Special Report 57

Alaska's Mineral Industry 2002

View looking north towards American Ridge with an 80-person tent camp and 5,000-foot runway, and valley and hills beyond containing the 23-million-ounce Donlin Creek gold resource. Most of the 2002 drill program at Donlin Creek was conducted in the valley of American Creek between the camp ridge and Lewis Ridge (in the photo's center). Photo courtesy of NovaGold Resources Inc.

Division of Geological & Geophysical Surveys
in cooperation with
Division of Community & Business Development
Division of Mining, Land & Water

Alaska's Mineral Industry 2002

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

Division of Geological & Geophysical Surveys

SPECIAL REPORT 57

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EXECUTIVE SUMMARY

Alaska's Mineral Industry 2002 is the twenty-second in a series of annual reports. This report is part of a cooperative venture between the Division of Geological & Geophysical Surveys (DGGS) and the Division of Mining, Land, & Water (DMLW) in the Department of Natural Resources (DNR) and the Division of Community & Business Development (DCBD) in the Department of Community & Economic Development (DCED).

The 2002 cumulative value of Alaska's mining industry is $1.073 billion, an increase of $50 million from the $1.022 billion reported in 2001. There was a 10 percent increase in exploration investment from 2001 ($26.5 million in 2002 versus $23.8 million in 2001). The 58 percent decrease in mineral development investment to $34.1 million in 2002 compared with the $81.2 million reported in 2001 was more than offset by the $100 million increased value of mineral products. Alaska's mineral production value was $1.01 billion, rebounding from the 2001 value of $917 million. Metals, with a value of $823 million, accounted for 81 percent of total production; and zinc continued to be the most valuable metal in terms of total revenue generated.

Total minerals industry employment in 2002 was 2,824 full-time-equivalent jobs, a drop of 11 jobs from the 2,835 jobs reported in 2001. Declines were mostly in the development sector, counteracted by an increase in the lode gold mining and industrial minerals sectors.

One thousand five hundred thirty-one new state mining claims, 57 new state prospecting sites, and 261 new federal claims were staked in 2002. State claim staking increased from 2001 levels, while the number of new federal mining claims was the lowest in the past 10 years. Land under claim in Alaska continued to drop from 1999 levels, with approximately 2.6 million acres of land covered by claims and prospecting sites in 2002, a 29 percent drop from the 3.7 million acres under claim in 1999.

Drilling was conducted during all phases of mining (exploration, development, and production) and drilling totals for 2002 are 385,290 feet of core drilling and 103,612 feet of reverse-circulation drilling. The southwestern region had the most drilling of all Alaska regions, followed by the eastern interior and the southeastern regions.

Exploration during 2002 occurred across most regions of the state, with almost half of the exploration funds spent in southwestern Alaska. The eastern interior region saw a sharp reduction in activity, while the Seward Peninsula experienced a rebirth in activity. Several large projects accounted for most of the exploration expenditures and drill footage: Donlin Creek gold project (NovaGold Resources Inc.); Pebble copper–gold project (Northern Dynasty Minerals Ltd.); Greens Creek mine exploration (Kennecott Minerals Co./Hecla Mining Co.); and Fairbanks mining district gold projects (Kinross Gold Corp.). Gold remained the major exploration commodity, with more than $17 million spent on exploration in 2002, although polymetallic exploration increased from recent levels. More than 72 percent of the exploration funds were derived from Canadian sources.

The decline in development investment mainly reflects completion of ongoing projects at Red Dog Mine in northern Alaska, but small projects were reported at the Fort Knox/True North complex, Usibelli Coal Mine, and Pogo Project in the interior, and at Kensington and Greens Creek mines in southeastern Alaska. Production at Greens Creek Mine reached record levels, and was robust at Fort Knox and Red Dog mines. The placer gold production level of 22,000 ounces was comparable to that of the previous year.

In government actions, the federal Mine Safety and Health Administration (MSHA) presented True North Mine with a Sentinels of Safety Award. Ray Lester and the U.S. Bureau of Land Management (BLM) received awards from DNR for reclamation activities. DGGS conducted a detailed, 300-person-day geologic mapping project in the Salcha River–Pogo (SRP) geophysical tract in the Big Delta Quadrangle. DGGS also contracted an airborne geophysical survey in the Council area east of Nome and released results of surveys flown in 2001 in the southeastern Pogo, Broad Pass, and Liberty Bell areas. Airborne geophysical surveys funded by BLM and managed by DGGS were flown in the southern Delta River area (Denali Block) west of Paxson, and in the Red Devil–Sleetmute area of southwestern Alaska. The U.S. Geological Survey (USGS) continued metallogenic studies at the Red Dog deposit, collected geochemical samples in southwestern Alaska including water samples in Donlin Creek and the surrounding area, and conducted gravity and magnetic geophysical studies on the Talkeetna Mountains Transect Project. BLM conducted a 7-week field program in the southern part of the Delta River mining district of eastern and southcentral Alaska.

GOVERNOR'S FOREWORD

For the seventh consecutive year the mineral industry in our state has contributed more than $1 billion to the Alaskan economy. While this is a noteworthy accomplishment in its own right, the fact that it has occurred during a serious downturn in the global economy is truly significant and a real testament to the hard working men and women of the Alaska mineral industry. I congratulate all of the state's miners and explorers on their remarkable accomplishment.

Alaska has a long and illustrious mining heritage. From the earliest gold seekers right up through today's high-tech mining operations, the discovery and production of minerals has been a significant part of Alaska's economy. I am proud of the hard working men and women of our mineral industry for the contributions they continue to make to Alaska and its future. As Governor I am dedicated to making sure unnecessary permitting procedures, unrealistic standards, and unresponsive administrators do not impede their efforts. I am happy to report that good progress has been made in the last year toward achieving this goal. In September work was completed on the Pogo Mine Environmental Impact Statement. This document will allow federal and state agencies to begin issuing permits for the Pogo Mine north of Delta Junction. This gold mining operation with gold reserves in excess of 5 million ounces will employ 500 people during construction and have a full-time workforce of 300.

While large mines make a significant impact to the State's economy, I will not forget the family-size mining operations scattered across our wonderful state. These outstanding men and women represent the true heart and soul of Alaska's mining heritage. With the growing onslaught of federal mining regulations, these family operations need our help. In the past year the Department of Natural Resources completed work on a Memorandum of Understanding with the federal Bureau of Land Management that will allow our smaller mining operators access to the state bonding pool. This will allow them to fully comply with federal bonding requirements without bankrupting their operations.

While producing mines such as Greens Creek, Usibelli, Fort Knox, and Red Dog are the now of our mining economy, exploration is the key to the future. During a recent trip to Fairbanks, I was reminded of the old saying that if you want to go elephant hunting you have to go where the elephants are. When it comes to mineral resources, Alaska is elephant country. The world's mining companies know this and it is reflected in their continued evaluations at Donlin Creek, Pebble, and Kensington. Additional exploration continues as well in the Fairbanks mining district and adjacent to Greens Creek Mine in Southeast Alaska. I would remind everyone that as far as the mineral explorationist is concerned, Alaska is still a brand new province. In the 105 years since the Fortymile mining district was established (Alaska's first), the true mineral potential of our 365 million acres has only been scratched.

The Alaska mining industry is not immune to the world's economic conditions and we will always remain challenged by our climate and lack of infrastructure. Regardless of the barriers, I foresee a bright future for mining in Alaska. In the final analysis we have the resources and we have the people who know how to mine them. The combination of big mineral reserves and big Alaskan hearts will keep our state right at the forefront of mineral development for decades to come.

Governor Frank H. Murkowski

COMMISSIONERS' FOREWORDS

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

The mission of DCED is to promote responsible development of Alaska's resources, including the state's mineral resources, both through promotion, and by investment in infrastructure through the Alaska Industrial Development and Export Authority (AIDEA). AIDEA has invested in the Red Dog Mine road and port, the coal loading facility in Seward, and the ore loading facility at Skagway. It has also participated in several projects to enhance the energy infrastructure of the state.

In 2002, for the seventh consecutive year, the total value of the industry exceeded $1 billion, despite base metal prices that were the lowest in many years. The rising price of precious metals in the latter part of the year bodes well for the future profitability of mines that have struggled with low prices for the past five years. For the first time in several years industrial mineral production, especially of sand and gravel, showed a marked increase due to many public works projects.

Existing projects provided about 2,800 well paid jobs in 2002, and with the Pogo gold project north of Delta Junction, and the Kensington gold project north of Juneau in the advanced permitting process, there are likely to be several hundred more jobs available in the near future. Many of the mines are in remote areas, where jobs are scarce.

In the longer term, the Nixon Fork Mine near McGrath, prospects such as Donlin Creek and Pebble Copper in southwestern Alaska, Rock Creek gold property north of Nome, and numerous prospects along the south flank of the Brooks Range promise an exciting mining future in the state. *Edgar Blatchford, Commissioner, Department of Community & Economic Development*

I join Governor Murkowski in congratulating the miners and explorers in Alaska for exceeding the billion-dollar mark for the seventh consecutive year. I believe that with the leadership from the Governor, along with the restructuring that has been completed in state government, we will experience a vital and exciting period of growth for the mining industry in our state.

In the last six months, changes to the permitting process have been made with the transfer of the Alaska Coastal Management Program and Division of Habitat to DNR. The department will continue to coordinate the permitting of all mine projects, large and small. We will build on the experience we have gained in past years and continue to improve the cooperative permitting environment.

Perhaps the most significant achievement of the past year is the publication of the final EIS for the Pogo gold project, near Delta Junction. At this writing, State and federal agencies are preparing to issue all necessary permits for this project. This high-grade, underground gold mine, situated entirely on state land, is the most exciting new mine development project to be permitted in Alaska in almost a decade. Pogo will add value to the industry in the coming years by providing hundreds of new, high-paying jobs and generating new revenues for the state. In addition, permitting efforts for expansions at Greens Creek mine are being finalized and work is in progress to update permits for the Red Dog zinc mine.

The conveyance of the eastern portion of the Denali Block to state ownership was completed in January. This area has displayed high potential for the discovery of platinum-group metals. We will pursue the conveyance of additional lands in this area, and in other mineral districts that have potential for significant mineral occurrences.

Coal continues to represent an important part of Alaska's mining industry with considerable potential. We are very pleased that Usibelli Coal Mine will once again be shipping coal from Seward to South Korea. In addition, HB 283 was passed by the Legislature that doubled the allowable acreage for coal leasing by a company.

Geophysical data for the Sleetmute quad were released in June, the most recent installment in providing useful geologic and geophysical data to encourage exploration efforts in attractive mineral districts throughout the state. DNR will continue to provide useful data to demonstrate our ongoing support for mineral exploration and development in Alaska.

The mining industry provides great potential for Alaska. With gold prices on the rise, we are looking forward to increased placer mining activity as well as resurgence in advanced exploration, development, and permitting activities at the Kensington, Donlin Creek, and Rock Creek properties. In addition, renewed interest is evident in properties such as the Nixon Fork, Pebble, and Little Squaw and at the Tulsequah Chief project in British Columbia.

DNR wants a strong mining industry and will continue to make wise and responsible decisions for the use of Alaska's land and natural resources. *Tom Irwin, Commissioner, Department of Natural Resources*

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Alaska's Mineral Industry 2002

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

INTRODUCTION

This summary of Alaska's mineral industry activity for the year 2002 is the twenty-second in the series of annual reports, and is made possible by information provided through phone interviews, replies to many of the 838 questionnaires sent to participants in the mineral industry, press releases, and other sources of information. This report is part of a cooperative venture between the Division of Geological & Geophysical Surveys (DGGS) and the Division of Mining, Land, & Water (DMLW) in the Department of Natural Resources (DNR) and the Division of Community & Business Development (DCBD) in the Department of Community & Economic Development (DCED). Funds for printing the report are provided by the DCBD.

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 in Alaska per year between 1981 and 2002, as divided between exploration and development investments, and the gross value of the mineral products. Company information is used to define the exploration and development parameters. Average metal prices are calculated from the daily London PM closing price for gold, and from the average weekly spot price on the London Metal Exchange for the other metals. These prices are used to calculate the value of metals produced in the state, but do not take into account the costs of mining or transportation, or smelter charges and penalties.

The 2002 cumulative value of Alaska's mining industry is $1.073 billion, an increase of about $50 million from the $1.022 billion reported in 2001. The 10 percent increase in the exploration investment over the previous year ($26.5 million in 2002 versus $23.8 million in 2001) was counterbalanced by a 58 percent decrease in development investment ($34.1 million in 2002 versus $81.2 million in 2001). The $47.2 million decrease in mineral development investment in 2002 was more than offset by the increased value of mineral products ($1,012.8 million in 2002 compared with $917.3 million in 2001). Alaska's mineral production value was $1,012.8 million, rebounding almost $100 million from the 2001 value of $917 million. Had the price of zinc not declined 12.5 percent from 2001 levels, the gross value of the mineral products would have been nearly $72 million greater.

Exploration during 2002 occurred across most regions of the state, with almost half of the exploration funds spent in southwestern Alaska. More than $17 million was spent exploring on gold and associated precious metal projects across the state. The decline in development investment mainly reflects completion of ongoing projects at Red Dog Mine in northern Alaska, but small projects were reported at the Fort Knox/True North complex, Usibelli Coal Mine, and Pogo in the interior, and at Kensington and Greens Creek mines in

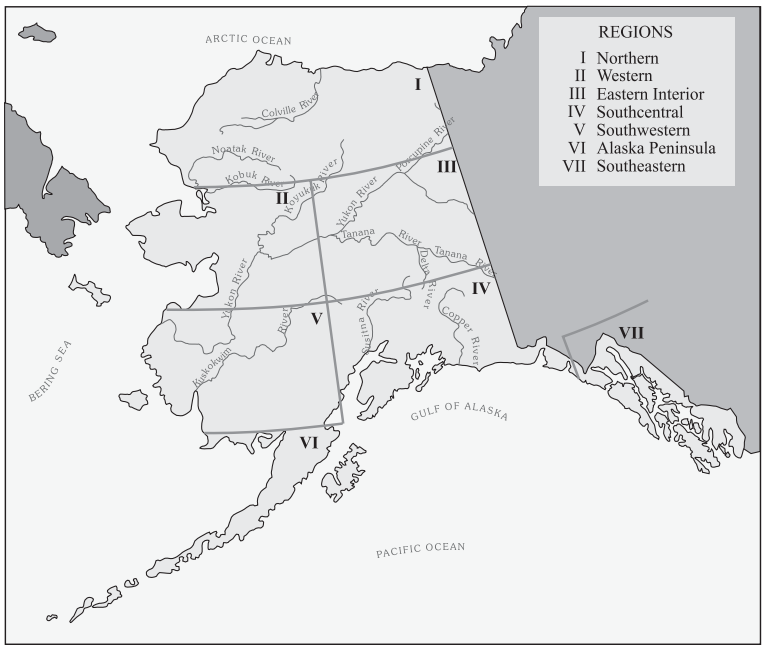

Figure 1. *Regions of mineral activity in Alaska as described in this report.*

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southeastern Alaska. Production at Greens Creek Mine reached record levels, and was robust at Fort Knox and Red Dog Mine. Placer gold production levels were comparable to those of the previous year, and are expected to increase in 2003 corresponding to the rising price of gold.

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	1,119.0
2000	34.9	141.7	1,106.4	1,283.0
2001	23.8	81.2	917.3	1,022.3
2002	26.5	34.0	1,012.8	1,073.3
TOTAL	**$831.8**	**$1,914.9**	**$11,584.4**	**$14,331.1**

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

The total minerals industry employment in 2002 is estimated to be 2,824 full-time-equivalent jobs (table 2; fig.3), a drop of 11 jobs from the 2,835 reported in 2001. Most of the decline was in the development sector, counteracted to some extent by an increase in the lode gold mining and industrial minerals sectors.

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 838 questionnaires in November 2002 and received 148 responses, 37 of which reported no mining activity. Dave Szumigala (DGGS) and Dick Swainbank (DCBD) prepared the body of the text, tables, and appendices with information supplied by many individuals and with the assistance of staff from other agencies. Where appropriate, these people have been acknowledged in the text.

The cover design is by Joni Robinson, and the graphic illustrations are by Fred 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.

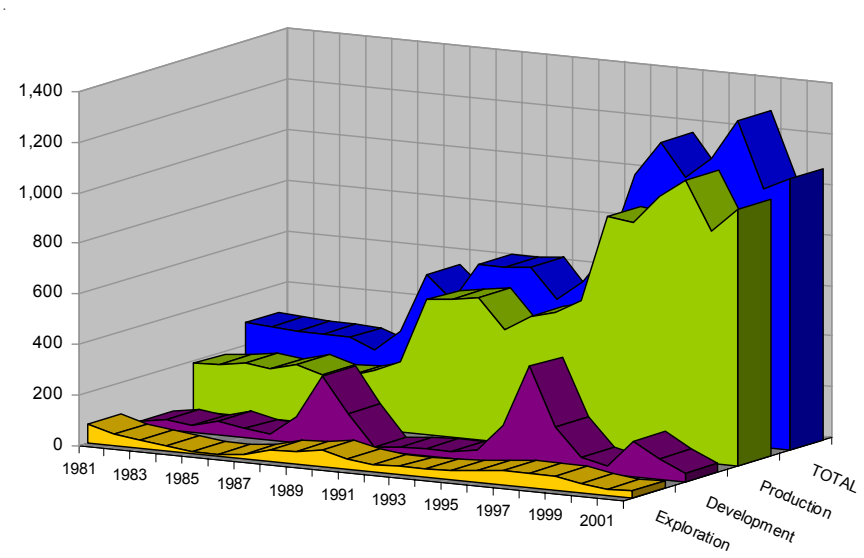


Figure 2. *Alaska's mineral industry total value, 1981-2002.*

Table 2. *Estimated Alaska mine employment, 1996–2002*[a]

	1996	1997	1998	1999	2000	2001	2002
Gold/silver mining							
Placer	825	780	710	591	470	176	148
Lode	138	415	345	296	274	337	413
Polymetallic	68	230	275	275	275	275	262
Base metals	407	478	466	549	556	559	580
Recreational	260	270	255	240	250	210	180
Sand & gravel	598	700	658	590	603	556	702
Rock	149	123	121	128	150	137	177
Coal	115	118	128	121	121	121	100
Peat	38	42	40	38	36	32	21
Tin, jade, soapstone, ceramics, platinum	20	20	20	20	20	20	20
Mineral development	862	409	177	135	345	333	135
Mineral exploration	257	277	282	183	83	79	86
TOTAL	**3,737**	**3,862**	**3,477**	**3,166**	**3,183**	**2,835**	**2,824**

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

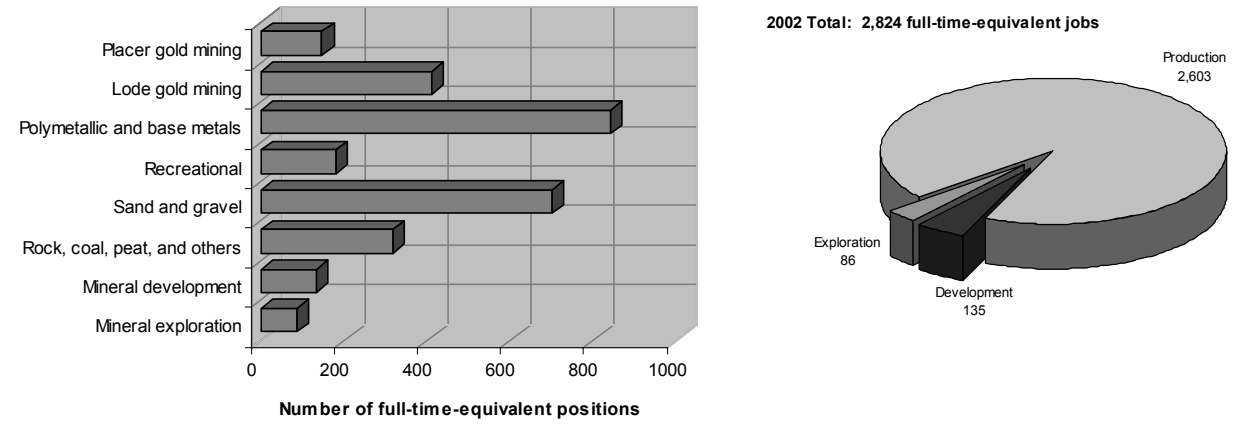


Figure 3. *2002 mineral industry employment by category.*

EXPLORATION

Estimated exploration expenditures in Alaska during 2002 are about $26.5 million, a $2.7 million increase compared to expenditures of $23.8 million in 2001. The value of mineral exploration is still low compared to spending levels in the late 1980s through late 1990s. Exploration expenditures and employment by region are detailed 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. Exploration during 2002 occurred across most regions of the state, with the exception of the Alaska Peninsula area, in which there was no known mineral exploration. Several large projects accounted for most of the exploration expenditures and drill footage: Donlin Creek gold project (NovaGold Resources Inc.), Pebble copper–gold project (Northern Dynasty Minerals Ltd.), Greens Creek mine exploration (Kennecott Minerals Co./Hecla Mining Co.), and Fairbanks mining district gold projects (Kinross Gold Corp.). Almost half of the 2002 Alaska exploration expenditures were spent in southwestern Alaska. The eastern interior region saw a sharp reduction in activity, while the Seward Peninsula experienced a rebirth in activity. Gold remained the major exploration commodity, with over $17 million spent on exploration in 2002, but polymetallic exploration increased from recent levels. As in years past, most exploration funds, more than 72 percent, were derived from Canadian sources.

Table 5 summarizes the number of new and active (new plus existing) claims per year, from 1991 to 2002. The table has been modified to show the number of 20-acre federal

Table 3. *Reported exploration expenditures and employment in Alaska, 2002*

	Northern	Western	Eastern interior	South-central	South-western	South-eastern	Total
			Exploration expenditures				
Placer	$ 18,000	$ 294,000	$ 140,700	$ 135,000	$ 10,000	$ 48,000	**$ 645,700**
Lode	1,600,000	2,656,000	5,631,300	982,000	12,361,000	2,626,000	**25,856,300**
TOTAL	**$1,618,000**	**$2,950,000**	**$5,772,000**	**$1,117,000**	**$12,371,000**	**$2,674,000**	**$26,502,000**
			Exploration employment				
Employment							
Workdays	1,354	2,565	3,650	1,228	13,156	528	**22,481**
Workyears[a]	5.2	9.9	14.0	4.7	50.6	2.0	**86**
Number of companies reporting[b]	4	18	30	21	13	8	**84**

[a]Based on 260-day workyear.
[b]Some companies were active in several areas.
No exploration expenditures or employment reported for Alaska Peninsula in 2002.

Table 4. *Reported exploration expenditures in Alaska by commodity, 1982–2002*

	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	50,000	10,000	1,106,000	**23,773,000**
2002	1,700,000	5,162,000	17,342,000[c]	185,000	- -	2,113,000	**26,502,000**
TOTAL	**$95,908,566**	**$90,183,161**	**$541,742,743**	**$4,841,500**	**$16,887,750**	**$5,802,900**	**$755,366,620**

[a]Polymetallic deposits considered as a separate category for the first time in 1992.
[b]Includes diamonds and tantalum.
[c]Approximately $650,000 spent on platinum-group-element exploration during 2002.
N/A = Not available.
- - Not reported.

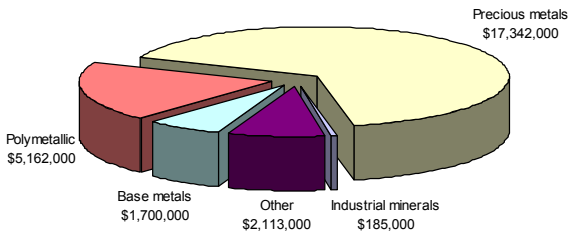


Figure 4. *2002 exploration expenditures by commodity.*

mining claims, 160-acre state prospecting sites, and 40- or 160-acre state mining claims. During 2002, 1,531 new state mining claims (158,320 acres), 57 new state prospecting sites (9,120 acres), and 261 new federal claims (5,220 acres) were staked. State claim staking increased from 2001 levels, while the number of new federal mining claims was the lowest in the past 10 years. The amount of land in Alaska under claim continues to drop from 1999 levels, with approximately 2.6 million acres of land covered by claims or prospecting sites in 2002. This is a drop of 7 percent from 2001 levels, and a 29 percent drop from the 3.7 million acres under claim in 1999.

NORTHERN REGION

Kennecott Exploration Co. planned to conduct mineral exploration, including core drilling, in the Wulik River area near the Lik camp. Previous work in this area during 2001 included collecting in excess of 500 geochemical samples, collecting gravity data from more than 1,500 sites, and mapping the geology of selected sites.

WESTERN REGION

The Seward Peninsula was the center of activity for the western region of Alaska. The major projects in the area are described below. Other exploration projects included work by Greatland Exploration Inc. on the Omalik property and some exploration at several placer gold properties.

NovaGold Resources Inc. and TNR Resources Ltd. finalized a joint-venture agreement to advance the million-ounce gold resource at the Rock Creek property near Nome toward production within the next 3 years. Under terms of the agreement TNR Resources would earn a 49.9 percent interest in the project by spending $10 million on exploration and development to bring the project to production by June 2005. As part of the agreement, TNR Resources will issue 500,000 shares to NovaGold. NovaGold previously released a total Measured and Indicated Resource of 555,000 ounces grading 0.08 ounces per ton gold with an additional Inferred Resource of 303,000 ounces of gold grading 0.081 ounces per ton using a 0.029 ounces per ton cut-off grade, based on work completed by NovaGold, Kennecott, Newmont, and Placer Dome at Rock Creek. The adjacent Saddle deposit contains an additional Inferred Resource of 260,000 ounces of gold grading 0.076 ounces per ton gold using a 0.029 ounces per ton cut-off grade.

The 2002 drill and trench program at Rock Creek was designed to expand the extent of the known gold resource and to complete in-fill core drilling along the higher grade Albion Zone. The drill program consisted of 16 core holes totaling 3,878 feet that successfully intersected targeted shallow high-grade Albion zone and surrounding vein mineralization. Gold grades within these drill holes confirm previous results, and more closely spaced drilling should upgrade some resources to the higher measured and indicated categories. Drilling also extended the overall mineralized zone to longer than 1 mile in strike length. The system remains open along strike and down dip and excellent potential remains to continue to expand the higher grade Albion Zone, as well as to discover new zones with further drilling. Drill highlights from 2002 include: drill hole 101 with 111.6 feet grading 0.047 ounces per ton gold, including 6.6 feet at 0.5 ounces per ton; hole 102 with 200 feet grading 0.044 ounces per ton gold, including 13 feet at 0.15 ounces per ton gold; hole 105 with 288.7 feet grading 0.037 ounces per ton gold, including 32.8 feet at 0.16 ounces per ton gold; drill hole 115 where the entire 344.5-foot hole averaged 0.025 ounces per ton gold and included 26.25 feet grading 0.103 ounces per ton gold with a separate interval of 39.4 feet grading 0.118 ounces per ton gold; and drill hole 116 with 380.6 feet grading 0.05 ounces per ton gold from top to bottom, including 52.5 feet grading 0.09 ounces per ton gold with a separate interval of 91.9 feet grading 0.134 ounces per ton gold.

Approximately 1,500 feet of trenching was completed on the Rock Creek project in 2002. Initial trenching on a broad gold-in-soil anomaly approximately 1,000 feet south of the modeled pit exposed a zone of stockwork veining and disseminated sulfide mineralization. High-grade gold mineralization, up to 39 feet of 0.15 ounces per ton gold, intercepted in trench RKT-104 is more than 400 feet southwest of the currently drilled resource. Also, sampling at the end of Trench RKT-111, more than 150 feet northeast of the modeled pit limit, showed highly anomalous gold and trace-element geochemistry consistent with peripheral Albion zone mineralization. Several other nearby soil anomalies also hold significant potential for similar styles of mineralization and will be targeted for work in 2003.

Navigator Exploration Corp. and Chapleau Resources Ltd. planned a minimum $600,000 drilling program on the Kougarok tantalum–tin prospect in the north-central Seward Peninsula, approximately 67 miles north of Nome, Alaska. The Kougarok property appears to be underlain by a large, multiphase intrusion that incorporates a number of mineralized cupolas formed by tantalum-enriched albite–zinnwaldite granites. Numerous significant drill intercepts of tin and tantalum mineralization in previous work (early 1980s) were encountered from a cupola known as the "main

plug." Surface exploration undertaken by Navigator and Chapleau during 2001 identified new showings at the Hill Top and Real Top prospects elsewhere on the property that were incorporated into the 2002 drilling program.

Five geographically distinct target areas were selected for the 2002 Kougarok work program to test geologic models, evaluate newly discovered mineral showings, and confirm tantalum values reported by Anaconda. In excess of 500 rock samples were collected during a property-wide prospecting program that ran concurrently with the 2002 drilling. Analytical results pertaining to these samples were not released. Approximately 8,000 feet of drilling was completed in seven vertical holes and a total of 259 samples were split for analysis. The holes were collared over an area of about 2 square miles with distances between holes ranging from 700 feet to more than a mile. Each hole encountered anomalous tantalum values at the hanging wall contact (that is, upper surface) of the targeted zinnwaldite granite. Only hole 2002-04, located on the previously untested eastern margin of the main plug, returned potentially economic values of tantalum. Zinnwaldite granite related to the main plug was intercepted between 429 and 1,003 feet. The best intercept within this interval was 347.5 feet grading 0.017 percent tantalum (0.021 percent Ta_2O_5) from 443 to 791 feet, including 184 feet grading 0.021 percent tantalum (0.026 percent Ta_2O_5) from 585.7 to 769 feet and 103 feet grading 0.023 percent tantalum (0.029 percent Ta_2O_5) from 585.7 to 689 feet. The program confirmed the presence of a large, well-preserved, tantalum-bearing granitic system. Given current tantalum prices, however, the economic potential of the deposit appears limited at this time.

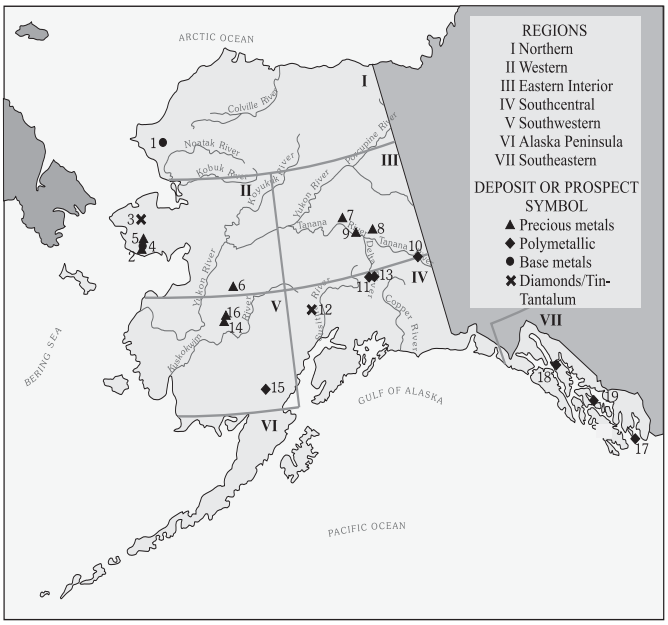
Quaterra Resources Inc. drill tested three road-accessible projects on the Seward Peninsula with drill targets established by coincident gravity and geochemical anomalies. The four diamond drill holes on the properties failed to intercept mineralization. As a result, Quaterra relinquished rights to the Think Zinc, Sinuk River, and Rocky Mountain

I Northern Region
1. Wulik River area—Kennecott Exploration Co.

II Western Region
2. Rock Creek—TNR Resources Ltd./NovaGold Resources Inc.
3. Kougarok—Navigator Exploration Corp./ Chapleau Resources Ltd.
4. Think Zinc/Rocky Mountain Creek/Sinuk River—Quaterra Resources Inc.
5. Divide—Rio Fortuna Exploration Corp.
6. Tolstoi/Boob Creek—3D Mining Inc./ Northern Associates Inc.

III Eastern Interior Region
7. 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—Freegold Ventures Ltd.
8. Pogo—Goodpaster mining district
   a. Gobi-Portal—AngloGold (USA) Exploration Inc./Continental Ridge Resources Inc.
   b. Eagle-Ogo-Fire— AngloGold (USA) Exploration Inc./ Rimfire Minerals Corp.
   c. Rob— Freegold Ventures Ltd.
9. Richardson district—Polar Consulting and Exploration Inc., Tri-Valley Corp.
10. Road Metal—North Star Exploration Inc.

IV Southcentral Region
11. MAN—Nevada Star Resource Corp.
12. Shulin Lake—Golconda Resources Ltd./Shulin Lake Mining Inc./Shear Minerals Ltd.
13. Forbes-Emerick— Northridge Exploration



V Southwestern Region
14. Donlin Creek—NovaGold Resources Inc.
15. Pebble—Northern Dynasty Minerals Ltd./Hunter Dickinson Group Inc.
16. Donlin Creek North— Ventures Resource Corp. Ada—Ventures Resource Corp.

VI Alaska Peninsula Region

VII Southeastern Region
17. Duke Island—Quaterra Resources Inc.
18. Greens Creek—Kennecott Minerals Co./Hecla Mining Co.
19. Woewodski Island—Olympic Resources Group LLC

Figure 5. *Selected exploration projects in Alaska, 2002.*

Table 5. *Summary of claim activity by acres, 1991–2002*

Year	State Claims				State Prospecting Sites		Federal Claims	
	New	New	Total (Active)	Total (Active)	New	Total (Active)	New	Total (Active)
	40 acre	160 acre	40 acre	160 acre				
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
2002	722	809	43,989	2,329	57	2,141	261	8,100

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.

Creek projects. Quaterra retained the 100-percent-owned Big Bar prospect.

On the Sinuk River prospect, a prominent egg-shaped 1.0 milligal gravity anomaly covering a 1,200-foot by 600-foot area and occurring at a depth of about 200 feet below the surface was tested with one vertical core hole. A basalt flow intersected in the drilling accounts for the gravity anomaly. At the Rocky Mountain Creek property, a broad, open-ended gravity anomaly appears to be cut into two blocks by a previously mapped left-lateral fault. The 0.7 milligal anomaly occurs at an estimated 200–300 feet below the surface and appears to be gently dipping to the west. The eastern margin of the zone correlates with outcropping massive-sulfide mineralization in at least three places. A drillhole into the zone intersected an exhalative horizon but did not encounter any massive-sulfide mineralization. Two holes, each 400 feet deep, were drilled at the Think Zinc property to test two gravity anomalies that are coincident with multi-element mobile metal ion anomalies. A monotonous schist sequence was encountered in both drill holes and the gravity anomalies remain unexplained. During 2002, reconnaissance of the Big Bar prospect area identified several localities for a possible airstrip to be used during a proposed 2003 drilling program.

Rio Fortuna Exploration Corp. acquired the road-accessible Divide Project 28 miles north of Nome. Rio Fortuna may earn a 100 percent interest in the property by making cash payments totaling $1 million over a 5-year period and issuing 1 million shares of Rio Fortuna common stock. The property will be subject to a sliding scale net smelter royalty ranging from 2 percent at a gold price of $300 or less per ounce to 5 percent at a gold price of $500 or more per ounce. A large, 0.029 ounces per ton gold-in-soil anomaly lies within the northeastern sector of a larger 8,000 feet by 4,500 feet gold-in-soil anomaly that averages greater than 0.003 ounces per ton. Rio Fortuna drilled 18 holes, totaling 4,452 feet, from eight drill pads to test flat-lying quartz–albite–arsenopyrite veins and silicified zones within a graphitic schist horizon over a strike length of 1,500 feet by 1,000 feet. Silicification was traced through nine out of eleven drill holes. Hole 02RF-5 intersected 39 feet of 0.048 ounces per ton gold. Other gold values in drill samples ranged from 0.007 ounces per ton up to 0.181 ounces per ton in 14 of 18 drill holes. Sample widths ranged from a minimum 6.5 feet to 52 feet.

Rio Fortuna also completed a first phase reconnaissance program on the 24-square-mile Full Auto project, which also is road accessible, 12 miles northwest of Nome. A total of 560 stream sediment, soil, and rock samples have been collected from this area, which is unexplored for lode resources but which has seen placer development on four creeks during the early 1900s. Gold placer concentrates from Hungry Creek contained native bismuth nuggets while it has been reported that gold-bearing native bismuth and scheelite in placer gold concentrates have been found at Nugget Gulch and Oregon Creek.

Altar Resources and subsidiary Royal Pretoria Gold Ltd. continued exploration on gold prospects not joint ventured with other companies. Altar Resources further sampled the "Dripping gold zone" on the Bulk Gold property in 2002. Soil samples ranged up to 0.016 ounces of gold per ton and greater than 1 percent arsenic. A float sample of silicified, arsenopyrite-bearing carbonate from near the highest-grade soil sample contained 0.06 ounces of gold per ton.

3D Mining Inc., with contractor Northern Associates Inc. (NAI), continued some exploration work while placer mining on the Tolstoi (gold–platinum) project in the Mt. Hurst–Boob Creek area northwest of McGrath. At Boob Creek, in the southern part of the property, mineralogical evidence indicates that proximal sources for gold and platinum are being actively eroded to produce the metals recovered during placer mining. Much prospective ground for lode platinum and gold mineralization remains untested.

Exploration for placer gold and platinum was conducted on Boob Creek in the Tolstoi mining district with test placer cuts through 20 to 35 feet of overburden. Most work on the Tolstoi property and Boob Creek was to test the placer potential of gravels beneath approximately 20 to 35 feet of overburden. Placer gold recovered from a test pit measuring 30 feet by 150 feet by 150 feet exhibited highly variable forms from wires to well-rounded grains. The PGE:Au (platinum-group elements to gold) ratio is approximately 1:100 for placer mineralization. Pyrite recovered in the placer concentrates occurs as rounded balls to crystal fragments and as disseminated grains and veins in the underlying, partially silicified mudstone bedrock. A sample of pyrite from placer concentrates assayed 0.90 ounces per ton gold, 0.10 percent arsenic, 0.06 percent copper, and trace amounts of mercury.

EASTERN INTERIOR REGION

The Alaska Division of Geological & Geophysical Surveys (DGGS) conducted a detailed geologic mapping project in the Salcha River–Pogo (SRP) geophysical tract within the Big Delta Quadrangle. Geologic mapping and geochemical sampling were conducted in a 60-day program stretching from the Salcha River near Caribou Creek to the Goodpaster River drainage near the Pogo gold property (fig. 6).

Kinross Gold Corp. continued exploration in the Fairbanks mining district with extensive drilling around the True North gold deposit. A mix of diamond and reverse-circulation drilling at True North continued throughout the year to focus on the conversion of resources to reserves and to outline the limits of mineralization. An aggressive drill-based exploration program was conducted at the Fort Knox pit and surrounding area. In-pit drilling results include 75 feet grading 0.057 ounces per ton gold from the North Wall pushback, 85 feet grading 0.064 ounces per ton gold from the South Wall pushback, and 45 feet grading 0.186 ounces per ton gold from the South Wall pushback. Several drill holes had 5-foot intercepts with grades greater than 1 ounce per ton gold. Kinross also planned to conduct a 6,000- to 8,000-foot, reverse-circulation drill program on the leased Steamboat Creek property. Drilling was planned in the Zone 19, Birch & Anderson, Cabin Creek, and South Ridge areas.

No exploration work was conducted on the Pogo property in 2002. However, Teck Cominco's Pogo gold project in Interior Alaska received its Preliminary Environmental Impact Statement (EIS) from the U.S. Environmental Protection Agency (EPA) and public review is anticipated in early 2003. The EPA draft EIS should be followed by a 60-day public comment period. The State Department of Natural Resources will release its recommendations as an attachment to the draft EIS. Teck completed permitting, condemnation and infill drilling, and feasibility studies during 2002. The company drilled more than 30,000 feet of core as part of an infill- and condemnation-drilling program. If permitting proceeds on schedule, construction may begin by late 2003.

AngloGold (USA) Exploration Inc. conducted a three-hole, 3,569-foot diamond-drilling program on Continental Ridge Resources Inc.'s 351-claim Gobi–Portal property, located 3 miles west of the Pogo deposit owned by Teck Cominco and Sumitomo Metals (fig. 7). AngloGold can earn a 60 percent interest in the Gobi–Portal property from Continental Ridge by making certain cash payments and spending $750,000 on exploration over a 5-year period. Drilling at the Hook target intersected a 330-foot-wide zone of gold mineralization hosted by granodiorite intrusive rocks near their contact with surrounding gneissic metamorphic rocks. Gold occurs in quartz veinlets with occasional calcite, tourmaline, pyrite, and arsenopyrite. Multiple sericite-altered, quartz-veined zones were intersected in hole AGGP-1. The

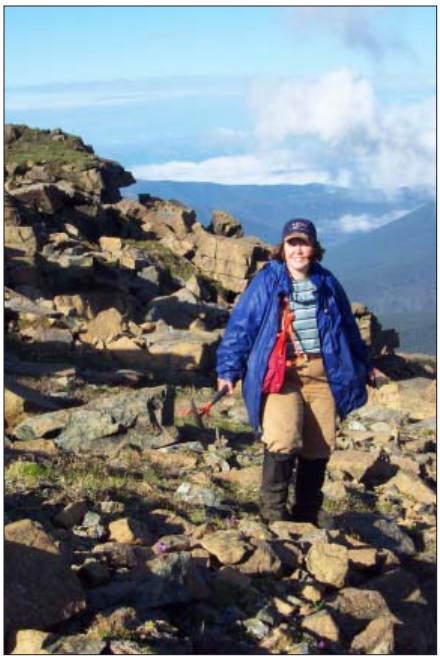


Figure 6. *Jen Athey, geologist with the Alaska Division of Geological & Geophysical Surveys, traverses through a chromite-bearing harzburgite and dunite ultramafic unit on Nail Ridge in the Salcha River–Pogo project area. Photo by Melanie Werdon.*

best assay results returned 0.031 ounces per ton gold over 10 feet, including 0.153 ounces per ton gold over 1.6 feet. Additional drilling is planned for 2003.

AngloGold also signed two option agreements with Rimfire Minerals Corp. to earn up to a 70 percent interest in the Eagle and ER–Ogo–Fire properties. Initially, AngloGold may earn a 50 percent interest in the properties by making exploration expenditures totaling $400,000 per property and paying Rimfire $100,000 per property in staged cash payments over 4 years. AngloGold may increase its interest in the properties to 70 percent by incurring an additional $500,000 in exploration expenditures per property. AngloGold conducted sampling and reconnaissance exploration, including soil auger and rock sampling programs on the properties. A gold-in-soil anomaly, coincident with elevated arsenic, bismuth, and antimony levels, covers a 5,000-foot by 1,000-foot area. An orientation soil auger program was also completed on the Eagle property over the intrusion–gneiss contact east of a grid sampled in 1999. AngloGold North America Inc. also signed an agreement with Zeus Exploration Inc. to earn a 65 percent vested interest in Zeus's West Pogo properties.

North Star Exploration Inc. continued a large exploration program, including drilling, at the Road Metal property near Northway. Tri-Valley Corp. continued gold exploration in the Richardson district. Polar Consulting and Exploration Inc. explored for the lode source of gold that produced placer gold previously mined by Polar Mining Inc. on a ridge between Buckeye and Tenderfoot creeks in the Richardson mining district. Silverado Mines Inc. conducted geochemical and geophysical surveys on the Ester Dome and Marshall Dome properties near Fairbanks.

Freegold Ventures Ltd. (Freegold), formerly International Freegold Mineral Development Inc., acquired the Rob gold project in the Goodpaster mining district, Alaska, a high-grade gold prospect about 20 miles southeast of the Pogo deposit. Freegold has an option to acquire a 100 percent interest in the property subject to payments totaling $29,000 in cash over 7 years, plus payment of 500,000 shares prior to July 2003 and an additional 500,000 shares once Freegold has spent $1 million on exploration. The property is also subject to a 1 percent net smelter return royalty. The Rob property is cut by a series of early N50°E-trending high-angle structures (Double Bear, Gray Lead, and Black Mountain faults) that are cut by younger east–west-trending high-angle structures (such as the Wolverine fault). Most previously discovered precious-metal veins on the property trend parallel to N50°E-trending structures in areas where Cretaceous granitic bodies are present. Limited sampling by Freegold in 2002 returned good results. Gold mineralization at both the Gray Lead and Hilltop prospects is controlled by the northeast-striking Gray Lead fault, which cuts sericite-altered Cretaceous granitic rocks and Paleozoic biotite gneiss. Mineralization is hosted in quartz veins and stockworks containing gold, arsenopyrite, bismuthinite, and an unknown tellurium-bearing mineral. Gold (up to 2.1 ounces per ton) is associated with highly anomalous arsenic (up to 10,000 parts per million), bismuth (up to 1,610 parts per million), and tellurium (up to 180 parts per million) and locally with elevated antimony (up to 1,000 parts per million) and tungsten (up to 495 parts per million). Mineralization on the Michigan, Upper–Lower Trench and O'Reely prospects is hosted in sericite-altered Cretaceous granitic rocks and Paleozoic biotite gneiss. Mineralization at these prospects is hosted in quartz veins, stockworks, and quartz breccias containing visible gold (up to 20.4 ounces per ton) with highly anomalous arsenic (up to 1 percent), antimony (up to 0.1 percent) and lesser bismuth (up to 39 parts per million). Gold mineralization on these prospects does not appear to be associated with elevated bismuth, tellurium, or tungsten, suggesting a genetically different style of mineralization from that seen on the Gray Lead prospect. Coarse visible gold was identified at surface on the Michigan lode and returned values up to 20 ounces gold per ton. This part of the Rob prospect has never been drilled. A single grab sample from unsplit diamond drill core from the Lower Trench prospect returned 0.12 ounces per ton gold from strongly quartz–sericite-altered granitic rock. The extent of this mineralization is unknown.

Figure 7. *Core drilling at the Hook Target on the Gobi–Portal property, Goodpaster River area, eastern Interior region. Exploration during 2002 on this intrusion-hosted gold prospect was funded by AngloGold (USA) Exploration Inc., in a joint venture with Continental Ridge Resources Inc. Photo by David Szumigala.*

Freegold also conducted an exploration program on the Golden Summit property on Cleary Summit in the Fairbanks mining district. Freegold conducted a resistivity survey over the Currey Zone and then dug trenches based on interpretation of the geophysics and previous geochemical sampling. Grab samples of quartz vein material in the trenches returned values up to 6.167 ounces per ton gold while channel sample values ranged up to 10 feet grading 0.125 ounces per ton and 29 feet grading 0.034 ounces per ton. One 5-foot channel sample assayed 0.337 ounces per ton gold. Approximately 100 feet of new backhoe trenching was conducted in a second phase and approximately 30 new channel and grab samples were collected. A trench extension exposed additional mineralization including an 18-inch-thick polyphase quartz vein that contained abundant coarse, visible gold (disseminated and leaf) with assays grading up to 12.5 ounces per ton gold. Grab sample geochemical results ranged from 0.127 to 12.5 ounces per ton gold, with five grab samples containing in excess of 1 ounce per ton gold.

Freegold's Currey Zone trenching program was designed to confirm hole CHD00-1 (64 feet grading 0.138 ounces per ton gold) and to test for continuity of mineralization along strike. The trenching program confirmed that hole CHD00-1 intersected a major system of veins and shear zones carrying significant gold values, the multi vein/shear zone system extends laterally with significantly mineralized widths similar to CHD00-1, and the mineralization "packet" is exposed at surface and is open along strike. Gold mineralization is associated with quartz, quartz–carbonate or quartz–sulfide-bearing veins and with shear zones where quartz volume is relatively low. Most of the mineralized structures mapped in the trenches trend N60°–80°W and dip steeply south. These structures range from quartz veins with no apparent wall rock alteration or shearing to iron oxide-stained, schist-hosted breccia and shear zones up to 100 feet in width containing 1 to 20 percent crushed quartz in pods and veinlets. Bedrock hosting the mineralization consists of highly oxidized quartzite, quartz mica schist, chlorite schist and local actinolite schist cut by quartz, quartz–carbonate and quartz–carbonate–sulfide veins ranging from 1 inch to 25 inches thick. High-grade gold mineralization is associated with elevated arsenic and with sporadic anomalous silver, lead, bismuth, antimony, and tungsten. Based on these results, Freegold intends to carry out a step-out drilling program, possibly 4,000 feet of diamond core drilling in 8 to 10 holes, from the site of drillhole CHD00-1 during the 2003 winter.

In addition to the above exploration programs, Freegold also entered into an agreement with Anglo Alaska Gold Corp. whereby Freegold may earn a 100 percent interest in the Yeager Property adjacent the Golden Summit Property. The acquisition of the Yeager Property increases the Golden Summit land block to approximately 18,000 acres.

Teryl Resources Corp., with Kinross Gold Corp., announced encouraging drilling and surface exploration results at the Gil joint venture property in the Fairbanks mining district. Teryl Resources owns a 20 percent working interest and Kinross Gold owns an 80 percent working interest in the Gil joint venture property. Infill drilling on the Main Gil deposit area at hole GVC02-264 intercepted 220 feet of gold mineralization including 80 feet of 0.06 ounces per ton gold from 20- to 100-foot depth. Infill drilling at the North Gil deposit area succeeded with thick intercepts of significant gold grades in the southwestern portion of the North Gil resource area where previous drilling has been limited. Drillhole GVC02-262 intercepted 15 feet of 0.095 ounces per ton gold at depths from 65 to 80 feet and 10 feet of 0.087 ounces per ton gold from 200 to 210 feet, and drillhole GVC02-263 with four mineralized zones from 5 to 55 feet thick from 75- to 975-foot depths ranging from 0.040 to 0.105 ounces per ton gold. At the Slippery Creek prospect, drillhole GVC02-266 intersected 20 feet of 0.078 ounces per ton gold from 20- to 40-foot depth. A new zone of mineralization was intercepted in the Sourdough Ridge prospect in drillhole GVC02-267 and consists of 15 feet (from 95- to 110-foot depth) of 0.49 ounces per ton gold, including a 5 foot section of 1.34 ounces of gold per ton with anomalous arsenic and bismuth. Mineralization is hosted at the contact between overlying but barren calc–silicate-altered metamorphic rocks in thrust contact with underlying sericite-altered muscovite schist. The high-grade ore zone is hypothesized to be located where an east–west-trending high-angle structure intersects the favorable thrust horizon. Drilling completed this year and in previous years suggests mineralization continues to the northeast, according to consultant Avalon Development. Kinross Gold and Teryl plan additional work in 2003. Teryl Resources Corp. also planned to conduct an exploration and drilling program in early January 2003 on its 100-percent-owned Westridge property and its 50 percent option from Linux Wizardry Systems, Inc. on the Fish Creek property, both in the Fairbanks district.

Our Creek Mining Inc. conducted exploration on their Our Creek gold property, on Old Murphy Dome Road west of the Elliot Highway. The company staked prospecting sites in the North Ridge area including portions of the Old Dog prospect, sampled the Pingo prospect and found porphyritic rock in soil pits along strike of a porphyry dike system with a nearby soil sample assay of 0.014 ounces per ton gold, continued limited geological investigation across the Our Creek holdings, and applied for exploration permits to trench and drill a 4,000-foot-long arsenic–gold soil anomaly at the Line 18 prospect area.

Lockray Mining LLC planned to drill a reverse-circulation drill hole on the Bear Creek Ridge road in the Cleary Summit area of the Fairbanks mining district. No results have been announced. Mines Trust Co., in association

with Piper Capital Inc., continued work on the Golden Zone property, with planned exploration to include trenching and drilling at the Copper King and Long Creek prospects. TriValley Corp. and TsNIGRI announced plans to form a joint stock company to be named Troika Mining Ventures Inc. The new company would pursue high-grade mining opportunities worldwide and one or more of TriValley's Richardson district properties may be included in the new company.

SOUTHCENTRAL REGION

Nevada Star Resource Corp. continued fieldwork during 2002 at its MAN nickel–copper–platinum-group-element (PGE) project near Tangle Lakes and the Denali Highway. Mapping, prospecting, and geochemical sampling were completed over a number of targets in the MAN Project area, including Canwell, East Rainy, Gezzi, Specimen Creek, Broxson Gulch and Bird's Beak. Detailed prospecting, mapping and sampling were also carried out in the area of the West Ridge, Middle Ridge and Odie showing areas. Additionally, three-dimensional modeling of Hummingbird® magnetic data from the Dunite Hill area, combined with geophysical results from the USGS and BLM, resulted in a more comprehensive interpretation of the geology and mineral potential of this high priority target area. Nevada Star is using an exploration model based on Noril'sk-style mineralization.

Nevada Star completed a helicopter-supported drill program on the Canwell portion of the MAN area, to test a linear zone of surface showings known as the West Ridge area (fig. 8). Here, disseminated to net textured sulfides occur in what is believed to be a tabular zone within a gabbroic border phase of a dunite intrusion. The semi-massive to massive sulfide mineralization varies from 0.5 feet to 6 feet thick and is discontinuously exposed along a strike length of approximately 750 feet. Best results from float, grab, and chip samples ranged from 0.11 to 13.68 percent nickel, 0.12 to 4.51 percent copper, 0.001 to 0.147 ounces per ton gold, 0.001 to 0.590 ounces per ton platinum, and 0.008 to 0.500 ounces per ton palladium. Platinum values are greater than palladium values in most of the higher-grade samples. Grab samples of this mineralization contained up to 8.56 percent nickel, 0.86 percent copper, 0.058 ounces of platinum per ton, and 0.098 ounces of palladium per ton.

Highlights from the 2002 drilling program of 958 feet of core drilling in 7 holes on the MAN property include: hole 02-01 in the West Ridge area with 12 feet of mineralization from 5.4 to 17.4 foot depth, containing 0.56 percent nickel, 0.50 percent copper, 0.012 ounces of platinum per ton, and 0.012 ounces of palladium per ton; hole 02-03 in the West Ridge area with 14 feet of mineralization from 5.0 to 19.0 foot depth, containing 0.63 percent nickel, 0.33 percent copper, 0.018 ounces platinum per ton, and 0.019 ounces palladium per ton; and hole 02-06 at the Odie prospect with 12 feet of mineralization from 398 to 410 foot depth, containing 0.56 percent nickel, 0.15 percent copper, 0.003 ounces platinum per ton, and 0.004 ounces palladium per ton. Only three of the seven holes reached target depth. During the drill program, Nevada Star discovered a massive-sulfide occurrence approximately 650 feet along strike from the West Ridge area. A grab sample of this material assayed 13.68 percent nickel, 2.9 percent copper, 0.59 ounces of platinum per ton, 0.26 ounces of palladium per ton and 0.149 ounces of gold per ton. The massive material was observed along a strike length of approximately 65 feet and has a thickness of up to 1 foot, as indicated by slumped massive-sulfide rubble outcrop.

A second zone of mineralization on the Canwell property, Odie, is approximately 1 mile along strike to the northwest from the West Ridge zone. Surface sampling results from the 2002 Nevada Star program at the Odie zone gave 1.25 percent nickel, 0.43 percent copper, 0.004 ounces of platinum per ton, and 0.018 ounces of palladium per ton over a 10-foot-long chip sample. One of two holes drilled at Odie (Hole 02-06) reached the target zone.

An intensive program of mapping, prospecting, and geochemical sampling also focused on the northern or Eureka Block of Nevada Star's 117-square-mile property. Several new nickel–PGE showings were discovered. Exploration was also carried out on the Gezzi copper–gold

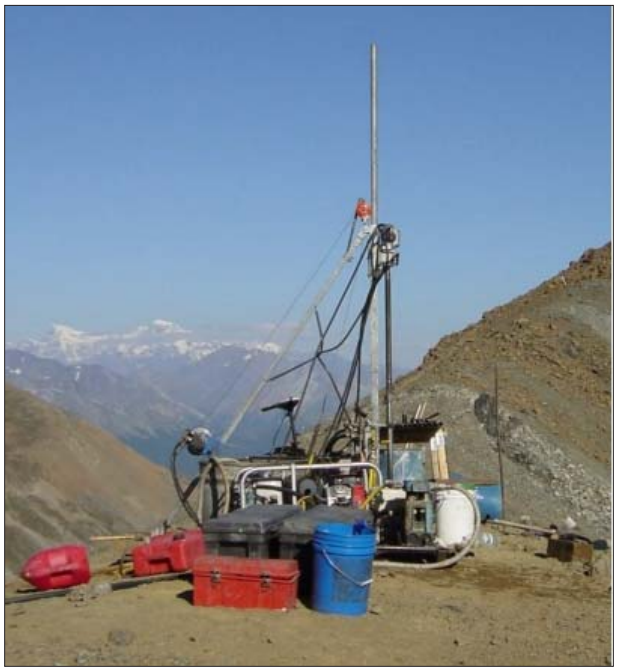


Figure 8. *Core drilling by Nevada Star Resource Corp. on the Canwell nickel–copper–PGE prospect as part of the exploration program on the MAN project. Photo by Peter Bittenbender.*

prospect, an intrusion-hosted deposit with bulk tonnage potential, and the Broxson gold prospect. Sampling along six old (1970s) trenches at the Gezzi prospect show potential for porphyry style, disseminated copper–gold mineralization within a gabbro intrusion. The trenches cover an area approximately 750 feet by 450 feet. The best chip sample collected along the trenches contained 1.42 percent copper and 0.020 ounces per ton gold for 19.7 feet of trench length. Primary mineralization consists of disseminated chalcopyrite, but copper mineralization in the trenches occurs mainly as secondary minerals. Nearby occurrences of copper–gold skarn mineralization in Specimen Creek may be related to the Gezzi copper–gold zone.

Nevada Star also staked 36 new claims (720 acres) to cover a mineralized portion of the Rainy Complex. Nevada Star's claims now cover the entire Rainy mafic–ultramafic complex, one of the largest (12 miles long by up to 1 mile wide) in the MAN project area. The newly acquired claims cover a zone of disseminated to net-textured sulfide mineralization near the footwall of the Rainy Complex, traced in float along a 2,400-foot length. Two grab float samples collected during the past field season had geochemical results of up to 1.15 percent nickel, 1.27 percent copper, 0.02 ounces per ton platinum, 0.035 ounces per ton palladium, and 0.019 ounces per ton gold.

The MAN project area was also the focus of ground and airborne geophysical surveys by the USGS and BLM, as well as regional metallogenic studies by Dr. Larry Hulbert of the Geological Survey of Canada. Results of these studies, to be released in 2003, are expected to add significantly to the understanding of the nickel–PGE mineral potential of the Nikolai intrusive–extrusive complex. These studies will aid in target definition, particularly in the southern Tangle area, where the area is obscured from direct observation by a thin cover of glacial overburden.

Golconda Resources Ltd., as operator and 51 percent owner, with joint venture partners Shear Minerals Ltd. and Shulin Lake Mining Inc., announced what is thought to be the first ever lode diamond discovery in Alaska at their Shulin Lake property in southcentral Alaska near Talkeetna. In the spring of 2002, Golconda drilled 11 holes (totaling more than 4,900 feet), of which the last six holes were core holes into what is interpreted, based on petrographic work, to be a maar-like sequence of interbedded volcaniclastic and tuffaceous rocks containing olivine and pyroxene. The holes were spaced over an area of about 2,000 feet by 1,000 feet and intersected an interfingering sequence of clay-altered tuffs and reworked pyroclastics. The reworked pyroclastics contain fragments of volcanic breccias, pebbles, and mafic to ultramafic fragments, and are thought to represent the crater facies of a volcanic pipe-like structure. The material is interpreted to be locally derived, as most of the fragments are still partly coated with fine-grained tuffaceous material. Golconda interprets the geometry of this unit to show similarities to lamproitic intrusions. Golconda personnel collected a total of 18 random samples from drill holes 8 through 10. Samples were shipped to Lakefield Research for caustic fusion and diamond recovery. A 22-pound sample contained 15 microdiamonds (defined as less than 0.02 inches in one direction with a minimum dimension of 0.004 inches in one direction) and one macrodiamond measuring 0.028 by 0.022 by 0.018 inches. Lakefield characterizes these diamonds as generally being white, transparent, mostly fragments, some with crystal faces, frosted surfaces, and graphite coatings. This sample was taken from hole 10 at a depth from 574 to 609 feet. All 18 samples yielded synthetic diamonds derived from the drilling operation including 44 synthetic diamonds from the diamondiferous sample described above.

Five additional samples from the spring drilling were sent to Lakefield Research for micro-diamond analysis. These samples were taken from drill hole 10 in order to follow up the diamond discovery. One microdiamond was recovered from a sample taken from 562 to 574 feet directly above the diamond-bearing zone. This diamond-bearing interval is described as being a graded sequence of volcaniclastic rock with a thickness of 47 feet.

The Shulin Lake joint venture later completed a second drill program that followed up the diamond-bearing zone. A total of five holes were drilled (02-11 to 02-15) totaling 3,221 feet. The graded horizon similar to that from hole 10 was recognized in several of the new drill holes from which samples will be sent for microdiamond analysis and indicator mineral chemistry. No results were announced from the later drilling.

A review by Golconda of airborne geophysical data from the Shulin Lake property recognized anomalies and structural trends north of the current drilling area that are coincident with features from satellite imagery. One anomaly is a complex circular feature 1.2 miles in diameter interpreted to be a volcanic center (potential pipe) and the source of the diamondiferous volcanic system. No outcrops are present in the area, but two samples spaced about one-quarter mile apart were taken from the bottom of little rivulets. One sample contained mostly granitic components and the other contained mainly volcanic components, but both samples contained fresh single grains of chrome diopside. The joint venture staked additional claims covering 4,500 acres and now controls an area of about 18,000 acres. In February 2003, when the ground is frozen, a bulldozer will dig exploration trenches and drilling will begin shortly thereafter. The geologic context of this diamond discovery continues to be discussed within the Alaskan exploration community.

Kennecott Exploration Co. entered into an agreement with Fort Knox Gold Resources Inc. to explore the GUN state mining claims near Sheep Creek. As part of the exploration, Kennecott planned to drill up to ten core holes. No

results were announced. Northridge Exploration continued exploration for massive-sulfide mineralization on the Forbes–Emerick property near Isabel Pass.

SOUTHWESTERN REGION

News from the Donlin Creek gold project dominated Alaska's exploration sector during 2002. Exploration expenditures on the Donlin Creek property since its discovery in 1988 are greater than $45 million. Gold mineralization is associated with disseminated sulfides, sulfide veinlets, and quartz-carbonate-sulfide veins in sericite-altered igneous dikes and sills and host sedimentary rocks. A new resource announced in early 2002 increased measured and indicated resources to 4.4 million ounces of gold grading 0.152 ounces per ton, and inferred resources to 6.2 million ounces of gold grading 0.152 ounces per ton (table 6). Total resources are 22.9 million ounces of gold at an average grade of 0.09 ounces per ton, ranking Donlin Creek as the 22nd largest gold deposit ever discovered in the world. Continued aggressive exploration during 2002 added to these resources, with new discoveries at Akivik Zone, Aurora Zone, and Far East Zone. During the 2002 program, NovaGold completed 347 drill holes (195 core holes and 152 rotary holes) for a total of 167,352 feet. This includes 128,472 feet of core drilling and 38,880 feet of rotary drilling in 2002. Location of 2002 drilling at the Donlin Creek property and sites of specific mineralized areas are shown on figure 9.

Highlights from the 2002 core drilling program at Donlin Creek are numerous. In the ACMA area, mineralized intercepts include hole DC02-679 with 297.3 feet grading 0.13 ounces per ton gold, drill hole DC02-870 with 183.7 feet grading 0.21 ounces per ton gold, and drill hole DC02-878 with 53.3 feet grading 0.39 ounces per ton gold. In the Akivik area, gold mineralization is largely within Kuskokwim Group sedimentary rocks and results from drilling include: Hole DC02-673 with 58 feet grading 0.26 ounces per ton gold; hole DC02-677 with 195 feet grading 0.20 ounces per ton gold and 150 feet grading 0.18 ounces per ton gold; hole DC02-688 with 59 feet grading 0.16 ounces per ton gold; hole DC02-723 with 52.5 feet grading 0.96 ounces per ton gold; hole DC02-727 with 57.4 feet grading 0.20 ounces per ton gold; hole DC02-856 with 22.6 feet grading 0.607 ounces per ton gold; hole DC02-858 with 12.8 feet grading 0.367 ounces per ton gold and another intercept of 25.25 feet of 0.114 ounces per ton gold; hole DC02-887 with 63.1 feet grading 0.26 ounces per ton gold; and hole DC02-941 with 82.0 feet grading 0.21 ounces per ton gold and another 59.9 foot interval grading 0.27 ounces per ton gold. Follow-up core holes at the new Aurora and 400 gold zones intercepted high-grade gold mineralization including: Hole DC02-730 with 20 feet grading 0.16 ounces per ton gold; hole DC02-732 with 26 feet grading 0.13 ounces per ton gold and 23 feet grading 0.11 ounces per ton gold; and hole DC02-744 containing 223 feet grading 0.10 ounces per ton gold (including 103 feet grading 0.15 ounces per ton gold); hole DC02-740 with 45.9 feet grading 0.27 ounces per ton gold; hole DC02-741 with 65.6 feet grading 0.23 ounces per ton gold; and hole DC02-855 with 62.3 feet

Table 6. *2002 Donlin Creek gold resource estimates*[a]

November 2002 updated resource estimates

0.058 ounces per ton gold cut off grade				***0.044 ounces per ton gold cut off grade***			
Resource Category	**Tons (Millions)**	**Gold Grade Ounces/Ton**	**Contained Ounces**	**Resource Category**	**Tons (Millions)**	**Gold Grade Ounces/Ton**	**Contained Ounces**
Measured	5.614	0.111	623,000	Measured	7.368	0.097	713,000
Indicated	75.094	0.102	7,636,000	Indicated	106.395	0.087	9,220,000
Total M&I:	**80.708**	**0.102**	**8,259,000**	**Total M&I:**	**113.763**	**0.087**	**9,933,000**
Inferred	146.197	0.102	14,829,000	Inferred	205.819	0.087	17,849,000

Previous March 2002 Donlin Creek resource estimates

0.058 ounces per ton gold cut off grade				***0.044 ounces per ton gold cut off grade***			
Resource Category	**Tons (Millions)**	**Gold Grade Ounces/Ton**	**Contained Ounces**	**Resource Category**	**Tons (Millions)**	**Gold Grade Ounces/Ton**	**Contained Ounces**
Measured	5.571	0.112	623,000	Measured	7.268	0.098	710,000
Indicated	75.968	0.102	7,732,000	Indicated	107.508	0.087	9,329,000
Total M&I	**81.539**	**0.102**	**8,347,000**	**Total M&I:**	**114.776**	**0.088**	**10,040,000**
Inferred	101.890	0.107	10,877,000	Inferred	142.357	0.091	12,921,000

Note: Tons and Contained Ounces are rounded to the nearest 1,000. Total M&I = Total Measured & Indicated Resource.
[a]As of December 2002 from NovaGold Resources Inc. press releases.

grading 0.19 ounces per ton gold, 42.7 feet grading 0.21 ounces per ton gold, and 107 feet grading 0.13 ounces per ton gold. At the Far East zone, reverse-circulation drilling included drill hole DR02-786, which intersected four significant intervals of mineralization, the best of which was 40 feet grading 0.23 ounces per ton gold. Other significant drill intercepts came from the Vortex zone (hole DC02-697 with 46.6 feet grading 0.152 ounces per ton gold and hole DC02-698 with 50 feet grading 0.167 ounces per ton gold) and the North Acma zone (57.4 feet grading 0.199 ounces per ton gold and hole DR02-752 with 29.9 feet grading 0.287 ounces per ton gold).

A new interim resource estimate for the Donlin Creek gold deposit announced late in 2002 indicated nearly a 40 percent increase in inferred gold resources by 4.0 million ounces at a discovery cost of less than $2 per ounce. This estimate is based on core drill results through October 2002 primarily in the new Akivik, Aurora, and 400 target areas. These new resource areas are outside the main Acma and Lewis deposit areas. Assay results from the late-year South Acma, South Aurora/400 drilling were not available in time for inclusion in this estimation. Due to the widely spaced (325 feet by 325 feet) core drilling in these areas these new resources are all in the inferred category. The previous Inferred Resource as defined in the March 2002 Scoping Study using a 0.058 ounces per ton gold cut-off grade was estimated at 10.9 million ounces grading 0.107 ounces per ton gold. The new total Inferred Resource has increased to 14.8 million ounces grading 0.102 ounces per ton gold with a total Measured and Indicated Resource of 8.3 million ounces grading 0.102 ounces per ton gold using a 0.058 ounces per ton gold cut-off grade.

NovaGold completed its required $10 million expenditure requirement to earn a 70 percent interest in the Donlin Creek Project from Placer Dome. NovaGold's accelerated exploration program more than doubled the higher grade contained gold estimates at the Donlin Creek gold project. A preliminary independent economic assessment study completed last spring confirmed that the project may be developed into a major new gold producer that, with additional exploration and engineering work, could produce 1 million ounces of gold per year.

Placer Dome has until mid February 2003 to determine its future level of participation in the Donlin Creek Project. The company is considering whether to contribute to the development of the Donlin project at a 30 percent participating interest level with NovaGold remaining as operator at 70 percent ownership; or choose to earn an additional 40 percent interest in the project in 5 years or less by spending a minimum of $30 million toward project development, completing a project feasibility study, and committing to build a mine that produces not less than 600,000 ounces of gold per year. Under the latter option Placer Dome would not earn any incremental additional interest in the project above their current 30 percent level until all of the above conditions are met within the maximum 5-year timeframe. NovaGold would not be required to contribute any additional funding up to $30 million and at NovaGold's election Placer Dome would assist with financing for any development costs exceeding $30 million, with NovaGold's share of the development costs to be repaid out of a portion of its future mine cash flow.

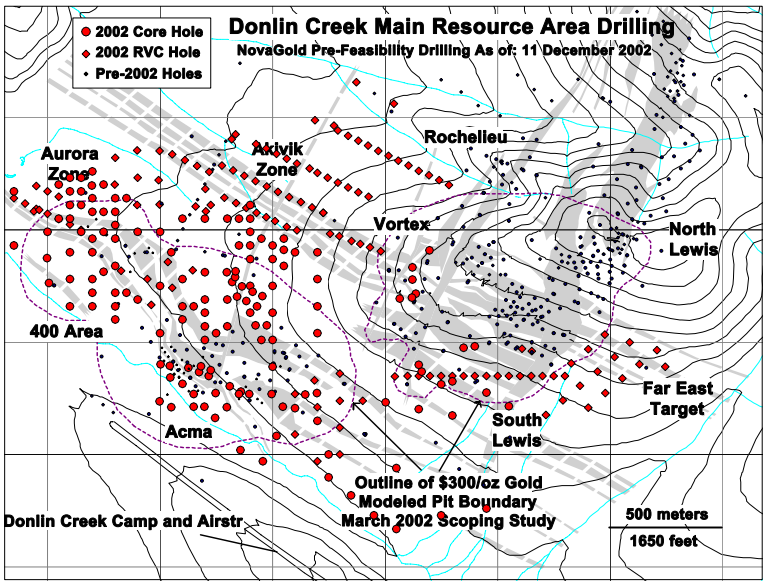


Figure 9. *Map of gold resource areas, 2002 core, and 2002 reverse-circulation holes at the Donlin Creek gold property. Image from NovaGold Resources Inc. Web site (http://www.novagold.net. - DonlinDrillMap_11Dec02.pdf).*

Northern Dynasty Minerals Ltd. made three important new discoveries during an exploration drilling program at the Pebble project located near Lake Iliamna. The program consisted of 68 widely spaced core holes (37,000 feet total) within the 34.3-square-mile copper–gold–molybdenum mineralized system that extends 13 miles southwest of the known 1-billion-ton Pebble deposit that contains 6.6 billion pounds of copper and 10.9 million ounces of gold. A detailed review and analysis of core from the Pebble deposit was also undertaken and led to a reinterpretation of the deposit's geology. A second granodiorite stock is recognized in the poorly explored northeast portion of the deposit. Several structural features that appear to control higher grade mineralization have also been recognized.

A new copper–gold–molybdenum porphyry deposit was discovered by drill holes 34 and 38, spaced 1,475 feet apart and located 7.5 miles southwest of the Pebble deposit. Both holes encountered wide intervals of gold–copper–molybdenum porphyry-style mineralization. Hole 34 intersected 210 feet of mineralization, starting at 70-foot depth, grading 0.30 percent copper and 0.006 ounces per ton gold. Hole 38 intersected 525 feet of mineralization starting at 116-foot depth grading 0.32 percent copper, 0.02 percent molybdenum, and 0.010 ounces per ton gold. Assay results show excellent continuity of mineralization and correlation between gold and copper values. The new porphyry copper–gold–molybdenum discovery is wide open in all directions and occurs in a 3.9-square-mile covered area associated with a very extensive induced polarization (IP) chargeability anomaly. The closest drill hole to the discovery is 1.2 miles to the east. A phase two program of 16 holes outlined mineralization for more than 3,300 feet along strike and up to 2,000 feet in width. Drill highlights include hole 49, which intersected 489 feet of mineralization grading 0.42 percent copper and 0.012 ounces of gold per ton; hole 50 with 0.30 percent copper and 0.033 ounces of gold per ton over 98 feet; hole 45, which intersected 0.41 percent copper and 0.009 ounces of gold per ton over 102 feet; and hole 44 with 0.40 percent copper and 0.011 ounces of gold per ton over 112 feet.

Substantial copper–gold values in chalcopyrite–pyrrhotite skarn-style mineralization were encountered in drill hole 37, located 10 miles to the southwest of the Pebble deposit and 3.1 miles west of hole 38. Drill hole 37 intersected 259 feet grading 0.4 percent copper and 0.029 ounces per ton gold, which included 21.3 feet grading 0.106 ounces per ton gold and 1.72 percent copper starting at 155.5-foot depth. This newly discovered copper–gold body is associated with a very strong, 0.6-mile-long, east–west-trending gold–copper soil geochemical anomaly that is open-ended in both directions.

High-grade gold was encountered 3.1 miles south of the Pebble deposit. Drill hole 25 intersected 0.84 ounces per ton gold over 20 feet starting at a 230-foot depth. This hole is situated within an intense gold-in-soil geochemical anomaly, measuring 0.5 mile by 0.5 mile, and is 1,150 feet southwest of historic Teck Cominco drill hole 9, which intersected an interval grading 0.99 ounces per ton gold over 5 feet. The discovery is open in all directions. Additional drilling in a phase two program encountered significant structurally-controlled gold mineralization. Drill hole 62 intersected strong silicification and multiple stages of brecciation in three intervals totaling 10 feet with an average grade of 0.446 ounces of gold per ton.

Ventures Resource Corp. announced results from a 2002 field program at its Donlin Creek North claim blocks, and at Golden Apex in the 85,000-acre Flat (Iditarod mining district) property. The $480,000 program was managed by WGM Inc. Ventures expanded its 17,000-acre Donlin Creek North project Timb claim block by staking an additional 4,800 acres (7.5 square miles). The Donlin Creek North group includes the Timb, Widg, Mose, and Eldo claim blocks that are strategically located between two gold districts. On the south, the Timb claims abut NovaGold's Donlin Creek deposit. On the north, Donlin Creek North claims cross the southeast part of the 85,000-acre Flat Property in the Iditarod mining district. About 1,800 stream sediment samples were taken in an 800-square-mile area encompassing 15 Donlin Creek North claim blocks. Samples of quartz-stockwork-veined rhyolite and associated hornfels, collected during 2002 in the Timb extension area, contain up to 0.0016 ounces per ton gold and anomalous gold pathfinder elements, including silver (up to 1.3 ounces per ton), arsenic (up to greater than 1 percent), mercury (up to 0.003 percent) and antimony (up to 0.1 percent), and up to 4.9 percent copper and 12.6 percent lead. Quartz-veined rhyolite on the SD property contained up to 0.01 ounces per ton gold and 0.12 percent arsenic.

At the Ada claims, 20 miles east of Flat, Ventures Resource Corp. discovered an epithermal gold occurrence. Rocks are cut by faults associated with breccia that contains silicified igneous and wallrock fragments, with sulfides in chalcedonic silica flooding. Twenty-six rock samples contain up to 0.037 percent mercury, up to 0.385 percent antimony; and five samples contain detectable gold values ranging from 0.0013 to 0.022 ounces per ton gold. Soil sampling outlines an 800- by 1,800-foot area with more than 0.0006 ounces per ton gold, open in all directions. Very high mercury and antimony values, anomalous gold, and the alteration, brecciation, and chalcedonic silicification indicate possible epithermal gold systems.

In 2003, Ventures anticipates startup of drilling at the Golden Apex and Divide properties, detailed examination of the Ada claims, upgrading of other Flat prospects to the drilling phase, and follow-up of additional Donlin Creek North prospects. In an effort to accelerate its various mineral programs, Ventures is exploring joint venture and other financing options.

TNR Resources Ltd. signed a joint-venture agreement with NovaGold Resources Inc. on NovaGold's 100-percent-owned Shotgun gold deposit. Under the terms of the agreement, TNR Resources can earn up to a 50 percent interest in the million-ounce gold deposit by spending $3 million on exploration over the next 4 years to advance the project towards a production decision. TNR Resources has a further option to earn an additional 20 percent interest in the Shotgun project subject to a back-in option for NovaGold. A $500,000 exploration program was planned for 2003.

TNR Resources Ltd. also acquired the right from BHP Minerals International Exploration Inc. (BHP) to earn a 70 percent interest in three claim blocks held by BHP and

located in the Lake Iliamna–Bristol Bay area of southwestern Alaska. Exploration on the Iliamna–Bristol claims was originally conducted in 2000 by Rio Algom Exploration Inc. and consisted of a regional airborne magnetic survey followed by reconnaissance geology and wide spaced induced polarization/resistivity geophysical surveys in selected areas. BHP's results suggested that these claims had potential to host porphyry copper–gold–molybdenum systems comparable to the Pebble deposit, located 60 miles to the northeast. TNR granted BHP 1,000,000 share purchase warrants, agreed to incur $800,000 in expenditures on the property, including at least 5,700 feet of diamond drilling within 2 years, and BHP has the right to back in to 70 percent ownership of the property by taking the project to feasibility. TNR plans detailed ground geophysics to define drill targets and possible drilling in 2003.

SOUTHEASTERN REGION

Quaterra Resources Inc. announced that a helicopter-borne geophysical survey on its 100-percent-owned Duke Island copper–nickel–PGE prospect identified an extensive zone of potential sulfide mineralization in an unmapped and unsampled area of the 10- by 12-mile island. The Aeroquest Ltd. helicopter-borne IMPULSE® multifrequency electromagnetic and magnetometer survey used an electromagnetic system with a 6-channel frequency domain towed bird system. The survey was completed at a 656-foot line spacing (448 line miles) with105 line miles of fill-in lines at 328-foot spacing in selected areas. The nominal EM bird terrain clearance was 100 feet. Results from the 554-line-mile survey are that areas of known mineralization generally fall within broad zones of anomalous conductivity that extend well beyond the limits of outcropping sulfides. Aeroquest identified a total of 459 high-priority anomalies, including 311 Type 1 anomalies with positive inphase response and a sharp, probable hardrock source and 148 Type 2 anomalies with a negative inphase and positive quadrature response (conductive magnetic anomalies). The largest zone of conductive anomalies occurs on the north side of the Discovery Zone and extends for 1.5 miles in an east–west direction. This zone is well north of the area drilled by Quaterra last year.

Quaterra also reported that a detailed review of the airborne geophysical survey has confirmed a number of high-priority targets. The review, by consulting geophysicist Joseph R. Inman, covered a 2.5-mile by 2.5-mile area and identified nine discrete, multi-anomaly zones with strike lengths ranging from 1,300 to 4,900 feet that may be indicative of massive-sulfide mineralization. Quaterra said its 2002 program at Duke Island focused on prioritizing targets for the next drilling campaign, now projected for spring 2003. Quaterra has been following up on surface sampling that returned values ranging from anomalous up to 2.8 percent copper, 0.25 percent nickel and 0.0292 ounces per ton combined platinum and palladium, and on four late 2001 drill holes from two drill pads approximately 750 feet apart. All holes intercepted disseminated, semi-massive and massive sulfides over extensive lengths.

Quaterra contracted for a preliminary Landsat Thematic Mapping (TM) analysis of the Duke Island project. The Marquis zone was used as a "type" locality and the TM imagery analysis identified two other target zones to the southwest and the southeast of the Marquis zone. Forty three samples were collected from the southwestern TM anomaly, known as the Monte zone. Of the samples collected, 21 had copper analysis results greater than 0.1 percent copper. Values for platinum, palladium, nickel, and cobalt were generally lower than seen in the Marquis zone, with maximum values of 0.009 ounces per ton, 0.014 ounces per ton, 0.08 percent, and 0.02 percent, respectively. Quaterra interprets the Monte zone to be on the distal edge of the Marquis zone mineralized system.

Quaterra also reported that the joint venture to explore the Union Bay PGE prospect north of Ketchikan has been terminated to permit Quaterra to focus its resources on its 100-percent-owned projects. After that option was terminated, Freegold Ventures Ltd. (Freegold) and Pacific North West Capital Corp. (PFN) entered into an option/joint-venture agreement on the Union Bay Platinum Project. PFN may earn a 50 percent interest in the project by expending $1 million on exploration, participating in the current Freegold financing for $165,000, making cash payments totaling $100,000 over 4 years, and issuing 60,000 PFN shares. PFN may earn a 60 percent interest by completing a feasibility study, and a 70 percent interest by arranging all financing through commercial production. The Union Bay property is centered on a 7.5-mile by 4.3-mile zoned Ural–Alaska complex consisting of a dunite core grading outward through olivine pyroxenite and pyroxenite to hornblendite and gabbro. Freegold originally acquired the property in 2000 after a regional review of PGE potential in the Alexander Platinum Belt of southeastern Alaska. Initial efforts were concentrated on the northeastern part of the Union Bay complex where government surveys indicated values up to 0.55 ounces per ton platinum in pan concentrates.

Results from unpublished graduate thesis work conducted at the University of Alaska Fairbanks on PGE mineralization at the Union Bay prospect have major implications for exploration. Most significant are results from multidisciplinary studies that indicate that PGE mineralization results from hydrothermal fluids and not a primary magmatic genesis. Pyroxene veins crosscut all other rock units and PGE-bearing magnetite is associated with the pyroxene. Magnetite veins clearly cut magmatic layering.

Kennecott Minerals Co. continued exploration to expand ore zones at the Greens Creek Mine. Exploration remained focused on the silver-rich 200 South orebody, where new resources were successfully identified in 2001

and 2002. Surface exploration targeted mine type structures in the immediate mine area and adjoining claims.

Olympic Resources Group LLC discovered new volcanogenic massive-sulfide (VMS) mineralization with a hydrothermal precious-metal overprint on the southern part of Woewodski Island. Mineralization is hosted in highly quartz–sericite-altered mafic volcanic tuff and tuff breccia of the late Triassic Hyd Group. Mineralization can be traced laterally for 6,000 feet and consists of massive to semimassive pyrite, sphalerite, and galena and unidentified silver- and gold-bearing minerals. A small quartz monzodiorite intrusion, coincident with a strong magnetic low in the BLM's Wrangell/Stikine airborne geophysical survey, occurs in the prospect area center and induced an apparent hydrothermal overprint and introduced a secondary gold mineralizing event. Olympic Resources completed a five hole (1,100 feet) diamond drilling program in the Brushy Creek area. Holes 4 and 5 contained massive to semimassive mineralization, with the best intercept from hole 4 from 115 to 196 feet containing 1.65 percent zinc, 0.35 percent lead, 0.97 ounces per ton silver, and 0.007 ounces per ton gold, including 7 feet (from 175 to 182 feet) of 4.66 percent zinc, 0.82 percent lead, 1.88 ounces per ton silver, and 0.017 ounces per ton gold. A total of 160 drill samples were collected for geochemical analysis. Some platinum–palladium mineralization was discovered associated with a medium-grained gabbro on the north side of lower Brushy Creek. Olympic Resources believes that the massive-sulfide mineralization and host rocks are equivalent to rocks hosting the Greens Creek deposit on Admiralty Island.

DEVELOPMENT

Development expenditures in 2002 were $34.1 million, down 58 percent from the $81.16 million invested in 2001.

Development in 2002 was reported at Fort Knox, True North, Usibelli, Kensington, and Greens Creek mines and the Pogo project. There was also a minor amount of development reported at many of the small rock quarries, gravel pits, and placer gold mines. For the first time in many years, there was no development at the Red Dog Mine.

Table 7 shows the regional employment and development investment, and table 8 compares the 2002 investment with that of the previous 20 years. Figure 10 shows the locations of selected development projects.

NORTHERN REGION

Silverado Gold Mines Ltd. began tunneling into the deep channel on claims 1 and 2 below Discovery between Faye and Archibald creeks at the Nolan placer gold mine near Wiseman in northern Alaska. Minor development projects were reported at several small placer gold mines in the northern region.

WESTERN REGION

Several of the small placer gold mines on the Seward Peninsula reported minor development such as stripping frozen overburden and road or pond construction.

EASTERN INTERIOR REGION

At Fort Knox Mine, development consisted of in-pit drilling, engineering, design, and construction of a tailings thickening system, and raising of the level of the tailings dam. At True North Mine, Fairbanks Gold Mining Inc. purchased a new fleet of haul trucks, and began expansion of the mine area after receiving final permit approval in June, and overcoming objections in August.

At Usibelli Coal Mine near Healy, construction of a 7-mile road and stripping of the Two Bull Ridge pit prepared for the move of the walking dragline from the operating Poker Flats pit.

At the Pogo gold project east of Fairbanks, Teck–Pogo Inc. and partner Sumitomo Metal Mining America Inc. conducted a core-drilling program of infill drilling of the L2 vein to update the indicated/inferred resource calculations and to assist in geotechnical modeling. The field activity was concurrent with preparation of a Draft Environmental Impact Statement and engineering studies.

Many of the placer gold mines in the region reported minor development projects.

SOUTHCENTRAL REGION

Some of the placer gold mines in the region reported development, mainly in road construction and ground preparation.

SOUTHWESTERN REGION

The only development reported in 2002 was for sources of industrial materials, and two small placer gold mines.

ALASKA PENINSULA REGION

No mineral development activity was reported in this region in 2002.

SOUTHEASTERN REGION

In southeastern Alaska, Coeur Alaska continued its efforts to permit the Kensington/Jualin Mine complex north of Juneau. Optimization studies of new mining methods

Table 7. *Reported mineral development expenditures and employment in Alaska by commodity and region, 2002*

	Northern	Western	Eastern interior	South-central	South-western	South-eastern	Total
Development expenditures							
Base metals	$ - -	$ - -	$ - -	$ - -	$ - -	$ - -	**$ - -**
Polymetallic	- -	- -	- -	- -	- -	5,700,000	**5,700,000**
Precious metals							
Placer	2,050,000	100,000	60,000	- -	45,000	- -	**2,255,000**
Lode	- -	100,000	22,200,000	- -	- -	2,100,000	**24,400,000**
Coal and peat	- -	- -	1,450,000	- -	- -	- -	**1,450,000**
Industrial minerals	- -	50,000	40,000	85,000	20,000	55,000	**250,000**
TOTAL	**$2,050,000**	**$250,000**	**$23,750,000**	**$85,000**	**$65,000**	**$7,855,000**	**$34,055,000**
Development employment							
Employment							
Workdays	4,500	1,650	21,750	354	450	6,170	**34,874**
Workyears[a]	17	6	84	2	2	24	**135**
Number of companies reporting[b]	3	3	7	3	3	4	**23**

[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 2002.
- - No expenditures reported.

Table 8. *Reported mineral development expenditures in Alaska by commodity, 1982–2002*

	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**
2002	- -	5,700,000	26,655,000	250,000	1,450,000	**34,055,000**
TOTAL	**$777,981,300**	**$268,033,136**	**$761,174,330**	**$24,443,500**	**$58,390,000**	**$1,890,022,266**

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

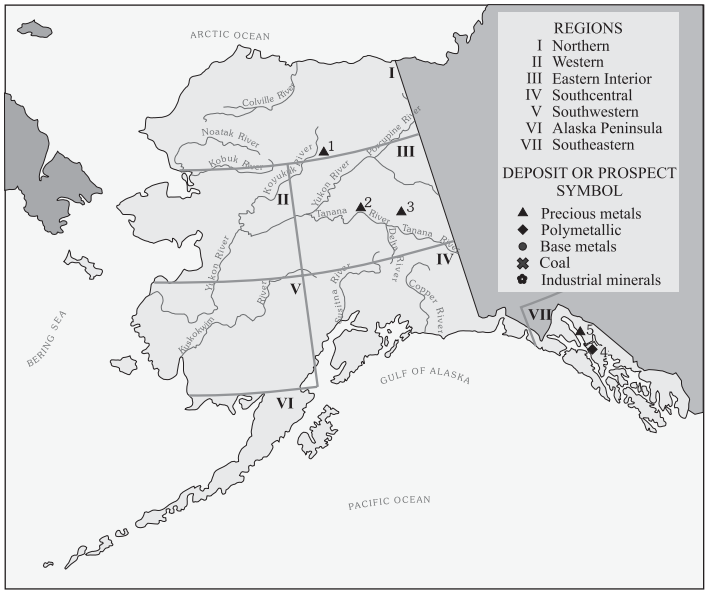


Figure 10. *Selected mineral development projects in Alaska, 2002.*

I Northern Region
1. Nolan Placer Mine (Silverado Gold Mines Inc.)—underground placer gold mine

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)

reduced the cost of building the mine by more than $56 million, and the mine redesign lowered operating costs from $282 per ounce to $226 per ounce.

At Greens Creek Mine, Kennecott Minerals/Hecla completed construction of their paste backfill plant, enabling the mill throughput to be increased to a record level, and continued drifting to access the orebody. Surface work included completion of the Environmental Impact Statement and design for an expanded tailings facility.

PRODUCTION

The total value of production from Alaska's mines and quarries in 2002 was $1,013 million, up 9 percent from the $917.34 million reported in 2001.

Gold production was reported from the Fort Knox, Greens Creek, and Illinois Creek hard rock mines, and at least 50 placer mines. Silver was produced at Red Dog and Greens Creek mines, which were also the primary producers of zinc and lead concentrates.

The decline in the price of zinc from $0.40 per pound in 2001 to $0.35 in 2002 had a strongly negative influence on the profitability of Red Dog and Greens Creek mines. Conversely, Fort Knox gold mine benefited from the rise in the gold price from an average of $271.04 per ounce in 2001 to $310.06 in 2002.

Table 9 shows the quantity and value of metal and material production from 2000 to 2002. Table 10 list the miners and mines that had an Alaska Annual Placer Mining Application (APMA) for 2002, and which were reported by the U.S. Bureau of Land Management (BLM) or the State of Alaska Division of Mining, Land, & Water (DMLW) to have had at least some production during the year. Figures 11, 12, and 13 show the historic production of sand and gravel, rock, and coal. Selected production sites are shown in figure 14.

Metals, with a value of $823 million, accounted for 81 percent of total production; and zinc (718,106 dry short tons with a value of $502.7 million) continued to be the most valuable metal in terms of the total revenue it generated. Zinc was followed by gold (562,094 ounces valued at $174.3 million), silver (17.8 million ounces valued at $82.3 million), and lead (146,462 tons with a value of $61.5 million). Zinc was 61 percent of total metal value, gold was 21 percent, silver 10 percent, and lead 7.5 percent.

Table 11 shows the average metal values used in this report over the last 10 years. The 31 percent drop in the price of zinc between 2000 and 2002 is the most dramatic decrease, but gold rose 14 percent and silver rose 5.5 percent between 2001 and 2002.

The production estimates included in this report are from 138 questionnaires returned by miners, Native corporations, agencies, and municipalities, supplemented by more than 100 phone surveys. Additional information was derived from State of Alaska Annual Placer Mining Applications (APMAs) submitted to the DMLW, but due

Table 9. *Estimated mineral production in Alaska, 2000–2002*[a]

	Quantity			Estimated values[b]		
Metals	**2000**	**2001**	**2002**	**2000**	**2001**	**2002**
Gold (ounces)	551,982	550,644	562,094[c]	$154,058,000	$149,246,000	$174,283,000
Silver (ounces)	18,226,615	16,798,000	17,858,183	90,404,000	73,408,000	82,326,000
Copper (tons)	1,400	1,400	1,600	2,296,000	1,988,000	2,272,000
Lead (tons)	123,224	127,385	146,462	51,754,000	56,049,000	61,514,000
Zinc (tons)	669,112	634,883	718,106	682,494,000	507,907,000	502,674,000
Subtotal				**$981,006,000**	**$788,598,000**	**$823,069,000**
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	10.4	22.4	49,855,000	55,221,000	120,698,000
Rock (million tons)	5.2	3.1	3.2	36,588,000	27,176,000	31,442,000
Subtotal				**$86,468,000**	**$82,422,000**	**$152,165,000**
Energy minerals						
Coal (tons)	1,473,000	1,537,000	1,158,000	$38,768,000	$48,108,000	$37,400,000
Peat (cubic yards)	35,600	36,000	35,000	178,000	180,000	175,000
Subtotal				**$38,946,000**	**$48,288,000**	**$37,575,000**
TOTAL				**$1,106,420,000**	**$919,308,000**	**$1,012,809,000**

[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 2002—gold ($310.06/ounce unless other value provided by operator); silver ($4.61/ounce); copper ($0.71/lb); zinc ($0.35/lb); lead ($0.21/lb). All other values provided by mine operators. Values rounded to nearest $1,000.
[c]Hardrock gold 539,713 ounces, placer gold 22,381 ounces.

Table 10. *Companies and individuals reported to be producing metal in Alaska, 2002*

Operator	Creek	District	Type[a]
	NORTHERN REGION		
DCE Inc.	Lake	Koyukuk	O/P Placer
Brandon, Katherine	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/Lotty/Buckeye	Koyukuk	O/P Placer
Jiles, O. J.	Gold Bottom	Koyukuk	O/P 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
Swenson, Lloyd	Slate	Koyukuk	O/P Placer
Tainter, Gary	Prospect	Koyukuk	O/P Placer
Tri-Con Mining	Nolan	Koyukuk	O/P and U/G Placer
Weisz, Larry	Hammond	Koyukuk	O/P Placer
Wicken, Jim	Gold	Koyukuk	O/P Placer
Teck Cominco Alaska Inc.	Red Dog Mine	Noatak	HR O/P (zinc-lead-silver)

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

Operator	Creek	District	Type[a]
	Western Region		
Loyer, Victor	Candle	Fairhaven	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
Pushcar, Jerry	Iron	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
Anderson, Ralph	Dry	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
Olsen, 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
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
Jacobs, David	Eva	Bonnifield	O/P Placer
Kiehl, Don	Gold King	Bonnifield	O/P Placer
Mitchell, Rod	Roosevelte	Bonnifield	O/P Placer
Oudekerke, James	Moose	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

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

Operator	Creek	District	Type[a]
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
DeGraaf, Larry	Fox	Fairbanks	O/P Placer
Fairbanks Gold Mining Inc.	Fort Knox Mine	Fairbanks	H/R O/P (gold)
Gavora, Steve	Fairbanks	Fairbanks	O/P Placer
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
Largent, Walter	Ester	Fairbanks	O/P Placer
Las, Allen	No Grub	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
Roman, Ron	Last Chance	Fairbanks	O/P Placer
Stein, Don	Gilmore	Fairbanks	O/P Placer
Thurman Oil & Mining	Fairbanks	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
Owen, Jeff	Davis	Fortymile	O/P Placer
Olsen, Gordon	Jack Wade	Fortymile	S/D
Olson, Hart	Wade	Fortymile	O/P Placer
Olsen, Stephen	Liberty	Fortymile	O/P Placer
Reed, Scott	Fortymile	Fortymile	O/P Placer
Regner, Leo	Lilliwig	Fortymile	O/P Placer
Roberts, Robert	Chicken	Fortymile	S/D
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

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

Operator	Creek	District	Type[a]
Treesh, James	Cherry/No Name	Fortymile	O/P Placer
Wolff, Flint	Walker Fork	Fortymile	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
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
Holt, Ryan	Quartz	Hope	S/D
Mastel, Fred	Quartz	Hope	O/P Placer
Outsider Mining (John Trautner)	Canyon	Hope	O/P Placer
Willard, Gerald	Bear	Hope	S/D
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.

to the inability to contact some placer miners, the estimate for placer mine production is thought to be conservative. Conversely, there may also be some operations listed in table 10 that elected not to mine due to the low price of gold and the high cost of fuel.

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, and 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 527,803 ounces in 2001 to 539,713 ounces in 2002, and placer production decreased marginally from 22,841 ounces in 2001 to 22,381 ounces in 2002. This decrease is much smaller than in the past four years, and production in 2003 is expected to increase, in part because of the rising gold price, and also because of renewed production at Nolan Creek underground placer mine.

Tables 14 and 15 show the value and regional importance of sand, gravel, and rock production. Production of sand and gravel in 2002 was 22.4 million tons, more than twice as much as in 2001, and rock production of 3.2 million tons in 2002 was a marginal increase from the 3.1 million ton production of a year earlier.

Coal production from Usibelli Coal Mine in 2002 was 1.16 million tons, down from 1.54 million tons in 2001. Only 311,000 tons was exported.

NORTHERN REGION

At Red Dog Mine near Kotzebue in northwestern Alaska, 3,489,600 tons of ore were milled, down 71,000 tons from the year before. However, the Mill Optimization Project of past years resulted in production of a record 1,366,480 tons of concentrate with 637,800 tons of contained zinc and 118,880 tons of contained lead, and an estimated 6.75 million ounces of silver (table 16). The ore grade was 21.1 percent zinc, 5.4 percent lead, and 2.7 ounces per ton silver. Despite the higher grade of ore and better recovery, the average price of zinc in 2002 ($0.35 per pound) was so much lower than the 2002 average ($0.40 per pound) that the mine reported a loss of $28 million for the year. In July 2002 Red Dog employed 521 regular employees and 59 temporary or casual employees, for a total of 580. Of these, 59 percent were shareholders of the NANA Regional Corp.

Placer gold production was reported from nine placer mines in the northern region, most of them in the Koyukuk drainage around Wiseman. The largest mine in the area, Nolan Mine of Silverado Mines (U.S.) Inc. did not sluice in 2002, but was under development.

Production of sand and gravel in the northern region in 2002 was 2.24 million tons, about the same amount that was used in 2001. Most of the material was used by the major oil companies (British Petroleum and Conoco-Phillips), and was extracted from several existing gravel pits such as Put 23, Milne Point, Duck Island, and the Kuparuk Deadarm, and pits C, E, and F. Smaller quantities were used by some of the oilfield service companies (Veco, A.I.C., Peak Oilfield Service), and by the North Slope Borough.

The only rock produced and used in this region in 2002 was near Red Dog Mine.

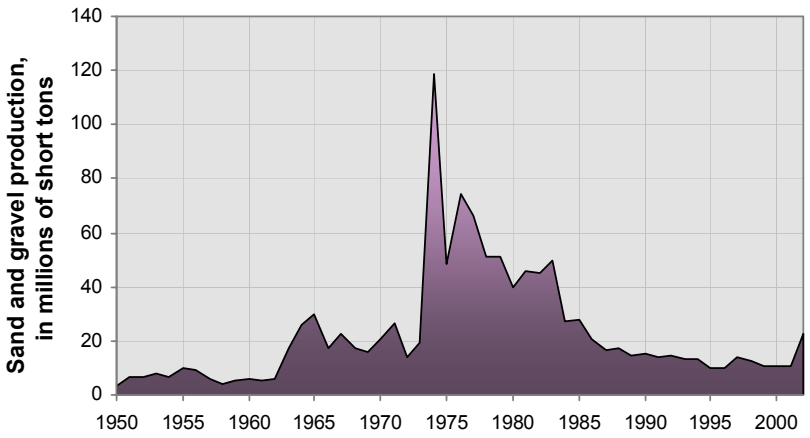


Figure 11. *Sand and gravel production in Alaska, 1950–2002.*

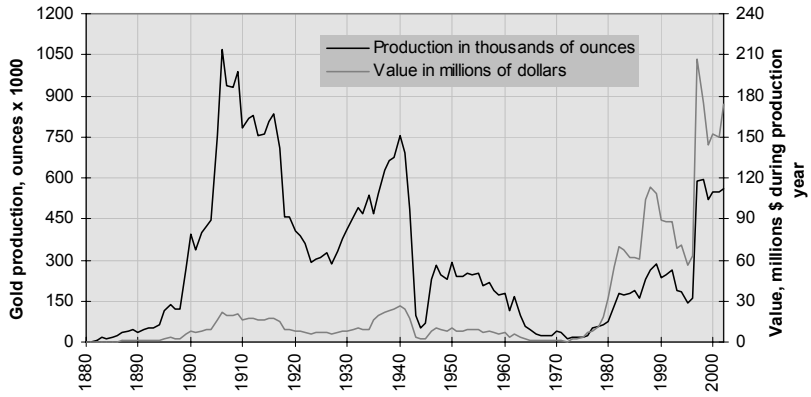


Figure 12. *Amount and value of gold production in Alaska, 1880–2002.*

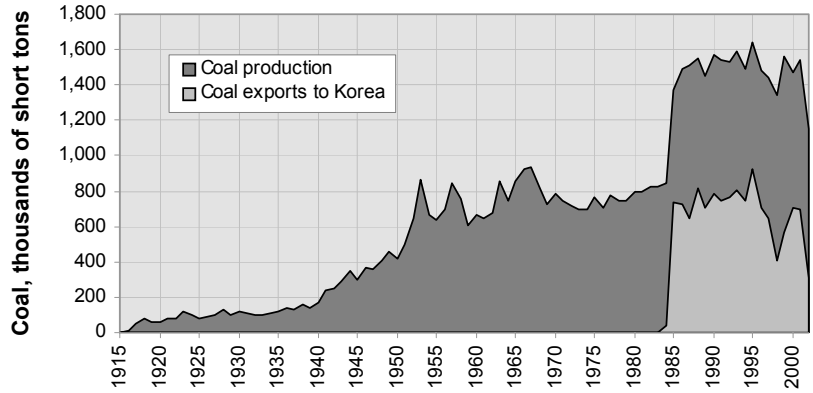


Figure 13. *Coal production in Alaska, 1915–2002, including exports to Korea.*

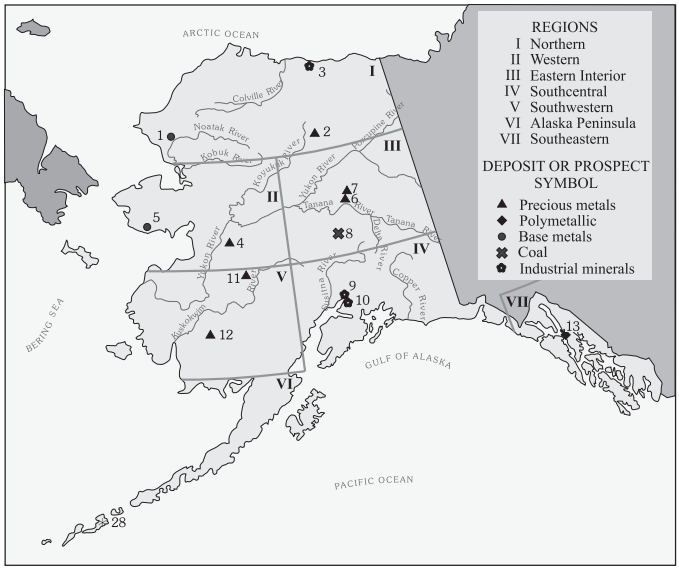


Figure 14. *Selected production projects, 2002.*

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

Table 11. *Average metal prices, 1993–2002*

	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
2002	310.06	4.61	0.71	0.35	0.21

Table 12. *Reported refined gold production, number of operators, and industry employment in Alaska, 2000–2002*[a]

Region	Number of operators			Production in ounces of gold			Number of employees		
	2000	2001	2002	2000	2001	2002	2000	2001	2002
Northern	17	11	9	1,434	631	685	11	9	16
Western	44	10	8	22,603	36,590	35,465	40	55	63
Eastern Interior	76	23	22	392,862	423,699	421,364	394	425	415
Southcentral	9	5	3	524	484	153	8	10	11
Southwestern	8	5	6	5,650	1,386	1,733	8	12	14
Southeastern	2	2	2	128,909	87,854	102,694	280	280	281
TOTAL	**156**	**56**	**50**	**551,982**	**550,644**	**562,094**	**741**	**791**	**800**

[a]2002 production includes 539,713 ounces gold from Illinois Creek, Fort Knox, and Greens Creek hardrock projects, and 22,381 ounces of placer gold.

Table 13. *Production for selected Alaska placer gold mines, 1996–2002*

Mine size	1996	1997	1998	1999	2000	2001	2002
			Number of mines				
Small[a]	9	25	45	38	60	33	43
Medium[b]	5	6	11	13	14	5	4
Large[c]	4	4	7	7	4	4	2
TOTAL	**18**	**35**	**63**	**58**	**78**	**42**	**49**
			Production in ounces				
Small[a]	1,433	5,077	10,159	4,710	8,981	5,048	9,931
Medium[b]	5,058	9,373	12,833	13,218	15,186	6,234	4,739
Large[c]	49,240	65,682	72,307	52,300	22,147	11,559	7,711
TOTAL	**55,731**	**80,132**	**95,299**	**70,228**	**46,314**	**22,841**	**22,381**

[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, 2002*

Region	Companies and agencies reporting[a]	Tons	Estimated unit value ($/ton)[b]	Total value	Estimated number of employees
Northern	9	2,242,000	4.59	10,291,000	105
Western	3	1,062,000	5.74	6,096,000	62
Eastern Interior	11	6,163,000	5.14	31,678,000	194
Southcentral	22	10,038,000	5.20	52,198,000	258
Southwestern	6	2,523,000	6.90	17,409,000	42
Alaska Peninsula	2	36,000	7.20	259,000	4
Southeastern	5	348,000	7.95	2,767,000	37
TOTAL	**58**	**22,412,000**	**5.39[c]**	**$120,698,000**	**702**

[a]From 34 returned questionnaires and 14 phone canvass responses. Also includes data from the Alaska Railroad, Department of Transportation, Division of Mining, Land & Water, U.S. Forest Service, and U.S. Bureau of Land Management.
[b]Values are based on price and cost estimates from 21 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, 2002[a]*

Region	Companies and agencies reporting[b]	Tons	Estimated unit value ($/ton)[c]	Total value	Estimated number of employees
Northern	2	43,000	7.32	$ 315,000	7
Western	2	15,000	7.01	105,000	5
Eastern Interior	8	828,000	8.65	7,162,000	41
Southcentral	9	1,259,000	8.25	10,387,000	63
Southwestern	3	215,000	16.25	3,494,000	17
Alaska Peninsula	2	3,000	12.77	38,000	7
Southeastern	4	789,000	12.60	9,941,000	37
TOTAL	**30**	**3,152,000**	**9.98[d]**	**$31,442,000**	**177**

[a]Includes shot rock, crushed stone, D-1, riprap, and modest quantities of ornamental stone.
[b]Derived from 23 questionnaires, 13 phone canvass responses. Also includes data from the Alaska Railroad, Department of Transportation, Division of Mining, Land & Water, U.S. Forest Service, and U.S. Bureau of Land Management.
[c]Unit value based on data supplied by 18 operations. Unit values for different stone products vary widely.
[d]Weighted average unit value ($/ton) of rock production in Alaska.

Table 16. *Red Dog Mine production statistics, 1989–2002*[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
2002	3,489,600	21.1	5.4	2.7	1,366,480	637,800	118,880	6.750	560

[a]Revised slightly from Special Report 50, Alaska's Mineral Industry 1995 (Bundtzen and others), 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.

WESTERN REGION

American Reclamation Group LLC continued leaching gold at Illinois Creek Mine from 385,000 tons of ore added to the existing heaps, and conducted a limited exploration program designed to prospect for the northward extension of the vein in the East Pit (fig. 15). The mine employs 53 workers, many from the nearby villages of Ruby, Galena, Huslia, Kaltag, and Nulato.

Eight placer gold mines reported production in the western region in 2002, and collectively produced 8,965 ounces of refined gold.

The only reported use of sand and gravel in the western region in 2002 was around Nome on the Seward Peninsula, and most was derived from washed tailings from NovaGold Resources' placer mines.

EASTERN INTERIOR REGION

Fairbanks Gold Mining Inc. (FGMI), a subsidiary of Kinross Gold Corp., is the operator of Fort Knox Mine and the satellite True North Mine about 25 miles north of Fairbanks. During 2002, with a workforce of 360, FGMI recovered 410,519 ounces of gold from the 15.26 million tons of ore milled (table 17). The ore was derived from 11.5 million tons of rock mined at True North, and 24.5 million tons mined at Fort Knox.

Placer mining has long been the backbone of the mining industry in interior Alaska, and there were about 25 mines working in 2002, despite the low gold price. Total production from these mines in 2002 was 10,845 ounces, down 13 percent from the 12,479 ounces reported for 2001.

Figure 15. *Illinois Creek Mine's East Pit. American Reclamation Group LLC continued leaching gold from this state-owned mineral resource near Galena. Photo by Dick Swainbank.*

The total amount of coal mined from Usibelli Coal Mine (UCM) near Healy in 2002 was 1,157,879 tons, considerably less than in past years. The reason for the decline was the expiration of its coal export contract with the Korean Electric Power Co., (KEPCO). UCM was forced to lay off 40 of its 120 employees during 2002. The mine did continue shipping coal to Korea through September to fulfill existing contract obligations, but the total of 310,646 tons shipped for 2002 was down substantially from prior years. Since the first shipment in 1984, UCM has shipped 12.4 million tons of coal to Korea through the port of Seward, providing revenue and jobs for the Alaska Railroad, and also for the coal-loading facility in Seward.

Table 17. *Fort Knox Gold Mine production statistics, 1996-2002*

	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
2002	36,044,000[b]	15,259,000	410,519	360

[a]8.5 million from True North.
[b]11.5 million from True North.

Sand and gravel production of 6 million tons in this region in 2002 was mainly for roadwork near Fairbanks and on the Dalton Highway between Fairbanks and Deadhorse. A magnitude 7.9 earthquake in November caused extensive road damage in the eastern part of the region, and a considerable amount of rock and gravel was required to complete temporary repairs to the Richardson Highway and the Tok Cutoff (figs. 16 and 17).

Figure 16. *Damaged road surface at milepost 78 along the Tok Cut-off from the magnitude 7.9 Denali fault earthquake of November 3, 2002. View looking north towards Mentasta Lodge on the east (right) side of road. At this location there was approximately 4 feet of vertical and 6 feet of horizontal displacement across road. West (left) side of road also shows the southwestern end of landslide-lateral spread into lake. A Shannon & Wilson team, including Rohn Abbott, Steve Adamczak, Frank Wuttig, Mark Lockwood, and Bill Perkins, investigated and documented geotechnical damage to Alaska's highways, the Trans-Alaska pipeline, and small villages along the fault following the world's largest earthquake during 2002. Photo provided courtesy of Shannon & Wilson Inc. from Web site (http://clients.shanwil.net/project.php?projectid=Fairbanks_ Quake_2002).*

SOUTHCENTRAL REGION

The only metal production in the southcentral region in 2002 was from four small placer gold mines, with a cumulative production of about 153 ounces.

In 2002, the production of sand and gravel in the southcentral region was 8.6 million tons, about half of which was used in road construction on the Kenai Peninsula. Late in the year, flooding on the Kenai required emergency road repair that added to the total.

SOUTHWESTERN REGION

Placer gold production in the southwestern region in 2002 was reported from six mines.

A small quantity of armor rock was produced from the Bristol Bay Native Corp. quarry near Dillingham, but most of the rock used in the region was from Calista Corp. lands. Sand and gravel for airport upgrades at Chevak and Toksook Bay were derived from local sources.

Figure 17. *Former DOT Commissioner Joseph Perkins and Maintenance Engineer Frank Richards examine road surface along the Tok Cut-off Highway between mileposts 44 and 91 that was damaged from liquefaction of road base materials during the magnitude 7.9 Denali Earthquake of November 3, 2002. Photo provided by northern region office of the Alaska Department of Transportation & Public Facilities.*

ALASKA PENINSULA REGION

The only production in the Alaska Peninsula region was a few thousand tons of rock and about 36,000 tons of gravel for local construction at Dillingham and on Kodiak Island.

SOUTHEASTERN REGION

With a workforce of 262 people, Kennecott Minerals milled a record 733,507 tons of ore in 2002, up 11.5 percent from the 658,000 tons milled in 2001 (table 18). Head grade of the ore was 12.52 percent zinc, 4.73 percent lead, 19.73 ounces per ton silver, and 0.203 ounces per ton of gold. The concentrate contained 80,306 tons of zinc, 27,582 tons of lead, 10,913,183 ounces of silver, and 102,694 ounces of gold. At the beginning of 2003 the proven/probable reserve stood at 7.05 million tons of 11.4 percent zinc, 4.2 percent lead, 14.9 ounces per ton of silver, and 0.13 ounces per ton of gold. Other resources were 2.7 million tons at 11.3 percent zinc, 4.9 percent lead, 17.0 ounces per ton silver, and 0.13 ounces per ton of gold.

Rock production of 789,000 tons in the southeastern region in 2002 was almost twice that of the previous year, but due to low levels of road maintenance by the U.S. Forest Service, well below the levels of a few years ago. The 348,000 tons of sand and gravel produced were used for local road maintenance and concrete mixes.

Table 18. *Greens Creek Mine production statistics, 1989–2002*

	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
2002	733,507	217,200	80,306	27,582	10,913,183	102,694	1,600	262

[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 2002. Table 19 lists all companies with significant drill programs in Alaska during 2002. Drilling totals for 2002 are 385,290 feet of core drilling and 103,612 feet of reverse-circulation drilling. Hardrock core (sometimes referred to as hardrock diamond drilling) footage in 2002 is approximately 60 percent higher than the 240,318 feet reported drilled in 2001. Reverse-circulation drilling footage also increased by approximately 37 percent from the 75,750 feet reported drilled in 2001. Hardrock core footage for 2002 is approximately 10 percent lower than the average core footage reported in Alaska from 1996 to 2001. Reverse-circulation drilling footage for 2002 is equal to the average reverse-circulation drilling footage from 1996 to 2001. Drilling at placer mines was largely unreported for 2002, with 1,250 feet reported. Coal drilling is unreported, but likely occurred at Usibelli Coal Mine. Tables 20 and 21 summarize the drilling activity in the state during 2002 by region and type of drilling. The southwestern region had the most drilling of all Alaska regions, with 42 percent of the total for 2002. The eastern interior region had 28 percent of the drilling, followed by the southeastern region with 22 percent. Major drill programs were conducted by NovaGold Resources Inc. at the Donlin Creek deposit (fig. 18), by Northern Dynasty Minerals Ltd. at the Pebble prop-

Table 19. *Companies reporting significant drilling programs in Alaska, 2002*

AngloGold (USA) Exploration Inc.	Kinross Gold Corp.	Olympic Resources Group LLC
Chapleau Resources Ltd.	Nevada Star Resource Corp.	Quaterra Resources Inc.
Golconda Resources Ltd.	North Star Exploration Inc.(EMEX Corp.)	Rio Fortuna Exploration Co.
Hecla Mining Co.	Northern Dynasty Minerals Ltd.	Teck Cominco Ltd.
Kennecott Exploration Co.	NovaGold Resources Inc.	Teck Pogo Inc.
Kennecott Minerals Co.		TNR Resources Ltd.

Table 20. *Drilling footage reported in Alaska, 1982–2002*

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	127,638	**561,748**
2001	1,100	- -	**1,100**	**36,151**	**316,068**	240,318	75,750	**353,319**
2002	1,250	- -	**1,250**	- -	**488,902**	385,290	103,612	**490,152**

[a]Core and rotary drilling not differentiated prior to 1987.
- - = Not reported.
Note: 500,000 feet of blasthole drilling reported for 2002 (incomplete).

erty, by Chapleau Resources Ltd. at the Kougarok property, by Kinross Gold Corp. in the Fairbanks mining district including Fort Knox and True North mines, by Teck Pogo Inc. at the Pogo property, and by Kennecott Minerals Co. at Greens Creek Mine.

Figure 18. *Drill helper unloads drill samples from core barrel into core boxes at the Donlin Creek gold property. NovaGold had the largest exploration drilling program in Alaska during 2002. Photo courtesy of NovaGold Resources Inc.*

Table 21. *Drilling footage by region in Alaska, 2002*

Type of drilling	Northern	Western	Eastern interior	South-central	South-western	South-eastern	TOTAL
Placer subtotal	- -	- -	**1,250**	- -	- -	- -	**1,250**
Coal subtotal	- -	- -	- -	- -	- -	- -	- -
Hardrock core	7,136	20,630	74,645	7,579	165,472	109,828	385,290
Hardrock rotary	- -	1,200	61,032	2,500	38,880	- -	103,612
Hardrock subtotal	**7,136**	**21,830**	**135,677**	**10,079**	**204,352**	**109,828**	**488,902**
TOTAL (feet)	**7,136**	**21,830**	**136,927**	**10,079**	**204,352**	**109,828**	**490,152**

- - = Not reported.
Note: 500,000 feet of blasthole drilling reported (incomplete). Drill footages do not include sand and gravel drilling.

GOVERNMENT ACTIONS

At the end of October, True North Mine received a Sentinels of Safety Award from the federal Mine Safety and Health Administration (MSHA) for 135,554 hours without lost time due to a work injury during the construction and startup of the mine.

Ray Lester received an award from the Alaska Department of Natural Resources for his reclamation activities on Birch Creek in the Circle mining district between 1995 and 2002. The U.S. Bureau of Land Management also received an award from DNR for innovative thinking that considerably reduced costs of reclamation at the Elim project on the Seward Peninsula.

Airborne geophysical surveys funded by the Alaska Division of Geological & Geophysical Surveys (DGGS) were flown in the Council area east of Nome. DGGS also released results of surveys from three areas flown in 2001: In the area southeast of the Pogo deposit, in the Broad Pass area south of Cantwell, and in the Liberty Bell area east of Healy (table 22).

Magnetic and multi-frequency electromagnetic geophysical surveys funded by the Bureau of Land Management and managed by DGGS were flown in the southern Delta River area (Denali Block) west of Paxson, and in the Red Devil–Sleetmute area of southwestern Alaska. Existing company data were incorporated into the Delta River data and the survey covers about 600 square miles. Publication of the surveys is expected in early 2003. These surveys are the fifth and sixth cooperative airborne geophysical projects between the BLM and DGGS (table 23).

Also in 2002, a strategic 235,000 acres of the Denali Block area, containing some of the best copper–nickel–platinum-group-element (PGE) targets, were Tentatively Approved (TA) for transfer to the State of Alaska from the federal government.

A team of four DGGS geologists, one University of Alaska Fairbanks professor, and two student assistants spent two months mapping in the central Big Delta Quad-

Table 22. *Detailed state airborne geophysical surveys and follow-up geologic ground-truth mapping as of December 2002*[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 maps
Livengood District	229 sq. miles	Airborne geophysical mapping (ground-truth in 2003)
SalchaRiver/North Pogo	1,032 sq. miles	Airborne geophysical mapping/ground-truth geologic maps
Southeast extension of Salcha River/Pogo	91 sq. miles	Airborne geophysical mapping (released winter 2002)
Liberty Bell	276 sq. miles	Airborne geophysical mapping (released winter 2002)
Broad Pass	304 sq. miles	Airborne geophysical mapping (released winter 2002)
Council	618 sq. miles	Airborne geophysical mapping (to be released winter 2003)
Total: 11 years $5.0 million	**8,515 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.

rangle during 2002. Geologic maps covering approximately 420 square miles in the area of a 2000 DGGS airborne geophysical survey will be published in June 2003. Fieldwork was supplemented by point-counting of feldspar-stained rock slabs, ore-element geochemical analyses, major, minor and trace element analyses, radiometric dating, detailed thin-section petrography, and microprobe analyses.

The U.S. Geological Survey (USGS) conducted studies over several years on the Red Dog deposit and regional setting. Recent results include a possible regional exploration tool for "Red Dog type" massive-sulfide mineralization in Mississippian Kuna shale. Geochemical indications of mineralization include greater than 2 parts per million germanium, greater than 1.2 parts per million thallium, greater than 45 parts per million arsenic, and greater than or equal to 20 parts per million antimony.

During the last two summers, USGS and Calista Native Corp. geologists collected geochemical samples in southwestern Alaska in conjunction with the National Geochemical Survey, a nationwide program designed to establish baseline chemical data in the geologic environment. These data are useful in mineral exploration and environmental studies. More than 350 randomly chosen sample sites were visited in 2001 and 2002. At each site, stream sediment and heavy-mineral concentrate samples were collected for chemical and mineralogical analyses. At many sites, vegetation samples were also collected to evaluate naturally occurring metal uptake by various plant species. In 2002, U.S. Geological Survey geologists also began collecting water samples to study metal concentrations and their transport in surface and subsurface waters in Donlin Creek and the surrounding area. NovaGold Resources hired an independent contractor to conduct similar hydrologic studies on the property. These studies will continue over the next few years to document the natural background concentrations of various metals in the environment prior to future development of a mine at Donlin Creek. This information will be valuable in determining permitting and environmental monitoring requirements at Donlin Creek.

The 2002 USGS program in the northern Talkeetna Mountains and southern Alaska Range, the Talkeetna Mountains Transect Project, included gravity and magnetic geophysical studies. Wrangellia terrane, including

Table 23. *Detailed federal airborne geophysical survey work as of December 2002*[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
Delta River	603 sq. miles	Airborne geophysical mapping (to be released 2003)
Sleetmute	641 sq. miles	Airborne geophysical mapping (to be released 2003)
Total: 6 years $2.04 million	**4,733 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 Trust Office, the City of Coffman Cove, and the City of Thorne Bay also contributed funds. Sealaska Corp. also contributed previously acquired geophysical data.

host rocks for ultramafic intrusions and possible PGE mineralization, was found to be two times larger in area than previously mapped and at least 30 miles wider, according to geophysical study results and models. Geophysical models also show two northeast-trending belts with gravity and magnetic features similar to the ultramafic Fish Lake Complex being explored by Nevada Star Resources. Magnetotelluric studies include a transect through the Amphitheater Mountains that reveal a "Honking Big Anomaly" that is too dense to be a graphitic schist and is interpreted to be a westward-plunging massive-sulfide body.

The BLM conducted a 7-week field program in the southern part of the Delta River mining district of eastern and southcentral Alaska over much of the area covered by the USGS Talkeetna Mountains Transect Project (fig. 19). Field crews visited 108 sites (lode, placer, industrial, and coal) and collected 355 samples (rock chip, placer, pan concentrate, and stream sediment). BLM plans to conduct 2 more years of fieldwork and possibly acquire more airborne geophysical data for the northern part of the district. The BLM's mineral assessment will include mineral occurrence surveying, mapping, and sampling; airborne and ground

Figure 19. *John Wandke, a temporary BLM employee, samples "roundwash" for assessment of potential placer minerals as part of the BLM's mineral assessment of the Delta River mining district. Photo by Joe Kurtak.*

geophysics; stream sediment geochemistry; and economic, engineering, and environmental analysis.

In 2002, Teck Cominco received recognition from the U.S. Coast Guard, with a public commendation to Foss Maritime and the Red Dog mine for their excellent efforts to secure and recover, without environmental incident, a barge that broke loose during a storm at the Red Dog port on the Chukchi Sea. During the year, the company also had to deal with some very difficult situations. A committee from the community of Kivalina near the Red Dog mine brought proceedings against Teck Cominco Alaska alleging violations of the federal Clean Water Act and the mine's water discharge permits. The vast majority of the alleged incidents were permitted through Compliance Orders issued by the EPA, and Teck Cominco Alaska has worked closely with the regulatory authorities and NANA to meet the concerns of the community of Kivalina.

The minerals industry paid almost $5.5 million to the State of Alaska in 2002, of which just less than $0.5 million was for mining license taxes. The severe drop in mining license taxes, which are based on profitability, resulted from a $30 million loss for Red Dog Mine. An additional $9.7 million was paid to municipalities. Mining companies were the largest tax payers in the City and Borough of Juneau and the Fairbanks North Star, Denali, and Northwest Arctic boroughs. Overall, payments to the state and the boroughs totaled nearly $15.2 million, about 9 percent less than in 2001 (table 24).

Table 24. *Revenues paid to the State of Alaska and municipalities by Alaska's mineral industry, 1997–2002*[a]

	1997	1998	1999	2000	2001	2002
State mineral rents and royalties						
State claim rentals[b]	$ 1,036,782	$ 1,170,812	$ 1,982,453	$ 1,975,376	$1,736,522	1,908,228
Production royalties	8,930	9,489	14,214	6,175	1,933	23,447
Annual labor	80,795	118,020	90,720	79,907	103,274	124,741
Subtotal	**1,126,507**	**1,298,321**	**2,087,387**	**2,061,458**	**1,841,729**	**2,056,416**
State coal rents and royalties						
Rents	173,773	331,716	205,983	233,249	198,545	256,927
Royalties	1,342,077	1,937,899	2,615,858	1,482,803	1,168,043	860,633
Bonus	0	0	0	372,000	0	0
Offshore Prospecting Permits	0	0	0	0	0	0
Subtotal	**1,515,850**	**2,269,615**	**2,821,841**	**2,088,052**	**1,366,588**	**1,117,560**
State material sales						
Mental Health	57,620	40,269	32,407	33,928	118,545	151,993
Division of Land	278,913	1,043,602	586,550	449,343	1,515,769	1,595,708
SPCO	27,579	28,491	28,941	41,395	12,894	24,725
Subtotal	**364,112**	**1,112,362**	**647,898**	**524,666**	**1,647,208**	**1,772,426**
State mining miscellaneous fees						
Filing Fees	4,187	2,510	4,288	5,400	3,000	3,000
Penalty Fees	0	0	8,000	0	0	450
Explore incentive app filing fee	0	2,000	3,000	0	0	0
Bond pool payment	91,666	79,929	70,692	50,100	53,866	45,208
Surface coal mining app fee	16,100	6,890	2,500	1,830	3,700	2,530
APMA mining fees	22,454	18,975	19,288	18,550	13,175	11,975
Subtotal	**134,407**	**110,304**	**107,768**	**75,880**	**73,741**	**63,163**
Mining license[c]	941,735	1,797,292	1,296,663	2,712,541	2,068,232	469,270
State total	**4,082,611**	**6,587,894**	**6,961,557**	**7,462,597**	**6,997,498**	**5,478,835**
Payments to Municipalities	**8,386,000**	**7,934,000**	**8,818,819**	**9,196,500**	**9,763,220**	**9,703,208**
TOTAL	**$12,468,611**	**$14,521,894**	**$15,780,376**	**$16,659,097**	**$16,760,718**	**$15,182,043**

[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 1997-2002 from Department of Revenue.
N/A = not available.
SOURCE: Municipalities, companies, and DNR Financial Services Section.

APPENDIX A

New claims staked in Alaska 1998-2002

Quad no.	Quadrangle name[a]	New federal mining claims					New state mining claims				
		1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
18	De Long Mountains	0	0	0	0	0	0	4,685	72	79	0
23	Phillip Smith Mountains	0	0	0	0	0	0	0	0	0	1
26	Noatak	0	0	0	0	0	0	1,411	216	112	0
27	Baird Mountains	0	0	0	10	0	0	64	1	0	8
28	Ambler River	0	0	0	0	0	6	0	95	0	0
30	Wiseman	90	13	15	12	12	30	92	33	6	14
31	Chandalar	1	13	10	7	15	56	3	8	14	22
32	Christian	0	0	0	0	0	0	0	0	0	1
36	Selawik	0	0	0	0	0	0	2	0	2	0
37	Shungnak	0	0	0	0	0	0	0	0	14	0
38	Hughes	0	0	0	0	0	1	1	0	1	0
39	Bettles	28	12	1	15	3	1	1	0	0	0
43	Teller	0	0	0	0	0	4	24	0	96	60
44	Bendeleben	0	0	0	0	0	43	56	64	17	52
45	Candle	0	0	0	27	0	8	0	26	51	48
47	Melozitna	0	0	0	0	0	0	0	1	11	0
48	Tanana	0	0	0	0	0	81	11	134	27	43
49	Livengood	0	0	0	0	0	28	38	186	54	151
50	Circle	0	0	0	0	0	663	391	551	111	139
52	Nome	0	0	0	0	0	16	1	9	38	13
53	Solomon	0	0	0	0	0	8	11	39	25	11
55	Nulato	0	0	0	0	0	56	80	28	32	0
56	Ruby	0	0	0	0	0	657	90	4	0	0
57	Kantishna River	0	0	0	0	0	0	8	0	0	0
58	Fairbanks	0	0	0	0	0	73	22	28	55	49
59	Big Delta	0	0	0	0	0	4,290	2,775	1,547	112	87
60	Eagle	0	0	0	0	0	794	465	761	90	53
64	Ophir	0	0	0	0	0	46	59	12	3	40
65	Medfra	0	0	0	0	0	26	37	0	0	12
67	Healy	0	0	0	0	0	683	78	12	73	139
68	Mt. Hayes	2	0	8	47	36	803	488	517	268	175
69	Tanacross	0	0	0	0	0	933	313	140	46	0
73	Iditarod	0	0	0	0	0	94	0	0	8	28
74	McGrath	0	0	0	0	0	0	16	0	23	117
75	Talkeetna	0	0	0	0	0	102	83	123	65	77
76	Talkeetna Mountains	0	0	0	0	0	112	18	59	17	37
77	Gulkana	0	0	0	0	2	6	231	0	0	0
78	Nabesna	0	0	0	0	0	1	2	0	0	0
81	Russian Mission	0	0	0	0	0	0	0	4	0	5
82	Sleetmute	0	0	0	0	0	0	62	0	0	6
83	Lime Hills	0	0	0	0	0	27	12	0	4	0
84	Tyonek	0	0	0	0	0	23	86	3	2	0
85	Anchorage	0	0	0	0	0	84	107	43	35	48
86	Valdez	0	0	0	0	0	0	1	153	0	9
92	Taylor Mountains	0	0	0	0	0	7	0	12	0	0
93	Lake Clark	0	0	0	0	0	0	0	0	8	2
95	Seward	44	24	24	16	17	12	29	13	5	10
96	Cordova	0	0	0	0	1	1	0	0	0	0
97	Bering Glacier	0	0	0	0	0	4	0	2	3	0
102	Dillingham	0	0	63	0	0	0	0	121	84	0
103	Iliamna	0	0	0	0	0	2	0	2	134	36
104	Seldovia	0	0	0	0	0	2	0	0	0	0
109	Skagway	0	1	0	0	0	1	38	1	12	1
112	Juneau	52	10	1	0	33	0	0	0	1	6

Quad no.	Quadrangle name	New federal mining claims 1998	1999	2000	2001	2002	New state mining claims 1998	1999	2000	2001	2002
114	Sitka	10	0	0	0	0	0	0	0	0	0
116	Port Alexander	0	0	2	0	0	0	0	0	0	0
117	Petersburg	183	98	0	6	141	0	2	0	1	0
118	Bradfield Canal	0	0	0	0	0	0	0	0	0	2
119	Craig	3	137	399	223	0	1	0	0	7	0
120	Ketchikan	0	0	0	0	0	0	0	0	0	2
121	Dixon Entrance	14	0	0	0	5	0	0	0	0	0
122	Prince Rupert	0	0	0	95	4	0	0	0	11	0
130	Karluk	0	0	0	0	0	0	0	0	5	18
135	Trinity Islands	0	0	0	0	0	0	74	66	0	13
138	Port Moller	0	0	0	0	0	0	10	0	0	
	TOTALS	**427**	**308**	**523**	**464**	**261***	**9,785**	**11,977**	**5,086**	**1,763**	**1,531**

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

[a]Unlisted quadrangles did not have any staked mining claims between 1998 and 2002.

*Eight federal claims extend over 2 quadrangles.

APPENDIX B
Prospecting sites in Alaska 1996–2002

Quad no.	Quad name[a]	1996 New	1996 Total	1997 New	1997 Total	1998 New	1998 Total	1999 New	1999 Total	2000 New	2000 Total	2001 New	2001 Total	2002 New	2002 Total
17	Point Hope	0	17	0	15	0	0	0	0	0	0	0	0	0	0
18	De Long Mountains	0	0	0	0	0	0	27	27	72	99	0	99	0	91
26	Noatak	24	48	0	48	0	0	0	0	1	1	0	1	0	1
27	Baird Mountains	8	32	0	32	0	32	0	32	0	32	0	22	0	22
30	Wiseman	63	67	2	23	31	38	0	29	11	13	0	13	0	13
31	Chandalar	4	30	37	60	14	46	14	24	0	23	0	11	0	11
36	Selawik	0	5	0	5	1	6	1	7	0	7	3	3	0	7
38	Hughes	0	0	9	9	0	9	1	10	0	8	0	8	0	8
41	Fort Yukon	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	Black River	1	1	0	1	0	0	0	0	0	0	0	0	0	0
43	Teller	0	0	0	0	0	0	0	0	15	15	0	15	0	15
44	Bendeleben	42	60	89	147	4	143	7	136	0	60	0	44	0	37
45	Candle	8	8	13	21	0	20	6	26	32	46	0	38	0	32
47	Melozitna	192	192	0	192	0	192	144	336	0	144	0	128	0	0
48	Tanana	295	401	18	379	5	289	97	337	27	123	2	107	0	30
49	Livengood	62	301	184	407	111	322	20	147	24	123	0	36	7	15
50	Circle	139	641	176	499	201	528	82	443	32	302	5	138	9	92
52	Nome	66	128	63	173	16	125	21	83	37	102	1	87	0	66
53	Solomon	34	59	12	64	5	53	10	40	0	28	0	23	0	13
55	Nulato	4	6	0	6	2	4	22	26	6	32	0	30	0	16
56	Ruby	16	19	57	76	37	113	8	95	0	48	0	11	0	3
57	Kantishna River	0	0	4	4	0	4	0	4	0	4	0	4	0	4
58	Fairbanks	90	193	63	221	49	149	19	105	0	72	2	32	0	19
59	Big Delta	118	244	295	449	1,968	2,301	967	3,152	405	2,823	1	913	0	555
60	Eagle	74	125	52	145	220	336	27	282	76	316	0	142	0	108
64	Ophir	5	9	46	55	0	53	1	39	177	182	0	182	0	181
65	Medfra	11	12	22	34	0	21	2	10	0	3	0	1	0	1
66	Mt. McKinley	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67	Healy	127	152	397	535	245	748	16	597	13	101	0	48	0	34
68	Mt. Hayes	246	273	194	423	73	442	25	414	46	329	8	277	0	264
69	Tanacross	56	93	54	110	22	91	155	219	0	185	0	147	0	0
73	Iditarod	235	235	0	235	0	207	16	180	0	165	4	169	3	152
74	McGrath	19	25	198	218	2	204	16	158	52	65	0	65	0	57
75	Talkeetna	15	38	281	308	63	331	19	282	42	77	0	68	27	64
76	Talkeetna Mountains	0	79	15	40	58	88	2	88	4	75	0	44	4	46

APPENDIX B
Prospecting sites in Alaska 1996-2002
(continued)

Quad no.	Quad name	1996 New	1996 Total	1997 New	1997 Total	1998 New	1998 Total	1999 New	1999 Total	2000 New	2000 Total	2001 New	2001 Total	2002 New	2002 Total
77	Gulkana	0	0	8	8	0	8	0	8	3	3	0	3	0	3
78	Nabesna	0	0	0	0	0	0	0	0	4	4	0	4	0	4
81	Russian Mission	0	0	46	46	0	46	0	46	0	46	0	46	0	46
82	Sleetmute	0	0	46	46	0	46	0	46	0	26	0	26	0	26
83	Lime Hills	0	0	9	9	0	9	0	0	0	0	0	0	0	0
84	Tyonek	14	28	6	20	0	20	0	14	0	0	0	0	0	0
85	Anchorage	21	84	24	98	5	64	10	64	3	62	0	61	1	54
86	Valdez	9	38	0	27	0	16	0	16	25	41	0	41	0	41
91	Bethel	16	22	4	26	0	12	18	22	0	18	0	10	0	0
92	Taylor Mountains	6	6	0	6	32	38	0	32	0	0	0	0	0	0
95	Seward	26	26	2	26	1	20	2	5	0	2	0	2	0	0
97	Bering Glacier	0	0	0	0	2	2	0	2	0	2	0	0	0	0
102	Dillingham	0	0	48	48	0	48	0	44	0	0	0	0	0	0
103	Iliamna	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	Seldovia	1	1	0	0	0	0	0	0	0	0	0	0	0	0
105	Blying Sound	7	7	0	7	0	7	0	0	0	0	0	0	0	0
109	Skagway	0	0	6	6	4	10	0	4	0	0	0	0	0	0
117	Juneau	13	13	0	13	0	5	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	14	16	0	14	17	31	0	17	14	28	0	0	5	5
137	Ketchikan	1	1	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS		**2,082**	**3,735**	**2,480**	**5,334**	**3,188**	**7,277**	**1,755**	**7,653**	**1,121**	**5,840**	**26**	**3,111**	**56**	**2,141**

[a]Unlisted quadrangles did not have any prospect sites staked during 1996-2002.

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

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).
Big Creek/Ladue, 58, (fig. C-1).
Big Hurrah, 32, (fig. C-3).
Binocular and other prospects, 72, (fig. C-1).
Bohemia Basin, 103, (fig. C-3).
Bokan Mountain, 122, (fig. C-3).
Bonanza Creek, 45, (fig. C-2).
Bond Creek, 73, (fig. C-2).
Bonnifield district massive sulfide deposits, 54, (fig. C-1).
Bornite, 8, (fig. C-1).
Brady Glacier, 98, (fig. C-3).
BT, 54, (fig. C-1).
Buck Creek, 23, (fig. C-2).
Calder Mine, 133, (fig C-2).
Canwell and Nikolai Complex, 140 (fig. C-3)
Cape Creek, 22, (fig. C-2).
Carl Creek, 74, (fig. C-2).
Casca VABM, 53, (fig. C-1).
Castle Island, 111, (fig. C-1).
Chandalar mining district, 17, (fig. C-3).
Chichagof, 101, (fig. C-3).
Chistochina, 68, (figs. C-2, C-3).
Circle mining district, 52, (fig. C-3).
Claim Point, 82, (fig. C-3).
Coal Creek, 63, (fig. C-2).
Copper City, 119, (fig. C-1).
Cornwallis Peninsula, 110, (fig. C-1).
Council mining district, 33, (fig. C-3).
Delta massive sulfide belt, 55, (fig. C-1).
Denali prospect, 67, (fig. C-1).
Dolphin, 49e, (fig. C-3).
Donlin Creek, 137, (fig. C-3).
Drenchwater, 3, (fig. C-1).
Dry Creek, 54, (fig. C-1).
Duke Island, 141 (fig. C-3)
Eagle Creek, 34, (fig. C-3).
Ear Mountain, 25, (fig. C-2).
Ellamar, 78, (fig. C-1).
Ernie Lake (Ann Creek), 15, (fig. C-1).
Esotuk Glacier, 20, (fig. C-2).
Fairbanks mining district, 49, (fig. C-3).
Fairhaven/Inmachuk district, 39, (fig. C-3).
Fort Knox, 49a, (fig. C-3).
Fortymile mining district, 60, (fig. C-3).
Frost, 7a, (fig. C-1).
Funter Bay mining district, 99, (fig. C-3).
Galena Creek, 21a, (fig. C-1).
Gil Claims, 49f, (fig. C-3).
Ginny Creek, 4, (fig. C-1).
Golden Zone mine, 64, (figs. C-1, C-3).
Goodnews Bay, 85, (fig. C-3).
Grant Mine, 49c, (fig. C-3).
Greens Creek, 105, (fig. C-1).
Groundhog Basin, 112, (fig. C-1).
Haines Barite/Palmer, 95, (fig. C-1).
Hannum, 27, (fig. C-1).
Hirst Chichagof, 101, (fig. C-3).
Horsfeld, 76, (fig. C-2).
Hot Springs mining district, 47, (figs. C-2, C-3).
Hyder mining district, 117, (figs. C-1, C-2).
Iditarod district, 43, (fig. C-3).
Illinois Creek, 132, (figs. C-1, C-3).
Independence, 79, (fig. C-3).
Independence Creek, 28, (fig. C-1).
Inmachuk River, 39, (fig. C-3).
Innoko-Tolstoi mining district, 44, (fig. C-3).
Ivanof, 88, (fig. C-2).
Jimmy Lake, 94, (fig. C-1).
Johnson River, 125, (fig. C-3).
Jualin, 128, (fig. C-3).
Jumbo, 118, (fig. C-1).
Kaiyah, 138, (fig. C-3).
Kantishna mining district, 61, (fig. C-3).
Kasaan Peninsula, 114, (fig. C-1).
Kasna Creek, 92, (fig. C-1).
Kemuk Mountain, 123, (fig. C-3).
Kennecott deposits, 71, (fig. C-1).
Kensington, 127, (fig. C-3).
Kivliktort Mountain, 5a, (fig. C-1).
Klery Creek, 14, (fig. C-3).
Klukwan, 96, (fig. C-3).
Kougarok Mountain, 26, (fig. C-2).
Koyukuk-Hughes mining district, 42, (fig. C-3).
Koyukuk-Nolan mining district, 16, (fig. C-3).
Latouche, Beatson, 80, (fig. C-1).
Liberty Belle, 54, (fig. C-1).
Lik, 1, (fig. C-1).
Livengood-Tolovana mining district, 48, (fig. C-3).
Lost River, 24, (fig. C-2).
Lucky Shot, 79, (fig. C-3).
McLeod, 124, (fig. C-2).
Mertie Lode, 99, (fig. C-3).
Midas mine, 77, (fig. C-1).
Mike deposit, 90, (fig. C-2).
Mirror Harbor, 102, (fig. C-3).
Misheguk Mountain, 13, (fig. C-3).
Mosquito, Peternie, 56, (fig. C-2).
Mt. Prindle, 50, (fig. C-3).
Nabesna mine, 69, (fig. C-3).
Niblack, 121, (fig. C-1).
Nim prospect, 65, (fig. C-1).
Nimiuktuk River, 126, (fig. C-1).
Nixon Fork, 135, (fig. C-3).
Nome mining district, 30, (fig. C-3).
Nunatak, 97, (fig. C-2).
Omalik, 35, (fig. C-1).
Omar, 7, (fig. C-1).
Orange Hill, 73, (fig. C-2).
Pebble Copper, 129, (fig. C-1).
Placer River, 38, (fig. C-2).
Pleasant Creek, 53, (fig. C-1).
Pogo, 130, (fig. C-3).
Poovookpuk Mountain, 40, (fig. C-2).
Porcupine Lake, 18, (fig. C-2).
Purcell Mountain, 41, (fig. C-2).
Pyramid, 87, (fig. C-2).
Quartz Creek, 37, (fig. C-1).
Quartz Hill, 120, (fig. C-2).
Red Bluff Bay, 109, (fig. C-3).
Red Devil, 83, (fig. C-3).
Red Dog, 2, (fig. C-1).
Red Mountain, 82, (fig. C-3).
Rex deposit, 91, (fig. C-2).
Rock Creek, 31, (fig. C-3).
Rua Cove, 81, (fig. C-1).
Ruby mining district, 46, (fig. C-3).
Ryan Lode, 49b, (fig. C-3).
Salt Chuck, 115, (fig. C-3).
Sheep Creek, 54, (fig. C-1).
Shotgun Hills, 131, (fig. C-3).
Shulin Lake, 139 (fig. C-3)
Sinuk River region, 29, (fig. C-1).
Slate Creek, 59, (fig. C-3).
Sleitat Mountain, 93, (fig. C-2).
Smucker, 11, (fig. C-1).
Snettisham, 107, (fig. C-3).
Snipe Bay, 113, (fig. C-3).
Solomon mining district, 33, (fig. C-3).
Spirit Mountain, 70, (fig. C-3).
Stampede mine, 62, (fig. C-3).
Story Creek, 5, (fig. C-1).
Sumdum, 106, (fig. C-1).
Sun, 10, (fig. C-1).
Taurus, 57, (fig. C-2).
Three Castle Mountain, 53, (fig. C-1).
Tracy Arm, 108, (fig. C-1).
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Twin Mountain, 51, (fig. C-2).
Union Bay, 116, (fig. C-3).
Valdez Creek district, 66, (fig. C-3).
Vinasale Mountain, 134, (fig. C-3).
Virginia Creek, 54, (fig. C-1).
Von Frank Mountain, 136, (fig. C-3).
War Baby, 79, (fig. C-3).
Weasel Mountain, Bee Creek, 89, (fig. C-2).
Whoopee Creek, 6, (fig. C-1).
Willow Creek, 79, (fig. C-3).
Wind River, 19, (fig. C-1).
Windy Creek, 36, (fig. C-2).
Zackly, 67a, (fig. C-1).

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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.

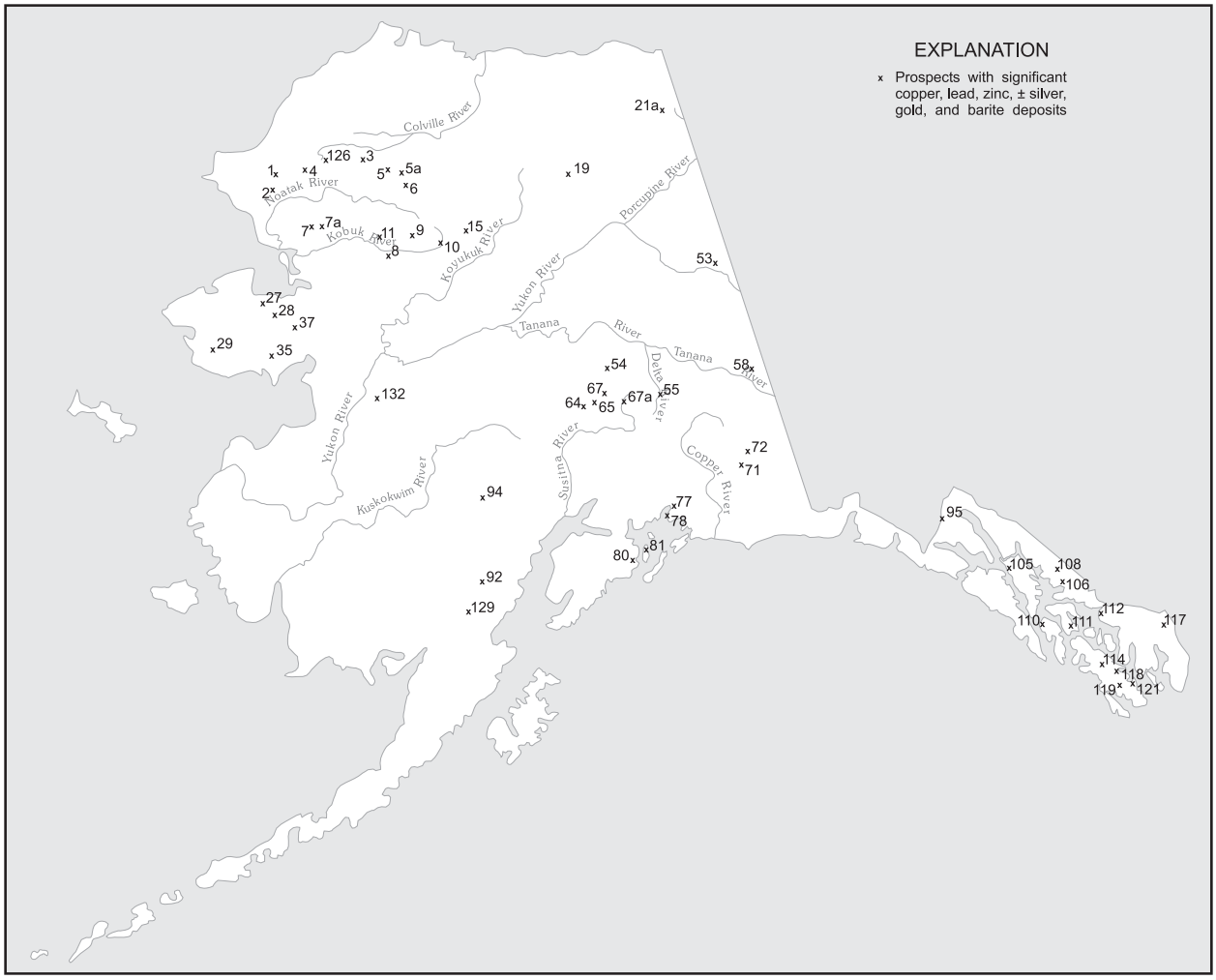

Figure C-1. *Significant copper, lead, zinc with credits of silver, gold, and barite deposits in Alaska, 2002.*

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. Mining from 1989 to 2002 produced 5.2 million tons of Zn, 832,796 tons of Pb, and 51.5 million oz Ag. Deposits include: (a) the Main deposit at Red Dog, which 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, which 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 of 10.6 million tons grading 17.8% Zn, 5.5% Pb, and 3.41 oz/ton Ag; (d) inferred resource in the Paalaaq deposit of 14.3 million tons of 15.0% Zn, 4.0% Pb, and 2.63 oz/ton Ag; and (e) Anarraq deposit, discovered in 1999, with 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

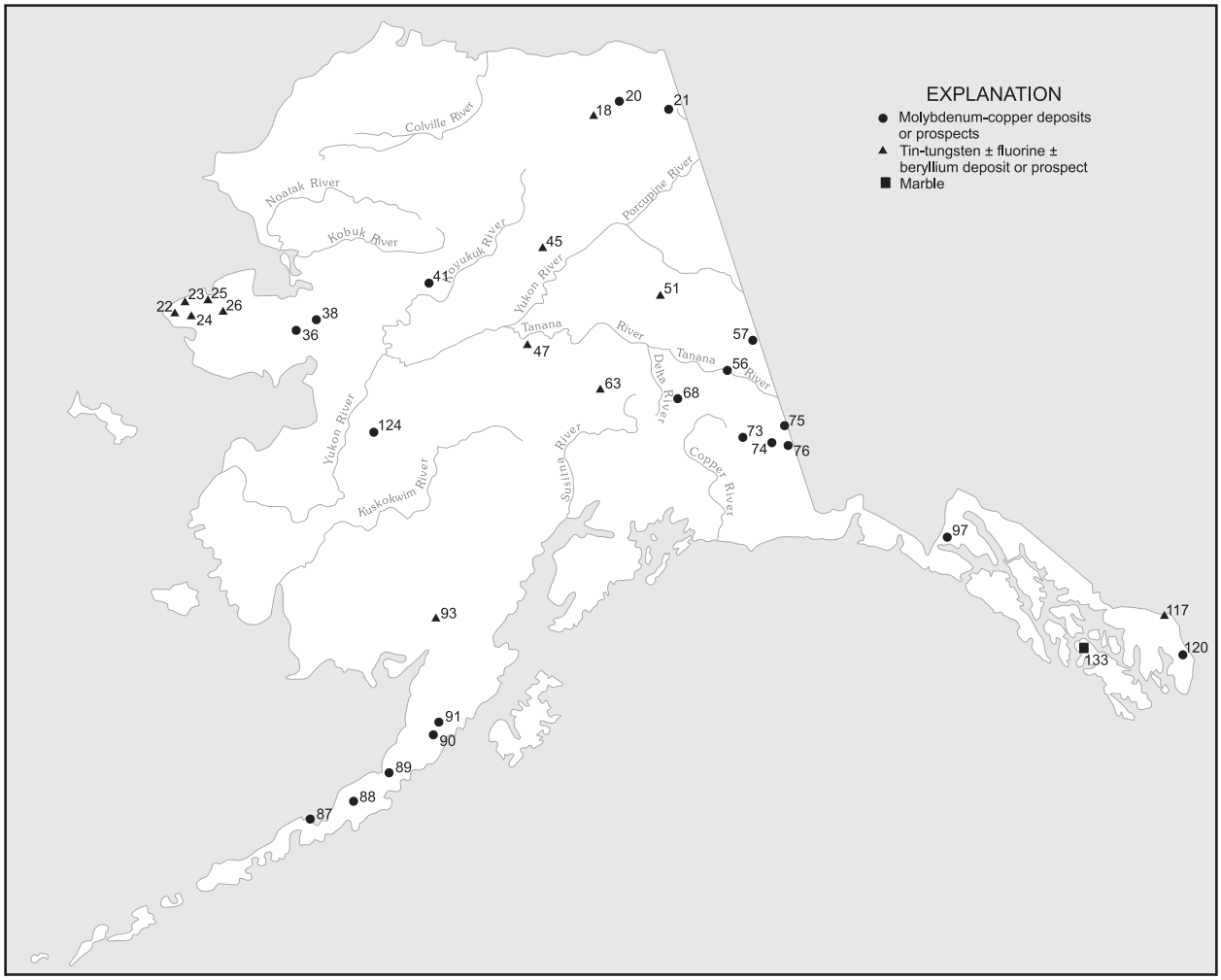

Figure C-2. *Significant molybdenum–copper and tin–tungsten with credits of fluorite and beryllium deposits in Alaska, 2002.*

Shale. Grab samples of high-grade material contain up to 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 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).

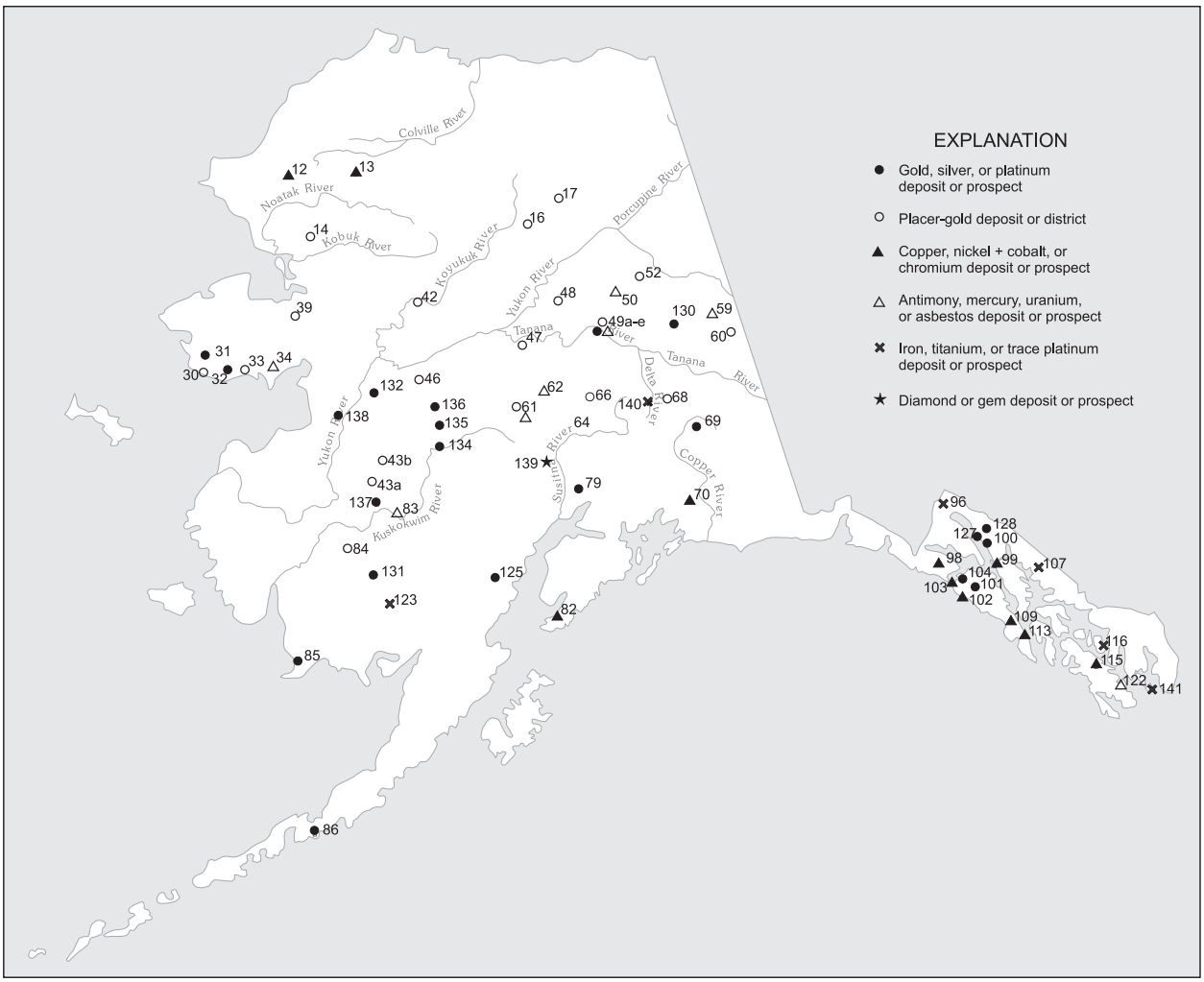

Figure C-3. *Significant gold, silver, platinum, and strategic mineral deposits in Alaska, 2002.*

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 2002 produced an estimated 344,983 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 2002 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 1897–2002 in excess of 4,988,928 oz Au all from placers. Past sporadic Sb and W production (fig. C-3).

31 **Rock Creek**—858,000 oz Au resource, with about 10.25 million tons grading 0.078 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 Nome Group. 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 2002. 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 348,089 oz production from 1902–2002; 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 258,344 oz Au from 1930 to 2002, 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 1,562,722 oz Au through 2002. 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 727,794 oz Au through 2002, 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 477,477 oz Au from 1931 to 2002; 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 577,956 oz Au and over 720,000 lb cassiterite through 2002. Includes Eureka and Tofty subdistricts. Magnetite-rich, niobium-bearing carbonatite sill in the Tofty area contains geochemically anomalous Nb, REE, P, and Y (figs. C-2, C-3).

48 **Livengood–Tolovana mining district**—Placer Au district; produced more than 529,466 oz Au since discovery in 1914 to 2002. 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 8,174,987 oz Au from placer deposits (1902–2002). Major lode Au and lode Sb producer; produced more than 2,587,964 oz Au and over 2000 tons Sb from veins and shear zones through 2002. 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. at Fort Knox and True North mines produced 2,283,416 oz of Au from 1996 to 2002 (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 2000 mineral inventory is 18.2 million tons grading 0.072 oz/ton Au for a contained 1,314,000 oz Au. Mining began in 2001 and 20 million tons of 0.06 oz/ton ore were processed at Fort Knox mill (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 1,062,005 oz Au since discovery in 1893 to 2002. 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 548,114 oz placer and very minor lode Au since discovery in 1883 to 2002, the longest continuous production of Au (119 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 2002. 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 ft (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 Jurassic 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. Production from 1989 to 1993 and 1996 to 2002 is 557,675 tons of Zn, 216,275 tons of Pb, more than 8,600 tons of Cu, 95.4 million oz of Ag, and 661,481 oz of Au. The 2002 reserve estimate is 7 million tons grading 0.13 oz/ton Au, 14.9 oz/ton Ag, 11.4% Zn, and 4.2% Pb. Resources are 2.7 million

tons grading 11.3% Zn, 4.9% Pb, 0.13 oz/ton Au, and 17 oz/ton Ag. (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 zoned, Ural-Alaska type ultramafic complex; area also contains PGE and V concentrations. At least six zones of PGE–magnetite hydrothermal mineralization are associated with pyroxene veins that crosscut magmatic layering (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 3.22% Zn, 1.70% Cu, 0.93 oz/ton Ag and 0.081 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 estimates indicate at least 10.95 million tons grading 0.16 oz/ton Au for

1,751,000 oz Au of proven and probable reserves. 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. Mineralized system extends over a 35-sq-mi area and includes other Cu–Au–Mo porphyry, Cu–Au skarn, and Au vein prospects (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 126,000 oz Au and 600,000 oz Ag from 1997 to 2002. Past ore grade of 0.076 oz/ton Au and 1.6 oz/ton Ag (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 was 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 up to 429 ft wide 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, refractory, and occurs along a 4-mi-long, 1-mi-wide zone. Measured and indicated resource on November 2002 estimated at 8.26 million oz of Au grading 0.102 oz/ton Au and an inferred resource of 14.83 million oz Au grading 0.102 oz/ton Au at a 0.058 oz/ton Au cut-off grade. Considered the 25th largest gold resource in the world (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 ft thick, and silicification are associated with pervasive advanced argillic, and sericite alteration (fig. C-3).

139 **Shulin Lake**—Micro- and macro-diamonds in interbedded volcaniclastic and tuffaceous rocks containing olivine and pyroxene. Discovered by tracing diamond indicator minerals in placer gravels. Possible lamproitic intrusions with up to 1-mi-diameter circular aeromagnetic anomalies (fig. C-3).

140 **Canwell and Nikolai Complex**—Ni–Cu–PGE semi-massive to massive-sulfide prospects hosted in mafic and ultramafic rocks of the Nikolai intrusive/extrusive complex. Five mafic–ultramafic intrusions in the central Alaska Range are comagmatic with the Nikolai flood basalts (fig. C-3).

141 **Duke Island**—Cu–Ni–PGE disseminated, semi-massive, and massive-sulfides associated with two zoned, Ural-Alaska type ultramafic bodies (fig. C-3).

APPENDIX D

State and federal agencies and private interest groups involved in mineral development activities, 2002

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

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.

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.

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

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/adfg

DEPARTMENT OF NATURAL RESOURCES
Office of the Commissioner
400 Willoughby Ave., Ste. 500
Juneau, AK 99801-1724
(907) 465-2400
http://www.dnr.state.ak.us

Alaska Coastal Management Program
302 Gold St., Ste. 202
Juneau, AK 99801
(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 Ave., Ste. 1660
Anchorage, AK 99501-3568
(907) 269-7470
(907) 269-3981 (fax)

Alaska Mental Health Trust Land Office
550 W. 7th Ave., Ste. 1430
Anchorage, AK 99501
(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.

Office of Habitat Management & Permitting
Headquarters & Juneau Area Office
400 Willoughby Ave., 4th Fl.
Juneau, AK 99801-1796
(907) 465-4105
(907) 465-4759 (fax)

Function: The Office of Habitat Management and Permitting fulfills specific statutory responsibilities for (1) protecting freshwater and anadromous fish habitat under the Anadromous Fish Act (AS 41.14.870) and (2) providing free passage of anadromous and resident fish in fresh waterbodies (AS 41.14.840). It 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.

Operations Manager & Fairbanks Area Office
1300 College Rd.
Fairbanks, AK 99701-1551
(907) 459-7289
(907) 456-3091 (fax)

Anchorage Area Office
333 Raspberry Rd.
Anchorage, AK 99518-1599
(907) 267-2285
(907) 267-2464 (fax)

Kenai Area Office
514 Funny River Rd.
Soldotna, AK 99669-8255
(907) 260-4882
(907) 260-5992 (fax)

Mat-Su Area Office
1800 Glenn Highway, Ste. 12
Palmer, AK 99645-6736
(907) 745-7363
(907) 745-7369 (fax)

Petersburg Area Office
P.O. Box 667
Petersburg, AK 99833-0667
(907) 772-5224
(907) 772-9336 (fax)

Prince of Wales Area Office
P.O. Box 668
Craig, AK 99921-0668
(907) 826-2560
(907) 826-2562 (fax)

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) 465-2494

Division of Geological & Geophysical Surveys
3354 College Rd.
Fairbanks, AK 99709-3707
(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 (AS 41.08.020). Publishes a variety of reports and maintains a web site 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)
John_Reeder@dnr.state.ak.us

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/mlw

A. Mining

Function: Principal agency for management of mining and reclamation on state land in Alaska. Maintains offices in Anchorage and 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) 451-2793

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)

Southeast Regional Office
400 Willoughby Ave., Ste. 400
Juneau, AK 99801-1724
(907) 465-3400
(907) 586-2954 (fax)
E-mail: sero@dnr.state.ak.us

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

Southeast Regional Office
400 Willoughby Ave., 5th 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: stefaniej@dnr.state.ak.us

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

Alaska Bureau of Wildlife Enforcement
5700 East Tudor Rd.
Anchorage, AK 99507-1225
(907) 269-5589

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

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Fairbanks, AK 99775-5780
(907) 474-7565
(907) 474-5163 (fax)
email: geology@www.uaf.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
Duckering Building, Room 357
University of Alaska Fairbanks
Fairbanks, AK 99775-5960
(907) 474-7366
(907) 474-6994 (fax)
email: FYSME@uaf.edu
http://www.uaf.edu/sme

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
P.O. Box 757240
Duckering Building, Room 357
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.

Dept. of Mining & Geological Engineering
School of Mineral Engineering
P.O. Box 755800
Duckering Building, Room 301
University of Alaska Fairbanks
Fairbanks, AK 99775-5800
(907) 474-7388
(907) 474-6635 (fax)
email: FYSME@uaf.edu
http://www.uaf.edu/sme

Function: Teaching research and public service; support of the mineral industry.

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 more than 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

Public Information Center (907) 271-5960
Northern Field Office (907) 474-2252
Public Information Center
http://www.ak.blm.gov/

Energy Branch (907) 271-5608
Solid Minerals Branch (907) 271-5608

Division Functions:

BLM is the surface manager of federal public lands (except national parks, wildlife refuges, national monuments, national forests, and military withdrawals). The Division is responsible for developing and coordinating statewide and regional program management policies and strategies related to federal onshore energy and non-energy leasable minerals, mineral assessments, and locatable minerals. It provides technical assistance and coordinates activities relating to ANILCA 1010 mineral assessments. The Division provides the basis for economic analysis relating to energy and mineral development in the state. It also provides leadership and technical assistance on abandoned mine lands inventories and impacts on public lands.

Energy Branch Functions:

The Branch is responsible for the federal onshore mineral leasing programs and functions; including oil and gas, geothermal resources, coal, and other energy and non-energy minerals. The Branch prepares and conducts oil and gas lease sales and is responsible for preparing pre- and post-lease sale fair market value evaluations for National Petroleum Reserve–Alaska leasing, and issuing leases; adjudicates oil and gas leases, transfers, and bonds; approves oil and gas industry operations for federal onshore oil and gas leases; protects federal lands from drainage of oil and gas resources, and inspects industry operations for compliance; and coordinates with other federal surface management agencies for the leasing and monitoring of minerals operations under their jurisdictions.

Solid Minerals Branch Functions:

The Branch maintains mining claim and mineral patent case files and electronic public minerals records related to those files. It adjudicates federal mining claim recordation filings, annual assessment affidavits, and timely payment of annual claim holding fees. It also adjudicates mineral survey and patent applications, and serves contest complaints for all federal lands in Alaska. The Branch conducts mineral assessments 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. Field information is augmented by studies of 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

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

Nome Field Station
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
(907) 474-2282 (fax)
1-800-437-7021

Tok Field Station
P.O. Box 309
Tok, AK 99780
(907) 883-5121
(907) 883-5123 (fax)

Juneau Office
John Rishel 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: As a part of the minerals branch, in addition to the assessments and studies described above, the Mineral information Center has a special library which contains 20,000 geologic and minerals publications, and provides a variety of information services; plus displays of Alaskan rocks, minerals, and mining artifacts.

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

U.S. Fish and Wildlife Service
Anchorage Fish and Wildlife 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 99508-4667
(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
2070 Peabody Rd., Suite 710
Vacaville, CA 95687
(707) 447-9842
(707) 447-9432 (fax)
email: bowen.ayers@dol.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: bowen.ayers@dol.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)
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

Function: To be effective as a business leader by supporting and focusing its broad-based membership in their efforts to grow Anchorage into a premier American city.

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. 105
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) 479-9450
paulcmpy@alaska.net

Juneau Branch of AMA
10430 Dock St.
Juneau AK 99801-8522
(907) 789-6800
email: twelker@alaska.net

Kenai Branch of AMA
155 Smithway, #101
Soldotna, AK 99669-3503
(907) 262-2788
mapts@alaska.net

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

American Institute of Professional Geologists
8703 Yates Dr., Ste. 200
Westminster, CO 80031-3681
(303) 412-6205
(303) 253-9220 (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) 339-3900
(907) 339-3980 (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

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 30153
Central, AK 99730
(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) 766-2821

Iditarod Mining District
John A. Miscovich
P.O. Box 87
Red Devil, AK 99656

Livengood-Tolovana Mining District
Rose Rybachek
P.O. Box 55698
North Pole, AK 99705
(907) 488-6453

Yentna Mining District
Carol Young
P.O. Box 211
Talkeetna, AK 99676
(907) 733-2351

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
406 W. Fireweed, S uite 104
Anchorage, AK 99503
(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
3900 C St., Suite 801
Anchorage, AK 99503-5963
(907) 339-6000
(907) 339-6028 (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.
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: kmcgee@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: lands@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 and Exploration Companies

Abacus Mining & Exploration Co.	http://www.amemining.com
Alaska Earth Sciences Inc.	http://www.aes.alaska.com
Alaska Freegold Co.	http://www.freegoldventures.com
Anchorage Sand and Gravel Co. Inc.	http://www.anchsand.com
Anglo Gold Ltd.	http://www.anglogold.com
Avalon Development Corp.	http://www.avalonalaska.com
Browns Hill Quarry	http://www.brownshill.com
CanAlaska Ventures Ltd.	http://www.canalaska.com
Chapleau Resources Ltd.	http://www.chapleauresources.com
Coeur d'Alene Mines Corp. (Coeur Alaska Inc.)	http://www.coeur.com
Continental Ridge Resources Inc. (now Nevada Geothermal Power Inc.)	http://www.continentalridge.com/geothermal-gold.htm
Copper Ridge Explorations Inc.	http://www.copper-ridge.com
Engineer Mining Corp.	http://www.emcorp.yk.ca
Freegold Ventures	http://www.freegoldventures.com
Golconda Resources Ltd.	http://www.golcondaresources.com
Grayd Resource Corp.	http://www.grayd.com
Hecla Mining Co.	http://www.hecla-mining.com
Inlet Resources Ltd.	http://www.inlet-resources.com
Kennecott Exploration Co.	http://www.kennecottexploration.com
Kennecott Minerals Co.	http://www.kennecottminerals.com
Kinross Gold Corp.	http://www.kinross.com
LAPP Resources Inc.	http://home.gci.net/~lapres
Navigator Exploration Corp.	http://www.navigatorexploration.com
Nevada Star Resources Corp.	http://www.nevadastar.com
Northern Associates Inc.	http://www.alaskaexploration.com
Northern Dynasty Minerals Ltd.	http://www.northerndynastyminerals.com
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
Rio Fortuna Exploration Corp.	http://www.riofortuna.com
Rubicon Minerals Corp.	http://www.rubiconminerals.com
Santoy Resources Ltd.	http://www.santoy.ca
Shear Minerals Ltd.	http://www.shearminerals.com
Silverado Gold Mines Ltd.	http://www.silverado.com
Sisyphus Consulting	http://sisyphus-consulting.com
Teck Cominco Ltd.	http://www.teckcominco.com
Teryl Resources Corp.	http://www.terylresources.com
TNR Resources Ltd.	http://www.tnrgoldcorp.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
WGM Inc.	http://www.wgm.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://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

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
Alaska 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/mcis
Alaska Resource Data Files	http://ardf.wr.usgs.gov
DGGS Maps On-Line	http://www.dggs.dnr.state.ak.us/gisexampl3.html
DGGS Publications On-Line	http://www.dggs.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
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

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, 1880-2002

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$)	(tons)	(t$)
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 (oz)	Gold (m$)	Silver (oz)	Silver (t$)	Mercury (flask[b])	Mercury (t$)	Antimony (lb)	Antimony (t$)	Tin (lb)	Tin (t$)	Lead (tons)	Lead (t$)	Zinc (tons)	Zinc (t$)	Platinum (oz)	Platinum (t$)	Copper (lb)	Copper (m$)	Chromium (tons)	Chromium (t$)
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	551,982	154.06	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	- -	- -
2002	562,094	174.28	17,858,183	82,326.0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	3,200,000	2.27	- -	- -
Other[c]	- -	- -	- -	- -	1,438	- -	- -	- -	- -	- -	- -	- -	- -	- -	71,946	17,091.9	- -	- -	- -	- -
TOTAL	**36,907,030**	**3,066.32**	**164,692,716**	**713,432.0**	**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**	**1,398,813,932**	**244.78**	**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

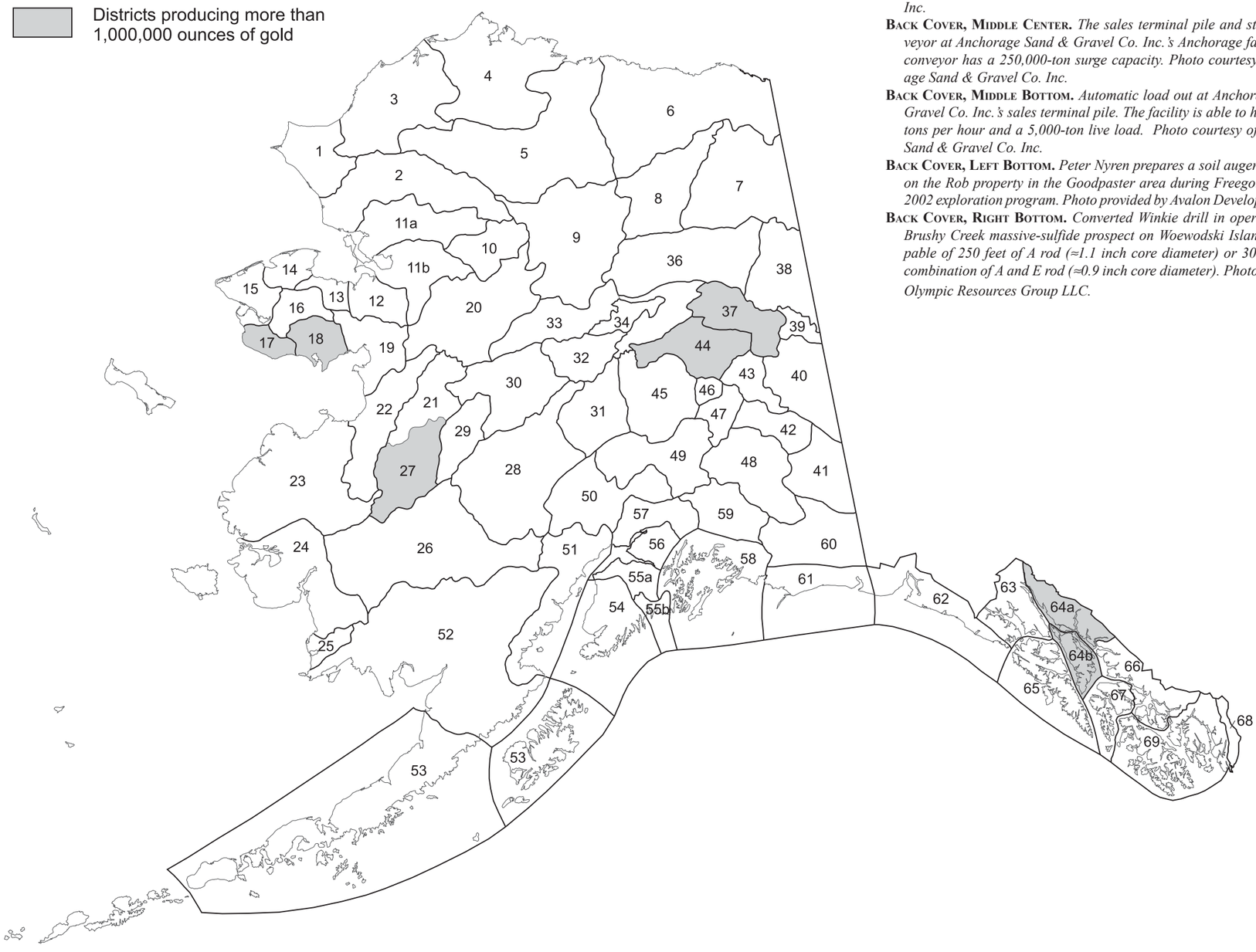
Production of industrial minerals, coal, and other commodities in Alaska, 1880-2002

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	- -	- -	- -
2002	1,158,000	37.40	22,412,000	120.70	3,152,000	31.44	- -	- -	- -
Other[d]	- -	- -	- -	- -	2,300,000[e]	W	79,000	W	- -
TOTAL[f]	**58,342,335**	**1,056.26**	**1,196,206,000**	**2,682.3**	**130,176,000**	**648.04**	**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.

	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	344,983	344,983	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	4,988,928	4,988,928	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	258,344	258,344	0
21.	Kaiyah district	131,843	5,400	126,443
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]	584,473	584,473	0
27.	Iditarod district	1,562,722	1,559,792	2,930
28.	McGrath-McKinley district	329,393	132,494	196,899
29.	Innoko-Tolstoi district	727,794	727,638	156
30.	Ruby-Poorman district	477,477	477,477	0
31.	Kantishna district	99,307	91,401	7,906
32.	Hot Springs district	577,956	577,956	0
33.	Gold Hill-Melozitna district[d]	12,089	12,089	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	1,062,005	1,062,005	0
38.	Black district	0	0	0
39.	Eagle district	52,000	52,000	0
40.	Fortymile district	548,114	548,114	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	10,762,951	8,174,987	2,587,964
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	132,442	67,442	65,000
56.	Anchorage district[e]	0	0	0
57.	Willow Creek-Hatcher Pass district	666,175	57,175	609,000
58.	Prince William Sound district	137,715	15	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	8,449,521	80,000	8,369,521
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	**37,396,760**	**24,224,860**	**13,171,900**
	Undistributed[g]	154,142		
	Total production (troy ounces)	**37,550,902**		



[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.

Back Cover, Top. *Red Dog Mine and mine complex with fall foliage. Red Dog Mine is the largest zinc producer and the Red Dog area contains the largest zinc resource in the world. Photo courtesy of Teck Cominco Alaska Inc.*

Back Cover, Middle Center. *The sales terminal pile and stacking conveyor at Anchorage Sand & Gravel Co. Inc.'s Anchorage facilities. The conveyor has a 250,000-ton surge capacity. Photo courtesy of Anchorage Sand & Gravel Co. Inc.*

Back Cover, Middle Bottom. *Automatic load out at Anchorage Sand & Gravel Co. Inc.'s sales terminal pile. The facility is able to handle 2,200 tons per hour and a 5,000-ton live load. Photo courtesy of Anchorage Sand & Gravel Co. Inc.*

Back Cover, Left Bottom. *Peter Nyren prepares a soil auger for drilling on the Rob property in the Goodpaster area during Freegold Ventures' 2002 exploration program. Photo provided by Avalon Development Corp.*

Back Cover, Right Bottom. *Converted Winkie drill in operation at the Brushy Creek massive-sulfide prospect on Woewodski Island. Drill capable of 250 feet of A rod (≈1.1 inch core diameter) or 300 feet using combination of A and E rod (≈0.9 inch core diameter). Photo courtesy of Olympic Resources Group LLC.*