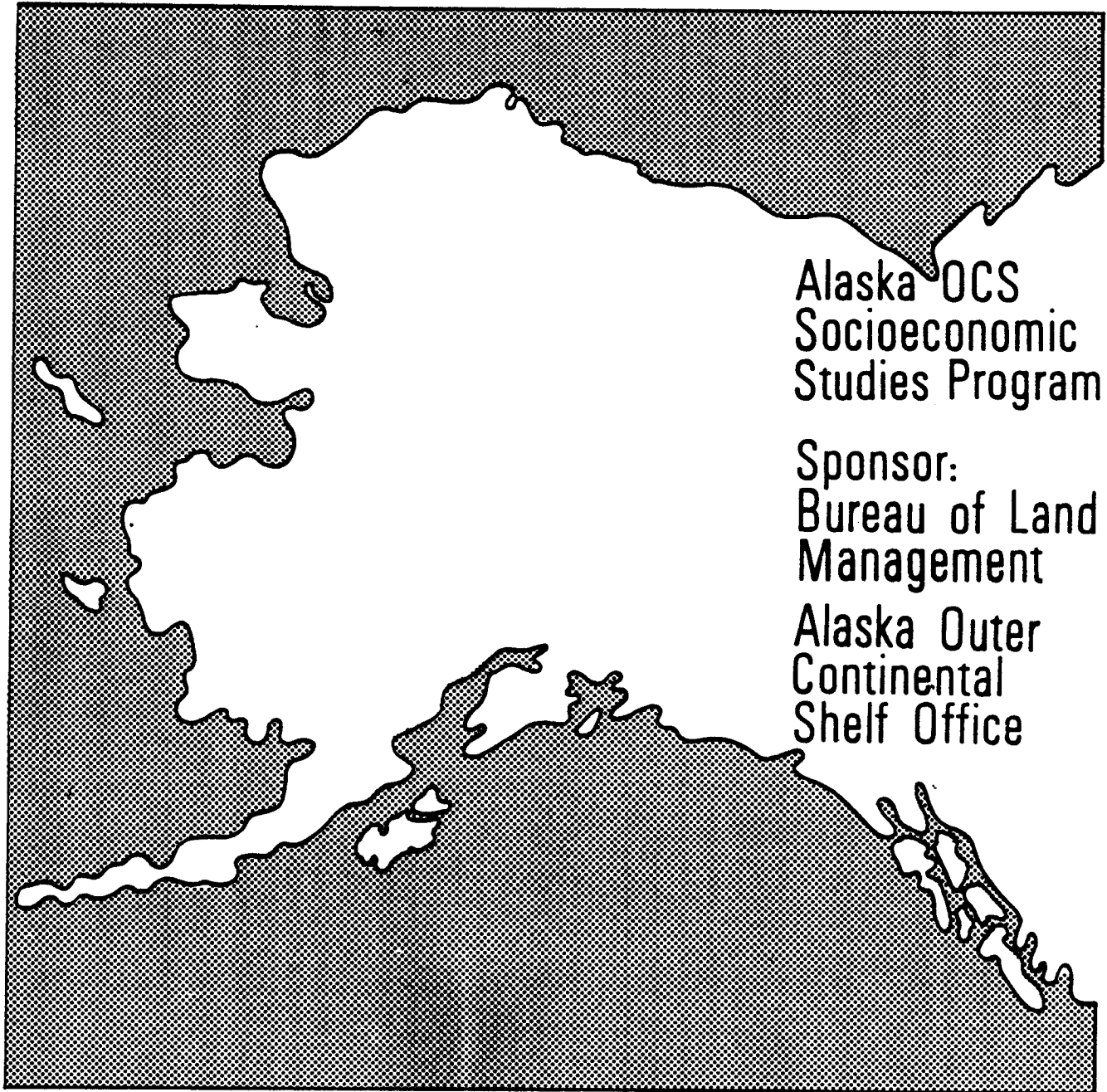


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TECHNICAL REPORT NUMBER 69



WESTERN ALASKA LOCAL SOCIOECONOMIC SYSTEMS ANALYSIS

The United States Department of the Interior was designated by the Outer Continental Shelf (OCS) Lands Act of 1953 to carry out the majority of the Act's provisions for administering the mineral leasing and development of offshore areas of the United States under federal jurisdiction. Within the Department, the Bureau of Land Management (BLM) has the responsibility to meet requirements of the National Environmental Policy Act of 1969 (NEPA) as well as other legislation and regulations dealing with the effects of offshore development. In Alaska, unique cultural differences and climatic conditions create a need for developing additional socioeconomic and environmental information to improve OCS decision making at all governmental levels. In fulfillment of its federal responsibilities and with an awareness of these additional information needs, the BLM has initiated several investigative programs, one of which is the Alaska OCS Socioeconomic Studies Program (SESP).

The Alaska OCS Socioeconomic Studies Program is a multi-year research effort which attempts to predict and evaluate the effects of Alaska OCS Petroleum Development upon the physical, social, and economic environments within the state. The overall methodology is divided into three broad research components. The first component identifies an alternative set of assumptions regarding the location, the nature, and the timing of future petroleum events and related activities. In this component, the program takes into account the particular needs of the petroleum industry and projects the human, technological, economic, and environmental offshore and onshore development requirements of the regional petroleum industry.

The second component focuses on data gathering that identifies those quantifiable and qualifiable facts by which OCS-induced changes can be assessed. The critical community and regional components are identified and evaluated. Current endogenous and exogenous sources of change and functional organization among different sectors of community and regional life are analyzed. Susceptible community relationships, values, activities, and processes also are included.

The third research component focuses on an evaluation of the changes that could occur due to the potential oil and gas development. Impact evaluation concentrates on an analysis of the impacts at the statewide, regional, and local level.

In general, program products are sequentially arranged in accordance with BLM's proposed OCS lease sale schedule, so that information is timely to decisionmaking. Reports are available through the National Technical Information Service, and the BLM has a limited number of copies available through the Alaska OCS Office. Inquiries for information should be directed to: Program Coordinator (COAR), Socioeconomic Studies Program, Alaska OCS Office, P. O. Box 1159, Anchorage, Alaska 99510.

ALASKA OCS SOCIOECONOMIC STUDIES PROGRAM

WESTERN ALASKA
LOCAL SOCIOECONOMIC SYSTEMS ANALYSIS

Prepared for

Bureau of Land Management
Alaska Outer Continental Shelf Office

January, 1982

NOTICE

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Alaska OCS Socioeconomic Studies Program
Western Alaska
Local Socioeconomic Systems Analysis

Prepared by
Alaska Consultants, Inc.

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ABSTRACT

This report includes detailed community baseline data about Dillingham and Bethel. It also projects and analyzes how the infrastructure of these towns could be affected by future growth without OCS development and includes methods, standards and assumptions by which such growth impacts can be quantified. In addition, it assesses the types of impacts which these communities might incur under conditions of OCS development.

Dillingham is one of Alaska's major fishing and fish processing centers. However, the commercial fishing season here is extremely brief and the workforce associated with it is highly transient. Thus, despite the scale of its fisheries industry, Dillingham is a relatively poor town in terms of the quality of its community facilities and services and would find it extremely difficult to upgrade those facilities and services under conditions of rapid economic growth.

Bethel is the largest community in Western Alaska. This town has grown from a small village to a major regional center during the past forty years and its growth has been closely tied to that of the region as a whole. As a second class city under Alaska law, Bethel has limited abilities to collect revenues and to provide the range of community facilities and services normally demanded in a town of this size. While Bethel actually provides a fairly comprehensive range of municipal services, it is forced to rely heavily on assistance from other levels of government to do so. This situation is likely to continue in the future.



COMMUNITY BASELINE INFORMATION



INTRODUCTION

The first section of this report contains an inventory of existing socioeconomic conditions for Dillingham and Bethel. Included in this inventory are analyses of the population and economy of each community; descriptions of existing land use, land status, housing conditions and possible constraints on urban development; a review of local community facilities and services, including public safety, health and social services; and an overview of local government powers and municipal financial conditions.

Aside from their general location, Dillingham and Bethel have few similarities. Dillingham is a predominantly Alaska Native community, with the largest number of local Natives claiming to be Aleuts. However, Dillingham also has a substantial white population and, during the brief but hectic salmon season, whites overwhelmingly predominate. Bethel, on the other hand, is a traditional Yupik Eskimo community which primarily functions as a regional center for the villages of the Yukon-Kuskokwim delta region.

The information contained in this report has been derived from a wide variety of sources, supplemented by informal interviews of people in government and industry in both Dillingham and Bethel. Factual data contained in this report is current as of October 1980 except where specifically noted.



CITY OF DILLINGHAM

Population and Economy

Dillingham lies approximately 350 air miles southwest of Anchorage. The town is located at the head of Nushagak Bay on the Nushagak River, near its confluence with the Wood River. Nushagak Bay is an arm of the larger Bristol Bay, the world's largest red salmon producing area and the main factor in Dillingham's economy.

POPULATION

Past Trends

The Dillingham area was traditionally occupied by Yupik Eskimo groups but development of the modern community followed the establishment of salmon canneries in this area around the turn of the century. By 1939, a total of 278 persons lived in Dillingham, a number which rose by more than 100 percent to 577 by 1950 (see Table 1). Between 1950 and 1960, however, Dillingham's population declined 26.5 percent, probably related to the relatively poor salmon harvests during that decade.

Since 1960, Dillingham's population has consistently increased. The 1970 Census recorded a total of 914 persons in the community, an increase of 115.6 percent, although Dillingham's incorporation of a 23 square mile area in 1963 which included the settlements of Kanakanak, Nelsonville

TABLE 1
 POPULATION TRENDS
 DILLINGHAM, ALASKA
 1939 - 1980

<u>Year</u>	<u>Population</u>	<u>Percent Change</u>
1939 <u>a/</u>	278	
1950	577	107.6
1960	424	- 26.5
1970 <u>b/</u>	914	115.6
1980	1,563	71.0

a/ Census taken in October 1939.

b/ Includes Kanakanak, Nelsonville and Wood River Village which were added to Dillingham upon its incorporation in 1963.

Sources: U.S. Department of Commerce, Bureau of the Census. March 1981. 1980 Census of Population and Housing, Alaska: Advance Reports. (PHC80-V-3).

U.S. Department of Commerce, Bureau of the Census. May 1971. 1970 Census of Population, Number of Inhabitants: Alaska. Washington, D.C., U.S. Government Printing Office. PC(1)-A3.

U.S. Department of Commerce, Bureau of the Census. 1960. United States Census of Population: 1960, Number of Inhabitants, Alaska. Washington, D.C., U.S. Government Printing Office. PC(1)-A3.

and Wood River Village doubtless exaggerated the real rate of growth during that period. Since 1970, Dillingham has continued to exhibit a strong pattern of growth. According to the 1980 Census, the City had a population of 1,563 persons, representing a 71 percent increase since 1970. Primary factors in this healthy growth rate are believed to be Dillingham's continued importance as a regional service center, the apparent recovery of the Bristol Bay red salmon fishery and the community's general attractiveness as a place to live.

Population Composition

Population composition data derived from the 1970 Census (see Table 2) indicate that Dillingham's population was then predominantly Alaska Native (63.6 percent), with persons claiming Aleut and Eskimo heritage accounting for almost all of this group. Whites (35.6 percent) were the other major ethnic group in 1970, with blacks and other races accounting for less than 1 percent of the community's total population. Advance figures from the 1980 Census indicate that the proportion of Alaska Natives (57.0 percent) has declined since 1970, while the proportion of whites (42.2 percent) increased. The racial composition of Dillingham's population regularly undergoes a seasonal transformation each summer, however, when there is a major influx of persons from outside the region who are associated with the salmon fishery.

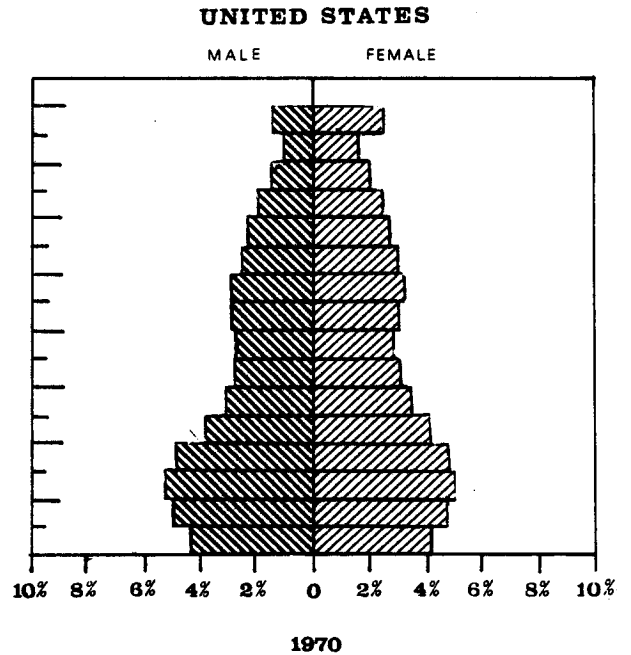
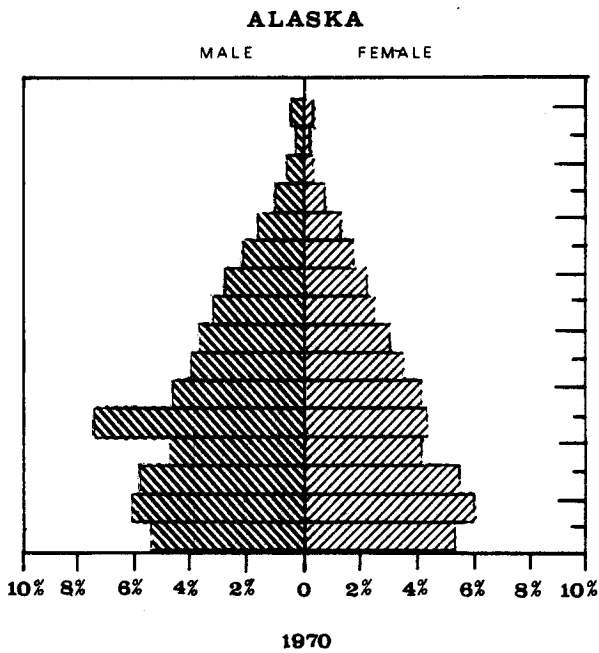
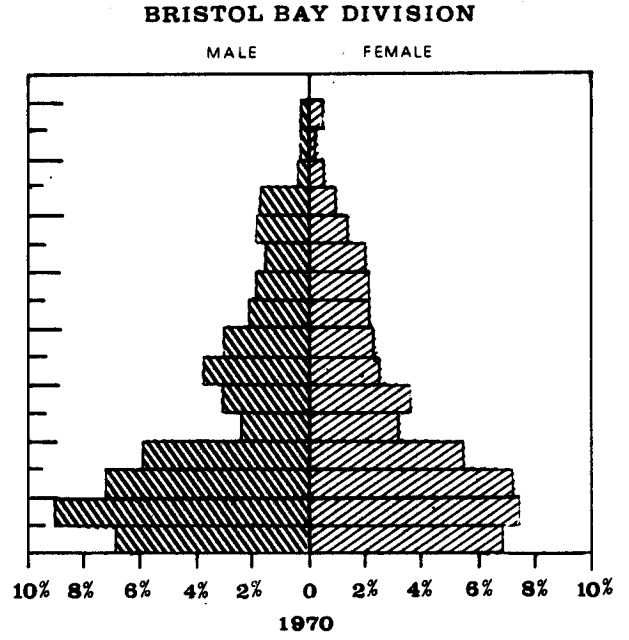
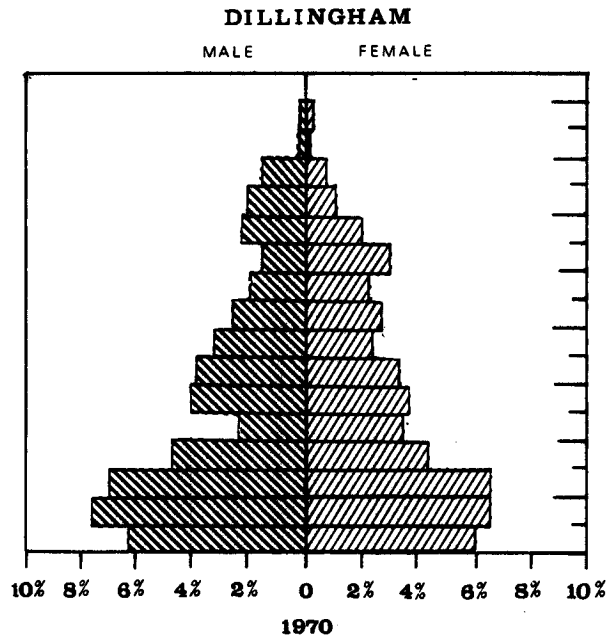
Other outstanding features of Dillingham's population in 1970 were that it was predominantly male and that it was very young (see Figure 1).

TABLE 2
COMPOSITION OF POPULATION BY RACE AND SEX
DILLINGHAM, ALASKA
1970

Race	Sex		Total	Percent of Total
	Male	Female		
White	167	158	325	35.6
Negro	0	1	1	0.1
Indian	5	8	13	1.4
Aleut	191	195	386	42.2
Eskimo	96	87	183	20.0
Other	6	0	6	0.7
<u>TOTAL</u>	<u>465</u>	<u>449</u>	<u>914</u>	<u>100.0</u>

Source: University of Alaska, Institute of Social, Economic and Government Research. September 1973. Age and Race by Sex Characteristics of Alaska's Village Population. College. (Alaska Review of Business and Economic Conditions. Vol. X, No. 2.)

COMPOSITION OF POPULATION



Source: US Census Bureau, 1970.

The community's 51 to 49 percent male to female ratio was unlike that of the nation where females outnumbered males by the same margin. However, primarily reflecting a local absence of military establishments, it was much less extreme than the State as a whole where males outnumbered females by a 54 to 46 percent ratio in 1970.

The median age of males in Dillingham in 1970 was 19.9, with local Alaska Native male residents having an even younger median age of 18.2. This was below the Statewide median of 23.3 and far below the national median of 27.0. The median age of Dillingham females of 21.5 was closer to the Statewide figure of 22.9, although the 19.1 median age of local female Alaska Natives was significantly lower. Both local and Statewide medians, however, were well below the 29.6 national median age for females in 1970. Nevertheless, Dillingham's population is older than that of its region. In 1970, the median age in the Bristol Bay census division was only 17.5 for males and 17.6 for females.

A significant factor in Dillingham's relatively youthful population in 1970 was the high proportion of persons in the 5 to 14 age groups. In 1970, 27.7 percent of Dillingham's population was in this age range compared with 23.6 percent Statewide. Dillingham also had a relatively high proportion of persons under 5 years of age (12.3 percent) compared with the State (10.7 percent). However, in Dillingham, as in the region, State and nation, declining birth rates resulted in this group being relatively less well represented than the 5 to 14 age groups in 1970. Judging from elementary school enrollment figures, this decline

has continued through to the present as the number of elementary school students in Dillingham rose only 23.3 percent during the past ten years compared with a 67.9 percent growth in total community population during the same period.

A feature which Dillingham shared with many rural areas of the State in 1970 was its relatively high proportion of older persons. At that time, 14.8 percent of the community's population was aged 50 or more compared with only 10.8 percent Statewide.

Growth Prospects

Prospects for Dillingham's continued growth appear good, with major contributing factors likely to be the continued health of salmon runs to the Bristol Bay area, plus the community's role as regional center for much of the Bristol Bay region. Development of the Wood-Tikchik State Park should also make some contribution to Dillingham's economy, but to a lesser extent.

There is reason to be optimistic about the future of the Bristol Bay salmon fishery. Red salmon runs to be area during the past few years have been strong and escapement goals have generally been met. According to the Alaska Department of Fish and Game, runs currently approximate the highest levels observed during peak periods in the 97-year history of this fishery, a situation which is not true of most red salmon fisheries elsewhere in the world.

Assuming the apparent recovery of the Bristol Bay red salmon fishery to be real, Dillingham should continue to prosper as one of the major fishing and fish processing centers in this area. Furthermore, other salmon species are also significant in the Nushagak district, with coho stocks here possibly having some additional harvest potential. While a significant proportion of persons involved in the harvesting of the salmon resources of the Nushagak district will continue to come from outside the region, it is probable that local involvement in this fishery will also increase over the years and thus make an even greater contribution to Dillingham's economy.

The Bristol Bay herring fishery is relatively new, with activity concentrated in the nearby Togiak district although much of it is funneled through Dillingham. In the absence of any evidence to the contrary, it is assumed that activity in this fishery will continue at around current levels.

Aside from fishing and fish processing, Dillingham's primary economic function is as the regional government, service and trade center for much of the Bristol Bay region. The community has the only hospital in the region and is the regional headquarters for organizations such as the Southwest Region Schools, the Bristol Bay Native Association and the Bristol Bay Area Health Corporation. Dillingham is also a major air transportation center for the western portion of the Bristol Bay region, with villages in the eastern part of the region being served out of King Salmon. Finally, Dillingham functions as a regional shopping and

financial center, with many local businesses indicating that a significant share of their business resulted from purchases by non-local Bristol Bay residents. In the future, Dillingham's role as a regional center is expected to be further consolidated, assuming continued growth of the region as a whole and an increased demand by village residents for the range of goods and services.

Tourism presently makes a minor contribution to Dillingham's economy but promises to make a more substantial one in the future. Dillingham is located near the entrance to one of the State's most spectacular scenic areas, the 1,428,320 acre Wood-Tikchik State Park. The lake systems in the Park support all five species of Pacific salmon as well as a variety of fresh water sport fish and the area also has significant game populations, especially of moose. These attractions presently support five lodges in the Park, plus several other facilities which are open to tour groups. Dillingham is within relatively convenient reach of Anchorage and it is assumed that visits by sportsmen and other groups to this area will increase in the future, with Dillingham standing to realize some economic benefits from this activity. On the other hand, the visitor season overlaps the commercial fishing and fish processing season in this area and could serve to add a further element of seasonality of employment to an already highly seasonal local economy.

ECONOMY

Dillingham's economy is dominated by the highly seasonal fishing and fish processing industry. However, the community's role as the regional center from which goods and services are distributed to western Bristol Bay villages is also important, with tourist-related activities occupying a relatively minor role. These activities are called "basic" or exogenous as they are export industries whose fortunes are determined by forces outside the local area and are the foundation upon which "secondary" or endogenous industries, those whose fortunes are determined by local forces, rest. Thus, gains in basic industry are essential for long term community growth.

Composition of Employment

A review of employment in Dillingham was undertaken by Alaska Consultants, Inc. in October 1980. This was felt to be necessary since although Dillingham is the major community in the Bristol Bay labor area, figures for the region as a whole tend to be misleading, especially in the government sector. Thus, each employer in Dillingham was contacted to obtain average annual full-time employment information for each establishment in 1980. The results were then categorized by Standard Industrial Classification (SIC) code and tabulated.

Employment in Dillingham's primary economic activity, fishing and fish processing, is highly seasonal and transient. As a result, many people

who work in this industry live in or work out of Dillingham for only part of the year or, in many cases, persons who live in town year-round engage in different occupations during the off-season. To minimize duplication and to reduce the distortion in total employment caused by transient workers, Alaska Consultants, Inc. attempted to estimate average annual full-time employment in all sectors of the community's economy. Except for fishermen, workers on floating processors, fish buyers and persons engaged in flying fish out of the area, this was done by asking each employer to indicate if, when and how many seasonal personnel were added to "normal" employee levels.

In the case of fishermen, Alaska Department of Fish and Game officials provided information as to the number of units of drift gill net and set gill net gear in the Nushagak district for the 1980 salmon season. In addition, information was obtained from the same source on the number of units of seine gear and gill net gear registered for the 1980 Bristol Bay herring fishery. By multiplying the number of gear units by average crew sizes, information also provided by the Alaska Department of Fish and Game, the total number of fishermen was then estimated. The number of months fished was subsequently taken into account to derive annual average full-time employment of salmon and herring fishermen who use Dillingham as a base for their efforts.

Information on the number of employees working on board floating processors in the Dillingham area for the 1980 salmon and herring seasons was obtained by assuming an average crew size for the smaller operators and

a larger crew size for four major operations. Information on the number of vessels registered and average crew sizes was derived with the assistance of the Alaska Department of Fish and Game, with the latter figures to some extent representing a "best guess" estimate.

Estimates of the number of persons engaged in the purchasing of fresh salmon and herring and those involved in flying the product out of the region were again derived with the assistance of the Alaska Department of Fish and Game. All of these figures were then converted to an average annual full-time employment basis.

A much higher proportion of employment in Dillingham would have been derived from fishing and fish processing were it not for the extreme seasonality of the salmon fishery in the Bristol Bay area. As a result, annual average full-time employment figures for the fishing and fish processing industry in this area are somewhat misleading as they tend to understate the intensity of activity and associated financial rewards which take place during a very short period. On the other hand, since a significant proportion of the activity during the salmon and herring seasons is associated with persons from outside the region, annual average full-time employment figures for this industry in Dillingham represent much more than locally derived jobs.

No attempt was made to allocate fishing and fish processing employment between local and non-local residents. Alaska Department of Fish and Game statistics indicate that out of a total of 1,717 units of gear

registered to fish salmon in the Bristol Bay area in 1980, 971 (57 percent) were registered to Alaska residents and 746 (43 percent) were registered to non-residents. However, the proportion of out-of-State residents in the fishery varies dramatically from district to district. For example, the Naknek-Kvichak district has traditionally been dominated by out-of-State fishermen. On the other hand, the smaller Nushagak district is primarily fished by State residents (normally about 85 percent), most of whom live in the Nushagak watershed area, i.e. in Dillingham and surrounding villages. Nevertheless, the dominance of local fishermen in the Nushagak district salmon fishery has tended to lessen since 1979 as a result of the recovery of the salmon runs and with increased competition in eastern Bristol Bay districts.

Overall, basic employment was estimated to account for 63 percent of the average annual full-time employment in Dillingham in 1980. The resulting basic to secondary employment ratio of 1:.6 is lower than national norms where ratios in the neighborhood of 1.0:1.5 are considered average. However, except for Anchorage and possibly Fairbanks, Alaska communities with healthy economies normally have a small secondary sector. This is particularly true of communities with economies heavily dependent upon fishing and fish processing.

When converted to an average annual full-time basis, Dillingham was found to have a total of 828 jobs in 1980 (see Table 3). One-third of these jobs were directly associated with the fishing and fish processing industry, accounting for all employment in the agriculture, forestry and

TABLE 3
 AVERAGE ANNUAL FULL-TIME EMPLOYMENT a/
 DILLINGHAM AND IMMEDIATE VICINITY
 1980

<u>Industry Classification</u>	<u>Number</u>	<u>%</u>	<u>% Basic</u>	<u>Basic Number</u>	<u>Secondary Number</u>
Agriculture, Forestry and Fishing	100	12.1	100	100	0
Mining	0	0.0	100	0	0
Contract Construction	34	4.1	29	10	24
Manufacturing	155	18.7	97	151	4
Transportation, Communication & Public Utilities	96	11.6	58	56	40
Trade	101	12.2	46	46	55
Finance, Insurance & Real Estate	18	2.2	56	10	8
Service	144	17.4	69	99	45
Government	180	21.7	26	47	133
Federal	(16)	(1.9)	(44)	(7)	(9)
State	(44)	(5.3)	(32)	(14)	(30)
Local	(120)	(14.5)	(22)	(26)	(94)
<u>TOTAL</u>	<u>828</u>	<u>100.0</u>	<u>63</u>	<u>519</u>	<u>309</u>

a/ Includes self-employed personnel.

Source: Alaska Consultants, Inc. October 1980.

fishing sector and almost all of that in the manufacturing sector. In addition, some fishing and fish processing-related employment was associated with the transportation, communication and public utilities sector (flying fish out of the region) and the trade sector (fish buyers). All fishing and fish processing employment is considered to be basic as only a very minor amount of fish is produced for local consumption.

Dillingham has a reasonably large government sector due, in large part, to the community's role as regional center for the western Bristol Bay area. The community has relatively few federal government jobs, with the major federal employer being the Federal Aviation Administration (FAA), followed by the U.S. Post Office, Alaska Legal Services and the U.S. Army Corps of Engineers. Seven of the 16 federal jobs were determined to be basic, including a share of those associated with the FAA and Alaska Legal Services and all those associated with the Corps of Engineers.

Approximately one-third of the 44 State jobs identified in Dillingham in 1980 were deemed to be basic, most of them associated either with the Alaska Department of Fish and Game and the Alaska Department of Public Safety. These basic jobs are associated with Dillingham's roles as a fishing and fish processing center and a regional center.

After manufacturing and government, the largest employment sector in Dillingham in 1980 was services with an annual average of 144 full-time jobs. Overall, almost 70 percent of the jobs in this sector were determined to be basic, most of them associated with three employers -

the Bristol Bay Area Hospital, the Bristol Bay Native Association and the Bristol Bay Area Health Corporation. These three organizations perform regional health and social services functions and, since Dillingham's 1980 population was about one-quarter that of the region (Dillingham and Bristol Bay Borough census divisions combined), three-quarters of their employment was assumed to be basic. Other basic employers in the service sector included two hotels, a regional housing authority and a fisherman's cooperative organization.

The other numerically significant employment sectors in Dillingham in 1980 were trade and transportation, communication and public utilities. The trade sector had an annual average of 101 full-time jobs, with almost half of these determined to be basic on the grounds that they either served regional rather than strictly local needs or were associated with the fishing and fish processing industry. The transportation, communication and public utilities sector provided 96 full-time jobs on an annual average basis in 1980. The major basic employers in this sector were associated with air taxi operations serving villages in the region or hauling fish. Half of the business associated with two local taxi firms was also assumed to be derived from non-local sources and was therefore classed as basic.

An annual average of 34 full-time jobs was estimated for the construction sector in Dillingham in 1980, with the largest single local project being building of the new elementary school. Close to 30 percent of all jobs in this sector were classed as basic. The only other sector

represented locally in 1980 was the finance, insurance and real estate sector with 18 jobs, over half of them deemed to be basic. All employment associated with the Bristol Bay Native Corporation and Choggiung, Ltd. (the local village corporation established under terms of the Alaska Native Claims Settlement Act) was classed as basic, as was a minor share of that associated with the only bank in the western Bristol Bay area.

Unemployment and Seasonality of Employment

Like most Alaska communities with economies heavily based in fishing and fish processing, employment in Dillingham shows a high degree of seasonal variation. Information provided by the Research and Analysis Section of the Alaska Department of Labor specifically for Dillingham and its immediate vicinity (including Kanakanak, Aleknagik and Manokotak) indicates that insured employment here ranged between 139 percent (July) and 75 percent (December) of the annual average in 1979 (see Table 4). Had total employment data been available, the range between the high and low months would have been much more extreme since insured employment statistics exclude fishermen.

Employment seasonality in Dillingham derives almost exclusively from fishing and fish processing activities. Peak employment coincides with the red salmon run which occurs between the end of June and early July. However, the other salmon fisheries and the herring fishery keep total employment at a generally high level between May and August. The only other significant contributors to employment seasonality in Dillingham

TABLE 4

INSURED EMPLOYMENT BY MONTH a/
DILLINGHAM AND IMMEDIATE VICINITY b/
1979

Employment Sector	Month												Annual Average	
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Agriculture, Forestry and Fisheries	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mining	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Contract Construction	*/	*/	*/	*/	*/	*/	44	54	40	34	51	41	*/	*/
Manufacturing	*/	*/	*/	*/	*/	*/	889	783	548	194	108	88	*/	*/
Transportation, Communication and Public Utilities	59	62	58	54	61	68	69	67	68	72	60	54	63	63
Trade	64	61	61	64	75	73	65	71	89	80	86	82	73	73
Finance, Insurance and Real Estate	36	35	32	34	31	28	24	28	32	31	30	31	31	31
Service	434	418	460	461	480	494	394	375	239	221	209	192	365	365
Government	446	476	484	496	491	315	267	266	386	405	427	456	410	410
Federal	(90)	(93)	(93)	(79)	(81)	(78)	(77)	(79)	(78)	(76)	(74)	(72)	(81)	(81)
State	(41)	(41)	(45)	(47)	(51)	(48)	(48)	(44)	(47)	(49)	(45)	(53)	(47)	(47)
Local	(315)	(342)	(346)	(370)	(359)	(189)	(142)	(143)	(261)	(280)	(308)	(331)	(282)	(282)
TOTAL	<u>1,113</u>	<u>1,139</u>	<u>1,158</u>	<u>1,248</u>	<u>1,398</u>	<u>1,278</u>	<u>1,752</u>	<u>1,644</u>	<u>1,402</u>	<u>1,037</u>	<u>971</u>	<u>944</u>	<u>1,257</u>	<u>1,257</u>

*/ Employment figures withheld to comply with disclosure regulations.

a/ Insured employment excludes self-employed persons and fishermen.

b/ Includes Dillingham, Kanakanak, Aleknagik and Manokotak.

Source: Alaska Department of Labor, Employment Security Division, Research and Analysis Section. Personal communication.

in 1979 occurred in the government and service sectors. Closure of the schools during the summer months resulted in a temporary drop in local government employment, while the cessation of youth CETA (Comprehensive Education and Training Act) programs in September is believed to be the major factor in a sudden falling off in employment in the service sector at that time.

Even allowing for the exclusion of fishermen and self-employed persons from insured employment statistics, there are several apparent discrepancies between 1979 figures provided by the Alaska Department of Labor and those compiled in 1980 by Alaska Consultants, Inc. These occur primarily in the manufacturing, service, government and the finance, insurance and real estate sectors and probably result from the State's inclusion of regional rather than local employment figures for a particular employer. In the government sector, however, differences in federal employment can be explained by the fact that management of the hospital was contracted to the Bristol Bay Area Health Corporation in 1980 and employment at this facility is now classed as service rather than government. Differences in local government employment are probably largely the result of the inclusion of jobs associated with schools in Aleknagik and Manokotak in the State statistics.

There are no unemployment statistics available specifically for Dillingham. Preliminary 1980 figures for the Bristol Bay labor area as a whole show an annual average unemployment rate of 7.4 percent, compared with the Statewide annual average of 9.6 percent. Peak unemployment in the

Bristol Bay labor area occurred in March when 10.9 percent of the labor force was unemployed. The "low" months occurred in July and August when fishing activity was at its peak and the labor force was at its largest. During those months, the unemployment rate dropped to 5.1 percent.

Although unemployment rates for the Bristol Bay labor area are officially lower than those recorded for the State, this is not really the case. Unemployment statistics include only those persons who have registered for employment and who are actively seeking work. In the Bristol Bay area, as in most other rural areas of the State, many potential workers do not register because there are no jobs available. For statistical purposes, these people are considered to be outside the labor force and are therefore excluded from State statistics. Thus, "real" unemployment rates for this area would doubtless be significantly higher than Statewide averages.

In Dillingham itself, unemployment is believed to be less of a problem than in the region as a whole. As in many other fishing and fish processing communities around the State, unemployment here is primarily a seasonal problem, with the extent of the problem being directly related to the success of local fishermen in a given year.

Recent Trends and Changes

Although the economy of the Bristol Bay region is dominated by the fishing and fish processing industry, employment trends for the region

as a whole are not necessarily indicative of those for Dillingham. Dillingham is the largest community in the Bristol Bay labor area. However, the labor area also includes a large number of small villages, many of which have little resident economic activity except for jobs associated with the schools. Thus, in order to show trends and changes in Dillingham, insured employment statistics specifically for the local area (including Kanakanak, Aleknagik and Manokotak) were obtained from the Research and Analysis Section of the Alaska Department of Labor for each year since 1970.

Between 1970 and 1979, total insured employment in the immediate Dillingham area rose 558.1 percent (see Table 5), a rate of growth well in excess of the 67.9 percent increase in population recorded by the U.S. Census between 1970 and 1980. The greatest apparent increase occurred in the government sector where employment rose 791.3 percent between 1970 and 1979. However, the rate of increase in total employment and in the government sector is exaggerated by the exclusion of most State and local government jobs prior to 1978.

Employment trends in most other sectors in Dillingham are obscured by non-disclosure requirements. However, the trade sector recorded a healthy 82.5 percent increase in employment between 1970 and 1979, with the transportation, communication and public utilities sector registering a more modest 16.7 percent gain.

TABLE 5
INSURED EMPLOYMENT DISTRIBUTION
DILLINGHAM AREA
1970 - 1979

Employment Sector	1970		1971			1972			1973			1974		
	Number	%	Number	%	% Change	Number	%	% Change	Number	%	% Change	Number	%	% Change
Agriculture, Forestry and Fisheries	*/		*/			*/			*/			*/		
Mining	0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0
Contract Construction	*/		*/			*/			*/			*/		
Manufacturing	*/		*/			*/			*/			*/		
Transportation, Communications and Public Utilities	54	28.3	57	38.5	5.6	51	30.5	-10.5	49	22.2	3.9	55	16.8	12.2
Trade	40	20.9	36	24.3	10.0	38	22.8	5.6	40	18.1	5.3	52	15.9	30.0
Finance, Insurance and Real Estate	*/		*/			*/			*/			*/		
Service	*/		*/			*/			*/			*/		
Government	46	24.1	6	41.0	-87.0	22	13.2	266.7	55	24.9	150.0	56	17.1	1.8
Federal	(46)	(24.1)	(6)	(4.1)	(-87.0)	(21)	(12.6)	(250.0)	(55)	(24.9)	(161.9)	(54)	(16.5)	(-1.8)
State	(0)	(0.0)	(0)	(0.0)	(0.0)	(1)	(0.6)		(0)	(0.0)		(2)	(0.6)	
Local														
TOTAL	191	100.0	148	100.0	-22.5	167	100.0	12.8	221	100.0	32.3	327	100.0	48.0

a/ Dillingham area includes Dillingham, Kakanak, Aleknagik and Manokotak.

b/ Insured employment excludes all self-employed persons, most fishermen and, prior to 1978, also excluded most State and local government employees.

c/ State and local government employment combined through 1977.

Source: Alaska Department of Labor, Employment Security Division, Research and Analysis Section. 1980. Personal communication.

1975			1976			1977			1978			1979			1970 - 1979
Number	%	% Change	Number	%	% Change	Number	%	% Change	Number	%	% Change	Number	%	% Change	% Change
*/ 0	0.0	0.0	*/ 0	0.0	0.0	*/ 0	0.0	0.0	0	0.0		0	0.0	0.0	
*/ *			*/ *			*/ *			*/ *			*/ *			0.0
51	13.5	- 7.3	54	17.8	5.9	64	14.8	18.5	68	8.2	6.2	63	5.0	- 7.4	16.7
62	16.4	19.2	*/ *			45	10.4		56	6.7	24.4	73	5.8	30.3	82.5
*/ *			*/ *			35	8.3		33	4.0	5.7	31	2.5	- 6.1	
						140	32.3		213	25.6	52.1	365	29.0	71.4	
54 (53)	14.3 (14.0)	- 3.6 (- 1.9)	65 (60)	21.5 (19.8)	20.4 (13.2)	84 (75)	19.4 (17.3)	29.2 (25.0)	390 (89)	46.9 (10.7)	364.3 (18.7)	410 (81)	32.6 (6.4)	5.1 (- 9.0)	791.3 (76.1)
(1)	(0.3)	(-50.0)	(5)	(1.7)	(400.0)	(9)	(2.1)	(80.0)	(44) (257)	(5.3) (30.9)		(47) (282)	(3.7) (22.4)	(6.8) (9.7)	
<u>378</u>	<u>100.0</u>	<u>15.6</u>	<u>303</u>	<u>100.0</u>	<u>-19.8</u>	<u>433</u>	<u>100.0</u>	<u>42.9</u>	<u>832</u>	<u>100.0</u>	<u>92.1</u>	<u>1,257</u>	<u>100.0</u>	<u>51.1</u>	<u>558.1</u>

The major change in Dillingham's economy during the 1970's decade was the recovery of the red salmon runs. The Nushagak district has seen exceptionally good runs since 1978 and this was reflected in an impressive 51.1 percent increase in total employment between 1978 and 1979 for the immediate Dillingham area.

Another significant change in Dillingham's economy during the past decade resulted from passage of the Alaska Native Claims Settlement Act in 1971. The activities of the profit-making regional and village corporations have led to an increase in the size of Dillingham's finance, insurance and real estate sector, while the contracting of certain government services to management by non-profit entities such as the Bristol Bay Native Association and the Bristol Bay Area Health Corporation has led to a significant growth in the local service sector.

Occupational Skills

Comprehensive information on the skills of the workforce of the Dillingham area is generally lacking and there are no reliable or current statistics developed on an individual community basis. However, the Employment Security Division of the Alaska Department of Labor has a Job Service Center in Dillingham and maintains a list of skills of persons who register there when looking for a job. The skills claimed by these people are not necessarily typical of those of Dillingham's population as a whole. However, they are used in the absence of other data.

TABLE 6
 OCCUPATIONAL SKILLS
 DILLINGHAM JOB SERVICE REGISTRANTS
 FY 1980 a/

<u>Occupational Category</u>	<u>Number</u>	<u>Percent of Total</u>
Professional/technical/managerial	33	12.1
Clerical and sales	40	14.7
Services	44	16.1
Farming, fishery, forestry	30	11.0
Processing	22	8.0
Machine trades	13	4.8
Bench work	--	--
Structural work	51	18.7
Miscellaneous	16	5.9
Unskilled	24	8.8
 <u>TOTAL</u>	 <u>273</u>	 <u>100.0</u>

a/ Fiscal year ends September 30.

Source: Alaska Department of Labor, Employment Security Division.
 Anchorage.

During FY 1980, a total of 273 persons registered at the Dillingham Job Service Center (see Table 6). The largest group of registrants (18.7 percent) claimed skills in structural work, i.e. construction. This group was followed by services (16.1 percent), clerical and sales (14.7 percent), professional/technical/managerial (12.1 percent), farming, fishery, forestry (11.0 percent) and processing (8.0 percent), while another 8.8 percent were determined to be basically unskilled.

Relatively few persons seeking work through the Job Service Center listed skills in farming, fishery, forestry (fishing), despite the very large number of fishermen in the community who are presumably highly skilled. However, this is more an indication that fishermen seeking employment do not normally use the services of the Job Service Center than it is a lack of persons wanting to fish in this area. In addition, relatively few persons listed processing as a skill but, according to the Department of Labor, many persons listing other skills are actually placed in processing jobs.

Income Levels

According to the 1970 Census, the median income of families in the Bristol Bay census division in 1969 was \$6,671, well below the Statewide median of \$12,443. However, these Census data are now twelve years old and are relatively meaningless today except in comparative terms. Since more recent Census data are not yet available, a look at Alaska Department of Labor wage and salary statistics published in the Statistical Quarterly

TABLE 7

AVERAGE MONTHLY WAGE BY INDUSTRY SECTOR
BRISTOL BAY DIVISION
1977 - 1980

	1977				1978				1979				1980	
	1st Qr	2nd Qr	3rd Qr	4th Qr	1st Qr	2nd Qr	3rd Qr	4th Qr	1st Qr	2nd Qr	3rd Qr	4th Qr	1st Qr	2nd Qr
TOTAL MONAGRICULTURAL INDUSTRIES	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Mining	*/	*/	4,004	*/	*/	*/	*/	1,988	1,378	1,417	2,713	2,322	1,576	2,155
Construction	685	1,345	2,544	1,132	503	836	2,672	*/	*/	*/	1,813	1,387	1,025	1,611
Manufacturing	1,016	909	1,136	1,128	996	1,011	1,319	1,339	1,208	1,187	1,403	1,433	1,266	1,274
Transportation, Communications & Public Utilities	0	0	0	*/	*/	*/	*/	*/	*/	*/	1,607	1,366	1,543	*/
Wholesale Trade	989	1,011	804	902	767	1,124	885	888	1,121	931	981	915	749	1,094
Retail Trade	1,602	1,717	1,349	1,904	2,045	2,115	1,710	2,573	1,899	2,721	2,021	2,115	2,202	2,407
Finance, Insurance & Real Estate	930	927	1,018	942	845	921	628	876	406	548	532	955	1,068	1,110
Services	972	1,144	1,466	1,409	1,132	1,280	1,458	1,208	1,164	1,598	1,448	1,483	1,448	2,260
Federal Government	1,178	1,233	1,426	1,203	1,036	1,327	1,265	1,206	1,122	1,458	1,182	1,319	1,513	1,847
State and Local Government	*/	0	0	0	0	0	0	0	0	0	0	0	0	*/
Miscellaneous & Nonclassifiable														

*/ Figures withheld to comply with disclosure regulations.

Source: Alaska Department of Labor, Employment Security Division. 1977-1980. Statistical Quarterly. Juneau.

was taken. According to these data, the average monthly wage in nonagricultural industries in the Bristol Bay division in 1979 was \$1,234, still below the Statewide average for that year of \$1,741. It should be noted, however, that fishermen in the Bristol Bay region are excluded from these statistics. As a group, fishermen tend to have reasonably high incomes and, thus, average monthly wages for all industries in the Bristol Bay division are undoubtedly understated by State figures.

A review of average monthly wages by industry sector for nonagricultural industries in the Bristol Bay division from 1977 through the second quarter of 1980 (see Table 7) indicates that the highest average monthly wages in the area are currently realized in the finance, insurance and real estate sector, a sector where employment is dominated by Native regional and village profit-making corporations. The average monthly wage for this sector in the Bristol Bay division for the second quarter of 1980 was \$2,407, well above the \$1,572 Statewide annual average in 1979.

After finance, insurance and real estate, the sector with the highest average monthly wage in the Bristol Bay division during the second quarter of 1980 was \$2,260 paid to federal government employees and \$2,155 to construction workers. Federal employee wages here were well in excess of Statewide averages but construction wages were relatively low by State standards. All other industry sectors in the Bristol Bay division registered average monthly wages for the second quarter of 1980 which were below State averages in 1979, with the greatest disparity

TABLE 8
 PUBLIC ASSISTANCE PROGRAM PAYMENTS
 DILLINGHAM, ALASKA
 MARCH 1980 a/

	<u>Old Age Assistance</u>	<u>Aid to the Blind</u>	<u>Aid to the Disabled</u>	<u>Aid to Families with Dependent Children</u>	<u>Total</u>
Total Payment	\$987	\$--	\$1,413	\$5,720	\$8,120
Number of Cases	11	--	9	18	38
Average Payment	\$ 90	\$--	\$ 157	\$ 318	\$ 214

a/ March is considered to be a representative month for public assistance payments.

Source: Alaska Department of Health and Social Services, Division of Public Assistance.

recorded in retail trade. The average monthly wage in this sector in the Bristol Bay division in the second quarter of 1980 was \$1,094, compared with the 1979 Statewide average of \$1,239.

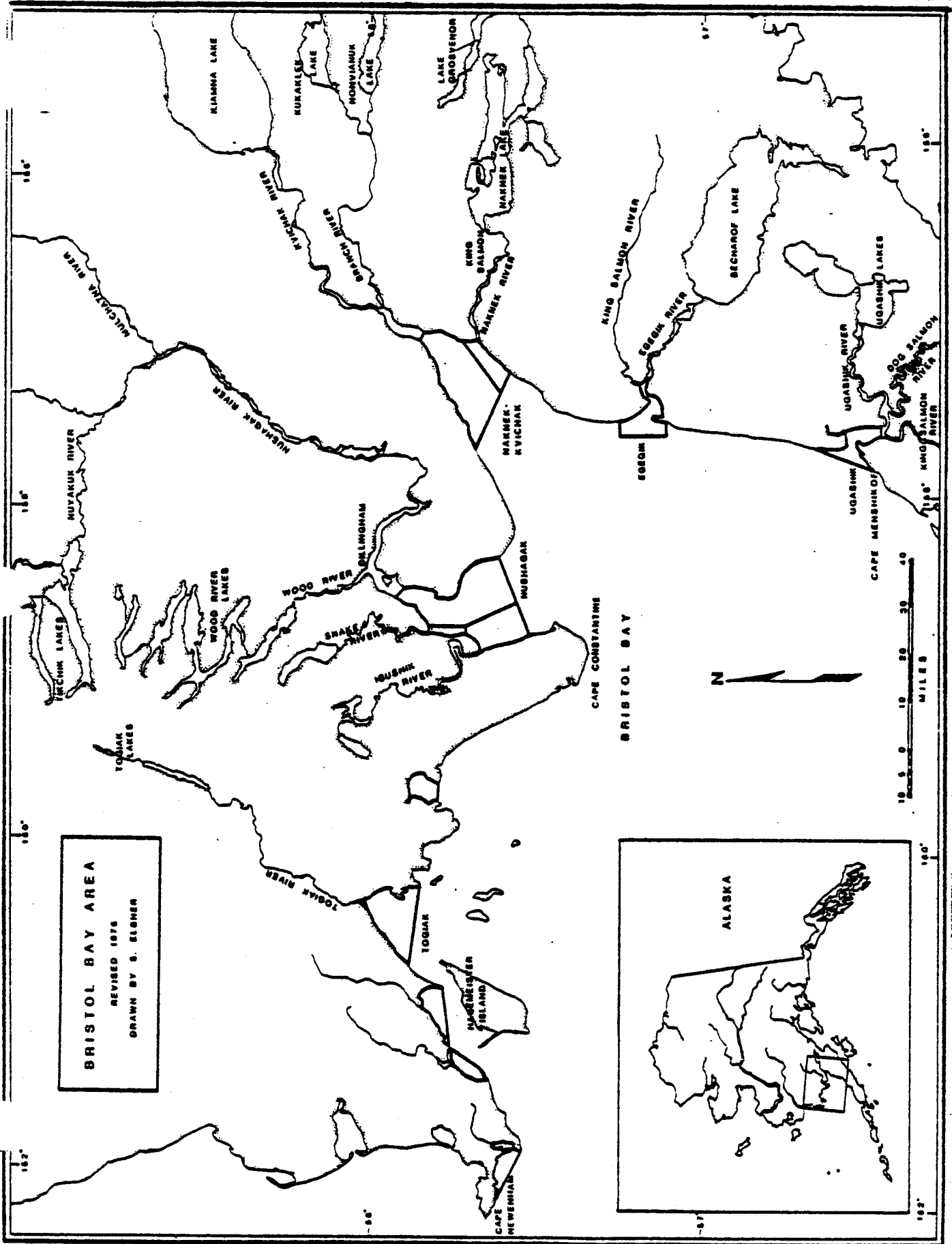
Although unemployment is seen primarily as a seasonal problem in the Dillingham area, welfare in the form of public assistance program payments is a significant source of income to some households in the community. Statistics provided by the Alaska Department of Health and Social Services, Division of Public Assistance indicate that \$8,120 was distributed to 38 individual cases in Dillingham during a typical month in 1980, for an average monthly payment of \$214 (see Table 8). About 70 percent of these funds involved Aid to Families with Dependent Children payments.

SECTOR ANALYSIS

Fishing and Fish Processing

Dillingham is the primary fishing and fish processing center for the Nushagak district of the Bristol Bay fisheries area. The larger area takes in all coastal waters and inland drainages east of a line from Cape Newenham to Cape Menshikof and is the world's largest red salmon producing region. It is divided into five fishing districts near the mouths of major salmon producing rivers. In addition to the Nushagak district, these are the Ugashik, Egegik, Naknek-Kvichak and Togiak districts (see Figure 2).

FIGURE 2



According to Alaska Department of Fish and Game personnel in Dillingham, the estimated peak fishing effort in the Nushagak district in 1980 amounted to 534 units of drift gill net gear and 202 units of set gill net gear. Using an average of two persons per drift gill net vessel and one person per set net site, a total of approximately 1,260 persons were engaged full-time in the Nushagak district salmon fishery during the height of the season. Assuming an average commitment of one month to the fishery, this figure can be adjusted downward to about 105 persons on an annual average full-time basis, of which it is assumed that approximately 80 could be allocated to Dillingham.

Unlike the Naknek-Kvichak district which is dominated by non-resident fishermen, the bulk of commercial fishing effort in the Nushagak district has traditionally been undertaken by residents of this area. According to Alaska Department of Fish and Game personnel in Dillingham, approximately 85 percent of the fishermen in the Nushagak district are Alaska residents, most of whom live in the Nushagak watershed area. However, Fish and Game personnel also indicated that this proportion has begun to change since 1979 as a result of the recovery of the district's salmon stocks. This, coupled with intense competition in the eastern Bristol Bay districts, has encouraged an increased participation in the Nushagak fishery by non-residents.

Activity in the Nushagak district salmon fishery is centered around Dillingham although other localities such as Clark's Point and Ekuk are also the site of onshore processing facilities. Excluding minor operators,

Dillingham had four onshore processors during the 1980 season. Of these, Peter Pan Seafoods and Ball Brothers were major operations while the other two, the Dillingham cold storage plant which was operated by the Engstrom Brothers and the Morpac plant which was operated by Martin Clark, were relatively small. Together, these four plants employed approximately 75 persons on an average annual full-time basis. However, during the peak month of July, the combined employment in these plants in 1980 was closer to 400 persons.

In addition to onshore processing operations, approximately 20 floating processors operated out of Dillingham during all or part of the 1980 salmon season. Of these, 16 were estimated to be relatively small operations, employing an average of 15 to 20 persons. However, the remaining four, which included three Icicle Seafoods freezer barges and the Al-Ind-Esk-A-Sea operated by the Thirteenth Regional Corporation, were much larger and were estimated to have an average workforce of close to 75 persons. On an average annual basis, the various floating processor operations operating primarily out of Dillingham were estimated to have a combined total employment of about 60 persons. At peak, however, floating processors in this district were estimated to employ in excess of 500 people.

Aside from onshore and offshore salmon processing operations, about six companies were involved in purchasing and flying out fresh fish from Dillingham in 1980. It is assumed that this activity accounted for about 10 jobs on an annual average year-round basis.

The commercial salmon fishery in the Bristol Bay area dates from 1884 and has remained the basic economic mainstay of the region since that time. All five species of Pacific salmon are indigenous to this area. Red salmon are pre-eminent and their runs to Bristol Bay are characterized by a distinctive five year cycle of peak abundance. Peak years presently occur on a bi-decade basis, i.e. 1970, 1975, 1980, etc., interspersed by years of lesser production. However, the area also has significant runs of kings, chums and cohoes and, in even years, of pink salmon. Kings arrive in the area first in late May/early June and peak in mid-June although they are still taken in early July. The red and chum salmon runs occur at the same time, entering the Bay in late June and peaking in early July. Pinks enter the area in mid-July and peak later that month, while cohoes enter in about mid-July and peak in August.

The Bristol Bay red salmon catch averaged 11 million fish annually between 1893 and 1980, with the peak period occurring from 1900 to 1940 when an average annual catch of 15 million reds was recorded. This catch level fell dramatically to an average of 8.1 million reds between 1940 and 1960 but began increasing again after that date, coincidental with the reversion of the Kvichak River stock to a five rather than a four year cycle. After 1960, peak year catches were at or near historical levels although "off" years remained relatively low. A temporary setback during the mid 1970's, believed to result primarily from harsh winters in 1970-71, resulted in greatly reduced catches as harvests were severely curtailed in order to meet escapement goals. Thus, the annual average harvest of Bristol Bay red salmon between 1960 and 1980 was only

9.1 million fish for the domestic inshore fishery (see Table 9). However, a Japanese high seas gill net fishery has been harvesting Bristol Bay red salmon since 1956. If the average of 2 million reds taken annually by the Japanese is included, the actual yield during the past twenty-one years is 11 million per year, the same as the long term historical level.

Red salmon catches in Bristol Bay recovered dramatically during the late 1970's and, except for possible environmental setbacks such as occurred during the winters of 1970-71, are expected to continue at historical high levels into the early and mid 1980's. According to the Alaska Department of Fish and Game, the present strength of the "off-cycle" years is especially encouraging as this feature has not been prevalent for the past forty years.

Of the five fisheries districts, the Naknek-Kvichak district is by far the largest red salmon producer with catches in excess of 15 million reds in 1979 and 1980. As a result, overall patterns and trends in the area's red salmon fishery generally parallel those in this district. Historically, the Nushagak district has been the second most productive system, averaging a 5 million red salmon catch from 1899 to 1918, nearly 3 million for the following thirty years and dropping to an average of 884,000 from 1960 to 1977. Only in the past three years has the catch from this district reached the historical sustained level although the size of the runs has been close to or in excess of the average run of million reds in six of the past seven years. The 1980 production of

TABLE 9
 COMMERCIAL INSHORE SALMON CATCH BY SPECIES
 NUSHAGAK DISTRICT AND BRISTOL BAY AREA
 1960 - 1980
 (000's of fish)

Year	Nushagak District						Bristol Bay Area					
	King	Red	Coho	Pink	Chum	Total	King	Red	Coho	Pink	Chum	Total
1960	81	1,518	13	290	642	2,543	112	13,705	16	302	1,316	15,451
1961	61	511	17	*	267	857	89	11,914	21	1	728	12,752
1962	61	1,462	28	880	291	2,723	84	4,718	39	914	678	6,433
1963	46	843	30	*	167	1,086	62	2,871	41	*	370	3,345
1964	109	1,421	26	1,498	463	3,317	140	5,591	37	1,532	808	8,106
1965	86	793	3	*	177	1,060	113	24,519	8	1	97	24,738
1966	58	1,170	12	2,337	129	3,706	77	9,314	34	2,493	343	12,262
1967	96	658	32	*	338	1,024	117	4,331	54	1	476	4,979
1968	78	749	49	1,705	179	2,760	104	2,793	93	1,936	364	5,290
1969	81	773	38	*	214	1,106	125	6,598	82	2	356	7,162
1970	88	1,189	4	418	435	2,133	141	20,721	14	457	718	22,051
1971	83	1,257	8	*	360	1,708	123	9,584	13	*	677	10,397
1972	46	381	4	68	310	809	70	2,416	14	127	657	3,283
1973	30	272	29	*	336	668	44	761	57	*	684	1,547
1974	32	511	13	414	158	1,127	46	1,362	44	940	286	2,678
1975	21	646	7	*	153	828	30	4,899	46	*	325	5,301
1976	61	1,265	7	740	801	2,874	96	5,619	27	1,037	1,329	8,108
1977	85	619	53	3	900	1,659	131	4,878	107	5	1,598	6,718
1978	106	3,240	46	4,369	664	8,425	175	9,896	82	5,187	1,166	16,505
1979	155	3,282	141	*	547	4,126	202	21,958	300	2	930	23,393
1980	64	4,404	150	2,311	782	7,711	96	23,674	335	2,650	1,405	28,160
Average	73	1,284	34	716	396	2,488	104	9,149	70	837	729	10,889

* / Less than 500 fish.

Source: Alaska Department of Fish and Game.

12.7 million reds for this district is considered exceptional by the Alaska Department of Fish and Game. Proportionately, based on total run performances since 1956, this was the largest increase in production of any Bristol Bay district in 1980.

Of the remaining districts in the Bristol Bay area, the Egegik district has traditionally had the largest red salmon runs, averaging 2.1 million fish from 1956 to 1980, with runs matching or exceeding this level for five of the past six years. By contrast, the Alaska Department of Fish and Game considers the long term prospects for the Ugashik district to be somewhat uncertain because of erratic returns, even when escapement levels were favorable. The Togiak district red salmon fishery, on the other hand, is the most recent in the area and is currently producing at a sustained high rate with no indication of problems.

Aside from red salmon, the Bristol Bay area also has significant runs of kings, chums and cohoes and, in even years, pink salmon. After reds, numerically the most abundant species in this area each year between 1960 and 1980 were pinks (835,000 average even year catch), followed by chums (740,000 average catch), kings (104,000 average catch) and cohoes (70,000 average catch). The species composition of the salmon runs varies markedly from district to district although reds dominate in all districts. King salmon are almost exclusively produced by river systems draining into the Nushagak district although significant catches also occur in the Togiak district and occasionally in the Naknek-Kvichak district. Pink salmon are quite specific to the Nushagak district

although there have recently also been strong pink runs in the Naknek-Kvichak district. However, pink salmon occur in Bristol Bay on even years only, with merely a trace in odd years. Coho salmon runs are mainly confined to the Nushagak and Togiak district river systems, with the Nushagak runs being the larger of the two. In the opinion of the Alaska Department of Fish and Game, the Nushagak district coho stocks represent the only salmon species in Bristol Bay which may have additional harvest potential.

According to the Alaska Department of Fish and Game, there are twelve shore-based canneries in Bristol Bay which employ in excess of 2,000 plant workers each season. However, not all of these canneries operate each year and, during low production years, some plants consolidate their canning operations with other firms to save on start-up and operating costs. As elsewhere in the State, there has been a marked shift from canning to freezing of salmon in this area in recent years which has resulted in an influx of floating processors, especially in the larger fishing districts. The Alaska Department of Fish and Game estimates that these newer processing operations seasonally employ an additional 500 to 700 workers. In addition, air freighting of fresh fish for processing elsewhere has become a major industry in this area, especially during high production seasons.

Two basic gear types, drift gill net and set gill net, are used in the Bristol Bay commercial salmon fishery. According to the Alaska Department of Fish and Game, registration by gear type has averaged 1,584 (67

percent) drift gill net and 781 (33 percent) set gill net licenses since 1960, although these averages have been exceeded in recent years because the recovery of the Bristol Bay red salmon runs has encouraged higher participation rates in the fishery. In terms of gear, drift gill nets are by far the most significant, accounting for an average of 90 percent of the total annual catch. The Alaska Department of Fish and Game also estimates that 67 percent of the area's licensed gear holders are Alaska residents and, of these, an estimated 70 percent are Bristol Bay residents. However, the proportion of residents to non-residents varies widely from district to district and from year to year. According to Fish and Game personnel in Dillingham, the proportion of non-resident fishermen in the Nushagak district has actually increased since 1979, primarily because of the apparent recovery of the red salmon run and increased competition in eastern Bristol Bay districts. The Commercial Fisheries Entry Commission has established maximum participation levels in the Bristol Bay area at 1,669 drift and 803 set gill net permits.

The ex-vessel value to fishermen of the Bristol Bay commercial salmon fishery averaged \$23.5 million between 1960 and 1980. During the late 1970's, this value rose dramatically as a result of both increased prices and abundance of red salmon. Thus, the average ex-vessel value for red salmon between 1978 and 1980 rose to \$92 million from a level of \$20 million between 1975 and 1977. A reversal of this trend occurred in 1980 when the ex-vessel dropped \$57.3 million despite the fact that the 1980 harvest exceeded that of 1979 by 5 million fish. Although this drop was partially due to a decrease in prices, an increased harvest of lower priced pink salmon in 1980 was also a factor.

Aside from salmon, the only other commercial fishery currently significant in the Bristol Bay area is herring. This is a new fishery which is primarily centered around the export of herring sac roe to Japan although herring carcasses are used for crab bait and human consumption to some extent as a byproduct of the fishery. Sac roe production has steadily increased during the past four years and attained a level of 17,700 metric tons in 1980. This fishery averaged \$4.1 million annually to area fishermen between 1977 and 1980, with activity normally extending from late April to early June.

A related fishery is the harvesting of herring roe on kelp, largely by area residents using rakes or hand picking the rockweed kelp at low tide. According to the Alaska Department of Fish and Game, about 100 persons have participated in this fishery in recent years. Production averaged 149 metric tons from 1976 to 1979 but dropped off to 86 tons in 1980, mainly as a result of stricter regulatory measures designed to protect the kelp from being overharvested.

Activity in the Bristol Bay herring fishery is concentrated in the Togiak district. However, most traffic bound for the Togiak district passes through Dillingham and there is some involvement of local processors in this fishery. According to the Alaska Department of Fish and Game, there were 140 units of seine gear and 363 of gill net gear registered for the Bristol Bay herring fishery in 1980. Assuming an average crew size of 4 to 5 persons for seine vessels and 2 to 4 for gill netters, approximately 1,700 persons fished for herring at some point during the

1980 season which effectively ran only for two weeks, from April 25 through May 10. Local Fish and Game officials in Dillingham estimate that there were close to 4,000 persons on the grounds involved in the herring fishery in 1980. This figure included not only fishermen and persons harvesting herring roe on kelp, but also personnel on floaters, those on foreign vessels awaiting herring deliveries, pilots engaged in transporting herring out of the area, and company support people. All told, there were 27 companies involved in this fishery in Bristol Bay in 1980 and in excess of 50 airplanes on the ground at Togiak at the peak of activity.

Although commercial fishing is the major source of employment and income for Bristol Bay residents, subsistence salmon fishing is also important as a source of food. Salmon subsistence catches in this area for personal use and dog food have averaged about 144,000 fish per year between 1963 and 1980. According to the Alaska Department of Fish and Game, there is little relationship between the number of fish taken and the size of the runs, indicating that there is a basic use level which is independent of the relative abundance of the various salmon species. The area also has winter subsistence fisheries for Dolly Varden, whitefish, pike, smelt, burbot and some rainbow trout and grayling.

Regional Services

While fishing and fish processing is the major element in Dillingham's economy, the community's role as a regional center for the Bristol Bay region is also important. The Bristol Bay region actually has two primary centers, Dillingham and Naknek/King Salmon, with Dillingham's main sphere of influence being the western portion of the region. However, several regionwide functions are based out of Dillingham, including the Bristol Bay Area Hospital and the administrative offices of the Southwest Region Schools, the Bristol Bay Native Association and the Bristol Bay Area Health Corporation.

Dillingham serves as a regional center for three primary functions - government and quasi-government services, air and water transportation and trade. Government agencies presently represented in Dillingham which perform more than strictly local functions include Alaska Legal Services, the Alaska Department of Fish and Game, the Alaska Department of Public Safety and the Southwest Region Schools. In addition, non-profit organizations such as the Bristol Bay Native Association, the Bristol Bay Area Health Corporation and the Bristol Bay Housing Authority provide government services on a contractual basis. All told, government and quasi-government services accounted for an estimated 130 basic jobs in Dillingham on an annual average full-time basis in 1980.

The Bristol Bay region has two major airports, one at Dillingham and the other at King Salmon. Both regional centers are served daily by jet

from Anchorage and transportation by small plane is available from these centers to outlying villages. One major (Wien Air Alaska) and one small (Kodiak Western Airlines) scheduled airline and three air taxi companies operated out of Dillingham in 1980. Approximately half of employment associated with scheduled carriers was assumed to be basic and all that associated with air taxi operations. All told, these companies accounted for 32 basic full-time jobs in Dillingham in 1980. Another 8 basic jobs in the community were estimated to be derived from taxi cab operations, with a share of this basic employment being derived from Dillingham's regional service function.

Dillingham is also a regional center for waterborne commerce. The community has the only municipal cargo dock in the region which receives northbound freight, with several lighterage firms using this facility to load and distribute freight and fuel throughout an area bounded to the east by Iliamna, to the west by Togiak, to the north by Koliganek and to the south by Port Heiden. In addition, the community also serves the seasonal needs of commercial fishing boats and processing vessels.

As the major community in the western Bristol Bay area, Dillingham is its primary shopping center. Close to half of the 101 jobs in the community's trade sector in 1980 were classed as basic, most of them derived from purchases by persons from smaller villages in the region. Local merchants selling groceries and hunting and fishing equipment, including snowmachines, estimated that between 50 and 50 percent to their sales were to non-local residents. While there is undoubtedly a

very large amount of mail order purchasing, especially of commodities such as clothing, Dillingham has the advantage of convenience and is a large enough town to permit some comparison shopping.

All told, close to 200 basic jobs in Dillingham are currently derived from the community's regional center role. Expansion of this role in the future will be related to growth of the region as a whole, both numerically and in terms of purchasing power. Given the apparent recovery of the Bristol Bay red salmon fishery, the prospects for regional growth appear good, as do those for Dillingham's function as a regional service center.

Tourism and Recreation

Unlike the fishing and fish processing industry and regional service activities, tourism is not presently a significant factor in Dillingham's economy. However, this area possesses some of Alaska's most spectacular scenery and some of its best sport fishing opportunities as well as having a largely undeveloped potential for boating, canoeing, hiking and camping. In recognition of these attractions, the Alaska State Legislature created the 1,428,320 acre Wood-Tikchik State Park in 1978. The southern boundary of the Park is a short distance north of Dillingham, with Dillingham being the point of entry to the area by visitors.

The Wood River Lakes and Tikchik Lakes drainage systems each contain six main lakes. Both systems drain into the Nushagak River and are extremely

important as nursery grounds for the Bristol Bay red salmon fishery. Aside from their scenic attractions, the lake systems contain highly productive sport fish habitat including all five species of Pacific salmon, rainbow trout, grayling, lake trout, arctic char, Dolly Varden and northern pike. The area also has significant game populations, with moose being the major big game species.

Visitor activity in the Wood-Tikchik State Park is currently at a relatively low level. According to the Alaska Department of Fish and Game, there are three lodges in the Wood River Lakes system and another two in the Tikchik Lakes system. There are also several relatively primitive cabin facilities in the area which are available through local guides and air charter operators. The Alaska Department of Fish and Game estimated that between 50 and 75 percent of non-resident visitors to the area stay at one of the five lodges. Local residents do not normally use these facilities.

A 1972 study conducted by Grumman Ecosystems Corporation for the State Division of Parks made "high" and "low" projections of recreational use of the Wood-Tikchik State Park. Their high projection anticipated a total of 6,600 visitors annually by 1980, with this group being made up of 5,600 tourists and 1,000 Alaskans. Their low projection assumed a total of 3,300 visitors by 1980, with all but 2,800 being tourists. To date, even the more conservative projections have not been realized, as indicated by the results of an angler survey conducted by the Alaska Department of Fish and Game (see Table 10).

TABLE 10

SPORT FISH EFFORT AND HARVEST a/
 DILLINGHAM AREA
 1977 AND 1978

	Days Fished	Species Caught									
		Red Salmon	Coho Salmon	Pink Salmon	Chum Salmon	Rainbow Trout	Arctic Char	Grayling	Northern Pike	Lake Trout	
<u>Tikchik Lakes System</u>											
1977	959	16	93	0	0	62	34	108	8	28	
1978	1,465	99	151	232	39	145	217	199	199	45	
<u>Wood River Lakes System</u>											
1977	3,549	129	61	0	0	252	435	201	3	0	8
1978	2,843	211	25	31	0	217	905	199	18	0	

a/ Statistics derived from a survey mailed to anglers.

Source: Alaska Department of Fish and Game.

Possible constraints to the development of tourism in the Dillingham area which were cited by Grumman Ecosystems included the lack of adequate accommodations in Dillingham, the area's remoteness and the non-availability of local labor during the fishing and fish processing season. These constraints generally still apply. Dillingham now has a modern hotel although it is booked up through the salmon season, and air connections between Dillingham and Anchorage have improved during the past ten years. In addition, at the request of the Bristol Bay Native Corporation, the Alaska Department of Transportation and Public Facilities is again investigating the feasibility of developing a land route from Bristol Bay around the north shore of Lake Iliamna to Pile Bay.

Another constraint to the development of tourism in the Dillingham area is that visitors presently spend little time or money in the community. According to local residents, incoming visitors are met at the Dillingham airport and taken by road to Aleknagik where there is a float plane base for travel to one of the various lodges in the Park. Lodge charges, reportedly around \$1,600 to \$1,800 per person per week, also pose a constraint on the number and type of visitors to the area.

Tourist activity in the Dillingham area will undoubtedly increase during the next twenty years. The State Division of Parks has tentative plans to station a ranger in Dillingham and to make a number of improvements in the area. However, significant growth in tourism here will depend on the provision of less exclusive facilities serving a larger section of the general public.

Other

Except for the activities of Choggiung, Ltd., the local village corporation established under terms of the Alaska Native Claims Settlement Act, there are no other basic economic activities in the Dillingham area which are of significance. The area is rated by the State as having some potential as grazing land but this potential is believed to be very limited. In addition, some mining has taken place here in the past. The Red Top Mine on Marsh Mountain, about 17 air miles north of Dillingham, produced mercury during the 1950's but is currently inactive, and a large but low grade iron ore deposit was discovered in 1959 near Kamuk Mountain north of Dillingham. There is also a molybdenum deposit on Akuluktok Peak about 45 miles northwest of town and some placer gold deposits. None of these deposits appear likely to make a significant contribution to Dillingham's economy in the near future.

The Dillingham area has some potential for economic growth derived from oil and gas-related activities. The State has scheduled an oil and gas lease sale in the Bristol Bay Uplands (Sale 41) area for September 1984. The area to be included in the Call for Nominations and Comments is very large. It takes in the entire Bristol Bay geological basin and extends from Kulukak Bay in the northwest, inland as far as Lake Iliamna and southwest along the north side of the Alaska Peninsula as far as Cape Leontovitch, near Cold Bay. Little exploration has previously taken place in this area and past drilling activities have not resulted in any significant finds. The State considers this area's petroleum potential

to be low to moderate, so that no major impacts on Dillingham's economy from this source are anticipated.

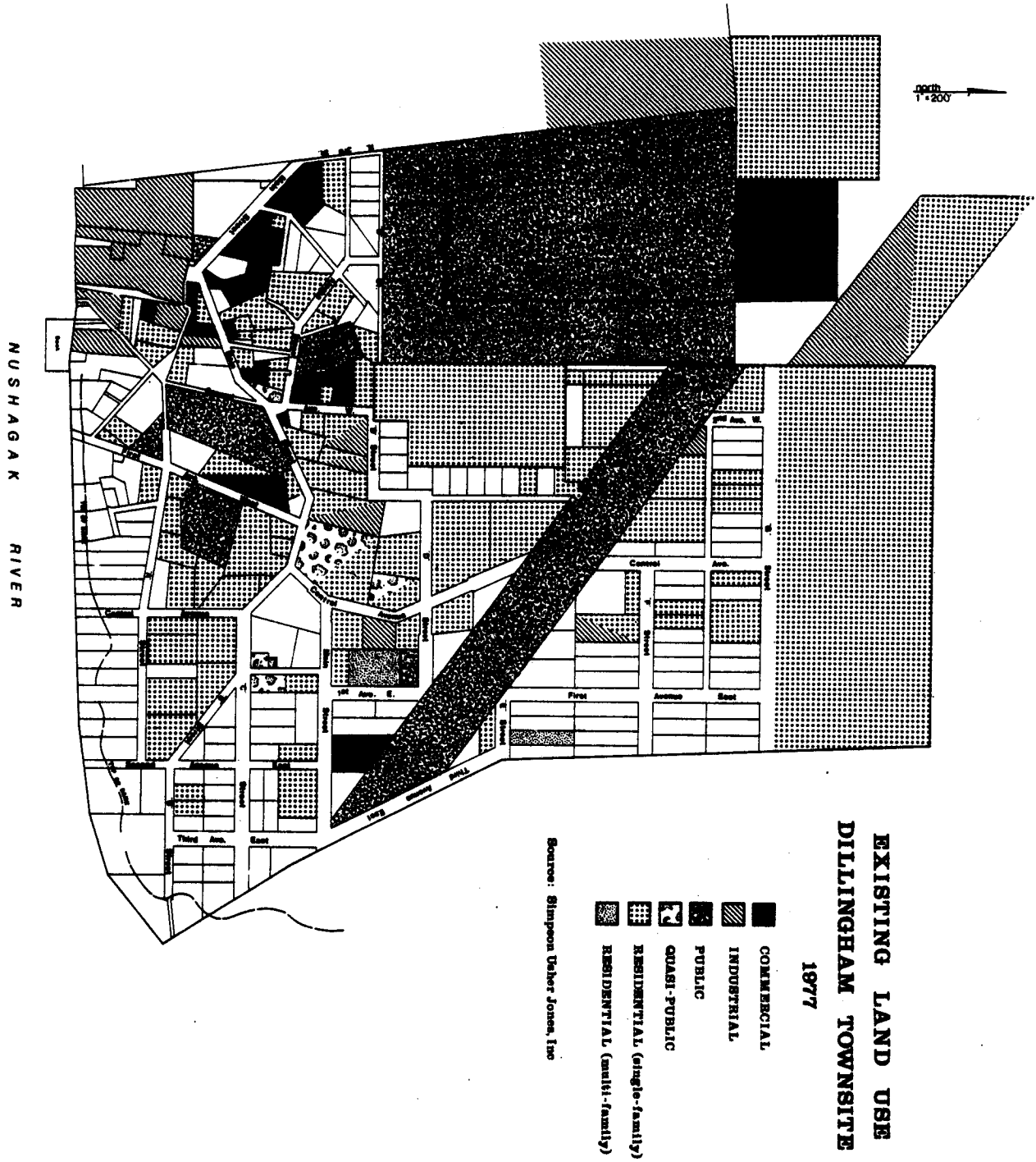
The activities of Choggiung, Ltd., on the other hand, have a significant impact on Dillingham's economy. Choggiung was formed from the merger of the Dillingham and Ekuk village corporations. The corporation has a total land entitlement of approximately 281,456 acres under the terms of sections 12(a) and 12(b) of the Alaska Native Claims Settlement Act, of which about 85 percent had been conveyed as of October 1980. As the major private land owner in the Dillingham area, Choggiung will obviously play an important role in local development in the future. While the company presently has a small office staff, it has been involved in several local construction projects. In addition, the corporation built and operates two boat storage buildings, provides management services to other village corporations in the area, and manages local gravel borrow pits which are owned by the regional corporation, the Bristol Bay Regional Corporation.

Land Use

OVERALL PATTERNS

The pattern of Dillingham's development today owes much to its past, to the physical environment and local drainage conditions, and to the dependence of the town's major industry on a waterfront location (see Figure 3). The present townsite was a traditional Eskimo village but

FIGURE 3



the town's modern character dates from around the turn of the century with the establishment of the Arctic Packing Company cannery near Snag Point in 1904. Early settlement clustered around the cannery and fishing and fish processing soon became the major economic activity of the area. Other canneries subsequently opened and by 1910 there were reportedly ten plants operating in the Nushagak Bay area.

Like most fishing communities, Dillingham's development is oriented toward the waterfront and close proximity to the water has traditionally been important to the people of this area. Most development in Dillingham is still within the original townsite. However, the soils of the Dillingham area often pose building problems because of poor drainage conditions and limited bearing capacity. As a result, urban development in areas away from the townsite is primarily in the form of scattered linear settlement along the major roads and in the Windmill Hill-airport and Kanakanak areas.

Residential development in Dillingham was traditionally concentrated within the original townsite. In recent years, however, most new housing has been built in rural areas outside town. According to the Alaska State Housing Authority, the number of units in the townsite and outlying areas was approximately the same in 1971. However, as a result of a number of factors, including soil conditions, poor access, conflicting land uses and inefficient land utilization, little new residential development within the townsite has taken place. A 1976 report prepared for the City by the Alaska Department of Community and Regional Affairs

found that dwelling units in outlying areas outnumbered those in the townsite by a ratio of about three to one, with the number of units in the Windmill Hill area near the airport being approximately the same as those in the townsite. Other housing in outlying areas at that time was scattered along the Wood River, Aleknagik River and Kanakanak Spur Roads. No reversal of this trend has occurred since 1976 except for a new concentration of housing in the Snag Point subdivision directly north of the townsite.

Most commercial activity in Dillingham is located along Main Street in the southwest portion of the townsite. However, some airport-related services are located at the airport and there are now several business establishments in the Windmill Hill area.

Industrial development in Dillingham is concentrated along the waterfront within the townsite except for the Ball Brothers Seafood processing plant at Scandinavian Beach and the Morpac facility at Squaw Creek. Major industrial uses in the townsite include the Peter Pan Seafoods complex, fuel storage tanks, the cold storage plant, the commercial dock and several warehouses. Dillingham's currently inoperative sewage treatment plant is also located in this area but away from the waterfront.

Available developable land within the original Dillingham townsite is in limited supply. However, this apparent shortage is due as much to random development patterns coupled with an inefficient road system as it is to unfavorable soil conditions. Outside the townsite, the

amount of available developable land is limited not only by soils conditions but also by land ownership patterns as large areas have been selected under terms of the Alaska Native Claims Settlement Act or by individuals as Native allotments.

As a first class city under Alaska law, Dillingham has the full range of local government planning powers. The City's first comprehensive development plan was completed in 1971 by the Alaska State Housing Authority. Since that time, the City of Dillingham has been involved in several planning and planning-related studies. These have included an identification of local development patterns, planning issues and development policy recommendations undertaken in 1976 by the Alaska Department of Community and Regional Affairs, Division of Community Planning at the request of the Dillingham Planning Commission; a residential land analysis completed for the City by Simpson, Usher, Jones, Inc. in 1977; and an aerial mapping program of the area which was completed in 1979. The City has also been active in subdivision planning since 1978 and is currently in the process of updating its comprehensive development plan. In addition, Dillingham is participating in coastal zone management planning for the region rather than proceeding on its own. The Bristol Bay Native Association recently received a coastal management organizational grant from the Alaska Department of Community and Regional Affairs and the City can be expected to play an important role in these efforts in the future.

DEVELOPMENT CONSTRAINTS

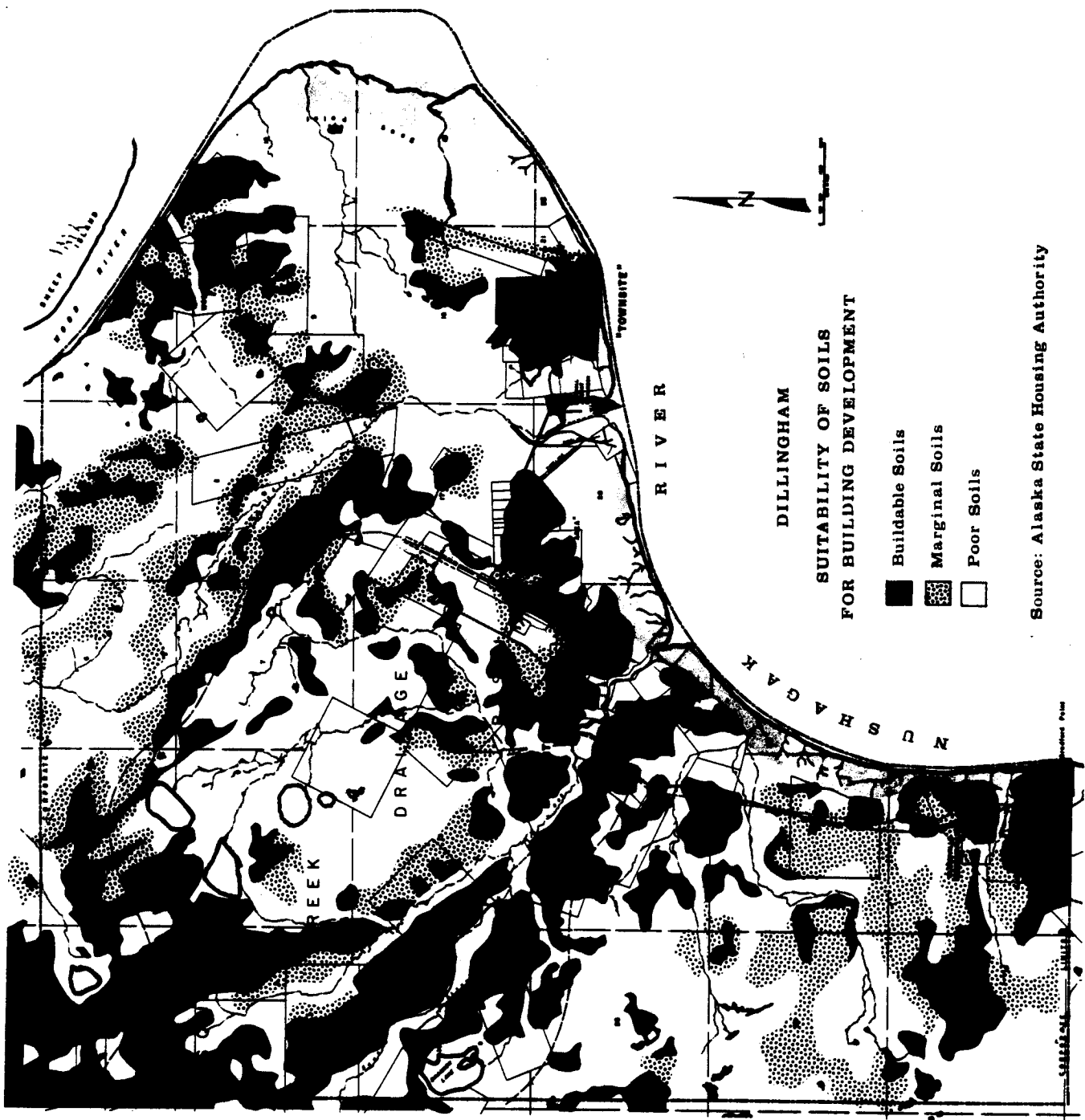
The major physical constraint on development in the Dillingham area is poor soil conditions. Other existing or potential constraints include beach erosion and flooding and earthquake susceptibility. There are also non-physical constraining influences such as past land use patterns and a shortage of available private land.

The primary limitation on urban development in the Dillingham area is soils conditions. Only about 37 percent (5,180 acres) of land within Dillingham's 23-square mile corporate limits is considered to be relatively free of building problems (see Figure 4). Other soils in the area are associated with high water tables, poor drainage conditions or permafrost and are, at best, extremely costly to develop for urban use.

Most of the townsite area is physically suited for urban development. However, about half of the developable land within the townsite is reportedly in residential use and there is little additional space available for future expansion. The lands immediately surrounding the townsite are generally unsuitable for building purposes. As a result, most development outside the townsite takes a scattered linear form paralleling major roads although there is some depth of development in the Windmill Hill area and in the new Snag Point subdivision.

Beach erosion also limits development in the Dillingham area to some extent. Waves generated by high tides or tidal currents are responsible

FIGURE 4



Source: Alaska State Housing Authority

for this erosion activity which is especially pronounced along the townsite waterfront. A lesser amount of wave generated erosion occurs along the shore from Kanakanak northeasterly to the small boat harbor. Thus, very little of Dillingham's waterfront area is entirely free of this development constraint. However, according to the U.S. Army Corps of Engineers, no additional erosion control measures at Dillingham are presently justifiable on an economic or environmental basis.

Flooding along the waterfront resulting from a combination of high winds off the Bay and high tides also acts as a constraint on development to some extent. A destructive storm in August 1980 caused extensive damage to property in this area. Other areas in the community are not generally susceptible to flooding. However, according to the U.S. Army Corps of Engineers, no additional erosion control measures at Dillingham are presently justifiable on an economic or environmental basis.

Finally, Dillingham's proximity to the seismically active Aleutian Arc places it within a zone with a potential for moderate structural damage resulting from an earthquake. However, the community has yet to experience a severe earthquake.

Aside from physical constraints, subdivision and land ownership patterns also influence the form of development in the Dillingham area. Poor platting of land within much of the townsite has led to the wastage of otherwise developable land. In addition, the location of the old City airstrip within the townsite served as a barrier to development in the

northern part of town. However, this latter constraint was removed with closure of the airstrip in November 1979 and the City is now proceeding with plans for a residential subdivision in that area.

Land ownership patterns in the Dillingham area affect the availability of land of urban development. Reportedly, 80 percent of lands in the City which are suitable for development are covered by Native allotments. This is a form of land ownership formerly available to Alaska Natives in which the federal government retains a trust responsibility. As a result, an individual Alaska Native owner cannot sell or lease all or part of his allotment without prior permission of the Bureau of Indian Affairs. While this does not preclude the sale or lease of such lands, in practice it is often time consuming and can therefore be considered a constraint.

Most other remaining developable lands in the vicinity of Dillingham are owned by Choggiung, Ltd., the local village corporation established under terms of the Alaska Native Claims Settlement Act, as amended. This corporation has sold a number of residential parcels although it has an established policy of leasing rather than selling lands for commercial, industrial and recreational development. According to Choggiung spokesmen, however, the form of title it has received to most lands thus far transferred from the federal government, i.e. interim conveyance, is itself a constraint on development. This is because lending institutions do not always consider the interim land conveyances adequate evidence of ownership for home mortgage purposes.

LAND STATUS

Within the Dillingham townsite, most land is privately owned. However, only a small percentage of land outside the townsite but within Dillingham's corporate limits is in individual private ownership. These lands are concentrated in the Windmill Hill-airport area and along the Aleknagik, Kanakanak and Wood River roads.

The City of Dillingham received approximately 20 acres of Community Grant land from the State (with one acre charged against the community's municipal entitlement) in the form of small lots scattered throughout the townsite. However, most City property was acquired from Choggiung, Ltd. under Section 14(c)(3) of the Alaska Native Claims Settlement Act, as amended. Under the terms of this legislation the village corporation is required to transfer land to the City of Dillingham for purposes of municipal expansion, rights-of-way for public use and other foreseeable community needs. The exact amount of land to be conveyed was originally specified as 1,280 acres although, as amended by the Alaska National Interest Lands Conservation Act, the amount may now be less than 1,280 acres if agreed to by the village corporation and the city (or, where there is no organized municipality, by the State). In Dillingham's case, the reconveyance process has gone smoothly and the total reconveyance is expected to be approximately 1,580 acres. The City has been quick claim deeded approximately 480 acres of that reconveyance in the Snag Point subdivision area immediately north of the townsite.

State holdings in the Dillingham townsite are limited to a tract directly east of the City Hall on which the State jail and Troopers' offices, Southwest Region Schools' offices, the Subsistence Office and housing are located; the Manpower site (Block 20, North part of Lot 5) at the corner of Main Street and Second Avenue; the Fish and Game offices and Warehouse site (Block 18, Lot 7) located on a 29,719 square foot parcel on the north side of Alaska Street; and the National Guard Armory site near the northwest end of the old airstrip which has recently been exccessed by the federal government and to which the City has requested title.

Outside the townsite but within Dillingham's corporate limits, the State owns a large tract which includes the airport and adjacent lands. Federal holdings are limited to a large tract of land at Kanakanak associated with the hospital plus a small tract at the small boat harbor held by the U.S. Army Corps of Engineers.

Most lands in the immediate Dillingham area are held either in Native allotments or by Choggiung, Ltd. Native allotments account for an estimated 80 percent of accessible developable land within Dillingham's corporate limits, with most being in large tracts along existing roads in the area.

Under provisions of the Alaska Native Claims Settlement Act, as amended, the local Native village corporation was entitled to select 161,280 acres of land in the vicinity of Dillingham. Dillingham pooled its

entitlement with the village of Ekuk and formed Choggiung, Ltd. which manages the 250,000 acre land estate of the two villages. In addition to its village entitlement, Choggiung is also entitled to receive reconveyance lands from the Bristol Bay Native Corporation under section 12(b) of the Claims Act. Choggiung has pooled that entitlement with eight other villages in the region for land management purposes and its land now takes in all former federal lands within Dillingham's corporate limits, except for parcels specifically noted above.

Overall, land status in the Dillingham area has undergone a major change in the past ten years. Federal lands in the area have been selected by the village and regional Native corporations and also by the State. Native-selected lands surround the villages in the area and are concentrated along all of the major waterways and their tributaries. In the immediate Dillingham area, most 12(a) entitlement lands have been conveyed to Choggiung, Ltd. except for overselected and holdback acreage. As of October 1980, Choggiung reported that it had received 85 percent of its total entitlement. Title to the subsurface estate of village selected land remains with the Bristol Bay Native Corporation.

The State has selected lands throughout the general Dillingham area. It has received tentative approval for selections near Warehouse Mountain and an area south and west of Lake Nerka. The Warehouse Mountain area was the site of a remote parcel disposal in 1978 and further State disposals in that area are planned. However, the major State landholding in the general Dillingham area is the Wood-Tikchik State Park which is

located a short distance north of Aleknagik and encompasses a total area of 1,428,320 acres.

Once conveyances of lands to Native corporations and the State have been completed, federal land retention in the Dillingham area is expected to be minimal.

HOUSING

At the time of the 1970 Census, there were 266 year-round housing units in Dillingham. Twenty-eight of these were found to be vacant, representing a vacancy rate of 10.5 percent. Preliminary 1980 Census figures indicate a total of 581 conventional housing units in the community, a 118 percent increase over the 1970 figure. However, the 1980 Census figures indicate that 114 of these units were vacant, representing a very high vacancy rate of 19.6 percent. City officials dispute these findings. The vacant unit count apparently included 50 newly constructed HUD homes which are now occupied. In addition, City personnel believe that Census enumerators counted a number of uninhabitable shacks in its vacant unit figures.

There are a few houses available for rent in Dillingham but the City is believed to have a generally low housing vacancy rate and a zero vacancy rate during the herring and salmon seasons when the community's population is greatly swollen by an influx of fishermen and transient processing plant workers. While many people from other villages of the region who

come here to fish stay with relatives and friends, many other transients do not live in conventional housing units. Alaska Consultants, Inc. counted 277 bunkhouse units associated with two local processing plants in 1980. In addition, all available space in the hotel is filled. A large number of people also live offshore, including around 550 persons on floating processors at the peak of the salmon season.

Most homes in Dillingham are single family units. Of the 266 housing units counted here by the 1970 Census, about 85 percent (225 units) were single family, 15 percent (40 units) housed two or more families and the remaining unit was a trailer.

A land use survey conducted by Simpson, Usher, Jones for the City in 1977 counted 103 housing units in the townsite area of which about 87 percent (90 units) were either single family or duplex units, 9 percent (9 units) were apartments in commercial buildings and 4 percent were multi-family housing units. Field observations by Alaska Consultants in 1980 found a continuation of this trend. Although there have been several apartment complexes constructed in Dillingham since 1977, these have been more than offset by the addition of 50 new HUD single family units and the construction of a number of single family units in subdivisions developed by Choggiung, Ltd. and the Bristol Bay Native Corporation.

Despite a substantial amount of home construction in recent years, Dillingham's housing stock includes a high proportion of substandard

units. A 1970 survey conducted by the Alaska State Housing Authority found about half of all units in the community to be structurally sound but in need of repair, while close to 20 percent were rated as dilapidated and in need of demolition. A more recent survey conducted by the Bristol Bay Native Association in 1975 found that of a sample of 47 homes, 28 needed to be replaced, 17 needed improvement and only 2 were be considered to be in satisfactory condition.

A major factor in Dillingham's high proportion of deteriorating housing is age. The Bristol Bay Native Association found the average age of the units it surveyed to be 35 years. Old building materials in combination with a good deal of do-it-yourself construction give much of the community's housing stock an aged appearance. Although substandard housing occurs throughout the City, it is most concentrated within the townsite.

As previously stated, most housing in Dillingham is located in the townsite, in the Snag Point subdivision, on Windmill Hill and along the Wood River and Kakanak Roads. In addition, new housing construction is taking place in several subdivisions, with the largest being that developed by the Bristol Bay Native Corporation along the Aleknagik Road.

Community Services and Facilities

PUBLIC SAFETY

Police

The Dillingham Police Department has provided police protection within the City's corporate limits since 1971. The police station is housed on the ground floor of the fire station on the corner of Main and D Streets, near the center of the old townsite and consists of two offices totalling approximately 430 square feet in area, a storage closet and a restroom. The remainder of the ground floor is taken up by the fire station, while the second story houses the youth center.

Dillingham has no City jail. Prisoners requiring detention are instead held in the State jail located off Third Street near the Nushagak Electric power plant. This facility includes two cells capable of accommodating at total of four people. There is no special provision made for the detention of females or juveniles.

According to the police chief, both the police station and jail are inadequate for current levels of operation and a new public safety building with much more office, storage and jail space as well as a fire station, is needed. However, funds are not presently available for such a project.

The police department is staffed by a chief, three full-time and three reserve officers and four dispatchers who also answer calls for the State Trooper. Police equipment consists of four radio-equipped, four-wheel drive vehicles.

Dillingham Police Department activity has undergone a major increase during the past few years. During the first eight months of 1980, the Department handled 272 active cases, a 67 percent increase over the 163 cases recorded in 1979. During this same period in 1980, there were 239 criminal cases filed in the Dillingham District Court, an increase of 64 percent since 1979.

As in most small Alaska communities, the incidence of serious crime in Dillingham is extremely low. According to the police chief, almost all crime in the community is alcohol related. Of approximately 300 people jailed during the first eight months of 1980, only three were arrested for non-alcohol related crimes.

Police Department activity in Dillingham is also highly seasonal. Peaks reportedly occur in early March when residents of Bristol Bay villages visit Dillingham to celebrate "Beaver Round-Up", during the May herring season, and again in July and August during the salmon season. Department officials estimate that, on average, about 85 percent of Dillingham's crime is committed by non-local residents.

An Alaska State Trooper stationed in Dillingham is responsible for police protection over a wide area extending from the boundary between the third and fourth judicial districts on the west, the Nushagak River on the east and including the Wood River and Tikchik Lakes to the north. In addition to criminal investigations, the State Trooper supervises the activities of village police officers and gives assistance throughout his district, where needed or requested. He is also charged with responsibility for search and rescue, crash site investigations, administration of the driver licensing and testing program and, when necessary, with assisting State Fish and Wildlife Protection personnel.

In 1980, there was one State Trooper stationed in Dillingham who indicated that crime problems in his region were similar to those cited by City police officials. Trooper equipment includes a late model four-wheel drive vehicle and a 21 foot Boston Whaler for search and rescue missions.

Fire Protection

Fire protection services are provided throughout the City by the Dillingham Volunteer Fire Department which is housed with the Police Department on the corner of Main and D Streets, close to the commercial center of town. The station contains three bays which are currently filled to capacity with three firefighting vehicles and two ambulances. The Fire Department also operates a substation at the airport which houses another tanker and a dry chemical/foam crash truck. In addition, the Alaska Department of Transportation and Public Facilities has a crash/fire rescue unit at the airport.

The Dillingham Fire Department is staffed by a volunteer chief and 12 to 15 active volunteer firemen. Firefighting equipment at the downtown fire station consists of a 1,500 gallon tanker, a 1,500 gallon pumper/tanker, a 500 gallon quick response pumper, an ambulance and a back-up ambulance which is also used as an equipment truck. The airport substation presently houses a 1,000 gallon tanker and a dry chemical/foam crash truck which serves as a quick response vehicle. The State crash/fire rescue unit is designed primarily to cope with airport emergencies and is equipped with 500 gallons of water for foam production and 500 pounds of dry chemicals.

Dillingham's Insurance Services Office (ISO) rating varies from area to area, depending on the availability of fire hydrants. The ISO rating for residential properties on the hydrant system is 8, while that for commercial properties served by hydrants is 9. Residential properties outside the hydrant system have a class 9 rating and commercial properties not accessible to hydrants are rated as class 10. According to the ISO, improvements to Dillingham's ISO rating are dependent upon extensions to the hydrant system and expansion of the Department's pumping capacity.

Although there have been no serious commercial or industrial fires in the community in the past three years, several reportedly substandard residences were destroyed by fire during this period. However, between 1973 and 1976, two hotels in the community burned to the ground. Dillingham's major fire protection problem is its inadequate hydrant system but high winds characteristic of this region also pose a fire

hazard, especially in the commercial district where many buildings are old and close together and where a wind-swept fire could spread rapidly from one unit to another.

Public safety officials in Dillingham indicated that the existing main fire station needs to be replaced. The Department's existing equipment uses all available space and the station cannot accommodate either additional equipment or any permanent staff. City officials hope to construct a combination police and fire facility in the near future but funds for this purpose are not currently available. The City also plans to acquire a new 2,500 gallon pumper/tanker to be housed at the airport substation.

In addition to fire protection, the Dillingham Fire Department provides ambulance service within the City under an agreement with the Bristol Bay Area Health Corporation. Emergency medical vehicles include a late model, fully equipped ambulance and a back-up vehicle which is also used as an equipment truck. Several of the emergency medical squad members are EMT-certified and are assisted, as needed, by EMT-certified Police Department personnel.

HEALTH AND SOCIAL SERVICES

Bristol Bay Area Hospital

The Bristol Bay Area Hospital is a 29 bed (including 6 bassinets) facility located at Kanakanak, 6.2 miles by road southwest of town. This is a regional hospital serving 27 villages in a 40,425 square mile area extending from Goodnews Bay to the west, along the coast and tributaries of Bristol Bay to Igiugig on Lake Iliamna, and down the Alaska Peninsula as far as Ivanof Bay on the Pacific Ocean side and Port Heiden on the Bristol Bay side. According to Public Health Service estimates, this area had a total population of close to 6,550 people in 1979, of whom approximately 65 percent were Alaska Natives.

The hospital was operated by the U.S. Public Health Service until October 1, 1980 when this function was contracted to the Bristol Bay Area Health Corporation, a non-profit Native corporation. However, ownership of the facility and responsibility for major repairs remains with the Public Health Service. Aside from patient beds, this facility includes a surgery, a delivery room and an emergency room. An adjoining quonset structure houses administrative offices, the medical and dental clinics and the social service, outpatient, laboratory, pharmacy and X-ray departments, while a morgue is connected to the walkway between the hospital and quonset hut.

The hospital is a wood frame structure which was constructed in 1941, was completely rehabilitated in 1973 and was last modernized in the summer of 1975. According to the Public Health Service, recent renovations to the main hospital building have been stopgap measures which have not corrected shortcomings in the original design. Moreover, the crowding of essential facilities within the hospital has caused unfavorable comment from the Joint Commission on Accreditation of Hospitals. Replacement of the entire facility by a modern hospital was listed by the Public Health Service as its top priority for delivering health care in this region in its FY 1979 operating plan.

As of October 1980, the Bristol Bay Area Hospital had a full-time staff of 54 persons including 3 physicians, 2 dentists, 2 dental assistants, 2 supervisory clinical nurses, 5 clinical nurses, 3 licensed practical nurses and 3 nursing assistants. The hospital also has a social worker who offers alcoholism counseling and refers patients to appropriate social service agencies for assistance. The largest number of the remaining staff members is engaged in construction and maintenance functions, followed by those in housekeeping/laundry, dietary and administration jobs.

As well as resident medical personnel, the Kanakanak hospital is periodically visited by specialists from the Alaska Native Medical Center in Anchorage. There are generally about 31 specialty clinics held at the hospital each year including eye, cardiac, orthopedic, pediatric, internal medicine, obstetrics/gynecology, ear/nose/throat, radiology, urology and pathology.

The Bristol Bay Area Hospital has the capacity to accommodate a much larger population than it now serves, even including the temporary influx of people during the salmon season. Statistics provided by the U.S. Public Health Service indicate a consistent decline in inpatient use of the facility during the past few years. The total number of inpatient days recorded at the hospital in FY 1980 was 1,934, down 52.3 percent from FY 1974 (see Table 11). As elsewhere in the State, much of this decline is related both to increasingly shorter hospital stays and to a greater proportion of persons now being treated as outpatients.

The average daily patient load at the Kanakanak facility in FY 1980 was only 5.3 persons who stayed an average of 3.5 days. This 23 percent hospital occupancy rate is well below the 1979 national average of 53 percent for government non-profit hospitals of comparable size but the average length of stay is fairly typical of similar facilities in rural areas of Alaska. In large part, this is due to the fact that patients with serious illnesses and/or requiring surgery or long periods of convalescence are normally sent to the Anchorage Native Medical Center in Anchorage.

While inpatient use of the Bristol Bay Area Hospital has declined during the past few years, the number of outpatient visits has trended upward. Public Health Service outpatient statistics tend to be misleading as apparent increases and decreases in numbers of visits are frequently only the result of changes in recording procedures. However, the 9,270 outpatient visits recorded in FY 1980 represent a significant 17.1

BRISTOL BAY AREA HOSPITAL USAGE
 FY 1974 - FY 1980 a/

TABLE 11

	<u>FY 1974</u>	<u>FY 1975</u>	<u>FY 1976</u>	<u>FY 1977</u>	<u>FY 1978</u>	<u>FY 1979</u>	<u>FY 1980</u>	Percent Change FY 1974-FY 1979
Total Inpatient Days	4,053	2,543	2,397	2,533	2,266	2,045	1,934	-52.3
Total Outpatient Visits <u>b/</u>	6,934	6,334	15,886	13,688	10,721	9,921	9,270	17.1

a/ Fiscal years ending June 30 through FY 1976 and September 30 thereafter.
 b/ Excludes dental visits. Apparent "increases" in outpatient visits in FY 1976 and FY 1977 and to a lesser extent thereafter primarily related to the inclusion of call-in requests. Apparent "deline" in outpatient visits in FY 1979 due mainly to a change in recording systems.

Source: U.S. Public Health Service. Personal communication.

percent increase since FY 1973. Approximately 40 percent of all outpatient visits to the Kanakanak facility are made by persons from communities in the region other than Dillingham.

Accidents and associated injuries plus alcohol abuse are considered to be major health problems in the Dillingham area. Other leading causes for hospitalization or outpatient visits include childbirth, upper respiratory problems, influenza and pneumonia, acute otitis media and refractive error.

Private Medical Services

There is one private general practitioner in Dillingham who operates a two-bed clinic for six months of the year on a three days per week basis. Facilities at the clinic include X-ray, a simple laboratory, a small surgery and a small pharmacy which stocks items such as common prescription drugs and surgical dressings. The doctor also performs surgery at the hospital on a contract basis.

State Public Health Clinic

The State Public Health clinic in Dillingham is located on Main Street next to the elementary school. It is staffed by two itinerant Public Health nurses and a clerk typist and provides a range of services including communicable disease control (i.e. immunization, tuberculosis detection and follow-up), pre-natal surveillance, post-natal follow-up,

well child care, family planning (including health exams, birth control assistance and distribution of educational materials), school health nurse services (including hearing and vision screening), and detection of chronic diseases, chest X-rays and assistance with respiratory problems, and women's clinic. Clinics are offered on a weekly to monthly basis.

One nurse serves Dillingham and the adjacent communities of Aleknagik, Clark's Point and Portage Creek, while the other serves Ekwok, Koliganek, Manokotak, New Stuyahok, Togiak, Goodnews Bay, Platinum and Twin Hills. Visits to outlying villages occur on an average of one every three months.

In the absence of immediate medical care, the nurses treat minor illnesses and injuries, as well as assist the community health aides located in the villages. However, emphasis of the Public Health Nursing program is primarily on preventive health care.

Bristol Bay Area Health Corporation

As well as operating the hospital, the Bristol Bay Area Health Corporation administers a variety of health programs serving the Bristol Bay region. These include health education, health planning and technical assistance, community injury control, emergency medical training and care, human services and the community health aides program. Under the latter program, 29 villages in the region with populations of 25 or more are provided with a resident aide trained by the Alaska Area Native Health

Service in advanced first aid and medical protocol. The aides report medical problems and receive instructions by contacting the hospital by radio or, in the case of six villages, by direct medical phone connection with the hospital.

Programs in drug abuse prevention, alcohol counseling and mental health services are provided by the Corporation's Human Service department which has a professional staff including a psychologist, a health planner, a recreational activities coordinator, an alcoholism counselor and eight community outreach workers. In addition, alcoholism counseling is available at the village level with supervisory support from Dillingham.

Public Assistance

A variety of State, federal and private agencies deliver public assistance-related programs in the Dillingham area. Housing assistance is provided by the Bristol Bay Housing Authority, a non-profit corporation which administers a U.S. Department of Housing and Urban Development program designed to provide decent and sanitary housing for Alaska Natives. Another non-profit corporation, the Bristol Bay Native Association operates several assistance programs under contract, including a Bureau of Indian Affairs' general welfare program which provides financial assistance to adults and children not eligible for State assistance. Eligible aged, blind and disabled persons and dependent children can receive supplemental income from the State Division of Public Assistance

and from the Social Security Administration's Supplemental Income Program, while Food Stamps are also available to qualified recipients.

Employment assistance is provided by the Alaska Department of Labor which operates a Job Service program in Dillingham. In addition, the Bristol Bay Native Association sponsors a Manpower program, on-the-job training, vocational training and financial assistance for higher education.

Legal assistance is available to eligible persons through Alaska Legal Services, a private non-profit corporation supported by federal, State and private funds which provides legal representation in civil matters. The Dillingham office is staffed by two attorneys. General legal services in the community are provided by a private attorney.

Under the Bureau of Indian Affairs' Child Welfare Act, the Bristol Bay Native Association sponsors a family stabilization program and provides counseling services. In addition, the Association hopes to have a shelter for battered spouses and children in the near future. Additional social services programs are provided by a State Health and Social Services social worker who provides assistance in the areas of child and adult protection, family counseling and foster home care.

Finally, the Bristol Bay Native Association sponsors a senior citizens program which provides transportation and referral services for the elderly.

EDUCATION

As a first class city which is not within an organized borough, Dillingham is also a school district and is thus responsible for constructing, maintaining and operating its own public school system. The local school district serves the education needs of all children in the City as well as some students in grades 9 through 12 from outlying villages. In addition, the Seventh Day Adventist church operates a small elementary school located off Aleknagik Road between the old townsite and the airport.

Administratively, the Dillingham public school system is divided on an elementary (kindergarten through the 6th grade) and high school (7th through the 12th grade) basis although the physical division of the school plant presently does not parallel this administrative division. Currently, students in kindergarten through the third grade are housed in the elementary school which is centrally located on a 2.5 acre site near the City hall. All other children attending public school in Dillingham attend classes at the high school which occupies a 9 acre site in the northwest portion of the old townsite between the State Court building and the library. However, this is a temporary situation until construction of the new elementary school is completed in the summer of 1981. The new facility is located on a 5 acre site immediately south of the high school and will house all elementary grades by the beginning of the 1981/82 school year. At that time, the existing elementary school will be converted to another public use as it has been condemned for school purposes.

The high school was built in the 1950's, with additions in 1970 and 1973, with the 1973 addition involving the rebuilding of much of the interior as a result of a major fire. More recently, a new gymnasium, public foyer and concession stand were added in 1978. Currently, the high school has 17 classrooms plus a band room, an art room, two special education rooms, three shops, a sewing room, a library, an industrial arts room which is now used only for storage, and two gymnasiums.

Although the high school has adequate space to accommodate high school students, the design of the facility has caused difficulties. The school was originally designed according to the open classroom concept and was subsequently converted to conventional "closed" classrooms. According to school officials, severe maintenance problems and changes in education philosophy have necessitated further remodeling of the school and the school district has retained consultants to conduct an educational needs assessment for the secondary program. When this has been done, the building will be completely remodeled and it is anticipated that it will then have a remaining useful life of at least twenty years.

The new elementary school will include 11 general classrooms plus a special education classroom, a multi-purpose room with stage and kitchen, a library, a teachers' lounge, library, storage area, the radio station; and a large administrative area which will house the Johnson-O'Malley program, the student boarding program, the radio station, and offices for school administrators and district personnel. Those portions of the

site not covered by school buildings include a hard surfaced basketball court and a large gravelled athletic area.

School district professional staff includes a superintendent, two principals (one of whom is also an elementary teacher), 11 elementary teachers and 27 secondary teachers. Additional personnel include 25 salaried employees (primarily teacher aides, special education and clerical personnel, and program coordinators) and 8 hourly employees, most of whom perform custodial functions.

Final enrollment in the Dillingham school system has fluctuated during the past decade (see Table 12). Overall, final enrollment rose about 24 percent between 1969/70 and 1979/80. However, it declined almost 24 percent between the peak year enrollment of 503 in 1972/73, when Dillingham hosted a number of foreign students, and 1979/80.

According to school officials, continued recent declines in school enrollment are due primarily to a reduction in the number of boarding students enrolled in the secondary school (down from 80 students in the early and mid-1970's to 16 students in the fall of 1980). If these boarding students are excluded, total school enrollment has actually increased.

Both the new elementary school and the secondary school have some excess capacity. The current elementary student to classroom ratio (based on 1979/80 enrollment figures and the number of classrooms in the new

TABLE 12
 SCHOOL ENROLLMENT TRENDS
 DILLINGHAM
 1969/70 - 1979/80

School Year	Final Enrollment				Total	Average Daily Membership a/
	Grades K - 6		Grades 7 - 12			
	Number	% of Total	Number	% of Total		
1969/70	165	53.6	143	46.4	308	326.59
1970/71	177	51.6	166	48.4	343	350.24
1971/72	165	48.2	177	51.8	342	378.80
1972/73	167	33.2	336 b/	66.8	503	381.26
1973/74	193	48.9	202	51.1	395	403.93
1974/75	205	50.0	205	50.0	410	416.29
1975/76	193	47.7	212	52.3	405	412.47
1976/77	175	43.0	232	57.0	407	424.66
1977/78	173	41.8	241	58.2	414	393.64
1978/79	171	44.2	216	55.8	387	410.89
1979/80	191	49.9	192	50.1	383	380.16

a/ Average daily membership includes special education classes from 1968/69 to 1973/74.

b/ Includes Dillingham Foreign Studies program.

Source: Alaska Department of Education. Juneau.

elementary school) is close to 17 to 1 which is about average. The secondary school classroom to student ratio is relatively low, however, even for a rural school district. According to school district officials, the two facilities should be able to accommodate foreseeable growth in enrollment for at least the next five years.

RECREATION

Dillingham has few formal recreation facilities except for those associated with the schools. The City maintains a small park near the center of town which is equipped with benches and picnic tables. In addition, there is a youth center located on the second floor of the fire station. It was closed for repairs in the fall of 1980 but, when remodeled, will be suitable for dances, movies and gymnastic activities. The only other non-school recreation-related facility is the City library which is located on the corner between City hall and the new elementary school and which is open daily for community use. However, the City has applied for funds from the State Division of Parks to develop a small playground in the new Snag Point low income housing subdivision.

Most formal recreational activities in Dillingham take place at the high school. The school's gymnasium and multi-purpose room are used extensively after hours for community athletic activities and public meetings, while classrooms are used for the community school program. The school outdoor play area and hard surfaced basketball court are also popular during non-school hours. In addition, the opening of new elementary

school in the fall of 1981 will make another multi-purpose room available for community use, while the planned school playground will further broaden local outdoor recreation opportunities for young children.

As in most rural Alaska communities, many locally popular leisure time activities in Dillingham depend less on the presence of formal recreation facilities than they do on the region's abundant natural resources. In the summer, fishing in the area's rivers, streams and lakes is extremely popular as is recreational boating, particularly in the Wood River-Tikchik Lakes Park which is accessible by road from Dillingham via Aleknagik Lake. Hiking, camping and hunting are also popular pursuits.

The relatively mild climate, gentle topography and snowfall characteristic of the Bristol Bay region combine to provide a particularly suitable environment for outdoor winter sports. Nearly every family in Dillingham has at least one snowmachine and these are used extensively for recreation in the winter months. According to local residents, cross country skiing is becoming increasingly popular, especially among young people, and skating on local lakes and ponds is popular with all age groups.

UTILITIES

Water

The availability of a reliable supply of good quality water is essential in any community but is of critical importance in a town like Dillingham

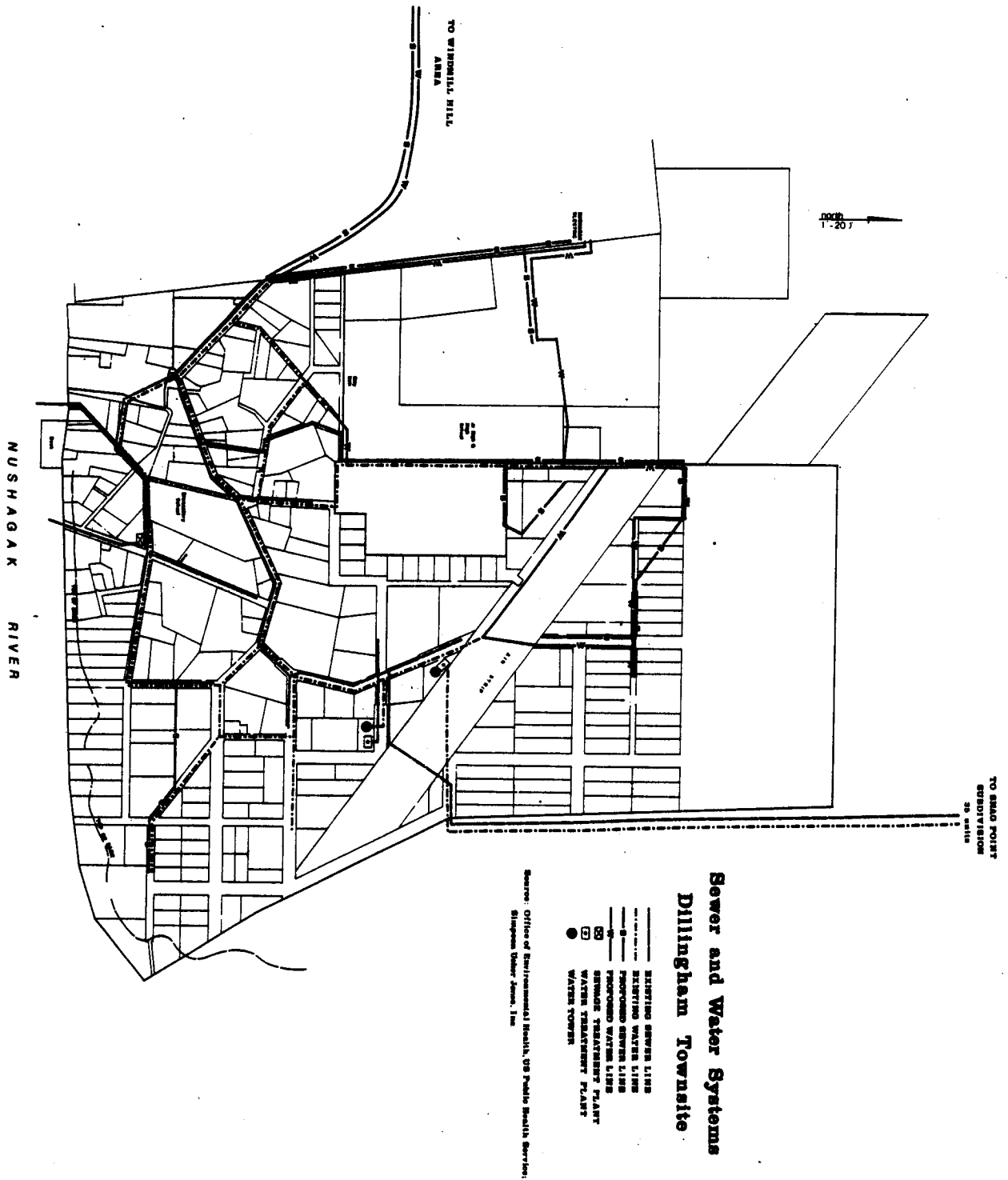
which has an economy heavily dependent on fishing and fish processing. The lack of a good water system has caused difficulties in this community, with the main remaining problem being inadequate area coverage.

Dillingham presently derives its municipal water supply from a deep well located on the hill near the auxiliary airstrip which yields a flow of about 150 gallons per minute. A second well located within the old townsite has a similar pumping capacity and be be activated as needed or in case of failure of the primary well. Water is chlorinated and stored in an elevated 110,000 gallon wood stave tank located adjacent to the primary well and in a new 500,000 gallon tank in the same vicinity. Water is distributed through a combination of 6-inch ductile iron and asbestos cement water mains. Pressure varies in different sections of town from 20 to 60 pounds per square inch.

At the present time, piped water service is provided only to the old townsite area and to the Snag Point subdivision (see Figure 5). In September 1980, there were 53 commercial and 86 residential hook-ups to the system (excluding Snag Point). Residential hook-ups thus represent less than 20 percent of the 569 households in the community counted by the 1980 Census.

Industrial users in the Dillingham area have been forced to develop their own water sources, as have residents of areas outside the old townsite. In the Windmill Hill area, residents obtain potable water almost exclusively from privately owned, generally shallow, driven or

FIGURE 5



drilled wells. According to the Public Health Service, since sewage disposal facilities in this area are generally inadequate, many of these wells are in danger of contamination. Furthermore, although the groundwater source pumped apparently has sufficient capacity, much of it has a high iron content.

Dillingham's piped water system was originally constructed in 1965. However, because the system was initially installed on a minimum budget and was poorly maintained, it was plagued with a number of operating problems in the early years. Water sources were unreliable, water quality was poor, and the water storage tank was inadequately insulated which caused freezing and low water flows during cold weather. As a result, the service was very poorly received by the public and only a small number of potential users were connected to the system. A lack of adequate as-built records of the water system caused additional problems.

Since 1977, the City has made a number of improvements to the water system, primarily with assistance from the the Public Health Service's Office of Environmental Health. A number of new wells have been drilled in the townsite and in outlying areas, and a new pump house, water storage tank and water treatment plant have been constructed. Service was extended to 5 new U.S. Department of Housing and Urban Development (HUD) housing units in the townsite and to 35 HUD units in the new Snag Point subdivision in 1978 and the City is currently attempting to extend a 6-inch water line out to the boat harbor in conjunction with an ongoing Public Health Service sewer line project. The City hopes to be

able to provide water service to the Windmill Hill and airport areas in the near future but currently has no funds available.

There is no metering of water in Dillingham and no accurate historic records of water consumption. According to City officials, usage peaks in the summer with an average of 106,360 gallons per day recorded in June 1980. Total water pumped in 1980 amounted to 28,606,000 gallons, for an average of between 78,000 and 79,000 gallons per day.

Sewer

The provision of an adequate sewer system serving all development in a community, plus sewage treatment, is essential to modern urban living. This is particularly true in a community such as Dillingham where subsurface conditions often limit the effectiveness of septic tanks. However, Dillingham does not currently have a good sewer system due primarily to inadequate area coverage and a lack of sewage treatment.

Like its water system, Dillingham's sewer system was originally constructed in 1965 and serves essentially the same area, including the new Snag Point subdivision (see Figure 5). Extension of service to the Windmill Hill area is expected to be completed by the Public Health Service by November 1981. This project is initially intended to serve 47 users, including both residences and businesses, and involves construction of a 6-inch force main and three lift stations, plus 8-inch lines within the Windmill Hill area. The City hopes to also extend sewer service to

the airport in the near future although it currently lacks funds for such a project.

The distribution system consists of 4-inch and 8-inch asbestos cement sewer mains and service lines and 8-inch cast iron sewage outfalls. In September 1980, there were 53 commercial and 86 residential hook-ups to the system (excluding the Snag Point subdivision).

No industrial users are connected to the Dillingham sewer system, nor are residents of areas outside the old townsite except for those living in the Snag Point subdivision. Moreover, according to the Public Health Service, quite a few townsite residents still use individual on-site sewage disposal systems varying from direct surface discharge to septic tank absorption field systems. In the Windmill Hill area, sewage disposal is presently accomplished entirely through individual on-site systems including septic systems, privies and direct surface discharge. According to the Public Health Service, however, septic systems in this area are only marginally operable and poor soils conditions combined with poor system design has often led to clogged absorption fields, backed up sewer systems and resulting surface sewage seepage. In fact, sewage-contaminated surface water flow draining to surrounding gullies and lower lying bog areas is reportedly not uncommon. As a result, the current extension of public sewer service to this area was seen to be especially urgent.

A sewage treatment plant and lift station were constructed as part of the original City sewer system in 1965. However, neither has been used since shortly after construction because of excessively high operating costs and untreated sewage is instead dumped through outfalls directly into the Nushagak River. According to the Public Health Service, the existing treatment plant is now inoperable as a result of poor maintenance and obsolescence.

The City does plan to replace its sewage treatment plant. An Environmental Protection Agency planning grant was used to develop preliminary plans for a new plant capable of providing primary treatment of about 200,000 gallons of wastewater per day through a settling process, with digested sludge disposed of in a pond. However, with the assistance of the Environmental Protection Agency, the City is continuing to look into other options for sewage treatment.

Electric Power

Dillingham's electric power is provided by the Nushagak Electric Cooperative, a Rural Electrification Administration (REA) cooperative corporation. Offices for the electric (and telephone) utility are located on Third Street across from the State office complex.

All power in Dillingham is diesel generated. The power plant is located adjacent to the Cooperative's office and currently houses four operating diesel units with a combined nameplate generating capacity of 2,600

kilowatts (kw). An additional 1,250 kw generator is currently on order and, when installed, will increase total generating capacity to 3,850 kw. Firm power is presently maintained at 1,600 kw but the new generator will increase this to 2,600 kw.

The Dillingham power plant provides service not only to Dillingham but also to Aleknagik. As of October 1980, there were 662 hook-ups to the system, an increase of 46 percent since 1975. During this same five year period, average power consumption per residential customer increased about 16 percent.

All major power consumers in the Dillingham area are served by Nushagak Electric. Peter Pan Seafoods maintained its own power system prior to 1979. However, this system was inoperative during the 1979 and 1980 processing seasons and the company switched to Nushagak Electric. It is anticipated that Peter Pan will continue to use Nushagak Electric power in the future but retain its own 825 kw generating capacity for standby purposes. Additional standby capacity in the community is located at the Federal Aviation Administration VORTAC site, at the hospital and at the cold storage plant.

According to Nushagak Electric, power consumption peaked during the summer of 1980 at about 1,590 kw, a level which is about equal to the system's firm generating capacity. However, Nushagak Electric estimates that, with delivery of the new generator, the system generating capacity will be adequate to meet local power needs through the early 1980's.

A power problem which has been experienced locally has been serious voltage drops in parts of the system. Nushagak Electric plans to correct this in the near future through the installation of sectionalizers and the upgrading of certain circuits from single to triple phase to provide a better load balance.

Although Dillingham has a generally good power system, diesel power has a major disadvantage compared with other systems in its high operating costs. These costs have accelerated with the dramatic rise in oil prices during the past several years and have, in turn, been passed on to consumers. For example, a typical urban residential household will consume somewhere around 800 to 1,000 kilowatt hours per month, excluding heat. As of October 1980, this would cost between \$136.24 and \$169.34 in Dillingham. Data published by Nushagak Electric indicate that the average Dillingham household consumes considerably less electric power than the typical urban residential household (an average of 417 kilowatt hours per month in 1979). Nevertheless, the cost of electric power here remains high when compared to other communities such as Anchorage where natural gas is the primary power source.

The operators of Dillingham's power system have long been interested in developing alternative, less expensive sources of power. In the short run, the most promising of these is a possible hydroelectric project on Elva Lake about 45 miles northwest of Dillingham. The economic and engineering feasibility of this project is currently under study by the Alaska Power Authority.

Solid Waste Disposal

Garbage collection in Dillingham has historically been operated by private firms. Since 1971, service to road-connected areas within the City limits has been provided by Dillingham Refuse Service. Residential service is generally once per week for a charge of \$7.50 per month, while commercial customers are served as often as required with charges varying depending on the size of the container and the frequency of service. Once weekly collection for a two cubic yard container costs \$45.00 per month, whereas larger containers or more frequent service add to this basic cost. Collection equipment includes two compactor trucks and two quarter ton pick-up trucks.

The City acquired a new landfill immediately north of its corporate limits in 1971. This site takes in about 104 acres but not all of it is usable because of poor soil conditions. Garbage is incinerated in a newly installed wire mesh dome and is then buried and backfilled. According to City officials, the new landfill is operating extremely effectively but indiscriminate dumping causes some clean-up problems.

Communications

Telephone service in the Dillingham-Aleknagik area is provided by the Nushagak Telephone Cooperative, a consumer cooperative. As of October 1980, the system included 765 stations, including 489 main stations and 276 extensions. According to Nushagak Telephone officials, the number

of stations has more than tripled since the Cooperative purchased the system from Northstate Telephone Company in 1975.

The telephone cooperative has recently made a number of major improvements to the system. All outside lines were replaced in 1977 and a new exchange was completed in the fall of 1980. In addition, a recently installed DMS 10-digital switch has increased main line capacity to about 5,000.

Eighteen trunk lines connect Dillingham with the outside world. These are considered adequate for current long distance communications needs.

Local Government Organization

Dillingham incorporated in 1963 and assumed first class city status in 1972. The City presently has a council-manager form of government with a six man council and a mayor elected at large. The manager directs the day to day operations of the City with policy direction from the mayor and Council.

CITY POWERS

As a first class city under Alaska law which is not within an organized borough, Dillingham has the full range of powers allowable for a municipality of its class. These include the following three major powers not shared by second class cities:

- A first class city outside an organized borough may levy property taxes of up to 30 mills (or 3 percent of assessed valuation) without a referendum whereas second class cities may tax only up to 5 mills and must first have voter approval.
- As a first class city outside an organized borough, the City of Dillingham is also a school district and thus has the responsibility for establishing, maintaining and operating a system of public schools.
- All first class cities elect their mayors at large. The mayor has the veto power which can be overridden by not less than three-quarters of the councilmen and he or she only votes in the case of a tie. This is unlike a second class city where the mayor is elected by and from the council and has no veto power although he/she has a vote equal to that of each other council member.

The City of Dillingham has assumed a wide range of powers as provided for in Chapter 48 of Title 29 of the Alaska Statutes. In addition, it has assumed responsibility for the operation of many public facilities and services listed in AS 29.48.030, plus those required to be assumed by cities outside organized boroughs as per Chapter 43 of Title 29 (Alaska Statutes). However, garbage collection services are presently contracted to a private firm, the local hospital is a federal facility which is operated by a non-profit corporation and the Dillingham airport is owned and operated by the State Department of Transportation and Public Facilities. In addition, ownership and management of Dillingham's

electric power and telephone systems were transferred to cooperative organizations eligible to receive low interest loans from the U.S. Rural Electrification Administration (REA) in 1964 and January 1975 respectively. Finally, although the City of Dillingham operates piped water and sewer systems, these systems do not serve a majority of community residences, nor any industrial users, and there is presently no system of sewage treatment.

LOCAL GOVERNMENT FINANCES

As a means of evaluating the City of Dillingham's current financial condition, the most recent City financial statement for the fiscal year ending June 30, 1980 was reviewed. In addition, data developed by the State Assessor on the subjects of property valuation, local tax rates and per capita debt were analyzed.

A review of the full value, as determined by the State Assessor, of property within Dillingham's corporate limits from 1970 to 1980 was undertaken (see Table 13). According to the State Assessor's records, the full value of property in Dillingham increased by over 1,000 percent during this period, with almost all of this increase taking place since 1975. Contributors to this growth included the construction of two large supermarkets, several boat warehouses, a processing plant and a number of apartment buildings and individual dwelling units.

TABLE 13

CITY OF DILLINGHAM
COMPARISON OF FULL VALUE DETERMINATION
1970 - 1980

(in \$000's to nearest \$1,000)

<u>Year</u>	<u>Full Value Determination</u>
1970	\$ 4,062
1971	4,867
1972	4,887
1973	5,938
1974	9,339
1975	10,162
1976	12,169
1977	17,140
1978	25,968
1979	32,693
1980	47,697

Source: Alaska Department of Community and Regional Affairs, Division of Local Government Assistance. Alaska Taxable: Municipal Property Assessments and Equalized Full Value Determinations. Juneau. (Annual Report).

TABLE 14
CITY OF DILLINGHAM
PROPERTY AND SALES TAX RATES
1972 - 1980

	Property Tax (mills)									
	1972	1973	1974	1975	1976	1977	1978	1979	1980	
Administration	18.50	18.50	13.05	13.05	18.50	17.00	10.00	10.00	10.00	
Schools	---	---	5.45	5.45	---	---	---	---	---	
	Sales Tax (percent)									
	1972	1973	1974	1975	1976	1977	1978	1979	1980	
Administration	---	0.3	1.0	1.0	1.0	2.6	2.6	3.0	3.0	
Schools	2.0	1.7	2.0	2.0	2.0	0.4	0.4	---	---	

Source: Alaska Department of Community and Regional Affairs, Division of Local Government Assistance.
Alaska Taxable: Municipal Property Assessments and Equalized Full Value Determinations.
Juneau. (Annual Report).

Under Alaska law, first class and home rule municipalities may levy property taxes of up to 30 mills although this millage rate may be exceeded if it is applied to debt service. In addition, both first and second class municipalities may levy sales taxes of up to 3 percent. (This limitation does not apply to home rule municipalities while overlapping units of government may each levy sales taxes and thus result in higher local sales tax rates.)

A review of local tax rates for Dillingham since 1972 indicates the City property tax rates were a relatively high 18.5 mills through 1976 but have since dropped appreciably and are currently set at 10 mills (see Table 14). In the early 1970's, Dillingham had among the highest property tax rates of any first class city in the State located within the unorganized borough. However, its current mill rate is now below that of most communities of a similar size which are charged with the responsibility for providing a similar range of municipal services. Similarly, the 3 percent sales tax levied by the City of Dillingham is well below the 6 percent maximum permitted for first or second class cities in the unorganized borough, although it is the rate most commonly levied by these local government units.

An analysis of Dillingham's general fund revenues and expenditures for the fiscal year ended June 30, 1980 was also undertaken (see Table 15). A very high proportion of Dillingham's general fund revenues is derived from local sources. Including transfers from other funds, total general fund revenues in FY 1980 amounted to \$1,130,094. Real and personal

TABLE 15

GENERAL FUND
STATEMENT OF REVENUES AND EXPENDITURES
CITY OF DILLINGHAM
YEAR ENDED JUNE 30, 1980

<u>Revenues</u>	<u>Estimated</u>	<u>Actual</u>	<u>Over (Under) Estimate</u>
Real and personal property taxes:	\$ 301,308	\$ 320,095	\$ 18,787
State revenues:	\$ 152,542	\$ 242,447	\$ 89,905
Shared revenue	64,716	83,019	18,303
Raw fish tax	61,926	95,307	33,381
Business license tax	3,000	29,497	26,497
Electric & telephone co-op tax	12,000	23,406	11,406
Liquor licenses	3,200	2,300	(900)
Amusement & gaming device tax	200	312	112
Vehicle licensing	2,500	3,606	1,106
Library grant	1,000	1,000	---
Forestry grant	4,000	4,000	---
Other revenues:	\$ 63,778	\$ 97,627	\$ 33,849
Other financing sources:	\$ 469,925	\$ 469,925	\$ ---
Operating transfers from Sales tax revenue fund	405,621	405,621	
Federal shared revenue fund	64,304	64,304	
<u>TOTAL REVENUES AND OTHER FINANCING SOURCES</u>	<u>\$ 987,553</u>	<u>\$1,130,094</u>	<u>\$ 142,541</u>
<u>Expenditures</u>			
General government	\$ 311,064	\$ 267,755	(\$ 43,309)
Public safety	\$ 267,905	\$ 244,879	(\$ 23,026)
Public works	\$ 208,519	\$ 212,463	\$ 3,944
Community services	\$ 79,230	\$ 64,832	(\$ 14,398)
Contingencies	\$ 91,087	\$ 32,799	(\$ 58,288)
<u>TOTAL EXPENDITURES</u>	<u>\$ 957,805</u>	<u>\$ 822,728</u>	<u>(\$ 135,077)</u>
Transfers to other funds	\$ 29,748	\$ 92,021	\$ 62,273
<u>TOTAL EXPENDITURES AND TRANSFERS</u>	<u>\$ 987,553</u>	<u>\$ 914,749</u>	<u>(\$ 72,804)</u>

Source: City of Dillingham.

property taxes accounted for 28.3 percent of the total. However, including monies transferred from the sales tax special revenues fund, local taxes accounted for 64.2 percent of Dillingham's general fund revenues in FY 1980. State and federal intergovernmental revenues accounted for slightly over one-quarter (27.1 percent) of total general fund revenues, with the single largest intergovernmental revenue source being monies transferred from the federal shared revenue fund. The remaining 8.6 percent of Dillingham's general fund revenues in FY 1980 were derived from other local sources, of which interest and rental of City equipment were the most significant.

A share of intergovernmental revenues such as raw fish taxes, business license refunds, electric and telephone cooperative tax and liquor license refunds can be said to be locally generated revenue. However, even excluding these revenues, almost three-quarters (72.8 percent) of Dillingham's general fund revenues in FY 1980 were from local sources. Although Dillingham's general government revenues are primarily derived from local sources, the same is not true for the Dillingham school district. According to figures provided by the Alaska Department of Education, about 86 percent of the Dillingham school district's operating revenues in FY 1980 were derived from the State versus only 3.7 percent from local sources (see Table 16). This level of State support is not atypical of Alaska school districts. State law specifies that State aid shall constitute at least 97 percent of a local school district's "basic need". However, basic need is derived from a State formula for minimum educational requirements and, in practice, most independent Alaska school

TABLE 16

OPERATING REVENUE SOURCES
DILLINGHAM SCHOOL SYSTEM
FY 1979 AND FY 1980

Fiscal Year	Local		State		Federal		Total	
	\$	%	\$	%	\$	%	\$	%
1979	\$85,023	4.2	\$1,754,194	87.1	\$174,316	8.7	\$2,013,533	100.0
1980	\$76,545	3.7	\$1,805,738	86.1	\$214,595	10.2	\$2,096,878	100.0

Source: Alaska Department of Education. Personal communication.

districts expend a higher proportion of locally generated funds for basic school support. Many school districts also receive federal revenues from programs such as P.L. 874 where funds are allocated depending on the number of children whose parents live or work on federal property. In Dillingham, federal funds accounted for slightly more than 10 percent of the school district's operating revenues in FY 1980, approximately 280 percent more than locally contributed funds.

A look at Dillingham's general fund expenditures for FY 1980 indicates that most monies were expended for general government, public safety and public works respectively. The City manager's office accounted for almost 57 percent of general government expenditures, with statutory administrative expenses such as legal and auditing services consuming another 27 percent. Almost all (92 percent) public safety expenditures in FY 1980 were incurred by the police department, while public works expenditures were dominated by streets (58 percent) and solid waste disposal (24 percent). The only other categories of general fund expenditures in FY 1980 were community services, most of which was accounted for by parks and recreation and the library, and contingencies which consisted of land acquisition and relocation of City airstrip businesses. In addition, a total of \$92,021 was transferred to other funds. Of these monies, \$63,691 was transferred to the State dock capital project and \$25,748 was transferred to the water and sewer special revenue fund.

TABLE 17
INDICATORS OF FINANCIAL CONDITION
CITY OF DILLINGHAM
1980

Population <u>a/</u>		1,656	
Full Value Determination <u>b/</u>	\$ 47,697,200		
Full Value Per Capita	\$ 28,803		
General Obligation Bonded Debt <u>c/</u>	\$ 116,000		
Total Debt	\$ 116,000		
Per Capita Debt			
General Obligation	\$ 70		
Total	\$ 70		
Debt as a Percent of Full Value			
General Obligation			0.24%
Total			0.24%
<hr/>			
<u>Guideline for Per Capita Debt</u>			
Percent of Full Value <u>d/</u>			5.50%

- a/ Dillingham's July 1980 population as accepted by the Department of Community and Regional Affairs for State Revenue Sharing purposes.
- b/ Full value determination as of January 1, 1980.
- c/ General Obligation bonded debt as of July 1, 1980.
- d/ Median for selected places of under 10,000 population used by Moody's Investors Services, Inc.

Source: Alaska Department of Community and Regional Affairs, Division of Local Government Assistance. January 1981. Alaska Taxable 1980: Municipal Property Assessments and Equalized Full Value Determinations. Juneau. (Alaska Local Government, Vol XX, No. 1).

According to the State Assessor's records, Dillingham's per capita valuation was \$28,803 in 1980 (see Table 17). This was well below the Statewide average of \$66,634 for home rule and first class cities in the unorganized borough. However, the Statewide average is seriously distorted by Valdez and Dillingham's 1980 per capita valuation exceeded that of all but five other Alaska cities in this category.

As reported by the State Assessor, the City of Dillingham had a total outstanding general obligation debt of \$116,000 as of January 1980 for a direct per capita debt of \$70. Dillingham's resulting 0.24 percent ratio of debt to valuation is well below that of almost all Alaska cities in the unorganized borough which have incurred general obligation indebtedness. It is also well within the recommended guidelines established by Moody's Investors Services. However, even although it has a low rate of indebtedness, Dillingham's ability to incur additional general obligation debt to finance capital improvements is very limited. Both the new elementary school currently under construction and additions to the high school in 1978 were funded entirely by the State and the extension of sewer service to the Windmill Hill area is being undertaken directly by the Public Health Service's Office of Environmental Health. Despite such assistance, the City still lacks funds to develop other needed projects such as a new public safety building and extensions to the community water and sewer system.



CITY OF BETHEL

Population and Economy

Bethel is located on the north bank of the Kuskokwim River, 86 miles upstream from the coast and about 400 air miles west of Anchorage. Originally a Yupik Eskimo village and trading post called Mumtrekhtagamute, the community was renamed Bethel by the Moravians who established a mission here in 1885. Today, Bethel functions as the primary government, trade, service and transportation center for the Yukon-Kuskokwim delta region.

POPULATION

Past Trends

Bethel has experienced continued rapid population growth during the past forty to fifty years as the community evolved from a small village to a major regional center (see Table 18). Only 110 persons lived here in 1910. However, this rose to 221 by 1920, 278 by 1930 and 376 by 1939. By 1939, Bethel was clearly the dominant population center of the region, although Hooper Bay and Quinhagak were also relatively large at that time.

Since 1939, Bethel's rate of population growth has continued to outstrip that of the region. Its population rose 73.1 percent between 1939 and

TABLE 18
POPULATION TRENDS
BETHEL, ALASKA
1939 - 1980

<u>Year</u>	<u>Population</u>	<u>Percent Change</u>
1939	376	
1950	651	73.1
1960	1,258	93.2
1970	2,416	92.1
1980 <u>a/</u>	3,576	48.0

a/ Preliminary U.S. Census figure which is disputed by the City of Bethel.

Sources: U.S. Department of Commerce, Bureau of the Census. March 1981. 1980 Census of Population and Housing, Alaska: Advance Reports. (PHC80-V-3).

U.S. Department of Commerce, Bureau of the Census. May 1971. 1970 Census of Population, Number of Inhabitants: Alaska. Washington, D.C., U.S. Government Printing Office. PC(1)-A3.

U.S. Department of Commerce, Bureau of the Census. 1960. United States Census of Population: 1960, Number of Inhabitants, Alaska. Washington, D.C., U.S. Government Printing Office. PC(1)-A3.

1950 and then nearly doubled during each of the following two decades. According to advance 1980 Census figures, Bethel's rate of growth slowed to about 48 percent between 1970 and 1980. The 1980 figure is disputed by the City of Bethel which estimates that its present population is closer to 4,000 persons. If this is the case, Bethel's population realized a 66 percent growth during the 1970 to 1980 decade.

The primary reason for Bethel's sustained rate of rapid population growth since World War II has been locational decisions by government agencies for facilities designed to serve the Yukon-Kuskokwim delta region. Bethel is a regional education center, has the region's only hospital and is its primary air and water transportation center. The location of major government facilities encouraged other government, quasi-government and private entities with regional functions to base their activities in the community. In turn, the availability of services, especially health and education, served to attract an in-migration of persons from smaller centers of the region into Bethel. As a result, Bethel's population has grown much more rapidly than that of the region as a whole (see Table 19).

Although preliminary 1980 Census figures indicate that over 20 percent of the population in this region now lives in Bethel, the community's population grew less rapidly in the 1970's than during the previous two decades, even if the City's own estimate of its 1980 population is used. In large part, this is believed to result from declining birth rates and a slowing of in-migration from smaller villages of the region where

TABLE 19
 RELATIVE POPULATION GROWTH
 CITY OF BETHEL AND BETHEL REGION
 1939 - 1980

<u>Year</u>	<u>Population</u>		<u>City Population as % of Region</u>
	<u>City of Bethel</u>	<u>Bethel Region a/</u>	
1939	376	7,739	4.9
1950	651	8,290	7.9
1960	1,258	10,966	11.5
1970	2,416	13,802	17.5
1980	3,576 <u>b/</u>	17,000	21.0

a/ Bethel region includes the Bethel, Wade Hampton and former Kuskokwim census divisions. (The latter is within the Yukon-Koyukuk census area for the 1980 Census). Census counts prior to 1960 also included the Innoko, Mt. McKinley and Otter districts plus the villages of Anvik and Holy Cross from the Nulato district and Mekoryuk and Cape Nash villages from the Cape Nome district.

b/ Preliminary U.S. Census figure which is disputed by the City of Bethel.

Sources: U.S. Department of Commerce, Bureau of the Census. March 1981. 1980 Census of Population and Housing, Alaska: Advance Reports. (PHC80-V-3).

U.S. Department of Commerce, Bureau of the Census. May 1971. 1970 Census of Population, Number of Inhabitants: Alaska. Washington, D.C., U.S. Government Printing Office. PC(1)-A3.

U.S. Department of Commerce, Bureau of the Census. 1960. United States Census of Population: 1960, Number of Inhabitants, Alaska. Washington, D.C., U.S. Government Printing Office. PC(1)-A3.

economic conditions and the range of amenities underwent a decided improvement during the 1970's. Passage of the Alaska Native Claims Settlement Act in 1971 resulted in the creation of some village-based jobs. Probably even more significant was the construction of village high schools which removed a major incentive for families to move to larger centers such as Bethel. In addition, Bethel has seen some erosion of its pre-eminence as a regional air transportation center since Aniak now has direct jet connections with Anchorage and villages in that area are served from Aniak rather than Bethel.

Despite some slowing in its rate of growth during the 1970's, Bethel's population rose more rapidly than that of the State as a whole and the community was the eighth largest in Alaska in 1980 according to 1980 Census figures. One factor which partially offset a decline in the rate of in-migration to Bethel of people from villages of the region in the 1970's was an increase in the number of persons, primarily white, coming here from outside the region. In turn, this has been reflected in certain changes in the composition of Bethel's population.

Population Composition

At the time of the 1970 Census, Bethel's population was predominantly Alaska Native (76.6 percent), with by far the largest ethnic group being Eskimo (see Table 20). Whites (21.7 percent) accounted for most of the remainder, with blacks and other racial groups making up less than 2 percent of the community's total population.

TABLE 20
 COMPOSITION OF POPULATION BY RACE AND SEX
 BETHEL, ALASKA
 1970

<u>Race</u>	<u>Sex</u>		<u>Total</u>	<u>Percent of Total</u>
	<u>Male</u>	<u>Female</u>		
White	275	250	525	21.7
Negro	11	1	12	0.5
Indian	29	34	63	2.6
Aleut	8	4	12	0.5
Eskimo	858	920	1,778	73.6
Other	19	7	26	1.1
<u>TOTAL</u>	<u>1,200</u>	<u>1,216</u>	<u>2,416</u>	<u>100.0</u>

Source: University of Alaska, Institute of Social, Economic and Government Research. September 1973. Age and Race by Sex Characteristics of Alaska's Village Population. College. (Alaska Review of Business and Economic Conditions. Vol. X, No. 2.)

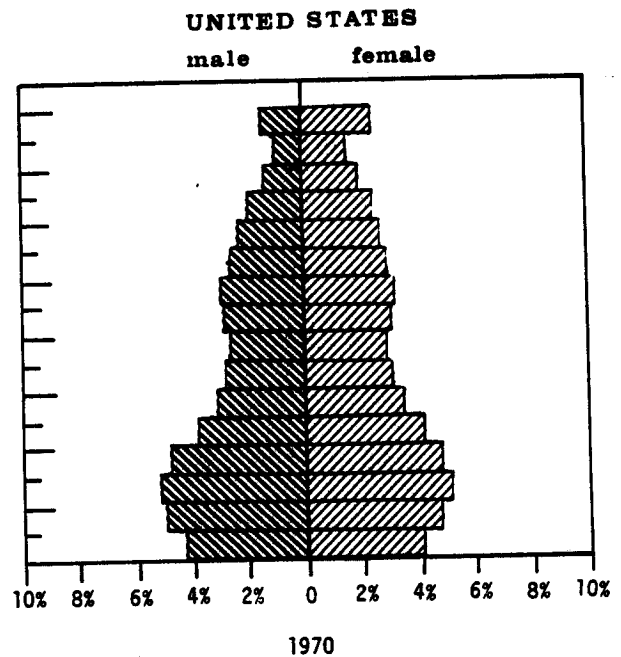
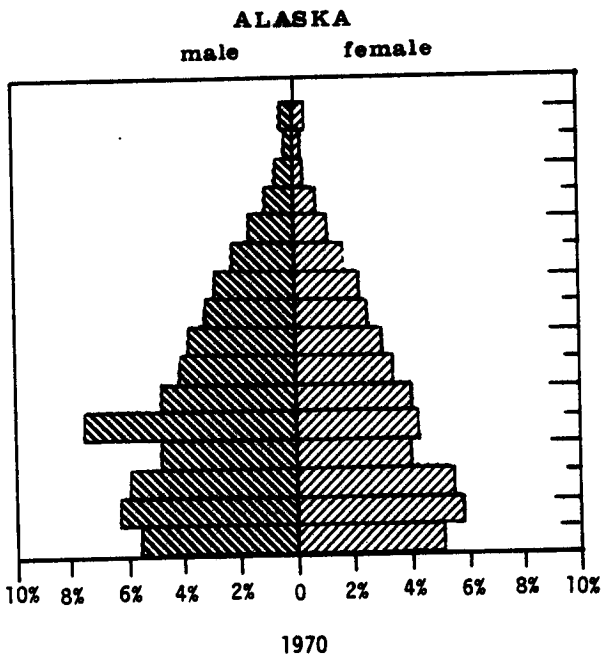
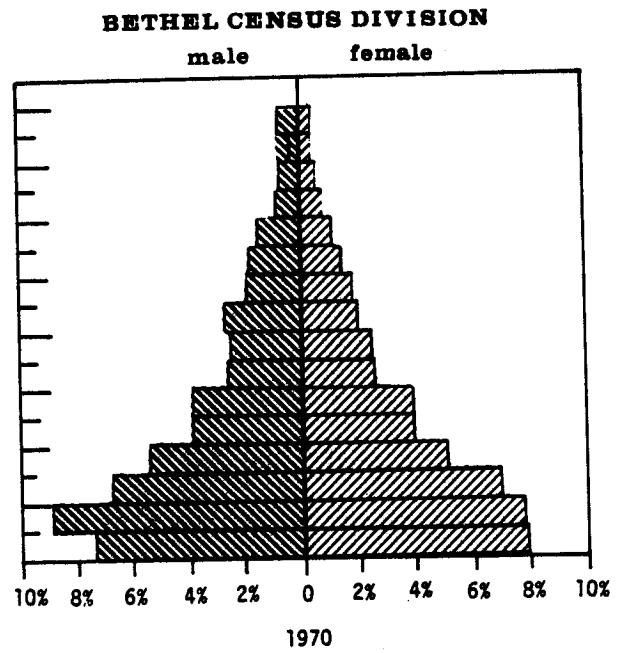
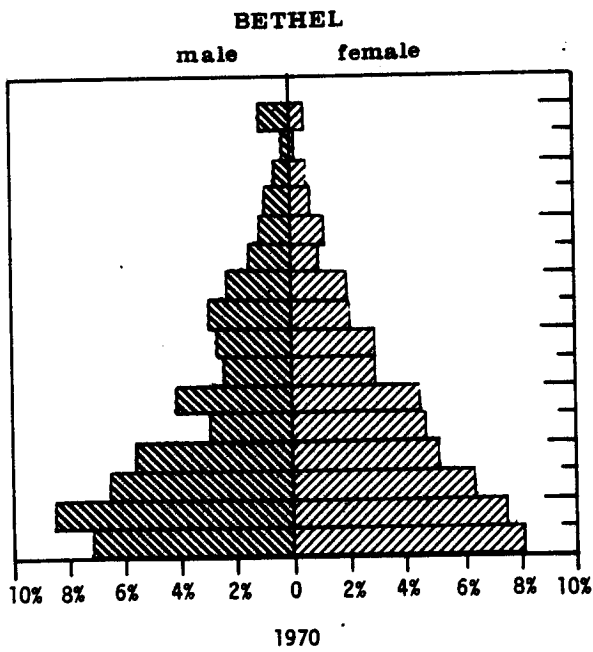
In 1970, the composition of Bethel's population was significantly different from State or national norms (see Figure). Unlike Alaska as a whole where males outnumbered females by a sizable 54 to 46 percent in 1970, Bethel had a slightly higher proportion of females (50.3 percent) than males (49.7 percent). This was similar to the 1970 national ratio of 51 percent females to 49 percent males.

The median age of males in Bethel in 1970 was 17.7, with local Alaska Native males having an even younger median age of 16.5. This was well below the State and national medians of 23.3 and 27.0 respectively. The median age of Bethel females was 18.2, slightly higher than that for local males, although the median for female Natives was only 17.4. Again, these medians were well below State (22.9) and national (29.6) norms in 1970. However, they were slightly above those for the Bethel census division where the median age of males was 17.6 and that of females was only 16.7.

The major factor in the youth of Bethel's population has been high birth rates of the region's Eskimo residents. However, these birth rates have been declining over the past fifteen years, a feature which was noticeable at the time of the 1970 Census. In 1970, 28.7 percent of Bethel's population was aged between 5 and 14, compared with 23.6 percent Statewide. At that time, Bethel's proportion of persons under 5 years of age (12.2 percent) was higher than that of the State (10.7 percent) but this age group was less well represented locally than the group aged between 5 and 9 (15.9 percent).

FIGURE 6

COMPOSITION OF POPULATION



Source: US Census Bureau, 1970.

A May 1979 survey of 149 Bethel households by Darbyshire and Associates indicated that significant changes in the community's population composition have occurred since 1970. Females (51.7 percent) outnumbered males (48.3 percent) by a slightly wider margin in 1979 than they did in 1970. More significant, the proportion of Alaska Natives (65 percent) was found to have declined substantially since 1970, with the reason being a combination of an in-migration of whites, declining Native birth rates and a slowing of migration into Bethel of Eskimos from the surrounding region. Provisional 1980 Census figures support Darbyshire and Associates findings. According to the Census, Alaska Natives accounted for 67.6 percent of Bethel's 1980 population, with whites accounting for 28.0 percent and the remaining 1.3 percent being made up of other racial groups.

The Darbyshire and Associates survey also indicated that birth rates in the Bethel area have continued to decline and that the overall composition of the community's population appeared to be growing closer to State norms. These findings are consistent with elementary school enrollments which declined 8.3 percent between 1970/71 and the first quarter of the 1980/81 school year, despite a healthy rate of community growth during that period.

Growth Prospects

Bethel's future growth prospects are closely tied to those of the region and Bethel's role in providing goods and services to it. At present,

the only other major source of economic strength is commercial fishing. However, the activities of the Bethel Native Corporation, the local village corporation established under terms of the Alaska Native Claims Settlement Act, are also likely to influence the form of Bethel's future development.

Although there are possibilities for resource development which would serve to bring new residents into the Bethel region, future growth in this community will probably be tied to its role as a regional government, transportation, trade and service center. Passage of the Alaska Native Claims Settlement Act and a high level of federal and State spending have greatly improved economic conditions in rural Alaska during the past ten years and the expectations and demands of rural residents are likely to continue to increase in the future. Bethel's future prosperity will thus be closely related to the extent to which it can meet these expectations and demands. The community is likely to face increased competition from regional sub-centers, but its role as premier regional center should be further consolidated in the future.

On the negative side, since Bethel's economy is to a large extent dependent on government spending rather than on resource development, the community is vulnerable to abrupt changes in government policy. For example, currently planned cutbacks in the CETA program could result in the loss of several hundred jobs in the Bethel region and inevitably cause economic hardship. Such events are difficult to foresee and are largely beyond the City's control.

In the past, Bethel's rapid growth resulted primarily from an out-migration of persons from smaller villages of the region. While the limited economic opportunities in rural areas will ensure continued out-migration, especially of young persons, much of Bethel's recent growth has resulted from an in-migration of whites from outside the region. Initially, this in-migration was associated almost entirely with government institutions, with employees often living in remote compounds such as those maintained by the Bureau of Indian Affairs, the Federal Aviation Administration and the Public Health Service. Employees at these facilities tended to regard themselves as temporary community residents, spent very little money locally and rarely socialized with their "clientele". More recently, however, whites have moved to Bethel to take up State positions in education and other areas as well as private sector positions in trade, service and transportation occupations. This newer group of migrants is not generally housed in compounds, nor does it have Post Exchange privileges. In addition, many of these newer residents have invested in homes and businesses in Bethel and have thus had a much greater positive economic impact than earlier migrants to the community. It is probable that this trend will continue and should result in further growth in secondary employment in Bethel.

Salmon catches in the Bethel area are currently at historically high levels and little growth in fishing activity here is anticipated in the future. On the other hand, additional fish processing in the community is likely to take place. At the present time, the only fish processing which takes place in Bethel is done by the Kuskokwim Fishermen's

Cooperative under an agreement with Kemp and Paulucci Seafoods. However, the Bethel Native Corporation purchased a 51 percent share in Elm Fisheries in December 1980 and has announced plans to establish local freezing facilities. Such a development would create several new jobs in Bethel and, if the business is successful, should also result in the retaining of additional income in the local area.

There are a number of resource development possibilities in the Bethel region which could have an impact on local employment and population growth. These include petroleum exploration and development activities, hydroelectric power development, timber harvesting in the upper Kuskokwim area, mining and tourism. Of greater short term promise, however, are the activities of the Bethel Native Corporation. This Native village corporation has invested heavily in Bethel. It has constructed apartment buildings and an office complex and is currently getting involved in the local fishing and fish processing industry. In addition, as the major land owner in the immediate Bethel area, the corporation will play an important role in the community's physical as well as economic development.

ECONOMY

Bethel's economy is based around the community's function as a regional government, trade, service and transportation center. Commercial fishing is a lesser, but still important, source of economic strength. These activities are called "basic" or exogenous as they are export industries whose fortunes are determined by forces outside the local

area and are the foundation upon which "secondary" or endogenous industries, those whose fortunes are determined by local forces, rest. Thus, gains in basic industry are essential for long term community growth.

Composition of Employment

A review of employment in Bethel was undertaken by Alaska Consultants, Inc. in October 1980. This was deemed to be necessary since the City is the primary center for a larger region than the Bethel labor area. In addition, figures for the labor area as a whole tend to overstate the importance of the government and service sectors in Bethel itself since they include a large number of employees associated with village schools and the CETA (Comprehensive Education and Training Act) program and relatively few jobs in other sectors. A 1979 survey of employment in Bethel conducted for the City was also not used as jobs counted were not classed consistently with the Standard Industrial Classification (SIC) code. Thus, each employer in Bethel was contacted to obtain average annual full-time employment information for each establishment in 1980. The results were then categorized by SIC code and tabulated.

Unlike many other areas of the State, employment in Bethel does not exhibit marked seasonal variations except for that associated with the local commercial fishing industry and, to some extent, contract construction. As a result, most people who are employed in this community live here year-round. Nevertheless, in order to minimize duplication

and to reduce the distortion in total employment which can be caused by seasonal or transient workers, Alaska Consultants, Inc. attempted to estimate average annual full-time employment in in all sectors of the local economy. Except for fishermen, this was done by asking each employer to indicate if, when and how many seasonal or transient personnel were added to "normal" employee levels.

In the case of fishermen, the Alaska Department of Fish and Game provided information on the number of entry permits issued to Bethel residents. Assuming an average of 1.5 fishermen per permit holder, a figure concurred in by the Alaska Department of Fish and Game, plus an average fishing period of six weeks, estimated total fishing employment was converted to an average annual full-time employment figure.

Overall, basic employment was estimated to account for 56 percent of the average annual full-time employment in Bethel in 1980. The resulting basic to secondary employment of 1:.8 is lower than national norms where ratios in the neighborhood of 1.0:1.5 are considered typical. However, except for Anchorage and possibly Fairbanks, Alaska communities with healthy economies normally have a small secondary sector. In fact, compared with many other medium sized Alaska cities, especially those with economies heavily dependent on fishing and fish processing, Bethel's ratio of basic to secondary employment is relatively mature.

When converted to an average annual full-time basis, Bethel was found to have a total of close to 1,700 jobs in 1980 (see Table 21). Almost half

TABLE 21
 AVERAGE ANNUAL FULL-TIME EMPLOYMENT a/
 CITY OF BETHEL
 1980

<u>Industry Classification</u>	<u>Number</u>	<u>%</u>	<u>% Basic</u>	<u>Basic Number</u>	<u>Secondary Number</u>
Agriculture, Forestry and Fishing	30.0	1.8	100	30.0	0.0
Mining	0.0	0.0	---	0.0	0.0
Contract Construction	93.5	5.5	62	58.0	35.5
Manufacturing	14.0	0.8	79	11.0	3.0
Transportation, Communication & Public Utilities	240.5	14.2	54	130.0	110.5
Trade	238.0	14.1	52	124.0	114.0
Finance, Insurance & Real Estate	24.0	1.4	46	11.0	13.0
Service	255.0	15.1	64	164.0	91.0
Government	796.0	47.1	54	426.0	370.0
Federal	(303.0)	(17.9)	(76)	(229.5)	(73.5)
State	(200.5)	(11.9)	(73)	(145.5)	(55.0)
Local	(292.5)	(17.3)	(17)	(51.0)	(241.5)
<u>TOTAL</u>	<u>1,691.0</u>	<u>100.0</u>	<u>56</u>	<u>954.0</u>	<u>737.0</u>

a/ Includes self-employed personnel.

Source: Alaska Consultants, Inc. October 1980.

of these jobs were in the government sector. Of the three levels of government, the federal government is the best represented locally, primarily because of its involvement in providing regional hospital services out of Bethel. Aside from the Public Health Service, other major federal employers in the community in 1980 included the Bureau of Indian Affairs, the Federal Aviation Administration and the Fish and Wildlife Service. About three-quarters of federal employment in Bethel was determined to be basic on the grounds that it served regional rather than purely local functions.

State government employment is also well represented in Bethel, accounting for a total of 200.5 full-time jobs in 1980. Of these jobs, 73 percent were classed as basic since they primarily serve regional rather than local needs. A total of twenty different State agencies was identified locally, with the largest single employer being the Kuskokwim Community College. Other significant State employers included the National Guard, the Department of Public Safety (Divisions of Alaska State Troopers and Fish and Wildlife Protection), the Department of Health and Social Services (Divisions of Public Assistance and Social Services plus the Itinerant Nursing Service and the Bethel Health Center), the Department of Transportation and Public Facilities (airport), the Department of Community and Regional Affairs (CETA Division and the Division of Local Government Assistance), the Alaska State Housing Authority, the Alaska Court System, the Department of Fish and Game and the Department of Law (District Attorney's Office).

Finally, Bethel had a large number of local government employees in 1980 of whom approximately one-quarter were classed as basic. All basic local government employment in the community was associated with the Lower Kuskokwim School District's central administration.

After government, the service sector was the best represented in Bethel in 1980. Close to two-thirds of the 255 average annual full-time jobs in this sector were determined to be basic, with the major employers being the administrative and CETA arms of the Association of Village Council Presidents (AVCP), the Yukon-Kuskokwim Health Corporation, Bethel Social Services, the Kuskokwim Inn and the AVCP Housing Authority. Except for the Kuskokwim Inn, all of these major employers are engaged in providing services to the Bethel region. Of the remaining employers in the service sector, some such as Nunam Kitlutsisti, the Bethel Prematernal Home and several businesses specializing in transportation equipment rentals and repair, perform regional rather than strictly local functions. Other basic employment in this sector includes a construction camp operation, a regional church organization and an engineering firm retained by the Lower Kuskokwim School District to inspect its facilities throughout the region. Almost all other employers in Bethel's service sector are small businesses or organizations performing strictly local functions.

For a town of its size, Bethel has a large transportation, communication and public utilities sector. This is due, in large part, to the community's role as the primary air and water transportation center for

the Yukon-Kuskokwim delta region. A total of 106 jobs associated with air carriers and another 34 associated with river transportation operators were identified in the community in 1980. All air charter jobs were classed as basic, as were half of those with scheduled carriers. In addition, half of the jobs associated with Bethel's three taxicab companies and an airport limousine service was assumed to be basic. As well as a share of jobs with scheduled air carriers and local taxicab firms, secondary employment in this sector included privately operated power and telephone utilities, local television and radio station operators, a travel agency, a school bus company and a taxi dispatching firm. All told, 54 percent of the 240.5 jobs in Bethel's transportation, communication and public utilities sector was determined to be basic.

Bethel's trade sector had a total of 238 employees on an average annual full-time basis in 1980. Slightly over half of these employees were determined to be basic, almost all of them associated either with the sale of goods to persons living elsewhere in the Bethel region or with the purchase of commercially caught salmon by fish buyers. All jobs associated with the latter were assumed to be basic. Other types of businesses in Bethel's trade sector with a high "basic" component include general merchandise, groceries, building supplies, motorized equipment and sporting goods.

Contract construction activity was at a reasonably high level in Bethel in 1980. Major projects included completion of construction of the new Public Health Service hospital plus an office complex for the Bethel

Native Corporation, a general store, remodeling of hospital housing and a new fire station. Almost two-thirds of all construction activity in the community in 1980 was determined to be basic.

Compared with many other Alaska communities, fishing and fish processing is a relatively minor component of Bethel's economy. However, it is seasonally significant as a source of employment and income to many people in the local area. All jobs in the agriculture, forestry and fishing sector were derived from commercial fishing and were assumed to be basic since virtually no commercially caught fish is consumed locally. In addition, except for jobs associated with the Tundra Drums, the local newspaper, all jobs counted in the manufacturing sector were derived from fish processing activities and are considered basic.

The only other employment sector represented in Bethel in 1980 was finance, insurance and real estate. Slightly less than half of all jobs in this sector were deemed to be basic, most of them associated with the local and regional Native profit making corporations, plus a share of those with the local bank which performs a regional as well as a local banking function.

Aside from conventional employment, subsistence-related activities are also an important factor in the economy of the Bethel area. A 1979 survey conducted by Darbyshire and Associates for the City of Bethel found that over 70 percent of the community's households used subsistence foods although most relied on these foodstuffs for a relatively small

proportion of their total food supply. However, except for subsistence-derived jobs such as those associated with the sale of sporting goods and equipment, employment equivalents associated with these activities have not been quantified by Alaska Consultants, Inc.

Unemployment and Seasonality of Employment

Because Bethel's economy is so heavily based on government and government-funded activities, employment in this area shows relatively little seasonal variation. Monthly statistics for the Bethel labor area provided by the Research and Analysis Section of the Alaska Department of Labor indicate that employment here ranged between a high of 109.1 percent (June) and a low of 87.9 percent (September) of the annual average in 1979. Employment sectors showing a high degree of seasonality in 1979 were contract construction, where activities are most concentrated in the summer months, and manufacturing and wholesale trade where peak employment coincides with the salmon runs (see Table 22). Fishing is generally excluded from nonagricultural wage and salary employment. Had it been included, statistics for the Bethel area would doubtless have exhibited a higher degree of employment seasonality.

Other sectors indicating a significant amount of employment seasonality in the Bethel labor area in 1979 were transportation, communication and public utilities and services. Water transportation in this area is severely curtailed during the winter months, while the dramatic drop in service employment in September is believed to be related to a seasonal

cessation of youth CETA program activities as children return to school. The finance, insurance and real estate sector also appeared to be affected by seasonal influences in the Bethel labor area in 1979. However, it is believed that this apparent seasonality is more a reflection of employment growth.

By contrast, the Bethel labor area's government sector showed almost no employment seasonality. The peak month was October when employment was 108.8 percent of the annual average and the low month was July when it was 81.9 percent. Even this level of seasonality is misleading since the drop in employment during the summer months corresponds with the long school vacation and represents time off for teachers and other school-related personnel rather than a loss of jobs.

There are no unemployment statistics available specifically for the City of Bethel. Preliminary 1980 figures for the Bethel labor area show an average annual unemployment rate of 12.9 percent compared with a Statewide annual average of 9.6 percent. However, unemployment statistics for the Bethel labor area are misleading, as they are in most rural areas of the State, since they include only those persons who have registered for employment and who are actively seeking work. In the Bethel labor area, many potential workers do not register because they are aware that there are no locally available jobs. For statistical purposes, these people are considered to be outside the labor force and are therefore excluded from State statistics. Thus, "real" unemployment rates for the labor area are undoubtedly higher than indicated by the State statistics.

TABLE 22

NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT BY MONTH ^{a/}
 BETHEL LABOR AREA
 1979

Employment Sector	Month												Annual Average	
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Mining	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/
Contract Construction	55	54	72	67	94	102	150	150	141	144	120	100	104	
Manufacturing	25	27	25	33	44	211	273	274	68	51	48	13	91	
Transportation, Communication and Public Utilities	162	165	168	178	200	206	201	208	198	193	157	154	183	
Wholesale Trade	*/	*/	*/	7	70	86	88	76	4	6	5	4	*/	
Retail Trade	281	273	279	326	347	380	397	428	449	350	344	347	350	
Finance, Insurance and Real Estate	78	75	86	87	129	114	103	146	125	122	132	110	109	
Service	1,664	1,750	1,681	1,395	1,417	1,474	1,018	989	664	914	917	1,010	1,241	
Miscellaneous	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/	*/	
Government Federal State and Local	1,335 (438) (897)	1,382 (432) (950)	1,417 (436) (981)	1,361 (414) (947)	1,341 (411) (930)	1,197 (389) (808)	1,102 (388) (714)	1,160 (392) (768)	1,386 (407) (979)	1,463 (405) (1,058)	1,492 (404) (1,088)	1,510 (408) (1,102)	1,345 (410) (935)	
TOTAL	3,609	3,735	3,737	3,467	3,648	3,775	3,335	3,437	3,042	3,249	3,221	3,253	3,459	

*/ Employment figures withheld to comply with disclosure regulations.

^{a/} Nonagricultural wage and salary employment excludes self-employed persons and most fishermen.

Source: Alaska Department of Labor, Employment Security Division, Research and Analysis Section. Personal communication.

In the immediate Bethel area, unemployment is not believed to be as significant a problem as it is in the labor area as a whole. However, since more jobs are available locally, it is probable that a higher proportion of persons seeking work in the City actually register for employment so that an "actual" survey of unemployment here using Department of Labor methodology could easily indicate a higher unemployment rate than that of the labor area as a whole.

Disregarding shortcomings in State statistics, unemployment and under-employment have long been recognized as major problems in the Bethel region. Although rural areas of the State have seen a great deal of government spending and the resulting creation of large numbers of government jobs, many of these jobs require skills which are not locally available and have necessitated an importation of whites into the region. The formation of village and Native corporations under terms of the Alaska Native Claims Settlement Act, plus associated regional non-profit corporations which administer certain federal programs on a contractual basis, has also resulted in an importation of skilled labor. However, these organizations have emerged as major employers of the region's Eskimo citizens and the distinction between "have" whites and "have not" Eskimos is becoming more blurred. Another major employer of Eskimos in the Bethel region is the CETA program. The future of this program is presently in doubt and any major cutbacks would certainly result in higher rates of unemployment among the region's Eskimo population.

In the City of Bethel, the range of available jobs cover the spectrum of economic activities. The community has relatively well developed trade and service sectors, both of which include opportunities for entry level as well as more skilled jobs. Furthermore, construction has been at a reasonably high level locally during the past few years and salmon runs have been at near record levels. Because of a combination of these factors, unemployment problems among Eskimos in the City are not believed to approach the severity that they pose in the smaller villages of this region.

Recent Trends and Changes

Since growth in Bethel's economy has been tied to growth in the region as a whole, employment trends for the Bethel labor area were examined using information obtained from the Research and Analysis Section of the Alaska Department of Labor for each year since 1970.

Overall, nonagricultural wage and salary employment in the Bethel labor area rose 235.8 percent between 1970 and 1979, a rate well in excess of the 21.3 percent population increase recorded for this area between 1970 and 1980 (see Table 23). However, this growth was not spread evenly among the various employment sectors. By far the greatest increase was recorded in the service sector where employment rose 1,554.7 percent between 1970 and 1979 and rose 165.6 percent in a single year between 1977 and 1978. The two major factors in this rapid rate of employment growth have been the CETA program and the formation and expansion of

Native regional non-profit organizations. The latter include the Association of Village Council Presidents (AVCP), Nunam Kitlutsisti, the Yukon-Kuskokwim Health Corporation and the AVCP Housing Authority. These entities deliver certain federal services on a contractual basis with agencies such as the Bureau of Indian Affairs, the Department of Housing and Urban Development, the Department of Health and Human Services and the Department of Labor. A very large component of the service sector in the Bethel region thus involves a transfer of government funds.

After services, the sector with the largest increase in employment between 1970 and 1979 was trade which registered a 204.3 percent gain during this period. Most of this growth is believed to have taken place in Bethel itself since that community's trade employment in 1980 amounted to close to 70 percent that of the region in 1979. Major factors in growth in the trade sector in Bethel are believed to be the increased purchasing power of local Eskimo residents plus an in-migration to the community of whites who live outside government compounds and who do not have Post Exchange privileges.

The transportation, communication and public utilities sector registered a healthy 157.7 increase in employment in the Bethel labor area between 1970 and 1979. State figures show employment in this sector peaking in 1975 and declining consistently since that time. However, this apparent decline may result from companies combining their employment figures with those in other regions since the 183 persons recorded in this

TABLE 23
 NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT DISTRIBUTION
 BETHEL LABOR AREA
 1970 - 1979

Employment Sector	1970		1971			1972			1973			1974		
	Number	%	Number	%	% Change	Number	%	% Change	Number	%	% Change	Number	%	% Change
Mining	*/		*/			*/			*/			*/		
Contract Construction	*/		*/			*/			*/			*/		
Manufacturing	*/		*/			*/			*/			*/		
Transportation, Communications and Public Utilities	71	6.9	94	8.6	32.4	108	8.1	14.9	136	8.9	25.9	194	12.4	42.6
Trade	115	11.2	128	11.7	11.3	168	12.6	31.2	180	11.8	7.1	184	11.8	2.2
Finance, Insurance and Real Estate	*/		*/			*/			*/			*/		
Miscellaneous	0		0			0			0			0		
Service	75	7.3	105	9.6	40.0	185	13.9	76.2	236	15.5	27.6	235	15.0	- 0.4
Government	580	56.3	595	54.4	2.6	747	56.0	25.5	845	55.4	13.1	829	53.0	- 1.9
Federal	(349)	(33.9)	(330)	(30.2)	(- 5.4)	(406)	(30.4)	(23.0)	(440)	(28.9)	(- 8.4)	(424)	(27.1)	(- 3.6)
State and Local	(231)	(22.4)	(265)	(24.2)	(- 14.7)	(341)	(25.6)	(28.7)	(405)	(26.6)	(18.8)	(405)	(25.9)	(- 0.0)
TOTAL	1,030	100.0	1,093	100.0	6.1	1,333	100.0	22.0	1,524	100.0	14.3	1,565	100.0	2.7

*/ Employment figures withheld to comply with disclosure regulations.
 a/ Retail trade employment only.

Source: Alaska Department of Labor, Employment Security Division, Research and Analysis Section. 1980. Personal communication.

1975			1976			1977			1978			1979			1970 - 1979
Number	%	% Change	Number	%	% Change	Number	%	% Change	Number	%	% Change	Number	%	% Change	% Change
*/			*/			*/			*/			*/			
*/			*/			40	1.8		91	3.0	127.5	104	3.0	14.3	
*/			*/			*/			64	2.1		91	2.6	42.2	
251	12.2	2.9	236	12.0	- 6.0	207	9.6	-12.3	193	6.4	- 6.8	183	5.3	- 5.2	157.7
266	12.9	44.6	221	11.3	-16.9	292 a/	13.5	32.1	278 a/	9.2	- 4.8	350 a/	10.1	25.9	204.3
109	5.3		91	4.6	-16.5	92	4.3	1.1	91	3.0	- 1.1	109	3.2	19.8	
302	14.6	28.5	285	14.5	- 5.6	391	18.1	37.2	1,038	34.3	165.5	1,241	35.9	19.6	1,554.7
*/			*/			*/			*/			*/			
1,007 (417) (590)	48.8 (20.2) (28.6)	21.5 (- 1.7) (45.7)	1,021 (434) (587)	52.1 (22.2) (30.0)	1.4 (4.1) (-0.5)	1,030 (398) (633)	47.6 (18.4) (29.3)	0.9 (-8.3) (7.8)	1,246 (419) (827)	41.2 (13.9) (27.4)	21.0 (5.3) (30.6)	1,345 (410) (935)	38.9 (11.9) (27.0)	7.9 (- 2.1) (13.1)	131.9 (17.5) (304.8)
<u>2,063</u>	<u>100.0</u>	<u>31.8</u>	<u>1,959</u>	<u>100.0</u>	<u>-5.0</u>	<u>2,164</u>	<u>100.0</u>	<u>10.5</u>	<u>3,022</u>	<u>100.0</u>	<u>39.6</u>	<u>3,459</u>	<u>100.0</u>	<u>14.5</u>	<u>235.8</u>

sector in 1979 by the State was significantly below the 240.5 counted by Alaska Consultants in Bethel alone in 1980. It is assumed that most growth in this sector during the past ten years has occurred in Bethel itself, primarily related to a growth in activity by air taxi services and scheduled carriers.

Government employment in the Bethel labor area rose by a more modest 131.9 percent between 1970 and 1979. However, whereas federal government employment rose only 17.5 percent during this period, employment by State and local governments rose an impressive 304.8 percent. A significant amount of growth in State and local government employment occurred in villages outside Bethel as a result of the construction of village high schools. However, State and local government employment in Bethel also underwent a major increase during this period.

Occupational Skills

Comprehensive information on the skills of Bethel's workforce is lacking. Nevertheless, an analysis of the occupational composition of employed City residents conducted by Darbyshire and Associates (see Table 24) combined with a review of the skills listed by persons registering with the Bethel Job Service (see Table 25) do give a fairly complete picture.

Darbyshire and Associates found that the occupations of employed persons in Bethel included a much higher proportion of professional and managerial jobs than was true of the State as a whole. However, given the very

TABLE 24

COMPARATIVE COMPOSITION OF EMPLOYMENT BY OCCUPATION
CITY OF BETHEL AND STATE OF ALASKA
1978

<u>Occupation Category</u>	<u>City of Bethel</u> %	<u>Alaska</u> %
Professional and Technical	25	18
Managers and Administrators	19	9
Clerical and Sales	9	27
Crafts, Foremen and Operatives	11	32 <u>a/</u>
Laborers	9	
Service Workers	14	14
Not Reported or Other	13	0
<u>TOTAL</u>	<u>100</u>	<u>100</u>

a/ State figures combine the labor and crafts-related occupations.

Source: Darbyshire and Associates. October 1980. City of Bethel
Comprehensive Plan. Anchorage.

TABLE 25
 OCCUPATIONAL SKILLS
 BETHEL JOB SERVICE REGISTRANTS
 FY 1980 a/

<u>Occupation Category</u>	<u>Number</u>	<u>Percent of Total</u>
Professional/technical/managerial	99	10.2
Clerical and sales	153	15.8
Services	142	14.6
Farming, fishery, forestry	83	8.5
Processing	88	9.1
Machine trades	23	2.4
Bench work	3	0.3
Structural work	174	17.9
Miscellaneous	124	12.8
Unskilled	82	8.4
 <u>TOTAL</u>	 <u>971</u>	 <u>100.0</u>

a/ Fiscal year ends September 30.

Source: Alaska Department of Labor, Employment Security Division.
 Anchorage.

high proportion of persons employed locally in providing regional health and education services and in administering a range of government and quasi-government programs, this is not particularly surprising. On the other hand, the fact that persons in clerical and sales and the laborer and crafts occupations were relatively poorly represented in Bethel tends to indicate that the community has a shortage of jobs requiring non-academic skills.

The occupational skills listed by persons registering with the Bethel Job Service are strikingly dissimilar from those recorded for employed persons. In FY 1980, a total of 971 persons registered with the Bethel Job Service. The largest group of registrants (17.9 percent) claimed skills in structural work, i.e. construction. This was followed by clerical and sales (15.8 percent) and services (14.6 percent). Persons listing professional/technical/managerial skills accounted for only 10.2 percent of all registrants, probably indicating that many of these positions are not filled by local residents. Another 9.1 percent of Job Service registrants claimed skills in processing, followed by 8.5 percent in fishing, 2.4 percent in machine trades and 0.3 percent in bench work. Finally, 8.4 percent of the persons registering were basically unskilled.

The fact that skills claimed by persons seeking work in Bethel do not coincide with the occupational composition of employed persons in this community is a matter of concern. It indicates not only a local unemployment problem but also a gap in the level of educational attainment of Eskimo residents and a need for occupational training programs.

Income Levels

According to the 1970 Census, the median income of families in the Bethel census division in 1969 was \$4,085. This was well below the Statewide median of \$12,443 and was higher than only three other census divisions in the State, two of them (Wade Hampton and Kuskokwim) also being in the Bethel region. However, these Census data are now twelve years old and are relatively meaningless today except in comparative terms. Since 1980 Census data on incomes are not yet published, a look was instead taken at Alaska Department of Labor wage and salary statistics published in the Statistical Quarterly. In addition, 1978 household income information compiled specifically for the City of Bethel by Darbyshire and Associates was analyzed.

A review of average monthly wages by industry sector for nonagricultural industries in the Bethel division from 1977 through the second quarter of 1980 (see Table 26) indicates that the highest average monthly wages in this area are currently realized in the construction, miscellaneous and non-classifiable, and the transportation, communication and public utilities sectors. However, in each of these sectors, the average monthly wage in the Bethel division for the second quarter of 1980 was well below the 1979 Statewide average. This was also true of all other employment sectors. A comparison of the average monthly wage in the Bethel division in 1979 (\$969) with that realized in other census divisions indicates that average wages here were lower than in any other area of the State and well below the Statewide norm (\$1,741), which

TABLE 26
 AVERAGE MONTHLY WAGE BY INDUSTRY SECTOR
 BETHEL DIVISION
 1977 - 1980

	1977				1978				1979				1980	
	1st Qr	2nd Qr	3rd Qr	4th Qr	1st Qr	2nd Qr	3rd Qr	4th Qr	1st Qr	2nd Qr	3rd Qr	4th Qr	1st Qr	2nd Qr
TOTAL NONAGRICULTURAL INDUSTRIES														
Mining	* /	* /	* /	* /	* /	* /	* /	* /	* /	* /	* /	* /	* /	* /
Construction	\$ 918	\$ 1,505	\$ 1,851	\$ 2,015	\$ 1,260	\$ 970	\$ 1,645	\$ 1,737	\$ 1,508	\$ 1,596	\$ 2,239	\$ 2,603	\$ 1,709	\$ 1,913
Manufacturing	* /	839	930	* /	375	675	451	1,851	480	572	626	1,174	430	672
Transportation, Communications & Public Utilities	1,218	1,311	1,508	1,443	1,414	1,422	1,730	1,535	1,494	1,601	1,741	1,773	1,728	1,829
Wholesale Trade	* /	* /	* /	* /	* /	* /	* /	* /	* /	568	784	891	* /	* /
Retail Trade	716	759	541	648	796	965	837	845	815	865	869	931	928	1,018
Finance, Insurance & Real Estate	544	533	415	535	563	486	419	552	649	491	499	701	674	688
Services	659	754	656	626	642	642	575	410	338	444	767	689	698	581
Federal Government	1,191	1,238	1,158	1,333	1,249	1,305	1,092	1,245	1,325	1,488	1,423	1,573	1,449	1,493
State and Local Government	1,140	1,183	1,329	1,376	1,014	1,175	1,014	1,206	1,197	1,292	1,136	1,249	1,440	1,357
Miscellaneous & Nonclassifiable	0	0	0	* /	* /	0	* /	* /	* /	* /	* /	* /	1,180	1,860

* / Figures withheld to comply with disclosure regulations.

Source: Alaska Department of Labor, Employment Security Division, 1977-1980. Statistical Quarterly. Juneau.

TABLE 27
 PUBLIC ASSISTANCE PROGRAM PAYMENTS
 BETHEL, ALASKA
 MARCH 1980 a/

	<u>Old Age Assistance</u>	<u>Aid to the Blind</u>	<u>Aid to the Disabled</u>	<u>Aid to Families with Dependent Children</u>	<u>Total</u>
Total Payment	\$6,619	\$ 548	\$7,328	\$26,733	\$41,228
Number of Cases	47	3	48	88	186
Average Payment	\$ 141	\$ 183	\$ 153	\$ 304	\$ 222

a/ March is considered to be a representative month for public assistance payments.

Source: Alaska Department of Health and Social Services, Division of Public Assistance.

suggests that economic conditions in the Bethel division have declined relatively since 1970.

Not surprisingly, welfare in the form of public assistance program payments is important to a significant proportion of Bethel households (see Table 27). Statistics provided by the Alaska Department of Health and Social Services, Division of Public Assistance indicate that \$41,228 was distributed to 186 individual cases in Bethel during a typical month in 1980, for an average monthly payment of \$222. About two-thirds of these funds involved Aid to Families with Dependent Children payments.

While incomes in the Bethel division are undoubtedly low, there is evidence that conditions in the City of Bethel itself are considerably better. A community survey conducted by Darbyshire and Associates for the City of Bethel in May 1979 found the average family income there to be \$21,300, a level well above that suggested for the region by Department of Labor statistics. However, marked differences between the incomes of Native and non-Native households were observed. The average income of non-Native households in the community was found to be \$26,600 per year compared with a much lower \$17,500 for Native households.

SECTOR ANALYSIS

Regional Services

Bethel is the largest community in the Yukon-Kuskokwim delta region. Originally a Yupik trading center serving an area as far west as the Bering Sea and east up the Kuskokwim River, Bethel also became a mission center in 1886 when the Moravian Brotherhood established a church and school here. Since that time, Bethel has consolidated its regional pre-eminence as a result of locational decisions by government and quasi-government agencies and because of its function as hub of the region's air transportation system and as the major port on the Kuskokwim River. The community's emergence as air and water crossroads for the region has, in turn, strengthened its position as a regional trading center.

Bethel has traditionally functioned as a regional center for federal agencies delivering services in this area. The Public Health Service has maintained a regional hospital facility here since 1939 while the Bureau of Indian Affairs also has a long history of involvement in the area. Other federal agencies currently represented in Bethel include the Fish and Wildlife Service, the National Weather Service, the Post Office, the Bureau of Land Management and the Federal Aviation Administration.

The involvement of State agencies in Bethel has generally been more recent, with the initial emphasis being on the provision of education and law enforcement services. These functions are still important

although elementary and high school education services are now provided by the State-funded Lower Kuskokwim School District rather than directly by the State. However, there are now many other State agencies involved in providing government services to Bethel and its region. These include law enforcement-related agencies (Alaska Court System, the District Attorney's Office, the Public Defender Agency, the Divisions of Alaska State Troopers, Motor Vehicles and Fish and Wildlife Protection in the Department of Public Safety, and the Division of Corrections in the Department of Health and Social Services); health-related agencies (Bethel Health Center and the Itinerant Nursing Service); social service-related agencies (Divisions of Social Services and Public Assistance in the Department of Health and Social Services); employment-related agencies (Department of Labor and the CETA Division of the Department of Community and Regional Affairs); plus miscellaneous other agencies such as the Department of Fish and Game, the Department of Transportation and Public Facilities, the Alaska State Housing Authority, the Department of Community and Regional Affairs' Division of Local Government Assistance, the State Legislative Information Office, the Kuskokwim Community College and the University of Alaska.

According to Alaska Consultants' review of employment, there were 303 federal and 200.5 State employees on an annual average full-time basis in Bethel in 1980. Close to three-quarters of these employees were judged to be basic on the grounds that they provided regional rather than strictly local services. In addition, 51 of the 64 jobs associated with the administration of the Lower Kuskokwim School District were deemed to be

basic, resulting in a grand total of 426 basic employees in Bethel's government sector.

Bethel also has a large number of quasi-government jobs. Most of these derive from the contracting of government services to regional or local non-profit organizations although others are primarily funded through government grants. Included in this category are the Association of Village Council Presidents (AVCP), the AVCP CETA Program, the AVCP Housing Authority, the Yukon-Kuskokwim Health Corporation, Alaska Legal Services, Bethel Social Services, Nunam Kitlutsisti, the Bethel Native Council, the Bethel Group Home, the Bethel Prematernal Home and the Tundra Women's Coalition. Only those jobs derived from providing service elsewhere in the region were classed as basic. However, they accounted for most of the 164 basic jobs identified in Bethel's service sector.

All told, close to 590 basic jobs in Bethel in 1980 derived from the provision of regional services by government and quasi-government agencies. This represented 61.8 percent of all basic employment and over one-third of total employment in the community.

Bethel has traditionally functioned as a regional transportation center. It has the region's major airport and is considered to be the upper limit for navigation by ocean going vessels of medium draft. In 1980, the community had direct air connections to Anchorage via two carriers, Wien Air Alaska and Sea Airmotive. Wien currently provides twice daily

jet service between Anchorage and Bethel while Sea Airmotive serves Bethel once daily from Monday through Friday with a Convair. The two carriers also have scheduled routes from Bethel to smaller villages in the region although Wien subcontracts this service. In addition to these two major carriers, six air taxi operations and an air freight hauler were active in Bethel in October 1980. Half of the employment associated with Wien Air Alaska, Sea Airmotive and Alaska International Air was assumed to be basic and all that associated with air taxi operations for a total of 73.5 basic jobs.

Bethel's function as a regional port also results in significant basic employment in this community. The Port of Bethel dates from 1976 as a permanent dock for both ocean barges and local traffic. Although it is a City facility, the Port is managed and operated by United Transportation. This company also ships freight from Bethel to villages along the Kuskokwim River and trucks freight around town. The other major water transportation-related employer in Bethel is Northwest Navigation which brings barges upriver during the summer months. Together, these firms were estimated to employ a total of 34 persons on an annual average full-time basis. Essentially all of these people were determined to be basic employees.

During the past ten years, Bethel has seen some competition for its role as transportation center for the Yukon-Kuskokwim delta region. Wien Air Alaska now provides direct jet service from Anchorage to Aniak four times per week and Sea Airmotive also provided direct service from

Anchorage to that community during the summer of 1980. In turn, this has resulted in an increase in Aniak's importance as a center for flights to smaller villages in that area. Nevertheless, Bethel still dominates air transportation in this region and is expected to continue to do so in the future.

Not only is Bethel a regional government, service and transportation center but it is also a regional shopping center. Approximately half of all employment in Bethel's trade sector in 1980 was classed as basic, essentially all of it related to the community's regional shopping function since there is virtually no local tourist activity.

Commercial Fishing

Commercial salmon fishing is a comparatively recent element in Bethel's economy but it has become extremely important to many Eskimo households in Bethel and other communities of the region as a source of cash income. King and chum salmon are also a locally important subsistence resource.

Bethel is located within the lower Kuskokwim River sub-district of the Kuskokwim fisheries district. The district takes in all waters of the Kuskokwim River drainage and all Alaska waters between Cape Newenham and the Naskonat Peninsula and includes five sub-districts - the lower, middle and upper Kuskokwim River, and two coastal areas, one centered around Quinhagak and the other around Goodnews Bay. However, the upper

Kuskokwim River sub-district has been closed to commercial fishing since 1966.

The lower Kuskokwim River sub-district has the region's major commercial salmon fishery. This sub-district takes in a 108 mile stretch of the Kuskokwim River and includes twelve villages and at least fifteen temporary fish camps. King, coho and chum salmon are the primary commercial species taken. In addition, sheefish and whitefish are harvested incidentally to salmon and a limited fall and winter whitefish fishery is carried out to satisfy local market requirements. King and chum salmon are the primary subsistence species, with whitefish, cisco, blackfish, pike, burbot and sheefish also important.

Commercial fishing periods in the Bethel area are designed to accommodate the needs of both commercial and subsistence fishermen. The commercial salmon season here extends from early June to late August. However, commercial fishing periods have been increasingly restricted in recent years, except for 1978, as a result of increased effort, gear efficiency and competition among fishermen.

According to the Alaska Department of Fish and Game, there was a total of 805 entry permits issued in the Kuskokwim district in 1979. Essentially all of these permits were issued to people living in the region, with 171 issued to Bethel residents. During the same year, the Alaska Department of Fish and Game estimated that 236 Bethel families (a total of 1,433 people) took part in subsistence fishing activities.

The Kuskokwim River has an intensive commercial king salmon fishery. Until June 26, commercial fishing periods for this species are regulated by emergency order to allow scheduling of the harvest throughout the major portion of the run. In 1980, the king salmon "season" in the Bethel area amounted to only two six-hour periods. The harvest goal for the lower Kuskokwim River sub-district was 25,000 kings which was exceeded, primarily because of fleet efficiency. However, according to the Alaska Department of Fish and Game, most recent king salmon runs here have been on the increase and adequate escapement levels have been maintained.

The commercial chum salmon season in the Bethel area officially extends between June 26 and July 31. In 1980, however, it was opened three weeks early because of an exceptionally early run. Despite the length of the season, commercial fishing periods are again very limited. In 1980, commercial fishermen were allowed a total of only 24 hours of fishing for this species (four six-hour periods), considerably less than the 48 hours allowed in 1978 and the 30 permitted in 1979.

The commercial coho salmon season extends from August 1 through August 30 but fishing periods are again restricted. In 1980, commercial fishermen here were limited to two six-hour periods per week for a total 48-hour season. This was down from the 108 hours permitted in 1978 and the 72 hours allowed in 1979.

Set gill nets and drift gill nets are the legal commercial gear types in the Bethel area. Skiffs used on the River are typically long (average length of 23 feet) and narrow (average deck width of 2.5 to 3 feet) with a high bow. According to the Alaska Department of Fish and Game, such vessels are not well suited for commercial fishing as they are unstable, too narrow for a stern roller and the sides and stern are generally too low to carry large loads. However, wider and more stable vessels are reportedly now entering the fishery.

Little processing activity takes place in Bethel. During the 1980 season, four major fish buyers operated out of Bethel - J.B. Crow and Sons, Elm Fisheries, Kemp and Paulucci Seafoods and Pal-Gon Fisheries. In addition, several other buyers made one or two purchases locally. Almost all fish purchased is iced and flown fresh directly out of the area except for a processing operation conducted by the Kuskokwim Fisherman's Cooperative under an agreement with Kemp and Paulucci Seafoods. Under the terms of this agreement, the Cooperative provides the necessary labor to butcher and freeze salmon on board a freezer barge. Processing operations take place between June 1 and September 5. According to the Kuskokwim Fisherman's Cooperative, this activity seasonally employs 15 persons engaged in butchering, 2 refrigeration trainees and 4 persons on board tenders, as well as about 10 Kemp and Paulucci personnel engaged in transporting fish out of the area.

Some additional processing activity is scheduled to take place in Bethel in the near future. The Bethel Native Corporation acquired a

majority interest in Elm Fisheries in December 1980 and has announced plans to initiate a local freezing operation and to construct a building in Bethel for that purpose. As initially conceived by the Corporation, such a facility would enable up to 200,000 pounds of salmon to be flash frozen within a 24-hour period.

Commercial and subsistence catch statistics compiled by the Alaska Department of Fish and Game (see Table 28) indicate a significant increase in salmon harvests in the lower and middle Kuskokwim River sub-districts during the past twenty years. Overall, salmon catches increased 171.6 percent. However, this rate of increase was not divided evenly between commercial and subsistence catches as the area's commercial salmon catch rose 8,666.9 percent during this period whereas the subsistence catch declined 35.3 percent.

In 1960, the commercial salmon fishery in the lower and middle Kuskokwim River sub-districts was primarily centered on kings and lesser numbers of cohoes. During that year, the commercial catch accounted for only 2.4 percent of all salmon taken in this area. However, that percentage rose to close to 10 percent by 1965, to about 20 percent by 1970, to 56 percent by 1975 and to slightly over 75 percent in 1980. Except for kings, most salmon taken in this area are now caught by commercial rather than subsistence fishermen.

The greatest emphasis of subsistence fishermen in the Bethel area is on king salmon where catches rose 194.0 percent between 1960 and 1980 and

TABLE 28

COMMERCIAL AND SUBSISTENCE SALMON CATCHES
KUSKOKWIM RIVER AREA a/
1960 - 1980
(numbers of fish)

Year	Commercial Salmon Catch				Subsistence Salmon Catch			Total	
	King	Red	Coho	Pink	Chum	King	Chum		Total b/
1960	5,969	0	2,498	0	0	20,361	327,297	347,658	356,125
1961	18,918	0	5,044	0	0	30,910	185,447	216,357	240,319
1962	15,341	0	12,432	0	0	14,642	165,626	180,268	208,041
1963	12,016	0	15,660	0	0	37,246	141,550	178,796	206,472
1964	17,149	0	28,613	0	0	29,017	189,660	218,677	264,439
1965	21,989	0	12,191	0	0	27,143	283,459	310,602	344,782
1966	25,545	0	22,985	0	0	49,606	174,660	224,266	272,796
1967	29,986	0	56,313	0	148	57,875	205,263	263,138	349,585
1968	34,278	0	127,306	0	187	30,230	260,023	290,253	452,024
1969	43,997	322	83,765	0	7,165	40,138	198,628	238,766	374,015
1970	39,290	117	38,601	44	1,664	69,204	245,550	314,754	394,470
1971	40,274	2,606	5,253	0	68,914	42,926	116,391	159,317	276,364
1972	39,454	102	22,579	8	78,619	40,145	120,316	160,461	301,223
1973	32,838	369	130,876	33	148,746	38,526	179,259	217,785	530,647
1974	18,664	136	147,269	37	171,887	26,665	277,170	303,835	641,819
1975 c/	21,720	23	81,945	10	181,840	47,784	176,389	224,173	509,711
1976	30,735	2,971	88,501	133	177,864	57,917	223,792	281,709	581,913
1977	35,830	9,379	241,364	203	248,721	55,339	210,294	265,633	801,084
1978	45,641	733	231,393	5,832	248,656	37,049	118,341	155,390	669,645
1979	38,966	1,054	219,060	78	261,874	54,381	115,118	169,499	690,531
1980	35,881	360	222,042	803	483,211	59,870	165,019	224,889	967,186
Average for Last 5 Years	34,578	2,832	168,853	1,251	233,791	52,911	174,513	219,424	742,072

a/ Area includes districts 335-10 and 335-30. Commercial fishing in district 335-30 has been prohibited since 1966.
b/ King and chum salmon only. Subsistence catches also include small numbers of red and pink salmon.
c/ Final catch data used.

Source: Alaska Department of Fish and Game, Division of Commercial Fisheries. November 1980. Arctic-Yukon-Kuskokwim Region, Salmon Fishery Report: A Report to the Alaska Board of Fisheries.

where subsistence catches outnumber those taken commercially. Silvers are taken almost entirely by commercial fishermen, as are relatively minor numbers of red and pink salmon. However, the River's chum fishery has changed from a wholly subsistence to a primarily commercial fishery during the past twenty years and commercial catches of this species have outnumbered those taken by subsistence fishermen during the past three years. The decline in subsistence catches of chum salmon is generally ascribed to the replacement of dog teams by snowmachines in this area and a resulting decline in need for dog food.

Overall, the outlook for Bethel's fishing industry appears good. Recent catches are at historically high levels, with the 1980 Kuskokwim fisheries district salmon harvest of 1,009,100 fish being the highest ever recorded, primarily due to an unusually strong chum salmon run in the Kuskokwim River. The Alaska Department of Fish and Game still considers the commercial salmon fishery in this area to be rather experimental. This is due to the vast size of the district and the turbid nature of many streams which make accurate estimates of the size of salmon runs and spawning escapements difficult. The Department also considers that fishery management in this area is hampered by the paucity of comparative catch and return information as all fisheries here have been expanding through regulation changes since their initiation in the early 1960's. These difficulties are further compounded by the need to provide sufficient escapement after commercial fishing for subsistence activities as well as for spawning purposes.

Other

The only basic economic activity currently significant in the Bethel area is that associated with the Bethel Native Corporation, a village corporation established under terms of the Alaska Native Claims Settlement Act. Calista, the regional corporation for this area, has its headquarters in Anchorage and has invested almost all of its monies outside the region. The Bethel Native Corporation, on the other hand, has built apartments and a modern office building in Bethel and has recently ventured into the local fishing business. In addition, the Corporation is the largest land owner in the Bethel area and its activities will thus impact on the local economy through the foreseeable future.

Oil and gas exploration and development activities have some potential to impact on Bethel's economy in the future. The Yukon and Kuskokwim lowlands have been identified by the U.S. Geological Survey as an onshore area with oil and gas potential although inadequate information is available to assess their probability for development. A number of oil companies carried out surface mapping and geophysical investigations in this area between 1957 and 1961 and a deep test well was drilled at Napatuk Creek, about 50 miles southwest of Bethel, in 1961. That well was dry and activity was subsequently diverted to Cook Inlet. However, a new oil and gas exploration effort is currently being conducted by the Amoco Production Co. on Calista Corporation lands so that some increase in activity in this area appears likely. In addition, the State has scheduled an oil and gas lease sale in the Holitna Basin (Sale No. 46)

for January 1985. The proposed sale area is upriver from Bethel and is rated by the State as having a low oil and gas potential. Nevertheless, Bethel could be impacted by any exploration and/or development activity in that area.

Bethel also has a potential for economic growth derived from the harvesting of timber in the middle and upper Kuskokwim areas. The feasibility of exporting round logs from these areas is currently being investigated by the Kuskokwim Native Association, a major land owner in the middle Kuskokwim region. If feasible, it is possible that Bethel could be used as a location for the storage and transshipment of logs for export.

Tourism is a very minor element in Bethel's economy. Although Bethel is the closest major Eskimo community to Anchorage, airline tours currently concentrate on Nome which has a romantic past and on Kotzebue and Barrow which are above the Arctic Circle. As airline fares continue to rise, however, Bethel may be perceived by tour operators as a more attractive stop for out-of-State visitors. Not only would such activities lead to direct increases in employment associated with hotel, restaurant and gift shop operations, but it could give local craftsmen an opportunity to sell their goods directly rather than through dealers.

The immediate Bethel area is believed to have little mineral potential. Like other areas of the State, the area has seen placer gold mining, including a major dredging operation at Nyac on the Tuluksak River. In addition, cinnabar (mercury) has been mined at Red Devil (near Sleetmute)

and there are other promising deposits of this mineral in the area. On the other hand, mercury is a commodity subject to abrupt price fluctuations and mining in the Bethel region has generally been confined to periods of favorable prices. The other major mineral in the region is platinum which has been the target of a large placer operation near Goodnews Bay. However, none of these developments has had much impact on Bethel's economy and none is anticipated to do so in the future.

Other possibilities for economic development in Bethel include agriculture and hydroelectric power development. The area is rated by the State as having some agricultural potential but no major development in the area is foreseen during the next twenty years. Several experimental agriculture projects are being attempted in the region but it is assumed that these will be primarily geared to producing food for local consumption rather than for export. Finally, development of a potential hydroelectric power site on the Kisaralik River, 30 miles east of Bethel would impact upon the community's economy, particularly during the construction stage. However, the feasibility of this project has yet to be demonstrated and it is not foreseen as an element in Bethel's economy, at least in the short term.

Land Use

OVERALL PATTERNS

The dispersed pattern of Bethel's development today (see Figure 7) reflects the town's past, changes in the local physical environment which have made the community susceptible to erosion and flooding problems, and land ownership patterns.

Originally a Yupik Eskimo trading center, Bethel became a mission settlement in 1886 when the Moravian Brotherhood established a church and school here. By the early years of the twentieth century, Bethel was a well organized mission and trading center located on fairly high ground between Brown's Slough and the vicinity of Mission Lake along what was then a side stream of the Kuskokwim River. This site was naturally protected by high bluffs and a series of islands which separated it from the main channel of the River. The Mission compound, consisting of a church, four missionary dwellings, a schoolhouse, a store, a sawmill and several smaller buildings lined the river bank, while beyond the Mission were about fifteen Native-owned wood frame dwellings.

Bethel's natural protection against the Kuskokwim River disappeared around 1939 as a result of erosion of the river bank (see Figure 8). According to the Corps of Engineers, erosion rates averaged 8 feet per year in front of the old town center and 25 feet per year in front of the old Public Health Service hospital and the Standard Oil tank farm.

Today, Bethel is located on an outside curve of the main channel of the Kuskokwim River. The constant erosion of the river bank caused by the action of floods, tides, winds, waves, currents and ice has forced the frequent moving of structures back to safer ground and has resulted in the loss of several streets paralleling the river bank.

With erosion of the river bank, the amount of available land in Bethel which was not susceptible to flooding decreased rapidly. Compounding this land shortage problem was the community's rapid growth, initially derived from an influx of Eskimos from the surrounding region. Many of these new residents constructed makeshift housing to the east of Brown's Slough along East Avenue and further back from the River on Hanger Lake Road on swampy land, areas subject to annual flooding problems.

More recently, there has been an attempt to construct buildings in areas without severe erosion or flooding problems. Development of the 200-unit Bethel Heights subdivision by the Alaska State Housing Authority between 1968 and 1970 was an attempt to provide safe, sanitary and decent housing for low income residents. The site chosen for this development is located inland to the north of Brown's Slough. Subsequently, the Bethel high school, an elementary school and some commercial structures have been built in this area. New commercial development has also occurred near Dull Lake in an area not susceptible to severe flooding problems. This drifting of commercial development inland, away from the old waterfront core area, appears likely to continue in the future given the older area's continuing erosion and flooding problems.

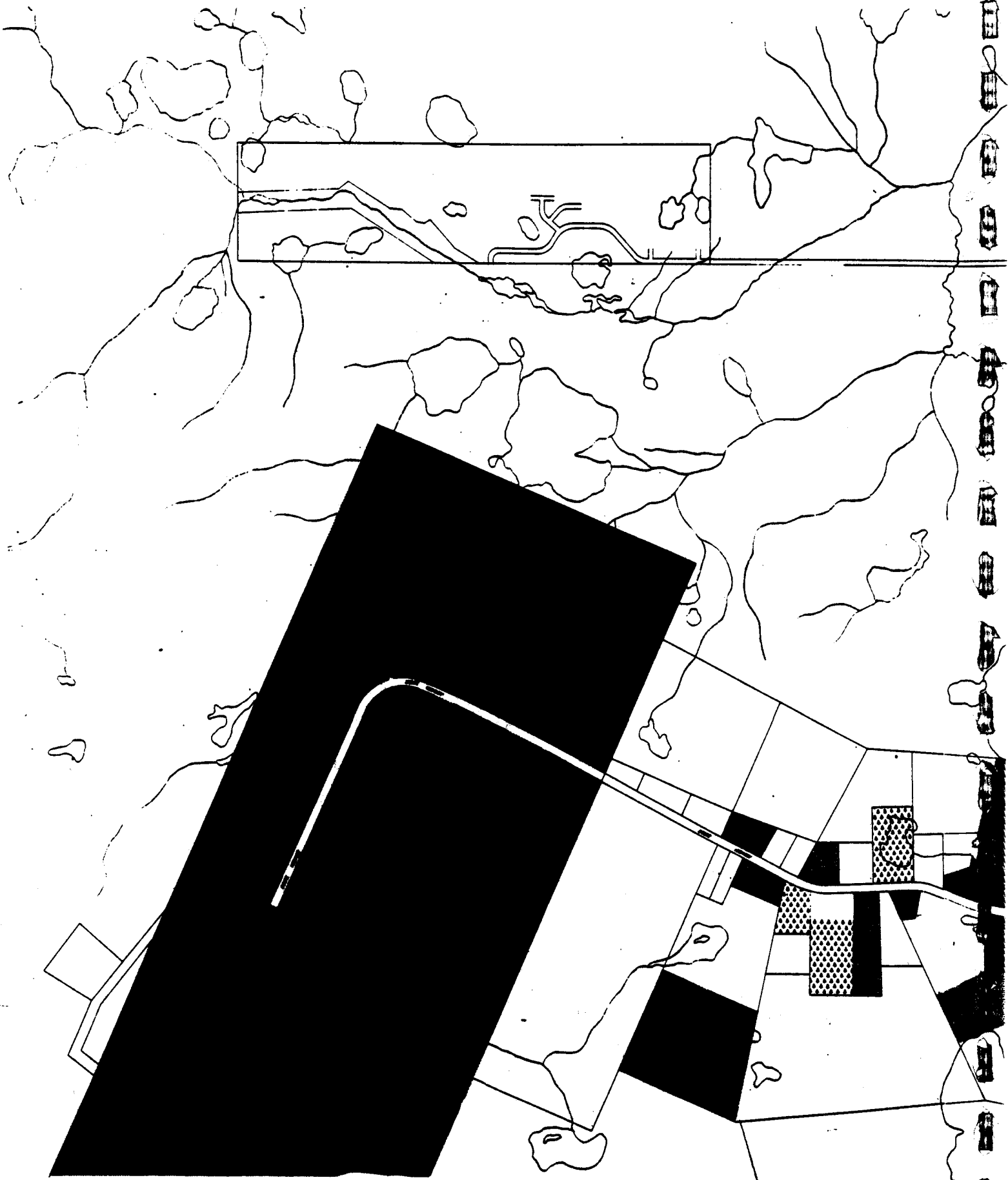


FIGURE 7

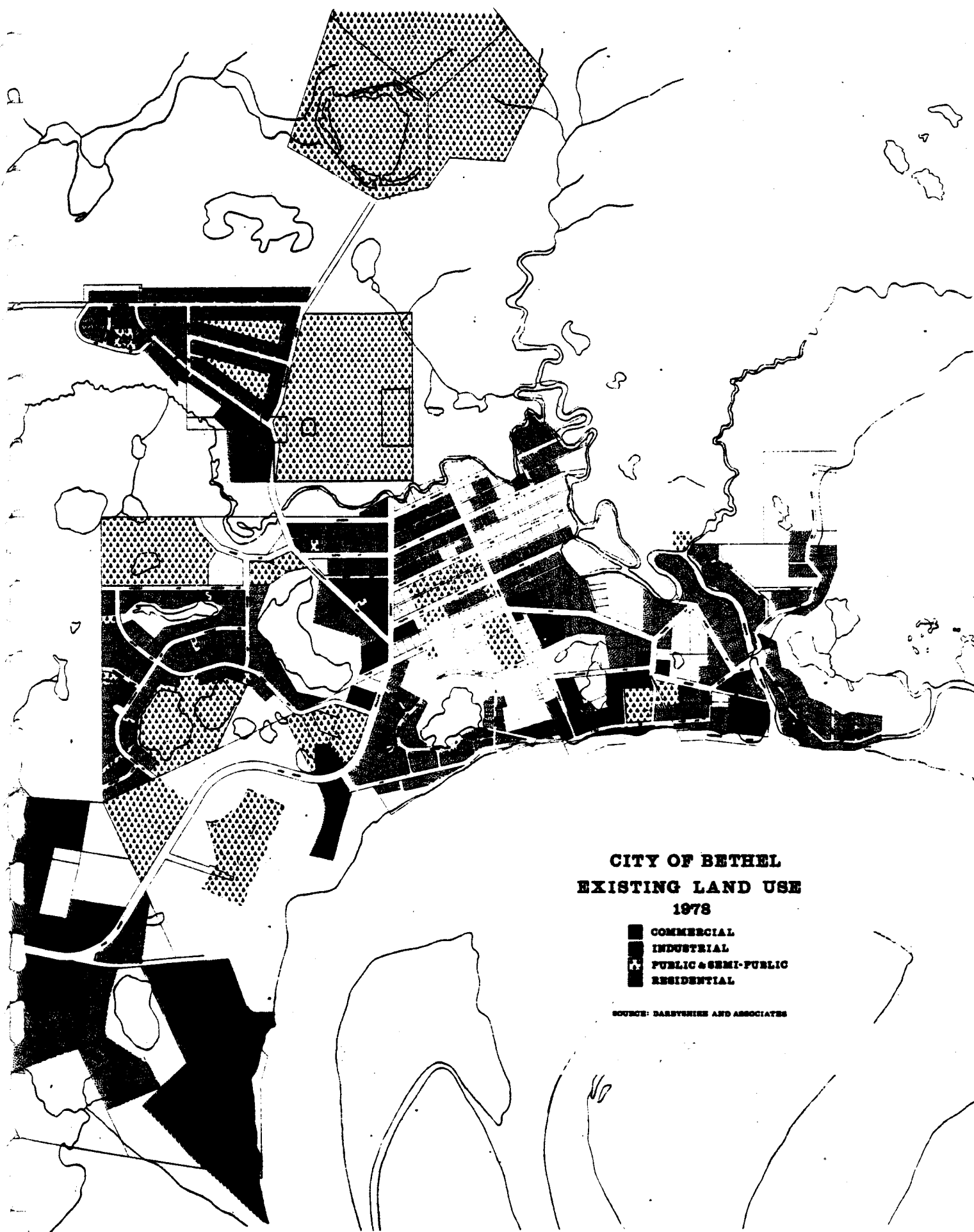
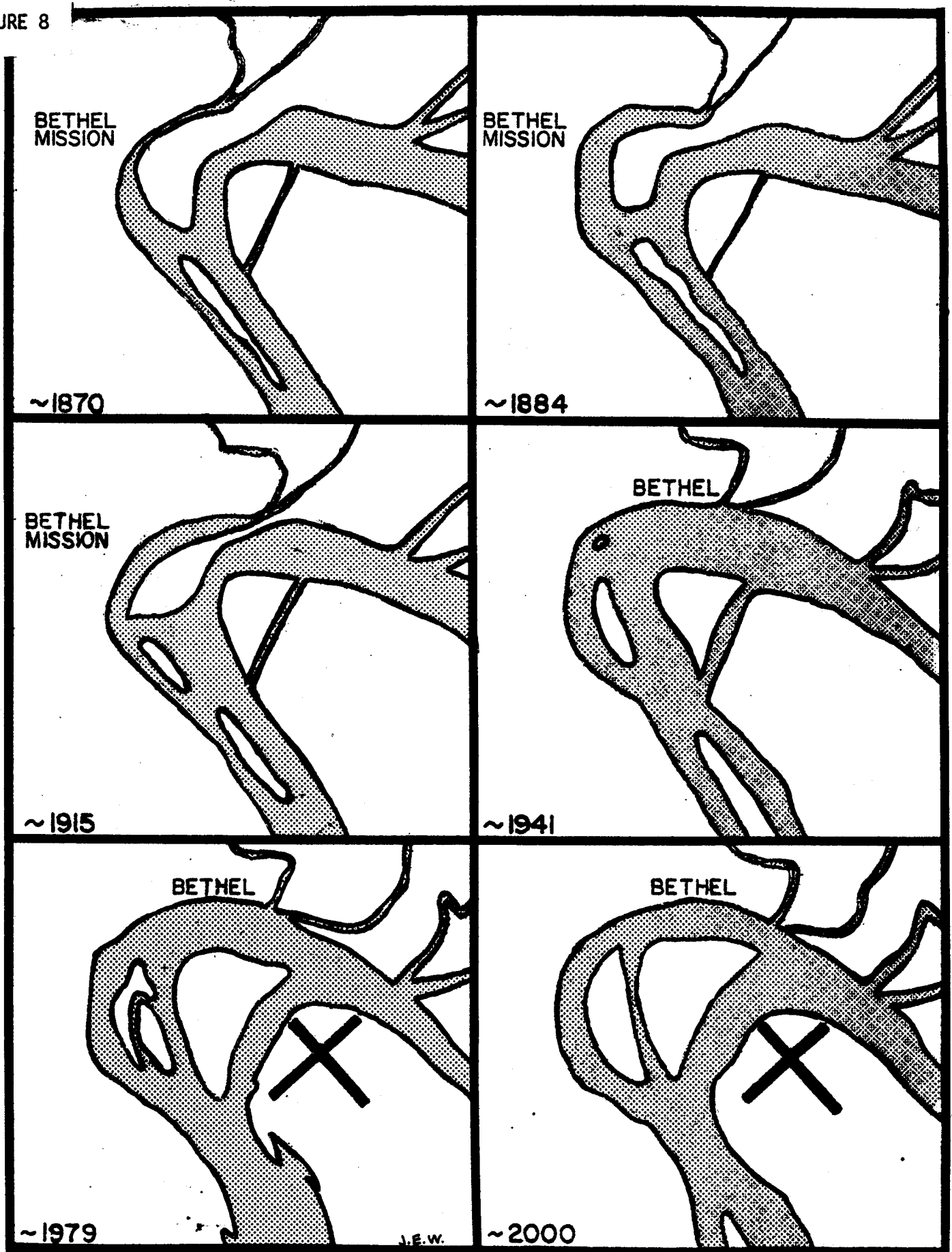


FIGURE 8



ESTIMATED CHANNEL CONFIGURATION AT 6 PTS. IN TIME OVER A 130 YR. PERIOD.

Residential development decisions made during the 1970's have further contributed to a drift away from the older areas of town. Most notable of these was the establishment of a large trailer court around 1974 off the road to the airport, well beyond the main settled areas of town, and the City subdivision west of Dull Lake. Additional residential development in the form of both apartments and single family units has also occurred in the Bethel Heights area. An exception to the location of new units in areas not susceptible flooding, however, is the Alligator Acres subdivision east of Sixth and Seventh Avenues near Brown's Slough.

Bethel's overall land use pattern is likely to become even more dispersed in the near future. A former Native allotment is being subdivided into 300 lots in an area off the new highway route between Bethel Heights and the airport. Development of this subdivision will make Bethel Heights, which was once thought of as being remote from the remainder of the community, seem relatively accessible and will further increase the reliance of local residents on motorized transport.

Another factor contributing to Bethel's dispersed development pattern has been locational decisions made by federal government agencies. As in many other rural areas of the State, federal agencies in Bethel have established a series of compounds for their employees. These compounds are located close to individual agency facilities. The most notable examples are the Public Health Service compound located next to the old hospital, the Fish and Wildlife Service compound located next to the trailer court, the Federal Aviation Administration/National Weather

Service compound located near the airport and the Bureau of Indian Affairs compound which occupies the site of a former White Alice site in the most remote section of town, well beyond the airport.

A tabulation of occupied lands within Bethel in 1978 by Darbyshire and Associates found a total of 2,371 acres in use (see Table 29). By far the largest share of this acreage (59.0 percent) was taken up by the airport. Of the remaining uses, residences took up the largest area (320 acres), followed by "public institutional" (268 acres), public open space (195 acres), other industrial (157 acres) and commercial uses (31 acres).

Bethel has been actively engaged in a formal planning program since the mid-1960's when the City applied to the U.S. Department of Housing and Urban Development for assistance under the Model Neighborhoods in Demonstration Cities program. At that time, it was felt that flooding and erosion problems were sufficiently severe to warrant the moving of the entire town back from the waterfront. While the City was not successful in obtaining this form of assistance, it became generally recognized by government agencies that the City had severe problems which were beyond its ability to correct. The Alaska State Housing Authority prepared a preliminary comprehensive plan in March 1968 and a final plan in the Spring of 1969, with construction of the Bethel Heights subdivision by the same agency also taking place during this period. More recently, the City of Bethel updated its comprehensive development plan in 1980 and has initiated actions to undertake a

TABLE 29

EXISTING LAND USE
CITY OF BETHEL, ALASKA
1978

<u>Land Use</u>	<u>Land Area</u> (acres)	<u>Percent of</u> <u>Developed Area</u> %	<u>Percent of</u> <u>Total Land Area</u> %
Residential	320	13.5	1.0
High density	(30)	(1.3)	(0.1)
Medium density	(115)	(4.9)	(0.4)
Low density	(175)	(7.4)	(0.5)
Commercial	31	1.3	0.1
Industrial	1,557	65.7	4.8
Airport	(1,400)	(59.0)	(4.3)
Other	(157)	(6.6)	(0.5)
Public	463	19.5	1.4
Institutional	(268)	(11.3)	(0.8)
Open Space	(195)	(8.2)	(0.6)
<u>Total Developed Area</u>	<u>2,371</u>	<u>100.0</u>	<u>7.3</u>
Vacant Land	<u>30,269</u>		<u>92.7</u>
<u>TOTAL LAND AREA</u>	<u>32,640</u>		<u>100.0</u>

Source: Darbyshire and Associates. October 1980. City of Bethel Comprehensive Plan.

coastal zone management program. Bethel now also has a locally based planner and an active planning commission.

DEVELOPMENT CONSTRAINTS

The major physical constraints on development in Bethel are erosion, flooding and drainage conditions. Land ownership patterns have also acted as a constraint on development here in the past.

As previously indicated, erosion has been and continues to be a major constraint on development within the City of Bethel. Not only has erosion along the waterfront caused losses of land and associated structures, roads and utilities but it inhibits further waterfront development. This is a serious problem in a community which functions as a regional marine cargo redistribution center and as a fishing port.

Efforts to control Bethel's erosion problems have thus far not been very successful. A short lived wooden revetement constructed with State and City funds during the mid-1960's proved effective against erosion caused by the velocity of the Kuskokwim River but was ineffective against erosion derived from wave action. Subsequently, the City has dumped inoperative vehicles along the riverfront and backfilled the barrier created by those vehicles with sandy silt. Reportedly, these efforts have proved to be almost as ineffective as the original wooden revetement.

Recognizing that permanent erosion control in the community was well beyond its financial means, the City of Bethel requested the Corps of Engineers to investigate the feasibility of constructing a permanent seawall. Previous investigations by the Corps had demonstrated a need for such a facility but were unable to justify a cost-benefit ratio sufficient to warrant Congressional funding. The current investigation recommends placement of rock riprap along 5,000 feet of waterfront between Brown's Slough and the Standard Oil tank farm for a cost-benefit ratio of 1.7 to 1.0, well above the required 1 to 1 minimum ratio. Nevertheless, even a favorable cost-benefit ratio does not guarantee construction as the project must first receive Congressional and Administration approval and funding. Such a process could take in excess of ten years and steps are reportedly being taken to approach the State Legislature for financial assistance.

Flooding is the other major development constraint in and around Bethel. The Kuskokwim River rises in the glaciers of Mt. Foraker and its passage across the Kuskokwim lowlands is characterized by many meanders, oxbow lakes and sloughs before it discharges into Kuskokwim Bay, an arm of the Bering Sea. The entire 50,000 square mile drainage basin of this river is underlain by permafrost and flooding is serious problem for many communities in the region. According to the Corps of Engineers:

"The primary cause of flooding in the Kuskokwim Basin is from ice jams which restrict the flow and impound the water upstream. The severity of spring floods is determined by a combination of factors, including thickness of ice, amount of snow pack, air temperatures, amount of sunshine and precipitation. The sequence of events also affects the flooding potential. For example, spring floods may occur as a result of an above-normal snowfall during the winter, followed by an unusually cold

spring, and finally, a rapid snow melt. Summer floods can result from an extreme amount of rainfall in a short period of time. High temperatures in the glacial areas or warm rain on snow and ice fields will contribute heavily to flood hazard during summer months". a/

Most known floods at Bethel have apparently been caused by jams downstream from the City. The Corps indicated that local residents attribute more damage to floating ice cakes during these floods than to the flood waters themselves.

A lack of local relief is the primary reason for the severity of flooding problems in Bethel. Most land in the community is low lying with less than a 3 percent grade and a maximum grade of 7 percent. In 1968, the Corps of Engineers estimated that 90 percent of all residences and businesses in the community had been flooded in the past and that a still higher proportion were within reach of even larger floods. Under conditions of a 100-year flood, essentially all areas in the community east of Dull Lake would be flooded, as would areas along Brown's Slough and its extension between Bethel Heights and Dull Lake. The only developed areas of the community not susceptible to flooding are a small area immediately east of Dull Lake, the Bethel Heights area and areas west of Dull Lake, including the Public Health Service regional hospital complex and the Standard Oil Company tank farm.

Bethel has experienced major floods in the past, with the most serious being recorded in 1941, 1963, 1967 and 1974. However, some parts of

a/ U.S. Department of the Army, Corps of Engineers, Alaska District. December 1968. Flood Plain Information, Kuskokwim River, Bethel, Alaska. Prepared for the City of Bethel. Anchorage.

town, especially areas near Brown's Slough, experience flooding dangers each year. Such hazards have discouraged major investment in residential structures in these areas with the exception of the Alligator Acres subdivision.

The soils of the Bethel area are considered marginal for urban development. The general surface configuration of the Bethel townsite suggests that it is a former bed of the Kuskokwim River. Soils here typically consist of deep alluvial deposits of silt and fine sands which are underlain by permafrost up to 450 feet deep. Along the waterfront area and in the central section of town, poorly drained silty soils predominate with permafrost occurring at depths of 30 to 40 inches. In low lying areas with these types of soil conditions, stagnant surface water is common and poses a constraint on development.

Permafrost conditions do not in themselves prohibit development but they do pose certain constraints. The presence of continuous permafrost limits drainage to surface runoff and leads to ponding. In addition, seasonal thawing of the active layers can result in subsidence, as can thawing of the permafrost as a result of the removal or disturbance of insulating surface materials. Well drained land suitable for development in Bethel is thus in short supply.

The availability of land has also posed constraints on development in Bethel. Originally, the ownership of large tracts of land in the "central" area of town by the Moravian Church and the federal government

forced a dispersal of development. More recently, the process of change in land ownership patterns due primarily to passage of the Alaska Native Claims Settlement Act has led to some temporary dislocations.

The Bethel Native Corporation is entitled to receive 161,000 acres of land in and near the community and has already received interim conveyance of surface rights to all formerly unreserved, unappropriated and undeveloped federal lands within the City's corporate limits. However, a significant amount of land within the community is covered by Native allotment applications. According to Darbyshire and Associates, only about 140 acres of developable land were available for residential use in 1979. This was made up of scattered vacant lots in town and one 50 acre tract and two 15 acre parcels near the trailer court. To relieve this situation, the City has offered lots for sale, while the new 300 lot subdivision between Bethel Heights and the airport should further alleviate temporary residential land shortages.

LAND STATUS

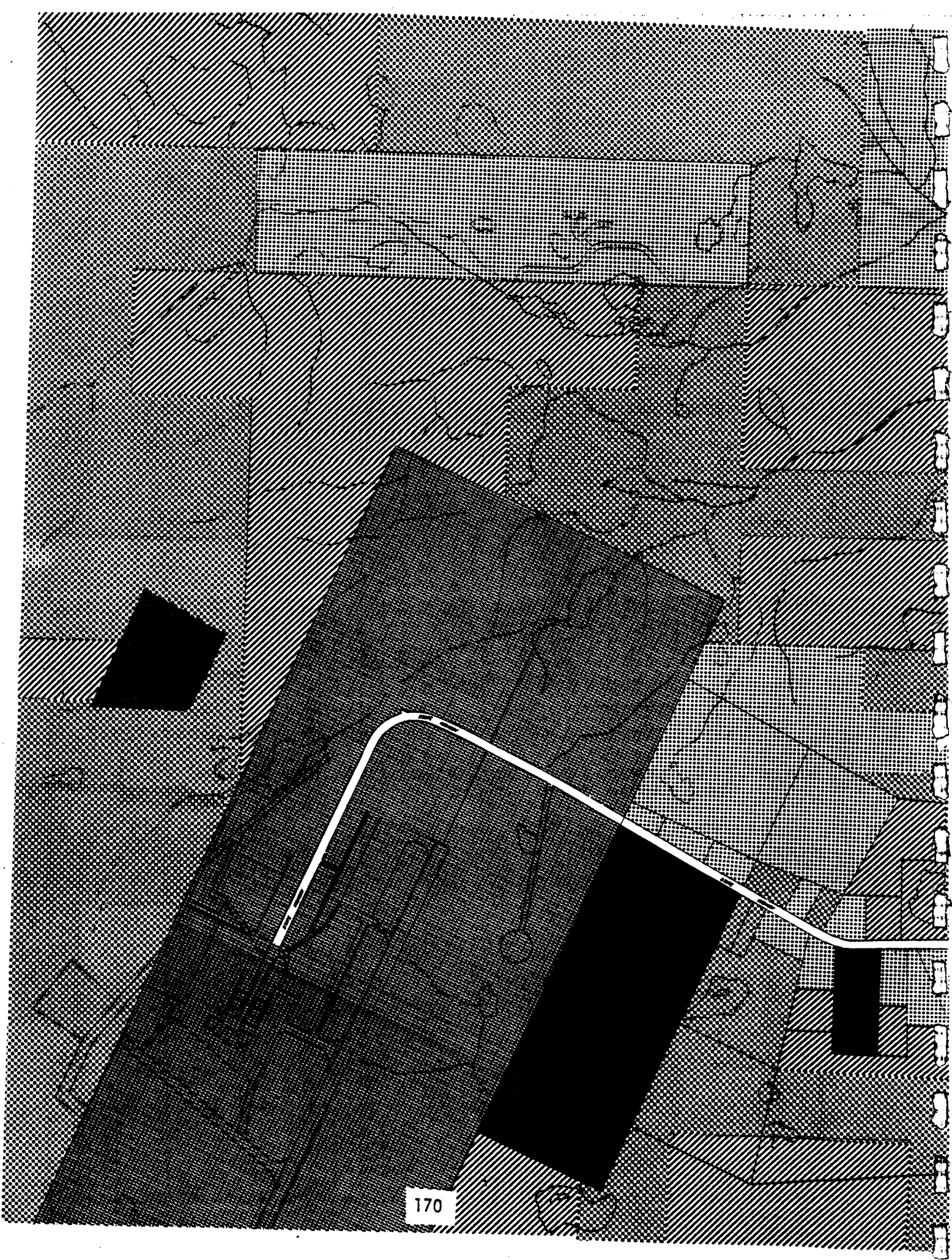
As in many other areas of the State, the status of lands in Bethel changed radically as a result of passage of the Alaska Native Claims Settlement Act in 1971. Prior to passage of the Act, most land in the community was owned by the federal government, with lesser amounts held by the Moravian church and private individuals. In fact, the non-availability of federal or Moravian church lands was a major factor shaping the form of the community's early development.

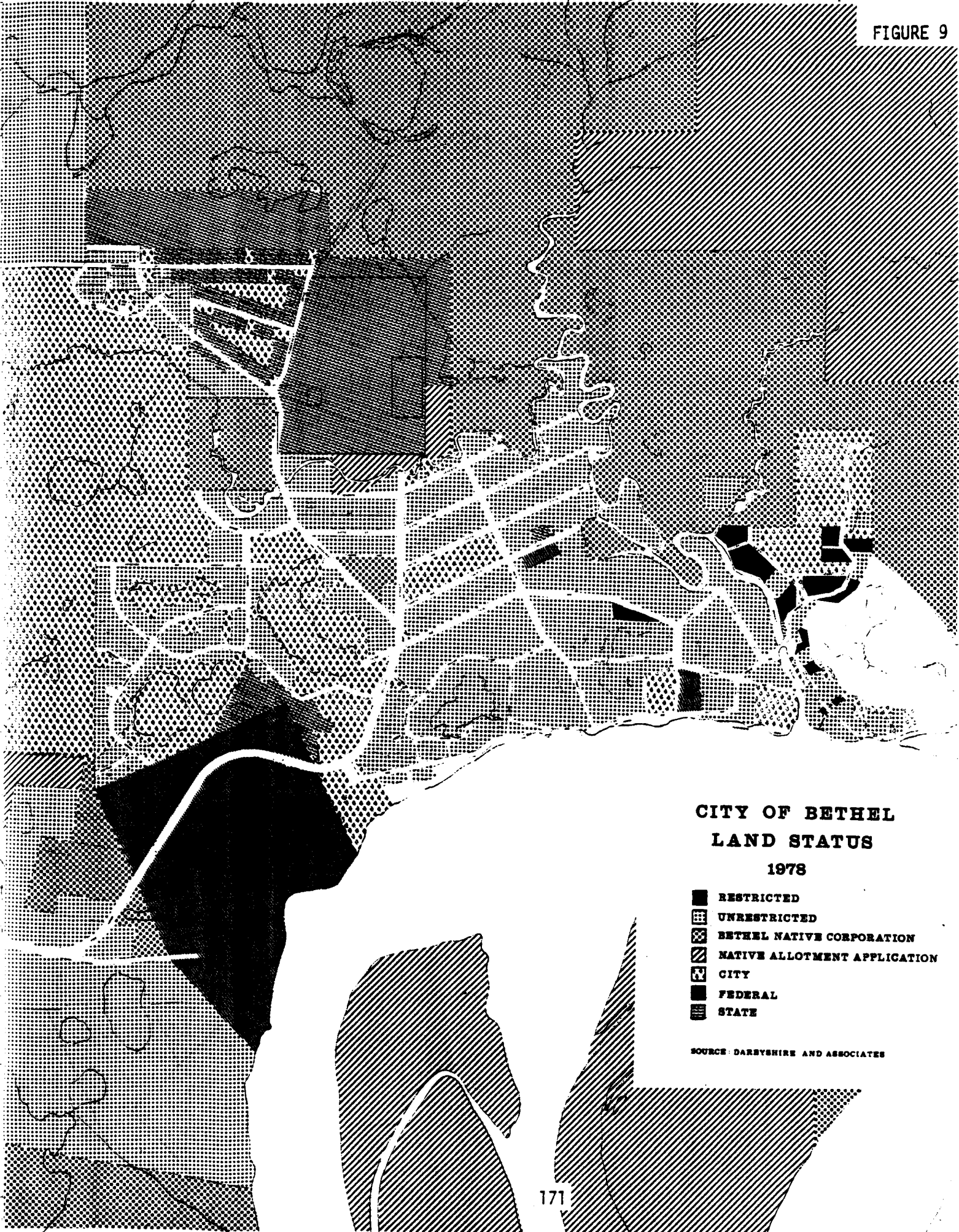
TABLE 30
 LAND OWNERSHIP
 CITY OF BETHEL
 1978

<u>Owner</u>	<u>Land Area (acres)</u>	<u>Percent of Total</u>
Bethel Native Corporation	14,421	44.2
Native Allotment Applications	11,066	33.9
Other Private	1,302	4.0
Federal	607	1.9
State	1,498	4.6
City <u>a/</u>	357	1.1
Navigable Waters	3,389	10.4
<u>TOTAL</u>	<u>32,640</u>	<u>100.0</u>

a/ Includes 188 acres west of the City subdivision which are contested.

Source: Darbyshire and Associates. October 1980. City of Bethel
 Comprehensive Plan. Anchorage.





**CITY OF BETHEL
LAND STATUS
1978**

- RESTRICTED
- UNRESTRICTED
- ▨ BETHEL NATIVE CORPORATION
- ▩ NATIVE ALLOTMENT APPLICATION
- ◻ CITY
- ▬ FEDERAL
- ▮ STATE

SOURCE: DARRYSHIRE AND ASSOCIATES

Today, the major land owner within Bethel's corporate limits is the Bethel Native Corporation (see Figure 9 and Table 30). Under section 12(a) of the Alaska Native Claims Settlement Act, the Corporation was entitled to select 161,000 acres of land in the vicinity of the community and it may receive as much as another 25 sections under section 12(b) of the same legislation. According to the Bethel Native Corporation, it currently owns close to 14,500 acres within Bethel's corporate limits, approximately 44 percent of the community's total land area. In addition, the Corporation anticipates that it will eventually acquire another 6 percent of all lands within the City under section 3(e) of the Claims Act. Included in this latter category are the old hospital site and several air navigation sites.

Under the terms of the Alaska Native Claims Settlement Act and subsequent amendments, the Bethel Native Corporation is required to transfer title for up to 1,280 acres to the City of Bethel for purposes of municipal expansion, rights-of-way for public use and other foreseeable community needs. (As amended by the Alaska National Interest Lands Conservation Act, the amount of land transferred may be less than 1,280 acres if agreed to by the village corporation and the city or, where there is no organized municipality, by the State). However, the Corporation is still working on reconveying lands to individuals under the terms of 14(c)(1) of the Claims Act and no lands have yet been conveyed to the City.

The other major land owner within the City of Bethel is the federal government but most federal lands here are blanketed by Native allotment applications. Native allotments are a form of ownership in which the federal government retains an interest and which were available to Alaska Natives prior to passage of the Claims Act. Such lands cannot be taxed by local or State government jurisdictions, nor can local or State regulations be applied to them without permission of the Bureau of Indian Affairs. According to Darbyshire and Associates, the status of allotments in Bethel has yet to be resolved by the Bureau of Land Management and such lands are therefore presently in limbo.

Another 1,302 acres of land in Bethel were in other forms of private ownership in 1978, primarily owned by individuals although the Moravian church is a significant land owner in the community. Almost all privately owned lands in Bethel are held in an unrestricted status, i.e. normal fee simple title. However, some lands near Brown's Slough are held under restricted title. This is an option available to Alaska Natives when they receive title to land in a Native Townsite. Restricted deeds retain some of the trust relationship between the federal government and Native citizens in a manner similar to those of Native allotments.

Of the 1,498 acres of State land in Bethel, 1,400 are associated with the airport property. Most of the remainder is accounted for by school sites and Alaska State Housing Authority units in the Bethel Heights subdivision.

The City of Bethel owned 357 acres of land in the community in 1978, with most being within the developed section of town or immediately adjacent to it. The largest single block of City land is an area lying immediately west of the City subdivision although City ownership of this tract has been contested by the Bethel Native Corporation. Under terms of the Alaska Native Claims Settlement Act, the City will eventually acquire up to 1,280 acres from the Corporation. In addition, the City is attempting to acquire additional lands from the State, including a 35 acre tract near the airport.

HOUSING

According to the 1970 Census, there were 715 year-round housing units in Bethel. Of these, 173 were determined to be vacant, indicating a very high vacancy rate of 24.2 percent. However, it is probable that almost all of these vacant units were uninhabitable since Bethel has traditionally had a severe shortage of housing.

A field survey conducted by Simpson Usher Jones in the spring of 1979 counted 1,100 dwelling units in the community, a net gain of 385 units since 1970. Fifty units were found to be vacant but most of them were deemed uninhabitable, leaving the City with a close to zero vacancy rate. Preliminary results from the 1980 Census recorded a total of 1,253 housing units in the community, indicating an even larger increase since 1970.

TABLE 31
 COMPARATIVE HOUSING SURVEY a/
 CITY OF BETHEL
 1970 AND 1979

<u>Housing Unit Type</u>	1970		1979	
	Number	% of Total	Number	% of Total
Single family	565	79.0	694	68.0
Multi-family	118	16.5	186	18.2
Mobile home	32	4.5	140	13.7
<u>TOTAL</u>	<u>715</u>	<u>100.0</u>	<u>1,020</u>	<u>100.0</u>

a/ Excludes 80 units of Bureau of Indian Affairs and Federal Aviation Administration housing.

Source: Darbyshire and Associates. October 1980. City of Bethel Comprehensive Plan. Anchorage.

The 53 percent increase in the number of housing units in Bethel between 1970 and 1979 occurred primarily in the private sector. During this period, the Bethel Native Corporation constructed 93 multi-family units at the entrance to the Bethel Heights subdivision; about 137 homes were constructed in the City subdivision; the Tundra North and Ptarmigan subdivisions were developed in the Bethel Heights area; and around 12 units were built in the Alligator Acres subdivision. Also during this period, the trailer court off the main route to the airport was developed and most of the community's 140 mobile home units are in this single location.

A comparison of housing types in Bethel in 1970 and 1979 (see Table 31) indicates a major increase in the proportion of mobile homes. Reportedly, the influx of trailers was in response to a severe local shortage of standard low cost housing. The proportion of multi-family units increased slightly during the same period but the proportion of single family units declined. Nevertheless, a much higher proportion of Bethel's housing stock remains in the form of conventional single family units than many other mid-sized Alaska communities.

Housing conditions in Bethel have improved dramatically since 1967 when the Alaska State Housing Authority classed 80 percent of all homes in the community as substandard. According to the 1979 Simpson Usher Jones, Inc. survey, over two-thirds of all units surveyed (excluding 80 Bureau of Indian Affairs and Federal Aviation Administration units) were in average or better condition (see Table 32). Another 99 units were

TABLE 32

CONDITION OF HOUSING UNITS a/
CITY OF BETHEL
1979

<u>Condition</u>	<u>Type of Housing Unit</u>			<u>Total Units</u>
	<u>Single Family</u>	<u>Multi-family</u>	<u>Mobile Home</u>	
Good	218	61	0	279
Average	168	123	119	410
Below Average	83	2	14	99
Poor	99	0	3	102
Very Poor	126	0	4	130
<u>TOTAL</u>	<u>694</u>	<u>186</u>	<u>140</u>	<u>1,020</u>

a/ Excludes 80 units of Bureau of Indian Affairs and Federal Aviation Administration housing.

Source: Darbyshire and Associates. October 1980. City of Bethel Comprehensive Plan. Anchorage.

determined to be basically sound but in need of minor repairs, so that structurally sound units accounted for over three-quarters of Bethel's housing stock. Of the remaining units, 102 were determined to be in poor condition, defined as needing major rehabilitation, while 130 were rated as uninhabitable and in need of demolition.

The Bethel Heights subdivision and adjacent areas were found to have the highest proportion of standard structures. By contrast, in the area east of Brown's Slough, almost 60 percent of the units were recommended to be demolished. A significant proportion of substandard units was also identified in the old downtown area west of Brown's Slough, in the Mission Lake Road area and in areas adjacent to the Kilbuck school.

Community Services and Facilities

PUBLIC SAFETY

Police

Police protection services inside Bethel's corporate limits have been provided by the Bethel Police Department since 1970 when the City assumed this responsibility from the State. The police station and jail are located on Akiak Drive near the corner of Willow Drive (part of the main highway route to the airport), within the City complex and reasonably central to Bethel's development.

The police station was constructed in the early 1970's and includes four administrative offices, a kitchen, a booking area and a jail. The jail is operated by the City of Bethel under contract to the Alaska Division of Corrections (which assumes 75 percent of operating and maintenance costs), and has a 24 bed capacity. Although this facility is in fair condition, overcrowding is a major problem and prisoners frequently have to be flown to Anchorage for incarceration. A 1978 State bond issue provided funding for a new jail in Bethel but no agreement has yet been reached as to whether it should be operated by the State or the City.

The Police Department is staffed by 12 police officers (a chief, lieutenant, 3 sergeants, a corporal and 5 patrolmen), 12 jail personnel, 4 hospital security guards, an animal control officer, an administrative assistant and a clerk/typist. Jail staff also handle dispatcher and communications duties, while part-time help is used to provide matron and cooking services at the jail plus additional clerical work. During the summer, the Police Department normally hires more people to handle the harbor patrol (funded through six CETA positions in 1980). Police equipment includes five radio-equipped 1980 Ford pick-ups and an old harbor boat.

Locally based Alaska State Troopers are primarily responsible for providing law enforcement services to villages outside Bethel but also render assistance to the Bethel Police Department, as needed. The Bethel detachment is located on Fourth Avenue next to Kilbuck School, and is staffed by 9 officers (a first sergeant, a corporal, 4 constables

TABLE 33

PART I CRIMINAL OFFENSES
CITY OF BETHEL
1977 - 1980

<u>Criminal Offense</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>Percent Change 1977-1980</u>
Homicide	1	2	0	1	0.0
Rape	13	11	22	14	7.7
Robbery	1	3	1	1	0.0
Assault (aggravated)	74	90	84	24	-67.6
Burglary	163	84	128	51	-68.7
Larceny	135	158	222	191	41.5
Auto Theft	152	135	112	75	-50.7
<u>TOTAL</u>	<u>479</u>	<u>483</u>	<u>569</u>	<u>357</u>	<u>-25.5</u>

Source: Alaska Office of the Governor, Criminal Justice Planning Agency. Annual Report. Crime in Alaska. Juneau.

and 3 troopers) who serve a total of 57 villages in the Bethel region. State Fish and Wildlife Protection personnel based in the community include an officer who may assume general law enforcement functions although most of his work is related to enforcing State fish and game laws.

During the past few years, the incidence of serious crime in Bethel peaked in 1979 with 569 offenses but dropped 37 percent in 1980 (see Table 33). Crimes against property (burglary, larceny, auto theft) accounted for most of the serious offenses and these decreased during the past year, especially burglaries which were down 60 percent. Crimes against people have also generally declined since 1977. Aggravated assaults were down almost 68 percent although the number of rapes increased slightly.

While Part I crimes represent only about 8 percent of the Department's service requests, they represent a disproportionate investment of the Department's man hours because they entail lengthy investigation and court proceedings and often involve sophisticated investigative techniques.

Fire Protection

The Bethel Fire Department provides fire protection services over a 50 square mile area, including Bethel, between the bluffs and Nick O'Nick's fish camp and across the Kuskokwim River. The Department was organized as a volunteer force in 1965 but is now staffed by five salaried personnel

(a fire chief, a fire fighter/engineer, two fire fighters and a part-time lieutenant/training officer) plus 25 volunteer firemen and 10 volunteer EMT trained ambulance personnel.

Bethel's fire station is located on Ridgecrest Drive near the entrance to the Bethel Heights subdivision. The building is a former Public Health Service store house which was built in 1973 and was remodeled by the City in 1975. It is a one-bay structure which houses Fire Department vehicles and the fire chief's office on the ground floor, with the firemen's dormitory and two apartments (one reserved for the fire chief) on the second floor. The fire station is in very poor condition, primarily because it was constructed directly on the ground without a foundation or insulating gravel pad, and is rapidly sinking into the permafrost. In addition, the building is too small to house all of the Fire Department's rolling stock.

A new fire station is currently under construction in the City complex, next to the Phillips Alcoholism Treatment Center. This \$1.9 million facility is being built with a combination of federal, State and City funds and will consist of a four-bay station, a 30 foot hose tower, a firemen's dormitory, a fire chief's apartment, a classroom, an office and a large amount of storage space. The new structure is scheduled for occupancy in April 1981, at which time the old fire house will be demolished.

Fire Department rolling stock presently consists of a 1969 light attack pumper which carries 250 gallons of water and has a 30 gallons per minute (gpm) pumping capacity; a 1972 Class "A" 1,000 gallon pumper with a 1,000 gpm pumping capacity; a 1980 Class "A", 55-foot aerial pumper with a remote control tip on top of its ladder and which carries 300 gallons of water with a pumping capacity of 1,000 gpm; plus a 1980 tanker which carries 1,500 gallons, pumps at 125 gpm and which is mainly used as a water source; a 1978 four-wheel drive rescue truck used to carry rescue equipment; a 1977 ambulance; and a 1981 ambulance. Areas outside Bethel's road network are served by helicopter or boat.

Bethel has no areawide piped water system. As a result, the availability of alternate water sources is a critical factor in effective fire fighting in this community. Fourteen hydrants in the Bethel Heights subdivision have a 440 gpm capacity at 50 pounds pressure and are used to provide water for fire fighting. In addition, the City complex has four hydrants but, because of relatively low hydrant pressure in this area, they are not generally used. Other water sources include sprinkler systems at the Kuskokwim Inn and Swanson's grocery store, the Fire Department's tanker vehicles and the City's three water trucks, each of which carries 1,500 gallons of water and which respond to all fire calls. The major informal water source is the Kuskokwim River.

Bethel's Insurance Services Office (ISO) rating is 8 for residential areas, 8 for commercial buildings within 1,000 feet of a hydrant and 9 for all other structures. However, the City has recently expended a

good deal of effort toward improving local fire fighting capability and is hopeful that its ISO rating will be upgraded to a 7 when its new fire station is operational.

According to the fire chief, the major fire protection problem in Bethel is related to inadequate area coverage by piped water systems with hydrants. Severe weather conditions during the winter months also often hamper fire fighting effectiveness. The combination of severe cold and high winds makes fire fighting extremely difficult and two fire trucks recently froze in place under this type of situation. While Bethel's development is generally dispersed, it is relatively dense in areas such as Bethel Heights, the trailer court and the old downtown district and, under "ideal" conditions, a major fire in these areas could easily involve several structures and be extremely difficult to bring under control.

Bethel has had more than its share of serious fires in the past, some of them involving loss of life. According to the fire chief, a number of Alaska State Housing Authority (ASHA) homes in the Bethel Heights subdivision burned down shortly after they were built and resulted in several deaths. More recently, the community was declared a federal disaster area in December 1975 when its power plant burned down while an October 1979 fire burned the Alaska Commercial store to the ground for a total loss estimated at \$4 million. However, no fire-related deaths occurred for several years prior to 1980 when there was a total of five deaths, three of them in a house fire and two in a fuel barge explosion.

In addition to fire protection, the Bethel Fire Department provides emergency ambulance services free of charge. The Department operates two ambulances, a 1981 custom built four-wheel drive ambulance which is fully equipped with emergency rescue and medical equipment, including four stretchers; and a 1977 ambulance with first aid and intravenous equipment. All 10 volunteer ambulance personnel are trained at the hospital under the emergency medical treatment (EMT) program sponsored by the Yukon-Kuskokwim Health Corporation. Emergency ambulance calls reportedly averaged three per day during a several month period in 1980.

Aside from City services, the State and the Federal Aviation Administration (FAA) have firefighting capability in the Bethel area. The State maintains a 1978 crash rescue truck at the airport. This quick response vehicle is equipped with 500 gallons of water and light water, 30 gallons of foam, 500 pounds of dry chemicals and dry chemical extinguishers. The volunteer firefighting staff includes a chief, an assistant chief and 23 firemen. Firemen are alerted by the siren at the airport. Firefighting equipment at the FAA compound includes a 200 gallon and a 300 gallon pumper, each mounted on a trailer.

HEALTH AND SOCIAL SERVICES

Health and social services in the Bethel area are provided by a combination of public, semi-public and private organizations. Health facilities include the 50-bed Public Health Service regional hospital, the Bethel

Health Center, the Phillips Alcoholism Treatment Center and the Bethel Prematernal Home. A wide variety of social services are offered by public and private providers which include Bethel Social Services, Inc., a private non-profit organization; the Yukon-Kuskokwim Health Corporation; the Bethel Group Home; the Tundra Women Coalition Resource Center; the Association of Village Council Presidents; and the Bureau of Indian Affairs.

Yukon-Kuskokwim Delta Regional Hospital

The Yukon-Kuskokwim Delta Regional Hospital is located between the main part of town and the airport and is accessible via the main route to the airport. This facility is operated by the U.S. Public Health Service which has maintained a hospital in the Bethel region since 1916. The original hospital was built in Akiak but was abandoned in 1939 when a new facility was constructed in Bethel on a site across from the existing hospital. Despite severe erosion problems associated with the original site, the hospital was rebuilt there in 1954 following destruction of the original facility in a 1950 fire. This 42-bed medical/surgical facility, in turn, has been replaced by a modern 50-bed hospital which was completed in September 1980.

According to the Public Health Service, the Yukon-Kuskokwim Delta Regional Hospital serves the hospital needs of about 18,000 people in 52 villages scattered across an 85,000 square mile area. The facility has 21 general medical and surgical, 18 pediatric, 7 obstetrical and 4

maternity beds, plus another 4 which are reserved for the mental health unit. In addition to patient beds, hospital facilities include a surgery, a delivery room, an emergency room, an outpatient clinic, an X-ray department, a laboratory, a physical therapy room, a dental clinic, a pharmacy and an environmental health branch. Ambulance service is contracted to the Yukon-Kuskokwim Health Corporation, with the vehicles being housed at the Bethel Fire Department.

Permanent medical staff associated with the Bethel hospital includes 15 physicians and 4 dentists. The hospital also has 73 nursing personnel including 42 registered nurses and an obstetric/gynecological nurse practitioner, with the remainder made up of licensed practical nurses, nursing assistants and ward clerks. Aside from physicians, there are another 12 hospital clinical services staff members, including a physician's assistant specializing in orthopedics, while the dental unit employs 8 persons in addition to the 4 dentists. Finally, the hospital has a 5 person administrative staff which includes an administrator, 2 persons in the community development branch and a social worker.

An additional 68 persons are employed in culinary, janitorial, laundry, maintenance, supply and clerical functions. Staff positions not presently filled but authorized include a physical therapist, a psychiatrist, a psychiatric nurse and an anesthetist.

Most general surgical care provided at Bethel involves minor elective surgery. Major elective and major emergency surgery is done at the

Alaska Native Medical Center in Anchorage and a large share of the admissions at the Anchorage facility come from the Bethel region. Consultation with specialists at the Alaska Native Medical Center is available by phone on a 24-hour basis and the Anchorage facility periodically sponsors specialty clinics at the Bethel hospital. Clinics scheduled between August 1980 and June 1981 included internal medicine, orthopedics, pulmonary, cardiac, ear-nose-throat, surgery, eye, gynecology and urology.

According to the Public Health Service, a total of 8,337 inpatient days were logged at the hospital during fiscal year 1980, with the average length of patient stay being 4.2 days (see Table 34). The hospital occupancy rate of 58 percent in 1979 was higher than the national average of 53 percent for government hospitals in the 25-49 bed category. Figures provided by the Public Health Service indicate an increase in the number of admissions, but a continued reduction in average length of stay. This pattern reflects a general shift from inpatient to ambulatory care and the Public Health Service's policy of sending long term care patients to the Alaska Native Medical Center in Anchorage.

According to the Public Health Service, outpatient visits in Bethel have increased steadily. However, year to year trends are obscured by a 1979 change in data gathering systems by the Public Health Service. As a result, pre-1979 figures are considered slightly high and 1979 figures are somewhat suspect.

TABLE 34

YUKON-KUSKOKWIM DELTA HOSPITAL USAGE
FY 1977 - FY 1980

	<u>FY 1977</u>	<u>FY 1978</u>	<u>FY 1979</u>	<u>FY 1980</u>	<u>Percent Change FY 1977-FY 1980</u>
<u>Inpatients</u>					
Total Admissions	1,566	1,737	1,581	1,953	24.7
Total Inpatient Days	7,419	7,939	7,064	8,337	12.4
Average Length of Stay	4.7	4.6	4.5	4.2	-10.6
Occupancy Rate	48.3	51.6	46.1	57.6	19.3
Average Patient Load	20.3	21.7	19.4	24.2	19.2
<u>Outpatients</u>					
Total Outpatient Visits	43,371	48,741	33,851	40,347	- 7.0

Source: Public Health Service, Health Statistics Section. Personal communication.

The new facility with its increased bed capacity will be better able to accommodate the needs of the growing Delta region. Services for the first year of operation of the new hospital are not expected to expand appreciably. Emergencies and routine care will be accommodated in Bethel but persons requiring surgery will continue to be referred to Anchorage.

During the past few years, the Public Health Service has noted a significant increase in the number of accidents, poisonings and violence, with many of these incidences being alcohol-related. In the Yukon-Kuskokwim delta, as in many other areas of the State, alcohol abuse is considered to be a major health problem. Drownings are also relatively common, some of them alcohol-related and others related to the fact that many people in the region cannot swim. According to the Public Health Service, the leading causes of hospitalization in this area are deliveries, accident and injury, respiratory diseases, otitis media, influenza and pneumonia, and skin diseases. In addition, the Yukon-Kuskokwim delta region has the State's highest tuberculosis death rate.

Despite the fact that the Bethel hospital is brand new, it is already apparent that parking space is inadequate. This is due in large part to the fact that the building was designed in 1968-69 when there were many fewer cars in the community. Other improvements underway include the rehabilitation of 40 hospital housing units located across the road at the old hospital site. These units are expected to be completed by March

1981. Additional housing will be required when the full staffing level is reached but there are no immediate plans to construct new units.

Private Medical Services

There are no private physicians in the Bethel region but there is a private dentist in Bethel. Itinerant dental and eye care is provided to the villages through contract services funded by the Public Health Service.

Bethel Health Center

The Bethel Health Center is located in the hospital building and is staffed by two State Public Health nurses and a supervisor who also supervises the operations of 7 itinerant nurses serving the needs of other communities in the region. Other staff include an audiologist and secretarial personnel.

As elsewhere in the State, the emphasis of Public Health nursing is on preventive health care. A wide range of services is provided, including venereal disease clinics, immunizations, hearing screenings, well-child clinics and prenatal clinics, family planning, preventive health education, referral services for mental disorders and substance abuse, and health surveillance. In the absence of immediate medical care, the nurses treat minor illnesses and injuries, as well as provide training and assistance to the community health aides located in the villages. The

staff coordinates its efforts with those of nurses in the schools and at the hospital.

Phillips Alcoholism Treatment Center

The Phillips Alcoholism Treatment Center is operated by the City of Bethel with State Alcoholism funds and is both a non-medical detoxification facility and inpatient alcoholism treatment center designed to meet the needs of Bethel and twelve other villages in the Bethel region. The Center provides sleep-off facilities, non-medical detoxification, outpatient counseling and some outreach and after-care programs plus community prevention and education services. It is located in the City complex and has been in operation since 1978, although the inpatient program was not initiated until September 1980.

The Center is a pleasant wood frame building about 3,200 square feet in area although space is reportedly a problem. Approximately half of the building is taken up by the detoxification unit which has a 10 bed capacity and includes four sleep-off rooms, an isolation room and an office. The other half of the building is taken up by the inpatient program which has an 8 bed capacity and includes four bedrooms, an office, an activities room, a dining room and a kitchen. In addition, the building has bathrooms and a laundry room which serve all users.

As of October 1980, staffing at the detoxification unit included 3 EMT supervisors, 5 detoxification attendants, 3 counselor trainees and a

detoxification supervisor. Staffing for the inpatient program was made up of a treatment director, a community education specialist, a substance/ use counselor, an inpatient counselor and 2 outpatient counselors.

There were also four general employees, including the director of the facility and the director of the Bethel Alcoholism Safety Program, while another three positions were vacant.

According to its director, 98 percent of the Phillips Alcoholism Treatment Center's clientele comes from the Bethel region although it has taken referrals from outside the region, mostly from Anchorage and Juneau. In 1979, the Center dealt with 3,975 detoxification patients, up 33 percent from the previous year. The Center also counseled 251 clients on an outpatient basis in 1978/1979 and reported that it had treated 13 inpatients between September 1980 and the end of October of the same year.

Bethel Prematernal Home

The Bethel Prematernal Home is operated by a non-profit corporation funded by the Public Health Service, the City and private donations. This facility was established in 1966 to provide interim housing for pregnant women from outlying villages before they entered the hospital to have their babies delivered. The current facility was built in 1976 and has a 20 patient capacity. As well as being a place to stay, the Home offers instruction in labor and delivery, health, nutrition, infant care, contraception methods, maternal and child health, and venereal

disease detection and treatment. One hundred seventy-one women used the facility in 1977, staying an average of 19.6 days. In 1980, staff at the Home reported an average of 10 to 13 patients from spring through fall and 16 to 20 patients during the winter months.

Yukon-Kuskokwim Health Corporation

The Yukon-Kuskokwim Health Corporation is a private non-profit corporation charged primarily with health planning and program development for Bethel plus 48 villages in the Bethel region. The Corporation has been in existence since 1969 and is funded by contracts with the Public Health Service and State and other grants.

The major focus of Yukon-Kuskokwim Health Corporation's program is to upgrade the health of the people of the region. One of the primary vehicles for this is the community health aide program under which villages with a population of 50 or more have at least one resident health aide. The health aide is trained in advanced first aid and medical protocol and treats minor ailments. For more serious ailments the hospital is contacted by radio. The Corporation employs 63 health aides and 53 alternative health aides. Training for the aides is administered by the Corporation with classes held at the outpatient clinic of the hospital.

Other Yukon-Kuskokwim Health Corporation programs include emergency medical services; accident prevention; maternal and child health and

family planning; dental disease prevention; otitis media; eye care; mental health; alcoholism prevention; health education; and employee and career development. The alcoholism prevention program is associated with the Phillips Alcoholism Treatment Center while the hospital has 4 beds and a padded room dedicated to the mental health program. A visiting psychiatrist presently visits the Bethel hospital once a month for 2 or 3 days to see patients and occasionally also travels to villages in the region. However, when a full-time psychiatrist is hired, the hospital will discontinue using mental health beds for general medical use and instead reserve them for mental health treatment.

Social Services Facilities

Bethel has a number of social service facilities operated by non-profit corporations. These facilities include the Tundra Women Coalition Resource Center, the Bethel Group Home, the Bautista House, the Lizzie Kameroff Infant Center, the Bethel Day Care Center, an Emergency Foster Care program and others.

The Tundra Women Coalition Resource Center acts as an emergency shelter for battered women and as a rape crisis center and maintains a 24-hour crisis line. In October 1980, this facility was housed in a large quonset in the the old downtown district but its operators were seeking funding for a new structure. Most funds for the Center's operation come from the State and from a small Law Enforcement Assistance Administration (LEAA) grant.

The Bethel Group Home is operated by a private non-profit corporation which receives State funds to provide resident child care for boys between the age of 12 and 18 who are referrals from either the Division of Corrections or the Division of Social Services. This facility is located in Unit 93 in Bethel Heights and can accommodate as many as 8 boys from Bethel and its region at a time.

Bethel Social Services, Inc. is a locally based private-non profit organization which has been in existence since January 1969. The organization acts as a clearinghouse for service demands and available social programs and currently administers seven programs in Bethel. Most of these programs are available only to Bethel residents. The organization is staffed by a director, a secretary and a bookkeeper and relies heavily on CETA positions rather than on volunteer help.

One program administered by Bethel Social Services, Inc. is the Bautista House. This 16 bed facility is located across from the Kilbuck school and was opened in 1980 to provide training and care in a group setting for adults who are retarded, mentally ill or handicapped. Funds for the operation of the Bautista House are derived primarily from State Revenue Sharing and payments by residents. Also, persons who qualify for the Developmental Disability program (seizure disorders, autism, retardation or cerebral palsy) are able to benefit through additional State funding and services.

Bethel Social Services, Inc. personnel indicated that Statewide facilities such as the Alaska Psychiatric Institute (API) in Anchorage are too crowded to be able to give the level of training and care afforded Bautista House residents and would like to see the local facility expanded. The Bautista House served 15 developmentally disabled persons between January and October 1980.

The Bautista House is divided internally into a central/recreation room, a kitchen/laundry, two bathrooms, five bedrooms and a staff apartment. Although the facility has a 16 person capacity, only about 9 of these people are permanent residents. Usually about 5 residents are classed as semi-permanent and some of these people work part of the year, while Bethel Social Services, Inc. attempts to keep the 2 remaining beds available for transient residents. Included in this group are persons coming into Bethel from elsewhere in the region for psychiatric consultation.

The Lizzie Kameroff Infant Center offers infant care and infant learning programs. The infant care program serves only local children and is supported by parent contributions and donations whereas the infant learning program serves not only Bethel but all villages within the Lower Kuskokwim School District and is funded through a contract with the Alaska Department of Health and Social Services. The Center is licensed for 29 children up to three years of age and is located off the road to the airport, a short distance west of the trailer court.

The Bethel Day Care Center is located in a City-owned building on the Park Block in the old downtown area. Although the structure was built as recently as 1970, it is now in very poor condition and its replacement is being sought. The Center provides day care services for children aged between three and seven years of age. According to Bethel Social Services, Inc., the Center served an average of 42 children during 1980.

The Emergency Foster Care Program is located in the Bethel Receiving Home which is associated with the Lizzie Kameroff Infant Center. The Receiving Home was completed in 1980 and is licensed to care for 11 children although it was actually designed to accommodate 24. Facilities at the Home include a kitchen, 5 bedrooms, 2 bathrooms and a small apartment for resident "parents".

Bethel Social Services, Inc. also operates a Professional Assistance Team for the Chronically Handicapped (PATCH) for all villages in the Lower Kuskokwim School District. Under this program, Bethel Social Services, Inc. provides the School District with special educational materials and services for handicapped students. Funding for the program is provided by the Lower Kuskokwim School District.

Public Assistance

A variety of federal, State and private organizations deliver public assistance-related programs in the Bethel area. The Bureau of Indian

Affairs office in Bethel provides a range of services directly to 30 villages in the Bethel region and contracts with the Association of Village Council Presidents (AVCP) to provide services to another 26 villages. These Bureau of Indian Affairs programs include social services, employment assistance, college assistance, tribal operations, credit and finance, the Housing Improvement Program and realty.

The Association of Village Council Presidents is a regional non-profit organization which delivers Bureau of Indian Affairs and several other agency programs throughout the Calista region. Such programs are designed primarily to promote the social and general welfare and education of the region's Alaska Native residents. Aside from Bureau of Indian Affairs' contracted programs, AVCP operates the Headstart Program which is funded directly by the U.S. Department of Health and Human Services and CETA program funds earmarked for Native Americans which are derived from the Division of Indian and Native American Programs (DINAP). This is the largest CETA program in the State with an annual budget in excess of \$4 million.

Housing assistance is provided by the AVCP Housing Authority which serves the same area as AVCP but has its own board of commissioners. In addition, AVCP administers Housing Improvement Program funds under contract to the Bureau of Indian Affairs. However, most low income housing in Bethel is managed by the Alaska State Housing Authority which still owns the units in the original Bethel Heights subdivision.

Legal assistance is available to eligible recipients through Alaska Legal Services, a private non-profit national corporation supported by a combination of federal, State and private funds. Alaska Legal Services provides legal representation in civil matters and its Bethel office is staffed by four attorneys. Also, the State Public Defender Agency has an office in Bethel and is available to provide legal representation in criminal matters for those who are unable to afford private counsel.

Finally, the aged, blind and disabled and dependent children may receive supplemental income from the State Division of Public Assistance which maintains an office in Bethel and from the Social Security Administration's Supplemental Income program. Food stamps are also available for eligible recipients.

EDUCATION

Because it is a second class city, education is not a local government responsibility in Bethel. Instead, education services in the community are provided by the Lower Kuskokwim School District, a State-funded Rural Education Attendance Area (REAA). The Lower Kuskokwim School District operates high school programs in 23 villages and elementary school programs in 6 villages in the Lower Kuskokwim region, with elementary schools in the remaining villages currently being operated by the Bureau of Indian Affairs. In Bethel, the Lower Kuskokwim School District operates the Mikelnguut El Tnaurviat school (an elementary facility for children in kindergarten through the second grade which is

commonly referred to as M.E.), the Kilbuck school which houses elementary and junior high school students (kindergarten through the 8th grade), and the Bethel high school which was also a regional facility until May 1980. In addition, the School District operates a local pre-school program for special education students.

Administratively, the Bethel schools are divided on an elementary (kindergarten through the 6th grade), junior high (7th and 8th grades) and high school (9th through the 12th grade) basis. The school district is responsible for the hiring of teachers and the maintenance of school plants under its jurisdiction. However, the State is directly responsible for the construction of new school facilities.

The M.E. school shares a 40 acre site adjacent to the Bethel Heights subdivision with the Bethel high school and the administrative offices of the Lower Kuskokwim School District. This facility was constructed in 1974 and includes 10 teaching stations, an instructional media center, a multi-purpose room/cafeteria, a kitchen, a work room, offices for the principal and a nurse and storage space. The building is in very good condition but is reportedly under-utilized and the School District is considering transferring students attending kindergarten through the second grade at the Kilbuck school to M.E.

The Kilbuck elementary school is located on a 5.8 acre site on Fourth Avenue, next to the National Guard Armory. The original facility was built in 1960, with major additions in 1962, 1965 and 1968. Currently

the school has 23 classrooms, a home economics room, a science room, a library, a cafeteria, a teachers' lounge, offices for the principal and a nurse, plus a limited amount of storage space. The building is attached to the National Guard Armory which is utilized for multi-purpose room space. Major repairs to the school roof were carried out in 1979 and, according to School District officials, the Kilbuck elementary school is now in fair condition.

The junior high portion of the Kilbuck school consists of 10 classrooms in relocatable units located behind the main building. Construction of these relocatable units was carried out in two stages in an effort to meet an increasing local need for elementary classrooms. Six one-classroom units were built in 1966, while two two-classroom units for special education were added in 1970. The School District considers these units to be in very poor condition and has rated the replacement of the community's junior high school facilities as the District's number 2 priority. No site for a new junior high school has yet been selected.

The Bethel high school was constructed as a regional facility in 1971 on a 40 acre site adjacent to the Bethel Heights subdivision. However, since May 1980, the school has served only local students. The ground floor of the former dormitory building has since been converted to a cafeteria for the high school, while a portion of the second floor now houses administrative offices of the Lower Kuskokwim School District.

According to School District officials, the Bethel high school is in good condition and, although the interior of the facility has been modified somewhat, no major repairs have yet been needed. The school houses 12 general classrooms plus an additional 11 special purpose rooms including a music room, a speech/hearing room, a chemistry and a science lab, a clothing and textile lab, a food lab and five shops (auto, metal, wood, aviation and electronics). The school also has a gymnasium, a cafeteria, a student center and student body assembly room, a dental clinic and a student store plus administrative office and storage space. However, a swimming pool is felt to be a major unmet need and this is listed by the District as its number 4 priority.

School District professional staff based in Bethel includes 67 administrative personnel, of whom 64 are associated with the District's central office. Other administrative staff are the principal and vice-principal of the Kilbuck school and the high school principal. As of October 1980, the School District had 64 teachers stationed in Bethel. Eleven of these were associated with the M.E. school, 37 with the Kilbuck elementary/junior high school and the remaining 16 with the Bethel high school. In addition, the District had 25 teacher aides in Bethel and another 26 persons performing kitchen, custodial and maintenance functions.

Trends in high school enrollment in Bethel are misleading since this facility also served students from elsewhere in the region until May of 1980. However, despite a healthy rate of population growth, elementary

school enrollments in Bethel declined 8.3 percent between 1970 and 1980 (see Table 35). This is not an unusual phenomenon. Declining school enrollments have recently been experienced by school districts around the State and throughout the nation. In most cases, this does not indicate a decrease in total community population but a decline in the birth rate, a phenomenon which is taking place nationwide. At the time of the 1970 Census, the largest population group in Bethel was between 5 and 9 years of age. These children are now in the high school grades or have left school and their place in the elementary school has been taken by a numerically smaller group. Another contributing factor in Bethel has been an influx of whites with few dependents into the community.

The Lower Kuskokwim School District does not have definitive standards for numbers of students per classroom although it attempts to ensure a ratio of 125 square feet per elementary school student and 150 square feet per junior high and high school student. Problems cited by the School District were high energy costs and the deteriorated condition of the Kilbuck junior high school plant.

In addition to its elementary and high schools, Bethel has a higher education facility. The Kuskokwim Community College is located in the Braund Building adjacent to the City complex and this two-year institution serves the higher education needs not only of Bethel but also those of the surrounding region. In addition, the College operates the 15,000 volume Consortium Library. This facility is located in a City-owned

TABLE 35
 SCHOOL ENROLLMENT TRENDS
 CITY OF BETHEL
 1970/71 - 1980/81

School Year	Final Enrollment				Total	Average Daily Membership <u>a/</u>
	Grades K - 6		Grades 7 - 12			
	Number	% of Total	Number	% of Total		
1970/71	542	63.7	309	36.3	851	913.27
1971/72	562	61.4	354	38.6	916	1,006.37
1972/73	549	56.0	432	44.0	981	1,083.77
1973/74	546	51.5	515	48.5	1,061	1,113.90
1974/75	575	49.2	594	50.8	1,169	1,197.70
1975/76	519	46.2	604	53.8	1,123	1,202.56
1976/77	537	50.5	527	49.3	1,064	1,154.53
1977/78	539	53.2	474	46.8	1,013	1,109.17
1978/79	535	49.4	548	50.6	1,083	1,108.30
1979/80	488	49.8	491	50.2	979	1,020.92
1980/81 <u>b/</u>	497	56.7	381	43.4	878	887.43

a/ Average daily membership includes special education classes from 1970/71 to 1973/74.

b/ First quarter enrollment only for 1980/81.

Source: Alaska Department of Education. Juneau. Personal communication.

building in the City complex and is open to the community at large for 65 hours per week.

Courses offered by the Kuskokwim Community College reflect the special needs for this region, including a traveling teachers program under which classes are held in outlying villages. The College offers Associate of Arts and Associate of Applied Science degrees. It also offers a wide variety of non-degree courses.

RECREATION

The provision of a variety of types of recreation facilities is an essential element of good community development. In Alaska communities such as Bethel where the ground is snow covered during the winter months, the provision of indoor recreation facilities is of special importance.

Most formal recreation activity in Bethel takes place at the Park Block or is associated with school facilities. The Park Block is a 3.1 acre area off Tundra Street between First and Second Avenues. This open area has a baseball backstop, a basketball court and a large play area with playground equipment. Indoor recreation activities are also provided at this location in the Parks and Recreation Building. This two story structure is owned and operated by the City of Bethel. The first floor houses a small room with a universal gym and a large open room used for senior citizens' programs, after-school programs, pre-school programs,

adult programs, teen dances and other activities. The second floor is occupied by Parks and Recreation offices. This eight-year old structure is considered to be in fair condition but is in need of some repair.

The Parks and Recreation Department sponsors a variety of programs for children, including after-school recreation, crafts and playground supervision, summer camp, basketball league for third through ninth graders, puppet shows and the Special Olympics for handicapped children. Adult programs include volleyball, basketball and softball leagues, badminton classes, physical fitness programs, and arts and crafts. Senior citizen programs include crafts, Eskimo dance demonstrations and a lunch supplement program. The Department also rents out recreational equipment such as cross-country skis at nominal cost.

City-sponsored special events include the Yukon-Kuskokwim State Fair, the Bethel Winter Carnival, the Fourth of July celebration, Eskimo dances, the Native Olympics, food contests, pinochle, cribbage and dog mushing.

As well as City-owned indoor recreation facilities, the high school and National Guard Armory gymnasiums and the Kilbuck school cafeteria are used for City-sponsored programs. The high school gymnasium is heavily used on week nights and weekends when no school activities are scheduled. These activities include soccer, volleyball, open gym, basketball, archery and tennis. All of these activities are geared to persons of high school age or older except for the archery program. The City men's

basketball league uses the National Guard Armory gymnasium which is located adjacent to the Kilbuck school. In addition, the Parks and Recreation Department sponsors programs at the Kilbuck school cafeteria including an adult women's fitness class, a young children's dance class, adult folk dancing and senior citizens activities.

Miscellaneous recreation activities sponsored by other organizations include a sports program for children in grades 4 through 6 which is conducted by the Alaska State Troopers in the National Guard Armory once a week. In addition, the Kuskokwim Community College holds arts and crafts classes, seminars and workshops and the Consortium Library sponsors reading programs and film festivals. Finally, the privately operated Buck Rogers Disco is located in a City-owned building next to the Parks and Recreation Department, there are pool tables at Chuck's Place, and the region's cultural heritage is on display at the Yugtarvik Regional Museum.

Bethel is in the process of expanding its range of recreation facilities through development of the Bethel Community Park, a 21 acre site in Tract A. The Park presently includes a 3/4 mile wooden bicycle path and a 6-lane bowling alley. Planned additions include a ball park, a children's play area, picnic shelter areas, an indoor rifle range and an outdoor tennis/basketball complex which could also be used for ice skating during the winter.

According to Darbyshire and Associates, several other sites in Bethel have been recommended by the planning commission to be retained for recreation purposes. These include a Bicentennial Park to be developed around the lake between the hospital and the City subdivision; four lots to be reserved in the Ptarmigan subdivision adjacent to Bethel Heights; and a 10-acre site around Sandpit Lake. In addition, the Alaska State Housing Authority plans to develop a playground in the Bethel Heights subdivision and the Calista Corporation has donated a 5 acre site next to the Bethel Utilities power plant for a swimming pool.

UTILITIES

Water

Bethel has no communitywide water (or sewer) system. The Bethel Heights subdivision/high school complex, the Public Health Service hospital and associated housing, and the City complex are served by piped water systems (see Figure 10). However, most Bethel residents are not connected to these systems and have their water delivered by truck. Some homes and businesses have access to individual wells, while an estimated 5 percent of the community's population obtains its own water from informal sources during the summer months.

Bethel's water supply is derived from wells ranging between 350 and 450 feet in depth, i.e. below the permafrost, since no reliable surface

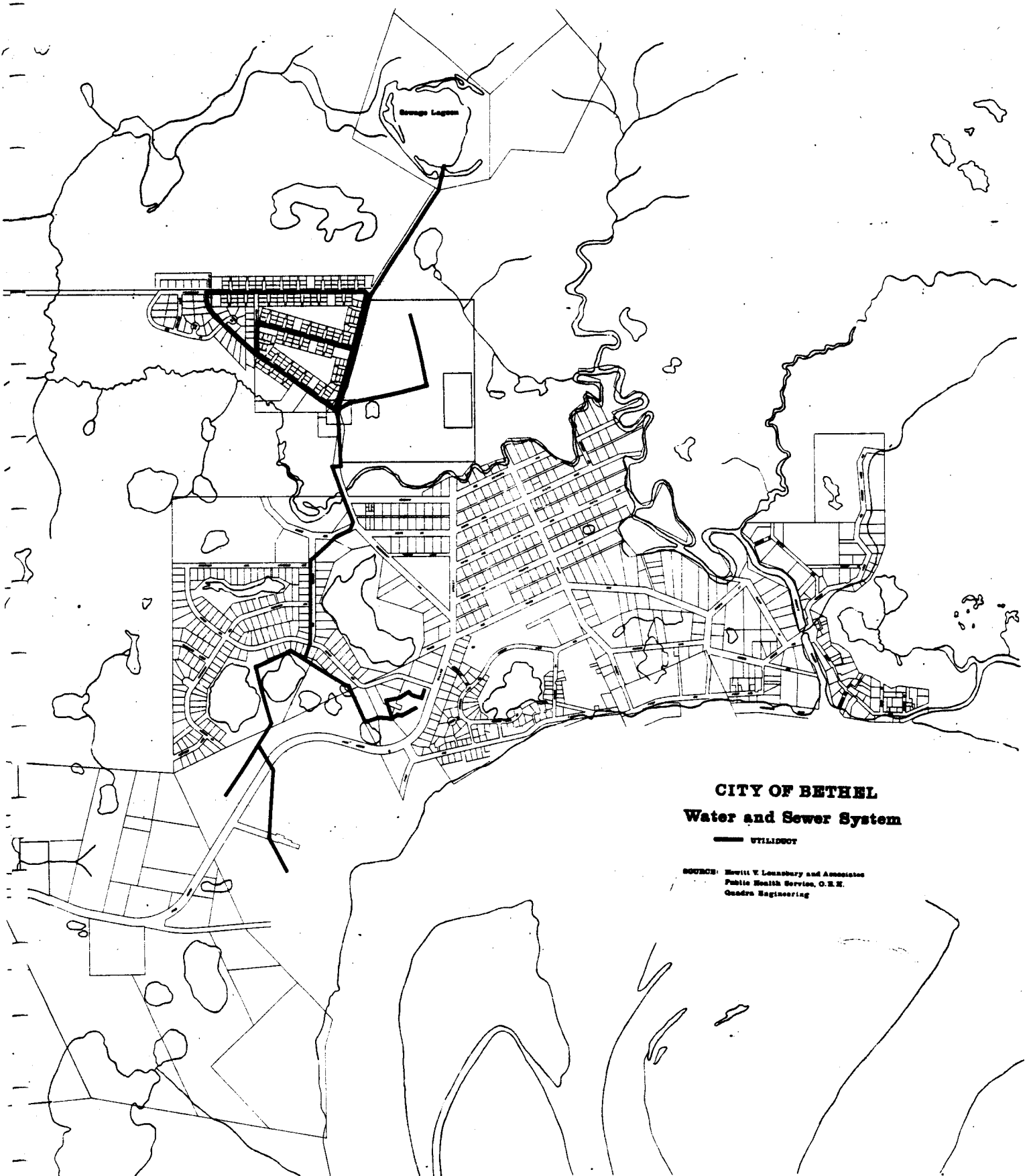
sources are available. Water from these wells is extremely cold and must be heated prior to chlorination and distribution.

There are three City wells, one at the Bethel Heights utility building, one at the City complex and a third at the old fire hall. The well at the Bethel Heights utility building has a pumping capacity of 350 gallons per minute and is the water source not only for the Bethel Heights subdivision but also for the community's hauled water. Water from this well is stored in two holding tanks with a total storage capacity of 120,000 gallons. A total of 190 units were hooked up to the piped system in this area in October 1980.

The well associated with the City complex primarily serves municipal buildings in the immediate vicinity. According to the Bethel Public Works Department, this well has a pumping capacity of about 150 gallons per minute although the designers of the system claim it has the capability to pump 300 gallons per minute. Water from this well is stored in a 130,000 gallon holding tank. About 60,000 gallons of the storage tank's capacity is reserved for a fire protection sprinkler system.

The third City well at the old fire station reportedly has a 125 gallon per minute pumping capacity and is used for back-up purposes only.

In addition to City-owned wells, there are a number of other wells in Bethel. The Bethel Native Corporation apartment complex has its own well and provides running water to all of its units. However, this



complex is on the City sewer system. The Public Health Service hospital has two wells, each with a 300 gallon per minute pumping capacity, and there is a third well associated with the old hospital complex. Other establishments which have their own wells include the Kilbuck school, Bethel Utilities, the Bureau of Indian Affairs, the Federal Aviation Administration, the trailer court, the Prematernal Home which shares a well with the Lizzie Kameroff Infant Center and the new Day Care Center, the Kuskokwim Inn, Elm Fisheries, the Joe Medola office complex, the Bethel Native Corporation office complex, the Alaska Commercial Company, the National Guard Armory, the Walsh Construction Camp, J.B. Crow and Sons and one private residence.

The Bethel Heights piped utility system was originally constructed underground between 1970 and 1972 to serve 170 units in that subdivision. However, the entire system was reconstructed in 1976 after a December 1975 fire destroyed the power plant and the system froze up. The new distribution system is above ground and, according to the Public Works Department, works well. A smaller distribution system in the City complex is also above ground. Both systems have continuous water circulation.

Although most residences in Bethel continue to depend on hauled water, there are no immediate plans to extend the system. In the opinion of the Public Works Department, the flooding problems associated with most of the older areas of town preclude piped service.

TABLE 36
 AVERAGE RESIDENTIAL WATER CONSUMPTION
 BETHEL, ALASKA
 1979

	Gallons Per Unit Per Day
Bethel Heights (piped)	175.0
Bethel Native Corporation Apartments Complex (piped)	127.0
Bethel Native Corporation Dormitory (piped)	234.0
Hauled water	17.3

Source: Darbyshire and Associates. October 1980. City of Bethel
 Comprehensive Plan. Anchorage.

Because it is inconvenient to depend on hauled water, usage rates for hauled water users are low (see Table 36). By contrast, facilities connected to piped water systems in the community consume unusually large amounts of water.

Sewer

Sewage disposal in Bethel is accomplished either via a piped system or a haul system with both disposal methods being provided for by the City of Bethel. The main piped system originates at the Public Health Service hospital and runs about 9,000 feet to the sewage lagoon northeast of the Bethel Heights subdivision. Several tributary lines serve the City complex, the Kuskokwim Community College and the Kilbuck elementary and Bethel high school complexes. Hauled sewage wastes are also disposed of at the sewage lagoon.

Bethel's piped sewer system consists of an above ground utilidor with five lift stations. The line to the lagoon is 10 inches in diameter, while mains and laterals have diameters of 8 inches and 4 inches respectively. Major contributors to this system include the Public Health Service hospital complex, the Lower Kuskokwim School District, the Bethel Heights subdivision, the Bethel Native Corporation apartments and the City complex (see Table 37).

The sewage lagoon was developed by the Public Health Service in 1969 to handle sewage from the Bethel Heights subdivision. Since that time,

TABLE 37
 MAJOR USERS
 PIPED SEWER SYSTEM
BETHEL, ALASKA, 1979

<u>User</u>	<u>Flow</u> (gallons per day)
Hospital Complex	37,400
Bethel Civic Center and Kuskokwim Community College	9,000
Bethel Native Corporation Apartments & Dormitory	15,900
Lower Kuskokwim School District	18,000
Bethel Heights Subdivision	<u>36,000</u>
 <u>TOTAL</u>	 <u>116,300</u>

Source: Darbyshire and Associates. October 1980. City of Bethel
 Comprehensive Plan. Anchorage.

however, the number of contributors to the lagoon has grown as new extensions to the system have been added and as increased amounts of sewage are hauled to the site. The present volume of the lagoon at its operating depth is 3,397,700 cubic feet and its water surface area is 21.1 acres. According to Darbyshire and Associates, the total hydraulic load on the lagoon is now approximately 124,300 gallons per day (116,300 gallons per day via the piped system and 8,000 gallons per day via the hauled system) and the facility is approaching capacity in terms of detention time.

Several agencies and commercial establishments in Bethel have their own sewage facilities and treatment systems. These include the Federal Aviation Administration, the Bureau of Indian Affairs, the Kuskokwim Inn, Wien Air Alaska and the trailer court.

Establishments and residences without treatment facilities or sewer line connections use the haul system. This includes honeybucket and septic tank evacuation service and is provided primarily to residential customers. The City operates two honeybucket and septic tank evacuation trucks, each with a 1,200 gallon capacity, with service provided at least once a week. Excluding the Bethel Heights subdivision and the Bethel Native Corporation apartments and dormitory which are on the sewer line, an estimated two-thirds of all residences in Bethel rely on honeybucket pick-up services. A very small number of residents do not use either system and dispose of their wastes privately.

According to the Bethel Public Works Department, the present sewage system is adequate for present community needs. However, the system could be overtaxed by the addition of major users. The most sensitive elements in the system are the lift stations which are potentially threatened by corrosion and the sewage lagoon which is approaching capacity.

Electric Power

Bethel's electric power is provided by a private company, the Bethel Utilities Corporation. The company's Bethel offices are located at the corner of Willow Street and Aniak Drive in front of the police station, while its corporate headquarters are in Eagle River.

All power in Bethel is diesel generated. The power plant is located behind the new hospital and was constructed in 1976 after the old plant was destroyed by fire in December 1975. The facility houses four generators, each with a generating capacity of 2,100 kilowatts (2.1 megawatts) for a total nameplate capacity of 9,100 kilowatts. Firm power is presently maintained at 8,400 kilowatts with peak capacity calculated at 10 percent over firm at 9,200 kilowatts.

According to Bethel Utilities, there were 1,301 hook-ups to the system (1,104 residential, 194 commercial and 3 bulk) in 1980, an increase of 33 percent since 1975 (798 residential, 168 commercial and 5 bulk). During the same period, power consumption increased about 27 percent,

from 15,492,000 kilowatt-hours (KWH) in 1975 to 19,698,351 KWH in 1980. All major power consumers in the community are serviced by Bethel Utilities, although all commercial and some residences also have back-up systems.

Bethel Utilities reported that power consumption during the winter of 1979 averaged 3,500 kilowatts and peaked at 4,500 kilowatts, slightly higher than the average of 3,200 kilowatts recorded in the summer of 1979. A higher peak requirement of 5,000 kilowatts was anticipated for the winter of 1980/81, primarily because the new hospital is now on line.

Major improvements planned by Bethel Utilities include the addition of three caterpillar engine generators, two with a continuous generating capacity each of 600 kilowatts and the third with a capacity of 900 kilowatts of continuous generation. This would bring the total continuous capacity of the system up to 10,500 kilowatts and the peak capacity up to 11,550 kilowatts.

Diesel power has a major disadvantage compared with other systems because of its high operating costs. These costs have accelerated with the dramatic rise in oil prices during the past few years and have, in turn, been passed on to consumers. For example, a typical urban residential household will consume around 800 to 1,000 kilowatts per month, excluding heat. As of October 1980, this cost between \$108 and \$135 in Bethel.

Solid Waste Disposal

All formal garbage collection services within Bethel's corporate limits are provided by the City. Rates vary according to the level of service desired. For example, self-haul permits can be obtained from the City for an annual cost of \$240 to residential users and \$1,082 to commercial establishments. On the other hand, customers desiring twice weekly pick-up service are charged \$15 per residence or \$35 per business. In addition, the City has initiated a dumpster program. Residents or businesses hauling their garbage to a dumpster are charged a \$7.25 weekly rate. The City then picks up garbage from the dumpsters, compacts it and hauls it to the dump. Finally, dumpsters can be rented from the City, an option preferred by most of the town's commercial establishments.

Solid waste disposal equipment operated by the City as of October 1980 included a 1980 container truck with a 33 yard capacity and dumpster pick-up prongs, plus a 1980 compactor truck with a 25 yard capacity. Equipment at the landfill site included a 1980 cat loader and a 1950 D-8 cat. In addition, the City owns 60 dumpsters and is expecting to receive another 60 on the 1981 spring barge.

The Bethel landfill site occupies approximately 10 acres and is located to the north of the sewage lagoon. This facility has been in operation for three years and is expected to continue to meet the City's needs for another seven. During the winter months, garbage is burned and the ashes are stockpiled for burial in the spring. However, because the

site is unfenced, this stockpiling causes some problems since the ashes and unburned refuse tends to be scattered by the wind. To alleviate this problem, the City plans to fence the site during the winter of 1982. The City recently alleviated another problem associated with the landfill by controlling public access to the facility, so that dumping of uncompacted garbage by individuals is no longer possible.

Communications

Telephone service in Bethel is provided by the General Telephone Company of Alaska. As of September 1980, the local system served 2,117 telephones, including extensions, more than double the number four years previously. According to General Telephone Company personnel, the system currently has between 1,200 and 1,300 individual customers.

The exchange is located on Main Street across the road from Alascom. It is approximately four year old and is a "CXP5" system with a common control office, automatic number identification and automatic switching. The capacity of the system is 1,700 lines, of which 1,400 were in use in September 1980. However, the life of the system has been shortened by the intensity of its use. The present office was designed to handle 10,000 calls per day but was handling an average of close to 35,000 per day in September 1980.

Recent improvements to the system have primarily been confined to the laying of cable. General Telephone is experimenting with burying cables

rather than leaving them above ground where they are more vulnerable to wind damage. Approximately one-third of the distribution system is now buried with no significant problems noted thus far. No other major improvements are planned and the level of service provided is such that anyone who wishes telephone service can readily obtain it. However, with continued community growth, the company indicated that the present system may be replaced by a digital switch with a capability of handling up to 5,000 lines.

Long distance telephone service is provided by Alascom. As of September 1980, 50 trunks (27 outgoing and 23 incoming) connected Bethel with the outside world. This represents a major improvement in service since 1976 when the community had only 11 two-way long distance trunks.

Local Government Organization

Bethel was incorporated as a fourth class city in August 1967 and was subsequently reclassified as a second class city in 1972. The city has a council-manager form of government. Like other second class cities, Bethel has seven elected councilmen, one of whom is appointed mayor. The city manager is responsible for directing the day to day operation of the city with policy direction provided by the mayor and the council.

CITY POWERS

As a second class city within the unorganized borough, Bethel could theoretically choose to exercise all municipal powers authorized by Title 29 of the Alaska Statutes except for education. Normally, however, second class cities do not do so, primarily because of their limited taxing ability. Although a second class city may levy a sales tax, property taxes may not exceed 5 mills or one-half of one percent. The imposition of either sales or property taxes must be approved by local referendum.

Despite statutory limitations on its ability to raise revenues through taxation, the City of Bethel has assumed responsibility for a fairly wide range of municipal powers as provided for in Chapter 48 of Title 29 of the Alaska Statutes. In addition, it has assumed responsibility for the operation of many public facilities and services listed in AS 29.48.030, plus the power of planning as per Chapter 43 of Title 29 (Alaska Statutes). However, to do so, it has had to rely on receiving a maximum of assistance from other government agencies.

Certain functions available to local governments are provided by other parties in Bethel. Primary among these are education services which are delivered by the State-funded Lower Kuskokwim School District. In addition, the hospital is operated by the U.S. Public Health Service and several other health and education-related facilities in the community are operated by non-profit organizations, sometimes with City assistance.

Telephone and electric power services in Bethel are provided by private companies, the library is operated by the Kuskokwim Community College and the airport is a State-owned and operated facility.

LOCAL GOVERNMENT FINANCES

In order to evaluate the City of Bethel's financial condition, the most recently available City financial statement for the year ended September 30, 1979 was examined (see Table 38). In addition, relevant data developed by the State Assessor was reviewed and Bethel's city manager was interviewed.

An analysis of Bethel's general fund revenues for FY 1979 indicate that a surprisingly high proportion of funds are generated from local sources, primarily sales taxes which accounted for almost one-third of general fund revenues in that year. This source is likely to become even more significant in the future as the City boosted its sales tax rate to 5 percent as of January 1981, up from the 3 percent levy maintained during the previous four years.

Intergovernmental revenues, primarily in the form of State Revenue Sharing funds, were also significant. Together with charges for services (operation of the jail, hospital security and airport surveillance) which can also be classed as intergovernmental transfers, these funds accounted for slightly over one-third of Bethel's general fund revenues in FY 1979. Most other general fund revenues in FY 1979 were derived from contributions from other funds.

TABLE 38

GENERAL FUND
STATEMENT OF REVENUES AND EXPENDITURES
CITY OF BETHEL
YEAR ENDED SEPTEMBER 30, 1979

<u>Revenues</u>	<u>Estimated</u>	<u>Actual</u>	<u>Over (Under) Estimate</u>
Sales tax, including penalty and interest	\$ 630,000	\$ 667,708	\$ 37,708
Intergovernmental revenues	\$ 300,347	\$ 349,060	\$ 48,713
Shared revenues	253,997	253,997	---
Business license tax	45,000	93,504	48,504
Other	1,350	1,559	209
Charges for services	\$ 335,748	\$ 363,705	\$ 27,957
Rents or leases	\$ 23,000	\$ 37,357	\$ 14,357
Permits, licenses and fees	\$ 26,500	\$ 35,406	\$ 8,906
Miscellaneous	\$ 71,000	\$ 150,538	\$ 79,538
Contributions from other funds	\$ 135,000	\$ 492,279	\$ 357,279
Utility Fund	135,000	135,000	---
Land Sales Fund	---	60,503	60,503
CETA Fund	---	86,400	86,400
Federal Revenue Sharing Fund	---	210,376	210,376
TOTAL REVENUES AND OTHER FINANCING SOURCES	\$1,521,595	\$2,096,053	\$ 574,458
<u>Expenditures</u>			
General government	\$ 38,600	\$ 92,400	(\$ 53,800)
Public works	\$ 580,508	\$ 700,282	(\$ 119,774)
Public safety	\$ 745,654	\$ 845,807	(\$ 100,153)
Culture and recreation	\$ 139,951	\$ 201,448	(\$ 61,497)
Social services	\$ 31,049	\$ 55,136	(\$ 24,087)
Contribution to KCC	\$ 6,000	---	(\$ 6,000)
Contributions to Special Revenue Funds	\$ 20,000	\$ 34,187	(\$ 14,187)
Contributions to Capital Projects Funds	\$ 48,938	\$ 44,056	\$ 4,882
Contributions to Debt Service Fund	\$ 11,953	\$ 11,036	\$ 917
TOTAL EXPENDITURES	\$1,622,653	\$1,984,352	(\$ 361,699)

Source: Price Waterhouse & Co. February 1980. City of Bethel Financial Statements, Year Ended September 30, 1979. Anchorage.

The largest items of general fund expenditure in FY 1979 were for public works and public safety. Together, these two functions accounted for over three-quarters of all general fund expenditures. Culture and recreation expenditures were also significant.

Although general fund revenues exceeded general fund expenditures in FY 1979, this was not always the case in the past and the City's auditors noted a \$315,882 general fund deficit as of September 30, 1979. The auditors also noted that cash from other dedicated funds, totalling \$186,503, had previously been improperly transferred to the general fund to meet its cash requirements.

According to the Bethel city manager, a primary emphasis of the current municipal administration is elimination of the City's general fund deficit. In 1974, this deficit was reportedly as high as \$700,000 but it was hoped that it would be closer to \$100,000 by the end of FY 1980. To assist the City in reaching a more stable financial position, sales taxes were scheduled to be raised to 5 percent as of January 1981 and charges for vehicle licenses were planned to be instituted.

In summary, Bethel's financial situation is similar to that of many other Alaska rural communities. Local revenue sources are extremely limited, costs are high and funding from other sources is not always reliably available. With its limited funds, the City must attempt to address the pressing service needs of its residents as well as it is able. In Bethel's particular case, such needs frequently extend beyond

its boundaries. Given these inherent difficulties, the City of Bethel has done a generally conscientious job in exercising its local government responsibilities.

COMMUNITY FORECASTS



INTRODUCTION

The first section of this report presented detailed baseline data about existing community conditions at Dillingham and Bethel. The objective of this section is to analyze how the growth and community infrastructure of these towns could be expected to evolve during the next twenty years under a non-OCS scenario.

To identify the significant community impacts, the following steps were taken:

- First, using techniques of economic base analysis and employment and population multipliers or other projection methods, annual forecasts of future employment by economic sector and of future population for both Dillingham and Bethel were prepared.
- Second, a set of uniform standards and assumptions was developed for forecasting. For a given population, standards were derived for projecting future public service and facility requirements and local government revenues and expenditures.
- Finally, the standards and assumptions were used to quantify population-related community impacts.

Methods of Forecasting

EMPLOYMENT AND POPULATION

The primary method used to forecast employment and population for Dillingham and Bethel was the economic base method, outlined in detail in the Appendices to this report. Briefly explained, this method divides all local economic activities into two categories: exporting or basic industries which bring money into a community by exporting locally produced goods and services; and non-exporting or service industries which produce goods and services for local consumption. Then, current employment is tabulated by economic sector and grouped as basic or service employment. Next, recent trends and future prospects for each basic economic sector are analyzed and future levels of basic employment are forecast for each year. Finally, suitable ratios or multipliers relating basic employment to service or indirect employment are applied to basic employment projections to yield overall employment forecasts by sector. These ratios vary from place to place, depending upon specific features of the local economy.

The employment forecasts are then used to project future population by applying an appropriate ratio of local employment to local population. The ratio proper to a given locality can be derived empirically, with adjustments as needed to account for any future factors which might alter it. This employment/population ratio varies with the social composition of a local population, particularly with its age structure

and labor force participation rate, and with the vitality of the local economy.

In the case of Bethel where relationships between employment and population are not always clear, the economic base method was used to project future employment. However, future population was related to growth of the region as a whole and assumptions were then made as to Bethel's share of that growth.

COMMUNITY INFRASTRUCTURE AND FINANCES

A set of uniform standards was developed for forecasting local public facility and service demands and local revenues and expenditures, usually on a per capita basis. Quantitative standards were developed for the following items of community infrastructure: housing demand by type of unit; residential land use; water system capacity; domestic sewage treatment capacity; electric power generating capacity; disposable solid wastes; telephone system capacity; police officers; jail facilities; fire stations; hospitals; school enrollment and classroom needs; and recreational facilities. These standards were then applied to the population forecasts to generate a projection of public service and facility needs under a non-OCS scenario for each community.

This use of uniform standards uniformly applied has the advantages of simplicity, of minimizing local biases and of yielding easily compared forecasts of impacts upon individual communities. Conversely, it has

the disadvantage of slighting local features which may importantly influence the shape which impacts take. As a result, the methodology may occasionally generate unrealistic impact forecasts. Whenever the uniform standards produced a forecast at odds with common sense or known local constraints, this was noted and an alternative forecast and the reasons for it were presented.

The revenue and expenditure forecasts require some special qualifications for their proper use and understanding. The fiscal forecasts simply carry forward into the future the local revenue patterns and expenditure practices which prevailed before the forecast period, adjusted for population growth (as determined by the economic base analysis). In terms of purchasing power, local property tax revenues were kept at a constant per capita level by discounting inflation.

The general fund and school district expenditure forecasts assume that each local government unit will maintain its present level, variety and quality of services at present per capita costs. On the whole, this is a debatable assumption, although it is not easy to pinpoint when and where exceptions to it may occur. Finally, the forecast of funds surplus to operating expenditures and available for capital improvements, debt service or other purposes is obtained by subtracting expenditures from revenues.

The fiscal forecasts also do not take into account possible changes in local tax policies (e.g. adoption of a use tax) or in local government

operations (e.g. assumption of additional functions) or State tax policies (e.g. revision of the statutes governing local government taxation) or many other factors which could radically upset the fiscal balance. While it is granted that factors of this type may well alter fiscal relationships, they are not for that reason alone germane to this fiscal analysis of growth impacts.

Again, it should be emphasized that this methodology has limited validity for predicting the services and facilities which will actually be provided in the future or for predicting actual expenditure and revenue patterns. For example, since the methodology imposes common standards for public service levels and assumes a continuation of current local fiscal practices, it cannot allow for local decisions to alter the assumed pattern of services or the pattern of taxation and expenditures. Nevertheless, the methodology does provide comparisons, within the framework of the assumptions, suggestive of the trend of growth impacts on the communities under study.

Finally, a major but necessary omission from the forecasts of local government revenues and expenditures is a projection of long term capital requirements to finance major capital improvements. In order to present such information, a complete needs assessment of the range of community facilities and services for each community would be required. A local assessment of the relative priority for improvement or replacement of various projects would then be made and cost estimates and the means for financing such projects would be developed. Such

information is not available for Dillingham or Bethel and its development is well beyond the scope of this study. Nevertheless, it is needed to present a complete picture of the probable financial demands on these communities and its absence from this report and the reasons for it are hereby noted.

PROJECTIONS OF GROWTH

Dillingham

SIGNIFICANT FACTORS AFFECTING GROWTH

Dillingham has experienced a period of sustained growth since 1970, due mainly to the apparent recovery of the Bristol Bay red salmon fishery since the mid-1970's. Prospects for Dillingham's further growth during the next twenty years appear favorable, with the main contributing factors seen as being the continued health of the region's red salmon runs, the community's role as the primary center for the provision of trade, transportation and services to the western Bristol Bay region, and some growth in local tourism and recreation activities resulting from development of the Wood-Tikchik State Park.

It is anticipated that the fishing and fish processing industry will remain the mainstay of Dillingham's economy through the foreseeable future. The Bristol Bay region has the world's largest red salmon fishery and State Fish and Game officials are generally optimistic about the status of the salmon runs here. Barring unforeseen events such as natural catastrophes, it is assumed that the recovery of the red salmon runs in this area since the mid-1970's will continue and that Dillingham will remain the primary fishing and fish processing center for the Nushagak district.

Aside from fishing and fish processing, Dillingham also has an important function as primary center for the provision of government and quasi-government services, air transportation and for trade in the western Bristol Bay region. In addition, it is the regional headquarters for the Bristol Bay Native Corporation, one of thirteen regional corporations established under the terms of the Alaska Native Claims Settlement Act, as amended. Assuming the continued health of the region's fishing and fish processing industry and continued high levels of State government spending, Dillingham's role as a regional center can be expected to expand in the future.

Tourism and recreation is presently a very minor element in Dillingham's economy. However, the Dillingham area possesses an outstanding scenic and sportsman's attraction in the Wood-Tikchik State Park. During the next twenty years, increased development of this facility by the State and increased usage by visitors are foreseen. Despite certain conflicts with the fishing and fish processing industry, most notably the need to protect salmon spawning areas and the allocation of fisheries resources among commercial fishing, subsistence and sport fishing interests, it is probable that tourism and recreation activities will make a greater contribution to Dillingham's economy in the future, provided that the facilities provided are less exclusive than those presently available.

Except for activities of Choggiung, Ltd., the local village corporation established under terms of the Alaska Native Claims Settlement Act, no other economic activities are foreseen as playing a major role in this

community's future growth during the next twenty years. Choggiung, Ltd. has a total land entitlement of approximately 281,456 acres in the general Dillingham area and this, together with local investments by the corporation, will obviously make it a significant factor in the City's future development.

FUTURE EMPLOYMENT

Under a non-OCS scenario, total employment in the immediate Dillingham vicinity is estimated to grow from slightly more than 800 jobs in 1980 to about 1,500 jobs by the year 2000. This represents a healthy increase of 83 percent over a twenty year period based primarily on the continued health of the region's red salmon fishery and on further expansion of Dillingham's role as a regional center.

Assumptions for Basic Employment

Basic employment is projected to increase from 519 jobs in 1980 to 891 by the year 2000 (see Table 39). The largest share of this growth is concentrated within the trade, services, the transportation, communication and public utilities and the finance, insurance and real estate sectors and is derived from gains in the community's function as a regional center and from activities and investments by regional and village Native corporations.

TABLE 39
 FORECAST OF BASIC EMPLOYMENT
 NON-OCS CASE
 DILLINGHAM AND IMMEDIATE VICINITY
 1980 - 2000

<u>Employment Sector</u>	<u>1980</u> (actual)	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Agriculture, Forestry and Fishing	100	100	100	100	100
Mining	0	0	0	0	0
Contract Construction	10	12	15	18	22
Manufacturing	151	151	151	151	151
Transportation, Communications and Public Utilities	56	71	91	116	149
Trade	46	59	75	96	122
Finance, Insurance and Real Estate	10	13	16	21	27
Services	99	120	147	178	217
Government	47	57	70	85	103
Federal	(7)				
State	(14)				
Local	(26)				
<u>TOTAL</u>	<u>519</u>	<u>583</u>	<u>665</u>	<u>765</u>	<u>891</u>

Source: Alaska Consultants, Inc.

Fishing and Seafood Processing. No significant growth in basic employment in either the agriculture, forestry and fishing or the manufacturing sectors is anticipated during the next twenty years. Limited entry laws restrict the number of salmon fishermen. It is also probable that substantial increases in salmon catches in this area could be accommodated without a significant rise in the number of processing workers. However, although total basic employment in Dillingham's fishing and fish processing industry is not expected to change much from present levels, the number of persons in these occupations who are local residents is expected to rise and thus contribute to higher levels of secondary employment in this community.

Regional Services. It is anticipated that Dillingham will further consolidate its function as the primary center for the provision of government and quasi-government services, air and water transportation and for trade in the western Bristol Bay region in the future. Growth in basic employment in these sectors will derive principally from increased government spending in the Bristol Bay region, especially by the State; from increased demands placed on Dillingham to supply the range of goods and services to other villages in the region; and from investments by regional and village Native corporations established under terms of the Alaska Native Claims Settlement Act of 1971.

Tourism and Recreation. Growth in Dillingham's as yet largely undeveloped tourism and recreation industry is expected during the next twenty years, primarily as a result of increased use of the Wood-Tikchik

State Park. These activities should contribute to an increase in basic employment in Dillingham, mainly in the transportation, communication and public utilities, the trade and the service sectors.

Based on the above assumptions, no growth in basic employment was forecast in Dillingham's agriculture, forestry and fishing, its mining or its manufacturing sectors through the end of the century. However, basic employment in the community's contract construction, government and service sectors is projected to increase at a 4 percent annual rate between 1980 and the year 2000; and at a 5 percent annual rate during the same period in the transportation, communication and public utilities, trade and the finance, insurance and real estate sectors. While fishing and fish processing will remain the community's major economic activity, regional services, tourism and recreation and activities of regional and local Native corporations are expected to be the major contributors to growth in basic employment in this community during the next twenty years.

Assumptions for Secondary Employment

As counted by Alaska Consultants, Inc., basic employment accounted for 63 percent of Dillingham's average annual full-time employment in 1980. This basic to secondary employment ratio of 1:0.6 is below national norms but it is not unusual in Alaska, especially in communities with economies heavily dependent on fishing and fish processing. In the future, however, the ratio of basic to secondary employment in Dillingham

TABLE 40
 FORECAST OF SECONDARY EMPLOYMENT a/
 NON-OCS CASE
 DILLINGHAM AND IMMEDIATE VICINITY
 1980 - 2000

<u>Employment Sector</u>	<u>1980</u> (actual)	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Agriculture, Forestry and Fishing	0	0	0	0	0
Mining	0	0	0	0	0
Contract Construction	24	30	34	42	49
Manufacturing	4	5	6	7	8
Transportation, Communications and Public Utilities	40	49	56	69	80
Trade	55	67	77	95	111
Finance, Insurance and Real Estate	8	10	11	14	16
Services	45	55	63	78	91
Government	133	163	186	230	268
Federal	(9)				
State	(30)				
Local	(94)				
<u>TOTAL</u>	<u>309</u>	<u>379</u>	<u>432</u>	<u>536</u>	<u>624</u>

a/ The sum of secondary employment figures in a given year may not always equal the total because of rounding.

Source: Alaska Consultants, Inc.

TABLE 41
 FORECAST OF TOTAL EMPLOYMENT AND POPULATION a/
 NON-OCS CASE
 DILLINGHAM AND IMMEDIATE VICINITY
 1980 - 2000

<u>Employment Sector</u>	<u>1980</u> (actual)	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Agriculture, Forestry and Fishing	100	100	100	100	100
Mining	0	0	0	0	0
Contract Construction	34	42	49	60	71
Manufacturing	155	156	157	158	159
Transportation, Communications and Public Utilities	96	120	147	185	229
Trade	101	126	152	191	233
Finance, Insurance and Real Estate	18	23	27	35	43
Services	144	175	210	256	308
Government	180	220	256	315	371
Federal	(16)				
State	(44)				
Local	(120)				
<u>TOTAL EMPLOYMENT</u>	<u>828</u>	<u>962</u>	<u>1,097</u>	<u>1,301</u>	<u>1,515</u>
<u>TOTAL POPULATION</u>	<u>1,563</u>	<u>1,924</u>	<u>2,304</u>	<u>2,862</u>	<u>3,484</u>

a/ The sum of secondary employment figures in a given year may not always equal the total because of rounding.

Source: Alaska Consultants, Inc.

is expected to change, mainly because it is expected that the local share of employment in the Bristol Bay salmon fishery will rise. By 1985, the ratio of basic to secondary employment here is expected to change to 1:0.65 and, by 1995, is assumed to change again to 1:0.7. By applying these ratios to forecasted basic employment, a projection of total secondary employment is thus derived (see Table 40).

In Dillingham's case, the forecast of secondary employment by industry sector assumes that the proportion of employment in each sector will remain approximately the same through the next twenty years. Thus, total forecasted secondary employment was disaggregated by sector in the same proportion as that counted in 1980 by Alaska Consultants, Inc. Then, basic and secondary employment were added together to arrive at total forecasted employment through the end of the century (see Table 41).

FUTURE POPULATION

Dillingham's resident population is projected to grow by 122.9 percent over the forecast period from 1,563 in 1980 to close to 3,500 persons by the year 2000 (see Table 41). Except for a probable increase in the proportion of whites, the characteristics of Dillingham's projected population are not expected to differ markedly from those which presently characterize the community. This is because almost all economic growth foreseen in the immediate Dillingham area involves an extension of existing activities, i.e. a greater number of persons in fishing and

and fish processing becoming permanent community residents and an expansion of the City's regional service function.

Although the types of people living in the immediate Dillingham area in the future are not expected to differ greatly from those who presently live here, the currently low ratio of 1.9 persons per job is projected to rise. This development is anticipated to result from a greater number of persons engaged in fishing and fish processing activities choosing to reside locally as it would essentially mean the replacement of single transients by persons with families. The ratio of persons per job is forecast to increase from the present 1.9 to 2.0 by 1985, to 2.1 by 1990, to 2.2 by 1995 and to 2.3 by the year 2000.

IMPACT ASSESSMENT

Social Impacts

Under a non-OCS scenario, it is assumed that community growth in this area will derive primarily from an expansion of existing sectors of the community's economy and from decisions made by persons seasonally engaged in fishing and fish processing activities to make Dillingham their permanent residence. As a result, few adverse social impacts of future growth are foreseen.

Forecasted growth will require expansion of Dillingham's presently rather limited range of community facilities and utilities services.

However, because this growth is foreseen as being gradual, it should enable the City to better expand its range of facilities and services in a more logical and orderly manner than would be possible under conditions of sudden growth or of new industrial demands.

The only area where significant adverse social impacts might occur is in tourism and recreation. If these activities become important in the Dillingham area, the task of allocating the region's salmon resources among competing commercial fishing, subsistence and sport fishing interests could result in conflicts among the various groups. Furthermore, significant growth in tourism and recreation activities here would result in increased pressure on community facilities and services during the height of the salmon season, a time when the City's ability to provide adequate levels of service is already severely strained.

Impacts on Community Infrastructure

Housing and Residential Land. Dillingham's housing stock includes a relatively high proportion of deteriorated units, with the number in need of replacement variously estimated at 20 percent (Alaska State Housing Authority) and close to 60 percent (Bristol Bay Native Association) of the total. Assuming a "compromise" of 40 percent of existing units being in need of replacement by the end of the century, another 232 units will be needed during that period to adequately house the community's present population.

Aside from housing units needed to replace existing substandard or deteriorated structures, the forecast of housing demand estimates that about 700 additional units will be added in the immediate vicinity of Dillingham by the year 2000 for new community residents, assuming a continuation of the average of 2.7 persons per unit recorded by the 1980 Census (see Table 42). Growth occurs throughout the forecast period, becoming stronger in each successive five-year period and strongest between 1996 and the year 2000 when an estimated 230 units will be demanded. Contract construction was a relatively minor element in Dillingham's economy in 1980. However, replacement of existing substandard units and development of new housing and related utilities to meet the needs of community growth will involve the addition of close to 950 units between 1980 and 2000 and should stimulate employment in the community's contract construction sector.

The forecast of housing demand excludes bunkhouse units and other group quarters. Alaska Consultants, Inc. counted 277 bunkhouse units associated with two local processing plants in 1980. In addition, all available space in the local hotel is taken at the peak of the salmon season and many people from other villages in the region who come here to fish stay temporarily in conventional units with relatives and friends. Still others live on boats or offshore, including around 550 persons living on floating processors at the peak of the season in 1980. However, while these people will continue to be an important seasonal element in Dillingham's population, their number is expected to decline slightly during the next twenty years as a higher proportion of persons

TABLE 42

FORECAST OF NET CHANGE IN DEMAND
FOR HOUSING UNITS AND RESIDENTIAL LAND a/
NON-OCS CASE
DILLINGHAM AND IMMEDIATE VICINITY
1981 - 2000

	<u>Net Change</u> <u>Demand for Housing Units</u>	<u>Net Change</u> <u>Demand for Residential Land</u> (acres)
1981 - 1985	132	34.9
(One & Two Family)	(93)	(31.0)
(Multi-Family)	(26)	(2.6)
(Mobile Homes)	(13)	(1.3)
1986 - 1990	140	36.9
(One & Two Family)	(98)	(32.7)
(Multi-Family)	(28)	(2.8)
(Mobile Homes)	(14)	(1.4)
1991 - 1995	207	54.5
(One and Two Family)	(145)	(48.3)
(Multi-Family)	(41)	(4.1)
(Mobile Homes)	(21)	(2.1)
1996 - 2000	230	60.6
(One & Two Family)	(161)	(53.7)
(Multi-Family)	(46)	(4.6)
(Mobile Homes)	(23)	(2.3)
<u>TOTAL</u>	<u>709</u>	<u>186.9</u>
(One & Two Family)	(497)	(165.7)
(Multi-Family)	(141)	(14.1)
(Mobile Homes)	(71)	(7.1)

a/ Forecasted housing demand excludes bunkhouse units and other group quarters.

Source: Alaska Consultants, Inc.

involved in fishing and fish processing activities become permanent community residents. Thus, no increase in demand for group quarters in the Dillingham area beyond current levels is anticipated.

The forecast of net housing demand for Dillingham also assumes that most (70 percent) new housing in the community will continue to be in the form of one or two family units. However, some increase in the proportion of multi-family units (20 percent) and trailers (10 percent) is also foreseen. On this basis, it is assumed that a total of 497 one and two family units will be added to satisfy new housing demands by the year 2000, plus 141 multi-family units and 71 trailers. On the other hand, it is assumed that existing deteriorated structures will be replaced by the same type of unit, i.e. single family units will be replaced by single family units, and so forth.

In terms of the impact that new housing demands will place on available land in the Dillingham area, a standard of 3 units per acre for one and two family structures has been assumed and one of 10 units per acre for both multi-family structures and mobile homes. On this basis, a total of close to 190 acres is projected to be demanded in the Dillingham vicinity by the year 2000. While some of this demand can be met in the townsite area, most new construction is expected to take place in the Windmill Hill-airport area and other outlying districts.

Public Safety

- Police. For a town of its size, especially considering the large influx of people during the salmon season, Dillingham had a small police department in 1980 staffed by a police chief, three full-time officers, three reserve officers and four dispatchers. A State trooper was also based in the community.

In the future, it is assumed that existing relationships between community population and the number of police officers will continue to persist in Dillingham. On that basis, about seven additional officers are expected to be needed locally by the end of the century.

Dillingham has no city jail and prisoners are instead housed in a two-cell State facility. According to the police chief, Dillingham is in need of both new police station and jail facilities. Using a ratio of one jail cell for every 500 persons, a new jail in Dillingham can be expected to need a total of seven cells by the year 2000, five more than are available in the existing facility.

- Fire Protection. The Dillingham Volunteer Fire Department operated a tanker and two pumpers out of its fire station in the townsite area and a second tanker at the airport substation

in 1980. However, compared with many other Alaska communities, Dillingham has a poor fire rating. According to the Insurance Services Office (ISO), this is related to the inadequate pumping capacity of the Department's firefighting equipment and to inadequate area coverage of the hydrant system.

During the next twenty years, a major upgrading of Dillingham's firefighting capabilities will be needed to meet both existing and forecasted community needs. This is anticipated to involve the construction of a new fire station, the acquisition of larger and more modern firefighting equipment and the extension of community water services, with hydrants, at least to the Windmill-airport area. The hiring of a full-time fire chief and several assistants is also foreseen during this period.

Health and Social Services. The Bristol Bay Area Hospital is located a short distance outside town at Kanakanak and is a 29-bed regional facility serving close to 6,550 people. The hospital has been operated by the Bristol Bay Area Health Corporation since October 1, 1980 although the U.S. Public Health Service remains the owner and the agency responsible for major repairs to the facility.

While the Bristol Bay Area Hospital has the capacity and staff to accommodate a much larger population than it now serves, the facility has outlived its useful structural life. Replacement of the entire

hospital was listed by the Public Health Service as its top priority for delivering health care in this region in its FY 1979 operating plan. Thus, although the level of staffing at the hospital (supplemented by the State Public Health Clinic) is adequate to meet foreseeable community demands, the provision of a new facility from which to offer these services is already needed.

Education. While final enrollment in the Dillingham school system rose about 24 percent between the 1969/70 and the 1979/80 school years, the number of students fluctuated during that period, mainly because the high school also served boarding students from other villages in the Bristol Bay region. The number of boarding students has recently been greatly reduced and was down to only 16 students in the fall of 1980.

Although school students accounted for 25 percent of Dillingham's total population in 1980, it is assumed that this proportion will trend downward to 20 percent by 1985 and remain constant thereafter. On this basis, total enrollment in the Dillingham school system can be expected to be close to 700 students by the end of the century, about 81 percent more than was recorded at the end of the 1979/80 school year (see Table 43). Assuming a 60 to 40 percent allocation of students between the elementary and high school grades, elementary and high school enrollment should be in the neighborhood of 418 and 279 students respectively by the year 2000.

TABLE 43
 SCHOOL ENROLLMENT FORECAST
 NON-OCS CASE
 DILLINGHAM AND IMMEDIATE VICINITY
 1985 - 2000

<u>Year</u>	<u>Elementary Enrollment</u>	<u>Secondary Enrollment</u>	<u>Total Enrollment</u>
1985	231	254	385
1990	277	184	461
1995	343	229	572
2000	418	279	697

Source: Alaska Consultants, Inc.

Existing student per classroom standards used by the Dillingham school district have been revised to 25 students per classroom for elementary grades and to 20 students per classroom for high school grades on the basis that increased enrollments will permit larger classroom sizes. On that basis, a total of 17 elementary and 14 general high school classrooms will be needed in Dillingham by the end of the century. This would necessitate the addition of six elementary and three high school classrooms to existing school plants. No replacement of the existing school plant following completion of the new elementary school is anticipated to be needed before the year 2000.

Recreation. Dillingham presently has few formal recreation facilities except for those associated with the schools. Assuming that 3 acres of land in outdoor neighborhood park and recreation space is needed for every 1,000 people, Dillingham has an existing demand for approximately 4.5 acres of this type of land use. With only a small park near the center of town and a planned playground in the Snag Point subdivision, Dillingham's existing outdoor recreation facilities are obviously inadequate to meet present community needs even if playground areas associated with the school are included.

In terms of indoor recreation facilities, Dillingham currently has a youth center and a school gymnasium and multi-purpose room. Thus, the community has an existing need for an additional indoor basketball court and a growing need for a formal swimming pool facility.

By the year 2000, Dillingham is projected to have a demand for close to 10 acres of land in outdoor neighborhood park and recreation space. At that scale, the City can also anticipate a need for a total of seven indoor basketball courts and, if it has not already been provided, for a community swimming pool.

Utilities

- Water. Only a relatively small proportion of residences in the immediate Dillingham area are presently connected to the community water system. Furthermore, the City's major seafood processing plants provide for their own water needs. As a result, current rates of demand on the municipal water system are much lower than would normally be expected to be demanded in a town of this size with major industrial water users.

In the forecast of water system capacity requirements, a standard of 125 gallons of water per capita has been assumed. It is also assumed that piped water services will be extended to the Windmill Hill-airport area before 1985 to enable approximately two-thirds of the community's residents to be connected to the municipal system by that date. On the other hand, it is assumed that industrial water demands will remain constant through the end of the century.

TABLE 44

ESTIMATED CAPACITY REQUIREMENTS
 WATER SUPPLY SYSTEM
 NON-OCS CASE
 DILLINGHAM AND IMMEDIATE VICINITY
 1985 - 2000
 (000's of gallons per day)

<u>Year</u>	<u>Domestic Capacity a/</u>	<u>Industrial Capacity</u>	<u>Total Capacity</u>
1985	160	100	260
1990	192	100	292
1995	238	100	338
2000	290	100	390

a/ The forecast of domestic capacity requirements assumes that two-thirds of Dillingham residents will be served by the community water system.

Source: Alaska Consultants, Inc.

On the basis of the foregoing, it is estimated that the Dillingham community water system will require a total capacity of 390,000 gallons of water per day by the year 2000 (see Table 44). Such a demand assumes that major extensions will be made to the presently limited distribution system.

- Sewer. Like its water system, the Dillingham sewer system presently serves relatively few persons in this community. In 1980, only those persons living in the townsite area and the Snag Point subdivision had access to the system although it was in the process of being extended to the Windmill Hill area. In addition, the City has no operating sewage treatment facilities.

In the future, it is assumed that additional extensions to the community sewer system will take place, with service being extended to the airport area before 1985. It is also assumed that the City of Dillingham will add sewage treatment facilities as soon as it is financially feasible for it to do so.

Assuming that two-thirds of Dillingham's projected population will be served by the community sewer system and using a standard of 125 gallons of wastewater per person per day, it is forecast that a sewage treatment plant in this community

TABLE 45

ESTIMATED CAPACITY REQUIREMENTS
 DOMESTIC SEWAGE TREATMENT
 NON-OCS CASE
 DILLINGHAM AND IMMEDIATE VICINITY
 1985 - 2000

 (000's of gallons)

<u>Year</u>	<u>Daily Treatment Capacity</u>	<u>Peak Hourly Capacity</u>
1985	160	20
1990	192	24
1995	238	30
2000	290	36

Source: Alaska Consultants, Inc.

would need to have a capacity of treating 290,000 gallons of domestic wastewater daily by the end of the century (see Table 45). In terms of hourly capacity, the same system would need to have the capability of treating a peak of 36,000 gallons of wastewater.

- Electric Power. Dillingham's existing electric power system is operated by the Nushagak Electric Cooperative and is basically a good one although diesel oil is relatively expensive when compared with other power sources. The present system serves all major industrial and residential consumers in Dillingham and nearby Aleknagik, a situation which is assumed to continue in the future.

The present installed capacity of close to 2.5 KW per person in Dillingham is projected to increase by 0.05 KW per year until 1990 when there should be 3.0 KW of installed capacity per capita. On that basis, the Dillingham power system would need an installed capacity of close to 10,500 KW (see Table 46), representing an increase of about 170 percent over the capacity of the present system (including the new generator).

- Solid Waste Disposal. Garbage collection services for both residential and commercial customers within Dillingham's corporate limits are provided by a private operator under contract to the City. All solid wastes are disposed of at

TABLE 46
ESTIMATED CAPACITY REQUIREMENTS
ELECTRIC POWER SYSTEM
NON-OCS CASE
DILLINGHAM AND IMMEDIATE VICINITY
1985 - 2000

<u>Year</u>	<u>Estimated Capacity Requirements in KW's</u>
1985	5,291
1990	6,912
1995	8,586
2000	10,452

Source: Alaska Consultants, Inc.

the City's 104 acre landfill site north of town where they are incinerated and buried. The City of Dillingham has experienced few problems with its solid waste disposal system and, although the capacity of the landfill is not as great as the size of the site might indicate, it should be adequate to accommodate projected community demands through the end of the century (see Table 47).

- Communications. Telephone service to Dillingham and nearby Aleknagik is provided by the Nushagak Telephone Cooperative. Since its purchase of the system from a private company in 1975, the present operator has made a number of improvements and the system is generally adequate to meet community needs. Assuming that 1.25 lines will be required initially for each housing unit added in the Dillingham area, the local system can expect to experience a demand for an additional 890 or so lines by the end of the century (see Table 48). Such an increase in demand should not place an undue burden on the capacity of the existing system.

Local Government Finances. The major share of Dillingham's general fund revenues are presently derived from the imposition of a local sales tax and from real and personal property taxes. Conversely, almost all of the City's operating expenditures now go toward the support of general municipal government operations, with only a relatively small amount going toward support of the local school district.

TABLE 47
 ESTIMATED DISPOSABLE SOLID WASTES
 NON-OCS CASE
 DILLINGHAM AND IMMEDIATE VICINITY
 1985 - 2000

<u>Year</u>	<u>Annual Tonnage</u>	<u>Annual Volume (cubic yards)</u>
1985	2,200	13,330
1990	2,770	16,790
1995	3,440	20,850
2000	4,190	25,390

Source: Alaska Consultants, Inc.

TABLE 48
ESTIMATED CAPACITY REQUIREMENTS
TELEPHONE SYSTEM
NON-OCS CASE
DILLINGHAM AND IMMEDIATE VICINITY
1981 - 2000

<u>Period</u>	<u>Additional Lines Needed</u>
1981 - 1985	165
1986 - 1990	175
1991 - 1995	259
1996 - 2000	288
<u>TOTAL</u>	<u>887</u>

Source: Alaska Consultants, Inc.

Using the methodology as outlined in the appendix to this report, and re-emphasizing the limitations of that methodology, projections of general fund revenues and operating expenditures were developed. Basically, these projections assume that the City's revenues and expenditures will grow at the same rate as its population and that the City of Dillingham will continue to maintain about the same level of services at about the same level of per capita cost as it does at present. Using these standards, Dillingham's general fund revenues are projected to reach around \$2,868,000 by the end of the century, with annual operating expenditures forecasted to be in the vicinity of \$2,210,000 by the same date (see Table 49).

At present, Dillingham has generally favorable rates of per capita debt and of debt to valuation, plus relatively low property tax rates. However, given a demonstrated need for the upgrading of certain of its community facilities and utilities services and its limited ability to incur additional general obligation debt, it is apparent that Dillingham has attained its present financial position by deferring needed capital projects. This situation is likely to become even more apparent in the future.

TABLE 49
 FORECAST OF GENERAL FUND REVENUES AND OPERATING EXPENDITURES
 NON-OCS CASE
 DILLINGHAM AND IMMEDIATE VICINITY
 1985 - 2000
 (\$000's)

Year	General Fund Revenues			Operating Expenditures			Available for Capital Improvements
	Property Tax	Other Revenues <u>a/</u>	Total	City Operations	School Support	Total	
1985	\$ 587	\$ 997	\$1,584	\$1,126	\$ 94	\$1,220	\$364
1990	703	1,194	1,897	1,348	113	1,461	436
1995	873	1,483	2,356	1,675	140	1,815	541
2000	1,063	1,805	2,868	2,039	171	2,210	658

a/ Includes sales taxes, intergovernmental revenues and miscellaneous other revenues.

Source: Alaska Consultants, Inc.

Bethel

SIGNIFICANT FACTORS AFFECTING GROWTH

Bethel has experienced rapid population growth during the past forty to fifty years as the community has evolved from a small village into a major regional center. In the future, Bethel's growth promises to continue to be tied primarily to its role as a regional government, transportation, trade and service center for the lower Yukon-Kuskokwim region. As noted previously in this report, passage of the Alaska Native Claims Settlement Act and a high level of federal and State spending have greatly improved living conditions in rural Alaska during the past ten years and the demands of rural residents are likely to continue to rise in the future. Bethel's future prosperity is therefore likely to be closely related to the extent to which it can meet these expectations and demands.

On the negative side, it appears likely that the recent trend toward reduced federal expenditures for social programs will have an adverse effect on employment in Bethel and its region in the immediate future. For example, cutbacks in programs such as CETA could result in hardship for many residents in the region. While State funds may serve to take up much of the slack, such a situation illustrates the vulnerability of a community like Bethel which depends so heavily on government spending to sudden changes in government policy.

Aside from its regional service function, fishing is a significant element in Bethel's economy. While the numbers of salmon fishermen are unlikely to increase to any marked extent, additional processing appears likely to take place in Bethel in the short term and should contribute to some increases in employment in the manufacturing sector of the local economy.

The activities of the Bethel Native Corporation, the local village corporation established under terms of the Alaska Native Claims Settlement Act, are likely to have a continuing positive impact on Bethel's economy. The Corporation has invested heavily in the local area and, as the major land owner in the immediate vicinity of Bethel, will doubtless play an important role in its future development.

There are a number of other factors which could affect Bethel's future growth. These include petroleum exploration and development activities, hydroelectric power development, timber harvesting in the upper Kuskokwim area, mining and tourism. Except for modest gains in tourism, however, these other factors have been largely discounted in developing a "most probable" forecast of economic and population growth for the immediate Bethel area.

FUTURE EMPLOYMENT

Under a non-OCS scenario, total employment in the City of Bethel is projected to grow from close to 1,700 jobs in 1980 to almost 2,900 jobs

by the year 2000. This represents a 71 percent gain in employment over a twenty year period, based primarily on the further consolidation of Bethel's role as a regional trade, transportation, service and government center for the Yukon-Kuskokwim region.

Assumptions for Basic Employment

Basic employment is forecasted to grow from the 954 jobs counted in Bethel in 1980 to 1,603 jobs by the end of the century (see Table 50). The sectors projected to exhibit the greatest rate of growth during that period are finance, insurance and real estate and trade, with significant growth also anticipated in the services and the transportation, communication and public utilities sectors. In actual numbers, the greatest gain in basic employment during the next twenty years is expected to accrue to the government sector. However, the rate of growth here is assumed to be slower, mainly because of a cutback in federal government spending for social programs. A relatively slow rate of growth is also forecast for the contract construction sector, primarily because employment in this sector was already at a high level in 1980.

Regional Services. It is expected that Bethel will continue to function as the dominant center for the provision of government and quasi-government services, air and water transportation and for trade in the Yukon-Kuskokwim region. Growth in basic employment in these sectors will be closely related to growth of the region as a whole and to levels

TABLE 50
 FORECAST OF BASIC EMPLOYMENT
 NON-OCS CASE
 CITY OF BETHEL
 1980 - 2000

<u>Employment Sector</u>	<u>1980</u> (actual)	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Agriculture, Forestry and Fishing	30	30	30	30	30
Mining	0	0	0	0	0
Contract Construction	58	64	71	78	86
Manufacturing	11	22	22	22	22
Transportation, Communications and Public Utilities	130	151	175	203	235
Trade	124	151	184	223	272
Finance, Insurance and Real Estate	11	14	18	23	29
Services	164	190	220	256	296
Government	426	470	519	573	633
Federal	(229.5)				
State	(145.5)				
Local	(51.0)				
<u>TOTAL</u>	<u>954</u>	<u>1,092</u>	<u>1,239</u>	<u>1,408</u>	<u>1,603</u>

Source: Alaska Consultants, Inc.

of government spending, especially by the State which will assume responsibility for operation of the remaining Bureau of Indian Affairs elementary schools in the region in the near future. Bethel's role as premier air transportation center for the region should also contribute to further community growth, as should the City's function as port and re-distribution center for waterborne freight destined for smaller Kuskokwim River villages. In addition, growth in demand for goods and services by the region as a whole should serve to increase Bethel's importance as a regional shopping center.

Fishing and Seafood Processing. Although it is expected that the number of Bethel residents engaged in commercial fishing activities in the local area will remain more or less constant in the future, an increase in the amount of seafood processing carried out in the community is anticipated as a result of the entry of the Bethel Native Corporation into this business. As a result, basic employment in manufacturing is projected to double between 1980 and 1985 and remain constant thereafter.

Other. It is projected that the sector to consistently record the highest rate of gain in basic employment in Bethel during the next twenty years will be finance, insurance and real estate. This is premised mainly on the activities of the Bethel Native Corporation which has invested heavily in real estate development activities in the local area and is expected to continue to do so.

Using the above assumptions, no growth in basic employment was forecast in either the agriculture, forestry and fishing or the mining sectors in Bethel through the end of the century. Basic employment in the manufacturing sector was projected to double between 1980 and 1985 as a result of the addition of a second local seafood processor but to remain at a constant level thereafter. In addition, a 2 percent annual rate of growth was projected for basic employment in both the contract construction and government sectors through the end of the century. Contract construction activities were at a high level in 1980 and it was assumed that future gains would therefore take place at a relatively slower pace. In the case of government, it was assumed that the decline in federal government involvement in social programs in this region would be generally offset by the State but would result in a slower rate of growth in basic employment for the sector as a whole.

A 3 percent annual rate of increase in basic employment was projected for the services and transportation, communication and public utilities sectors, based on the assumption of further growth of Bethel's role as premier regional center for these activities in the future. It is likely, however, that some trade-offs between the government and the services sectors will take place as responsibility for the operation of government programs or facilities is transferred to regional non-profit organizations such as the Association of Village Council Presidents (ACVP) and others.

In Bethel's trade sector, a 4 percent annual rate of growth in basic employment was forecasted to take place through the year 2000 based on the continued growth in importance of this community as a regional shopping center. A relatively high rate of growth in this sector is anticipated because it is assumed that the City's retail establishments will offer a wider range of merchandise in the future. Finally, a 5 percent annual rate of growth in basic employment in the finance, insurance and real estate sector was projected, mainly a reflection of the activities of the Bethel Native Corporation. It should be noted, however, that while the forecasted rate of growth in this sector is high, the numbers involved are relatively small.

Assumptions for Secondary Employment

As counted by Alaska Consultants, Inc. in 1980, basic employment accounted for about 56 percent of Bethel's average annual full-time employment in 1980. This basic to secondary employment ratio of 1:0.8 is below national norms but, except for Anchorage and possibly Fairbanks, is relatively mature by Alaska standards. In the future, the ratio of basic to secondary employment in Bethel is projected to remain at around current levels. By applying this ratio to forecasted basic employment, a forecast of total secondary employment is thus derived (see Table 51).

The forecast of secondary employment by industry for Bethel assumes, that, except for manufacturing where the addition of a second processing

TABLE 51
 FORECAST OF SECONDARY EMPLOYMENT a/
 NON-OCS CASE
 CITY OF BETHEL
 1980 - 2000

<u>Employment Sector</u>	<u>1980</u> (actual)	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Agriculture, Forestry and Fishing	0	0	0	0	0
Mining	0	0	0	0	0
Contract Construction	36	43	49	55	63
Manufacturing	3	6	6	6	6
Transportation, Communications and Public Utilities	110	130	148	168	191
Trade	114	135	154	175	199
Finance, Insurance and Real Estate	13	16	18	20	23
Services	91	108	122	138	158
Government Federal State Local	370	436	495	564	643
<u>TOTAL</u>	<u>737</u>	<u>874</u>	<u>991</u>	<u>1,126</u>	<u>1,282</u>

a/ The sum of secondary employment figures in a given year may not always equal the total because of rounding.

Source: Alaska Consultants, Inc.

TABLE 52

FORECAST OF TOTAL EMPLOYMENT ^{a/}
 NON-OCS CASE
 CITY OF BETHEL
 1980 - 2000

<u>Employment Sector</u>	<u>1980</u> (actual)	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>
Agriculture, Forestry and Fishing	30	30	30	30	30
Mining	0	0	0	0	0
Contract Construction	94	107	120	133	149
Manufacturing	14	28	28	28	28
Transportation, Communications and Public Utilities	240	281	323	371	426
Trade	238	286	338	398	471
Finance, Insurance and Real Estate	24	30	36	43	52
Services	255	298	342	394	454
Government	796	906	1,014	1,137	1,276
Federal	(229.5)				
State	(200.5)				
Local	(292.5)				
<u>TOTAL EMPLOYMENT</u>	<u>1,691</u>	<u>1,966</u>	<u>2,230</u>	<u>2,534</u>	<u>2,885</u>

^{a/} The sum of secondary employment figures in a given year may not always equal the total because of rounding.

Source: Alaska Consultants, Inc.

facility is expected before 1985, the proportion of employment in each sector will remain approximately the same through the next twenty years. Therefore, total forecasted secondary employment for 1985 was disaggregated by sector in the same proportion as that counted in 1980 by Alaska Consultants, Inc. except that gains in manufacturing were assumed to be offset by a slightly lower rate of growth in government. From 1985 thereafter, forecasted secondary employment was disaggregated in the same proportion as projected for 1985.

Once the forecast of secondary employment was undertaken, basic and secondary employment were added together to arrive at total forecasted employment in the City of Bethel through the end of this century (see Table 52).

FUTURE POPULATION

Between 1970 and 1980, the population of the Bethel region (defined as the Bethel, Wade Hampton and former Kuskokwim census divisions) increased at an average rate of 2.1 percent per year, from a total of 13,802 in 1970 to 17,007 in 1980. Population growth in the region as a whole is primarily related to rates of natural increase, with some out-migration from the villages being generally counterbalanced by in-migration to job centers, primarily Bethel. This situation is expected to continue in the region in the future. Using a constant 2 percent annual rate of population growth, the population of the Bethel region is projected to be in the vicinity of 18,777 by 1985, 20,731 by 1990, 22,889 by 1995 and 25,272 by the year 2000.

TABLE 53

POPULATION FORECAST a/
 NON-OCS CASE
 CITY OF BETHEL AND BETHEL REGION b/
 1980 - 2000

<u>Year</u>	<u>Population Forecast</u>		<u>City Population as % of Region</u>
	Bethel Region	City of Bethel	
1980 (actual)	17,007	3,576	21.0
1981	17,347	3,730	21.5
1982	17,694	3,893	22.0
1983	18,048	4,061	22.5
1984	18,409	4,234	23.0
1985	18,777	4,413	23.5
1986	19,153	4,597	24.0
1987	19,536	4,786	24.5
1988	19,926	4,982	25.0
1989	20,325	5,183	25.5
1990	20,731	5,390	26.0
1991	21,146	5,604	26.5
1992	21,569	5,824	27.0
1993	22,000	6,050	27.5
1994	22,440	6,283	28.0
1995	22,889	6,523	28.5
1996	23,347	6,771	29.0
1997	23,814	7,025	29.5
1998	24,290	7,287	30.0
1999	24,776	7,557	30.5
2000	25,272	7,834	31.0

a/ Population of Bethel region is forecasted to increase at a constant rate of 2 percent per year, with the City of Bethel's share of the region's population projected to rise at the rate of 0.5 percent per year.

b/ Bethel region defined as the Bethel, Wade Hampton and former Kuskokwim census divisions.

Source: Alaska Consultants, Inc.

Although the population of the Bethel region has increased at a relatively consistent rate and is expected to continue to do so, Bethel's share of the region's population has steadily increased during the past forty years. In 1939, Bethel accounted for only about 5 percent of the region's total population. This proportion rose to almost 8 percent by 1950, 11.5 percent by 1960, to 17.5 percent by 1970 and to 21 percent by 1980. This trend is expected to continue in approximately the same proportion as it has during the past twenty years, i.e. the City's share of the region's population is projected to increase by about 5 percent every ten years. Thus, Bethel's population should be about 26 percent that projected for the region by 1990 and close to 31 percent by the end of the century. Using these assumptions, Bethel should have a population of 4,413 by 1985, 5,390 by 1990, 6,523 by 1995 and 7,834 by the year 2000 (see Table 53).

IMPACT ASSESSMENT

Social Impacts

During the next twenty year period, Bethel's population is projected to more than double, with much of this growth being derived from an immigration of persons from other villages in the region, plus a lesser amount from outside the region. By contrast, the number of jobs in this community is forecasted to increase at a slower rate (approximately 71 percent between 1980 and 2000) than anticipated population growth. As a result, Bethel appears likely to face increasingly difficult social

problems if present population trends within the region and the share of that population which might accrue to Bethel continue.

Relationships between employment and population in the Bethel region have often been tenuous in the past although this is likely to become less so in the future. Many people in the region still live at least a semi-subsistence lifestyle and are essentially outside the labor force. On the other hand, many of the government and quasi-government services provided from Bethel, e.g. health and education, require the employment of highly skilled personnel from outside the region. The extent to which Bethel can meet the needs of these disparate groups and those in between the two extremes will, to a large extent, determine the nature and degree of any adverse social impacts upon the community. However, this is an extremely difficult task for a city like Bethel which has few local sources of revenue and which must depend heavily on the federal and State governments for assistance.

Impacts on Community Infrastructure

Housing and Residential Land. The condition of Bethel's housing stock has improved markedly during the past fifteen years. According to a 1979 survey conducted by Simpson Usher Jones, Inc. for Darbyshire and Associates, only 232 units (21 percent of the total) in the community were classed as structurally unsound, although another 99 units (9 percent of the total) were described as being in need of some repair. This is a far different picture than was painted by the Alaska State

Housing Authority in 1967 when 80 percent of all units were classed as substandard.

Assuming that all substandard units and those in need of repair will be replaced by the end of the century, approximately 331 additional units will be demanded during that period to adequately house Bethel's present population.

In addition to housing units needed to replace existing substandard or deteriorating structures, the forecast of housing demand projects a demand for about 1,450 new housing units in Bethel by the year 2000, assuming a continuation of the average of 2.9 persons per unit recorded by the 1980 Census (see Table 54). This number may be somewhat overstated as the relationship between population and housing cited by the 1980 Census is a subject of local dispute. Nevertheless, it is an indication of the extent of growth which can be expected to take place here during the next twenty years.

The forecast of net housing demand for Bethel assumes that the types of new housing demanded in the community will be constructed in approximately the same proportion as that recorded by Simpson Usher Jones, Inc. for the community in 1979. On that basis, 68 percent of new (non-replacement) units will be in the form of single family dwellings, 18 percent will be in multi-family units and 14 percent will be mobile homes. Thus, it is projected that a net total of 1,000 single family homes will be added to Bethel's housing stock by the year 2000, plus about 263 multi-family units and 205 trailers.

TABLE 54

FORECAST OF NET CHANGE IN DEMAND
FOR HOUSING UNITS AND RESIDENTIAL LAND
NON-OCS CASE
CITY OF BETHEL
1981 - 2000

	<u>Net Change Demand for Housing Units</u>	<u>Net Change Demand for Residential Land (acres)</u>
1981 - 1985	289	74.9
(One & Two Family)	(197)	(65.7)
(Multi-Family)	(52)	(5.2)
(Mobile Homes)	(40)	(4.0)
1986 - 1990	336	87.0
(One & Two Family)	(229)	(76.3)
(Multi-Family)	(60)	(6.0)
(Mobile Homes)	(47)	(4.7)
1991 - 1995	391	101.2
(One and Two Family)	(266)	(88.7)
(Multi-Family)	(70)	(7.0)
(Mobile Homes)	(55)	(5.5)
1996 - 2000	452	117.1
(One & Two Family)	(308)	(102.7)
(Multi-Family)	(81)	(8.1)
(Mobile Homes)	(63)	(6.3)
<u>TOTAL</u>	<u>1,468</u>	<u>380.2</u>
(One & Two Family)	(1,000)	(333.4)
(Multi-Family)	(263)	(26.3)
(Mobile Homes)	(205)	(20.5)

Source: Alaska Consultants, Inc.

To assess the impact that net new housing demands could place on available land in the vicinity of Bethel, a standard of 3 units per acre for one and two family structures was used. A standard of 10 units per acre was used for both multi-family structures and mobile homes. Using these figures, a total of almost 400 additional acres of residential land in the Bethel area is likely to be demanded by the year 2000. Although there are physical problems such as erosion or flood susceptibility associated with the development of much land in the Bethel area, there are large blocks of land suitable for urban development in the immediate vicinity of town. For example, a former Native allotment off the new road between Bethel Heights and the airport was being subdivided into 300 lots in 1980.

Public Safety

- Police. In 1980, the Bethel Police Department was staffed by 12 police officers, plus a complement of administrative, clerical, jail and miscellaneous other personnel. In addition, nine State troopers serving the law enforcement needs of 57 villages in the Bethel region were also based out of the community, as was a State Fish and Wildlife Protection officer.

In the future, it was assumed that one additional officer will be needed for every 300 persons forecasted to be added to Bethel's population. On that basis, the community can expect a demand for 14 more officers by the year 2000.

This represents a more than 100 percent increase over the present staffing level.

The Bethel jail is a 24-bed facility which is currently operated by the City of Bethel under contract to the State. Funding for a new jail was provided by a 1978 State bond issue but the project is stalled pending an agreement on whether it should be operated by the City or the State. Assuming that one additional jail cell should be added for every 300 new persons in the community, a demand for a further 14 cells by the year 2000 is foreseen, as well as a need for replacement of the existing facility.

- Fire Protection. The Bethel Fire Department operated three pumpers and a tanker during 1980. At that time, the dilapidated fire station near the entrance to the Bethel Heights subdivision was in the process of being replaced by a modern facility within the City complex. Firefighting equipment was also maintained at the airport and the nearby FAA compound.

Compared with most other Alaska cities of its size, Bethel has a poor fire rating. This is due primarily to the lack of piped water service in much of the community and to the poor condition of some of the town's housing stock. The City has expended a great deal of effort designed to improve its local firefighting capability and is hoping for an improved ISO

rating. However, the lack of piped water service to many areas of town is likely to remain a problem in the future.

During the next twenty years, it is probable that an additional substation will be demanded to meet local fire protection needs, given the community's dispersed development pattern. Further upgrading of firefighting capabilities in the airport area is also likely to be needed.

Health and Social Services. The Yukon-Kuskokwim Delta Regional Hospital is a new 50-bed facility operated by the U.S. Public Health Service and serves the needs of 52 villages in the Bethel region. In addition, a wide range of other health and social services are provided in Bethel by State, City and private non-profit groups.

Bethel's hospital facilities should be adequate to meet the inpatient needs of this community and its region through the remainder of the century. However, given the amount and type of growth forecasted to take place here, outpatient demands and demands for expanded social services are likely to be experienced.

Education. Because it is a second class city, the responsibility for providing education services in the City of Bethel remains with the State. Although the City has recently been investigating the possibility of changing its status to that of a first class municipality and, thus, assuming local responsibility for education, for the purposes of this

analysis it is assumed that the education function will remain with the State for the remainder of the century.

Final enrollment in the Bethel schools rose only about 3 percent between 1970/71 and the end of the first quarter of 1980/81. This apparent lack of growth is misleading as the Bethel high school also served students from elsewhere in the region until May of 1980. However, as in many other school districts around the State, elementary school enrollment in Bethel declined slightly during this period.

School students accounted for 25 percent of Bethel's total population in 1980. In the future, it is assumed that this proportion will trend downward to 20 percent by 1985 but will remain constant thereafter. On that basis, total enrollment in the Bethel schools can be expected to reach slightly more than 1,550 students by the year 2000, a 78 percent increase over first quarter enrollment in 1980/81 (see Table 55). If a 60 to 40 percent allocation of students between the elementary and high school grades is assumed, elementary and high school enrollment should be around 940 and 627 students respectively by the end of the century.

The Lower Kuskokwim School District does not use definitive standards for numbers of students per classroom. Thus a standard of 25 students per classroom for elementary grades and 20 students per classroom for the high school grades has been assumed. On that basis, a total of 38 elementary and 31 high school general classrooms would be needed to meet the education demands of Bethel students by the end of the century.

TABLE 55
 SCHOOL ENROLLMENT FORECAST
 NON-OCS CASE
 CITY OF BETHEL
 1985 - 2000

<u>Year</u>	<u>Elementary Enrollment</u>	<u>Secondary Enrollment</u>	<u>Total Enrollment</u>
1985	530	353	883
1990	647	431	1,078
1995	783	522	1,305
2000	940	627	1,567

Source: Alaska Consultants, Inc.

This represents a gain of 5 elementary (assuming that each teaching station at the M.E. school is equivalent to a classroom) and 9 high school general classrooms over those available in the existing school plants.

Aside from forecasted general classroom needs to meet the demands of population growth, replacement of part of Bethel's education plant is already warranted. Replacement of the 10 classroom Kilbuck junior high school is rated as the School District's number 2 priority for capital improvements. In addition, replacement of the 23 classroom Kilbuck elementary school is likely to be demanded before the end of the century.

Recreation. Most of Bethel's formal recreation facilities are associated either with the 3.1 acre Park Block or with the schools. Assuming that 3 acres of land in outdoor neighborhood park and recreation space is needed for every 1,000 people, Bethel has an existing demand for about 10.5 acres of this type of land use. The City will basically meet any outstanding need for this type of space with development of the Bethel Community Park, a 21 acre site, which it is in the process of developing into a comprehensive outdoor and indoor recreation facility.

In terms of indoor recreation facilities, Bethel residents currently have access to gymnasiums in the Parks and Recreation Building, the high school and the National Guard Armory. However, using a standard of one indoor basketball court for every 500 people, the community has an existing need for four additional courts. Furthermore, Bethel has

no swimming pool although provision of such a facility is rated by the Lower Kuskokwim School District as its number 4 priority for capital improvements projects. Finally, Bethel has no formal community center.

By the year 2000, Bethel is projected to have a demand for about 23 acres of land in outdoor neighborhood park and recreation space. Such space would logically include small playgrounds in residential subdivisions as well as community parks. At that scale, the City can also anticipate a need for a total of 16 indoor basketball courts.

Utilities

- o Water. As in Dillingham, only a relatively small proportion of residences in Bethel (190 units as of October 1980) are connected to the piped water system. This excludes units associated with the Federal Aviation Administration and the Bureau of Indian Affairs which have their own systems. It also excludes a number of other wells operated by agencies or companies and which provide running water to many community residences. Most notable of this latter group are the Bethel Native Corporation apartment complex, the Public Health Service hospital and associated housing area, and the trailer court out the main road between town and the airport.

Because of the susceptibility of much of Bethel to flooding, it is assumed that the older sections of town will remain

unconnected to the community piped water system. In addition, it is probable that a share of new residential development will take place either in the floodplain or in areas remote from the existing system. Such users will be forced to obtain their water from wells (generally not feasible for single residences) or to purchase their needs from water carriers.

In the forecast of water system capacity requirements, it has been assumed that 25 percent of Bethel residents will be served by the community piped water system. (This represents an increase over the approximately 19 percent of all units connected to the system in 1979, excluding the FAA and Bureau of Indian Affairs complexes). In addition, a standard of 125 gallons of water per capita per day has been assumed. Bethel has no major industrial users connected to its piped water system and it is not anticipated that it will do so in the future. Although there are large institutional water users in the community, their water capacity requirements are unknown and are, for that reason, excluded from this analysis.

Based on the above assumptions, it is estimated that the Bethel piped water system will require a total capacity of almost 245,000 gallons of water per day by the year 2000 to meet residential demands (see Table 56). Since the present system also serves several major institutional users, this would necessitate the drilling of additional wells.

TABLE 56
 ESTIMATED DOMESTIC CAPACITY REQUIREMENTS a/
 WATER SUPPLY SYSTEM
 NON-OCS CASE
 CITY OF BETHEL
 1985 - 2000

(000's of gallons per day)

<u>Year</u>	<u>Domestic Capacity</u>
1985	138
1990	168
1995	204
2000	245

a/ The forecast of domestic capacity requirements assumes that 25 percent of Bethel residents will be served by the community piped water system. The remainder of the community will rely either on non-City wells or on hauled water sources.

Source: Alaska Consultants, Inc.

- Sewer. Like its water system, Bethel's piped sewer system serves relatively few users. In fact, according to Darbyshire and Associates, approximately two-thirds of all residences in the community now rely on honeybucket pick-up services. In addition, several other users (including the FAA, the Bureau of Indian Affairs, the Kuskokwim Inn, Wien Air Alaska and the trailer court) have their own sewage collection and treatment systems.

Except for users with their own treatment facilities, both piped and hauled wastes are delivered to the Bethel sewage lagoon. This facility was developed in 1969 to handle sewage from the Bethel Heights subdivision but has since been used to serve general community needs and is already approaching capacity.

For purposes of estimating future capacity requirements for domestic sewage treatment in Bethel, a standard of 125 gallons of wastewater per day was assumed. This number is unrealistically high as only honeybucket wastes are delivered to the sewage lagoon for about two-thirds of the community's residences and some groups have their own sewage treatment systems. On the other hand, the lagoon serves several major institutional users, some of which house residents from outside the immediate Bethel area.

TABLE 57
 ESTIMATED CAPACITY REQUIREMENTS
 DOMESTIC SEWAGE TREATMENT
 NON-OCS CASE
 CITY OF BETHEL
 1985 - 2000

 (000's of gallons)

<u>Year</u>	<u>Daily Treatment Capacity</u>	<u>Peak Hourly Capacity</u>
1985	552	69
1990	674	84
1995	815	102
2000	979	122

Source: Alaska Consultants, Inc.

In the absence of better data and noting the limitations of this methodology, the Bethel sewage lagoon would need to have the capacity to handle close to 980,000 gallons of wastewater daily by the year 2000 using this standard (see Table 57). Even if this figure was divided by three to more accurately reflect probable future demands, the 326,000 gallon capacity required is still more than double the capacity of the present system.

- Electric Power. Electric power is provided by a private company, the Bethel Utilities Corporation, to all users in the immediate Bethel vicinity and is 100 percent diesel generated. Total nameplate generating capacity of the system was 9,100 kilowatts in 1980.

The present installed capacity of 2.5 KW per person in Bethel is projected to increase by 0.05 KW per year until 1990 when there should be 3.0 KW of installed capacity per capita. On that basis, the Bethel power system can be expected to need an installed capacity of close to 23,500 KW by the end of the century (see Table 58), more than two and one-half times the capacity of the present system. Unless alternative power sources are developed in the Bethel area, this will involved the costly addition of diesel units at periodic intervals.

TABLE 58
ESTIMATED CAPACITY REQUIREMENTS
ELECTRIC POWER SYSTEM
NON-OCS CASE
CITY OF BETHEL
1985 - 2000

<u>Year</u>	<u>Estimated Capacity Requirements in KW's</u>
1985	12,136
1990	16,170
1995	19,569
2000	23,502

Source: Alaska Consultants, Inc.

- Solid Waste Disposal. Garbage collection services for all users within Bethel's corporate limits is provided by the City of Bethel and solid wastes are disposed of at the 10 acre Bethel landfill site located north of the sewage lagoon. Although this facility is adequate to meet present community needs, the City expects that it will continue to do so for only another seven or so years. Table 59 indicates the volumes of solid wastes which could be expected in Bethel during the next twenty years under a non-OCS scenario.
- Communications. Telephone service in Bethel is provided by the General Telephone Company of Alaska which, as of September 1980, had between 1,200 and 1,300 individual subscribers. The capacity of the exchange was severely overloaded in 1980. At that time, it was handling an average of close to 35,000 calls daily versus a design capacity of closer to 10,000 calls per day. Assuming that 1.25 lines will be required initially for each housing unit added in the Bethel vicinity, the local system can expect to experience a demand for an additional 890 or so lines by the end of the century (see Table 60). Such an increase in demand would be completely beyond the capabilities of the present system.

Local Government Finances. As a second class city under Alaska law, Bethel has limited sources of local revenue and more limited powers and responsibilities than a first class municipality. Bethel levies no

TABLE 59
ESTIMATED DISPOSABLE SOLID WASTES
NON-OCS CASE
CITY OF BETHEL
1985 - 2000

<u>Year</u>	<u>Annual Tonnage</u>	<u>Annual Volume (cubic yards)</u>
1985	5,050	30,600
1990	6,480	39,270
1995	7,850	47,580
2000	9,420	57,090

Source: Alaska Consultants, Inc.

TABLE 60
ESTIMATED CAPACITY REQUIREMENTS
TELEPHONE SYSTEM
NON-OCS CASE
CITY OF BETHEL
1981 - 2000

<u>Period</u>	<u>Additional Lines Needed</u>
1981 - 1985	165
1986 - 1990	175
1991 - 1995	259
1996 - 2000	288
<u>TOTAL</u>	<u>887</u>

Source: Alaska Consultants, Inc.

property taxes and depends heavily on a locally imposed 5 percent sales tax as a source of municipal revenue. On the other hand, education services in the community are provided by a wholly State-funded entity, the Lower Kuskokwim School District.

Despite its limited powers and taxing ability, the City of Bethel has assumed responsibility for a fairly wide range of municipal powers as permitted under Title 29 of the Alaska Statutes. However, in order to do so, it has had to rely on receiving a maximum of assistance from other levels of government. This is likely to continue to be the case in the future, possibly to an even greater degree than at present.

APPENDIX.



METHODS, STANDARDS AND ASSUMPTIONS

The following pages present the methods, standards and assumptions which were developed and applied to forecasted future employment and population under both a non-OCS and an OCS case and related future demands for land and local government facilities and services for the cities of Dillingham and Bethel under a non-OCS case.

Economy and Population - Non-OCS Case

FORECASTING METHODS

There are several forecasting techniques which are commonly used to project future growth or decline in the economy and population of local areas. Probably the simplest method is the projection of past rates of growth or decline. However, this technique is usually practical only in large areas which have consistently shown steady rates of growth or decline and where the economic structure has been relatively stable over time.

A second method involves projections based upon relationships to growth in other geographic areas. Projections for industries and population for a region, the State or the nation are related to the local area. However, although this method provides a valuable check against projections obtained by other methods, it is not a reliable means of forecasting in small local areas subject to sudden change.

The third method which is often used in large communities is a projection based upon net migration and natural growth. This method of forecasting is commonly called the natural increase or cohort-survival method due to the technique of projecting the natural increase element of population and is normally used where natural growth rather than economic change is expected to be the main impetus for population growth.

A fourth method is to derive future population estimates from future employment estimates. This method, termed the population/employment ratio method, assumes that persons of employable age in the labor force represent a fairly constant proportion of the total population. Therefore, population forecasts can be derived directly as a statistical proportion of future employment. The simplest means of applying this technique may overlook such variables as productivity, market trends and the decline or expansion of extractive industries. Nevertheless, the ratio of total community employment to total community population is an important factor in forecasting population using the economic base method discussed below.

The most sophisticated method used to define and measure the economic structure of a community as the basis for forecasting future population is the input-output approach. The input-output methods clearly are well suited to comparative statics and, through the use of models, can be adapted to dynamic problems. While this method is ideally suited to measure and distribute the effects of major industrial impacts, the detailed information necessary to use this method effectively is not available in a suitable form for the communities under study.

Another method of forecasting employment and population growth or decline is the economic base method. This method stresses the importance of export activities as a determining factor in regional and community economic growth. Within a specialized economy, regions or cities must both import and export goods and services in order to prosper. To pay for these imports, the regions or communities must in turn export to other regions. In this method of analysis, the basic or primary sector of regional or community economic activity involves the production of goods and services for export. The non-basic or secondary sector of regional community activity involves the production of goods and services for local purchase and consumption.

The economic base method is derived from modern theories of international and interregional trade and it makes use of such economic concepts as the multiplier. For technical reasons, the method is restricted in its breadth of application. Difficulties are sometimes encountered in allocating activities to basic and secondary sectors, external money flows into a region are not always easily accounted for and the treatment of indirect effects is necessarily unclear. As a general rule, the smaller the economic region, the more sensitive its economy will be to fluctuations in its export base. Conversely, in more populous, economically diversified regions, the multiplier tends to approximate that of the nation. Thus, the economic base method can provide a useful explanation of economic development in small communities where the flow of goods and services within the community is limited and can be traced.

Although economic base studies have used various units of measure such as jobs, payroll, value added, value of production and dollar income and expenditure accounts to measure economic activity, most studies have relied solely or primarily upon employment. In this study, where the economic base method is used, employment is used as the primary unit of measure and as the basis for forecasting the magnitude of future economic and population growth or decline.

In the economic base forecast, the activities of certain employers are classified as basic (exogenous). This group is composed of employees engaged in export industries or performing labor based upon demand determined by forces outside the city or region. All other employees are classified as secondary (endogenous). The fortunes of the employees of these secondary industries are determined by internal forces which are expressed by a numerical multiplier linking the export sector to total regional or community employment.

In a simple economic model, secondary employment is shown as a function of total employment

$$Y_s = f(Y_t)$$

and

$$Y_t = Y_s + E$$

where: Y_t = total community or regional employment

Y_s = total community or regional secondary employment

E = total community or regional basic employment. This is the sum of all basic employment as arrayed in the Standard

Industrial Classification Manual by the following divisions:
 Agriculture, Forestry and Fishing; Mining; Contract
 Construction; Manufacturing; Transportation, Communication
 and Public Utilities; Trade; Finance, Insurance and Real
 Estate; Service; and Government.

In its simplest form, the economic base model hypothesizes a homogeneous relationship expressing secondary employment as a constant proportion, k , of total employment

i.e.: $Y_s = kY_t$

so that: $Y_t = \left(\frac{1}{1 - k} \right) E = mE$

and so that m , the multiplier, $\frac{1}{1 - k} = \frac{1}{1 - \left(\frac{Y_s}{Y_t} \right)} = \frac{Y_t}{E} = \frac{Y_s + E}{E} = 1 + \frac{Y_s}{E}$.

The multiplier is estimated by observing the historic relationship between the activities of the export sector and total regional activities. Then, given the estimates of future magnitude of basic employment in each SIC division, the application of the multiplier yields a forecast of total employment as a reflection of total regional or community economic activity. Furthermore, total regional or community employment can be multiplied by a population dependency ratio, gained by observing the historic relationship of total employment to total population, to produce a forecast of total population.

Under some circumstances, structural change in the local economy may alter the balance between the basic and secondary economies. For example, expansion in local commerce to provide a wider range of consumer goods and services would magnify the multiplier effect of basic employment upon the secondary economy. Conversely, where the mix of new basic employment includes a disproportionate share of temporary, seasonal or unattached workers, the employment multiplier may be depressed. Sometimes, rapidly expanding economies can exhibit both of these tendencies. However, the employment multiplier can be varied over time to reflect the dynamic impact of such changes.

PRESENT EMPLOYMENT ESTIMATES

Based upon a review of existing local economies and political organization, a precise geographic definition of the areas to be studied was determined. The areas of study were defined as the cities of Dillingham and Bethel. Unfortunately, these areas do not conform to the statistical areas used by the Alaska Department of Labor so there are no published data series for community employment by economic sector for economic base trend analysis. However, unpublished data were obtained for the City of Dillingham from the Department of Labor and were used, along with other data, for the economic analysis.

Within these areas of study, informal interviews of employers and other knowledgeable individuals were conducted. From a review of published and unpublished materials and the interviews, the basis of the present

economic activities and the potential for future growth or decline of the Dillingham and Bethel areas were assessed. The process of investigation was carried out for each of these local economies.

Since both of the communities under study are relatively small, informal interviews of all employers were conducted during the development of the baseline description. Among the information obtained were the following items:

- The number of full-time and part-time salaried employees.
- The number of months worked by the employees.
- The product(s) or service(s) produced or delivered.
- The quantities of product produced by major manufacturers such as fish processing plants.
- The months during which the product is produced.
- The suppliers to the major manufacturing plants such as the number and type of fishing vessels (to estimate the number of jobs in fishing).
- The percent of the firm's business (revenues) resulting from activities (sales) related to firms and individuals outside the region or the local area.
- The plans of the firms regarding expansion or retrenchment which would result in increased or decreased employment.
- The views of the owners or operators of the firm regarding future prospects of their firm and their industry, estimates and timing of major growth or decline in terms of employment and opinions on future seasonality.

These employer interviews, together with published and unpublished employment data provided by the Employment Security Division of the Alaska Department of Labor were relied upon to assemble the total picture of current and past employment patterns.

Total employment for Dillingham and Bethel was then arrayed by major industrial sector in conformance with the Office of Management and Budget's Standard Industrial Classification Manual (see Tables 3 and 21). The SIC Manual defines industries in accordance with the composition and structure of the economy and covers the entire field of economic activity. The following base year data necessary for the forecasting process was developed:

- Total employment.
- The distribution of basic and secondary employment by industrial sector.
- The employment multiplier.

From the ratio of basic to secondary employment, the base year employment multiplier can be derived for each community by the formula:

$$m = \frac{Y_t}{E}$$

Although it is usually reasonable to assume that the employment multiplier and the distribution of service employment among the various employment sectors will remain constant in the model throughout the forecast period, there are factors which affect the multiplier and the distribution

of service employment. Among these factors which can be taken into account in the forecast are the following:

- A lag which sometimes occurs in service employment, especially during periods of rapid growth or decline in basic industry.
- Changes in consumer habits which result in more or fewer purchases locally. For example, improved local retail and service facilities can often increase local purchases.

To account for these factors, the structure of employment in communities which have experienced rapid growth or decline in the past can be reviewed, together with retail and service trends during various periods of growth, and corrective adjustments in the structure of service employment can be based upon these comparisons. This was the procedure followed in the economic and population forecasts where the introduction of new economic activities seemed capable of altering historic economic patterns.

FORECAST OF EMPLOYMENT

Because of major differences in their demographic and economic characteristics and their economic prospects, Dillingham and Bethel are not suited to a uniform employment and population forecasting methodology. Therefore, different forecasting methods were used according to the individual character of each community, with the choice of methods governed by the demographic and economic structure of each town.

The primary employment and population forecasts for Dillingham were developed by the economic base method. The choice of this method was justified by the nature of that community's economy. Dillingham already has an established and substantial economic base and it was feasible on the basis of historic trends and analysis of prospects for expansion of traditional industries, to apply this method to forecast future employment in the traditional economy.

Reflecting Bethel's primary economic function as a regional service center and its traditional socio-economic function as an acculturation center, growth in employment in this community in recent years has been closely tied to levels of government spending in the region as a whole. However, relationships between economic and population growth in the Bethel region are not well defined. As recently noted by the University of Alaska's Institute of Social and Economic Research (July 1981), the region's economy is still in a transitional stage of development between pure subsistence on the one hand and a pure market situation on the other. Thus, while the region's population has grown at a pace generally consistent with rates of natural increase, high levels of government spending have resulted in a relatively rapid growth in employment. These new job opportunities have encouraged a much higher participation rate by regional residents, many of whom have been outside the labor market, plus some in-migration, mainly by whites with few dependents. This disparity between growth in employment and population can be clearly seen in the Wade Hampton census division where nonagricultural

wage and salary employment grew an an average annual rate of 7.2 percent between 1970 and 1980, whereas population growth here during the same period averaged only 1.8 percent per year.

Because of the inconsistent and changing relationship between employment and population growth in the Bethel region, forecasts of future employment and population for the City of Bethel were derived by different methods. Future employment by sector was estimated using the economic base method since Bethel has a fairly well established economy and it was therefore feasible to analyze the community's traditional industries, assess their future prospects, project future levels of basic employment and to derive relationships between basic and secondary employment to develop a forecast of total employment by sector. For purposes of forecasting future population, however, the cohort-survival method was instead used to derive a regional population forecast and assumptions were then made as to Bethel's share of that growth.

Based upon economic research done for both Dillingham and Bethel, significant factors likely to affect future growth or decline in basic industries were identified and analyzed, annual growth rates by sector were estimated and future basic employment by industry sector in a non-OCS case was forecast. In a hypothetical example, the derivation of future community basic employment can be shown as follows:

<u>Industrial Classification</u>	<u>Base Year Basic Employment</u>	<u>Forecast Growth %</u>	<u>Year 1 Basic Employment Forecast</u>
Agriculture, Forestry and Fishing	110	5	116
Mining	4	2	4
Contract Construction	5	4	5
Manufacturing	97	5	102
Transportation, Communication and Public Utilities	12	5	13
Trade	24	4	25
Finance, Insurance and Real Estate	2	4	2
Service	16	4	17
Government	60	3	62
<u>TOTAL</u>	<u>330</u>		<u>346</u>

The sum of the basic employment forecasts by industry sector in any given year equals total basic employment in that year. Next, total basic employment can be multiplied by the employment multiplier to produce a projection of total employment, as represented by the following formula:

$$Y_t = mE$$

Secondary employment is then derived through the following formula:

$$Y_s = Y_t - E.$$

In order to derive total employment by industrial sector, secondary employment can be distributed as in the base year, if it is assumed to have a constant distribution over time. Alternatively, if it is

concluded that the structure of the secondary economy will change over time in response to local economic development, then the distribution of secondary employment can be varied to reflect anticipated trends. If it is assumed that the community in the hypothetical example has an employment multiplier of 1.67, then the following estimate of total employment by industry sector for basic and secondary employment is obtained:

<u>Industry Classification</u>	<u>Base Year Secondary Employment Distribution</u>	<u>Forecast Secondary Employment</u>	<u>Forecast Basic Employment</u>	<u>Forecast Total Employment</u>
Agriculture, Forestry and Fishing	0.0	0	116	116
Mining	0.5	1	4	5
Contract Construction	4.5	10	5	15
Manufacturing	1.4	3	102	105
Transportation, Communication & Public Utilities	8.2	19	13	32
Trade	20.9	49	25	74
Finance, Insurance & Real Estate	5.9	14	2	16
Service	17.7	41	17	58
Government	40.9	95	62	157
<u>TOTAL</u>	<u>100.0</u>	<u>232</u>	<u>346</u>	<u>578</u>

Dillingham. Using the previously described methodology, the forecast of basic employment for Dillingham and its immediate vicinity assumes an

average annual growth rate of 4 percent in the contract construction and government sectors and of 5 percent in the transportation, communications and public utilities, trade, finance, insurance and real estate and services sectors through the year 2000. No growth in basic employment was forecast in the agriculture, forestry and fishing, the manufacturing or the mining sectors. The rationale for these varying projected rates of basic employment growth is contained in the main text of this report.

To derive a forecast of secondary employment for Dillingham and its immediate vicinity, existing relationships between basic and secondary employment in this community were examined. It was determined that the present ratio of 1:0.6 would change to one of 1:0.65 by 1985 and to 1.0:0.7 by 1995. These ratios were then applied to forecasted basic employment. It was also assumed that the proportion of secondary employment in each sector would remain approximately the same through the end of the century. Accordingly, secondary employment was disaggregated by sector in the same proportion as was found to be the case in 1980. Forecasted secondary employment was then added to forecasted basic employment to derive a total non-OCS employment forecast. The breakdown of forecasted basic, secondary and total employment by sector in a non-OCS case is given in the main text of this report.

Bethel. Using the same methodology as was used in the case of Dillingham, the forecast of basic employment for Bethel assumes an average annual growth rate of 5 percent in the finance, insurance and real estate sector, one of 4 percent in trade, 3 percent in transportation,

communications and public utilities and in services, and 2 percent in both government and contract construction. No growth in basic employment was forecast in the agriculture, forestry and fishing or the mining sectors. In the manufacturing sector, on the other hand, basic employment was projected to double between 1980 and 1985 based on the addition of a second seafood processing operation but to remain stable thereafter through the end of the century. The rationale for these different projected rates of basic employment growth is given in the main text of this report.

As was the case with Dillingham, existing relationships between basic and secondary employment in Bethel were examined in order to derive a forecast of secondary employment. In Bethel, however, the present 1:0.8 ratio of basic to secondary employment was assumed to continue through the end of the century. In the forecast of secondary employment by sector, gains in manufacturing in 1985 are assumed to be offset by a slightly slower rate of growth in government, with other sectors disaggregated in the same proportion as was found to be the case in 1980. Thereafter, forecasted secondary employment was disaggregated in the same proportion as projected for 1985. The breakdown of Bethel's forecasted basic, secondary and total employment by sector is given in the main text of this report.

PRESENT POPULATION ESTIMATES

The base year population figures were obtained from advance 1980 Census data counts. As a check, the census figures were compared with other

recent local population estimates. To clarify census figures and to aid in their interpretation, interviews were held with city and/or other local officials and with other sources having knowledge of recent changes in local populations.

The base year household population estimate was then divided by the base year employment estimate, excluding workers resident in group quarters. The product of this division is a dependency ratio for estimating total household population from total employment in future years.

For example, if the household population in a hypothetical community is assumed to be 1,200 people including 500 employees, the following dependency ratio is obtained:

$$\frac{\text{Estimated Base Year Population}}{\text{Estimated Base Year Employment}} = \frac{1,200}{500} = 2.2 \text{ Dependency Ratio}$$

Although this ratio can be employed as a constant throughout the forecast period, it should be recognized that it is subject to change, especially if there is a heavy influx of new residents with markedly different family characteristics. Factors can be statistically identified in similarly situated communities at various levels of growth which evidence different ratios. Some of these factors are as follows:

- Changes in the composition of population as a result of birth rates, death rates and migration.
- Variations in the pattern of seasonality of employment resulting in a greater or lesser year-round population.

- Entry into or withdrawal from the workforce and employment of household members, especially wives.
- Changes in the rates of unemployment and underemployment.

FORECAST OF POPULATION

The dependency ratio obtained by the method previously described was used to forecast total population on an annual basis throughout the forecast period for Dillingham and its immediate vicinity. However, this method proved impractical in Bethel where relationships between population and employment are less well defined. Growth in population in Bethel has primarily been related to rates of natural increase in the Bethel region and to Bethel's growing share of the region's total population. Thus, for the non-OCS forecast, the population of the region was projected and assumptions were then made as to Bethel's share of that growth through the end of the century.

Dillingham. In 1980, a total of 828 average annual full-time jobs was counted in Dillingham and its immediate vicinity. The 1980 Census recorded a total community population of 1,563, resulting in a dependency ratio of 1.9. This presently low dependency ratio is forecasted to rise to 2.0 by 1985, 2.1 by 1990, 2.2 by 1995 and 2.3 by the year 2000 as more people make their permanent homes in the community. By applying these ratios to projected total employment, forecasts of total community population are thus derived. (The actual population forecasts for Dillingham are included in the main text of this report).

Bethel. Between 1970 and 1980, the population of the Bethel region (defined as the Bethel, Wade Hampton and former Kuskokwim census divisions) increased at an average rate of 2.1 percent per year, from a total of 13,802 in 1970 to 17,007 in 1980. Population growth in the region is expected to continue to be derived primarily from rates of natural increase. Using a constant 2 percent annual rate of growth, the population of the Bethel region is thus forecasted to be in the vicinity of 18,777 by 1985, 20,731 by 1990, 22,889 by 1995 and 25,272 by the year 2000.

Bethel's share of the population of its region has steadily increased during the past forty years. This trend is expected to continue in approximately the same proportion as it has during the past twenty years, i.e., the City's share of the region's population is projected to increase by about 5 percent every ten years, from the 21 percent recorded in 1980 to 31 percent by the end of the century. (The actual population forecasts for Bethel are included in the main text of this report).

Housing and Residential Land Use

In order to forecast the future local demand for housing, it was necessary to subdivide the projected increase in into two sub-groups possessing distinctly different housing needs: those new residents living in households (i.e. a mix of family and unrelated individual households) and those residents living in group quarters (i.e. in bunkhouses and dormitories). This was necessary because it was assumed that group housing would continue to play a significant role in meeting the housing

needs of seasonal employees in some economic activities such as fishing and fish processing and that these employees would, as a group, place different demands upon the system of public services and facilities than residents living in conventional housing. (It should also be noted that people living aboard floating processors were not included as part of Dillingham's resident population, although the needs of this group for certain services was considered).

Historically, within the fish processing industry, the provision of group housing has resulted in large part from the seasonality inherent in the past pattern of exploitation of traditional fisheries resources. Although, recent trends in the fishing and processing industry have been toward year-round operations, such trends are not expected in either the Dillingham or Bethel areas where commercial fishing activities are almost exclusively centered around salmon and herring. It is therefore assumed that Dillingham's fishing and fish processing industry will continue to attract large numbers of seasonal residents to the community with these people continuing to come both from smaller villages in the region and from outside the region. Especially for seasonal residents from outside the region, group accommodations promise to remain a significant style of housing since it is often advantageous or necessary for major employers to provide living quarters for all or part of their workforce.

In the future, the number of employees allotted to group housing depends on many factors such as the size of the community, the stage of industrial development and the nature of the industrial task in which the workforce

is employed. For example, it is plausible that the proportion of shore-based processing plant workers residing seasonally in group quarters in Dillingham may decline in the future as the community grows and a higher proportion of plant workers elect to take up permanent residence in the community.

Group housing for fishermen and processing workers is not a factor in Bethel where almost all of these people are local residents. On the other hand, employer provided housing, especially by federal agencies, has long been a factor in the local housing supply. However, although local employee housing residents undoubtedly constitute a less permanent portion of the community's population, they nevertheless live in households rather than in group accommodations.

The total increase in population estimated to be living in households was divided by the estimated average family size or number of persons per household to obtain the projected number of new housing units which would be needed to satisfy the future demand for conventional housing units. The remainder of the forecast population increase was assigned to group housing.

The distinction between persons living in households and persons living in group housing is important for a number of other reasons bearing upon future demand for community facilities and services. For instance, households will most often be composed of families and related individuals while group quarters will most often be occupied by unattached individuals.

Consequently, residents of households will affect certain public services (e.g. education, social services, public safety) very differently than residents of group housing.

In order to provide a basis for forecasting the residential land required to accommodate future growth, the number of housing units was estimated for three categories of types of units: one and two family homes; multi-family units; and mobile homes or trailers. The selection of the housing type mix appropriate for each community for each component of population growth was governed by an evaluation of the specific physical constraints (terrain and soils conditions, land availability, etc.) in each community and by the anticipated social and economic characteristics of future residents.

For purposes of forecasting future residential land requirements, existing local zoning and subdivision ordinances were not viewed as reliable predictors of future land use densities. Both Dillingham and Bethel have instituted local subdivision control but neither community has formally adopted zoning regulations. Bethel does have a recent comprehensive plan which provides broad guidelines for future community growth and the forecast of future residential land use was checked for consistency with those guidelines.

The forecast of future residential land use was obtained by converting the estimate of future housing demand for new residents by type of housing unit into a forecast of land use demand by using the following

generalized assumptions about the average residential unit densities (including rights-of-way) for each housing type: one and two family units at 3 units per acre; multi-family units at 10 units per acre; and mobile homes and trailers at 10 units per acre.

Community Facilities and Services

A series of assumptions has been made and standards developed for assessing future needs for a range of community facilities and services in the communities under study in the non-OCS case, as follows.

PUBLIC SAFETY

Police

The following basic assumptions have made for police protection:

- Police protection services will continue to be provided by the cities of Dillingham and Bethel for areas within their corporate limits.
- Law enforcement in the unincorporated areas outside these communities will continue to be provided by the State of Alaska.

To arrive at reasonable standards for police protection, commonly used nationwide standards for the number of law enforcement officers and jail cells needed to serve a given number of people were obtained. These

standards were then reviewed in relation to existing conditions in the two communities under study and special situations were noted.

Nationwide, the desired ratio of law enforcement officers to population is one for every 500 people. According to the Alaska Department of Public Safety, when a community reaches a size where it becomes desirable to have an officer on duty 24 hours per day, 7 days per week, a minimum of 6 officers (mathematically, 5.75) must be hired when factors such as annual leave, sick leave and others are taken into account. A similar situation exists with support personnel.

According to the Alaska Department of Public Safety, a commonly used standard for jail cells is one for every 500 people. However, since State law requires that male, female and juvenile offenders be separated during incarceration, a minimum sized jail in Alaska should have at least three cells.

On the basis of the foregoing, the following standards were derived for policemen and jail cells in the non-OCS case:

- Existing relationships between population and the number of public safety officers at Dillingham and Bethel are assumed as the base from which forecasts are made. For Dillingham an additional officer is assumed to be required for each successive increment of 500 population. However, because a significant proportion of police activity in Bethel derives from offenses committed by people from outside the local area, the standard

was assumed to continue at the rate of one additional officer for each additional 300 persons.

- At Dillingham, one jail cell for every 500 people, except that the minimum jail size shall be three cells. Since the Bethel facility serves more than the local area, one added jail cell for every 300 new persons was assumed.

Fire Protection

Fire protection is a normal responsibility of Alaska cities and one which is exercised by the cities of Dillingham and Bethel.

The State has no established qualitative fire protection standards except that an individual fire department must be registered with the Division of Fire Protection to be eligible to receive State revenue sharing funds for firefighting purposes. However, the Insurance Services Office, on behalf of fire insurance companies and as an aid to the underwriting of fire insurance premiums, publishes comprehensive fire protection guidelines to enable the classification of communities throughout the United States in relation to the adequacy of their fire defenses and their physical characteristics. Based upon the extent to which local fire departments meet these standards, individual communities are graded on a class 1 (best) to a class 10 (worst) scale and local insurance rates are adjusted to reflect these differences in fire protection capability. Present ratings for the communities under study are 8 to 9 for residential properties within both the cities of Dillingham and Bethel, with areas not served by hydrant systems having the poorer rating.

According to the Insurance Services Office, the minimum criteria for a recognized fire department are as follows:

- Organization: The department shall be organized on a sound, permanent basis under applicable state and/or local laws. The organization shall include one person (usually with the title of Chief) responsible for the operation of the department.
- Membership: The department shall have an active membership which provides a response of at least 4 members to alarms.
- Training: Training shall be conducted for all active members.
- Apparatus: Response to any alarm or fire shall be with at least one piece of apparatus suitably designed and equipped for fire service. Provisions shall be made for the housing and maintenance of apparatus.
- Alarm Notification: Means shall be provided for 24-hour receipt of alarms and immediate notification of members.

In addition to minimum criteria for fire departments, the Insurance Services Office also establishes minimum criteria for water supplies for firefighting purposes, quoted as follows:

"A minimum recognized water supply usually contemplates a network of mains and hydrants capable of delivering at least 250 gallons per minute (over and above normal consumption) for a period of at least two hours. Where there are numerous commercial buildings, this minimum might be converted to at least 500 gpm for one hour (the same total quantity of water but available at a greater flow rate for a shorter period of time).

. . . the small settlement of a few hundred people and comprised of the usual number of small mercantile structures in a central commercial district would require 500 gpm in residential sections (well spaced or scattered small single family dwellings). In the commercial district, water in the range of 1,000 to 3,000 gpm would

be required. A school complex serving the settlement and the surrounding territory probably would need something on the order of 3,000 to 5,000 gpm if there is a large building such as a gymnasium."

A great deal of flexibility is built into guidelines developed by the Insurance Services Office. This is necessary since firefighting requirements for individual communities vary greatly depending on population densities, land use patterns and the natural terrain, all of which affect running distances and response times for firefighting equipment. In addition, water requirements vary according to the character and scale of an area to be served. For example, the flow of water required to service low density residential areas is much less than that needed in a typical waterfront industrial area.

Recognizing that precise standards for fire protection are not generally applicable, the following standards are nevertheless offered:

- All communities to have at least one fire station with at least two fire trucks. The capacity of the fire trucks and the need for additional equipment will be determined primarily by fire flow requirements.
- Additional fire stations (each with at least two fire trucks) to be required where areas of concentrated development are beyond a 2 to 4 mile radius of existing fire stations. (The actual distance may vary according to possible response time).
- Established fire flow requirements for various areas of each community are assumed to remain approximately the same except

in developing residential areas where a water flow minimum of 500 gallons per minute is assumed.

The level of fire protection in both Dillingham and Bethel falls short of these standards in some respect, primarily in regard to response time or availability of water for firefighting purposes, with detrimental effects on their insurance ratings.

For purposes of projecting future requirements, demands for land will be estimated and additional firefighting capabilities needed to service population growth will be determined.

HEALTH

The standards used to determine existing and future needs for medical facilities and services in the communities under study are those developed by South Central Health Planning and Development, Inc. These standards have been adopted and are used by the State for various sized communities in Alaska (see Tables A-1 and A-2).

Both Dillingham and Bethel currently have operating hospitals which serve a regional as well as a local clientele. The standards summarized in Tables A-1 and A-2 indicate the two communities are at "Level Three".

The most critical element involved in health care is the presence of a physician. On average, it is assumed that one physician requires a

TABLE A-1
COMMUNITY LEVELS FOR
ASSESSMENT OF HEALTH RESOURCES

Criteria	Level I Village	Level II Subregional	Level III Regional	Level IV Urban	Level V Metropolis
Population	25 - 80	500 - 2,500	2,000 - 200,000	100,000 - 500,000	500,000 +
Isolation/Transportation/Network	Distances from other communities resources great; transportation alternatives and reliability limited	Semi-regular transportation network to: 1) outlying villages & 2) regional center	Moderately reliable transportation network to: 1) subregional center & outlying villages 2) urban centers	Continuously reliable statewide transportation center	National international network
Communications	Unreliable radio contact; one or no phone services	Reliable radio; minimal phone service	Reliable radio; some television, statewide phone network	Radio, television, statewide phone network	All communications media; statewide phone network
Economic Development	Minimal or no services	Basic commercial services to outlying villages	Service and commercial center for majority of villages in the region	Statewide, financial & commercial center	Statewide, financial & commercial center
Examples	Eek, Egegik	Unalaska	Bethel, Homer	Anchorage	Seattle

Source: South Central Health Planning and Development, Inc.

TABLE A-2

INDICATORS OF AVAILABILITY

<u>Level One</u>	<u>Level Two</u>	<u>Level Three</u>	<u>Level Four</u>
itinerant public health nurse <u>a/</u>	1 mid-level practitioner	1 primary care M.D. per 3,500 people (no less than 2)	1.3 physicians per 1,000 (less than half specialists) people
health aide and alternate <u>b/</u>	1 public health nurse	3 acute care beds per 1,000 people	3 acute inpatient beds per 1,000 people
clinic space	1 EMT II	community health center and psychologist	paramedics and advanced life support
EMT trained person	1 dentist extender	1 dentist per 4,000 people	inpatient psychiatric beds
annual itinerant dental visits	diagnostic X-ray capability	X-ray technician	long term alcoholism treatment beds
monthly itinerant behavioral health worker visits	1 behavioral health counselor or social worker	detox capability	neonatal beds/live births
communications system	medical laboratory capability (microscope and refrigerator)	Class 4 emergency room (AMA)	therapeutic radiation capability
annual itinerant eye care	home health aide or long term care alternative	mobile e.m.s. capacity with EMT-trained attendants	surgical capacity
representative health decision-making group		medical technologist	1 CAT Scanner per 250,000 residents
		1 optometrist	pathology and autopsy capability
		short term shelter care	blood bank
		itinerant M.D. specialist visits	specialists/population

a/ Definition to include audiologic testing, immunization.

b/ Range of services provided by health aide as described in Guidelines for Primary Health Care.

Source: South Central Health Planning and Development, Inc.

practice of a minimum of 1,500 people. However, physicians are reluctant to work alone since there are occasions when back-up assistance is required and time is also needed away from the practice for vacations, conferences, education and other purposes. Therefore, physicians in isolated Alaska communities commonly practice in pairs. To support these two physicians, a population base of 3,500 people is generally required.

In some areas, the practice need not be confined to permanent residents nor need it be precisely 3,500. A significant portion of the patient load in Dillingham for example, is made up of persons living in other Bristol Bay communities and fishermen, processing plant workers and other transient workers and visitors who are not permanent residents but are part of the local health care clientele load. Similarly, the hospital in Bethel serves regional as well as purely local needs.

It is assumed that each addition of an increment of 1,500 people above a population of 3,500 in the two regions served by the Dillingham and Bethel hospital facilities would require another physician in the communities under study.

In regard to hospital beds (used as a measure of hospital facility needs), acute care beds are general hospital beds as distinguished from long-term care or nursery beds. South Central Health Planning and Development, Inc. estimates the maximum capable of being adequately funded to be 3 to 3.5 acute care beds per 1,000 people in communities of at least 3,000 persons where the services of a physician are available.

For both Dillingham and Bethel, 3.5 acute care beds per 1,000 people will be used as a standard for projection for hospital service areas with a population of more than 3,500. Given the high incidence of injury inherent in the fishing and seafood processing industry and normally high rates of accidents associated with rural Alaska areas, the upper range of the standard for hospital beds is deemed to be warranted in both communities.

EDUCATION

It is assumed that education facilities in both Dillingham and Bethel will continue to be provided by existing authorities, i.e. the Dillingham City School District and the Lower Kuskokwim School District at Bethel.

Generally, students make up a reasonably consistent proportion of a community's population, although recently a declining one due to the nationwide drop in birth rates. A comparison of school enrollment as a proportion of total population for five boroughs in Southeast and Southcentral Alaska (Ketchikan Gateway Borough, City and Borough of Sitka, Kenai Peninsula Borough, Kodiak Island Borough and Matanuska-Susitna Borough) indicated that students accounted for an average of 27.2 percent of the the total population of these areas in 1970. By 1977, this had declined to 23.2 percent and would have declined even more significantly had it not been for the inclusion of the Kodiak Island Borough (where the closure of the Naval Station during this period resulted in an increase in the proportion of students to total population). Some further decline in the student to total population ratio is anticipated. For example,

students accounted for only 18.3 percent of Anchorage's population and for 19.8 percent of that of the Ketchikan Gateway Borough in 1977. However, continued declines should be much less dramatic and student to population ratios are then expected to stabilize.

Final enrollment for the 1979/80 school year in both Dillingham and Bethel accounted for nearly 25 percent of the total population in each community. In view of the general decline in student population ratios observed elsewhere in the State, it is assumed that this ratio will decline at a rate of one percent per year to 20 percent by 1985 and remain stable thereafter for both communities.

Once total school enrollment has been forecasted, allocation of students between elementary and high school grades is necessary since standards for the number of students per classroom normally differentiate between the two levels. Approximately 60 percent of school students in Alaska are usually enrolled in the elementary grades. This proportion has been slightly lower recently as the "peak" student years are now in high school. The enrollment pattern in Bethel is now reasonably close to this 60/40 ratio and the forecast of future school enrollment therefore allots students to elementary and secondary grades in that proportion.

In Dillingham's case, the high school still served some children from outside the local community in the fall of 1980 which served to distort the elementary to secondary student ratio. It is assumed that the ratio of elementary to secondary students (approximately 50 percent each of

final enrollment in 1979/80) will change 2 percent per year until 1985 when it will reach a 60 to 40 percent ratio and will continue in that proportion through the remainder of the century.

According to the National Education Association, there are no established national or State standards for the number of students per classroom. Nevertheless, a standard used by many Alaska school districts is 25 students per classroom for the elementary (K-6) grades and 20 students per classroom for the high school grades.

To determine future classroom needs in all cases, the following assumptions have been made:

- Except as noted for Dillingham, student enrollment will be divided on a 60 percent elementary (K-6) and 40 percent high school (7-12) basis throughout the forecast period.
- Standards of 25 students per classrooms for elementary grades and 20 students per classroom for high school grades will apply throughout the forecast period.
- For purposes of estimating teacher staffing requirements, it is further assumed that the number of added teachers will be equal to the number of added classrooms.

RECREATION

The cities of Dillingham and Bethel operate recreational facilities and programs although in Dillingham's case much of the recreation function is associated with the schools. By contrast, Bethel has given recreation

activities a high local priority and has an organized Parks and Recreation Department which operates facilities and programs in addition to those offered by the schools. In both communities, outdoor recreational activities which need no formal recreational facilities are also highly popular.

The following standards suggested by the National Recreation and Park Association are basic standards which are slightly modified to apply to the Dillingham and Bethel:

- Neighborhood Parks: 21.5 acres per 1,000 people serving a population of 500 to 10,000 people.
- Play Lots and Other Neighborhood Recreation Areas: 0.5 acres per 1,000 people serving a population of 250 to 2,500 people.

Therefore, a total of 3 acres per 1,000 people is assumed to be required in outdoor neighborhood park and recreation areas. These outdoor areas are assumed to accommodate all outdoor basketball courts, volleyball courts, baseball or softball diamonds, tennis courts, jungle gyms, etc. However, while national standards provide adequate guidelines for local parks and recreation, the combination of isolation, geography, climate and local desires for parks and recreation facilities in Alaska must also be taken into account.

Most isolated Alaska communities feel deprived without a reasonably full range of parks and recreation facilities. For example, the national standard for 50 meter swimming pools is one per 20,000 people. However,

almost every coastal Alaska coastal community of 2,000 people has a swimming pool as well as every major high school in the urban areas of the State. Perhaps a more extreme deviation from national standards occurs with indoor basketball courts where most Alaska communities of any size have an indoor facility of some description.

Thus, in addition to outdoor recreation facilities, indoor basketball courts and swimming pools are needed and desired recreation facilities in the communities under study. These facilities provide recreation alternatives, especially during the long inclement Alaska winters.

Also, swimming pools permit the local populations to learn to swim and to develop swimming skills. In areas where a large proportion of the people work on boats or on the waterfront, these skills may be necessary for survival and they cannot be easily learned in the frigid ocean waters, streams or lakes of Alaska.

Therefore, the following minimum standards are assumed to apply to the communities under study:

- Indoor Basketball Courts: One for every 500 people.
- Swimming Pools: One for every community of 2,000 to 15,000 residents, plus an additional pool in conjunction with each added high school complex.

There must also be some provision for those not desiring strenuous indoor recreation. In most Alaska communities, this form of recreation is

provided through a community center or, as they are often called, a community hall. Thus:

- Community Center: One for every 25,000 people, except that every community of 2,000 residents or more shall have a community recreational center of appropriate size.

UTILITIES

Water

Both Dillingham and Bethel have piped water systems which serve portions of each community. Dillingham has several major industrial plants. However, except for the City-owned cold storage plant, they provide their own water needs. Bethel has no major industrial users but some major institutional complexes such as the Bureau of Indian Affairs, the Federal Aviation Administration and the hospital have their own systems.

Present rates of water usage in coastal communities such as Dillingham and Bethel are estimated by the U.S. Public Health Service to be approximately 120 gallons per person per day for domestic use. However, many local utilities in Alaska estimate usage at approximately 125 gallons per person per day and this figure was used to forecast future increments in domestic water consumption. The higher figure is believed to be warranted in Dillingham's case because of the large number of additional residents in the community during the salmon season. Measured average consumption rates for the Bethel Heights subdivision and the

Bethel Native Corporation's apartment and dormitory complexes also argue for the higher figure for piped water users in Bethel although usage rates by persons depending on hauled water are presently very low.

Thus, the estimate of future water consumption for domestic purposes is calculated by multiplying the estimated annual average population by 125 gallons per person per day by the number of days in the year to arrive at estimated total annual domestic water use figure.

Sewer

At present, Dillingham does not treat its sewage and the capacity of treatment facilities in Bethel is becoming severely strained. However, it is assumed that these facilities will be brought up to standard for the base case forecast.

According to the U.S. Public Health Service, the quantities of domestic wastewater can be assumed to equal domestic water use and, since industrial wastes are not run through the sewage collection system and treatment plants in the communities under study, domestic wastewater can be assumed to equal total wastewater. Therefore, given a per capita consumption of 125 gallons per day of water usage and a peak flow being an estimated three times the average flow, a treatment plant would be required to have the capacity to process approximately 15.63 gallons per person per hour or:

- $125 \text{ gallons/day} \div 24 \text{ hours/day} = 5.21 \text{ gallons/hour} \times 3 = 15.63$ gallon capacity to accommodate peak loads.

Therefore, it is assumed that sewage treatment plants must have the capacity to accommodate 15.63 gallons of wastewater per person. It is also assumed that industrial wastes produced at seafood processing plants will be processed by the industries generating the industrial waste.

Electric Power

Electric power is distributed to Dillingham area residents by a Rural Electrification Administration (REA) cooperative corporation, while Bethel's power is supplied by a private company. In both cases, all major users are connected to the main power system although some industrial and institutional users maintain standby systems.

In calculating future electric capacity requirements for the non-OCS case, it is assumed that the present installed capacity of approximately 2.5 KW per person will be required initially for each person added, increasing yearly by 0.05 until there is 3.0 KW of installed capacity per capita. This assumption is based on the provision of service for the same basic household functions currently being serviced and for an industrial and institutional mix which is similar to the present distribution.

Solid Waste Disposal

The standards for solid waste disposal are based upon disposal records of the Municipality of Anchorage and trends of solid waste generation in

Anchorage. According to the Solid Waste Division of the Public Works Department, the average Anchorage resident generated 5.35 pounds of solid waste per day during 1977. This has been projected to increase at an average rate of 2 percent per year through 1985, then at an average rate of 1 percent through 1990. Thereafter, it is assumed that no increase in the per person rate of solid waste generation will occur.

In terms of sanitary landfills, the Municipality records an average density of 330 pounds per cubic yard delivered and 800 pounds per cubic yard in place. These standards are assumed for the forecast of the non-OCS cases in both Dillingham and Bethel.

Communications

Telephone service in Dillingham and Bethel is currently provided by a consumer cooperative corporation and a private company respectively. The Alaska Public Utilities Commission, the Municipality of Anchorage's Telephone Utility and the Southeastern Telephone Company were contacted in an attempt to derive standards for future levels of telephone service which are likely to be demanded in these communities.

According to the Anchorage Telephone Utility, in order to determine future levels of demand, the number of lines (excluding extensions) is estimated by using past trends and applying them to forecasts of population growth. The consulting engineers for the Southeast Telephone Company employ a linear trend equation based upon past lines installed.

Both means of forecasting are short range and depend upon yearly installation figures. A relationship, however, was found between telephone lines in use and housing units, with the number of lines per housing unit for Dillingham and Bethel in 1980 being between 1.0 and 1.2. Using Anchorage as a comparison, Anchorage has approximately 2 telephone lines per housing unit. On the other hand, in 1970 Anchorage had only 0.57 telephone lines per housing unit (or, with the military housing units totally discounted, 0.89). This represents a growth rate of over 15 percent per year. However, Anchorage's unique function as the hub of Alaska's communications and transportation and its Statewide appeal as a retail and services area must be taken into account.

It is assumed that 1.25 lines will be required initially for each housing unit added in Dillingham and Bethel under a non-OCS case. However, it should be noted that housing units in this case do not include group housing such as construction camps or cannery barracks as a basis for calculating future requirements. It is also assumed that telephone equipment and services will be provided by the existing telephone utility companies.

Local Government Finances

Where applicable, the following standards, methods and assumptions will be employed to forecast community revenues and expenditures. The resulting surplus or deficit calculated provides an indication of the community's ability to fund capital improvements or upgrade services employing its current rates and measures to capture revenues.

The following assumptions are made:

- Forecasts of revenues are made using current rates and measures as a basis for projection. A 5-year average or an average appropriate to reflect recent circumstances will be utilized.
- The existing level of service is used as the basis for projection. Despite a level of service which may be less than desired, expenditures for services are maintained at current levels.
- Current State statutory limitations on taxation of certain oil and gas properties by local governments will continue to be in force. Although local government units theoretically have the power to levy property taxes of up to 30 mills, in reality their taxing ability may fall far short of this because of limitations on the taxation of certain oil and gas properties as defined in Title 43.56 of the Alaska Statutes. These limitations are set forth in Section 29.53.045 of the Alaska Statutes, which is quoted in part:

"(a) A municipality may levy and collect taxes on taxable property taxable under AS 43.56 only by using one of the methods set out in (b) or (c) of this section.

"(b) A municipality may levy and collect tax on the full and true value of taxable property taxable under AS 43.56 as valued by the Department of Revenue at a rate not to exceed that which produces an amount of revenue from the total municipal property tax equivalent to \$1,500 a year for each person residing within its boundaries.

"(c) A municipality may levy and collect a tax on the full and true value of that portion of taxable property taxable under AS 43.56 as assessed by the Department of Revenue which value, when combined with the value of property otherwise taxable by the municipality, does not exceed the product of 225 percent of the average per capita assessed full and true value of property in the State multiplied by the number of residents of the taxing municipality."

Title 29.53.055 of the Alaska Statutes states that there is no limitation on taxes levied or pledged to pay or secure the payment of the principal and interest on bonds. In this regard, Chapter 94 SLA 1977 stressed that the per capita limitation did not include debt service. AS 29.53.055 is quoted as follows:

NO LIMITATION ON TAXES TO PAY BONDS. The limitations provided for in Sec. 45 or 50 of this chapter do not apply to taxes levied or pledged to pay or secure the payment of the principal and interest on bonds. Taxes to pay or secure the payment of principal and interest on bonds may be levied without limitation as to rate or amount, regardless of whether the bonds are in default or in danger of default.

Therefore, at the extreme, AS 43.56 serves only to limit municipal operating budgets.

- The limitation imposed in AS 29.53.045(b) is used in this study as the upper limit of municipal property tax revenues. Therefore, a total property tax equivalent to \$1,500 a year for each person residing within the municipal boundary is assumed as the upper limit of property tax revenues.
- It is also assumed that the excise tax limitation imposed in AS 43.56.030 cited below will remain in effect throughout the planning period.

AS 43.56.030(2): ...all other taxes imposed by a municipality on or with respect to the property subject to tax under this chapter or exempted from taxation by Section 20 of this chapter, including, but no limited to,

- (A) taxes on the retail sale or use of the property except for the retail sales tax on the first \$1,000 of each sale;

- (C) taxes on the sale or use of services used in or associated with the property or in its maintenance or operation except for the sales tax on the first \$1,000 of each sale;
- (E) any license, excise, fee, charge or other tax on or pertaining to the property or services.

As a result of this limitation, significant revenues are not forthcoming from oil and gas activities. Therefore, a projection of current sales tax revenues on a per capita basis is assumed to be representative of the future receipts from this revenue source.

- It is assumed that current federal law prohibiting State or local government taxation of properties beyond the three mile limit or revenue sharing from oil and gas development on the Outer Continental Shelf will remain in effect throughout the planning period.

REVENUES

Revenues are grouped and forecasted under the headings of property taxes and other revenues such as sales taxes, intergovernmental revenue and miscellaneous revenues. Revenues are projected in constant dollars as of 1980.

Property Tax Revenues

The non-OCS property tax revenue estimates are based upon per capita additions to assessed valuation. Thus, each new resident is assumed to

add to the assessed value of the community an amount equal to the total assessed value in the base year divided by the total population. The total assessed value is then multiplied by the current millage rate to obtain the forecast of uninflated property tax revenue for each year.

Sales Tax Revenues

Non-OCS sales tax revenues are based upon current per capita additions to sales tax receipts. Thus, each new resident is assumed to add to the total sales tax receipts of the community an amount equal to the total sales tax receipts in the base year divided by the total population.

Intergovernmental Revenues

In the non-OCS case, intergovernmental revenues estimates are based upon per capita additions to intergovernmental revenues. Thus, each new resident is assumed to add to the intergovernmental revenues transferred to the community an amount equal to the total value of intergovernmental revenues in the base year divided by the population.

Other Revenues

In the non-OCS case, other revenues estimates are based upon per capita additions to the total of other revenues such as license fees, permits, interest earnings, rentals, etc. Thus, each new resident is assumed to add to other revenues of the community an amount equal to the total value other revenues in the base year divided by the total population.

EXPENDITURES

Operating Expenditures

In the non-OCS case, the operating budget is forecast on a per capita basis.

Debt Service

Debt service is the amount necessary to pay or secure the payment of the principal and interest on bonds. Only existing debt service requirements to maturity will be listed.

School Support

Funds provided to support local school districts are calculated on a per student basis. It is assumed that a proportionate share of the support for schools will be maintained by local, State and federal support throughout the planning period.

Surplus or Deficit

In the non-OCS case, the total of revenues is subtracted from the total of expenses to produce a surplus or a deficit of funds. A surplus represents funds available for additional capital improvements or additional operating expenditures. A deficit indicates the inability to

provide for the same level of community services and to provide added capital improvements.

Economy and Population - OCS Case

Alaska Consultants, Inc. was also asked to identify the economic and population-related assumptions likely to be used in forecasting the various OCS cases, even though the forecast and analysis of those cases were not a part of this study. This discussion is organized around the fact that changes to the economy and population of a local community are influenced directly and indirectly by OCS activities. Detailed petroleum development scenarios which aid in defining direct and indirect influences are not yet available from the Bureau of Land Management's Alaska OCS Office. Consequently, assumptions governing both the direct and indirect situations are each included in this appendix.

Important to this discussion is the fact that Dillingham and Bethel are both located some distance inland from the respective lease sale areas likely to influence their economic growth. Dillingham is approximately 60 air miles from Bristol Bay and is even more remote from the North Aleutian Shelf lease sale area. Bethel is approximately 86 miles upriver from the Bering Sea and is even further from the Navarin Basin lease sale area. Since most onshore OCS activities are likely to occur in the coastal areas adjacent to the sale area, little, if any, direct OCS employment is expected in either Dillingham or Bethel.

However, it is possible that some OCS activities, such as those related to transportation services, would locate in these communities. Both communities are much more likely to be indirectly influenced by construction camps and terminal facilities operations in coastal areas lying within each city's respective economic region. The intensity of such direct influence will depend upon the size of resource find, if any, as suggested by the scenarios. In the absence of the scenarios, this discussion does not treat the intensity issue directly. Specific assumptions for each community for both direct and indirect economic and population influences are presented in the following sections.

DILLINGHAM

The location of OCS employees in Dillingham (a direct OCS influence) would constitute a change in basic employment estimates developed for the base case and, through the multiplier effect, would also increase secondary employment. The magnitude of such additional OCS employment would depend on the size of resource find. However, Alaska Consultants, Inc. feels it is unlikely that the magnitude of such OCS employment would be significant enough to cause structural change in the local economy to the extent that the balance (multipliers) assumed to exist between the basic and secondary economies would be affected. Without such intense influences, it is therefore assumed that the multipliers used to develop the base case remain the same. (The reader should refer to the text and earlier discussion in this appendix.) The specific economic sectors most likely to be affected include basic and secondary

employment in the transportation, communications and public utilities sector, together with minor, perhaps insignificant, increases in secondary employment in the trade and contract construction sectors.

The location of OCS activities in coastal areas within Dillingham's economic region (an indirect OCS influence) would be expected to cause some increase in basic employment in transportation activities. It is also likely that increased State spending for public facilities in the region might affect basic and secondary transportation, communications and public utilities sector employment, plus very minor changes in secondary employment in the trade and contract construction sectors.

The indirect effects of OCS development on Dillingham could be substantially greater if these activities encouraged the formation of a regional borough government with Dillingham as the borough seat. Under such a situation, local government taxation of onshore oil and gas properties could lead to a higher rate of local government spending and could further increase Dillingham's importance as a regional service center for the western Bristol Bay region. However, the prospect of a regional government is beyond the scope of this analysis.

In summary, although the potential employment opportunities associated with OCS development in this area appear great, the number of employees expected to accrue to Dillingham is very small. As a result, the distribution of added employment among the various economic sectors

is assumed to remain essentially the same as in the base case. The employment multipliers are also assumed to remain unchanged from the base case.

With respect to population changes induced by direct OCS activities, dependency ratios for non-OCS employment were assumed not to change throughout the forecast period. Dependency ratios for any OCS employees living in enclaves is assumed to be zero. Dependency ratios for the few OCS employees who might locate in Dillingham are assumed to be approximately the same as those used in the non-OCS case.

BETHEL

The location of OCS employees in Bethel would be expected to affect that community in much the same way as Dillingham. Although Bethel is a larger community, its inland location and distance from the lease sale area suggest it will be similarly affected. Because of these similarities, the method of analysis and assumptions about multipliers, the distribution of new employment among affected economic sectors, and those related to dependency ratios are the same for the two communities.

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