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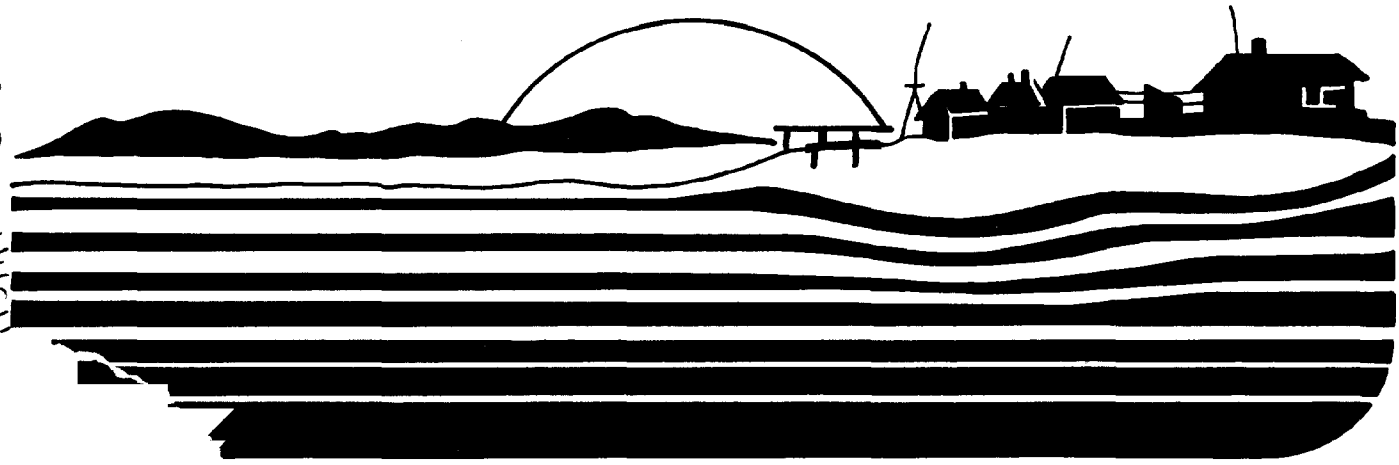
BETHEL

CITY OF BETHEL

COASTAL MANAGEMENT PLAN

Conceptually Approved Draft



Alaska Coastal Zone Management Plan

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

City of Bethel, Alaska

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Bethel Coastal Management Plan

Conceptually Approved Draft

City of Bethel
Bethel, Alaska

June 1983

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HOW TO USE THIS DOCUMENT

This public hearing draft of the Bethel Coastal Management program both presents information and sets down guidelines to be followed. The information presented in chapters 1 through 6 is of interest to persons living in Bethel or working on projects involving Bethel. Chapters 4 and 5 address specific areas of concern, riverfront redevelopment and wetlands, and may be of special interest to the reader.

The second function - the setting down of guidelines - is what makes this a working document. Since the plan applies to the entire city, chapters 7 and 8 are of importance to anyone developing a project in Bethel and to local, state and federal decision makers. Please note that for the purposes of this plan, the term "developer" means any individual or organization with a construction project in Bethel. If you are going to build a new house, for example, you are a developer. If you are going to put in a new commercial venture, you are a developer. If you are going to put in a new subdivision, you are a developer.

Chapter 7, the Coastal Management Plan, contains a discussion of the issues, goals and objectives of the program which will provide the reader a sense of what the plan hopes to accomplish. It contains a list of "subject uses" which identifies the kinds of developments that are subject to the standards and policies in this plan. Also included in this chapter are the standards and policies that must be met by developments subject to this plan. The standards and policies section is the single most important part of this document: it provides the measuring sticks that decision makers will use when considering any individual project that comes up for their review.

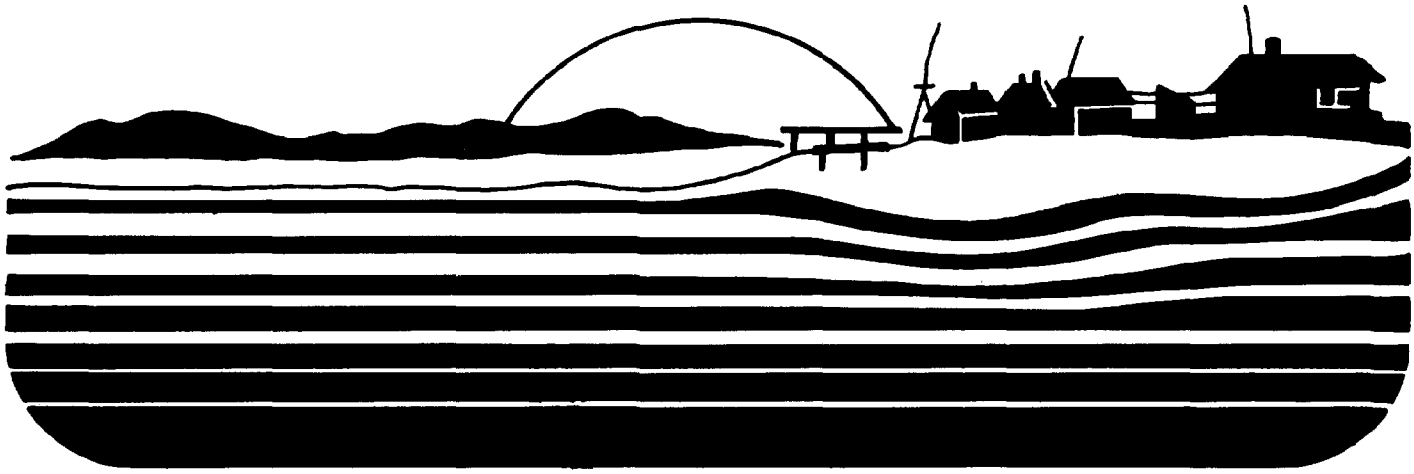
Both developers and decision makers should be familiar with the standards and policies of this coastal management plan. Developers are urged to consider these criteria while designing their projects, as it will aid them in dealing with local (and any other) review processes.

Chapter 8, Implementation, outlines how the standards and policies will be used in the review and approval of development projects. Developers should read this chapter carefully to gain an understanding of the steps and timing of review procedures. Decision makers can use this chapter to see how coastal management policies and standards will be incorporated into their existing review activities.

Appendices and other materials are included in this draft for persons wishing detailed information on specific aspects of the coastal management program. The Planning Department of the City of Bethel also welcomes any questions the reader may have about coastal management in Bethel.

INTRODUCTION

Chapter 1



INTRODUCTION TO COASTAL MANAGEMENT

Coastal areas of what is now the State of Alaska have been important to people since the first inhabitants began arriving, searching for the resources to live. The early residents, few in number, were often nomadic, travelling from place to place in search of what they needed to maintain life. During recent times this has changed - permanent communities have been established. Resources are taken not only to meet local need, but to meet demands created by the growing populations of the United States and other countries.

As the demands increase, can the coastal areas continue to provide the resources? Certainly not without good management.

It was the recognition of the need for proper management, balancing supply and demand, that led to the creation of the coastal management process. The federal government enacted the Coastal Zone Management Act in 1972. This act set up a process for coordinating management between governmental units at federal, state and local levels.

The Alaska Coastal Management Act of 1977 is similar to the federal act, but also takes another step toward solving the controversy between use and non-use of the land and water of Alaska's coastal areas. By setting up coastal districts, it provides localities, such as the City of Bethel, with the opportunity to develop coastal management plans for their particular areas.

A pair of coastal districts have developed in the Yukon-Kuskokwim Delta area. The Yukon-Kuskokwim Coastal Resource Service Area was initiated in May of 1979 to develop policy for an area incorporating the Lower Yukon and Lower Kuskokwim School Districts, excluding the City of Bethel. (See Figure 1).

The Bethel City Council authorized the city's participation in the Alaska Coastal Management Program (ACMP) in 1980. Using the ACMP allows a local jurisdiction, such as the City of Bethel, to address coastal issues and provides it with the tool of "consistency." Within the context of Coastal Management, consistency refers to activity occuring after a plan is developed and accepted on local, state and federal levels. The actions of all three

governmental levels must be in agreement and consistent with the accepted Coastal Management Plan. (Actions on federal lands are only subject to consistency requirements if there will be "spillover" effects onto non-federal lands.)

The process for plan development and approval is lengthy and controlled by regulation (refer to A.S. 46, 40 and ACMP regulations). However, it does allow for considerable leeway in the actual issues addressed, presuming that different districts will have different needs.

Who Is Involved

There are several major participants in the coastal management process. Foremost is the local jurisdiction, the City of Bethel in this case, which produces the actual plan. Local participation is described in the chapter entitled "Public Participation." The Department of Community and Regional Affairs, Division of Community Planning provides technical assistance and administration of planning grants. Another important participant is the Alaska State Coastal Policy Council (CPC), a sixteen member body composed of nine regional public representatives and seven state agency representatives. The major role of the CPC is to review and approve Coastal Management Plans making sure that the plans adequately address environmental concerns along with the needs of the population affected by the Plan. The CPC review also insures that the plan meets state guidelines.

The Office of Coastal Management (OCM) is staff to the Coastal Policy Council. OCM prepares information for the CPC. They also coordinate the activities of other state agencies participating in the process.

Other state and federal agencies participate by reviewing and commenting on the plans and draft documents circulated to them. These agencies normally are concerned that local planning efforts take into account the needs and mandates of their agencies.

What The Process Is

The process of preparing a coastal management plan has many procedural steps that must be followed in order to insure that all interested parties have ample opportunity to participate. The steps following the publication of a Public Hearing Draft include:

1. Circulating the draft for comment, and holding a public hearing.
2. Revising the Public Hearing Draft according to the comments received.
3. City Council review and approval of the revised draft. This approval is referred to as "conceptual approval."
4. The conceptually approved draft is then forwarded to the state Coastal Policy Council. The CPC has ninety days to review the plan, hold meetings for plan discussion, and to take action either recommending changes or accepting the plan. It usually adopts the plan at this step.
5. After the plan is accepted by the CPC, the City Council adopts the plan by ordinance.
6. The CPC forwards the plan to the Department of Commerce, Office of Ocean and Coastal Resource Management (formerly OCZM), for incorporation into the Alaska Coastal Management Program at the federal level.

What the Plan Must Address

The Alaska Coastal Management Program outlines ten specific elements that have to be included for the plan to be accepted by the State (6 AAC 85.010-110).

1. Needs, objectives, and goals (6 AAC 85.020)
   Bethel must include a statement of overall needs, objectives, and goals for Coastal Management.
2. Organization (6 AAC 85.030)
   Bethel must include a description of the district program organization and include budgetary and staff needs and a schedule for reorganization as necessary to implement and carry out the Coastal Management Program.
3. Boundaries (6 AAC 85.040)
   Bethel must map and delineate the boundaries of the coastal area within the district subject to the district program.
4. Resource Inventory (6 AAC 85.050)
   Bethel must include a comprehensive resource inventory which described natural resources, land use, and land status in a manner sufficient for program development and implementation.

5. Resource Analysis (6 AAC 85.060)
   Bethel must include a resource analysis sufficient in detail for program development and implementation.
6. Subject Uses (6 AAC 85.070)
   Bethel must include a description of the land and water uses and activities which are subject to the district program. Uses which must be included, if applicable, are: (a) coastal management, (b) geophysical hazard areas, (c) recreation, (d) energy facilities, (e) transportation and utilities, (f) fish and seafood processing, (h) mining and mineral processing, and (i) subsistence.
7. Proper and Improper Uses (6 AAC 85-080)
   Bethel's district program must include a description of the uses and activities, including uses of state concern, that will be considered proper and improper within the coastal area, including land and water use designation.
8. Policies (6 AAC 85.090)
   Bethel's district program must include a statement of the policies that will be applied to land and water uses and activities subject to the district program and the process which was used to determine whether specific proposals for land and water uses and activities will be allowed.
9. Implementation (6 AAC 85.100)
   Bethel's district program must include a description of the methods and authority which will be used to implement the district program.
10. Public Participation (6 AAC 85.110)
    Bethel's district program must include evidence of effective and significant opportunities for public participation in program development.

In addition to the ten specified program elements, the ACMP requires, in some instances, that districts specifically address other important aspects. These include: (1) uses and activities subject to the Coastal Management Act; (2) areas meriting special attention; (3) federal consistency/federal exclusion/ Federal agency participation; (4) uses of state concern; and (5) energy facility siting.

Other ACMP Standards

The ACMP also identified nine major uses or activities that are to be dealt with in the development of district plans. For each of these uses or activities the Alaska Coastal Policy Council has established standards which bind local districts and state agencies. They are: (1) coastal development; (2) recreation; (3) historic, prehistoric, and archaeological resources; (4) energy facilities; (5) transportation and utilities; (6) fish and seafood processing; (7) timber harvesting and processing; (8) mining and mineral processing; and (9) subsistence. (6 AAC 80.040, 6 AAC 80.060-120, 6 AAC 80.140)

The Council has set two standards which apply to all the uses and activities listed above. These policies cover: (1) geophysical hazards; and (2) air, land, and water quality. (6 AAC 80.050, 6 AAC 80.140)

The Alaska Coastal Policy Council also identified and set standards for eight major habitat types. These standards are designed to protect and reserve these habitats, regardless of the use or activity which takes place within them.

Therefore, in addition to satisfying an applicable use standard, a use or activity in a specified habitat must meet the relative habitat standard. Habitats include: (1) offshore areas; (2) estuaries; (3) wetlands and tide flats; (4) rocky islands and sea cliffs; (5) barrier islands and lagoons; (6) exposed high energy coast; (7) rivers, streams, and lakes; and (8) important upland habitats. (6 AAC 80.130)

The guidelines and standards cited above can be obtained from the Office of Coastal Management, the Department of Community and Regional Affairs, or the City of Bethel Planning Department.

Relationship Between Bethel and Cenaliulriit Coastal Management Plans and Regions

Two coastal management plans are being developed in this region: one for the City of Bethel and one for the remainder of the greater Yukon-Kuskokwim Delta. The plan for the Delta is being developed by an elected regional coastal resource service area board called Ceñaliulriit. (See Figure 1). The two districts have very different concerns, yet the two plans must work well together. The coastal habitats and resources in the two are a single system, in delicate balance. This balance must be recognized and accounted for in the two plans.

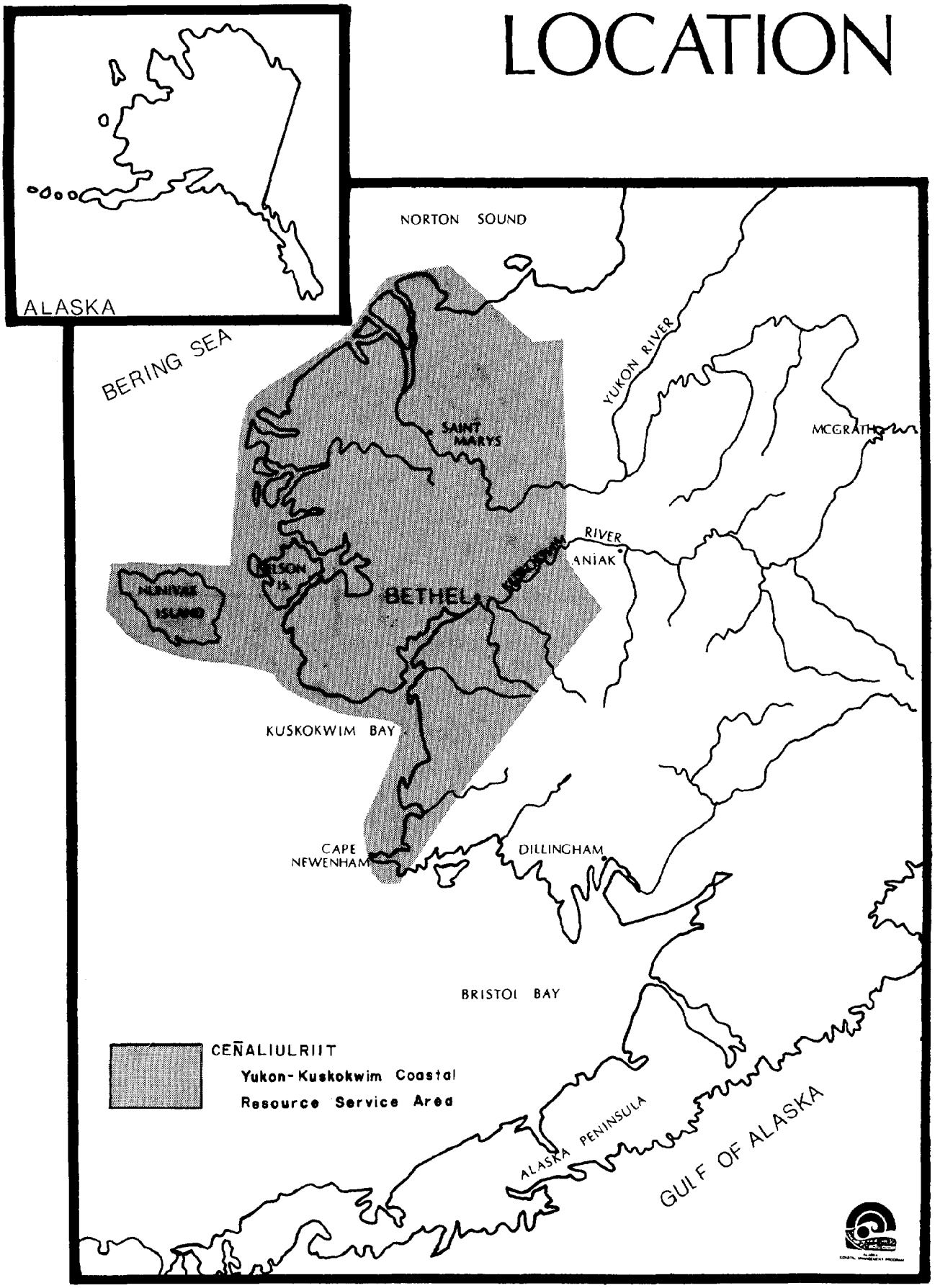
It is also a requirement of the Alaska Coastal Management Program that adjacent districts coordinate their plans. The City has met this requirement in several ways. Two Ceñaliulriit staff members (staff to the Yukon-Kuskokwim Coastal Resource Service Area Board) participate in the coastal management working group that has been guiding the development of the Bethel plan. Copies of all drafts and documents have been circulated to Ceñaliuriit staff and Board members for their review and comment. Meetings have been held with Ceñaliulriit staff specifically to discuss coordination of the two plans.

Bethel residents also have an interest in the Cenaliulriit plan, particularly since most subsistence activities take place outside the city limits. For this reason, both the City and Ceñaliulriit plans are recommending that a special management district be established for the area used most heavily by Bethel residents for subsistence. This district, referred to as an Area Meriting Special Attention or AMSA, is discussed more fully in Chapter 6 of this document. Briefly, it would run along the Kuskokwim River from the Johnson River on the south to the Gweek River on the north.

Also, the City will be participating in the public review process for the Ceñaliulriit plan, which is now out in Public Hearing Draft form.

FIGURE 1

LOCATION



Relationship of Coastal Management Plan to the Bethel Comprehensive Plan

The City of Bethel 1980 Comprehensive Plan and the Coastal Management Plan serve complimentary purposes. The Comprehensive Plan, through a survey process, identified problems and alternative solutions. In general, these problems and solutions have not dealt directly with resource management or the lay of the land. The coastal management process provides an opportunity to broaden the community's planning base and the ability to move towards managing and protecting important environmental aspects while recognizing development needs.

The Bethel Coastal Management Plan is intended to build on the framework of the Comprehensive Plan and to compliment it.

Development issues facing the Bethel community, as defined by the Comprehensive Plan, include:

- continued development of social services
- improvement of general housing conditions, water/sewer service, energy efficiency
- senior citizen activity and care
- preservation and improvement of community aspects relating to subsistence activities
- increase of park and playground areas
- city regulation of land use
- subdivision and zoning regulations
- clean-up and repair of hazard areas, including roads, old buildings, and the riverfront
- concentration of industrial activities
- building of a small boat harbor
- development allowing a continued cultural identity and opportunity to mix traditional and modern activities.

Through the coastal management process the City of Bethel will receive recommendations on additional planning and regulatory elements. These include:

- riverbank erosion control measures, access and use controls
- land use controls, with review of environmental, density, and service delivery concerns
- sewage and garbage disposal measures
- provisions for improved techniques dealing with dust and windblown sand resulting from development
- controls on surface water drainage
- development of transportation and circulation elements, including city roads, trails, and pedestrian walkways.

The coastal management program represents a refinement of planning issues facing the Bethel community. It is not a substitute for the Comprehensive Plan, but an addition to the Plan.

Boundaries of Bethel Coastal Management Plan Area

The guidelines for District Coastal Management Programs adopted by the Alaska Coastal Policy Council state that "initial boundaries must be based on Biophysical Boundaries of Alaska's Coastal Zone"..."and must include the zone of direct interaction and the zone of direct influence." (6 AAC 85.040)

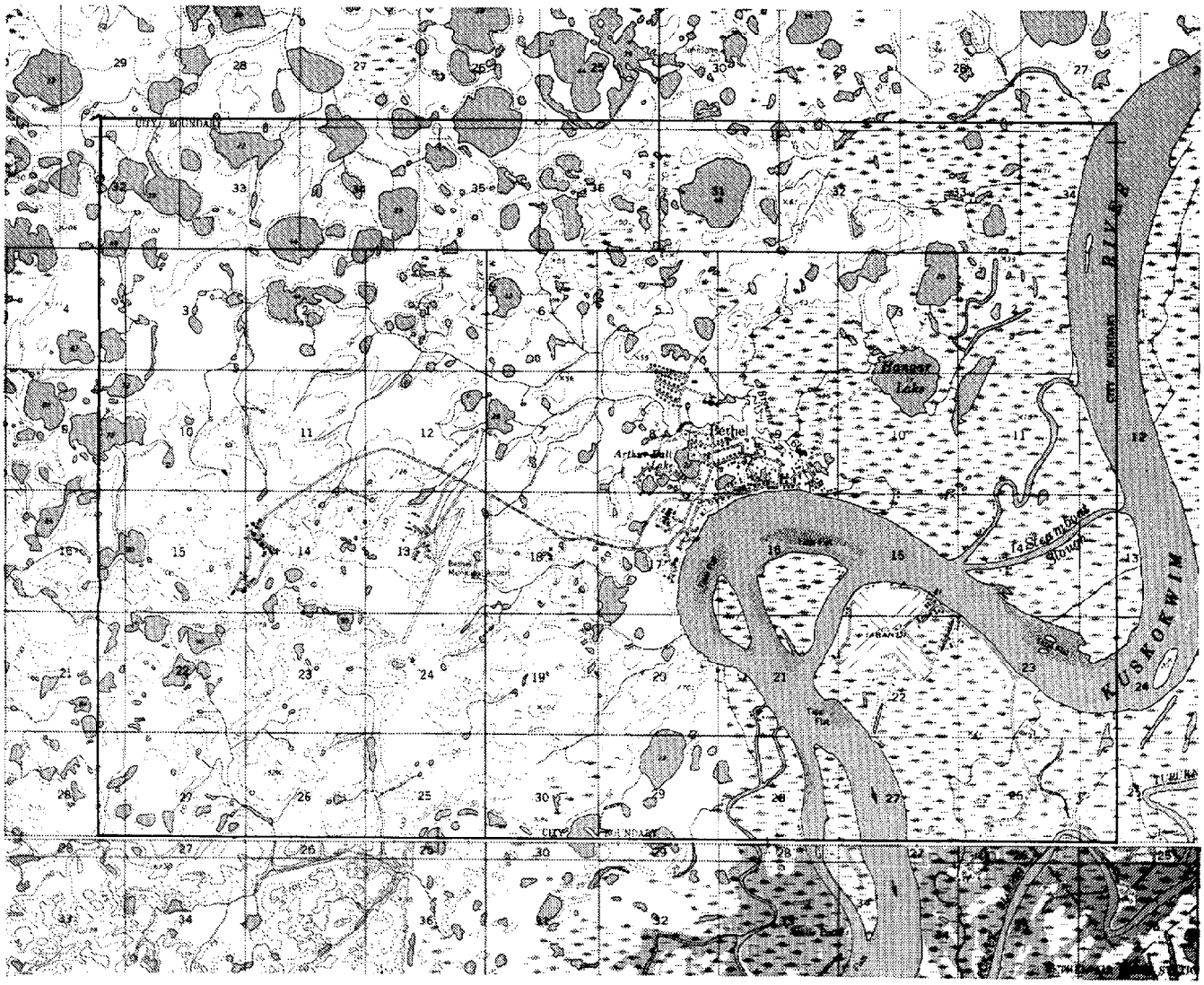
All of the City of Bethel lies within the coastal area as defined in the Biophysical Boundaries. Since the municipality exercises jurisdiction over the entire city in other matters, it was decided to use the same boundaries for the coastal management plan. Thus the coastal management boundaries include the entire city limits, as shown below in Figure 2.

The study area use in the resource inventory and analysis is larger than the planning area. It encompasses the resources of freshwater and terrestrial environments that are important to Bethel in terms of potential economic development and resource planning.

Bethel's function as a regional center will play an increasingly important role with the development of economic activities such as forest development in the middle Kuskokwim area, mining and on-shore oil development and the expansion of the commercial fishing industry. Although the City of Bethel cannot regulate any development beyond the city limits, an understanding of the region's resource base is vital to local planning, and will allow greater coordination with the regional coastal management plan. Areas of particular importance to the city residents that lie outside city boundaries are discussed in Chapter 6, which proposes the creating of a special management district (AMSA) for the Bethel subsistence use area.

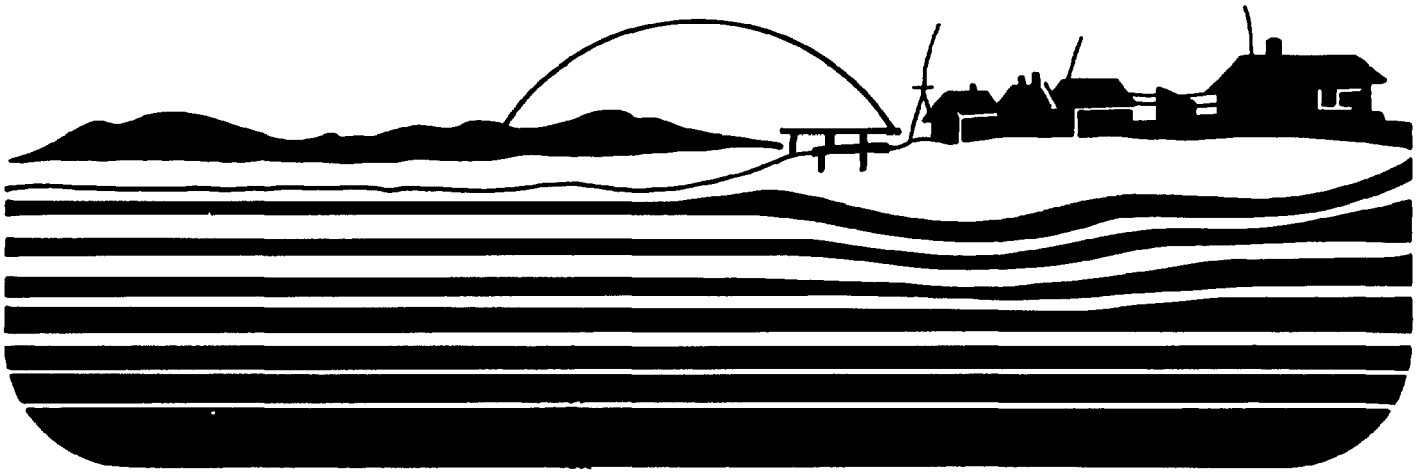
FIGURE 2

Boundaries of the Bethel Coastal Management Plan (City Limit)



RESOURCE ASSESSMENT

Chapter 2



NATURAL RESOURCES

CLIMATE

Bethel is located in a transitional climate zone. The major influences on climate are the storms and weather patterns originating from the Bering Sea, 86 miles to the west. Bethel is also influenced by the inland continental climate, resulting in the warm mid-summer temperatures and the very cold midwinter temperatures. Bethel has a mean July temperature of 54.7° F and a mean January temperature of 6.0° F, with recorded temperature extremes ranging from 90° F to -52° F. The warmer summer winds are predominantly SSW, shifting to a cool NNE winds from October through March, then shifting to predominantly NW winds from April through June. Bethel has an average growing season of 101 days, the average last freezing temperature being recorded on May 30 and the average first freezing temperature being recorded on September 9. Detailed climatic data for Bethel is recorded in the following tables and figures.

TABLE 1

Average Monthly Temperatures (°F)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	6.0	7.2	11.1	25.1	40.3	51.6	54.7	52.7	45.2	30.6	17.1	6.0	29.0
Max	13.3	14.7	19.8	33.5	48.9	60.6	62.3	59.5	52.2	36.7	23.5	12.9	36.5
Min	-1.3	-0.3	2.3	16.6	31.6	42.5	47.0	45.8	38.1	24.5	10.7	-1.0	21.4

Source: U.S. Department of Commerce, NOAA

TABLE 2

Mean Precipitation and Snowfall (Inches)

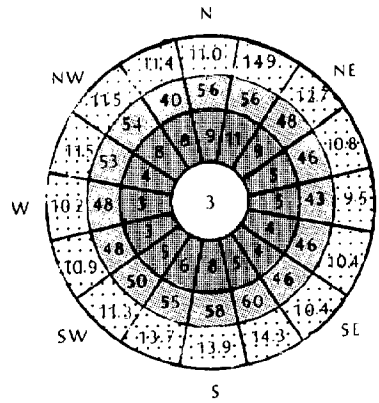
	Mean Precipitation (Water Equivalent)	Mean Snowfall
Jan	0.84	5.2
Feb	0.75	5.7
Mar	0.85	7.2
Apr	0.63	6.8
May	0.84	2.2
Jun	1.28	0.2
Jul	2.19	Trace
Aug	3.73	0.0
Sep	2.57	0.1
Oct	1.53	4.7
Nov	0.98	7.4
Dec	0.93	8.6
ANNUAL	17.12	48.1

Source: U.S. Department of Commerce, NOAA

FIGURE 3

Prevailing Winds

AVERAGE ANNUAL WINDS



AVERAGE WIND SPEED FOR DIRECTION NOTED

PERCENTAGE WIND BLOWS FROM DIRECTION NOTED

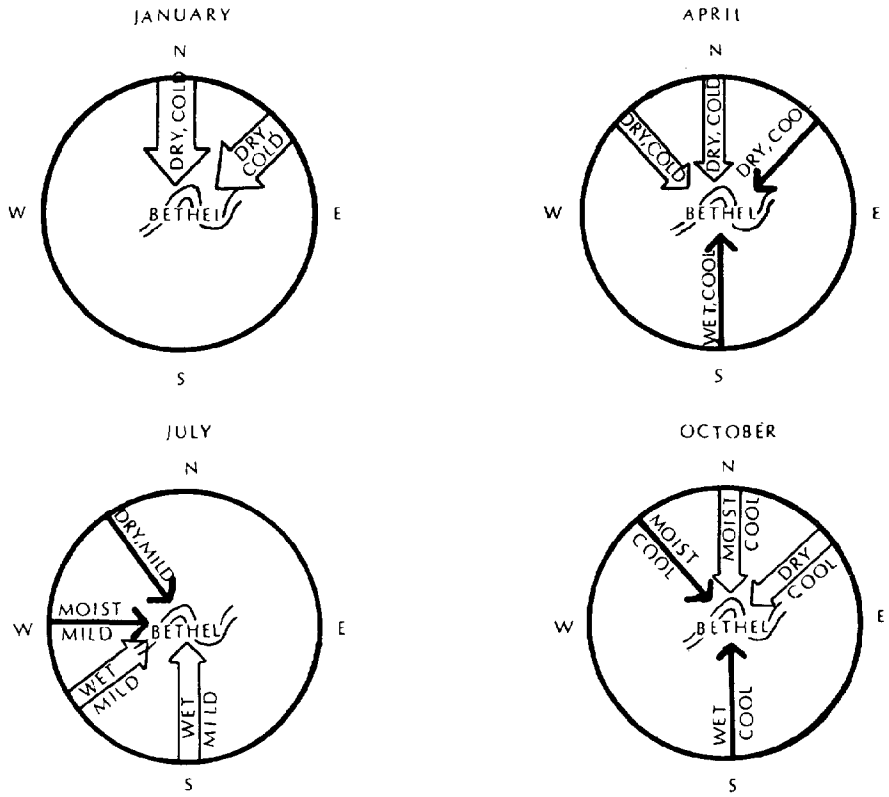
EXTREME WIND FOR DIRECTION NOTED (SUSTAINED FOR ONE MINUTE)

PERCENTAGE WIND IS CALM

WIND SPEEDS ARE IN MILES PER HOUR

SOURCE: ALASKA REGIONAL PROFILES

SEASONAL WINDS



FREQUENCY OF WIND FROM DIRECTION NOTED

OVER 24 PERCENT

18 – 24 PERCENT

10 – 17 PERCENT

SOURCE: N.O.A.A.

SOILS, PERMAFROST AND GEOLOGY

Soils

The most recent soil survey of the Bethel area was completed in 1966. The total map area is 11,465 acres (including 1020 acres of water area), or about one-third of the area within the city limits. Most Bethel soils are silty, acidic, poorly drained, have a low shrink-swell potential, and have variable to high frost action. Most soils are not suitable for agricultural or urban uses. Figure 4 illustrates the Bethel soil survey map and table 3 summarizes the characteristics of each soil type. Figure 5 depicts the soil areas suitable for urban development. Urban suitability was determined by evaluating a combination of soil characteristics including: internal drainage, bearing capacity, and subjectivity to ponding and flooding.

Permafrost

Permafrost is defined as: 1) permanently frozen material underlying the solum (upper soil horizons), or 2) a permanently frozen soil horizon (Brady). Permafrost underlies most of Bethel but is absent from localized areas close to large water bodies. The permafrost begins 12 to 40 inches below the surface, has an average depth of 400 feet, and a maximum depth of 600 feet. The typical temperature of the permafrost at depths just below the layer of seasonal variation ranges from 28° to 31.5° F, with some spots as much as 2° F above freezing (Malone, personal communication).

Geology

The geology beneath Bethel is very young, composed almost entirely of flood plain alluvium and silt deposits (Figure 6). Northeast of Hanger Lake is an area of reworked silt. Flood plain alluvium is composed of recent deposits of mud, silt, sand, gravel, boulders, and intermixed wood, peat, and other vegetal material. Silt deposits contain abundant permafrost, and are composed of organic "mulch" which becomes sandier with depth and contains areas of pebbles and wood fragments. Silt deposits probably originated from the river but some areas may include wind and marine deposits. Reworked silt is a plain, transitional with or slightly above younger flood-plain

deposits and separated from older silt deposits by an erosional scarp 10 to 50 feet high. The scarp suggests that the plain is an erosional feature formed by dissection and almost complete removal of the upper part of older silt deposits (U.S.G.S).

TABLE 3
SOILS MATRIX

Soil Type	Map Symbol	Approximate Areas (acres)	Percentage of Land Area	Slope Range (%)	Internal Drainage	Subject to Ponding	Subject to Flooding	Depth to Permafrost (inches)	Gardening/Farming Suitability	Reindeer Range	Bearing Capacity	Urban Suitability	Common Location
Kuskokwim silt loam	KuA	3728	35.6	0-3	poor	yes	yes	<12*	no	yes	mod-poor	poor	principal soil of tundra, often occurs with Kwethluk soils
Kuskokwim silt loam	KuB	42	0.4	3-7	poor	yes	yes	<12	no	yes	mod-poor	poor	
Kuskokwim - Kwethluk Complex	KkA	29	0.3	0-7	poor -mod	yes	yes	<12 >40	no	yes	good poor	poor	Occurs on upland tundra: Kwethluk; on low knolls, slopes boarding drainageways and drained thaw lakes. Kuso- level areas between Kwethluk soils.
Kuskokwim - Kwethluk Complex	KkB	1358	13.3	3-7	var.	?	yes	<12 >40	no	yes	good poor	poor fair	
Kuskokwim - Kwethluk Complex	KkC	428	4.1	7-12	var.	no	no	<12 >40	yes*	yes	good poor	fair	
Kuskokwim - Kwethluk Complex	KkD	127	1.2	12-20	var.	no	no	<12 >40	yes*	yes	good poor	fair	
Napaishak loamy fine sand	Na	216	2.1	0-3	poor	yes	yes	<12	no	yes	good poor	poor	Beds of drained thaw lakes
Susitna fine sandy loam	Su	1240	11.9	0-3	mod-good	?	yes	?	yes[c]	no	good poor	poor	Alluvial plains bordering river
Tuluksak fine sandy loam	Tk	423	4.1	0-3	mod-poor	yes	yes	20	yes[w]	no	good poor	poor	Slopes bordering lakes, drainageways
Tupuknuk silt loam	Tu	825	7.9	0-3	poor	yes	yes	30-40	no	yes	good poor	poor	Floodplain of river and secondary stream
Freshwater Marsh	Fm	2029	19.4	0	poor	yes	yes	<12	no	no	poor	poor	Alluvial plain bordering river

Total Land Area 10445
Total Water Area 1020

Total Map Area 11465

Compiled from Bethel Area Soil Survey

*Small areas on slopes
c = climate limitation (spring flood)
w = wetness limitation

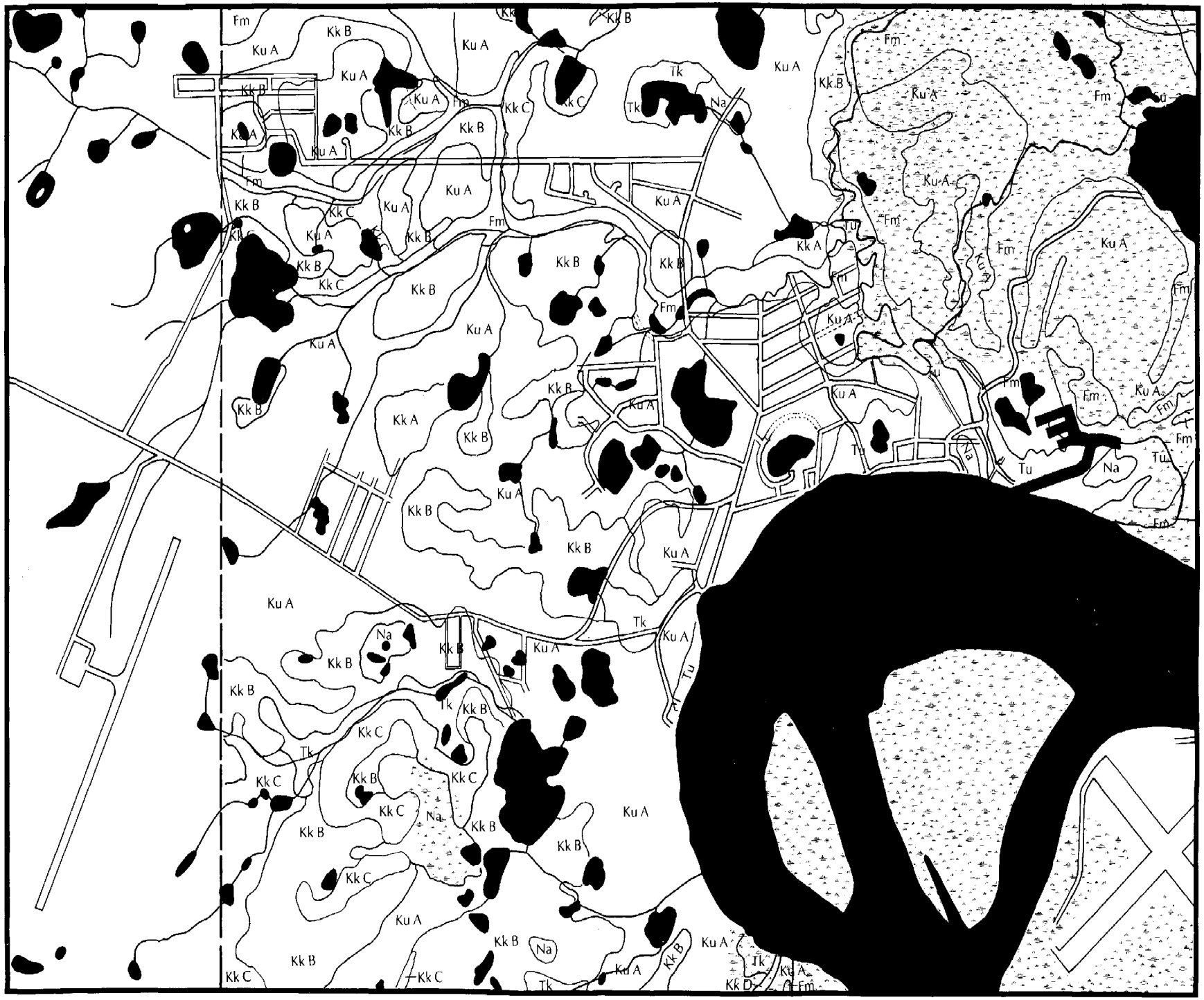

Fm
Ku A
Kk B
Kk C
Kk A
Kk D
Tk
Na
Tu

FIGURE 4

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Bethel Area Soil Survey

SYMBOL	SOIL TYPE	SLOPE (Percent)
KuA	Kuskokwim Silt Loam	0 - 3
KuB	Kuskokwim Silt Loam	3 - 7
KkA	Kuskokwim - Kwethluk Complex	0 - 3
KkB	Kuskokwim - Kwethluk Complex	3 - 7
KkC	Kuskokwim - Kwethluk Complex	7 - 12
KkD	Kuskokwim - Kwethluk Complex	12 - 20
Na	Napaishak Loamy Fine Sand	0 - 3
Su	Sustina Fine Sandy Loam	0 - 3
Tk	Tuluksak Fine Sandy Loam	0 - 3
Tu	Tupuknuk Silt Loam	0 - 3
Fm	Freshwater Marsh	0

Soil Survey Boundary

SOURCE: U.S. SOIL CONSERVATION SERVICE

SCALE

0 1 MILE

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FIGURE 5

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Urban Suitability

Fair Suitability

Poor to Fair Suitability (may be subject to ponding or flooding)

All other soils: Poor Suitability

Soil Survey Boundary

ADAPTED BY ESE FROM U.S. SOIL CONSERVATION SERVICE

SCALE

0 1 MILE

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Qrs
Qs
Qf
Qs
Qf
Qs
Qrs

FIGURE 6

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Bethel Geology

Qs	Silt deposits
Qf	Flood plain alluvium
Qrs	Reworked silt

SOURCE: U.S. GEOLOGICAL SURVEY

SCALE

0 1 2 MILES

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GEOPHYSICAL HAZARDS

Natural phenomena such as flooding, erosion, volcanoes, earthquakes, and tsunamis are called geophysical hazards. The most predominant hazards in the Bethel area are flooding and erosion. Earthquakes and tsunamis near Bethel are possible, but not a real concern. The nearest volcano is 250 miles southeast, on the Alaska Peninsula.

Flooding

The primary cause of flooding in Bethel is ice jams. The magnitude of the flood is influenced by several factors including snowmelt, winter and spring temperatures, precipitation, and ice thickness. The greatest flooding usually occurs in the spring when a thick river-ice buildup experiences rapid warming before breakup. Flooding is also common in late summer and early fall when Bethel experiences its heaviest rainfall of the year.

Most of the developed part of Bethel is located within the 100-year flood plain (Figure 7). 80% of the major residential and commercial areas have been inundated by floods in the past. The lower Brown Slough area and Lousetown are flooded to some degree almost every year.

A major flood can create a maximum river velocity of ten feet per second (f.p.s.), as compared to an average velocity of less than two f.p.s. The highest discharge recorded during a flood is almost 580,000 cubic feet per second, (c.f.s.) compared to the average discharge of 60,000 c.f.s. (See appendix for summary of Bethel Flood Plain Ordinance.)

Table 4 lists the ten largest recorded floods between 1941 and 1982, and Table 5 lists flood elevation levels and frequencies.

STUDY AREA BOUNDRY

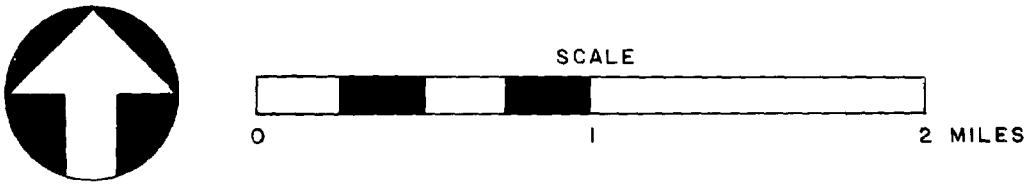
FIGURE 7

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

100 Year Flood Plain

100 Year Flood Plain

SOURCE: FEDERAL EMERGENCY MANAGEMENT AGENCY
REVISED PRELIMINARY, FLOOD INSURANCE RATE MAP,
DECEMBER 9, 1981



PREPARED BY
CITY OF BETHEL

TABLE 4

Highest Known Stages and Discharges of Kuskokwim River at Bethel

1941 - 1967

Order No.	Date of Crest	Elevation of Water Surface (ft m.l.l.w.	Estimated Peak Discharge (c.f.s.)
1	Spring 41	16.5 *	--
2	Spring 63	15.6 *	--
3	5 Jun 64	15.5 *	--
4	Spring 74	15.0 *	--
5	9 Jun 64	14.3	579,200
6	13 May 67	13.7 *	--
7	1 Sep 63	12.2	446,200
8	11 May 57	11.5	384,200
9	5 Jun 52	11.5	384,200
10	5 Sep 51	11.2	373,800

* Affected by ice jam, floating ice and/or tide

Source: US. Army Corps of Engineers

TABLE 5

Bethel Flood Elevation and Frequencies

Flood Elevation (Feet above mean low low water)	Frequency of Occurrence (years)
17.1	100
16.5	50
14.8	10
13.6	5
10.0	2

Source: U.S. Army Corps of Engineers

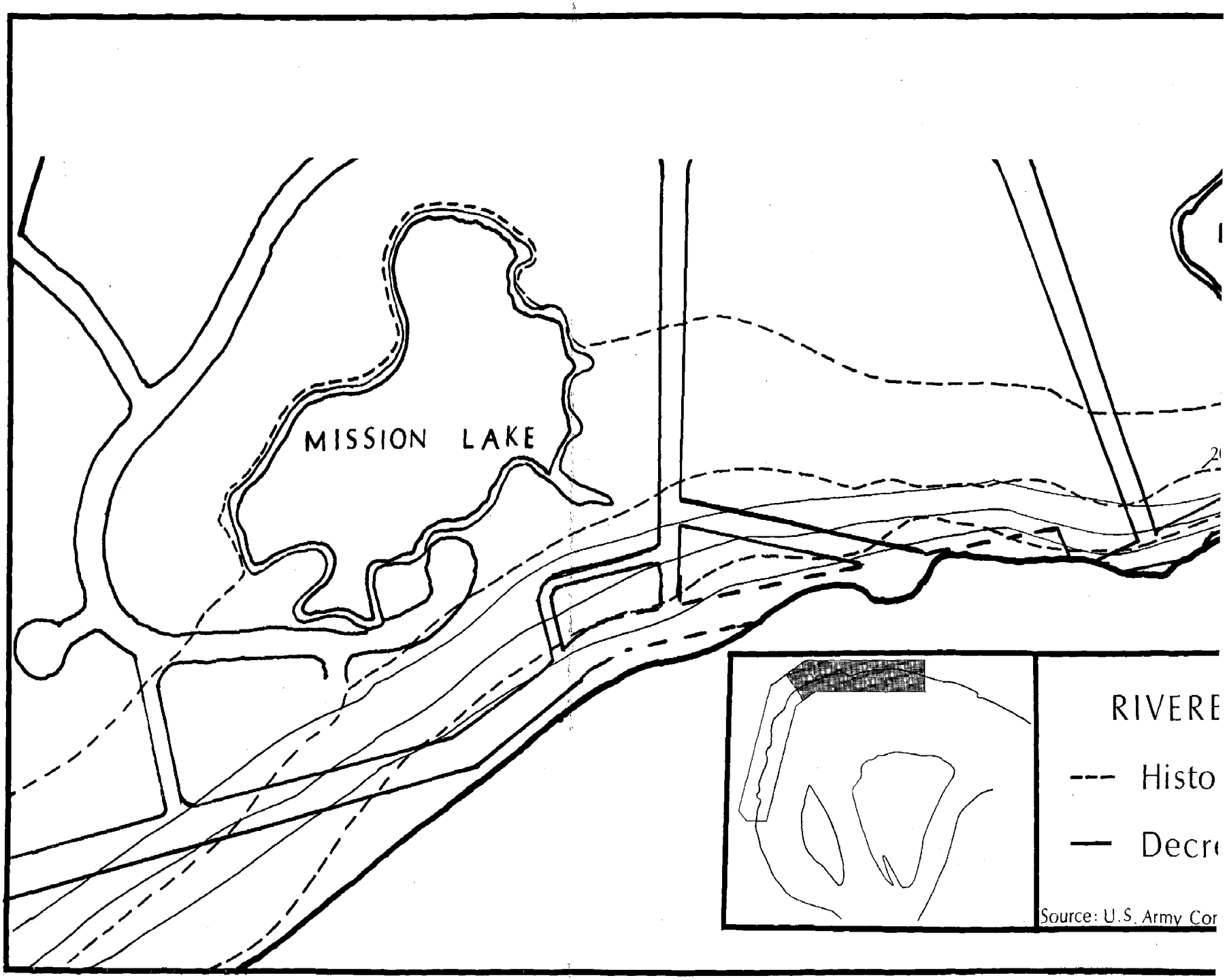
Riverbank Erosion

Documentation of the Bethel riverbank erosion began in 1939. Erosion now averages eight feet per year along the town front and twenty-five feet per year in front of the old PHS hospital and the Chevron tank farm. The channel on the east side of the island in front of Bethel is becoming the main channel of the river. The erosion rate should increase in the east channel and decrease in front of Bethel. Figures 8 and 9 depict the projected erosion advance of the Kuskokwim based on a decreasing erosion rate and the historic erosion rate.

The bank erosion process begins when wind and boat traffic drive waves into the bank, eroding the toe. The southeast exposure to the sun and rain along the high bank melts the permafrost and saturates the soil. The soil saturation combined with the toe erosion creates bank instability, which results in the bank sliding into the river. The eroded material is carried away by the river and exposes more of the bank to the erosional process. Erosion is further compounded by removal of vegetation along the top of the river bank and ice gouging.

Bank Stabilization Efforts

Past bank stabilization efforts have included a timber bulkhead, submarine netting, and the infamous junked cars. All past efforts have failed and many buildings have been destroyed, with many more in immediate danger. The U.S. Army Corps of Engineers Bank Stabilization Study recommended three alternatives for further sudy: 1) Articulated concrete mattress, at a cost of $25,200,000 and estimated maintenance costs of $600,000 every five years over the fifty year lifespan; 2) Rock riprap, at a cost of $14.7 million and maintenance costs of $250,000 every five years over the fifty year lifespan; 3) River diversion structure with bank stabilization, at a cost of $27.0 million and maintenance costs of $1.8 million every five years. Other options that were rejected because of expense, public acceptance, or engineering feasibility included; steel wall with articulated concrete mattress toe protection, steel wall and sloped bank, river diversion dike, river diversion channel, and a nonstructural alternative of intensive riverfront land use management. The Corps selected plan is rock riprap and this proposal is currently being reviewed by Congress for federal funding. The City of


MISSION LAKE
RIVERE
--- Histo
— Decr
Source: U.S. Army Cor

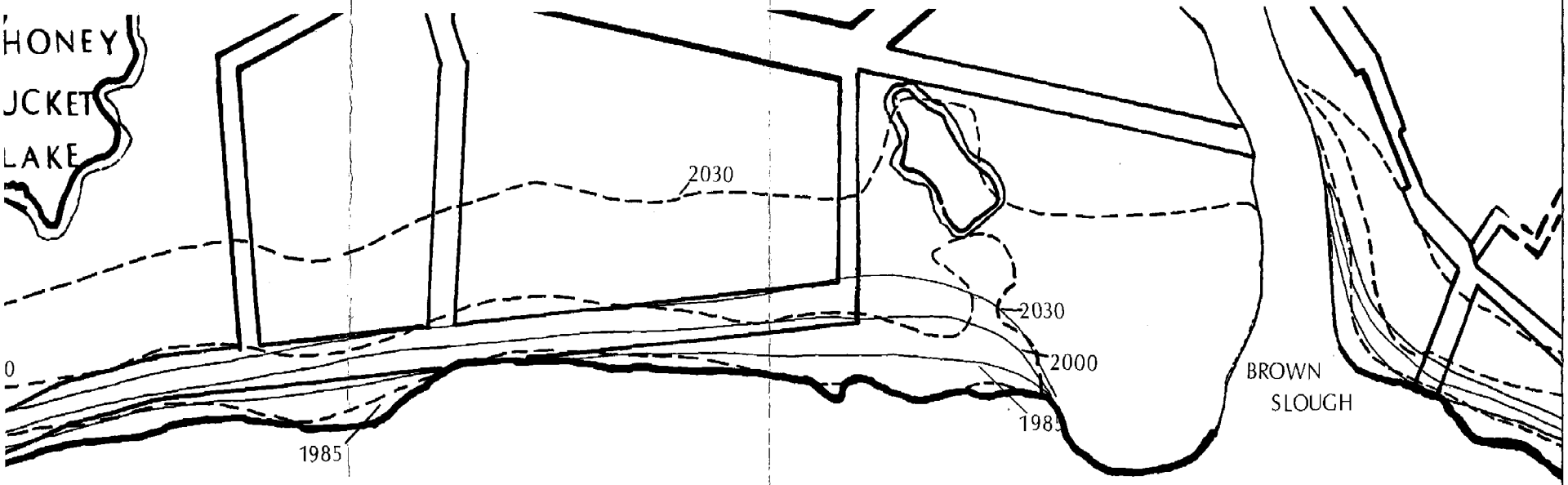


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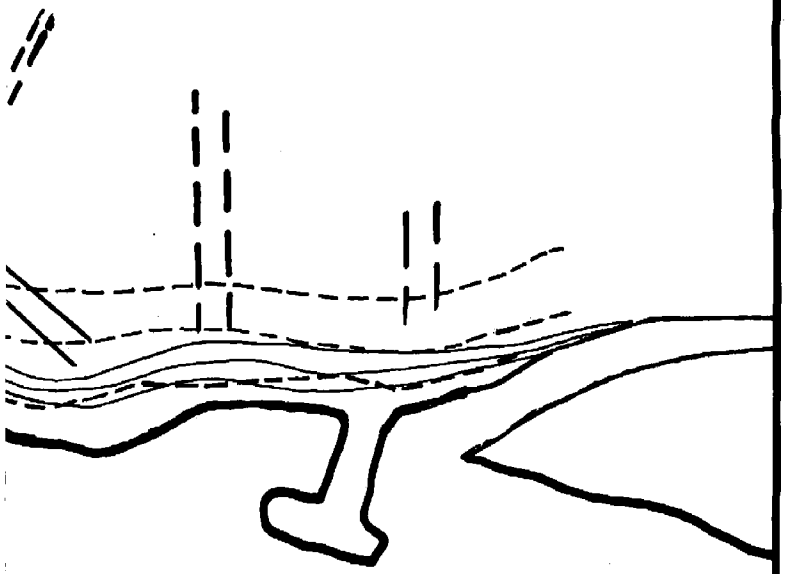
FIGURE 8



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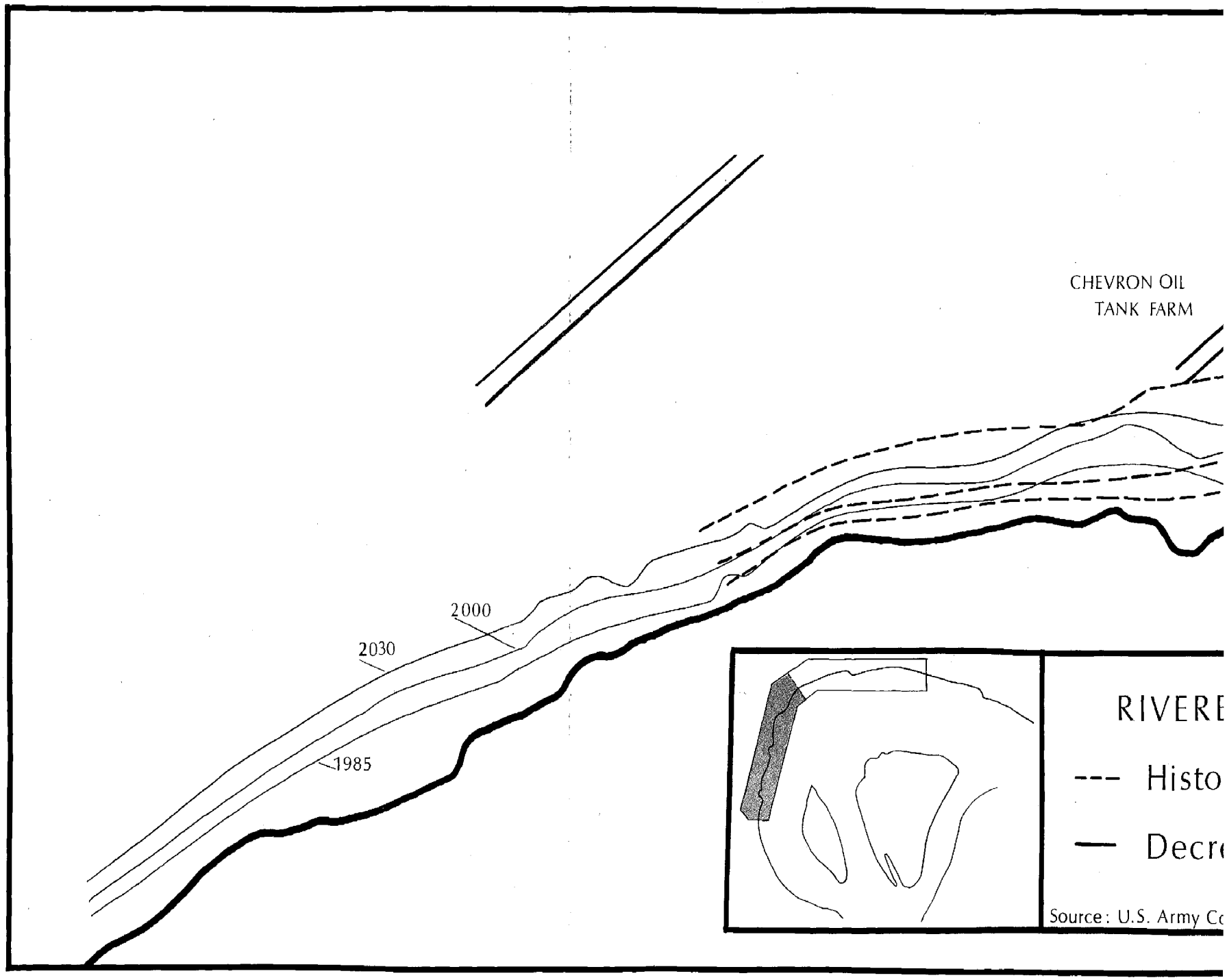
CHEVRON OIL
TANK FARM
2000
2030
1985
RIVERE
--- Histo
— Decr
Source: U.S. Army Co

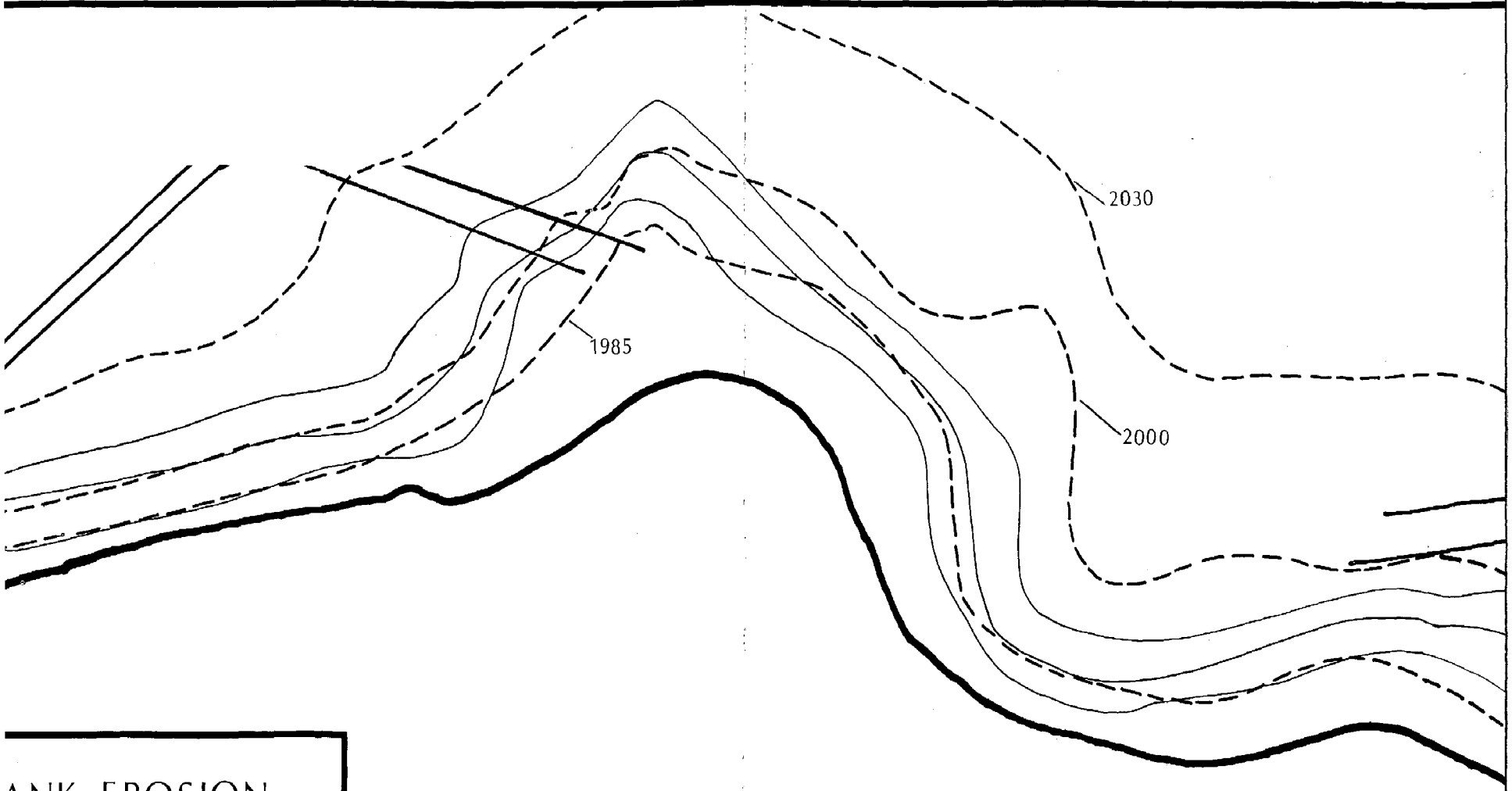

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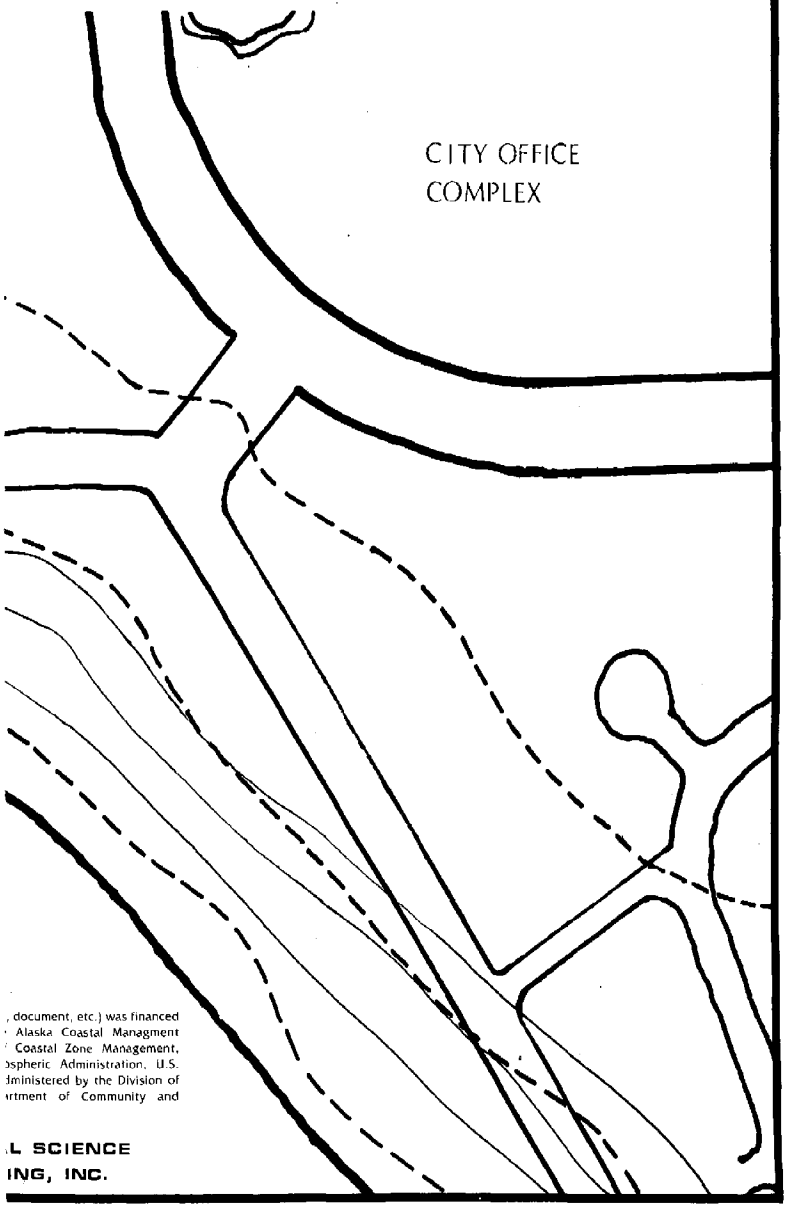
FIGURE 9



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Bethel has immediate plans for construction of steel cells and a seawall at the Chevron tank farm and expanding the seawall at the general cargo dock. The city plans to stabilize the remainder of the bank between the general cargo dock and the tank farm with a combination of steel bulkhead and articulated concrete mattress. Total estimated expenditures between 1981 and 1990 for bank stabilization is close to $30 million (Galliett and Silides). The City secured funding of $5 million in Spring 1983 from the State. This will be used to begin construction on the first phase of the seawall.

Onshore Erosion

The primary cause of onshore erosion is improper construction of buildings and roads. Many buildings are constructed on sandpads, and in the past water erosion and ponding problems have resulted from little consideration of natural drainage when siting buildings. Road construction has resulted in similar drainage problems. Road and building construction also often results in a large quantity of unconsolidated sand and silt. The sand and silt clogs culverts and drainage pipes and is picked up by the wind which aggravates the dusty air conditions common in Bethel during the summer.

Earthquakes and Tsunamis

Although Bethel is located 300 miles from the Aleutian Islands, one of the most seismically active areas in the world, little seismic activity is noticable in Bethel. The nearest known major geologic fault is in the Kuskokwim Mountains, 100 miles to the southseast. Alaska Regional Profiles identifies the region surrounding Bethel as having a moderate potential (4.5-6.0 magnitude) for damage to buildings by earthquake. The Great Alaska Earthquake of 1964 was felt very strongly in Bethel, although the epicenter was over 400 miles to the east (James Hoffman).

Tsunamis (seismic sea waves) are common in the Aleution Islands but rarely impact western Alaska. The Kuskokwim River at Bethel does have a small tidal influence, so theoretically a large tsunami directed at Kuskokwim Bay could be felt in Bethel. However, the probability is very low.

HYDROLOGY

The Kuskokwim River

The Kuskokwim River begins in the glaciers of Mt. Foraker, in the Mt. McKinley National Park. The river flows 540 miles to its mouth in Kuskokwim Bay. Near Bethel, the river meanders extensively forming ponds, sloughs, and oxbow lakes. Severe erosion problems are caused by the river constantly changing course (refer to Geophysical Hazards section). The river is very murky because of a high glacial flour concentration. Table 6 summarizes physical characteristics of the river.

TABLE 6

Physical Characteristics of the Kuskokwim River at Bethel

Length	540 miles
Total Drainage Area	50,000 sq miles
Drainage Area Upstream From Bethel	42,800 sq miles
Summer Discharge Range	50,000-200,000 c.f.s.
Average Discharge	60,000 c.f.s.
Maximum Spring Flood Discharge	600,000 c.f.s.
Velocity (During discharge of 95,000 c.f.s.)	High Tide - 0.8 f.p.s. Low Tide - 2.2 f.p.s.
Temperature Range	32° F to 44° F
Average Freeze-up Date	October 29
Average Break-up Date	May 15

The Kuskokwim River has an average diurnal tidal range of five feet. The maximum tidal effect is felt when the river discharge is lowest. The maximum tidal range is estimated at +7 MLLW (Mean Lower Low Water) to -3 MLLW. As the river discharge increases, the tidal range decreases, until the tidal effect disappears when the river discharge reaches the magnitude of a twenty-year frequency flood.

Drainage

The natural drainage system on which the developed portion of Bethel is located is known as Brown Slough (technically a stream). The general direction of drainage is from the north and northwest throughout the city and emptying into the Kuskokwim River. Several other tributaries of a shorter length flow into the Kuskokwim, but, with the exception of Lousetown Slough, do not drain the developed area.

Approximately two-thirds of this area within the city limits is a low profile undulating topography. No dominant stream system has been able to develop due to topographic conditions and the presence of permafrost. Thus, the entire area is imperfectly drained and is characterized by numerous potholes (384 according to a 1977 U.S. Geologic Survey Map). The remaining

one-third of Bethel's corporate area is freshwater marsh. This includes land both north and south of the river bend.

Within the developed area of the City, the combination of localized irregular topography, saturated soil, permafrost and near level position with the river results in extensive areas of standing water. The surface water problem will expand as development continues over time, being influenced by increasing amounts of impervious cover and land alteration which can interfere with surface flow. Large scale maps (1":100') have been prepared for the City to illustrate local drainage direction.

Groundwater

All of Bethel's potable water is supplied by ground-water. The water that is extracted from the wells is very cold and water supplied by the city is treated with chlorine. Almost all of the successful wells must drill below the permafrost before an aquifer is found. Location of recharge areas and estimates of aquifer size are very difficult due to the presence of the permafrost.

HABITATS

Habitats in the Bethel planning area which are subject to the Alaska Coastal Management Program are wetlands and tideflats; rivers, lakes and streams; and uplands. These habitats are depicted in Figure 10. These habitats support a wide range of terrestial and aquatic life forms, and therefore should be managed in a manner which maintains or enhances the physical and biological characteristics of these habitats. A brief discussion of the habitat types follows.

Wetlands and Tideflats

A recent field study conducted by the Bethel City planning staff, Environmental Science and Engineering and the U.S. Army Corps of Engineers determined that almost the entire area found within the Bethel city limits was technically wetlands. Based on this study, two groups of wetlands were identified; significant wetlands and nonsignificant wetlands. The significant wetlands include streamways and areas subject to periodic inundations. The nonsignificant wetlands include areas that are not subject to flooding and are better drained. Wetlands are characterized by tundra vegetation such as grasses, sedges, herbs, and mosses; and by freshwater flora such as diatoms, algae and seed plants. Wetlands are extremely important to resident and migratory bird species for resting, nesting, rearing, and foraging areas. They also provide habitats for furbearers such as fox, hare, weasels, mink, muskrat, beaver, and other mammals like lemmings and voles. Wetland habitats can be easily disrupted by urban development, thus careful management of these areas is essential.

Rivers, Lakes, and Streams

Rivers, lakes, streams and other freshwater habitats such as sloughs and the shallow tundra lakes and ponds are well represented in the Bethel planning area. The Kuskokwim River system provides a migration route and important spawning, feeding, rearing, and overwintering habitats for resident and anadromous fish species. The riparian and high brush vegetation types bordering the rivers and sloughs provide habitats for waterfowl, game birds,

and several species of passerines. Small furbearing animals associated with the aquatic environments are beaver, muskrat, mink, and land otter.

The shallow tundra lakes are abundant throughout the planning area and are integral with the freshwater wetlands. Diatoms, blue green algae, and both submerged and emerged forms of aquatic seed plants occur in these habitats, providing important feeding areas for fish populations. These habitats are equally important to waterfowl, shorebirds, and various animals as resting and foraging areas.

Uplands

The wetlands study found that those areas not technically qualifying as wetlands, based on examination of soil characteristics, hydrology and vegetation type, were extremely small sites (usually no more than a few hundred square feet) found on south facing slopes in the nonsignificant wetland area. Plant life is less dense and a predominance of lichen is found in these areas. No species exclusively adapted to uplands are found in the areas except on a seasonal basis, i.e., snowshoe rabbits, arctic hares, and ptarmigan. The animal and bird species of the upland areas are influenced by he lowlying freshwater habitats, and are generally well dispersed throughout the planning area.

FIGURE 10

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Coastal Habitats

Rivers, Lakes, and Streams

Wetlands (swamps, marshes, bogs, wet and moist tundra)

SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING

SCALE

0 1 2 MILES

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FIGURE 11

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Vegetation

Wet and Moist Tundra

High Brush

Freshwater Flora

SOURCE: ALASKA REGIONAL PROFILES

SCALE

0 1 2 MILES

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VEGETATION

Vegetation in the Bethel area can be described as primarily wet and moist tundra, characterized by low growing grasses, sedges, and shrubs, rooted in a mat of lichens and mosses. Alaska Regional Profiles has grouped vegetation in and around Bethel into the following communities (Figure 11).

Wet Tundra

Characterized by an almost continuous cover of grasses and sedges rooted in mosses and lichens. On slightly raised ridges dwarf shrubs may be found, while in standing water rooted aquatic plants, such as horsetail, pondweed, and bur reed are found.

Characteristic species: Bog orchid, Cotton grass, Sphagnum moss.

Moist Tundra

Characterized by wide-variety of low-growing shrubs, herbs, grasses, and sedges rooted in a continuous mat of mosses and lichens. Cotton grass may be most obvious in depressions, and the abundant grasses and sedges are accented by numerous colorful flowers during summer.

Characeristic species: Crowberry, Sedge, Hair Moss, Reindeer lichen.

High Brush

Characterized by dense thickets of willow, alder, and birch with an understory of a wide variety of lower shrubs, herbs, grasses, ferns, and mosses.

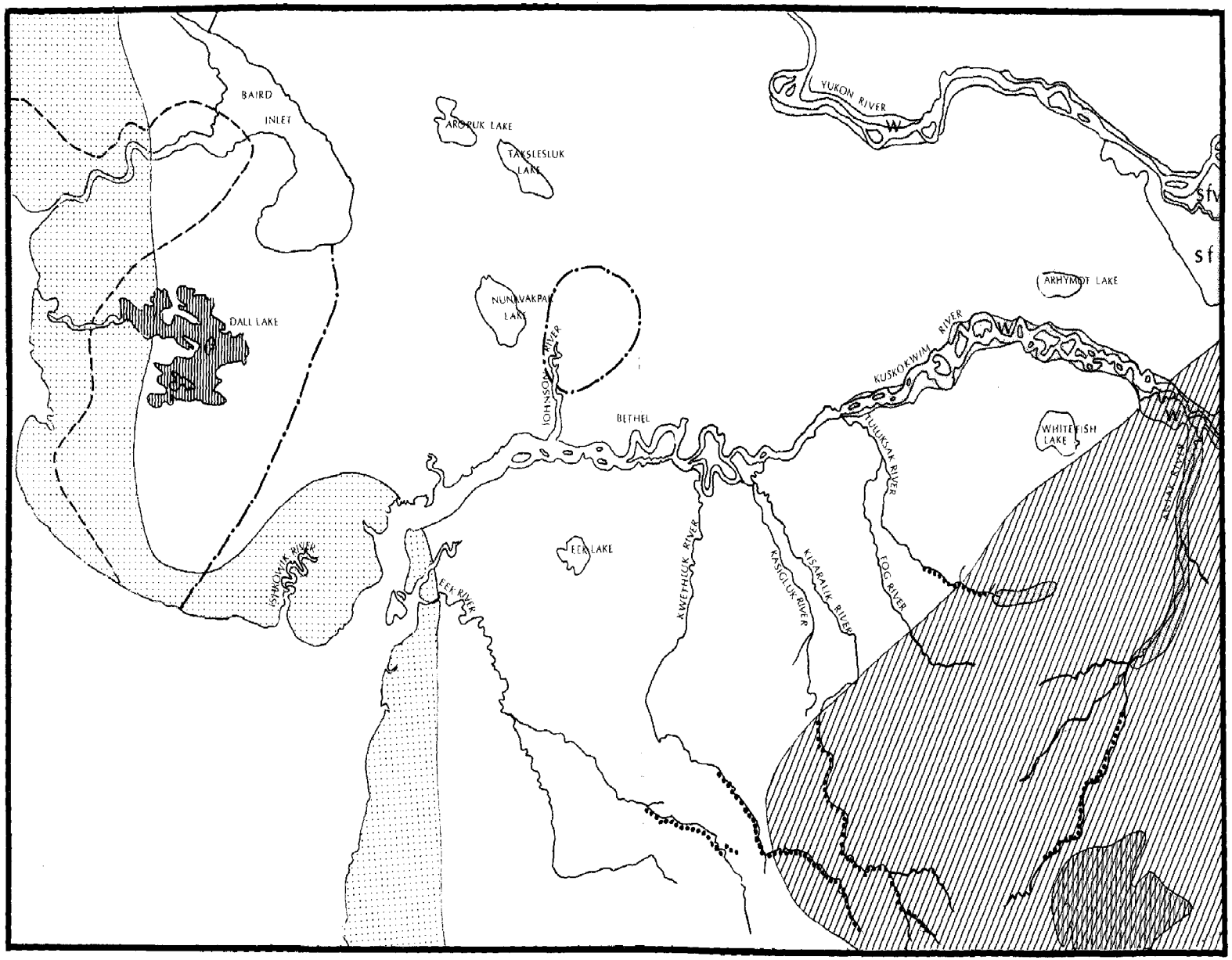
Characteristic species: Felt leaf willow, Littletree willow, Thin leaf alder.

Freshwater Flora

Characterized by phytoplankton, seed plants, and small algae. Phytoplankton and small algae commonly grow in the top few inches of soft bottom sediments in ponds and shallow lakes. Both submerged and emergent forms of aquatic seed plants occur in shallow ponds and lakes.

Characteristic species: Horsetail, Pondweed, various species of diatoms, and algae.

Additional species and their scientific names for each type of plant community is listed in Appendix I.



SOURCES: ALASKA DEPARTMENT OF FISH AND GAME
U.S. FISH AND WILDLIFE SERVICE, BETHEL

FIGURE 12

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Special Mammal and Bird Habitats in the Bethel Study Area

Waterfowl

Potential Molting Areas - Emperor and Cackling Canada Geese

Potential High Density Molting Area - White-fronted Geese

Identified Non-breeder Molting Area - White-fronted Geese

Brown Bear

Concentration Along Streams

Intensive Use Area

Moose

s — Spring and Summer Concentrations

f — Fall Concentrations

w — Winter Concentrations

Caribou - Present within Generalized Boundary

Arctic Fox - High Density within Generalized Boundary

SCALE

10 0 10 30 MILES

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BIRD LIFE

Bethel is located on the eastern margin of one of the largest and most productive avifauna habitats on the continent, the Yukon-Kuskokwim Delta. Many species of waterfowl, shorebirds and songbirds have been observed around Bethel, however the extent to which the bird species utilize the river, sloughs, lakes, and tundra habitats is not well documented.

Waterfowl

Diving and surface feeding ducks are the most abundant of the waterfowl, with pintail, greater scaup and oldsquaw the most prevalent. Other important species include mallard, green winged teal, common scoter and widgeon. Nesting of ducks occurs throughout the study area, with the most extensive nesting sites occuring in areas characterized by a high density of lakes and ponds. Observed nesting species in the Bethel planning area are pintail, mallard, greater scaup, green winged teal, and canvasback (ADF&G).

The delta habitats are equally important to geese and swan populations. Whistling swans are common around Bethel and throughout the delta. They are the most conspicuous of the waterfowl, due to their enormous size, and are frequently seen flying overhead or foraging on the tundra vegetation. Small flocks of black brant and some geese such as white-fronted, and lesser Canada also appear on the tundra to rest and forage on crowberries prior to their fall departure. Nesting of black brant, cackling, and emperor geese is generally confined to coastal and estuarine habitats and are fairly uncommon in the Bethel study area. White-fronted and lesser Canada geese nesting habitats are more well dispersed throughout the study area. High density nesting is found in areas supporting a dense complex of lakes and ponds.

The first waterfowl arrive on the delta in late April to early May, with some species arriving in the coastal nesting habitats through June. Nesting begins in late May with the breakup of the river. Most broods of geese and duck are fledged by mid-August. Fall departure of waterfowl

in the Bethel area appears to peak in late September and may extend through October if warm weather persists. Waterfowl are most commonly observed during spring and fall migrations. Special bird habitats are identified in figure 12: none fall within the city itself.

Shorebirds and Other Waterbirds

Common shorebirds found throughout the study area include Wilson snipe, western sandpipers, American golden plovers, northern phalaropes, and Arctic terns. Other common waterbirds include red-neckedhgrebes, Arctic and common loons, sandhill cranes, and mew, sabine and glaucous winged gulls. Hangar Lake has been indentified as a popular nesting and foraging site for waterbirds as well as waterfowl. Preferred nesting habitats appear to be a fair distance from town and around the periphery of lakes and ponds.

The majority of waterbirds arrive on the tundra as soon as the snow melts and immediately disperse onto nesting habitats. Common and Arctic loons, Arctic terns, snipes, phalaropes, and gulls are known nesting species in the study area. Waterbirds migrate to the delta from all over the world and are the most abundant of the bird species inhabiting the area during the spring and early fall.

Upland

Raptors are fairly uncommon on the lowland tundra habitats, however the study area is frequented by marsh hawks and gryfalcon which prey on ptarmigan and small rodents. Willow ptarmigan are year-round residents and are most commonly observed in higher, better drained tundra habitats. Spruce grouse are wintering residents of the study area. Short-eared owls are also observed on the tundra and occur in greater abundance as rodent populations increase.

Passerine (songbirds) birds commonly observed throughout the study area include lapland longspurs, parasitic and longtailed jaegars, yellow wagtails, tree and bank swallows, rusty blackbirds, boreal chickadees, robins, snow buntings, and common redpolls. Ravens are abundant throughout the region.

A nesting site of the endangered Peregrine falcon has been identified near the Upper Falls of the Kisaralik River (U.S. Fish and Wildlife Service). Peregrine falcons arrive in Alaska in late April and depart for their wintering grounds during September, following their nesting season. They are thought to winter from Central to South America. Peregrines may not utilize the same next year after year, but they traditionally use the same area. Peregrines feed primarily on waterfowl, shorebirds, and various small birds.

TABLE 7 SEASONAL ABUNDANCE AND NESTING OF BIRD SPECIES IN THE IMMEDIATE BETHEL AREA.

Bird Species	Spring	Nesting	Fall	Winter
Waterfowl				
Whistling swan	C	+	C	
Lesser Canada goose	C	+	C	
White-fronted goose	C	+	C	
Mallard	C	+	C	
Pintail	C	+	C	
Green-winged teal	C	+	C	
Greater scaup	C	+	C	
Old squaw	C	+	C	
Common scoter	C	+	C	
Canvas back	U	+	U	
Widgeon	C	+		
Shorebirds and Other Water Birds				
Arctic loon	U	+	U	
Red throated loon	U	+	U	
Common loon	C	+		
Red-necked grebes	U			
Lesser sandhill crane	C	+	C	
Common (Wilson) snipe	A	+		
Western sandpiper	A	+	A	
Northern phalarope	C	+	C	
Dowitcher	U	+		
Whimbrel	U	+		
American golden plover	C	+	C	
Glaucous winged gull	C	+	C	
Mew gull	C	+	C	
Sabine gull	U			
Arctic tern	C	+		
Passarines				
Parasitic jaeger	C	+	C	
Long-tailed jaeger	C	+	C	
Fox sparrow	C			
Savannah sparrow	A	+	A	
Tree sparrow	A	+		
Bank sparrow	A	+		
Gray jay			U	U
Boreal chickadee			C	C
Robin	A	+	A	
Yellow wagtail	U	+		
Yellow warbler	C	+	C	
Rusty blackbird	C	+	C	
Hoary redpoll	U	+	U	U
Lapland longspur	A	+		
Raven	A	+	A	A

Raptors				
Short eared owl	C	+	C	C
Marsh hawk				C
Willow ptarmigan	C	+	C	C
Rock ptarmigan				U
Snow bunting				C
McKays snow bunting				C

CODES: A = Abundant
C = Common
U = Uncommon

Compiled from U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game, Bethel.

MAMMALS

Few big game species occur in the immediate vicinity of Bethel. Moose, wolf and wolverine are found primarily in the forested upland sections of the Yukon and Kuskokwim River drainages. Black bear are common throughout the open upland forest areas but are rarely observed on the lowland tundra of the delta (ADFandG). Small fur bearers occur in greater numbers in the study area and are of primary importance to the village winter economy. The more valuable small fur bearers are mink, beaver, muskrat, land otter, and red fox. Special mammal habitats in the Bethel study area are identified in Figure 12.

The "tundra" mink of the Yukon-Kuskokwim Delta are of the highest quality and command top prices in world fur markets. The highest recorded mink densities occur near Chevak, east of Hooper Bay, and in the larger water bodies east of Nelson Island, including Baird Inlet and Dall Lake. Moderate mink densities occur in the southern portion of the Yukon-Kuskokwim Delta east of the foothills of the Kilbuck Mountains including the Johnson River drainage and adjacent tundra areas. Areas of low mink abundance include areas where relative relief exceeds 100 feet and areas immediately adjacent to the coast and the Yukon and Kuskokwim Rivers.

Mink are associated with lakes, ponds, and slow moving waterways and are commonly trapped with a "taluyuk", a homemade cylindrical fish trap. Between 10,000 and 14,000 mink are taken on the delta annually. A large percentage of the "tundra" mink are trapped in early November before the ice has formed a thick layer.

Beavers are common throughout the delta region, particularly in deepwater streams and tributaries. A moderate beaver trapping effort exists on the delta. The average number of sealed beaver is about 1,300 per year (ADFandG). The 1980-81 catch recorded in the Yukon-Kuskokwim Game Management area (see appendix) was considerably higher than the average takes, approximately 2,396 beavers were sealed.

Muskrats are also common throughout the delta region, although populations may fluctuate widely due to unfavorable weather conditions. Preferred habitats by muskrats are slow moving waterways such as lakes, marshes, ponds, and sloughs. The majority of muskrat are trapped in early spring, immediately after break-up. Actual harvests were not available.

Arctic and red fox are present on the delta, although arctic foxes occur commonly only in the coastal regions of the delta. The red fox is abundant throughout the study area and is associated with riparian willow along the river and neighboring sloughs. Fox populations are to a large extent dependent on the abundance of prey species. Increasing numbers of fox are taken on the delta with the aid of snow machines. In 1980-81 approximately 2000-2500 fox were taken in the Yukon-Kuskokwim Delta Game Management Area (ADFandG).

Land otters are found on the tundra in and around streams and river drainages. Otters of the Yukon-Kuskokwim Delta are of high quality and continue to bring top prices to the trappers. The 1981 game management report recorded 638 sealed otters for the entire region, with the majority trapped along the Kuskokwim River drainage between from Eek and Kalskag and along the lower Yukon Drainage between Mountain Village and Russian Mission (Dinneford).

Other small animals found in the study area include shrews, hares, lemmings, voles, squirrels, ermines, weasels, and occasionally lynx.

Additional species and their scientific names are listed in Appendix I.

FISHES

The freshwater habitats of the Kuskokwim area support a wide range of anadromous and freshwater fish species. The major fish species are: all five species of Pacific salmon, whitefish (including sheefish and cisco), burbot or "lush", northern pike, blackfish, boreal and pond smelt, arctic lamprey, arctic char, grayling, rainbow trout, longnose sucker, slimy sculpin, three-spine and nine-spine stickleback. The fish resources of the Kuskokwim River system historically have been used for subsistence needs, and more recently, support an important commercial fishery and a limited sport fishery.

The waters of the study area (see Figure 13) include the Kuskokwim River, from Eek Island to Aniak, and major streams and rivers draining the Kilbuk and Ahkum Mountain Ranges and flowing west and north into the main river. Throughout the study area there are numerous lakes, ponds, and shallow waterways which are important to the ecology of many fish species.

The map in Figure 13 is based on Alaska Department of Fish and Game personnel field observations, as provided by Rae Baxter and Glenn Seamen. Only the major tributaries and lakes are delineated; there are many lesser streams and ponds, some that exist only intermittently, that are not illustrated on the map. The nonanadromous species are particularly found in the lesser tributaries.

Salmon

The main river serves as an important migration route for all five species of Pacific salmon. King salmon are the earliest to arrive to the Kuskokwim area, ascending the river in early May. By mid June the salmon are entering the spawning streams and rivers in the study area. The distribution and spawning areas for the five species of Pacific Salmon are delineated in Figure 13 (ADFandG). The major river tributaries provide excellent spawning habitats (ADFandG). King salmon spawning occurs in July and August. Fry emerge in the spring and the young salmon remain in freshwater until the following summer before migrating to the sea.

Chum salmon are the most abundant salmon species in the Kuskokwim River, ascending the river shortly after the arrival of the king salmon run. During July and August chum salmon migrate upstream to their spawning areas. There are sixteen known chum spawning tributaries in the Kuskokwim River system, however they have not been well documented due to insufficient funds necessary to survey all areas. Unfavorable weather conditions for surveying further limits the Department of Fish and Game in their surveying efforts (ADF&G). Fry emerge from gravel beds in spring and begin their seaward migration. Chum salmon spend two to four years in the sea before returning to the river system.

Pink and red salmon are more abundant in rivers and streams of the Kuskokwim Bay area. The majority of red salmon are anadromous, although some may become "lake locked" and remain in freshwater habitats. These fish are referred to as "kokanee". In the Yukon-Kuskokwim area kokanee are fairly uncommon. Preferred spawning habitats are swift rivers with medium fine gravel bottoms; and some lakes. Fry emerge in April and May and the young remain in freshwater habitats one to two years before migrating to coastal areas.

Pink salmon spawning usually occurs in the tributaries of the lower Kuskokwim River. However spawning has occured in tributaries further up river as far as the Holitna River (ADF andG). Spawning has not been documented in the Kuskokwim River itself but limited evidence suggests it may occur in the river above Kalskag. Pink salmon spawn in July and August, and by the following spring the young pink salmon are migrating downstream to spend summer months in nearshore waters. Pink salmon are abundant only in even years (i.e., 1980, 1982, 1984).

Coho Salmon are abundant and present throughout the study area. They enter spawning rivers and streams in early fall, and spawning occurs between September and January. Coho juveniles rear in lakes, ponds, and streams; and remain in freshwater from one to three years before they migrate downstream to coastal areas.

All five species of Pacific salmon are utilized primarily for subsistence and commercial purposes, with a slight fishing pressure from sports fishermen.

Whitefish

Several species of whitefish are found throughout the study area. These are: broad whitefish, humpback whitefish, round whitefish, sheefish or "iconncu", Bering cisco commonly called arctic cisco, and least cisco. Bering cisco are more commonly found in the estuarine and lowland tundra habitats, while least cisco are found in freshwater habitats throughout the area. Round whitefish prefer the swift flowing sections of streams and are found in all the major tributaries of the Kuskokwim River from Eek River to the headwater. They seldom occur in the lower reaches of the Kuskokwim River, except for a short duration immediately following break-up. The two species of major importance to subsistence fishermen in the lower Kuskokwim River are broad and humpback whitefish.

Several whitefish species of the Kuskokwim River drainage, including least cisco, broad whitefish and humpback whitefish, exhibit seasonal movements between the Kuskokwim River and outlying tundra streams, lakes, and ponds. During the summer and early fall the whitefish disperse and feed in the shallow tundra aquatic habitats of the delta. From August to December the whitefish migrate downstream to preferred spawning and overwintering habitats in the Kuskokwim River. Spawning occurs during the fall in the deep waters of the Kuskokwim River. Humpback spawning has been observed in the main river near Bethel and over 400 miles upriver from the mouths of summer feeding streams of the lower Kuskokwim River. From December to May the main river is an important overwintering habitat, due to the unavailability of free water and the near anerobic conditions of the shallow tundra lakes and ponds. By midspring nonspawners and juvenile whitefish leave their overwintering habitats and return to their summer feeding habitats (Baxter).

Sheefish appear to spawn in alternate years with only one half of the population breeding in any year. Many of the non-breeders do not move upstream with the spawners but instead disperse in the delta in the shallow, slow moving tundra streams, lakes, and ponds to feed. The upstream migration of breeding individuals is protracted and occurs from at least April to June (ADF&G). Sheefish are fall spawners and prefer habitat with a swift current and deep pools. Suitable spawning habitats are outside the study area (Baxter).

The Kuskokwim River whitefish fishery is predominately utilized for subsistence needs. The main river, from Johnson River to Akiachak, is an area of intensive whitefish harvest by Bethel residents (see Figure 13). During the fall and winter whitefish are taken under the ice with gill nets or with a hook and line method of fishing, locally known as "jigging." Other important species harvested along with whitefish include northern pike, burbot, lamprey, and blackfish. As smelt ascend the river in spring, subsistence fishing is done by means of dip-nets.

The commercial utilization of whitefish occurs incidentally to the August coho season, and in a limited fall and whitefish fishery conducted by the Fish and Game Department in Bethel.

Sport fishing

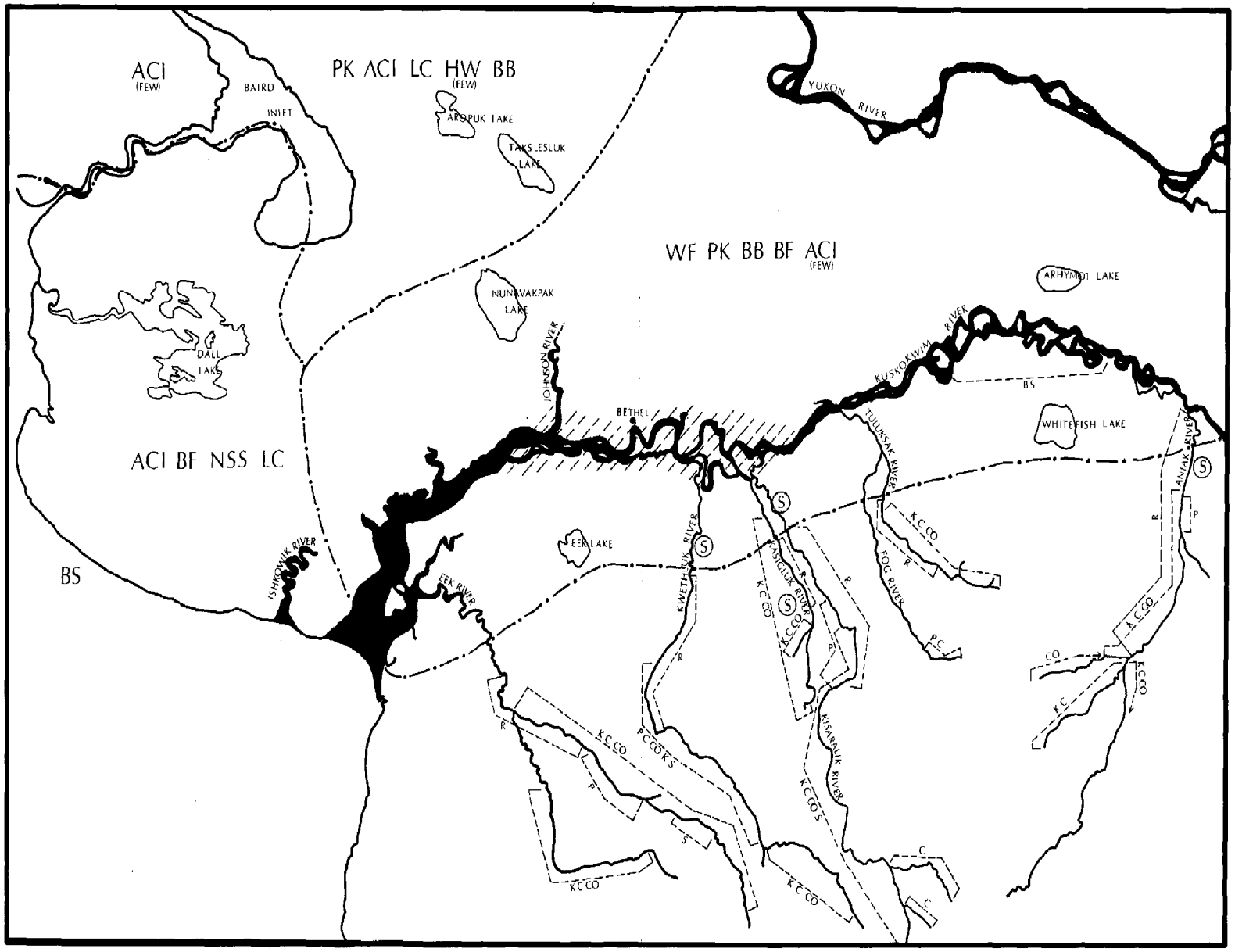
Rainbow trout is the principal fish specie sought by sports fishermen. Rainbow trout are year round stream residents and are found in all major tributary streams of the lower Kuskokwim River, with the exception of Eek, Tuluksak, and Johnson Rivers. Rainbow trout have not been documented in the Holitna River or farther upstream in the Kuskokwim drainage (ADFandG). Other species valuable to sports fishermen are sheefish, arctic char, grayling, northern pike, and all five species of Pacific salmon. The Kisaralik River receives the greatest sport fishing pressure from Bethel residents and area fishermen. The river is navigable approximately seventy miles and thus, is preferred by many sports fishermen. The Kwethluk and Kasigluk river systems receive moderate sports fishing pressure from residents of Bethel (ADFandG).

TABLE 8 DISTRIBUTION AND RELATIVE ABUNDANCE OF FRESHWATER FISH IN THE LOWER KUSKOKWIM RIVER

SPECIES	Aniak River	Tuluksak River	Kisaralik River	Kasigluk River	Eek River	Kwethluk River
Arctic Lamprey	+	x	x	x	P	x
King Salmon	+	+	+	+	+	+
Coho	+	+	+	+	+	+
Chum	+	+	+	+	+	+
Red	x	o	P	P	+	P
Pink	+	x	x	x	+	x
Rainbow Trout	+	x	+	+	o	+
Arctic Char	+	+	+	+	+	+
Lake Trout	o	o	o	o	o	o
Sheefish	x	P	P	x	x	P
R. Whitefish	+	x	+	+	+	+
H. Whitefish	+	+	x	+	+	+
B. Whitefish	+	+	+	+	+	+
Least cisco	+	x	x	x	+	x
Bering cisco	x	P	P	P	x	P
Arctic grayling	+	+	+	+	+	+
Boreal smelt	o	P	x	x	x	x
Pond smelt	+	P	P	P	P	P
Burbot	+	P	P	P	P	P
Northern Pike	+	+	+	+	+	+
Blackfish	+	+	+	+	+	+
9-spine stickleback	+	+	P	P	P	P
Longnose sucker	+	+	+	+	P	+
3-spine stickleback	o	o	o	o	x	o
Slimy sculpin	+	+	+	+	+	+

+ Abundant; x Low Abundance; P thought to be present; o absent

Source: Alaska Department of Fish and Game, Inventory and Cataloging of Western Alaskan Waters



SOURCE: ALASKA DEPARTMENT OF FISH AND GAME

FIGURE 13

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Fish Habitats and Distribution of Species in the Bethel Study Area

Salmon

C - Chum
K - King
Co - Coho
P - Pink
S - Sockeye

Other Fish Species

WF - Whitefish (General)
LC - Least Cisco
ACI - Arctic Cisco
HW - Humpback Whitefish
PK - Northern Pike

BF - Blackfish
BB - Burbot
BS - Boreal Smelt
R - Rainbow Trout
NSS - Ninespine Stickleback

Anadromous Fish Streams

Discontinuous Spawning

Major Concentration of Fish Species
(During Ice-free periods Whitefish are ubiquitous throughout the area.)

Harvest

Intensive Subsistence Whitefish and Salmon Harvest area by Bethel Residents

(S) Sports Fishing Streams

SCALE

10 0 10 30 MILES

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CULTURAL RESOURCES

Photo by Ferdinand Dreybert.
Courtesy of Moravian Archives.

HISTORY OF BETHEL

The history of Bethel began with the establishment of the permanent Eskimo village of Mumtrekhlagamute, which means "smokehouse village" in the Yupik language. The date has not been determined when the settlement first originated. Across the river from the village the first trading post was established by Reinhold Separe in the early 1870's. The settlement was known as Mumtrekhlagamute Station. A second trading post owned by the Alaska Commercial Company was established at the upriver end of the

settlement, near Brown Slough. The inventory of goods was owned by Separe, however the store was operated by Edward Lind (Oswalt). Moravian missionaries arrived at Mumtrekhlagamute Station in 1884 in search of a place to establish a mission. The following year John Kilbuck and William Weinland founded a mission one-half mile west of the trading post. The first school was opened in 1886, and by the turn of the century the Bethel Mission was well established.

Reindeer herding and fur farms were among the early industries in Bethel. The first reindeer were introduced to Alaska in 1892 in an effort to revitalize the Alaskan economy. In 1901 the Moravian mission received 175 reindeer. By the early 1930's approximately 43,000 reindeer grazed along the Kuskokwim River. The population of reindeer gradually diminished and in 1946 only 600 remained. During the 1930's several residents of Bethel owned fur farms where mink and fox were raised. Remnants of an early fur farm can still be seen near the present site of the Chevron oil storage tanks.

As a result of the commercial activities associated with early industries and river uses, Bethel emerged as an economic and trade center for the surrounding region. Its role as a regional center was further reinforced with the development of transportation facilities and extensive capital projects financed by the government. Government and social services grew considerably during the 1960's and soon became the dominant force in Bethel's economy. Although many economic changes have occurred in Bethel since its beginnings, the traditional lifestyle and culture of the Yupik people remains visible today.

Historic Sites

The Alaska Heritage Resources Survey, maintained by the Alaska Division of Parks, has identified three historic sites in Bethel. (See Figure 14).

St. Sophia - the St. Sophia Church is owned by the Russian Orthodox Church in Sitka. The Church was Built in 1967 and the foundation of the Church was blessed on August 9, 1968. Records of Communion of the Sergie Mission in 1906 reveals the early influence of the Russian Orthodox Church in Bethel (Emphanka).

The First Settler's Cabin - This cabin is the first home built by a white settler in Bethel. The building is still standing but is threatened by the erosion of the riverbank.

The Moravian Church - The Moravian Church was built in 1885 by John Kilbuck and William Weinland. The building has been relocated from its original site.

Much of Bethel's early history was lost due to erosion along the waterfront. However, there are several older homes along Mission Road and in other parts of town. Nerby's store, built in 1927, has been moved back from the river three times (Hoffman).

There are two old cemetery sites in Bethel known as Lousetown cemetery and Orutsararmuit (Hoffman). (Figure 14.) The oldest burial ground was at the original site of Mumtrekhlagamute or Bethel. Excavations at this site were made in 1926 by Dr. Ales Hrdlicka, an anthropologist of the Smithsonian Institute (Schwalbe).

Atmautluak Tr.
Akiachak Tr.
Hangar Lake
to BIA

FIGURE 14

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Historic Sites and Winter Trails

Regional Trail

Local Trail

1 Moravian Church

2 Settler's Cabin

3 St. Sophia Church

Cemetery Site

SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING

SCALE

0 1 MILE

The Preparation of this (map, document, etc.) was financed in part by funds from the Alaska Coastal Management Program and the office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, administered by the Division of Community Planning, Department of Community and Regional Affairs.

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RECREATION

Bethel supports a variety of indoor and outdoor recreation activities. Several recreation facilities are new, with more facilities planned for the near future. The City Department of Parks and Recreation (Parks and Rec) coordinates most of the facilities and activities in town. The department consists of five full-time employees, five part-time employees, several volunteers, and occasional contracted employees for special programs.

The focal point of outdoor summer activities is 21 Acre Park (Pinky's Park), located on the north side of the city subdivision. The park complex consists of a six-lane bowling alley, a baseball field, a childrens' playground, an outdoor hockey rink with lights, and a 3/4 mile boardwalk encircling the park. The park also serves as the center of the city's Fourth of July activities.

The city plans to establish a series of neighborhood "mini-parks". Two of the planned parks are in the Alaska State Housing Authority (ASHA) housing area, one is in the Ptarmigan Subdivision, one is near the Russian Orthodox Church in Lousetown, and one is on Second Street in Lousetown. Mini-parks have also been proposed near Mission Lake and near Dull Lake. Parks and Rec has hopes of eventually constructing a boardwalk system from the Ptarmigan mini-park through the ASHA mini-park to 21 Acre Park and possibly connecting with the P.H.S. Hospital. Construction of the segment from 21 Acre Park to A.S.H.A. Housing is planned for the summer of 1983.

A popular recreation area, that is predominantly private property, is H-Marker Lake. The lake is used for swimming and by seaplanes. The land surrounding the lake is used for a variety of recreation activities.

Other popular recreation areas include Hanger Lake, Arthur Dull Lake, and the Kuskokwim River. The City hopes to eventually secure land for a riverfront park.

Outdoor recreation during the winter is restricted to cross-country skiing, snowmobiles, and dogsleds. All three activities use trails that

wind through the city and out to surrounding villages. (Figure 14). Dogsled racing, known as "mushing" has become very popular. The "Kuskokwim 300", a 300-mile race to Aniak and back, is the highlight of community activity in the winter. Bethel also holds the Yukon-Kuskokwim State Fair during the winter, which includes dog and snow machine races, several arts and craft events, and Eskimo dances.

Facilities used for indoor recreation include the bowling alley, the high school gym, the National Guard Armory, the Kilbuck Elementary School, the Senior Citizens Center, and the Parks and Rec Building, and the Teen Center The city has been trying, without success, to secure funding for construction of a swimming pool.

Parks and Rec cooperates with the high school, the Armory and the elementary school to sponsor regular activities in basketball, volleyball, soccer, aerobic dancing, exercise classes, weightlifting and open gym. Non-athletic programs include Boy Scouts, Girl Scouts, Cub Scouts, Senior Citizens and children's activities, and various arts and crafts skills. Occasionally Parks and Rec programs are pre-empted by activities of the building's owners. In order to avoid such cancellations, Parks and Rec is hoping to construct a multi-purpose recreation center. Figure 15 identifies recreation areas and facilities.

SENIOR CENTER
REGIONAL HIGH SCHOOL
BOWLING ALLEY
TEEN CENTER
ARMORY
PARK AND REC.
5
6
10
12
13

FIGURE 15

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Parks and Recreation Areas

● Indoor Recreational Facilities

Parks

CHARACTERISTICS		PARK	H MARKER LAKE 1	SANDPIT LAKE 2	21 ACRE 3	ASHA SUBDIVISION 4	PTARMIGAN 5	DALL 6	MISSION 7	BROWN SLOUGH 8	LOUSETOWN 9	HANGER LAKE 10	FIFTH AVE 11	WATERFRONT 12	LOUSETOWN 13
TYPE:	PLAYGROUND				●	●									●
	NEIGHBORHOOD					●	●	●	●		●		●		●
	COMMUNITY				●					●				●	
	RECREATION AREA		●	●	●							●			
ACCESS:	STREET ROAD		●	●	●	●	●	●	●	●	●	●	●	●	●
	WATER									●					
	TRAIL		●									●			
USES:	PASSIVE		●		●	●	●	●	●		●	●	●	●	●
	ACTIVE		●	●	●	●	●	●	●	●	●	●	●		●
	URBAN				●	●	●	●	●		●		●		●
	NATURAL		●									●			
STATUS:	EXISTING		●	●	●	●						●			
	PROPOSED						●	●	●	●	●		●	●	●
OWNERSHIP:	CITY			●	●	●	●	●			●		●	●	●
	PRIVATE		●						●						
	BETHEL NATIVE CORP.		●							●		●			

SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING

SCALE

0 1 MILE

The Preparation of this (map, document, etc.) was financed in part by funds from the Alaska Coastal Management Program and the office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, administered by the Division of Community Planning, Department of Community and Regional Affairs.

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SUBSISTENCE

The Yupik Eskimos inhabiting the Yukon-Kuskokwim Delta historically have depended on the abundance of fish and wildlife resources for their existence. Although there have been significant economic changes within the region, subsistence continues to be the economic mainstay of many Native communities and an integral part of the Yupik culture. Subsistence may play an increasingly important role in the Yukon-Kuskokwim Delta region with respect to potential changes in Federal and State government policies affecting employment, the management of resources, and economic development.

A community attitude survey relating to the culture and lifestyle of Bethel residents was conducted by Darbyshire and Associates in 1980. The results of the survey found that 60% of those surveyed participated in at least one subsistence activity. The major types of subsistence activities pursued were fishing, hunting, and berry picking. Outside of the survey local residents have expressed the importance of subsistence uses as a necessary supplement to their food supply. (Refer to Bethel Comprehensive Plan for details.)

The land and waters within the City's boundaries is extremely important to the community for subsistence activities (see Figure 16). Throughout the year fish are taken in the main river and its neighboring sloughs. Many tundra lakes and ponds also support fish populations, particularly blackfish, which provides a major source of food to some Bethel residents during several months of the year. Fox, muskrat, hare, ptarmigan, and waterfowl are obtained by various means of trapping and hunting throughout the Bethel area. While the fish and wildlife resources in the City of Bethel are used by many, some local residents prefer to hunt and fish further distances from town. With improved means of transportation more remote areas are accessible to subsistence users. Because moose and other big game species are found in forested areas upriver many individuals charter planes to those areas.

The following section summarizes the predominant seasonal subsistence activities in Bethel and the surrounding area.

Subsistence Activities

SUMMER	Pink Salmon Red salmon Coho salmon Chum salmon	Drift and set gill nets are used to harvest large numbers of salmon from the Kuskokwim River. The many fish camps located along the main river reflect the abundance of salmon resources in the Kuskokwim area.
AUTUMN	Whitefish Burbot or "lush" Pike Blackfish Coho salmon	After the salmon fishing season the salmon nets are set again and vast quantities of whitefish, pike, and blackfish are secured. Whitefish and other fish species are harvested in the tundra streams during their fall downstream migration.
	Waterfowl	Ducks and geese are available during the early part of the season.
	Berries	In early autumn blueberries, salmonberries, crowberries and low bush cranberries are abundant throughout the region.
	Small furbearers	The hunting and trapping of fur bearing animals begins with the first heavy frost of autumn. A large number of mink and muskrat are taken in streams and creeks on the delta using a "taluyuk" or small wicker fish trap. These traps are used primarily to trap blackfish in the tundra lakes and ponds of the delta. Hares, fox, beaver and land otter also receive subsistence trapping and hunting pressures during the fall and autumn.

WINTER	Small furbearers	The hunting and trapping of small furbearers continues until the short cold days of mid-winter. Around February trapping and hunting activities are resumed until late March and early April. The furs of small animals are valuable and represent an important source of income to village communities. In addition much of the clothing of the people of the Yukon-Kuskokwim is made from various skins.
	Whitefish Pike Burbot of "lush" Blackfish	During the winter months whitefish are a principal source of food to the people of the delta. Whitefish are harvested intensely in the main river with set gill nets under the ice or with the use of an "ice jigger." In the sloughs and tributaries of the Kuskokwim River subsistence fishing also occurs. Above the mouth of the Johnson River is particularly a popular area for subsistence whitefish fishing.
	Ptarmigan	Ptarmigan are taken during the winter principally by hunting with rifles, although snares are occasionally used.
SPRING	Muskrat	Muskrat are abundant throughout the delta and are hunted primarily in the spring. In early spring the tundra lakes and ponds are still frozen and muskrat are commonly taken by trapping the "push-up" habitats. As the lakes and ponds begin to thaw most muskrats are hunted with rifles.

SPRING	Blackfish Whitefish Smelt King salmon	Immediately following breakup whitefish are moving back into the summer feeding habitats outlying the Kuskokwim River. Fish fences are set across streams and whitefish are removed with dip nets. There is a large subsistence effort for harvesting sheefish as they migrate up the main river to spawning locations. Great quantities of smelt are taken in the main river with dip nets during an annual spring run. Throughout the region blackfish are taken by means of wicker fish traps ("taluyuks") which are set in small streams and shallow lakes and ponds on the tundra. The king salmon run commences in early May and continues to be predominately utilized for subsistence needs.
	Waterfowl Ptarmigan	Spring hunting of migratory waterfowl plays a significant role in the economy of most villages. While fishing is the principal source of food in the villages, waterfowl hunting and egg gathering is practiced every spring. Bethel is physically distant from the best waterfowl hunting areas, more intensive hunting occurs near the villages.
	Wood gathering	Immediately following breakup many residents of Bethel travel upriver to gather wood on shore or floating in the river. This has become an increasingly important activity as the price of heating fuels increase.

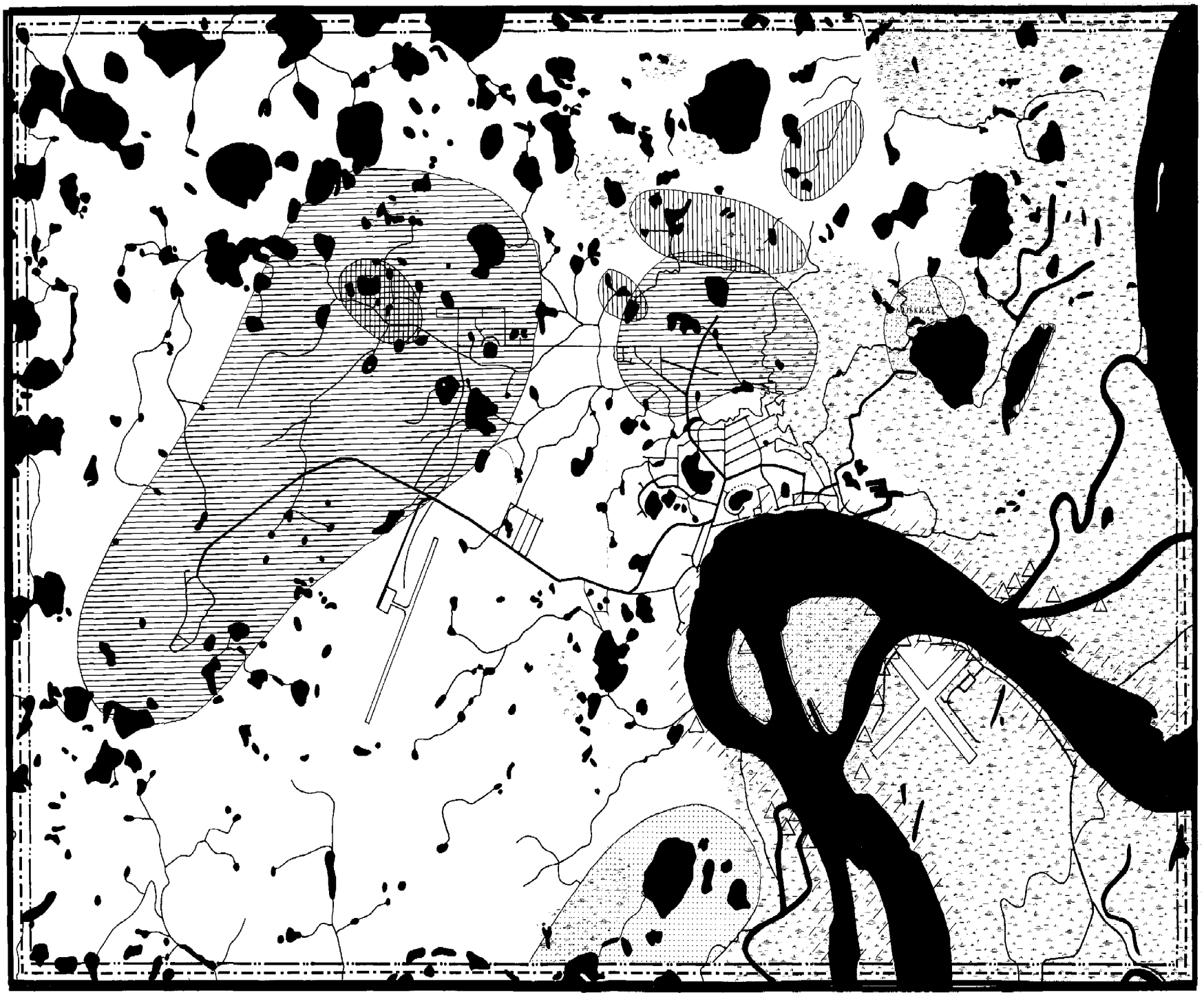
ABERRAT

FIGURE 16

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Subsistence Harvest Areas

Salmon and Whitefish Harvest (Intensive)

Known Blackfish Trapping

Summer Fish Camp

Waterfowl Hunting (Light)

Small Game Hunting

FOX

Identified Hunting area

Berry Picking

Popular Picking Site

SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING

SCALE

0 1 2 MILES

The Preparation of this (map, document, etc.) was financed in part by funds from the Alaska Coastal Management Program and the office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, administered by the Division of Community Planning, Department of Community and Regional Affairs.

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POPULATION

Bethel has experienced tremendous population growth over the past two decades. Much of the population growth in the 1960's was attributable to a high birth rate. As the birth rate declined in the late 60's and early 70's, immigration to Bethel from surrounding villages and from the outside became the dominant source of population growth. As the number of outsiders coming to Bethel increased, Bethel changed from a predominantly native community (90%) in 1960, to a community comprised of 1/3 non-natives by 1980. The following two tables illustrate population growth and birth rate of Bethel for the past 20 years.

TABLE 9

Bethel Population Growth, 1960-1980

	1960	(Fraction of Total)	1970	% Change	1980*	% Change
Native	1132	(.90)	1879	(.78)	66	2417 (.68)	29
Non-Native	126	(.10)	537	(.22)	326	1159 (.32)	116
Total	1258		2416		92	3576	48

Sources: U.S. Bureau of Census
Alaska Department of Labor

TABLE 10

Birth Rate, Bethel Region 1960-1981
(Births Per 1000 Population)

Year	Bethel Region*	City of Bethel
1960-1966	47.2	Not available
1970-1977	25.6	Not available
1978-1981	23.25 a/	29.9 a/
1978	19.5	23.0
1979	21.0	25.6
1980	24.5	33.1 a/
1981	28.0 a/	38.0 a/

a/ Preliminary estimate
* Defined by P.H.S. Hospital as the Yukon-Kuskokwim Delta Service Unit. Includes majority of Calista Region and small parts of Nana and Doyon.

Source: Alaska Dept. of Social and Health Services (MCH Family Planning Office-Bethel)
Darbyshire and Associates

The federal census of 1980 was disputed by the City. In early 1982 the City conducted a census to re-check population numbers. Preliminary results show that the growth in Bethel may be leveling off, as the population count was very close to the federal census. (City 1982: 3,494 people. Federal 1980: 3576.) The city survey also indicates that there has been a shift in the percentages of Native (51%) and non-native (49%) residents. Table 10 indicates that the sharp decline of the Bethel birth rate has leveled off and is rising again. The phrase "baby-boom" is once again quite popular in Bethel.

Bethelites are less crowded today than in 1970. The average number of persons per housing unit fell from 4.5 in 1970 to 3.26 in 1980.

The age and sex distribution of Bethel is atypical when compared to Alaska as a whole. Table 11 illustrates the differences.

TABLE 11

Bethel Median Age and Sex Distribution as Compared to State

	1970		1979*	1980
	Bethel	State	Bethel	State
Male (%)	49.7	54	48.3	53
Female (%)	50.3	46	51.7	47
Median Age (Both Sexes)	18.0	23.1	22.9	26.1

Source: U.S. Bureau of Census
* Source: Darbyshire and Associates

Population Growth

Since 1950, Bethel has experienced a substantial increase in population, with the number of people nearly quadrupling between 1950 and 1980. The period between 1970 and 1980 saw an additional increase of nearly 50%. More recently, population growth has slowed.

TABLE 12
Population Growth

Year	Population	% Increase
1950	650	
1960	1258	93.24
1970	2416	92.05
1980	3576	48.01
*1982	3494	-2.00

*Preliminary results, City of Bethel Census
Source: U.S. Bureau of the Census

The major factor influencing growth in Bethel is job opportunities. To a lesser degree, the availability of government services, particularly health care, is another factor that brings people to Bethel.

The 1980 population, determined by the U.S. Bureau of the Census, is 3576. This is a relatively small population base and is subject to significant increases or declines as the result of external factors. These include changes in government policy, namely support for CETA, service agencies, the PHS Hospital and capital projects; major regional development, which potentially includes forest and agricultural products and mining and petroleum activity (largely predicated on the proposed Yukon-Kuskokwim crossing); and the normal growth that is occurring in the region, for which Bethel serves as a commercial center.

The City conducted its own census in 1982. Preliminary results show a leveling off of the growth rate, with a total population of 3494. However, statistical analysis shows that no valid statistical population prediction can be made from the city census information.

Given the lack of strong emerging trends to use as a base for population forecasts, until such indicators become firm, Bethel must be considered to

be at a "cross-roads" in time. Some qualified assumptions have been postulated to represent a forecast base, which are provided in the following table. These represent a range of non-enumerated possibilities that could occur depending on the degree of influence from the factors cited in the above paragraph.

TABLE 13
Population forecasts - 1990

Assumptions	1990 Population
Substantial Federal budget reductions without supplemental State funding or private sector investment - 25% growth for the decade	4470
Government funding and private sector investment remain constant with the previous decate - 48% growth for the decade*	5293
Government funding remains constant but a moderate increase in private sector investment - 78% growth for the decade**	6365
Government funding is moderately increased but private sector investment doubles - 96% growth for the decade***	7009
Government funding is substantially increased in conjunction with private activities and private sector investment quadrouples - 200% growth for the decade	10728

* The same growth rate as occured between 1970 and 1980
** The growth rate that occured between 1950 and 1980
*** Double the growth rate that occured between 1970 and 1980

LABOR

Several state and private sources were studied while attempting to determine accurate employment figures for Bethel. Alaska Department of Labor employment figures have shortcomings in that they are extrapolations based on 1978 population estimates for the entire southwest region, and estimates of unemployment are invariably low in rural areas. Because distribution of population and employment varies widely within the southwest region, the state figures were deemed inaccurate. A 1980 survey by Alaska Consultants contacted every business in town, and is felt to be the most accurate representation of present employment levels in Bethel.

Employment

Table 14 illustrates 1980 average annual fulltime employment. Highly seasonal industries such as fishing, construction, and manufacturing (mostly fish processing) are concentrated in a 2 - 3 month span so that the actual peak employment in these industries is several times greater than the average for the entire year. Seasonal employment has been estimated to have a summer peak of 117% of the average annual employment and a winter low of 78% of the average annual employment (Darbyshire and Associates).

TABLE 14

1980 Average Annual Full-time Employment

Industry	Employment	% of Total
Fishing	30	1.8
Construction	93.5	5.5
Manufacturing	14	0.8
Transp.,Comm., and Util.	240.5	14.2
Retail Trade	238	14.1
Finance, Insurance, and Real Estate	24	1.4
Service	255	15.1
Total Government	796	47.1
Federal	303	17.9
State	200.5	11.9
Local	292.5	17.3
TOTAL EMPLOYMENT	1691.0	100.0

Source: Alaska Consultants

The most significant change in Bethel employment since 1980 has been in the government sector. Federal budget cuts have been responsible for the loss of at least 120 jobs, largely in the state and federal CETA programs (Refer to Government Analysis section).

The 1980 Alaska Consultants survey did not estimate total work force or unemployment. The Bethel Comprehensive Plan estimated 1978 unemployment at 15% (Darbyshire and Associates). The Alaska Department of Labor estimated unemployment for the Bethel census division in September, 1981 at 10%. However, a January, 1981 survey conducted by the Association of Village Council Presidents of the Wade Hampton census division (directly north of Bethel) discovered an unemployment rate of 24.7% as compared to the official Department of Labor estimate of 13.2% (ADOL). The same survey estimated the size of the labor force based on a broad definition that included "discouraged" workers, and estimated unemployment at 48.8%. This survey serves to emphasize the shortcomings of the Department of Labor estimates.

Income

The Bethel census division (about 10,000 people) has a far higher cost of living and a far lower per capita income than the rest of Alaska or the United States.

TABLE 15

1978 Per Capita Income and Family Budget Requirements Bethel Census Division as Compared to Alaska and the U.S.

	Per Capita Income ($)
Bethel Census Division	4,970
Alaska	10,851
Ratio: Bethel Census Division to Alaska	.46
U.S.	7,810
Ratio: Bethel Census Division to U.S.	.64

	Family Budget Requirements for Moderate Standard Living
Bethel Census Division	40,782
Alaska	28,942
Ratio: Bethel Census Division to Alaska	1.41
U.S.	18,622
Ratio: Bethel Census Division to U.S.	2.19

Source: Alaska Department of Commerce and Economic Development

Average household income and per capita income in Bethel varies significantly between Natives and Non-Natives.

TABLE 16

1979 Average Annual Income - Natives and Non-Natives City of Bethel

	Households ($)	Median Household Size	Per Capita ($)
Natives	17,500	4.2	4,170
Non-Natives	26,700	2.7	9,889
TOTAL	21,300	3.5	6,085

Source: Darbyshire and Associates

LAND OWNERSHIP

Land ownership in Bethel has changed dramatically with the passage of Alaska Native Claims Settlement Act (ANCSA) in 1971. 1982 land ownership is depicted in Figure 17 and in the pocket fold-out. Under section 12(a) of ANCSA the Bethel Native Corporation was authorized to select 160,280 acres of "unreserved and unappropriated federal lands" within the immediate area of the village townsite. On January 12, 1979 the Bethel Native Corporation received interim conveyance to 130,323 acres in the Bethel area. This amount included 14,421 acres within the corporate city limits, approximately forty four percent of the community's total land area (Darbyshire and Associates).

The Bethel Native Corporation has completed a land management study encompassing the village corporation lands within the city limits, and is presently addressing the ANCSA section 14(c) reconveyances. Section 14(c) provides that the village corporation reconvey ANCSA conveyed lands that were occupied prior to the December 18, 1971 settlement of the Native land claims.

Under section 14(c) 1 and 2, the village corporation is required to reconvey land to individuals and non-profit organizations who utilized village corporation selection lands, prior to ANCSA, as a primary place of residence, business, subsistence camp, headquarters for reindeer husbandry, or nonprofit uses. The Bethel Native Corporation Board of Directors established February 26, 1982 as the deadline for filing an application for the reconveyance of land under the provisions of 14(c) 1 and 2.

Section 14(c) 3 provides that the village corporation reconvey not less than 1,280 acres to the municipality. As amended by the Alaska National Interests Lands Conservation Act (ANILCA) of December 2, 1980, the amount of land received by the city may be less than 1,280 acres if an agreement can be achieved between the city and the Bethel Native Corporation. The two parties are just beginning to negotiate the municipal reconveyance.

The second major land ownership category is the Native allotment lands, held in trust by the Federal government. Prior to ANCSA Alaskan Natives who had applied and were eligible under the provisions of the Native Allotment Act of 1906 and subsequent amendments were granted up to 160 acres of land. When it became apparent that section 18(a) of ANCSA would repeal the Native Allotment Act, thousands of Native allotment applications were filed to the Department of Interior, Bureau of Land Management (BLM). Because of the enormity of Native allotment applications, the process to approve the applications was incredibly slow. To expedite the process Congress approved a Native allotment amendment, under section 905 of ANILCA.

With the passage of ANILCA all uncontested Native allotment applications were automatically approved. An approved allotment is an allotment held in trust by the Federal government. The land may not be developed, sold or leased without the authorization of the Secretary of Interior, and is not subject to State and local jurisdiction including property taxes.

The majority of Native allotments in Bethel have been legislatively approved under the Native Allotment Act or under section 905 of ANILCA. However, there are still several Native allotment applications which have been protested and are pending approval. The Bethel Native Corporation is responsible for the protest of fourteen Native allotment applications to which Bethel Native Corporation is seeking title under ANCSA. The City is also protesting one Native allotment application. The approval or denial of the disputed Native allotments is the decision of the BLM.

When the allotments have been legislatively approved they must still be verified by a BLM adjudicator to make sure the allotment boundaries are correct and there hasn't been any overfiling. Once the property has been adjudicated and approved the land deed is "certified" by the BIA who transfers the restricted title to the individual. The definition of "restricted" asserts that the property is held by the individual and pursuant to Federal codes and regulations. The land is exempt from property taxes, although Bethel presently does not have property taxes.

The title status may be modified to "unrestricted" or fee simple with the approval of BIA or once the property has been sold to a non-native. An unrestricted title allows the owner to develop the property in the same

manner as private property, which means property is subject to State and local jurisdiction including property taxes.

The certification of Native allotments has been at a snails pace and as of February 1983 only ten Native allotments have received a certificate of title (AVCP Realty). As much of the Native allotments encompass suitable lands for development, the certification of future allotments will have considerable implications on the permanent land use patterns in Bethel.

In addition to the certified allotments, other privately owned lands include all land held in unrestricted status and restricted Native townsite deed properties. Private land ownership comprises 2,609 acres, approximately eight percent of the community's total land area (not including BNC's land).

According to Darbyshire and Associates, State and Federal governments own 1,099 and 600 acres of land, respectively. The 1,055 acre airport site comprises the major portion of State owned lands. Federal lands include the Federal Aviation Administration site, Public Health Service hospital site, Bureau of Indian Affairs site, and the old BIA headquarters. In addition, the Federal government owns the surface rights of all navigable waterways. The bottom surface rights of navigable waters are retained by the State. There are approximately 3,389 acres of navigable waters in Bethel. (Darbyshire and Associates).

The City of Bethel presently owns approximately 985 acres of land within the City limits (Stigall). The City anticipates the acquistion of additional lands from the Bethel Native Corporation under section 14(c) 3 of ANCSA. The City is also negotiating with a Native allotment holder for the conveyance of some 88 acres west of the City subdivision (Stigall). A summary of the land ownership in Bethel is provided in the following table:

TABLE 17

Summary of Bethel Land Ownership *, 1982

Land Ownership	Acres	Percent
Bethel Native Corporation	14,200	43.5
Native Allotment Applications (pending certification)	9,758	29.9
City of Bethel	985	3.0
Other Private (including certified Native allotments)	2,609	8.0
Federal	600	1.8
State	1,099	3.4
Navigable Waters	3,389	10.4
Total Bethel City Limits	32,640	100.0 %

* The land ownership figures are approximate as land ownership is presently undergoing change.

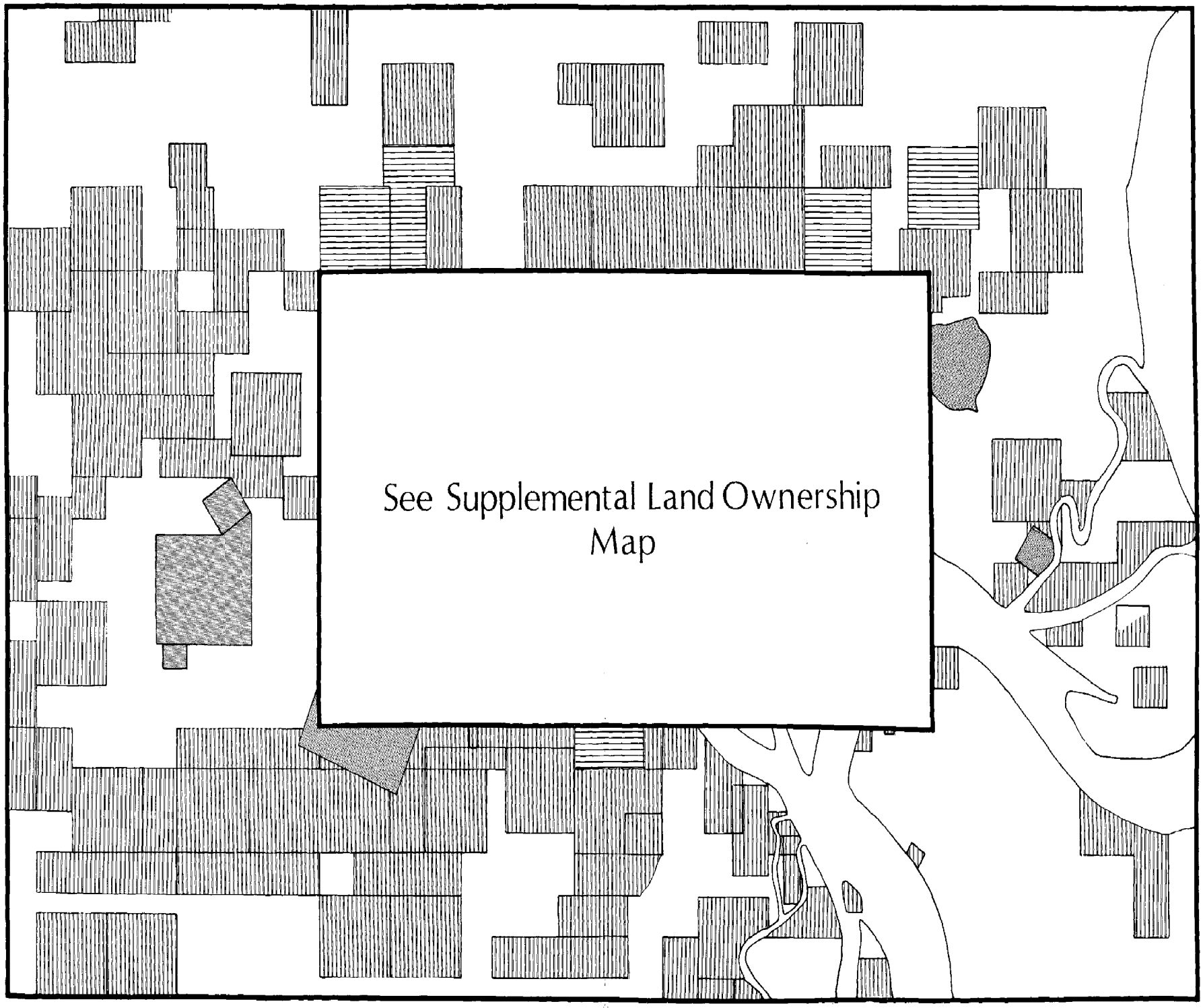
See Supplemental Land Ownership Map

FIGURE 17

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Land Ownership

Bethel Native Corporation

Pending Native Allotment

Certified Native Allotment

State, Federal, and Other Private

SCALE

0 1 2 MILES

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LAND USE

The three major determining factors of land use in Bethel are the terrain, the Kuskokwim River, and land ownership. Most of Bethel is located on moist or wet tundra and few areas are suitable for urban-type development. Land users along the Kuskokwim River must be constantly aware of river movement and erosion. Land ownership in Bethel is very unclear with over one-third of the land area in Bethel classified as pending native allotment applications.

The unclear land ownership has potentially dramatic effects on land use and development. An episode in early 1983 highlights this possibility. A pending native allotment was discovered within the project area of the small boat harbor immediately prior to startup of construction. The project was almost cancelled, but the City was able to negotiate with the allottee and the BIA, and removed the claim.

Urban land uses have been grouped into the following catagories, as defined by the 1980 Bethel Comprehensive Plan (Darbyshire and Associates).

Commercial - Includes all types of businesses that provide services or sell goods, but do not manufacture the items they sell. This includes private offices, and public offices whose land use is similar to private offices. Alaska Department of Health and Social Services, Yukon-Kuskokwim Health Corporation, and the Association of Village Concil Presidents offices would be considered a commercial use, while the city center complex in considered a public institutional use.

Industrial - Uses that require complete use of the land for their own purposes, do not mix well with other uses, require transport of goods and materials by heavy truck, air, or barge, create physical hazards if open to public access, and may have some negative noise, dust, drainage, and visual impacts on adjacent property. Some industrial uses include manufacturing and construction, docks, warehouses, storage yards, fish processing and cold storage plants, the power plant, the sewage plant, and the airport.

Residential - Includes homes, duplexes, apartments, and mobile homes.

Public Institutional - Public or government uses not defined as commercial uses. Examples include the hospital, schools, churches, the city center complex, and the solid waste disposal site.

Public Open Space - Open areas with few if any structures that have been designated for a public use or purpose. Includes parks, cemeteries, greenbelts, or drainage easements.

Often land use is mixed, such as a store with apartments above it or a business operating out of a person's home. In such cases, the land use was designated as what was judged to be the primary use. E.S.E. has updated the 1980 land use survey by Darbyshire and Associates. Land use, as of February, 1982, is summarized in Table 18.

TABLE 18

Bethel Land Use - 1982

Land Use	Acres	% of Total	% of Developed
Commercial	39	0.1	1.9
Industrial (minus Airport)	159	0.5	7.8
Industrial (Airport only)	1055	3.2	51.6
Residential	328	1.0	16.1
Public Institutional	267	0.8	13.1
Public Open Space	195	0.6	9.5
Undeveloped	30,597	93.8	----
TOTAL AREA - CITY OF BETHEL	32,640	100.0	100.0

Source: Darbyshire and Associates
Environmental Science and Engineering

UTILITIES

Electrical Utility

The electrical power in Bethel is generated by Bethel Utilities Corporation, a privately owned utility. The power facility, located behind the Public Health Service Hospital, operates four 2,100 Kw diesel generators which have a combined installed load capacity a 8,400 Kw. Bethel Utilities Corporation serves approximately 1,416 customers, an annual increase of 10% since January 1981. The average load during the summer is 2,500 Kw and 2,700 Kw during the winter. The power facility is capable of handling the existing peak load and could easily accommodate 50% increase in demand. The power lines are fairly new and are reported to be in good condition with the exception of a few short spans in the older parts of town.

Recently, Bethel Utilities initiated a waste heat project which will deliver the waste heat generated by the power plant to the Public Health Service Building and its housing. Construction of the project will begin in January (1982) and completion of the project is anticipated in September. It is also very likely that Bethel Utilities will include the City Complex, KYUK and Kuskokwim Community College in their waste heat plans, however a final agreement must be achieved between the City and Bethel Utilities.

Water Utilities

The water supply in Bethel is derived from wells drilled 350-450 feet through permafrost (Darbyshire and Associates). At the present time the ground water sources are the only reliable potable water supply due to the extensive treatment necessary for surface water sources in the area. Although several service organizations and residences obtain water from private wells, the majority of the water supplied to the community is derived from the City-owned wells. Water is distributed in the community by a piped system and a hauled system.

The City owns and operates two wells located at the Bethel Heights utility building and adjacent to the City complex. The Bethel Heights well supplies water to the Bethel Heights piped system and the City hauled system.

The average consumption is 23,000 gallons per day for the hauled system and 60,000 gallons per day for the piped system. Peak water consumption is 30,000 gallons per day for the hauled system and 70,000 gallons per day for the piped system (Bethel Public Works). The well has an estimated pumping capacity of 350 gallons per minute. The pumphouse contains two tanks with a storage capacity of 120,000 gallons.

The well adjacent to the City complex supplies water to the Municipal buildings in the immediate area. The City does not meter water consumption from this well. The pumping capacity of the well is reported to be 150 gallons per minute. Water is stored in a 130,000 gallon tank with 60,000 gallons on reserve for a fire protection system.

Water derived from both wells is treated with chlorine and samples are tested every week and a half to ensure good water quality (Bethel Public Works).

The Bethel Heights piped system was originally constructed underground. In 1975 a fire destroyed the Bethel Utilities power plant which eliminated the heating source to the piped system and caused the pipes to freeze and break. Bethel was declared a "National Disaster" area and the Army Corps of Engineers rebuilt the system above ground for $6,000,000. While the Bethel Heights and City complex piped systems appear to work well, the exorbitant construction and maintenance costs of the system preclude further expansion. The present system serves two hundred hook-ups (Bethel Public Works).

The majority of Bethel residents will continue to depend on the hauled water system. The Bethel Public Works Department operates four water trucks, each with a 3,500 - 4,000 gallon water holding capacity. Water is delivered on an average of once per week, although service is available up to four times per week. The Public Works Department has indicated that the service rates are subject to change due to increasing maintenance costs, and the Department will be initiating a rate study this year.

Sewage Utility

The sewage disposal system provided by the Bethel Public Works Department consists of a piped system and a hauled system. The sewage collected by these systems is treated at the sewage lagoon, located north of the regional high school.

The main piped system originates at the Public Health Hospital (PHS) and extends approximately 9,000 feet to the sewage lagoon (Darbyshire and Associates). Connected to the main line are several tributary lines which serve the City complex, Kuskokwim Community College (KCC), Kilbuck Elementary School, the Bethel Native Corporation apartments and dormitory, and the regional high school.

The piped system is an above-ground arctic insulated utilidor with six lift stations. The lift stations are located at the Kilbuck Elementary School, PHS Hospital, Bethel Heights subdivision, City subdivision, and the pump-house (Figure 18). The piped system is in fair condition, however the lift stations are subject to corrosion and there are occasional "freeze-ups" in the sewer line (Bethel Public Works).

The Bethel Sewage lagoon was constructed in 1969 by the U.S. Public Health Service to serve the Bethel Heights subdivision. The volume of the lagoon is 3,397,700 cubic feet from its operating depth and the water surface area is approximately twenty-one acres (Darbyshire and Associates). Darbyshire and Associates, in 1980, estimated the hydraulic load on the sewage lagoon as 124,300 gallons per day. This figure included both piped and hauled sewage collection. According to the Bethel Public Works Department the sewage lagoon is projected to meet the community's needs through 1990.

Additional sewage treatment systems in Bethel are privately owned and operated by the Bureau of Indian Affairs (BIA), Kuskokwim Inn, Federal Aviation Administration (FAA), Wein Airlines and the trailer court (Alaska Consultants).

The City's hauled system consists of honey bucket collection and "septic tank" (holding tank) evacuation. The holding tank system is utilized in conjunction with honey buckets, chemical and flush toilets. The Bethel Public Works Department operates two honey bucket and two septic evacuation trucks, each with an estimated holding capacity of 25,000 gallons. Honey-bucket service is provided at least once a week. Holding tank evacuation can be provided weekly, and many customers receive service "on call". In November 1981 the Public Works Department provided honey bucket collection for 420 customers and sewage evacuation for eighty-three customers (Bethel Public Works). As the piped sewer system is extremely costly to construct, Bethel residents will continue to depend on the hauled system. The increasing demand for services will necessitate the hiring of additional personnel.

The remaining businesses and residences who choose not to be serviced by the City, employ other methods of sewage disposal. These methods include private collection and sewage treatment systems, chemical toilets, and the dumping of honey buckets into the lagoon or along the river bank.

Solid Waste

The Public Works Department provides refuse collection and maintains the solid waste landfill site. The refuse collection service consists of a dumpster program and a limited street collection for private residences and businesses.

The Dumpster program was initiated in 1980 in an effort to reduce the cost of refuse collection in the community and control the use of the landfill site. At present there are approximately sixty dumpsters provided for residential and commercial users throughout the City. All residential users are charged $7.50 per month for the dumpster service. Dumpsters may also be indivdually leased on a weekly, monthly or yearly basis. An additional twenty-five dumpsters are scheduled to arrive this year (Bethel Public Works).

The limited collection service is provided to approximately thirty homes and several businesses. Refuse is collected twice a week and the cost of the service is fifteen dollars for residences and thirty dollars per month for commercial use. The Bethel Public Works Department operates two trucks for refuse collection and dumpster containers.

The Bethel sanitary landfill site is a ten-acre open site located directly east of the sewage lagoon. To avoid unnecessary burning and scattering of waste, the land fill site has been closed to the public with the exception of fifteen permit holders who are authorized to use the site. Maintenance of the landfill site is provided by the City and consists of spreading and covering the refuse with a small track dozer.

The Bethel Department of Public Works intends to eliminate the major problems with operating a landfill site through the use of a thermal incinerator. The thermal incinerator would be installed subsequent to construction of the new public utilities maintenance facility (Bethel Public Works).

TWO WATER TANKS 120,000 Gal.

FIGURE 18

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Utilities

- Water
- Sewer
- Proposed Sewer
- Lift Station
- Pump House
- Sewage Lagoon
- Sanitary Landfill
- Electricity

SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING

SCALE

0 1 MILE

The Preparation of this (map, document, etc.) was financed in part by funds from the Alaska Coastal Management Program and the office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, administered by the Division of Community Planning, Department of Community and Regional Affairs.

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Public Works

The Public Works Department, located in the Braund building, consists of the utility office and utility maintenance shop. The quonset hut, located behind the Braund building, houses the road maintenance shop and provides storage space for equipment. At present the existing facilities are not adequate for the current services provided to the community. The construction of a new utility maintenance facility has been approved by Bethel voters and construction is scheduled to begin in Fall, 1982.

In addition to the utility services, the Bethel Public Works Department provides for the construction and maintenance of streets, roads, boardwalks, drainage improvements and parks; and the maintenance of vehicular and stationary equipment and overhaul of all city-owned facilities. The Public Works Department is also responsible for the management and operation of the dredge and tender, which was acquired last summer. Dredging operations will be provided to the villages along the river as well as Bethel.

Local roads and streets in Bethel are constructed of sands, silts and gravels and are generally 20-30 feet wide. The maintenance of streets and roads is difficult due to unfavorable weather conditions, and consequently roads and streets are generally in poor condition. The need to upgrade and maintain local streets and roads is prevalent throughout the City, with major problems occuring at Fifth Avenue, Sixth Avenue, Seventh Avenue, Ptarmigan, Tundra Ridge and Hanger Lake roads, and East Avenue in Lousetown (Bethel Public Works).

The six mile paved road or "Airport Road" is maintained by the State Department of Transportation and Public Facilities.

Natural drainage patterns are invariably disrupted with the construction of roads and other urban land uses. Major drainage problems occur at Fifth Avenue, Ptarmigan and City subdivisions (Bethel Public Works). To divert runoff away from subdivisions and off local streets, the Public Works Department installed several culverts last summer. Additional culverting is planned throughout the City.

During the summer, favorable weather conditions permit the Public Works Department to accomplish new construction and repairs to roads, streets and boardwalks. To accommodate the increased work load during the summer, the hiring of additional personnel is essential.

GOVERNMENT POLICY ANALYSIS

There are numerous government policies at the local, State and Federal levels that have a potential effect on Bethel. Listed below are the policy categories that are most likely to influence life in Bethel, either through the continuance or withdrawal of the policy. All but two of the policy categories represent funding programs. The two exceptions are subsistence use and home rule charter for Bethel, though these have major economic considerations.

Housing

The Office of Management and Budget has recommended the termination of HUD funds which financed Indian, public housing, and housing assistance payments. However, the House must make its own recommendation which may include to maintain funding at its present level. If the HUD funding is approved 4,000 homes will be constructed nationwide. Funding for the construction of 600 homes will be appropriated to the State of Alaska. The Association of Village Council Presidents (AVCP) Regional Housing Authority has submitted applications to HUD for the construction of 250 homes within the AVCP region. Bethel is listed as the number one priority in the region, and if funding is maintained the construction of seventy homes will begin next year.

HUD loan insurance programs are available but due to uncompetitive business rates and extensive application requirements (for lending institutions), these are not being utilized.

The Alaska Housing Finance Corporation (AHFC) has a low income and regular loan insurance program which is currently in effect and is expected to remain so in the future. Through the AVCP Regional Housing Authority between sixty and seventy homes have been assisted by the AHFC program since its initiation in the summer of 1979. Seventy percent of the homes financed were new construction.

The BIA Housing Improvement Program (HIP) is currently providing funds for rennovations and upgrading existing homes. The Bureau is no longer

financing the construction of new homes through HIP. Services to Natives are provided through BIA and AVCP. While HIP is funded through FY-83, future funding is uncertain at this time.

The Farm Home Administration low income housing program is also still available for single-family residences.

Employment

The Federal government has withdrawn funds for its CETA (Comprehensive Employment Training Act) program which has affected both the State CETA and AVCP employment training programms considerably. The AVCP program has received a 72% reduction in authorized funds, and further reductions are anticipated.

Although the State is continuing its CETA program, the program has made major revisions due to the federal reductions, resulting in a 62% funding decrease. It is difficult to determine how the State CETA program will be supported in the future, though it is likely that without the legislative approval of the proposed State Jobs bill the State CETA program will be terminated in Bethel. The impact of the discontinuance of the CETA program has been a considerable loss of badly needed employees for public agencies and non-profit organizations in the community.

A major employer in Bethel is the PHS hospital. Federal support has already been reduced at this facility and further cuts may be made in the future. Not only will this result in a loss of jobs for residents, but it will also reduce the level of commerce for Bethel businesses, which is generated from both local people and outsiders who work or use the hospital.

Economic Development

The major federal economic program that supported community economic development projects was administered by the Economic Development Administration (EDA). This program has subsequently been terminated by the Federal government. A Federal program still in effect is the River and Harbor Improvements Program, which is administered by the U.S. Army Corps of Engineers. With the exception of annual allocations for maintenance, each capital project requires a Congressional appropriation. Furthermore, these

projects are prioritized on a list provided by the District Engineer, which means it might take years or decades for a project to be funded. Funds for proposed capital projects in Bethel such as the seawall, cultural convention center, recreation center,and transshipment dock may have to come mostly from State legislated appropriations, or combinations of State and private funding.

In addition to community developmment projects, Federal and State policies and funding programs influence major regional economic developments. Policies and programs which will likely affect Bethel's economy include petroleum exploration and development, mining activities, and reindeer husbandry.

Additional oil-related revenues to be gained by the State will depend on the successful exploration and development of oil reserves through Federal and State lease sales. Resource development in lease areas close to Bethel will undoubtedly impact the Bethel economy, however the degree of the impact depends on the recoverable resource which is highly speculative at the present time. Further analysis of Outer Continental Shelf petroleum exploration is provided in the economic section of this report.

Future State policies that encourage the exploration and development of mineral and alternative energy resources, such as coal, may increase mining activities in the Yukon-Kuskokwim region. If mining activities dramatically increase in the Kuskokwim area, Bethel would likely become a major transportation and service center for the export of raw mineral products.

There has been a growing interest in the development of reindeer husbandry in the Yukon-Kuskokwim region. Orutsararmuit, the Traditional Village Council in Bethel, is currently seeking funds from the State to finance a study on the economic viability of reindeer herding in the Calista region.

Environmental Quality

The major issue in Bethel concerning environmental quality is sewage disposal. Federal money provided through the U.S. Environmental Protection Agency has mostly been eliminated. Again the only probable source of funding will come from a State legistated appropriation. However, the U.S. Farm Home Administration has limited funds for community water and sewer systems.

A related State policy in the form of enforcement of standards is found in the Alaska Department of Environmental Conservation (ADEC). ADEC has informally notified the City of Bethel that a more acceptable means of sewage treatment disposal will have to be provided in the future. This situation will undoubtably have to be addressed in the near future.

Another environmental policy issue is found in the U.S. Army Corps of Engineers responsibility to issue permits for development in wetlands. The entire area within the City's boundary is considered wetlands. See wetlands discussion for more details on this issue.

Subsistence

The Alaska State Subsistence Law (1978) established that the State's fish and game resources were to be managed to give subsistence use the highest priority when the resource cannot satisfy all uses. An initiative was on the fall 1982 ballot to repeal the subsistence priority law. If the initiative had passed, subsistence use would have lost its priority standing. This measure was defeated by the voters by a comfortable margin.

Home Rule

A policy concern that has become a local issue is the proposed change from a second class city to a home rule city. In summary, the following changes would result:

1. The City would have to assume responsibility for public education. (It is assumed that State funds are adequate for public school support for the next five years.)

2. The City would have increased taxing powers.

3. The City would be required to adopt a comprehensive plan, zoning ordinance, and subdivision ordinance.

4. The City could exercise eminent domain by ordinance.

5. Should a borough be formed, the City would automatically have a representative on the assembly.

Home rule would provide with more flexibility and autonomy in governing its affairs, but it would also mean accepting new responsibilities.

ECONOMIC ACTIVITIES

TRANSPORTATION

Air Transport

Three areas in Bethel are used for aviation activities: the Bethel Airport, Hanger Lake, and the Kuskokwim River. Some air taxi and charter operators maintain offices on the riverfront as well as at the airport. The river is preferred by many passengers because of the convenient location next to town. Delaire Charter Service and Bush Air conduct most of the aviation business on the river. The two company's estimates of total flights and percent of operations that occur on the river is as follows:

TABLE 19

Selected Aircraft Activity on Kuskokwim River

	Total Flight Operations	Estimated % of Operations on the River
Delaire	3000	45%
Bush Air	1600	75%

Hanger Lake is preferred by many operators during inclement weather when tying down on the river becomes hazardous (Alaska Department of Transportation and Public Facilities).

The Bethel Airport is located approximately three miles west of the center of Bethel. The state owns the 1055 acre site, half of which is in use. The main runway is a hard surface, precision instrument runway, with a length of 6400 feet and width of 150 feet. The gravel cross-wind runway used by small aircraft is 1850 feet by 75 feet. Short-term plans exist for paving the apron adjacent to the cross-wind runway and associated taxiways, the North general aviation apron and associated taxiways, and the parking lot. Long-term development plans include resurfacing the runway, extension of the cross-wind runway, paving several aprons, expanding the passenger terminal, designating an area for fuel storage, and designating a transient parking area for light aircraft.

Passenger service from Anchorage is provided twice daily by Wien Air Alaska and five times weekly by Sea Airmotive. In addition, Alaska International Air operates cargo flights five times weekly and several air charter and air taxi services operate in Bethel.

The Bethel airport currently ranks third in Alaska in total flight services and in civilian airport operations by certificated route air carriers. Table 23 summarizes activity at the Bethel airport.

TABLE 20

1980 Bethel Airport Activity

		% Increase 1978-1980
Total Flight Services	257,249 (1981)	11.1 (1977-1981)
Airport Operations	8,729	28.0
Enplaned Passengers	40,796	10.9
Total U.S. Mail (Tons)	3,276	Not Available
Total Cargo and Mail (Tons)	6,021	30.2

Sources: Civil Aeronautics Board, Anchorage
FAA Flight Service Station, Bethel

In 1979, the Alaska Department of Transportation and Public Facilities (DOTPF) projected growth of Bethel air traffic based on the growth rate from 1972 to 1976. The accuracy of the projections was mixed. Table 21 compares the DOTPF projections with the actual growth rate from 1978 to 1980.

TABLE 21
Bethel Air Traffic Growth and Growth Projections

	1979 DOTPF Projection	Actual Annual Growth: 1978-1980
Total Flight Services	17.6	2.7 (1977-1981)
Airport Operations	9.0	13.1
Enplaned Passengers	7.5	5.3
Total Cargo and Mail	9.7	14.1

WATER TRANSPORT

Present Port Facility

The Bethel port facility is owned by the State of Alaska, leased by the City of Bethel, and operated by Kuskokwim Transportation, a private company. The general cargo dock and staging area is constructed of four circular sheet steel pile cells, providing a working frontage of 240 feet (Galliet and Silides). During the summerof 1982, the dock was extended up Brown Slough for a length of 400 feet. The Brown Slough segment is used for transshipment of cargo onto river barges. The dock can accommodate only one ocean-going barge at a time. The dock limitation forces some barges to unload at other riverfront locations, which adds rehandling costs. Other barges are forced to wait, as are many transshipment barges. The time lost waiting is a serious problem, especially on a river that has only a five-month shipping season.

Four commercial barge companies deliver to Bethel: Foss Alaska, Pacific Alaska Lines, Northland Services, and Southeast Alaska Barge Line. In addition, an occasional government barge delivers cargo to Bethel. Bulk petroleum is delivered to Bethel by Chevron U.S.A. and is redistributed by United Transportation and Northwest Navigation. Table 22 summarizes port activity in Bethel during 1981.

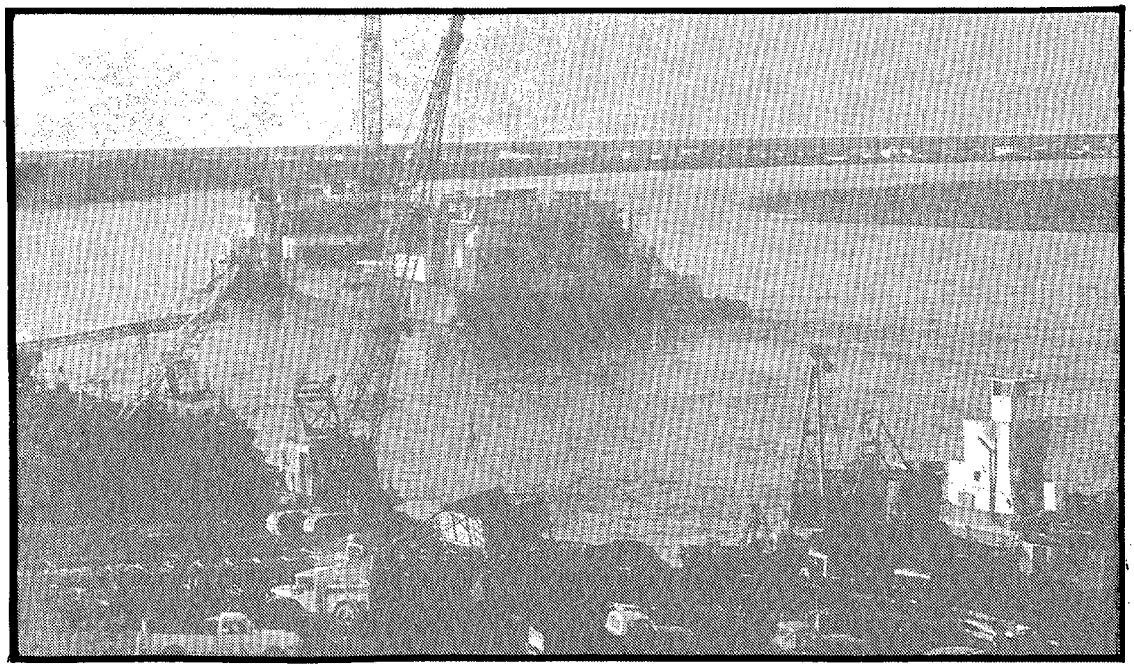

TABLE 22

General Cargo and Bulk Petroleum Shipped Through Bethel - 1981

	General Cargo (Tons)	Bulk Petroleum (Gallons)
Total Delivered to Bethel	18,000	13.5 million
Total Transshipped	4,183	6.0 million

Sources: Chevron U.S.A.
United Transportation

Port Construction Plans

Construction of a mooring facility and staging area for transshipment barges is planned to begin in March 1982. The transshipment dock will be located on Brown Slough, adjacent to the general cargo dock. The Army Corps of Engineers is discussing with the City and United Transportation plans for extending the general cargo dock. The planned expansion would enable the general cargo dock to accommodate two ocean-going barges at a time. United Transportation is also studying sites to construct badly needed warehouse facilities.

The City plans to stabilize the river bank by the Chevron tank farm by constructing a sixty-foot diameter sheet steel cell, flanked on each side by a seawall (Boyette). The City hopes to have construction completed by Fall 1982. Comprehensive bank stabilization efforts are examined in the geophysical hazard section.

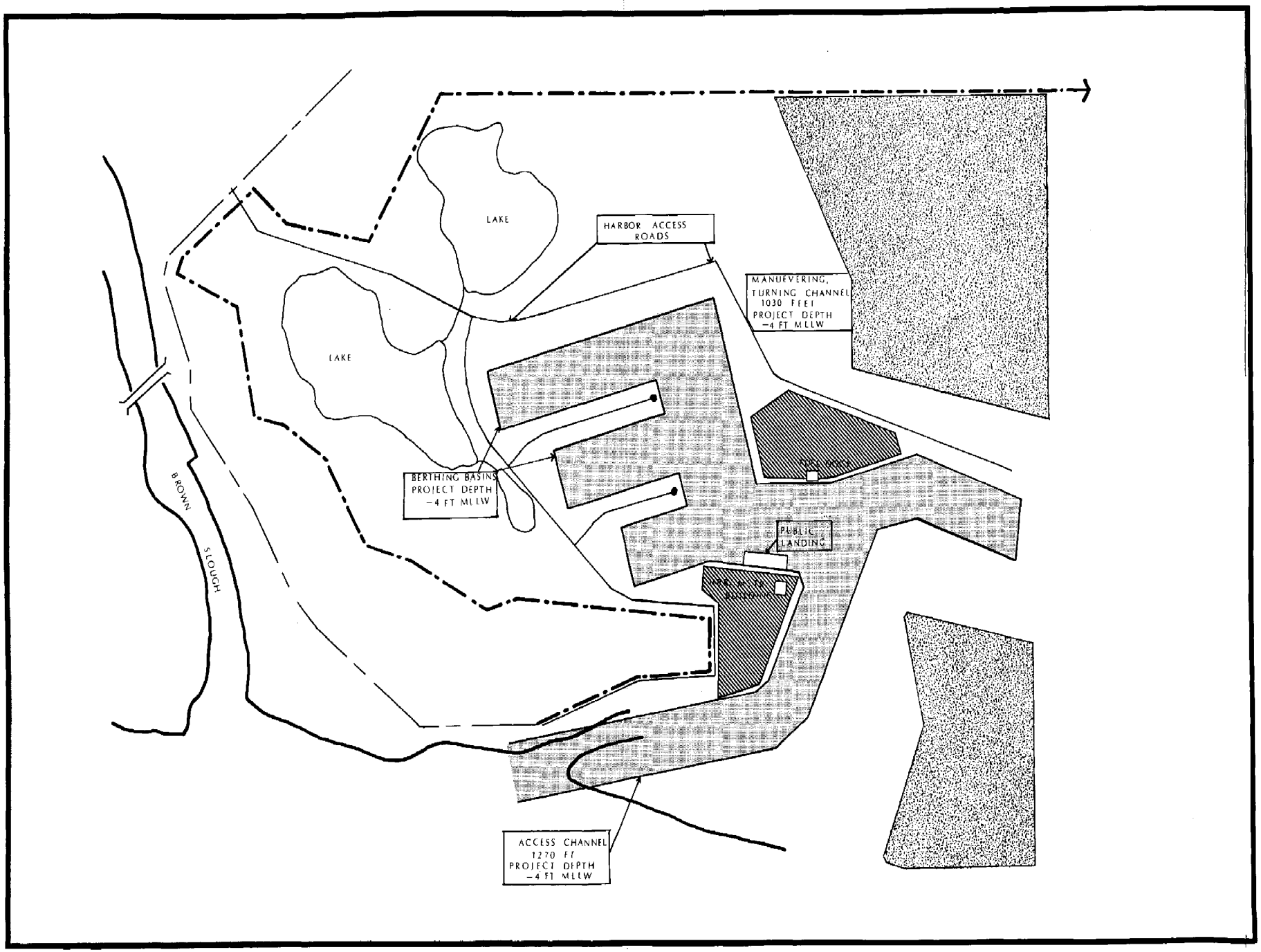
LAKE
LAKE
HARBOR ACCESS ROADS
MANUEVERING, TURNING CHANNEL 1030 FEET PROJECT DEPTH -4 FT MLLW
BERTHING BASINS PROJECT DEPTH -4 FT MLLW
PUBLIC LANDING
BROWN SLOUGH
ACCESS CHANNEL 1270 FT PROJECT DEPTH -4 FT MLLW

FIGURE 19

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Proposed Small Boat Harbor Design

Dredged Channels

Commercial Areas

Dredge Disposal Areas

Project Boundry

Existing Shoreline

Centerline of existing road

Centerline of proposed roads

SOURCE: U.S. ARMY CORPS OF ENGINEERS

SCALE

0 200 400 600 FEET

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Small Boat Harbor

Proper moorage for small boats is non-existent in Bethel. Boatowners currently use the shores of Brown Slough or the Kuskokwim River. The design for the planned small boat harbor will dredge Lousetown Slough and three berthing basins (Figure 20). The basin area will require twelve acres and the basin clearance area will require twenty-five acres. Total area affected by the project, including a dredge disposal area is forty-two acres. Boats will be moored by tying bow lines to cables anchored along the shores of the basins. The planned capacity of the harbor is approximately 1200 boats. The small boat harbor is expected to be operational in Spring 1984. The estimated number of boats berthing in Bethel in 1980 (based on a 1975 boating count) equals the design capacity of the harbor. However, a number of boaters are expected to continue using Brown Slough or the river. Table 23 illustrates the projections of number of boaters using Bethel.

TABLE 23

Projection of Small Boats Berthing in Bethel

Year	1975	1980	1985	1990
Town Boats	600	966	1556	2506
Transient Boats	400	441	488	538
TOTAL	1000	1407	2044	3044
In Repair	150	211	307	457
DESIGN TOTAL	850	1196	1737	2587

Source: U.S. Army Corps of Engineers

The total project cost estimate is $4,241,000. The harbor will provide benefits from reduced weather damage, reduced theft and vandalism, improved subsistence, commercial fishing, travel and freight savings and employment. The benefit/cost ratio has been estimated at 1.21.

The most significant environmental impact of the proposed harbor project is the destruction of forty-two acres of wetlands (Corps of Engineers). Possible specific impacts include loss of some waterfowl and muskrat habitats,

disruption of fish habitat and changes in the benthic community (Corps of Engineers). The entire forty-two acre site is located in the floodplain. The Corps of Engineers notes that economically feasible alternatives to harbor development on the floodplain or on wetlands do not exist in Bethel. Localized drainage would also be affected. The U.S. Environmental Protection Agency has expressed concern that pollutants may accumulate in the berthing basins as a result of inadequate flushing. However, the Corps of Engineers feels that flushing in the basins will be adequate. The greatest danger to the Kuskokwim River from the proposed harbor project is the possiblity of dredged material being washed into the river during flood conditions. The dredged material is being piled to form a wall that comes within thirty feet of the river. The sides will be sloped at a ratio of 3:1 and will be seeded.

Two areas on the boat harbor site have been designated commercial. The existence of the boat harbor would likely encourage other commercial development in the Lousetown area. The expected commercial activities and the traffic to and from the boat harbor will add congestion and strain to East Avenue, which is already overburdened, and to Lousetown, which is already congested.

Land Transport

The Automobile

Traditionally, the automobile has not been an important mode of transportation in Bethel. Bethel has only approximately sixteen miles of roads and no definite plans of adding any major roads. But as Bethel has spread out over the past decade, the automobile has increased in importance. With new housing being built a couple of miles west and northwest of town, the importance of the auto will likely continue to increase. Table 24 specifies vehicle registration for calendar year 1980.

TABLE 24

Bethel Vehicle Registration - Calendar Year 1980

Type of Vehicle	Number of Vehicles
Passenger vehicles	498
(1) Motorcycles	67
Trailers	21
Commercial trucks	33
Pickups	459
Buses	6
(2) Snow machines	4
TOTAL	1088

(1) Includes some 3-wheelers; registration of 3-wheelers is optional
(2) Registration of snow machines is optional.
Source: Alaska Department of Public Safety, Division of Motor Vehicles, Bethel.

Bethel has extensive taxi cab service with fifty-seven registered cabs as of December 1981. A private bus service called "Hustlebuggy" has been operating for the past couple of years with a single 19-seat bus. In mid-January 1982, "Hustlebuggy" began operating two new 21-seat buses and developed two routes and schedules.

Proposed Roads

A road from Bethel to Napakiak has been discussed for several years. The road is not likely to be built due to high cost estimates ($20 million) and low benefits. The Alaska Department of Transportation and Public Facilities does not plan to seek funding for the road in the near future (Edwards).

Engineers Galliett and Silides have prepared a report on the Yukon-Kuskokwim Crossing for the Alaska State Legislature. The study emphasized the economic benefits of constructing a year-round haul road connecting the Yukon and Kuskokwim Rivers. The termini of the crossing would be Paimiut Slough on the Yukon and Kalskag on the Kuskokwim. The study noted that the Y-K crossing would allow the Yukon market to utilize the better access and better port at Bethel. The crossing would also open the Bethel market to

Yukon mineral, timber, and agricultural resources. The construction of the crossing would undoubtedly increase the importance of the port of Bethel and expand the role of Bethel as a regional center.

Other Motorized Transport

Snow machines and 3-wheel vehicles are popular modes of transport during the winter. 3-wheelers are also used during the summer. Both vehicles usually travel on the web of trails that wind through the City. As the popularity of snow machines and 3-wheelers increase, and as more housing is constructed, conflicts are likely to increase between landowners that have trails crossing their property and the users of the trails.

United Transportation (UT) has conducted tests for the Alaska Department of Transportation and Public Facilities over the past couple of years assessing the feasibility of air cushion vehicle operation on the Kuskokwim River. UT has decided that the air cushion vehicle is not economically feasible to operate during the summer because of inexpensive competition from boats. UT is undecided about the economic feasibility of air cushion vehicle operation during the winter (Hoffman).

Pedestrian

A large portion of Bethel residents walk as their primary means of transport. Pedestrians use many of the same trails used by snow machines and 3-wheelers. Foot traffic during the summer is hindered by the many lakes and sloughs and the muddy condition of the trails and road shoulders. Winter movement is usually easier than summer because the lakes, sloughs, and mud are frozen and covered with snow. However, walking becomes hazardous in the winter when the temperature warms above freezing, creating a very slippery surface. Boardwalks are constructed alongside some of the major roads. Many of the boardwalks are in poor shape due to severe weathering and poor maintenance.

FIGURE 20

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Bethel Transportation

Major Arterial

Collector

Boardwalk

Tank Farm

Proposed Small Boat Harbor

Cargo Dock

Aircraft Activity

SOURCE: ENVIRONMENTAL SCIENCE AND ENGINEERING

SCALE

0 1 MILE

The Preparation of this (map, document, etc.) was financed in part by funds from the Alaska Coastal Management Program and the office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, administered by the Division of Community Planning, Department of Community and Regional Affairs.

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ENERGY

Energy Supply and Demand

Electricity

Electricity is supplied by Bethel Utilities Corporation (B.U.C.), a private company. All electricity is supplied by four 2100 kilowatt diesel generators with a combined power capacity of 8400 Kw. Peak loads in 1981 were approximately 3200 Kw in the summer and 4000 Kw in the winter. In 1981, 1416 customers used a total of 21,068,096 kilowatt-hours. Following is a breakdown of electrical consumption by consuming section, including the cost to the consumer based on the rate structure as of December 1981.

TABLE 25

Bethel Electrical Consumption - 1981

	Bulk	Commercial	Residential	Other
Number of Customers	3	209	1,199	5
Combined Annual Consumption (Kwh)	2,694,425	13,276,836	5,059,340	37,495
Average Monthly Consumption/ Customer (Kwh)	74,845	5,294	352	625
Average Cost, not including surcharge and tax (¢/Kwh)	12.8	14.3	17.2	NA
Average Cost including surcharge and tax (¢/Kwh)	15.9	17.2	21.8	NA

NA = Not Applicable

Source: Bethel Utilities Corporation

Bethel Utilities Corporation has reached an agreement with Alaska Power Authority that will allow B.U.C. to participate in the state's power cost assistance program. The program should reduce electrical costs by about 4.5¢/Kwh for eligible (non-commercial) B.U.C. customers.

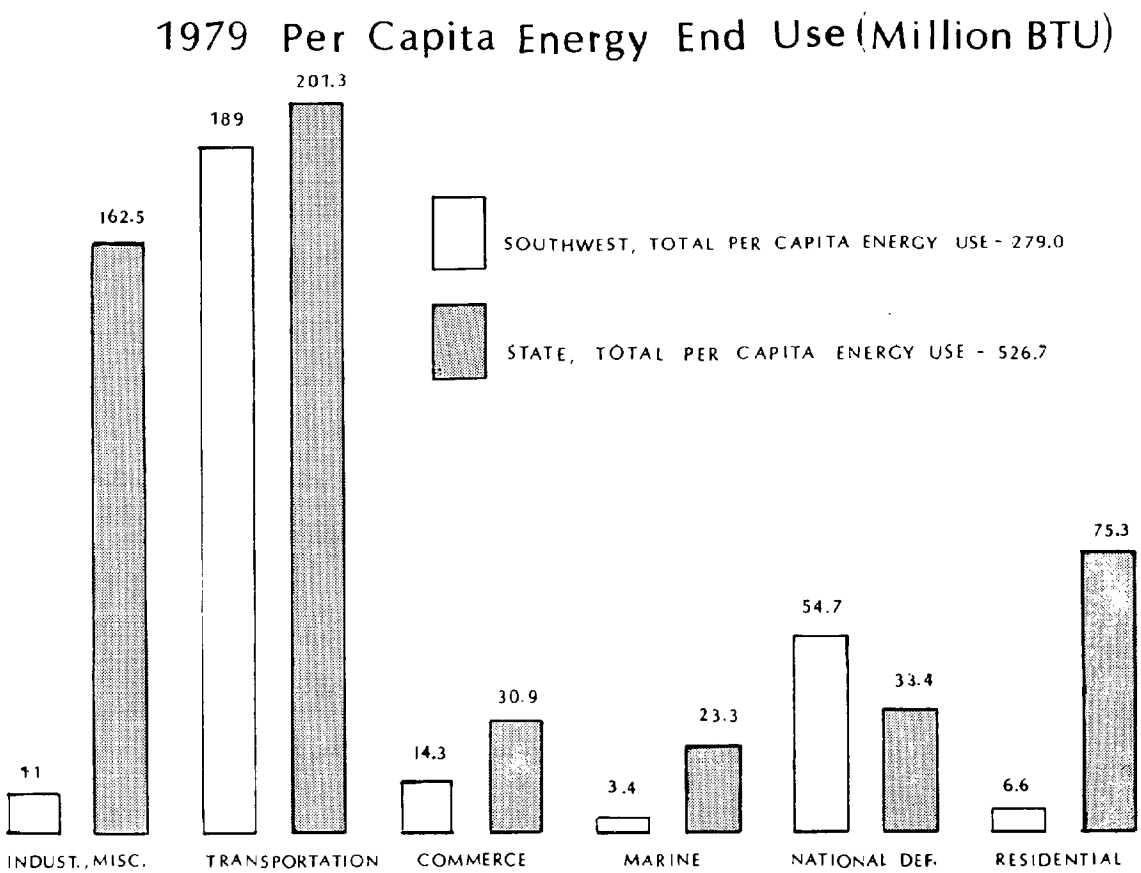
Petroleum

Chevron U.S.A. owns and operates the bulk petroleum distributorship in Bethel. The Chevron tank farm has a bulk storage capacity of 8 million gallons. 13.5 million gallons of petroleum was delivered to Bethel in 1981 with about 6 million gallons redistributed throughout the Yukon-Kuskokwim Region.

Regional Energy End Use

Energy end use analysis illustrates the quantities of energy used by various consuming sectors. End-use data are not available for Bethel, but data are available for the Southwest region. The following figures compare regional energy end use with statewide energy end use.

FIGURE 21

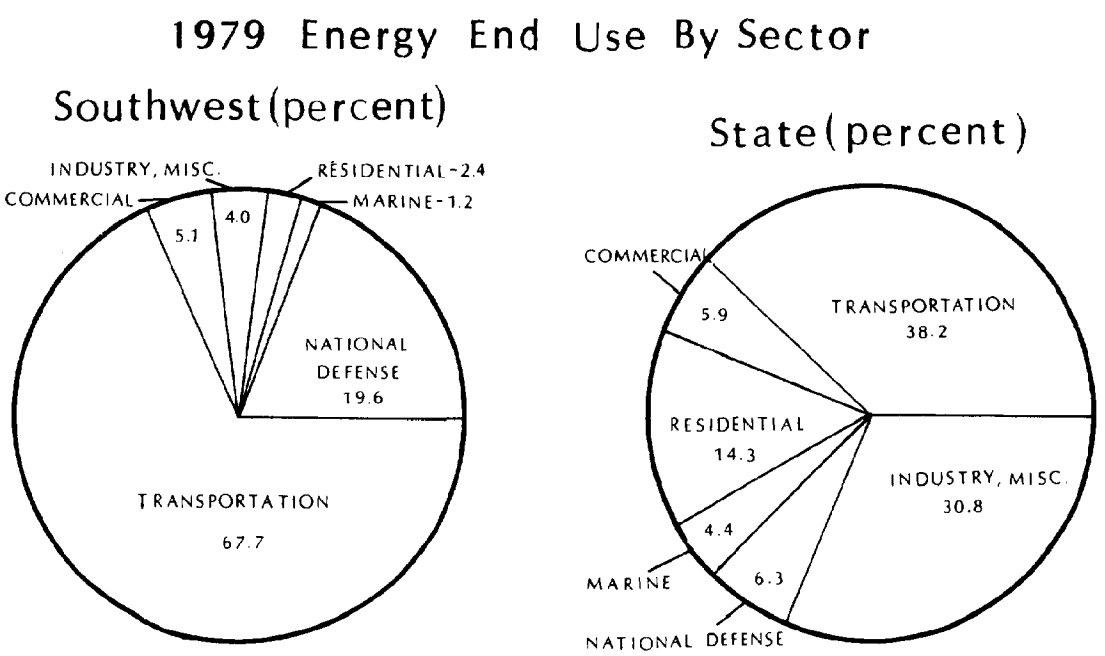


SOURCE: ALASKA LONG TERM ENERGY PLAN - DRAFT

Figure 21 illustrates that per-capita energy use in the southwest region is just over half (53%) of per-capita energy use in the state as a whole. The southwest region contains 7.5% of the state's population, but uses only 4.0% of the state's energy.

Figure 22 emphasizes the stark difference in energy end use in the southwest region as compared to the rest of the state. Transportation is proportionately a far larger energy user in the southwest than the state as a whole, while residential and industrial uses use a far smaller share of southwest energy than in the state as a whole.

FIGURE 22

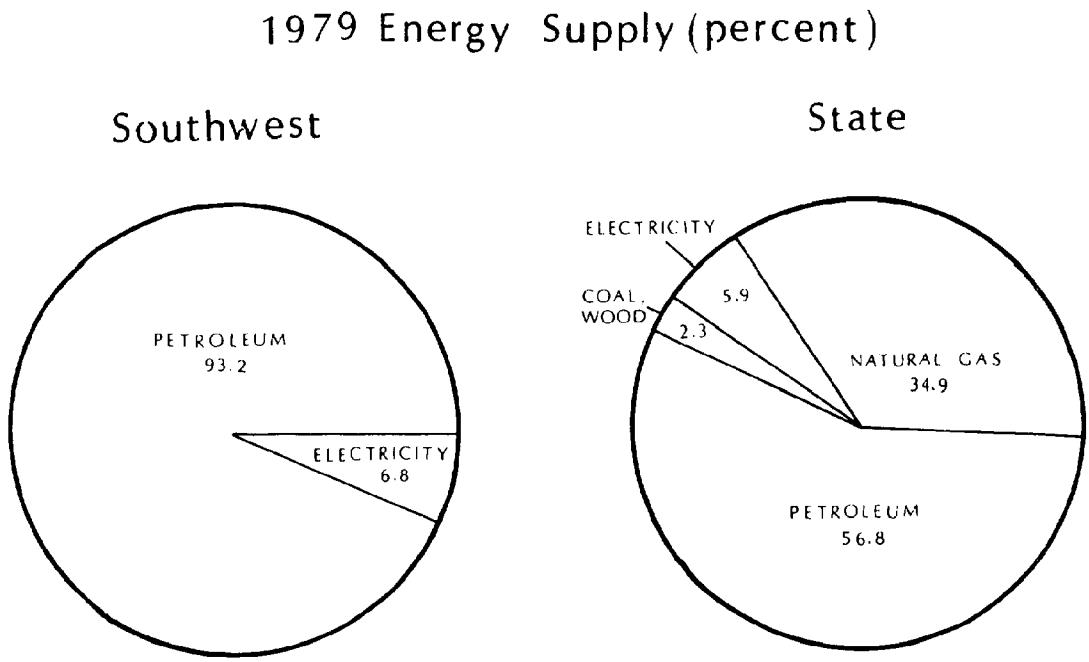


SOURCE: STATE OF ALASKA LONG TERM ENERGY PLAN - DRAFT

Regional Energy Supply

End use energy (energy in a usable form) in the southwest region is supplied almost totally by petroleum products, with the balance being supplied by electricity. State-wide, a large proportion of energy is supplied by natural gas. Regional and state energy supplies are illustrated in Figure 23.

FIGURE 23



SOURCE: STATE OF ALASKA LONG TERM ENERGY PLAN-DRAFT

Potential Energy Sources

Hydro

The hydroelectric dam proposed near Bethel that has been most thoroughly studied is the lower falls site on the Kisaralik River. The proposed project would consist of two 15,000 Kw generators and would be able to produce 131,400,000 Kwh per year. Electricity would be delivered to Bethel via a 69-mile transmission line. Power would be distributed from Bethel to 11 surrounding villages. Busbar Cost (cost at the power plant) estimates are compared in Table 26.

TABLE 26

Estimates of Busbar* Electricity Costs
Busbar Cost of Electricity (¢/Kwh)

	1980	1990	2000
Continued use of diesel (Bethel)	12.6	21.0	35.8
Small communities local diesel	32.7	62.0	102.1
Intertied system diesel only	14.7	20.8	35.1
Intertied system with Kisaralik hydro	----	30.6	17.8

Source: Retherford Associates

*Busbar is cost of electricity produced at the power plant, not cost to consumer.

The Kisaralik hydro project does not appear to be close to becoming reality, however. The Alaska Power Authority commissioned a study that began early in 1982 to reassess the potential of a regional power system centered in Bethel and to serve as a follow-up to the reconnaissance study of the Kisaralik Hydro Project and alternate sources conducted by Robert W. Retherford Associates in 1980.

The "Bethel Area Power Plan Feasibility Assessment: Regional Report" by Harzi Engineering indicates that the Kisaralik River hydro project is not an economically feasible means to provide low cost power in the Bethel area. It also indicates a more likely and economical source of power to be the proposed Chikuminik Lake Hydro Project. (Report available from the Alaska Power Authority.)

Wind

The potential for tapping wind as an energy source is very good in the Bethel area. The average annual wind speed at a height of 20 feet (the anemeter height) is 11.2 mph and at 60 feet (a good tower height) is 13.9 mph. Average monthly wind velocities are shown in Table 27.

TABLE 27

Average Monthly Wind Velocity (MPH)

Month	H=20 ft	H=60 ft	Month	H=20 ft	H=60 ft
Jan	12.2	13.9	Jul	10.0	12.5
Feb	13.1	15.2	Aug	10.5	13.1
Mar	12.3	16.3	Sep	10.6	13.2
Apr	15.5	14.3	Oct	11.0	13.7
May	10.5	13.1	Nov	11.4	14.2
Jun	10.2	12.7	Dec	11.3	14.1
			ANNUAL	11.2	13.9

Only one wind generator is currently operational in Bethel. The National Guard Armory installed an Enertech 2 Kw-rated system in early November 1981 and tied the system into the Armory's electrical system in early December 1981. So far, tests have been encouraging. The system has been producing an average of 8.4 Kwh per day, (including low wind days), almost enough to power one house at current Bethel consumption levels. Table 28 summarizes the characteristics of the system.

TABLE 28

Summary of National Guard Armory Wind System

Make: Enertech Power Rating: 2 Kw
Tower Height: 60 Feet
Wind Required for Start up: 14 mph (at 60 ft.)
Primary or Secondary Electrical Source: Secondary Source.
No battery storage, provides electricity via A.C. generator.
Average Electrical Production Per Day: 8.4 Kwh

The Armory wind system had an initial cost of over $10,000. The high investment cost of a small (2 Kw) wind system is too large for the average homeowner. The longterm payoff of a small wind system is becoming economically competitive with diesel generated electricity. The Lower Kuskokwim School District has plans to install a 4 Kw Enertech wind system near the high school during the summer of 1982.

Coal

Nunivak Island is known to contain small coal deposits, although the volume is undetermined (Prince). Another known coal deposit is the Nulato Coal Field, 300 miles to the northeast on the Yukon River. The deposit is not considered economically recoverable due to steep topography and thin coal seams. A large peat resource likely exists but permafrost precludes extraction (Retherford Associates).

Waste Heat

Bethel Utilities Corporation began operation in January, 1982, of a project that taps waste heat from its generators and supplies heat to the PHS Hospital. A chance exists of hookup agreements being reached between B.U.C. and the City of Bethel, Kuskokwim Community College, and KYUK Radio and TV. B.U.C. estimates that the power plant loses an average 12 million BTU/hour as waste heat, theoretically enough to heat one-third of the buildings in Bethel (E.S.E. estimate).

Geothermal

Three geothermal sites are known to exist within 100 miles of Bethel. The three sites are 1) Mitchell in the Chilmuck Mountains; 2) Tuluksak Hot Springs near Nyac; 3) Ophir Creek Hot Springs near White Bear Lodge. The Ophir Creek site is used to heat a home and a lodge. None of the sites have temperatures or flow rates sufficient for commercial use (Retherford Associates).

Solar

Bethel has a good potential for passive solar space heating and for solar hot water heating. A 1978 study on solar energy potential in Alaska

(Seifert and Zarling) concluded that active solar hot water heating was economically competitive with electric hot water heating (at 10¢/Kwh), but not quite competitive with oil fired hot water heating when oil cost 53¢/gallon. Residential electricity now costs 21¢/Kwh and oil costs $1.31/gallon so the cost comparisons are likely to be significantly different.

Passive solar heated buildings have been proven cost-effective in Alaska (Alaska Department of Commerce and Economic Development, 1981). A passive solar building design has little or no extra construction costs when compared to conventional buildings. The solar insolation data in Table 29 was applied in Table 30 to illustrate the effectiveness of passive solar heating in a typical Bethel home design.

TABLE 29

Average Daily Solar Radiation-Bethel
(BTU-day/ft^2)

$\overline{V}$ = Average Daily Radiation on Vertical South-Facing Surface
$\overline{W}$ = Average Daily Radiation on Vertical West-Facing Surface
$\overline{E}$ = Average Daily Radiation on Vertical East-Facing Surface
$\overline{H}$ = Average Daily Radiation on Horizontal Surface

	$\overline{V}$	$\overline{W}$	$\overline{E}$	$\overline{H}$
January	832	153	153	174
February	1224	410	410	495
March	1882	915	915	1186
April	1689	1231	1231	1791
May	1176	1124	1124	1766
June	1021	1054	1054	1701
July	886	851	851	1357
August	715	574	574	888
September	874	485	485	685
October	823	291	291	372
November	518	105	105	127
December	502	65	65	73

Source: Seifert and Zarling, 1978

TABLE 30

Passive Solar Heating Potential - Small Bethel Home

	Average Daily Solar Heat Gain (BTU/day)	Average Daily Heat Loss (BTU/day)	% Solar Heated
January	23,640	117,432	20
February	39,216	115,584	34
March	67,368	107,616	63
April	70,080	79,704	88
May	55,200	29,859	100
June	49,800	25,896	100
July	41,688	22,800	100
August	30,936	23,880	100
September	32,616	39,816	82
October	26,736	69,648	38
November	14,952	95,544	16
December	13,608	117,432	12
ANNUAL	*309,651	845,211	*46%

Assumptions

House Size: 20 feet x 30 feet x 8 foot-high walls
Insulation: Floor and Ceilings = R-31; Walls = R-19
Windows: Two 3 foot x 4 foot south facing; one 3 foot x 4 foot each, facing west and east. All windows are doublepane, insulation value = R-2
Assume proper placement and volume of thermal storage mass.

* When calculating annual % solar heated, average daily heat gain cannot be greater than the average daily heat loss.

Wood

Use of wood for space heating is very common in Bethel. Individuals travel up the Kuskokwim to cut trees, or gather wood on shore or floating in the river. Wood is usually used as a secondary heat source, although some people heat primarily with wood. The decentralized nature of acquisition and use of wood make estimation of quantities used in Bethel very difficult, but a rough estimate of wood use in Bethel is as follows:

Estimate of Wood Heat Use in Bethel - 1981

1970 Census estimate of Bethel households that use wood	11% (79 houses)
1982 ESE estimate	20% (250 houses)
Amount of wood used to completely heat home	8 - 10 cords/year
Amount of wood used by average home	4 cords/year
Total amount of wood used in Bethel	1,000 cords/year (4 x 250)

Conservation

A multitude of state conservation programs exist, many a result of the Alaska Energy Conservation Act of 1980. Examples of programs active in Bethel include inexpensive residential audits, weatherization grants, emergency fuel assistance loans and grants, and seminars. The Division of Energy and Power Development estimates six trillion BTU's saved statewide in 1980 from the low income weatherization program alone (DCED, 1981). The Bethel Utilities waste heat project will conserve electrical consumption and provide a source of heat less expensive than oil. Another possible source of waste heat could be a thermal reduction plant for solid waste. Subterranean housing is an energy efficient construction style that has some historical roots in the lower Yukon-Kuskokwim region (Angaiak, Personal Communication).

Exploration for Petroleum and Natural Gas

Exploration and testing activities have indicated that a moderate potential exists for natural gas and petroleum reserves in the Bethel area. Tests in 1959-61 near Numavakpak Lake, 30 miles west of Bethel, resulted in a dry hole but some indications of oil. Etolin Strait, between Nelson Island and Nunivak Island about 100 miles west of Bethel, has a high potential for oil deposits (Alaska Regional Profiles).

Calista Corporation owns subsurface rights to all native corporation lands in the region. Calista contracted with AMOCO to conduct seismic surveys for oil and gas potential in the region. To date, Calista has not released the results of the AMOCO surveys, amid considerable speculation that oil and gas deposits exist.

COMMERCIAL FISHING AND FISH PROCESSING

Commercial Fishing

Commercial fishing in the Kuskokwim area was reported as early as 1913, yet the Kuskokwim River salmon fishery remained virtually undeveloped prior to Alaska Statehood in 1959. The commercial salmon fishery has grown considerably since statehood and represents an important source of income to the people of the Kuskokwim area. Bethel has become a major center for area fishermen with the establishment of several fish buying operations and reliable transportation facilities.

The most valuable commercial fish species in the Kuskokwim River are the five species of Pacific salmon: king, coho or "silver", chum or "dog", red or "sockeye", and pink or "humpback". Although all five species of salmon occur in the Kuskokwim River, the king, coho and chum salmon are present in commercial quantities. Red and pink salmon are more abundant in the Kanektok and Goodnews River drainages. Other important fishery resources include whitefish, sheefish, burbot or "lush", pike and blackfish.

Traditional methods of fishing are employed by local fishermen, although modern materials have replaced fishing gear made from local materials. Both drift and set gill nets are legal types of commercial fishing gear, however set gill nets are more commonly utilized by subsistence fishermen. Fishing is conducted by setting the gill net from the fishing vessel and then drifting with the river current. The fishing vessels of the Kuskokwim River are typically long, narrow skiffs and are operated by a two-man crew.

The Kuskokwim River management area includes all waters of the Kuskokwim River drainage, and all waters from Cape Newenham to the Kaskonet Peninsula (ADFG). Commercial fishing is permitted in four districts: the Middle Kuskokwim River, the Lower Kuskokwim River, Goodnews Bay and the Quinhagak area. The Lower Kuskokwim District, from Eek Island to Mishevik Slough below Tuluksak, encompasses the largest area and supports the greatest commercial fishing effort. The Lower Kuskokwim River fishing effort from 1965-81 is presented in Table 31.

TABLE 31
1/ Kuskokwim River Commercial Effort Data, 1965-81

Year	King Salmon	Chum Salmon	Coho Salmon
1965	195		
66	210		107
67	233		147
68	303		242
69	329		231
70	361		266
71	418	216	83
72	405	176	245
73	456	341	411
74	606	467	516
75	472	540	533
76	561	517	516
77	563	622	572
78	615	617	597
79	591	617	613
80	553	579	586
81	589	613	586

1/ Number of actual fishing vessels in Lower Kuskokwim District
Source: Alaska Department of Fish and Game.

The management of the commercial salmon fishery is conducted by the Department of Fish and Game in Bethel. Due to increased fishing efforts and gear efficiency in recent years, the Kuskokwim River commercial fishing regulations have been fairly restrictive. Conservative management of the commercial fishing industry has insured sufficient salmon to satisfy subsistence needs and meet salmon escapement requirements.

The king salmon season is regulated by emergency order and is generally a short season due to the intensity of the run and increased fishing efforts. The 1981 Kuskokwim River catch was 47,663, a 21% increase from the previous five-year average. Although the commercial utilization of king salmon has increased, the subsistence king salmon fishing remains predominant in the Kuskokwim River districts.

The chum salmon season is conducted from July 26-31, and is generally permitted only in the lower Kuskokwim River fishing district below Bethel. Commercial chum salmon fishing is also allowed in the middle Kuskokwim district, but fishing effort and harvest is low compared to the lower Kuskokwim district. The commercial utilization of chum salmon has increased steadily since its initiation in 1971. In 1981 the chum salmon run was exceptionally strong corresponding with a high effort and the Kuskokwim River catch was reported as 418,677. This was the second longest catch recorded and was 32% above the previous five-year average.

After July 31, the commercial coho fishery is conducted by emergency order due to the variability of the coho run. The length of the coho season has decreased in the last few years from 108 hours in 1978 to fifty-four hours in 1981. Again, the short fishing periods are conducted in response to the intensity of the present fishing effort.

Despite the short salmon season the 1981 Kuskokwim River catch was 726,258 salmon, the second largest catch recorded (the 1980 catch was 742,297 salmon). A breakdown of the catch is presented in Table 32.

TABLE 32

Kuskokwim River Catch Data, 1976-1981

Kuskokwim River[1/]	King	Red	Coho	Pink	Chum	Total
1976	30,735	2,971	88,501	133	177,864	300,204
1977	35,830	9,379	241,364	203	248,721	535,451
1978	45,641	733	213,393	5,832	248,656	514,255
1979	38,966	1,054	219,060	78	261,874	521,032
1980	35,880	360	222,012	803	483,211	742,297
1981	47,663	48,375	211,251	292	418,677	726,258
Previous five-year Average	37,411	2,900	200,472	1,410	284,065	522,648

1/ Kuskokwim River includes the middle and lower Kuskokwim Districts
Source: Alaska Department of Fish and Game

The economic value of the 1981 Kuskokwim area catch to the area fishermen was estimated at $3,767,000. The economic value represents the gross dollar value of catch to fishermen, plus wages earned by processing plant employees and tender boat operators. Approximately twenty percent of the 826 permit holders were residents of Bethel (ADFG).

Besides salmon the commercial utilization of whitefish has increased in recent years. The major commercial whitefish fishery occurs incidental to the August coho season and the majority of whitefish are sold to Bethel stores to satisfy a local market. In addition, a limited fall and winter whitefish fishery is conducted by the Department of Fish and Game. In 1981 three whitefish permits were issued in Bethel.

A commercial herring fishery has recently developed in the Kuskokwim area. In Security Cove, Goodnews Bay and Cape Romanzof, the development of a herring fishery was initiated in 1978. The herring fishery in these areas has grown significantly since its initiation, producing over 1000 metric tons in 1980. (Table 33). Projections of the herring catch and fishing effort in the Kuskokwim area during the years 1980-2000 were estimated by

authors of the Sea Grant Study. The projections indicate that the herring harvest is expected to remain constant, while the fishing effort may increase moderately (see Table 34).

TABLE 33

Characteristics of the 1980 Herring Season

District	Metric Tons Landed	Number of fishermen	Boats	Catch per boat (metric tons)
Security Cove	611	178	20-30	6.0
Goodnews Bay	407	165	NA	6.4
Cape Romanzof	554	69[a]	54	7.0

a. The higher number of fishermen per boat may reflect a certain degree of sharing among related and unrelated fishermen.

Source: Steve Langdon, the Western Alaska Sac Roe Herring Fishery, 1980: A Summary of ANF Questionnaire Findings. Alaska Native Foundation, December 1, 1980.

TABLE 34

Projected Harvest and Fishing Effort in the Yukon Kuskokwim Roe Herring Fisheries: 1980-2000

District	Catch (metric tons)	Number of Boats	Number of Fishermen	Catch per boat
Security Cove	640	111	333	5.8
Goodnews Bay	430	44	132	9.8
Cape Romanzof	590	59	162	10.9

Source: Sea Grant Study, Table 4.65.

Fish Processing

Fish processing in Bethel is limited to three major fish buying operations: Kemp & Paulucci Seafoods of Duluth, Minnesota, Elm Fisheries, Inc., and J.B. Crow and Sons. All three fish buyers operate facilities capable of cleaning and dressing fish. The fish is then iced and transported out of the area by air or by sea. Both Elm Fisheries and Kemp and Paulucci have the facilities to freeze fish which enables them to utilize water transportation. Processing operations take place from June to September.

J.B. Crow and Sons began their fish buying operation in the Bethel area in 1966. The processing facility consists of two small freezers with a combined estimated storage capacity of 25,000-30,000 pounds. The freezers are used for the storage of heads, roe, and seconds. Crow exports up to one million pounds of fresh salmon annually.

The largest portion of the Kuskokwim River salmon catch is purchased by Kemp and Paulucci. The company works in agreement with the Kuskokwim Fishermen Cooperative who conduct the processing operation on the co-op barge, the Upiat. The barge facility has two freezers, each with a 35,000 pound capacity. In addition, the barge contains freezer holds for the storage of frozen salmon pallets. The capacity of the freezer holds is 450,000 pounds. The frozen fish are transferred to a Japanese tramp in Bethel and shipped to Japan.

Processing capabilities were further increased in Bethel with the completion of the Elm Fisheries freezer facility. The facility is capable of freezing 200,000 pounds of salmon within a twenty-four hour period. In the past, Elm Fisheries has handled approximately twenty-five percent of the Kuskokwim River catch. With the new facility, Elm hopes to handle a larger portion of the commercial catch and are exploring the economic viability of other potential commercial resources in the area.

In a report titled A Technical Appraisal and Assessment of the Bethel Fishing Industry, the development of additional processing facilities was unadvisable. The two major constraints were the cost of constructing a tender facility and the limited salmon resource supply to accommodate an additional major fish buyer.

More likely, the expansion of the commercial fishing industry will be dependent on the local processors' ability to integrate the processing of other commercial resources into the existing plant capacities.

In recent years, the local demand for whitefish has stimulated the development of a small commercial whitefish fishery. An important consideration for further development of this fishery is the relatively low-cost investment to adapt the present processing facilities for the processing of whitefish. However, several major factors limit the economic viability of a large scale whitefish fishery including the following:

- the subsistence utilization of the Kuskokwim whitefish fishery,
- uncertain marketability of whitefish products,
- high transportation costs,
- the absence of trained labor, and
- the high overhead associated with the operation of a year-round processing facility.

A small whitefish operation may be economically viable for two reasons. First, the market for whitefish exists in most of the large Native communities in the region as well as Bethel. Second, the overhead associated with operating a small freezer facility would be greatly reduced.

The bottomfish industry is just beginning to develop in Southwestern Alaska. Based on a study entitled The Growth of the Nunam Kitlutsisti Region: A Projection 1981 to 2000, the bottomfishing efforts in the Bering Sea will require the development of land-based processing facility by 1995. The processing facility will be located in Goodnews Bay and employment will be allocated to the coastal and Kuskokwim regions and Bethel (Husky).

FOREST DEVELOPMENT POTENTIAL

Resource Potential

Reid, Collins, Inc. released a study in June, 1981 of the forest development potential in the Middle Kuskokwim. The study, prepared for the Kuskokwim Native Association, concluded that a sufficient quantity and quality of timber resourses exist to supply the demand of the Kuskokwim villages and Bethel, as well as support a timber export facility. The study maintained that a mill supplying only local demand would not be an efficient use of the available resource and recommended a mill and export facility that would supply Japanese demand. A major source of North American log exports to Japan is private lands in the Pacific Northwest. The Northwest supply faces immediate contraction and the Kuskokwim resource should become more attractive to Japan (Reid, Collins). Bethel has an advantage over Northwest ports in that Bethel is four to five sailing days closer to Japan.

Reid, Collins suggested that a cost effective timber operation would export raw logs to Japan and try to capture 50% of the local market for finished lumber (lumber is now imported from Washington). The suggested operation would have an annual output of 7514 million board feet (mbf). A local market-only mill would have an annual output of 1750 mbf. In contrast, the only sawmill still operating on the Kuskokwim produces seventy mbf per year (Reid, Collins, Inc.). The Kuskokwim Corporation is investigating the possibility of establishing a local market-only mill in the near future. Such a mill would likely be located adjacent to the resource, probably near Sleetmute (Cook, personal communication). An export facility is considered a long term possibility that may become feasible if the Japanese market becomes available. Bethel is considered a good location for an export facility.

Potential Impacts on Bethel

The Reid, Collins export mill site example would require 10.3 acres of land. Shoreline property would be necessary for loading operations. Log booms would add to the demand of the riverfront as a transportation corridor. Reid, Collins noted that modern log ships are usually in the range of 20,000 to 30,000 dead weight long tons (DWT) and require a draft of twenty to twenty-five feet. The Bethel port has an estimated capacity of 12,000 DWT and a draft of eighteen feet. Dredging of Oscarville Channel could increase draft capacity to twenty-two feet (Galliet and Silides).

The Reid, Collins export mill example would employ eleven people per shift with total wages of $1500 per shift. Kuskokwim River timber would compete with Washington timber, resulting in an increase in local dollars spent on local products. The fuel demand of the mill example would be 22.5 gallons per hour or 180 gallons per shift.

MINING

The mining industry currently does not provide any direct employment in Bethel and has an insignificant impact on the Bethel economy. The quantity of services provided to mining is impossible to determine, although Bethel probably provides some services such as transportation and retail sales.

The Bethel region is considered to have good deposits of several metallic and non-metallic minerals, although mining activities do not exist within 25 miles of Bethel. Some active mining sites in the region include: Goodnews Bay, 115 miles to the south; Quinhagak, 85 miles to the south; Canyon Creek, 80 miles to the southeast; Columbia Creek, 40 miles to the southeast; Akulikautak River, 25 miles to the southeast; Cripple Creek, 90 miles to the east; and the Tuluksak River near Nyac, 70 miles to the east. Minerals extracted include gold, platinum, antimony, mercury, copper, tin, tungsten, beryllium, chromite, and molybdenum. Silver has also been reported. Most of the Yukon-Kuskokwim Delta, including Bethel, is located in a sedementary basin that is considered to have uranium potential. Coal, oil, and natural gas potential are discussed in the Energy section.

OUTER CONTINENTAL SHELF IMPACT ASSESSMENT

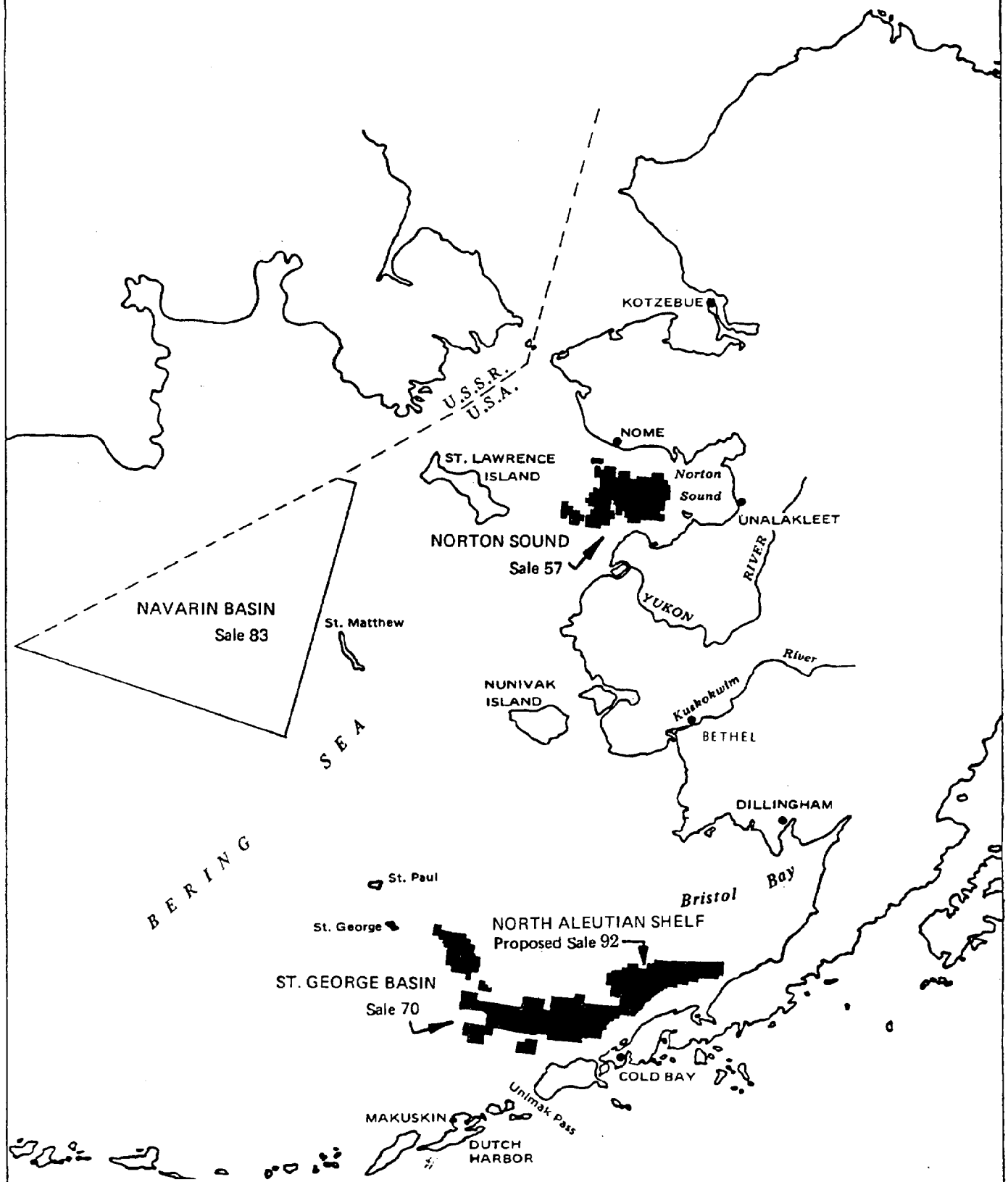
OCS Resource Potential

Outer Continental Shelf (OCS) petroleum exploration in the Bering Sea has shown moderate development potential. Figure 25 shows proposed lease sale areas in the Bering Sea. The North Aleutian Shelf and St. George Basin lease areas are considered the easiest areas to develop because of lack of substantial amounts of sea ice and close proximity to potential support facilities at Cold Bay and Dutch Harbor. However, hazards of the Aleutian lease areas include seismicity, volcanism and tsunamis. The Norton Basin experiences a substantial amount of sea ice, but is close to a potential regional support center at Nome. The Navarin Basin has formidable barriers to development that include sea ice, deep water and a long distance to an existing support facility (Tremont). The lease area closest to Bethel is St. Matthew-Hall. The waters of the area are too shallow for tankers and the area has recoverable resource estimates of virtually zero. St. Matthew-Hall is not scheduled for a lease sale.

Table 35 summarizes resource estimates and proposed sale dates of the proposed federal lease areas in the Bering Sea, and Table 36 summarizes petroleum potential of proposed state onshore areas in Southwest Alaska.

FIGURE 24

PROPOSED OCS LEASE SALES IN SOUTHERN BERING AND NORTON SOUND



Source: Alaska OCS Office, 1983

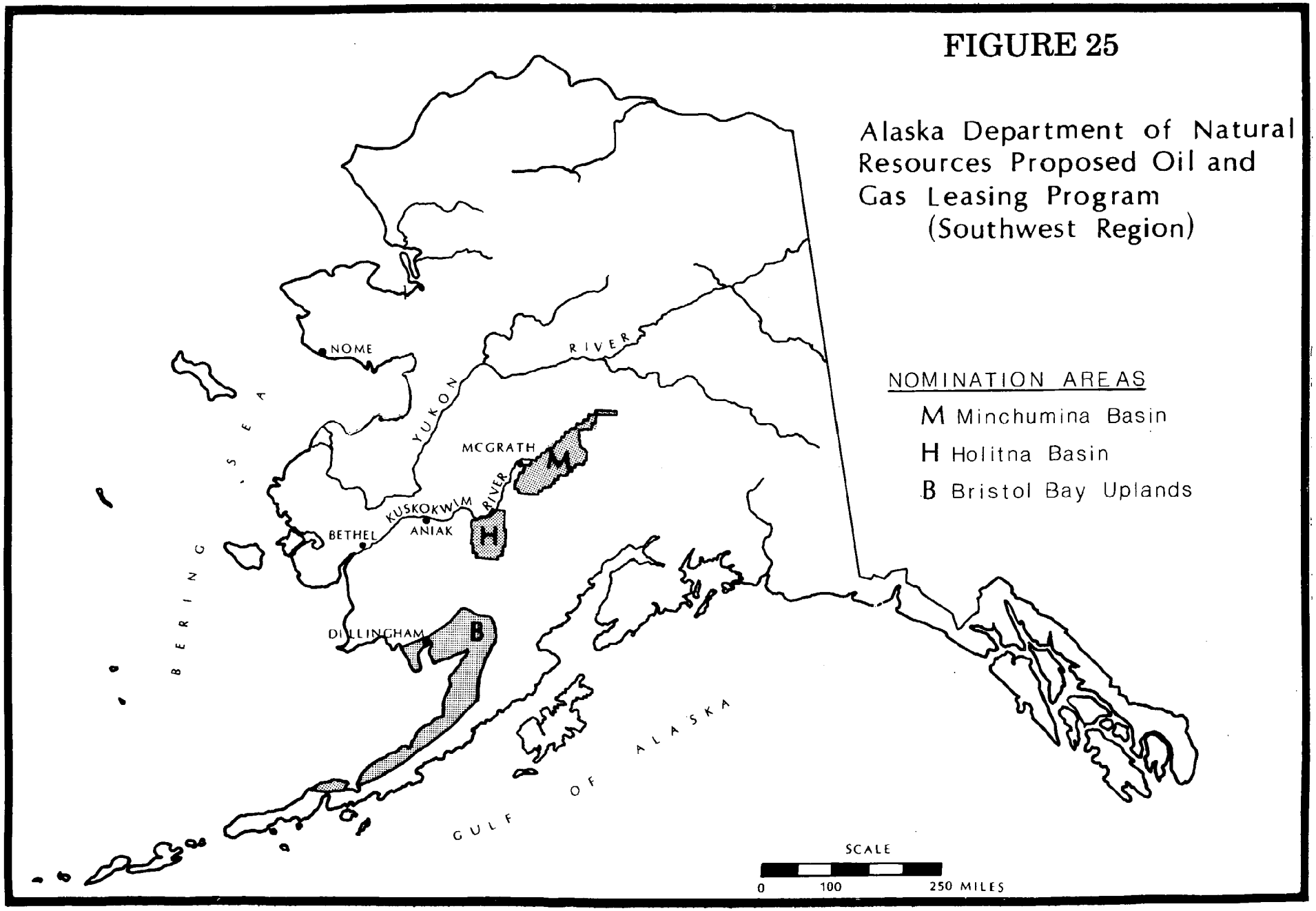


FIGURE 25

Alaska Department of Natural Resources Proposed Oil and Gas Leasing Program (Southwest Region)

NOMINATION AREAS

M Minchumina Basin

H Holitna Basin

B Bristol Bay Uplands

TABLE 35

Risked and Unrisked Resource Forecasts
For Proposed Bering Sea Lease Sales (Federal Offshore Schedule)

Proposed Sale	Proposed Sale Date	Unrisked Mean Case Resource Estimates		Marginal Probability of Success		Risked Resource Estimates	
		Oil	Gas	Oil	Gas	Oil	Gas
Norton Basin (Sale 57)	November, 1982	480 MMbbls	2.01tcf	.14	.26	.67MMbbls	523bef
St. George Basin (Sale 70)	February, 1983	1.12 Bbbls	3.66tcf	.28	.37	314MMbbls	1.39tcf
*Navarin Basin (Sale 83)	March, 1984	2.47 Bbbls	8.95tcf	.41	.41	1.01Bbbls	3.67tcf
St. George Basin (Sale 89)	December, 1984	NOT AVAILABLE					
North Aleutian Shelf (Sale 92)	April, 1985	300 MMbbls	2.93tcf	.22	.22	66MMbbls	645bcf
Norton Basin (Sale 100)	October, 1985	200 MMbbls	1.2tcf	NOT AVAILABLE			
Navarin Basin (Sale 107)	March, 1986	NOT AVAILABLE					
St. George Basin (Sale 101)	December, 1986	NOT AVAILABLE					

* Basin-wide estimate

Sources: Alaska Department of Natural Resources
Tremont (from U.S.G.S.)
U.S. Department of Interior, Minerals Management Service

TABLE 36

Petroleum Potential for Proposed Sale Areas in Southwest Alaska (State of Alaska Onshore and Nearshore Schedule)

Sale Area	Sale No.	Date Scheduled	Petroleum Potential
Minchumina Basin (Nomination Area)	42	January, 1984	Low
Bristol Bay Uplands (Nomination Area)	41	September, 1984	Low to Moderate
Holitna Basin (Nomination Area)	46	January, 1985	Low

Source: Alaska Department of Natural Resources

A 1981 U.S. Geological Survey open-file report has estimated undiscovered oil and gas resources for the Yukon-Koyukuk Basin, a large area that includes the Bethel Basin. The estimate for crude oil is zero, and the mean estimate (50% probability) for natural gas is 0.1 trillion cubic feet with a high estimate (5% probability) of 0.6 trillion cubic feet.

Sources of Potential OCS Impacts on Bethel

Any OCS-related impacts on Bethel are likely to originate from Norton Basin development. The Norton Sound region would absorb the bulk of the cultural, economic, and environmental impacts. The lower Yukon region is adjacent to southern Norton Sound and would likely experience a direct impact from OCS development in the Norton Basin (Husky). The lower Yukon is also part of the Bethel service area.

Impacts on Bethel from Norton Basin OCS development would be indirect, via the impacts on the lower Yukon villages. A "high find scenario" in the Norton Basin would probably create a "moderate impact" on Bethel. Potential impacts from onshore resource development near Bethel are still highly speculative but would likely be more direct and more substantial than OCS imports.

Potential Economic Impacts

The industries in Bethel most likely to be impacted by OCS development are the transportation and construction sectors. Offshore and onshore OCS facilities require shipments of cargo and people. If Bethel were to experience a "moderate-impact" scenario, its role as regional transportation center would be significantly expanded. A "moderate-impact" scenario would also increase the demand for Bethel construction services due to construction needs in the lower Yukon region.

Most of the labor required to fill direct OCS jobs would be imported. Table 37 illustrates projections of local and imported labor requirements for Norton Basin lease sale 100 (formerly #88).

TABLE 37

Estimated Direct Employment Impact on
Nunam-Kitlutsisti Region* From Norton
Basin Lease Sale 100 (formerly sale #88)

	(Petroleum) Mining		Transport		Construction		Total	
	Local	Imported	Local	Imported	Local	Imported	Local	Imported
Initial (1985)	0	150	0	72	1	18	1	240
Peak (1989)	15	352	45	190	0	1381	60	1923
Year (2000)	15	559	35	105	0	0	50	664

*Region defined as the Bethel and Wade Hampton census divisions
Source: Husky, Webesky, and Kerr.

Table 37 projects direct employment impact from lease sale 100 only and does not account for Norton Basin lease sale 57. Table 38 projects direct OCS employment impact on Bethel from lease sale 100 only.

TABLE 38

Projected Direct Employment Impact on Bethel
From Norton Basin Lease Sale 100

Initial (1987)	Peak (1991)	Year 2000
2	20	13

Source: Husky, Webesky and Kerr.

As Table 38 indicates, direct OCS employment impacts on Bethel are likely to be small. Most employment impacts are likely to be indirect.

Population Impacts

Significant population increases are often a function of increased employment opportunities. Employment opportunities resulting from Norton Basin OCS activities will concentrate in the Norton Sound Region, therefore OCS population impacts will also concentrate in Norton Sound. A "high-find" or "moderate find" scenario in the Norton Basin is likely to indirectly increase employment opportunities in Bethel, which may result in a small population increase.

Potential OCS-Related Facilities

A variety of facilities are associated with OCS development. Bethel is not likely to become a marine service base for OCS-related activities due to the long distance to any lease area. However, Bethel could possibly serve as an air support facility due to its position as the major air transportation hub for southwest Alaska.

A Bering Sea refinery would be economical if lease sales in the Bering Sea are successful (Alaska Research Service). Bethel could be attractive as a small refinery site because of a good port facility, availability of level land, availability of electricity and Bethel's role as the regional hub for transportation and commerce. Major obstacles to transporting crude oil by barge to Bethel include the short shipping season and the distance to Norton Sound. An alternative to moving crude oil by barge is moving it by pipeline. A short pipeline could deliver oil from Norton Sound to Bethel year-round and make a refinery feasible. However, obstacles to construction of a Norton-Bethel pipeline include the high investment costs of a pipeline, the presence of the Yukon Delta National Wildlife Refuge, and complex land ownership.

Bethel is incapable of becoming a major petroleum staging area or the terminus of a major pipeline. Tankers needed to supply such facilities require a draft of 66 feet (Alaska Department of Community and Region Affairs), but Bethel is only capable of accommodating an 18-foot draft ship. The shallow draft capability of the Bethel port would also preclude location of a Liquified Natural Gas (LNG) conversion plant, which requires a draft capability of 46 feet (Alaska DCRA).

Potential Socio-Cultural Impact

If a "medium-find" scenario becomes reality in the southern Norton Sound, the impact on the socio-cultural systems of the lower Yukon villages would be dramatic. A sudden influx of "outsiders" would bring large numbers of non-natives to a predominatly native culture. Resource development and support facility construction would likely interfere with subsistence activities. In contrast the socio-economic impact on Bethel would likely be small due to Bethel's distance from Norton Sound. However, many municipal and cultural services are already strained due to Bethel's rapid population growth. Bethel may be incapable of accommodating even a small population growth.

Potential Environmental Impacts

Potential environmental impacts on Bethel from Norton Basin development are likely to be minimal. The location of OCS-related facilities in Bethel faces either physical or economic constraints. An unlikely exception could be the construction of a refinery in Bethel. The environmental impacts of refineries are diverse, affecting air quality, water quality, soil stability and aesthetics.

TOURISM

A 1979 survey by Darbyshire and Associates for the Bethel Comprehensive Plan seems to indicate that Bethel residents do not favor the development of a tourist industry (some residents doubt the accuracy of the survey). 46% of the survey respondents felt tourism was undesirable, 16% felt tourism was desirable, and 22% had mixed feelings. Despite the apparent negative public sentiment towards tourism, Bethel contains some resources that could support a significant tourist industry.

The resources that could be most easily developed for tourism in Bethel would be sport fishing and hunting. These two sports currently provide a small amount of tourist activity in Bethel. Rainbow trout is common in most of the streams along the lower Kuskokwim River. The average size of King salmon in the Kanektok River (on Kuskokwim Bay) is among the largest in the state, with 30-40 pound fish common. Hunting and fishing camps combined for over 25% of the 17,400 total visitors in 1978 to the towns of Barrow, Prudhoe Bay, Nome, and Kotzebue. The average charge for a guide was $300.00 per person per day and the average charge for a hunting or fishing camp was $75.00 per person per day (Berger and Assoc.). Tourism in these four western and northern towns is dominated by packaged tours. Packaged tours do not currently operate in Bethel. The extensive tourist industry in other western and northern towns as compared to Bethel, and the attractive hunting and fishing resources in Bethel, combine to illustrate the potential for a tourist industry in Bethel. However, a major obstacle to expansion of the sport fishing and hunting industry would be competition with subsistence activities.

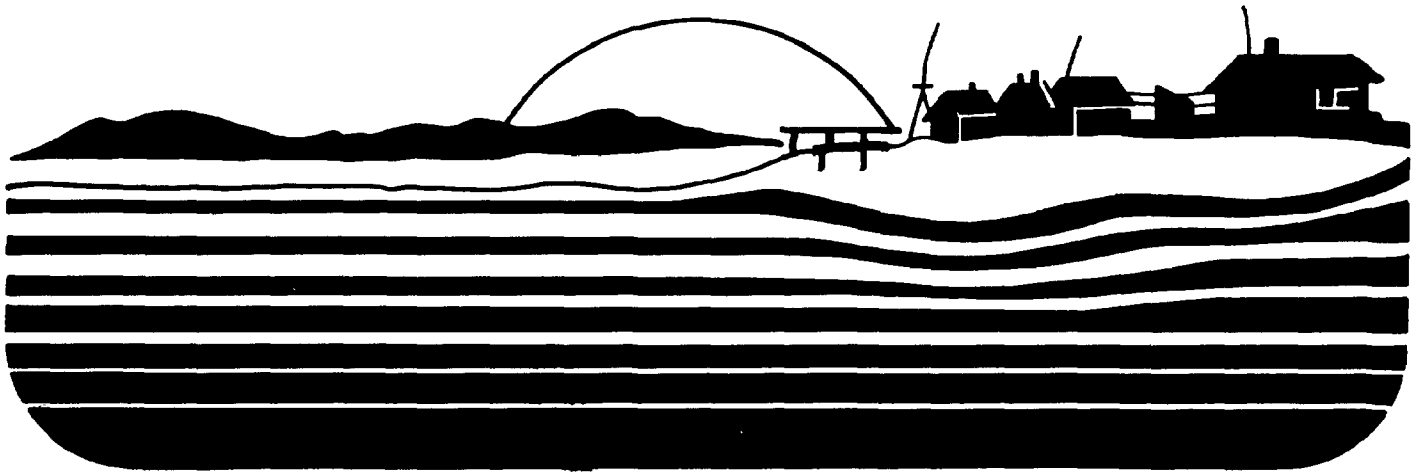
Another potential tourist attraction is the Kuskokwim 300 Dog Sled Race. The race is well known in Alaska and increasing in popularity each year. Currently, visitors are almost always directly connected to the race and volunteers in Bethel provide most of the visitors' accommodations.

The employment industries usually affected by tourism are, in order of impact; transportation, retail trade including eating and drinking places, hotel and lodging places, and amusement and recreation services. Bethel is

served by an extensive transportation industry that could probably easily accommodate an influx of tourists. The retail trade, lodging, and recreation industries would likely have to expand to accommodate an influx of tourists.

RESOURCE ANALYSIS

Chapter 3



RESOURCE ANALYSIS

Under section 6 AAC 85.060 of the guidelines of the Alaska Coastal Management Program each district is required to include a resource analysis which describes the following:

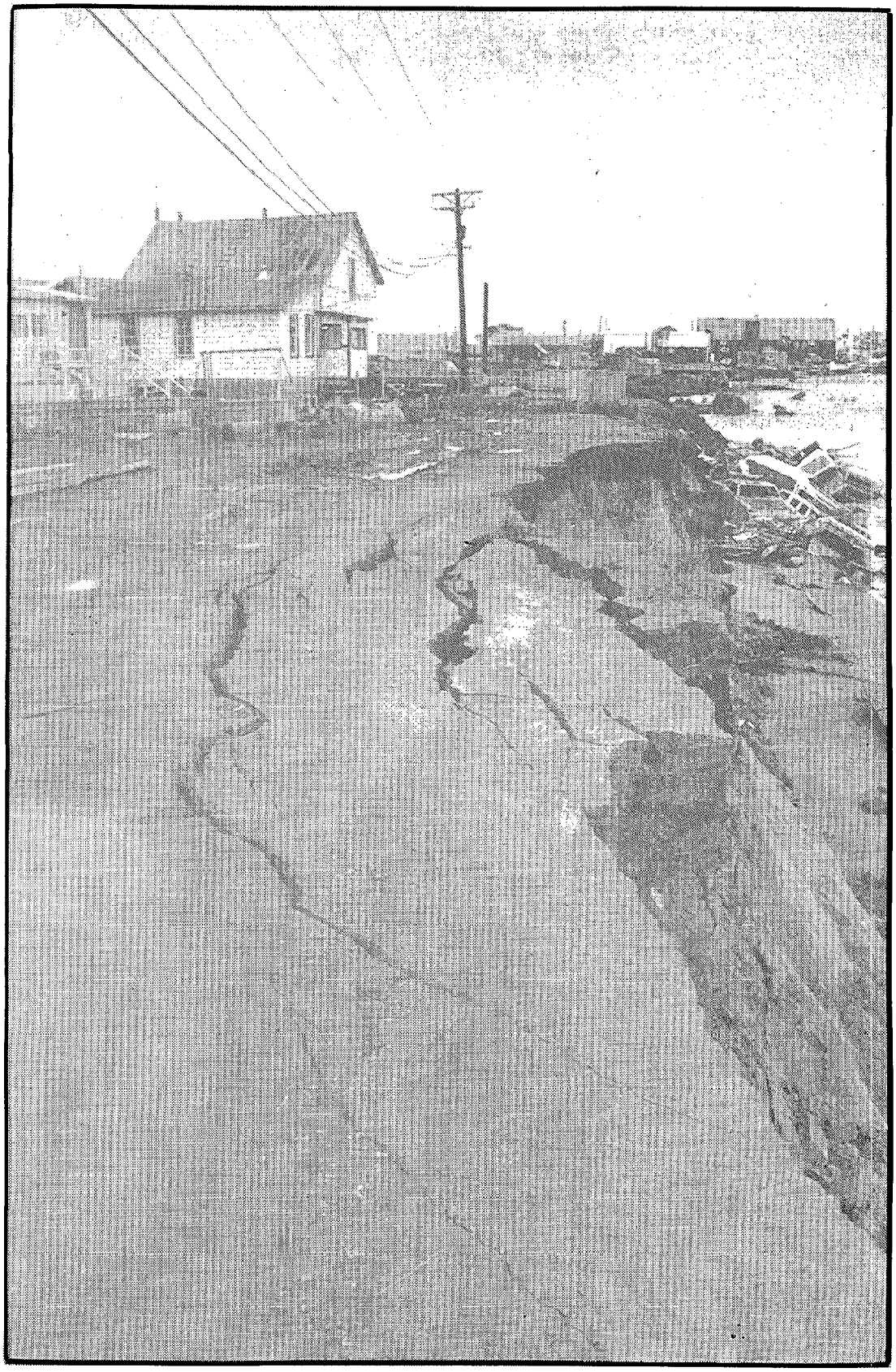
1) Significant anticipated changes in the matters identified under the Resource Inventory;

2) An evaluation of the environmental capability and sensitivity of resources and habitats, including cultural resources, for land and water uses and activities; and

3) An assessment of the present and anticipated needs and demands for coastal habitats and resources.

The analysis is divided into four sections. Natural, economic and cultural cultural resource analyses follow the lines developed in the previous sections. Also a land use compatibility matrix is provided to be used as a decision-making tool, with the caution that land use compatibility is only one of many factors to be considered in the decision-making process.

Two issues, wetlands and riverfront land use, are considered in separate chapters. These two have been singled out for more in-depth analysis since the issues are quite complex and important to the future development of Bethel.



NATURAL RESOURCES

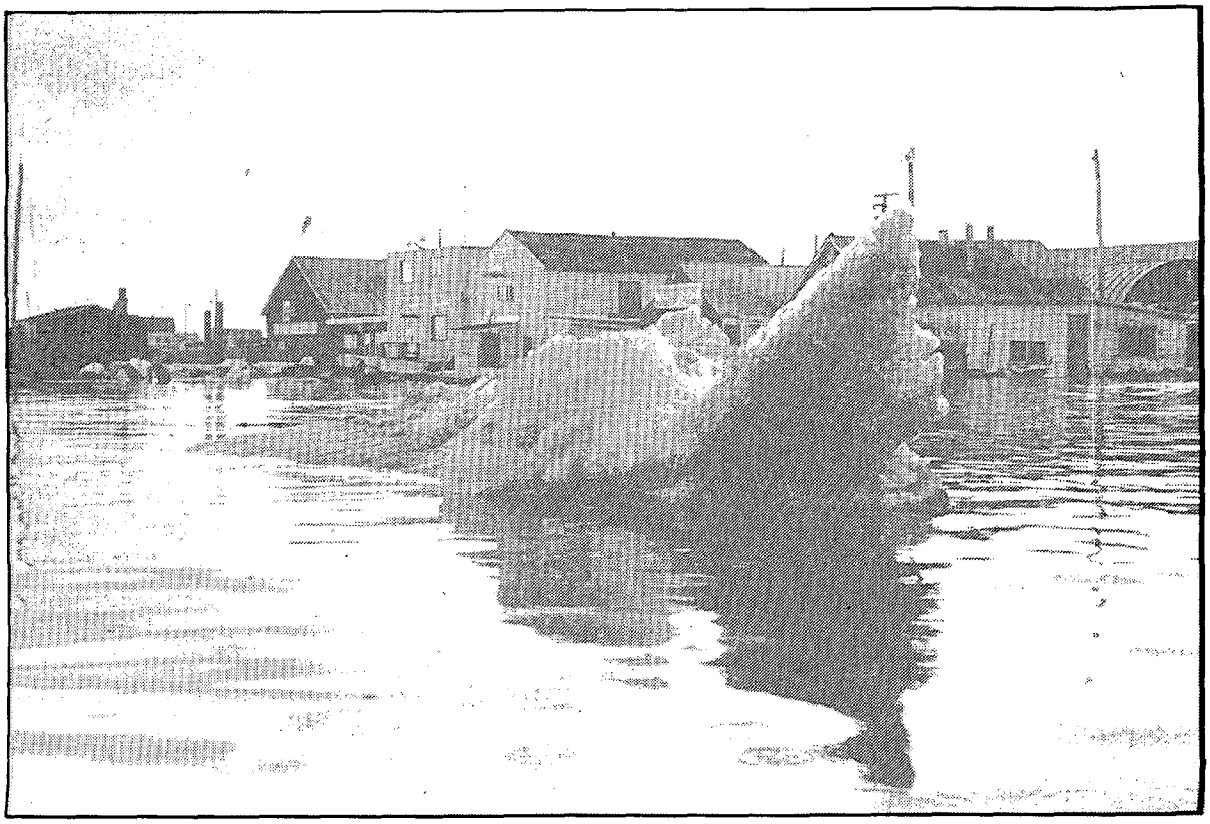
Significant changes to the natural resources in the Bethel area are likely to originate from either intensified human activities or natural occurences of the Kuskokwim River. The human activities include increased urban development or increased resource utilization. Natural occurances of the Kuskokwim River include flooding and bank erosion.

Past urban development has occurred without consideration to natural drainage patterns in the area. Basically all of the Bethel area is wetlands, and most has poor drainage. Any obstruction of the natural drainage patterns intensifies ponding, flooding, and erosion problems. A comprehensive drainage study is needed that will include proper locations for culverts, drainage easements, and the development of subdivision standards. Wetlands management should be addressed in depth.

Most of the soils in the Bethel area are not suitable for urban development, a condition that is compounded by the fragility of the permafrost that underlies Bethel. Construction of roads and buildings which exposes the permafrost causes it to melt, which in turn causes slumping and buckling. Melted permafrost is very unstable and is a major factor in drainage problems in Bethel. The Kuskokwim bank erosion is a natural example of how melting permafrost accelerates erosion. Better construction practices may be helpful in reducing dramage to the permafrost.

Most of the fish and wildlife habitats surrounding Bethel can be classified as either freshwater habitat or as wetlands. Both habitats are very sensitive to human caused disturbances. Wetlands and freshwater habitats are crucial for fish, waterfowl, and furbearers. The habitats surrounding Bethel are experiencing increasing pressure from urban expansion, and intensified hunting and fishing pressures from subsistence, commercial, and sport users. Detailed studies and careful management of the fish and wildlife resources in the Bethel area are needed in order to insure the sustainability of the resources. Nomination of the area used most heavily for subsistence by Bethel residents as an AMSA (area meriting special attention) would be a good way of focusing attention on these resources.

The Kuskokwim River is the most vital and most dynamic natural resource in Bethel. The river is not only a vital fish and wildlife habitat, but is a dominant feature in determining the future development of Bethel. The gradual movement of the river channel is resulting in an erosion problem that is threatening many businesses and homes on the waterfront. There are plans to begin the initial phase of a bank stabilization project that will consist of seawall and articulated concrete mat. Flooding is a natural phenomenon of the Kuskokwim River that occasionally drastically alters the physical appearance of Bethel. Most of the developed portion of Bethel lies within the flood plain. Efforts need to be made to discourage future construction in the flood plain.



CULTURAL RESOURCES

The City of Bethel has experienced tremendous population growth over the past two decades. Bethel's role as a service, transportation, and economic center for the Yukon-Kuskokwim Delta region suggest that the community's population will continue to grow. However, the rate of growth will depend on many external factors including changes in government policies, particularly those which affect Federal and State expenditures for the support of social service agencies, employment assistance programs, the PHS hospital, and capital projects; and major regional economic developments, including forest products, mining, and petroleum activities.

Future population growth in Bethel will necessitate increased city utility services and the expansion of community facilities. Current methods of waste disposal including solid waste, sewage, and grey water runoff will not be adequate as the community continues to grow. The construction of the new public utility facility will alleviate the immediate problems; however, the development of a comprehensive long range utility plan is badly needed.

Increased community growth will also demand the construction and development of facilities and areas for cultural and recreational pursuits. Funding for such facilities has mostly come from State legislated appropriations which will continue to be the only reliable source of funding in the near future. While the State appropriations for capital projects finance the construction costs, the City is responsible for the projects' operation and maintenance costs. To insure that the cost of capital projects incurred by the City is not excessive, feasibility studies that include a cash flow analysis of the capital project should be required.

The City's development of community and neighborhood parks, the maintenance of adequate open space, and the expansion of community facilities is contingent on the availability of land to the City. At present the City owns only three percent of the land within the entire city limits, and is limited in its ability to provide the basic city services and recreational and cultural amenities demanded by the community. The City is entitled to

receive not more than 1,280 acres of land for municipal expansion purposes from the Bethel Native Corporation under Section 14(c)(3) of ANCSA. In deciding which lands might be conveyed the City should identify areas in which municipal expansion would be the most appropriate, and consistent with the City's long range planning efforts. The conveyance of municipal lands will not be completed until the status of other lands selected by the Bethel Native Corporation have been resolved.

Another concern expressed by the city regarding municipal expansion is the land use implications of the certification of pending native allotments, which encompass a major portion of the developable land surrounding the town. In light of the eventual certification of these properties it would behoove the City to seek cooperation with landowners, developers, and federal agencies, namely the BIA, in their planning efforts.

An additional area where land use is of particular importance to the community is along the riverfront. The factors of erosion, economic activities, and intense multiple use combine to warrant special attention to riverfront land use.

As the City of Bethel experiences increased community development the potential for conflicting land uses is certain to arise. Because of the importance of the natural resources of the Kuskokwim River to residents of Bethel for subsistence, recreation, transportation, and economic activities, an evaluation of existing and potential conflicting land and water uses and activities is provided in the Land and Water Use Compatibility Matrix.

ECONOMIC ACTIVITIES

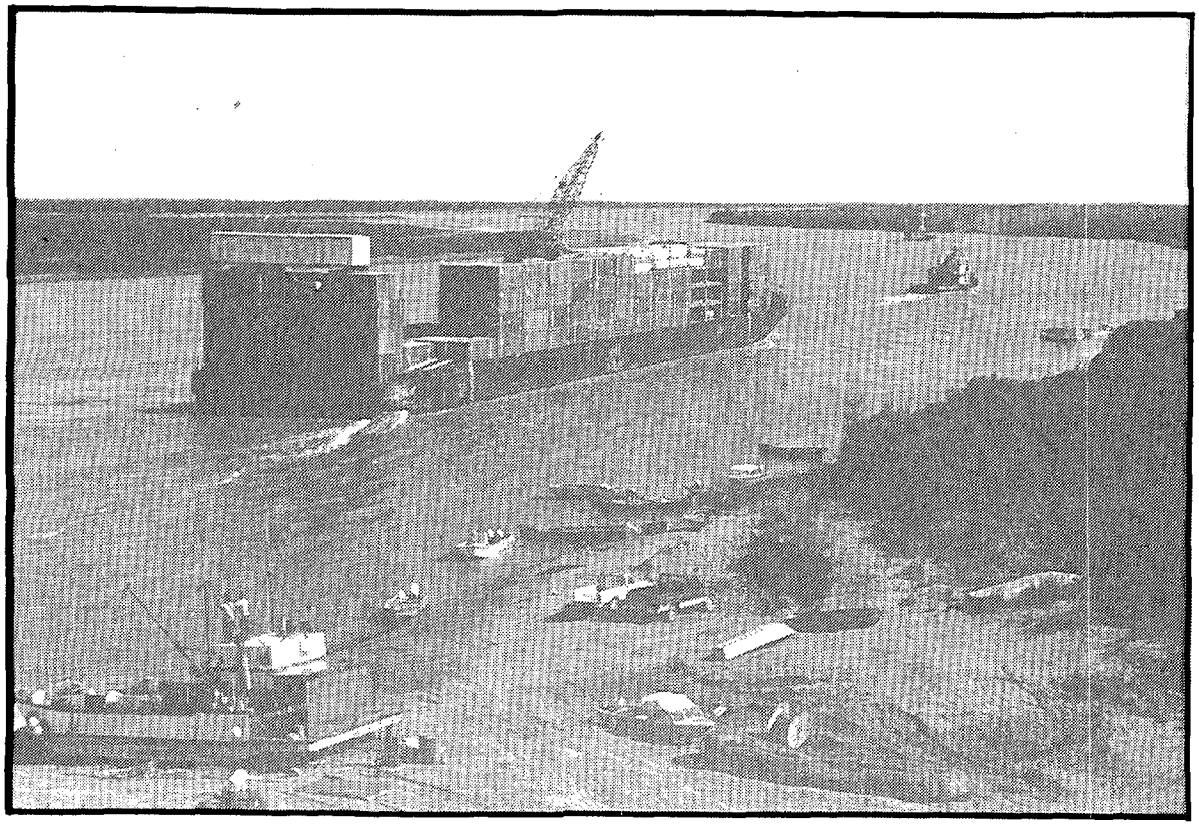
Over the past two decades Bethel has experienced tremendous economic growth concurrent with its population growth. The growth has been directly related to the expanding role of Bethel as the center of transportation, government, and services for southwest Alaska. Recent governmental cutbacks have severely impacted government and social services, and will likely have a negative effect on the Bethel economy for at least the short term. However, several other factors have the potential for contributing to rapid economic growth in the future including energy development, tourism, and expansion of the transportation industry.

Electricity is produced in Bethel and all the surrounding villages by expensive diesel generators. The Kisaralik River Hydro project has been proposed as a source of inexpensive electricity, but many economic and environmental questions remain unanswered. The Bethel National Guard Armory has a small wind generator that is operating, but investment costs are still too prohibitive for the average homeowner. Other energy alternatives being explored and developed include increased use of wood, solar technologies, and conservation.

The potential for impact from Outer Continental Shelf (OCS) activities has caused considerable concern in Bethel. Bethel's role as the transportation and service center for southwest Alaska may attract OCS activities, despite the long distance to lease sale areas. The municipal and social services in Bethel are already strained due to rapid population growth and a sudden influx of OCS-related population may overload the services. Bethel needs more specific information concerning potential OCS impacts.

The transportation needs of Bethel have expanded significantly in the past and are expected to continue growing in the future. Plans for the immediate future include construction of a badly needed transshipment dock and construction of a small boat harbor. The small boat harbor has caused some consternation because it will be built in the flood plain, will destroy forty-two acres of wetlands, and the site is adjacent to some cautious

neighbors. The proposed Yukon-Kuskokwim crossing would have a significant impact on port activity and would increase availability of some consumer products in Bethel.



Commercial fishing (primarily salmon) is a major component of the Bethel economy during the summer. The industry thrives on a fragile and limited resource, therefore educated and careful management is essential. The development of a whitefish or bottomfish industry has some potential but more detailed biological and market research is needed.

The tourist industry is practically non-existent in Bethel. However, a considerable potential exists to develop fishing and hunting tours or promotion of the Kuskokwim 300 Sled Dog Race.

CONFLICTING LAND AND WATER USE DEMANDS

In the planning and approval of future land uses and activities along coastal areas, development which may adversely affect the natural environment and preservation of resources and which would be incompatible with existing surrounding land uses should be avoided. The following figure illustrates the degree of compatibility that exists among selected land uses. An explanation of the parameters is provided below.

Weighting Values

The degree of compatibility is weighted as being of high, moderate, or low compatibility. High compatibility represents a condition when, in most cases, the land use is compatible with another selected use (as represented by the other parameters). A moderate weighting refers to a condition where the land use is partially compatible with another use and can be mitigated for further compatability. Low compatibility refers to a situation when, in most cases, two selected land uses would produce major negative impacts or simply could not be carried out at the same location. The evaluation of compatibility between the selected parameters is fairly subjective. The matrix should be considered only as a guide for the district's coastal plan.

Parameters

The parameters on the y-axis (land and water uses and activities) are grouped according to 1) water dependent, 2) water related, and 3) non-water dependent. (The Coastal Management Standards require that districts and state agencies give first priority to water-dependent uses, second priority to water-related uses, and final priority to uses that are neither water-dependent or water-related, when planning for the development of coastal areas. See glossary for definitions of water-dependent and water-related.) The x-axis of the matrix represents future or potential coastal uses and activities that are subject to the district program. The matrix is to be read horizontally so that the parameters on the y-axis are evaluated with the potential coastal uses on the x-axis.

Subsistence - refers to the use of the river for subsistence hunting and fishing. The concern for subsistence in this case is as much subsistence use outside the City boundary as it is inside the boundary.

Commercial Fishing - refers to the use of the river to take commercial fish harvests.

Seafood Process - refers to canneries and freezer processing plants and associated dock facilities.

River Transportation - includes public and private day use boat docks.

Cargo docks - refers to commercial docks as required for transhipment exchange and temporary storage.

Boat Harbor - pertains to docking/marina facilities for the continuous moorage of small boats, plus support facilities such as fuel sales, haul out areas and gear storage.

Sea Plane Transportation Facility - pertains to sea plane ports.

Oil and Gas Facilities - refers to petroleum storage tanks, docking and pumping facilities.

Air Cushion Vehicular Transport - pertains to the use of the river as a transportation corridor by hovercraft.

Tourism - pertains to facilities and services, such as restaurants, motels and boat tours, that are primarily designed to attract tourists.

Forestry - pertains to the use of the river for rafting, shipment or onshore storage.

Mining - refers to the use of the river as a means for shipping equipment and/or ore and on-shore storage.

Residential Development - refers to private housing.

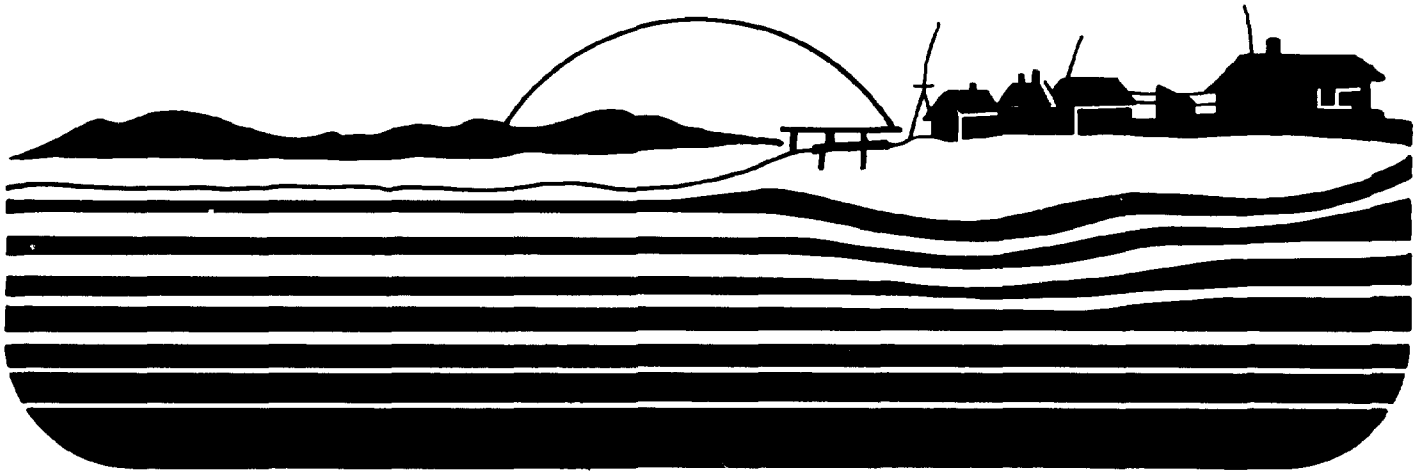
FIGURE 26
LAND AND WATER USE COMPATIBILITY MATRIX

Land and Water Uses and Activities	Urban Development: Residential	Urban Development: Commercial	Urban Development: Industrial	Urban Development: Open Space	Timber Harvesting	Subsistence	Fishing and Fish Processing	Recreation	Energy Facilities	Transportation and Utilities	Mining
Water Dependent											
Subsistence	◐	●	●	○	●	○	◐	◐	●	◐	●
Commercial Fishing	◐	◐	◐	◐	●	◐	○	●	◐	○	●
Seafood processing	●	○	○	●	◐	◐	○	●	◐	○	●
River transportation	○	○	○	○	○	○	○	○	○	○	○
Cargo dock	●	○	○	●	○	◐	○	●	○	○	○
Small boat harbor	◐	○	○	●	●	○	○	○	◐	○	◐
Oil and Gas facilities	●	○	○	●	◐	●	●	●	○	○	◐
Seaplane	●	○	○	●	◐	◐	○	◐	○	○	◐
Forestry	●	○	○	●	○	●	●	●	◐	○	◐
Mining	●	○	○	●	◐	●	●	●	○	○	○
Air Cushion Vehicular Transport	◐	○	○	◐	○	◐	○	○	◐	○	○
Water Related											
Tourism	●	○	◐	◐	●	●	◐	○	○	○	●
Recreation	◐	●	●	○	●	◐	◐	○	●	○	●
Non-Water Dependent											
Residential Development	○	◐	●	◐	●	●	◐	◐	◐	○	●

KEY: ○ High Compatibility
◐ Moderate Compatibility
● Low Compatibility

RIVERFRONT LAND USE STUDY

Chapter 4



RIVERFRONT LAND USE STUDY

Early discussion on the coastal management issues facing Bethel revolved around the riverfront, the way it was being used now and what the future land and water use needs would be. Riverfront land use was identified as a major concern, and in need of some indepth study. This chapter is the first step in developing a riverfront land use plan. It presents background information on current uses, and considerations for redevelopment of the area. It is not a land use plan, nor does it endorse the ideas presented.

The background information was prepared by the Planning Department. The design considerations for riverfront revitalization are taken from a preliminary report prepared for the City by ESE/Kasprisin Pettinari Design. The report, entitled "Bethel Waterfront Revitalization Study: A Conceptual Report" is available from the City Planning Department.

Background Information

Bethel, the service and trade center for the Yukon-Kuskokwim Delta, is a community with a population f 3,500. When the community was initially settled, it occupied ground along what was a side stream of the Kuskokwim River. At that time (late 1800's), Bethel's waterfront was protected by a series of small islands. Those islands have long since eroded away along with several hundred feet of riverbank. The Army Corps of Engineers' draft, "Bank Stabilization Environmental Statement and Feasibility Report", April 1981, indicates an erosion rate of eight feet per year along the town front and twenty-five feet per year near Public Health Service lands and the Petroleum Tank Farm.

Throughout its history, Bethel's ties to the Kuskokwim have remained extremely strong. The river is a primary lifeline for the community. The river provides much of the subsistence resources utilized by area residents. A high percentage of incoming freight for the entire region arrives by way of ocean going barges.

The river provides one of the few avenues for personal travel throughout the year. During summer, over 1,000 privately owned river skiffs and boats

are utilized as residents engage in activities ranging from subsistence and commercial fishing to wood gathering. During winter, individuals using snowmachines, automobiles, and dog teams travel on the river ice.

The river helps sustain the community as a livelihood source, but also threatens the community. Spring floods are an expected occurrence. Floods and erosion have caused a movement to develop areas of higher ground away from the riverfront and flood plain.

Bethel residents agree that improvements to the riverfront are a great need. Current land usage does not meet the community's demands. As the community continues to develop, a river front strategy must be brought into existence.

This background report on Bethel's waterfront reviews current land use and ownership. Also reviewed is access. Originally the community developed in such a way that access was not questioned. Use and access to the river was an integral part of life. Today, access has become a problem due to private river front land ownership and the stop-gap erosion control method of placing old automobile bodies against the riverbank.

Current Land Use

There are ten miles of riverfront property within Bethel City limits. Only two miles of this frontage are currently developed. This area begins at what is known as "Lousetown" near Brown Slough and extends downriver to the Petroleum Tank Farm area; and the construction dock and staging area known as "Hately's Old Fox Farm Area." (Figure 27)

Current waterfront land use falls into four (4) primary categories: residential, commercial, industrial, and undeveloped. For purposes of this report, the properties under review are those immediately adjacent to the river and Brown Slough up to the bridge, or those that will be impacted by port development, continued erosion, or seawall construction.

Eighty-two (82) parcels fall into this category. As of early 1982, 58 were primarily residential, 31 were primarily industrial and 11 were primarily commercial. Some had large areas of undeveloped space on them. In addition to these parcels, there was a large tract of undeveloped property extending from Mission Road south behind the old Public Health Service (PHS) Hospital.

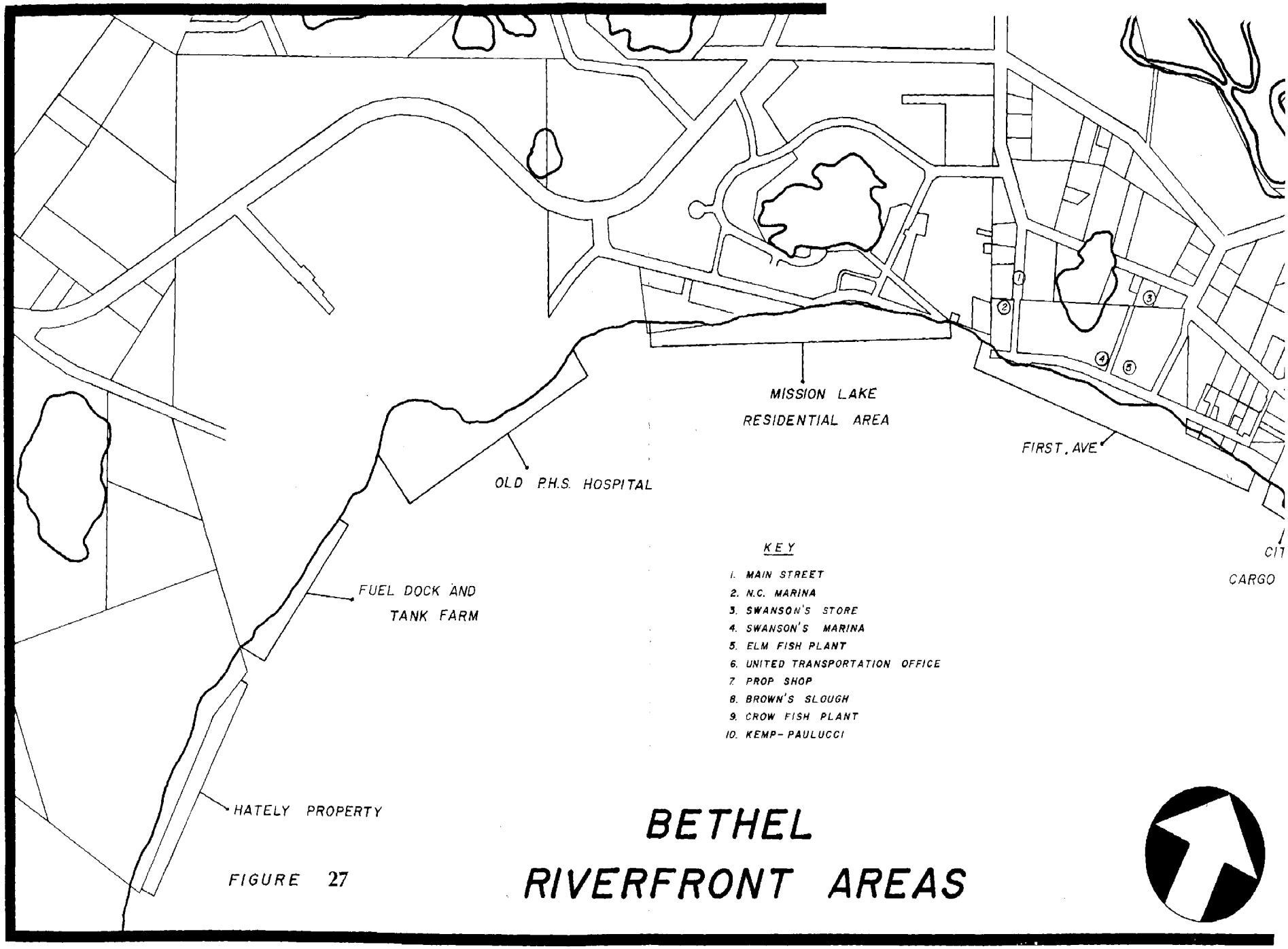
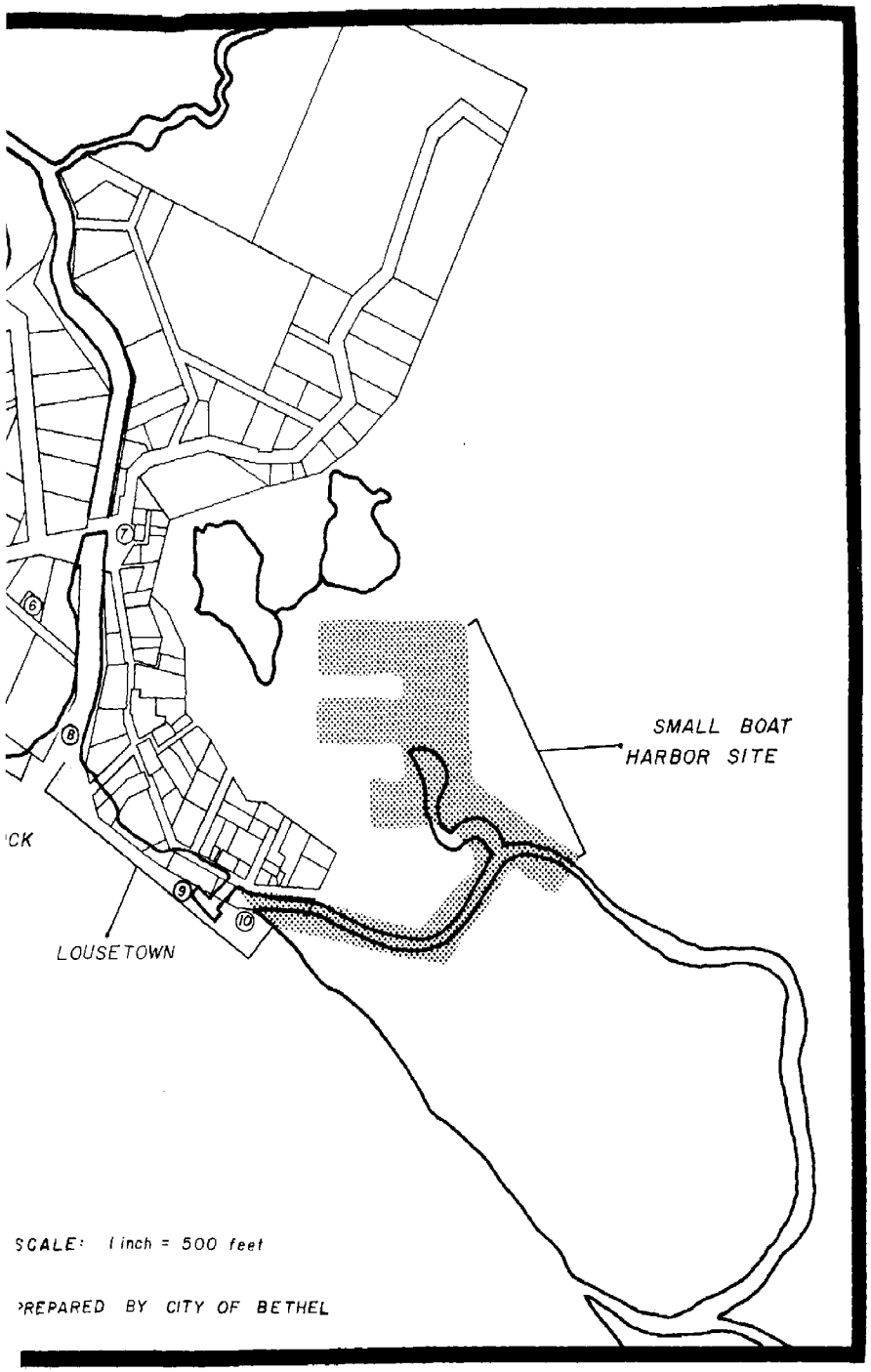


FIGURE 27

BETHEL RIVERFRONT AREAS


SMALL BOAT
HARBOR SITE
LOUSETOWN
SCALE: 1 inch = 500 feet
PREPARED BY CITY OF BETHEL

This property has 5,000 feet of river frontage.

Since the lots and parcels of riverfront land vary greatly in size, it is necessary to look at land use percentages. The figures shown in tables 39 and 40 were developed by using the Land Use and Land Ownership maps located in the pocket of this report. (Figures 39 and 40). The maps were prepared in early 1982. The percentages given are approximate.

TABLE 39

Riverfront Land Use by Category

Use	Percent of Total
Industrial	35%
Residential	27%
Undeveloped	27%
Commercial	11%
	100%

TABLE 40

Riverfront Land Ownership by Category

Ownership	Percent of Total
Private	49%
City of Bethel	22%
Federal	19%
Certified Native Allotment	10%
	100%

It is instructive to look at uses of riverfront land that are water-dependent or water-related. The ACMP defines water-dependent uses as those which require access to the water body. Water-related uses do not require access to water but provide goods or services directly associated with water-dependence and which, if not located adjacent to water, would result in a public loss of quality in the goods or services offered.

Industrial activities that are water-dependent include: the City Dock; United Transportation Offices and Operations area; Binkley Co./Northwest Navigation; J.B. Crow and Sons Fish Processing Plant; Elm Fish Processing Plant; Kuskokwim Fishermen's Co-op Warehouse; Alaska Commercial Warehouses

(currently leased as Fish Processing Plant); Standard Oil Petroleum Tank Farm; Knik's Construction, equipment loading and staging area (Hately property).

Other industrial activities occurring in the waterfront area that are not water-dependent include private warehousing along Brown Slough and the Public Health Service Maintenance yard.

Water-dependent commercial operations include: Hoffman's Fuel Distribution (summer gasoline sales) and Dull's Gasoline Sales. Water-related commercial operations include four marinas: P.J.'s Cat House, Swansons Marina, A.C. Marina, and the Prop Shop.

Commercial activities that are neither water-dependent nor water-related include: The Wild Goose (eatery); the Kuskokwim Native Valley Association Building and Nunam Kitlutsisti offices; the Adult Educational Center; Buck Rogers Disco; City Parks and Recreation Building; Swanson's Store and Lumber Sales; First National Bank; Riverfront Restaurant; and Tundra Drums Newspaper/ Tundra Press. Swanson's business, while not water-related, benefit from their proximity to the river, as residents from outlying areas often use Swanson's services due to the ease of transferring purchased goods from the store to their sleds or boats.

Current residential use is primarily single-family, with many residences located between various commercial and industrial operations. There are at least fifteen residential lots in the Mission Lake neighborhood (United States Survey (USS) 870) that will be affected either by continued erosion or erosion control methods, i.e., continued dumping of wrecked automobiles or permanent seawall construction. Residential lots in other neighborhoods, such as Lousetown, will also be affected.

Current Development

Immediate riverfront needs being addressed by the City include the seawall, a small boat harbor and dock/port expansion.

Seawall construction has begun along the waterfront. Construction completed includes the city dock and the western bank of Brown Slough adjacent to the dock. Underway is construction along the frontage of the Petroleum Tank Farm.

Also underway is testing of a steel pipe system for building the remainder of the seawall. The City will receive an additional five million dollars for

seawall construction in 1983. Where the next phase will be constructed is yet to be determined. Funds for the completion of this project will continue to be sought.

Work began on the small boat harbor project in early 1983. The City acquired approximately 50 acres from the Bethel Native Corporation and a Native allotment applicant for the small boat harbor. The primary site will be located on 40 acres, the remaining 10 will be used for disposal of dredged and excavated materials. The harbor will be partially operational in the summer of 1983, and fully operational in the summer of 1984.

The City dock/port was built in 1975. Initial construction created 240 feet of docking frontage: construction in 1982 increased docking frontage an additional 900 feet along the western bank of Brown Slough. An expansion of the dock warehousing area is being pursued in 1983.

Access

Access parallel to the river and actual access on to the river are both current problems. Bethel residents, since the earliest days of community development, have desired to live near the river. Up until recent years, work and home were much the same as many residents gained their livelihood through what is now commonly known as "subsistence."

During the past decade Bethel has grown beyond a subsistence community. This change has occurred due to the growth of the region and Bethel's role as the hub of much regional activity. This growth has provided occupational and cash opportunity. Even with this growth, 70% of the local residents surveyed in 1979 indicated that they obtain some form of food through subsistence activity; one third (30%) of those surveyed obtain 50% or more of their food through subsistence.

Presently this food and resource gathering activity (subsistence) is hampered by poor access to the river. During summer, the Brown Slough area is jammed with river skiffs. The ability to load and unload supplies or goods is hindered by vessels that are parked sometimes as many as three deep, leaving only a narrow navigation channel. Other access points are limited, and usually present difficulties for loading/ unloading of boats.

During winter, snowmachines and other forms of transportation use the river heavily. Similar access problems occur during winter with access conditions being generally poor.

A major concern of the community is the retention and improvement of multiple use of the river including subsistence, commercial fishing, commercial and private transportation. The issue of access is at the heart of this multiple use concern.

Future Development Needs

The existing port is inadequate to handle existing and projected cargo volumes. Current problems are the lack of storage and warehousing facilities and the conflicts between small river boats and larger ocean going vessels. As stated in the Comprehensive Plan, "The City of Bethel needs to make a commitment for the expansion and upgrading of the existing port in order to maintain its role as a distribution center for the region."

The Comprehensive Plan also points out the need for additional land for industrial development and estimates seventy acres will be needed by 1990. Possible areas for industrial expansion include lands adjacent to the existing dock (U.S.S. 3230) and lands within the old PHS Hospital site (U.S.S. 4000).

The seawall is the most pressing future development need. When seawall construction occurs, the nature of the riverfront will be greatly affected. Access and multiple use considerations will be paramount in seawall design. During seawall construction, the need for construction access/easements will begin the change along the riverfront.

Riverfront Land Use

The next step, given the critical importance of the riverfront to city inhabitants, is to develop a land use plan for the riverfront from the small boat harbor to the old fox farm area, including Brown Slough up to the bridge. The land use plan must ensure that the needs and interests of all residents are taken into account in riverfront redevelopment. To that end, the "Bethel Waterfront Revitalization Study" was undertaken. It presents concerns and concepts as an initial step toward a land use plan. It is not a land use plan as it now stands, but a working document to be discussed and used when

developing the plan itself. Inclusion of this report does not endorse the ideas it presents.

The following is exerpted from the "Bethel Waterfront Revitalization Study: A Conceptual Report" prepared by ESE/Kasprisin Pettinari Design. The full report can be obtained from the City Planning Department.

bethel waterfront revitalization study

a conceptual report

seawall/port requirements

o Seawall requirements
- deep enough penetration to withstand undermining;
- strong enough to withstand ice action;
- tight enough for heavy barges;
- high enough for erosion/inundation control;
- appurtenant bank stabilization;

o Port requirements
- capacity enough for two (2) ocean going barges or one (1) ocean going barge plus loading of two smaller river vessels;
- dock height for most vessels should be 10-12 feet above mean level low water.

o Ship sizes
- barge requirements range from 260 feet to 300 feet in length and 76 feet to 100 feet in width;
- draft (loaded) equals twelve to sixteen (12-16) feet.

o Operations
- existing situation consists of a pass/pass system comprised of a double handling system where an article is picked up, deposited, picked up, and redeposited due to a lack of ramp facility;
- ramp additions will permit a roll on/roll off system where a vehicle (forklift) picks up an object once (rolls on) and rolls-off to deposit it in the storage yard, thus reducing labor, time, machinery;
- portable ramps are desired by the major barge operators along with significant improvements in the on-shore land conditions, particularly in the spring thaw period;
- ramp capability should be fifteen (15) feet.

o Transportation components/requirements
- day use boat docks for river transportation;
- cargo docks for transhipment exchange/temporary storage;
- boat harbor, 1,200 continuous slips and support facilities;
- sea plane transportation facility;

- oil and gas facility;
- Hovercraft transporation;
- tourism boat tours, guides;
- forestry use of river via rafting/ shipment/storage;
- mining river transport;
- access via river to outlying residences.

o Generalized port objectives
- stabilize the bank with 1,200 feet of bulkhead between Main Street and Lot 11, Block 20;
- City acquires all of Block 19 and Lots 3 through 8 of Block 20;
- develop a Southwest Alaska deep water port;
- in conjunction with the Yukon-Kuskokwim haul road, develop a major transportation system servicing timber, grain and meat from Nenana, oil from Fairbanks, fuel service to Bristol Bay and Norton Sound;
- provide separate mooring facilities and additional staging area for transhipping vessels;
- provide facilities for ocean-going barges and tugs;
- provide necessary warehousing.

IMPACTS OF RIVERFRONT EROSION

- By 1985, up to and including portion of First Avenue;
- by 2000, all of First Avenue and approaching the edge of Mission Lake;
by 2030, all of Mission Lake, approaching Honey Bucket Lake and taking the majority of the general cargo dock.

determinants

ENGINEERING DETERMINANTS

A seawall design developed by the City of Bethel and Galliett & Silides Engineers is providing the basis for a staged improvement of the waterfront. Based on factors of cost, installation techniques, and material availability, the engineers have proposed a system which accomplishes the following:

o establishes an immediate yet long term beachhead against erosion with a seawall considered economic compared to other recommended engineering options;
o permits improvements on land to be staged according to the successive phases of the seawall construction;
o provides an opportunity to assess in detail future amenity options for public access to the waterfront.

The engineering aspects of the seawall are detailed in the River Bank Erosion Protection Conceptual Plan for the Port of Bethel, developed by Galliett & Silides Engineers.

Highlights of that plan, and the basis for conceptual design recommendations, include the following:

- o a two (2) foot diameter steel pipe pile wall driven into the ground two-thirds the length of the pipe;
- o a runoff intercepting embankment and drainage system to prevent surface runoff from eroding the back side or land side of the seawall;
- o threadbar tie back rods to secure the seawall to the land side;
- o a pedestrian bridge connecting the seawall to finished grade on the land side;
- o a gangway and float;
- o backfill material.

LAND USE DETERMINANTS

The significant uses along the seawall will include cargo loading and unloading; subsistence activity such as access to the water, load/unload facilities, and boat service; resident use for access, circulation, recreation; and commercial and industrial uses which are water-dependent or water related. Primary conflicts occur between subsistence use of the waterfront and cargo operations. Below are listed pertinent determining factors for waterfront facilities by the major use.

Cargo Handling Facilities

- capability to handle two ocean-going barges and one river barge at one time;
- space on-land for long term open storage as well as semi-enclosed storage;
- "roll-on/roll-off" system, defined as a vehicle such as a forklift rolling onto a barge, picking up cargo and rolling off the barge to store the cargo with only one handling operation;
- mud-free work areas and forklift service roads;
- heated warehouse space;
- fifteen (15) foot wide ramps connecting the seawall to vessels;
- storage yard lighting for night shifts.

Subsistence Facilities

- public access to and from the water;
- boat moorage, floats;
- float plane moorage;
- small goods load/unload apparatus;
- on-land temporary storage areas;
- pick-up/drop-off facilities for taxi cabs and private vehicles;
- information points for visitors needing orientation to Bethel area facilities;
- winter vehicle access to river.

Resident Use of Waterfront

- open space buffer along riverfront;
- recreation facilities such as viewing, walking, jogging, skiing, access to water;
- view access to river;
- access for water oriented transportation.

Commercial/Industrial Water-Dependent/Related

- fuel line access for float planes;
- load/unload facilities and access;
- product and supply storage space;
- berthing facilities;
- expansion space on-land and dock space.

land use concepts

The conceptual land use diagram and accompanying circulation diagram highlight the area from the river front to Third Avenue and the State Highway. The intent of the diagrams is to depict a conceptual overview of land use organization as it relates to waterfront issues.

The area receiving the more intense waterfront use, from Browns Slough west to Mission Lake Road, is highlighted in three-dimensional sketches as examples of physical development based on the conceptual land use plan.

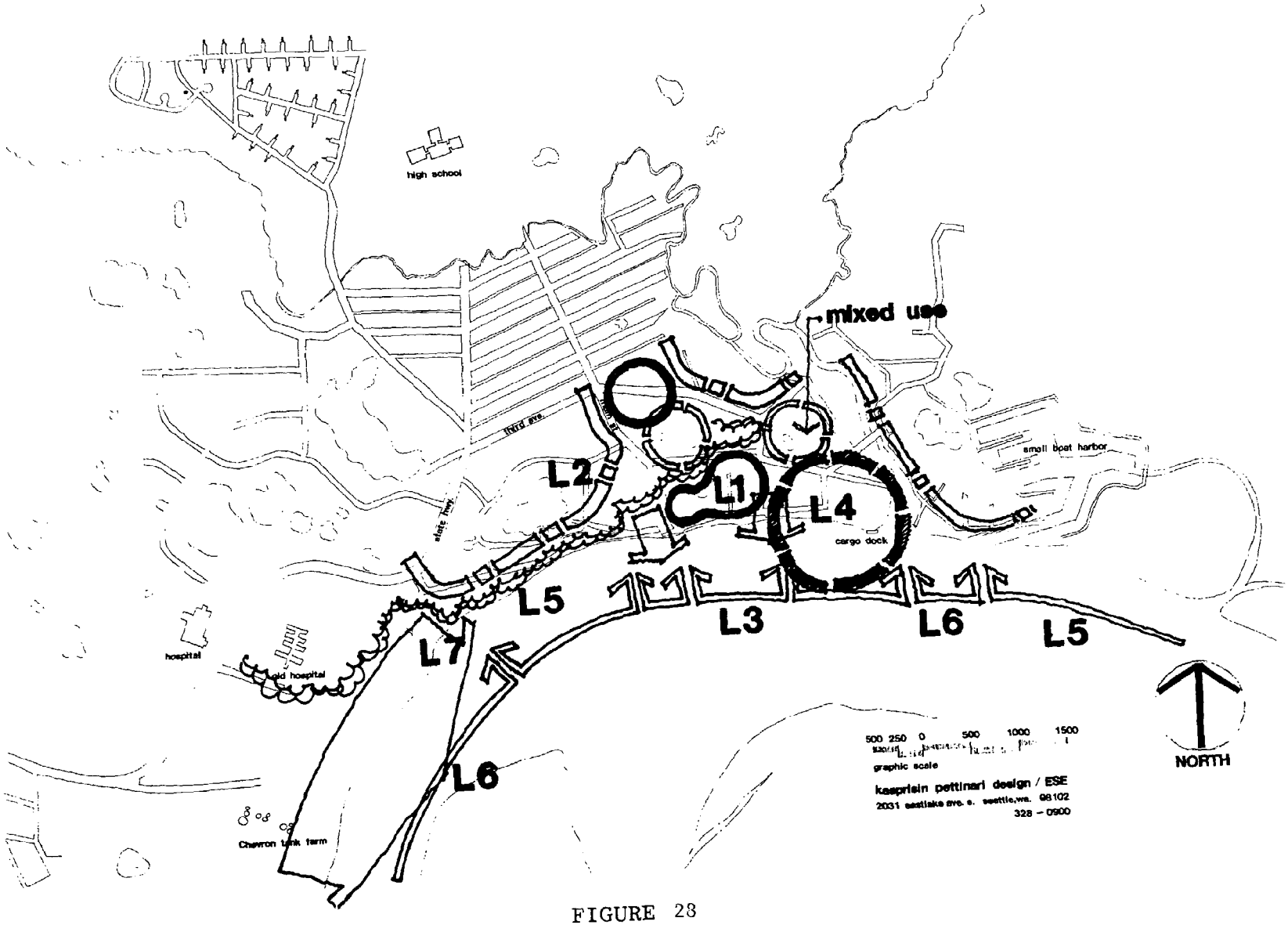

high school
mixed use
third ave.
state hwy.
small boat harbor
L1
L2
L3
L4
L5
L6
L7
cargo dock
hospital
old hospital
Chevron tank farm
500 250 0 500 1000 1500
graphic scale
kasprisin pettinari design / ESE
2031 eastlake ave. e. seattle,wa. 98102
328 – 0900
NORTH

FIGURE 28

policy considerations

o Land Use

L1. Define the size and extent of the Main Street-Elm Street general commercial use;

L2. identify and strengthen the edge of existing and future residential districts and neighborhoods;

L3. allocate sufficient lands along the waterfront for subsistence support activities;

L4. allocate sufficient lands for existing and future general cargo dock facilities, to be developed in a phased manner over time;

L5. in residential districts adjacent to the river, preserve the waterfront for access and use by neighborhood residents;

L6. allocate waterfront areas for water/dependent/water related commercial and indusstrial future uses;

L7. set aside public lands for public waterfront access and future industrial water dependent use;

L8. designate wetlands, pond areas and adjacent buffer strips as open space; utilize this open space as edges and boundaries for residential, commercial and industrial land use;

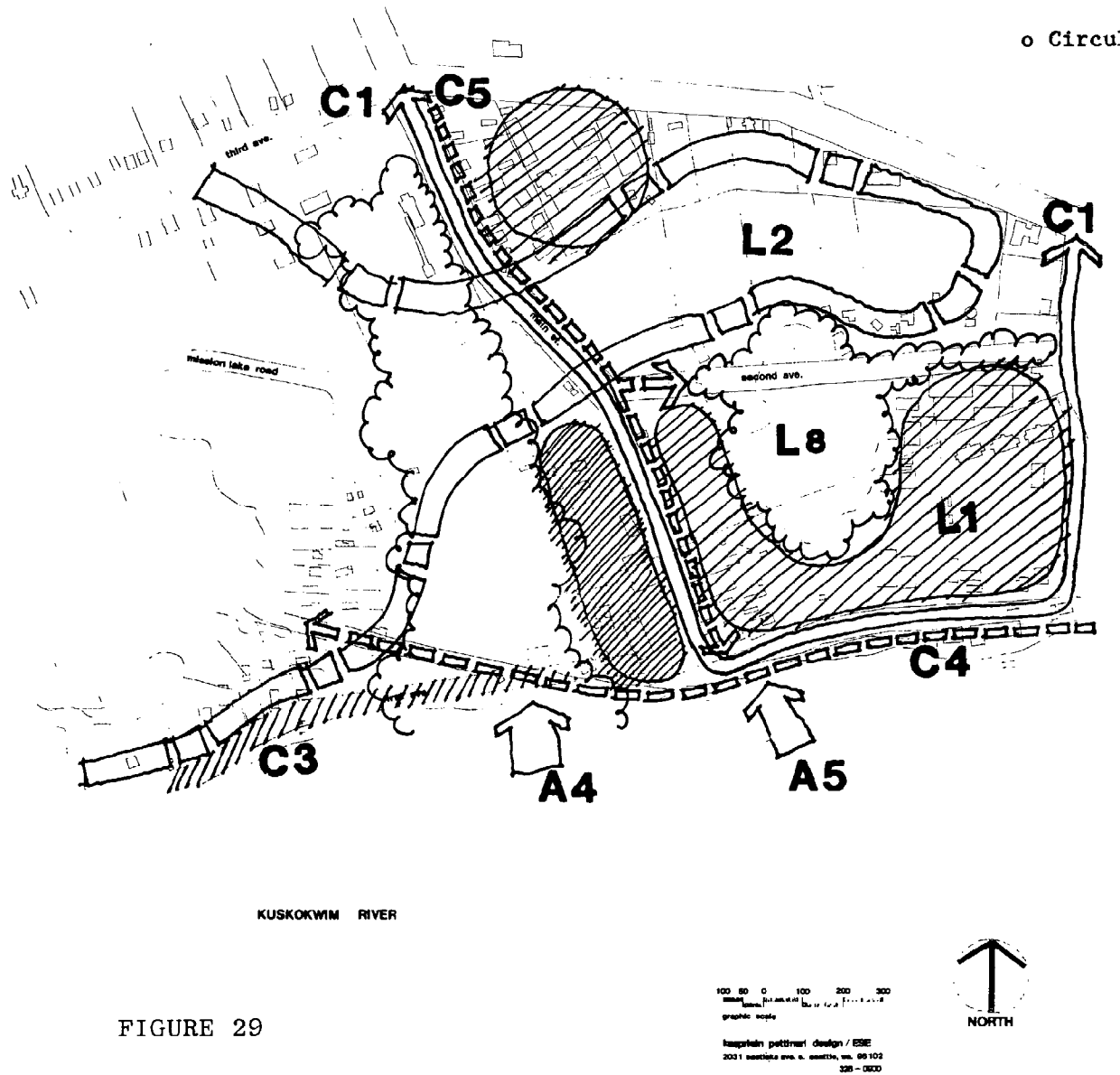


FIGURE 29

o Circulation

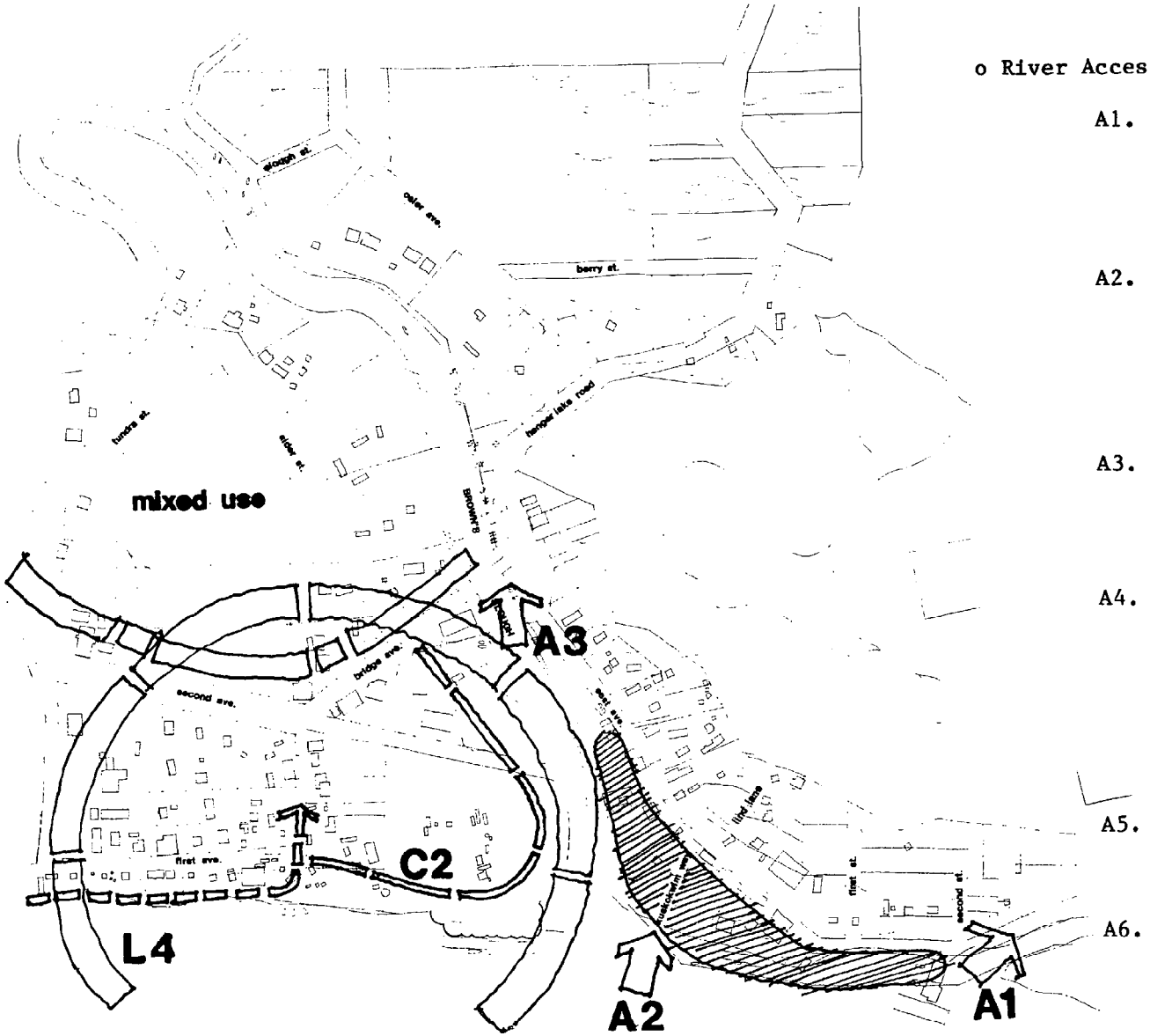
C1. Establish Main Street-First Avenue-Elm Street as a collector street;

C2. develop a lime rock or hard surfaced service-work road through the general cargo dock area in an alignment parallel to the seawall;

C3. abandon First Avenue west of Main Street from future consideration as a through street;

C4. designate a pedestrian trail system throughout the waterfront area coordinated with a seawall walkway segregated from motorized vehicles;

C5. establish an easement along the eastern edge of Main Street right-of-way for a pedestrian walkway connecting the waterfront to the center of Bethel;



o River Access

A1. Lousetown Slough/Entrance, Small Boat Harbor; boat moorage should be limited to the small boat harbor;

A2. Kuskokwim Way neighborhood access only; coordinated with a neighneighborhood subsistence support facility;

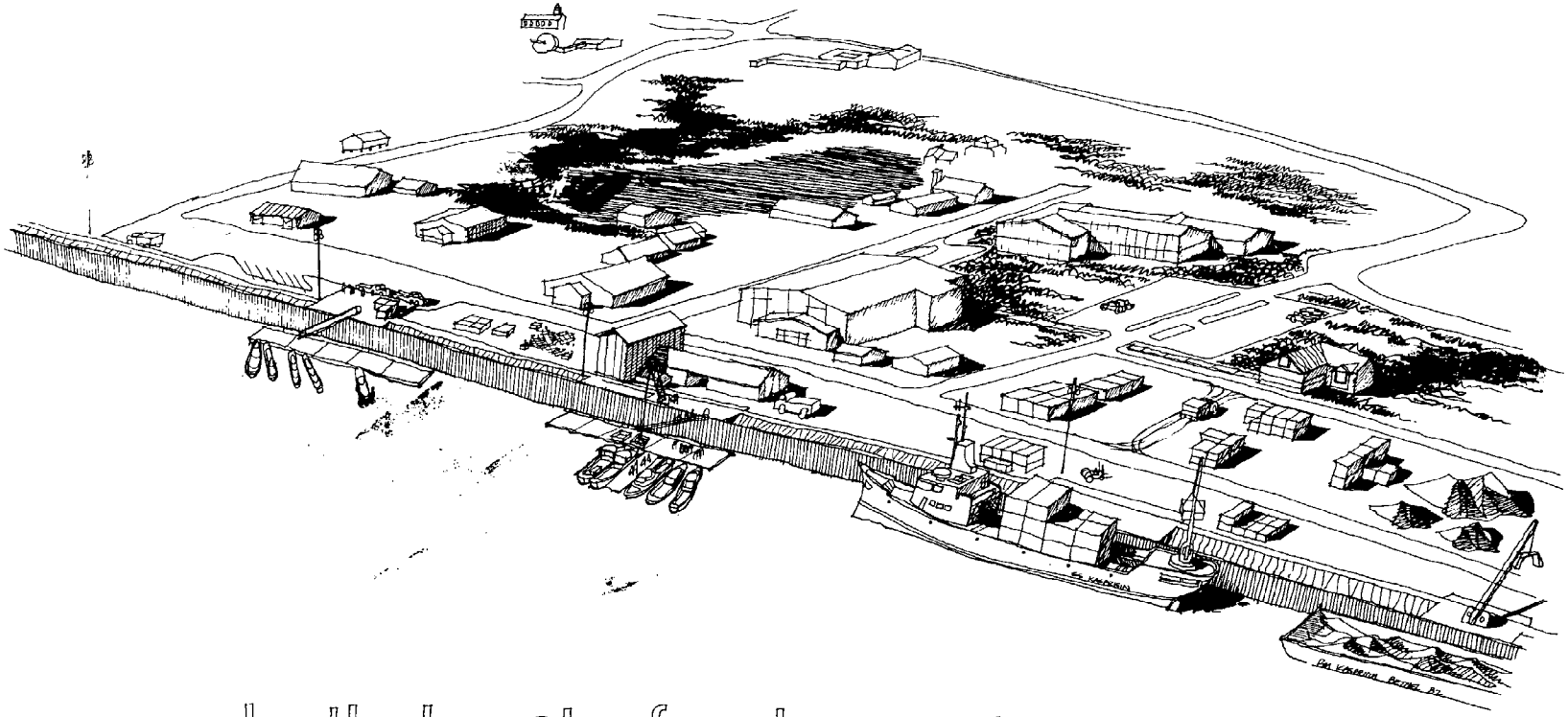
A3. Brown Slough pull-out area just south of the bridge on the east side of the slough;

A4. The First Avenue-Mission Lake Road area, west of Main Street; this area is utilized for winter and summer access, non-commercial in nature;

A5. Main Street access to retail and commercial facilities;

A6. Standard Oil, for fuel purposes only.

FIGURE 30



bethel waterfront main st./east - phase I

kesprisin pettinari design / ESE

FIGURE 31

design concepts by phase

Summary of Design Concepts by Construction Phase

Phase I-II: Main Street

Initial Seawall Construction

- Construct seawall for a length of approximately 2000 feet west of the general cargo dock to the Mission Lake Road/ First Avenue juncture;
- construct intercepting drainage berm along the full length of the seawall;
- expand drainage berm at critical locations to provide staging pads for subsistence and general cargo handling facilities; suggested pad locations include:
  - immediately east of Main Street/First Avenue juncture for subsistence activity;
  - at USS 319 for fish processing;
  - at general cargo dock at spaced intervals allowing two or more vessels to be handled simultaneously;
- provide floats and gangways for small boat and fishing boat tie-up (short term);
- provide short term parking and drop-off/ pick-up lanes for subsistence related vehicle load/unload along First Avenue just east of Main Street;
- provide open storage areas for subsistence related activities along First Avenue;
- protect the wetland periphery of pond areas from development;
- initiate the planning process for detailed design and community approval for a community-wide trail system which will connect the riverfront to the community centers;
- establish a pedestrian way on top of the intercepting drainage berm the length of the seawall;
- segregate motorized vehicles from designated pedestrian ways, particularly the top of the intercepting drainage berm;
- clearly designate all conflict areas between pedestrian and load/unload activities;
- provide a medium duty crane or hoist for subsistence related load/unload activities;
- establish open storage areas for water dependent/water related cargo.

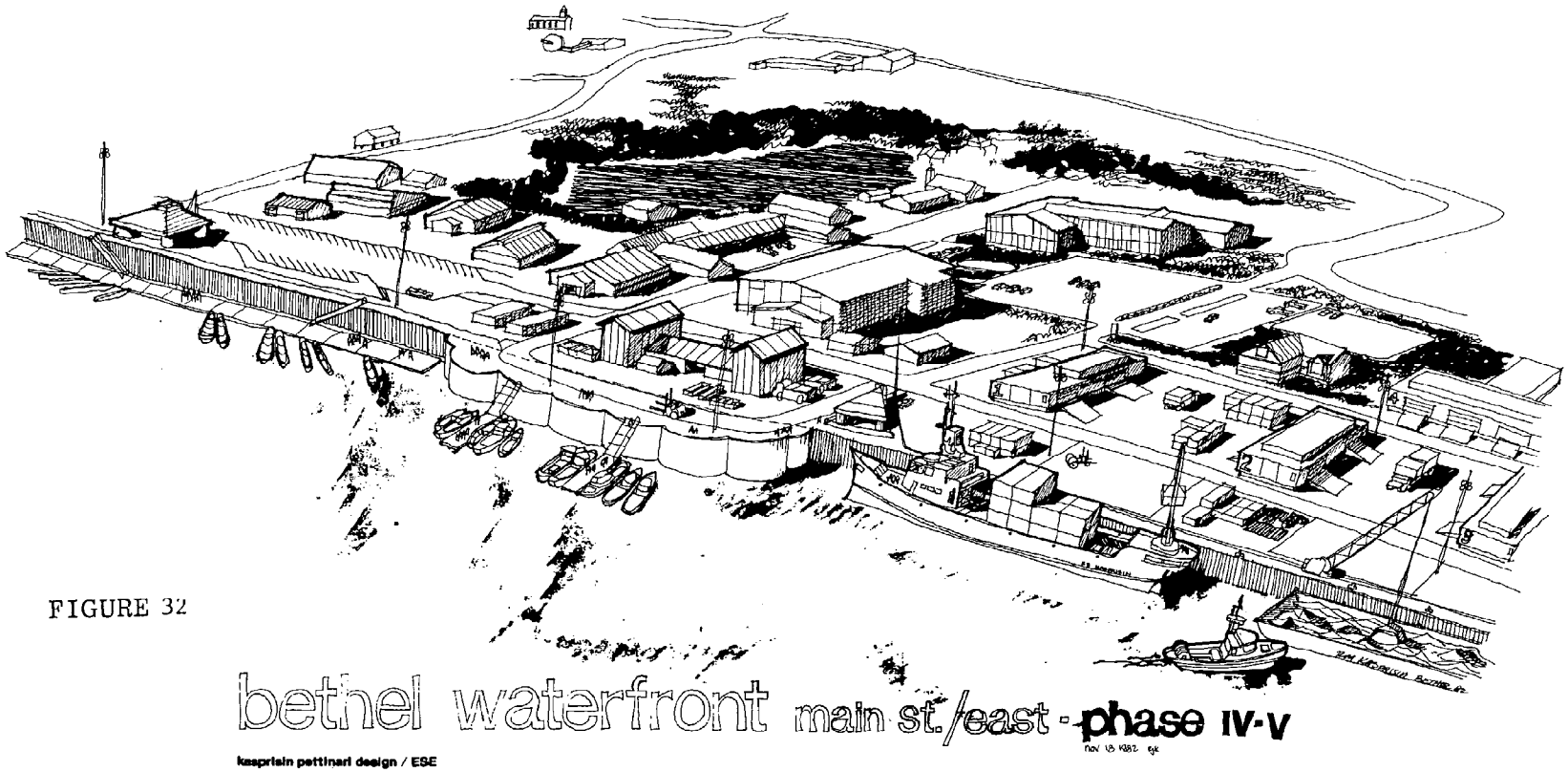


FIGURE 32

Phase III-IV-V: Main Street/East

- Complete backfill between drainage berm and seawall;
- establish hard surface staging and work areas to eliminate or reduce mud and spring thaw conditions;
- develop public and private warehouse districts which are coordinated with open storage and truck circulation patterns;
- expand floats and gangways to handle peak loads of summer subsistence and fishing craft. Investigate the configuration of float systems to minimize disruption from southerly storms;
- expand and hard-surface parking areas along

First Avenue, complete with load and unload areas for subsistence related activities;

- provide community shelters which contain information areas and facilities for visitors from the villages; such a "village annex" could include village news boards, locked storage areas for clothes and personal items while people are visiting Bethel, shower and restroom facilities and a caretaker;

- provide community shelters which permit weather protected viewing areas for local residents of the general cargo handling activities along the waterfront;

- depending on engineering constraints regarding currents and water movement around dock extensions, investigate

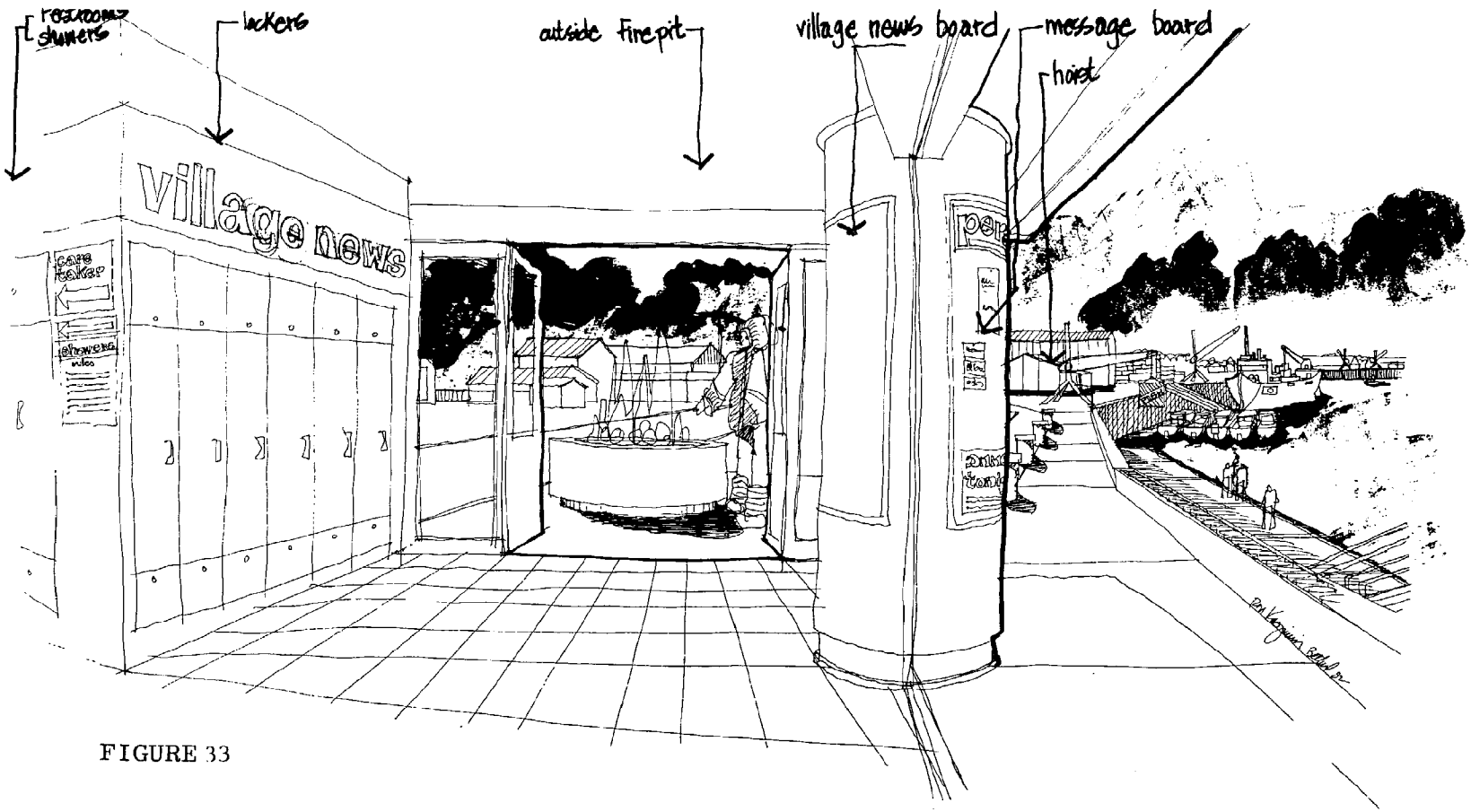


FIGURE 33

the types of extensions and seawall expansions capable of increasing the shoreline work areas for cargo;

- provide open and enclosed secured storage areas for subsistence related goods along First Avenue.

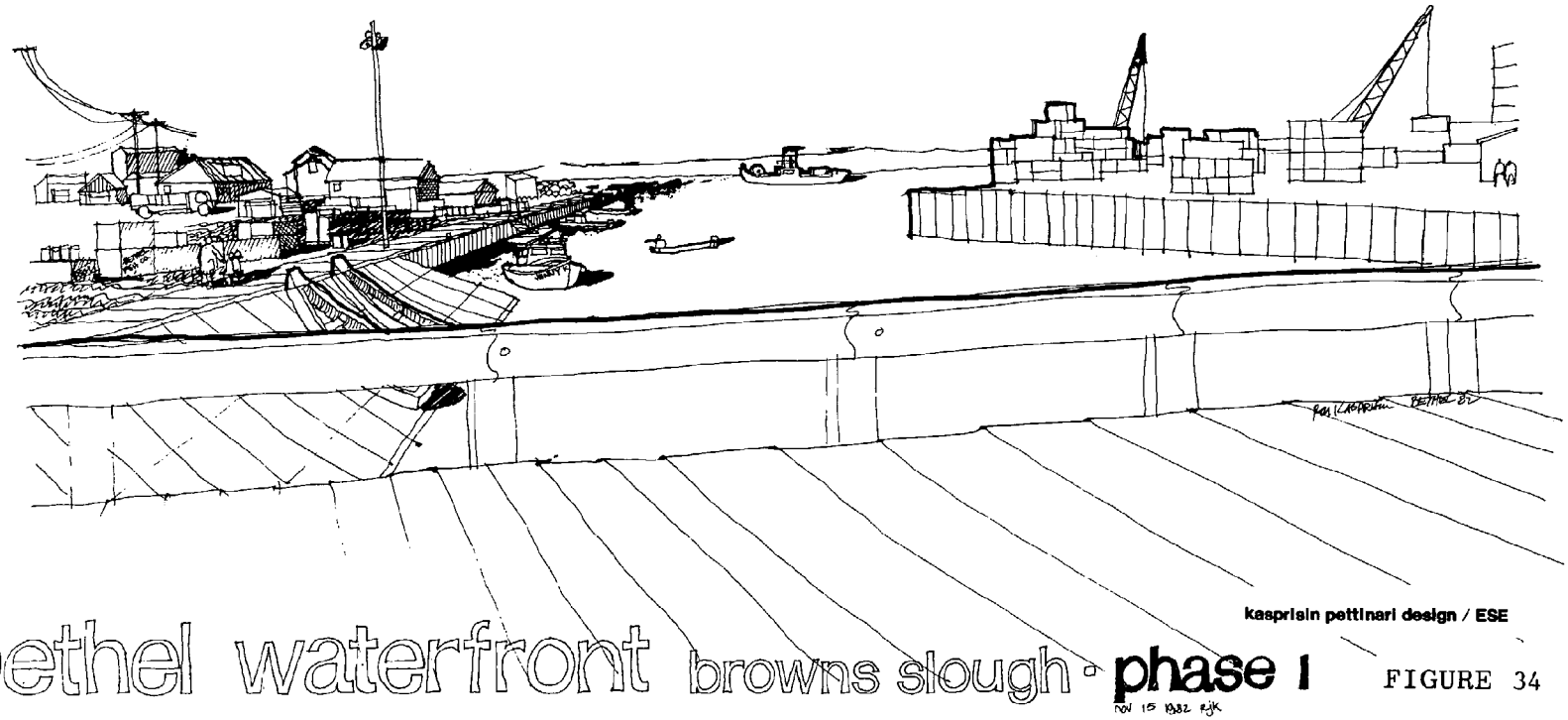


FIGURE 34

Phase I-II: Browns Slough

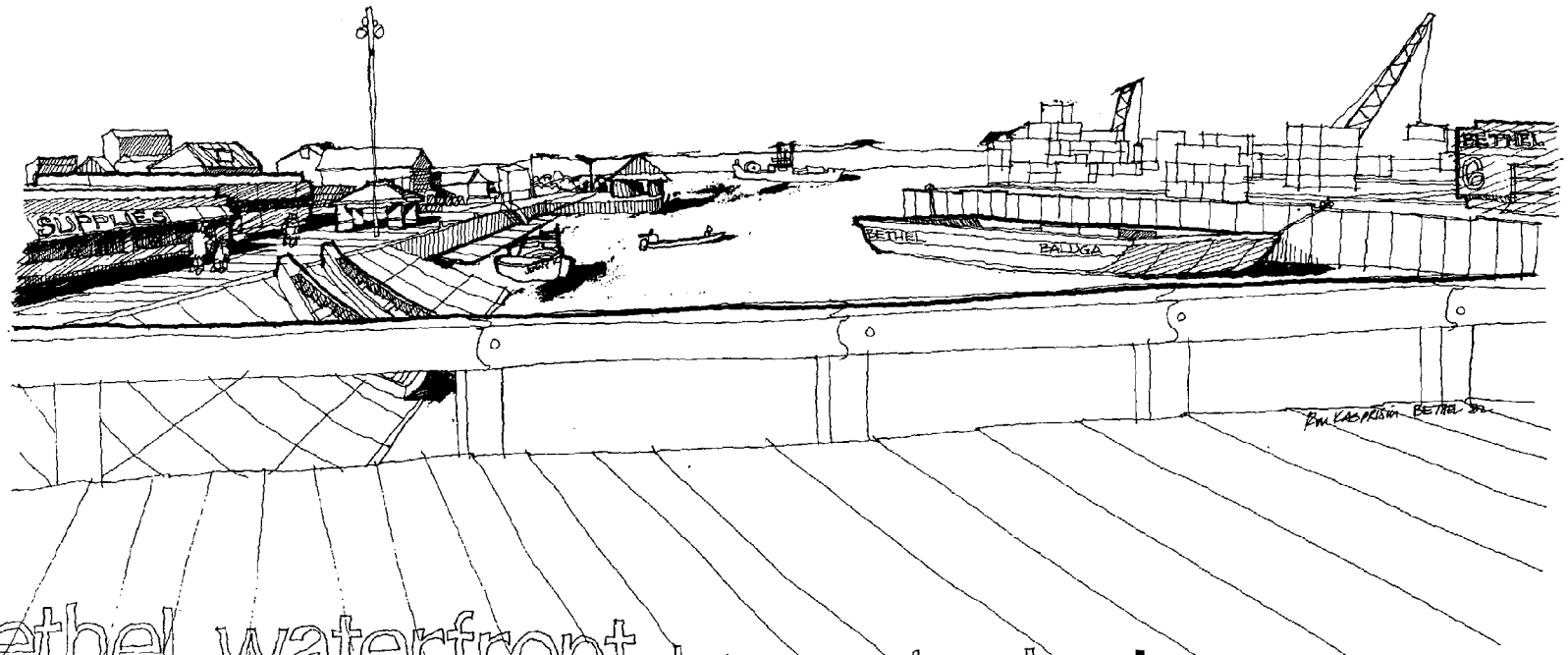
- Construct a seawall along the east side of the slough;
- construct a small boat pull-up slope just south of the bridge;
- establish a pedestrian way along the seawall from the bridge to Kuskokwim Way;
- provide area and secur-

ity lighting;

- allocate a staging area for subsistence and visitor activities along the east bank;

Phase III-IV-V: Browns Slough

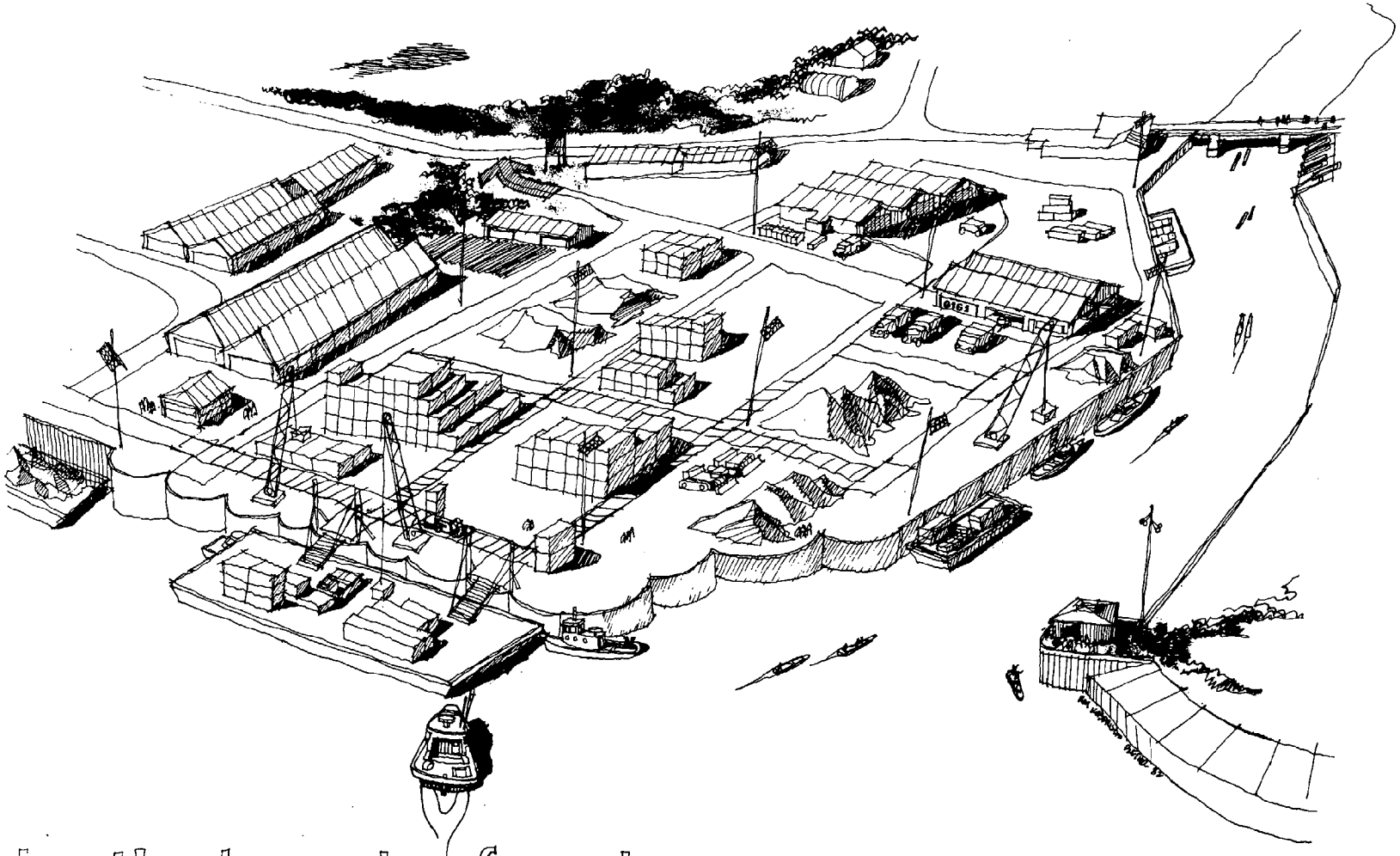
- Provide floats and gangways along seawall for visitor and subsistence small boat access;
- establish community and neighborhood shelters for neighborhood activities (B2a) and port area viewing (B2b);
- set aside land for commercial supply stores for subsistence activity and village residents near boat pull-up.



bethel waterfront browns slough · phase IV

kasprisin pettinari design / ESE

FIGURE 35



bethel waterfront cargo dock - phase IV-V

NOV 19 1982 BJK

kasprisin pettinari design / ESE

FIGURE 36

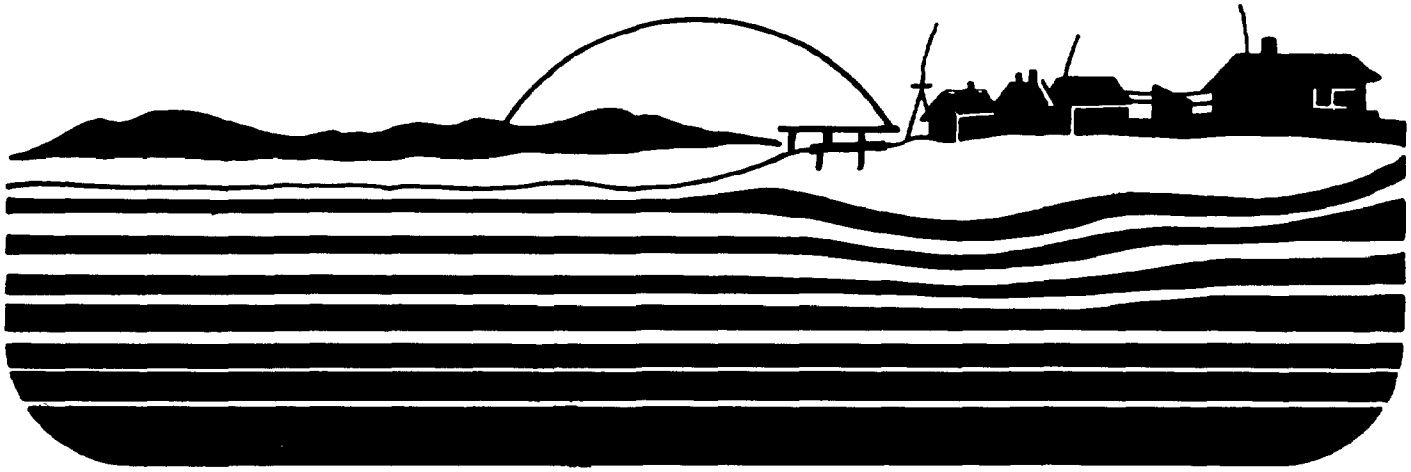
Phase IV-V: Cargo Dock

Initial phases of the cargo dock are already in operation.

- Establish an interior circulation system for forklifts and other cargo handling vehicles which is hard-surfaced and capable of providing a work base during muddy periods and spring thaws;
- provide adequate staging and maneuvering area along the seawall;
- provide open and bulk storage areas accessible by forklift on hard surfaced service roads;
- develop heated and non-heated warehouse complexes on the periphery of the open and bulk storage area;
- provide a minimum of two ramps or transfer spans for simultaneous roll on/roll off cargo handling;
- provide area lighting for night shift and security purposes.

WETLANDS STUDY

Chapter 5



WETLANDS STUDY

Wetlands management was one of the first issues identified when the City began developing this coastal management plan. Two goals have been set relating to wetlands:

- to develop a management strategy, and
- to facilitate local compliance with federal law regarding wetlands.

(See Chapter 7 for full statement of goals, objectives, etc.)

In order to meet these goals it became clear that more detailed information was needed. A precise delineation of what areas within the city limits fell into the federal definition of wetlands was needed as well as an assessment of the relative importance of these wetlands. It was also necessary to review the applicable federal laws and regulations.

A study was undertaken by Environmental Sciences and Engineering, Inc. (ESE) to provide the City and other interested parties with this information. (Study prepared by James R. Newman, Gil Peterson, and Edward N. West of ESE.) The following is an excerpt from the Wetland Study prepared by ESE. The full study can be obtained from the City of Bethel Planning Department.

* * * * *

STATEMENT OF THE PROBLEM

Three separate but related activities have required a wetland evaluation for the City of Bethel.

1. Community growth; over 400 new housing units during the past ten years.
2. U.S. Army Corps of Engineers (COE) made comments regarding the proposed City of Bethel Coastal Management program, particularly the COE's desire for refinement of the vegetation map to indicate the extent and quality of Bethel's wetland areas.
3. The COE's intention to issue a general permit (General Permit #81-4) for the Association of Village Council President's (AVCP)

Regional Housing Authority pursuant to Section 404 of the Clean Water Act. This application does not include the area contained in the city limits of Bethel.

Since wetlands fall under COE jurisdiction of permitting authority and since the wetland and non-wetland areas of the City of Bethel had not been described, the following study was undertaken. This study represents the first formal evaluation of wetlands within the City of Bethel and involves two parts: a wetland evaluation of the City of Bethel and a description of the COE permitting process as applicable to the City of Bethel.

METHOD

The criteria used by the Corps for defining wetlands is as follows: (a) a predominance of vegetation characterized as wetland plants; (b) soil with evidence of mottling (streaks) in the upper soil layers (horizons) and a chroma (soil color scale) of two or less; and (c) the presence of water (free) in the soil. All three of these criteria must be present to classify the locale as a wetland.

A color infrared enlargement (1:30,000) was made from imagery of the Bethel area flown on 17 June 1977 by the U.S. Bureau of Land Management. From this enlargement, color patterns, produced by vegetation types and density, were selected for field checking and establishing field sites. Numerous sites were examined for vegetation type and wetness. A transect through the city from low to high elevation was identified. Six sites were qualitatively investigated for applying all three Corps criteria. These are located on the accompanying map (Figure 37).

The field work was carried out on August 17 and 18, 1982. Participants were Steve Gabor (planner), City of Bethel; Dr. James Newman (ecologist), ESE; Dr. Gil Peterson (environmental planner), ESE; Dr. Edward West (ecologist), ESE; and Joe Williamson (environmental engineer), U.S. Army Corps of Engineers.

FINDINGS

Based on the field work, virtually the entire area qualifies as wetlands and, therefore, comes under COE permitting jurisdiction. All sites contained

wetland vegetation; only numbered sites two and six did not qualify in all three criteria categories. These sites did not exhibit the appropriate soil and hydrology characteristics for wetland classification. However, sites of the type like number two and six are mostly confined to slopes with a southerly exposure which occupy very little surface area. These locations, being small in area and irregular in shape, do not lend themselves for serving as a determinant for classifying land for urban use.

The field investigation and other data indicates that the amount of non-wetlands is not large enough for permitting considerations. Therefore, an evlauation was made as to the general areas of the city likely to contain wetlands of importance. The following discussion and conclusions are based on the general survey, discussions with COE personnel, interpretation of the high altitude photography and review of topographic maps.

Section 320.4(b) of the COE's general regulatory policies (Federal Register Vol. 47, No. 141, Thursday, July 22, 1982, p. 31804) states that some wetlands are vital areas that constitute a productive and valuable public resource. Wetlands that perform functions important to the public interest exhibit the following characteristics:

1. Serve significant natural biological function, i.e., food chain production, habitate, etc.;
2. Are set aside for special study;
3. Alteration of such wetlands would detrimentally affect natural drainage and other hydrological characteristics;
4. Shield other areas from wave action;
5. Serve as valuable storage areas for storm and flood waters;
6. Are prime natural recharge areas; and
7. Provide significant natural water filtration functions.

Characteristics numbers 3, 5, and 7 are of particular importance to Bethel. To date, no wetland areas within the city limits have been formally set aside for special study of the aquatic environment or as sanctuaries or refuges.

The Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service have both maintained research stations in Bethel for a number of

years. Interviews with biologists representing both agencies resulted in the conclusion that although various fish and wildlife populations do exist in the city limits, there were no significant wildlife populations in Bethel proper. In addition, they felt that the wetlands within the city limits did not provide significant natural biological functions to the area's fish and wildlife populations. The shallow tundra lakes and ponds, depending upon accessiblility to streams, can contain fish. However, anaerobic conditions occur in these water bodies during the winter which limit the importance of these aquatic habitats. Nesting waterfowl do occur in these habitats. This waterfowl habitat, however, is not considered highly productive because of low number of nesting birds and the intense hunting pressure on these lakes and ponds.

The field survey showed that the wetlands within the 100 year flood plain contained a much greater amount of surface water and soil saturation, making development more costly and hazardous for human occupancy. This same area, when undisturbed, provides a much greater variety and density of vegetation. In close proximity to the river, streams and sloughs, the wetlands have a greater likelihood of exhibiting COE defined characteristics 1, 3, 4, 5, and 7. By contrast, the wetland area outside of the 100 year flood plain, though relatively level, has a primitive drainage pattern, less dense vegetation and a lower likelihood of exhibiting wetland functions important to the public interest. The investigation team therefore defined two types of wetlands, significant and non-significant.

Significant wetlands are major drainage ways, sloughs and lakes (including a 25 foot set back from the high water mark) and the undisturbed areas of the flood plain. All undisturbed land below 17.8 feet elevation (mean lower low water) is within the 100 year flood plain (C.O.E. 1981), and is considered significant wetlands. Land located above this level is considered non-significant wetlands (see Figure 37).

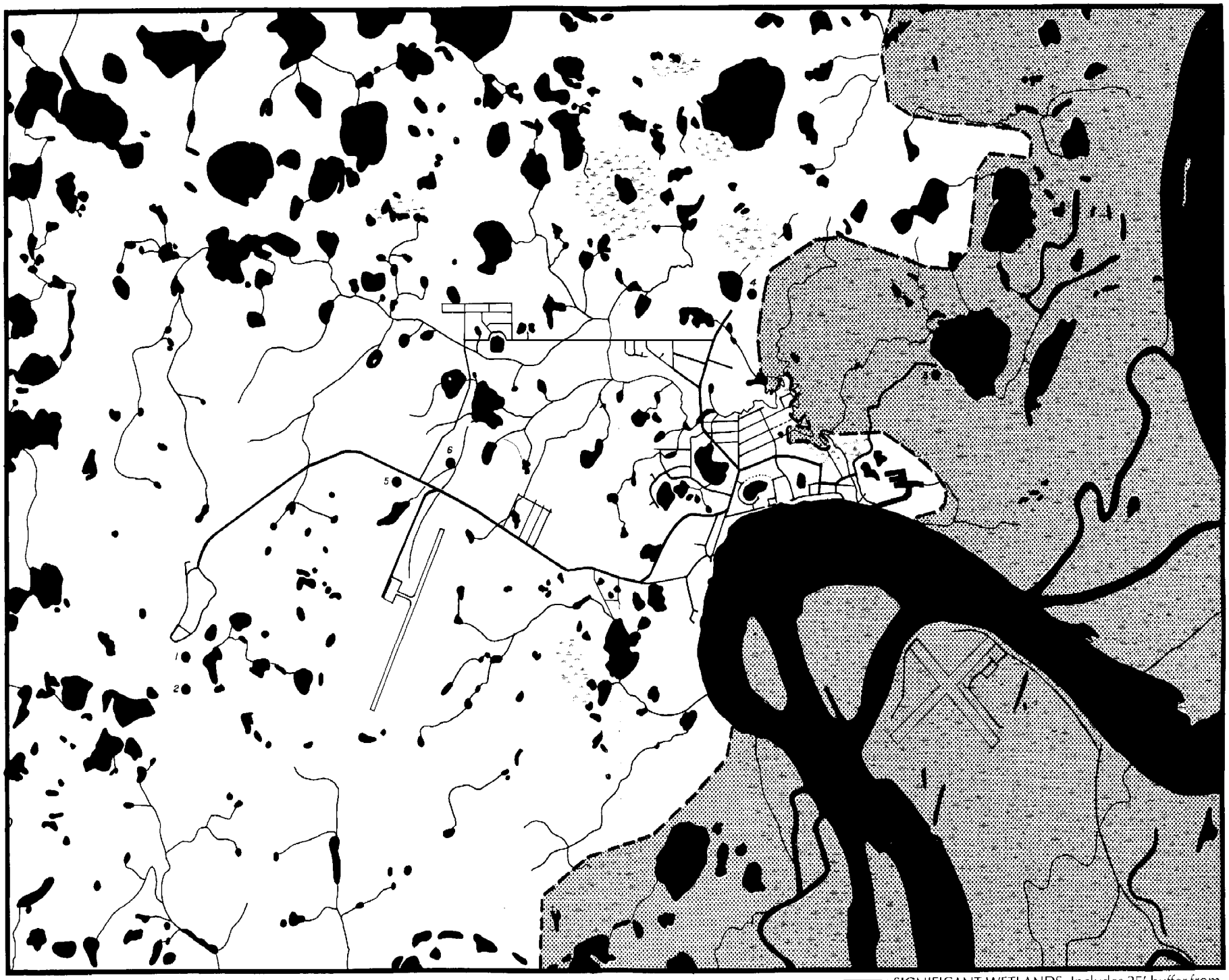


FIGURE 37
PREPARED BY CITY OF BETHEL

DESCRIPTION OF COE JURISDICTION

The regulatory programs of the U.S. Army Corps of Engineers (COE) have recently been issued as interim final rules (Federal Register 47, No. 141, Thursday, July 22, 1982). The COE has statutory authority to regulate certain activities "on navigable waters of the United States" (under Section 10 of Rivers and Harbors Act of 1899) and "in waters of the United States" (Section 404 of the Clean Water Act). Navigable waters are defined as freshwater, marine and estuarine waters that have been or may be used for interstate or foreign commerce (see 33 CFR part 329). Waters of the U.S. include all navigable waters and also all tributaries, strams, lakes and adjacent wetlands on public and private property. Adjacent wetlands are defined as bordering, contiguous or neighboring areas that are inundated or saturated by surface or ground water at a frequency and duration to support and that under normal circumstances support a prevalance of vegetation typically adapted for life in saturated soil conditions (see 33 CFR Part 323). The activities regulated under these two laws include construction of structures, excavation or dredging, and fill activities. Wetlands permitting is specifically concerned with dredge and fill activities.

The jurisdiction of the two laws overlap. The permitting process including the application for a permit, however, is the same for both laws.

The purpose of the COE's jurisdiction is to protect and maintain the quality of our nation's water resources by protecting rivers, lakes or wetlands and other similar water resources, to prevent alteration or obstruction of a navigable water of the U.S. and to control dumping of dredge materials into ocean waters.

APPLICATION OF THE COE'S JURISDICTION TO THE CITY OF BETHEL

Based on qualitative evaluation of vegetation communities, most of the land area of the City of Bethel contains vegetation that would likely be classified as wetland vegetation. Small areas widely scattered through the city have vegetation which would be considered transition or non-wetland areas. These areas are too small to be considered important for planning purposes.

The wetlands of the city are also likely to be designated as adjacent wetlands for the existing lakes, streams, sloughs and the Kuskokwim River.

Any project or development proposed within the city limits of Bethel (and likely for miles beyond the city limits) would come under COE jurisdiction. Approval from the COE will, therefore, be required for dredge and fill activities associated with these projects.

OTHER JURISDICTION

Although the COE has primary jurisdiction for activities in "navigable waters of the U.S." and "Waters of the U.S.", there are a number of other regulations and policies which the COE must adhere to in its permitting authority. Alaska Department of Environmental Conservation (ADEC) must review the project to assure that it does not violate state water quality standards and other state laws. This review is covered in its issuance of a "401 certificate" at the time COE permit is issued. In addition, a Coastal Management Plan "consistency determination" is made by Alaska Governmental Coordination Unit (formerly Division of Policy Development and Planning). The consistency determination is made on the basis of the Bethel Coastal Management Plan, once adopted. City comments are given "great weight" by the GCU in their analysis. (See wetlands policies in Chapter 7 and the implementation discussion in Chapter 8.)

Besides these formal approvals, a number of agencies are requested by the COE for their review and comment on the permit application. Minimally, these agencies include:

U.S. Environmental Protection Agency

Concerns regarding compliance with Clean Water Act and alternative analysis.

U.S. Fish and Wildlife Service

Concerns regarding efforts to endangered species, migratory bird, fisheries resources and mammals.

National Marine Fisheries Service

Concerns regarding effects to marine fish, shellfish and mammals.

Alaska Department of Fish and Game

Concerns regarding effects to anadromous fish and game animals and their habitat.

* * * * *

The ESE report continues in some detail on the procedural steps for obtaining wetlands permits from the Corps of Engineers, and also describes existing nation-wide permits for specific activities.

With the above information on the nature and extent of the wetlands in the city limits, the City initiated discussion with the COE toward obtaining a general permit for fill activities associated with individual residential construction in non-significant wetlands.

As discussion proceeded, the scope of the general permit was broadened. The public notice for the general permit, published April 27, 1983, states the coverage of the permit as follows: "Activities authorized under this general permit will include the placement of fill material for the construction of foundation pads for structures, associated driveways and parking areas, and for the construction of roads." (General Permit 83-4, City of Bethel, Alaska.)

Significant wetlands are exempted from the general permit: individuals wishing to place fill in significant wetlands must apply for individual permits from the Corps of Engineers.

The general permit, if issued as proposed, does contain a number of specifications that must be met by the permittee, i.e., anyone filling in non-significant wetlands. Minimum widths and depths of roads and driveways are given. A minimum distance of 25 feet between the toe of the fill and the high water mark of any drainageway, slough or lake must be maintained. Fill material must be free of toxic pollutants in toxic amounts. Other special conditions are also listed. The entire permit is not reproduced here as it is still a draft document, currently being circulated for public review and comment. Copies can be obtained from the City of Bethel Planning Department or the Regulatory Functions Branch of the U.S. Army Corps of Engineers in Anchorage.

HOW THE GENERAL PERMIT WILL WORK

Anyone wishing to fill (pour a sand pad, for example) a wetlands area should first contact the City Planning Department to determine if the area involved is covered by the general permit. This will be determined from the 1:500' map the City has developed.

If a question exists regarding whether or not a specific property falls within the significant wetlands, an individual determination will be made by planning department staff. This will involve review of larger scale contour maps and a visit to the site. The definition of significant wetlands (given above) will be the basis of the determination, keeping in mind the best interests of the community.

If the property involved is covered by the general permit, the process outlined in the public notice for the general permit is as follows:

1. No less than ten (10) days before beginning work, the permittee is to contact either the City Planning Department (if fee-simple land) or the Bureau of Indian Affairs (if trust land or land subject to 25 CFR 1.4). This is to allow the planning departments of these two governments the opportunity to monitor activities authorized under the permit.

2. The fill is placed.

3. Within thirty (30) days of completing the fill activity, the permittee must notify the Alaska District Corps of Engineers.

Contacting the City or the BIA prior to the placement of fill also provides an opportunity for the developer to double-check his or her plans, to ensure that they meet all applicable special conditions of the general permit.

If the property involved is not covered by the general permit, i.e., is in the significant wetlands, the developer must secure an individual wetlands permit from the Corps of Engineers. In this instance, it is recommended that the developer work with the City Planning Department in designing the site, so as to facilitate COE approval.

Once an individual submits an application to the COE, notice is circulated for public comment. Individual permits, like the general one, must be certified by the State Governmental Coordination Unit (formerly DPDP) as being consistent with the local coastal management plan. Part of that certification process includes asking the City for comment: the City's comments are given "great weight" by GCU in making their decision (see Chapter 8 for a more complete discussion of the consistency determination process).

The City will base its recommendation on an analysis of how the proposed project meets the coastal management policies listed in Chapter 7 of this Coastal Management Plan. If a developer works with the City in designing the site and/or applying for the permit, it is more likely that a positive response

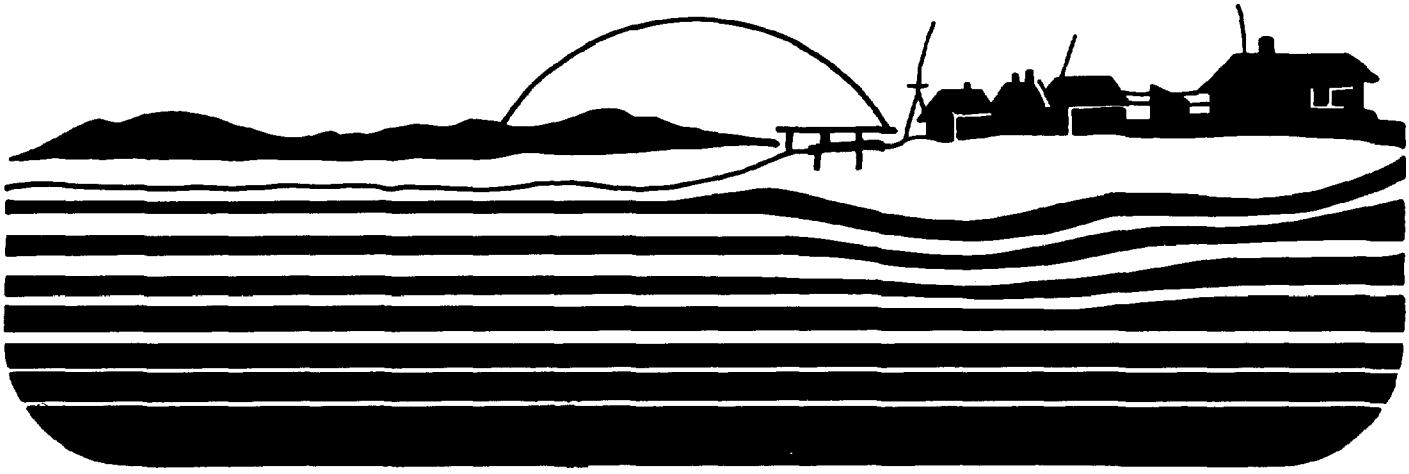
can be given to the state. Hence, it would be in the best interests of a developer to discuss his/her plan with the City Planning Department.

NOTE: Lands held in federal trust, subject to 25 CFR 1.4, do not fall into the jurisdiction of the City of Bethel. They are, however, subject to the permitting authority of the Corps of Engineers. Developers of such lands should deal with the Bureau of Indian Affairs regarding wetlands permits.

The general thrust of the wetlands strategy is to discourage further development in significant wetlands.

BETHEL SUBSISTENCE USE AREA: Proposing an Area Meriting Special Attention (AMSA)

Chapter 6



BETHEL SUBSISTENCE USE AREA: proposing an Area Meriting Special Attention

Subsistence activities - fishing, hunting, berrying - are an important element of the way of life of many Bethel residents. A survey performed in 1979 showed that over 70% of Bethel residents used some form of subsistence foods. Preserving opportunities to continue subsistence activities has been identified as a goal of the coastal management plan, and is reflected in many of the issues addressed in the plan. One way of recognizing the importance of subsistence and providing for its continuing practice is to develop a special management plan for the area used most heavily for subsistence by Bethel residents.

Most of the area used for subsistence lies outside city limits, and is therefore not subject to this coastal management plan. However, the Alaska Coastal Management Program recognized that there would be some areas needing attention that would not fall into local jurisdictions, or would need special management plans above and beyond the basic coastal management plan. The ACMP set up a category and process for "Areas Meriting Special Attention" that will allow the development of a management plan for the Bethel subsistence use area.

The ACMP guidelines provide criteria for judging whether or not an area qualifies as an AMSA. Generally, an area can be considered meriting special attention if it has outstanding value to the general public, is particularly sensitive to change, or because plans for the area or claims upon its resources could preclude other uses. One of the specific criteria for AMSA designation is "areas important for subsistence hunting, fishing, food gathering, and foraging." (6 AAC 80.160)

The purpose of this chapter is to propose an area for consideration for nomination as an "Area Meriting Special Attention." The area used for subsistence hunting, fishing, food gathering and foraging by Bethel residents overlaps Bethel and Ceñaliulriit Coastal Management districts.

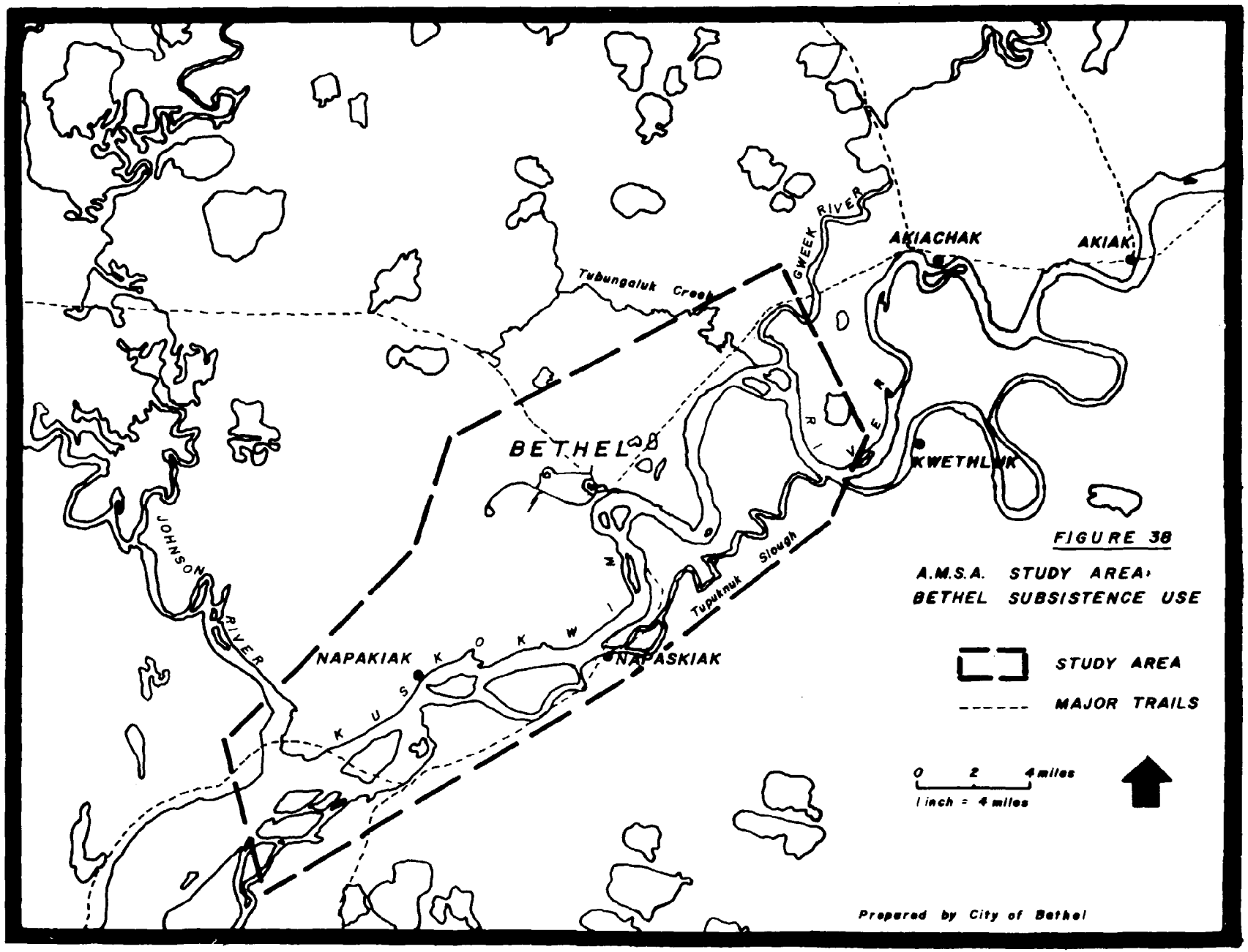


FIGURE 38

A.M.S.A. STUDY AREA: BETHEL SUBSISTENCE USE

The area which receives the heaviest use for subsistence fishing, including placement of fish camps, extends along the Kuskokwim River, from the Johnson River on the south, to the Gweek River on the north. (See Figure 38). It also receives use for hunting, trapping, berrying, gathering of firewood, and recreation. More study is needed to provide exact boundaries for the AMSA.

The need for an Area Meriting Special Attention in the vicinity of Bethel has also been recognized in the draft coastal management plan for Ceñaliulriit, the Yukon-Kuskokwim Coastal Resource Service Area. The Ceñaliulriit plan notes that "The land surrounding Bethel is used extensively for recreation, subsistence, and sport hunting and fishing. Because Bethel is rapidly growing into one of Alaska's largest cities, this land and water area must be managed to preserve the natural values that attract public use." (p 7-5, Public Hearing Draft, Ceñaliulriit Coastal Management Plan).

The terrain included in the AMSA is moist tundra, with lakes and rivers. Current management responsibility and ownership is mixed, with a variety of state and federal agencies, local municipalities, native corporations and private owners.

The Bethel and Ceñaliulriit districts will jointly develop the management plan for the AMSA as the AMSA includes lands in both districts. Bethel proposes coordinating this effort with Ceñaliulriit, appropriate state agencies and any other interested or affected party.

The AMSA management plan will be adopted as a significant amendment to both Bethel and Ceñaliulriit coastal management plans. Further details on the process for the nomination and development of the management plan for the "Area Meriting Special Attention" are yet to be finalized.

STATE OF ALASKA

BILL SHEFFIELD, GOVERNOR

OFFICE OF THE GOVERNOR

OFFICE OF MANAGEMENT AND BUDGET

DIVISION OF GOVERNMENTAL COORDINATION

POUCH AW
JUNEAU, ALASKA 99811
PHONE: (907) 465-3568

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October 14, 1983

Mr. James P. Burgess, Acting Chief
Coastal Programs Division
Office of Ocean and Coastal Resource Management
NOAA, U.S. Department of Commerce
Page Building One
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

Dear Mr. Burgess:

On behalf of the Alaska Coastal Policy Council (CPC), the Office of the Governor, Office of Coastal Management (OCM) formally submits the Bethel District Coastal Management Program (DCMP) for incorporation into the Alaska Coastal Management Program (ACMP) as a routine program implementation action.

On September 29, 1983, the CPC approved the Bethel DCMP. For your reference, enclosed are copies of the Bethel Coastal Management Program, OCM's revised findings and conclusions on the Bethel DCMP, and the order of adoption for the Council's action adopting this program.

As you are aware, the ACMP gained Federal approval on July 9, 1979. Any change in an approved State program must be viewed either as an amendment to or as routine program implementation of the approved State program. OCM has reviewed the Bethel DCMP in light of the criteria for determining if the program change is an amendment, as set out in 15 CFR 923.80(c). The following are the results of the review:

1. Boundaries: Requirements for the coastal boundary are given at 6 AAC 85.040. The Coastal Policy Council adopted the biophysical boundaries of Alaska's coastal area. Neither the requirements for boundaries nor the biophysical boundaries have been changed by the Bethel DCMP. The boundaries are identified and mapped at pp. 1-10 to 1-11 of the Bethel program document and include all of the area within the City of Bethel.

2. Uses Subject to the Management Program: The ACMP provides, at 6 AAC 85.080, criteria for definition of subject uses. These criteria have not been changed by the proposed action. Moreover, the subject uses are defined at page 7-24 of the Bethel DCMP. These uses are consistent with 6 AAC 85.080.

3. Criteria or Procedures for Designating or Managing Areas of Particular Concern or Areas for Preservation or Restoration: The criteria for designating and managing areas of particular concern are included with the ACMP regulations at 6 AAC 80.160. These are not affected by the proposed action. Moreover, the Bethel DCMP does not designate any areas meriting special attention.

4. Consideration of the National Interest: The ACMP provides for consideration of the national interest in its guidelines and standards by requiring that a variety of resource uses be addressed and by requiring recognition of uses of State concern. These requirements are not affected by the proposed action. Moreover, the Bethel DCMP has met all pertinent requirements.

As a result of this review, OCM has concluded that the Bethel DCMP does not represent substantial changes in or to the ACMP. Consequently, OCM considers the incorporation of the Bethel DCMP into the ACMP to be a matter of routine program implementation. Therefore, I request the concurrence of the U.S. Department of Commerce, NOAA, Office of Ocean and Coastal Resource Management, with this determination within four weeks of receipt of this letter as required under 15 CFR 923.84(b)(3).

In compliance with 15 CFR 923.84(b)(2), notice of this action has been given to the general public and affected parties, including State and Federal agencies. Copies of this notice and a distribution list are enclosed. Comments are due to your office by November 10, 1983. Your concurrence is anticipated by November 17, 1983.

Should you have any questions, please call Amy D. Kyle, OCM Senior Analyst at (907) 465-3562.

Sincerely,

Amy D. Kyle/for

Jim Ayers
Coordinator
Office of Coastal Management

cm/840

Enclosures

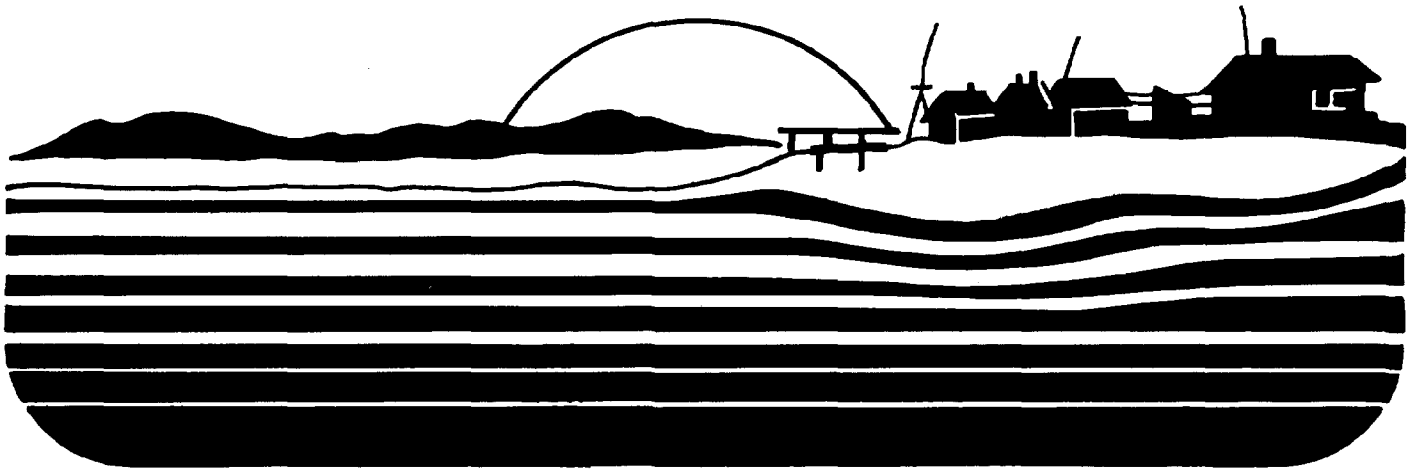
1. Program document
2. Revised findings and conclusions
3. Order of adoption
4. Public notice
5. Distribution list

cc/enc: Bill Brah, OCRM, Washington D.C.

cc: Jay Hogan, DGC, Juneau
The Honorable Jon Halliwill, Mayor, City of Haines
Nelda Warkentin, DCRA, Anchorage
Cheryl Keepers, Bethel

COASTAL MANAGEMENT PLAN

Chapter 7



COASTAL MANAGEMENT PLAN PREFACE

This chapter is divided into five distinct sections, each having a different purpose. While some items appear in more than one section, the duplication is necessary.

The first section is a broad look at the issues and goals of the coastal management plan. It provides the context for the local focus of the plan. It sets forth the aspirations of the City, and will serve to guide City actions into the future.

The second section discusses the relationship of the issues and goals to the background information and the resource analysis found in Chapters 2 and 3 of this document.

The third section notes that no new management authorities are being established by this plan, and refers the reader to a list of who is to regulate what activity in the City.

The fourth section lists what activities are subject to this coastal management plan, and what uses will be considered proper or improper.

The fifth section lists the coastal management policies which are to be the "rules" of the Bethel Coastal Management Plan. This is the section of most importance to state and federal decision-makers. It is also the section the City will use in determining if a particular project is consistent with the coastal management plan.

ISSUES, GOALS, OBJECTIVES, POLICIES & IMPLEMENTATION

Issues, goals, objectives, policies and implementation measures, if well developed, will represent an integrated system for bringing about positive community change or maintaining desirable existing conditions. Issue statements represent a definition of community problems and community resources; goals are expressed community standards which are derived from shared ideals; objectives are identified to formulate programs or targets to direct categoric community change or retain the status quo in order to fulfill the goals; policies are guidelines for public officials so as to ensure that decision making is in keeping with the stated goals and objectives and to serve as the basis for developing detailed standards; and implementation represents the various public and private actions necessary to realize the goals and objectives.

The purpose for establishing issues, goals, objectives, policies, and implementation is to provide a statement of existing conditions, a vision of what the community wants in the future and the steps necessary to bring the vision into reality.

The following issues, goals, objectives, policies, and implementation measures were developed by the Bethel Coastal Management Working Group, a local group enpaneled to provide guidance for the development of coastal management program. The issues represent the broad concerns of environmental, social and quality of life interests.

RIVERBANK EROSION

Issue:

- An issue of major concern to most of the residents of Bethel is the rapid rate at which the riverbank is eroding, between eight and twenty-five feet per year, depending on location. Through the years, numerous buildings have fallen victim to the river and many structures have been

moved more than once to escape the advancing water. Attempts at stabilizing the bank have not been successful, and has resulted in creating an ugly scene in the form of hundreds of wrecked auto bodies lining the riverbank. In addition to the auto bodies creating somewhat of a hazard, it also makes access and general use of the riverfront very difficult.

Goal:

- Eliminate bank erosion that is threatening the City.

Objectives:

- The City shall pursue funding to provide shore defense works along the north bank of the river.
- Erosion control measures shall provide adequate access to/from the river.
- Erosion control measures shall allow for adequate commercial and industrial use of the river.

Policies:

- Adequate access shall be provided for in the design process for erosion control measures.
- Adequate space for commercial and industrial use shall be provided for in the design process for erosion control measures.
- Public access shall be the highest priority use in any lands reclaimed by erosion control measures.

Implementation:

- The City shall petition U.S. Army Corps of Engineers to get the proposed shore defense works on their capital projects list.
- The City shall seek other Federal and State funds (existing programs) for the above project.
- The City shall seek capital appropriations from the Alaska legislature for the above project.
- The City shall include adequate access as a determinant in the design process for erosion control measures.

- The City shall include adequate commercial and industrial use as a determinant in the design process and erosion control measures.

RIVER & WATERFRONT USE

Issue:

- The lifeline of Bethel is the Kuskokwim River. It represents a resource with many opportunities, which in turn have produced conflicting demands for the use of the river and the waterfront. Without planning based on the articulation of community preferences in a spirit of goodwill and compromise, the use of the river and adjacent waterfront will grow into a larger problem than it is at the present time. Conflicting concerns to be resolved include providing enough waterfront land for water oriented industry, particularly transportation and fish processing, without destroying the river's resource value for subsistence. The competition for location along the river has resulted in mixed land use, traffic congestion and associated problems. In addition, development has spread into the 100-year flood plain and is subject to annual flooding and ice damage.

Goals:

- Retain multiple use of the river, including subsistence, recreation, commercial fishing, shipping, private conveyance (transportation), and private boat use.
- Protect and enhance subsistence use of the river.
- Protect and enhance public access to/from river for water and land vehicles.

Objectives:

- Space shall be provided for river use facilities, including public and private docks, haul out areas, launch ramps, commercial cargo handling facilities and floatplane ports.

Policies:

- Priority shall be given to waterfront uses which are water-dependent and water-related.
- Other uses will also be allowed if adequate space is provided for water-dependent and water-related uses.
- Adequate opportunities for subsistence use of the river shall be provided.
- Increased public access to the river for land and water vehicles shall be provided.
- Development along the waterfront shall allow for adequate public access.
- The river, inculding tributaries and sloughs, shall be kept free of navigation hazards.

Implementation:

- A riverfront study shall be initiated that will identify needs and alternative sites for water-dependent and water-related uses such as: the off-loading of fish; float plane bases; subsistence use.
- The City shall develop and adopt a land use plan for the riverfront area.
- The City shall provide funds to accomplish the above. When necessary the City shall also seek federal, state or other sources of implementation funds.

SUBSISTENCE

Issue:

- A 1980 community survey indicated that approximately 70% of Bethel residents acquire some form of their food supply through subsistence activity. Subsistence is a way of life for many and is considered an important part of the Bethel lifestyle. Subsistence concerns must be taken into account as further community development occurs.

Goal:

- Subsistence shall be recognized as an important dimension of the lifestyle of Bethel residents.

Objective:

- Develop an open space system and other features of the Comprehensive Plan that will facilitate the pursuit of subsistence activities.

- Designate the area most intensively used for subsistence activities by Bethel residents as an Area Meriting Special Attention (AMSA) and develop an appropriate management plan for it.

Policies:

- Drainageways and lakes shall be kept free from development.
- Development in subsistence use areas identified and designated in accordance with 6 AAC 80.120 shall be discouraged. Potentially conflicting uses or activities in subsistence use areas may be authorized if a study of the possible adverse impacts of the proposed potentially conflicting use or activity upon subsistence usage is conducted and appropriate safeguards to assure subsistence usage are provided. [6 AAC 80.120(d)]
- Development in the proposed Bethel Subsistence Use Area AMSA shall be conducted in accordance with the management plan for that area, when adopted.

Implementation:

- Moorage and launch areas for small boats shall be provided.
- The Comprehensive Plan shall be amended to address the subsistence resource use pattern.
- An open space system and/or other means to facilitate land and water based subsistence activities shall be established
- The City shall nominate the area used most intensively by Bethel residents for subsistence activities as an Area Meriting Special Attention (AMSA).
- The City shall provide funds to accomplish the above. When necessary, the city shall seek additional federal, state or other funds for implementation.

HABITAT

Issue:

- Residential and commercial development in Bethel alters vegetation and

topography through the creation of sand pads and use of other construction techniques. Site development sensitive to critical habitat characteristics can reduce the impact on wildlife.

Goal:

- A variety of habitats shall be maintained within the Bethel City limits.

Objective:

- Provide an open space system that will preserve the different habitat types.

Policies:

- Habitats shall be managed in accordance with ACMP standard 6 AAC 80.130.
- Roads constructed over drainageways that contain fish shall be adequately culverted or bridged to allow for fish passage.

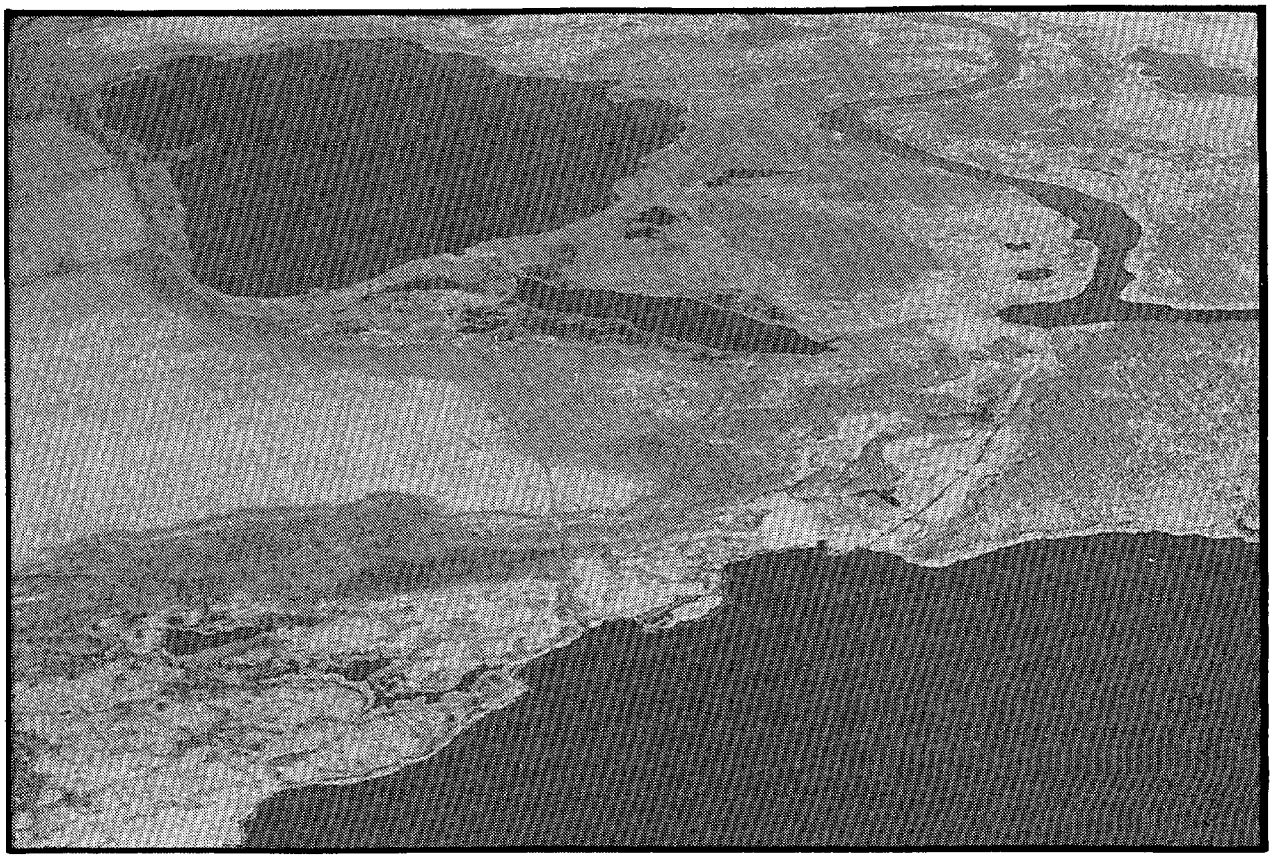
Implementation:

- The City shall establish appropriate setbacks.
- The Comprehensive Plan shall be amended to set forth mechanisms for maintaining open space in various habitats.
- The City shall provide funds for the above. When necessary, federal, state or other funds shall be sought for implementation.

WETLANDS MANAGEMENT

Issue:

- The area in and around the City of Bethel contains extensive wetlands. Some wetlands experience annual flooding from the Kuskokwim River, while other wetland locations serve as drainageways or temporary water holding areas. The significance of these wetlands varies and development policy needs to be formulated for future growth. (See wetlands chapter for definition of significant and non-significant wetlands and their details.)



Goals:

- Develop a wetlands management strategy that will reduce the impact of flooding on structures and properties in the city.
- Facilitate local compliance with federal law.

Objectives:

- Obtain general permit from U.S. Army Corps of Engineers for fill in non-significant wetlands.

- Facilitate permit application process for other types of development in wetlands in the City.
- Develop information for area wetlands that meets Corps and other agency criteria.
- Develop a comprehensive wetlands inventory and plan.

Policies:

- Wetlands shall be managed so as to assure adequate water flow, to avoid adverse effects on natural drainage patterns, and to avoid the destruction of important habitat.
- New development in significant wetlands shall be discouraged unless:
  - there is significant public need for the proposed use or activity;
  - there is no feasible prudent alternative to meet the public need which would conform to the above policy; and
  - all feasible and prudent steps to maximize conformance with the above policy are taken.
- A minimum distance of 25 feet shall be maintained between the toe of any fill and the high water mark of any drainageway, lake or slough.
- Roads constructed over drainageways shall be adequately culverted or bridged to maintain normal surface water flow and fish passage (where appropriate).

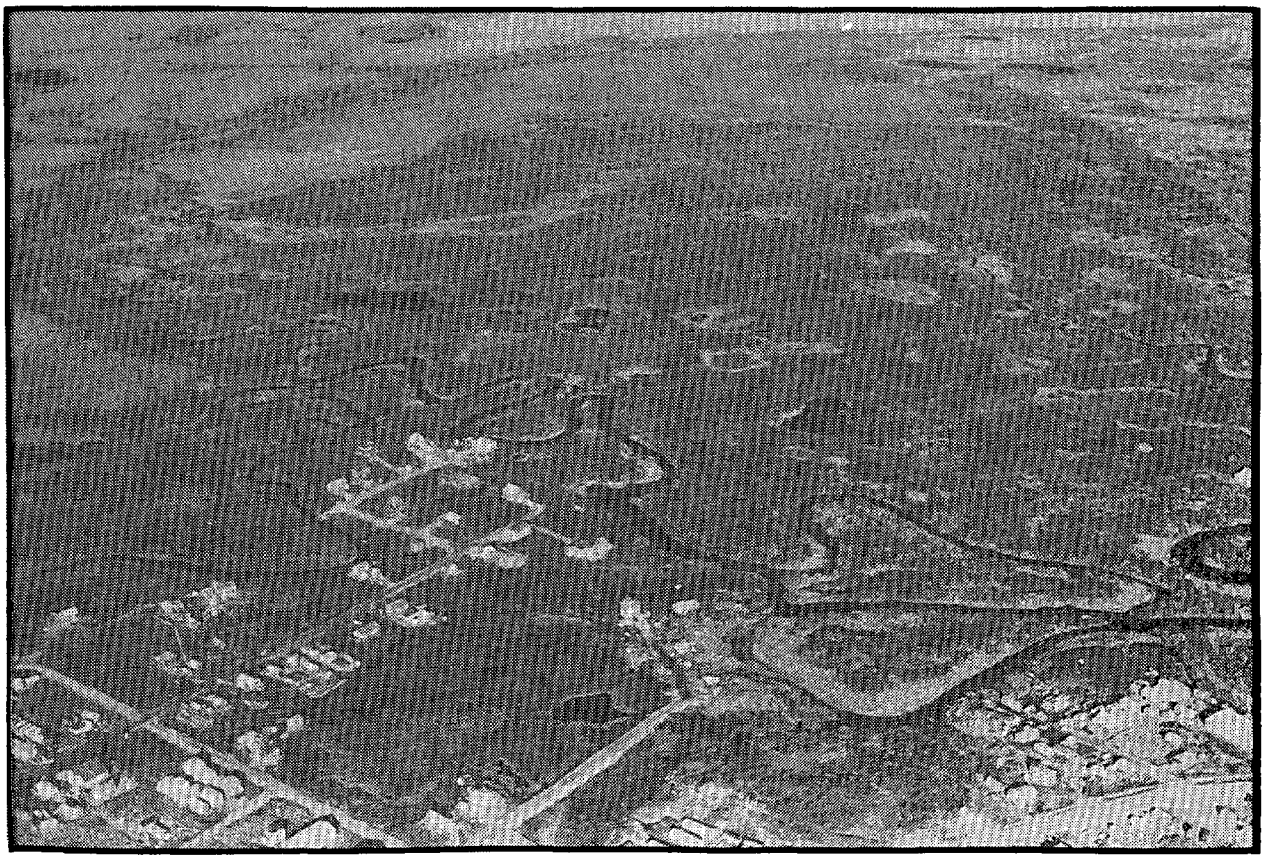
Implementation:

- The City shall seek a general permit from the U.S. Army Corps of Engineers for fill in non-significant wetlands.
- The City shall develop a permit review process (subdivision, building, etc.) that shall encourage development compatible with wetlands.
- The City shall provide citizens with information and general assistance on the C.O.E. permit process for wetlands.
- The Comprehensive Plan shall be revised to discourage development within significant wetlands.
- The City shall provide funds to accomplish the above. When necessary the City shall also seek federal, state or other sources of funds for implementation.

SURFACE DRAINAGE

Issue:

- Development has occurred with little understanding of the overall drainage pattern within the City. Consequently, the natural drainageway has been disrupted, crossings have been inadequately culverted and inundation and erosion problems have been created. The City needs an overall drainage plan as a prelude for future development.



Goal:

- Provide for adequate surface drainage.

Objective:

- Develop a drainage element as part of the Comprehensive Plan.

Policies:

- Drainageways and lakes shall be kept free from development.
- No development shall take place without adequate measures to provide for natural surface drainage and run-off.
- Natural drainageways and catchment basins shall be the preferred use for managing surface drainage.
- Roads shall be properly ditched and culverted.
- Roads constructed over drainageways shall be adequately culverted or bridged to maintain normal surface water flow and fish passage (where appropriate).
- Road banks shall be seeded to prevent erosion.

Implementation:

- The City shall initiate a surface drainage study.
- The City shall assist citizens and require that they meet drainage standards.
- The City shall act to provide adequate drainage across/through city streets and properties.
- Adequate surface drainage shall be a determinant in the design review and permit processes for any new subdivisions.
- Setbacks shall be established for streams and lakes.
- The drainage element of the Comprehensive Plan shall address standards for new construction and associated fill that will act to minimize the creation of drainage problems.
- The City shall provide funds to accomplish the above. When necessary the City shall also seek federal, state or other sources of funds so that these will be accomplished.

WASTE DISPOSAL

Issue:

- Approximately one-third of the City is on a sewer system which is dumped into a lagoon, and the lagoon is estimated to be at capacity by 1990. The remainder of the City receives a honey bucket or vacuum pump collection service. However, a significant amount of sewage finds its way into the streams or the river. A solution is needed for the City's waste disposal problems.

Goals:

- Strive for unpolluted lakes, sloughs, streams and the Kuskokwim River.
- Provide a litter free city and adequate disposal of solid waste.

Objectives:

- Develop adequate sewage collection measures for the City.
- Develop adequate sewage treatment measures for the City.
- Develop solid waste disposal system adequate for City needs.
- Study the actual impact of gray water runoff, and develop any necessary strategies to lessen negative effects.
- Initiate a study to determine the effects of and alternatives for fish processing by-product disposal.

Policies:

- Sewage, waste and gray water disposal in Bethel shall meet the Alaska Department of Environmental Conservation standards.
- Waste incineration shall meet or exceed ADEC standards for air quality.
- Recycling shall be encouraged.

Implementation:

- A waste disposal plan for the City shall be developed and incorporated into the Comprehensive Plan. All actions shall be consistent with that plan.

- The City shall initiate a study to examine alternative methods of sewage collection in the City.
- The City shall initiate a study to examine alternative methods of sewage treatment in the City.
- The City shall initiate a study to identify and evaluate means of collection and disposal of solid waste.
- The City shall initiate a study to identify and evaluate the impact of gray water runoff. The study shall also identify alternative means of lessening negative effects.
- The City shall seek funds for a fish by-product disposal study.
- The City shall use ANCSA 14(c)(3) process to secure future waste disposal sites.
- The City shall provide funds to accomplish the above. When necessary the City shall also seek federal, state or other sources of implementation funds.

AIR QUALITY

Issue:

- Blowing sand and silt represent a problem during the summer months. Not only does it irritate the eyes and get into the home and damage machinery, but it eventually gets into the streams in the form of sediment. Exposed cover needs to be seeded where possible.

Goal:

- Minimize blowing sand and silt.

Objective:

- Control the release source of the wind-borne material.

Policies:

- Development shall be carried out in a manner which keeps blowing sand and silt under reasonable control.
- Roads shall be covered with gravel.

- Waste incineration shall meet or exceed ADEC standards for air quality.
- Roadbanks shall be seeded.

Implementation:

- The City shall develop standards to control the release of wind-borne sand and silt from roads, sand pads and sand pits.
- The City shall encourage property owners to establish vegetation on sand pads.
- The Comprehensive Plan shall be amended to address the reclamation (revegetation) of lands so that appropriate action is taken.
- The City shall seed roadbanks and encourage vegetation on private roads.
- The City shall provide funds to accomplish the above. When necessary the City shall also seek federal, state or other sources of implementation funds.

PEDESTRIAN WALKWAYS & TRAILS FOR OFF—ROAD VEHICLES

Issue:

- A conflict exists between automobile, other motorized, and pedestrian traffic. The Bethel road system does not provide for transportation other than automobiles. Community growth has brought about a need to define a trail system that will improve the safety of pedestrians and the operators of snowmachines and other off-road vehicles.

Goal:

- Minimize pedestrian and vehicular conflicts by providing a safe city-wide trail system.

Objectives:

- Develop a trail system element as part of the Comprehensive Plan which addresses pedestrian and vehicular circulation.

- Design and construct a trail system that minimizes pedestrian and vehicular conflict. Pedestrian and vehicular traffic should be kept separate.
- Improve pedestrian access.
- Maintain traditional winter trails to villages.

Policies:

- Future development shall take place in such a way as to minimize pedestrian and vehicular conflict.
- Future development shall allow for the continued use of traditional winter trails.

Implementation:

- Maps shall be drawn of existing trails within the City.
- The trail element of the Comprehensive Plan shall be completed and adopted.
- The trail system shall be designed.
- The City shall acquire and designate land or easements for trails. The ANCSA 14(c)(3) process may be used to acquire these lands and/or easements.
- The City shall provide adequate safety measures on trails.
- Boardwalks and trails shall be repaired or constructed where needed.
- The City shall provide funds to accomplish the above. When necessary, state, federal or other funds shall be sought to implement the above.

RECREATION

Issue:

- A need exists for adequate recreation facilities.

Goal:

- Provide adequate recreation space and facilities for all Bethel residents.

Objective:

- Develop a long-range plan for parks and recreation.

Policies:

- Selected municipal properties shall be designated for recreational purposes.
- Parks or mini-parks shall, to the extent feasible, be provided in all city neighborhoods.
- Development of recreational areas shall be in accord with ACMP standard 6 AAC 80.060.

Implementation:

- A long range parks and recreation plan shall be developed and made an element of the Comprehensive Plan.
- The City shall provide funds to accomplish the above. When necessary, state, federal or other funds will be sought to implement the above.

MINERALS EXTRACTION

Issue:

- A need exists to coordinate and plan for efficient use of sand resources within the City.

Goal:

- To maximize resource use while minimizing the negative effects of sand extraction.

Objective:

- Develop a long-range plan for sand extraction.

Policy:

- Mining and mineral processing shall meet ACMP standard 6 AAC 80.110.

Implementation:

- A long-range sand extraction plan shall be developed with the input of all interested parties.
- The City shall provide funds to accomplish the above. When necessary, state, federal or other funds will be sought to implement the above.

RELATIONSHIP OF ISSUES TO RESOURCE ASSESSMENT

Riverbank Erosion

The Geophysical Hazards section discusses erosion rates of the Kuskokwim River and explains the erosional process at Bethel. Maps are included that predict the advance of the riverfront based on a historic and decreasing rate. The Geophysical Hazards section also discusses the City of Bethel's comprehensive bank stabilization program. The Transportation section discusses seawall projects at the cargo dock and fuel dock and illustrates the importance of the River as a transportation corridor. The Subsistence section emphasizes the importance of the river as a subsistence resource. The Recreation section mentions the use of the river as a popular recreation area. All important uses of the riverfront must be considered when planning for bank stabilization projects.

Use of the River and Riverfront

The physical characteristics of the Kuskokwim River are discussed in the Hydrology section. The actions of the river often determine the time of year, the length, and the type of activity that occurs on the river. The primary concern of use of the river is the availability of proper access. Access needs to be insured for a variety of uses that are specifically discussed in this report. The uses include: subsistence, transportation, commerce, commercial fishing, and recreation. Riverbank stabilization projects need to consider the many uses of the river so that none are prevented by seawall construction. Future planning of riverfront use must consider existing land ownership and existing land use. Pocket fold-out maps of land ownership and land use are provided in the back of this report. Potential future economic activities that may need to be considered when planning for riverfront use includes outer continental shelf activities, forest development, mining, and tourism.

Community Growth

Bethel's rapid population growth in recent decades has had profound

effects on the economy and lifetyle of Bethel. A generation ago the culture was almost totally Native and the economy predominantly subsistence. Now Bethel is at least one-third non-Native and the cash economy is dominant. The Alaska Native Claims Settlement Act (ANCSA) awarded land allotments to eligible Natives. ANCSA has created an interesting planning situation for Bethel in that 30% of the land within the City limits is pending native allotment applications and are not subject to state or local jurisdiction.

The direct cause of Bethel's rapid population growth has been economic growth particularly in the government, transportation and service sectors. Benefits of economic growth have been increased per capita income and better community and utility services. However, negative impacts caused by overly rapid growth include a severe housing shortage and heavy strain on community services. The economy of Bethel is in a vulnerable position because of an overdependence on government and support industries such as transportation and service. Continued large government cutbacks could have a devastating impact on the Bethel economy. The economy may potentially expand from the development of a tourist industry, upriver forest development, or outer continental shelf activities.

Subsistence

The patterns of subsistence use are identified in the Cultural Resources section of the Resource Assessment. The importance of subsistence is noted throughout the Assessment. Access to the river and riverfront for subsistence purposes is discussed in the Riverfront Land Use chapter and Transportation section of the Assessment.

Discussions of Habitat, Bird Life, Vegetation, Mammals, and Fishes are all pertinent to the issue of subsistence, as is the discussion of Commercial Fishing. The chapter which proposes that an Area Meriting Special Attention (AMSA) be established for the area used most intensively for subsistence activities by Bethel residents provides additional information on this topic.

Habitat

The discussions of Hydrology, Habitats, Vegetation, Bird Life, Mammals and Fishes all pertain to the issue of habitat and indicate a need to maintain a system of open space within the city. Related issues include Subsistence, Recreation, Drainage and Wetlands.

Future planning for open space must refer to current land use and ownership as well as economic activities. Of particular importance is the matter of city owned land and/ or easements, and the negotiations currently underway with the Bethel Native Corporation for ANCSA 14(c)(3) lands. See Land Use and Land Ownership sections.

Wetland Management

Wetland habitats, subject to the Alaska Coastal Management Program, have been defined in the Coastal Habitat section. The importance of wetland habitats to fish and wildlife resources and the continuance of a subsistence lifestyle and commercial and sport utilization of these resources is implicit throughout the report. Specific mention of environmental concerns associated with future development in wetland areas is found in the discussion of the small boat harbor, contained in the section on Transportation.

Surface Drainage

Surface drainage is discussed in the Hydrology section. Due to low profile, undulating topography, and the presence of permafrost, no dominant stream systems have been able to develop. A major portion of the area is imperfectly drained which results in extensive areas of standing water. The impact of increased urban development without consideration of natural drainage is discussed in the Geophysical Hazards and Public Works sections. Large scale maps (1":100') have been prepared for the City to illustrate local surface water movement. The maps will be useful in the siting of new roads and sites for location of sand pad foundations. However, a more comprehensive drainage study is recommended.

Waste Disposal

The City of Bethel's existing methods of waste disposal are identified in the Utilities section. This section includes some discussion on the limitations of the City to provide conventional waste disposal services to the entire community. The need for expanded services and the development of a comprehensive utility plan is implicit.

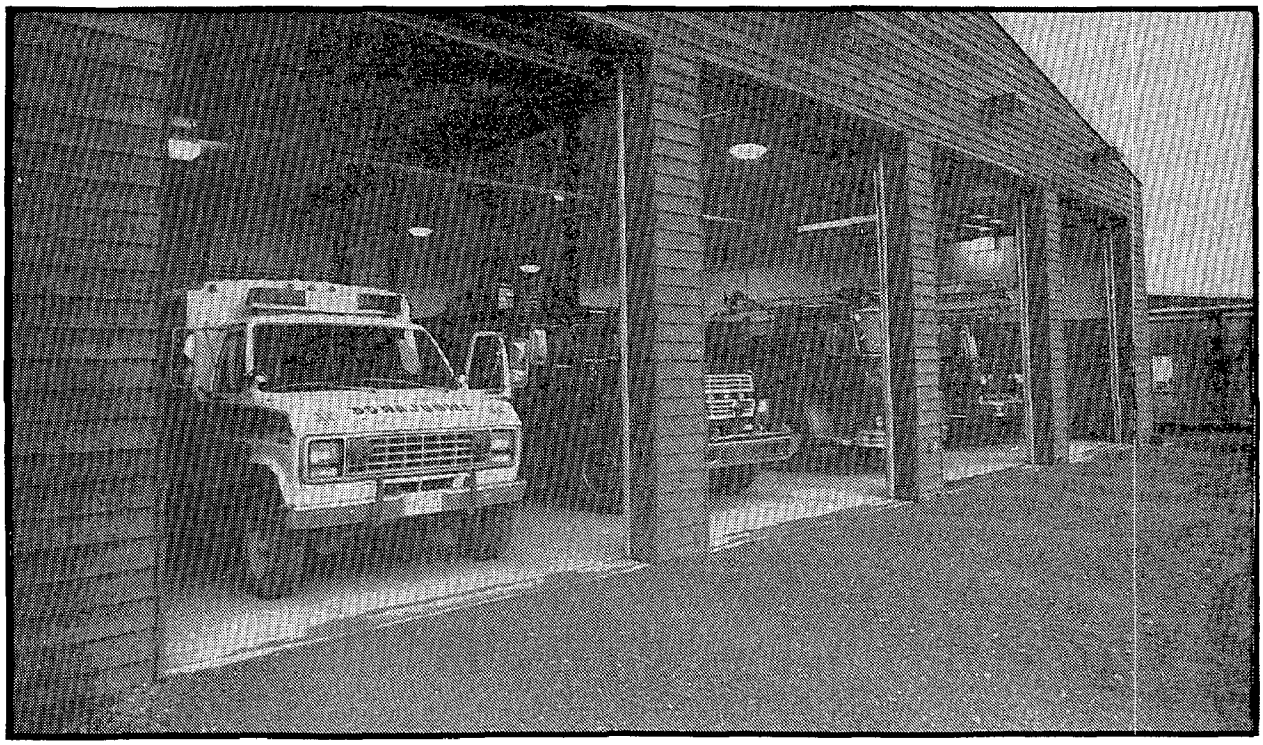
Air Quality

The major air quality concern expressed by residents of Bethel is the blowing of sand and silt. The level of wind borne materials may be reduced with improved construction methods, the seeding of sand pads, and revegetation of exposed areas which would prevent or mitigate further onshore erosion. Onshore erosion is addressed in the Geophysical Hazards section.

Pedestrian Walkways and Trails for Winter Off Road Vehicles

The designation of a city-wide winter trail system in Bethel would greatly benefit the community. With the increased utilization of 3-wheelers and snow machines for transport, problems are certain to arise as new developments obstruct commonly used trails (see Transportation section). The major local and regional trails have been identified and are illustrated in figure 14.

In spite of the recent increases in the numbers of cars in Bethel, a large portion of the community still uses foot travel as the primary mode of transport. Safe pedestrian walkways are at a minimum and need expansion. Boardwalks are discussed in the Transportation subchapter. See also the Recreation discussion.



MANAGEMENT AUTHORITY

One of the principles of the coastal management program is to use - to the greatest extent possible - existing governmental authorities and agencies to implement local coastal management plans. Within state and federal government, a number of cabinet level departments, as well as divisions and agencies within those departments, have statutory responsibilities that relate directly or indirectly to matters of concern in the coastal area. Local ordinances and actions also affect matters of concern in the coastal management plan.

The Alaska Coastal Management Act did not bestow new legal authority on municipalities. It did create the mechanism of "consistency" to ensure the implementation of coastal management plans. That means that although agencies do not lose their management responsibility or authority within a coastal district, they do have to ensure that their actions are consistent with the approved coastal management plan.

Appendix IV lists existing state and federal management authorities that directly or indirectly affect implementation of the coastal management plan in Bethel. Persons wishing to develop projects within Bethel are also required to see that pertinent state/federal requirements are met. Satisfying concerns of this plan as stated in policies and standards does not exempt the developer from meeting other federal/state requirements that may exist.

USES & ACTIVITIES SUBJECT TO THE COASTAL MANAGEMENT PLAN

The State of Alaska Coastal Management Program guidelines specify several uses subject to the coastal management program, and allows local districts to add other uses that will be subject to their plans.

The City of Bethel plan sets standards for all new development and construction in the city limits. Specific activities covered include, but are not limited to:

- Construction of residential, commercial, industrial, or public facilities.
- Subdivisions
- Development in wetlands
- Development along the waterfront
- Development in hazardous areas
- Erosion control measures
- Subsistence Use
- Trails
- Recreation
- Energy Facilities
- Transportation and Utilities
- Fish & Seafood Processing
- Timber Harvest & Processing
- Mining and Mineral Processing

Uses of State Concern

Land uses that significantly affect the long term public interest have been singled out in the Alaska Coastal Management Program (ACMP) for special treatment. They are called "uses of state concern", and include:

- Coastal land uses "of national interest", specifically,
  - ports that contribute to meeting national energy needs;
  - facilities that contribute to meeting national energy needs;
  - navigational facilities and systems;
  - development of resources on federal lands;
  - national defense and security facilities.

- Land uses of more than local concern, including those that confer significant environmental, social, cultural or economic benefits or burdens beyond a single coastal management district;
- Major energy, industrial, or commercial facilities, that, because of their magnitude or the magnitude of their effect on the state's economy or the regional economy, are issues of more than local significance;
- Transportation or communications facilities that serve statewide or interregional needs;
- State parks, state recreational areas, state game refuges, state game sanctuaries, or critical habitat areas established by statute.

ACMP guidelines state that these uses must be treated fairly in local plans, and not be unreasonably excluded or restricted. Policies in the Bethel plan generally reflect state coastal management objectives, and do not unreasonably exclude or restrict these uses.

Proper and Improper Uses

Uses that are consistent with the standards and policies set forth in the coastal management plan are to be considered proper uses. Uses not consistent with the policies and standards are improper uses.

The standards and policies for the Bethel Coastal Management program are set out below.

COASTAL MANAGEMENT POLICIES

The policies listed below are the "rules" of the Bethel Coastal Management Plan. These are the policies to be used by local, state and federal decision-makers in determining if a specific proposed use is consistent with the Bethel Coastal Management Plan.

The list is roughly grouped by issue or topic area. In some cases, a policy will be listed under more than one heading. When this occurs, it will appear with its original number: it will not be renumbered.

GENERAL POLICIES WHICH APPLY TO ALL DEVELOPMENT IN CITY LIMITS

Community Growth

1. . Future development shall take place in such a way as to minimize vehicular and pedestrian conflict.
2. . Future development shall allow for the continued use of traditional winter trails.

Wetlands Development

3. . Wetlands shall be managed so as to assure adequate water flow, to avoid adverse effects on natural drainage patterns, and to avoid the destruction of important habitat.
4. . New development in significant wetlands shall be discouraged unless:
   - there is significant public need for the proposed use or activity;
   - there is no feasible prudent alternative to meet the public need which would conform to the above policy; and
   - all feasible and prudent steps to maximize conformance with the above policies are taken.
5. . A miminum distance of 25 feet shall be maintained between the toe of any fill and the high water mark of any drainageway, lake or slough.

6. . Roads constructed over drainageways shall be adequately culverted or bridged to maintain normal surface water flow and fish passage (where appropriate).

Drainage

7. . Drainageways and lakes shall be kept free from development.
8. . No development shall take place without adequate measures to provide for natural surface drainage and run-off.
9. . Natural drainageways and catchment basins shall be the preferred use for managing surface drainage.
10. . Roads shall be properly ditched and culverted.
6. . Roads constructed over drainageways shall be adequately culverted or bridged to maintain normal surface water flow and fish passage (where appropriate).
11. . Road banks shall be seeded to reduce erosion.

Habitat

12. . Habitats shall be managed in accordance with ACMP standard 6 AAC 80.130.
13. . Roads constructed over drainageways that contain fish shall be adequately culverted or bridged to allow for fish passage.

Waste Disposal

14. . Sewage, waste and gray water disposal in Bethel shall meet the Alaska Department of Environmental Conservation standards.
15. . Waste incineration shall meet or exceed ADEC standards for air quality.
16. . Recycling shall be encouraged.

Air Quality

17. . Development shall be carried out in a manner which keep blowing sand and silt under reasonable control.
18. . Roads shall be covered with gravel.
15. . Waste incineration shall meet or exceed ADEC standards for air quality.
11. . Road banks shall be seeded to reduce erosion.

Development along the Waterfront

19. . Priority for development along the waterfront shall be given to water dependent and water related uses and activities.

20. . Other uses will also be allowed if adequate space is provided for water-dependent and water-related uses.

21. . Adequate opportunities for subsistence use of the river shall be provided.

22. . Increased public access to the river for land and water vehicles shall be provided.

23. . Development along the riverfront shall allow for adequate public access.

24. . The river, including tributaries and sloughs, shall be kept free of navigation hazards.

25. . Public access shall be the highest priority use in any lands reclaimed by erosion control measures.

Geophysical Hazards (Development in Hazardous Areas)

26. . Residential construction in already platted and developed flood plain areas not in the significant wetlands shall be allowed if it meets the requirements of the National Flood Insurance Program.

27. . Development in areas threatened by erosion shall not be permitted unless siting, design and construction standards for minimizing property damage and protecting against loss of life are met.

Subsistence Use

7. . Drainageways and lakes shall be kept free from development.

21. . Adequate opportunities for subsistence use of the river shall be provided.

28. . Development in subsistence use areas identified and designated in accordance with 6 AAC 80.120 shall be discouraged. Potentially conflicting uses or activities in subsistence use areas may be authorized if a study of the possible adverse impacts of the proposed potentially conflicting use or activity upon subsistence usage is conducted and appropriate safeguards to assure subsistence usage is provided [6 AAC 80.120(d)].

29. . Development in the proposed Bethel Subsistence Use Area AMSA shall be conducted in accordance with the management plan for that area, when adopted.

POLICIES WHICH APPLY TO SPECIFIC USES AND ACTIVITIES

Erosion Control Measures

30. . Adequate access shall be provided for in the design process for erosion control measures.

31. . Adequate space for commercial and industrial use shall be provided for in the design process for erosion control measures.

Trails

1. . Future development shall take place in such a way as to minimize vehicular and pedestrian conflict.

2. . Future development shall allow for the continued use of traditional winter trails.

Recreation

32. . Selected municipal properties shall be designated for recreational purposes.

33. . Parks or mini-parks shall, to the extent feasible, be located in all city neighborhoods.

34. . Development of recreational areas shall be in accord with ACMP standard 6 AAC 80.060.

Energy Facilities

35. . Any energy facility necessary for future development shall be sited according A.C.M.P. standard 6 AAC 80.070.

Transportation and Utilities

36. . Transportation and utility routes and facilities shall comply with the A.C.M.P. standard 6 AAC 80.080.

Fish and Seafood Processing

37. . Development of new facilities for commercial fishing and fish processing shall meet the general policies in this plan.

Timber Harvest and Processing

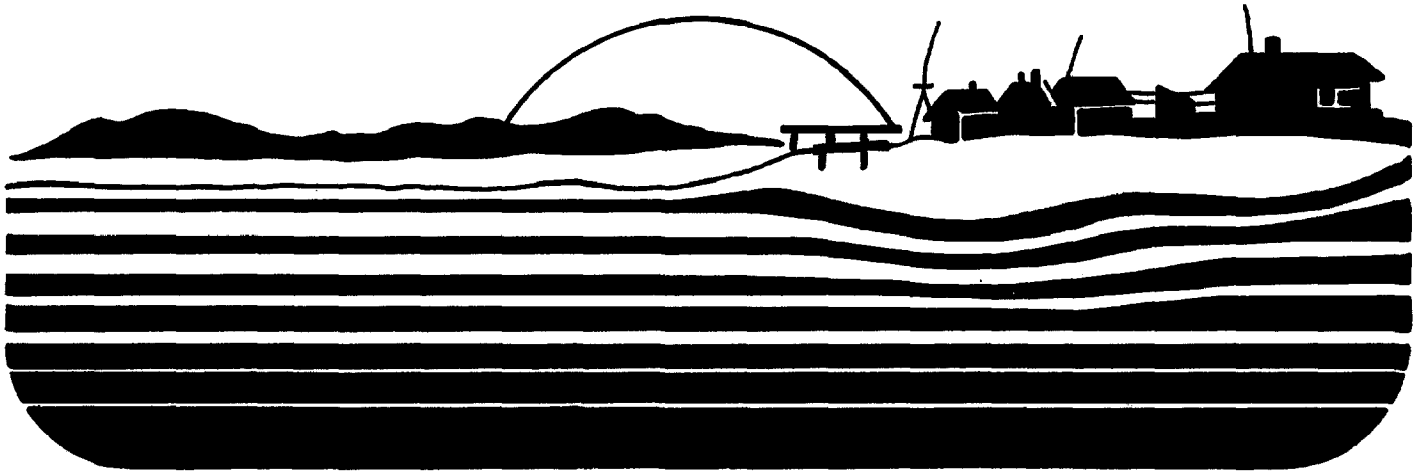
38. . Timber harvest and processing shall meet A.C.M.P. standard 6 AAC 80.100.

Mining and Mineral Processing

39. . Mining and mineral processing shall meet A.C.M.P. standard 6 AAC 80.110.

IMPLEMENTATION

Chapter 8



IMPLEMENTATION

The intent of this coastal management plan is to benefit the community of Bethel by furthering the common good. It is with this understanding, and in a spirit of helpfulness, that the plan is to be implemented.

Implementing a plan is both the most difficult and the most important task facing a planner. Unless the ideas in a plan are put into action, it remains a mere collection of papers, collecting dust on a shelf.

This plan is no exception. Fortunately, the design of the Alaska Coastal Management Program provides several tools for this. One, "consistency", allows the plan to affect actions beyond those of the City proper. This is described in the section titled "Coastal Management Policies: How they will be implemented by State and Federal agencies."

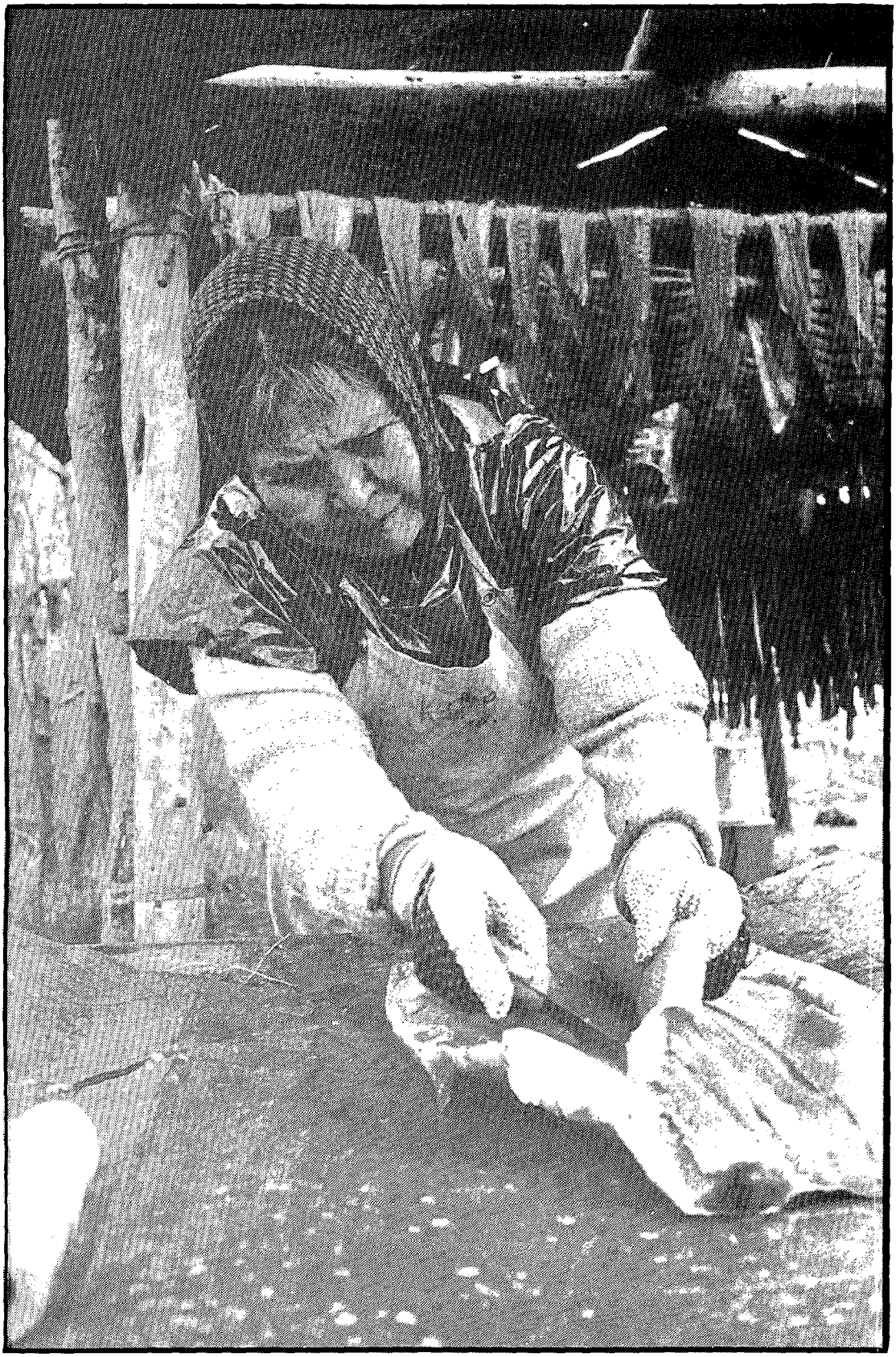
For purely local actions, the City will use existing authorities to implement the policies as allowed for in Title 29. How this will be done is discussed in the following section.

Coastal Management Policies: How they will be implemented locally

The coastal management policies listed in the previous chapter are the basis of this plan: they are the "rules" for local coastal management. Whether backed by City ordinance (such as the subdivision ordinance) or federal law (such as wetlands permitting), these are the policies which shall be followed once this plan is adopted.

In all cases, developers should plan their projects with these guidelines in mind. Decision makers, such as Planning Commissioners, or a state agency with permitting responsibilities, will use these policies in their review of a proposed project.

This plan does not establish any new review procedures or new layers of bureaucracy. It relies on existing procedures, such as the building permit system and subdivision review process. It does add new policies to these procedures. It also gives new responsibilities to the decision-makers, as they must ensure their actions are in conformance with this plan.



There are currently three types of routine local action that will incorporate the coastal management policies. They are: building permits, review and comment on state or federal permits, and Planning Commission actions. **

In the granting of building permits, the coastal management policies will simply be added to the list of criteria considered before granting a building permit.

For example, one of the non-coastal management criteria considered is whether or not a building will meet the yard requirement for distance from the property line. This is routinely checked when reviewing a building permit application.

Once this plan is adopted, conformance with coastal management policies will be added to the process. A checklist or other similar format will be used by Planning Department staff to make sure all pertinent City regulations are met.

From the point of view of an applicant, the steps will be as follows:

1. Pick up and fill out the building permit application.
2. Submit the completed application with the appropriate fee to the Planning Department.
3. Planning Department staff reviews the application. If additional information is necessary, staff will contact the applicant and request it.
4. If the application shows the project will conform to all applicable City regulations, including coastal management policies, the preliminary building permit will be issued. (The preliminary permit is valid for 120 days.)
5. When the project is permanently positioned on the lot, the applicant submits an as-built survey to the Planning Department
6. Planning Department staff grants the final permit.

If the application shows that the project will not meet all applicable City regulations, the following steps will be taken:

** If a developer is proposing to put any fill(sand) in wetlands, the steps outlined in Chapter 5 also apply. See Chapter 5, especially pages 5-8 through 5-10, for a discussion of the COE general permit.

A. Planning Department staff will contact the applicant and present the problem.

B. Together, the applicant and staff will discuss the problem and try to resolve it. This may be a matter of providing more information to City staff, or may involve modifying the project.

C. If the problem is resolved, the preliminary permit is granted and things proceed as usual.

If the problem is not resolved, the applicant can appeal to the Planning Commission. If not satisfied with the Planning Commission's decision, an appeal can be made to City Council. These steps are contained in state law (AS 29.33.110). If the negative decision is made on the basis of a coastal management policy, the applicant can appeal to the State Coastal Policy Council. These steps are outlined in the ACMP guidelines. (AS 46.40.100)

In most cases, a developer can anticipate a two to three day processing time for preliminary building permits.

For actions that go before Planning Commissoin for review, such as subdivision approval, a coastal management analysis will be added to the usual procedural steps. Planning Department staff will prepare a written analysis of the proposed project's consistency with applicable city regulations, including the coastal management policies. (This is, in effect, a local "consistency review"). The Planning Commission will use this analysis in making their decision.

The precise steps involved, from a developer's point of view, are not listed here as they vary, depending on the nature of Planning Commission action needed (e.g. plat approval, subdivision approval, vacation of an easement, etc.). Most are established by ordinance or statute: contact the Planning Department for specific instructions.

In all cases, it will be necessary for a developer to contact the Planning Department in advance of the Planning Commission meeting to provide staff the time to prepare the written review. Again, if in the process of doing the analysis, more information is needed, the staff will contact the developer.

If it appears that the proposed project will not meet coastal management or other criteria, staff will contact the developer to discuss the problem. Staff will work with the developer to resolve any problems, in the spirit of helpfulness cited in the introduction to this chapter.

The analysis provided to Planning Commission will note any unresolved issues: Planning Commission then decides what action to take.

If a developer is dissatisfied with the Planning Commission decision, he/she can appeal to City Council. If the decision is based on coastal management policies, and the developer is still dissatisfied with the City Council decision, the state Coastal Policy Council is the final recourse, as noted above.

Adding the consistency analysis to projects going before Planning Commission will increase the time needed for processing, as the staff shall prepare the written analysis prior to the Planning Commission meeting. If a developer presents a proposed project to the Planning Department a minimum of three weeks prior to the Commission meeting, this will usually provide adequate time to perform and prepare the consistency review. Developers are advised to contact the Planning department in the early stages of their planning, to provide for adequate consideration and discussion of the project and avoid unnecessary delays.

The third local action that will routinely occur is City review of a permit application submitted to a state or federal agency.

Many projects will need state or federal permits in addition to a local building permit. The City is not responsible for issuing these permits but does have a role in reviewing them for consistency with the local coastal management plan. Developers are responsible for applying for any needed permits directly to the appropriate agency.

When agencies or clearinghouses send the Planning Department a notice of pending permit action on a project that will affect Bethel, the proposed project will be reviewed for consistency with coastal management policies. The Planning Department will prepare this analysis, and send a copy of its findings to the permitting agency (or clearinghouse) and the applicant.

City response to permit notifications will be within the time limits imposed. Developers should be aware that the time required for processing state and federal permits varies, but is usually quite lengthy.

All consistency analyses will be prepared by the Planning Department. If a development does not meet coastal management standards, informal attempts will be made to resolve the problem. If no resolution is possible, a recommendation to deny approval will be made. In some instances, the analysis

may recommend specific stipulations be included in the permit which would bring the project into conformance with the coastal management policies. Reference to the policies used in these instances will be provided.

Developers are urged to discuss their projects with the Planning Department in the early planning stages. This way the Department can ensure that the developer is aware of requirements the project will have to meet early enough to avoid delays or extensive modification of a project. Also, Planning Department staff can provide suggestions on how to best meet relevant requirements.

Coastal Management Policies: How they will be implemented by State and Federal Agencies

The mechanism of "consistency" means that once this plan is adopted by the Alaska Coastal Policy Council and, later, by the Federal Department of Commerce, both state and federal agencies must ensure that their actions are consistent with this plan, to the maximum extent practicable. This affects agency actions: projects they plan in Bethel must meet coastal management policies. (There is one exception: federal lands are excluded. However, any "spillover impacts" of actions on federal lands that have "direct effects" on state lands or waters are reviewed for consistency.)

Probably more importantly, their decisions on permits must be based on local coastal management policies, as well as their own criteria. Local review and comments on permit action will influence agency decisions.

In the case of federally initiated or permitted activities, the state clearinghouse reviews proposals for consistency with the Alaska Coastal Management Program. The clearinghouse contacts the local district and must give "great weight" to the views of the district regarding the project's consistency with the district program. ("Great weight" means shifting the burden of proof to the deciding agency to reach a contrary decision.)

For state initiated or regulated activities, Bethel requests that the earliest possible notification be sent to the Planning Department for any state activity or permit action within the city limits or that will have an impact on the city for any use or activity subject to the coastal management program. Upon notification of a pending action or permit decision by the

state agency, the Planning Department will submit its written analysis of the project's consistency with the local coastal management plan. This will be done within the time limits imposed. The state agency must give "great weight" to the views of the district.

Field checks will be carried out through observation by a planning department staff member trained in the coastal management standards and policies.

Enforcement, when necessary, will be carried out according to existing local ordinances and/or pursuant to existing state/ federal regulations. No new mechanisms are being established by this plan.

Meeting Goals and Objectives

Another aspect of implementing the plan involves the follow through on the goals and objectives listed in Chapter 7. Most of these activities will be the responsibility of the Planning Department: for example, amending the Comprehensive Plan or developing a drainage plan. Planning Department will pursue these objectives as aggressively as possible given staff and budget constraints.

The following studies or plans have been identified as necessary for follow-through for the coastal management plan. They are listed in order of priority:

- Drainage study (ready to begin)
- Comprehensive Plan update (scheduled for summer of 1983). Elements to be added to the Comprehensive Plan include:
    - drainage
    - trails
    - subsistence resource use
    - recreation
    - open space
    - air quality
- Waste disposal plan
- Riverfront Land Use
- Subsistence Use AMSA
- Mineral Extraction

Once adopted, this plan becomes City policy and will guide City actions. In some instances, activities listed as implementation steps in chapter 7 are appropriate to a City department other than Planning. In such cases, City Administration will be responsible for seeing that the follow-through is made. Planning Department will assist in that process to the extent possible. Of course, it is ultimately the responsibility of City Council to see that the coastal management plan is followed.

Organization and Staffing

Throughout this chapter reference has been made to the Planning Department as the City entity responsible for local implementation of coastal management policies and standards, and the contact for state and federal decision-makers. As staff to the Planning Commission and the City department charged with planning responsibilities, this is the most appropriate department to handle these tasks.

Current staffing includes a Planning Director, Planner, Planning Technician and Coastal Management Coordinator. The latter three report to the Planning Director. The Planner is currently responsible for consistency reviews.

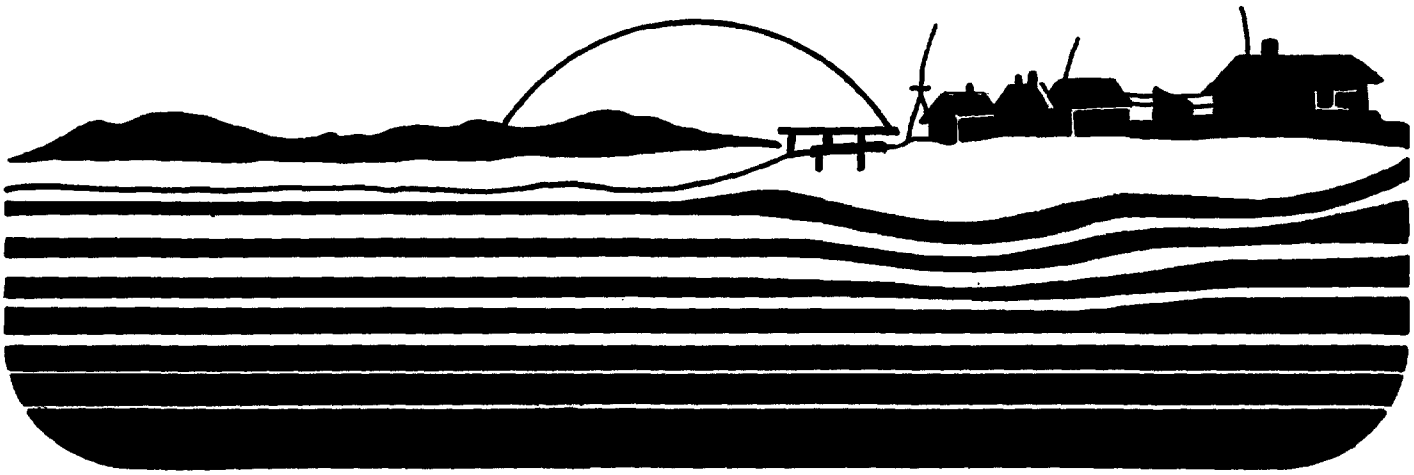
Maintaining this staffing level will be necessary once the Coastal Management Plan is adopted, given the additional implementation responsibilities. Additional staff will not be required for plan implementation. The estimated annual expense for these positions and related support costs is $185,000.

There are no current plans to change the organization of the Planning Department. Correspondence relating to coastal management should be sent to:

Planning Department
City of Bethel
P.O. Box 388
Bethel, AK 99559

PUBLIC PARTICIPATION

Chapter 9



PUBLIC PARTICIPATION

The Alaska Coastal Management Program requires that a district program include "evidence of effective and significant opportunities for public participation" in development of the coastal management program (6 AAC 85.110).

This chapter summarizes the efforts made by the City of Bethel to involve and inform local residents of the coastal management planning process. Considerable energy has gone into this effort, based on the belief that this plan should address issues identified by citizens, and use their opinions and wisdom in fashioning solutions to existing problems.

The basic element in the effort to ensure the representation of different viewpoints in the planning process has been the formation of the "coastal management working group". Representation from various organizations was sought, including the Bethel Native Corporation, Orutsaramuit Native Council, Lousetown Development Association, Ceñaliulriit (Yukon Kuskokwim Coastal Resource Service Area Board), private individuals, and City of Bethel Parks and Recreation Committee, Planning Commission and City Council.

The working group met frequently in the development of this draft, providing coastal management staff with considerable guidance and feedback, particularly regarding issues, goals, objectives, implementation, and policies. Working group meetings were also open to the public. (Notes and/or tapes of all public meetings are available in the City's record of public meetings for coastal management.)

Two general public meetings and one public hearing were held prior to the publication of the public hearing draft. The public meetings were held in October, 1981 and February, 1982. Both were widely advertised in the local newspaper, The Tundra Drums, and announced over radio KYUK. The October meeting was an introduction to coastal management and an opportunity for the public to identify issues. The February meeting was held to review the Preliminary Report, published that month. Also shown at the February public meeting was a slide show, developed by coastal management staff, entitled "Coastal Management: A Local Perspective". The slide show has also been shown over KYUK television (channel 4), the local public T.V. station.

At the public hearing in March (1982), the City Council accepted the Preliminary Report. Prior to this hearing, the Coastal Management Coordinator reviewed the planning efforts to that point on "Yuk to Yuk", an hour long local radio talk show.

Other efforts to inform the public prior to printing the public hearing draft included columns in the local newspaper, a summary of the preliminary report which was published as an insert to the newspaper (February 1982) with extra copies distributed around town, and an update on coastal management planning efforts which was mailed to all boxholders (October 1982).

The public hearing draft was published in February 1983. A summary was printed as an insert to the local newspaper in March. Coastal management staff also appeared on the "Yuk to Yuk" show prior to the first public meeting to discuss the public hearing draft and to inform people about the meetings scheduled.

An intensive public awareness campaign was conducted in March. Public service announcements were made for radio and television, and were given considerable air time on KYUK. Advertising was placed in the newspaper, meeting notices were on cable TV, and notices were posted in many locations around town.

Initially one public meeting and one public hearing were scheduled. At those meetings, people requested more time to consider the plan and additional meetings to discuss it. Six more topical meetings were held in response to their request, and one additional public hearing. In sum, considerable public input was generated at those meetings. This draft of the Bethel Coastal Management Plan reflects substantial public participation and is the better for it.

APPENDICES

APPENDIX I

LOCAL PLACE NAME MAP

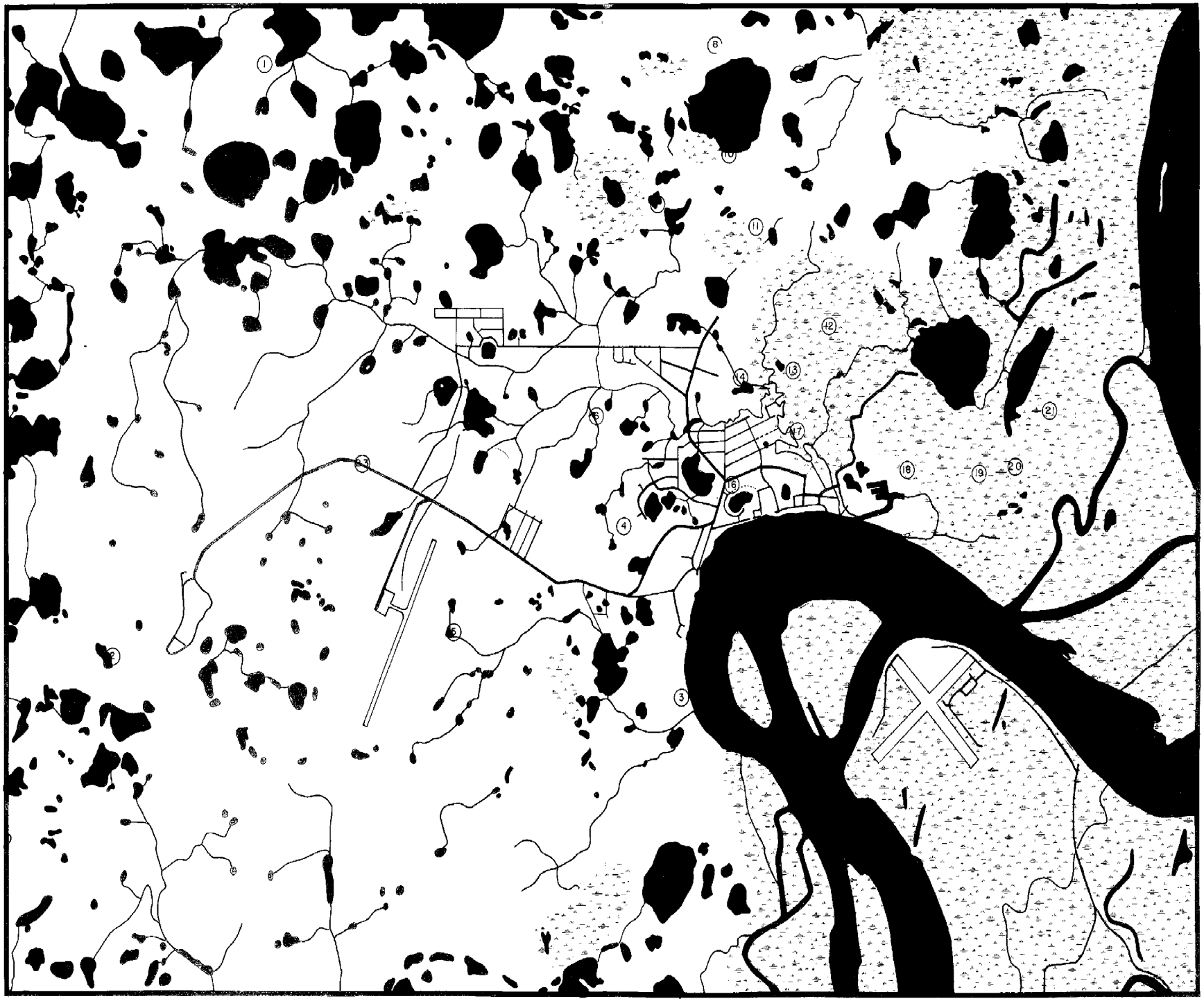

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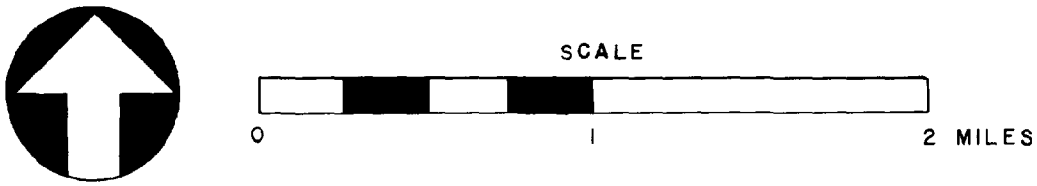
FIGURE 41

COASTAL MANAGEMENT PROGRAM
CITY OF BETHEL

Place Names and Neighborhoods

1. TUNDRA RIDGE
2. AIRPORT
3. FUEL DOCK
4. P.H.S. HOSPITAL
5. TRAILER COURT
6. CITY SUBDIVISION
7. A.S.H.A. HOUSING
8. SEWAGE LAGOON
9. CITY DUMP
10. MIKELNGUUT ELITNAUVIAT SCHOOL
11. HIGH SCHOOL
12. "ALLIGATOR ACRES"
13. KILBUCK SCHOOL
14. POST OFFICE
15. KUSKOKWIM COMMUNITY COLLEGE
16. CITY OFFICES
17. MISSION LAKE
18. FIRST AVENUE
19. CARGO DOCK
20. LOUSETOWN
21. SMALL BOAT HARBOR
22. HANGER LAKE
23. BLUEBERRY FIELDS SUBD.



PREPARED BY THE
CITY OF BETHEL

APPENDIX II

GLOSSARY/DEFINITIONS

GLOSSARY/DEFINITIONS

ACMP	Alaska Coastal Management Program. Established by the Alaska Coastal Management Act of 1977. Standards and guidelines of the ACMP are contained in 6 AAC 80 and 6 AAC 85.
AMSA	Area Meriting Special Attention, an area which may require special management because it has outstanding value to the general public, is particularly sensitive to change, or because plans for the area or claims upon its resources could preclude other uses.
CPC	Coastal Policy Council, a 16 member body, composed of nine local elected officials and seven cabinet members to oversee the ACMP.
COE	Corps of Engineers, U.S. Department of Army.
CENALIULRIIT	Yukon-Kuskokwim Coastal Resource Service Area Board (see figure 1 for area involved).
DEVELOPER	For purposes of this plan, anyone making an improvement on a lot in Bethel. This includes the construction of an external building or structure, water or sewer facility, or external changes that constitute a betterment of real property.
DRAINAGEWAYS	Areas which serve as collectors for runoff, including lakes, sloughs, and areas that channel water into them. Refer to the Bethel Planning Department for questions on specific locations.
FLOOD PLAIN	That area of land adjoining the channel of river, stream, watercourse, lake or similar body of water which will be inundated by a flood that can reasonably be expected for that region. Land below 17.1 feet elevation, mean lower low water.
HIGH WATER	The maximum height or stage reached by rising water.
LAKE	Standing body of water with a surface area of 1/2 acre or more.
MEAN LOWER LOW WATER	The mean height of the lowest waters at a particular point over a considerable period of time.
TRUST LANDS	Lands held for Alaskan Natives by the federal government. Actions on these lands are regulated by 25 CFR 1.4.

WATER-DEPENDENT Refers to a use or activity which can be carried out only on, in, or adjacent to water areas because the use requires access to the water body.

WATER-RELATED Refers to a use or activity which is not directly dependent upon access to a water body, but which provides goods or services that are directly associated with water-dependence and which, if not located adjacent to water, would result in a public loss of quality in the goods or services offered.

WATERFRONT For purposes of the policies in this plan, the waterfront is the land adjacent to the Kuskokwim River and to Brown Slough, from the mouth of the slough to the bridge.

WETLANDS Land that exhibits the following characteristics:

a) predominance of vegetation characterized as wetland plants,
b) soil with evidence of mottling (streaks) in the upper soil layers (horizons) and a chroma (soil color scale) of two or less, and
c) the presence of water (free) in the soil.

SIGNIFICANT WETLANDS Major drainageways, lakes and sloughs (including a 25 foot setback from the high water mark) and the undisturbed areas of the flood plain. (Below 17.1 feet elevation mean lower low water). Map available from the Bethel Planning Department.

NON-SIGNIFICANT WETLANDS All other land areas within the city.

APPENDIX III

PLANTS, MAMMALS, AND FISH IN STUDY AREA

IMPORTANT PLANTS OF THE WET TUNDRA COMMUNITY

Characteristic Species

Bog orchid	*Platauthera dilatata*
Cotton grass	*Eriophorum angustifolium* ssp. *subarcticum*
Sphagnum moss	*Sphagnum rubellum*

Additional Species

Shrubs

Dwarf birch	*Betula nang* ssp. *exilis*
Blueberry	*Vaccinium uliginosum*
Labrador tea	*Ledum palustre* ssp. *decumbens*
Willow	*Salix fuscescens*

Herbs

Bistort	*Polygohum bistorta* ssp. *plumosum*
Bur reed	*Sparganium* sp.
Bog cranberry	*Oxycoccus microcarpus*
Mare's tail	*Hippuris vulgaris*
Marsh Marigold	*Caltha palustris* ssp. *arctica*
Pond weed	*Potamogetan* sp.
Wild flag	*Iris setosa* ssp. *setosa*

Grasses and Sedges

Beach rye grass	*Elymus arenarius* ssp. *mollis*
March arrowgrass	*Triglochin palustris*
Oat grass	*Hordeum brachyantherium*
Rush	*Luzula wahlenbergii* ssp. *piperi*
Sedge	*Carex pluriflora*
Spear rye grass	*Poa eminens*

Fern Relatives

Fir clubmoss	*Lycopodium selago* ssp. *selago*
Quilwort	*Isoetes muricata* ssp. *maritima*

Lichens, mosses and liverworts

IMPORTANT PLANTS OF THE MOIST TUNDRA COMMUNITY

Characteristic Species

Crowberry	Empetrum migrum ssp. nigrum
Sedge	Carex saxatilis
Hair Moss	Dicranum sp.
Reindeer linchen	Cladonia sp.

Additional Species

Shrubs

Arctic willow	Salix arctica ssp. crassijulis
Blueberry	Vaccinium uliginosum
Cranberry	V. Vitis-idaea ssp. minus
Drawf birch	Bethula nang ssp. exilis

Herbs

Aster	Aster sibiricus
Bistort	Polygonum bistorta ssp. plumosum
Buttercup	Ranunculus Eschscholtzii
Goldthread	Coptis trifolia
Lousewort	Pedicularis Kanei ssp. Kanei
Monkshood	Aconitum delphinifolium ssp. delphinifolium
Violet	Viola epipsila ssp. repens

Grasses and Sedges

Bentgrass	Agrostis borealis
Bluejoint reed grass	Calamagrostis canadensis
Cotton grass	Eriophorum angustifolium ssp. subarcticum
Hair grass	Deschampsia caespitosa
Mountain timothy	Phleum commutatum
Wood rush	Luzula parviflora
Sedge	Carex pluriflora

Fern Relatives

Alpine clubmoss	Lycopodium alpinum
Fir clubmoss	L. Selago ssp. selago

Lichens and Mosses

IMPORTANT PLANTS OF THE HIGH BRUSH COMMUNITY

Characteristic Species

Felt leaf willow	*Salix alaxensis*
Littletree willow	*S. arbusculoides*
Thin leaf alder	*Alnus tenuifolia*

Additional Species

Shrubs

Alpine azalea	*Loiseleuria procumbeus*
Green alder	*Alnus crispa* ssp. *Crispa*
Narrow leaf Labrador tea	*Ledum palustre* ssp. *decumbeus*
Prickly rose	*Rosa acicularis*
Dwarf birch	*Betula nana*

Herbs

Alpine pyrola	*Pyrola asarifolia*
Bluebell	*Mertensia paniculata*
Geranium	*Geranium erianthum*
Lupine	*Lupinus nootkatensis*
Twinflower	*Linnaea borealis*

Grasses

Bentgrass	*Agrostis scabra*
Bluejoint reedgrass	*Calamagrostis canadensis*
Fescue	*Festuca ovina*

Ferns and Fern Relatives

Naked fern	*Gymnocarpium dryopteris*
Grown cedar	*Lycopodium complanatum*
Horsetail	*Equistum arvense*

Lichens and Mosses

MAMMALS OF THE BETHEL STUDY AREA

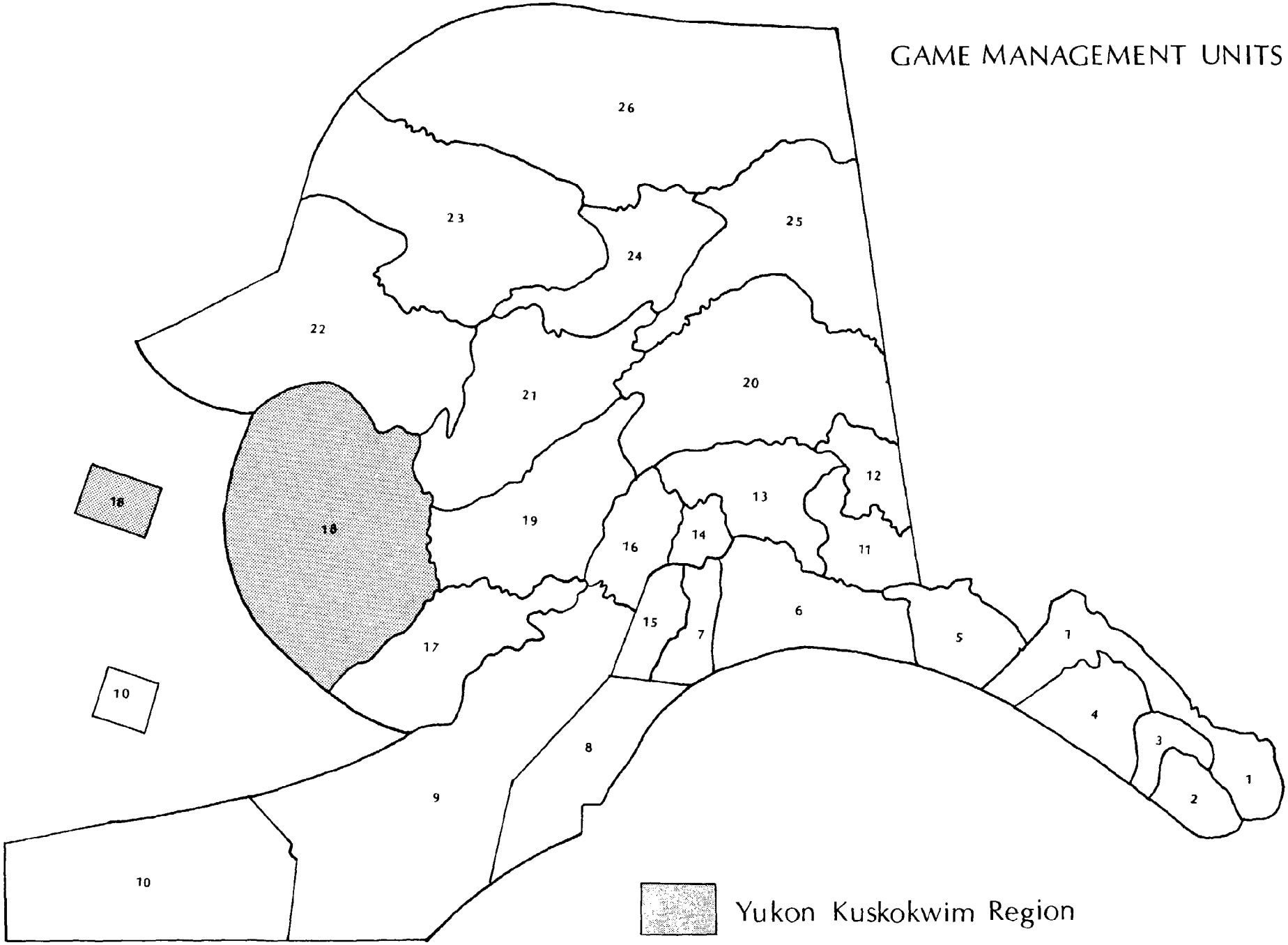
Scientific Name	Common Name
Sorex arancus	Arctic Shrew
Sorex caecutiens	Mask Shrew
Sorex palustris	Water Shrew
Sorex obscurus	Dusky Shrew
Microsorex hoyi	Pigmy Shrew
Lepus americanus	Snowshoe Hare
Lepus othus	Arctic Hare
Castor canadensis	Beaver
Dicrostonyx groenlandicus	Collared Lemming
Sunaptomys borealis	Bog Lemming
Lemmus trimucronatus	Brown Lemming
Clethrionomys rutilus	Red-backed Vole
Microtus miurus	Tundra Vole
Microtus oeconomus	Meadow Vole
Ondatra zibethicus	Muskrat
Zapus hudsonius	Meadow Jumping Mouse
Mustela rixoza	Least Weasel
Mustela uison	Mink
Alopex lagopus	Arctic Fox
Vulpes Vulpes	Red Fox
Lutra canadensis	Land Otter
Ursus americanus	Black Bear
Alces alces	Moose
Canus lupes	Wolf
Gulo gulo	Wolverine

FISHES OF THE KUSKOKWIM RIVER

Scientific Name	Common Name
Lampetra japonica	Arctic Lamprey
Stenodus leucichtyhs	Sheefish
Coregonus nasus	Broad Whitefish
Coregonus pidschian	Humpback Whitefish
Coregonus albula	Least Cisco
Coregonus autumnalis	Arctic Cisco
Prosopium cylindraceum	Round Whitefish
Oncorhynchus tshawytscha	King Salmon
Oncorhynchus nerka	Red Salmon
Oncorhynchus kisutch	Coho Salmon
Oncorhynchus gorbuscha	Pink Salmon
Oncorhynchus keta	Chum Salmon
Salmo gairdnerii	Rainbow Trout
Salvelinus alpinus	Arctic Char
Salvelinus namaycush	Lake Trout
Thymallus arcticus	Grayling
Osmerus eperlanus	Boreal Smelt
Llypomesus olidus	Pond Smelt
Dallia pectoralis	Blackfish
Esox lucius	Northern Pike
Lota lota	Burbot
Catostomus catostomus	Longnose Sucker
Cottus cognatus	Slimy Sculpin
Pungitius pungitius	Ninespine Stickleback
Gasterosteus aculeatus	Threespine Stickleback

APPENDIX IV

GAME MANAGEMENT UNITS


GAME MANAGEMENT UNITS
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Yukon Kuskokwim Region

APPENDIX V

SOURCES USED FOR RESOURCE ASSESSMENT

SOURCES USED FOR RESOURCE ASSESSMENT

Climate

Alaska Department of Fish and Game. Marine/Coastal Habitat Management Map.

Alaska, State of. Alaska Regional Profiles. Volume III, Southwest Alaska, 1975.

Darbyshire and Associates. City of Bethel Comprehensive Plan. Oct. 1980.

U.S. Department of Commerce, National Oceanographic and Atmospheric Administration Climactic Atlas of the Outer Continental Shelf Waters and Coastal Regions of Alaska, Vol. 1. Funded by U.S. Department of Interior, 1977.

_____. Local Climatological Data - Bethel, Alaska. Annual Summary with comparative Data, 1980.

Soils, Permafrost, and Geology

Brady, Nyle C. The Nature and Property of Soils, 8th Edition. Copyright 1974, McMillan Publishing Co. Inc.

Hinton, Robert B. and Charles L. Girdner, Jr. Soils of the Bethel, Area, Alaska. United States Department of Agriculture, Soil Conservation Service, 1968.

Malone, John. (Personal Communication) Malone & Malone, Bethel.

U.S. Department of Interior, United States, Geological Survey. Geology of the Bethel Quadrangle, Alaska (Map). Compiled by J.M. Hoare and W.L. Coonrad. 1959.

_____. Permafrost Map of Alaska. Compiled by Oscar J. Ferrians, Jr. 1965.

Geophysical Hazards

Alaska, State of. Alaska Regional Profiles. Volume III, Southwest Region.

Boyette, Dan. (Personal Communication). Capital Projects Coordinator, City of Bethel.

Galliet and Silides. Master Plan and Report for Port Development at Bethel, Alaska. Prepared for the City of Bethel, Alaska. April, 1981.

Hoffman, James. (Personal Communication). United Transportation.

U.S. Army Corps of Engineers. Bank Stabilization. Bethel, Alaska. Draft of an Environmental Impact Statement and Feasibility Report. April, 1981.

_____. Bethel Small Boat Harbot Report. Detailed Project Report and Final Environmental Impact Statement, Bethel, Alaska. August, 1981.

_____. Flood Insurance Study. City of Bethel, Alaska. Prepared for the Federal Insurance Administration, U.S. Department of Housing and Urban Development. January, 1975.

_____. Flood Plain Information. Kuskokwim River, Bethel, Alaska. Prepared for the City of Bethel. November, 1968.

Hydrology

Alaska, State of. Alaska Regional Profiles, Volume III - Southwest Region. 1975.

Bethel, City of. Department of Public Works.

Hinton, Robert B. and Charles L. Girdner, Jr. Soils of the Bethel Area, Alaska. U.S. Department of Agriculture, Soil Conservation Service, 1968.

U.S. Army Corps of Engineers. Flood Insurance Study. City of Bethel, Alaska. Prepared for the Federal Insurance Administration, U.S. Department of Housing and Urban Development. January, 1975.

_____. Flood Plain Information. Kuskokwim River, Bethel, Alaska. Prepared for the City of Bethel. December, 1968.

_____. Bank Stabilization, Bethel, Alaska. Draft of an Environmental Impact Statement and Feasibility Report. April, 1981.

_____. Bethel Small Boat Harbor Report. Detailed Project Report and Final Environmental Impact Statement. August, 1981.

Vegetation

Alaska, State of. Alaska Regional Profiles - Southwest Region, Volume III. 1975.

Hinton, Robert B. and Charles L. Girdner, Jr. Soils of the Bethel Area, Alaska. U.S. Department of Agriculture, Soil Conservation Service. 1968.

Bird Life

Baxter, Rae. (Personal Communication). Alaska Department of Fish and Game, Bethel.

Fortenbery, Donald K. Resources Inventory Southwest Planning Region, Migratory Birds, Raptors, and Endangered Species. 1975.

Smith, Mike and Chuck Hunt. (Personal Communication). U.S. Fish and Wildlife Service, Bethel.

Mammal

Alaska, State of. Alaska Regional Profiles - Southwest Region. 1975.

Baxter, Rae and Bruce Dinneford. (Personal Communication). Alaska Department of Fish and Game, Bethel.

Burns, John James. The Ecology, Economics, and Management of Mink in the Yukon-Kuskokwim Delta, Alaska. 1964.

Cardon, Randy. (Personal Communication). Game Biologist, Alaska Department of Fish and Game, Anchorage.

Fish

Alaska Department of Fish and Game. "Annual Salmon Management Report 1980 Kuskokwim Area". 1981.

Alaska Department of Fish and Game. Alaska Inventory and Cataloging Western Alaska Waters. Sports Fish Division. Juneau, Alaska. 1977.

Alaska Department of Fish and Game. "Board Management Report Kuskokwim Area 1981". Bethel.

Baxter, Rae and Keith Schultz. (Personal Communication). Alaska Department of Fish and Game, Bethel.

Baxter, Rae. "Eek River: Reconnaissance Survey 1976." Whitefish Research Biologist, Alaska Department of Fish and Game, Bethel, Alaska. 1979.

_____. "Whitefish Investigations of the Yukon-Kuskokwim Delta" Whitefish Research Biologist, Alaska Department of Fish and Game, Bethel, Alaska. 1975.

Seaman, Glenn. (Personal Communication). Habitat Biologist, Alaska Department of Fish and Game, Coastal Management Program, Anchorage, Alaska.

History

Alaska Division of Parks. Alaska Heritage Resource Survey (micro-fiche), Anchorage. 1981.

Dreydoppel, Sue. (Personal Communication). Curator, Yugtarkvik Regional Museum. 1981.

Emphanka, Gus. (Personal Communication). 1981.

Hoffman, Edward. (Personal Communication). 1981.

Oswalt, Wendell H. Historic Settlements Along the Kuskokwim River, Alaska. Alaska State Library Historical Monograph No. 7.

Schwalbe, Anna Buxbaum. Dayspring on the Kuskokwim. Moravian Press, Bethlehem, Pennsylvania. 1951.

Transportation

Alaska Department of Public Safety, Division of Motor Vehicles. Vehicle Registration Statistics, Calendar Year 1980. Bethel Office.

Alaska Department of Transportation and Public Facilities. Bethel Airport Land Use and Development Plan. October, 1979.

Bethel, City of, Finance Department. Sales Tax Master Sheet Printout. December, 1981.

Boyette, Dan. (Personal Communication). City of Bethel. Capital Projects Director.

Bush Air. Bethel, Alaska.

Civil Aeronautics Board. Enplaned Passengers, Enplaned Revenue Tons of Cargo and Mail. 12 months ending December 31, 1980.

Delaire Charter Service. Bethel, Alaska.

Federal Aviation Administration, Flight Service Station, Bethel, Alaska.

Galliett, Jr., Harold H., and George Silides. Master Plan and Report for Port Development at Bethel, Alaska. Prepared for City of Bethel, April, 1981.

_____. A Report on the Yukon-Kuskokwim Crossing. Prepared for the Senate Special Interim committee on Transportation, Alaska State Legislature, December, 1981.

Hoffman, James. (Personal Communication). United Transportation, Bethel, Alaska.

Lush, Dan. (Personal Communication). Hustlebuggy, Inc., Bethel, Alaska.

U.S. Army Corps of Engineers, Alaska District. Bethel Small Boat Harbor Report. Detailed Project Report and Final Environmental Impact Statement, August, 1981.

Recreation

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

Dittman, Martha and Rahn Parker. (Personal Communication). City of Bethel, Department of Parks and Recreation.

Population

Alaska Consultants. Existing Socioeconomic Conditions and Forecast North Aleution Shelf and Navarin Basin's Socioeconomic Systems. Draft Technical Memorandum. Prepared for BLM Alaska O.C.S. Office. April, 1981.

Alaska Department of Labor, Research and Analysis Section. 1980 Census Data.

Alaska Department of Social and Health Service. Number of Births, Bethel Region. MCH Family Planning Office, Bethel. January, 1982.

Darbyshire and Associates. City of Bethel Comprehensive Plan. October, 1980.

U.S. Department of Commerce, Bureau of Census. 1970 Census Data.

_____. 1980 Census of Population.

Housing

Alaska Consultants. Existing Socioeconomic Conditions and Forecast North Aleutian Shelf and Navarin Basin's Socioeconomic Systems. Draft Technical Memorandum. Prepared for BLM, Alaska O.C.S. Office. 1981.

Darbyshire and Associates. Bethel Comprehensive Plan. October, 1980.

Naneng, Myron. (Personal Communication). Alaska Department of Community and Regional Affairs, Housing Assistance Division, Bethel.

U.S. Department of Commerce, Bureau of Census. 1970 Census Data.

_____. 1980 Census of Housing.

Labor

Alaska Consultants. Existing Socioeconomic Conditions and Forecast North Aleutian Shelf and Navarin Basin's Socioeconomic Systems. Draft Technical Memorandum. Prepared for Bureau of Land Management, Alaska O.C.S. Office. April, 1981.

Alaska Department of Commerce and Economic Development, Division of Economic Enterprise. NUMBERS: Basic Economic Statistics of Alaska Census Divisions. November, 1979.

Alaska Department of Labor. Labor Force by Region and Census Division. November, 1981.

_____. Lower Yukon-Kuskokwim Region Labor Market Analysis. July, 1981.

Darbyshire and Associates. City of Bethel Comprehensive Plan. October, 1980.

Land Ownership

Adams, Willie. (Personal Communication). Bureau of Indian Affairs Realty Office, Bethel.

Cannelos, George. (Personal Communication). Bethel Native Corporation Land Manager.

Darbyshire and Associates. Bethel Native Corporation Land Management Plan. 1980.

_____. City of Bethel Comprehensive Plan. 1980.

Joseph, Alan. (Personal Communication). AVCP Realty.

Stigall, Tony. (Personal Communication). Planning Director, Bethel Planning Department.

Varnell, Tom. (Personal Communication). Police Chief, Bethel City Police Department.

Weed, David. (Personal Communication). Public Defenders Agency, Bethel.

Education

Ali, Fred, John Schuler, and Dave Williams. (Personal Communication). Kuskokwim Community College.

Darbyshire and Associates. City of Bethel Comprehensive Plan. 1980.

Peterson, Carl and Dan Raskin. (Personal Communication). Lower Kuskokwim School District.

Cultural Facilities

Darbyshire and Associates. City of Bethel Comprehensive Plan.

Dreydoppel, Sue. (Personal Communication). Curator, Yugtarvik Regional Museum.

Wintersteen, Teddy. (Personal Communication). Head Librarian, Kuskokwim Consortium Library, Bethel.

Utilities

Electrical

Borrego, Hal and Jerry Korthuis. (Personal Communication). Bethel Utilities Corporation.

Public Works

Alaska Consultants. Baseline Socioeconomic Conditions North Aleutian Shelf and Navarin Basin's Socioeconomic Systems. Draft Technical Memorandum. Prepared for U.S. Department of Interior, BLM, Alaska OCS Office. April, 1981.

Darbyshire and Associates. City of Bethel Comprehensive Plan. 1980.

Jordan, Nancy and Gary Volkman. (Personal Communication). Bethel Public Works Department. 1981.

Land Use

Darbyshire and Associates. City of Bethel Comprehensive Plan. October, 1980.

Stigall, Tony and Stephanie Walker. (Personal Communication). City of Bethel Planning Department.

Service

Health and Social Services

Barton, Betty. "Reductions in Federal Health Expenditures: Yukon-Kuskokwim Research Request No. 81-172". Alaska State Legislature, House of Representatives Research Agency Memorandum. 1981.

Bethel Social Services. (Personal Communication).

Peterson, Don. (Personal Communication). Comptroller of Yukon-Kuskokwim Health Corporation.

Prince. (Personal Communication). Bureau of Indian Affairs, Bethel.

Ryan, Joe. (Personal Communication). Director, Alaska Area Native Health Service, Bethel Service Unit, Bethel.

Emergency Services

Cooper, Corlis. (Personal Communication). Director, Emergency Medical Services at Yukon-Kuskokwim Health Corporation.

Darbyshire and Associates. City of Bethel Comprehensive Plan.

Flood, Jack. (Personal Communication). Phillips Alcoholism Treatment Center.

Tundra Women's Coalition Resource Center. (Personal Communication).

Public Safety

Alaska State Troopers. (Personal Communication).

Eyerly, Tred. (Personal Communication). Alaska Legal Services, Bethel.

Energy

Alaska Consultants. Baseline Socioeconomic Conditions North Aleutian Shelf and Navarin Basin's Socioeconomic Systems Draft Technical Memorandum. Prepared for BLM, Alaska OCS Office, April, 1981.

Alaska, State of. Alaska Regional Profiles, Vol. III., Southwest Region. 1975.

Alaska Department of Commerce and Economic Development, Division of Energy and Power Development. State of Alaska Long Term Energy Plan - Draft. April, 1981.

Alaska Research Services. Yukon-River Oil Delivery Study. February, 1981.

Angaiak, John. (Personal Communication). Orutsararmuit Native Council, Bethel.

Beans, Major Joe and Louie Crew. (Personal Communication). National Guard Armory, Bethel.

Berger and Associates. Western and Arctic Alaska Transportation Study, Phase I - General. February, 1981.

Borrego, Hal and Jerry Korthuis. (Personal Communication). Bethel Utilities Corporation.

Chevron U.S.A., Bethel.

Darbyshire and Associates. City of Bethel Comprehensive Plan. 1980.

Mazria, Edward. Passive Solar Energy Book. Rodale Press, 1979.

Prince, Everett. U.S. Department of Interior, Bureau of Indian Affairs. Letter of comments to City of Bethel Coastal Management Program, Preliminary Report. March 3, 1982.

Robert W. Retherford Associates. Reconnaissance Study of the Kisaralik River Hydroelectric Power Potential and Alternative Electric Energy Resourcces in the Bethel Area. Prepared for the Alaska Power Authority. February, 1980.

_____. A Regional Electric Power System for the Lower Kuskokwim Vicinity. Prepared for the Alaska Power Administration. 1975.

Siefert, Richard D. and John P. Zarling. Solar Energy Resource Potential in Alaska. University of Alaska - Fairbanks, Institute of Water Resources. March, 1978.

Tundra Drums, The. Bethel newspaper, (several articles).

U.S. Department of Interior. Proposed Yukon Delta National Wildlife Refuge.

Wise, James and et al. Wind Energy Resource Atlas. Pacific Northwest Laboratory, December, 1980.

Commercial Fishing and Fish Processing

Alaska Department of Fish and Game, Division of Commercial Fisheries. Annual Salmon Management Report 1980 Kuskokwim Area. 1981.

Alaska Department of Fish and Game, Division of Commercial Fisheries. Board Management Report for 1981 Kuskokwim Area. 1982.

Alaska Native Foundation. Western Alaska's Fishing Industry: A Profile. April, 1981.

Baxter, Rae and Keith Schultz. (Personal Communication). Alaska Deppartment of Fish and Game, Division of Commercial Fisheries, Bethel.

Crow, J.B. (Personal Communication). J.B. Crow and Sons, Bethel.

Hoffman, Lyman. (Personal Communication). Elm Fisheries, Inc., Board Member.

Husky, Lee, William Nebesky and Jim Kerr. The Growth of the Nunam Kitlutsisti Region: A Projection 1981-2000. Institute of Social and Economic Research, University of Alaska, Anchorage, Alaska. July, 1981.

Knapp, Barb. A Technical Appraisal and Assessment of the Bethel Fishing Industry; prepared for the City of Bethel. 1981.

Forest Development

Cook, Bob. (Personal Communication). Kuskokwim Native Association.

Galliet and Silides. A Report on the Yukon-Kuskokwim Crossing. Prepared for the Alaska State Legislature, December, 1981.

Reid, Collins, Inc. Forest Development Potential in the Middle Kuskokwim. Prepared for Kuskokwim Native Association. June, 1981.

Mining

Alaska Department of Natural Resources, Bethel Recording Office. (Personal Communication). Bethel District Mining Claims.

Alaska Department of Transportation and Public Facilities. Bethel Airport Land Use and Development Plan. October, 1979.

Berger and Associates. Western and Arctic Alaska Transportation Study, Phase I, General. February, 1980.

Hoare, Joseph M. and Edward H. Cobb. Mineral Occurrences (Other than Mineral Fuels and Construction Materials) in the Bethel, Goodnews, and Russian Mission Quadrangles, Alaska. U.S. Department of Interior, Geological Survey, Open File Report 77-156, 1977.

OCS

Alaska Department of Community and Regional Affairs. Planning for Offshore Oil Development, Gulf of Alaska Handbook. 1978.

Alaska Department of Natural Resources, Division of Minerals and Energy Management. Five Year Oil and Gas Leasing Program. January, 1982.

Alaska Research Services. Yukon River Oil Delivery Study. February, 1981.

Alaska, University of, Institute of Social and Economic Research. Bering-Norton Petroleum Development Scenarios, Economic and Demograph Analysis. Technical Report Number 50. Prepared for Bureau of Land Management, Alaska Outer Continental Shelf Office, June, 1980.

Dames and Moore. Review of Supply-Demand and Marketing Problems of OCS Oil and Gas from the Bering-Norton Lease Sale. Technical Memorandum Number BN-25. Prepared for Bureau of Land Management, Alaska Outer Continental Shelf Office, June, 1980.

David M. Dornbusch and Co., Inc. Management of OCS-Related Industrial Development. Prepared for the Alaska Department of Community and Regional Affairs, December, 1976.

Ellanna, Linda j. Bering-Norton Petroleum Development Scenarios, Sociocultural Systems Analysis. Technical Report No. 54, Volume 1. Prepared for Peat, Marwick, Mitchell and Co. and the BLM, Alaska OCS Office, April, 1980.

_____. IBID, Volume 2, August, 1980.

Husky, Nebesky and Kerr. University of Alaska, Institute of Social and Economic Research. The Growth of the Nunam Kitlutsisti Region: A Projection 1981-2000. Prepared for Nunam Kitlutsisti, July, 1981.

Tremont, John. (Personal Communication). Alaska OCS Office, Anchorage.

_____. Resources, Developmental Timeframes and Infrastructure Assumptions and Black Deletion Alternative for Proposed Federal Lease Sales in the Bering Sea and Norton Sound. Technical Paper No. 1, BLM, Alaska OCS Office, April, 1981.

U.S. Department of the Interior Geological Survey. Estimates of Undiscovered Recoverable Resource of Conventionally Producible Oil and Gas in the United States, A Summary. Open File Report 81-192, 1981.

Tourism

Berger and Associates. Western and Arctic Alaska Transportation Study. Phase 1, General. February, 1980.

Darbyshire and Associates. City of Bethel Comprehensive Plan. October, 1980.

Robinson, E. Thomas. Fairbanks Tourism. Community Research Center Special Report No. 9. Fairbanks North Star Borough. September, 1981.

APPENDIX VI

PUBLIC NOTICE OF GENERAL WETLANDS PERMIT

US Army Corps
of Engineers
Alaska District

Public Notice

Date: April 27, 1983

Identification No.: General Permit 83-4

In reply refer to above Identification Number

GENERAL PERMIT 83-4
CITY OF BETHEL, ALASKA

Upon the recommendation of the Chief of Engineers and pursuant to Section 404 of the Clean Water Act (Public Law 95-217), 33 U.S.C. et. seq.), the Secretary of the Army intends to issue a permit to the general public to place fill material into wetlands within the city of Bethel, Alaska. Activities authorized under this general permit will include the placement of fill material for the construction of foundation pads for structures, associated driveways and parking areas, and for the construction of roads.

INTRODUCTION

General permits are considered appropriate for activities which are substantially similar in nature and cause only minimal individual and cumulative adverse environmental impact when performed separately and which would provide a more effective administration of the Clean Water Act without creating an undue burden on the public. A preliminary review of the general permit concept indicates that an Environmental Impact Statement will not be required. However, an Environmental Assessment will be prepared before issuance of the General Permit.

PROPOSED ACTIVITIES COVERED UNDER THIS GENERAL PERMIT:

The proposed general permit would authorize the placement of sand, gravel or rock, which is free of toxic substances, in conjunction with the construction of foundation fill pads for structures, driveways and parking areas, and for road construction. Driveways must be a minimum of 20 feet wide. Roads constructed in dedicated rights-of-way must have a 25 foot wide driving surface and the road surface must be a minimum of 3 feet from the existing ground surface.

The general permit would be in effect for a period of 5 years. At the end of the 5-year period, an evaluation of the program would be made and at that time it would be decided whether or not this permit should be renewed. The District Engineer may, at any time during this 5-year period, alter, modify, or revoke this permit, if he deems such action to be in the public interest. The District Engineer will monitor fills authorized by this general permit to the extent possible given the prohibited transportation costs and great distances involved.

PROCEDURE:

A Department of the Army general permit would be issued in accordance with Section 404 of the Clean Water Act (Public Law 95-217, 33 U.S.C. 1344 et. seq.) and would be limited to work in wetland areas. The placement of fill material into other waters of the United States may require individual authorizations under Section 404 of the Clean Water Act, and, if in navigable waters of the United States, under Section 10 of the River and Harbor Act of 1899.

When the proposed general permit has been issued, the placement of fills as described herein may be accomplished by the general public without the need for individual permits for each undertaking.

1. SPECIAL CONDITIONS

a. That the permittee must contact the city of Bethel (or the Bureau of Indian affairs if the land is under Federal trust status or subject to 25 CFR 1.4), no less than 10 days before beginning work under this permit. This is to allow the planning departments of those two governments the opportunity to monitor activities authorized under this permit.

b. That the permittee notify the Alaska District, Corps of Engineers within 30 days after completing any fill activity authorized under this permit.

c. That wetlands identified as significant on the attached map (the undisturbed areas within the 100-year floodplain of the Kuskokwim River) are excluded from this permit. Individual Department of the Army permits will be required for fill activities taking place in those areas.

d. That a mimimum distance of 25' will be maintained between the toe of the fill and the high water mark of any drainageway, slough, or lake. The City of Bethel will maintain large scale maps (1"=500') in their offices depicting the drainageways, sloughs and lakes referred to in this special condition.

e. That the fill material to be used will be free of toxic pollutants in toxic amounts.

f. That any roads or driveways constructed under this permit will conform to specifications determined by the City of Bethel (or the Bureau of Indian Affairs if the land is under Federal trust status or subject to 25 CFR 1.4).

g. That roads constructed over drainageways will be adequately culverted or bridged to maintain normal surface water flow and fish passage. Roads constructed over drainageways which contain fish will require a permit from the Alaska Department of Fish and Game. Information regarding such permits can be obtained by writing the Alaska Department of Fish and Game, Region IV, Habitat Division, 333 Raspberry Road, Anchorage, Alaska, 99502 or call (907) 344-0541.

h. That sides of the fill will be stablized by maintaining 3:1 or more gradual slopes, and by seeding or planting with vegetation.

i. That the permittee will construct and maintain the fill in good condition so as to prevent erosion and non-point sources of pollution.

j. That the activity will not take place in, or adversely affect a known archaeological site.

k. That authorization under this permit does not eliminate the need for the permittee to obtain other required permits, licenses or approvals of City, State or Federal governments within the State of Alaska.

2. General Conditions:

a. That all activities identified and authorized herein shall be consistent with the terms and conditions of the general permit and any activities not specifically identified and authorized herein shall constitute a violation of the terms and conditions of this general permit which may result in the modification, suspension or revocation of any authorization in whole or in part, as set forth more specifically in General Conditions j or k hereto, and in the institution of such legal proceedings as the United States Government may consider appropriate, whether or not this permit has been previously modified, suspended, or revoked in whole or in part.

b. That all activities authorized herein shall, if they involve during their construction or operation, any discharge of pollutants into waters of the United States and their adjacent wetland, be at all times consistent with applicable water quality standards, effluent limitations and standards of performance, prohibitions, pretreatment standards, and management practices established pursuant to the Clean Water Act (PL 95-217 33 U.S.C. 1344), the Marine Protection, Research and Sanctuaries Act of 1972 (PL 92-532; 86 Stat. 1052) and pursuant to applicable State and local law.

c. That when the activity authorized herein involves a discharge during its construction or operation, of any pollutant (including dredged or fill material), into waters of the United States, and adjacent wetland, the authorized activity shall, if applicable water quality standards are revised or modified during the term of this permit, be modified, if necessary, to conform with such revised or modified water quality standards within 6 months of the effective date of any revision or modification of water quality standards, or as directed by an implementation plan contained in such revised or modified standards, or within such longer period of time as the District Engineer, in consultation with the Regional Administrator of the Environmental Protection Agency, may determine to be reasonable under the circumstances.

d. That the activity will not jeopardize the continued existence of a threatened or endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species.

e. That the permittee agrees to make every reasonable effort to execute the construction or operation of the work authorized herein in a manner so as to minimize any adverse impact on fish, wildlife, and natural environmental values.

f. That the permittee agrees that he will execute the construction or work authorized herein in a manner so as to minimize any degradation of water quality.

g. That the permittee shall allow the City of Bethel or the District Engineer or his authorized representative(s) or designee(s) to make periodic inspections at any time deemed necessary in order to assure that the activity being performed is in accordance with the terms and conditions prescribed in the general permit.

h. That the permittee shall maintain the structure or work authorized herein in good condition and in accordance with approved plans and drawings.

i. That this general permit does not convey any property rights, either in real estate or material, or any exclusive privileges; and that it does not authorize any injury to property, or invasion of rights or any infringement of Federal, State, or local laws or regulations nor does the general permit nor any authorization obviate the requirement to obtain State or local assent required by law for the activity authorized herein.

j. That an activity being performed under authorization of this permit may be summarily suspended, in whole or in part, upon a finding by the District Engineer that immediate suspension of the activity authorized herein would be in the general public interest. Such suspension shall be effective upon receipt by the permittee of a written notice thereof which shall indicate (1) the extent of the suspension, (2) the reasons for such action, and (3) any corrective or preventive measures to be taken by the permittee which are deemed necessary by the District Engineer to abate imminent hazards to the general public interest. The permittee shall take immediate action to comply with the provisions of such notice. Within 10 days following receipt of a notice of suspension, the permittee may request a hearing in order to present information relevant to a decision as to whether the authorization should be reinstated, modified or revoked. If a hearing is requested, it shall be conducted pursuant to procedures prescribed by the Chief of Engineers. After completion of the hearing, or within a reasonable time after issuance of the suspension notice to the permittee if no hearing is requested, the authorization will either be reinstated, modified or revoked.

k. That this general permit, may be either modified, suspended, or revoked in whole or in part, if the Secretary of the Army or his authorized representative determines that there has been a violation of any of the terms or conditions of this permit or that such action would otherwise be in the public interest. Any such modification, suspension, or revocation shall become effective (30) days after receipt by the permittee of written notice of such action which shall specify the facts or conduct warranting same unless (1) within the (30) day period the permittee is able to demonstrate satisfactorily that (a) the alleged violation of the terms and the conditions of this general permit did not, in fact occur or (b) the alleged violation was accidental, and the permittee has been operating in compliance with the terms and conditions of the permit and is able to provide satisfactory assurances that future operations shall be in full compliance with the terms and conditions of this general permit or (2) within the aforesaid (30) day period, the permittee requests that a public hearing be held to present oral and written evidence concerning the proposed modification, suspension or revocation. The conduct of this hearing and the procedures for making a final decision either to modify, suspend or revoke this permit in whole or in part shall be pursuant to procedures prescribed by the Chief of Engineers.

l. That any modification, suspension, or revocation of either authorization under this permit or this permit itself shall not be the basis for any claim for damages against the United States.

m. That the general permit does not approve the construction of particular structures, the authorization or approval of which may require authorization by the Congress or other agencies of the Federal Government.

n. That if and when the permittee desires to abandon the activity authorized herein, the permittee must restore the area to a condition satisfactory to the District Engineer.

o. That this permit does not authorize the interference with any existing or proposed Federal project and that the permittee shall not be entitled to compensation for damage or injury to the structures or work authorized herein which may be caused by or result from existing or future operations undertaken by the United States in the public interest.

p. That no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized by this permit.

q. That if the permittee during prosecution of the work authorized herein, encounters a previously unidentified archeological or other cultural resource within the area subject to Department of the Army jurisdiction that might be eligible for listing in the National Register of Historic Places, he shall immediately notify the District Engineer.

r. That the permittee, upon receipt of a notice of revocation of authorization under this permit or upon its expiration before completion of the authorized work, shall cease from any discharge of dredged or fill material and desist from future discharges. If the permittee fails to comply with the direction of the Secretary of the Army or his authorized representative, action will be taken leading to the referral of the case to the U.S. Attorney.

EVALUATION FACTORS:

The decision whether to issue the proposed general permit will be based on an evaluation of the probable impacts of the proposed activities on the public interest. That decision will reflect the national concern for both protection and utilization of important resoures. The benefit which reasonably may be expected to accrue from the proposal must be balance against its reasonable foreseeable detriments All factors which may be relevant to the proposal will be considered, among these are conservation, economics, aesthetics, general environmental concerns, historic values, fish and wildlife values, flood damage prevention, land use, navigation, recreation, and, in general, the needs and welfare of the people.

No permit will be granted unless its issuance is found to be in the public interest. The evaluation will include application of the guidelines promulgated by the Administrator, Environmental Protection Agency under authority of Secton 404(b) of the Clean Water Act.

ENDANGERED SPECIES:

Preliminary determinations indicate that the proposed activity would not affect any endangered species or their critical habitat as defined by the Endangered Species Act of 1973 (878 Stat. 844). Formal consultation pursuant to Section 7 of the Act with the Department of Interior is not required for this proposed activity.

HISTORIC PLACES:

The National Register of Historic Places, and the latest published version of the Federal Register have been consulted in regard to the proposed general permit. No sites within the city limits of Bethel were listed on those registers.

WATER QUALITY CERTIFIATION:

A Certificate of Reasonable Assurance or waiver of certification is required for this activity under Section 401 of the Clean Water Act (Public Law 95-217). This certification, or waiver thereof, is issued by the Alaska Department of Environmental Conservation, Pouch 0, Juneau, Alaska, 99801, telephone (907) 465-2670.

CERTIFICATION OF CONSISTENCY:

The State of Alaska, Division of Governmental Coordination will review this work for consistency with the approved Alaska State Coastal Management Program.

REPORTING AND MONITORING:

The proposed general permit will be conditioned to require individuals performing work under the permit to report to the District Engineer the location, description, and size of the area to be filled, including applicable drawings, and a description of the purpose and intended use of the fill within 30 days after completion of the project.

This requirement will provide a means of monitoring activities authorized by the General Permit and will enable a review of this work for compliance to the special conditions. Onsite monitoring is expected to be accomplished by the U.S. Army of Engineers, with the assistance of other Federal, State, and local agencies, as funding and manpower dictate.

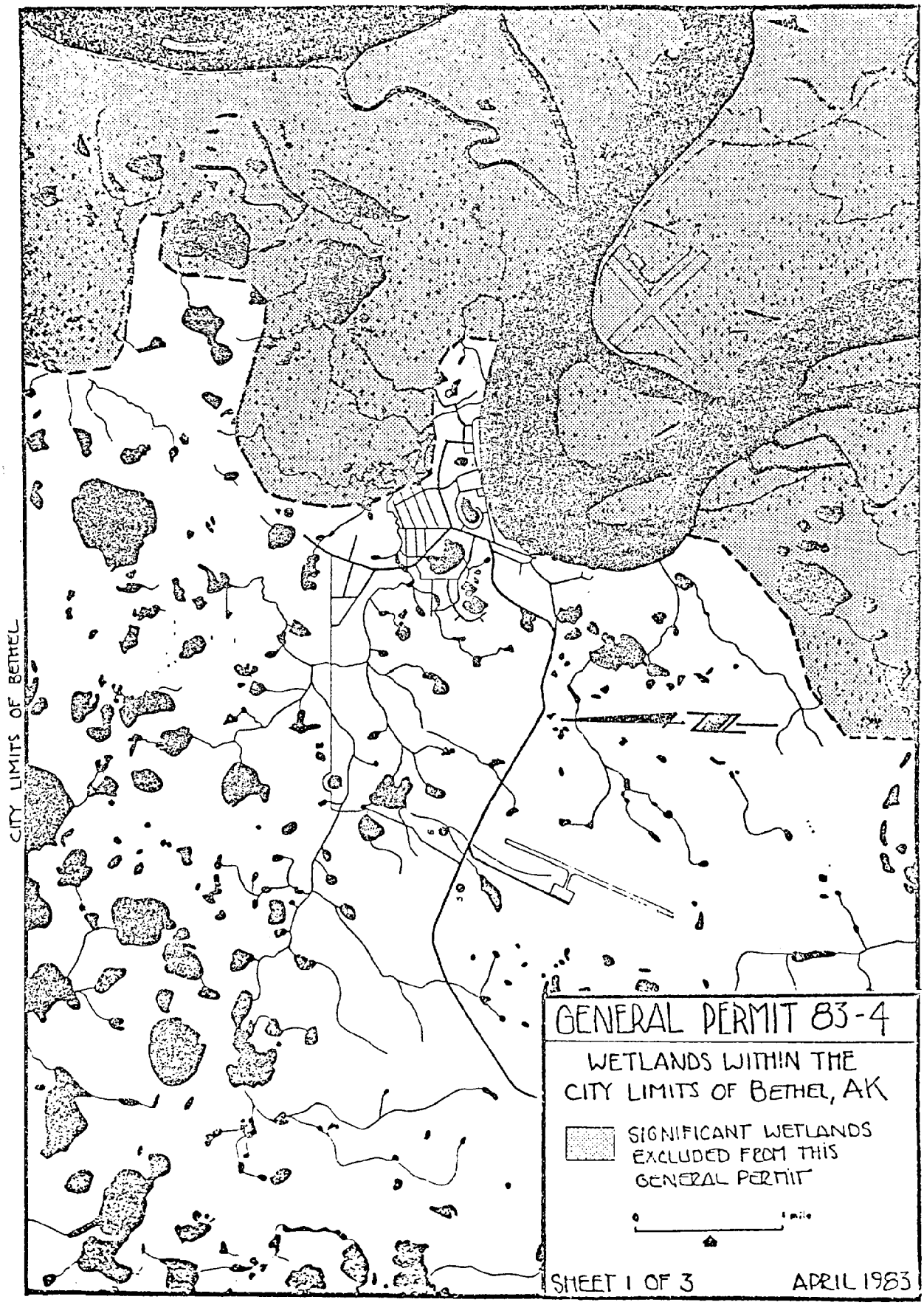
RESPONSE:

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider the proposed general permit. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

Written statements received in this office within 30 days of the publication date of this notice will become a part of the record and will be considered in the determination. Any response to this notice should be mailed to the Alaska District, Corps of Engineers, ATTN: Regulatory Functions Branch, Pouch 898, Anchorage, Alaska, 99506. If further information is desired concerning this notice, contact Ms. Mary F. Leykom at (907) 279-6733 or 279-4123.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

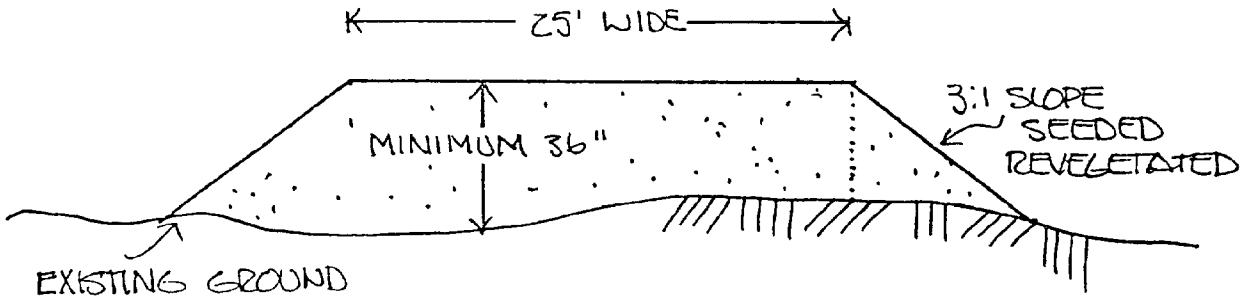
District Engineer
U.S. Army, Corps of Engineers


CITY LIMITS OF BETHEL
GENERAL PERMIT 83-4
WETLANDS WITHIN THE CITY LIMITS OF BETHEL, AK
SIGNIFICANT WETLANDS EXCLUDED FROM THIS GENERAL PERMIT
SHEET 1 OF 3
APRIL 1983

ROADS CONSTRUCTED IN DESIGNATED RIGHTS-OF-WAY

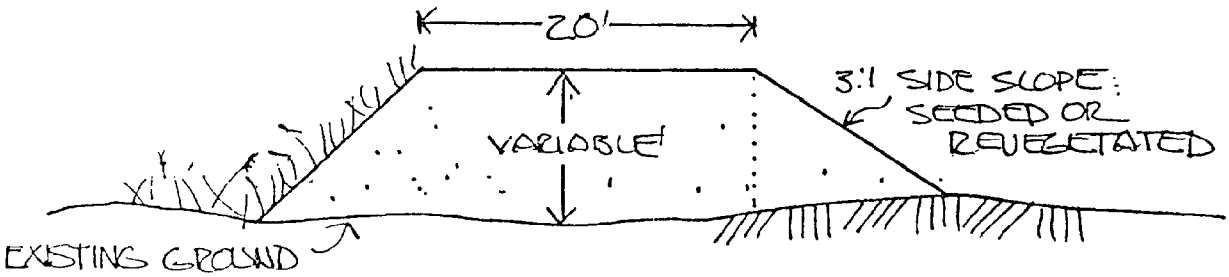
NOT TO SCALE

TYPICAL:



DRIVEWAY CONSTRUCTION

TYPICAL:



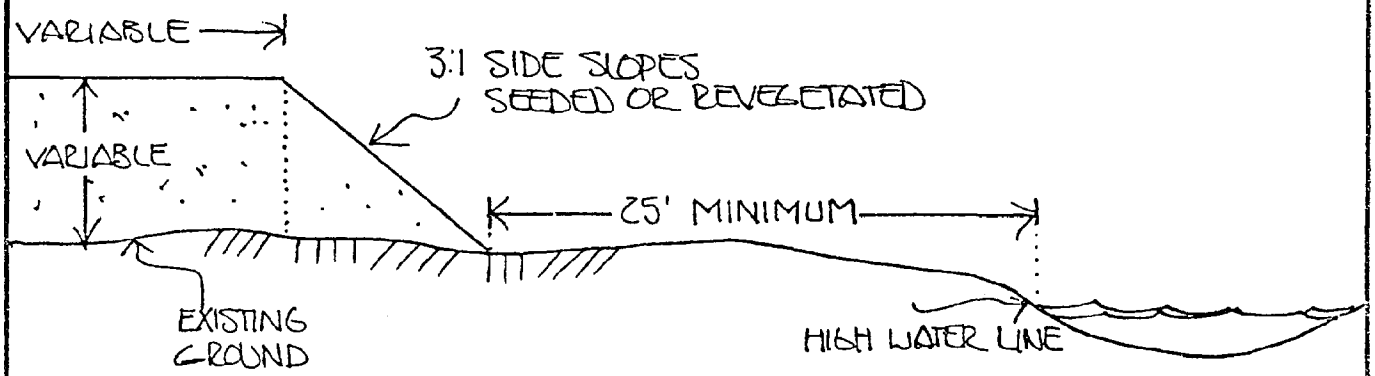
GENERAL PERMIT 83-4

WETLANDS WITHIN THE CITY LIMITS OF BETHEL, AK

SHEET 2 OF 3 APRIL 1983

FOUNDATION FILL PADS FOR STRUCTURES

TYPICAL:



* A 25' MINIMUM SETBACK FROM THE TOE OF THE FILL TO THE HIGH WATER MARK OF ANY DRAINAGEWAY, SLOUGH, OR LAKE MUST BE MAINTAINED.

GENERAL PERMIT 83-4

WETLANDS WITHIN THE CITY LIMITS OF BETHEL, AK

SHEET 3 OF 3 APRIL 1983

APPENDIX VII

MANAGEMENT AUTHORITIES

APPENDIX VII

Existing Federal, State and Local Authorities

Entity	Legislative Title	Responsibility
Federal:		
U.S. Coast Guard	Ports & Waterways Safety Act 1972 33 USC 1221 46 USC 391A	Regulate marine transportation for safety and protection of environment.
	Steamboat Inspection Act, Tank Vessel Act 46 USC 391A	Inspect carriers of hazardous material.
	Permit for Private Aids to Navigation 33 CFR 66	Control placement & operation of navigational aids.
	Permit for Bridges Over Navigable Waters 33 CFR 114 33 CFR 115	Approve construction or alterations of bridges over navigable waters.
	High Seas Intervention Act 1975 33 USC 1471, et. seq.	Attempt to control spillage of oil from ships if oil threatens coastline.
	Permit for Facilities & Vessels to Handle Hazardous Material 33 CFR 125 33 CFR 126 33 CFR 154 33 CFR 155 33 CFR 156	Waterfront facilities & vessels handling hazardous material.
U.S. Army Corps of Engineers	Marine Protection, Research & Sanctuaries Act	Regulate ocean dumping, initiate program to establish marine sanctuaries.
	Permit for Ocean Dumping of Dredged Material 33 USC 1413 33 CFR 324	Regulate transporting dredges material for purposes of dumping in territorial seas or contiguous zone.

Entity	Legislative Title	Responsibility
U.S. Army Corps of Engineers (cont'd)		
	Permit for Structures or Work Affecting Navigable Waters 33 USC 403 33 USC 323	Regular construction of structures or work such as dredging affecting navigable waters of the U.S.
	Permit for the Discharge of or Fill Materials 33 USC 1344 33 CFR 323	Regulate fill or dumping dredge spoils in or adjacent to tidelands, submerged lands, rivers and wetlands.
Council on Environmental Quality		
	National Environment Policy Act of 1969 42 USC 4321 et.seq.	Require preparation of EIS for federal action affecting the quality of the environment.
U.S. Fish and Wildlife		
	National Wildlife Refuge Special Use Permit 16 USC 668 50 CFR 26 50 CFR 29	Govern activities on lands of national wildlife range.
	Migratory Bird Treaty 16 USC 703-711	Protect migratory birds.
	Marine Mammals Protection 16 USC 1361-1407 50 CFR 18 50 CFR 216 PL 92-522	Provide conservation & protection of marine mammals.
Environmental Protection Agency		
	Federal Water Pollution Control Act 1972 33 USC 1251, et.seq. 33 USC 1321 33 USC 1288	Provide funds for states to identify & write regulations governing non-point pollution control discharges of pollutants into the navigable waters.

Entity	Legislative Title	Responsibility
Environmental Protection Agency (cont'd)		
	Pollution Discharge Elimination System Permit 33 USC 1341,1342 40 CFR 125	Regulate wastewater discharge into waters of U.S.
	Canned & Preserved Seafood Processing Point Source Category 40 CFR 408	Approves point-source wastewater discharge into waters of U.S. This permit is often adopted as the ADEC wastewater disposal permit.
State:		
Commercial Fisheries Entry Commission		
	Limited Entry Permits AS 16.43.100	Regulate commercial fishing by means of species, gear & geographical region.
Alaska Department of Fish and Game		
	Critical Habitat Area Permit AS 16.20.220-270	Regulate projects or actions affecting critical habitat.
	Protection of Anadromous Fish Permit AS 16.05.870 5 AAC 95.010	Review projects or actions affecting rivers, lakes or streams for spawning of anadromous fish.
	Board of Fish and Game AS 16.05.251 AS 16.10.010-620 AS 16.05.221-320	Determine rules and regulations for hunting and fishing.
Alaska Department of Environmental Conservation		
	Pesticide Control AS 46.03.020 AS 46.03 320 18 AAC 90	Regulate use of pesticides and herbicides in public places.

Entity	Legislative Title	Responsibility
Alaska Department of Environmental Conservation (cont'd)		
	Certificate of Risk Avoidance AS 30.25.040 AS 30.25.070 18 AAC 20	Regulate certification of oil tank vessel as to potential for oil pollution within state.
	Oil Discharge Contingency Plan AS 30.25.040 AS 30.25.070 AS 30.020(10)(a) 18 AAC 75.310-340	Require oil spill contingency be prepared by oil terminals and oil tank vessels operating within state.
	Civil Penalties for Discharge of Oil AS 46.03.758 18 AAC 75.520	Establish fines for persons who discharge oil into waters of state.
	Surface Oiling Permit AS 46.03.020 AS 46.03.740 18 AAC 75	Regulate oil treatment of roads.
	Wastewater Disposal Permit AS 46.03.020 AS 46.03.100 AS 46.03.050 AS 46.03.090 AS 46.03.720 18 AAC 72 18 AAC 70	Regular discharges of liquid wastes into waters or onto land of state, except for domestic sewage into approved sewage system.
	Solid Waste Management AS 46.03.020 AS 46.03.100 18 AAC 60	Regulate disposal of solid wastes except on premises of single-family residence, duplex, farm, or small incinerator.
	Air Quality Control AS 46.030.010 AS 46.03.140 AS 46.03.170 18 AAC 50	Govern quality of air within state.

Entity	Legislative Title	Responsibility
Alaska Department of Environmental Conservation (cont'd)		
	Oil Terminal and Transfer Procedures AS 30.15.070 18 AAC 25	Establish standards for transfer of oil between terminals, tank vessels and tank barges.
	Subdivision Plan Review AS 46.03.020 AS 46.03.050 AS 46.03.090 18 AAC 72.065	Review subdivision of land resulting in greater than 5 lots.
Office of Coastal Management		
	Alaska Coastal Management Program AS 46.40.010 AS 46.40.180 6 AAC 80 & 85	Provide standards & guidelines for land and water planning affecting federal, state, and local activities; provide funding.
Alaska Department of Natural Resources		
	Tideland Permit AS 38.05.330 11 AAC 62	Regulate temporary use of state owned tide and submerged lands (less than five years).
	Tideland Lease AS 38.05.070 11 AAC 62	Regulate use of state-owned tide and submerged lands more than five years.
	Miscellaneous Land Use Permit AS 38.05.205 AS 38.05.250 AS 38.05.275 AS 38.05.020 AS 38.05.035 11 AAC 96.010	Regulate activities including installation of roads and utilities on state-owned lands.
	Permit to Appropriate Water AS 46.15.010 11 AAC 72	Regulate withdrawal of fresh water from source reserved for public use.

Entity	Legislative Title	Responsibility
Alaska Department of Natural Resources (cont'd)		
	Material Sales AS 38.05.110 11 AAC 76	Regulate sale of sand, gravel, rock, pumice, clay and other materials on state owned lands, tidelands and submerged lands.
	Gas and Oil Leasing AS 38.05.185-184 11 AAC 82.100-805 11 AAC 8.1.00-630 11 AAC 88.100-185	Regulate leasing of subsurface oil and gas resources.
	Land Classification AS 38.05.300 11 AAC 52	Classify state lands, similar to zoning.
	Subsistence Act HB 960 SL 151	Amend fish and game status to give subsistence use highest priority.
	Land Lease AS 38.05.070 11 AAC 58	Regulate long-term use of state-owned uplands.
Alaska Department of Public Safety		
	Fire Prevention AS 18.70.080 13 AAC 50.027	Esablishes standards to protect life and property from fire & explosion and to set fire & safety criteria for commercial, industrical, and business structures.
City of Bethel		
	Land Subdivision Regulations Ordinance #135	Regulate land subdivision, sets minimum design standards for subdivisions, describes procedures for subdivision approval.

Entity	Legislative Title	Responsibility
	Building Permit System, Ordinance #114	Establishes a building permit system for improvements, sets minimum design standards and defines encroachment rules and regulations.
	Yard Requirement Regulations Ordinance #138	Establishes minimum setbacks from property lines for all structures and commercial parking lots.
	Port Facility Regulation Ordinance #97	Regulates operations of Bethel's medium draft port facility.
	Port & Transporation Commission Ordinance #137	Establishes a port and commission, and defines its powers.

APPENDIX VIII

CITY ORDINANCE SUMMARIES

WHICH APPLY TO THE COASTAL MANAGEMENT PROGRAM AS OF THIS PRINTING (JUNE 1983)

Applicable City Ordinances (Summaries)

APPENDIX VIII

ORDINANCE #114

Establish a building permit system for improvements on lots within the City of Bethel and defining encroachment rules and regulations for all streets, roads, alleys and easements that are under the jurisdiction of the City of Bethel.

Summary: A person is required to obtain a building permit for any improvement made on any land recorded or platted within the City.

A building permit may not be issed if the lot improvement:

a) encroaches on any right of way;

b) causes the placement of fill on any City right of way when the width of the fill is greater than 20 feet at its widest point;

c) does not provide for adequate drainage as determined by Planning Department;

d) does not include a water/sewer system conforming to minimum requirements. It must not be a potential hazard or nuisance to neighbors. Water and sewage holding tanks must be at least 300 gallons with an additional 200 gallons per bedroom.

ORDINANCE #135

Regulating the subdivision of land in the City of Bethel: requiring and regulating the preparation of preliminary and final plats for such purposes; establishing minimum subdivision design standards; providing minimum improvements to be made or guaranteed to be made by subdivider; setting forth procedures to be followed by Planning Commission in applying rules, regulations and standards; and prescribing penalties for the violation of its provisions.

Summary: Subdivison and platting powers and authorities are vested in the Planning Commission. This applies to all lands in the City limits.

Subdividers must submit and get approvals on preliminary and final plats, and then record the plats with the District Recorder.

The ordinance describes the procedures for submitting preliminary plats, what they should contain, and the public hearing and approval process. It also describes the contents and process for a final plat, including a description of the improvements the subdivision must guarantee.

It sets standards for improvements, roads, street lights, etc., with regard to the character of the land, access, compliance with the Comprehensive Plan, etc.

It discusses easements, drainage, waste disposal, water supply, sizing and arrangement of lots and blocks, dedication of open space for recreation, etc.

It establishes procedures for resubdivision of land and vacation of plats. It sets procedures for variances and waivers and appeals.

It also sets penalties for conveying land before plat approval and recording or recording a plat without Planning Commission approval.

ORDINANCE #138

Establishing the location for structures, improvements, and structural alterations within property boundaries, as measured from designated property lines, and providing penalties for violation of its provisions.

Summary: Minimum yard requirements for all buildings, structures and improvements are:

Front - 15 feet from property line;

Side - 10 feet except when adjacent to street, then 15 feet;

Rear - 10 feet.

Exceptions to this include:

- the front yard for commercial, professional, or institutional buildings may be reduced to 10 feet if adequate parking is provided;
- commercial or residential buildings may be "zero lot line" if they meet certain conditions;
- existing structures are exempt unless there is proof of public nuisance or hazard.

A procedure is set for dealing with violations, and misdemeanor penalties are outlined (fines of $25 to $500 or imprisonment of up to 10 days).

ORDINANCE #66

Establishing land use regulations to conform to requirements of the National Flood Insurance Program.

In order to make flood insurance and federal/federally regulated financial assistance available, it establishes a land use permit system for areas within the flood plain. It requires protection of construction in areas vulnerable to floods, and insures that subdivisions and development of land in Bethel is consistent with the need to minimize flood.

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