

3.16.3.4 Effects of Alternative C – Concentrate and Wastewater Pipelines

Under Alternative C, pipelines would be used to transport concentrate from the mine to the port, and fuel from the port to the mine. The use of pipelines would eliminate concentrate trucks and fuel trucks, eliminating much of the DMTS road noise. A daily supply truck and light vehicle traffic would continue but noise levels on the DMTS road would be much lower than operations involving the concentrate trucks. A minimal amount of additional noise would be created at the port with the addition of new generators. The filter press operations necessary to dewater the concentrate prior to storage would be conducted indoors and therefore would not contribute to external noise at the port. The use of the pipeline would reduce the extent of environmental monitoring within the Wulik River drainage. The reduction in monitoring would reduce helicopter traffic in the area and the attendant noise. The reduction would occur until the relocation of the outfall back to Red Dog Creek after closure in 2031. However, the post closure monitoring program might be conducted on a smaller scale requiring less helicopter sampling than the current program.

3.16.3.5 Effects of Alternative D – Wastewater Pipeline and Additional Measures

Under Alternative D, the DMTS road would be closed for the month of October. The noise associated with the concentrate trucks would be eliminated for this time period to lessen transportation related effects on the fall caribou migration pattern. Also, the shipping season at the port facility would open later, so port activities would not interfere with any subsistence activities related to marine wildlife conducted through the middle of July. The reduction in noise from helicopter-based sampling would be the same as Alternative C, except the reduction would be permanent.

3.16.4 Noise – Summary

Noise would continue to occur under all alternatives, generated by activities at the mine site, vehicles traveling the DMTS road, and shipping activities at the port facility. Under all alternatives, blasting noise would impact the largest area, although infrequently. Under Alternative A, mining and the associated generation of noise would cease in approximately 2011. Under the remaining alternatives, mining would continue through approximately 2031. Under Alternative C, the use of pipelines would eliminate concentrate trucks and fuel trucks, eliminating much of the DMTS road noise. Under Alternative C, there would be a minimal amount of additional noise associated with generators at the port. Under Alternative D, the DMTS road would be closed for the caribou migration during month of October and the shipping season at the port facility would open later to accommodate subsistence activity. Both closures would provide positive noise benefits to subsistence resources. Additionally, the use of pipelines under alternatives C and D would reduce helicopter traffic related to environmental sampling.

3.17 Socioeconomics

The Northwest Arctic Region is composed of approximately 39,000 square miles along the Kotzebue Sound, and the Wulik, Noatak, Kobuk, Selawik, Buckland and Kugruk rivers. It is governed by the NWAB and is the second-largest borough in Alaska after the North Slope Borough. The region contains 11 communities, 10 of which are incorporated cities with municipal governments. The population of the region is predominately Iñupiat Alaskan and the tribal IRA Councils in each village also play a role in governance in the communities. According to the NANA Lands Department, about 76 percent of the land in the region is federally owned and protected as parks, preserves and wildlife refuges. Other major landowners include the State of Alaska, NANA, and the Kikiktagruk Iñupiat Corporation. As a major landowner, NANA, also plays a key leadership role in the region.

The NWAB is a home-rule borough, incorporated in 1986. According to the Alaska Constitution, a home-rule borough can exercise any power not specifically prohibited by state law or by the borough's charter,

which defines its powers and duties and is adopted by voter approval. The borough is governed by a mayor, who is elected to a three-year term, and an 11-member Assembly whose members are also each elected to a three-year term. The Assembly holds meetings once a month in Kotzebue. The borough is responsible for holding yearly elections in October, during which the residents also vote on members of the School Board and the Planning Commission.

The NWAB provides a variety of services to the region including public safety, planning and zoning, the public library in Kotzebue, the regional Department of Motor Vehicles, and regional economic development. One of the key functions of the borough is to support education through the NWAB School District. The borough also participates in both the Higher Education Consortium and the Northwest Arctic Leadership Team with the Maniilaq Association, the NWAB School District, and NANA.

Note that Appendix F provides descriptions of Kivalina and Noatak, the two villages closest to the Red Dog Mine. The community descriptions include details on local economic data. Appendix G provides a description of the social conditions within the NWAB and offers supplemental material relevant to socioeconomics.

3.17.1 Socioeconomics – Pre-mining Environment

3.17.1.1 Northwest Arctic Borough Population and Demographics

Throughout the 1960s, 1970s, and early 1980s, the population of the NWAB area (known then as the Kobuk Census Area) grew slowly. The area's population increased at an annual rate of 1.3 percent in the 1960s and 1.8 percent during the 1970s. Data indicate that population growth accelerated early in the 1980s, increasing at about 3 percent annually between 1980 and 1983, though differing methodologies for estimating population may have accounted for some of the change. Most of the individual communities in the area were also growing throughout this period. Table 3.17-1 presents the population of each village in the NWAB between 1960 and 1983.

In 1980, 85.1 percent of the NWAB population was Alaska Native. In 2000, 82.5 percent of the population was Alaska Native, according to U.S. Census data.

Table 3.17-1 Northwest Arctic Borough Area Pre-Red Dog Population, 1960, 1970, 1980, 1983

Community	1960	1970	1980	1983
Ambler	70	169	192	275
Buckland	87	104	177	218
Deering	95	85	150	165
Kiana	253	278	345	364
Kivalina	142	188	241	269
Kobuk	54	N/A	62	85
Kotzebue	1,290	1,696	2,054	2,237
Noatak	275	293	273	365
Noorvik	384	462	492	522
Selawik	348	429	535	599
Shungnak	135	165	202	241
Northwest Arctic Borough	3,560	4,048	4,831	5,340

Source: U.S. Census Bureau, 1960, 1970, 1980 and Alaska Department of Labor, 1983, as reported in the 1984 Red Dog EIS, and Alaska Department of Labor, 1983

N/A = not available

Northwest Arctic Borough Migration Patterns

While the population of the northwest Arctic region has grown since the 1960s, the area has experienced a net out migration since 1970. Separating the differences in migration patterns based on the time frame before and after construction of the Red Dog Mine is complicated. To simplify the discussion and provide for more continuity, migration patterns beginning with the pre-mining time period are discussed under Section 3.17.2.1, Northwest Arctic Borough Migration Patterns.

3.17.1.2 Northwest Arctic Borough Employment and Income

The Alaska Department of Labor reported a total of 1,438 jobs in the NWAB area in 1980, more than twice the number reported in 1970. Government was by far the largest source of employment in the area, particularly the federal government. The decline in federal employment between 1970 and 1980 was largely the result of the Indian Self-Determination Act of 1975, which allowed ANCSA non-profits to apply for grants or contract with the Bureau of Indian Affairs to administer their own health and social service programs. By 1980, state and local government had become the largest source of employment, accounting for almost half of all wage and salary jobs. The dramatic increase in state revenues as oil production in Prudhoe Bay came on line in 1977 fueled a six-fold increase in state budgets and a 13-fold increase in local revenue sharing, which drove the corresponding increase in state and local employment in the NWAB between 1970 and 1980. Overall, government accounted for 63 percent of all jobs in 1970 and 1980 (Table 3.17-2).

Table 3.17-2 Northwest Arctic Borough Area Employment by Industry, 1970 and 1980

Industry	1970		1980	
	Number	Percent	Number	Percent
Mining	—	—	—	—
Construction	—	—	81	5.6
Manufacturing	—	—	—	—
Transportation, Communication and Utilities	106	16.6	125	8.7
Trade	100	15.6	133	9.2
Finance, Insurance and Real Estate	—	—	18	1.3
Services	17	2.7	168	11.7
Federal Government	300	46.7	218	15.2
State and Local Government	104	16.3	692	48.1
Miscellaneous	—	—	—	—
Total	641	100.0%	1,438	100.0%

Source: Alaska Department of Labor, as reported in the 1984 Red Dog EIS
 — = not reported

Similarly, government was the most important source of personal income in the NWAB area in 1970 and 1980. In 1970, government directly accounted for \$4.8 million of the area's total personal income of \$7.3 million (in 1970 dollars). In 1980, government generated \$17.1 million in personal income for residents of the NWAB area, \$12.1 million of which was from state and local government (values in 1980 dollars).

Total personal income in the NWAB area in 1980 was \$35 million, while per capita income was \$7,225 (1980 dollars). Transfer payments (payments from governments to individuals) accounted for 21.5 percent of all personal income in 1980 (Table 3.17-3). Per capita personal income in the NWAB was \$15,286 in 2000, according to census data.

Table 3.17-3 Northwest Arctic Borough Area Total and Per Capita Income by Source, 1970 and 1980

Source	1970		1980	
	Income	Percent	Income	Percent
Net Earned Income (in thousands)	\$6,761	77.8%	\$26,261	74.8%
Dividends (in thousands)	216	2.5	1,178	3.4
Transfer Payments (in thousands)	1,708	19.7	7,544	21.5
Total Personal Income (in thousands)	8,685	100.0	34,983	100.0
Per Capita Personal Income	\$2,141	N/A	\$7,225	N/A

Source: U.S. Department of Commerce, 1982, as reported in the 1984 Red Dog EIS

N/A – not applicable

3.17.2 Socioeconomics – Baseline Conditions

3.17.2.1 Northwest Arctic Borough Population and Demographics

Since 1990, the population of the NWAB has increased 21 percent. In 2007, the NWAB population totaled 7,396 residents, 2.6 percent above the 2000 population. Population growth was slow and generally steady from 2000 to 2007, with slight declines between 2000 and 2001 and between 2004 and 2005 (Table 3.17-4). Overall, the NWAB's population increased by 188 residents between 2000 and 2007.

The NWAB's 7,396 residents live in the regional center of Kotzebue and 10 smaller communities: Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Noatak, Noorvik, Selawik, and Shungnak. These communities are situated along the NWAB's four major rivers, all of which flow into Kotzebue Sound. Kotzebue continues to serve as the hub of the region, and is the transfer point for goods shipped to the outlying communities. As Table 3.17-5 shows, Kotzebue has not only a larger population than the other communities in the region, but also a more diverse population, higher employment rates, higher median age, higher median income, and smaller household size. Kotzebue is also distinctive in that it is the only northwest Alaska community that chose to incorporate its own ANCSA village corporation—KIC—and not to merge its assets with NANA as did the other 10 communities for the purposes of simplifying land ownership and reducing administrative costs.

Table 3.17-4 Northwest Arctic Borough Population, 1990, 2000–2007

Communities	1990	2000	2001	2002	2003	2004	2005	2006	2007
Ambler	–	309	282	295	291	276	282	277	277
Buckland	–	406	404	426	409	438	434	418	461
Deering	–	136	137	129	131	145	139	138	133
Kiana	–	388	404	400	408	396	381	399	391
Kivalina	–	377	385	383	387	390	385	392	398
Kobuk	–	109	94	106	125	126	131	135	119
Kotzebue	–	3,082	3,059	3,074	3,068	3,141	3,122	3,102	3,133
Noatak	–	428	438	455	468	450	474	470	489
Noorvik	–	634	643	676	648	612	627	636	636
Selawik	–	772	777	778	819	833	831	842	828
Shungnak	–	256	245	249	263	266	259	260	269
Remainder NWAB	–	279	227	227	234	229	229	230	229
NWAB Total	6,113	7,176	7,095	7,198	7,251	7,302	7,294	7,299	7,363

Source: U.S. Census Bureau 2000 and Alaska Department of Labor and Workforce Development 2008

– = data for individual villages not available

Table 3.17-5 Profile of NWAB Village Demographics, 2000

Community	Population (2000)	Percent Native	Percent Employed (age 16 +)	Median Age	Median Household Income	Avg Household Size
Ambler	309	87	74	21.8	\$43,500	3.9
Buckland	406	97	65	17.8	\$38,333	4.8
Deering	136	94	58	27.0	\$33,333	3.2
Kiana	388	93	55	22.4	\$39,688	4.0
Kivalina	377	97	47	20.8	\$30,833	4.8
Kobuk	109	94	45	17.4	\$30,750	4.2
Kotzebue	3,082	77	70	25.9	\$57,163	3.4
Noatak	424	96	55	22.7	\$30,833	4.3
Noorvik	634	95	52	21.2	\$51,964	4.7
Selawik	772	95	44	18.9	\$25,625	4.5
Shungnak	256	95	66	18.8	\$44,375	4.6

Source: U.S. Census Bureau 2000

Northwest Arctic Borough Migration Patterns

While the overall population of the NWAB has increased, the northwest arctic region has experienced net out-migration since 1970 (Table 3.17-6). In each decade since 1970, more people moved from the region than moved to the region (ADLWD 2008). The number of out-migrants increased in each period. Out-migrants also increased as a percent of the total population, rising from 3 to 10 percent of the population.

Table 3.17-6 Components of Population Change

	Natural Increase	Net Migration	End of Period Population
1970-1980	931	-148	4,831
1980-1990	1,591	-309	6,113
1990-2000	1,451	-349	7,215
2000-2007	929	-748	7,396

Source: ADLWD 2008

Population in the region grew throughout the period in spite of the negative effects of migration on population change. Throughout the period, population grew because natural increases exceeded the level of net out-migration. Natural increase equals the number of births minus the number of deaths. Rates of natural increase were relatively high throughout the period. However, both the rate of natural increase and the actual natural increase fell during the 1990s and through 2007. In the post 2000 period, net out-migration increased to almost 81 percent of the natural increase.

The patterns of migration and levels of natural population increases are related. Young people are more likely to migrate. Historic high birth rates mean more candidates for migration. As the young migrate, rates of birth fall and death rates rise, resulting in a decline in natural population increase. High regional rates of natural increases in the 1970s and 1980s might be expected to result in the pattern of both out-migration and natural increase seen in the region since 1990. Out-migration is likely to be more pronounced when employment opportunities do not keep pace with a growing labor force.

Migration is more complex than described by net migration (Huskey and Howe, forthcoming). People not only leave the region, they also return. According to the U.S. Census, between 1995 and 2000,

approximately 71 percent of out-migrants from the NWAB were replaced by in-migrants. This means population change is more fluid than described by net changes. There is also a great deal of migration within the region. According to the 2000 census almost 50 percent of the in-migrants to villages in the NWAB were from other villages.

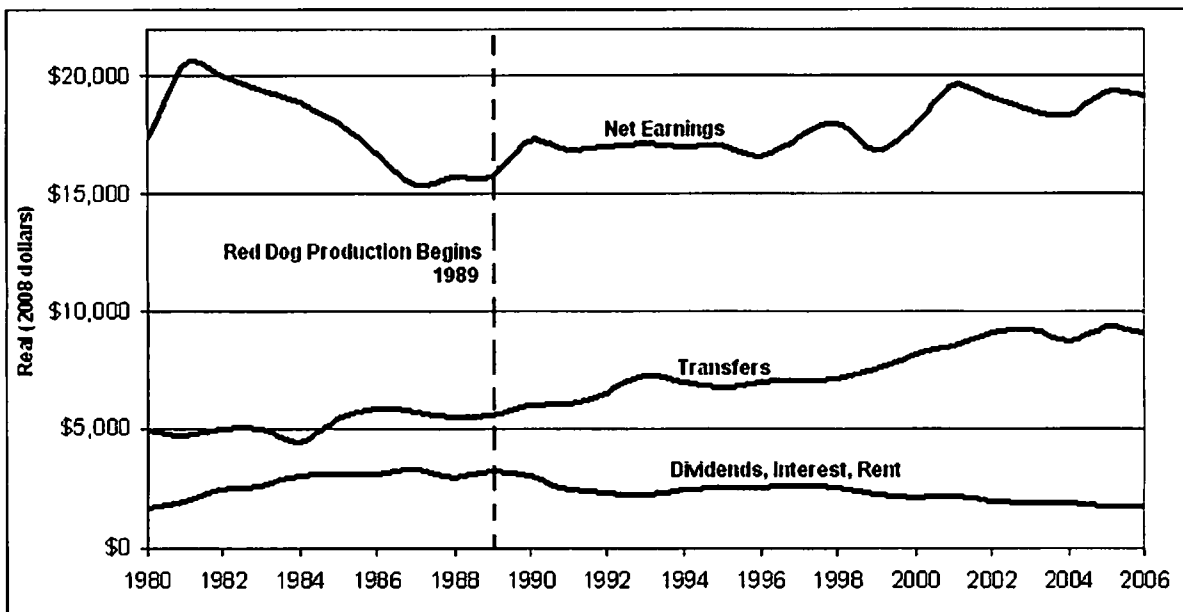
In 2000, 60 percent of NWAB residents were living in the same residence as they were in 1995. Of the residents who were not in the same residence, about one-quarter (25.8 percent) had moved from one location to another within in the NWAB. All others had moved to the NWAB from elsewhere in Alaska (7.7 percent), from another state (5.9 percent), or had moved from another country (0.4 percent) (U.S. Census Bureau, 2000 Census).

Kotzebue had the most active migration activity in the NWAB. Less than half (46.4 percent) of the residents in the community in 2000 were in the same residence as they were in 1995. Of the residents that were not in the same residence, just under 30 percent (29.8 percent) had moved from within the NWAB and almost one-quarter (23.9 percent) of the population had moved to the community from outside the NWAB since 1995 (U.S. Census Bureau, 2000 Census).

3.17.2.2 Northwest Arctic Borough Economy

Personal Income

Figure 3.45 displays the per capita income of the NWAB by type of income, from 1980 to 2006, in 2008 dollars. Table 3.17-7 shows the percent increase for each type of income. Over this time span, total real per capita income increased by almost 50 percent.



Source: Bureau of Economic Analysis and ISER calculations

Figure 3.45 Northwest Arctic Borough's Real Per Capita Income by Component

Table 3.17-7 Northwest Arctic Borough's Real Increase in Per Capita Income, 1980 to 2006

Parameter	Percent
Per Capita Income	48
Per Capita Net Earnings	31
Per Capita Transfers	119
Per Capita Dividends, Interest, Rent	22

Source: Bureau of Economic Analysis

Per capita net earnings decreased in the years leading up to Red Dog production, but rose fairly steadily since 1989. Dividends¹, interest and rent rose in the years prior to Red Dog start up and decreased slightly thereafter. Per capita transfer payments rose steadily throughout the period. As a percentage increase, transfer payments grew the most at 119 percent growth between 1980 and 2006, compared to 31 percent growth in net earnings (Table 3.17-7). This is primarily due to rising health care costs, and the fact that Medicaid and Medicare fall into this category. Medical benefits make up the largest component of transfer payments and have increased the most. The Alaska Permanent Fund Dividend (PFD) program began in 1982. From 1983 to 2006, the real-dollar increase in medical transfer income was 480 percent, while miscellaneous (primarily PFD) transfers increased by only 6 percent. As a share of total transfer income, medical transfers increased from 20 percent in 1983 to 56 percent in 2006, while miscellaneous transfers (consisting primarily of PFDs) decreased from 32 percent to 16 percent.

Table 3.17-8 shows per capita household income² by source from the 2000 U.S. Census, in 2008 dollars and as a percentage of total income. The table is sorted by total per capita household income. Total income in the NWAB was well below the Alaska average, and just over half of Anchorage's total income. Kivalina and Noatak are near the bottom of the list with almost the lowest income in the borough.

Wage and salary income made up about three-quarters of total income in most places, while self employment income made up the lowest portion in most places – in the NWAB, only Kotzebue, Noorvik and Kiana had a contribution from self employment above 1 percent.

Second after wage and salary income is the category including interest, dividends, rent, and other sources. In Alaska, the share was 10 percent, and most NWAB communities had a higher share, from 8.2 percent (Kotzebue) to almost 20 percent (Kivalina and Selawik). Note that the two communities with the lowest total income had the highest percentage from this category. One factor contributing to the size of this category is the PFD, which was \$1,769.84 in 1999. On the U.S. Census long form questionnaire, this would have been reported in the "other" category, or (incorrectly) in the "interest, dividends, and rent" category. NANA dividends would also be included in this category.

Ranking third is social security, supplemental security, and retirement income at about 6 percent in the NWAB overall. Ranking last in the borough is public assistance, at less than 2 percent, although this is mostly due to the weight of Kotzebue; in most NWAB communities, income from public assistance was higher than income from self employment.

¹ The Alaska Permanent Fund Dividend is included in the "Transfers" category, not the "Dividends, Interest and Rent" category.

² Household income is used because households are the level at which income by source is reported in detail by the Census.

Table 3.17-8 Per Capita Household Income by Source in 1999

	Total	Wage and Salary	Self Employment	Interest, Dividends, Rent and Other Sources	Social Security, Supplemental Security, and Retirement	Public Assistance
2008 Dollars						
Anchorage	\$31,375	\$24,100	\$2,000	\$2,996	\$2,128	\$150
Alaska	\$27,957	\$20,935	\$1,972	\$2,782	\$2,096	\$172
Kotzebue	\$22,920	\$18,770	\$1,022	\$1,883	\$1,109	\$135
Ambler	\$18,291	\$14,429	\$134	\$2,486	\$601	\$641
NWAB	\$16,756	\$13,197	\$527	\$1,838	\$932	\$262
Noorvik	\$14,824	\$10,990	\$260	\$2,079	\$1,142	\$353
Kiana	\$14,654	\$11,154	\$704	\$1,435	\$752	\$609
Deering	\$14,022	\$11,039	\$73	\$1,993	\$826	\$91
Shungnak	\$13,808	\$10,478	\$3	\$2,172	\$952	\$203
Buckland	\$12,792	\$9,999	\$12	\$1,577	\$961	\$243
Kobuk	\$12,102	\$9,749	\$0	\$1,543	\$680	\$129
Noatak	\$12,084	\$9,043	\$87	\$1,851	\$820	\$283
Kivalina	\$10,368	\$7,523	\$0	\$2,001	\$520	\$325
Selawik	\$10,355	\$6,930	\$46	\$2,013	\$806	\$560
Percentage of Total						
Anchorage	100.00%	76.8%	6.4%	9.5%	6.8%	0.5%
Alaska	100.00%	74.9%	7.1%	10.0%	7.5%	0.6%
Kotzebue	100.00%	81.9%	4.5%	8.2%	4.8%	0.6%
Ambler	100.00%	78.9%	0.7%	13.6%	3.3%	3.5%
NWAB	100.00%	78.8%	3.1%	11.0%	5.6%	1.6%
Noorvik	100.00%	74.1%	1.8%	14.0%	7.7%	2.4%
Kiana	100.00%	76.1%	4.8%	9.8%	5.1%	4.2%
Deering	100.00%	78.7%	0.5%	14.2%	5.9%	0.6%
Shungnak	100.00%	75.9%	0.0%	15.7%	6.9%	1.5%
Buckland	100.00%	78.2%	0.1%	12.3%	7.5%	1.9%
Kobuk	100.00%	80.6%	0.0%	12.7%	5.6%	1.1%
Noatak	100.00%	74.8%	0.7%	15.3%	6.8%	2.3%
Kivalina	100.00%	72.6%	0.0%	19.3%	5.0%	3.1%
Selawik	100.00%	66.9%	0.4%	19.4%	7.8%	5.4%

Source: U.S. Census Bureau 2000

Table 3.17-9 shows aggregate wages reported to the Alaska Department of Labor and Workforce Development (ADLWD) and aggregate wages paid to Red Dog employees living in the NWAB from 1989 to 2007. These are in nominal dollars. The community with the highest percentage of wages from Red Dog is Noatak, with more than one-third of total wages over this time period coming from Red Dog employment. Kivalina is near the middle with 17 percent of wages coming from Red Dog.

Both the U.S. Census and Bureau of Economic Analysis data indicate that personal income in the NWAB increased at a greater rate than Alaska as a whole. U.S. Census data indicate that from 1979 to 1999, real personal income increased 28.8 percent in the NWAB and decreased 3.2 percent in Alaska. Bureau of Economic Analysis data indicate growth rates of 18.8 percent and -7.4 percent for the NWAB and Alaska, respectively. Real earnings declined in Alaska from 1983 to 1996 reflecting the shift in employment from higher wage jobs in government and industry into lower wage jobs in the service sector. By contrast, real earnings in the NWAB grew from 1989 to 2001. U.S. Census data indicate that the NWAB had the

greatest increase in personal income of any region in Alaska. Bureau of Economic Analysis data indicate the NWAB ranked third in personal income growth over the period.

Table 3.17-9 Aggregate Total Wages and Red Dog Wages, 1989-2007

Community	Total Wages	Red Dog Wages	Red Dog Percentage
Noatak	\$62,739,520	\$21,734,608	34.6%
Ambler	\$43,393,105	\$9,436,340	21.7%
Buckland	\$48,470,287	\$9,721,001	20.1%
Noorvik	\$83,590,661	\$15,382,736	18.4%
Kivalina	\$41,435,093	\$7,203,088	17.4%
Kiana	\$61,843,237	\$9,795,259	15.8%
Shungnak	\$29,002,230	\$4,521,484	15.6%
Deering	\$19,627,439	\$2,517,295	12.8%
Kotzebue	\$789,697,723	\$28,276,920	3.6%
Kobuk	\$9,759,167	\$304,812	3.1%
Selawik	\$68,788,664	\$960,061	1.4%
Total	\$1,258,347,125	\$109,853,604	8.7%

Source: Alaska Department of Labor and Workforce Development 2008
 Note: Total wages may be slightly underreported, due to data suppression.

Table 3.17-10 shows the rank ordered real per capita income changes in NWAB communities in 1979, 1989 and 1999 (in 2008 dollars). Kobuk, the smallest community of the borough, had the fastest income growth: 96.6 percent between 1979 and 1999. Kivalina, the community with the second-highest proportion of employment at Red Dog, came in third at 81.4 percent real income growth. (The change in Noatak, the community with the highest proportion employed at Red Dog, is not measurable because there is no income figure available from the 1980 Census.) Kotzebue, the city with the largest population but smallest percentage of Red Dog employees, had the lowest rate of growth in real income but remained the borough's leader in per capita income. This means that income inequality between communities is shrinking in the borough.

Table 3.17-10 Rank Ordered Changes in Real Per Capita Income, NWAB Communities, 2008 dollars

	1979	Percent Change 1979-1989	1989	Percent Change 1989-1999	1999	Percent Change 1979-1999
Kobuk	\$6,983.39	36.8	\$9,551.98	43.7	\$13,729.98	96.6
Buckland	\$7,119.02	11.0	\$7,903.81	69.8	\$13,421.77	88.5
Kivalina	\$6,425.81	36.4	\$8,766.72	33.0	\$11,658.98	81.4
Noorvik	\$9,521.17	35.7	\$12,924.20	29.7	\$16,763.27	76.1
Selawik	\$6,594.59	62.4	\$10,709.58	6.4	\$11,394.00	72.8
Deering	\$9,057.01	41.7	\$12,832.44	19.5	\$15,340.76	69.4
Ambler	\$14,726.31	-13.9	\$12,685.98	50.7	\$19,122.95	29.9
Shugnak	\$12,043.87	29.3	\$15,567.63	-7.0	\$14,471.91	20.2
Kiana	\$13,963.77	9.1	\$15,232.35	5.6	\$16,085.48	15.2
Kotzebue	\$22,384.83	9.6	\$24,539.04	3.9	\$25,506.10	13.9
Noatak	N/A	N/A	\$12,509.51	7.7	\$13,470.58	N/A

N/A = not available
 Source: U.S. Census Borough Bureau, 1980, 1990 and 2000

Employment and Payroll

NWAB employment (as measured by the Bureau of Economic Analysis), which includes self-employed proprietors) totaled 3,474 jobs in 2005 (Table 3.17-11). Employment in the NWAB has been reasonably steady, between 3,300 and 3,400 jobs. The increase of 156 jobs in 2005 represents a 4.7 percent increase.

In 2005, 64 percent of all NWAB employment was in the private sector, strictly defined as non-government. The remaining 36 percent was government employment, including federal, state, and local governments. It is important to note that many private organizations receive some public funds, either through government contracts or grants. For example, Maniilaq, one of the largest employers in the borough, is classified as a private organization although it is supported by public funds.

Table 3.17-11 Northwest Arctic Borough Employment by Industry, 2001-2005

	2001	2002	2003	2004	2005
Total employment	3,351	3,411	3,323	3,318	3,474
<i>Wage and salary employment</i>	3,024	3,049	2,978	2,945	3,087
<i>Proprietors employment</i>	327	362	345	373	387
Nonfarm proprietors employment	327	362	345	373	387
<i>Nonfarm employment</i>	3,351	3,411	3,323	3,318	3,474
<i>Private employment</i>	2,213	2,107	2,077	2,083	2,210
Forestry, fishing, related activities, and other	58	46	35	43	42
Mining	D	D	D	D	D
Utilities	D	D	D	D	D
Construction	D	64	48	31	57
Manufacturing	L	D	D	10	D
Wholesale trade	D	L	L	L	L
Retail trade	208	D	215	223	182
Transportation and warehousing	151	155	D	D	D
Information	59	55	58	65	68
Finance and insurance	D	D	D	D	D
Real estate and rental and leasing	D	D	D	D	D
Professional and technical services	D	D	D	D	D
Administrative and waste services	18	D	D	D	D
Educational services	15	19	20	18	20
Health care and social assistance	D	D	D	D	D
Arts, entertainment, and recreation	52	D	94	165	246
Accommodation and food services	80	D	116	111	109
Other services, except public administration	96	107	103	99	89
<i>Government and government enterprises</i>	1,138	1,304	1,246	1,235	1,264
Federal, civilian	57	55	56	55	57
Military	47	54	54	54	54
State and local	1,034	1,195	1,136	1,126	1,153
State government	54	59	64	71	68
Local government	980	1,136	1,072	1,055	1,085

Source: Bureau of Economic Analysis 2008

D = Not shown due to disclosure of confidential data

L = Lower than \$50,000

NWAB employment as measured by the ADLWD, which excludes proprietors and uniformed military personnel, averaged 2,911 jobs in 2006. These jobs accounted for \$126.7 million in payroll, with an average monthly wage of \$3,628. A total of 153 “units,” or employers, reported 2006 employment in the NWAB (Table 3.17-12).

Table 3.17-12 Northwest Arctic Borough Employment and Earnings, 2006

	Units	Average Employment	Total Wages	Average Monthly Wages
Total Industries	153	2,911	\$126,757,967	\$3,628
<i>Total Government</i>	75	1,244	36,945,083	2,474
Federal Government	10	54	2,426,573	3,768
State Government	20	67	3,560,519	4,412
Local Government	45	1,123	30,957,991	2,296
<i>Private Ownership</i>	78	1,667	89,812,884	4,490
Goods-Producing	10	465	—	—
Natural Resource and Mining	5	438	—	—
Construction	5	26	2,508,386	7,938
Trade, Trans. and Utilities	25	265	9,061,261	2,849
Information	5	55	2,783,439	4,243
Financial Activities	3	114	5,228,234	3,825
Professional and Business Services	1	3	—	—
Educational and Health Services	12	543	—	—
Leisure and Hospitality	10	167	4,494,737	2,249
Other Services	12	56	771,611	1,145

Source: ADLWD 2008

— = no data

Red Dog Mine employment is captured in the “Natural Resource and Mining” sector, which averaged 438 jobs in 2006 (this does not include employment with NANA/Lynden, which is included in the “Trade, Transportation, and Utilities” sector). Wages are not published by the ADLWD because of confidentiality restrictions.

The single largest employers in the NWAB include the school district, with reported employment of 648, and Maniilaq Association, with an average of 542 jobs in 2006. Red Dog Mine related employers include Teck and NANA Management Services. NANA/Lynden employment at the Red Dog Mine is not reported, most likely because it is grouped with other Lynden employment and reported in Anchorage. NANA/Lynden employs approximately 50 workers at the Red Dog Mine.

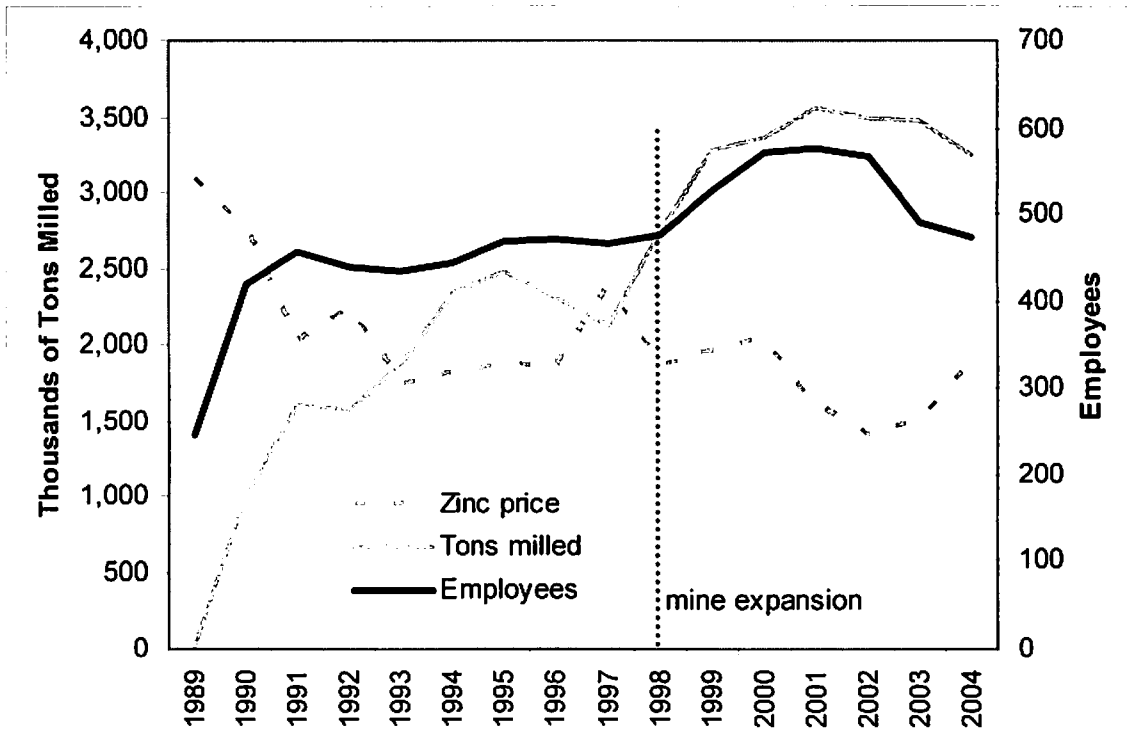
Reported employment for the top employers in the NWAB includes residents and non-residents of the NWAB (Table 3.17-13).

Employment at Red Dog Mine rises and falls with mine production. Production rates have been affected by world zinc prices. Figure 3.46 shows Red Dog production, employees, and world zinc prices from 1989, the first year of Red Dog’s production, to 2004. Tons of ore milled is used here as the measure of production, rather than tons of concentrate produced because the milled volume reflects the mine’s labor output. Increases in production generally mean increases in employment: they are 87 percent correlated. In particular, the large-scale mine expansion, which began in April 1996 and ended in September 1998, increased production by 35 percent and increased employment by 22 percent.

Table 3.17-13 Northwest Arctic Borough Top 20 Employers, 2006

	Low Monthly Employment	High Monthly Employment	Annual Average
NWAB School District	625	668	648
Maniilaq Association	514	569	542
Teck Cominco Alaska, Inc.	329	434	384
City of Kotzebue	66	79	75
NANA Management Services, LLC	55	73	64
AK Commercial Co.	60	71	62
Kikiktagruk Iñupiat Corp	30	84	54
NW Iñupiat Housing Authority	33	76	51
Veco Alaska, Inc.	28	70	45
OTZ Telephone Cooperative, Inc.	32	43	36
Northwest Arctic Borough	20	58	31
Bering Air Incorporated	26	34	30
Kotzebue IRA Council	24	35	29
City of Noorvik	23	39	28
Selawik City Council	19	40	27
Department of The Interior	21	33	25
U.S. Postal Service	22	28	25
Noatak Village Council	17	32	24
Selawik IRA Council	13	40	24
Kivalina City Council	15	32	23

Source: ADLWD Firm list 2008



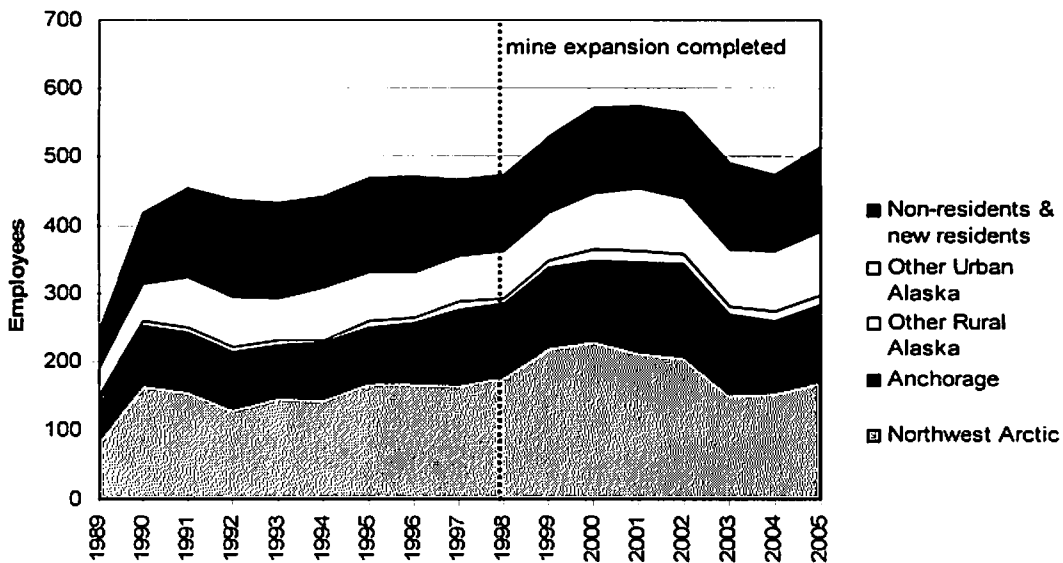
Employment is head count, including seasonal and temporary workers during the calendar year.
 Source: Alaska Department of Community and Economic Development and the London Metal Exchange.

Figure 3.46 Red Dog Production, Employment and Zinc Price

Figure 3.47 displays Red Dog employment by region. The Alaska Department of Labor identified the residency of Red Dog employees using PFD data. Employees with no corresponding PFD match are either non-residents or new residents who are not yet eligible for a PFD. Statewide, the Department of Labor estimates about 15 percent of the employees with no PFD match are new residents, and the rest are non-residents. This figure shows that although employment in the NWAB is variable, the variation in employment from other Alaska regions is largely parallel.

Figure 3.48 illustrates Red Dog employment as a percent of total employment in northwest arctic communities in 2000. Noatak and Kivalina, the communities geographically closest to the mine and which enjoy preferential hire, have the highest percentage of employment: 44 percent and 37 percent, respectively. Four of the top five communities in percent employment at Red Dog are also in the top five in proximity to the mine.

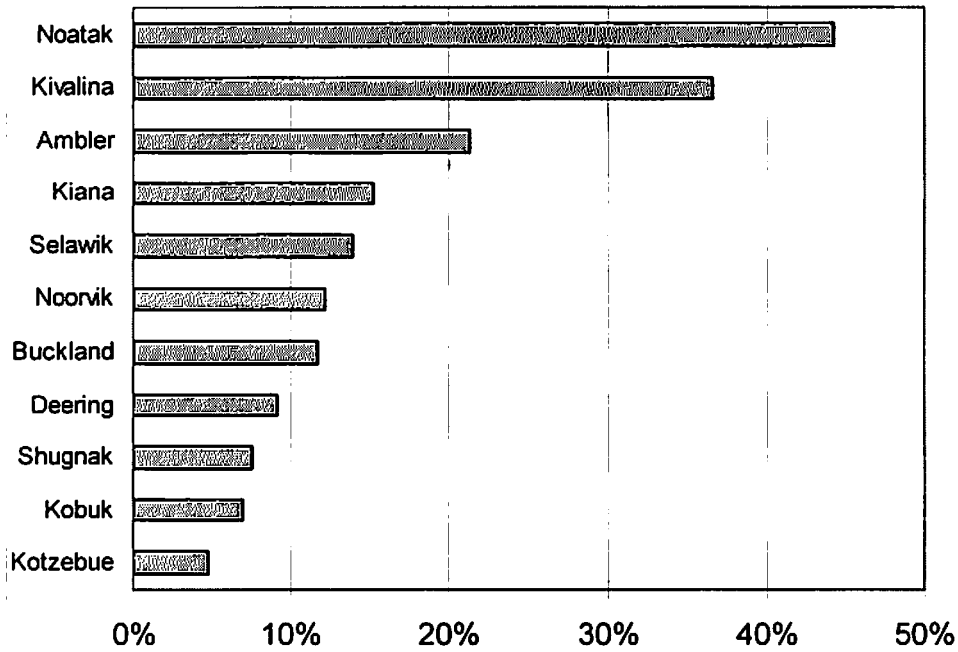
Figure 3.49 shows NWAB employment by sector from 1985 to 2004. State government employment shrank during this time period while “other private” showed the largest growth. In 1985, government (federal, state, and local) provided the largest share of jobs in the NWAB; by 2004 the private sector (Red Dog and other private entities) provided the largest share of jobs. This is in spite of an increase in local government employment in 2001 due to changes in ADLWD counting methods³ in which tribal entities switched from “private ownership” to “local government.”



Source: ADLWD, Research and Analysis Section, 2007

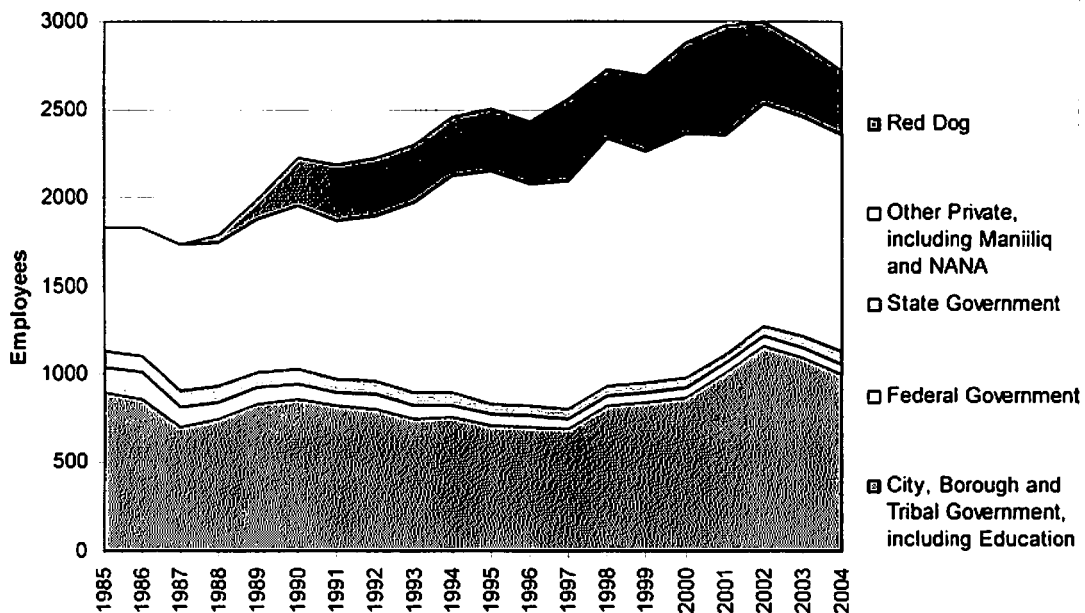
Figure 3.47 Red Dog Employment by Region, 1989-2005

³ The counting method changed from the Standard Industrial Classification (SIC) system to the North American Industrial Classification System (NAICS). This should not affect the comparability of the numbers except in the aforementioned instance of tribal entities.



Source: ADLWD 2007 (Red Dog Employee Figures) and U.S. Census Bureau 2000 (Employment Numbers and Age Numbers).

Figure 3.48 Red Dog as Percent of Total Employment in NWAB Communities, 2000



Source: ADLWD, Research and Analysis Section, 2007

Figure 3.49 Employment by Sector in the NWAB

The shift in employment from the public to the private sector also occurred in other areas of remote rural Alaska, due to declines in state spending and employment, declines in federal employment, and increases in ANCSA nonprofit employment. Table 3.17-14 shows the percentage of jobs in the private sector over time for remote rural boroughs and census areas, based on the average number of jobs in each given year. While most of remote rural Alaska increased their proportion of private sector jobs over the last two decades, the NWAB had one of the highest rates of increase and gained in rank order from 11 out of 13 remote rural areas in 1985, to 8 out of 13 in 2005. Red Dog employment largely accounted for this relative gain.

Table 3.17-14 Percent of Jobs in Private Industry, Remote Rural Boroughs and Census Areas

	1985	1995	2005	Percentage Change
Aleutians (East Borough + West Census Area)*	57.9	83.5	85.0	27.1
Yukon-Koyukuk Census Area + Denali Borough*	37.9	51.7	59.8	21.8
Northwest Arctic Borough	38.0	66.6	58.8	20.8
Bristol Bay Borough	63.6	66.6	79.1	15.6
Bethel Census Area	45.3	61.0	54.3	9.0
Nome Census Area	48.2	58.7	54.4	6.2
Wade Hampton Census Area	30.8	39.4	32.8	2.0
Prince of Wales-Outer Ketchikan Census Area	56.2	64.4	57.9	1.7
Kodiak Island Borough	74.9	82.1	75.1	0.2
Skagway-Hoonah-Angoon Census Area + Yakutat Borough*	63.0	74.0	63.0	0.0
North Slope Borough	83.3	70.0	81.6	-1.7
Wrangell-Petersburg Census Area	67.6	67.7	64.0	-3.7
Dillingham Census Area + Lake and Peninsula Borough*	65.6	72.7	56.3	-9.3

* Weighted averages for comparability across years
 Source: ADLWD, Research and Analysis Section, 2007

Key Industry Overview

Government. As is the case in most of Alaska, and particularly in rural Alaska, government employment and spending is a key component of the economic base of NWAB. Employment with government and government enterprises accounted for 1,264 jobs in 2005, 36 percent of all employment in the NWAB (Table 3.17-15). Local government, including NWAB government, city governments, tribal governments/councils, and the school district, accounts for 86 percent of all government employment in the NWAB.

Table 3.17-15 Northwest Arctic Borough Total Employment and Government Employment, 2001-2005

	2001	2002	2003	2004	2005
Total Employment	3,351	3,411	3,323	3,318	3,474
Government and government enterprises	1,138	1,304	1,246	1,235	1,264
Federal, civilian	57	55	56	55	57
Military	47	54	54	54	54
State and local	1,034	1,195	1,136	1,126	1,153
State government	54	59	64	71	68
Local government	980	1,136	1,072	1,055	1,085

Source: Bureau of Economic Analysis 2008

Employment data actually understates the importance of government in the economy. Other employers in the region are dependent on government funding, including Maniilaq, one of the NWAB's largest employers. Government money also flows into the region's economy for construction projects, other government procurement, and transfer payments to individuals.

Some of the single largest sources of federal money flowing to the NWAB include Indian Health Services Health Management Development Program funds (\$33 million in 2005), Impact Aid (\$7 million), Indian Housing Block Grants (\$6 million), Social Security payments to individuals (\$5 million), Tribal self-governance funds (\$4 million), and food stamps (\$3 million).

The amount of federal money flowing into the NWAB increased in 2005 to \$88.5 million (including only direct expenditures), from \$84.9 million in 2004 (tables 3.17-16 and 3.17-17). The increase was largely the result of an increase in payments to individuals, along with an increase in procurement contracts.

Visitor Industry. While the visitor industry is an important part of Alaska's economy, with 1.6 million visitors (summer, 2006) who spent \$1.5 billion while in Alaska, the industry plays a small role in the NWAB economy. Many recreational visits to the region are centered around sport hunting, which remains a controversial activity in a region reliant on subsistence hunting and fishing.

Commercial Fishing. Commercial fishing plays a limited role in the NWAB economy, but does generate income for a number of residents. In 2005, 45 NWAB residents fished under 47 permits, harvesting 734,041 pounds of fish and earning \$213,505 in gross (ex-vessel) income (CFEC 2008). The Kotzebue salmon gillnet fishery accounts for most of this activity (41 of the 47 permits fished in 2005), but NWAB residents also fish elsewhere in the state and draw money back into the regional economy.

Mining Industry (Unrelated to the Red Dog Mine). The NWAB is richly endowed with mineral resources and has a long history of exploration and production. Historically, placer mining produced over 600,000 ounces of gold, including mining in the Kiana, Noatak, and Shungnak areas, as well as the Fairhaven-Inmachuk District (ADCCED 2008). Exploration activity has identified numerous base metals (copper, lead, and zinc), precious metals (gold and silver), chromium, other metals, and coal deposits.

Today, mining is the single most important private sector economic activity in the NWAB. While there is substantial exploration activity in the region, the Red Dog Mine accounts for nearly all of the local economic impact related to mining. The following analysis provides an overview of some of the mining industry activity in the NWAB that is not related to the Red Dog Mine. A detailed assessment of the economic impact of Red Dog Mine in the region and in the state overall is provided in the next section.

Minerals Exploration Activity in the NWAB. In addition to the Red Dog Mine, numerous mineral occurrences have been identified in northwest Alaska. Notable among these occurrences is the Lik Deposit, located 12 miles north of Red Dog Mine. Historic exploration work identified resources of 24 million tons of 9 percent zinc, 3.1 percent lead, and 1.4 ounces per ton gold. Zazu Metals, in a 50/50 partnership with Teck, has initiated a drilling program to evaluate the property's economic potential. This deposit is noteworthy because its development and operation could use much of the infrastructure now in place for the Red Dog Mine.

The Anarraaq Deposit, located about 6 miles north of the Red Dog Mine, is located on State land and patented by Teck. Drilling has identified a resource of about 17 million tons containing 17 percent zinc, plus high concentrations of lead and silver. The nearby Aktiguruk Deposit also contains high concentrations of zinc. These deposits are being actively explored by Teck.

Table 3.17-16 Northwest Arctic Borough Consolidated Federal Funds Summary, 2003-2005

	2003	2004	2005
Total Direct Expenditures or Obligations	\$84,019,855	\$84,891,521	\$88,477,328
Retirement/Disability Payments for Individuals	6,498,738	6,822,446	6,893,477
Other Direct Payments for Individuals	4,278,383	4,372,771	5,379,271
Direct Payments other than for Individuals	1,172,892	4,954,620	6,657,227
Grants (Block, Formula, Project, and Cooperative Agreements)	65,438,483	61,519,988	60,379,023
Procurement Contracts	2,680,314	3,250,586	5,198,915
Salaries and Wages	3,951,045	3,971,110	3,969,415
Other Federal Assistance			
Direct Loans	484,200	Not available	80,700
Guaranteed/Insured Loans	150,000	4,034,000	2,500,000
Insurance	3,334,840	3,393,686	4,462,303

Source: U.S. Census Bureau 2000

Table 3.17-17 Northwest Arctic Borough, Consolidated Federal Funds 2005

	2005
Total Direct Expenditures or Obligations	\$88,477,328
Retirement/Disability Payments for Individuals	6,893,477
Social Security	5,354,395
Federal Retirement and Disability Payments	1,147,103
All Other	391,979
Other Direct Payments for Individuals	5,379,271
Food Stamps	3,240,403
Medicare- Hospital Insurance	1,181,473
Medicare- Supplementary Medical Insurance	665,761
All Other	1,393,169
Direct Payments other than for Individuals	6,657,227
Aid to Tribal Governments	1,025,696
Consolidated Tribal Government Program	557,414
Tribal Self-Governance	4,004,739
Indian Self-Determination Contract Support	275,327
All Other	794,051
Grants (Block, Formula, Project, and Cooperative Agreements)	60,379,023
National School Lunch Program	953,883
Indian Housing Block Grants	6,211,952
Highway Planning and Construction	2,091,678
Indian Environmental General Assistance Program	907,855
Impact Aid	7,114,010
Alaska Native Educational Programs	1,714,835
Community Health Centers	1,027,309
Indian Health Services Health Management Development Program	33,344,281
Temporary Assistance for Needy Families	770,252
Low-Income Home Energy Assistance	789,061
All Other	4,546,052
Procurement Contracts	5,198,915
Procurement Contracts – Department of Defense	1,806,639
Procurement Contracts – All Federal Agencies other than Defense and U.S. Postal Service	2,739,923
Procurement Contracts – U.S. Postal Service	652,353

	2005
Salaries and Wages	3,969,415
Salaries and Wages – All Government Civilian Employment Except Defense and U.S. Postal Service	1,518,000
Salaries and Wages – U.S. Postal Service	2,451,415
Other Federal Assistance	
Guaranteed/Insured Loans and Direct Loans	2,580,700
Insurance	4,462,303

Source: U.S. Census Bureau 2000

Well to the southeast of the Red Dog Mine, the Kobuk River area is also the target of extensive exploration activity. Mantra Mining, Inc., is examining the Arctic Deposit, part of the Ambler District, located approximately 180 miles southeast of the Red Dog Mine. The Ambler property includes 35,000 acres of patented and State of Alaska mining claims. The Arctic Deposit includes 40 million tons with an average grade of 4 percent copper, 5.5 percent zinc, 0.8 percent lead, 1.6 ounces per ton silver, and 0.2 ounces per ton gold (Szumigala and Hughes 2007).

Another Ambler District Deposit, the SUN, is owned by Andover Ventures. The SUN property consists of 11,000 acres of State of Alaska mining claims. The deposit includes high concentrations of copper, lead, zinc, silver, and gold. In 2007, Andover conducted 14,750 feet (4,500 meters) of drilling and constructed a 1,500-foot airstrip.

Coal resources have also been identified in the NWAB. Coal was actually mined at the Chicago Creek Deposit in the early 1900s and burned to support gold placer mining operations in the area. The Chicago Creek coal resource includes 15 million tons of sub-bituminous coal. The Kobuk coal resource includes 10 million tons of high-volatile bituminous coal (ADCCED 2008).

3.17.2.3 Government and Public Services in the NWAB

Overview

The NWAB is a home rule borough, incorporated in 1986. According to the Alaska Constitution, a home rule borough can exercise any power not specifically prohibited by state law or the NWAB's charter, which defines its powers and duties, and is adopted by voter approval. The NWAB does not levy any taxes on its residents, although communities within the NWAB do (Division of Community and Regional Affairs, ADCCED).

All of the communities in the NWAB are second-class cities, with the exception of Noatak, which is an unincorporated community. Both first- and second-class cities provide a range of municipal services, such as police protection and sewer and water utilities. The difference between the two classes of city includes taxing authority, responsibility for schools, and the powers and duties of the mayor. For example, with regard to education, a first-class city must exercise education powers while a second-class city may not. Additionally, a community must have at least 400 permanent residents to form a first-class city (ADCCED 2008).

None of the communities in the NWAB impose a property tax. Eight of the 11 communities have a sales tax, ranging from 2 percent to 6 percent, and Kotzebue levies two special taxes, a 6 percent bed tax and a 6 percent alcohol tax.

Northwest Arctic Borough

The NWAB was incorporated two years before the Red Dog Mine began operations to provide services to the region’s residents using revenue generated from the mine. Over the past 20 years, the expansion of both NWAB staff and services has paralleled the increasing amounts of Teck PILT to the regional governing body. In recent years, the PILT have grown substantially, making Teck the largest single revenue source for NWAB (Table 3.17-18). Revenue increases have allowed the NWAB to increase its staff from nine employees to 15, and increase funding for its four main departments—public services, planning, economic development, and education.

Table 3.17-18 Northwest Arctic Borough Revenues, Fiscal Year 2007

Revenue Sources	General Funds	Bulk Fuel	Kivalina Bulk Fuel Shoreline Protection Grant	Debt Service	Non-major Funds	Total Revenue Funds
Local Sources						
Teck	\$8,721,473	N/A	N/A	N/A	N/A	\$8,721,473
NWAB Usage Fee	2,126,016	N/A	N/A	N/A	N/A	2,126,016
Investment Income	353,095	N/A	N/A	276,214	N/A	629,309
Fuel Revenue	N/A	1,048,408		N/A	N/A	1,048,408
Contribution from School District	50,000	N/A	N/A	N/A	N/A	50,000
Other	72,406	N/A	N/A	N/A	582,219	654,625
Total Local Income	11,322,990	1,048,408	0	276,214	582,219	13,229,831
Intergovernmental						
Federal Sources	636,441	N/A	1,063,742	N/A	265,977	1,966,160
State Sources*	633,267	N/A	1,326,690	4,329,382	770,062	7,059,401
Total Revenue	\$12,592,698	\$1,048,408	\$2,390,432	\$4,605,596	\$1,618,258	\$22,255,392

Source: NWAB, Basic Financial Statements and Supplementary Information, FY 2007

*This includes federal funds passed through the State of Alaska

N/A = not applicable

In fiscal year (FY) 2007, the NWAB’s expenditures totaled \$25.7 million. Nearly 29 percent of expenditures were directed toward school renovation projects in Deering and Shungnak, and another 14 percent went directly to the school district. Other NWAB expenditures include \$2.2 million for general government costs, \$5 million for public services, and \$6.3 million for debt service.

Without PILT funds from the Red Dog Mine, the NWAB would be much more reliant on state and federal funds. For example, as noted by a NWAB official, the ongoing efforts to relocate Kivalina (because of severe erosion on its shores) would be completely dependent on state or federal aid if the NWAB did not have significant revenue from the Red Dog Mine. These funds are not only important logistically, but give the region a sense of self-reliance and self-determination.

The NWAB is working to develop short- and long-term plans to address the possibility of revenue that would be forgone due to an unplanned closure of the Red Dog Mine. A savings account was established for short-term use if mining operations cease. Long-term revenue prospects are much less certain.

Municipal/Tribal Services and Finances

Ten of the 11 communities in the NWAB have both a municipal government and a tribal council. Neither the municipal governments nor tribal councils have direct links to the mine. The division of services provided by each entity is generally clear, with separate funding sources and administrative bodies. Kiana is somewhat distinctive because a single individual serves as the executive director of both the

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municipality and the tribal council, although each governing entity still has distinct revenue sources and the tribal council has a directive board. Noatak is an unincorporated community, and thus does not have any form of municipal government; the NWAB provides services not accounted for by the tribal council.

Seven of the remaining communities (Ambler, Buckland, Deering, Kivalina, Kobuk, Noorvik, and Shungnak) have formed contractual agreements with the Maniilaq Association, the regional health and social services provider, to provide services to community residents. Maniilaq receives per-community funding from the Bureau of Indian Affairs based on tribal enrollment in each community. Funding generally ranges from \$70,000 to \$150,000 per community. These funds are pooled by Maniilaq, and combined with funds from other sources, to pay for and implement community service programs, such as food preservation, housing improvement, realty, rights protection, subsistence hunting, traditional foods, tribal environment protection, and the newly reinstated Village Public Safety Officer program. Additionally, these communities receive monthly payments or a lump sum amount from Maniilaq under the Aide-to-Tribal Governments program. These payments cover tribal administration salaries and costs.

Typically, municipal governments in the NWAB receive their primary revenues from local sources. State and federal revenue often comes in the form of capital project funding. Services provided by municipalities commonly include water and sewer utilities, landfill operation, and cable television services, in addition to capital improvement projects. Table 3.17-19 provides an overview of regional community municipal revenues and expenditures for FY 2005.

Table 3.17-19 Municipal Revenues and Expenditures, Fiscal Year 2005

	Local Revenues	Outside Operating Revenues	Outside Capital Revenues	Total Revenues	Operating Expend.	Capital Expend.	Total Expend.
Ambler	\$208,767	\$10,940	\$28,790	\$248,497	\$251,444	\$42,683	\$294,197
Buckland	702,416	0	0	702,416	668,226	707	668,933
Deering	367,613	44,698	100,022	512,333	476,322	0	476,322
Kiana	681,182	6,166	44,792	732,140	657,404	0	657,404
Kivalina	214,808	10,249	0	225,057	290,833	0	290,833
Kobuk	201,052	1,241	25,000	227,293	226,380	0	226,380
Kotzebue	6,386,286	153,487	343,624	6,883,397	6,505,656	512,094	7,017,750
Noorvik	485,751	0	0	485,751	579,930	0	579,930
Selawik	547,801	35,503	23,397	606,701	601,457	3,635	605,092
Shungnak	141,970	35,288	70,135	247,393	220,566	17,744	238,310

Source: Alaska Department of Commerce, Community and Economic Development, Community Database

Note: Noatak is an unincorporated community and thus has no municipal finances. Water and sewer utilities, as well as landfill operation are handled by the local village council.

Health and Social Services in the Northwest Arctic Borough

Most health and social services programs offered in the NWAB are managed by Maniilaq Association, a non-profit corporation. Maniilaq Association represents 12 federally recognized tribes located in northwest Alaska and manages social and health services for about 6,500 people within the NWAB and the village of Point Hope. Maniilaq also coordinates tribal and traditional assistance programs, as well as environmental and subsistence protection services.

Maniilaq Association is one of the largest employers in the region with approximately 550 workers and is therefore a key component of the regional economy.

Maniilaq health service facilities and programs include a health center, dental clinic, eye clinic, laboratory, Social Services Department, pharmacy, physical therapy, radiology, and 11 remote village clinics.

There are no apparent direct economic linkages between Maniilaq operations and the Red Dog Mine. Maniilaq provides health and social services to mine employees and their families that reside in the region. However, there is no indication that the presence of the mine related population has any positive or negative impact on Maniilaq services in terms of cost or availability of services. In 2007, Teck made a \$106,500 contribution to Maniilaq Association in support of its cancer treatment program.

Northwest Arctic Borough School District

School enrollment in the NWAB has been steady at around 2,000 students over the past several years. The NWAB School District administers schools in 11 different communities, with local enrollments ranging from 35 students in Kobuk to 720 students in Kotzebue.

The NWAB School District's FY 2008 budget reports annual operating revenues of \$45.8 million. Contributions from the NWAB's general fund total \$3.8 million. In FY 2007, roughly 70 percent of general fund revenues were Teck PILT. The school district's estimated 2008 expenditures are \$45.3 million. Roughly 65 percent of these funds are directed toward instructional expenditures.

Approximately one-fifth of NWAB School District students have parents employed directly at the Red Dog Mine or at one of the mine contractors, according to a school district official. The number of former district students employed at the mine is unknown.

The most notable concrete effect that the Red Dog Mine has had on the NWAB School District, according to the NWAB School District Superintendent, is Teck's financial backing of a \$100 million bond initiative passed by the NWAB in 1998. (PILT revenues flowing from the mine to the NWAB were essential for securing and repaying the bond.) Bond funds, in conjunction with State government grants, were used to renovate, and in some cases completely rebuild, severely dilapidated village schools throughout the NWAB. The superintendent underscored that without Teck backing, the bond initiative would not have been possible.

The Red Dog Mine supports and facilitates the Career Awareness and Job Shadow programs for students throughout the NWAB. Under the Job Shadow Program, high school students spend three days paired with a Red Dog Mine employee at the mine site, learning first-hand what it is like to work in the mining industry. The Red Dog Mine finances the logistics of these programs.

The Alaska Technical Center (ATC), governed by the NWAB School District Board of Directors, is an adult vocational/technical training school constructed in 1981 to help local residents meet the construction and operational employment demands of the Red Dog Mine and regional support services. Funded primarily by the ADLWD, ATC currently offers four nine-month courses, employer-designed short programs, and adult basic education/general educational development. In 2007, 90 percent of ATC's Millwright Apprenticeship Program graduates were hired by the Red Dog Mine, with starting salaries averaging \$57,000. During the 2006–2007 academic year, the ATC awarded 197 certificates of completion for long-term (six to nine months) training programs, 400 certificates for short-term programs (less than one month), and 39 general educational development diplomas. If mine operations cease, this institution would likely stop receiving funding and close down. According to the NWAB School District Superintendent, ATC's impacts on regional employment are critical and closure of the school would be very harmful to the region.

3.17.2.4 Effects of Existing Operations on Socioeconomics

The conception and implementation of the Red Dog Mine began as and has continued to be an iterative process involving the participation of many people. In 1982 NANA entered an agreement with Cominco (which later became Teck Cominco) with the goal to "develop one of the richest zinc deposits in the world; provide employment; and protect the subsistence lifestyle of the people in the region" (NANA-

Cominco brochure, n.d., p.7). The main goal of the NANA-Cominco partnership was to meet the needs and address the concerns of the residents of the borough.

In two public hearings, one on May 2, 1984, in Anchorage, and another on May 3, 1984, in Kotzebue, community members, NANA employees, mineral development agencies, the State of Alaska, and environmental groups presented their concerns about the Red Dog Mine EIS and the many ways the mine's development could play out. Approximately 60 people attended each of the hearings. The central concern raised in the hearings was the protection of the traditional way of life of the Iñupiaq people. The main expectation was increased social and economic welfare of the residents of the NWAB through jobs and regional income. Creating a partnership between Teck, which operates the mine, and NANA, the regional for-profit corporation established under ANCSA that owns the land on which the mine operates, and of which most of the residents of the NWAB are shareholders, was the principle way to address the needs and concerns of the people living in the NWAB.

Red Dog Mine Employment. Red Dog Mine employment as of September 2007 included 465 full-time and 78 part-time workers, including Teck, NANA Management Services, and NANA/Lynden jobs at the Red Dog Mine (Teck 2008). Total 2007 payroll for these workers is estimated at \$45.8 million. NANA shareholders accounted for 55.5 percent of the mine's full-time employees and 91 percent of the part-time employees (Table 3.17-20).

Table 3.17-20 Red Dog Mine Employment Including NANA Regional Corporation Shareholder Hire, September 2007

	Full-time			Part-time		
	Total	NANA	Percentage of NANA Shareholders	Total	NANA	Percentage of NANA Shareholders
Teck	370	203	54.9	42	38	90.5
NANA/Lynden	52	23	44.2	3	2	66.7
NANA Management Services	43	32	74.4	33	31	93.9
Overall Total	465	258	55.5	78	71	91.0

Source: Teck 2008

According to Teck records, 100 current employees at Red Dog reside in the NWAB. In 2007, those employees earned \$9 million. The largest concentration of Red Dog Mine employees is in Kotzebue (where 20 employees now reside), Noatak (17 employees), and Noorvik (18 employees) (see Table 3.17-21). Over the life of the mine, 237 different Kotzebue residents and 108 Noatak residents have been employed at the mine. Another 15 NWAB residents from Noatak have been employed by NANA Management Services or NANA/Lynden.

Local-level employment data also illustrates that employment at the Red Dog Mine may have facilitated community residents to relocate to Anchorage, for lifestyle and/or economic reasons (Teck provides transportation between the mine and Anchorage). For example, Teck records indicate that 20 Kotzebue residents who worked at the Red Dog Mine moved to Anchorage (or elsewhere in Alaska). Twelve Ambler residents migrated out of the community, as did nine Noorvik residents. Table 3.17-21 presents information about the distribution of employees from within the NWAB.

Since 1989, jobs at the Red Dog Mine have generated \$118.6 million in payroll for the residents of the NWAB (Teck 2008) (Table 3.17-22). Employees from elsewhere in Alaska earned a cumulative total of \$306.5 million, including \$24.8 million in 2007. Non-Alaskans employed at the mine have earned a cumulative total of \$130.2 million, including \$8.3 million in 2007.

Table 3.17-21 Teck Employment of Northwest Arctic Borough Residents by Community

Community	Population (2007)	Teck Employment Since 1989	Other Red Dog Mine Employment Since 1989	Migrated Employees	Current Teck Employees
Ambler	277	68	0	12	6
Buckland	461	59	0	0	7
Deering	133	16	0	0	3
Kiana	391	80	0	7	5
Kivalina	398	80	20	3	12
Kobuk	119	3	0	0	0
Kotzebue	3,133	237	0	20	20
Noatak	489	108	15	2	17
Noorvik	636	125	0	9	18
Selawik	828	78	0	2	9
Shungnak	269	37	0	5	3

Source: ADLWD and Teck 2008

Table 3.17-22 Red Dog Mine Employee Cumulative Gross Payroll, by Place of Residence, 1989-2007

	1989-2007 Payroll (Cumulative)	2007 Payroll
NWAB	\$118,583,605	\$8,991,193
Ambler	9,436,340	642,590
Buckland	9,721,001	767,877
Deering	2,517,295	*
Kiana	9,795,259	685,359
Kivalina	7,203,088	649,958
Kobuk	304,812	0
Kotzebue	28,276,920	2,093,475
Noatak	21,734,608	1,569,588
Noorvik	15,382,736	1,430,923
Selawik	960,061	*
Shungnak	4,521,484	*
Other Alaska Total	306,515,324	24,750,018
Anchorage	153,068,356	12,860,875
Wasilla	47,206,723	3,920,537
Palmer	19,408,800	2,039,788
Fairbanks	13,175,082	859,156
Eagle River	11,257,164	332,585
Other Alaska	62,399,200	4,737,077
Outside Alaska	130,236,637	8,311,931
Total Shareholders	244,038,446	20,893,104
Total Non-shareholders	311,297,120	21,160,037
Total Gross Payroll (1989-2007)	\$555,335,566	\$42,053,142

Source: Teck 2008

* Data suppressed due to confidentiality of data.

Since 1989, NANA shareholders have earned a total of \$244.0 million in payroll, 44 percent of the total payroll generated at the Red Dog Mine over the 19-year period. NANA shareholders earned \$20.9 million in payroll in 2007, half of the mine's total payroll. Since 1989, NANA shareholders have earned a total of

\$244.0 million in payroll, 44 percent of the total payroll generated at the Red Dog Mine over the 19-year period (tables 3.17-23 and 3.17-24).

Table 3.17-23 Teck Employee Wages, 1982–2006

Year	NANA Non-Shareholders	NANA Shareholders	Teck Total Wages
1982–1989	\$3,873,080	\$1,388,757	\$5,261,837
1990	7,611,651	6,310,100	13,921,751
1991	11,650,718	8,848,608	20,499,326
1992	13,454,495	9,245,507	22,700,002
1993	13,293,269	8,949,906	22,243,175
1994	14,723,490	9,358,753	24,082,243
1995	15,488,092	10,045,629	25,533,721
1996	16,418,014	10,652,703	27,070,717
1997	17,532,841	11,887,635	29,420,476
1998	19,136,624	13,695,093	32,831,717
1999	17,744,731	14,843,486	32,588,217
2000	19,675,432	16,450,076	36,125,508
2001	20,267,806	17,891,380	38,159,186
2002	20,915,818	17,471,430	38,387,248
2003	21,258,923	16,527,650	37,786,573
2004	18,779,275	15,019,936	33,799,211
2005	18,918,989	16,169,481	35,088,470
2006	18,462,164	19,239,068	37,701,232

Source: Teck 2008

Table 3.17-24 Red Dog Mine Wages, 2002–2006

Year	NANA Non-Shareholders	NANA Shareholders	Teck Total Wages	NANA Mgmt. Services Wages	NANA/Lynden Wages	Total Wages
2002	\$20,915,818	\$17,471,430	\$38,387,248	\$3,092,291	\$3,571,108	\$45,050,647
2003	21,258,923	16,527,650	37,786,573	3,122,563	4,089,650	44,998,786
2004	18,779,275	15,019,936	33,799,211	2,966,502	4,089,728	40,855,441
2005	18,918,989	16,169,481	35,088,470	2,945,125	3,905,846	41,939,441
2006	18,462,164	19,239,068	37,701,232	3,132,041	3,878,850	44,712,123

Source: Teck 2008

Out-Migration. A rough idea of the effect that employment at the Red Dog Mine has on out-migration can be determined by linking Alaska Department of Labor data containing addresses from the PFD files with employment data. The following analysis considers data for 16- to 64-year-olds in the NWAB collected from the first quarter of each year from 1992 through 2008. People are counted as movers if their zip code in the first quarter of year 1 differs from the first quarter of year 2. The analysis considers totals for Teck employees, other private sector employees, state and local government employees and others. Note that the “other” category includes self-employed, unemployed, and people not in the labor force. These data allow examination of migration and employment.

Table 3.17-25 shows that the population has been increasing by about 1.6 percent per year since 1992. Although the number of people moving away has increased, the out-migration rate (percentage of the population who moved outside of the NWAB) has remained relatively steady from 1992 to 2007.

Table 3.17-25 Out-migration of NWAB Residents, 1992-2007

Year	Residents 16 to 64	Migrants out of NWAB	Out-migration rate (percent)
1992	3,309	381	12
1993	3,384	349	10
1994	3,541	468	13
1995	3,522	440	12
1996	3,533	402	11
1997	3,627	452	12
1998	3,676	451	12
1999	3,755	460	12
2000	3,856	519	13
2001	3,787	476	13
2002	3,843	416	11
2003	3,977	428	11
2004	4,074	523	13
2005	4,115	518	13
2006	4,101	463	11
2007	4,193	465	11

Figure 3.50 shows that Teck employees account for a small number of out-migrants, about 20 people per year (4 percent of total out-migration). An average of 84 state and local government employees move away each year. Others, including students, self-employed, and unemployed make up the largest group, and average about 203 per year.

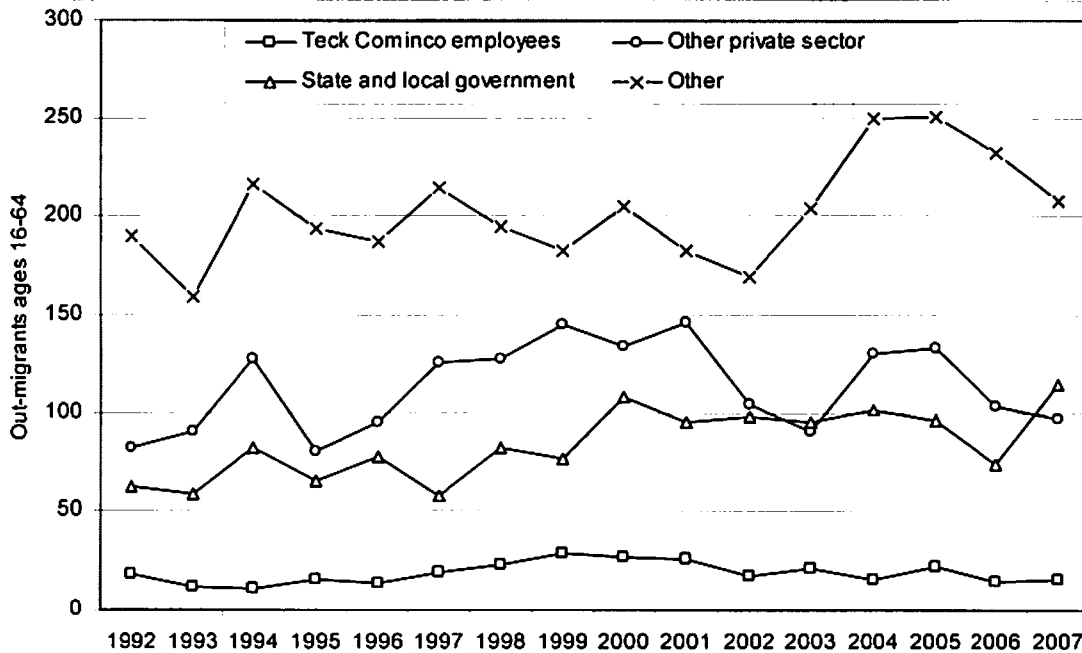


Figure 3.50 Out-migration by Employment Status 1992-2007

The data show that while raw numbers for out-migrants indicate that Teck employees are a relatively small number, the percentage of Teck employees that have moved (e.g., 20 out of approximately 400) is higher than in other employment categories. These data indicate that from 1992 through 2007, a slightly larger share of Teck employees moved out of the NWAB. Out-migration rates for Teck employees ranged from 15 percent to just over 25 percent at its peak in 1997. Out-migration rates for the other groups generally ranged between 7 and 14 percent.

Figure 3.51 combines data from 1992 to 2007 and shows the destinations of people leaving Kotzebue and the NWAB villages, comparing Teck employees to all other out-migrants. The first two columns show people moving from Kotzebue, while the last two columns show people moving from the villages. The percent of Teck employees moving within the NWAB are similar to other movers: about 13 percent of movers from Kotzebue and about 30 percent of those moving from a village. Overall, the largest share of people leaving the NWAB move outside of Alaska. These include teachers and other workers who are originally from other states. Teck employees are less likely than others to move outside of Alaska. Teck employees in both Kotzebue and the villages are more likely than others to move to Anchorage, and less likely to move elsewhere in Alaska. Detailed data on place of employment following moves is not available; however, many of these movers may become commuters from Anchorage to the Red Dog Mine.

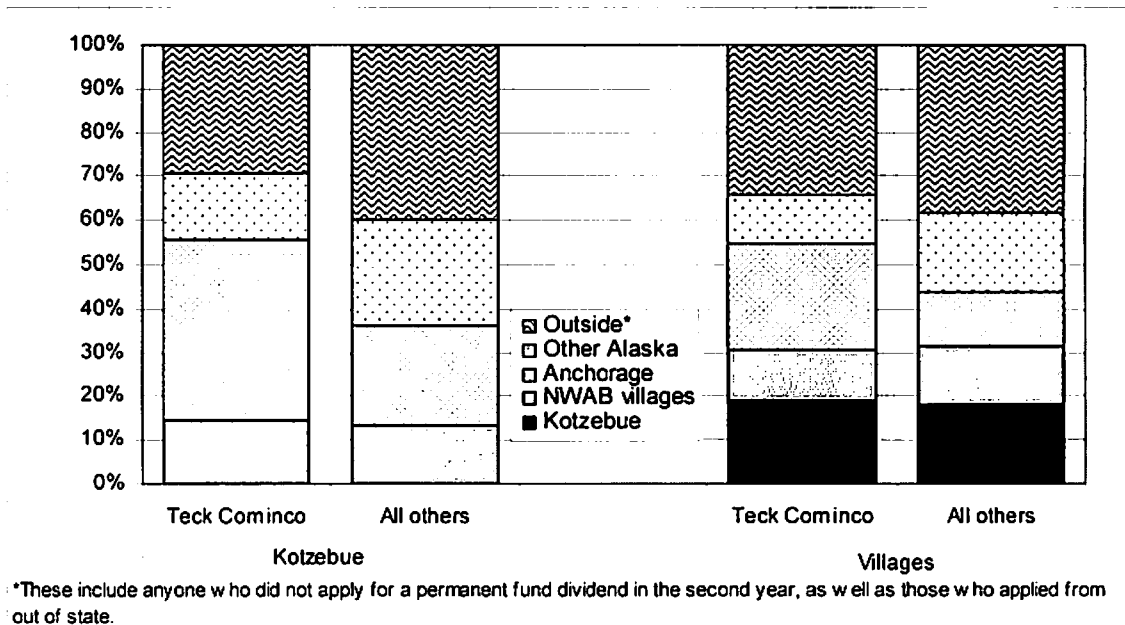


Figure 3.51 People Moving from Kotzebue and Villages (ages 16-64) by Destination 1992-2007

Royalty Payments to NANA Regional Corporation. As owner of the Red Dog Mine property, NANA earns royalties on the net earnings of the mine. Through most of the life of the mine, NANA earned royalties equal to 4.5 percent of net smelter returns. However, with full recovery of certain capital expenditures by year-end 2007, NANA is now earning a royalty equal to 25 percent of net production from the mine under a net proceeds royalty system. NANA's share of net production will increase by increments of 5 percent every five years, up to a maximum of 50 percent. The royalty paid to NANA under the old net smelter system can be calculated using the equation:

Net Smelter Royalty (old system) = 4.5% x Production (pounds) x Zinc Price (\$/pound)

The royalty paid to NANA under the new net proceeds system can be calculated using the equation:

Net Proceeds Royalty (new system) = (% of net proceeds [starting at 25%]) x Production (pounds) x (Zinc Price [\$/pound] – Cost of Mining Zinc [\$/pound])

The switch in Teck’s royalty payment from a net smelter to a net proceeds royalty, increases NANA’s royalty payments while exposing the royalties to greater price vulnerability. Through 2007, NANA earned \$220 million in total cumulative royalties from its ownership interest in the Red Dog Mine (Table 3.17-26).

Table 3.17-26 Teck Royalty Payments to NANA Regional Corporation, 1982–2007

Year	Royalty	Cumulative
1982–1989	\$7,594,566	\$7,594,566
1990	1,492,589	9,087,155
1991	2,082,514	11,169,669
1992	4,528,457	15,698,126
1993	1,785,902	17,484,028
1994	2,346,425	19,830,453
1995	4,632,009	24,462,462
1996	5,851,529	30,313,991
1997	8,915,537	39,229,528
1998	5,270,574	44,500,102
1999	6,638,128	51,138,230
2000	11,099,199	62,237,429
2001	7,190,964	69,428,393
2002	8,990,745	78,419,138
2003	4,901,460	83,320,598
2004	13,728,521	97,049,119
2005	17,139,159	114,188,278
2006	33,952,840	148,141,118
2007	72,313,266	220,454,384

Source: Teck 2008

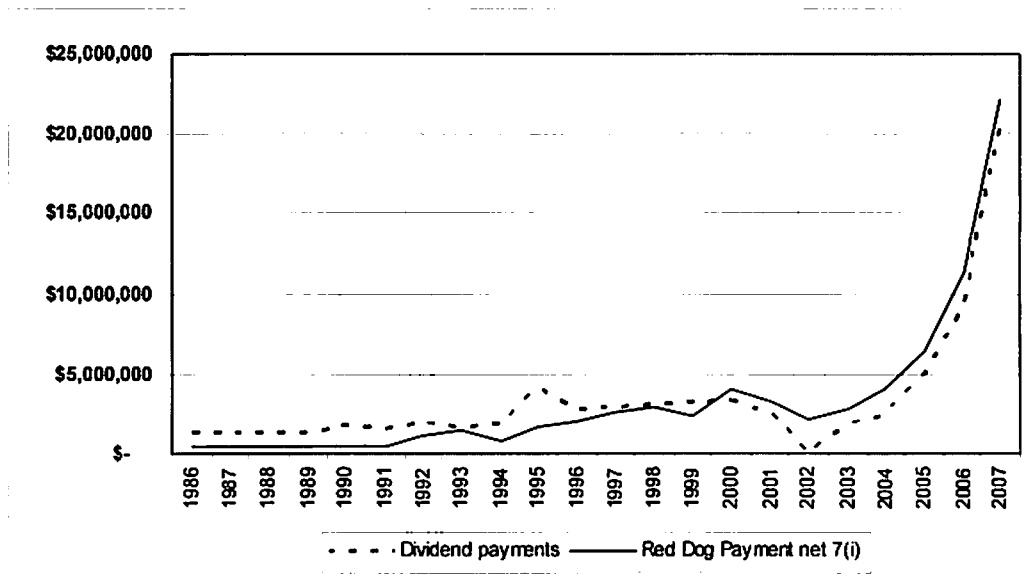
Royalty payments to NANA climbed steadily in recent years as the price of zinc increased the mine’s net smelter returns. Teck paid royalties based on the net proceeds system for only a fraction of 2007. The 2008 royalty payment will be the first entirely calculated using the net proceeds system.

Currently, Teck’s royalty payments to NANA indirectly increase the income of the residents of the region through NANA dividends. Analysis of NANA Annual Reports suggests that NANA likely has used much of the Teck royalty payments to pay dividends to NANA shareholders. Figure 3.52 shows a graphical relationship of Red Dog Mine royalties and the total dividend paid to NANA shareholders between 1986 and 2007.

Beyond the income for NANA and its shareholders, royalties from the Red Dog Mine have a substantial impact on the regional economy, and the statewide economy. The majority of these royalty revenues are actually distributed to other ANCSA regional and village corporations. The 7(i) provision of ANCSA requires that 70 percent of all revenues received by each regional corporation from timber resource development and subsurface resource development (excluding industrial minerals) from ANCSA-

conveyed land be divided annually among the 12 regional corporations according to the number of Alaska Natives enrolled in each region. Regional corporations must then further distribute these funds to village corporations. Therefore, as a result of the 7(i) provisions of ANCSA, Red Dog Mine royalties flow throughout Alaska's economy.

As these shared royalties flow through the Alaska economy, additional income is created. These multiplier effects are difficult to predict and depend on where and how the royalty money is actually spent. Each regional corporation is likely to use its money in different ways. The indirect employment and income effects of these royalties are described later in this section.



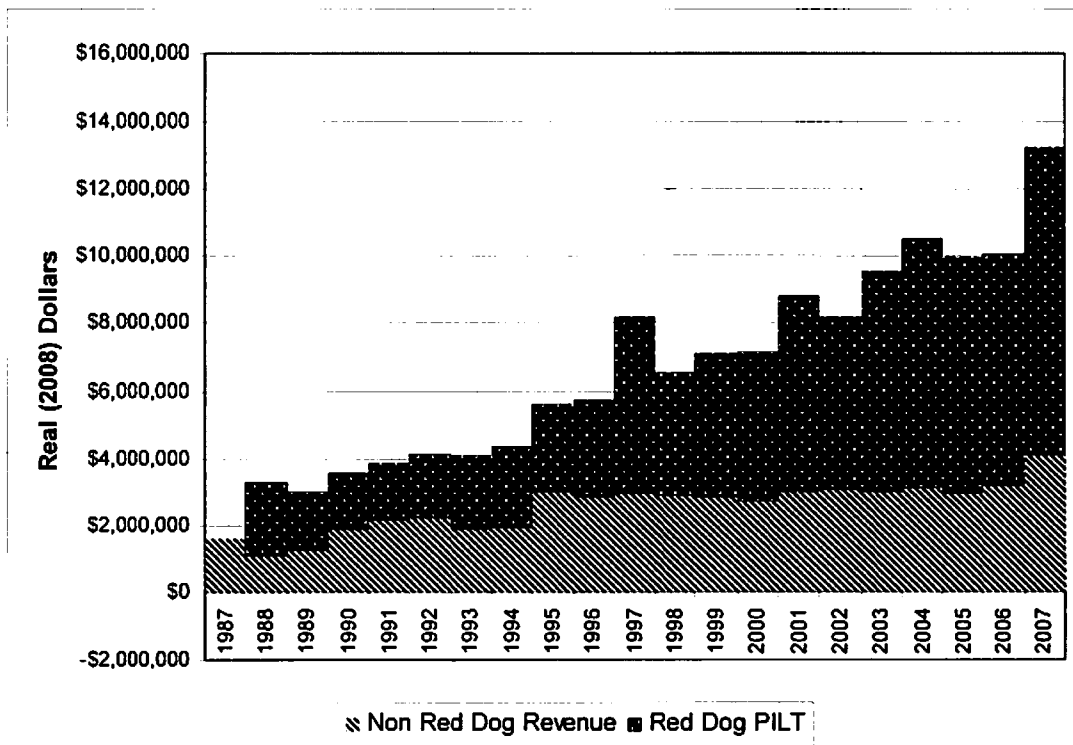
Source: NANA Annual Reports, 1990–2007.

Figure 3.52 Dividend Payments and Net NANA Royalties

Teck Payments In Lieu of Taxes to the NWAB. As stated in the NWAB's FY 2007 Basic Financial Statements and Supplementary Information, an agreement between the NWAB and Teck stipulates that the NWAB will receive quarterly PILT from Teck to fund programs and services designed to support villages within the NWAB. These services may directly or indirectly aid the Red Dog Mine. NWAB annual revenues steadily increased since borough formation with the Red Dog PILT constituting a growing share (Figure 3.53). Since 2003, almost 70 percent of NWAB revenues have come from Red Dog PILT.

In addition to quarterly base payments from Teck, which started in 1988 and will span the life of the mining operation, the NWAB receives "zinc price escalator payments" when the London Metal Exchange 12-month average price per pound for zinc exceeds \$0.60 per pound. These payments are set at \$50,000 per \$0.01 over the \$0.60 base price.

Pending suspension or closure of the Red Dog Mine, the Teck-NWAB agreement will remain in effect for a period of 12 months following the suspension or closure. All payments will be required according to schedule during this period. At the end of the 12-month period, the agreement can be terminated without penalty.



Source: NWAB Annual Reports, 1988-2007

Figure 3.53 Northwest Arctic Borough General Fund Revenue Source

According to the NWAB financial statement, the NWAB received payments totaling \$8,621,473 from Teck in FY 2007 (Table 3.17-27). Of that, \$2,293,473 was based on the zinc price escalator. The NWAB is scheduled to receive \$6,528,000 in payments from the mining company in FY 2008, plus any payments based on the zinc price escalator.

Red Dog Mine Related Purchases of Goods and Services. In 2007, Teck purchased approximately \$131 million in goods and services from Alaska businesses and organizations. (This does not include royalty payments to NANA, tax payments to the State of Alaska, the PILT to NWAB, or payroll to its own employees). Approximately 350 different Alaska businesses and organizations received payment from Teck in 2007. Roughly \$71 million of this spending occurred with NANA affiliates. Payments made to specific vendors are confidential and therefore not disclosed in this assessment.

The impact of spending with vendors in the NWAB is difficult to isolate because many of these businesses have a statewide presence, including the NWAB. It is likely that in certain instances, the volume of business related to the Red Dog Mine in specific sectors of the economy is such that there are indirect benefits for other customers of those vendors. For example, in 2007 the Red Dog Mine spent approximately \$4 million on air transportation services to, from, and within the NWAB. This volume of business in this sector of the economy likely results in economies of scale that reduce cost and improve service for air transportation users unrelated to the mine.

Table 3.17-27 Teck Payments In Lieu of Taxes, 1991–2007

Fiscal Year	PILT	Cumulative
1991	\$3,750,000	\$3,750,000
1992	1,150,000	4,900,000
1993	1,350,000	6,250,000
1994	1,550,000	7,800,000
1995	1,750,000	9,550,000
1996	1,950,000	11,500,000
1997	3,725,000	15,225,000
1998	2,525,000	17,750,000
1999	2,900,000	20,650,000
2000	3,500,000	24,150,000
2001	4,375,000	28,525,000
2002	4,200,000	32,725,000
2003	4,800,000	37,525,000
2004	5,875,000	43,400,000
2005	6,145,000	49,545,000
2006	6,328,000	55,873,000
2007	8,621,473*	64,494,473

Source: Teck 2008

Note: A slight discrepancy exists between NWAB and Teck FY 2007 PILT figures.

Teck spending also includes approximately \$950,000 in contributions to non-profit organizations in Alaska, including \$600,000 to organizations in the NWAB. Contributions were made to large regional organizations, such as the NWAB School District and Maniilaq Association, village government organizations, youth organizations such as the Boys and Girls Club of Northwest Alaska, and a variety of others. Approximately 55 different non-profit organizations from around Alaska received a contribution from the Red Dog Mine, including 30 located in the NWAB.

In addition to cash contributions, the Red Dog Mine has made in-kind contributions to meet specific needs within the NWAB. In 2005 and 2006, Red Dog Mine personnel assembled and assisted in the transportation of flood control equipment needed to respond to emergency coastal erosion problems in Kivalina. The mine also provided personnel, equipment, and materials to repair erosion damage.

Red Dog Mine Related Total Direct and Indirect Employment and Payroll. Direct Red Dog Mine employment as of September 2007 included 465 full-time and 78 part-time workers, for a total of 543 jobs, including Teck, NANA Management Services, and NANA/Lynden jobs at the Red Dog Mine. Total 2007 payroll for these workers is estimated to be \$45.8 million (including \$38.8 million paid to Teck employees) (Table 3.17-28). Based on an analysis using the model Impact Analysis for Planning (IMPLAN), indirect and induced labor income related to the Red Dog Mine is estimated at \$217 million for 2007, resulting in a total statewide labor income impact of \$263 million.

In 2007, Teck spent \$321 million in Alaska in support of Red Dog Mine operations, including purchases of goods and services, royalty and tax payments, and its own payroll (Table 3.17-28). As money spent by Teck circulates through the regional and statewide economies, additional income is created. This “multiplier effect” includes indirect and induced economic impacts. Indirect impacts include jobs and income in businesses that provide goods and services to the mine. This includes the 350 businesses and organizations described in the preceding discussion of vendor payments. Induced impacts include jobs and income associated with providing goods and services to the Red Dog Mine labor force and their dependents (jobs and income created as a result of the spending of payroll dollars by Red Dog Mine employees). Induced impacts are felt throughout the private and public sector.

Table 3.17-28 Teck Red Dog Mine Related Expenditures in Alaska, 2007

Source	2007 Amount
Vendors and Affiliates	\$100.7 million
Payments to State Government	108.8 million
Royalties to NANA	72.3 million
Direct Teck/Red Dog Mine Payroll	38.8 million
Total Alaska Spending	\$320.6 million

Source: Teck 2008

Multipliers are used to capture these indirect and induced economic impacts. Precisely measuring multipliers related to Red Dog Mine spending requires very detailed information about local economies—information that is not available for the NWAB (or any other local area of Alaska). In the absence of detailed data regarding the economy, models such as IMPLAN can provide reasonable multipliers for sectors of the economy that are affected by visitor spending. IMPLAN is a predictive input-output model of regional and state economies that is widely used to measure the economic impact of industries and industrial/commercial development.

The degree of the multiplier effect (the size of the multiplier) depends on a number of factors, including the relative amount of local spending on goods and services by the businesses that serve the mine, the residency of the labor force, average wages paid to workers at the mine, the residency of the owners of mine-affected businesses, and the level of service and support sector development in the area to meet the needs of the mine. In general, multipliers are lowest for non-locally owned businesses operating in small communities and employing a large percentage of non-resident workers. Multipliers are highest for locally owned businesses operating in urban settings and employing resident workers who are paid high wages.

The Red Dog Mine is an enclave economy within the region. The economic impact of the mine on the regional economy is relatively small because most of the goods and services purchased, by both the mine and the residents of the region, come from outside the region. The Teck/NANA agreement attempts to mitigate this effect by requiring local hire preference but non-labor inputs to the mine are almost exclusively imported from outside the region.

When cash does flow from the Red Dog Mine into the local economy it still has a small impact because of the region's small economic multipliers. Local residents and business spend most of their cash outside the region to buy goods and services that are not available in the region. According to IMPLAN economic multipliers, \$1 million in wages in the NWAB creates 0.8 jobs and \$1 million in wages in Anchorage creates 5.1 jobs. Therefore, a Teck employee living in the NWAB will have a smaller economic impact on the NWAB than a Teck employee living in Anchorage will have on the Anchorage economy.

It is more difficult to measure indirect and induced employment related to the Red Dog Mine during this period of rapidly increasing royalty and tax payments. Models such as IMPLAN are most useful for measuring indirect economic impacts at a relatively steady level of direct impact. Translating the very high labor income impact of the Red Dog Mine in 2007 into annual equivalent employment generates very high indirect employment, approximately 3,400 jobs statewide. However, this likely overstates the number of jobs in Alaska that are linked to the Red Dog Mine because the economy has not had time to adjust, in terms of employment, to the large increase in royalties and taxes flowing into it in 2007. Estimated indirect and induced employment related to the Red Dog Mine reported in the following table, 1,695 jobs, is based on average royalties and taxes paid over the past five years (Table 3.17-29).

Table 3.17-29 Total Direct and Indirect Red Dog Mine Related Employment, Labor Income, and Expenditures in Alaska, 2007

Source	Direct	Indirect and Induced	Total
Employment	543	1,695	2,238
Labor Income	\$45.8 million	\$217 million	\$263 million
Non-Payroll Spending	\$274.8 million	\$108 million	\$383 million

Source: Direct figures from Teck 2008; indirect and induced figures are McDowell Group estimates.
 Note: Direct labor income includes payroll for NANA Management Services and NANA/Lynden.

Table 3.17-30 presents Red Dog Mine related indirect and induced statewide labor income. This labor income includes approximately \$46 million linked to Red Dog Mine purchases of goods and services in Alaska, \$100 million linked to payments to governments, \$65 million linked to royalties, and \$6 million linked to direct payroll. Labor income includes wages, salaries, and proprietor's profits.

Table 3.17-30 Red Dog Mine Related Indirect and Induced Labor Income, 2007

Source	2007 Amount	Indirect and Induced Labor Income
Purchases of Goods and Services in Alaska	\$100.7 million	\$46 million
Payments to State Government	108.8 million	100 million
Royalties	72.3 million	65 million
Direct Teck Payroll	38.8 million	6 million
Total	\$320.6 million	\$217 million

Source: McDowell Group estimates 2008

Calculations of indirect and induced economic impacts in the NWAB are more uncertain and therefore should be viewed as broad approximations. In particular, the amount of royalties that stays within and impacts the NWAB economy is difficult to quantify. For purposes of this portion of the analysis, it is assumed that half of NANA's share of Red Dog Mine royalties flows through the NWAB economy, with the other half flowing through other areas of the State's economy, primarily Anchorage. Further, the employment and income effects of spending with local vendors are also difficult to quantify without very detailed research into the purchasing and employment patterns of the vendors.

As noted above, direct employment and labor income related to the Red Dog Mine includes the 543 full-time and part-time jobs at the mine and \$45.8 million in payroll (with 104 jobs held by residents of the NWAB, accounting for \$8.3 million in annual payroll). Recognizing the uncertainty in the estimates, indirect and induced employment and labor income is estimated at 120 jobs and \$7 million in labor income (Table 3.17-31). The low multipliers indicated by these estimates are indicative of the relatively undeveloped service and supply sectors of the NWAB (relative to Anchorage and Fairbanks, where many of the services and supplies required at the mine are available). This analysis indicates that the Red Dog Mine directly or indirectly accounts for about 20 percent of all employment in the NWAB region.

Table 3.17-31 Direct and Indirect Red Dog Mine Related Employment, Labor Income, and Expenditures in the Northwest Arctic Borough, 2007

Source	Direct	Indirect and Induced	Total
Employment	543	120	663
Labor Income	\$45.8 million	\$7 million	\$53 million
Spending	\$21 million	\$2 million	\$23 million

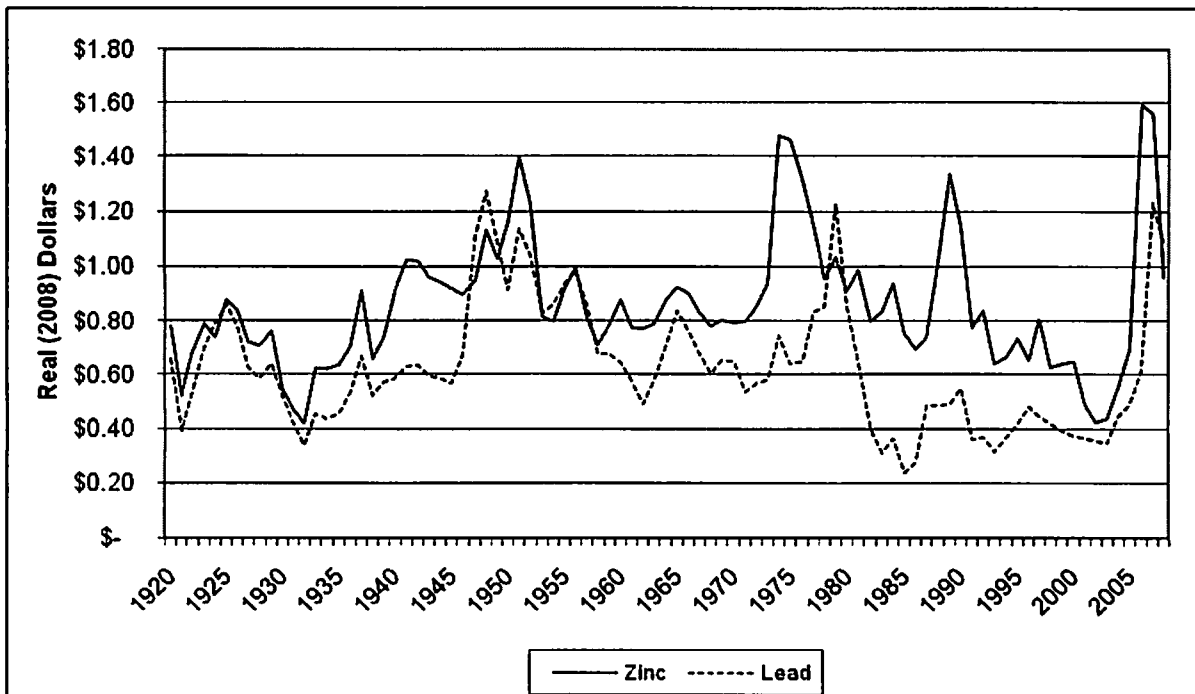
Source: McDowell Group estimates 2008

3.17.3 Socioeconomics – Environmental Consequences

3.17.3.1 Effects Common to All Alternatives

Zinc Price Vulnerability

Red Dog Mine revenues are directly based on zinc, lead and, to a lesser extent, silver prices. Red Dog profits and operations, NANA royalties, and NWAB PILT are all determined by the size of Red Dog’s revenues. The value of Red Dog Mine revenues can be calculated as the quantity of mineral concentrates produced multiplied by their respective prices. Of the two drivers of mine revenues, zinc and lead prices (Figure 3.54) are more volatile than metal production levels. Zinc and lead production have been steady since the mine expansion in 1997 (Figure 3.55). Volatile zinc prices create financial vulnerability for Teck, NANA and the NWAB. These financial vulnerabilities created by zinc prices are common to all alternatives.



Source: USGS, Historical Statistics for Mineral and Material Commodities in the United States 2008, International Monetary Fund, IMF Primary Commodity Funds 2008, ISER calculations.

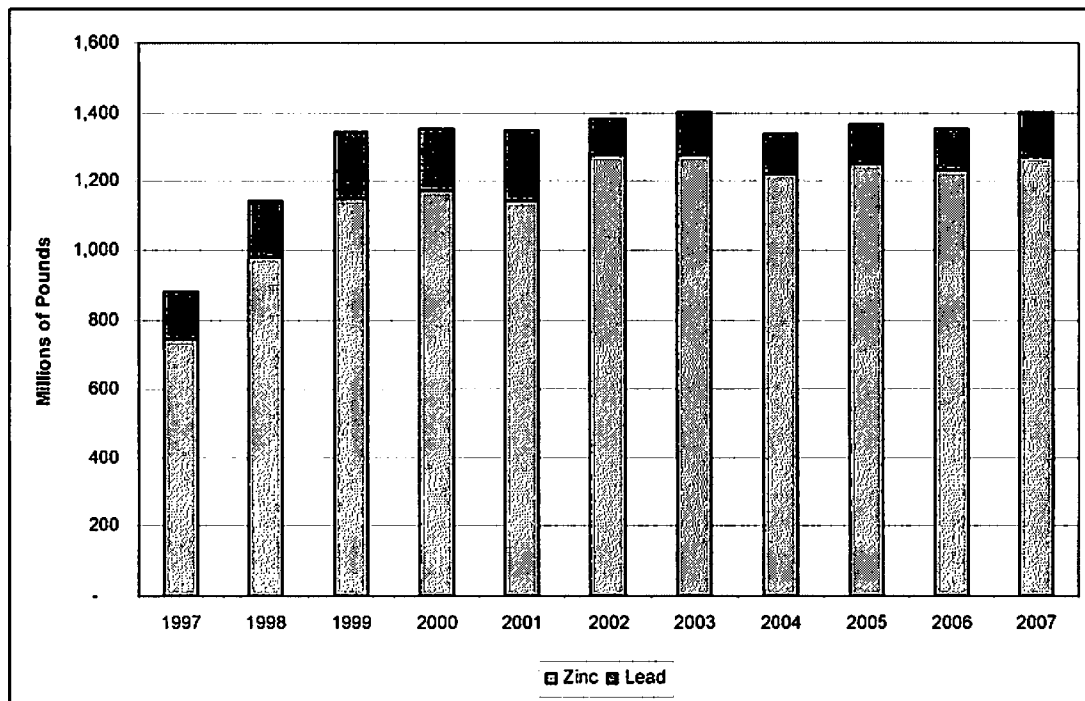
Figure 3.54 Lead and Zinc Prices

33-42

Zinc is the primary metal produced at Red Dog (Figure 3.55) and, as a result, zinc prices have a larger effect on the economic impact of the Red Dog Mine than silver or lead prices. Zinc will remain the primary metal produced for the remaining life of the Main Pit as well as for the Aqqaluk extension. Therefore, only zinc production and prices are used to examine the economic impact of all alternatives.

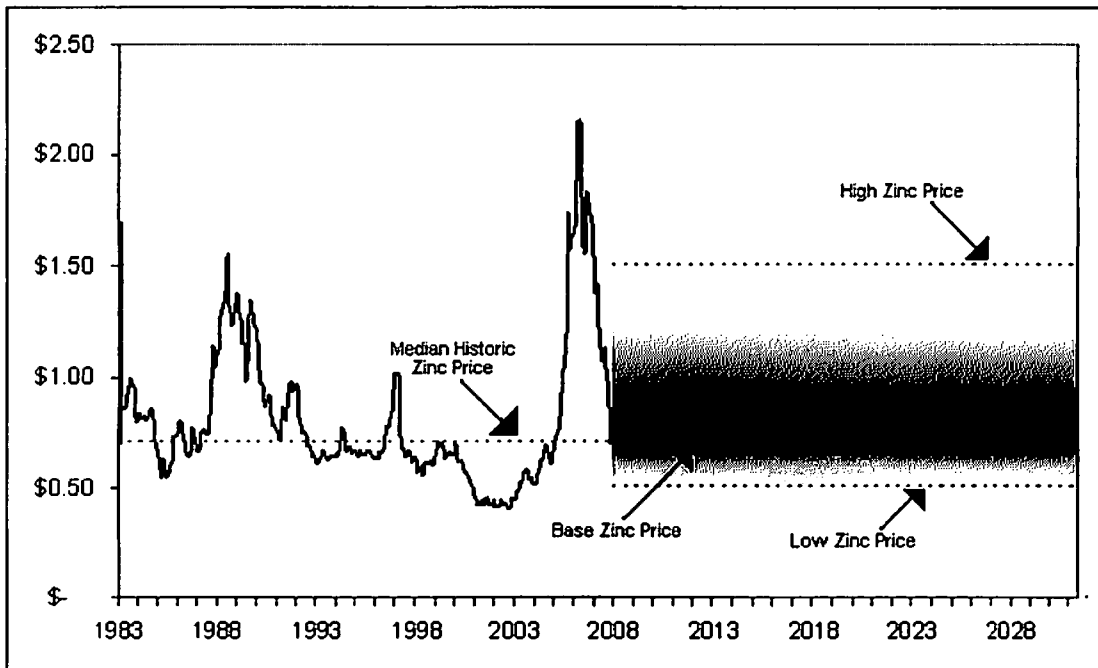
Zinc prices, in addition to production volumes and costs, need to be forecasted to estimate the economic impact of each alternative. For the base case, this analysis follows the price assumption used by the State of Alaska Department of Revenue in its Fall 2008 Revenue Sources Book (ADR 2008) projecting that the zinc price will decrease from its 2007 price of \$1.47 per pound to around \$0.70 per pound. The \$0.70 per pound is used as the basis for estimates presented in this analysis. The 25-year monthly median price is also approximately \$0.70 per pound (Figure 3.56), which means that half the time it was higher than this and half the time lower. In actuality, the price will continue to be volatile and could range anywhere from the historic high of \$2.00 per pound down to \$0.40 per pound. Figure 3.56 shows the relationship between historical zinc prices and the forecasted zinc price used in this analysis.

Price Vulnerability and Red Dog Operations. Zinc prices must remain above a certain price or it would be in Teck's financial interests to cease mining operations. Teck's cost of mining zinc has three components: fixed costs (i.e., sunk capital, long-term leases), variable costs that are independent of zinc prices (i.e., wages, fuel), and variable costs that are dependent on zinc prices (i.e., royalties, income taxes, PILT). If the price of zinc drops below the price-independent variable cost of producing zinc for a period of some time, the mine, barring legal obligations, would cease operation. At that point Teck would be losing more money by continuing to mine than by closing the mine.



Source: Teck Annual Reports, 1997-2008

Figure 3.55 Red Dog Metal Production



International Monetary Fund, IMF Primary Commodity Funds 2008, ISER calculations.

Figure 3.56 Zinc Price Assumptions

The price of zinc might be substantially higher than the forecast and yield windfall benefits for NANA and the NWAB as well as Teck. However, if zinc prices were to collapse, closing the Red Dog Mine before its scheduled closure would create substantial regional economic impacts. The impacts of an unscheduled closure would be similar to the impacts of Alternative A (discussed in Section 3.17.3.2). Economic stability is essential to the region and influences all aspects of residents' lives, including subsistence and general health. To address forgone income from Red Dog operations, a regional long-term economic planning process could be initiated to promote economic stability in the region across all phases of development, including abandonment and rehabilitation. Appropriate economic expertise could be used.

A regional economic planning process could provide a highly effective planning tool to allow regional, tribal, and local governments to engage in a long-term economic planning process targeted at minimizing the adverse effects of an economic downturn at the conclusion of mining activities. The effectiveness of this measure would be proportional to the degree to which it successfully prevented a rapid and severe economic downturn at the conclusion of mining.

Price Vulnerability and the NWAB PILT. Under its agreement with Teck, the NWAB receives a PILT, which finances government activities. The PILT is paid in quarterly installments with the annual amount paid increasing by \$100,000 every year. In addition to the base payment, the NWAB also receives a zinc price escalator payment of \$50,000 annually for every \$0.01 per pound the annual average zinc price (based on the London Metal Exchange settlement price) exceeds an adjustable 1996 base price of \$0.60 per pound.

In FY 2007, the NWAB received \$8,721,473, of which \$6,428,000 was base payment and \$2,293,473 was based on the zinc price escalator. The zinc price escalator creates some price vulnerability for the NWAB but, because the base payments make up the majority of the PILT, the financial risk to the borough is relatively small.

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Price Vulnerability and NANA Royalties. As discussed in Section 3.17.2.4, Teck's royalty payment in 2007 switched from a net smelter royalty to a net proceeds royalty, increasing NANA's royalty payments as well as the price vulnerability.

The Aqqaluk extension would be expected to yield nearly 20 billion pounds of zinc. If NANA were to receive an average royalty share of 35 percent over the future life of the mine (alternatives B through D), then a \$0.01 per pound difference in the price of zinc over the life of the extension would change the cumulative royalty paid to NANA by nearly \$70 million.

Analysis of Teck annual financial and production reports suggest that the cost of producing zinc at Red Dog averages roughly \$0.50 per pound. While NANA could expect its future net proceeds royalties to be much higher than the net smelter royalties it has received in the past, the value of the net proceeds royalty is highly uncertain and much more dependent on the price of zinc. NANA would only be receiving more under the new royalty system if zinc is valued above a certain price (Table 3.17-32). Table 3.17-32 shows the price, assuming a \$0.50 per pound cost to produce, for each royalty level that zinc must remain above for the net proceeds royalty to be greater than net smelter royalty. If the price of zinc were to drop below the cost of production, then NANA would receive no royalty.

Table 3.17-32 Royalty System Break Even Price

Year	NANA Royalty Share (percent)	Zinc Price (\$/pound)
2007	25	\$ 0.61
2012	30	\$ 0.59
2017	35	\$ 0.57
2022	40	\$ 0.56
2027	45	\$ 0.56
2032	50	\$ 0.55

Source: NANA Annual Reports, ISER estimates

Table 3.17-33 shows the royalty NANA would receive in a given year (2008 as an example) under various zinc prices, assuming 1.2 billion pounds of zinc production and costs of \$0.50 per pound. Note that zinc prices were below \$0.50 per pound as recently as 2003 and over \$1.50 in 2007, making each price scenario reasonable. Understanding the uncertainty and potential variability of royalty payments to NANA is key to understanding potential effects on NANA shareholder dividends.

**Table 3.17-33 Royalty Payments to NANA at Different Prices
(baseline price scenario highlighted)**

2008 Zinc Price (\$/pound)	Zinc Production (millions of pounds)	NANA Royalty (\$ millions)
1.50	1,240	310
1.40	1,240	279
1.30	1,240	248
1.20	1,240	217
1.10	1,240	186
1.00	1,240	155
0.90	1,240	124
0.80	1,240	93
0.70	1,240	62
0.60	1,240	31
0.50	1,240	0

Source: NANA Annual Report, 2008 and ISER calculations, 2008

Impacts of Royalty Payments on Shareholder Dividends. Currently, Teck's royalty payments to NANA indirectly increase the income of the residents of the region through NANA dividends. Analysis of NANA Annual Reports suggests that NANA likely has used much of the Teck royalty payments to pay dividends to NANA shareholders. Figure 3.52, presented previously, shows a graphical relationship of Red Dog Mine royalties net 7(i) sharing and the total dividend paid to NANA shareholders between 1986 and 2007. It is not possible to predict the relationship between Red Dog Mine royalties and NANA dividends paid to shareholders based on past patterns. However, for the purpose of this analysis, it is assumed that 90 percent of Red Dog royalties, after 7(i) revenue sharing, would be paid out in dividends, similar to what has been done in the past.

NANA's Red Dog royalty payments are subject to 7(i) sharing. Seventy percent of the royalty is shared by the 12 land owning Alaska Native Regional Corporations. Since NANA also receives a portion of 7(i) payments, the amount NANA ends up sharing is only 62 percent of its royalty (Teck 2007) with the remaining 38 percent potentially available as dividend payments. Fifty-five percent of NANA shareholders live in the NANA region. To illustrate the potential input to the economy as a result of the dividend payout within the NWAB, this analysis assumes that 90 percent of Teck royalties would be paid out in dividends. (Note that this does not necessarily mean that NANA would continue to distribute 90 percent of the dividends in the future.) Based on these assumptions, an estimated 19 percent (38 percent of royalty x 90 percent x 55 percent) of royalties from the Red Dog Mine would enter the regional economy as personal income. At a price of \$0.70 per pound a royalty of \$62 million would create approximately \$12 million in additional regional income. For comparison, the 2007 royalty was slightly more than that amount (\$72 million), and Teck employees living in the region were paid just under \$9 million in wages (Teck 2007).

The royalty is meaningful when evaluating the economic impact of the proposed alternatives. A 25 percent net proceeds royalty means that every additional dollar spent by Teck results in \$0.25 less in royalty payments, because each additional dollar spent in mine operations by Teck reduces its profits by one dollar. If the regional income was increased by the 19 percent share of the royalty payment (calculated above), then each additional dollar spent by Teck in mine operations would decrease that additional regional income by almost \$0.05 (i.e., for each million dollars spent by the operation, the royalty payment would be reduced by \$50,000). This is important because each alternative, especially alternatives C and D, pose measurable costs. These costs would be reflected in royalty payments to NANA and could therefore affect dividends paid to all NANA shareholders.

3.17.3.2 Effects of Alternative A – No Action Alternative

The existing conditions would continue to occur through 2011. At that time the Red Dog Mine would end production and begin closure. Socioeconomic consequences include direct impacts and indirect impacts. Mine closure would include the following direct impacts:

- Direct employment and payroll of 543 full- and part-time jobs and \$45.8 million in annual payroll (based on 2007 payroll) would be dramatically reduced. NANA shareholders hold 56 percent of these jobs. An estimated 25 jobs would be retained to manage post-closure activities, including the wastewater treatment operations. Annual payroll would be less than \$2 million (based on 2007 payroll); many of the jobs could be held by NANA shareholders.
- Job loss would include the 103 Red Dog Mine employees who reside in the NWAB. These employees earned \$8.3 million in payroll in 2007.
- Beginning in 2012, NANA would forgo its share (approximately 38 percent) of an estimated \$155 million royalty (based on estimates explained above) and all future royalties that would be earned under the other alternatives. Regional and village corporations throughout Alaska would

forgo approximately 70 percent of Red Dog Mine royalties (through sharing according to the 7(i) provisions of ANSCA). The loss of royalty payments would be permanent.

- NANA businesses would forgo \$71.3 million in gross revenue. Other businesses providing goods and services to the mine would forgo \$29 million in gross revenue.
- The NWAB would forgo approximately \$8 million annually in PILT from the Red Dog Mine. The Red Dog Mine PILT accounted for two-thirds NWAB General Fund revenues in 2007.
- State government would forgo \$70 million in mining license and corporate income taxes, based on 2007 payments.

The total cumulative amount of payroll forgone with mine closure in 2011 rather than 2031 would be \$856 million, based on an estimate of \$45.8 million in annual payroll (including Teck, NANA Management Services, and NANA/Lynden payroll at the Red Dog Mine). The net present (2008) value of lost payroll for the years 2013 through 2031 is \$332 million, assuming a 7 percent private sector discount rate. The total cumulative amount of royalties forgone with mine closure in 2011 rather than 2031 would be over \$1.2 billion based on an estimate of annual royalties of \$62 million.

Impact on NANA

Directly, NANA businesses would forgo \$71.3 million in gross revenue that would come from the continued operation of the mine. Other businesses providing goods and services to the mine would forgo \$29 million in gross revenue.

All royalties to NANA would cease in 2012, the year after the end of production at the Red Dog Mine. Assuming zinc prices of \$0.70 per pound and costs of \$0.50 per pound for the final years of the Main Pit's production, the net proceeds royalty would result in annual NANA royalties of \$62 million. These royalties are markedly greater than the typical NANA royalty received under the net smelter royalty system. For perspective, NANA received only an estimated \$242 million (in real 2008 dollars) in net smelter revenues from 1982 to 2007.

Under Alternative A cumulative royalty payments to NANA during the remaining life of the Red Dog Mine would be an estimated \$248 million based on the same zinc value estimates. This amount represents more than the aggregate of royalties paid to NANA to date, but substantially less than the total royalty payments that NANA would receive under all other alternatives.

Impact on the NWAB

NWAB annual revenues have steadily increased since borough formation with the Red Dog Mine PILT having constituted a growing share, as discussed previously (see Figure 3.53). Since 2003, almost 70 percent of NWAB revenues have come from the Red Dog Mine PILT. PILT forgone from the Red Dog Mine could have drastic consequences for the NWAB. Following mine closure in 2011, the NWAB could drastically cut back on services, or could potentially choose to dissolve if it could not replace the Teck revenue with another local revenue source (e.g., sales or property tax). The loss of the NWAB government could be partially offset by increased local presence of the state and federal governments, lessening the economic impact on the region.

Mine closure would include the following direct and indirect impacts:

- Difficulty in repaying the remaining NWAB School District bonds.
- One million dollars in annual contributions to non-profit organizations would be lost, including \$600,000 to organizations in the NWAB, based on 2007 contribution levels.

- Indirect and induced labor income of \$63 million forgone annually, which are the result of royalties circulating through the Alaska economy, based on royalty payments made in 2007.
- Indirect and induced labor income of \$100 million, which are the result of taxes and other payments to state government circulating through the Alaska economy would be forgone, based on tax and fee payments made in 2007.

In summary, \$263 million in direct, indirect, and induced labor income in Alaska would be forgone, based on 2007 data as a result of Red Dog Mine closure in 2011. This is the sum of all direct payroll, payroll with businesses that provide goods and services to the Red Dog Mine, payroll and personal income associated with royalty payments, and labor income associated with payments to governments.

Net changes in the regional economy associated with mine closure would depend on other forces at work in local and regional economies. If other sectors of the economy were to be expanding at the time of—and following—mine closure, the effects of mine closure may be partially offset. However, there is little likelihood of such offsetting economic activity in the NWAB by 2011. Following mine closure, transfer payments flowing into the NWAB economy would increase, as unemployment benefits were paid out. These payments would be temporary, however. The tourism industry has some limited potential for growth, but on a small scale relative to the economic influence of the Red Dog Mine.

In the long term, mine development, other than that related to the Red Dog Mine, might provide employment opportunities for NWAB residents (and others) trained in mining industry occupations. However, the project with the highest potential for development, Mantra Mining Inc.'s Arctic Deposit in the Ambler District, is likely eight to 10 years in the future, if development were to occur at all. Further, that project would be located on State of Alaska patented mining claims rather than NANA property, and therefore would not generate royalties for NANA or other Alaska Native corporations, nor would it necessarily employ a high percentage of NANA shareholders.

Impact on Local Workforce

The completion of mining operations in 2011 would result in the loss of the majority of jobs at the mine, including those with NANA/Lynden and NANA Management Services. Operators of the water treatment plants would continue to be employed, along with a small number of management and support positions. During reclamation and closure, a number of heavy equipment operators would also remain employed for a period of two to five years until reclamation and closure were complete.

3.17.3.3 Effects of Alternative B – Applicant's Proposed Action

Impact on NANA

Teck began paying NANA royalties based on net proceeds in the fourth quarter of 2007. This royalty regimen change preceded the proposed Aqqaluk extension by a little more than two years. NANA would expect payments from Teck to be much larger under the net proceeds royalty system than the net smelter returns royalty system, except in the case of historically low zinc prices.

NANA's share of net proceeds began at 25 percent in 2007 and is set to increase by 5 percent every five years. This increased share of net proceeds would likely be offset by declining production and increasing cost of production. Figure 3.57 shows the expected NANA royalty over the life of the Aqqaluk extension as proposed under alternatives B, C and D. The y-axis has no values because not enough price and cost information is known to make a reasonable estimate of the value of future royalties. Based on forecasted production, the known schedule of net proceed share increases, and stable price and cost scenarios, the expected year-to-year changes in royalty with respect to the three alternatives are shown in Figure 3.57.

Annual Red Dog Mine zinc production would decline over the life of the mine, but the increasing NANA royalty share would offset the decline, assuming constant zinc prices and mining costs.

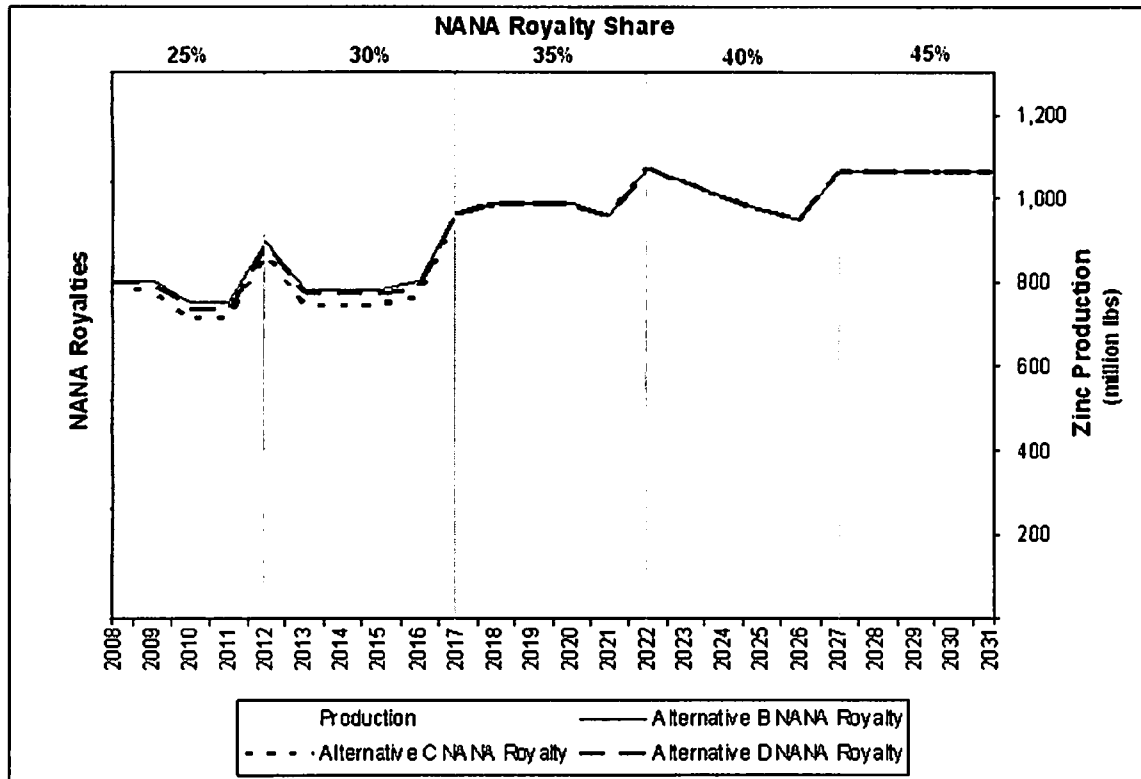


Figure 3.57 NANA Royalty Share, Amount and Red Dog Zinc Production

Impact on the NWAB

Alternative B would have no impact on NWAB government funding until the end of mining in 2031. Until that time, Teck would continue to pay PILT at the current rate because increased mining costs would have no impact on the PILT. The additional payments based on the zinc price escalator would continue to be variable because of its dependence on the price of zinc. The analysis assumes that the economic effects to the NWAB would not be significant when the mine closes in 2031 since the NWAB would have time to plan and develop contingencies for offsetting the lost PILT.

Impact on Local Workforce

Under Alternative B, the workforce would not be expected to change noticeably beyond the current levels of employment. Job opportunities at the mine would continue through 2031. Alternative B represents the highest level of royalty payments over the duration of the mine life compared to all other alternatives.

3.17.3.4 Effects of Alternative C – Concentrate and Wastewater Pipelines

Alternative C is different from Alternative B in three regards: concentrate would be transported to the port site via a slurry pipeline instead of concentrate trucks, tailings impoundment wastewater would be discharged at the port site instead of Red Dog Creek, and closure would be designed to minimize water treatment needs at the mine site. Alternative C would include the following economic effects.

Impact on NANA

As noted under Alternative B, NANA would expect Teck dividends to be much larger under the new royalty system, except in the case of historically low zinc prices. Under Alternative C, approximately \$293 million in construction costs would be expected over two years, beginning in 2009 (Table 3.17-34). Assuming 10 years of depreciation, NANA would be paid approximately \$72 million less in total royalties under Alternative C than under Alternative B. The total decreased royalty would be comparable to the effect of a one-year zinc price decrease of \$0.25 per pound. Figure 3.57 compares NANA royalties under Alternative C to alternatives B and D with the capital cost depreciated over 10 years.

Table 3.17-34 Alternative C Capital Costs

Construction Component	Estimated Costs (\$ millions)
Bench and Wastewater Pipeline	66.2
Water Treatment Plant	68
Concentrate Pipeline	43.4
Concentrate Filtering and Handling	80
Diesel Pipeline	35.7
Total	293.3

Source: Teck 2008

Impact on the NWAB

Alternative C would have no impact on NWAB government funding until the end of mining in 2031. Until that time, Teck would continue to pay PILT at the current rate regardless of mining costs. The additional payments to NWAB based on the zinc price escalator would continue to be variable because of their dependence on zinc prices. The additional payments based on the zinc price escalator would continue to be variable because of its dependence on the price of zinc. The analysis assumes that the economic effects to the NWAB would not be significant when the mine closes in 2031 since the NWAB would have time to plan and develop contingencies for offsetting the lost PILT.

Impact on Local Workforce

Some change in employment would occur as a result of pipeline transportation of concentrates rather than trucking. Teck would need to hire additional employees to run a dewatering facility and maintain pipelines. At the same time NANA/Lynden would need fewer drivers and mechanics and the contract could potentially be eliminated altogether. The possibility exists that the few remaining trucking jobs (trucking of supplies from the port to the mine site would still occur) could be done by Teck employees. It is expected that there would be a net decrease in employment at NANA/Lynden of approximately 40 transportation related jobs.

This decrease in employment would be temporarily offset by construction employment. Teck expects to employ 128 workers during the first year of construction and 268 the second year. Construction will likely involve a NANA company (or companies) with approximately half of the workers expected to be NANA shareholders residing in the region. Over the life of the extension, Alternative C would likely decrease total mine related wages.

3.17.3.5 Effects of Alternative D – Wastewater Pipeline and Additional Measures

Alternative D is different from Alternative B in three regards: wastewater would be discharged to the Chukchi Sea instead of Red Dog Creek (similar to Alternative C), enhanced dust control measures would be implemented, and the road and port site would be closed during certain times of the year to reduce subsistence impacts. Alternative D would include the following economic effects.

Impact on NANA

Under Alternative D, approximately \$67 million in construction costs would be expected over two years, beginning in 2009 (Table 3.17-35). During the 10 years of depreciation, NANA would be paid approximately \$22 million less in royalties under Alternative D than under Alternative B. The total decreased royalty is comparable to the effect of a one-year zinc price decrease of \$0.08 per pound. Figure 3.57 compares NANA royalties under Alternative D to alternatives B and C with the capital cost depreciated over 10 years.

Table 3.17-35 Alternative D Capital Costs

Construction Component	Estimated Costs (\$ millions)
Bench and Wastewater Pipeline	66.2
Truck Washes	1
Total	67.2

Source: Teck 2008

Impact on NWAB

Alternative D would have no impact on NWAB government funding until the end of mining in 2031. Until that time, Teck would continue to pay PILT at the current rate regardless of mining costs. The additional zinc price escalator payments would be the same as alternatives B and C and would continue to be variable because of its dependence on the price of zinc. The analysis assumes that the economic effects to the NWAB would not be significant when the mine closes in 2031 since the NWAB would have time to plan and develop contingencies for offsetting the lost PILT.

Impact on Local Workforce

Under Alternative D, 128 workers could be employed in the first year of construction and 108 during the second year. Construction would likely involve a NANA company (or companies) with approximately half of the workers expected to be NANA shareholders residing in the region. The construction would provide a short-term employment boost with no long-term decline in mining wages.

3.17.4 Socioeconomics – Summary

The Red Dog Mine provides substantial benefit to the NWAB, NANA, and NANA shareholders by providing local employment opportunities, PILT, royalties, and dividends. Alternative A would see the end of operations in 2011, 20 years sooner than the other alternatives. Closure in 2011 would result in the loss of \$8 million annually in PILT to NWAB, and an estimated loss of \$155 million in annual NANA royalties, \$70 million in annual payments to the state, and over 500 jobs held by employees from inside and outside the region. Alternatives B through D would allow these production related benefits to continue through 2031. However, the costs associated with the pipeline bench under Alternatives C and D would result in slightly less income to NANA than Alternative B. Because of costs associated with the