gold, and lead through cut-and fill and long hole stoping. Greens Creek was discovered in 1975, produced from 1989 through 1993, then resumed continuous production in 1996.
- Kensington Mine is an underground long hole stop-

ing and drift-and-fill gold mine 45 miles north of Juneau near Lynn Canal. It has been producing continuously since 2010.

2 Export Value of Alaska Metals AND RANK AMONG ALL OF ALASKA'S FOREIGN EXPORTS IN 2017

Zinc is now more valuable than gold

The thought of valuable metals may conjure the image of heavily laden lines of prospectors climbing Chilkoot Pass during the Klondike Gold Rush in a mad dash for discovery riches. But while gold continues to provide a lucrative revenue stream, Alaska's zinc production value has surpassed that of gold by 10 percent over the last decade.

Zinc and its concentrates were also Alaska's top foreign export in 2017, followed by lead ore and its concentrates at a distant second. (See Exhibit 2.)

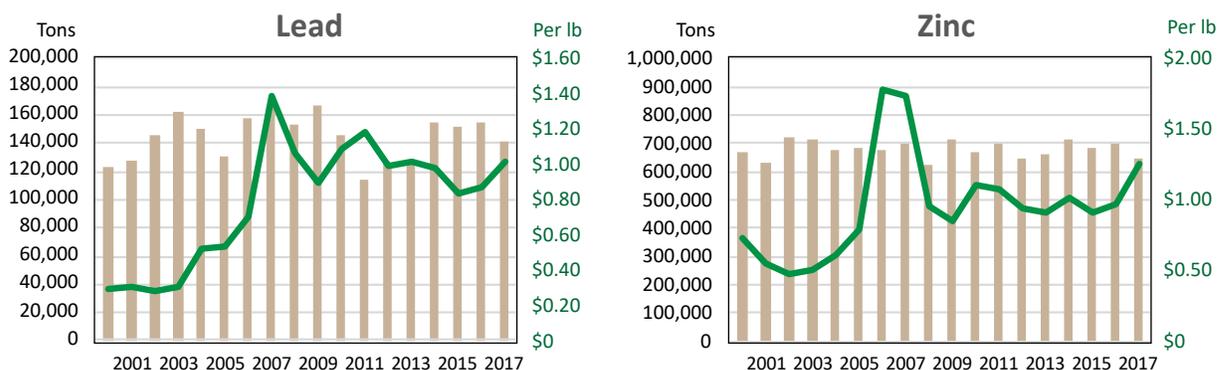
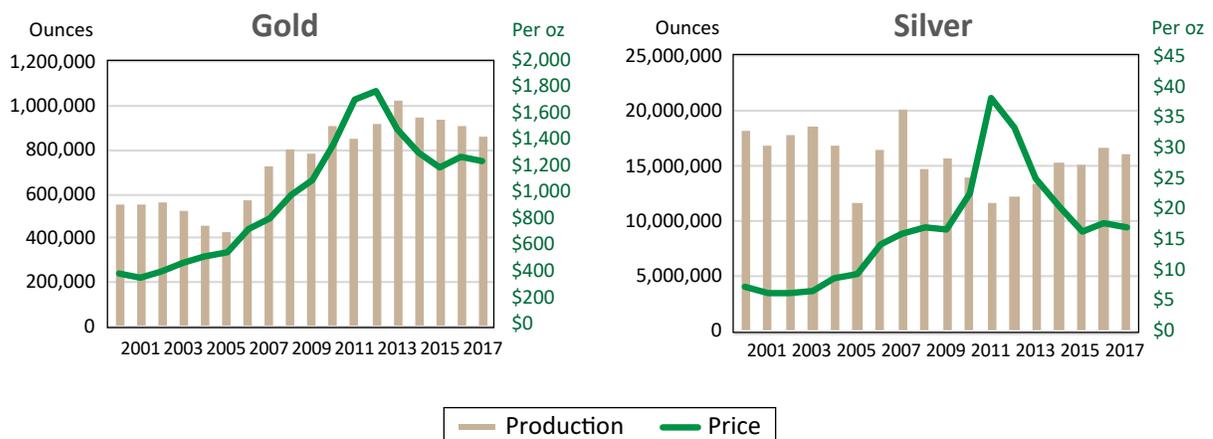
Rank	Description	Value* in millions of dollars			
		2014	2015	2016	2017
1	Zinc Ores and Concentrates	\$1,106	\$917	\$864	\$1,231
2	Lead Ores and Concentrates	\$380	\$338	\$391	\$431
12	Precious Metals Ores/Concentrates, Exc Silver	\$145	\$159	\$151	\$131

*Adjusted to 2017 dollars
Source: U.S. Census Bureau foreign trade statistics

Production and price have a complex relationship

While gold and silver have been mined continuously in Alaska since the late 1800s, significant production of lead and zinc began just over three decades ago with the commercial success of the Northwest Arctic

3 Production and Prices of Alaska's Main Metals 2000 TO 2017, PRICES ADJUSTED TO 2017 DOLLARS



Source: Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys: Alaska's Mineral Industry 2017

Alaska's current and historically mined metals, and future possibilities

Metals Alaska produced in 2017

Gold (Au)	Gold has been mined in Alaska since the 1870s. Forty percent of domestic use is for jewelry, 35 percent is electrical and electronics, and 20 percent is coins. Gold is also used in dental applications. Alaska ranks ninth globally for known gold deposits.
Lead (Pb)	Minor amounts of lead have been mined in Alaska since the 1880s, but significant production began in 1989, aside from a brief swell from the 1910s to 1940s. The lead-acid based industry consumes approximately 85 percent of Alaska's mined lead. It's also used in ammunition and alloys such as bronze. Environmental and health concerns have reduced its role in gasoline, paint additives, solder, and pipes. As of 2017, Alaska ranked sixth globally for known lead deposits.
Silver (Ag)	Silver is used in emerging medical and hygiene applications such as bandages and clothing and in the manufacturing of coins, jewelry, and soldering. It's also used in the declining print photography market. As of 2017, Alaska ranked 10th globally for known silver deposits.
Zinc (Zn)	Before the Red Dog Mine opened in 1989 and raised production levels significantly, zinc had a brief production stint from 1947 to 1949. Most domestic use is for galvanizing. As of 2017, Alaska ranked seventh globally for known zinc deposits.

Metals Alaska produced in the past

Antimony (Sb)	Used in flame retardants and shrapnel alloys, antimony was produced from 1914 to 1918 and again in 1937, then sporadically until the mid-1980s. Antimony is also used in lead-acid batteries and plastic.
Barite (BaSO4)	Barite contains barium, an earth metal produced from the 1960s to 1980. Barite is a weighting agent in fluids used in the drilling of oil and gas wells. It can also be a contrast medium for x-ray and tomography exams of the gastrointestinal tract.
Chromium (Cr)	Chromium, a transition metal, is an ingredient in stainless steel and was produced in Alaska in small amounts from 1942 to 1943 and again from 1954 to 1957.
Copper (Cu)	Copper production started in 1901 and peaked in 1916 with the help of Kennecott Mine near McCarthy, then petered out by the 1960s. Most copper is used in construction and electronics, but it's also used for machinery and consumer products. Electric vehicle production could boost demand for copper in the coming years. As of 2017, Alaska ranked 11th globally for known copper deposits.
Mercury (Hg)	Alaska produced some mercury, a transition metal, from 1940 to 1973. This toxic metal was historically used in thermometers, batteries, cosmetics, and paint. Due to Environmental Protection Agency restrictions, mercury is now mainly limited to use in chlorine caustic soda. It occurs as a byproduct of gold mining and was once used to separate gold from placer gravels.
Platinum (Pt)	Platinum is a byproduct of copper mining that was dredged in Southwest Alaska for about 40 years beginning in 1926. It's used as a catalyst for air pollution abatement in vehicles and in chemical and electronic technologies as well as in jewelry.
Tin (Sn)	Tin production in Alaska reportedly began in 1902 and ceased in 1993. Tin was used for tin cans, containers, electronics, vehicles, and solder. It was also used in construction.
Tungsten (W)	Tungsten was produced in Alaska intermittently from 1916 to 1980. Nearly 60 percent of the tungsten used in the U.S. was in cemented carbide parts for cutting and wear-resistant applications, primarily in the construction, metal working, mining, and oil and gas drilling industries.
Uranium (U)	Uranium was produced in Alaska from 1955 to 1971.

Metals Alaska is likely to produce in the future

Molybdenum (Mo)	While there is no history of molybdenum production in Alaska, it is a prospective product of the Pebble Mine Project, which is in the advanced exploration phase. Molybdenum is used in steel alloys and superalloys.
Rare Earth Elements (REEs)	Rare earth elements are composed of the lanthanide series. They have a silver appearance and can be difficult to extract. REEs are used in national defense technology, petroleum refining, and air pollution control. The Bokan-Dotson Ridge Project on Prince of Wales Island, which is in the advanced exploration phase, shows potential for REEs including dysprosium, terbium, and yttrium.

Sources: Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys; and United States Geological Survey, Mineral Commodity Summaries 2017

Borough's Red Dog Mine.

Since 2000, only gold production has significantly increased in volume. This is the result of Pogo coming online in 2006 and Kensington in 2010. Zinc production remained relatively flat over that period, while silver and lead production bounced around. (See Exhibit 3.)

Price and production don't always track together, as the relationship is complicated. High startup and operation-

al costs, the time it takes from discovery to start of production, and regulatory obligations mean short-term price volatility doesn't usually affect short-term production. Mines can't promptly shut down when prices fall, nor can they quickly expand when prices jump. Some mines also produce multiple metals, so changes in an individual metal's price or production level can have a lesser effect on operational decision-making.

On the other hand, commodity prices have a direct

relationship with total production value. Since 2000, prices for all four metals have grown steadily, marked by occasional price spikes due to market volatility. (See Exhibit 3.)

Commodity price increases coupled with large production volumes have led to significant growth in production value, even when year-to-year changes in volume were modest. This was the case with zinc and gold. From 2008 to 2017, zinc's production value grew by 36 percent but production only rose 4 percent. Gold's trend was similar, with value increasing 34 percent but production up only 7 percent. (See Exhibit 4.)

Silver and lead are worth less and their production value gains were also more modest. Silver recorded 10 percent growth in value and production, and lead's production and value fell by 8 percent and 12 percent, respectively, over the 2008-2017 period.

Small but growing industry pays high average wages

In 2017, Alaska had an average of 2,688 jobs in metal mining and more than \$296 million in total wages. The industry paid among the highest average wages in the state, behind oil and gas, at \$110,171. (See Exhibit 5.) This was more than double the state's average wage that year.

From 2008 to 2017, metal mining employment grew 36 percent and its wages rose 44 percent. This was in stark contrast to Alaska's total employment, which grew just 2 percent while total wages rose 5 percent.

While metal mining has increased its presence in Alaska, these jobs remain a small fraction of total employment and wages. In 2008, metal mining represented 0.6 percent of Alaska employment, which grew to 0.8 percent in 2017. Wages grew from 1.2 percent of the total to 1.7 percent.

By mineral, the highest average wage in 2017 was \$114,296 for silver, lead, or zinc mining, and gold mining wasn't far behind at \$109,229. Metal mining support jobs paid an average of \$89,088.

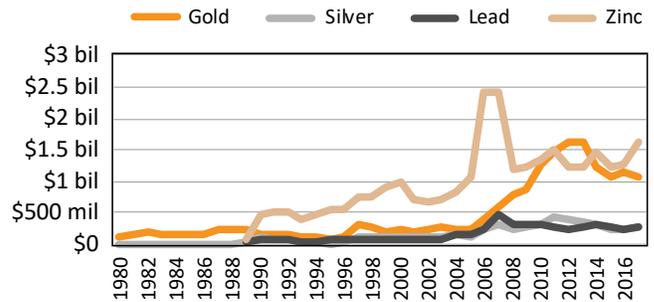
In terms of wage distribution by worker, 53 percent of metal mining workers made less than \$90,000 per year, 26 percent averaged between \$90,000 and \$120,000, and 22 percent made more than \$120,000 per year. (See Exhibit 6.)

Most jobs, wages are in gold

Three of Alaska's five main mines produce only gold, so gold mining makes up almost two-thirds of total metal mining employment and wages.

4 Metal Production Values

ALASKA, 1980 TO 2017, IN 2017 DOLLARS



Source: Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys: Alaska's Mineral Industry 2017

5 Small Industry, High Wages

SELECT ALASKA INDUSTRIES, 2017

Industry	Jobs	Avg wage	Total wages
Oil and Gas	9,753	\$135,458	\$1,321,118,766
Metal Mining	2,688	\$110,171	\$296,140,024
Utilities	2,116	\$86,726	\$183,512,285
Construction	15,162	\$74,937	\$1,136,196,966
Transportation/Warehousing	19,746	\$64,129	\$1,266,300,600
Information	5,985	\$63,750	\$381,543,471
Professional/Business Svcs	27,875	\$61,537	\$1,715,333,781
Financial Activities	12,821	\$56,821	\$728,504,267
Wholesale Trade	6,368	\$56,177	\$357,732,284
All Industries	327,987	\$53,208	\$17,451,502,959
Education And Health Services	48,848	\$51,002	\$2,491,359,372
Manufacturing	13,217	\$49,115	\$649,152,816
Agriculture, Forestry, Fishing, Hunting	1,151	\$48,600	\$55,938,034
Retail Trade	36,368	\$31,174	\$1,133,752,759
Leisure And Hospitality	35,371	\$23,627	\$835,719,030

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

Gold mining employment grew 45 percent over the last decade and wages grew 51 percent, mostly from 2009 to 2012 when gold production jumped. (See exhibits 3 and 7.) Nongold metal mining employment grew more gradually, rising 24 percent overall from 2008 to 2017.

Gold mining employment was more volatile and had larger swings, as Exhibit 8 shows, until 2016 when prices stabilized. For other metals, growth has been more gradual but sustained. Only 2014 showed a dip in non-gold mining employment.

Most metal miners are young men, Alaska residents

In 2017, Alaska residents made up 62 percent of all metal mining workers and brought home 64 percent of total wages, with some variation depending on the type of metal. (See Exhibit 9.)

The highest resident percentage was in zinc and lead mining, at 71 percent. This is largely because Alaska's largest zinc mine is Red Dog, which operates under an agreement with NANA Development Corporation, which owns the mine. A substantial portion of Red Dog's workers are resident NANA shareholders.

Support jobs are the exception, at just 39 percent resident. The need for highly specialized workers unavailable locally is often cited for the disparity. These jobs include drilling and boring machine tool setters, specialized earth drillers and extraction workers, and millwrights.

The majority of residents in metal mining are men (88 percent), who earn 91 percent of total wages. Women, at 12 percent of workers, earn 9 percent.

The median age is 37, with 57 percent of workers 40 or younger. Just 26 percent are 50 or older. (See Exhibit 10.)

These demographics are common in the mining industry overall due to remote job sites, extreme conditions, and atypical work schedules such as one week on, one week off.

Interest in metal mining is growing

Interest in mining appears to be growing. From 2016 to 2017, the number of state prospecting sites increased 174 percent while active site claims grew 10 percent and federal claims increased by 11 percent. Overall, the area of new claims staked grew 232 percent in 2017.

According to the Alaska Department of Natural Resources, a prospecting site grants exclusive prospecting rights for two years and exclusive rights to convert the site to a claim upon discovery. A mining claim is a parcel of land in which the claimant has the right to develop and extract a discovered mineral deposit. These claims can be on state or federal land and are subject to applicable regulations.

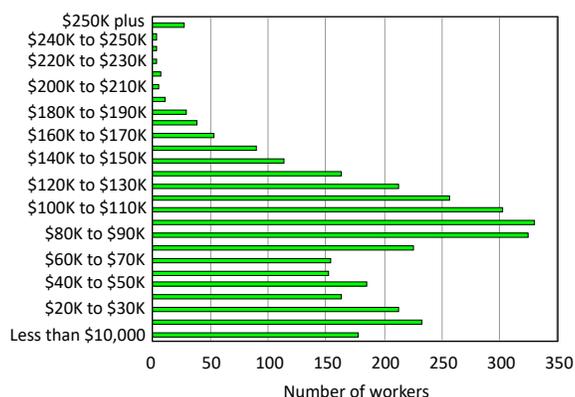
A range of new projects and new ores are on the horizon

According to the Fraser Institute's Annual Survey of Mining Companies, Alaska ranked fifth out of 91 global regions for mineral potential in 2017 and 10th for over-

6

What Metal Miners Earn*

ALASKA, 2017



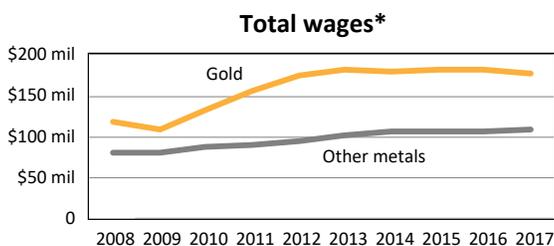
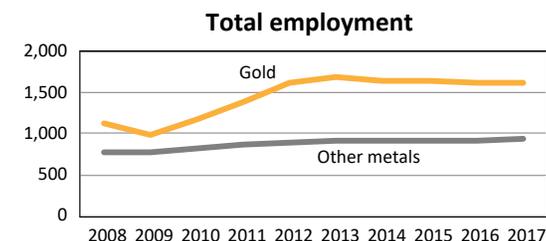
*Includes wages for all people who worked in metal mining at any time during the year. Workers with lower wages likely worked only part of the year.

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

7

Most Jobs, Wages in Gold

ALASKA, 2008 TO 2017



*Adjusted to 2017 dollars

Note: Does not include support employment and wages

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

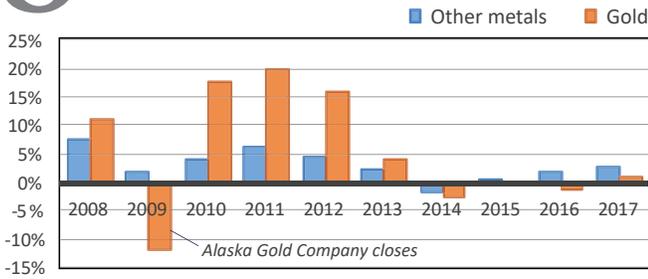
all investment attractiveness by mining and exploration companies. The Department of Labor and Workforce Development projects metal mining employment¹ will grow 18.4 percent from 2016 to 2026.

Alaska has multiple opportunities on the horizon, both in the short and long term. Some mines are expanding or pursuing new developments, such as Kensington Mine's

¹Does not include support jobs

8 Gold Mining More Volatile

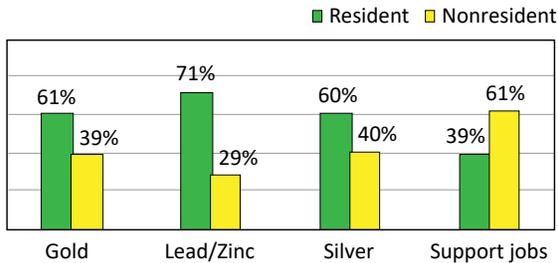
EMPLOYMENT CHANGE, 2008 TO 2017



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

9 Most Miners Are Residents*

RESIDENCY BY METAL MINED, 2017



*As defined by PFD eligibility criteria
Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

Jualin vein, Fort Knox’s Gilmore project, and Red Dog’s Anarraaq-Aktigiruaq project.

Other potential projects include new mines such as the Pebble Project, a porphyry copper-gold-molybdenum deposit in the Bristol Bay region; Donlin Gold, a proposed, large open pit gold mine in the southwest; and Palmer (copper-zinc-silver-gold-barite). All three are in the advanced exploration stage, although final permitting is uncertain for Pebble in particular due to opposition from groups concerned about possible effects on Alaska’s salmon streams.

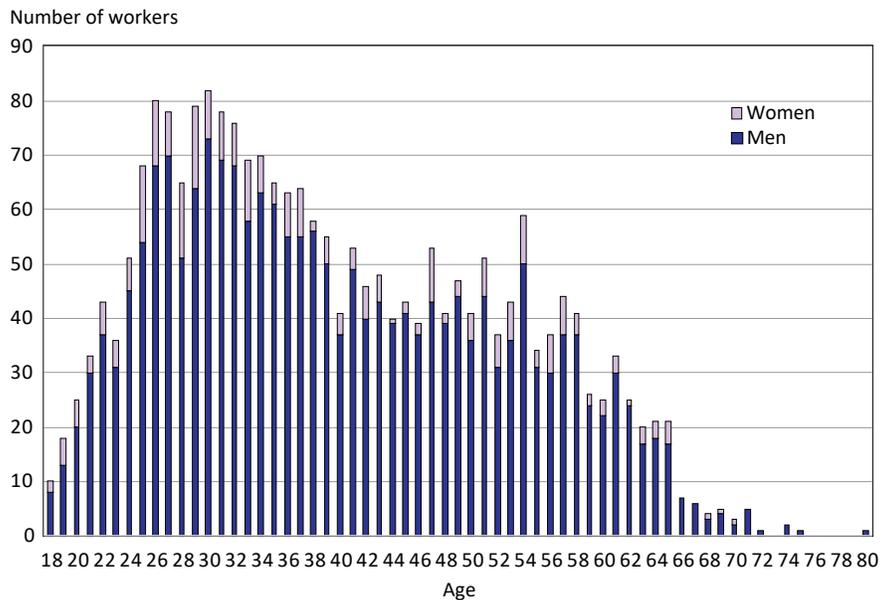
Some former metal-producing mines aim to restart production, including Nixon Fork Mine (gold) and Niblack (copper-zinc-gold-silver). Mining of copper, which has been produced in Alaska on and off for more than a century, is expected to resume due to rising global demand for copper in the power industry and electric vehicle production.

Finally, while still an emerging market, exploration of rare earth elements shows promise as demand increases due to their use in defense and other modern technology. One such possibility is the Bokan-Dotson Ridge Project, which is in the advanced exploration phase. The project is located on Prince of Wales Island in an area rich in heavy rare earth elements such as dysprosium, terbium, and yttrium.

Sara Teel is an economist at Research and Analysis in Juneau. Reach her at (907) 465-6027 or sara.teel@alaska.gov.

10 Age and Gender Distribution of Workers

ALASKA METAL MINING, 2017



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

Wages Resumed Growth Before Employment

Why some indicators turned positive as job losses continued

By NEAL FRIED

Although Alaska continued to lose jobs in 2017, the state's gross domestic product and personal income began to grow again that year. The two improving economic indicators, which both grew again in 2018, signaled the economy might be on the mend.

A third key economic indicator, total wages, also resumed growth in 2018, even as job losses persisted. (See exhibits 1 and 2.)

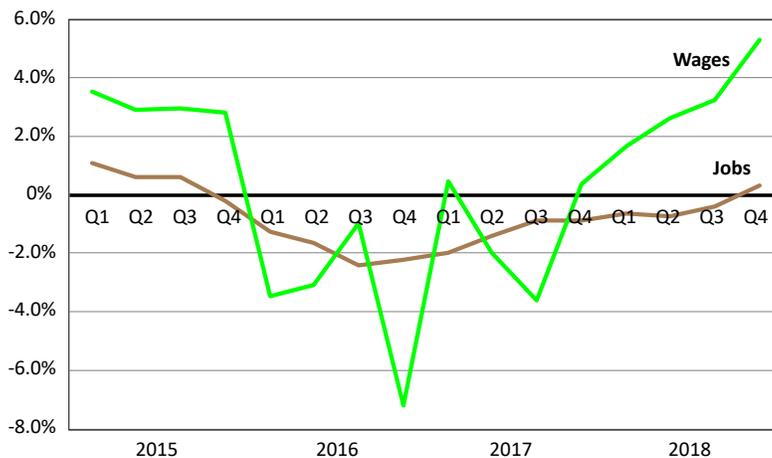
Although it might seem strange for GDP, personal income, and total wages to grow during a period of job loss, looking closer at recent years' data sheds light on how that can happen. The explanation for resumed growth in GDP and income is fairly straightforward, while the pattern for jobs and wages shows a more complicated relationship but makes sense in terms of how the recession progressed over the last three years.

GDP and personal income rose with oil prices, nonwork payments

In the case of state gross domestic product, the price of oil is the tail that often wags the dog. Oil prices went from \$43 per barrel in 2016 to \$54 per barrel in 2017, boosting GDP.

The reasons for the rise in personal income (the

1 Changes in Wages, Jobs Over Four Years 2015 TO 2018, BY QUARTER



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

money a person takes in from all sources) were more nuanced. Although the largest share of income comes from working, more than a third comes from other sources, including investments and transfer payments such as Social Security, Medicaid, and in Alaska's case, the Permanent Fund Dividend.

The stock market performed exceptionally well in 2017, with the Dow Jones up 25 percent. Income from transfer payments also went up that year.

In 2016, total wages fell harder than employment

The pattern for jobs and wages changed each year over the past three.

2 Employment and Wages by Industry During the Recession

2015 to 2018

	2015			2016			Change in jobs 2015-2016	Change in total wages 2015-2016	2017			Change in jobs 2016-2017	Change in total wages 2016-2017
	Jobs	Total wages	Mth avg	Jobs	Total wages	Mth avg			Jobs	Total wages	Mth avg		
Total Employment	338,574	\$18,343,850,415	\$4,515	332,177	\$17,667,325,894	\$4,432	-1.9%	-3.7%	327,963	\$17,451,502,959	\$4,434	-1.3%	-1.2%
Mining	17,146	\$2,294,834,454	\$11,153	14,249	\$1,836,258,350	\$10,739	-16.9%	-20.0%	12,829	\$1,649,127,947	\$10,712	-10.0%	-10.2%
Oil and Gas	14,169	\$1,978,174,691	\$11,634	11,303	\$1,520,917,129	\$11,213	-20.2%	-23.1%	9,753	\$1,321,118,766	\$11,288	-13.7%	-13.1%
Construction	17,680	\$1,437,170,309	\$6,774	16,247	\$1,260,060,228	\$6,463	-8.1%	-12.3%	15,162	\$1,136,196,966	\$6,245	-6.7%	-9.8%
Manufacturing	14,142	\$668,964,247	\$3,942	13,655	\$653,362,440	\$3,987	-3.4%	-2.3%	13,217	\$649,152,816	\$4,093	-3.2%	-0.6%
Wholesale Trade	6,540	\$367,064,525	\$4,677	6,469	\$361,351,701	\$4,655	-1.1%	-1.6%	6,368	\$357,732,284	\$4,681	-1.6%	-1.0%
Retail Trade	37,431	\$1,148,810,182	\$2,558	37,082	\$1,138,281,257	\$2,558	-0.9%	-0.9%	36,368	\$1,133,752,759	\$2,598	-1.9%	-0.4%
Transp and Warehousing	19,694	\$1,230,169,237	\$5,205	19,689	\$1,240,689,678	\$5,251	0.0%	0.9%	19,746	\$1,266,300,600	\$5,344	0.3%	2.1%
Utilities	2,135	\$186,673,705	\$7,286	2,120	\$180,597,013	\$7,099	-0.7%	-3.3%	2,116	\$183,512,285	\$7,227	-0.2%	1.6%
Information	6,313	\$407,038,070	\$5,373	6,293	\$395,576,049	\$5,238	-0.3%	-2.8%	5,985	\$381,543,471	\$5,312	-4.9%	-3.5%
Financial Activities	12,958	\$711,369,551	\$4,575	12,930	\$721,308,698	\$4,649	-0.2%	1.4%	12,821	\$728,504,267	\$4,735	-0.8%	1.0%
Prof and Business Svcs	29,974	\$1,891,834,199	\$5,260	28,448	\$1,749,125,682	\$5,124	-5.1%	-7.5%	27,875	\$1,715,333,781	\$5,128	-2.0%	-1.9%
Education/Health Svcs'	46,353	\$2,271,287,343	\$4,083	47,721	\$2,371,969,226	\$4,142	3.0%	4.4%	48,848	\$2,491,359,372	\$4,250	2.4%	5.0%
Health Care/Soc Asst	44,027	\$2,199,714,646	\$4,164	45,392	\$2,299,305,526	\$4,221	3.1%	4.5%	46,450	\$2,412,683,443	\$4,328	2.3%	4.9%
Leisure and Hospitality	34,942	\$809,525,818	\$1,931	35,314	\$823,536,868	\$1,943	1.1%	1.7%	35,371	\$835,719,030	\$1,969	0.2%	1.5%
Other Services	11,764	\$391,765,810	\$2,775	11,154	\$392,472,813	\$2,932	-5.2%	0.2%	11,232	\$402,265,865	\$2,985	0.7%	2.5%
Federal Government	14,955	\$1,162,962,435	\$6,480	15,198	\$1,178,859,122	\$6,464	1.6%	1.4%	15,077	\$1,197,617,759	\$6,619	-0.8%	1.6%
State Government	25,768	\$1,443,246,101	\$4,667	24,562	\$1,426,132,304	\$4,839	-4.7%	-1.2%	23,793	\$1,348,076,599	\$4,722	-3.1%	-5.5%
Local Government	39,399	\$1,854,695,268	\$3,923	39,637	\$1,870,581,700	\$3,933	0.6%	0.9%	39,728	\$1,908,829,512	\$4,004	0.2%	2.0%

	2018			Change in jobs 2017-2018	Change in total wages 2017-2018
	Jobs	Total wages	Mth avg		
Total Employment	326,791	\$18,018,167,759	\$4,595	-0.4%	3.2%
Mining	12,538	\$1,730,266,335	\$11,500	-2.3%	4.9%
Oil and Gas	9,364	\$1,382,122,947	\$12,300	-4.0%	4.6%
Construction	15,820	\$1,247,760,717	\$6,573	4.3%	9.8%
Manufacturing	12,622	\$648,109,058	\$4,279	-4.5%	-0.2%
Wholesale Trade	6,439	\$376,250,379	\$4,869	1.1%	5.2%
Retail Trade	35,816	\$1,145,349,625	\$2,665	-1.5%	1.0%
Transportation	20,062	\$1,345,304,382	\$5,588	1.6%	6.2%
Utilities	2,194	\$208,789,354	\$7,930	3.7%	13.8%
Information	5,617	\$364,183,190	\$5,403	-6.1%	-4.6%
Financial Activities	12,387	\$733,412,940	\$4,934	-3.4%	0.7%
Professional and Business Services	27,280	\$1,710,515,079	\$5,225	-2.1%	-0.3%
Education and Health Services	49,558	\$2,638,779,476	\$4,437	1.5%	5.9%
Health Care and Social Assistance	47,122	\$2,557,355,623	\$4,523	1.4%	6.0%
Leisure and Hospitality	35,573	\$867,739,910	\$2,033	0.6%	3.8%
Other Services	11,181	\$407,036,141	\$3,034	-0.5%	1.2%
Federal Government	14,868	\$1,220,362,429	\$6,840	-1.4%	1.9%
State Government	23,599	\$1,353,673,667	\$4,780	-0.8%	0.4%
Local Government	39,604	\$1,961,978,138	\$4,128	-0.3%	2.8%

Source: Alaska Department of Labor,
Research and Analysis Section Quarterly
Census of Employment and Wages

Overall, Alaska lost about 6,400 jobs in 2016, another 4,200 in 2017, and 1,200 in 2018. (See Exhibit 2.)

In 2016, total wages fell harder than total employment, as most of the jobs lost were in the high-wage oil and gas, construction, state government, and professional and business services sectors. The biggest loser in 2016 was the oil industry, where the average monthly wage was \$11,213 compared to \$4,432 for all industries. Construction, with an average monthly wage of \$6,463, was the second-largest job loser.

In 2017, percent losses in jobs and wages were about the same

In 2017, the same high-wage industries continued to lose jobs, but the losses slowed. A growing number of lost jobs that year came from manufacturing, retail, and other industries with lower-than-average monthly wages. As a result, the loss in total wages moderated, making the percentages of jobs and wages lost in 2017 nearly identical.

In 2018, wages began to grow but employment continued to fall

The pattern changed in a less predictable way in 2018. Wages began growing again in the first quarter, and growth accelerated over the next three quarters even as the state continued to lose jobs.

Employment losses moderated considerably in 2018, however, and the fourth quarter showed slight growth. Even more than the year before, 2018's job losses came from lower-wage industries such as retail and manufacturing, and fewer were from high-wage industries. (See Exhibit 2.)

Another big change was in the construction industry.

After two years of extensive loss, construction began to grow again. This high-wage industry had been a big contributor to the overall wage losses over the two prior years, so its resumed growth pushed total wages deeply into the black in 2018.

Other possible reasons for increasing wage growth

Although the oil industry continued to lose jobs in 2018, its total wages grew by 4.6 percent. A number of reasons are likely, including larger bonuses or more total hours worked. The job mix could also have changed in favor of more higher-wage jobs.

Raises are another possibility. Although Alaska's oil industry was still contracting in 2018, which doesn't usually signal a positive environment for raises, nationally the industry began to recover in 2017 and was having a hard time finding workers. Under those conditions, Alaska's oil industry had to stay competitive to keep its workforce, which likely pushed wages higher.

It's also important to remember a number of industries largely escaped the ravages of the recession, including the mining industry, those linked to tourism, and federal government. In the normal course of employment, a large share of the workforce receives raises over the long term, and after three years the cumulative effects would contribute to an overall increase in wages.

Any conversation about the change in wages over time should include inflation. Until 2018, Alaska's inflation rate was very low — under 1 percent from 2015 to 2017. It jumped to 3 percent in 2018, which muted that year's real wage gains.

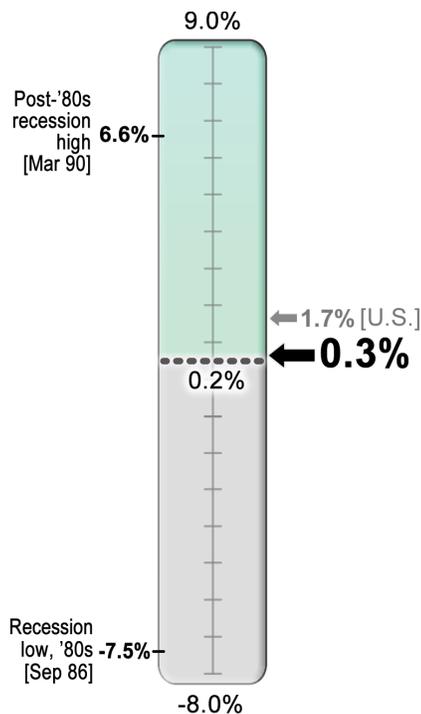
Neal Fried is an economist in Anchorage. Reach him at (907) 269-4861 or neal.fried@alaska.gov.

Gauging Alaska's Economy



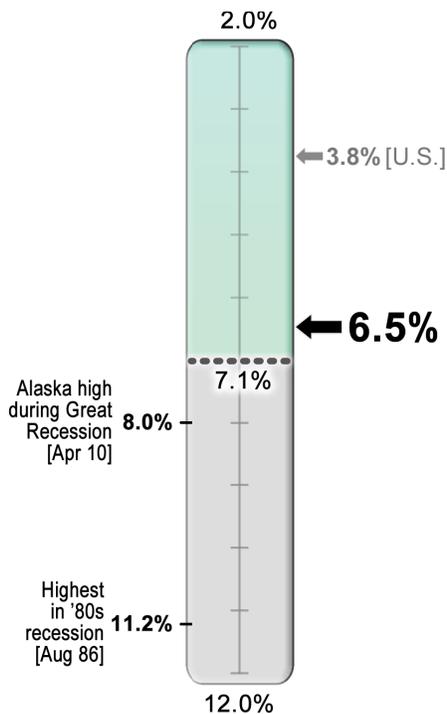
Job Growth

March 2019
Over-the-year percent change



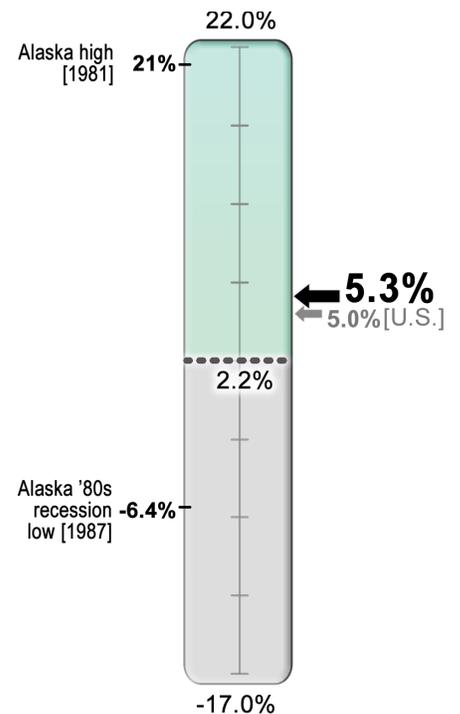
Unemployment Rate

March 2019
Seasonally adjusted



Wage Growth

4th Quarter 2018
Over-the-year percent change



- After revisions to 2018 data, the state has registered over-the-year job gains for six consecutive months after losing jobs for the prior 36 months.
- The gains are small but could signal the end of the state's recession.
- U.S. job growth remains strong and has been positive since 2010, with the strongest growth in 2015.

- Alaska's rate has been level at 6.5 percent for the last eight months.
- Unemployment rates are complicated economic measures and generally less telling than job or wage growth as indicators of broad economic health.

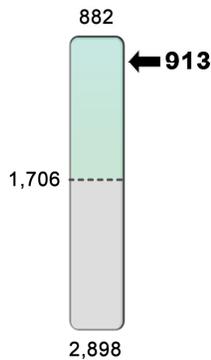
- Wages increased for the fifth consecutive quarter, with the strongest recent growth in fourth quarter 2018.
- Fourth quarter 2018 wages grew faster in Alaska than the national average, signaling the ongoing recovery from the state's longest recession.

Gauging Alaska's Economy

ALASKA'S 10-YR AVERAGE
← CURRENT ALASKA

Initial Claims

Unemployment, week ending April 6, 2019†

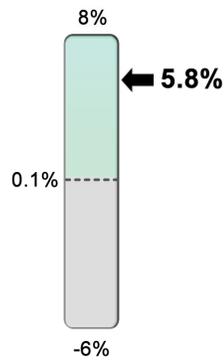


➤ For a variety of reasons, initial claims are well below the 10-year average despite job losses.

† Four-week moving average ending with the specified week

GDP Growth

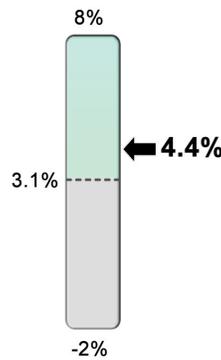
3rd Quarter 2018
Over-the-year percent change



➤ Gross domestic product is the value of the goods and services a state produces. Alaska's GDP has grown for the last eight quarters after declining for 15 out of the prior 16.

Personal Income Growth

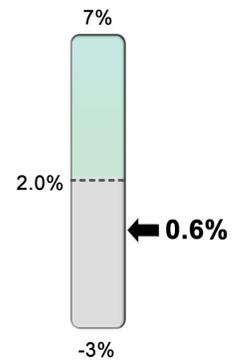
4th Quarter 2018
Over-the-year percent change



➤ Personal income includes wages as well as transfer payments (such as Social Security, Medicaid, and the PFD) and investment income. Growth has resumed and is now well above the 10-year average.

Change in Home Prices

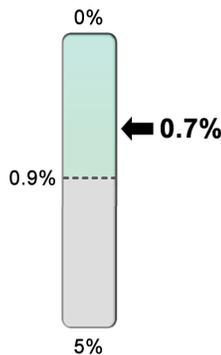
Single-family, 4th Qtr 2018
Over-the-year percent change



➤ Home prices include only those for which a commercial loan is used. This indicator tends to be volatile from quarter to quarter.

Foreclosure Rate

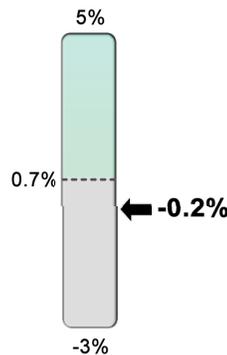
4th Quarter 2018



➤ Foreclosure rates remain very low, highlighting how different the current recession is from the '80s recession when foreclosure rates exceeded 10 percent.

Population Growth

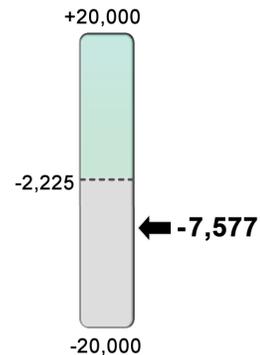
2017 to 2018



➤ The state's population has remained mostly stable during the state's recession, although 2018 was the second year of small population declines since 1988.

Net Migration

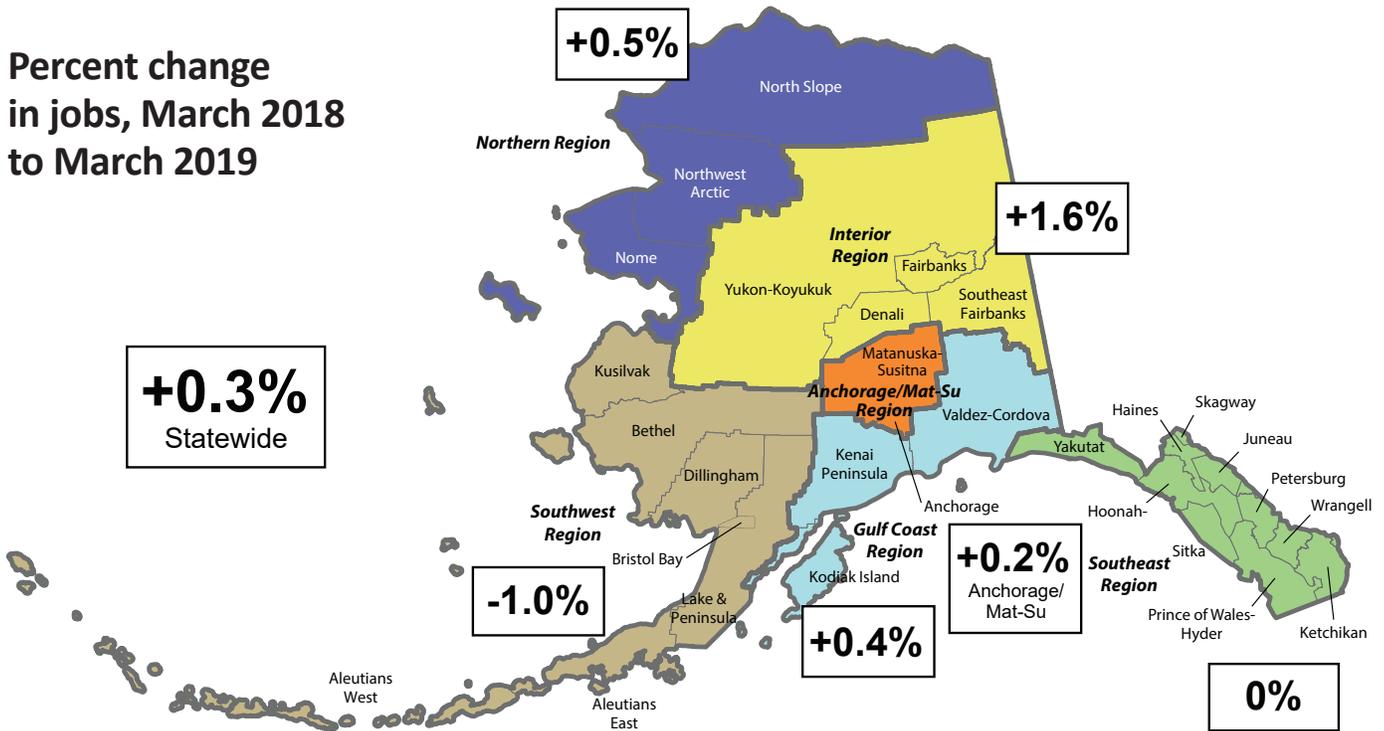
2017 to 2018



➤ The state had net migration losses for the sixth consecutive year in 2018, although natural increase (births minus deaths) offset those losses until 2017 and 2018.

Employment by Region

Percent change
in jobs, March 2018
to March 2019



Unemployment Rates

Seasonally adjusted

	Prelim.	Revised	
	03/19	02/19	03/18
United States	3.8	3.8	4.0
Alaska	6.5	6.5	6.7

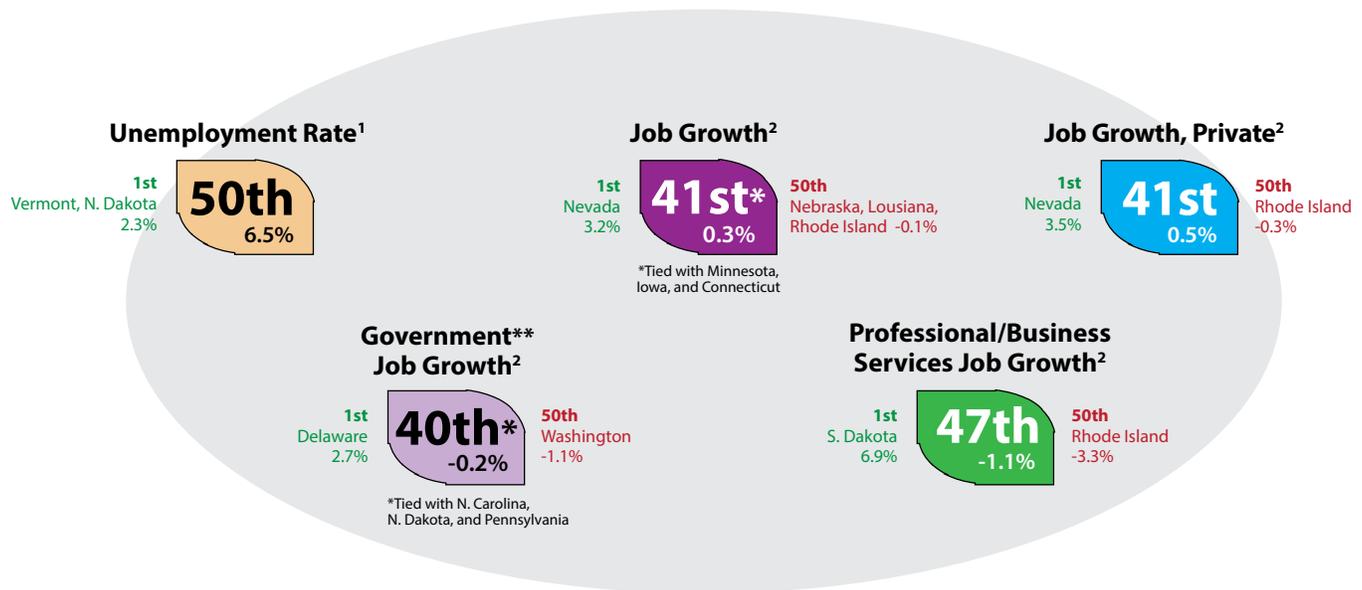
Not seasonally adjusted

	Prelim.	Revised	
	03/19	02/19	03/18
United States	3.9	4.1	4.1
Alaska	7.2	7.5	7.3

Regional, not seasonally adjusted

	Prelim.	Revised			Prelim.	Revised			Prelim.	Revised	
	03/19	02/19	03/18		03/19	02/19	03/18		03/19	02/19	03/18
Interior Region	7.4	7.8	7.3	Southwest Region	10.3	10.7	9.9	Southeast Region	7.8	8.4	7.3
Denali Borough	18.4	20.0	16.6	Aleutians East Borough	2.2	2.0	1.9	Haines Borough	14.4	15.3	14.5
Fairbanks N Star Borough	6.4	6.7	6.4	Aleutians West Census Area	2.9	2.7	2.4	Hoonah-Angoon Census Area	19.7	21.2	19.6
Southeast Fairbanks Census Area	10.4	11.8	11.5	Bethel Census Area	13.8	14.7	13.1	Juneau, City and Borough	5.5	5.7	4.8
Yukon-Koyukuk Census Area	17.4	18.6	17.8	Bristol Bay Borough	15.0	17.9	15.2	Ketchikan Gateway Borough	7.9	8.4	7.5
Northern Region	11.0	11.4	11.0	Dillingham Census Area	9.9	9.8	9.3	Petersburg Borough	12.3	11.7	11.9
Nome Census Area	12.0	12.8	12.2	Kusilvak Census Area	21.3	22.3	21.1	Prince of Wales-Hyder Census Area	14.1	15.9	13.3
North Slope Borough	6.8	6.7	6.7	Lake and Peninsula Borough	13.9	15.9	13.9	Sitka, City and Borough	4.8	5.1	4.8
Northwest Arctic Borough	14.6	15.3	14.7	Gulf Coast Region	8.1	8.7	8.7	Skagway, Municipality	18.5	23.6	19.2
Anchorage/Mat-Su Region	6.3	6.5	6.6	Kenai Peninsula Borough	8.6	9.1	9.4	Wrangell, City and Borough	9.2	10.8	8.8
Anchorage, Municipality	5.7	5.8	5.9	Kodiak Island Borough	5.2	5.2	4.8	Yakutat, City and Borough	11.5	12.5	8.7
Mat-Su Borough	8.3	8.5	8.8	Valdez-Cordova Census Area	9.9	11.4	10.3				

How Alaska Ranks



**Federal, state, and local; includes public schools and universities

¹March seasonally adjusted unemployment rates

²March employment, over-the-year percent change

Sources: U.S. Bureau of Labor Statistics and Alaska Department of Labor and Workforce Development, Research and Analysis Section

Other Economic Indicators

	Current	Year ago	Change
Urban Alaska Consumer Price Index (CPI-U, base yr 1982=100)	227.992 2nd half 2018	219.131	+4.0%
Commodity prices			
Crude oil, Alaska North Slope, * per barrel	\$67.94 March 2019	\$66.60	+2.01%
Natural gas, residential, per thousand cubic feet	\$10.14 Jan 2019	\$10.59	-4.25%
Gold, per oz. COMEX	\$1,269.60 4/23/2019	\$1,324.00	-4.11%
Silver, per oz. COMEX	\$14.97 4/23/2019	\$16.66	-10.14%
Copper, per lb. COMEX	\$2.92 4/23/2019	\$3.13	-6.79%
Zinc, per MT	\$2,767.00 4/18/2019	\$3,229.00	-14.31%
Lead, per lb.	\$0.88 4/23/2019	\$1.05	-16.19%
Bankruptcies			
	101 Q1 2019	101	0%
Business	9 Q1 2019	13	-30.77%
Personal	92 Q1 2019	88	+4.55%
Unemployment insurance claims			
Initial filings	4,359 March 2019	4,972	-12.33%
Continued filings	41,936 March 2019	46,062	-8.96%
Claimant count	10,718 March 2019	12,670	-15.41%

*Department of Revenue estimate

Sources for pages 14 through 17 include Alaska Department of Labor and Workforce Development, Research and Analysis Section; U.S. Bureau of Labor Statistics; U.S. Bureau of Economic Analysis; Kitco; U.S. Census Bureau; COMEX; Bloomberg; Infomine; Alaska Department of Revenue; and U.S. Courts, 9th Circuit

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