Alaska's Mineral Industry 2001

SPECIAL REPORT 56

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
in cooperation with
Division of Community & Business Development
Division of Mining, Land & Water

Alaska's Mineral Industry 2001

by
R.C. Swainbank, D.J. Szumigala, M.W. Henning, and F.M. Pillifant

Division of Geological & Geophysical Surveys

SPECIAL REPORT 56

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EXECUTIVE SUMMARY

Alaska's Mineral Industry 2001 is the twenty-first in a series of annual reports produced cooperatively by the Department of Natural Resources (DNR) and the Department of Community & Economic Development (DCED) through their Division of Geological & Geophysical Surveys (DGGS) and Division of Community & Business Development (DCBD), respectively.

The cumulative value of the Alaska minerals industry for the year 2001 reached only $1.022 billion, a decrease of 20 percent compared with the $1.28 billion in 2000. Of this total, $23.8 million was invested in exploration and $81.2 million in development projects. Production was valued at $917.34 million, with most ($786.6 million) from metals.

The year 2001 was difficult for the industry because the price of zinc declined 22 percent, from $0.51 per pound in 2000 to $0.40 in 2001, and the price of both silver and gold declined by 13 and 3 percent, respectively. Zinc production accounted for 65 percent of metal value, and almost 50 percent of total mineral production value in Alaska, while gold accounted for 19 percent and silver for 9 percent of the total metal value, respectively.

The decline in exploration investment in Alaska during 2001 is consistent with the decline in activity worldwide in response to low metal prices, and the consequent difficulty in attracting investment. Exploration investment was more evenly distributed throughout Alaska during 2001, with investment in eastern Alaska at 42 percent of the total spent in the state, while expenditures in southwestern and northern Alaska were 23 and 20 percent, respectively, of the total.

Mining claim staking dropped precipitously during 2001, with only 1,380 state mining claims, 8 state prospecting sites, and 464 federal mining claims staked. The number of state claims and prospecting sites staked decreased 77 percent from 2000 levels, more than double the 32 percent drop in exploration expenditures from 2000 to 2001. New federal claims in 2001 decreased to 89 percent of 2000 levels. Many of the federal claims staked in Alaska were in southeastern Alaska and reflect the continued exploration in this region for platinum-group elements.

The amount of placer and hard-rock drilling dropped during 2001 compared to 2000, reflecting the slump in exploration expenditures. Core drilling totaled 240,318 feet and reverse-circulation drilling totaled 75,750 feet. The eastern Interior region led the drilling during 2001, followed by the southeastern region.

Gold deposits remained the main focus of exploration, with 67 percent of 2001 expenditures, followed by base-metals deposits (20 percent) and polymetallic deposits (8 percent). The largest mineral exploration program in Alaska during 2001 was at the Donlin Creek gold property near Crooked Creek in southwestern Alaska. High-grade gold mineralization was expanded at the Acma zone. Other major Alaskan exploration projects included the discovery of the zinc–lead–silver Aktigiruq deposit near Red Dog Mine, continued drilling at the Road Metal prospect (gold–silver–base-metals) near Northway, drilling at the True North and Gil gold properties near Fairbanks, work on the White Gold property near Tok, ground geophysics and drilling at the Shulin Lake diamond property near Petersville, drilling at Greens Creek Mine that identified downdip extensions of silver-rich polymetallic mineralization, and extensive exploration (including drilling) at the Union Bay and Duke Island properties for platinum-group-element mineralization.

With completion of the Mill Optimization Project at Red Dog Mine during 2001, development investment declined from $141.7 million in 2000 to $81.2 million in 2001. Development projects were reported at True North Mine (associated with the Fort Knox mill), at the Pogo gold mine north of Delta Junction, and at Greens Creek and Kensington/Jualin mines near Juneau.

Total value of production from Alaska's mines and quarries in 2001 was $917.34 million, down 17 percent from the $1.106 billion reported in 2000. Much of the decline can be attributed to the 22 percent decline in the price of zinc, 13 percent decline in the price of silver, and 3 percent decline in the price of gold year-on-year, but 2001 also saw reduced production of all of these metals from 2000 levels.

Metals accounted for 86 percent of the total value of Alaska's mineral production in 2001, followed by industrial minerals (rock, sand, and gravel) at 9 percent, and coal and peat at 5 percent. Zinc continued to be the most valuable metal in terms of total production value, followed by gold, silver, and lead. Production of sand and gravel remained about the same as in the previous year at 10.4 million tons, but rock production fell back to 3.1 million tons from 5.2 million in 2000.

Although the mill throughput at Red Dog and Greens Creek mines was a record in 2001, mining of lower grade ore resulted in less zinc and silver production, which was not offset in value by the higher production of lead. Both Fort Knox and Illinois Creek mines reported record production, but a 50 percent decline in placer gold production continued a trend that started in 1997.

Alaska's mineral industry provided an estimated 2,835 full-time-equivalent jobs in 2001, down 348 from the previous year. Most jobs lost were in the placer mining sector.

In government actions, the popular airborne geophysical surveys were reinstated in 2001 and three areas were surveyed. The Department of Natural Resources presented reclamation awards to Mike Busby, James Oudekerk, Flint Wolf, Cy Bras, and Placer Dome Inc. Geologists from the Division of Geological & Geophysical Surveys spent two months mapping, sampling, and collecting field information in the Fortymile and Salcha River–Pogo geophysical tracts.

GOVERNOR'S FOREWORD

Alaska's mineral industry exceeded $1 billion in total value for the sixth year in a row in 2001, an impressive achievement for the mining industry in Alaska and one that points to the mining industry's importance in our state's diversified economy. Overall the total value of Alaska minerals production, exploration, and development was $1.022 billion last year and the minerals industry provided 2,835 high-paying jobs. Record production from Alaska's hardrock metal mines in 2001 was offset by depressed metal prices including a 20 percent drop in zinc prices. While the total value of the minerals industry was down from the previous year's record of almost $1.3 billion, the value of the minerals industry in Alaska was up from $720 million in 1995 and an average of $580 million in the previous four years.

Highlights of the year include the Red Dog Mine, which now has the capacity to produce 1.2 million tons a year of concentrate grading 56 percent zinc. At its increased capacity, production from the Red Dog Mine will be about 10 percent of the world's mined zinc output. The joint venture between NANA Regional Corp. and Teck Cominco Alaska Inc. has provided long-term, stable jobs for the residents of the region, who are trained and hired to work at the mine site. In addition, Teck Cominco has adopted a progressive training program that includes management training, a job shadow program, and aggressive shareholder hire goals. Currently more than 60 percent of the over 500 employees at the mine are NANA shareholders, with wages exceeding $15 million paid to these employees annually. In addition, Teck Cominco has made many important contributions in the region, and in the local communities. Agreements with NANA have established committees that review the impacts of mining on traditional hunting and fishing activities, and give the local people authority and input over these activities. The NANA–Teck Cominco partnership is an excellent example of responsible mining in partnership with local communities.

Another project that holds great promise for the future is the Donlin Creek gold project in southwestern Alaska. A mine at Donlin Creek could bring the same benefits to the southwestern region that the Red Dog Mine has brought to northwestern Alaska. The Yukon–Kuskokwim region is one of Alaska's poorest areas with few stable employment opportunities. Calista Corp., the regional Native corporation, hopes that a major mine can employ hundreds of local people, modeled after Red Dog. The exciting results from NovaGold Resources' 2001 exploration program, with some of the highest grade drill intercepts ever reported from the property, are extremely encouraging and help to continue this exploration project towards what one day could be Alaska's largest gold mine.

The minerals industry has benefited from changes in state law and the way the state has done business over the past 8 years. This includes passage of the Exploration Incentives Act in 1995, providing more flexible work hours for miners in 1996, and resolution of the Mental Health Lands issue in 1997. We also upgraded equipment in the Recorders Office in 1998, and funded a core permitting team at the Alaska Department of Environmental Conservation in 2001. Such proactive measures, and Alaska abundant mineral endowment, helped Alaska rank seventh out of 45 regions in the Americas and Australia for mining investment attractiveness in a survey conducted in 2001 by the Fraser Institute, Canada's leading economic think tank.

While the year 2001 presented challenges for Alaska's minerals industry, the industry was able to meet those challenges and continue to expand production and provide well paid jobs for Alaskans. The State of Alaska welcomes continued investment in developing its mineral resources as we seek further expansion of the mining sector in Alaska's economy.

Governor Tony Knowles

COMMISSIONERS' FOREWORDS

The Department of Community and Economic Development (DCED) and the Department of Natural Resources (DNR) are pleased to bring you the twenty-first annual report on Alaska's minerals industry.

DCED works closely with the mining industry and is an advocate for sound development of the state's significant mineral deposits. Through our sister agencies, the Alaska Industrial Development and Export Authority (AIDEA) and the Alaska Science and Technology Foundation (ASTF), the department has helped to develop necessary infrastructure and fostered important industry-related research. AIDEA, for example, financed the port and road facilities at Red Dog, and managed the coal loading facility at Seward and the dock and loading facility at Skagway. ASTF has funded research into new methods for beneficiation of ores and concentrates.

Despite low metal prices in 2001, the mining industry continued to provide nearly 2,900 high-paying jobs statewide, many in economically depressed areas. Almost 600 of these jobs are associated with the world-class Red Dog zinc mine in northwestern Alaska. AIDEA is working with the mine owner and operator to investigate options to expand the port for more efficient and safe loading of concentrates and to promote regional development.

At Donlin Creek in southwestern Alaska, the new gold resource estimate of over 20 million ounces holds promise for much-needed development. It is likely that AIDEA and other state agencies will play a role in these developments.

Elsewhere in the state, both DCED and DNR are involved in the permitting of the 5.6-million-ounce Pogo gold deposit near Delta Junction and the 2.5-million-ounce Kensington/Jualin property north of Juneau. In addition to these advanced stage projects, there are many exciting prospects such as Pebble Copper, Arctic, Bornite, Shotgun, Kougarok and Rock Creek (Appendix C) that may be developed in the future.

With these promising prospects and the advanced stage projects already underway, Alaska's mineral industry is well positioned to benefit from an improving global economy and a rebound in metal prices.

Deborah B. Sedwick, Commissioner, Department of Community & Economic Development

The value of Alaska's mineral industry in 2001 remained above the billion-dollar mark, the sixth consecutive billion-dollar year. This achievement is significant for the Alaska mineral industry as it continues to struggle with depressed metal prices, restrictions in venture capital, and worldwide competition for mineral investment.

The Alaska Department of Natural Resources (DNR) contributes to Alaska's economy by encouraging the wise development of mineral resources. DNR accomplishes this by providing the land base for mineral exploration and development, by managing its lands to facilitate the sound development of mineral resources, and by providing data and information about Alaska's land and minerals.

DNR has continued to work for conveyance of mineral-rich selected lands from the federal government to the state. This year, after successfully securing special management funding, the state expects to receive the so-called "Denali Block" of lands along the Denali Highway, containing platinum-group elements of high priority to the Alaska mineral industry.

The Large Mine Permitting Team at DNR deserves recognition for streamlining permitting among all state agencies and working closely with federal regulators. Fort Knox gold mine near Fairbanks was brought on line using this new approach and in December 2000 final authorizations were issued to Fairbanks Gold Mining Inc., to begin development of the True North Project near Fairbanks. DNR is currently conducting a similar permitting project for the proposed Pogo gold mine near Delta.

Divisions within DNR continue to streamline processing times and to provide more information through the Internet. Land records, forms for mining-related activities, filing affidavits of annual labor, filing a MTRSC location certificate, and geologic information are now available on-line. More information and increased remote access capabilities are continually being added.

DNR's Division of Geological & Geophysical Surveys sent geologic field teams to numerous sites across Alaska to gather data on geologic resources and natural conditions, and to map and inventory mineral and energy resources on state land. Geologic teams from DGGS's mineral section worked on areas of high mineral potential that had previously been flown for airborne geophysics in the Fortymile mining district and the Big Delta Quadrangle near the Pogo gold property. DGGS also contracted for additional airborne geophysical surveys that will assist DGGS geologists in evaluating state lands.

DNR will continue to ensure that Alaska's mining industry remains robust. Innovation and dedication at DNR will allow Alaska to successfully compete with other worldwide mineralized areas.

Pat Pourchot, Commissioner, Department of Natural Resources

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Alaska's Mineral Industry 2001

R.C. Swainbank,[1] D.J. Szumigala,[2] M.W. Henning,[3] and F.M. Pillifant[4]

INTRODUCTION

This summary of the year 2001 Alaska mineral industry is the twenty-first in the series of annual reports, and is made possible by information provided through phone interviews, replies to many of the 884 questionnaires sent to members of the mineral industry and compiled by the Division of Community & Business Development (DCBD) and the Division of Geological & Geophysical Surveys (DGGS), press releases, and other information sources. Funds for printing the report are provided by the DCBD in the Department of Community & Economic Development (DCED). This report is part of a cooperative venture between DGGS in the Department of Natural Resources (DNR), the DCBD, and the Division of Mining, Land & Water (DMLW) in DNR.

Figure 1 shows the regions of the state used in this and subsequent sections. Table 1 and figure 2 show the estimated value of the mineral industry for each year since 1981, divided into exploration and development investment, and the value of the mined products. We rely on company information to define the exploration and development parameters. Average metal prices are calculated from the daily London PM close for the price of gold, and from the weekly average spot prices on the London Metal Exchange, and are used to calculate the value of production. These values do not take into account the costs of mining or transportation, or smelter charges and penalties.

The 2001 cumulative value of Alaska's minerals industry is $1.022 billion, a decrease of 20 percent from the record $1.28 billion in 2000. A decline of 32 percent in exploration ($23.8 million in 2001 versus $34.9 million in 2000), and of 43 percent in development investment ($81.16 million in 2001 versus $141.7 million in 2000), was overshadowed in value by the 17 percent decline in production from $1,106.4 million in 2000 to only $917.3 million in 2001. Because zinc is by far the most valuable single mineral commodity produced in Alaska, the 22 percent decline in price ($0.51 per pound in 2000 versus $0.40 per pound in 2001) accounts for almost the entire deficit.

Mining companies sometimes report in metric units, but this report uses only U.S./English units. A conversion table is included as Appendix F. In some instances values are reported as parts per million or billion, reflecting industry standards. Whenever possible, values for gold and silver have been converted to ounces per ton, unless the translation would render the numbers insignificant.

Companies spent $23.8 million on mineral exploration in Alaska in 2001. Low metal prices affected the ability of companies to raise capital for exploration, not only in Alaska but globally, and this trend is likely to continue into the year 2002. Compared to the past several years, exploration activity was more evenly distributed throughout Alaska. The eastern interior region saw a sharp reduction in activity, while the Seward Peninsula and southeastern Alaska experienced a rebirth in activity. Gold remained the major exploration commodity, but polymetallic and platinum-group-element (PGE) exploration increased from recent levels.

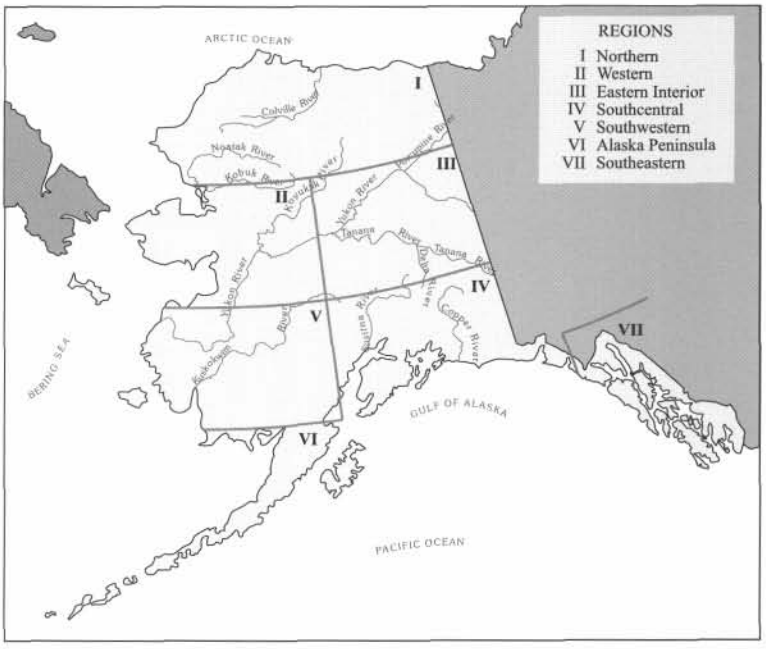

Figure 1. *Regions of mineral activity in Alaska as described in this report.*

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Development expenditures in Alaska in 2001 were $81.16 million, and projects included completion of the Mill Optimization Project at the Red Dog zinc–lead mine; permitting, road construction, and construction of the True North Mine; permitting at the Pogo, Greens Creek, and Kensington projects; and pit development at Usibelli Coal Mine.

Table 1. *Total value of the mineral industry in Alaska by year (in millions of dollars)*

	Exploration (expenditure)	Development (expenditure)	Production (value)	Total (calculated)
1981	76.3	24.7	188.6	289.6
1982	45.6	41.6	196.4	283.7
1983	34.1	27.9	212.4	274.4
1984	22.3	53.4	199.4	275.1
1985	9.2	34.1	226.6	269.9
1986	8.9	24.3	198.5	231.7
1987	15.7	100.3	202.4	318.4
1988	45.5	275.0	232.2	552.6
1989	47.8	134.3	277.0	459.0
1990	63.3	14.3	533.0	610.6
1991	39.9	25.6	546.5	612.0
1992	30.2	29.6	560.8	620.6
1993	30.3	27.7	448.7	506.7
1994	31.1	45.0	507.5	583.6
1995	34.3	148.6	537.2	720.1
1996	44.7	394.0	590.4	1,029.2
1997	57.8	168.4	936.2	1,162.4
1998	57.3	55.4	921.2	1,033.9
1999	52.3	33.8	1,032.9	1,119.1
2000	34.9	141.7	1,106.4	1,283.0
2001	23.8	81.2	917.3	1,022.3
TOTAL	**$805.3**	**$1,880.9**	**$10,571.6**	**$13,257.9**

SOURCE: Alaska's mineral industry reports published annually by DGGS.

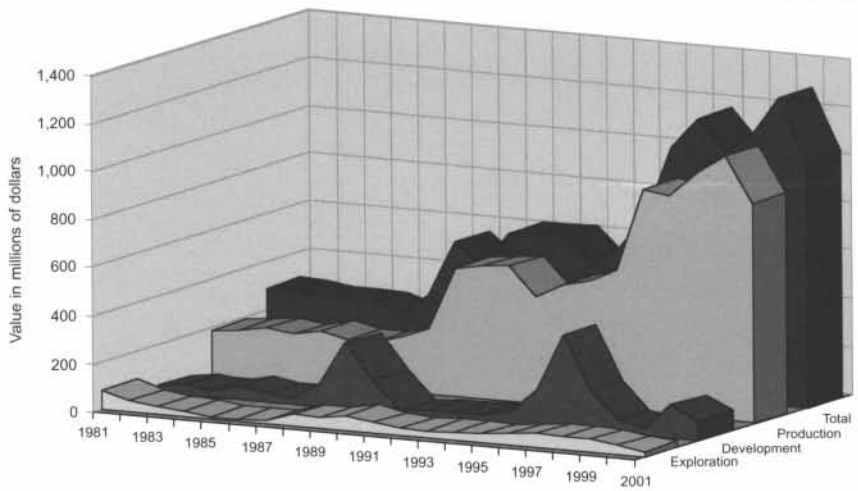


Figure 2. *Alaska's mineral industry total value, 1981-2001.*

Despite record mill throughput in 2001 at Red Dog and Greens Creek mines, total production of concentrates at both were lower than in 2000 due to milling of lower-grade ore. Production at the Fort Knox Mine was a record 411,220 ounces, due to the blending of higher-grade True North ore with the lower-grade Fort Knox ore. Placer gold production in 2001 was 22,841 ounces, a 50 percent decrease from the 46,314 ounces recovered in 2000, continuing the decline that began in 1997.

EMPLOYMENT

The estimated total employment by the Alaska mineral industry in 2001 was 2,835 full-time-equivalent jobs (table 2; fig. 3). This is a decrease of 348 jobs (11 percent) from the 3,183 jobs in 2000. There was a decline of 294 jobs in placer mining, partially offset by an increase of 63 jobs in hard-rock gold mining. The only other significant change was the decrease of 47 jobs in sand and gravel production between 2000 and 2001.

ACKNOWLEDGMENTS

This report on the Alaska minerals industry is intended to provide current, accurate, and technically reliable information. The authors wish to thank all companies, agencies, and individuals that responded to the questionnaires or phone calls and provided information about their activities and operations. Without your voluntary and timely information this report would not be possible.

DGGS mailed 884 questionnaires in November of 2001, and received 135 responses. Dick Swainbank (DCBD) and Dave Szumigala (DGGS) prepared the body of the text, tables, and appendices with information supplied by many individuals and the assistance of staff from other state agencies.

The cover design is by Joni Robinson, and graphic illustrations are by Alfred Sturmann and Joni Robinson of DGGS. Paula Davis of DGGS edited the final version, and Joni Robinson completed the layout and design. Printing costs were paid by the Division of Community & Business Development.

Table 2. *Estimated Alaska mine employment, 1995–2001*[a]

	1995	1996	1997	1998	1999	2000	2001
Gold/silver mining							
Placer	975	825	780	710	591	470	176
Lode	38	138	415	345	296	274	337
Polymetallic	- -	68	230	275	275	275	275
Base metals	397	407	478	466	549[b]	556	559
Recreational	255	260	270	255	240	250	210
Sand & gravel	577	598	700	658	590	603	556
Rock	200	149	123	121	128	150	137
Coal	120	115	118	128	121	121	121
Peat	30	38	42	40	38	36	32
Tin, jade, soapstone, ceramics, platinum	20	20	20	20	20	20	20
Mineral development	637	862	409	177	135	345	333
Mineral exploration	157	257	277	282	183	83	79
TOTAL	**3,406**	**3,737**	**3,862**	**3,477**	**3,166**	**3,183**	**2,835**

[a]Calculated on a 260-day work year.

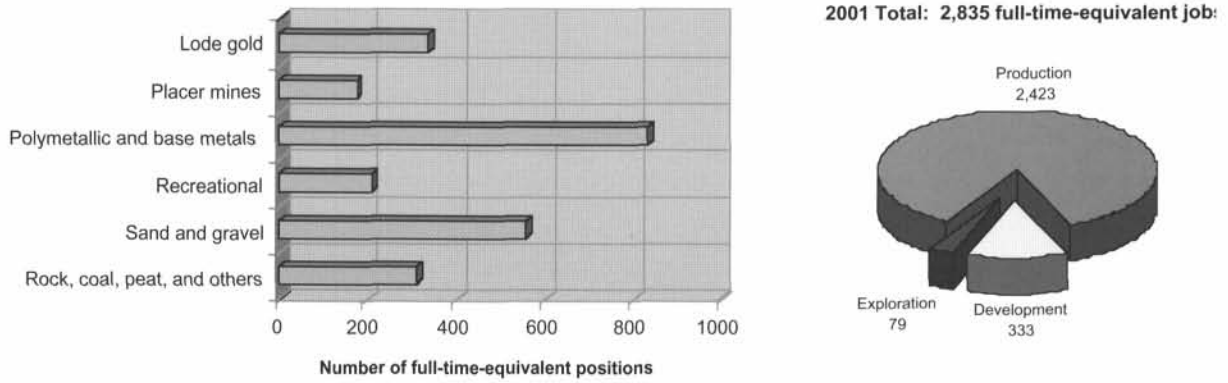


Figure 3. *2001 mineral industry employment by category.*

EXPLORATION

Exploration expenditures in Alaska during 2001 were estimated at $23.8 million, a drop of about 32 percent compared to expenditures of $34.9 million in 2000. The value of mineral exploration was at its lowest point since 1987. The drop in mineral exploration expenditures in Alaska during the past four years reflects four successive years of falling worldwide mineral exploration budgets. The Canadian minerals consultancy Metals Economics Group (MEG) researched information from 679 mining companies with annual budgets of US$100,000 or more and noted that the aggregate exploration budget of US$2.2 billion is a nine-year low for exploration budgets and a 15 percent decline from 2000 exploration budgets. Factors for the decline include five major mining companies disappearing in 2000 through takeovers or mergers and six more significant mergers during 2001, depressed metal prices, and continued lackluster equity markets for junior mining and exploration companies. The percentage decline in expenditures in Alaska between 2000 and 2001 is equal to the percentage drop in expenditures for exploration in the United States. Exploration expenditures in Alaska during 2001 accounted for 15 percent of the total exploration spending in the United States.

Exploration expenditures and employment by region are listed in table 3. Exploration expenditures by commodity are listed in table 4 and shown in figure 4. The locations of significant exploration projects in Alaska during 2001 are shown in figure 5. About 1,380 new state mining claims (146,400 acres), 8 new state prospecting sites (1,280 acres), and 464 new federal claims (9,288 acres) were staked in 2001. Acres of state land staked (claims and prospecting sites) dropped to 32 percent of 2000 levels,

Table 3. *Reported exploration expenditures and employment in Alaska, 2001*

	Northern	Western	Eastern interior	South-central	South-western	South-eastern	Total
			Exploration expenditures				
Placer	$ 30,000	$ 192,000	$ 155,000	$ 44,000	$ 85,500	$ 34,700	**$ 541,200**
Lode	4,700,000	3,090,000	9,875,000	651,000	3,318,500	1,597,300	**23,231,800**
TOTAL	**$4,730,000**	**$1,111,000**	**$10,030,000**	**$695,000**	**$3,404,000**	**$1,632,000**	**$23,773,000**
			Exploration employment				
Employment							
Workdays	1,225	2,968	8,060	1,065	6,640	515	**20,473**
Workyears[a]	4.7	11.4	31.0	4.1	4.1	2.0	**79**
Number of companies reporting[b]	6	18	46	26	26	14	**113**

[a]Based on 260-day workyear.
[b]Some companies were active in several areas.
No exploration expenditures or employment reported for Alaska Peninsula in 2001.

Table 4. *Reported exploration expenditures in Alaska by commodity, 1982–2001*

	Base metals	Polymetallic[a]	Precious metals	Industrial minerals	Coal and peat	Other[b]	Total
1982	$31,757,900	$ N/A	$ 10,944,100	$ --	$ 2,900,000	$ 15,300	**$ 45,617,300**
1983	9,758,760	N/A	20,897,555	2,068,300	1,338,454	70,000	**34,133,069**
1984	4,720,596	N/A	14,948,554	270,000	2,065,000	279,500	**22,283,650**
1985	2,397,600	N/A	6,482,400	--	270,000	--	**9,150,000**
1986	1,847,660	N/A	6,107,084	170,000	790,000	--	**8,914,744**
1987	2,523,350	N/A	11,743,711	286,000	1,150,000	31,000	**15,734,061**
1988	1,208,000	N/A	41,370,600	160,200	2,730,000	--	**45,468,800**
1989	3,503,000	N/A	43,205,300	125,000	924,296	5,000	**47,762,596**
1990	5,282,200	N/A	57,185,394	370,000	321,000	97,000	**63,255,594**
1991	4,789,500	N/A	34,422,039	92,000	603,000	2,000	**39,908,539**
1992	1,116,000	3,560,000	25,083,000	25,000	425,000	--	**30,209,000**
1993	910,000	5,676,743	23,382,246	163,500	--	125,000	**30,257,489**
1994	600,000	8,099,054	18,815,560	225,000	2,554,000	810,000	**31,103,614**
1995	2,770,000	10,550,000	20,883,100	100,000	--	3,000	**34,306,100**
1996	1,100,000	11,983,364	31,238,600	400,000	--	--	**44,721,964**
1997	1,700,000	22,347,000	32,960,500	80,000	720,000	--	**57,807,500**
1998	1,000,000	13,727,000	42,441,000	12,000	87,000	--	**57,267,000**
1999	3,869,000	3,168,000	44,891,000	1,000	--	410,000	**52,339,000**
2000	8,545,000	3,933,000	21,579,000	58,500	--	736,100	**34,851,600**
2001	4,810,000	1,977,000	15,820,000[c]	50,000	10,000	1,106,000	**23,773,000**
TOTAL	**$94,208,566**	**$85,021,161**	**$524,400,743**	**$4,656,500**	**$16,887,750**	**$3,689,900**	**$728,864,620**

[a]Polymetallic deposits considered as a separate category for the first time in 1992.
[b]Includes diamonds.
[c]Approximately $2M spent on platinum-group-element exploration during 2001.
N/A = Not available.
-- Not reported.

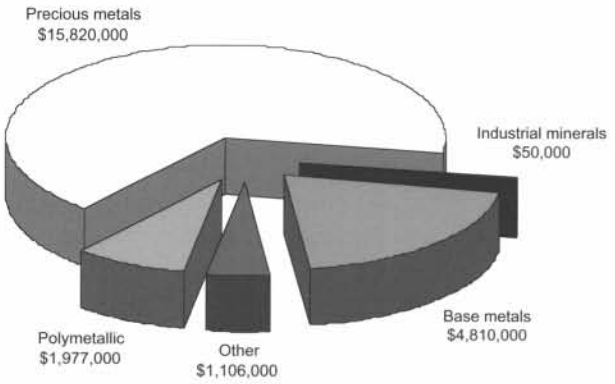


Figure 4. *2001 exploration expenditures by commodity.*

reflecting the drop in exploration expenditures and a general slowdown in grass-roots exploration. The precipitous drop in number of prospecting sites (160-acre sites, valid for 2 years, non-renewable, that provide an exclusive right to stake a mining claim if locatable minerals are discovered on the site) from previous years is due to amendment of state law allowing staking of 160-acre mining claims and a new $200 fee for the 2-year term of the prospecting site. The new law has generally made staking of prospecting sites uneconomical in most situations. Federal claim staking dropped 11 percent from 2000 levels, with many of the new federal claims staked in southeastern Alaska for their platinum-group-element mineralization potential. Table 5 summarizes the number of new and active (new plus existing) claims per year, from 1984 to 2001. The table format has been modified to show the number of acres staked and active during each year to minimize confusion between 20-acre federal mining claims and 40- or 160-acre state mining claims.

Exploration activity in 2001 was more evenly distributed throughout Alaska than in the past several years. The eastern interior region continued to be the most active region, but there was a sharp reduction in activity. The Seward Peninsula and southeastern Alaska experienced a rebirth in activity due to base-metal and platinum-group-element explorations, respectively. Gold remained the major exploration commodity in Alaska, but polymetallic and platinum-group-element (PGE) exploration increased from recent levels. There was no known mineral exploration during 2001 in the Alaska Peninsula region.

NORTHERN REGION

Teck Cominco Ltd. announced drilling results near Red Dog mine, owned by its wholly owned affiliate Teck Cominco American Inc. The Anarraaq deposit, 6 miles north of Red Dog Mine, was discovered by drill-testing a gravity anomaly in 1999. Further drilling in 2000 established an inferred resource of 19 million tons grading 15.8 percent zinc, 4.8 percent lead, and 0.5 ounces per ton silver (table 6). A new deposit named Aktigiruq was also discovered 2.5 miles north–northwest of the Anarraaq deposit. Drill hole 932, which was drilled in 2000, intersected significant zinc mineralization (13.8 feet of 30 percent zinc, 5 percent lead, and 0.1 ounces per ton silver at a depth of 2,285 feet) on a gravity feature centered on the Aktigiruq deposit. Eight additional drill holes were completed on this large gravity anomaly during the 2001 field season. All eight holes cut significant widths of sulfides (12 to 81 feet wide) and four of these holes intersected good grade (7 to 21 percent) zinc. Hole 1114, which is 2.1 miles north of Anarraaq, intersected the highest grade interval yet encountered in the Red Dog area, with 17 feet grading 45.8 percent zinc included within an interval of 78 feet grading 20.9 percent zinc.

Kennecott Exploration Co. conducted exploration in the Wulik Basin on lands selected by Arctic Slope Regional Corp. and the state of Alaska. Kennecott collected over 500 geochemical samples, conducted a gravity survey, and conducted geologic mapping.

WESTERN REGION

The Seward Peninsula was the center of activity for the western region of Alaska. Continuing exploration programs for gold and base-metal targets were joined by programs searching for tantalum–rare-metal mineralization and platinum-group-element mineralization.

Navigator Exploration Corp. reached an agreement with Greatland Exploration Ltd. whereby Navigator may earn a 100 percent interest in the Kougarok tantalum–tin property, 70 miles north–northeast of Nome by making a total of $3.4 million in payments and exploration expenditures over 5 years, subject to a 5 percent royalty. Navigator subsequently entered into an option agreement with Chapleau Resources Ltd. whereby Chapleau can earn a 50 percent interest by spending $1 million on exploration before December 1, 2003. Chapleau can earn a 60 percent interest by spending an additional $500,000 on or before December 1, 2004. The Kougarok property comprises approximately 4,000 acres, contains a 3,300-foot airstrip, and has state-maintained road access to within 30 miles of the site. Anaconda Minerals Co. spent $5.5 million on the Kougarok property from 1979 to 1983 exploring for tin; work included 33,000 feet of diamond drilling, 3,600 feet of trenching, geological mapping, geochemical sampling, and detailed gravity surveys. Tantalum mineralization was encountered incidental to the tin exploration but was of limited economic interest at that time. Intercepts from Anaconda's drilling include 100 feet of 0.0425 percent tantalum (0.052 percent Ta_2O_5) and 378 feet of 0.0238 percent tantalum (0.029 percent Ta_2O_5).

Tantalum is a "high-tech" metal used primarily in electronic applications, special corrosion-resistant metal alloys, and medical prostheses. Tantalum is a good conductor of heat and electricity and is resistant to corrosion by acids.

Demand for tantalum has grown at an average rate of 10 percent per year since 1992 and the trend is expected to continue for the foreseeable future.

The Kougarok property contains a large magmatic–hydrothermal system with tantalum–tin mineralized greisens in strongly evolved fluorine–lithium granite. Similar deposits worldwide are important sources of tantalum and related rare-metal mineralization (lithium, beryllium, rubidium, cesium, scandium, etc.). Such granite deposits are generally larger (commonly in excess of 15,000–35,000 tons Ta_2O_5) than the largest tantalum pegmatite deposits (11,000–13,000 tons Ta_2O_5).

The Kougarok property is underlain by a large, buried, multi-phase intrusion that incorporates a number of satellite mineralized cupolas formed by tantalum-enriched albite–zinnwaldite granites. Most tantalum-enriched zones lie subjacent to the area of high-grade tin mineralization and remain open in all directions. Surface geochemical surveys have also identified a number of fluorine and rare-metal anomalies that require further follow-up work.

I Northern Region

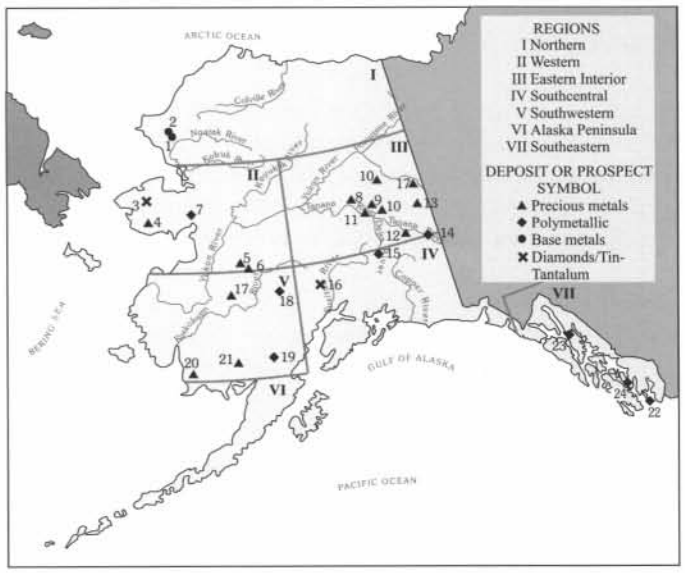
1. Red Dog Mine/District—Teck Cominco Ltd.
2. Wulik River area—Kennecott Exploration Co.

II Western Region

3. Kougarok—Navigator Exploration Corp./ Chapleau Resources Ltd./Greatland Exploration Ltd.
4. Think Zinc/Rocky Mountain Creek/Sinuk River—Quaterra Resources Inc.
5. Tolstoi/Boob Creek—3D Mining Inc.
6. Takotna—North Star Exploration Inc.
7. Dime Creek—Platinum–Palladium Holdings Inc.

III Eastern Interior Region

8. Fairbanks district
   a. Fort Knox-True North—Kinross Gold Corp.
   b. Gil claims—Kinross Gold Corp./Teryl Resource Corp.
   c. General—Kinross Gold Corp.
   d. Golden Summit—International Freegold Mineral Development Inc.
9. Salcha River area—NovaGold Resources Inc.
10. Pogo—Goodpaster mining district
    a. Pogo—Teck Corp./Sumitomo Metal Mining America Inc.
    b. East Divide—Zeus Exploration Inc.
    c. Boundary Zone & Surf—Western Keltic Mines Inc./Rimfire Minerals Corp./Barrick Gold Corp.
    d. Black Mountain/Brink—Sumitomo Metal Mining America Inc./WGM Ltd.
    e. Pogo/Goodpaster area—Numerous companies
11. Richardson district/Uncle Sam area—Kennecott Exploration Co., Tri-Valley Corp.
12. Delta Mineral Belt—Grayd Resource Corp./ Placer Dome Exploration Inc.
13. Fortymile district
    a. Napoleon—Teck Cominco Ltd./Kennecott Exploration Co.
    b. Veta—Ventures Resource Corp.
    c. Champion— Ventures Resource Corp.
14. Road Metal—North Star Exploration Inc.



IV Southcentral Region

15. Nikolai Mafic–Ultramafic Belt—M.A.N. Resources Inc./ Nevada Star Resource Corp., WGM Ltd., Northridge Exploration
16. Shulin Lake—Shear Minerals Ltd./Shulin Lake Mining Inc./ Golconda Resources Ltd.

V Southwestern Region

17. Donlin Creek—NovaGold Resources Inc.
18. Farewell—Platinum–Palladium Holdings Inc.
19. Pebble—Northern Dynasty Minerals Ltd./Hunter Dickinson Group Inc.
20. Susie Mtn.—Corral Creek Corp.
21. Kemuk Mtn.—Bristol Bay Native Corp.

VI Alaska Peninsula Region

VII Southeastern Region

22. Duke Island—Quaterra Resources Inc.
23. Greens Creek—Kennecott Minerals Co./Hecla Mining Co.
24. Union Bay—Quaterra Resources Inc./International Freegold Mineral Development Inc.

Figure 5. *Selected exploration projects in Alaska, 2001.*

Table 5. *Summary of claim activity by acres, 1991–2001*

Year	State Claims				State Prospecting Sites		Federal Claims	
	New 40 acre	New 160 acre	Total (Active) 40 acre	Total (Active) 160 acre	New	Total (Active)	New	Total (Active)
1991	3,277	0	38,485	0	747	1,735	1,299	23,222
1992	2,650	0	36,947	0	454	1,490	695	20,254
1993	2,110	0	34,908	0	1,412	2,281	601	9,298
1994	4,064	0	35,184	0	810	2,449	341	8,495
1995	4,508	0	31,796	0	1,030	2,850	376	7,766
1996	9,495	0	37,843	0	2,082	3,735	681	9,346
1997	8,671	0	43,968	0	2,480	5,334	1,872	11,320
1998	9,786	0	50,464	0	3,187	7,278	427	11,033
1999	11,977	0	56,673	0	1,740	7,639	308	10,176
2000	4,472	614	54,369	614	1,077	5,641	523	7,805
2001	620	760	48,923	1,372	8	3,043	464	8,248

Federal claims = 20 acres, State claims = 40 acres or 160 acres, State prospecting sites = 160 acres.
Information provided by Jack Davis (Land Records Information Section, DNR) and Evvie Garis (USBLM). Table has been reorganized to conform with computer records available after 1990.

Anaconda Minerals Co. identified tantalum–tin mineralization in the area know as the Main Plug. Surface geochemical sampling and prospecting undertaken by Navigator and Chapleau during 2001 identified additional strong mineralization potential at the Hill Top area (0.01 square mile area) 1,600 feet east of the Main Plug and the Real Top area (0.9 square mile area) about 2 miles south of the Main Plug area. Grab samples from the Hill Top area returned inductively coupled plasma (ICP) results ranging from 218 to 341 parts per million Ta_2O_5 (0.022 to 0.034 percent Ta_2O_5) with anamolous lithium, cesium, and niobium. The strong partitioning of tantalum and tin in these samples suggests close proximity to the roof of a granite intrusion. The Hill Top showing, which is updip from the previously known mineralization, may represent a significant, larger, new target for tantalum mineralization. Navigator and Chapleau plan to drill these targets in early 2002.

Quaterra Resources Inc. reached an agreement in principle with Altar Resources to acquire an undivided 100 percent interest in Altar's Think Zinc, Rocky Mountain Creek, and Sinuk River massive sulfide prospects on the Seward Peninsula by making staged payments of $500,000 in cash, issuing 500,000 shares, and completing $1,000,000 in exploration work over a 6-year period. A net smelter royalty (NSR) of 2.5 percent will also be retained by Altar, 1 percent of which may be purchased for $1,750,000. An initial payment of $10,000 and 200,000 Quaterra shares was made to Altar.

The Think Zinc, Rocky Mountain Creek, and Sinuk River prospects host potential volcanogenic massive sulfide mineralization that may be in the same package of rocks that host mineralization at Quaterra's Big Bar prospect and may represent the southern extension of the Ambler schist belt. The Rocky Mountain Creek prospect is the most advanced property in the group, with three drill holes. A 30-foot core hole intersected thin bands of massive sulfide, with the interval from 19 to 26 feet containing 1.7 percent lead, 2.31 percent zinc, 0.65 ounces per ton silver and 0.008 ounces per ton gold.

Quaterra completed gravity surveys on its four 100-percent-owned/optioned massive sulfide prospects and identified strong anomalies on each prospect. Allan Spector and Associates completed the gravity survey with a total of 393 gravity measurements taken at 200-foot intervals along lines spaced 400 feet apart. Three of the prospects, Think Zinc, Rocky Mountain Creek, and Big Bar, have well defined gravity anomalies with coincident geochemistry. For example, the Rocky Mountain Creek property

Table 6. *Red Dog ore reserves*[a]

	Tons (millions)	Zinc (wt%)	Lead (wt%)	Silver (oz/ton)
Main (Proven)	46.2	19.2	5.2	2.92
Aqqaluk (Probable, Indicated, Inferred)	73.0	15.2	4.0	2.17
Qanaiyaq[b] (Indicated)	10.6	17.8	5.5	3.41
Paalaaq (Inferred)	14.3	15.0	4.0	2.63
Anarraaq (Inferred)	19.0	15.8	4.8	2.07
Total/*Average*	**163.1**	***16.6***	***4.5***	***2.48***

[a]As of December 31, 2000 from Cominco 2000 Annual Report.
[b]Qanaiyaq was previously referred to as Hilltop.

has a north-trending high-density zone defined by seven gravity lines that extends for more than 2,000 feet and is partially coincident with scattered outcrops of massive sulfide mineralization containing significant lead and zinc values. The fourth, Sinuk River, has gravity anomalies adjacent to mineralized, zinc-rich float. Overall, 11 gravity anomaly zones were identified with anomalies ranging from 0.5 to 1.0 milligals, with areas up to 800 feet wide and up to 2,000 feet long.

North Star Exploration Inc. (a subsidiary of EMEX Corp.) conducted geologic mapping, rock-chip sampling, and soil sampling with a follow-up diamond drill program consisting of five holes (2,924 feet) at the Telephone Hill and Goss Gulch prospects on the Takotna project in the Innoko and McGrath mining districts. Drill results indicate that gold was present in altered veins, in altered intrusive rocks, and in structures associated with Late Cretaceous and early Tertiary-age igneous complexes. Mineralized intercepts range in width from 2.5 to 43 feet and grade from 0.01 to 0.12 ounces per ton gold. Drill hole TH-01-01 had a 16-foot intercept beginning at 90 feet of 0.06 ounces per ton gold, and drill hole GG-01-2 had a 5-foot intercept beginning at 560 feet with a grade of 0.12 ounces per ton gold. Gold correlates strongly with arsenic at both prospects.

Platinum-Palladium Holdings Inc. continued exploration at the Dime Creek prospect in the Koyuk district with a large soil grid and a ground magnetometer survey. Placer Dome Exploration Co. conducted limited exploration in the Solomon and Big Hurrah areas of the Seward Peninsula. Greatland Exploration conducted drilling on the Omilak lead-zinc-silver property.

Altar Resources continued exploration on their gold prospects. The Dripping Gold zone on the Bulk Gold property was identified by a 1,500-foot-long soil anomaly averaging 0.003 ounces per ton gold, with a high value of 0.13 ounces per ton gold and greater than one percent arsenic. A shallow, hand-dug trench within this zone exposed a 6- to 12-inch-thick quartz vein that assayed 0.004 ounces per ton gold, greater than 6 ounces per ton silver, 7,750 parts per million copper, 388 parts per million bismuth, and 20 parts per million arsenic. Hand excavated trenches and pits at the Divide property exposed gold-bearing quartz veins with northeast strikes and moderate northwest dips. Altar collected 30 soil samples at the 200 M property at the head of the Snake River, with 9 samples yielding values greater than 300 parts per billion gold and the highest gold value being 690 parts per billion gold. Royal Pretoria Gold Ltd., Altar's wholly owned Alaska corporation, conducted exploration on the Full Auto project, a 21-square-mile area near Buster and Osborn creeks on Bering Straits Native Corp. lands. RPG personnel spent 12 days collecting 462 soil samples on this work funded by Gold Fields Exploration Inc. RPG also signed an agreement with BSNC in August 2001

3D Mining Inc., with contractor Northern Associates Inc. (NAI), continued work on the Tolstoi (gold–platinum) project in the Mt. Hurst–Boob Creek area northwest of McGrath. Heavy equipment was cat-trained into the area, a new camp and airstrip were constructed at the mouth of Boob Creek, Mastodon Creek and Boob Creek were partially realigned, overburden was removed on the lower 1,200 feet of Boob Creek, and a bedrock drain was established in preparation for mining in 2001. NAI completed 14 lines totaling 45 line miles of geophysical ground-penetrating radar survey and identified 83 bedrock channel reflectors. Fieldwork by NAI also documented that placer gold from upper Esperanto and Madison creeks are from residual or alluvial deposits developed on hydrothermally altered monzonite bedrock cut by the Tolstoi fault zone. Bedrock in Boob Creek is Kuskokwim Group shale locally cut by quartz veining. No reconnaissance work has yet been directed toward discovering lode sources of platinum-group elements found in these placer deposits.

EASTERN INTERIOR REGION

Teck continued evaluating extensions of gold mineralization across the Pogo property, and continued an exploration program including diamond core drilling at the Napoleon property in the Fortymile mining district near the Alaska–Yukon border (fig. 6). No exploration drilling was carried out during the year on the Pogo property. Kennecott Exploration continued an extensive drilling program at the Uncle Sam area near Delta Junction, drilled at the Tower project, and continued work on the Hope

Figure 6. *Examining drill core of intrusion-hosted gold mineralization at the Napoleon property, Eagle Quadrangle. Photo by David Szumigala.*

project in the Circle district. North Star completed an induced polarization (IP) survey, a ground magnetic survey, an auger drilling soil survey, and 6,991 feet of diamond drilling in 2001 at its Northway project (Road Metal) on the Alaska Highway. These surveys were conducted over a zone where gold, silver, and base-metal mineralization was intersected in two diamond drill holes in 2000. A large chargeability anomaly, located by the IP survey, measures 1,650 feet by up to 1,600 feet, and is open along strike to the north and south, open to the west, and open at depth. The anomaly is immediately west of the mineralization encountered in the 2000 and 2001 drill programs and represents a significant new drill target with a large size potential.

The 2001 drilling by North Star confirmed extensions of mineralized zones in steeply dipping greisen zones in altered granite, but did not intersect similar widths of mineralization as in the 2000 drill program. Gold and silver mineralization was encountered in five of the eight drill holes in the 2001 program. Mineralized intercepts include 7.8 feet at depth of 70.4 feet in drill hole RM-01-06 averaging 0.055 ounces per ton gold and 3.54 ounces per ton silver, 4.4 feet at depth of 693.3 feet in drill hole RM-01-13 averaging 0.19 ounces per ton gold and 0.97 ounces per ton silver, and 9.9 feet at depth of 1,361.1 feet in drill hole RM-01-13 averaging 0.061 ounces per ton gold and negligible silver.

North Star also conducted soil and rock chip sampling at Step Mountain north of the Yukon River near Eagle over areas with smithsonite (zinc) mineralization in limestone (possible Mississippi Valley type model?) and at the Windy Creek property northwest of Rampart on the Yukon River for zinc skarn mineralization.

Kinross Gold Corp. conducted exploration at the Steamboat Creek gold project and exploration and definition drilling programs at the True North gold project. A mix of diamond and reverse-circulation drilling at True North Mine, largely in the Central and Sheppard zones, aided in converting resources to reserves and outlining mineralization limits (fig. 7). An interim reserve calculation completed in August indicated that 144,000 ounces of gold were added to the 611,000 ounces of probable reserves from year-end 2000 and more reserve ounces were expected by the end of 2001. In addition, drilling results at the newly identified West Zeppelin zone were encouraging.

The Gil property near Fort Knox Mine, a joint-venture property held by Kinross Gold Corp. (80 percent owner) and Teryl Resources Corp. (20 percent working interest), was explored by Fairbanks Gold Mining Inc., a wholly owned subsidiary of Kinross Gold Corp. Trenching was completed on the Main Gil prospect, and two trenches were excavated 2,500 feet east of Main Gil at a new prospect named Sourdough Ridge. The Sourdough Ridge prospect has widespread gold, bismuth, and arsenic soil anomalies with rock assays having gold mineralization up to 0.5 ounces per ton in east–west-striking high-angle veins and fracture fillings. An extensive drill program continued at Gil on the Main Gil, North Gil, and Sourdough Ridge prospects. Highlights of the 2001 drill program include hole 250 at Sourdough Ridge with an average grade of 0.02 ounces per ton gold over the 225-foot depth and a grade of 0.033 ounces per ton gold for the first 105 feet; hole 255 at the North Gil prospect with 75 feet of 0.036 ounces per ton gold starting at 40-foot depth, and a 50-foot intercept grading 0.050 ounces per ton gold in hole 256 (North Gil) starting at 190-foot depth.

Grayd Resource Corp. and Placer Dome U.S. Inc. struck a joint-venture deal in which Placer Dome had an option to earn an undivided 51 percent joint-venture interest in Grayd's wholly owned White Gold property by spending $3.1 million over a 4-year period. Grayd remained the operator and Placer Dome agreed to finance a minimum of $350,000 in exploration expenditures on the property in 2001. The White Gold property, in the Delta mineral belt, has gold mineralization along a 5-mile-long trend on the property. Grayd had previously identified prospects, including the Shalosky showing, Hunter prospect, Kokanee Hill prospect, Low showing, HD area, Flicks showing, and Goldberg area, by prospecting, soil sampling, and hand trenching.

Placer Dome, with Grayd as operator, undertook a program of surface sampling, geophysics (max-min and magnetics), hand trenching, and drilling on the White Gold

Figure 7. *Core drilling at the True North project. Photo provided by Kinross Gold Corp.*

property. Surface sampling results include 270 out of 891 soil samples that assayed greater than 100 parts per billion gold and 50 out of 225 rock samples that assayed greater than 0.029 ounces per ton gold. A 21-foot portion of a hand trench at the Hunter showing ran 0.28 ounces per ton gold (including 3.3 feet at 1.1 ounces per ton gold). At Low, a trench exposed 32.1 feet true width of altered and sulfide-bearing rock averaging 0.25 ounces per ton gold, including 12.5 feet grading 0.42 ounces per ton gold. Results at the Flicka showing have been lower grade, but a structure up to 56 feet wide with anomalous gold was exposed. A total of 5,720 feet was drilled in 12 holes, spread over a distance of 5 miles. All holes had anomalous gold intervals. Drilling intersected wide zones of silicification within structures and in adjoining wall rock. Higher-grade intersections included WG01-01 (4.3 feet grading 0.36 ounces per ton gold) and WG01-02 (57.4 feet grading 0.035 ounces per ton gold) at the Shalosky showing in the southwestern part of the property, and WG01-10 (42.6 feet grading 0.035 ounces per ton gold) at the Goldberg prospect in the northeastern part of the property. Exploration in 2001 confirmed that gold-bearing structures have continuity both along strike and down dip. Placer Dome canceled its option on the White Gold property after completion of the exploration program. Placer Dome paid all current mineral claim fees on the 309 claims the property comprises, and sufficient assessment work was completed to hold the property for several years.

Tri-Valley Corp., along with geologists from TsNIGRI, the principal Russian mineral research institute, explored a new gold–arsenic–bismuth discovery on the Richardson gold project. Tri-Valley's 61-square-mile claim block is 65 miles south of Fairbanks between the Richardson Highway and the Alyeska Pipeline service road. Named the Hilltop zone, the zone was sampled over an area 300 feet by 3,000 feet with 56 soil samples and 83 bedrock chip samples. The best 14 (of 83) rock samples assayed gold grades ranging from 0.2 ounces per ton through 1.9 ounces per ton. Highly anomalous bismuth (up to 289 parts per million) and arsenic (greater than 10,000 parts per million) are associated with elevated gold values at the Hilltop zone.

Gold mineralization in the Hilltop zone is found in stratabound quartz–pyrite–arsenopyrite (with bismuth oxide minerals and native gold) veins and veinlets with sulfide-bearing alteration envelopes in quartz–feldspar, quartz–feldspar–mica, amphibole, and amphibole–pyroxene gneiss. Sulfide quantity in quartz veins and veinlets is 3 to 5 percent. Some sample results of host rocks between veins assayed gold up to 0.05 ounces per ton. The discovery area is presently open on all sides and at depth. Further results are pending. Tri-Valley is presently designing a limited core-drilling program for next season to confirm and further define the content and extent of gold in the Hilltop zone.

Western Keltic Mines Inc. and Rimfire Minerals Corp., with funding through an option agreement with Barrick Gold Corp., conducted fieldwork on the California and Surf properties in the Goodpaster area. Western Keltic currently has a 70 percent interest in the properties and can earn an additional 10 percent interest from Rimfire. The properties lie along the eastern extension of the Pogo Trend, an 8-mile-long southeast-trending belt of favorable geology that hosts the Pogo gold deposit and numerous other gold occurrences. The exploration program included auger soil sampling, mapping, a 516-line-mile airborne magnetics and radiometrics geophysical survey, and diamond drilling totaling 2,031 feet. The drill hole tested an area of quartz stockwork gold mineralization within the Boundary zone prospect and intersected quartz–feldspar–biotite gneiss, altered gneiss, altered granite dikes, and granodiorite. Carbonate–quartz veinlets ranging from 1 to 5 mm wide were intersected in the hole.

Data compiled from a 500-line-mile airborne magnetic and radiometric geophysical survey flown in 2001 over the entire property with prospecting, soil, silt, and rock geochemical data, identified four areas of follow-up, in addition to the Boundary zone. The Southeast Surf zone, previously defined by reconnaissance work, remains an untested drill target. Three areas were highlighted by the magnetic and radiometrics data and follow-up in 2001 identified favorable soil geochemistry at the Blue, California North, and Beverly grids. A total of 823 soil samples and 47 rock samples were collected. All four zones exhibit favorable geological, geochemical, and geophysical characteristics including a combination of anomalous gold and/or bismuth, arsenic, antimony, and silver in association with prominent northwest-trending structures that lie at or near the contacts between gneissic rocks and granitic intrusive bodies and dikes. The widespread spacing of the grid lines in each area has not allowed for a clear understanding of the orientation of any mineralized zones, and gridlines must be extended to trace the full extent of open-ended anomalies. Drilling at the Boundary zone on the California–Surf properties did not return any significant results. Barrick terminated their option on the property after the field season.

Zeus Exploration Inc., a subsidiary of EMEX Corp., completed an extensive soil survey and drilled the intrusion-hosted East Divide gold–bismuth–copper prospect in the eastern Goodpaster mining district. Core drilling totaled 1,691 feet in three holes. Platinum–Palladium Exploration Inc. conducted reconnaissance rock chip and soil surveys, as well as geologic mapping, in the Cascaden Ridge area near Livengood.

Blue Moose Exploration Inc. conducted an exploration program in the Tanacross Quadrangle near MacArthur Creek to test the BME Anomaly, a multi-element soil geochemical anomaly identified during previous sampling

programs. A survey grid with a 4,500-foot baseline and cross lines at 300-foot intervals was established and 185 soil samples were collected. Results included low levels of gold with anomalous base-metal values. A 4,500-foot-long trench was excavated, sampled for geochemical analysis, and mapped. A polyphase, hydrothermally altered intrusion with a zone of brecciation and silicification was exposed during trenching.

NovaGold Resources completed trenching and rock sampling on the Caribou gold project in the Salcha River area. WGM–Sumitomo continued exploration efforts, including drilling, at the Brink prospect to the southeast of the Pogo property. Barrick Gold conducted exploration on the Radio project in the Salcha River area. Hyder Gold terminated its option agreement with Rimfire Mineral Corp. and relinquished all interest in the Eagle claims. Cusac Gold Mines acquired an 80 percent interest in the Taurus porphyry copper–molybdenum deposit, located 46 miles northeast of Tetlin Junction. Goldmark Minerals Ltd. sluiced three bulk samples of placer gold-bearing gravels from bench gravels at Boundary.

Ventures Resource Corp. discovered zinc, lead, and silver mineralization at its Fish and Little Whiteman prospects on the Veta property. The prospects are 3 miles apart and 27 miles from the Taylor Highway. At the Fish prospect, projection of a steeply dipping, vein-hosted zinc deposit has been traced 4,800 feet in a north–south direction by 300 soil grid samples. The zone cuts gently dipping calcareous quartz–feldspar–biotite schist, chloritic schist, and greenstone. Soil values, which range from 1,000 to well over 5,000 parts per million zinc, extend 1,700 feet down the host gully and across this trend for 50 to 100 feet upslope to the east and west of the gully bottom, indicating that the mineral system may be from 100 to over 200 feet wide. The only rock found along the projected zone is gossan rubble, distributed about 50 to 75 feet normal to vein projection, and apparently derived from massive to semi-massive sulfides, with up to 28.6 percent zinc, 0.88 percent lead, and 6.3 ounces per ton silver. Twenty rock samples contained more than 6 percent zinc. Rubble is found in a 2,400-foot segment straddling Trout Ridge. A rock sample near the south end of the grid contained 0.011 ounces per ton gold. Another potential vein zone is possible due to multi-element soil anomalies occurring 400 feet to the east of the above zone.

At Little Whiteman, a black-shale (argillite) hosted "stratabound" zinc–lead–silver prospect, 113 soil samples were collected by Ventures on a 400-foot grid added to a 1998 grid. The multi-metallic geochemical anomaly comprises a square mile, within which lead and zinc soil values exceed 100 parts per million and/or 250 parts per million, respectively. The target is open to the north and locally open to the west. In the core zone, values exceed 500 parts per million lead and 1,000 parts per million zinc in an area 300 to 800 feet across and up to 3,000 feet long. Frost-heaved gossan is present in four sample pits within the soil anomaly and samples of the gossan had combined zinc–lead values ranging from over 6 percent to over 40 percent, with silver values up to 13 ounces per ton. Soil sample results from other pits in the anomaly that contain no gossan are also strongly anomalous, suggesting that mineralization underlies most, if not all, of the soil anomaly. Ventures believes that the geology, geochemical pattern, and mineralogy at Little Whiteman suggest a stratabound sedimentary exhalative (sedex) mineralization model. Ventures anticipates a drill program at the Fish and Little Whiteman prospects during 2002.

Ventures Resource Corp. reported positive drilling results at the Pebble Dike Hill prospect on the 13,000 foot by 7,000 foot Lead Creek portion of the Champion Property. Core holes LC-01-15 to LC-01-22 were drilled outward from lead–zinc–silver intersections in discovery holes LC-97-7 and LC-00-14. Drill hole LC-01-15, 450 feet south of LC-00-14, intersected 50.6 feet of 11.7 ounces per ton silver and 5.1 percent lead at 357 feet, including 20.2 feet of 17.0 ounces per ton silver and 5.1 percent lead at 362.8 feet. Hole LC-01-19, drilled at a 45-degree angle, intersected 17.3 feet of low-grade base-metal mineralization at 473.8 feet, which may correlate with the LC-00-14 and LC-01-15 intersections. Drill hole LC-00-13, 500 feet northwest of LC-00-14, intersected 6.3 feet of 5.6 ounces per ton silver and 1 percent lead in intensely oxidized rock at 214 feet. Negligible mineralization was intersected in holes LC-01-16 to 22, located north, east, and south of LC-00-14 and LC-01-15, and in LC-01-22 to the east of LC-97-7.

Mineralization in drill holes LC-00-14, LC-01-15, and LC-01-19 is composed of secondary lead, silver, and zinc minerals and is hosted by oxidized segments of sandstone with a gentle easterly dip. Preliminary data suggest that drill holes LC-00-14 and LC-01-15 may be in a 200-foot-wide high-grade zone that extends up to 1,000 feet or more northwest and southeast of LC-00-14 and LC-01-15. A broad area west of drill holes LC-00-14 and LC-01-15 is untested.

SOUTHCENTRAL REGION

Nevada Star Resource Corp. signed a letter of intent with Fort Knox Gold Resources Inc. to acquire an undivided 60 percent interest in Fort Knox's Canwell Glacier property by spending $600,000 and issuing 200,000 Nevada Star common shares to Fort Knox over a 4-year period, after which the companies will form a joint venture. The property consists of 44 state claims and is about halfway between Anchorage and Fairbanks. Nevada Star has committed to spending a minimum of $100,000 and to completing at least 1,000 feet of drilling during the first year of the agreement. Nevada Star will be the operator

and conduct all exploration activities on the property. The Canwell property is subject to a 2 percent net smelter royalty (NSR) payable to American Copper & Nickel Co. Inc. (ACNC), a wholly owned subsidiary of Inco U.S. Inc. No exploration has been conducted on the property since 1998 and past exploration efforts totaling $400,000 in expenditures, including five drill holes totaling 2,922 feet, were designed to discover large nickel–copper massive-sulfide ore deposits. Very little of that work was designed to look for platinum–palladium mineralization. Nevada Star is primarily interested in the property's potential for platinum-group-element mineralization. The highest-grade occurrences on the property are within sulfides at the base of the Canwell mafic intrusive. A trench grab sample from the Upper Canwell Glacier showing assayed 0.12 ounces per ton platinum, 0.146 ounces per ton palladium, 0.06 ounces per ton gold, 6.92 percent nickel, and 2.30 percent copper. A grab sample at the Odie showing assayed 0.455 ounces per ton platinum and 0.076 ounces per ton palladium. In addition to the high-grade values noted above, the Canwell showings are also enriched in other platinum-group elements with assay values up to 289 parts per billion iridium, 537 parts per billion osmium, 662 parts per billion ruthenium, and 105 parts per billion rhodium. Nevada Star and M.A.N. Resources Inc. continued exploration for platinum-group elements on the Eureka Creek–Tangle Lakes project, with over 1,500 mobile-metal-ion (MMI) geochemical samples collected in glacial moraine-covered areas of the property. Geochemical anomalies from the MMI work are coincident with geophysical anomalies in some areas.

Shear Minerals Ltd. signed an amended agreement with Shulin Lake Mining Inc. for a 24 percent vested interest in the Shulin Lake diamond and gold property near Petersville. Under the new agreement terms, Shulin will contribute the next $150,000 in exploration expenditures including two drill holes. Golconda Resources Ltd. subsequently entered a joint-venture agreement with Shulin Lake Mining for the direct acquisition of a 40 percent interest in the property and the right to acquire another 11 percent of the property by incurring exploration expenditures of $1 million.

Shear Minerals conducted ground geophysics on six high-priority drill targets as part of a winter exploration program at Shulin Lake. The ground geophysics followed a detailed airborne magnetic survey. Shulin Lake Mining Inc., as operator, completed a drill program testing three targets. The three holes, although up to 1.2 miles apart with outcropping Tertiary sandstone between the holes, intersected a rock type interpreted to be a mafic pyroclastic with volcanic crater facies characteristics. Tests carried out for diamond indicator minerals at Kennecott Canada's laboratories revealed a suite of eclogitic garnets, chrome diopsides, and diamond-stability-field chromites as well as olivine and pyroxenes. Golconda and its partners believe that this rock is most likely the source of indicator minerals discovered in surface and stream samples on the property. The partners plan to conduct additional exploration drilling in early 2002.

Elsewhere in the Yentna mining district, H & H Exploration & Mining panned for placer gold on Big Boulder Creek in the Collinsville portion of the Petersville mining area. Mines Trust Co. completed ground geophysics (AMT [audio-frequency magnetotellurics], CSAMT [controlled source audio-frequency magnetotellurics], and Gradient Array IP [induced polarization]) on claims surrounding the Golden Horn Mine.

WGM Ltd. conducted an exploration program on Latitude Minerals Corp.'s Tonsina Platinum–Palladium property in southcentral Alaska. The area of focus was Sheep Mountain. Results were very encouraging, with grab samples as high as 4 parts per million platinum and palladium and over 1 percent nickel. Latitude is currently negotiating an extension of the option agreement with WGM for the Tonsina property.

Northridge Exploration discovered the source of massive sulfide float boulders on the Forbes–Emerick property near Isabel Pass. Samples from the Verona Pick prospect, the new discovery, included values up to 4.8 percent copper, 1.3 percent lead, 2.7 percent zinc, 3 ounces per ton silver, and 1,922 parts per billion gold. Gold and copper values in grab samples ranged up to 0.77 ounces per ton and 8.5 percent, respectively. Additional fieldwork is planned and several parties have discussed acquisition.

Inlet Resources Ltd. entered into an agreement with Western Warrior Resources Ltd. to acquire up to a 60 percent interest in the Cliff Gold Mine near Valdez for expenditures of $750,000 by the end of 2002. The Cliff Mine, sampled but not drilled by WGM Ltd. during the mid 1980s, is a former high-grade gold producer with between four and seven mesothermal gold quartz veins.

SOUTHWESTERN REGION

NovaGold Resources Inc. at Donlin Creek conducted the largest mineral exploration program in Alaska during 2001. A State of Alaska designated winter road connects the project to a commercial barge site on the Kuskokwim River at the village of Crooked Creek. The project has an all-season exploration camp for up to 75 people with an adjacent 5,000-foot runway that is directly serviced by commercial aircraft as large as C-130 Hercules freighters. Donlin Creek is one of the largest undeveloped gold resources in the world with a measured and indicated resource estimated to be 6.9 million ounces of gold grading 0.089 ounces per ton gold and an additional inferred resource of 6.0 million ounces of gold grading 0.082 ounces per ton gold at a 0.044 ounces per ton gold cutoff grade. This resource remains open at both ends and

at depth with high potential for expansion. Using a higher cutoff grade of 0.10 ounces per ton gold, the measured and indicated resource is estimated to be 3.1 million ounces of gold grading 0.152 ounces per ton with an additional inferred resource of 2.4 million ounces grading 0.145 ounces per ton gold. The total potential higher-grade resource is 5.5 million ounces of gold grading 0.149 ounces per ton gold at a 0.10 ounces per ton gold cutoff grade. This higher-grade resource is the focus of the upcoming exploration program.

Gold mineralization occurs over a 4-mile trend along north–south- and northeast-trending structural zones associated with disseminated and veinlet-controlled gold-bearing fine-grained sulfides. Gold mineralization primarily occurs within felsic to intermediate dikes and sills, but also as high-grade stockwork vein zones in the surrounding sedimentary rocks. Over $37 million has been expended on exploration at the Donlin Creek property since 1987, including over 400,000 feet of drilling and 70,000 feet of trenching, as well as comprehensive surface and airborne geophysics. Within the 308 diamond core holes completed by Placer Dome between 1995 and 2000, there are a total of 528 separate intercepts of greater than 0.146 ounces per ton gold with intercept lengths equal to or greater than 13 feet. Within those intercepts, 232 intervals exceed 32-foot lengths and an additional 86 intervals exceeded 66-foot lengths.

NovaGold Resources Inc. signed agreements with Placer Dome U.S. Inc and Calista Corp. to acquire a 70 percent interest in the 13-million-ounce Donlin Creek gold deposit. The deposit is on part of Calista Corp.'s 6.5 million acres of land. Under the terms of the definitive agreement, NovaGold will be the manager and operator and must expend $10 million within a 10-year period toward exploration and development to earn a 70 percent interest in the project. Placer Dome has the option of then converting to a 5 percent net profits interest or to exercise a back-in right to re-acquire a majority interest in the project (70 percent Placer Dome/30 percent NovaGold) by expending three times the amount expended by NovaGold at the time the back-in is exercised and conducting a feasibility study.

NovaGold's exploration program commenced with on-site work including geologic mapping, sampling, and trenching. A new three-dimensional model revealed previously unrecognized controls to gold mineralization, including an east–west-trending antiformal structure that acted as a trap for gold-rich hydrothermal fluids within sills below an impermeable mudstone horizon. The potential of high-grade ore bodies is interpreted to extend along the fold axis in several directions, and may lead to discovery of new high-grade zones in other areas of folding. Drilling began on higher-grade targets in the Acma area and also included six holes further defining mineralization in the 400 zone, 1,650 feet west of the Acma area (fig. 8). NovaGold completed 42 drill holes totaling 24,000 feet. Of the 42 drill holes completed, 26 are offset holes that substantially expand the known higher-grade mineralization beyond the current resource area. The other 16 drill holes are in-fill holes that will upgrade "inferred" category resources to the higher "measured and indicated" category resources. All holes were drilled on 82- to 164-foot spacing and intersected significant intervals of ore-grade gold mineralization. Drilling was completed in late November 2001 and work began on updating the Donlin Creek resource estimate. Drilling for a preliminary feasibility study is anticipated to begin in March or April 2002.

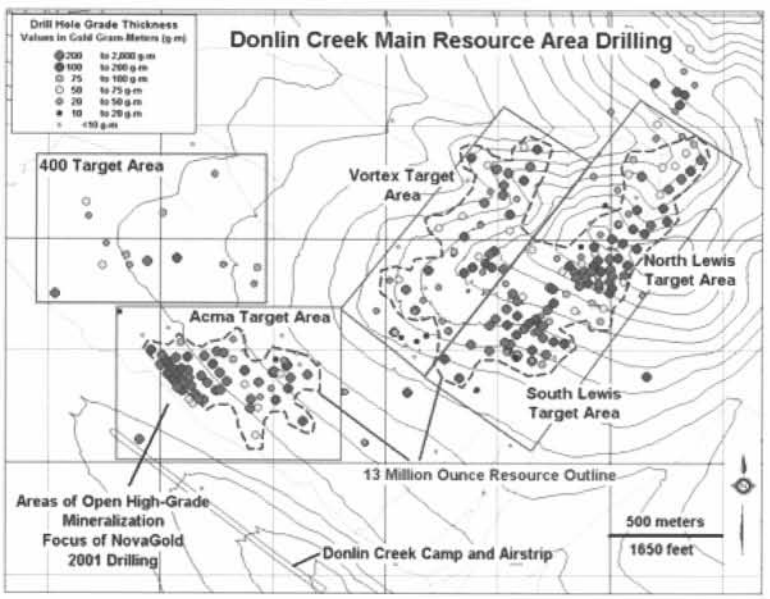


Figure 8. *Map showing the gold resource areas and areas drilled during 2001 at the Donlin Creek property. Photo from NovaGold Resources Inc. Web site (http://www.novagold.net).*

McClelland Labs of Reno, Nevada completed metallurgical analyses on Donlin Creek samples. Results show that concentration by a conventional sulfide flotation followed by pressure oxidation and carbon-in-leach cyanidation would be effective for higher-grade Donlin Creek ores and yield greater than 90 percent gold recovery.

Results from the NovaGold drilling program include some of the best gold intercepts from the property to date. Higher-grade mineralization on the Acma area was expanded and appears to be continuous and consistent. Drill results demonstrated the potential for significant high-grade gold mineralization at other nearby targets like the 400 zone that have only been tested by limited, widely spaced drill holes. There were 97 significant drill intersections in 42 drill holes from the 2001 first phase drill program. The weighted average of all significant intersections is 57.2 feet grading 0.20 ounces per ton gold. Some examples of significant drill intercepts include the near-surface 410-foot intersection grading 0.14 ounces per ton gold in hole DC01-587; hole DC01-604, which intersected 84 feet grading 0.22 ounces per ton including 27 feet grading 0.52 ounces per ton gold; and hole DC01-611, which intersected 385 feet grading 0.15 ounces per ton gold. Hole DC01-597, which intersected 479 feet grading 0.20 ounces per ton gold starting at 26-foot depth, is the best single intercept drilled to date on the Donlin Creek property.

The intersections from drill holes DC01-619 and DC01-625 represent a substantial downdip extension of the Acma zone to the southwest where mineralization remains open. Hole DC01-625 is a 265-foot offset to high-grade mineralization in hole DC01-605, which included 72 feet at 0.23 ounces per ton, and hole DC01-595 with 65.6 feet at 0.17 ounces per ton. This greatly expands the Acma zone to the southwest and towards hole DC99-573, 660 feet to the southwest, which included 174 feet at 0.12 ounces per ton. An extensive area to the southwest below alluvial cover remains untested, as does the area between the Acma area and the 400 zone. These open areas will be tested during the spring 2002 pre-feasibility drill program to determine the ultimate pit boundaries.

Hole DC01-607 intersected the widest zone of high-grade gold mineralization to date with 226 feet grading 0.41 ounces per ton gold, including 80 feet grading 0.89 ounces per ton gold and a 27.6-foot intersection grading 1.69 ounces per ton gold within the 80-foot high-grade interval. The DC01-607 intersection represents a downdip test of the wide zones of ore-grade mineralization encountered in hole DC01-586, which included 103 feet at 0.17 ounces per ton gold, 52.5 feet at 0.18 ounces per ton gold and 72.2 feet at 0.19 ounces per ton gold. These drill holes are the westernmost and southernmost holes in the Acma area. High-grade mineralization remains open in that direction. The Acma area also remains open to the east where holes are planned to offset the high-grade zones encountered in hole DC01-600.

The six drill holes at the 400 zone all intersected promising near-surface gold mineralization. Hole DC01-610 intersected 86.1 feet grading 0.16 ounces per ton. Hole DC01-620, the downdip test of the mineralization in DC01-610, intersected 66.8 feet grading 0.14 ounces per ton gold. These mineralization intercepts demonstrate that gold-in-soil anomalies at the 400 zone are excellent indicators for potential new near-surface higher-grade mineralization outside of the Acma area.

AMEC E&C Services Ltd. personnel joined the NovaGold technical team to review the geologic model, begin the quality assurance and quality control phase of the resource evaluation, and revise the three-dimensional geologic model. This new model will provide the framework for completing a resource estimate and economic scoping study. Detailed engineering work is underway to further refine the economic operating parameters for the higher-grade resource.

Northern Dynasty Minerals Ltd. acquired the rights to two options granted by Teck Cominco American Inc. to Hunter Dickinson Group Inc. for its Pebble property in southwestern Alaska. Under the first option, Northern Dynasty can purchase 100 percent of the 36 claims hosting the Pebble deposit for $10 million and under the second option Northern Dynasty can acquire an interest ranging from 50 percent to 100 percent in the balance of the property (1,179 claims), which encompasses the giant mineralized system. Exploration by Cominco on the property in the 1980s outlined the 1-billion-ton Pebble copper–gold porphyry deposit that contains 6.6 billion pounds of copper and 10.9 million ounces of gold at grades of 0.3 percent copper and 0.01 ounces per ton gold. Mineralization, consisting of disseminated and veined pyrite, chalcopyrite, bornite, and molybdenite, is centered on a Late Cretaceous multi-phase intrusive complex on the southeastern edge of the Kaskanak batholith that occurs as stocks, dikes, sills, and irregular bodies emplaced within Jurassic to Cretaceous sedimentary rocks. The Pebble deposit and its higher-grade core (59.5 million tons grading 0.54 percent copper and 0.016 ounces per ton gold) are incompletely defined, compose only 5 percent of the potential mineralized system defined by geophysics, and remain open to significant expansion. A recently completed field program has staked additional ground southwest of the original claims, expanded the geophysical (induced polarization/chargeability) anomaly to a 13-mile length southwest of the Pebble deposit, and up to 5.6 miles in width, for a total area of 34.4 square miles, and substantiated a series of at least six coalescing mineralizing centers. From the southwestern portion of the property, 601 soil samples were collected and analyzed. The IP anomaly potentially outlines one of the largest mineralized hydrothermal systems in the world and coincides with extensive copper–gold–molybdenum soil geochemical anomalies (fig. 9). Favorable porphyry-style alteration and surface

copper mineralization are also present in very sparse surface exposures. For 2002, Northern Dynasty is designing a major, multi-rig core-drilling program to systematically assess new deposit-scale targets within the extensive copper–gold mineralized system and to fully define the higher-grade core of the known Pebble deposit.

In the Farewell mining district, about 165 miles northwest of Anchorage, Platinum–Palladium Holdings Inc., also a subsidiary of EMEX Corp., conducted a major reconnaissance program for nickel, copper, and platinum-group-element occurrences in Late Triassic and Tertiary mafic to ultramafic sill-form intrusions. Two known nickel–copper–platinum-group-element occurrences (Roberts PGM and Chip Loy) were defined by surface mapping and sampling and tested by diamond drilling (nine holes totaling 2,455 feet). Results from channel sampling at Roberts PGM include 1.5 feet of peridotite averaging 0.49 ounces per ton total platinum-group elements (platinum + palladium + iridium + osmium + rhodium + ruthenium), and 3 feet of peridotite averaging 0.29 ounces per ton total platinum-group elements. Mineralized drill intercepts from the Roberts PGM prospect include 15 feet averaging 0.03 ounces per ton platinum and 0.037 ounces per ton palladium starting at 277.5 foot depth in drill hole R-01-01B, and 5 feet (within a 15-foot mineralized interval) averaging 0.038 ounces per ton platinum and 0.054 ounces per ton palladium starting at 380 foot depth in drill hole R-01-03. The best reported drill intercept at the Chip Loy prospect is in drill hole CL-01-2, with 4.5 feet beginning at 77-foot depth of 1.54 percent nickel, 0.37 percent copper, 0.07 percent cobalt, and no reported platinum-group-element values.

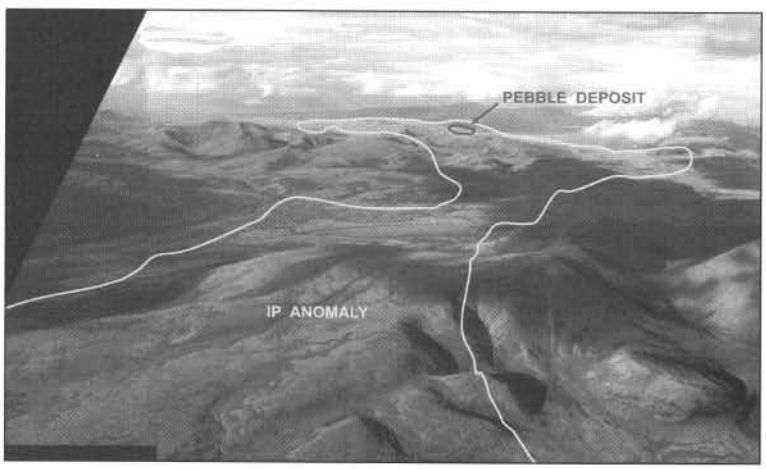


Figure 9. *Airborne photo of the Pebble deposit with an outline of a portion of the large induced polarization (IP) anomaly that covers at least six mineralizing centers. The Pebble deposit is outlined in the upper center of the photo. Photo provided by Northern Dynasty Minerals Ltd.*

Numerous other occurrences were identified in Platinum–Palladium's reconnaissance programs, suggesting the potential for a new nickel–copper–platinum-group-element district extending over 60 miles. Selected surface samples of peridotite and gabbro ranged up to 0.49 ounces per ton total platinum-group elements (platinum + palladium + iridium + osmium + rhodium + ruthenium) with 2.27 percent nickel and 1.31 percent copper. Further work is required in the Farewell district to define mineralization associated with these newly discovered mafic sills and their regional significance.

NovaGold Resources Inc. completed an agreement with Cominco American Ltd. to acquire a 100 percent interest in the 1-million-ounce Shotgun deposit about 110 miles south of the 13-million-ounce Donlin Creek deposit in the Kuskokwim mineral belt. Cominco American retains a 5 percent net profits interest on the Shotgun property and receives from NovaGold the remaining 50 percent interest in the nearby Sleitat tin deposit, subject to a 5 percent net profits interest to NovaGold. NovaGold drilled the Shotgun deposit in 1998 and estimated an inferred gold resource of 980,000 ounces, with recoveries in excess of 90 percent using conventional cyanide leaching.

Corral Creek Corp. found a new zone of anomalous platinum mineralization at Susie Mountain in the Goodnews Bay area of Calista Corp.'s land. The Susie Southwest zone extends at least 2,100 feet along strike, is delineated by rock samples with platinum values in the 100–500 parts per billion, and contains rock samples with up to 0.078 ounces per ton platinum. The Susie Southwest zone mineralization is associated with an abundance of clinopyroxenite dikes and elevated magnetite content. Additional sampling at nearby Red Mountain collected 27 rock samples from the Squirrel Creek drainage that averaged 145 parts per billion platinum.

Bristol Bay Native Corp. reported that 40-year-old core from the Kemuk Mountain iron–titanium deposit was received from ExxonMobil Corp. The core was discovered last year in a Houston, Texas, warehouse and is from a 9,000-foot drilling program conducted in 1958 and 1959 by Humble Oil and Refining, a predecessor of ExxonMobil. The core contains magnetite-bearing ultramafic rocks and traces of chalcopyrite, but it had never been analyzed for platinum-group elements. Selected sampling of the core reveal that significant portions of the core contain anomalous platinum and palladium, with one sample containing 0.04 ounces per ton combined platinum and palladium.

Calista Corp. explored for gold on their Stuyahok property and continued regional

reconnaissance work. John Miscovich completed additional trenching and bulk sampling of residual placer and underlying bedrock on his properties in the Flat area.

SOUTHEASTERN REGION

Kennecott Minerals Co. and Hecla Mining Co. continued a large exploration program near the jointly owned Greens Creek Mine near Juneau. Exploration drilling was conducted in the Lower Southwest area and the southern projections of the Southwest and 200 South ore zones. Drilling identified downdip extensions of the silver-rich 200 South orebody.

Medallion Resources Ltd. terminated its option with Santoy Resources Ltd. on the Salt Chuck palladium–copper–gold property. Santoy maintained its claims on the property and conducted minimal platinum-group-element exploration. Rock samples collected to the west of the mine workings returned anomalous values of copper and platinum-group elements.

Quaterra and International Freegold Mineral Development Inc. entered into a joint-venture agreement to further explore a zoned Ural-Alaska type platinum-group-element (PGE) prospect at Union Bay, about 35 miles north of Ketchikan. Quaterra has the option to earn a 50 percent interest in the Union Bay PGE property by spending $1 million on exploration and development, making staged cash payments to International Freegold totaling $100,000 over the next 4 years, and issuing International Freegold 200,000 shares of its common stock. Quaterra will be the operator during the earn-in period, with work directed by its Alaskan-based consultant, Avalon Development Corp. The joint venture encompasses International Freegold's 2,500-acre Union Bay property plus significant additional placer and lode claims recently staked by Quaterra, which extend the joint holdings to an approximate area of 7 miles by 3 miles or nearly 13,500 acres. The partners now control most of the prospective ground in Union Bay.

The 3-mile by 5-mile Union Bay complex has zonal features characteristic of a Ural-Alaska complex, progressing from a 0.6-mile dunite core on the southeastern side through wehrlite and magnetite-bearing olivine clinopyroxenite to hornblendite and gabbro on the margins. The other part of the complex appears as a western, subhorizontal lopolith folded along a later-staged west–northwest-trending axis.

Six zones of platinum–palladium mineralization were discovered through extensive rock chip sampling and mapping. It is believed that these zones make up one greater reef structure. High-grade outcrop PGE mineralization now extends along two east–west corridors for a distance of 3 miles in the north corridor and 1.2 miles in the south corridor. Both remain open along strike with mineralization occurring over a vertical distance of at least 1,800 feet. The first zone discovered at Union Bay, the North zone, contains potential economic-grade platinum and palladium values, with several 0.50 to 0.55 ounces per ton platinum and palladium sample results, over a minimum 1,300-foot strike length. The zone appears to be between 200 and 400 feet wide. Continuous 5-foot rock chip samples taken at the North zone returned combined platinum and palladium grades ranging from 0.100 to 0.52 ounces per ton. PGE mineralization is associated with podiform magnetite, chromite stringers, late shear fabric, and abundant pyroxenite dikes. Trace amounts of pyrite, pyrrhotite, and chalcopyrite are also present, especially with hydrothermal magnetite.

The largest zone discovered to date is the Mt. Burnett zone with a current strike length of over 2,500 feet. Combined platinum and palladium values ranged up to 0.335 ounces per ton. The zone remains open along strike. Other zones discovered include the Lexus zone (400 feet of strike with combined platinum and palladium values up to 0.146 ounces per ton, as well as one sample containing greater than 2 percent chromium and 558 parts per million nickel) where mineralization is hosted in interbedded dunite and pyroxenite and is accompanied by magnetite and chromite, and the Jaguar zone (1,200 feet of strike with combined platinum and palladium values up to 0.097 ounces per ton). In addition, reconnaissance sampling of the Cobra east and the Cobra west zones returned sample grades up to 0.257 and 0.105 ounces per ton combined platinum and palladium, respectively. Exploration to date suggests that platinum–palladium mineralization occurs in one or more stratiform layers or horizons similar to the platiniferous reefs in the Stillwater and Bushveld complexes that can be traced discontinuously over an area 5 miles long and 3 miles wide.

A four-hole drilling program totaling 1,168 feet of diamond drilling was completed at the Union Bay property. Angle holes UB01-1 and UB01-2 were scissored under North zone outcrops where previous surface sampling and rock-saw trenching had returned values up to 0.525 ounces per ton platinum and palladium. The holes were designed to test downdip continuity of a northwest-trending PGE-bearing horizon defined by previous mapping and sampling. Hole UB01-1, drilled to the west, intersected this horizon at a depth of 62 feet, with a 1.5-foot interval assaying 0.327 ounces per ton platinum and palladium. Mineralization is hosted in pyroxenite with disseminated and vein type magnetite. Hole UB01-2 was drilled to the northeast and intersected 2 feet of lower grade mineralization beginning at 164 feet averaging 0.013 ounces per ton platinum and palladium. It is possible that the high-grade horizon intersected in hole UB01-1 was cut out or diluted by post-mineral pyroxenite dikes.

Holes UB01-3 and UB01-4 were drilled at Mt. Burnett, about 2 miles west of the North zone, where previous surface sampling returned values up to 0.335 ounces per ton

platinum and palladium. Both holes intersected anomalous platinum and palladium in multiple horizons up to 29 feet thick hosted primarily in hornblende pyroxenite containing disseminated and vein type magnetite. Values ranged up to 0.032 ounces per ton platinum and palladium over a 1-foot interval in hole UB01-4.

Quaterra staked and recorded 94 federal claims and 11 State of Alaska claims at Duke Island, about 30 miles southeast of Ketchikan. The Duke Island complex consists of two separate, well exposed, zoned ultramafic bodies. The Judd Harbor body is almost 2 miles in diameter and the Hall Cove body is about 3 1/2 miles in diameter. The Judd Harbor and Hall Cove complexes have been interpreted to be parts of the same intrusive body at depth. Both bodies are composed of a dunite and peridotite core surrounded by concentric zones of olivine clinopyroxenite, hornblende-magnetite clinopyroxenite, and gabbro (fig. 10).

Interpretation of an induced polarization (IP) survey completed at Duke Island by Zonge Engineering suggests that the extremely low resistivity (high conductivity) values encountered on all four lines of the survey may be due to the presence of massive sulfides. The interpretation is consistent with the observation that net-textured sulfides formed by gravity separation from an ultramafic magma may signal the presence of massive-sulfide mineralization below the iron-stained outcrops on Duke Island. Outcrop samples taken from this zone returned assay results up to 1.95 percent copper, 0.25 percent nickel, and 0.029 ounces per ton platinum and palladium. Extensive soil sampling in the same area has averaged 2,241 parts per million copper, 401 parts per million nickel, 210 parts per million cobalt, 175 parts per billion platinum, and 129 parts per billion palladium.

The IP survey and surface geochemical sampling has outlined a zone of potential mineralization that extends 3 miles in length, at least 400 feet in depth from surface, and up to 1,300 feet in width. The zone is open to the northwest where it appears to plunge 200 feet below the surface. The IP survey covers an area of only 0.6 by 0.6 miles along a prospective trend that is 6 to 10 miles long. Samples, taken from a recessive-weathering zone of orange–red iron staining, contain from 5 percent to 30 percent residual fine-grained sulfides (pyrite, pyrrhotite, and chalcopyrite), some in net-texture form. Mineralization is hosted in pyroxenite and hornblende pyroxenite that appear to intrude dunite and wehrlite of the Duke Island ultramafic complex along a northwest-trending linear. Much of the outcrop and subcrop occur in low, boggy areas with heavy red–brown clay.

Quaterra completed four diamond drill holes (1,469 feet total) in the central portion of a 3-mile-long zone of copper–nickel–PGE mineralization on Duke Island. The late 2001 drill holes originated from two drill pads approximately 750 feet apart, centered on coincident rock geochemical and IP geophysical anomalies. Previous rock sampling of massive to semi-massive pyrrhotite plus chalcopyrite in the central portion of the IP anomaly returned anomalous values ranging up to 2.8 percent copper, 0.25 percent nickel, and 0.029 ounces per ton combined platinum and palladium.

Holes DK01-1 and DK01-2 intercepted disseminated, semi-massive and massive sulfides (pyrrhotite, chalcopyrite, and trace pyrite) from the collar to termination depth, and neither hole exited the mineralized envelope. Host rocks are predominantly olivine pyroxenites to pyroxenite with variable amounts of serpentinization. Copper and nickel values are strongly correlative with each other and with sulfur.

Holes DK01-3 and DK01-4 were collared 750 feet southeast of holes 1 and 2 in the original discovery area of the property. Hole DK01-3 intercepted disseminated, semi-massive and massive pyrrhotite and subordinate chalcopyrite hosted in pyroxenites from the collar to termination depth (252 feet) and did not exit the mineralized envelope. Host rocks are predominantly olivine pyroxenites to pyroxenite with variable amounts of serpentinization. Hole DK01-4 intercepted mineralization and host rocks similar to those in DK01-3 to a depth of 188 feet, at which

Figure 10. *Dr. Tom Patton of Quaterra Resources Inc. examines dramatic magmatic layering within dunite (ultramafic rock) at Duke Island. Photo provided by Quaterra Resources Inc.*

point the hole entered olivine-rich wehrlite and dunite. Sporadic copper mineralization below 188 feet is correlative with moderate chargeability anomalies outlined by the IP survey.

Based on the drill results, sulfide mineralization in the Discovery zone is at least 130 feet wide and remains open to the south, northwest, and at depth. Sulfides and host silicates appear to crosscut earlier bedded dunite–wehrlite cumulate rocks, which in turn crosscut older pyroxenite and wehrlite units. Comparison of the geology and mineralization at Duke Island with other known Cu–Ni–PGE deposits suggests it is similar to several ultramafic-hosted occurrences in China, including the world-class Jinchuan deposit (600 million tons grading 1.2 percent nickel and 0.7 percent copper).

Given the close correlation between surface/drill geochemistry and three-dimensional limits of mineralization derived from IP surveys, the company is planning to conduct additional surface and airborne geophysical surveys prior to conducting additional drilling on the project in 2002.

DEVELOPMENT

Although development expenditures of $81.16 million in 2001 were down 43 percent from the $141.7 million in 2000, the activity was widespread, including work at the Red Dog Mine near Kotzebue, at True North and Fort Knox near Fairbanks, at Pogo near Delta Junction, at Usibelli Coal Mine near Healy, and at the Kensington and Greens Creek Mines near Juneau.

Table 7 shows regional employment and development investment, and table 8 compares 2001 investment with that of the previous 19 years. Figure 11 shows the location of selected development projects.

NORTHERN REGION

In 2001 Teck Cominco Alaska Inc. continued the Mill Optimization Project (MOP) that was initiated by Cominco Alaska Inc. in the previous year as part of a larger Value Improvement Program (VIP) (fig. 12). Most of the work was completed by Thanksgiving 2001. The project was designed to allow production of 1.2 million tons of 56 percent zinc concentrate, with the recovery of zinc to concentrate increased from 84 to 87 percent. At the higher production rate Red Dog will produce 10 percent of the world's zinc.

The mine also purchased a new fleet of haulage trucks with total containment of the ore concentrate, and set up wash bays at both the mine and port to eliminate fugitive ore dust that has been found along the 52-mile haul road. Almost 18,000 feet of in-pit development drilling was also reported.

Several placer gold mines in the northern region report minor amounts of development such as stripping overburden, and construction of roads and settling ponds.

WESTERN REGION

Minor development associated with placer gold mines was reported in the western region in 2001.

EASTERN INTERIOR REGION

In January of 2001 Fairbanks Gold Mining Inc. (FGMI), a wholly owned subsidiary of Kinross Gold Corp., received permits to develop its True North Mine about 10 miles northwest of its Fort Knox Mine and mill. After construction of a new road, including a major bridge to carry the Steese Highway over the haul road, trucking of ore from True North began in April, and full production was achieved in July. The road was constructed in winter conditions in steep terrain, and was designed to minimize noise, light, and dust impacts on nearby residents (fig. 13). A fleet of nine custom-built 60-ton end-dump trucks was purchased for hauling the ore to the mill; the trucks were designed with special mufflers and headlight cowls to minimize disturbance to the neighborhood.

Late in the year FGMI submitted an application to the Corps of Engineers to expand its operations at the True North Mine.

Teck Pogo Inc. continued to provide information to the Environmental Protection Agency regarding its permit application and Environmental Impact Statement for its Pogo Mine northeast of Delta Junction. Teck also announced preliminary results from an underground metallurgical sampling program. Results indicate that 80 percent of the gold at Pogo is less than 50 microns in size, while the remaining 20 percent is between 50 and 200 microns, so nugget effect is not expected to pose significant problems. Metallurgical testing of a 49-ton bulk sample from the L1 vein returned overall gold recoveries of 96.4 percent using gravity and cyanidation. Gravity recovery was high at 68 percent, so total cyanide amounts and leach time will be reduced. Additional optimization work is being conducted.

Seven gold placer mines in the interior region reported minor development work such as stripping, road, and pond construction during the year.

Table 7. *Reported mineral development expenditures and employment in Alaska by commodity and region, 2001*

	Northern	Western	Eastern interior	South-central	South-western	South-eastern	Total
			Development expenditures				
Base metals	$43,800,000	$ --	$ --	$ --	$ --	$ --	**$43,800,000**
Polymetallic	--	--	--	--	--	3,300,000	**3,300,000**
Precious metals							
Placer	--	200,000	50,000	34,000	35,000	--	**319,000**
Lode	--	--	30,300,000	--	--	2,100,000	**32,400,000**
Coal and peat	--	--	1,040,000	--	--	--	**1,040,000**
Industrial minerals	--	--	10,000	--	290,000	--	**300,000**
TOTAL	**$43,800,000**	**$200,000**	**$31,400,000**	**$34,000**	**$325,000**	**$5,400,000**	**$81,159,000**
			Development employment				
Employment							
Workdays	39,600	1,010	40,308	810	820	4,150	**86,698**
Workyears[a]	152	4	155	3	3	16	**333**
Number of companies reporting[b]	3	2	9	4	3	4	**25**

[a]Based on 260-day workyear.
[b]Some companies active in more than one area.
No development expenditures or employment reported for Alaska Peninsula region in 2001.
-- No expenditures reported.

Table 8. *Reported mineral development expenditures in Alaska by commodity, 1982–2001*

	Base metals	Polymetallics	Precious metals	Industrial minerals	Coal and peat	Total
1982	$ 10,270,000	$ N/A	$ 19,320,000	$ 4,251,000	$ 7,750,000	**$ 41,591,000**
1983	19,500,000	N/A	7,112,500	1,000,000	250,000	**27,862,500**
1984	10,710,500	N/A	15,058,555	579,000	27,000,000	**53,348,055**
1985	13,000,000	N/A	16,890,755	1,830,000	2,400,000	**34,120,755**
1986	3,260,800	8,000,000	12,417,172	124,000	530,000	**24,331,972**
1987	38,080,000	48,000,000	13,640,848	188,000	342,000	**100,250,848**
1988	165,500,000	69,000,000	40,445,400	--	--	**274,945,400**
1989	118,200,000	411,000	6,465,350	7,000,000	2,196,000	**134,272,350**
1990	--	4,101,000	7,136,500	30,000	3,079,000	**14,346,500**
1991	--	8,000,000	14,994,350	262,000	2,318,000	**25,574,350**
1992	80,000	4,300,000	23,151,300	404,000	1,655,000	**29,590,300**
1993	--	10,731,136	15,103,000	433,500	1,400,000	**27,667,636**
1994	10,000,000	5,000,000	27,392,850	5,000	2,545,000	**44,942,850**
1995	11,200,000	9,590,000	127,165,750	426,000	200,000	**148,581,750**
1996	60,000,000	60,100,000	273,042,000	495,000	400,000	**394,037,000**
1997	133,880,000	7,300,000	26,299,000	500,000	410,000	**168,389,000**
1998	28,000,000	5,600,000	15,602,000	5,355,000	850,000	**55,407,000**
1999	12,500,000	2,500,000	15,864,000	400,000	2,575,000	**33,839,000**
2000	100,000,000	16,400,000	24,699,000	611,000	--	**141,710,000**
2001	43,800,000	3,300,000	32,719,000	300,000	1,040,000	**81,159,000**
TOTAL	**$777,981,300**	**$262,333,136**	**$734,519,330**	**$24,193,500**	**$56,940,000**	**$1,855,967,266**

N/A = Figures not available prior to 1986.
-- Not reported.

At Usibelli Coal Mine near Healy, development work concentrated on preparation of the Two Bull Ridge pit as the primary production area when the Poker Flats pit is exhausted (fig. 14). Usibelli also requested and received permits to bring a new coal reserve into future production. The Rosalie Mine, in Healy Creek valley, has a reserve of 6.7 million tons of coal.

SOUTHCENTRAL REGION

Four placer mines in the southcentral area reported minor development, including stripping, constructing roads, and preparing for production next year.

SOUTHWESTERN REGION

Two placer mines reported minor development in 2001, mainly stripping and pit development.

Bristol Bay Native Corp. developed a new source of rock, including rip-rap, at a pit on Snake Lake Road north of Dillingham, with a long-term intent of providing material for public works projects in the southwestern and western areas of the state (fig. 15). Knik Construction reported minor development of material sites at Kalskag and Platinum.

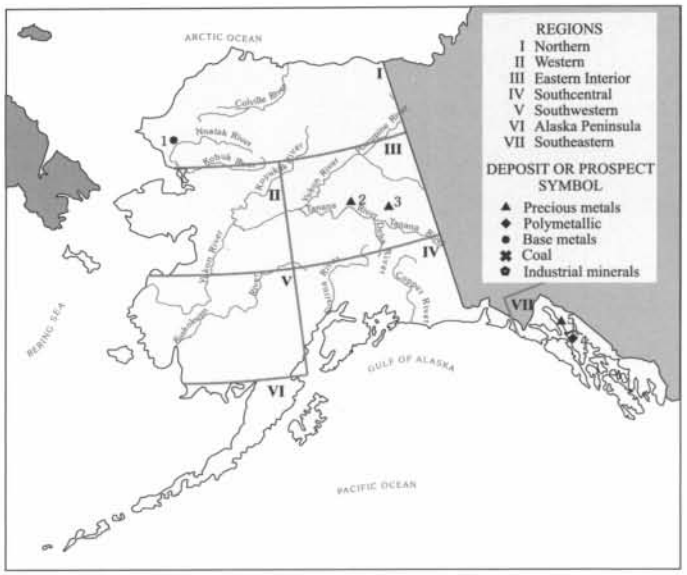


Figure 11. *Selected mineral development projects in Alaska, 2001.*

I Northern Region
1. Red Dog Mine—Cominco Alaska Inc. (mill circuit)

II Western Region

III Eastern Interior Region
2. Fairbanks area
   a. Fort Knox Mine—Kinross Gold Corp. (drilling)
   b. Several open-pit and underground placer mines
   c. True North Mine, Kinross Gold Corp. (road and mine construction)
3. Pogo Project—Teck Corp./Sumitomo Metals Mining America Inc. (permitting)

IV Southcentral Region

V Southwestern Region

VI Alaska Peninsula Region

VII Southeastern Region
4. Greens Creek Mine—Kennecott Mineral Co./ Hecla Mining Co. (access drifting, underground drilling)
5. Kensington Mine—Coeur Alaska (optimization studies)

Figure 12. *Newly expanded zinc circuit at the Red Dog mill. The zinc flotation module consists of 12 Outokumpu OK-50 flotation cells and four column cells (not shown). Photo provided by Teck Cominco Alaska Inc.*

Figure 13. *Fairbanks Gold Mining Inc. building a new road connecting the True North Mine to the Fort Knox Mine mill. Roadwork was completed during winter in steep terrain. Photo provided by Kinross Gold Corp.*

ALASKA PENINSULA REGION

There was no development reported in this region in 2001.

SOUTHEASTERN REGION

Coeur Alaska continued its attempt to permit the Kensington–Jualin mines and submitted a plan for tailings impoundment near the Jualin Mine, rather than the earlier plan for a dry-stack impoundment at the Kensington Mine.

Kennecott Minerals Co., in partnership with Hecla Mining Co., constructed an underground paste plant at Greens Creek Mine to augment the standard fill process, and to facilitate mining of mechanized longhole stopes. Ultimately this will result in less surface tailings. Other development projects were expansion of the mill cleaner cells and construction of a solar gas turbine generator. Kennecott also continued with permitting of the expansion of the surface tailings facility, and drove sills and overcuts for longhole production at the Central West ore zone. Additional work focused on the Lower South West and 200 South ore zones and their southern projections.

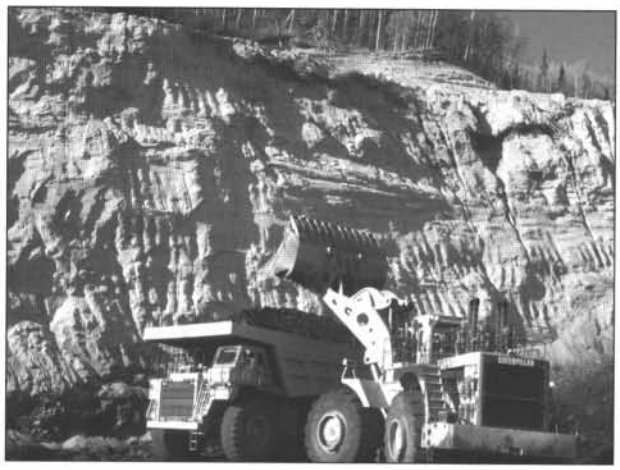


Figure 14. *Development at Usibelli Coal Mine Inc.'s Two Bull Ridge pit concentrated on making a box cut down to the coal-bearing seams. A Caterpillar 785 haul truck is being loaded by a Caterpillar 992 loader. Photo by David Szumigala.*

Figure 15. *View of the new rock quarry 18 road miles from Dillingham that will provide a local source of material for various construction projects. Photo provided by Bristol Environmental and Engineering Services Corp.*

PRODUCTION

The total value of production from Alaska's mines and quarries in 2001 was $917.34 million, down 17 percent from the $1,106.4 reported in 2000. Although mill throughput at both the Red Dog and Greens Creek mines was a record, the milling of lower grade ore resulted in a slight decrease in metal production. Far more significant was the 22 percent decrease in the price of zinc between 2000 and 2001. Production of gold and silver at the Fort Knox and Illinois Creek mines was also at record levels, offset in value by the year-on-year 3 percent decrease in price.

Table 9 shows the quantity and value of metal and material production from 1999 to 2001. Table 10 lists the miners and mines that had an Alaska Annual Placer Mining Application (APMA) for 2001, and which were reported by the U.S. Bureau of Land Management or the State of Alaska Division of Mining, Land & Water (DMLW) to have had at least some production. Figures 16, 17, and 18 show the historic production of sand and gravel, rock, and coal. Selected production sites are shown in figure 19.

Metals, with a value of $786.6 million, account for 86 percent of total production, and zinc (634,883 short tons with a value of $507.9 million) continued to be the most valuable metal. This was followed by gold (550,644 ounces valued at $149.3 million), silver (16.8 million ounces valued at $73.4 million), and lead (127,385 tons valued at $56.1 million). Zinc was 65 percent of the total metal value, gold was 18.9 percent, silver 8.8 percent, and lead 7.1 percent.

Table 11 shows the average metal values used in this report over the last 9 years. The 22 percent decline in zinc price between 2000 and 2001 is the most dramatic decrease,

Table 9. *Estimated mineral production in Alaska, 1999–2001*[a]

	Quantity			Estimated values[b]		
Metals	**1999**	**2000**	**2001**	**1999**	**2000**	**2001**
Gold (ounces)	517,890	551,982[c]	550,644	$144,262,000	$154,058,000	$149,246,000
Silver (ounces)	16,467,000	18,226,615	16,798,000	85,628,000	90,404,000	73,408,000
Copper (tons)	2,100	1,400	1,400	2,982,000	2,296,000	1,988,000
Lead (tons)	125,208	123,224	127,385	57,596,000	51,754,000	56,049,000
Zinc (tons)	643,642	669,112	634,883	630,769,000	682,494,000	507,907,000
Subtotal				**$921,237,000**	**$981,006,000**	**$788,598,000**
Industrial minerals						
Jade and soapstone (tons)	2.0	2.0	2.0	$ 25,000	$ 25,000	$ 25,000
Sand and gravel (million tons)	10.6	10.6	10.4	52,418,000	49,855,000	55,221,000
Rock (million tons)	2.34	5.2	3.1	18,010,000	36,588,000	27,176,000
Subtotal				**$ 70,453,000**	**$86,468,000**	**$82,422,000**
Energy minerals						
Coal (tons)	1,560,000	1,473,000	1,537,000	$ 41,048,000	$38,768,000	$48,108,000
Peat (cubic yards)	38,000	35,600	36,000	165,000	178,000	180,000
Subtotal				**$ 41,213,000**	**$38,946,000**	**$48,288,000**
TOTAL				**$1,032,903,000**	**$1,106,420,000**	**$919,308,000**

[a]Production data from DGGS questionnaires, phone interviews with mine and quarry operators, Alaska Department of Transportation and Public Facilities, and federal land management agencies.
[b]Values for selected metal production based on average prices for each year; for 2001—gold ($271.04/ounce unless other value provided by operator); silver ($4.37/ounce); copper ($0.71/lb); zinc ($0.40/lb); lead ($0.22/lb). All other values provided by mine operators. Values rounded to nearest $1,000.
[c]Hardrock gold 527,803 ounces, placer 22,841 ounces.

Table 10. *Companies and individuals reported to be producing metal in Alaska, 2001*

Operator	**Creek**	**District**	**Type**[a]
		Northern Region	
Dykes, Bob	Nugget	Koyukuk	S/D Placer
Fleming, Mitchell	Myrtle	Koyukuk	O/P Placer
Frantz, Peter	Linda	Koyukuk	O/P Placer
Green, Steve	Davis	Koyukuk	O/P Placer
Hall, John	Linda	Koyukuk	U/G Placer
Hamm, Ralph	Hammond River	Koyukuk	O/P Placer
Jiles, O. J.	Gold Bottom	Koyukuk	O/P Placer
Kotle Brothers	Clara	Koyukuk	S/D Placer
Lounsbury, Jim	Union Gulch	Koyukuk	O/P Placer
Nordeen, William	Emma	Koyukuk	U/G & S/D Placer
Olmstead, Jim	Gold	Koyukuk	O/P Placer
Paradise Mining	Birch	Koyukuk	O/P Placer
Philpott, Roy	Smith	Koyukuk	O/P Placer
Swan, James	Gold	Koyukuk	O/P Placer
Swenson, Lloyd	Slate	Koyukuk	O/P Placer

[a]O/P=Open-pit; HR=Hard-rock; U/G=Underground; S/D=Suction Dredge.

Operator	Creek	District	Type[a]
Tainter, Gary	Prospect	Koyukuk	O/P Placer
Tri-Con Mining	Nolan	Koyukuk	O/P and U/G Placer
Wicken, Jim	Gold	Koyukuk	O/P Placer
Wiggers, Dean	Hammond	Koyukuk	O/P Placer
Wright, Richard	Magnet	Koyukuk	O/P Placer
Teck Cominco Alaska Inc.	Red Dog Mine	Noatak	HR O/P (zinc-lead-silver)
	Western Region		
Loyer, Victor	Candle	Fairhaven	O/P Placer
Tanner, Noel	Mud	Fairhaven	O/P Placer
Tanner, Noel	Candle	Fairhaven	O/P Placer
Taiga Mining	Bear	Hughes	O/P Placer
Rosander, Ron	Colorado	Innoko	O/P Placer
American Reclamation Group, LLC	Illinois Creek Mine	Kaiyuh	HR O/P (gold-silver)
Benesch, George	Coffee	Kougarok	O/P Placer
Gumaer, Mark	Dick	Kougarok	O/P Placer
Lohman Mining	Coffee	Kougarok	O/P Placer
Mullikin, Christopher	Boulder	Kougarok	O/P Placer
Mullikin, Donald	Noxapaga	Kougarok	O/P Placer
Pushcar, Jerry	Iron	Kougarok	O/P Placer
Redmond, Richard	Macklin	Kougarok	O/P Placer
Tweet, Bruce & Doug	Kougarok	Kougarok	O/P Placer
Magnuson, Manzie	Candle	McGrath	O/P Placer
Gibson, Wayne	Golden	Melotzitna	O/P Placer
Amerigold	Airport	Nome	O/P Placer
Anderson, Ralph	Rock	Nome	O/P Placer
Bartholomae, Bill	Goldrun	Nome	O/P Placer
Blake, Thomas	Iron	Nome	O/P Placer
Coggins, Graig	Norton Sound	Nome	S/D Placer
Groethe, Lenhart	Tripple	Nome	O/P Placer
Gustafson, Aaron	Norton Sound	Nome	S/D Placer
High Bench	Anvil	Nome	O/P Placer
Johnson, Al	Norton Sound	Nome	S/D Placer
K & S Leasing	Norton Sound	Nome	S/D Placer
Krutzsch, Betty	Specimen Gulch	Nome	O/P Placer
Lee, Robert	Norton Sound	Nome	S/D Placer
Massie, Perry	Cripple	Nome	O/P Placer
McCauley, Edward	Norton Sound	Nome	S/D Placer
McFarland, Frank	Norton Sound	Nome	S/D Placer
Mendenhall, Perry	Darling	Nome	S/D Placer
Olson, Dave	Canyon	Nome	O/P Placer
Pettigrew, Bert	Anvil	Nome	O/P Placer
Pomrenke, Steve	Tripple	Nome	O/P Placer
Stamps, Thomas	Norton Sound	Nome	S/D Placer
Sykes, Frank	Norton Sound	Nome	S/D Placer
Turner, Martin	Norton Sound	Nome	S/D Placer
Wade, Mike	Norton Sound	Nome	S/D Placer
Walsh, Daniel	Gold Run	Nome	O/P Placer

[a]O/P=Open-pit; HR=Hard-rock; U/G=Underground; S/D=Suction Dredge.

Operator	Creek	District	Type[a]
Kralik, Janos	Gold Run	Port Clarence	O/P Placer
Stultz, Thomas	Gold Run	Port Clarence	O/P Placer
Tweet, Bruce & Doug	Windy	Port Clarence	O/P Placer
Clay, Barry	Swift	Ruby	O/P Placer
Tryck, Keith	Ophir	Ruby	O/P Placer
Sweetsir, Michael	Glen Gulch	Ruby	O/P Placer
	Eastern Interior Region		
Decker, James	Sheep	Bonnifield	O/P Placer
Kiehl, Don	Gold King	Bonnifield	O/P Placer
Totat Mining	Totatlanika	Bonnifield	O/P Placer
Traxler, Gene	Totatlanika	Bonnifield	O/P Placer
Alaska Rose Garnet	Faith	Circle	O/P Placer
Manuel, Paul	Crooked	Circle	O/P Placer
Fulton, Gordon	Switch	Circle	O/P Placer
Glassburn, Don	Gold Dust	Circle	O/P Placer
Koppenberg, Sam	Faith	Circle	O/P Placer
Lapp, Ed & Sons	Ketchum	Circle	O/P Placer
Lines, Lester	North Fork Harrison	Circle	O/P Placer
Loud, Richard	Harrison	Circle	O/P Placer
Olsen, Steven	Eagle	Circle	O/P Placer
Smith, David Jr.	Switch/Deadwood	Circle	O/P Placer
Stone, James	Porcupine	Circle	O/P Placer
Willis Mine Service	Circle	Circle	O/P Placer
Wilkenson, Fred	Ketchem	Circle	O/P Placer
Wrede, Ronald	Switch	Circle	O/P Placer
Jensen, Dan	McCumber	Delta River	O/P Placer
Andresen, John	Dome	Fairbanks	O/P Placer
Bergman, Kevin	Ester	Fairbanks	O/P Placer
Cornelius, Fred	Fox	Fairbanks	O/P Placer
Fairbanks Gold Mining Inc.	Fort Knox Mine	Fairbanks	H/R O/P (gold)
Goodwin, Robert	Twin	Fairbanks	O/P Placer
Hassel, Jerry	Ready Bullion	Fairbanks	O/P Placer
Hopen, Alf	Cleary	Fairbanks	O/P Placer
Jobaric Enterprises	Wildcat	Fairbanks	O/P Placer
Knudsen, Richard	Specimen	Fairbanks	O/P Placer
Krzykoski, Ben	Big Eldorado	Fairbanks	O/P Placer
Largent, Walter	Ester	Fairbanks	O/P Placer
Las, Allen	No Grub	Fairbanks	O/P Placer
Loud, Richard	Chatanika	Fairbanks	O/P Placer
McClain, John	Kokomo	Fairbanks	O/P Placer
Miscovich, Andy	Wolf	Fairbanks	O/P Placer
Moore, Roger	Ready Bullion	Fairbanks	O/P Placer
Polar Mining	Fox Goldstream	Fairbanks	O/P Placer
Read, Donald	Treasure	Fairbanks	U/G Placer
Roberts, Mike	Dome/ Little Eldorado	Fairbanks	U/G Placer
Roman, Ron	Last Chance	Fairbanks	O/P Placer
Stein, Don	Gilmore	Fairbanks	O/P Placer

[a]O/P=Open-pit; HR=Hard-rock; U/G=Underground; S/D=Suction Dredge.

Operator	Creek	District	Type[a]
Thurman Oil & Mining	Smallwood/Fairbanks	Fairbanks	O/P Placer
Tweiten, Oscar	Chatham	Fairbanks	O/P Placer
45-Pup Mining	Fortymile	Fortymile	O/P Placer
Bickell, Harvey	Walker Fork	Fortymile	O/P Placer
Bras, Cy	Canyon	Fortymile	O/P Placer
Burns, John	Davis	Fortymile	O/P Placer
Carr, Brad	Chicken	Fortymile	O/P Placer
Edgerton, Judd	Napoleon	Fortymile	O/P Placer
GeoQuest	Chicken	Fortymile	O/P Placer
Gurule, Dave	Ingle	Fortymile	O/P Placer
Hanks, G.A.	Lost Chicken	Fortymile	O/P Placer
Hayden, Forest	Kal	Fortymile	O/P Placer
Heflinger, Fred	Walker Fork	Fortymile	O/P Placer
Kukowski, Dave	Mosquito Fork	Fortymile	O/P Placer
Leach, James	Fortymile	Fortymile	O/P Placer
Likens, David	Fortymile	Fortymile	O/P Placer
Maxwell Mining	Kal / Squaw	Fortymile	O/P Placer
Mitchell, Harold	Mosquito Fork	Fortymile	O/P Placer
Mitchell, Joseph	Fortymile	Fortymile	O/P Placer
Mitchell, Paul	Eagle	Fortymile	O/P Placer
Nevers, Harold	American	Fortymile	O/P Placer
Olsen, Gordon	Jack Wade	Fortymile	S/D Placer
Olsen, Stephen	Liberty	Fortymile	O/P Placer
Olson, Jeff	Wade	Fortymile	O/P Placer
Owen, Jeff	Davis	Fortymile	O/P Placer
Reed, Scott	Fortymile	Fortymile	O/P Placer
Regner, Leo	Lilliwig	Fortymile	O/P Placer
Roberts, Robert	Chicken	Fortymile	S/D Placer
Schene, Earl	Uhler	Fortymile	O/P Placer
Schofield, Walter	Fortymile	Fortymile	O/P Placer
Seuffert, George Jr.	Chicken	Fortymile	O/P Placer
Thurneau, Vernon	Fortymile	Fortymile	O/P Placer
Treesh, James	Cherry/No Name	Fortymile	O/P Placer
Weston, Thomas	Dome	Fortymile	O/P Placer
Wolff, Flint	Walker Fork	Fortymile	O/P Placer
Cassiterite Placers	Tofty	Hot Springs	O/P Placer
De Lima Placers	American	Hot Springs	O/P Placer
Hodges, Jay	American	Hot Springs	O/P Placer
Ott, Richard	Omega	Hot Springs	O/P Placer
Wilder, Richard	Boulder	Hot Springs	O/P Placer
Wood, James	Little Boulder	Hot Springs	O/P Placer
AK Placer Dev.	Livengood	Tolovana	O/P Placer
Eaves, Samuel	Warwick Gulch	Tolovana	O/P Placer
	Southcentral Region		
Crow Creek Mining	Crow	Anchorage	O/P Placer
Girdwood Mining Co.	Crow	Anchorage	O/P Placer
Hoffman Mining	Chistochina	Chistochina	O/P Placer

[a]O/P=Open-pit; HR=Hard-rock; U/G=Underground; S/D=Suction Dredge.

Operator	Creek	District	Type[a]
Holt, Ryan	Quartz	Hope	S/D Placer
Mastel, Fred	Quartz	Hope	O/P Placer
Outsider Mining (John Trautner)	Canyon	Hope	O/P Placer
Willard, Gerald	Bear	Hope	S/D Placer
Miller, Jerry	Willow/Homestake	Willow Creek	O/P Placer
Mrak Placer Mine	Willow	Willow Creek	O/P Placer
Kragness, Sonny	Cache	Yentna	O/P Placer
LaCross, Jack	Willow	Yentna	O/P Placer
Lake Creek Placers	Lake	Yentna	O/P Placer
	Southwestern Region		
Chase Bros	Flat	Anvik	O/P Placer
Matter, Mark	Marvel	Aniak	O/P Placer
Nyac Placer	Bear	Aniak	O/P Placer
Wilmarth, Richard	Chicken	Iditarod	O/P Placer
Clarke-Wiltz	Podesie/Ganes	Innoko	O/P Placer
Little Creek	Little	Innoko	O/P Placer
Lyman Resources	Queen	Innoko	O/P Placer
Plano, Ed	Anvil	Innoko	O/P Placer
Roberts, Bob	Boob	Innoko	O/P Placer
	Southeastern Region		
Big Nugget Mine	Porcupine	Juneau	O/P Placer
Kennecott/Hecla	Greens Creek Mine	Admiralty Island	U/G (zinc-lead-silver-gold)

[a]O/P=Open-pit; HR=Hard-rock; U/G=Underground; S/D=Suction Dredge.

but silver (13 percent) and gold (3 percent) also show a decline.

These production estimates are from 135 questionnaires returned from miners, Native corporations, agencies, and municipalities, supplemented by about 100 phone surveys. Additional information was derived from State Annual Placer Mining Applications (APMA) submitted to the DMLW, but due to the inability to contact several placer miners, the estimate for placer mine production is thought to be conservative. There may also be some operations listed in table 10 that elected not to mine due to the high price of fuel and the low price of gold.

The authors also wish to thank the Alaska Railroad Corp., the Alaska Mental Health Trust Land Office, the Alaska Department of Transportation & Public Facilities, the Alaska Division of Mining, Land & Water, the U.S. Bureau of Land Management, and the U.S. Forest Service for providing information for this section of the report.

Some respondents reported costs and unit values, but in general metal values were computed from weekly averages on the London Metal Exchange, and do not take into account mining, shipping, smelting, or other costs incurred by the reporting company.

Tables 12 and 13 show the gold production by region of the state, and the placer production by small, medium, and large operations. Hardrock gold production increased from 505,668 ounces in 2000 to 527,803 ounces in 2001, while placer production decreased 49 percent from 46,314 ounces in 2000 to 22,841 ounces in 2001.

Tables 14 and 15 show the value and regional importance of sand, gravel, and rock production. Sand and gravel

Table 11. *Average metal prices, 1993–2001*

	Gold ($/oz)	Silver ($/oz)	Copper ($/lb)	Zinc ($/lb)	Lead ($/lb)
1993	359.00	4.30	0.87	0.44	0.18
1994	386.00	5.41	1.05	0.45	0.35
1995	395.00	5.43	1.33	0.48	0.34
1996	387.60	5.19	1.03	0.49	0.37
1997	330.76	4.91	1.03	0.59	0.28
1998	293.88	5.53	0.75	0.46	0.24
1999	278.70	5.20	0.71	0.49	0.23
2000	279.10	4.96	0.82	0.51	0.21
2001	271.04	4.37	0.71	0.40	0.22

production, 10.4 million tons in 2001, was almost the same as in 2000, but was sold at a higher average unit price. Rock production in 2001 was 3.1 million tons, a sharp decline from the 5.2 million tons reported in 2000, mainly due to the completion of roadwork in the southcentral and southeastern areas of the state.

Coal production at Usibelli Coal Mine in 2001 was 1.54 million tons, up slightly from the 1.47 million tons the previous year, and almost 700,000 tons was exported to Korea.

NORTHERN REGION

During the year 2001 Teck Corp. bought controlling interest of Cominco Ltd., and the new company became Teck Cominco Ltd. The Alaskan subsidiary is now Teck Cominco Alaska Inc., and it operates the Red Dog Mine near Kotzebue on behalf of the owner, NANA Regional Corp. During 2001 the mine milled a record 3,560,430 tons of ore to produce 570,980 dry short tons (dst) of contained zinc, 105,000 dst of contained lead, and an estimated 5.9 million ounces of silver (table 16). The head grades were 19.8 percent for zinc, 5.0 percent for lead, and 2.5 ounces per ton for silver, resulting in a slight decline in the amount of contained zinc, and a slight increase in the amount of lead from the previous year.

The mine employs about 560 people, including miners, millworkers, maintenance, and portsite workers. Accommodations and food are provided by NANA–Marriott, and trucking is contracted to NANA–Lynden. During the summer shipping and supply season, an additional 90 workers are hired for approximately three months, and four tugs are used to haul barges out to deeper water to load and offload ocean-going freighters (fig. 20).

Red Dog is a conventional open-pit operation, using only three dozers, three 15-cubic-yard loaders, and five 85-short-ton haul trucks, with a water/sand truck, two graders, and two utility loaders. Because of the high grade of the ore, the equipment is only about 45 percent utilized.

Proven and probable year-end ore reserves at Red Dog are 104 million tons at 17.6 percent zinc and 4.6 percent lead. There is also an additional indicated resource of 10 million tons grading 17.4 percent zinc and 5.2 percent lead, and a further inferred resource of 41 million tons grading 13.8 percent zinc and 4.3 percent lead. The silver content of the reserves and resources varies from about 2.2 to 2.9 ounces per ton.

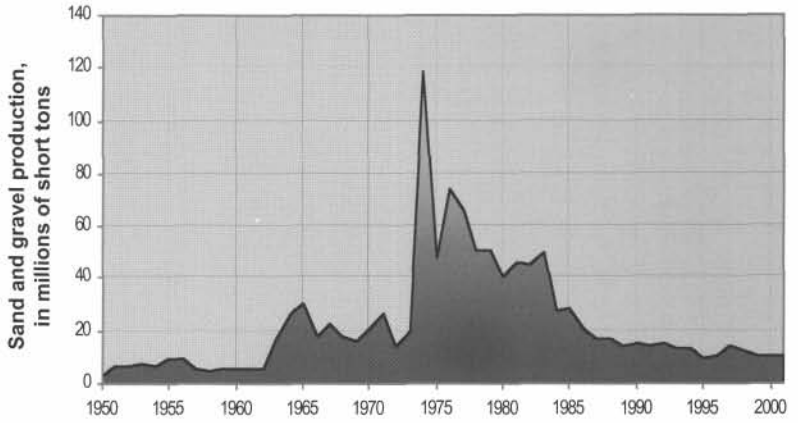


Figure 16. *Sand and gravel production in Alaska, 1950–2001.*

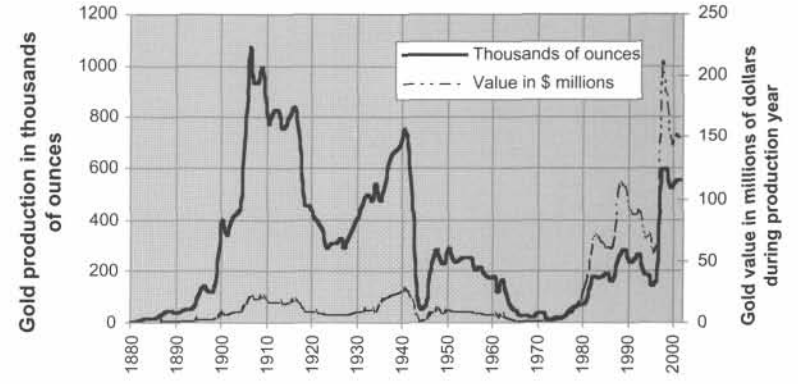


Figure 17. *Amount and value of gold production in Alaska, 1880–2001.*

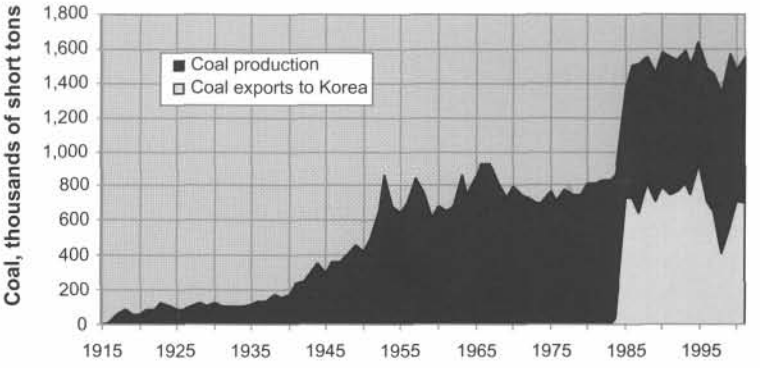
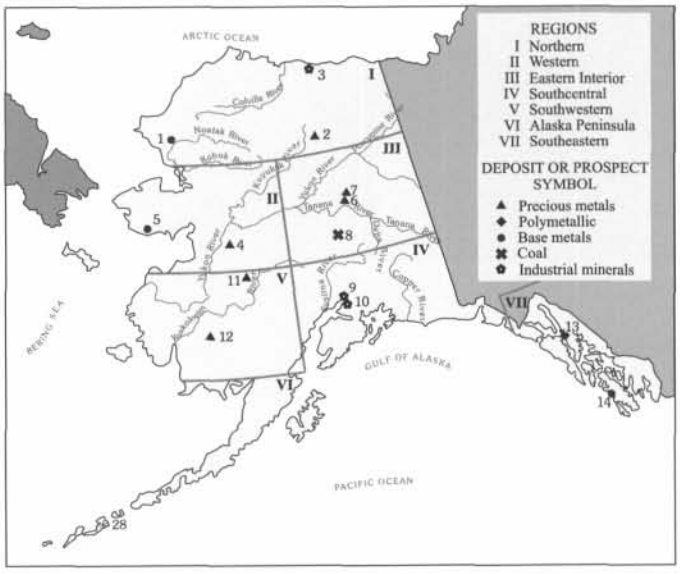


Figure 18. *Coal production in Alaska, 1915–2001, including exports to Korea.*

Several small placer gold mines reported production in the northern region during 2001, mainly near Wiseman on the south flank of the Brooks Range.

Industrial mineral production, mainly sand and gravel, was reported throughout the northern region, particularly in the vicinity of the North Slope oilfields. Gravel pits used include the Milne Point, Kuparuk E, C, and F, Duck Island, Point Thomson, Put 23, and Kuparuk Deadarm. Sand was extracted from the DS L-4 sand site. About 150,000 tons of gravel was used at Barrow, and a small amount of rock was used along the Red Dog road between the mine and the coast. The Alaska Department of Transportation & Public Facilities expanded rock and rip-rap production at the Milepost 260 pit on the Dalton Highway to provide material for road maintenance and for stream diversion and armoring (fig. 21). Material was also extracted from other materials sites along the Dalton.



I Northern Region
1. Cominco Alaska Inc. Red Dog Mine, Noatak district—zinc–lead–silver (germanium)
2. Gold Placer Mines—gold
3. Prudhoe Bay and Kuparuk pits (numerous)—sand and gravel

II Western Region
4. American Reclamation Group LLC. Illinois Creek Mine, Koyukuk–Hughes district—gold–silver
5. Nome—placer gold, sand and gravel

III Eastern Interior Region
6. Polar Mining Inc., Fairbanks district—gold–silver–screened aggregate
7. Kinross Gold Corp. Fort Knox Mine, True North Mine, Fairbanks district—gold–silver; placer mines
8. Usibelli Coal Mine Inc., Bonnifield district—coal

IV Southcentral Region
9. Landscape Supply Corp., Hatcher Pass district—topsoil–peat
10. Palmer–Anchorage district—sand and gravel

V Southwestern Region
11. Clark–Wiltz Partnership, Innoko district—gold–silver
12. NYAC Mining Co., Nyac district—gold–silver

VI Alaska Peninsula Region

VII Southeastern Region
13. Kennecott Minerals Co./Hecla Mining Co., Greens Creek Mine, Juneau–Admiralty district—silver–zinc–gold–lead–copper
14. Calder Island Marble-SeaCal LLC.

Figure 19. *Selected production projects, 2001.*

Table 12. *Reported refined gold production, number of operators, and industry employment in Alaska, 1999–2001*[a]

Region	Number of operators			Production in ounces of gold			Number of employees		
	1999	2000	2001	1999	2000	2001	1999	2000	2001
Northern	5	17	11	1,262	1,434	631	8	11	9
Western	21	44	10	36,377	22,603	36,590	114	40	55
Eastern Interior	57	76	23	392,237	392,862	423,699	443	394	425
Southcentral	8	9	5	305	524	484	14	8	10
Southwestern	8	8	5	7,577	5,650	1,386	28	8	12
Southeastern	2	2	2	80,132	128,909	87,854	280	280	280
TOTAL	**101**	**156**	**56**	**517,890**	**551,982**	**550,644**	**887**	**741**	**791**

[a]2001 production includes 527,803 ounces gold from Illinois Creek, Fort Knox, and Greens Creek hardrock projects, and 22,841 ounces of placer gold.

Table 13. *Production for selected Alaska placer gold mines, 1995–2001*

Mine size	1995	1996	1997	1998	1999	2000	2001
			Number of mines				
Small[a]	11	9	25	45	38	60	33
Medium[b]	5	5	6	11	13	14	5
Large[c]	4	4	4	7	7	4	4
TOTAL	**20**	**18**	**35**	**63**	**58**	**78**	42
			Production in ounces				
Small[a]	1,459	1,433	5,077	10,159	4,710	8,981	5,048
Medium[b]	5,890	5,058	9,373	12,833	13,218	15,186	6,234
Large[c]	43,390	49,240	65,682	72,307	52,300	22,147	11,559
TOTAL	**50,739**	**55,731**	**80,132**	**95,299**	**70,228**	**46,314**	**22,841**

[a]<650 oz gold/yr.
[b]650-2,500 oz gold/yr.
[c]>2,500 oz gold/yr.

Table 14. *Reported sand and gravel production and industry employment in Alaska by region, 2001*

Region	Companies and agencies reporting[a]	Tons	Estimated unit value ($/ton)[b]	Total value	Estimated number of employees
Northern	3	2,224,000	4.67	$10,386,000	110
Western	4	416,500	3.89	1,620,000	36
Eastern Interior	6	2,463,000	4.47	11,010,000	147
Southcentral	10	4,178,000	6.10	25,486,000	177
Southwestern	4	974,000	6.40	6,233,000	53
Southeastern	4	104,000	4.67	486,000	34
TOTAL	**31**	**10,359,500**	**5.33[c]**	**$55,221,000**	**557**

[a]From 21 returned questionnaires and 10 phone canvass responses. Also data from the Alaska Railroad, Department of Transportation, Division of Mining, Land & Water Management, U.S. Forest Service, and U.S. Bureau of Land Management.
[b]Values are based on price and cost estimates from 15 producers.
[c]Weighted average unit value ($/ton) of sand and gravel production in Alaska.

Table 15. *Reported rock production and industry employment in Alaska by region, 2001[a]*

Region	Companies and agencies reporting[b]	Tons	Estimated unit value ($/ton)[c]	Total value	Estimated number of employees
Northern	2	1,658,000	7.45	$12,352,000	24
Western	2	304,000	9.00	2,736,000	17
Eastern Interior	4	269,000	7.82	2,104,000	25
Southcentral	2	336,000	8.40	2,822,000	37
Southwestern	2	58,000	7.80	452,000	11
Alaska Peninsula	0	- -	- -	- -	- -
Southeastern	4	466,000	14.40	6,710,000	23
TOTAL	**14**	**3,091,000**	**8.79[d]**	**$27,176,000**	**137**

[a]Includes shot rock, crushed stone, D-1, riprap, and modest quantities of ornamental stone.
[b]Derived from 22 questionnaires, 8 phone canvass responses. Also data from the Alaska Railroad, Department of Transportation, Division of Mining, Land & Water Management, U.S. Forest Service, and U.S. Bureau of Land Management.
[c]Unit value based on data supplied by 17 operations. Unit values for different stone products vary widely.
[d]Weighted average unit value ($/ton) of rock production in Alaska.
- - Not reported.

Table 16. *Red Dog Mine production statistics, 1989–2001*[a]

	Tons Milled	Ore Grade Zinc %	Lead %	Silver oz/ton	Total Tons Concentrate Produced[c]	Contained Tons Zinc	Contained Tons Lead	Million Ounces Silver[b]	Employees
1989	33,300	20.4	7.6	3.6	8,532	--	--	--	228
1990	996,700	26.5	8.5	3.6	443,600	191,981	31,187	--	350
1991	1,599,300	22.5	6.6	2.8	521,400	234,510	43,815	--	331
1992	1,582,000	19.9	6.0	2.9	474,900	231,363	15,960	--	349
1993	1,874,600	18.4	5.7	2.8	539,800	255,149	24,788	--	376
1994	2,339,500	18.8	5.7	2.8	658,000	328,160	32,775	--	391
1995	2,485,900	19.0	5.8	2.8	753,600	358,676	55,715	3.615	397
1996	2,312,600	18.7	5.0	2.8	765,300	357,680	65,886	4.304	417
1997	2,127,000	20.3	5.2	2.9	799,400	373,097	69,284	4.273	479
1998	2,752,587	21.4	5.2	2.7	1,015,773	490,461	80,193	5.202	466
1999	3,282,788	21.3	5.2	2.7	1,207,160	574,111	97,756	6.205	539
2000	3,365,508	21.0	4.7	2.5	1,211,539	585,030	91,557	5.843	536
2001	3,560,430	19.8	5.0	2.5	1,215,837	570,980	105,000	5.898	559

[a]Revised slightly from Bundtzen and others (1996) based on new company data.
[b]Estimate based on grade and tonnage.
[c]Totals for years 1990 through 1995 include bulk concentrate.
-- = No data.

SOURCE: Gary Coulter, Jim Kulas, Bob Robinson, and Garth Elsdon, Teck Cominco Alaska Inc.

Figure 20. *Tugs lined up for lightering Red Dog Mine ore concentrates at the De Long Mountains Regional Transportation System port on the Chukchi Sea. The Alaska Industrial Development and Export Authority (AIDEA) owns the transportation system and Teck Cominco Alaska Inc. pays tolls for use of the facilities and maintains the system. Photo by Dick Swainbank.*

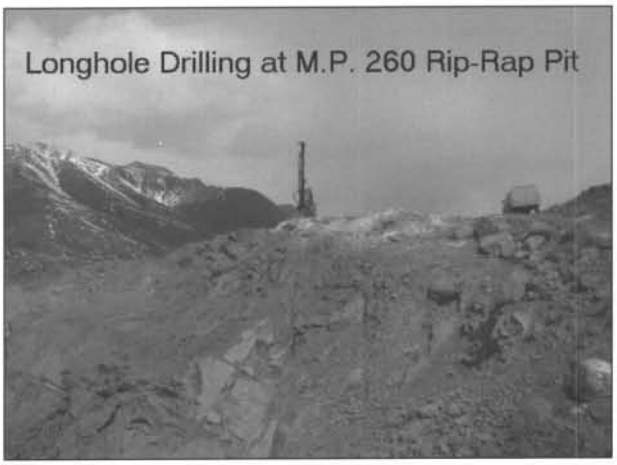


Figure 21. *Longhole drilling at the DOTPF rip-rap pit at mile 260 of the Dalton Highway. Photo provided by Bill Cole, Alaska Department of Transportation & Public Facilities (DOTPF).*

WESTERN REGION

American Reclamation Group LLC continued to leach gold from about 750,000 tons of ore at the Illinois Creek open-pit gold–silver mine south of Galena, and intends to continue mining in 2002. Several small placer mines on the Seward Peninsula near Nome and near McGrath also reported some production.

Sand and gravel was produced from pits in the Nome area on land owned by Alaska Gold Co., a subsidiary of NovaGold Resources Inc., and a substantial quantity of rock from a recently developed local quarry was used in reconstruction of the runway at McGrath.

Table 17. *Fort Knox Gold Mine production statistics, 1996-2001*

	Tons Mined	Tons Milled	Ounces Produced	Employment
1996	16,684,000	769,700	16,085	243
1997	32,380,000	12,163,151	366,223	249
1998	33,294,000	13,741,610	365,320	245
1999	30,350,000	13,819,010	351,120	253
2000	35,600,000	15,000,000	362,929	253
2001	34,500,000[a]	15,660,000	411,220	360

[a]8.5 million from True North.

EASTERN INTERIOR REGION

In 2001 Fairbanks Gold Mining Inc. (FGMI) mined 25,957,900 tons of ore and waste from its Fort Knox pit, and 8,448,400 tons from its True North Mine to mill 15,662,774 tons through the Fort Knox mill, producing 411,221 ounces of gold equivalent (table17).

In April 2001 FGMI began mining at the Hindenburg Pit of True North Mine about 8 miles northwest of its mine and mill at Fort Knox. The new mine became fully operational in July (fig. 22). The ore, averaging about 0.063 ounces per ton, is trucked to the mill at Fort Knox Mine at a rate of about 10,000 tons per day, where it is blended with about 30,000 tons of Fort Knox ore, averaging about 0.0231 ounces per ton.

With a direct workforce of 360, FGMI is one of the largest employers in Fairbanks, and also one of the largest taxpayers. Benefits to the community include $20.5 million per year in direct payroll, an additional indirect 530 jobs with a payroll of $14 million, direct local purchases of about $42 million, and a rate reduction for the members of the local rural electrical cooperative.

About 20 placer gold mines in the eastern interior region reported at least some production, and about 12,500 ounces were recovered. The most active districts were Fairbanks, Fortymile, and Circle (fig. 23).

At Usibelli Coal Mine near Healy, the only operating coal mine in the state, approximately 1,537,000 tons of coal was mined from the Poker Flats and Two Bull Ridge pits. About 699,000 tons of that were exported through the Port of Seward to Korea, with the remainder sold to six power plants in Interior Alaska. The Poker Flats pit is almost exhausted, with reserves for only two more years, but the box cut at Two Bull Ridge is almost complete, and permits for the nearby Rosalie area are expected in the near future.

Several quarries and gravel pits in the eastern interior region produced material for roadwork, mainly on the Taylor Highway and the Fairbanks area. Work on the Taylor included installation of large-diameter culverts, reconstruction and chip-sealing almost to Chicken at milepost 56. In the Fairbanks area, work included construction of a major abutment to protect the Parks Highway from further degradation caused by past placer mining near Ester, and reconstruction of local roads.

Figure 22. *A Caterpillar 992C loader dumping gold ore into a 60-ton truck at True North Mine for transport to Fort Knox Mine mill and transfer directly into the crusher. Photo provided by Kinross Gold Corp.*

Figure 23. *Looking downstream at Leo Regner's placer gold plant and settling ponds on Lilliwig Creek in the Fortymile area. Photo by Leo Regner.*

SOUTHCENTRAL REGION

A small amount of placer gold production was reported in 2001 in the southcentral region, mainly in the Willow Creek, Placerville, and Collinsville areas.

Several gravel pits in the Mat-Su Borough produced material for road work in the southcentral region, and the Alaska Railroad hauled a record 3.54 million tons from pits near Palmer to the Anchorage Bowl area.

A small limestone quarry near Cantwell produced soil conditioner for local horticultural markets.

SOUTHWESTERN REGION

Five placer gold mines in the southwestern region reported limited production in 2001, for a total of 1,386 ounces. Production of sand and gravel was reported at Platinum and Kalskag for local work, and at Igiugig and Egegik for projects in Togiak, Naknek, Dillingham, and Pedro Bay. Hanson Industries, owners of the Goodnews Bay Platinum Mine, resurrected a 1937 bucketline dredge to reprocess gravel deposits in the Salmon River drainage near Platinum for platinum-group elements.

SOUTHEASTERN REGION

The only major mine in the southeastern region, Greens Creek Mine, is 29.73 percent owned by Hecla Mining and 70.27 percent by Kennecott Minerals Co. In 2001 it milled a record 658,000 tons of ore, grading 12.12 percent zinc, 4.75 percent lead, 21.76 ounces per ton silver and 0.194 ounces per ton gold to produce 63,903 dry short tons (dst) of zinc; 22,385 dst of lead; 10.9 million ounces of silver; and 87,583 ounces of gold (table18). Reserves at the mine, calculated from the Hecla year-end report, consist of 7.6 million tons grading 11.6 percent zinc, 4.6 percent lead, 16.7 ounces per ton silver, and 0.133 ounces per ton of gold. An additional 2 million tons with similar grades is characterized as a resource. The combined reserve and resource contain an estimated 159 million ounces of silver, 1.3 million ounces of gold, 1.1 million tons of zinc, and 440,000 tons of lead.

Greens Creek improved mill throughput by 6 percent from optimization efforts implemented during 2001. New lead and zinc cleaner circuits commissioned early in 2001 improved metal recoveries at higher production rates. Ore grades were generally lower, continuing to vary with the mining sequence, but production of silver was 19 per cent higher for a total of 11.0 million ounces. Greens Creek mined 100 million ounces silver and 1 billion pounds of zinc for the life of the mine (LOM) by midyear 2001.

Two placer mines reported minor gold production in 2001, and about 30 rock, sand, and gravel pits and quarries, many operated by the U.S. Forest Service, produced material for local road maintenance.

Table 18. *Greens Creek Mine production statistics, 1989–2001*

	Tons Milled	Tons Concentrate	Contained Tons Zinc	Contained Tons Lead	Contained Ounces Silver	Contained Ounces Gold	Contained Tons Copper	Employees
1989	264,600	--	18,007	9,585	5,166,591	23,530	--	235
1990	382,574	--	37,000	16,728	7,636,501	38,103	--	265
1991	380,000	--	41,850	16,900	7,600,000	37,000	--	238
1992	365,000	113,827	40,500	16,500	7,100,000	32,400	--	217
1993[a]	77,780	--	9,500	3,515	1,721,878	7,350	--	217
1994	--	--	--	--	--	--	--	--
1995	--	--	--	--	--	--	--	--
1996[a]	135,000	43,000	9,100	4,200	2,476,000	7,480	193	265
1997	493,000	--	46,000	19,000	9,700,000	56,000	1,300	275
1998	540,000	--	58,900	22,700	9,500,000	60,572	1,300	275
1999	578,358	--	68,527	25,503	10,261,835	80,060	1,400	275
2000	619,438	--	84,082	31,677	12,424,093	128,709	1,400	275
2001	658,000	--	63,903	22,385	10,900,000	87,583	1,400	275

[a]Part-year production.
-- Not reported.

DRILLING

Drilling was conducted during all phases of mining (exploration, development, and production) on various projects across Alaska during 2001. Companies reporting significant drilling are listed in table 19. Preliminary drilling totals for 2001 are 240,318 feet of core drilling and 75,750 feet of reverse-circulation drilling. Hardrock core footage in 2001 is approximately 58 percent of the 416,017 feet reported drilled in 2000. Reverse-circulation drilling footage dropped to 1999 levels and approximately 59 percent of the 127,638 feet reported drilled in 2000. Drilling at placer mines was largely unreported for 2001, but placer drilling totals are likely lower than in recent years due to the lower levels of placer activities for 2001 compared to previous years. Tables 20 and 21 summarize the drilling activity in the state during 2001 by region and type of drilling. The eastern Interior region had the most drilling of all Alaskan regions, with 44 percent of the total for 2001. The southeastern region had 30 percent of the drilling, followed by the northern region with 16 percent. Coal drilling and hardrock reverse-circulation drilling were restricted to the eastern Interior region, except for one hardrock reverse-circulation drill program in southwestern Alaska. Major drill programs were conducted by Teck Cominco Ltd. in the Red Dog area, by NovaGold Resources Inc. at the Donlin Creek deposit, by Kinross Gold Corp. in the Fairbanks mining district at Fort Knox and True North mines, and by Kennecott Minerals Co. at Greens Creek Mine.

Table 19. *Companies reporting significant drilling programs in Alaska, 2001*

Hecla Mining Co.	NovaGold Resources Inc.	Usibelli Coal Mine Inc.
Golconda Resources Ltd.	Placer Dome Exploration Inc.	Ventures Resource Alaska Corp.
International Development Inc.	Platinum-Palladium Holdings Inc.	Western Keltic Mines Inc./Rimfire
Kennecott Exploration Co.	Quaterra Resources Inc.	Minerals Corp./Barrick Gold Corp.
Kennecott Greens Creek Mining Co.	Shear Minerals Ltd.	Zeus Exploration Inc.
Kinross Gold Corp.	Sumitomo Metal Mining America Inc.	
North Star Exploration Inc.	Teck Cominco Ltd.	

Table 20. *Drilling footage reported in Alaska, 1982–2001*

Year	Placer Exploration	Placer Thawing	TOTAL PLACER	TOTAL COAL	TOTAL HARDROCK	Hardrock Core[a]	Hardrock Rotary[a]	TOTAL FEET
1982	30,000	94,000	**124,000**	**80,000**	**200,000**	--	--	**404,000**
1983	23,000	30,000	**53,000**	**12,000**	**180,500**	--	--	**245,500**
1984	31,000	98,000	**129,000**	**25,700**	**176,000**	--	--	**330,700**
1985	46,000	34,000	**80,000**	**8,700**	**131,700**	--	--	**220,400**
1986	32,400	227,000	**259,400**	**28,800**	**50,200**	--	--	**338,400**
1987	50,250	130,000	**180,250**	**19,900**	**115,100**	95,600	19,500	**315,250**
1988	152,000	300,000	**452,000**	**26,150**	**353,860**	223,630	130,230	**832,010**
1989	97,250	210,000	**307,250**	**38,670**	**332,230**	242,440	89,790	**678,150**
1990	78,930	105,000	**183,930**	**18,195**	**760,955**	648,600	112,355	**963,080**
1991	51,247	130,000	**181,247**	**16,894**	**316,655**	205,805	110,850	**514,796**
1992	6,740	65,000	**71,740**	**12,875**	**359,834**	211,812	148,022	**444,449**
1993	25,216	--	**25,216**	--	**252,315**	124,325	127,990	**277,531**
1994	21,000	--	**21,000**	**8,168**	**438,710**	347,018	91,692	**467,878**
1995	27,570	--	**27,570**	--	**415,485**	363,690	51,795	**443,055**
1996	61,780	--	**61,780**	**8,500**	**658,857**	524,330	134,527	**729,137**
1997	38,980	--	**38,980**	**13,998**	**704,510**	523,676	180,834	**757,488**
1998	33,250	--	**33,250**	**2,300**	**549,618**	505,408	45,670	**585,168**
1999	6,727	--	**6,727**	--	**448,797**	369,863	78,934	**455,524**
2000	15,480	--	**15,480**	--	**546,268**	418,630[b]	127,638	**561,748**
2001	1,100	--	**1,100**	**36,151**	**316,068**	240,318	75,750	**353,319**

[a]Core and rotary drilling not differentiated prior to 1987.
[b]92,900 feet of core drilling was underground.
-- = Not reported.
Note: 363,181 feet of blasthole drilling reported for 2001 (incomplete).

Table 21. *Drilling footage by region in Alaska, 2001*

Type of drilling	Northern	Western	Eastern interior	South-central	South-western	South-eastern	TOTAL
Placer subtotal	--	--	**1,000**	--	--	**100**	**1,100**
Coal subtotal	--	--	**36,151**	--	--	--	**36,151**
Hardrock core	56,100	3,600	45,692	1,000	26,455	107,471	240,318
Hardrock rotary	--	--	74,500	--	1,250	--	75,750
Hardrock subtotal	**56,100**	**3,600**	**120,192**	**1,000**	**27,705**	**107,471**	**316,068**
TOTAL (feet)	**56,100**	**3,600**	**157,343**	**1,000**	**27,705**	**107,571**	**353,319**

-- = Not reported.
Note: 2,712,000 feet of blasthole drilling reported (incomplete). Drill footages do not include sand and gravel drilling.

GOVERNMENT ACTIONS

During 2001 the State of Alaska resumed airborne geophysical surveys under the auspices of the Division of Geological & Geophysical Surveys (DGGS) (table 22). Three areas were selected: the northeastern extension of the Upper Chulitna area in the vicinity of Broad Pass–Cantwell; part of the Bonnifield district east of Healy; and part of the Goodpaster mining district southeast of the Pogo deposit. The results were released in March 2002. The federal government did not issue contracts to perform geophysical surveys during 2001 (table 23).

DGGS geologists spent 3 weeks conducting geologic ground-truthing, including geologic mapping and geochemical sampling, in the Salcha River–Pogo (SRP) geophysical survey area of the Big Delta Quadrangle. A team of DGGS geologists also spent 1 month conducting geological mapping and geochemical sampling in the Eagle A-1 Quadrangle of the Fortymile area. New geologic maps of the Eagle A-2 Quadrangle based on previous fieldwork were released in 2001 and new geologic maps based on 2001 fieldwork will be released in May 2002.

BLM geologists began field investigations in the Aniak mining district as part of a 5-year study. Geologists from Calista Corp. and DGGS aided the BLM geologists.

A joint team from USGS and BLM completed a geophysical transect in the Nikolai/Wrangellia Superterrane across the Amphitheater Synform of the Tangle ultramafic complex in the Tangle Lakes area. More than 155 line-miles of gravity data, more than 93 line-miles of magnetotelluric data, and density and magnetic susceptibility data from hundreds of rock samples were collected. Interpretation of gravity, magnetic, and magnetotelluric data suggests that there is a graben-like feature along the synform axis. Large coincident gravity (15 mgal anomaly), magnetic, and magnetotelluric anomalies extend to a 10-kilometer depth. Geochemical sampling was also conducted across this area of high platinum-group element, gold, and magmatic sulfide mineralization potential.

Cooperative investigations by the USGS and the Alaska Department of Natural Resources continued in the area near Pogo. Fieldwork focused on the ground- and surface-water chemistry and hydrology in the context of regional bedrock geology and structures.

Reclamation awards were given to several operations in 2001: Mike Busby, owner of Geoquest and a longtime miner in the Fortymile mining district, received the Governor's Award for Mined Land Reclamation for reclamation of Nora Bench on Chicken Creek; James Oudekerk was recognized for reclamation on Rex Creek near Healy; Flint Wolf and Cy Bras received a 2001 Award for Mined Land Reclamation for voluntary cleanup of old fuel tanks from Twelvemile Creek near Boundary in the Fortymile district; and Placer Dome Inc. received a Reclamation Award for work on Ester Dome near Fairbanks.

The minerals industry paid almost $7 million to the State of Alaska in 2001, of which slightly over $2 million was for mining license taxes. An additional $9.7 million was paid to municipalities. Mining companies were the largest taxpayers in the City & Borough of Juneau, and the Fairbanks North Star, Denali, and Northwest Arctic boroughs. Overall, payments to the state and the boroughs totaled $16.76 million, slightly more than in 2000 (table 24).

A settlement was reached in the Alaska Department of Transportation (DOT) lawsuit filed against Yellow Eagle Mining Co. for damage caused to the Parks Highway near Ester as a result of Yellow Eagle's placer gold production activities. In late 1999, Yellow Eagle employees hit the water table while excavating a 95-foot-deep open pit and the resulting flood caused a 300-foot section of the highway to settle and shift toward the pit. A July agreement between the state, Yellow Eagle, and Walter Wigger, owner of the land, allowed workers to enter the mine site and buttress the pit slope that caused damage to the road base. Exclusive Landscaping won the job with the low bid of about $1.5 million.

Table 22. *Detailed state airborne geophysical surveys and follow-up geologic ground-truthing as of December 2001*[a]

Nome District western core area	494 sq. miles	Airborne geophysical/ground-truth geological mapping
Nyac District core area	183 sq. miles	Airborne aeromagnetic mapping
Circle District core area	338 sq. miles	Airborne geophysical mapping/ground-truth geologic map
Valdez Creek District	75 sq. miles	Airborne geophysical mapping
Fairbanks District	626 sq. miles	Airborne geophysical mapping/ground-truth geologic map
Richardson District	137 sq. miles	Airborne geophysical mapping
Rampart/Manley-Tofty	1,017 sq. miles	Airborne geophysical mapping/ground-truth geologic map
Upper Chulitna District	364 sq. miles	Airborne geophysical mapping/ground-truth geologic map
Petersville-Collinsville District	415 sq. miles	Airborne geophysical mapping/ground-truth geologic map
Iron Creek District	689 sq. miles	Airborne geophysical mapping/ground-truth geologic map
Ruby District	591 sq. miles	Airborne geophysical mapping/ground-truth geologic map
Fortymile District	1,036 sq. miles	Airborne geophysical mapping/ground-truth geologic map (ground-truth began FY00; 3-year project)
Livengood District	229 sq. miles	Airborne geophysical mapping
SalchaRiver/North Pogo	1,032 sq. miles	Airborne geophysical mapping (ground-truth began in FY01; 3-year project)
Southeast extension of Salcha River/Pogo	91 sq. miles	Airborne geophysical mapping (to be released winter 2002)
Liberty Bell, Western Bonnifield District	276 sq. miles	Airborne geophysical mapping (to be released winter 2002)
Broad Pass	304 sq. miles	Airborne geophysical mapping (to be released winter 2002)
Total: 10 years $4.5 million	**7,897 sq. miles**	**1.3% of Alaska's total area**

[a]Projects funded by the Alaska State Legislature. Projects concentrate on state, Native, state-selected and Native-selected lands and are managed by DGGS.

Note: Surveys listed above are complete except where noted. Additional areas will be scheduled for surveying at later dates contingent on future funding.

Table 23. *Detailed federal airborne geophysical survey work as of December 2001*[a]

Wrangell/Stikine[b]	1,111 sq. miles	Airborne geophysical mapping
Koyukuk/Wiseman	533 sq. miles	Airborne geophysical mapping
Ketchikan[c]	605 sq. miles	Airborne geophysical mapping
Aniak	1,240 sq. miles	Airborne geophysical mapping
Total: 5 years $1.34 million	**3,489 sq. miles**	**0.5% of Alaska's total area**

[a]Projects funded mainly by U.S. Bureau of Land Management with contributions by DGGS, local and state governments, and private corporations. Projects concentrate mainly on federal land. Data are released through DGGS.

[b]Major funding came from BLM and the City of Wrangell.

[c]Major funding came from BLM and Ketchikan Gateway Borough. Sealaska Corp., Alaska State Mental Health Land Office, the City of Coffman Cove, and the City of Thorne Bay also contributed funds. Sealaska Corp. also contributed previously acquired geophysical data.

Table 24. *Revenues paid to the State of Alaska and municipalities by Alaska's mineral industry, 1996–2001*[a]

	1996	1997	1998	1999	2000	2001
State mineral rents and royalties						
State claim rentals[b]	$ 917,970	$ 1,036,782	$ 1,170,812	$ 1,982,453	$ 1,975,376	$1,736,522
Production royalties	20,002	8,930	9,489	14,214	6,175	1,933
Annual labor	55,195	80,795	118,020	90,720	79,907	103,274
Subtotal	**993,166**	**1,126,507**	**1,298,321**	**2,087,387**	**2,061,458**	**1,841,729**
State coal rents and royalties						
Rents	188,210	173,773	331,716	205,983	233,249	198,545
Royalties	996,408	1,342,077	1,937,899	2,615,858	1,482,803	1,168,043
Bonus	0	0	0	0	372,000	0
Offshore Prospecting Permits	0	0	0	0	0	0
Subtotal	**1,184,619**	**1,515,850**	**2,269,615**	**2,821,841**	**2,088,052**	**1,366,588**
State material sales						
Mental Health	63,324	57,620	40,269	32,407	33,928	118,545
Division of Land	699,845	278,913	1,043,602	586,550	449,343	1,515,769
SPCO	26,673	27,579	28,491	28,941	41,395	12,894
Subtotal	**789,842**	**364,112**	**1,112,362**	**647,898**	**524,666**	**1,647,208**
State mining miscellaneous fees						
Filing Fees	1,500	4,187	2,510	4,288	5,400	3,000
Penalty Fees	0	0	0	8,000	0	0
Explore incentive app filing fee	0	0	2,000	3,000	0	0
Bond pool payment	87,411	91,666	79,929	70,692	50,100	53,866
Surface coal mining app fee	36,728	16,100	6,890	2,500	1,830	3,700
APMA mining fees	21,950	22,454	18,975	19,288	18,550	13,175
Subtotal	**147,589**	**134,407**	**110,304**	**107,768**	**75,880**	**73,741**
Mining license[c]	481,000	941,735	1,797,292	1,296,663	2,712,541	2,068,232
State total	**3,596,216**	**4,082,611**	**6,587,894**	**6,961,557**	**7,462,597**	**6,997,498**
Payments to Municipalities	**N/A**	**8,386,000**	**7,934,000**	**8,818,819**	**9,196,500**	**9,763,220**
TOTAL	**$3,596,216**	**$12,468,611**	**$14,521,894**	**$15,780,376**	**$16,659,097**	**16,760,718**

[a]Does not include state corporate income taxes, which were not released for this study.
[b]Includes upland lease and offshore lease rentals.
[c]Includes metals, coal, and material. New numbers 1997-2001 from Department of Revenue.
N/A = not available.
SOURCE: Municipalities, companies, and DNR Financial Services Section.

APPENDIX A

New claims staked in Alaska 1997-2001

Quad no.	Quadrangle name	New federal mining claims					New state mining claims				
		1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
14	Sagavanirktok	0	0	0	0	0	0	0	0	0	0
17	Point Hope	0	0	0	0	0	0	0	0	0	0
18	De Long Mountains	0	0	0	0	0	0	0	4,685	72	79
26	Noatak	0	0	0	0	0	96	0	1,411	216	112
27	Baird Mountains	1	0	0	0	10	0	0	64	1	0
28	Ambler River	0	0	0	0	0	1,437	6	0	95	0
29	Survey Pass	0	0	0	0	0	613	0	0	0	0
30	Wiseman	47	90	13	15	12	22	30	92	33	6
31	Chandalar	17	1	13	10	7	81	56	3	8	9
35	Kotzebue	0	0	0	0	0	28	0	0	0	0
36	Selawik	0	0	0	0	0	53	0	2	0	2
37	Shungnak	0	0	0	0	0	0	0	0	0	14
38	Hughes	0	0	0	0	0	73	1	1	0	1
39	Bettles	56	28	12	1	15	0	1	1	0	0
43	Teller	0	0	0	0	0	1	4	24	0	96
44	Bendeleben	0	0	0	0	0	124	43	56	64	9
45	Candle	0	0	0	0	27	75	8	0	26	51
47	Melozitna	0	0	0	0	0	0	0	0	1	0
48	Tanana	0	0	0	0	0	235	81	11	134	27
49	Livengood	1	0	0	0	0	250	28	38	186	33
50	Circle	0	0	0	0	0	719	664	391	551	109
52	Nome	0	0	0	0	0	102	16	1	9	23
53	Solomon	0	0	0	0	0	28	8	11	39	22
55	Nulato	0	0	0	0	0	0	56	80	28	32
56	Ruby	0	0	0	0	0	137	657	90	4	0
57	Kantishna River	1	0	0	0	0	0	0	8	0	0
58	Fairbanks	0	0	0	0	0	361	73	22	28	51
59	Big Delta	0	0	0	0	0	976	4,242	2,775	1,547	96
60	Eagle	0	0	0	0	0	180	794	465	761	68
64	Ophir	0	0	0	0	0	24	46	59	12	3
65	Medfra	0	0	0	0	0	118	26	37	0	0
67	Healy	0	0	0	0	0	393	683	78	12	29
68	Mt. Hayes	772	2	0	8	47	950	803	488	517	114
69	Tanacross	0	0	0	0	0	112	933	313	140	42
73	Iditarod	0	0	0	0	0	195	94	0	0	8
74	McGrath	0	0	0	0	0	0	0	16	0	13
75	Talkeetna	0	0	0	0	0	126	102	83	123	52
76	Talkeetna Mountains	4	0	0	0	0	39	112	18	59	5
77	Gulkana	0	0	0	0	0	192	6	231	0	0
78	Nabesna	0	0	0	0	0	2	1	2	0	0
81	Russian Mission	0	0	0	0	0	0	0	0	4	0
82	Sleetmute	0	0	0	0	0	0	0	62	0	0
83	Lime Hills	0	0	0	0	0	242	27	12	0	0
84	Tyonek	0	0	0	0	0	10	23	86	3	2
85	Anchorage	0	0	0	0	0	99	84	107	43	18
86	Valdez	0	0	0	0	0	7	0	1	153	0
87	McCarthy	0	0	0	0	0	0	48	0	0	0
91	Bethel	0	0	0	0	0	91	0	0	0	0
92	Taylor Mountains	0	0	0	0	0	131	7	0	12	0
93	Lake Clark	0	0	0	0	0	0	0	0	0	8
95	Seward	108	44	24	24	16	13	12	29	13	4
96	Cordova	1	0	0	0	0	0	1	0	0	0
97	Bering Glacier	0	0	0	0	0	3	4	0	2	3
102	Dillingham	0	0	0	63	0	32	0	0	121	84

Quad no.	Quadrangle name	New federal mining claims					New state mining claims				
		1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
103	Iliamna	0	0	0	0	0	294	2	0	2	134
104	Seldovia	0	0	0	0	0	0	2	0	0	0
107	Icy Bay	0	0	0	0	0	3	0	0	0	0
109	Skagway	4	0	1	0	0	3	1	38	1	7
112	Juneau	263	52	10	1	0	1	0	0	0	0
114	Sitka	7	10	0	0	0	0	0	0	0	0
116	Port Alexander	0	0	0	2	0	0	0	0	0	0
117	Petersburg	485	183	98	0	6	0	0	2	0	1
119	Craig	101	3	137	399	223	0	1	0	0	7
120	Ketchikan	2	0	0	0	0	0	0	0	0	0
121	Dixon Entrance	1	14	0	0	0	0	0	0	0	0
122	Prince Rupert	0	0	0	0	95	0	0	0	0	6
135	Trinity Islands	0	0	0	0	0	0	0	74	66	0
138	Port Moller	0	0	0	0	0	0	0	10	0	0
	TOTALS	**1,871**	**427**	**308**	**523**	**464**	**8,671**	**9,786**	**11,977**	**5,086**	**1,380**

SOURCE: Data provided by Alaska Department of Natural Resources Land Records Information Section and U.S. Bureau of Land Management.

APPENDIX B
Prospecting sites in Alaska 1995–2001

Quad no.	Quad name[a]	1995 New	1995 Total	1996 New	1996 Total	1997 New	1997 Total	1998 New	1998 Total	1999 New	1999 Total	2000 New	2000 Total	2001 New	2001 Total
17	Point Hope	9	17	0	17	0	15	0	0	0	0	0	0	0	0
18	De Long Mountains	0	0	0	0	0	0	0	0	27	27	72	99	0	99
26	Noatak	24	24	24	48	0	48	0	0	0	0	1	1	0	1
27	Baird Mountains	6	24	8	32	0	32	0	32	0	32	0	32	0	22
30	Wiseman	4	19	63	67	2	23	31	38	0	29	11	13	0	13
31	Chandalar	21	47	4	30	37	60	14	46	14	24	0	23	0	11
36	Selawik	5	5	0	5	0	5	0	5	0	5	0	5	0	5
38	Hughes	0	0	0	0	9	9	0	9	1	10	0	8	0	8
42	Black River	0	0	1	1	0	1	0	0	0	0	0	0	0	0
43	Teller	0	0	0	0	0	0	0	0	0	0	15	15	0	15
44	Bendeleben	5	24	42	60	89	147	4	143	7	136	0	60	0	44
45	Candle	0	0	8	8	13	21	0	20	6	26	32	46	0	38
47	Melozitna	0	7	192	192	0	192	0	192	144	336	0	144	0	128
48	Tanana	78	118	295	401	18	379	5	289	97	337	27	123	1	106
49	Livengood	221	395	62	301	184	407	111	322	20	147	24	123	0	36
50	Circle	211	818	139	641	176	499	201	528	82	443	31	301	5	138
52	Nome	47	83	66	128	63	173	16	139	21	97	37	116	0	100
53	Solomon	18	32	34	59	12	64	5	53	10	40	0	28	0	23
55	Nulato	0	2	4	6	0	6	2	4	22	26	6	32	0	30
56	Ruby	0	3	16	19	57	76	37	113	8	95	0	48	0	11
57	Kantishna River	0	0	0	0	4	4	0	4	0	4	0	4	0	4
58	Fairbanks	73	136	90	193	63	221	49	149	19	105	0	72	1	27
59	Big Delta	92	246	118	244	295	449	1,968	2,301	967	3,152	402	2,683	1	910
60	Eagle	42	80	74	125	52	145	220	336	27	282	75	315	0	141
64	Ophir	3	11	5	9	46	55	0	53	1	39	177	182	0	182
65	Medfra	0	9	11	12	22	34	0	21	2	10	0	3	0	1
66	Mt. McKinley	0	1	0	0	0	0	0	0	0	0	0	0	0	0
67	Healy	12	124	127	152	397	535	245	748	16	597	13	101	0	48
68	Mt. Hayes	15	64	246	273	194	423	73	439	11	397	14	280	0	227
69	Tanacross	18	196	56	93	54	110	22	91	155	219	0	184	0	146
73	Iditarod	0	0	235	235	0	235	0	198	16	171	0	156	0	156
74	McGrath	6	6	19	25	198	218	2	204	16	158	52	65	0	65
75	Talkeetna	11	46	15	38	281	308	63	331	19	282	41	76	0	66

[a]Unlisted quadrangles did not have any prospect sites staked during 1995-2001.

SOURCE: Data provided by Alaska Department of Natural Resources Land Records Information Section.

APPENDIX B
Prospecting sites in Alaska 1995-2001
(continued)

Quad no.	Quad name	1995 New	1995 Total	1996 New	1996 Total	1997 New	1997 Total	1998 New	1998 Total	1999 New	1999 Total	2000 New	2000 Total	2001 New	2001 Total
76	Talkeetna Mountains	34	82	0	79	15	40	58	88	2	88	4	75	0	44
77	Gulkana	0	0	0	0	8	8	0	8	0	8	3	3	0	3
78	Nabesna	0	0	0	0	0	0	0	0	0	0	4	4	0	4
81	Russian Mission	0	0	0	0	46	46	0	46	0	46	0	46	0	46
82	Sleetmute	0	0	0	0	46	46	0	46	0	46	0	26	0	26
83	Lime Hills	0	2	0	0	9	9	0	9	0	0	0	0	0	0
84	Tyonek	0	28	14	28	6	20	0	20	0	14	0	0	0	0
85	Anchorage	51	82	21	84	24	98	5	64	10	64	3	62	0	61
86	Valdez	13	40	9	38	0	27	0	16	0	16	25	41	0	41
91	Bethel	6	6	16	22	4	26	0	12	18	22	0	18	0	10
92	Taylor Mountains	0	0	6	6	0	6	32	38	0	32	0	0	0	0
95	Seward	1	1	26	26	2	26	1	20	2	5	0	2	0	2
97	Bering Glacier	0	0	0	0	0	0	2	2	0	2	0	2	0	0
102	Dillingham	0	0	0	0	48	48	0	48	0	44	0	0	0	0
103	Iliamna	0	2	0	0	0	0	0	0	0	0	0	0	0	0
104	Seldovia	0	0	1	1	0	0	0	0	0	0	0	0	0	0
105	Blying Sound	0	0	7	7	0	7	0	7	0	0	0	0	0	0
109	Skagway	4	42	0	0	6	6	4	10	0	4	0	0	0	0
117	Juneau	0	0	13	13	0	13	0	5	0	5	0	5	0	5
123	Sitka	0	0	0	0	0	0	0	0	0	0	0	0	0	0
128	Try Islands	0	28	14	16	0	14	17	31	0	17	14	28	0	0
137	Ketchikan	0	0	1	1	0	0	0	0	0	0	0	0	0	0
TOTALS		**1,030**	**2,850**	**2,082**	**3,735**	**2,480**	**5,334**	**3,187**	**7,278**	**1,740**	**7,639**	**1,083**	**5,787**	**8**	**3,043**

APPENDIX C

Selected significant mineral deposits and mineral districts in Alaska[a]

The alphabetized list of mineral deposits and mineral districts is keyed to the list of explanatory paragraphs that follow. For example, The Lik deposit in the alphabetized list is "**Lik,** 1, (fig. C-1)." This says that the location of Lik is shown as number 1 in figure C-1.

Alaska-Juneau, 100, (fig. C-3).
Anderson Mountain, 54, (fig. C-1).
Aniak district, 84, (fig C-3).
Apex-El Nido, 104, (fig. C-3).
Apollo-Sitka mines, 86, (fig. C-3).
Arctic, 9, (fig. C-1).
Avan Hills, 12, (fig. C-3).
Baultoff, 75, (fig. C-2).
Bear Mountain, 21, (fig. C-2).
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[a]This generalized summary does not describe all of the known 6,400 mineral deposits in Alaska.

NOTE: In cooperation with DGGS and the Russian Academy of Sciences, the USGS published Open-File Report 93-339 (Nokleberg and others, 1993), *Metallogenesis of mainland Alaska and the Russian northeast*, which describes 273 lode deposits and 43 significant placer districts in Alaska.

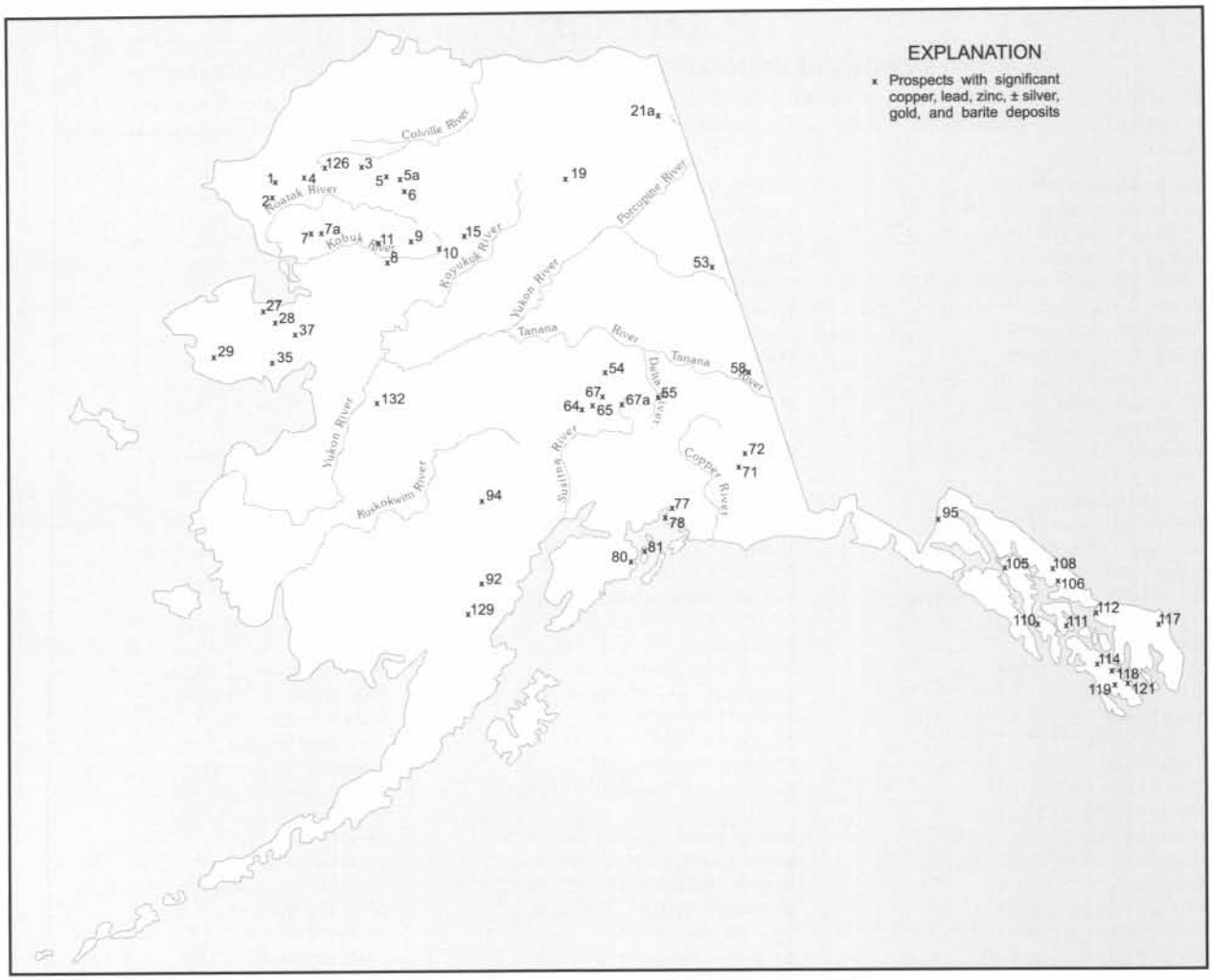


Figure C-1. *Significant copper, lead, zinc with credits of silver, gold, and barite deposits in Alaska, 2001.*

Map no.

1 **Lik**—Major stratabound massive sulfide (Zn–Pb–Ag–Ba) deposit in black shale and chert. Proven reserve (Lik) estimate of 24 million tons of 9% Zn, 3.1% Pb, and 1.4 oz/ton Ag (fig. C-1).

2 **Red Dog**—At least five major stratabound massive sulfide deposits hosted in Pennsylvanian or Mississippian shale; similar to locality 1. (a) The Main deposit at Red Dog contains 46.2 million tons of proven ore grading 19.2% Zn, 5.2% Pb, with 2.92 oz/ton Ag. (b) The Aqqaluk deposit contains probable, indicated, and inferred reserves of 73.0 million tons grading 15.2% Zn, 4.03% Pb, and 2.17 oz/ton Ag. (c) The Qanaiyaq (formerly named Hilltop) deposit with an indicated reserve is 10.6 million tons grading 17.8% Zn, 5.5% Pb, and 3.41 oz/ton Ag. (d) Inferred resource in the Paalaaq deposit is 14.3 million tons of 15.0% Zn, 4.0% Pb, and 2.63 oz/ton Ag. (e) Anarraq deposit discovered in 1999 has an inferred reserve of 19.0 million tons of 15.8% Zn, 4.8% Pb, and 2.07 oz/ton Ag (fig. C-1).

3 **Drenchwater**—Mississippian and Pennsylvanian shales and cherts contain three stratabound base metal occurrences spatially related to acid volcanics. The lowest unit, a siliceous mudstone, contains a 2 ft layer with up to 23% Zn. An overlying gray chert contains up to 11% Zn and up to 5% Pb with some Ag in fracture fillings. At the top of the overlying tuffaceous layer, Ag-bearing Zn and Pb mineralization outcrops discontinuously for at least 6,500 ft, and contains up to 26% Zn and 51% Pb in grab samples (fig. C-1).

4 **Ginny Creek**—Epigenetic, disseminated Zn–Pb–Ag deposits with barite in sandstone and shale of Noatak Sandstone of Late Devonian through Early Mississippian age. Random grab samples of surface float contain 0.3% to 3.0% Zn and highly variable amounts of Pb and Ag (fig. C-1).

5 **Story Creek**—Epigenetic replacement deposits of Zn–Pb–Ag–Cu–Au hosted in brecciated zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Grab samples of high-grade material contain up to

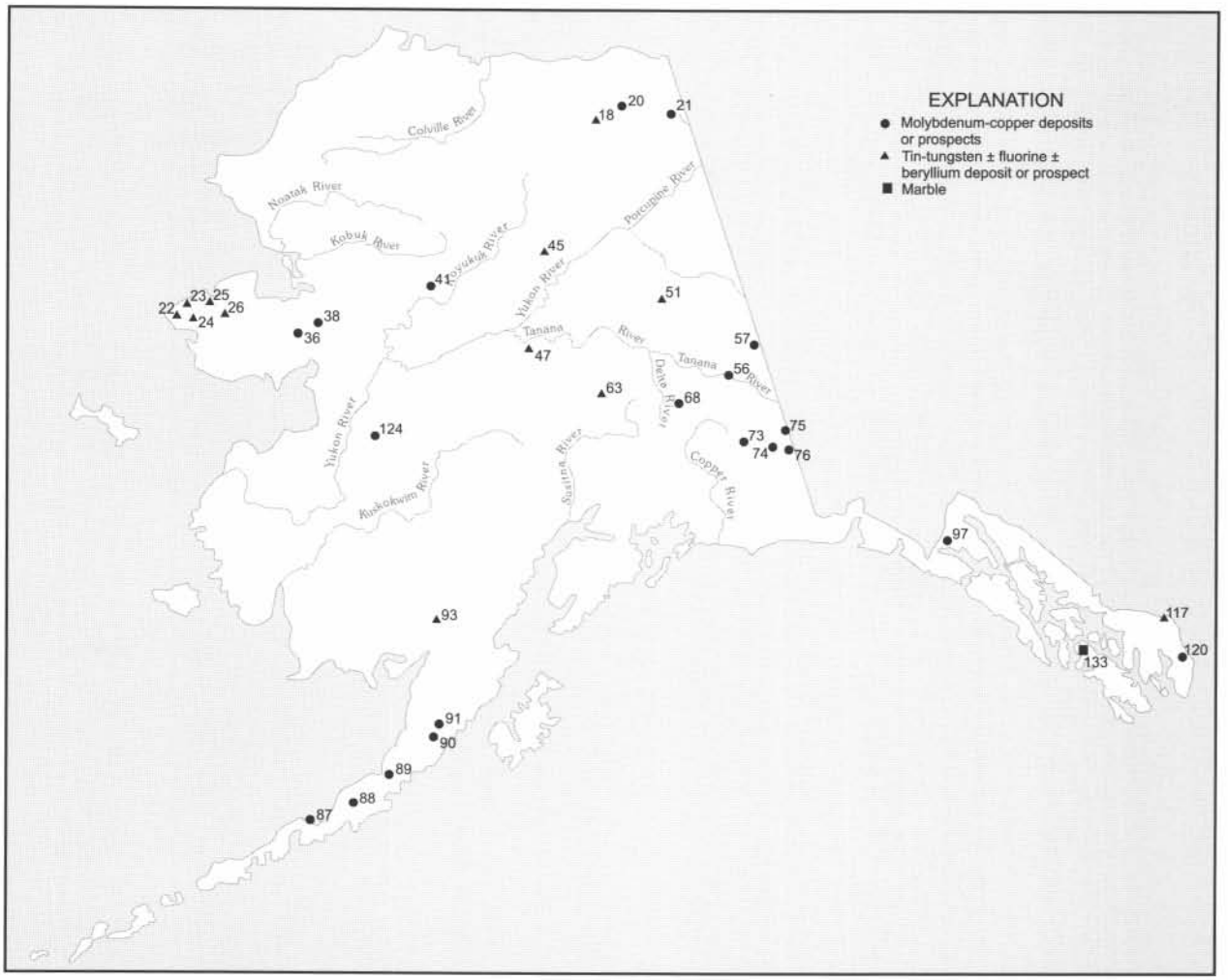


Figure C-2. *Significant molybdenum–copper and tin–tungsten with credits of fluorite and beryllium deposits in Alaska, 2001.*

0.43% Cu, 34% Pb, 28.8% Zn, 0.04 oz/ton Au, and 30 oz/ton Ag (fig. C-1).

5a **Kivliktort Mountain**—Mineralized float is widespread on the north flanks of the mountain, apparently spatially related to the contact between shales at the base of the hills and coarse-grained siliceous clastic rocks on the upper slopes. Rock samples containing up to 30% Zn have been reported (fig. C-1).

6 **Whoopee Creek**—Epigenetic replacement deposits of Zn–Pb–Cu–Ag–Au–Cd in breccia zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Random grab samples of mineralized material contain 0.24% Cu, 0.37% Cd, 46% Zn, 44% Pb, 0.14 oz/ton Au, and 14.8 oz/ton Ag (fig. C-1).

7 **Omar**—Epigenetic replacement deposits of Paleozoic age; include bedded barite occurrences. Grab samples contain 15.3% Cu, 0.15% Pb, 0.95% Zn, 0.05% Co, and 0.3 oz/ton Ag. BLM estimates 35 million tons of 4% Cu (fig. C-1).

7a **Frost**—Possible 9 million tons of barite in pods, lenses, and wavy-banded quartz-calcite-barite veins. Chalcopyrite and galena occur in the veins which cross cut Paleozoic limestone and dolomite for a minimum distance of 1 mi. Selected samples contain up to 13.2% Zn (fig. C-1).

8 **Bornite**—Major stratabound Cu–Zn deposit in brecciated carbonate rock of Devonian age; 5.0 million ton orebody contains 4.0% Cu and accessory Zn and Co. Larger reserve estimate of 40 million tons of about 2% Cu and undisclosed amount of Zn and Co. At grade of 1.2% Cu, reserves are 100 million tons (fig. C-1).

9 **Arctic**—Major volcanogenic (Cu–Zn) massive sulfide deposit hosted in sequence of metarhyolite, metatuff, and graphitic schist of Devonian age; indicated reserves of 40 million tons grade 4.0% Cu, 5.5% Zn, 0.8% Pb, 1.6 oz/ton Ag, and 0.02 oz/ton Au (fig. C-1).

10 **Sun**—Major (Cu–Pb–Zn–Ag) massive sulfide deposit in sequence of middle Paleozoic metarhyolite and

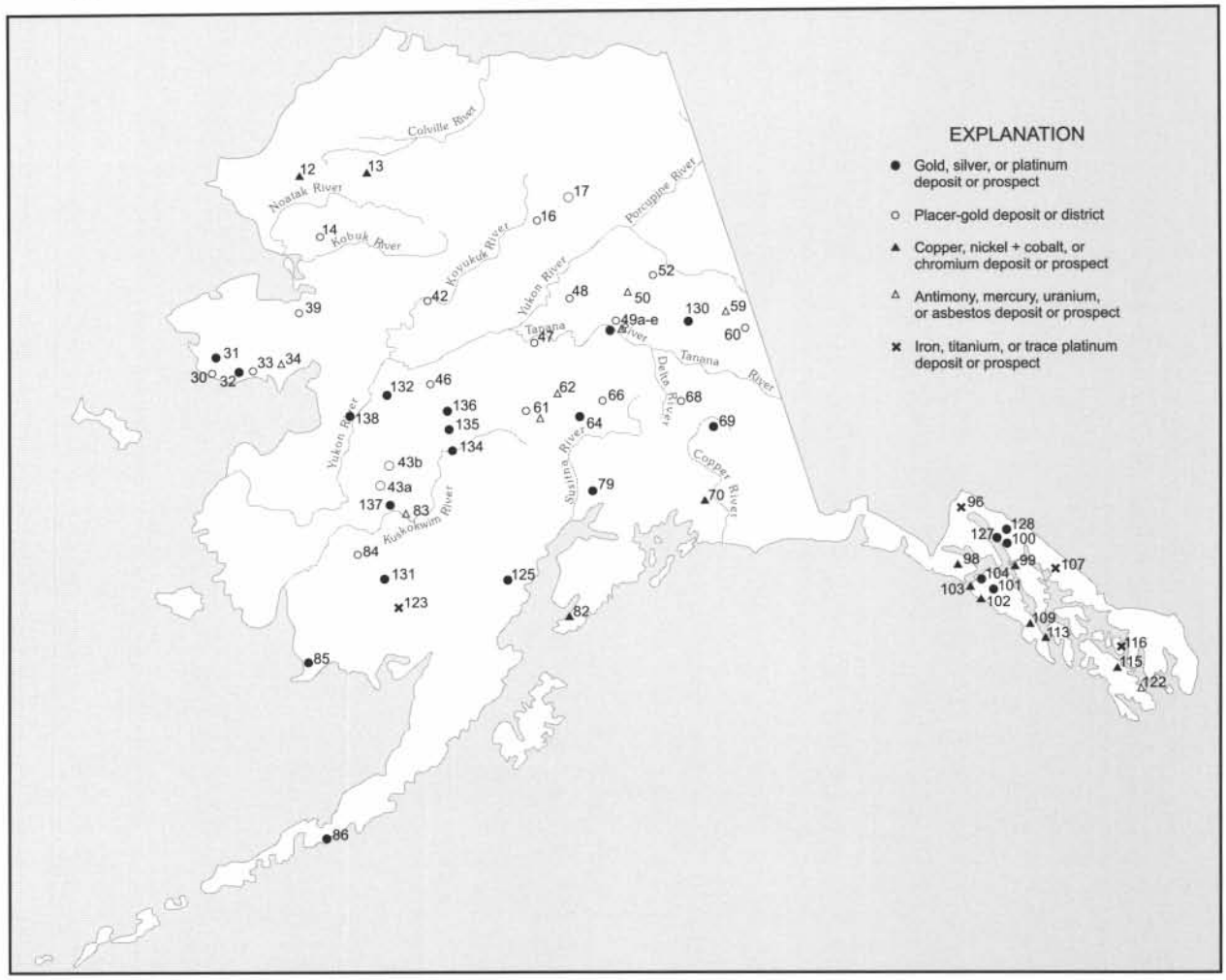


Figure C-3. *Significant gold, silver, platinum, and strategic mineral deposits in Alaska, 2001.*

metabasalt. Average grades are 1 to 4% Pb, 6 to 12% Zn, 0.5 to 7% Cu, 3 to 11 oz/ton Ag (fig. C-1).

11 **Smucker**—Middle Paleozoic volcanogenic massive sulfide deposit; 3,000 ft long and up to 190 ft wide; contains significant tonnage of Cu–Pb–Zn ore that grades 1.5% Pb, 5 to 10% Zn, 3 to 10 oz/ton Ag, with minor Au (fig. C-1).

12 **Avan Hills**—Disseminated chromite in layered ultramafic rocks; grab samples contain up to 4.3% Cr with 0.015 oz/ton PGM (fig. C-3).

13 **Misheguk Mountain**—Chromite occurrences similar to those in Avan Hills (fig. C-3).

14 **Klery Creek**—Lode and placer Au deposits worked intermittently from 1909 through 1930s. Total production through 1931, mostly from placer deposits, estimated at 31,320 oz Au (fig. C-3).

15 **Ernie Lake (Ann Creek)**—Stratabound massive sulfide occurrence in metarhyolite, metatuff, and marble. Gossan zones strongly anomalous in Cu–Pb–Zn and Ag (fig. C-1).

16 **Koyukuk–Nolan mining district**—Major placer Au district; from 1893 to 1999 produced an estimated 342,489 oz Au. Gold placers in Nolan Creek mined on surface and underground, both sources of large gold nuggets. Significant deep placer reserves remain (fig. C-3).

17 **Chandalar mining district**—Major Au-producing district; substantial production in excess of 65,860 oz Au through 1999 from lode and placer sources; lode Au found in crosscutting quartz veins that intrude schist and greenstone. Active development of placer deposits and lodes in progress. Inferred lode reserves estimated to be 45,000 tons with grade of 2 oz/ton Au (fig. C-3).

18 **Porcupine Lake**—Stratiform fluorite occurrences and argentiferous enargite, tetrahedrite associated with felsic volcanic rocks of late Paleozoic age. Reported grades of up to 30% fluorite (CaF_2) reported, with grab samples of 4.8% Cu (fig. C-2).

19 **Wind River**—Stratabound Pb–Zn massive sulfide prospects; reported grades of up to 5% Pb (fig. C-1).

20 **Esotuk Glacier**—Disseminated Mo–Sn–W–Pb–Zn mineralization in skarns associated with Devonian(?) schistose quartz monzonite. Grab samples contain up to 0.08% Sn and 0.15% W (fig. C-2).

21 **Bear Mountain**—Major stockwork Mo–W–Sn occurrence in intrusive breccia. Rock samples containing up to 0.8% Mo and 0.6% W occur within a 35-acre area where soil samples average more than 0.2% MoS_2, and an adjacent 25-acre area where rubble contains wolframite has soils averaging greater than 0.12% WO_3. Rubble crop in this area indicates a Tertiary porphyry system as the source of the Mo and W (fig. C-2).

21a **Galena Creek**—Steeply dipping veins contain up to 21% Cu, 3.5% Zn, and 1.3% Pb with 5.5 oz/ton Ag on the east side of the creek, and on the ridge west of the creek a large area of disseminated mineralization and veinlets contains predominantly Zn (fig. C-1).

22 **Cape Creek**—Major placer Sn producer. More than 500 tons Sn produced from 1935 to 1941; from 1979 to 1990, produced 1,040 tons Sn. Derived from Cape Mountain in contact zone of Cretaceous granite and limestone (fig. C-2).

23 **Buck Creek**—Major placer Sn producer. More than 1,100 tons Sn produced from 1902 to 1953 (fig. C-2).

24 **Lost River**—Major Sn, fluorite, W, and Be deposit associated with Cretaceous Sn granite system. More than 350 tons Sn produced from skarn and greisen lode sources. Measured reserves amount to 24.6 million tons that grade 0.15% Sn, 16.3% CaF_2, and 0.03% WO_3, based on 45,000 ft of diamond drilling (fig. C-2).

25 **Ear Mountain**—Placer Sn district and Sn–Cu–Au–Ag–Pb–Zn skarn mineralization of Cretaceous age. Area also anomalous in U (fig. C-2).

26 **Kougarok Mountain**—Sn deposit hosted in quartz–tourmaline–topaz greisen of Cretaceous age. Grades may average 0.5% Sn and 0.01% Ta and Nb, but a high-grade resource of 150,000 tons grading 1% + Sn has been identified, with incrementally higher tonnage at lower grades (fig. C-2).

27 **Hannum**—Stratiform, carbonate-hosted Pb–Zn–Ag massive sulfide deposit of mid-Paleozoic age in heavily oxidized zone that ranges from 30 to 150 ft thick. Mineralized zone reported to assay up to 10% Pb, 2.2% Zn, 0.04 oz/ton Au, and 1.76 oz/ton Ag (fig. C-1).

28 **Independence Creek**—Pb–Zn–Ag massive sulfide deposit; high-grade ore shipped in 1921 contained 30% Pb, 5% Zn, up to 150 oz/ton Ag. Mineralization restricted to shear zone in carbonates (fig. C-1).

29 **Sinuk River region**—Several Pb–Zn–Ag–Ba–F bearing massive sulfide deposits and layered Fe deposits in carbonate and metavolcanic rocks of Nome Group. Mineralized zones extend for over 8,000 ft along strike (fig. C-1).

30 **Nome mining district**—Major placer Au producer. Production from 1897–1999 in excess of 4,978,449 oz Au all from placers. Sporadic Sb and W production in past (fig. C-3).

31 **Rock Creek**—750,000 oz Au resource, with about 10.2 million tons grading 0.074 oz/ton Au in vein swarms and stringers in an area 1,500 ft long, 500 ft maximum width and 300 ft deep (fig. C-3).

32 **Big Hurrah**—Epigenetic vein deposit in black slate and metasedimentary rocks of the Soloman schist. Deposit contains some W mineralization and has produced over 27,000 oz Au from nearly 50,000 tons milled ore. Proven, inferred, and indicated reserves total 104,000 tons that grade 0.61 oz/ton Au, 0.55 oz/ton Ag, and credits of WO_3 (fig. C-3).

33 **Solomon and Council mining districts**—Major placer Au districts; produced over 1,046,513 oz through 1999. Three structurally controlled Au deposits in Bluff area—Daniels Creek, Saddle, and Koyana Creek—contain minimum inferred reserves of 6.5 million tons grading 0.1 oz/ton Au (fig. C-3).

34 **Eagle Creek**—U prospect in Cretaceous Kachauik alkalic intrusive rocks. Highly anomalous geochemical values and U concentrations of 1,000 ppm reported (fig. C-3).

35 **Omalik**—Vein-type Pb–Zn–Ag massive sulfide prospect in Paleozoic carbonate rocks; from 1881 to 1900, produced 400 tons of Pb–Zn ore that averaged about 10% Pb and 40 oz/ton Ag. Grades of oxidized Zn ore reported to be up to 34% Zn (fig. C-1).

36 **Windy Creek**—Disseminated Mo–Pb–Zn mineralization in quartz veins and skarns with reported values as high as 0.15% Mo (fig. C-2).

37 **Quartz Creek**—Significant Pb–Zn–Ag mineralization; reported grades of 15% combined Pb–Zn and 10 oz/ton Ag (fig. C-1).

38 **Placer River**—Significant Mo–F mineralization disseminated in intrusive rocks. Reported values of 0.2% Mo (fig. C-2).

39 **Fairhaven/Inmachuk district**—Placer deposits with 348,079 oz production from 1902–1999; significant reserves remaining in a large ancestral channel system. Large base metal sulfide concentrations and U values in concentrates (fig. C-3).

40 **Poovookpuk Mountain**—Porphyry Mo mineralization. Reported grades of up to 0.25% Mo (fig. C-2).

41 **Purcell Mountain**—Mo and Ag occurrences associated with Cretaceous alkalic igneous plutons, alaskite, and bostonite dikes (fig. C-2).

42 **Koyukuk–Hughes mining district**—Production of 245,188 oz Au from 1930 to 1999, mainly from Alaska Gold Co. dredge at Hogatza; dredge reactivated in 1981, but deactivated in 1984, and reactivated again in 1990. Nonfloat mechanized operation on Utopia Creek produced significant amount of placer Au from 1930 to 1962 (fig. C-3).

43 **Iditarod district**—Major placer Au district; produced 1,562,674 oz Au through 1999. Significant reserves of lode Au and lode W at Golden Horn deposit Chicken Mountain, and other known lodes in region associated with shear zones and monzonite intrusive rocks of Late Cretaceous age (fig. C-3).

44 **Innoko–Tolstoi mining district**—Major placer Au district with significant lode Au–Sb–Hg potential; lode sources for placers are Late Cretaceous volcanic-plutonic complexes and dike swarms that intrude Mesozoic flysch; mining district produced 723,290 oz Au through 1999, almost all from placer deposits (fig. C-3).

45 **Bonanza Creek**—Skarn-type W mineralization along intrusive contact; no published information available (fig. C-2).

46 **Ruby mining district**—Placer Au–Sn district; produced more than 477,171 oz Au from 1931 to 1999; mining district also contains Pb–Ag prospects with grades reportedly as high as 82 oz/ton Ag (fig. C-3).

47 **Hot Springs mining district**—Placer Au–Sn district; produced more than 576,082 oz Au and over 720,000 lb cassiterite through 1999. Includes Eureka and Tofty subdistricts (figs. C-2, C-3).

48 **Livengood–Tolovana mining district**—Placer Au district; produced more than 527,978 oz Au since discovery in 1914 to 1999. Substantial reserves remain mainly on Livengood Bench, a Pliocene ancestral channel (fig. C-3).

49 **Fairbanks mining district**—Nationally ranked Au-producing district; largest producer in Alaska. Produced about 8,145,550 oz Au from placer deposits (1902–1999). Major lode Au and lode Sb producer; produced more than 304,548 oz Au and over 2000 tons Sb from veins and shear zones through 1990. Production of W exceeded 4,000 short ton units since 1915, all derived from skarn near Cretaceous quartz monzonite (fig. C-3).

49a **Fort Knox**—Disseminated Au deposit within granodiorite/quartz monzonite pluton near Fairbanks. Proven and probable reserves as of December 31, 2000, open at depth, are 3,686,000 oz of Au in 138.4 million tons of rock at an average Au grade of 0.024 oz/ton. Measured and indicated resources are 34.45 million tons containing 963,000 ounces of gold. Fairbanks Gold Mining Inc. mined 1,461,677 oz of Au from 1996 to 2000. (fig. C-3).

49b **Ryan Lode**—Based on a 0.015 oz/ton cutoff, total reserves in the metasediment-hosted Ryan Lode and subparallel igneous-hosted Curlew Shear are 822,200 oz of Au in 14.6 million tons of rock. A geologic resource of about 2.4 million oz occurs within the total shear zone system (fig. C-3).

49c **Grant Mine**—A series of subparallel Au-bearing quartz veins in the schist and quartzite of Ester Dome based on exploration in 1990. Indicated reserves on one vein system, the O'Dea, are 212,000 tons of 0.36 oz/ton Au. Other similar vein systems have been identified within the property (fig. C-3).

49d **True North**—Au occurs in siderite-quartz veins in carbonaceous quartzite and schist within a terrane containing eclogitic rocks. The mineral inventory is 18.2 million tons grading 0.072 oz/ton Au for a contained 1,314,000 oz Au. Further exploration is expected to increase the reserve base (fig. C-3).

49e **Dolphin**—Recently recognized mineralized intermediate intrusion contains anomalous Au, As, Bi and Sb. Discovery hole in 1995 intercepted 330 ft of 0.049 oz/ton Au (fig. C-3).

49f **Gil Claims**—Gold occurs in two calc-silicate zones within Paleozoic schist units. Gold enrichment occurs along iron-stained shears and within quartz-calcite veinlets. Drilling has identified an in-place Au resource of 433,000 oz at an average grade of 0.04 oz/ton Au (fig. C-3).

50 **Mt. Prindle**—Significant U-rare-earth mineralization in Mesozoic alkaline igneous rocks. Rock geochemical values of up to 0.7% U; up to 15% rare-earth elements reported (fig. C-3).

51 **Twin Mountain**—Significant W mineralization associated with skarn development along contact zone of quartz monzonite stock of Cretaceous age (fig. C-2).

52 **Circle mining district**—Currently one of Alaska's largest producing placer Au districts; produced 1,049,157 oz Au since discovery in 1893 to 1999. Has significant potential for Sn, W, and Au mineralization from variety of lode sources (fig. C-3).

53 **Three Castle Mountain, Pleasant Creek, Casca VABM**—Stratabound Pb–Zn massive sulfide mineralization. Reported grades of up to 17% Zn and 2% Pb (fig. C-1).

54 **Bonnifield district massive sulfide deposits (Anderson Mountain, Dry Creek, Sheep Creek, Virginia Creek, BT, Liberty Belle)**—Significant volcanogenic Cu–Pb–Zn–Ag massive sulfide deposits of Devonian to Mississippian age in Bonnifield mining district. Potential for high-grade deposits reported. Includes Liberty Belle stratabound Au–B deposit and mineralization in Sheep Creek; latter contains Sn as well as base metals (fig. C-1).

55 **Delta massive sulfide belt**—Contains at least 30 known volcanogenic massive sulfide deposits and occurrences. Grades from 0.3 to 1.1% Cu, 1.7 to 5.7% Zn, 0.5 to 2.3% Pb, 0.7 to 2.0 oz/ton Ag, and 0.018 to 0.061 oz/ton Au; estimated potential reserve of 40 million tons for all deposits. Recent exploration has identified several gold prospects associated with silicified structures in the White Gold trend (fig. C-1).

56 **Mosquito, Peternie**—Porphyry Mo prospects of early Tertiary age; reported grades of up to 0.17% Mo (fig. C-2).

57 **Taurus**—Significant major porphyry Cu–Au prospect of Paleocene age. East Taurus Zone contains inferred reserves of 140 million tons grading about 0.30% Cu and 0.01 oz/ton Au, and 0.03% Mo (fig. C-2).

58 **Big Creek/Ladue**—Stratabound Pb–Zn–Ag massive sulfide prospects in metavolcanic rocks (fig. C-1).

59 **Slate Creek**—At least 55 million tons of 6.3%, high-quality chrysotile asbestos in serpentinized ultramafic rocks of Permian(?) age (fig. C-3).

60 **Fortymile mining district**—Major placer Au district. Produced over 542,396 oz placer and very minor lode Au since discovery in 1883 to 1999, the longest continuous production of Au (113 years) of any Alaskan mining district (fig. C-3).

61 **Kantishna mining district**—Major placer Au and lode Ag–Au–Pb–Zn–Sb–W district. Produced 99,307 oz placer and lode Au, about 307,000 oz lode Ag, and 2,500 tons Sb from shear zones and vein deposits hosted in metamorphic units of Yukon-Tanana terrane. Nearly 90 lode deposits have been identified; potential exists for significant Ag–Au–Pb–Zn resources. Metalliferous stratabound base metal deposits occur in schist and quartzite (fig. C-3).

62 **Stampede mine**—Major Sb deposit; produced more than 1,750 tons Sb from large shear zone in poly-metamorphic rocks of Yukon–Tanana terrane (fig. C-3).

63 **Coal Creek**—Greisen-hosted Sn–Cu–W deposit in "McKinley" age pluton (55 million years old). Reported reserves of 5 million tons of ore that grade 0.28% Sn and 0.3% Cu with credits of W, Ag, and Zn (fig. C-2).

64 **Golden Zone mine**—Major Au–Cu–Ag deposits in Late Cretaceous breccia pipe and skarn deposits. Produced more than 1,581 oz Au, 8,617 oz Ag, and 21 tons Cu. On the basis of recent (1994) drilling, the Pipe, Bunkhouse, and Copper King deposits contain 13.3 million tons grading 0.095 oz/ton Au (figs. C-1, C-3).

65 **Nim Prospect**—Porphyry Cu–Ag–Au deposit of Late Cretaceous age. Reported grades of up to 5.0% Cu and 9 oz/ton Ag (fig. C-1).

66 **Valdez Creek district**—About 508,554 oz Au production through 1999. Cambior Alaska Inc., the largest placer mine in Alaska, operated in this district until September 1995 (fig. C-3).

67 **Caribou Dome (Denali)**—Ten identified stratabound Cu deposits in volcanic sedimentary rocks of Triassic age. Proven and probable ore is 700,000 tons grading 6% Cu with Ag credits, with indicated resources that may contain 2 million tons ore over strike length of 4,000 feet (fig. C-1).

67a **Zackly**—Disseminated Cu and Au in a garnet-pyroxene skarn and marble. Reserves are estimated at 1.4 million tons grading 2.6 percent Cu and 0.175 oz/ton Au (fig. C-1).

68 **Chistochina**—Porphyry Cu prospects of Tertiary age and placer Au district; produced more than 181,261 oz Au and small amount Pt from placer deposits (figs. C-2, C-3).

69 **Nabesna mine**—Classic high-grade Au skarn that envelopes quartz diorite of Jurassic(?) age; produced over 66,500 oz Au from about 88,000 tons of ore from 1930 to 1941 (fig. C-3).

70 **Spirit Mountain**—Massive and disseminated Cu–Ni mineralization in mafic-ultramafic complex (fig. C-3).

71 **Kennecott deposits**—Major stratiform Cu–Ag massive sulfide deposits localized near contact between Chitistone Limestone and Nikolai Greenstone of Triassic age; contained some of highest grade Cu lodes mined in North America. From 1911 to 1938, produced more than 600,000 tons Cu and 10 million oz Ag from 4.8 million tons ore. Some reserves remain (fig. C-1).

72 **Binocular and other prospects**—Kennecott-type Cu–Ag massive sulfide deposits (fig. C-1).

73 **Bond Creek–Orange Hill**—Two major porphyry Cu–Mo deposits of Late Cretaceous age; reported inferred reserves of 850 million tons ore that grade 0.3 to 0.5% Cu and 0.03% Mo (fig. C-2).

74 **Carl Creek**—Porphyry Cu prospect in altered intrusive complex; similar to locality 73 (fig. C-2).

75 **Baultoff**—Porphyry Cu prospect in altered intrusive rocks; inferred reserves of 145 million tons of 0.20% Cu; similar to locality 73 (fig. C-2).

76 **Horsfeld**—Porphyry Cu prospect; similar to locality 73 (fig. C-2).

77 **Midas mine**—Significant stratabound Cu (Ag–Au–Pb–Zn) massive sulfide deposit in volcanic sedimentary rocks of Tertiary Orca Group. Produced more than 1,650 tons Cu from 49,350 tons ore (fig. C-1).

78 **Ellamar**—Stratabound Cu–Zn–Au massive sulfide deposit in sediment of Eocene(?) Orca Group. Produced more than 8,000 tons Cu, 51,307 oz Au, and 191,615 oz Ag from about 301,835 tons ore (fig. C-1).

79 **Willow Creek, Independence, Lucky Shot, War Baby**—Major lode Au deposits (Ag–Cu–Pb–Zn–Mo) in veins that cut Mesozoic quartz diorite. Produced more than 606,400 oz Au from lode sources and about 55,600 oz Au from associated placer deposits (fig. C-3).

80 **Latouche, Beatson**—Major stratabound Cu–Zn–Ag massive sulfide deposits in Orca Group sedimentary rocks and mafic volcanic rocks. Produced more than 10,250 tons Cu from 6 million tons ore. Inferred reserves of 5 million tons ore that grade 1% Cu, 1.5% Pb+Zn (fig. C-1).

81 **Rua Cove**—Major stratabound Cu–Zn massive sulfide deposit in complex ore shoots enclosed in mafic volcanic rocks of Orca Group. Reported reserves of over 1.1 million tons ore that grade 1.25% Cu (fig. C-1).

82 **Red Mountain and Claim Point**—Significant Cr occurrence associated with layered ultramafic complexes of Tertiary age at Red Mountain near Seldovia. More than 39,951 tons of metallurgical-grade ore shipped through 1976; huge low-grade Cr resource may remain, of which 30 million tons grade 5.1% Cr_2O_3 (fig. C-3).

83 **Red Devil**—Major Hg–Sb deposit; high-grade epithermal Hg–Sb deposit hosted in shear zones in Kuskokwim Group sedimentary rocks. More than 35,000 flasks Hg produced from 75,000 tons ore (fig. C-3).

84 **Aniak district**—Significant placer Au district. Aniak mining district produced 578,708 oz Au from placer deposits, mainly from the Nyac and Donlin Creek areas (fig. C-3).

85 **Goodnews Bay**—Major placer Pt district; estimated to have produced over 555,000 oz refined PGE metals from 1934 to 1976; one of the largest known PGE metal resources in United States. Possible resources of 60 million yd^3 of deep, PGE-bearing gravels remain. Lode source believed to be Alaskan-type zoned ultramafic complex of Jurasssic or Cretaceous age. Possible significant offshore placer potential (fig. C-3).

86 **Apollo–Sitka mines**—Major lode Au deposits; produced more than 107,600 oz Au from ore that averaged about 0.22 oz/ton Au. Inferred reserves are 748,000 tons grading 0.76 oz/ton Au, 2.16 oz/ton Ag, with base metal credits (fig. C-3).

87 **Pyramid**—Late Tertiary porphyry Cu–Mo deposit; inferred reserves of 125 million tons ore that grade 0.4% Cu and 0.03% Mo reported (fig. C-2).

88 **Ivanof**—Late Tertiary porphyry Cu prospect; grades of up to 0.72% Cu reported. Potential for large tonnages (fig. C-2).

89 **Weasel Mountain, Bee Creek**—Porphyry Cu–Mo prospect of late Tertiary to Quaternary age; grades of up to 0.48% Cu and 0.035% Mo reported. Potential for moderate tonnages of low-grade mineralization (fig. C-2).

90 **Mike deposit**—Porphyry Mo prospect of late Tertiary age; grades of up to 0.21% Mo reported. Potential for large tonnages of low-grade Mo mineralization (fig. C-2).

91 **Rex deposit**—Porphyry Cu prospect similar to locality 90; grades of up to 0.3% Cu reported. Potential for moderate reserves of low-grade mineralization (fig. C-2).

92 **Kasna Creek**—Major stratiform Cu–Pb–Zn and skarn-sulfide deposits of Mesozoic age in mafic, volcanic, and sedimentary rocks; reported reserves of over 10 million tons ore that grade more than 1% Cu (fig. C-1).

93 **Sleitat Mountain**—High-grade east-west-trending, Sn–W–Ag topaz–quartz greisen system hosted in 59-million-year-old granite and in hornfels. Zone up to 3,000 ft long and 500 ft wide. One drill-hole showed 85 ft of 1.8% Sn, and 0.4% W. Inferred resources are 64,000 to 106,000 tons Sn in 29 million tons ore (fig. C-2).

94 **Jimmy Lake**—Complex Cu–Ag–Sn mineralization of late Tertiary(?) age; reported grades of up to 105 oz/ton Ag and 3% Cu (fig. C-1).

95 **Haines Barite/Palmer**—Major stratiform Ba–Pb–Zn–Cu–Ag deposit in pillow basalt-dominated section of Paleozoic or Triassic age; consists of 48- to 60-ft-thick zone of 60% barite with upper zone (2 to 8 ft thick) of massive sulfides that contain 2% Pb, 3% Zn, 1% Cu, up to 4 oz/ton Ag, and 0.12 oz/ton Au. Estimated to contain 750,000 tons of 65% barite with Zn and Ag credits (fig. C-1).

96 **Klukwan**—Major Fe–Ti deposits in zoned ultramafic complex of Mesozoic age; reported to contain 3 billion tons of material that contains 16.8% Fe and 1.6 to 3.0% Ti (fig. C-3).

97 **Nunatak**—Porphyry Mo deposit; reported reserves of 2.24 million tons ore grading 0.067% Mo, 0.16% Cu, and 129.5 million tons of 0.026% Mo, 0.18% Cu (fig. C-2).

98 **Brady Glacier**—Major Ni–Cu deposit in layered gabbro–pyroxenite complex of Tertiary age. Proven reserves of 100 million tons ore that grade 0.5% Ni, 0.3% Cu reported and about 0.03% Co; also contains PGE concentrations (fig. C-3).

99 **Mertie Lode and Funter Bay mining district**—Contains substantial reserves of lode Au mineralization. Past production totaled about 15,000 oz Au. Deposits also contain significant Ni–Cu and Pb–Zn–Ag mineralization. Funter Bay deposit contains reported reserves of 560,000 tons that grade 0.34% Ni, 0.35% Cu, and 0.15% Co in gabbro-pipe system (fig. C-3).

100 **Alaska–Juneau**—Major lode Au deposit that consists of 100- to 300-ft-wide zone that contains en echelon, Au–bearing quartz veins in metamorphic rocks; produced more than 3.52 million oz Au from 88.5 million tons ore from 1893 to 1944. Reserves (all categories) of 105.7 million tons of 0.05 oz/ton Au remain (fig. C-3).

101 **Chichagof and Hirst Chichagof**—Major lode Au deposits in quartz veins that cut Mesozoic graywacke; produced more than 770,000 oz Au, most of which was produced at Chichagof Mine. Inferred leased reserves estimated to be 100,000 oz Au (fig. C-3).

102 **Mirror Harbor**—Ni–Cu mineralization in layered gabbro complex of Mesozoic age; reported proven reserves of 8,000 tons of 1.57% Ni and 0.88% Cu and reported inferred reserves of several million tons ore that grade 0.2% Ni and 0.1% Cu (fig. C-3).

103 **Bohemia Basin**—Major Ni–Cu–Co mineralization in layered mafic complex similar to locality 102; reported reserves of 22 million tons ore that grade 0.33 to 0.51% Ni, 0.21 to 0.27% Cu, and 0.02% Co, all of which are recoverable with standard flotation technology (fig. C-3).

104 **Apex–El Nido**—Significant lode Au–W deposits that occur as crosscutting veins in graywacke; produced more than 50,000 oz Au (fig. C-3).

105 **Greens Creek**—Major sediment-hosted Pb–Zn–Cu–Ag–Au volcanogenic massive sulfide deposit of Devonian or Triassic age; most recent reserve estimate of the original orebody is 11.0 million tons grading 0.12 oz/ton Au, 13.3 oz/ton Ag, 12.8% Zn, and 4.0% Pb. Additional reserves in the southwest orebody are 2.0 million tons grading 13.5% Zn, 5.5% Pb, 0.27 oz/ton Au, and 33 oz/ton Ag. Total combined reserves and resources of the mine are estimated to be 18 million tons (fig. C-1).

106 **Sumdum**—Volcanogenic Cu–Pb–Zn massive sulfide deposit in Mesozoic metamorphic complex with potential strike length of over 10,000 ft. Inferred reserves of 26.7 million tons ore that grade 0.57% Cu, 0.37% Zn, and 0.3 oz/ton Ag reported (fig. C-1).

107 **Snettisham**—Fe–Ti deposit in mafic zoned intrusive complex; reported grades of about 18.9% Fe and 2.6% Ti (fig. C-3).

108 **Tracy Arm**—Stratabound Cu–Zn–Pb massive sulfide prospect in Mesozoic schist; over 1,100 ft long and up to 12 ft thick. Reported grades of 1.5% Cu, 3.9% Zn, 0.76 oz/ton Ag, and 0.013 oz/ton Au (fig. C-1).

109 **Red Bluff Bay**—Significant chrome mineralization in Mesozoic ultramafic complex (probably ophiolite); reported reserves of 570 tons of material that grade 40% Cr and 29,000 tons that grade 18 to 35% Cr (fig. C-3).

110 **Cornwallis Peninsula**—Volcanogenic Cu–Pb–Zn–Ag–Ba massive sulfide deposit of Triassic(?) age; reported grades of up to 20% Pb–Zn and 23 oz/ton Ag (fig. C-1).

111 **Castle Island**—Stratiform barite deposit of Triassic age hosted in carbonate and pillow basalt; about 856,000 tons of raw and refined barite produced from 1963 to 1980; also contains Zn, Pb, and Cu sulfides. Reported to be mined out (fig. C-1).

112 **Groundhog Basin**—Area contains several massive sulfide prospects in Mesozoic schist and gneiss whose origins are now thought to be plutonic associated. Reported grades of up to 8% Pb, 29 oz/ton Ag, and 0.5 oz/ton Au. Sn has also been recently identified. Area also contains potential for porphyry Mo deposits (fig. C-1).

113 **Snipe Bay**—Ni–Cu deposit in zoned mafic-ultramafic complex; inferred reserves of 430,000 tons of 0.3% Ni, 0.3% Cu, and 0.13 oz/ton Ag reported (fig. C-3).

114 **Kasaan Peninsula**—Major skarn-type Cu–Fe-Au massive sulfide deposit of Jurassic age; area has produced over 14,000 tons Cu, and 55,000 oz Ag. Reported reserves of 4 million tons ore that grade 50% Fe and less than 2% Cu (fig. C-1).

115 **Salt Chuck**—Cu–PGM–Ag–Au deposit in contact zone between pyroxenite and gabbro within Alaskan-type zoned mafic-ultramafic pluton. From 1900 to 1941, 2,500 tons Cu, over 20,000 oz PGM, and Au and Ag credits were produced from 325,000 tons ore (fig. C-3).

116 **Union Bay**—Significant Fe–Ti mineralization in ultramafic complex; area also contains Pt and V concentrations (fig. C-3).

117 **Hyder mining district**—Area produced more than 25,000 tons high-grade W–Cu–Pb–Zn–Ag ore from 1925 to 1951 from crosscutting ore shoots in Texas Creek granodiorite of Tertiary age. Area also contains potential for porphyry Mo–W mineralization and massive sulfide–skarn Pb–Ag–Au–W deposits (figs. C-1, C-2).

118 **Jumbo**—Cu–Fe–Mo–Ag skarn deposit; produced more than 5,000 tons Cu, 280,000 oz Ag, and 7,000 oz Au from 125,000 tons ore. Zoned magnetite–Cu skarns are associated with epizonal granodiorite pluton of Cretaceous age. Reported reserves of 650,000 tons ore that grade 45.2% Fe, 0.75% Cu, 0.01 oz/ton Au, and 0.08 oz/ton Ag (fig. C-1).

119 **Copper City**—Stratiform Cu–Zn–Ag–Au massive sulfide deposit hosted in late Precambrian or earliest Paleozoic Wales Group. Reported grades of up to 12.7% Cu, 2.7% Zn, 2.5 oz/ton Ag, and 0.2 oz/ton Au (fig. C-1).

120 **Quartz Hill**—A porphyry Mo deposit hosted in a 25-million-year-old composite felsic pluton. Probable reserves are 232 million tons with a grade of 0.22% MoS_2, and possible reserves are 1.2 billion tons with 0.12% MoS_2 (fig. C-2).

121 **Niblack**—Volcanogenic Cu–Pb–Au–Ag massive sulfide deposit hosted in Precambrian(?) Wales Group or Ordovician to Silurian Descon Formation; produced more than 700 tons Cu, 11,000 oz Au, and 15,000 oz Ag. Current resource is 2.78 million tons at 3.3% Zn, 1.7% Cu, 1.14 oz/ton Ag and 0.087 oz/ton Au. (fig. C-1).

122 **Bokan Mountain**—Numerous U–Th prospects associated with Jurassic peralkaline intrusive complex; from 1955 to 1971, produced more than 120,000 tons ore that graded about 1% U_3O_8. Contains inferred reserves of about 40 million tons of 0.126% Nb and up to 1% REE metals (fig. C-3).

123 **Kemuk Mountain**—Magmatic Fe–Ti deposit hosted in Cretaceous(?) pyroxenite. Inferred reserves of 2.4 billion tons that average 15 to 17% Fe, 2 to 3% TiO_2, and 0.16% P_2O_5 (fig. C-3).

124 **McLeod**—Porphyry Mo deposit that contains quartz-molybdenite fissure veins in quartz-feldspar porphyry. Chip samples contain up to 0.09% Mo (fig. C-2).

125 **Johnson River**—Epigenetic(?) quartz-sulfide stockwork or massive sulfide deposit hosted in volcaniclastic, pyroclastic, and volcanic rocks of Jurassic Talkeetna Formation. Deposit has drilled-out reserves at a $45/ton cutoff with no cut of high Au assays, 1,099,580 tons grading 0.32 oz/ton Au, 0.24 oz/ton Ag, 0.76% Cu, 1.17% Pb, and 8.37% Zn (fig. C-3).

126 **Nimiuktuk River**—Small hill of massive, high-grade barite estimated to contain at least 1.5 million tons barite. Widespread stream-sediment Ba anomalies in area indicate further barite potential (fig. C-1).

127 **Kensington**—Stockwork quartz veins in sheared and chloritized quartz diorite produced 10,900 tons grading 0.18 oz/ton Au prior to 1930. Recent reserve estimates indicate at least 11.5 million tons grading 0.143 oz/ton Au. Subparallel Horrible vein system contains 3.93 million tons grading 0.11 oz/ton Au (fig. C-3).

128 **Jualin**—Five quartz-fissure veins in Cretaceous quartz diorite, more than 15,000 ft of underground workings; produced 48,387 oz Au, mainly prior to 1930. Reserves estimated at 1.07 million tons of 0.349 oz/ton Au (fig. C-3).

129 **Pebble Copper**—Cu–Au porphyry with identified resource of 1 billion tons grading 0.30% Cu and 0.010 oz/ton Au with Mo in the 0.03 to 0.04% range (fig. C-1).

130 **Pogo**—Au hosted in a series (3 discovered to date) of sub-parallel and tabular, gently dipping, quartz vein

zones hosted by Paleozoic gneisses intruded by Cretaceous felsic plutonic rocks. Au in the 3 ft to 60 ft thick quartz bodies has a strong correlation with Bi. A 1999 conservative kriged geological resource for the Liese L1 and L2 zones is 10.7 million tons at an average grade of 0.524 oz/ton, for a total of 5.6 million oz at a 0.1 oz/ton cut-off grade. Other high-grade Au targets have been identified along an 8-mi-long trend southeast of the Liese zones (fig. C-3).

131 **Shotgun Hills**—Quartz stockwork and breccia Au–Cu–As mineralization in a Late Cretaceous rhyolite (granite porphyry) stock. A preliminary, inferred Au resource of 980,000 oz (36.11 million tons at an average grade of 0.027 oz/ton Au) at a 0.016 oz/ton Au cut-off grade, with initial metallurgical tests indicating >90% Au recovery by cyanide leaching (fig. C-3).

132 **Illinois Creek**—Au–Ag–Cu–Pb–Zn–Bi–As-bearing, Fe–Mn oxide (gossan) shear zone crosscutting dolomitic quartzite localized near Cretaceous granitic pluton. Shear zone averages 148 ft wide, has a drill-defined east-west strike length of 11,600 ft, and is open along strike and depth. Produced approximately 56,600 oz Au and 222,000 oz Ag from 1997 to 1999. Proven and probable reserves as of December 31, 1997, calculated using a $330 Au price, totalled 144,200 oz of Au represented by 1.9 million tons of ore at a grade of 0.076 oz of Au and 1.6 oz of Ag/ton (figs. C-1, C-3).

133 **Calder Mine**—Seven recrystallized carbonate units exposed at the apex of a large regional antiform. Drilling has identified 13 million tons of chemically homogenous, high-brightness, high-whiteness marble with a purity of 98 to 99% calcium carbonate. Potential resource of 80 million tons of high-value calcium carbonate (fig. C-2).

134 **Vinasale Mountain**—Intrusion-hosted Au deposit. Au mineralization is associated with arsenopyrite and pyrite in quartz-dolomite hydrothermal breccias, magmatic breccias, and zones of phyllic and silicic alteration hosted within a 69 Ma quartz monzonite stock. Both disseminated and veinlet mineralization exist. An inferred resource of 14.35 million tons grading 0.067 oz/ton Au, with an 0.03 oz/ton cut-off grade has been identified by drilling in the Central zone (fig. C-3).

135 **Nixon Fork**—Au–Cu skarn deposits; Historic Nixon Fork mine produced 59,500 oz Au from Late Cretaceous skarns associated with quartz monzonite-Devonian limestone contact zones. Underground mining resumed in October 1995, with 133,900 oz of Au, 1,800 tons of Cu, and significant Ag produced through mine closure in 1999 (fig. C-3).

136 **Von Frank Mountain**—Au and very weak Cu mineralization are associated with chalcopyrite, pyrite, and rare molybdenite within a zone of quartz stockwork veining hosted in a 69 Ma quartz-diorite stock. The stock is a cupola of the larger Von Frank Pluton. Drill intercepts include thicknesses up to 429 ft with an average grade of 0.013 oz/ton Au. Higher grade intercepts include 0.035 oz/ton Au up to 135 ft (fig. C-3).

137 **Donlin Creek**—Au mineralization associated with disseminated pyrite and arsenopyrite, sulfide veinlets, and quartz-carbonate-sulfide veinlets in sericite-altered Late Cretaceous to early Tertiary rhyodacitic porphyry dikes and sills. Au mineralization is structurally controlled and refractory. Measured and indicated resource on January 2001 estimated at 6.9 million oz of Au grading 0.09 oz/ton Au and an inferred resource of 6.0 million oz Au grading 0.08 oz/ton Au at a 0.04 oz/ton Au cut-off grade. Using a higher cut-off grade of 0.1 oz/ton Au, the measured and indicated resource is 3.1 million ounces of gold grading 0.151 oz/ton Au with an additional inferred resource of 2.4 million ounces gold grading 0.145 oz/ton Au (fig. C-3).

138 **Kaiyah**—Au–Ag epithermal prospect in silicified Koyukuk sedimentary rocks adjacent to Poison Creek caldera. Polymetallic sulfides in quartz veins, with some veins over 100 feet thick, and silicification are associated with pervasive advanced argillic, and sericite alteration (fig. C-3).

APPENDIX D

State and federal agencies and private interest groups involved in mineral development activities, 2001

(The *Alaska Miners Association Directory* lists technical and professional consultants and companies available for work in Alaska. The report is published annually and is free to AMA members. The cost for non members is $15 plus shipping and handling.)

STATE OF ALASKA AGENCIES

DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT
State Office Building, 9th Fl.
P.O. Box 110800 (mailing)
Juneau, AK 99811-0800
(907) 465-2500
(907) 465-3767 (fax)

Function: Promotes economic development in Alaska.

Division of Community and Business Development
550 W. 7th Ave., Ste. 1770
Anchorage, AK 99501
(907) 269-8110
(907) 269-8125 (fax)

State Office Building, 9th Fl.
333 Willoughby Ave.
P.O. Box 110804 (mailing)
Juneau, AK 99811-0804
(907) 465-5463
(907) 465-3767 (fax)
http://www.dced.state.ak.us/cbd/
email: frankie_pillifant@dced.state.ak.us

Unit 7, 3677 College Rd.
Fairbanks, AK 99709
(907) 451-3050
(907) 451-3053 (fax)
email: swainbnk@ptialaska.net

Function: Primary state government advocacy agency for economic growth. Researches and publishes economic data on Alaska's mining industry. Attracts capital investment by advertising Alaska's resource potential. Provides research staff aid for the Alaska Minerals Commission. The Division also encourages the development of new markets for Alaska resources, increases the visibility of Alaska and its products in the international marketplace, and makes referrals and provides technical assistance to those interested in developing export markets for Alaska-produced or value-added goods and services.

Alaska Industrial Development & Export Authority (AIDEA)
813 W. Northern Lights Blvd.
Anchorage, AK 99503
(907) 269-3000
(907) 269-3044 (fax)
http://www.aidea.org

Function: AIDEA provides capital to finance economic growth throughout Alaska—from multi-million-dollar mining projects to small, family-owned businesses; from urban centers to small towns and rural villages. Regardless of project size, location, or business type, all AIDEA-financed projects must enhance the state's economy and provide or maintain jobs for Alaskans. AIDEA's financing assistance programs—the Credit Program and the Development Finance Program—have played an important role in Alaska's mineral development. The Credit Program includes the Loan Participation, Business and Export Assistance loan guarantee, and the Tax-Exempt Revenue Bond programs. AIDEA's Development Finance Program allows AIDEA to develop, own, and operate facilities within Alaska such as roads, ports, and utilities which are essential to the economic well-being of an area; are financially feasible; and are supported by the community in which they are located.

Alaska Science & Technology Foundation
4500 Diplomacy Dr., Ste. 515
Anchorage, AK 99508
(907) 272-4333
(907) 274-6228 (fax)
email: bchaney@astf.org
http://www.astf.org

Function: The Foundation was created to help diversify Alaska's economy by investing in economic development and technological innovation within the state and to improve the health status of its residents. By awarding grants for both basic and applied research and development, the Foundation will enhance the state's economy and help build its science and engineering capabilities.

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
410 Willoughby Ave., Ste. 303
Juneau, AK 99801-1795
(907) 465-5365
(907) 465-5070(fax)
(907) 465-5040 TTY
(907) 465-5065 Commissioner's Office
(907) 465-5365 Public Information

Function: Issues permits for activities (including mining) that affect air or water quality or involve land disposal of wastes. Sets air- and water-quality standards. Inspects, monitors, and enforces environmental quality statutes, regulations, and permits. Reviews all federal permits.

Alaska Department of Environmental Conservation
Anchorage Office
555 Cordova St.
Anchorage, AK 99501-2617
(907) 269-7500
(907) 269-7600 (fax)
(907) 269-7511 TYY
Permits/Compliance Assistance
1-800-510-2332 (inside Alaska only)
email: compass@envircon.state.ak.us

Alaska Department of Environmental Conservation
Fairbanks Office
610 University Ave.
Fairbanks, AK 99709-3643
(907) 451-2360
(907) 451-2188 (fax)
(907) 451-2184 TTY

DEPARTMENT OF FISH AND GAME
1255 W. 8th St.
P.O. Box 25526 (mailing)
Juneau, AK 99802-5526
(907) 465-4100
(907) 465-4759
http://www.state.ak.us/local/akpages/FISH.GAME/habitat/hab_home.htm

Habitat and Restoration Division
(907) 465-4105

Function: Habitat and Restoration Division protects fish and fish habitat through the implementation of the Fishway Act, the Anadromous Fish Act, and other authorities. Manages refuges, sanctuaries, and critical habitats. Requires prior written authorizations for any work affecting the free movement of fish, for any use or activity that may affect designated anadromous fish waters, and for any disturbance-producing or habitat-altering activity that would occur in a designated state refuge, critical habitat area, or game sanctuary.

Northern and Interior Regional Office
Habitat and Restoration
1300 College Rd.
Fairbanks, AK 99701-1599
(907) 459-7289
(907) 456-3091 (fax)

Southcentral Regional Office
Habitat and Restoration Division
333 Raspberry Rd.
Anchorage, AK 99518-1599
(907) 267-2285
(907) 267-2464 (fax)

Southeast Regional Office
Habitat and Restoration Division
802 3rd St., 2nd Fl.
P.O. Box 240020 (mailing)
Douglas, AK 99824-0020
(907) 465-4290
(907) 465-4272 (fax)

OFFICE OF MANAGEMENT AND BUDGET
Division of Governmental Coordination
302 Gold St.
P.O. Box 110030 (mailing)
Juneau, AK 99811-0030
(907) 465-3562
(907) 465-3075 (fax)

Function: Conducts coordinated State review of permits for mining projects within Alaska's Coastal Management Zone. Provides project design information to applicants for consistency with the policies and standards of the Alaska Coastal Management Program. Coordinates State response to direct federal actions, including proposed regulations, that affect Alaska's mining industry.

Southcentral Regional Office
550 W. 7th St., Ste. 1660
Anchorage, AK 99501-3568
(907) 269-7470
(907) 269-3981 (fax)

DEPARTMENT OF NATURAL RESOURCES
400 Willoughby Ave., 5th Fl.
Juneau, AK 99801-1724
(907) 465-2400
http://www.dnr.state.ak.us

Alaska Mental Health Trust Land Office
550 West 7th Avenue, Suite 1430
Anchorage, Alaska 99501
Ph.: (907) 269-8658
(907) 269-8905 (fax)
http://www.dnr.state.ak.us/mhtlo/

Function: The Trust Land Office (TLO) manages the approximately 1 million acres of land that are included in the Alaska Mental Health Trust, which was created by Congress in 1956. Lands in the Trust are located throughout the state and are used to generate revenues to meet the expenses of mental health programs in Alaska. Management activities include all aspects of land use and resource development, including mineral and oil and gas leasing, exploration, and development; material sales (including gravel, sand, and rock); timber sales; surface leasing; land sales; and issuance of easements across Trust land.

Division of Forestry
550 W. 7th Ave., Ste. 1450
Anchorage, AK 99501-3566
(907) 269-8463
http://www.dnr.state.ak.us/forestry

Function: Establishes guidelines to manage mining in state forests.

Northern Region Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2660

Coastal Region Office
400 Willoughby Ave., Ste. 300
Juneau, AK 99801
(907) 465-5401

Division of Geological & Geophysical Surveys
794 University Ave., Ste. 200
Fairbanks, AK 99709-3645
(907) 451-5000
(907) 451-5050 (fax)
email: dggs@dnr.state.ak.us
http://wwwdggs.dnr.state.ak.us

Function: Conducts geological and geophysical surveys to determine: the potential of Alaska land for production of metals, minerals, fuels, and geothermal resources; locations and supplies of construction materials; potential geologic hazards to buildings, roads, bridges, and other installations and structures; and other surveys and investigations as will advance knowledge of the geology of Alaska and general geologic inventories. Publishes a variety of reports that contain the results of these investigations. Advises the public and government agencies on geologic issues. Maintains a library of geologic bulletins, reports, and periodicals. Maintains a geologic materials storage facility at Eagle River.

Geologic Materials Center
P.O. Box 772805
Eagle River, AK 99577-2805
(907) 696-0079
(907) 696-0078 (fax)

Division of Mining, Land & Water
550 W. 7th Ave., Ste. 1070
Anchorage, AK 99501
(907) 269-8600
(907) 269-8904 (fax)
http://www.dnr.state.ak.us

A. Mining

Function: Principal agency for management of mining and reclamation on state land in Alaska. Maintains a mining office in Fairbanks. Issues property rights to leasable minerals; manages locatable mineral filings. Also issues millsite leases and permits

for hard rock and placer mining activity. Maintains records of mineral locations, permits and leases. Provides technical, legal, and land-status information. Administers the Alaska Surface Mining Control and Reclamation Act (ASMCRA), which includes permitting and inspection of coal mining activity and reclamation of abandoned mines.

B. Land

Function: Manages surface estate and resources, including materials (gravel, sand, and rock). Handles statewide and regional land-use planning. Issues leases, material-sale contracts, land-use permits, and easements for temporary use of State land and access roads. Administers land sales program.

C. Water Management

Function: Manages water resources of the State; issues water-rights permits and certificates; responsible for safety of all dams in Alaska.

Mining Information:
Anchorage (907) 269-8642
Fairbanks (907) 451-2790

All other Land & Water Information:
Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2740
(907) 451-2751 (fax)

Southcentral Regional Office
550 W. 7th Ave., Ste. 900A
Anchorage, AK 99501
(907) 269-8503
(907) 269-8947 (fax)

Southeastern Regional Office
400 Willoughby Ave., Ste. 400
Juneau, AK 99801-1724
(907) 465-3400
(907) 586-2954 (fax)

Division of Parks and Outdoor Recreation
550 W. 7th Ave., Ste.1310
Anchorage, AK 99501-3565
(907) 269-8700

Function: Manages approximately 3,000,000 acres of state park lands primarily for recreational uses, preservation of scenic values, and watershed. Responsible for overseeing mining access, recreational mining activity, and valid mining-claim holdings within state park lands. The Office of History and Archaeology reviews mining permit applications on all lands within the state for impacts to historic resources.

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2695

Southeastern Regional Office
400 Willoughby Ave., 4th Fl.
Juneau, AK 99801-1724
(907) 465-4563

Office of History and Archaeology
550 W. 7th Ave., #1310
Anchorage, AK 99501-3565
(907) 269-8721
(907) 269-8908 (fax)
email: michelej@dnr.state.ak.us

DEPARTMENT OF PUBLIC SAFETY
450 Whittier St.
P.O. Box 111200 (mailing)
Juneau, AK 99811-1200
(907) 465-4322

Division of Fish and Wildlife Protection
5700 East Tudor Rd.
Anchorage, AK 99507-1225
(907) 269-5509

Function: Enforces state laws, in particular AS Title 16. Protects Alaska's fish and wildlife resources through enforcement of laws and regulations governing use of natural resources within Alaska. These laws are in Alaska Statutes 8, 16, 46, and Alaska Administrative Codes 5, 12, and 20.

DEPARTMENT OF REVENUE
State Office Bldg.
11th Fl., Entrance A
P.O. Box 110400 (mailing)
Juneau, AK 99811-0400
(907) 465-2300
http://www.revenue.state.ak.us

Tax Division
State Office Bldg., 11th Fl., Entrance B
P.O. Box 110420 (mailing)
Juneau, AK 99811-0420
(907) 465-2320
(907) 465-2375 (fax)
email: fish_excise@revenue.state.ak.us
http://www.tax.state.ak.us

Function: Issues licenses for mining, production, and sale of minerals. Administers mining-license tax based on net income, including royalties. New mining operations—except sand and gravel mining—can apply for and receive certificates of tax exemption for the first 3½ years of operation. (Tax returns must be filed annually.)

UNIVERSITY OF ALASKA

College of Science, Engineering, and Mathematics
Department of Geology & Geophysics
P.O. Box 755780
Natural Sciences Building, Room 308
University of Alaska Fairbanks
Fairbanks, AK 99775-5780
(907) 474-7565
(907) 474-5163 (fax)
email: geology@zorba.uafadm.alaska.edu
http://www.uaf.edu/geology

Function: Provides undergraduate and graduate education in geology and geophysics and conducts basic and applied research in geologic sciences. For undergraduate studies, the department offers a B.A. program in Earth Science and a B.S. program in Geology (with emphasis options in general geology, economic geology, and petroleum geology). For graduate studies, the department offers M.S. and Ph.D. programs in Geology and Geophysics, with concentrations in: General geology; economic geology; petroleum geology; Quaternary geology; remote sensing; volcanology; solid-earth geophysics; and snow, ice, and permafrost geophysics.

School of Mineral Engineering
P.O. Box 755960
Brooks Building - Rm. 209
University of Alaska Fairbanks
Fairbanks, AK 99775-5960
(907) 474-7366
(907) 474-6994 (fax)
email: FYSME@uaf.edu
http://sme.uaf.edu

Function: Provides undergraduate and graduate education programs in geological engineering, mining engineering, mineral preparation engineering, and petroleum engineering. Through research programs conducts laboratory and field studies to promote mineral and energy development.

Mineral Industry Research Laboratory (MIRL)
School of Mineral Engineering
O'Neill Resources Bldg., Rm. 229
University of Alaska Fairbanks
Fairbanks, AK 99775-7240
(907) 474-6746
(907) 474-5400 (fax)

Function: Conducts applied and basic research in exploration, development, and utilization of Alaska's mineral and coal resources with emphasis on coal characterization, coal utilization, coal upgrading, coal preparation, mineral beneficiation, fine gold recovery, hydrometallurgy, and environmental concerns. Publishes reports on research results and provides general information and assistance to the mineral industry.

Mining Extension Program
Duckering Bldg., Rm. 401
University of Alaska Fairbanks
Fairbanks, AK 99775-5800
(907) 474-7702

Function: Offers prospecting and introductory mineral and mining courses under an open admissions policy.

Mining and Petroleum Training Service
155 Smith Way, Ste. 101
University of Alaska Anchorage
Soldotna, AK 99669
(907) 262-2788
(907) 262-2812 (fax)
email: mapts@alaska.net
http://www.alaska.net/~mapts

Function: Provides direct training and assistance to mine operators, service and support companies, and governmental agencies in mine safety and health, mining extension, vocational mine training, and technical transfer. Specialized training services in hazardous materials, first aid and CPR, industrial hygiene, and professional safety education and consulting are available on demand.

FEDERAL AGENCIES

U.S. DEPARTMENT OF THE INTERIOR
Office of the Secretary
1689 C St., Ste. 100
Anchorage, AK 99501-5151
(907) 271-5485
(907) 271-4102

Function: Coordinates the Department of the Interior's policy and stewardship with DOI bureaus for the management of over 200 million acres of public land in Alaska.

Bureau of Land Management
Alaska State Office
Division of Lands, Minerals, and Resources
222 West 7th Ave., Ste. 13
Anchorage, AK 99513-7599
(907) 271-5477
Minerals Branch (907) 271-5049
Public Land Information Center (907) 271-5960
http://www.ak.blm.gov/

Function: Surface manager of federal public lands (except national parks, wildlife refuges, national monuments, national forests, and military withdrawals). Performs a variety of land administration functions for federal lands. Responsible for many minerals functions on federal lands, including issuing leases for all federal leasable minerals including oil and gas, coal, phosphates, and oil shale. Arranges for sale of minerals other than leasable or materials, such as sand, gravel, or stone. Issues rights-of-way and special use permits. Monitors mining operations to ensure protection of surface resources. Maintains land status plats and issues patents. Records federal mining claims and annual assessment affidavits, and collects annual claim holding fees.

The Minerals Branch conducts studies that aid environmentally sound development of a viable mineral industry in Alaska. Emphasis is on field programs that identify the type, amount, and distribution of mineral deposits in Alaska. The field information is augmented by studies of beneficiation technologies, economic feasibility, and economic and environmental effects of mineral development. Information is provided to government agencies to aid land-planning and land-use decisions, and to the private sector to identify targets of opportunity for further exploration and/or development.

Anchorage Field Office
6881 Abbott Loop Rd.
Anchorage, AK 99507-2599
(907) 267-1246
(907) 267-1267 (fax)

Glennallen Field Office
P.O. Box 147
Glennallen, AK 99588
(907) 822-3217
(907) 822-3120 (fax)
http://www.glennallen.ak.blm.gov

Juneau Mineral Information Center
100 Savikko Rd.
Mayflower Island
Douglas, AK 99824
(907) 364-1553
(907) 364-1574 (fax)
email: jalbrech@ak.blm.gov
http://juneau.ak.blm.gov

Function: Conducts mineral assessment and economic, engineering, and environmental studies primarily on federal lands. Library contains 20,000 geologic and minerals publications and provides a variety of on-line land status and mineral information services.

Kotzebue Field Station
P.O. Box 1049
Kotzebue, AK 99752-1049
(907) 442-3430
(907) 442-2720 (fax)

Nome Field Office
P.O. Box 925
Nome, AK 99762-0925
(907) 443-2177
(907) 443-3611 (fax)

Northern Field Office
1150 University Ave.
Fairbanks, AK 99709-3899
(907) 474-2200
(907) 474-2251 Public Room
1-800-437-7021

U.S. Fish and Wildlife Service
Region 7 Office
1011 East Tudor Rd.
Anchorage, AK 99503
(907) 786-3542
http://www.r7.fws.gov/

Function: Administers the federal public lands in national wildlife refuges, issues special-use permits for activities on refuges, reviews permits and applications for various mining activities on all private and public lands and waters, and provides information to regulatory agencies on fish and wildlife and their habitat. Makes recommendations to regulatory agencies to mitigate adverse environmental impacts.

U.S. Fish and Wildlife Service
Fairbanks Ecological Services
101 12th Ave.
Box No. 19
Fairbanks, AK 99701
(907) 456-0327
(907) 456-0208 (fax)

U.S. Fish and Wildlife Service
Juneau Fish and Wildlife Service Office
3000 Vintage Blvd., Ste. 201
Juneau, AK 99801-7100
(907) 586-7240
(907) 586- 7154 (fax)

U.S. Fish and Wildlife Service
Anchorage Field Office
605 West 4th Ave., Rm. G-61
Anchorage, AK 99501
(907) 271-2888
(907) 271-2786 (fax)

U.S. Geological Survey
Alaska Science Center
Geologic Science Office
4200 University Dr.
Anchorage, AK 99508-4663
(907) 786-7479

The mission of the USGS Alaska Science Center (ASC) is to provide scientific leadership and accurate, objective, and timely data, information, and research findings about the earth and its flora and fauna to Federal and State resource managers and policy makers, local government, and the public to support sound decision making regarding natural resources, natural hazards, and ecosystems in Alaska and circumpolar regions.

Geologic Discipline programs in the ASC are based on insightful monitoring, assessments, and research activities that address natural hazards, earth resources, and geologic processes. The Geologic Discipline provides comprehensive, high quality, and timely scientific information to decision makers at Federal, State, and local government levels, as well as the private sector. The Minerals Program investigates and reports on the occurrence, quality, quantity, and environmental characteristics of mineral resources in Alaska, the processes that create and modify them, models for assessing mineral endowment, and the potential impacts of mineral development.

U.S. Geological Survey
Alaska Science Center
Geographic Science Office
Earth Science Information Center
4230 University Dr., Suite 101
Anchorage, AK 99508-4664
(907) 786-7009

Function: Publishes and distributes all available topographic maps of Alaska, digital products, and aerial photography.

National Park Service
Alaska Regional Office
Physical Resources
2525 Gambell St.
Anchorage, AK 99503-2892
(907) 257-2632
(907) 257-2448 (fax)

Function: Administers lands within the national park system in Alaska. Manages oil and gas operations and pre-existing valid mining claims in parklands through plans of operation under Mining in Parks Act, National Park Service regulations, and other applicable federal and state laws and regulations.

U.S. DEPARTMENT OF LABOR
Mine Safety and Health Administration
1815 14th St., SE
Albany, OR 97321
(541) 924-8495
(541) 924-8499 (fax)
email: widows-john@msha.gov

Mine Safety and Health Administration
Anchorage Federal Building
US Courthouse - Rm. 126
222 West 7th Ave., Box 30
Anchorage, AK 99513
(907) 271-1250
(907) 271-1252 (fax)
email: osborn-russell@msha.gov

Function: Administers health and safety standards to protect the health and safety of metal, nonmetal, and coal miners. Cooperates with the State to develop health and safety programs and develops training programs to help prevent mine accidents and occupationally caused diseases. Under agreement with the Coal Mine Safety and Health Office, the MSHA metal/nonmetal section has assumed responsibility for enforcement and training activities at coal mines in Alaska.

Mine Safety and Health Administration
Coal Mine Safety and Health, District 9
P.O. Box 25367
Denver, CO 80225
(303) 231-5458
(303) 231-5553 (fax)
http://www.msha.gov

Function: Administers health and safety standards according to the Code of Federal Regulations to protect the health and safety of coal miners; requires that each operator of a coal mine comply

with these standards. Cooperates with the State to develop health and safety programs and develops training programs to help prevent coal or other mine accidents and occupationally caused diseases in the industry.

U.S. DEPARTMENT OF AGRICULTURE
Forest Service
Regional Office, R.L.M.
P.O. Box 21628
Juneau, AK 99802-1628
(907) 586-7869
(907) 586-7866 (fax)
email: jkato@fs.fed.us
http://www.fs.fed.us/
http://www.fs.fed.us/r10earth/

Function: With the Bureau of Land Management, provides joint administration of general mining laws on national forest system lands. Cooperates with Department of Interior agencies in the review and issuance of mineral leases. Issues permits for disposal of sand, gravel, and stone.

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 10 Regional Office
1200 6th Ave., MS OW-130
Seattle, WA 98101
(206) 553-1200
(206) 553-1746 (NPDES permits)
http://www.epa.gov/r10earth/

Function: Issues National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act to regulate effluent discharges. Implements a compliance enforcement program. Maintains regulatory and review authority over wetland and NEPA/EIS-related issues.

Alaska Operations Office
222 West 7th Ave., Rm. 537
222 W. 7th Ave., Box 19 (mailing)
Anchorage, AK 99513-7588
(907) 271-5083

Alaska Operations Office
709 W 9th St., Rm. 223A
Box 20370 (mailing)
Juneau, AK 99802-0370
(907) 586-7619

U.S. DEPARTMENT OF THE ARMY
Corps of Engineers
Regulatory Branch
2204 3rd St.
P.O. Box 6898
Elmendorf Air Force Base, AK 99506-6898
(907) 753-2712
(907) 753-5567 (fax)
(800) 478-2712 (in Alaska only)
http://www.poa.usace.army.mil/reg

Function: Regulates structures or work in navigable waters of the U.S. and discharge of dredged or fill material into U.S. waters, including wetlands. Under Section 404 of the Clean Water Act, the Corps of Engineers issues dredge and fill permits for certain mining activities in waters of the United States. Examples of regulated mining activities include construction of berms, dikes, diversions, ponds, overburden stripping, stockpiling, and reclamation activities.

COOPERATIVE STATE–FEDERAL AGENCIES

Alaska Public Lands Information Center
250 Cushman St., Ste. 1A
Fairbanks, AK 99701
(907) 456-0527
(907) 456-0514 (fax)
(907) 456-0532 (TDD for hearing impaired)
http://www.nps.gov/aplic

Function: Clearinghouse for general information on outdoor recreation in Alaska. Information sources include U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, U.S. Geological Survey, National Park Service, Alaska Departments of Natural Resources, Fish and Game, and Community and Economic Development.

BOARDS AND COMMISSIONS

Alaska Minerals Commission
Irene Anderson, Chair
c/o Sitnasuak Native Corp.
P.O. Box 905
Nome, AK 99762
(907) 443-2632
(907) 443-4023
(907) 443-3063 (fax)
email: ianderson@snc.org

Function: The Minerals Commission was created by the Alaska State Legislature in 1986 to make recommendations to the Governor and the Legislature on ways to mitigate constraints on the development of minerals in Alaska. The Commission has published annual reports since 1987.

CHAMBERS OF COMMERCE

Alaska State Chamber of Commerce
217 Second St., Ste. 201
Juneau, AK 99801
(907) 586-2323
(907) 463-5515 (fax)
email: asccjuno@ptialaska.net
http://www.alaskachamber.com

Function: The State Chamber of Commerce researches and formulates positions on Alaskan resource development. Recommendations for consideration are submitted to the State Chamber of Commerce board of directors.

Anchorage Chamber of Commerce
441 West 5th Ave., Ste. 300
Anchorage, AK 99501
(907) 272-2401
email: info@anchoragechamber.org
http://www.anchoragechamber.org

Greater Fairbanks Chamber of Commerce
250 Cushman St., Ste. 2D
Fairbanks, AK 99701-4665
(907) 452-1105
(907) 456-6968
email: staff@fairbankschamber.org
http://www.fairbankschamber.org

Juneau Chamber of Commerce
3100 Channel Dr., Ste. 300
Juneau, AK 99801
(907) 463-3488
(907) 463-3489 (fax)
email: juneauchamber@gci.net
http://www.juneauchamber.org

PUBLIC INTEREST GROUPS AND ASSOCIATIONS

Alaska Miners Association Inc.
Statewide Office
3305 Arctic Blvd., Ste. 202
Anchorage, AK 99503
(907) 563-9229
(907) 563-9225 (fax)
email: ama@alaskaminers.org
http://www.alaskaminers.org

Denali Branch of AMA
P.O. Box 1000
Healy, AK 99743
(907) 683-2226
email: keith@usibelli.com

Fairbanks Branch of AMA
P.O. Box 73069
Fairbanks, AK 99707-3069
(907) 458-2874

Juneau Branch of AMA
4420 Taku Blvd.
Juneau AK 99801
email: spetsel@gci.net

Kenai Branch of AMA
155 Smithway, #101
Soldotna, AK 99669-3503
(907) 262-2788

Nome Branch of AMA
P.O. Box 1107
Nome, AK 99762-1107
(907) 443-5168

American Institute of Professional Geologists
8703 Yates Dr., Ste. 200
Westminster, CO 80031-3681
(303) 412-6205
(303) 412-6219 (fax)
email: aipg@aipg.org
http://www.aipg.org

Alaska Section
P.O. Box 242672
Anchorage, AK 99524-2672
(907) 336-5361

Earthjustice
325 Fourth St.
Juneau, AK 99801
(907) 586-2751
(907) 463-5891 (fax)
http://www.earthjustice.org

National Wildlife Federation
750 W. Second Ave., Ste. 200
Anchorage, AK 99501
(907) 258-4800
(907) 258-4811 (fax)

Neighborhood Mine Watch
P.O. Box 84531
Fairbanks, AK 99708-4531
(907) 452-5021, ext. 28
email: nmw@mosquitonet.com

Northern Alaska Environmental Center
830 College Rd.
Fairbanks, AK 99701-1535
(907) 452-5021
(907) 452-3100 (fax)
email: info@northern.org
http://www.northern.org

Northwest Mining Association
10 North Post St., Ste. 220
Spokane, WA 99201
(509) 624-1158
(509) 623-1241 (fax)
email: nwma@nwma.org
http://www.nwma.org

Resource Development Council for Alaska, Inc.
121 W. Fireweed Ln., Ste. 250
Anchorage, AK 99503
(907) 276-0700
(907) 276-3887 (fax)
email: Resources@akrdc.org
http://www.akrdc.org

Society for Mining, Metallurgy, and Exploration Inc.
P.O. Box 277002
Littleton, CO 80127-7002
(303) 973-9550
(303) 973-3845 (fax)
email: sme@smenet.org
http://www.smenet.org

Secretary Treasurer-John Rishel
1505 Atkinson Dr.
Anchorage, AK 99504
(907) 337-0511

Southeast Alaska Conservation Council (SEACC)
419 6th St., Ste. 200
Juneau, AK 99801
(907) 586-6942
(907) 463-3312 (fax)
email: info@seacc.org
http://www.seacc.org

Trustees for Alaska
1026 W. 4th Ave., # 201
Anchorage, AK 99501-1980
(907) 276-4244
email: ecolaw@trustees.org
http://www.trustees.org

ORGANIZED MINING DISTRICTS

Circle Mining District
P.O. Box 80674
Fairbanks, AK 99708
(907) 488-6058

Fairbanks Mining District
105 Dunbar
Fairbanks, AK 99701
(907) 456-7642

Haines Mining District
P.O. Box 149
Haines, AK 99827
(907) 766-2228

Iditarod Mining District
John A. Miscovich
1200 I St., Unit 404
Anchorage, AK 99501-4392

Kantishna Mining District
Valerie Mundt
P.O. Box 84608
Fairbanks, AK 99708
vmundt@hotmail.com

Livengood-Tolovana Mining District
Rose Rybachek
P.O. Box 55698
North Pole, AK 99705
(907) 488-6453
email: k17qq@yahoo.com

Yentna Mining District
P.O. Box 211
Talkeetna, AK 99676

MINERAL EDUCATION PROGRAMS

ALASKA MINERAL AND ENERGY RESOURCE EDUCATION FUND (AMEREF)
121 W. Fireweed Ln., Ste. 250
Anchorage, AK 99503
(907) 276-0700
(907) 276-3887 (fax)
email: resources@akrdc.org
http://www.ameref.org

Function: A 501(c)(3) educational non-profit formed to help provide Alaska's students with the knowledge to make informed decisions on mineral, energy, and forest resources.

Alaska Department of Education and Early Development
801 W. 10th St., Ste. 200
Juneau, AK 99801-1894
(907) 465-2826
(907) 465-3396 (fax)
email: Cynthia_Curran@eed.state.ak.us
http://www.eed.state.ak.us/tls/minerals/minerals.html

NATIVE REGIONAL CORPORATIONS

AHTNA INC.
Main Office
P.O. Box 649
Glennallen, AK 99588-0649
(907) 822-3476
(907) 822-3495 (fax)
http://www.ahtna-inc.com/

Anchorage Office
1750 Abbot Rd.
Anchorage, AK 99507
(907) 868-8235
(907) 868-8234 (fax)

THE ALEUT CORP.
4000 Old Seward Hwy., Ste. 300
Anchorage, AK 99503-6087
(907) 561-4300
(907) 563-4328 (fax)
email:aleut@alaska.net
http://www.aleutcorp.com

ARCTIC SLOPE REGIONAL CORP.
P.O. Box 129
Barrow, AK 99723-0129
(907) 852-8633
(907) 852-5733 (fax)
http://www.asrc.com/

Anchorage Office
301 Arctic Slope Ave., Ste. 300
Anchorage, AK 99518-3035
(907) 349-2369
(907) 349-5476 (fax)

BERING STRAITS NATIVE CORP.
P.O. Box 1008
Nome, AK 99762-1008
(907) 443-5252
(907) 443-2985 (fax)
email: jimmy@beringstraits.com
http://www.beringstraits.com/

BRISTOL BAY NATIVE CORP.
800 Cordova St., Ste. 200
Anchorage, AK 99501-3717
(907) 278-3602
(907) 276-3924 (fax)
http://www.bbnc.net

CALISTA CORP.
301 Calista Court, Ste. A
Anchorage, AK 99518-3028
(907) 279-5516
(907) 272-5060 (fax)
http://www.calistacorp.com/

CHUGACH ALASKA CORP.
560 E. 34th Ave., Ste. 300
Anchorage, AK 99503-4196
(907) 563-8866
(907) 561-6961 (fax)
email: rrogers@chugach-ak.com
http://www.chugach-ak.com/

COOK INLET REGION INC.
and its subsidary North Pacific Mining Corporation
2525 C St., Suite 500
Anchorage, AK 99503
(907) 274-8638
(907) 263-5190 (fax)
email: cbeery@ciri.com
http://www.ciri.com/

DOYON LTD.
1 Doyon Place, Ste. 300
Fairbanks, AK 99701-2941
(907) 459-2030
(907) 459-2062 (fax)
email: land@doyon.com
http://www.doyon.com

KONIAG INC.
4300 B St., Ste. 407
Anchorage, AK 99503
(907) 561-2668
(907) 562-5258 (fax)
http://www.koniag.com/

NANA REGIONAL CORP.
P.O. Box 49
Kotzebue, AK 99752
(907) 442-3301
(907) 442-2866 (fax)
http://www.nana.com

Anchorage Office
P.O. Box 241449
Anchorage, AK 99524-1449
(907) 265-4100
(907) 265-4123 (fax)

SEALASKA CORP.
One Sealaska Plaza, Ste. 400
Juneau, AK 99801
(907) 586-1512
(907) 586-2304 (fax)
http://www.sealaska.com/

APPENDIX E
Alaska Mining Websites

Mining Companies

Abacus Mining & Exploration Co.	http://www.abacusminerals.com/
Alaska Freegold Co.	http://alaska-freegold.com
Anchorage Sand and Gravel Co., Inc.	http://www.anchsand.com/
Anglo Gold Ltd.	http://www.anglogold.com
Boliden Limited	http://www.boliden.ca/
Browns Hill Quarry	http://www.brownshill.com/
Cambior Inc.	http://www.cambior.com
CanAlaska Ventures, Ltd.	http://www.canalaska.com/
Chapleau Resources Ltd.	http://www.chapleauresources.com/main.shtml
Coeur d'Alene Mines Corp. (Coeur Alaska Inc.)	http://www.coeur.com/
Copper Ridge Explorations Inc.	http://www.copper-ridge.com
Cusac Gold Mines Ltd.	http://www.cusac.com
EMEX Corp.	http://www.emexcorp.com/
Engineer Mining Corp.	http://www.emcorp.yk.ca/
Golconda Resources Ltd.	http://www.golcondaresources.com
Grayd Resource Corp.	http://www.grayd.com/
Hecla Mining Co.	http://www.hecla-mining.com/
Hunter Dickinson Inc.	http://www.hdgold.com/hdifl.htm
Inco Ltd.	http://www.incoltd.com/
Inlet Resources Ltd.	http://www.inlet-resources.com/s/default.asp
International Freegold Mineral Development Inc.	http://www.augoldgroup.com/itf.html
Kennecott Exploration Co.	http://www.kennecottexploration.com/
Kennecott Minerals Co.	http://www.kennecottminerals.com/
Kinross Gold Corp.	http://www.kinross.com/
Latitude Mineral Corp.	http://www.latitudeminerals.com
Navigator Exploration Corp.	http://www.navigatorexploration.com/s/Home.asp
Newmont Mining Corp.	http://www.newmont.com/
North Star Exploration Inc.	http://www.northstarexploration.com
Northern Dynasty Mineral Ltd.	http://www.hdgold.com/NDM.htm
NovaGold Resources Inc.	http://www.novagold.net
Placer Dome Inc.	http://www.placerdome.com/
Quaterra Resources Inc.	http://www.quaterraresources.com/
Red Diamond Mining Co., Inc.	http://www.reddiamondmining.com
Rimfire Minerals Corp.	http://www.rimfire.bc.ca/
Rubicon Minerals Corp.	http://www.rubiconminerals.com/home.htm
Santoy Resources Ltd.	http://www.bmts.bc.ca/san/
Shear Minerals Ltd.	http://www.shearminerals.com
Silverado Gold Mines Ltd.	http://www.silverado.com/
Teck Cominco Ltd.	http://www.teckcominco.com
Teryl Resources Corp.	http://www.terylresources.com
Tri-Valley Corp.	http://www.tri-valleycorp.com/
Usibelli Coal Mine Inc.	http://www.usibelli.com/
Ventures Resource Corp.	http://www.venturesresource.com/
Western Keltic Mines Inc.	http://www.keltic.com/

Alaska Native Corporations

Ahtna Inc.	http://www.ahtna-inc.com/
Aleut Corp.	http://www.aleutcorp.com/
Arctic Slope Regional Corp.	http://www.asrc.com/
Bering Straits Native Corp.	http://www.beringstraits.com/
Bristol Bay Native Corp.	http://touchngo.com/BBNC/ or http://www.bbnc.net/
Calista Corp.	http://www.calistacorp.com/
Chugach Alaska Corp.	http://www.chugach-ak.com

Cook Inlet Region Inc.	http://www.ciri.com/
Doyon Ltd.	http://www.doyon.com/
Koniag Inc.	http://www.koniag.com/
NANA Regional Corp.	http://www.nana.com/
Sealaska Corp.	http://www.sealaska.com/

Exploration

Alaska Earth Sciences Inc.	http://www.aes.alaska.com
Avalon Development Corp.	http://www.alaska.net/~avalon/
Northern Associates Inc.	http://www.alaskaexploration.com
Red Diamond Mining Co., Inc.	http://www.reddiamondmining.com
WGM Inc.	http://www.wgm.com/wgm_bg001.htm

General

Alaska Miners Association	http://www.alaskaminers.org
Alaska Resource Data Files	http://ardf.wr.usgs.gov
Alaska Division of Geological & Geophysical Surveys	http://www.dggs.dnr.state.ak.us
Division of Community & Business Development	http://www.dced.state.ak.us/cbd/

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

Alaska Mining Claims Information System	http://www.dnr.state.ak.us/ssd/lris/gis/mcis_p0/index.cfm
Alaska Resource Data Files	http://ardf.wr.usgs.gov/
DGGS Maps On-Line	http://wwwdggs.dnr.state.ak.us/gisexampl3.html
DGGS Publications On-Line	http://wwwdggs.dnr.state.ak.us/pubs.html
Digital Index of Geological Information	http://imcg.wr.usgs.gov/digi.html
DNR Sites Related to Mining Applications and Forms	http://www.dnr.state.ak.us/mlw/forms/index.htm
Georeferenced Bibliography of USGS Publications	http://akdata.wr.usgs.gov/moims/default.htm
Guide to Alaska Geologic and Mineral Information	http://wwwdggs.dnr.state.ak.us/Libguide/intropage.htm
Land Records Web Application	http://www.dnr.state.ak.us/landrecords
NURE Data	http://imcg.wr.usgs.gov/nuredata.html
On-Line Annual Payments	https://nutmeg.state.ak.us/ixpress/dnr/case/lasmenu.dml
RASS, PLUTO Geochemistry Data	http://geopubs.wr.usgs.gov/open-file/of99-433/
State Map Library	http://www.dnr.state.ak.us/lris/gis_maplib/maplib_start.cfm
State Recorder's Office Search	http://www.dnr.state.ak.us/ssd/recoff/search.cfm
State Uniform Commerical Code (UCC) Documents Search	http://www.dnr.state.ak.us/ssd/ucc/search.cfm
USGS Alaska Technical Data Unit (USGS Archives for Alaskan Geology)	ftp://pluton.wr.usgs.gov/pub/atdu/aktkdata.htm

APPENDIX F

U.S. Customary Units/Metric Units Conversion Chart

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

Temperature conversions:
From degrees Fahrenheit to degrees Celsius, subtract 32 and multiply by 5/9.
From degrees Celsius to degrees Fahrenheit, multiply by 9/5 and add 32.

SOURCE: *Minerals Today,* February 1993, U.S. Bureau of Mines.

APPENDIX G
Primary metals production in Alaska, 1880-2001

Year	Gold		Silver		Mercury		Antimony		Tin		Lead		Zinc		Platinum		Copper		Chromium	
	(oz)	(m$)	(oz)	(t$)	(flask[a])	(t$)	(lb)	(t$)	(lb)	(t$)	(tons)	(t$)	(tons)	(t$)	(oz)	(t$)	(lb)	(m$)	(tons)	(t$)
1880-1899	1,153,889	23.85	496,101	329.0	--	--	--	--	--	--	250	17.0	--	--	--	--	--	--	--	--
1900	395,030	8.17	73,300	45.5	--	--	--	--	--	--	40	3.4	--	--	--	--	--	--	--	--
1901	335,369	6.93	47,900	28.6	--	--	--	--	--	--	40	3.4	--	--	--	--	250,000	0.04	--	--
1902	400,709	8.28	92,000	48.5	--	--	--	--	30,000	8.0	30	2.5	--	--	--	--	360,000	0.04	--	--
1903	420,069	8.68	143,600	77.8	--	--	--	--	50,000	14.0	30	2.5	--	--	--	--	1,200,000	0.16	--	--
1904	443,115	9.16	198,700	114.9	--	--	--	--	28,000	8.0	30	2.5	--	--	--	--	2,043,586	0.28	--	--
1905	756,101	15.63	132,174	80.2	--	--	--	--	12,000	4.0	30	2.6	--	--	--	--	4,805,236	0.75	--	--
1906	1,066,030	22.04	203,500	136.4	--	--	--	--	68,000	38.6	30	3.4	--	--	--	--	5,871,811	1.13	--	--
1907	936,043	19.35	149,784	98.8	--	--	--	--	44,000	16.8	30	3.2	--	--	--	--	6,308,786	1.26	--	--
1908	933,290	19.29	135,672	71.9	--	--	--	--	50,000	15.2	40	3.4	--	--	--	--	4,585,362	0.61	--	--
1909	987,417	20.41	147,950	76.9	--	--	--	--	22,000	7.6	69	5.9	--	--	--	--	4,124,705	0.54	--	--
1910	780,131	16.13	157,850	85.2	--	--	--	--	20,000	8.3	75	6.6	--	--	--	--	4,241,689	0.54	--	--
1911	815,276	16.85	460,231	243.9	--	--	--	--	122,000	52.8	51	4.5	--	--	--	--	27,267,778	3.40	--	--
1912	829,436	17.14	515,186	316.8	--	--	--	--	260,000	119.6	45	4.1	--	--	--	--	29,230,491	4.82	--	--
1913	755,947	15.63	362,563	218.9	--	--	--	--	100,000[c]	44.1[c]	6	0.6	--	--	--	--	21,659,958	3.35	--	--
1914	762,596	15.76	394,805	218.3	--	--	--	--	208,000	66.6	28	1.3	--	--	--	--	21,450,628	2.85	--	--
1915	807,966	16.70	1,071,782	543.3	--	--	520,000	W	204,000	78.8	437	41.1	--	--	--	--	86,509,312	15.14	--	--
1916	834,068	17.24	1,379,171	907.4	--	--	1,200,000	W	278,000	121.0	820	113.2	--	--	8	0.7	119,654,839	29.50	--	--
1917	709,049	14.66	1,239,150	1,020.6	--	--	500,000	W	200,000	123.3	852	146.6	--	--	53	5.5	88,793,400	24.40	1,100	W
1918	458,641	9.48	847,789	847.8	--	--	540,000	W	136,000	118.0	564	80.1	--	--	284	36.6	69,224,951	17.10	1,100	W
1919	455,984	9.42	629,708	705.3	--	--	--	--	112,000	73.4	687	72.1	--	--	569	73.7	47,220,771	8.80	--	--
1920	404,683	8.37	953,546	1,039.7	--	--	--	--	32,000	16.1	875	140.0	--	--	1,478	160.1	70,435,363	13.00	--	--
1921	390,558	8.07	761,085	761.1	45	1.5	--	--	8,000	2.4	759	68.3	--	--	40	2.7	57,011,597	7.40	--	--
1922	359,057	7.42	729,945	729.9	--	--	--	--	2,800	0.9	377	41.5	--	--	29	2.8	77,967,819	10.50	--	--
1923	289,539	5.98	814,649	668.1	--	--	--	--	3,800	1.6	410	57.4	--	--	--	--	85,920,645	12.60	--	--
1924	304,072	6.29	669,641	448.6	2	0.3	--	--	14,000	7.1	631	100.9	--	--	28	2.6	74,074,207	9.70	--	--
1925	307,679	6.36	698,259	482.4	44	3.6	W	W	28,600	15.4	789	140.6	--	--	10	1.2	73,055,298	10.30	--	--
1926	324,450	6.70	605,190	377.0	22	1.7	W	W	16,000	10.4	778	124.4	--	--	3,570	274.5	67,778,000	9.49	--	--
1927	286,720	5.97	350,430	215.0	--	--	--	--	53,400	34.0	1,008	127.0	--	--	--	--	55,343,000	7.25	--	--
1928	331,140	6.85	351,730	187.0	--	--	--	--	82,000	41.0	1,019	118.0	--	--	120	9.0	41,421,000	5.96	--	--
1929	375,438	7.76	472,900	252.0	4	0.5	--	--	77,200	35.0	1,315	166.0	--	--	475	32.0	40,570,000	7.13	--	--
1930	408,983	8.47	408,570	157.3	--	--	--	--	29,400	9.3	1,365	136.5	--	--	--	--	32,651,000	4.24	--	--
1931	459,000	9.51	352,000	102.0	15	1.2	--	--	8,200	2.0	1,660	126.0	--	--	393	14.0	22,614,000	1.88	--	--
1932	493,860	10.20	234,050	66.0	8	0.5	--	--	--	--	1,260	75.6	--	--	--	--	8,738,500	0.55	--	--
1933	469,286	9.70	154,700	55.0	--	--	--	--	5,800	2.3	1,157	85.6	--	--	605	18.6	29,000	0.02	--	--
1934	537,281	8.78	154,700	100.0	--	--	--	--	8,200[c]	4.3	839	62.1	--	--	2,555	85.6	121,000	0.06	--	--
1935	469,495	16.43	286,600	206.0	--	--	--	--	98,800	49.8	815	65.2	--	--	8,685	259.6	15,056,000	1.25	--	--
1936	540,580	18.92	484,306	375.0	--	--	--	--	226,000	105.0	941	86.6	--	--	5,654	241.9	39,267,000	3.72	--	--
1937	627,940	21.98	494,340	382.0	--	--	962,000	147.6	372,000[c]	202.3[c]	823	97.1	--	--	9,823	313.4	36,007,000	4.74	--	--
1938	662,000	23.17	479,853	310.0	8	0.6	444,000	54.8	210,000	89.1	994	91.5	--	--	41,000	2,460.0	29,760,000	2.98	--	--
1939	676,780	23.68	201,054	136.5	--	--	210,000	25.9	66,000	38.0	937	88.1	--	--	33,900	2,034.0	278,500	0.04	--	--
1940	755,900	26.45	191,679	136.3	156[c]	130.9	306,000	42.8	92,000	52.0	840	72.0	--	--	28,886	1,093.0	110,000	0.02	--	--
1941	692,314	24.23	199,700	142.0	W	W	774,000	87.3	93,600[c]	61.0[c]	742	58.0	--	--	22,630	813.0	144,000	0.02	--	--
1942	487,657	17.07	135,200	96.0	W	W	316,000	41.0	5,600	2.5	523	44.0	--	--	22,000	779.0	48,000	0.01	--	--
1943	99,583	3.49	31,700	22.0	786	153.4	368,000	33.3	2,000[c]	1.0[c]	200	22.0	--	--	27,900	1,020.0	54,000	0.01	5,564	186.3
1944	49,296	1.73	15,240	10.8	841	165.0	70,080	30.0	--	--	44	5.8	--	--	33,616	2,017.0	4,000	0.01	1,845	64.6
1945	68,117	2.38	9,983	6.2	275	180.0	W	W	--	--	11	1.8	--	--	22,949	1,377.0	10,000	0.01	--	--
1946	226,781	7.93	41,793	26.3	699	68.7	W	W	--	--	115	25.0	--	--	22,882	1,418.7	4,000	0.01	--	--
1947	279,988	9.79	66,150	46.3	127	10.6	52,000	16.1	2,000	2.2	255	76.5	226	0.15	13,512	1,351.2	24,000	0.06	--	--
1948	248,395	8.69	67,341	58.7	108	7.8	88,000	29.3	10,000	10.8	317	88.9	226	0.15	13,741	1,209.2	28,000	0.07	--	--
1949	229,416	8.03	36,056	32.4	102	7.9	88,000	31.3	114,000	100.8	49	11.2	226	0.15	17,169	1,545.2	7,700	0.02	--	--

APPENDIX G *(continued)*

Year	Gold		Silver		Mercury		Antimony		Tin		Lead		Zinc		Platinum		Copper		Chromium	
	(oz)	(m$)	(oz)	(t$)	(flask[b])	(t$)	(lb)	(t$)	(lb)	(t$)	(tons)	(t$)	(tons)	(t$)	(oz)	(t$)	(lb)	(m$)	(tons)	(t$)
1950	289,285	10.13	52,638	48.0	W	W	W	W	158,000	170.3	144	27.5	--	--	W	W	12,000	0.03	--	--
1951	239,628	8.38	32,870	29.8	28	W	1,718,000	2,061.6	138,000	198.0	21	7.2	--	--	W	W	2,000	0.01	--	--
1952	240,571	8.42	31,825	28.7	40	W	740,000	1,406.0	180,000	243.9	1	0.3	--	--	W	W	--	--	W	W
1953	253,771	8.88	35,387	32.1	1,023	270.0	W	W	98,000	105.9	--	--	--	--	17,489	1,696.4	--	--	W	W
1954	248,511	8.70	33,694	31.8	1,046	276.0	--	--	398,000	409.9	--	--	--	--	18,790	1,615.9	8,000	0.02	2.953	208.0
1955	249,294	8.73	33,693	30.4	43	12.0	--	--	172,000	182.5	1	0.3	--	--	17,253	1,466.5	2,000	0.01	7,082	625.3
1956	204,300	7.33	26,700	24.1	3,414	837.0	134,400	150.0	--	--	1	0.3	--	--	17,934	1,829.3	--	--	7,200	711.5
1957	215,467	7.54	28,862	26.0	5,461	1,349.0	71,120	80.0	--	--	9	3.0	--	--	15,479	1,377.6	--	--	4,207	431.0
1958	186,000	6.53	24,000	22.0	3,380	774.0	--	--	--	--	--	--	--	--	10,284	647.9	10,000	0.03	--	--
1959	171,000	5.99	22,000	20.0	3,750	852.0	--	--	--	--	--	--	--	--	10,698	770.3	72,000	0.04	--	--
1960	180,000	6.30	23,000	21.0	4,450	938.0	W	W	--	--	--	--	--	--	13,352	1,054.8	82,000	0.04	--	--
1961	114,228	3.99	--	--	4,080	816.0	--	--	--	--	--	--	--	--	16,133	1,274.5	184,000	0.06	--	--
1962	165,142	5.78	--	--	3,843	711.0	--	--	--	--	--	--	--	--	12,520	951.5	--	--	--	--
1963	99,000	3.48	6,100	9.0	400	76.0	W	W	--	--	5	1.1	--	--	12,322	961.1	--	--	--	--
1964	58,000	2.05	7,200	6.0	303	95.0	46,400	60.3	--	--	--	--	--	--	13,010	1,522.2	22,000	0.01	--	--
1965	43,000	1.51	5,000	6.0	180	104.0	46,400	60.3	--	--	14	4.0	--	--	10,365	1,368.2	64,000	0.03	--	--
1966	27,325	0.96	7,000	9.0	185	101.0	16,000	19.2	--	--	19	4.3	--	--	9,033	1,273.7	--	--	--	--
1967	22,948	0.80	6,000	9.0	161	79.0	20,000	22.0	--	--	--	--	--	--	7,888	1,238.4	W	W	--	--
1968	21,000	0.81	3,000	6.5	156	78.0	6,000	6.0	--	--	--	--	--	--	8,433	1,652.9	--	--	--	--
1969	21,227	0.88	2,000	4.2	238	100.0	94,000	100.0	--	--	2	0.5	--	--	8,500	2,321.2	--	--	--	--
1970	38,400	1.38	4,000	7.0	3,100	1,260.0	365,000	410.0	--	--	--	--	--	--	6,015	925.1	W	W	--	--
1971	34,000	1.36	2,000	4.0	675	285.0	68,000	74.0	34,000	47.0	--	--	--	--	5,407	625.6	--	--	--	--
1972	8,639	0.56	1,000	2.0	125	44.0	160,000	185.0	W	W	--	--	--	--	6,478	985.5	--	--	--	--
1973	15,000	1.86	13,200	22.0	70	52.5	420,000	515.0	10,000	12.0	6	2.0	--	--	5,524	964.5	--	--	--	--
1974	16,000	2.56	1,500	3.5	70	52.5	80,000	95.0	W	W	--	--	--	--	4,351	1,067.0	--	--	--	--
1975	14,980	3.35	6,000	25.0	--	--	120,000	145.0	22,000	60.0	--	--	--	--	3,726	623.3	--	--	--	--
1976	22,887	6.90	6,500	24.0	--	--	160,000	165.0	W	W	14	6.0	--	--	3,212	515.2	--	--	8,000[c]	1,200.0[c]
1977	50,000	7.80	8,000	20.0	--	--	W	W	W	W	--	--	--	--	6,891	1,119.8	--	--	--	--
1978	60,000	12.00	6,000	50.0	--	--	W	W	W	W	--	--	--	--	--	--	--	--	--	--
1979	65,000	18.00	6,500	93.0	--	--	100,000	125.0	100,000	830.0	--	--	--	--	--	--	--	--	--	--
1980	75,000	32.00	7,500	111.0	--	--	--	--	120,000	984.0	31	29.0	--	--	--	--	--	--	--	--
1981	134,200	55.20	13,420	111.3	W	W	--	--	106,000	700.0	--	--	--	--	900	200.0	--	--	--	--
1982	175,000	69.90	22,000	198.0	--	--	--	--	198,000	1,365.0	--	--	--	--	W	W	--	--	--	--
1983	169,000	67.60	33,200	332.0	--	--	22,400	45.0	215,000	1,100.0	--	--	--	--	W	W	--	--	--	--
1984	175,000	62.13	20,000	159.0	5	1.5	135,000	225.8	225,000	400.0	--	--	--	--	W	W	--	--	--	--
1985	190,000	61.18	28,500	171.0	27	10.0	65,000	98.0	300,000	650.0	--	--	--	--	--	--	--	--	--	--
1986	160,000	60.80	24,000	134.4	12	2.8	45,000	67.5	340,000	890.0	--	--	--	--	W	W	--	--	--	--
1987	229,707	104.51	54,300	391.0	--	--	--	--	288,000	460.0	--	--	--	--	W	W	--	--	--	--
1988	265,500	112.84	47,790	282.0	W	W	--	--	300,000	950.0	--	--	--	--	25	13.8	--	--	--	--
1989	284,617	108.70	5,211,591	27,300.0	--	--	--	NR	194,000	672.0	9,585	7,700.0	19,843	29,400.0	--	--	--	--	--	--
1990	231,700	89.20	10,135,000	50,675.0	--	--	--	--	57,000	200.0	44,220	30,954.0	181,200	253,680.0	--	--	--	--	--	--
1991	243,900	88.29	9,076,854	39,110.0					6,800	22.1	69,591	33,403.7	278,221	278,221.0	15	5.3	--	--	--	--
1992	262,530	88.46	9,115,755	34,913.0	--	--	--	--	1,500	5.9	68,664	31,585.0	274,507	301,957.7	--	--	--	--	--	--
1993	191,265	68.64	5,658,958	24,333.0	--	--	--	--	21,000	50.6	38,221	13,759.6	268,769	236,516.7	3	1.2	--	--	--	--
1994	182,100	70.29	1,968,000	10,391.0	--	--	--	--	--	--	36,447	25,512.9	329,003	296,102.7	5	2.1	--	--	--	--
1995	141,882	56.04	1,225,730	6,655.0	--	--	--	--	--	--	58,098	34,428.6	359,950	345,552.0	1	0.4	--	--	--	--
1996	161,565	62.62	3,676,000	19,078.0	--	--	--	--	--	--	70,086	52,284.0	366,780	361,646.0	2	0.8	780,000	0.80	--	--
1997	590,516	207.29	14,401,165	70,710.0	--	--	--	--	--	--	88,560	49,593.0	419,097	494,888.0	--	--	3,440,000	3.54	--	--
1998	594,191	174.62	14,856,000	82,154.0	--	--	--	--	--	--	102,887	49,386.0	549,348	505,400.0	--	--	3,800,000	2.85	--	--
1999	517,890	144.26	16,467,000	85,628.0	--	--	--	--	--	--	125,208	57,596.0	643,642	630,769.0	--	--	4,200,000	3.00	--	--
2000	546,000	152.39	18,226,615	90,404.0	--	--	--	--	--	--	123,224	51,754.0	669,112	682,494.0	--	--	2,800,000	2.30	--	--
2001	550,644	149.25	16,798,000	73,408.0	--	--	--	--	--	--	127,385	56,049.0	634,883	507,907.0	--	--	2,800,000	1.99	--	--
Other[c]	--	--	--	--	1,438	--	--	--	--	--	--	--	--	--	71,946	17,091.9	--	--	--	--
TOTAL	**36,338,954**	**2,890.37**	**146,834,533**	**631,106.0**	**40,945**	**9,910.5**	**11,070,800**	**6,655.1**	**7,287,700**	**12,523.5**	**988,476**	**497,014.9**	**4,995,033**	**4,924,534.6**	**668,548[d]**	**65,815.7**	**1,395,613,932**	**242.51**	**39,051**	**3,426.7**

[a]From published and unpublished state and federal documents.
[b]76-lb flask.
[c]Not traceable by year.
[d]Crude platinum; total production of refined metal is about 575,000 oz.
W = Withheld.
-- = Not reported.
t$ = Thousand dollars.
m$ = Million dollars.

APPENDIX H

Production of industrial minerals, coal, and other commodities in Alaska, 1880-2001

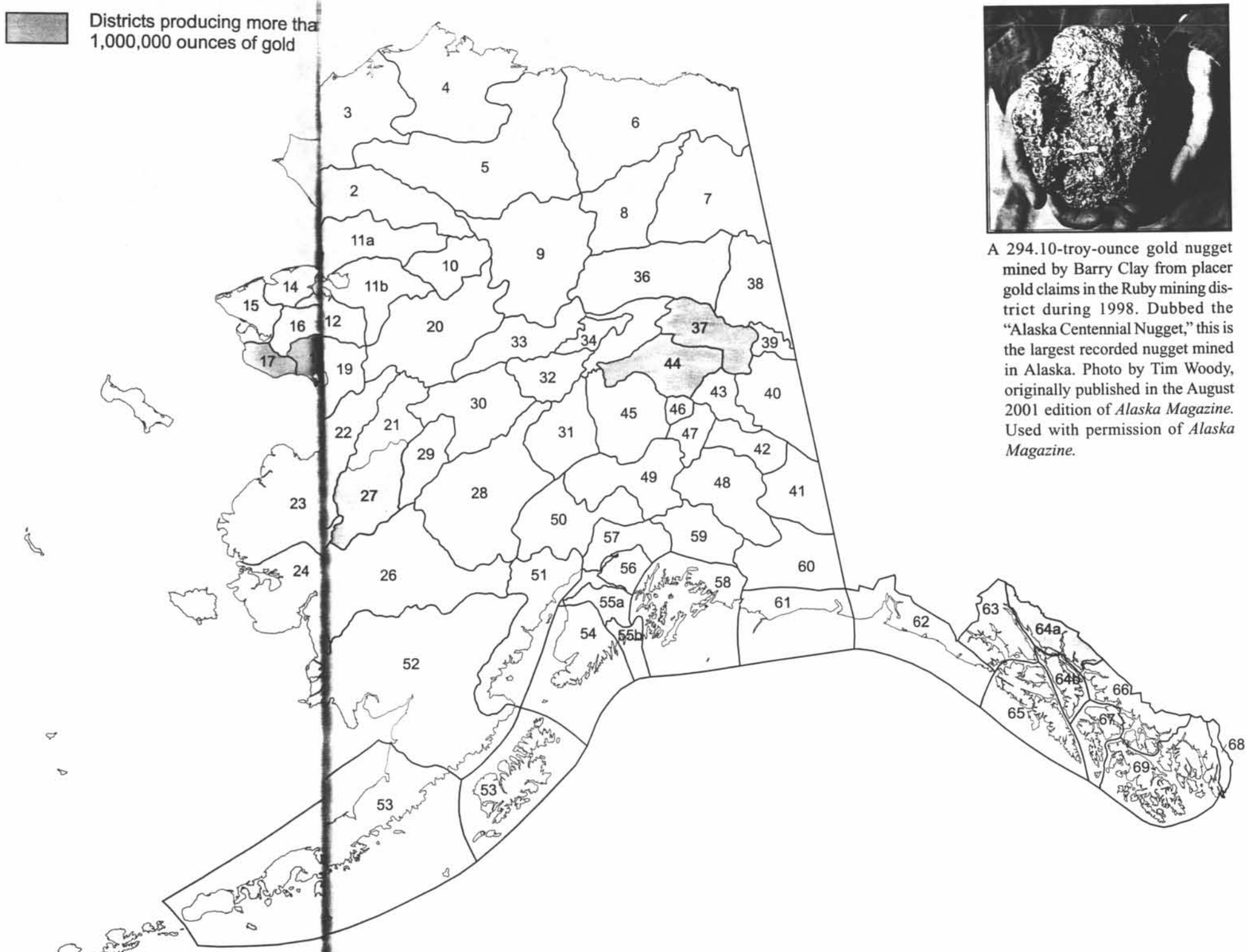
Year	Coal		Sand and gravel		Rock[a]		Barite		Other[b]
	s. tons	m$	s. tons	m$	s. tons	m$	s. tons	t$	$
1880-1899[c]	19,429	0.14	--	--	7,510	0.04	--	--	--
1900	1,200[d]	0.02[d]	--	--	510	0.01	--	--	--
1901	1,300[d]	0.02[d]	--	--	700	0.01	--	--	500
1902	2,212[d]	0.02[d]	--	--	800	0.01	--	--	255
1903	1,447	0.01	--	--	920	0.01	--	--	389
1904	1,694	0.01	--	--	1,080	0.02	--	--	2,710
1905	3,774	0.02	--	--	970	0.02	--	--	740
1906	5,541	0.02	--	--	2,863	0.03	--	--	19,965
1907	10,139	0.05		--	3,899	0.03	--	--	54,512
1908	3,107[d]	0.01[d]	--	--	2,176	0.03	--	--	81,305
1909	2,800	0.02	--	--	1,400	0.01	--	--	86,027
1910	1,000[d]	0.01[d]	--	--	W	W	--	--	96,408
1911	900[d]	0.01[d]	--	--	W	W	--	--	145,739
1912	355[d]	0.01[d]	--	--	W	W	--	--	165,342
1913	2,300	0.01	--	--	W	W	--	--	286,277
1914	1,190	0.01	--	--	W	W	--	--	199,767
1915	1,400	0.03	--	--	W	W	--	--	205,061
1916	12,676	0.05	--	--	W	W	--	--	326,731
1917	54,275	0.27	--	--	W	W	--	--	203,971
1918	75,816	0.41	--	--	W	W	--	--	171,452
1919	60,894	0.35	--	--	50,014	0.29	--	--	214,040
1920	61,111	0.36	--	--	37,044	0.27	--	--	372,599
1921	76,817	0.49	--	--	59,229	0.31	--	--	235,438
1922	79,275	0.43	--	--	54,251	0.30	--	--	266,296
1923	119,826	0.76	--	--	83,586	0.41	--	--	229,486
1924	99,663	0.56	--	--	35,294	0.26	--	--	348,728
1925	82,868	0.40	--	--	32,193	0.19	--	--	454,207
1926	87,300	0.46	--	--	33,283	0.20	--	--	423,000
1927	104,300	0.55	--	--	41,424	0.22	--	--	--
1928	126,100	0.66	--	--	63,347	0.31	--	--	--
1929	100,600	0.53	--	--	54,766	0.26	--	--	194,000
1930	120,100	0.63	--	--	66,234	0.33	--	--	157,300
1931	105,900	0.56	--	--	59,175	0.29	--	--	108,000
1932	102,700	0.53	--	--	54,167	0.27	--	--	223,400
1933	96,200	0.48	--	--	56,291	0.28	--	--	--
1934	107,500	0.45	--	--	64,234	0.36	--	--	46,155
1935	119,425	0.50	--	--	74,049	0.38	--	--	46,755
1936	136,593	0.57	--	--	76,379	0.38	--	--	45,807
1937	131,600	0.55	--	--	50,057	0.25	--	--	147,048
1938	159,230	0.62	--	--	189,090	0.21	--	--	125,302
1939	143,549	0.60	42,332	0.02	--	--	--	--	--
1940	170,174	0.88	515,011	0.10	--	--	--	--	--
1941	241,250	0.97	530,997	0.09	--	--	--	--	1,367,000
1942	246,600	0.99	W	W	--	--	--	--	1,124,000
1943	289,232	1.84	W	W	--	--	--	--	--
1944	352,000	2.37	712,496	0.50	--	--	--	--	2,350,309
1945	297,644	1.87	W	W	--	--	--	--	5,910,704
1946	368,000	2.36	W	W	--	--	--	--	2,005,241
1947	361,220	2.55	W	W	219,000	1.00	--	--	5,927,319
1948	407,906	2.79	W	W	67,341	0.33	--	--	1,257,699
1949	455,000	3.60	W	W	W	W	--	--	7,181,886
1950	421,455	3.03	3,050,020	2.38	W	W	--	--	2,100,000
1951	494,333	3.77	6,818,000	3.54	W	W	--	--	3,600,000
1952	648,000	5.77	6,817,800	3.54	W	W	--	--	9,052,000
1953	861,471	8.45	7,689,014	5.08	47,086	0.17	--	--	1,231,350
1954	666,618	6.44	6,639,638	6.30	283,734	0.47	--	--	1,572,150
1955	639,696	5.76	9,739,214	8.24	265,740	0.29	--	--	1,552,427
1956	697,730	6.37	9,100,000	8.30	50,000	0.02	--	--	1,551,500
1957	842,338	7.30	6,096,000	8.79	528,000	1.95	--	--	2,751,000
1958	759,000	6.93	4,255,000	3.87	615,000	2.07	--	--	695,000
1959	602,000[d]	5.88[d]	5,600,000	5.10	54,000	0.20	--	--	1,338,000

Year	Coal		Sand and gravel		Rock[a]		Barite		Other[b]
	s. tons	m$	s. tons	m$	s. tons	m$	s. tons	t$	$
1960	669,000[d]	5.95[d]	5,892,000	5.35	80,000	0.30	--	--	975,000
1961	650,000[d]	5.87[d]	5,241,000	4.19	--	--	--	--	--
1962	675,000[d]	6.41[d]	5,731,000	5.36	--	--	--	--	--
1963	853,000	5.91	16,926,000	22.01	W	W	W	W	2,589,000
1964	745,000	5.01	26,089,000	18.49	W	W	W	W	4,912,000
1965	860,000[d]	5.88[d]	29,959,000	33.93	W	W	W	W	5,296,000
1966	927,000	6.95	17,457,000	21.79	W	W	44,000	350.0	6,167,000
1967	930,000	7.18	22,300,000	26.25	W	W	W	W	4,924,000
1968	812,000[d]	5.03[d]	17,515,000	20.73	W	W	91,000	W	4,117,000
1969	728,000[d]	4.65[d]	16,205,000	18.62	1,954,000	3.90	90,000	850.0	5,163,000
1970	786,000[d]	5.28[d]	20,375,000[d]	26.07[d]	6,470,000	10.01	134,000[d]	1,875.0	7,994,000
1971	748,000[d]	5.05[d]	26,391,000	41.99	2,658,000	5.07	102,000[d]	1,075.0	--
1972	720,000[d]	6.26[d]	14,187,000	15.21	652,000	3.01	W	W	--
1973	700,000[d]	6.23[d]	19,350,000	19.01	5,967,000	12.00	112,000	1,792.0	12,846,000
1974	700,000	7.34	118,740,000[d]	240.94[d]	5,484,000	12.95	110,000	1,895.0	14,495,000
1975	766,000	7.81	48,145,000	95.78	8,877,000	26.65	2,000[d]	30.0	12,731,000
1976	705,000	8.00	74,208,000[d]	204.73[d]	6,727,000	20.09	W	W	14,019,000
1977	780,000[d]	12.00[d]	66,126,000	134.25	4,008,000	17.47	--	--	14,486,000
1978	750,000	15.00	51,100,000	122.00	3,437,000	14.65	22,000	750.0	--
1979	750,000	16.00	50,900,000	104.90	3,650,000	15.45	20,000	800.0	930,000
1980	800,000	16.00	40,000,000	86.00	3,700,000	15.40	50,000	2,000.0	97,500
1981	800,000	17.60	46,000,000	88.20	4,200,000	19.30	--	--	256,000
1982	830,000	18.00	45,000,000	91.00	3,400,000	15.60	--	--	150,000
1983	830,000	18.00	50,000,000	105.00	5,270,000	25.00	--	--	242,000
1984	849,161	23.75	27,000,000	95.00	2,700,000	16.00	--	--	875,875
1985	1,370,000	39.73	28,184,080	112.06	2,500,000	12.00	--	--	559,000
1986	1,492,707	40.10	20,873,110	75.76	4,200,000	20.32	--	--	384,800
1987	1,508,927	42.35	16,696,374	42.66	1,805,000	11.62	--	--	388,400
1988	1,551,162	44.30	17,264,500	48.75	3,600,000	24.65	--	--	389,000
1989	1,452,353	41.46	14,418,000	39.88	2,914,000	20.34	--	--	1,492,000
1990	1,576,000	44.99	15,013,500	40.82	3,200,000	22.10	--	--	400,000
1991	1,540,000	39.00	14,160,011	45.45	3,000,000	22.50	--	--	462,000
1992	1,531,800	38.30	14,599,746	42.20	2,900,000	22.97	--	--	430,000
1993	1,586,545	38.10	13,162,402	40.64	3,561,324	26.21	--	--	465,000
1994	1,490,000	36.75	13,518,321	40.95	3,843,953	27.04	--	--	459,500
1995	1,640,000	41.30	9,847,550	30.89	2,811,152	22.13	--	--	182,500
1996	1,481,000	38.00	9,890,463	32.20	3,000,045	23.56	--	--	200,000
1997	1,446,000	38.05	13,800,000	51.91	3,200,000	20.00	--	--	217,000
1998	1,339,000	35.23	12,363,450	57.28	1,636,200	14.04	--	--	215,000
1999	1,560,000	41.05	10,600,000	52.42	1,640,000	18.01	--	--	--
2000	1,473,355	38.77	10,600,000	49.86	5,200,000	36.59	--	--	--
2001	1,537,000	48.11	10,360,000	55.22	3,091,000	27.18	--	--	--
Other[d]	--	--	--	--	2,300,000[e]	W	79,000	W	--
TOTAL[f]	**57,184,355**	**1,018.86**	**1,173,794,000**	**2,561.60**	**127,024,000**	**616.60**	**856,000**	**11,417.00**	**177,761,872**

[a]Building-stone production figures for 1880-1937 are for the southcentral and interior regions of Alaska only.
[b]Includes 2.4 million lb U_3O_8 (1955-71); 505,000 tons gypsum (1905-26); 286,000 lb WO_3 (intermittently 1916-80); 94,000 lb asbestos (1942-44); 540,000 lb graphite (1917-18 and 1942-50); and undistributed amounts of zinc, jade, peat, clay, soapstone, miscellaneous gemstones, and other commodities (1880-1993).
[c]Production not traceable by year.
[d]When state (territorial) and federal figures differ significantly, state figures are used. Figures for sand and gravel production in 1974 show state estimates (118,740,000 s. tons; 240.94 m$) and federal (42,614,000 s. tons; 88.96 m$). The federal estimate was not added to total production.
[e]Marble quarried on Prince of Wales Island, southeastern Alaska (1900-41).
[f]Rounded to nearest 1,000 ton.
m$ = Million dollars.
t$ = Thousand dollars.
-- = Not reported.
W = Withheld.

NOTES

	Mining districts[a]	Total production	Placer	Lode
1.	Lisburne district	0	0	0
2.	Noatak district	7,800	7,800	0
3.	Wainwright district	0	0	0
4.	Barrow district	0	0	0
5.	Colville district	0	0	0
6.	Canning district	0	0	0
7.	Sheenjek district	0	0	0
8.	Chandalar district	65,860	48,460	17,400
9.	Koyukuk-Nolan district	344,298	344,298	0
10.	Shungnak district	15,000	15,000	0
11.	Squirrel River district	40,600	40,600	0
12.	Fairhaven-Inmachuk district	348,089	348,089	0
13.	Candle district	253,720	253,720	0
14.	Serpentine district	4,220	4,220	0
15.	Port Clarence district	42,351	42,351	0
16.	Kougarok district	176,776	176,776	0
17.	Cape Nome district	4,984,343	4,984,343	0
18.	Council-Solomon district	1,046,513	1,019,513	27,000
19.	Koyuk district	84,132	84,132	0
20.	Koyukuk-Hughes district	254,444	254,444	0
21.	Kaiyuh district	105,343	5,400	99,943
22.	Anvik district[b]	0	0	0
23.	Marshall district	124,506	124,506	0
24.	Bethel district	42,945	42,945	0
25.	Goodnews Bay district	29,700	29,700	0
26.	Aniak-Tuluksak district[c]	583,423	583,423	0
27.	Iditarod district	1,562,674	1,559,744	2,930
28.	McGrath-McKinley district	329,393	132,494	196,899
29.	Innoko-Tolstoi district	726,869	726,713	156
30.	Ruby-Poorman district	477,477	477,477	0
31.	Kantishna district	99,307	91,401	7,906
32.	Hot Springs district	577,316	577,316	0
33.	Gold Hill-Melozitna district[d]	11,929	11,929	0
34.	Ramparts district	196,699	196,699	0
35.	Tolovana-Livengood district	529,466	529,466	0
36.	Yukon Flats district	0	0	0
37.	Circle district	1,058,443	1,058,443	0
38.	Black district	0	0	0
39.	Eagle district	52,000	52,000	0
40.	Fortymile district	546,434	546,434	0
41.	Chisana-Nabesna district	144,500	78,000	66,500
42.	Tok district	280	280	0
43.	Goodpaster district	2,350	2,050	300
44.	Fairbanks district	10,347,434	8,169,989	2,177,445
45.	Bonnifield district	82,650	75,950	6,700
46.	Richardson district	120,940	118,640	2,300
47.	Delta River district	6,740	6,740	0
48.	Chistochina district	181,842	181,842	0
49.	Valdez Creek district	508,554	506,973	1,581
50.	Yentna-Cache Creek district	197,690	197,690	0
51.	Redoubt district	105	105	0
52.	Illiamna-Bristol Bay district	1,570	1,570	0
53.	Kodiak-Unga Island district	112,400	4,800	107,600
54.	Homer district	16	16	0
55.	Hope-Sunrise & Seward district	132,412	67,412	65,000
56.	Anchorage district[e]	0	0	0
57.	Willow Creek-Hatcher Pass district	666,057	57,057	609,000
58.	Prince William Sound district	137,715	[illegible]	137,700
59.	Nelchina district	14,115	14,115	0
60.	Nizina district	148,500	148,500	0
61.	Yakataga district	18,040	18,040	0
62.	Yukutat district[f]	13,200	2,200	11,000
63.	Porcupine district	81,440	81,440	0
64.	Juneau & Admirality districts	7,680,652	80,000	7,600,652
65.	Chichagof district	770,000	0	770,000
66.	Petersburg-Sumdum district	15,000	15,000	0
67.	Kupreanof district	0	0	0
68.	Hyder district	219	219	0
69.	Ketchikan district	62,000	4,000	58,000
	SUBTOTAL	**36,168,491**	**24,202,479**	**11,966,012**
	Undistributed[g]	154,142		
	Total production (troy ounces)	**36,322,633**		



A 294.10-troy-ounce gold nugget mined by Barry Clay from placer gold claims in the Ruby mining district during 1998. Dubbed the "Alaska Centennial Nugget," this is the largest recorded nugget mined in Alaska. Photo by Tim Woody, originally published in the August 2001 edition of *Alaska Magazine.* Used with permission of *Alaska Magazine.*

[a]Mining district names and boundaries revised slightly from those defined by Ransome and Kerns (1954) and Cobb (1973). Sources of data: U.S. Geological Survey, U.S. Bureau of Mines, and Territorial Department of Mines records 1880–1930; U.S. Mint records 1930–1969; State of Alaska production records 1970–2001. Entries of "0" generally mean no specific records are available.

[b]Included in Marshall district.

[c]Includes Georgetown and Donlin districts.

[d]Includes Tanana area.

[e]Placer gold included in Willow Creek–Hatcher Pass district.

[f]Includes lode production from Glacier Bay and placer production from Lituya Bay district.

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

Above: Pete Nyren, assisted by Myriam Figueiredo, using a Partner rock saw to take a channel sample of platinum-group-element-bearing (sample averaged 0.32 ounces per ton platinum + palladium) magnetite stringers in pyroxenite at the North Zone prospect on the Union Bay property, southeastern Alaska. Exploration work conducted by Avalon Development Corp. in 2001 for joint-venture partners Quaterra Resources Inc. and International Freegold Mineral Development Inc. *(Photo provided by Avalon Development Corp.)*

Left: Which way to the end of the rainbow? Mining in the Fairbanks mining district leads to new roads built for Kinross Gold Corp.'s Ft. Knox and True North gold mines. *(Photo provided by Kinross Gold Corp.)*

Below: Placer mining by Double J Mining on Napoleon Creek in the Fortymile mining district. *(Photo by David Szumigala.)*