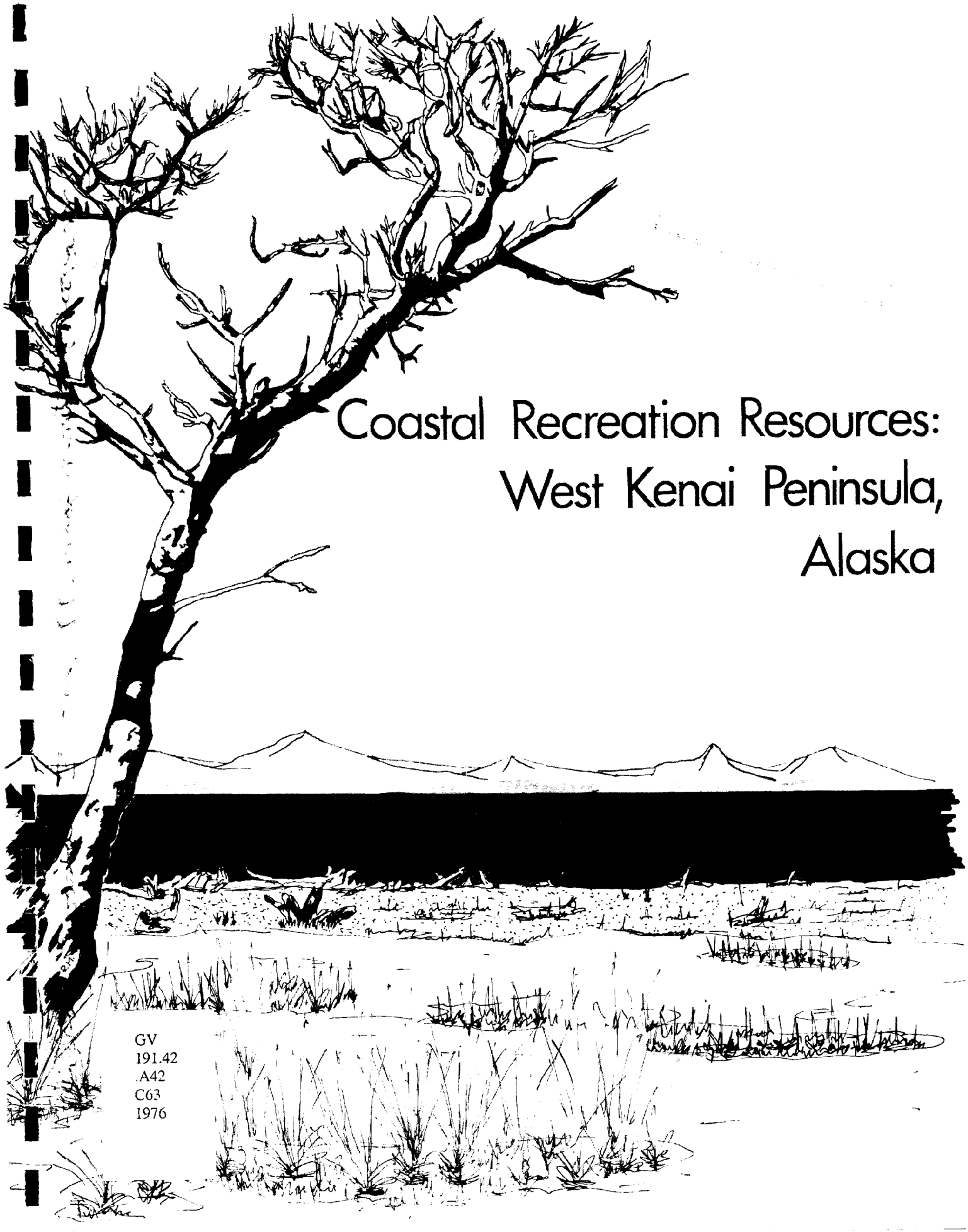

Coastal Recreation Resources: West Kenai Peninsula, Alaska

PRELIMINARY DRAFT

Coastal Recreation Resources: West Kenai Peninsula, Alaska

ALASKA
COASTAL MANAGEMENT PROGRAM

ALASKA
DIVISION OF PARKS

A report by

Planning Section
Alaska Division of Parks

for

Alaska Coastal Management Program

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"This project was supported, in part, by federal Coastal Zone Management Program Development funds (P. L. 92-583, Sec. 305) granted to the State of Alaska by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U. S. Department of Commerce."

November, 1976

preface

The coastal parks and recreation situation on the west Kenai Peninsula shoreline is critical. Each year thousands of Alaskans and out of state tourists drive to the Cook Inlet beaches to dig clams, fish, camp, and beachcomb. The existing 297 acres of coastal State parklands spread between four coastal park facilities between the mouth of the Kenai River and Homer is inadequate to accomodate the present level of recreational use much less increases in future use. The City of Homer, which operates one campground on Homer Spit and a second east of the downtown business district, is the only other provider of public recreation facilities on the west Kenai coast. Kachemak Bay State Park and the Kenai National Moose Range are extremely large acreages of public lands dedicated for recreation use; however, their locations and accessibility do little to solve the demand for lower Cook Inlet beach access by automobile-oriented recreationists.

The potential for new coastal park areas is limited by the extent of existing developments on the coastline and the severe lack of public lands. The acquisition of private lands for public recreation is very costly and most likely beyond the means of either State, municipal or local governments. Land trades are possible but take long periods of time. It is imperative that the remaining

public lands which are capable of supporting recreational use be retained along this coastline. Where necessary, private lands should be acquired to insure public accessibility to the Kenai beaches.

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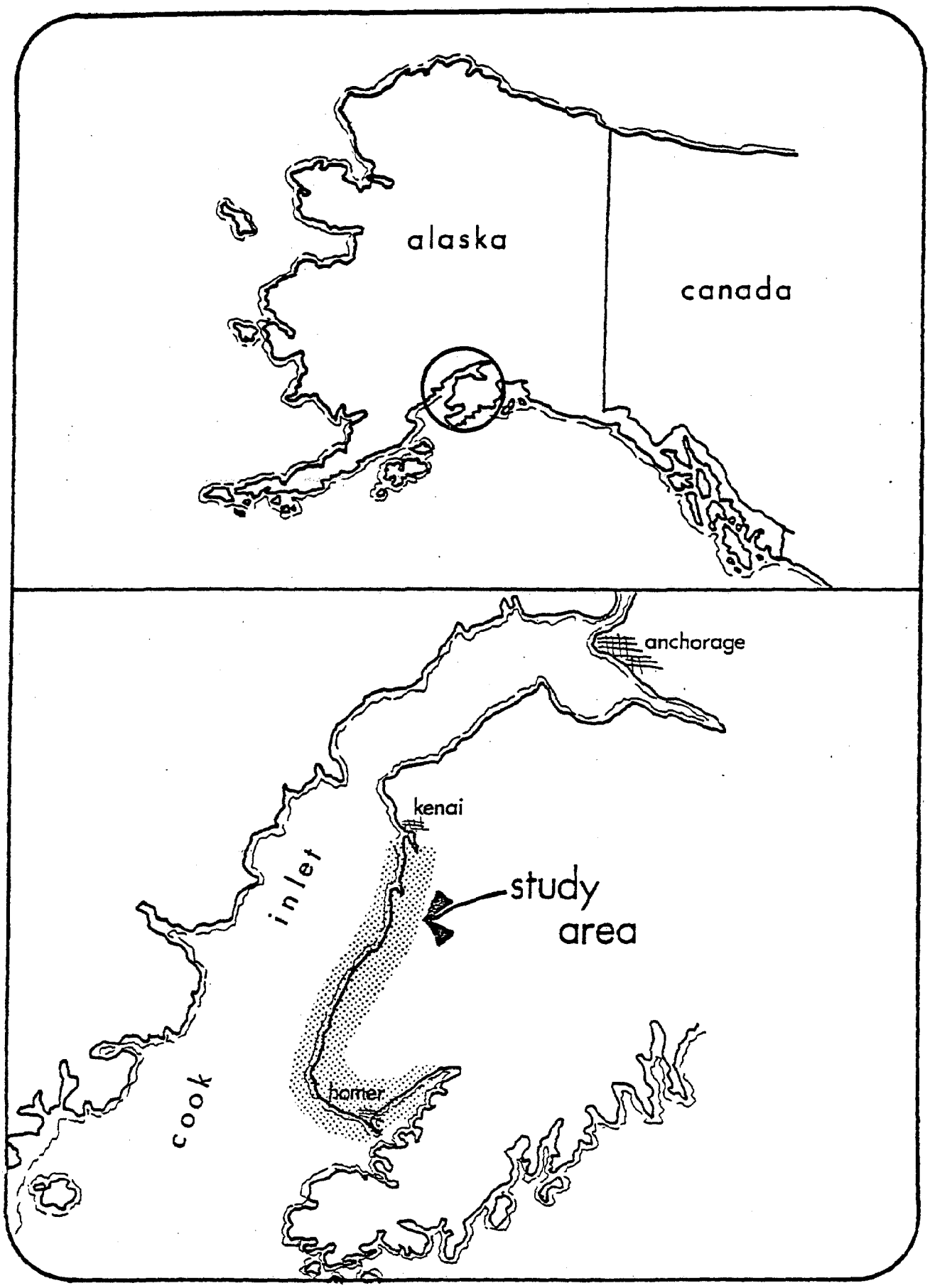

alaska
canada
anchorage
kenai
inlet
study
area
cook
homer

1 introduction

Natural Setting

The natural environment of the study area is generally referred to as the Kenai lowlands. Although relatively flat, the Caribou Hills which are located to the north and east of Homer provide some topographic relief to the area. The coastal lowlands in the northern portion of the study area are quite broad while in the Kachemak Bay-Homer area these lowlands decrease in width to the point where the Caribou Hills slope directly into Kachemak Bay. Soils in the area have been formed in marine continental deposits which are overlayed with glacial drift. The coastal strip bordering on Cook Inlet is vegetated with coastal hemlock, Sitka spruce, and a variety of hardwood, while inland is an upland spruce-hardwood forest interspersed with muskeg and black spruce bogs.

The coastline is typified by relatively high coastal bluffs of which many are actively eroding. Beaches generally have a belt of cobbles near the foot of the bluffs and are sand or silty sand in texture. In some areas large boulders which have eroded from glacial drift may be found off-shore. Waters in the northern portion of the study area are highly turbid and contain drift ice during the winter months. Waters south of Anchor Point and in

Kachemak Bay are relatively free of glacial-caused turbidity. Relatively large rivers drain the interior of the study area while smaller streams drain the coastal uplands. Several of these rivers form estuaries and sand spits at their entrance to Cook Inlet.

Cultural Setting

Many important archaeological sites attest to early habitation of the area by Pacific Eskimos. At a period which is still uncertain, the Pacific Eskimos yielded the area to the Tanana Athapaskan Indians. The first historic record of the area is from a 1778 expedition into Cook Inlet by Captain James Cook in his search for the Northwest Passage. Minor contact with Natives in the form of trading occurred during Cook's expedition as well as a second English expendition in 1786. The establishment in 1786 of Russian settlements at English Bay and Fort St. John on the Kasilof River marked the beginning of Russian dominance of the area. During this Russian period of activity, both material (tools and weapons) and spiritual (Russian Orthodox Church) changes occurred in the Native people.

Further Western influence occurred in the area in 1867 when Alaska was purchased from Russia. Americans continued fur trading in the area until 1897 when both low prices and a depletion

of resources led to the demise of the fur trading industry. The gold rush era saw the founding of Homer in 1895 by coal and gold prospectors. Up until World War II the area was dominated by fishing, mining, trapping, hunting and agriculture.

In 1957 the discovery of oil and gas in the Swanson River area brought the establishment of an urban population in the Kenai-Soldotna area and saw oil and gas production begin in the 1970's. A recent federal proposal to expand oil and gas development in the area by leasing lower Cook Inlet outer continental shelf tracts promises to cause further population growth and economic orientation towards the oil and gas industry on the Kenai Peninsula.

Aside from oil and gas related development, fishing continues to be an important industry in the southern portion of the area while tourism and the demand for outdoor recreation areas and facilities by local and non-local residents continues to grow.

Outdoor Recreation

Although comprehensive recreation demand data is lacking for the Kenai Peninsula, circumstantial information including field

observation shows this area to be possibly the most intensively used recreation area in the State of Alaska. Because of the long continuous coastal beach and the Sterling Highway having been constructed paralleling that beach, the coastal zone receives a majority of the recreation use which occurs on the west Kenai Peninsula. Presently operated coastal park and recreation facilities are inadequate, both in terms of acreage and level of development, to meet present usage. In view of pending new oil and gas development and its co-commitent commercial and residential development, there is a need to assess outdoor recreation and the role it should play in future land use patterns on the west Kenai Peninsula.

Study Objectives

It is the purpose of this report to investigate the landbase upon which recreation does or might occur; assess present and future recreation demands; and identify specific areas and boundaries necessary to protect the area's coastal recreation, scenic, and heritage resources.

Study Methodology

The methodology employed by this study involves three major phases. These are an inventory phase which focuses on the gathering of information on both the natural and cultural environments; an analysis and synthesis phase which views the implications of the inventory data for coastal recreation, and finally, a recommendation phase which develops proposals for the protection of recreation and heritage resources in the area.

Inventory. The inventory portion of this study (Chapters I and II) has attempted to gather information pertinent to the identification and management of areas possessing unique recreational, scenic, and heritage values. Both primary and secondary source materials have been utilized. Primary sources are listed in the bibliography. Secondary source material includes the Alaska Regional Profile: Southcentral Region, prepared by the University of Alaska's Arctic Environmental Information and Data Center and the Draft Environmental Impact Statement for Lower Cook Inlet Proposed Oil and Gas Lease Sale prepared by the Alaksa Outer Continental Shelf Office, Bureau of Land Management. Additional efforts in the inventory phase involve the contacting of all agencies, organizations, and individuals which were felt to have knowledge of the area pertinent to the needs of this study.

Analysis and Synthesis. The focus of the analysis and synthesis phase of the study was to define the opportunities and constraints imposed on coastal recreation by various components of the environment. For example, constraints included such things as soil types which are incapable of supporting intensive use or critical wildlife habitat areas which may be severely disrupted by recreational use and developments. Opportunities included such things as salmon streams, areas of high scenic quality, and coastal areas with upland acreage suitable for the necessary support facilities such as parking and camping. These opportunities and constraints are identified under the heading Management Implications following each section of the inventory. Additional work in this phase of the study involved a determination of coastal landforms or land units representing relatively homogeneous ecosystems. These landform types were identified along the study area's coastline through the use of topographic maps and from visual observation during an aerial overflight of the area. A discussion of environmental impacts, which may be expected to arise from various recreational activities is also presented in this section. Since these impacts can only be identified in a generalized (non site specific) manner, a set of matracies was developed. These matracies showed the relationships between the activities and facilities, facilities and impacts, and subsequently environmental impacts likely to be generated by specific recreational

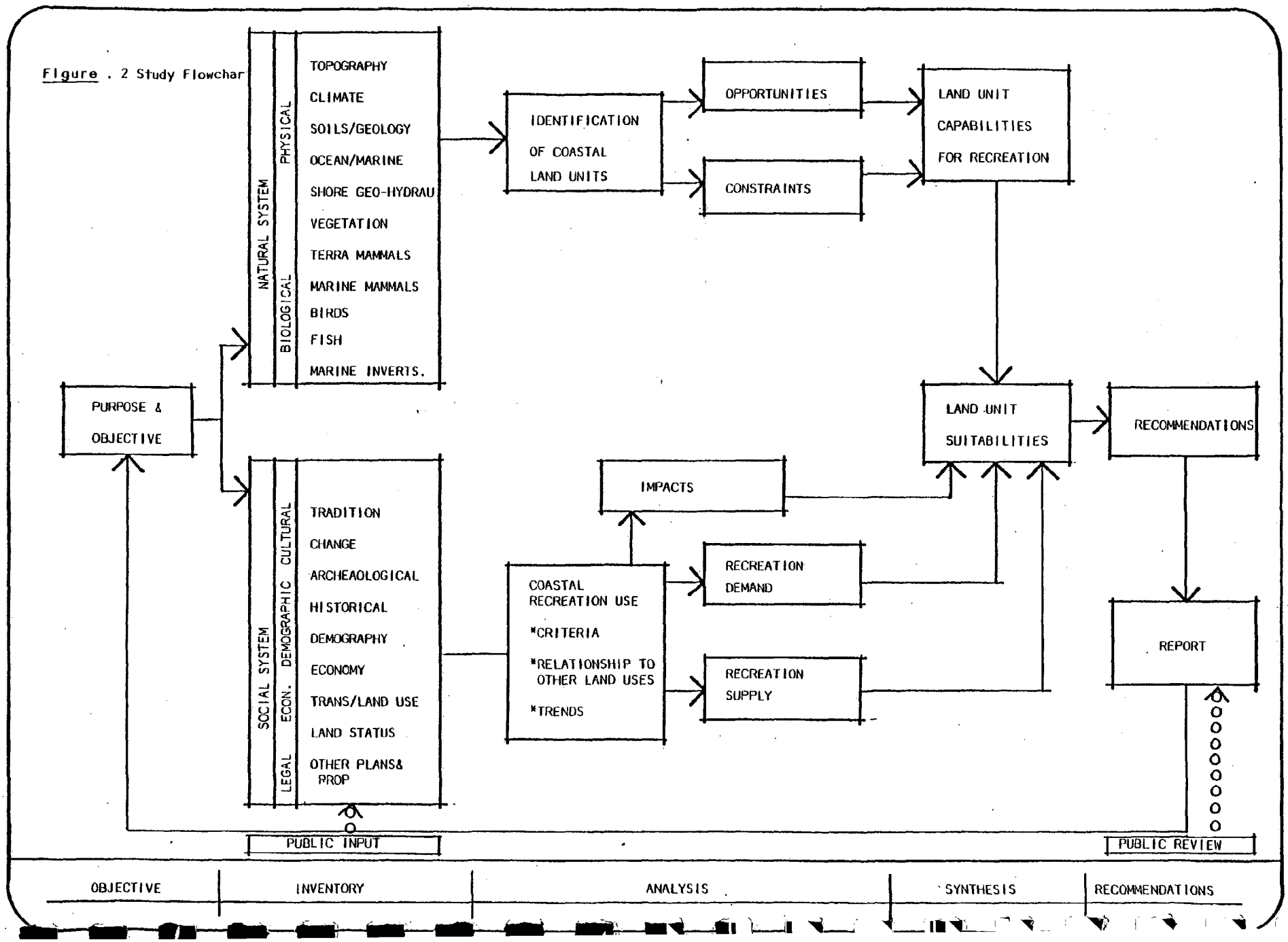
activities. It must be remembered that these impacts are generalized and site specific conditions may alter their intensity or duration.

The synthesis portion of this phase attempts to assess recreation demands for use of the areas coastline. Also addressed is the capability of specific coastal land units to support various recreational activities, without undue impact to the natural environment.

Recommendations

Recommendations developed in this study are an attempt to identify needed areas and facilities which will resolve some of the recreational use problems presently occuring in the study area. The various recommendations have been grouped according to their intended functions in meeting present and future shortages in coastal recreation areas. Also included in this section is a discussion of land use policy questions which have a bearing on coastal recreation use and should be addressed by both state and local governments. The flow chart on Page 8 illustrates the overall study procedure.

Figure . 2 Study Flowchar



2 inventory (biophysical)

Inherent in the process of identifying and assessing recreation values of an area is an understanding of the natural and social environments. Potentials and constraints of these environments as they relate to outdoor recreation must be determined prior to the identification of areas worthy of special management or land use designations to protect the recreation resource.

This chapter as well as Chapter 3 are a discussion of the study area's natural and cultural subsystems (i.e., soils, wildlife, economy, land status, etc.). Potentials and constraints of each of these subsystems are itemized to highlight their implication for the identification planning and management of the recreation resource. The management implications listed in each section of the inventory is by no means a complete listing of the inter-relationships between recreation and its environment. They are simply an attempt to highlight known concerns and present possible planning and management programs for consideration.

Topography

The topography of the study area is typified by coastal bluffs along Cook Inlet leading up to a wide and relatively flat area referred to as the Kenai lowlands. To the northeast of these lowlands are the Chugach Mountains, while the Kenai Mountains lie due east. The Caribou Hills and Lookout and Bald mountains near Homer provide a west by northwesterly slope to this lowland. A portion of the study area lies along the northern shore of Kachemak Bay which is some 7 miles wide and 25 miles in length.

Major rivers in the area include the Kasilof, Ninilchik and the Anchor. Larger creeks are Stariski, Clam, and Deep Creek. The stream systems generally flow in a westerly direction to enter Cook Inlet. Several small creeks along Kachemak Bay with relatively small watersheds flow in a southerly direction. Figure 3 illustrates the area's topography.

Relatively high coastal bluffs tend to dominate the study area's coastline. Low bluffs (less than 25' in heighth) occur along the area's northern coastline, near river mouths, and in the vicinity of Homer.

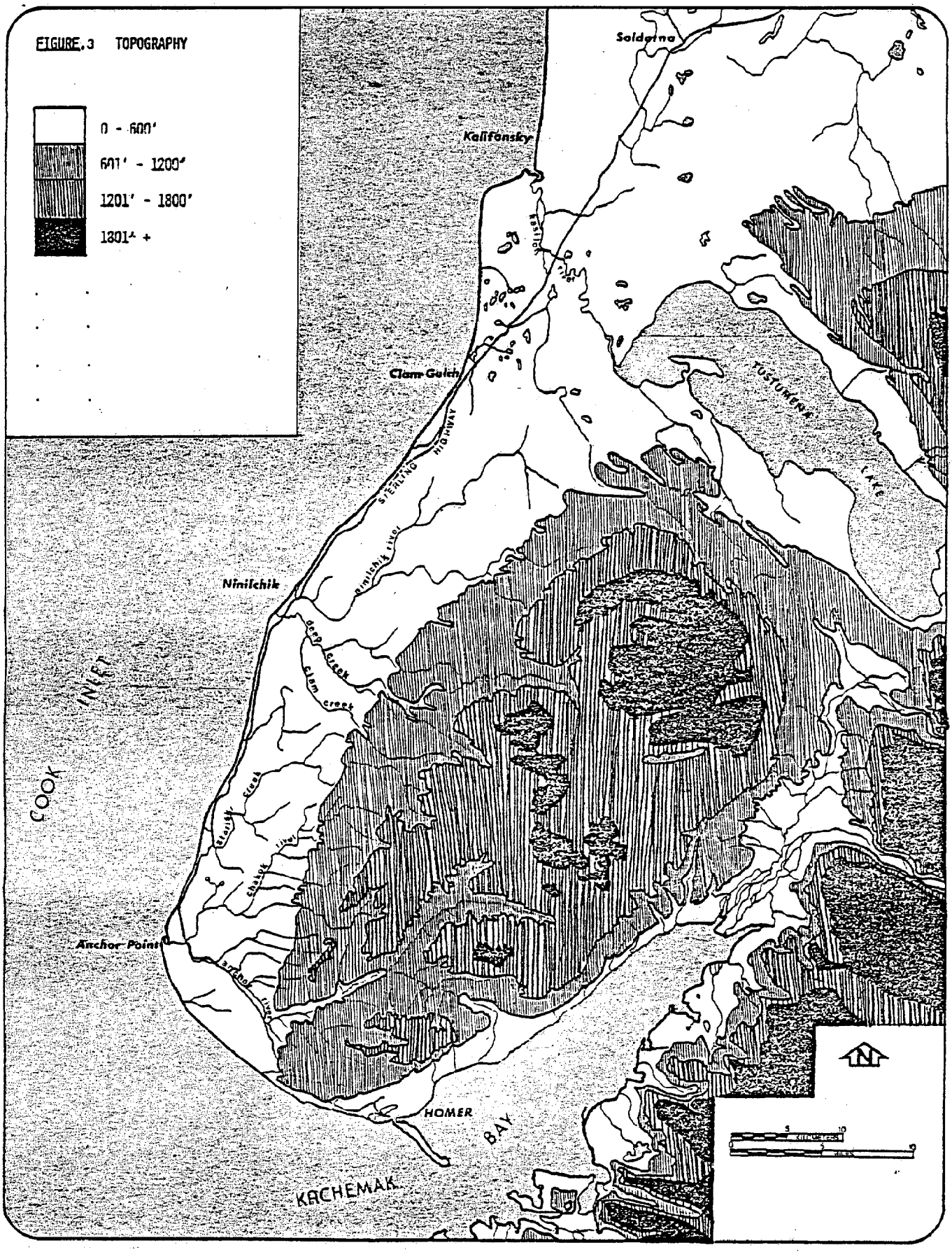


FIGURE 3 TOPOGRAPHY
0 - 600'
601' - 1200'
1201' - 1800'
1801' +
Soldotna
Kalifonsky
Clam Gulch
STERLING HIGHWAY
TUSTUMENA LAKE
Ninilchik
deep creek
clam creek
COOK INLET
Anchor Point
HOMER
BAY
KACHEMAK

Management Implications

1. The relatively continuous high coastal bluffs of the study area's shoreline tend to physically restrict access to beaches. River mouths, small drainages, and low bank areas tend to provide the easiest access to the coastline and should be valued highly for public park use.

2. On bluffs which are stable (generally those which are vegetated) it may be possible to develop trails to the beach. Staircases could be utilized in areas where trail construction is difficult.

3. As the shoreline topography is generally similar, those areas which provide a diversity of topographic relief would possess a higher value in terms of scenic qualities than those areas which do not.

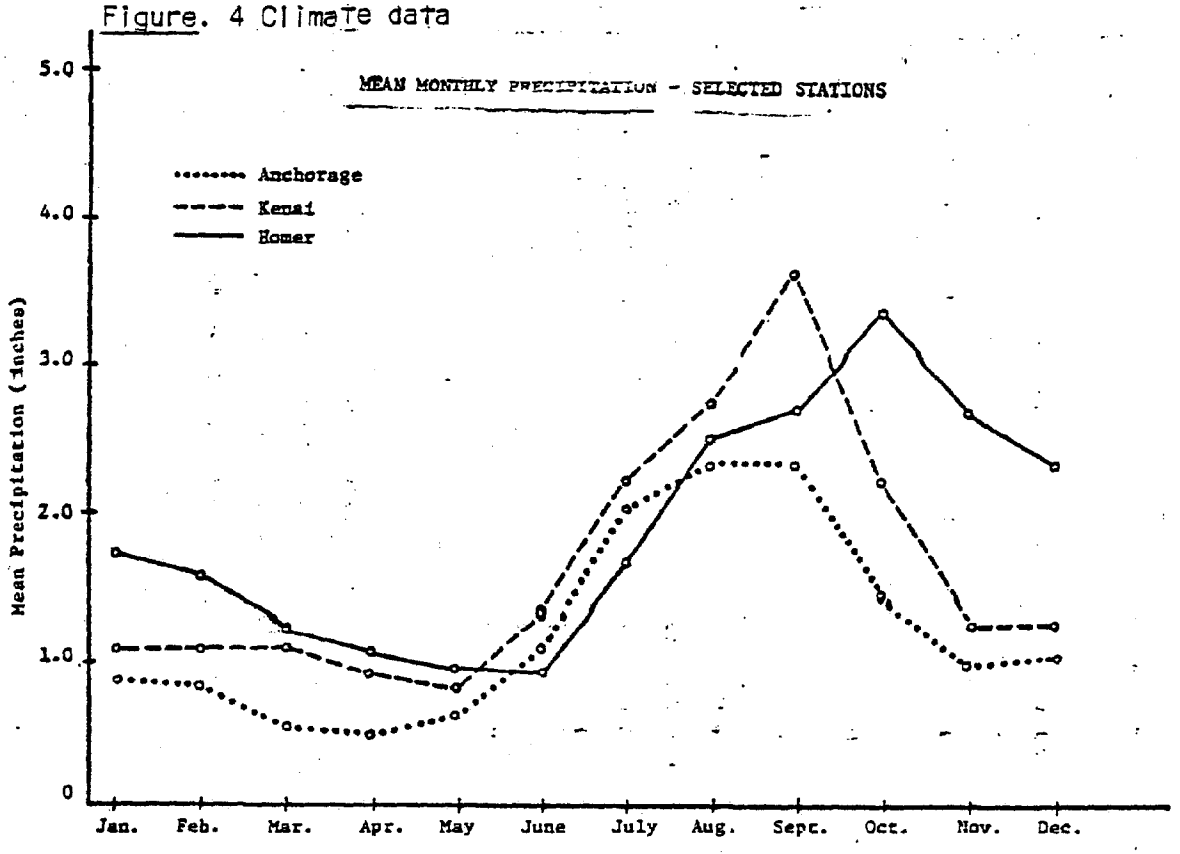
Climate

The entire study area lies within a transitional climatic zone. This is a zone which exhibits a climate between the extremes of the continental zone found in interior Alaska, and the milder southern Alaska coastal climatic zone. Precipitation rates in the study area are greater than those for the Anchorage area illustrating a stronger maritime influence. Temperatures are slightly higher than Anchorage with Homer showing a mean average temperature which is 10 degrees F warmer than Anchorage or the Kenai/Soldotna area. Figure 4 shows climatilogical data for the study area.

While summers generally exhibit warm temperatures, winter temperatures may dip quite low. These winter lows may be partially attributed to cold westerly air drainage from the Kenai mountains. However, cool temperatures may also be experienced during the summer months along glacier-fed rivers such as the Kenai River. This chilling effect due to cold water temperatures is generally localized to a river drainage.

The study area is generally protected from strong winds due to a sheltering effect of the Kenai mountains to the east and the Aleutian Range to the west. Kenai wind data shows a north or northwest wind direction from September through April and a south

Figure. 4 Climate data



CLIMATOLOGICAL DATA - COOK INLET

Station	January Temp. Min. Ave.[1]	January Temp. Mean Ave.	January Temp. Max. Ave.	January Total precip.[2]	January Snow[2]	July Temp. Min. Ave.	July Temp. Mean. Ave.	July Temp. Max. Ave.	July Total Precip.	July Snow	Year Temp. Min. Ave.	Year Temp. Mean Ave.	Year Temp. Max. Ave.	Year Total Precip.	Year Snow	Elev. (feet)
Susitna 1932-1947	2.6	12.6	22.8	1.38	14.5	45.5	57.8	70.1	2.55	0.0	24.8	35.6	46.3	28.05	68.2	
Anchorage Airport 1943-1971	3.6	11.4	19.2	0.88	11.7	49.9	57.6	65.3	2.07	0.0	26.2	34.7	43.3	16.83	71.4	114
Tyonek*	4.3		9.9	0.80	11.9	50.3	58.3	68.0	1.86	0.0	28.1		43.4	14.71	68.3	114
Kenai 22 year	3.7	12.7	21.6	1.12	13.4	46.1	53.5	61.0	2.23	0.0	26.5	33.1	41.7	19.31	68.7	16'
Kasilof 22 year	3.7	12.7	21.6	1.12	13.4	45.1	53.0	60.8	2.00	0.0	25.3	32.4	43.6	17.77	55.6	80'
Homer 1931-1971	14.0	20.7	27.3	1.73	10.4	48.6	52.4	60.2	1.69	0.0	29.2	36.4	43.6	23.08	55.9	67
Seldovia*	18.1	23.2	28.2	2.3	10.2	48.6	55.8	57.7	1.40	0.0	33.7	41.8	48.2	26.3	50.8	0-30

* Unofficial Local records
1 Degrees Fahrenheit
2 Inches

Source: Evans et al. 1972.

Figure.5 Climate data

SKY CONDITIONS, FOG AND THUNDERSTORMS
COOK INLET

Station	Monthly Variation of Mean Tenths Sky Cover	Mean Number of Days Per Year			
		Cloudy*	Thunderstorms	Heavy Fog**	Visibility Less Than 1/2 Mile
Susitna		149			
Anchorage	6 to 8	235	1	28	28
Kenai			1	***	22
Kasilof		102			
Homer	5 to 8	223	1	9	10

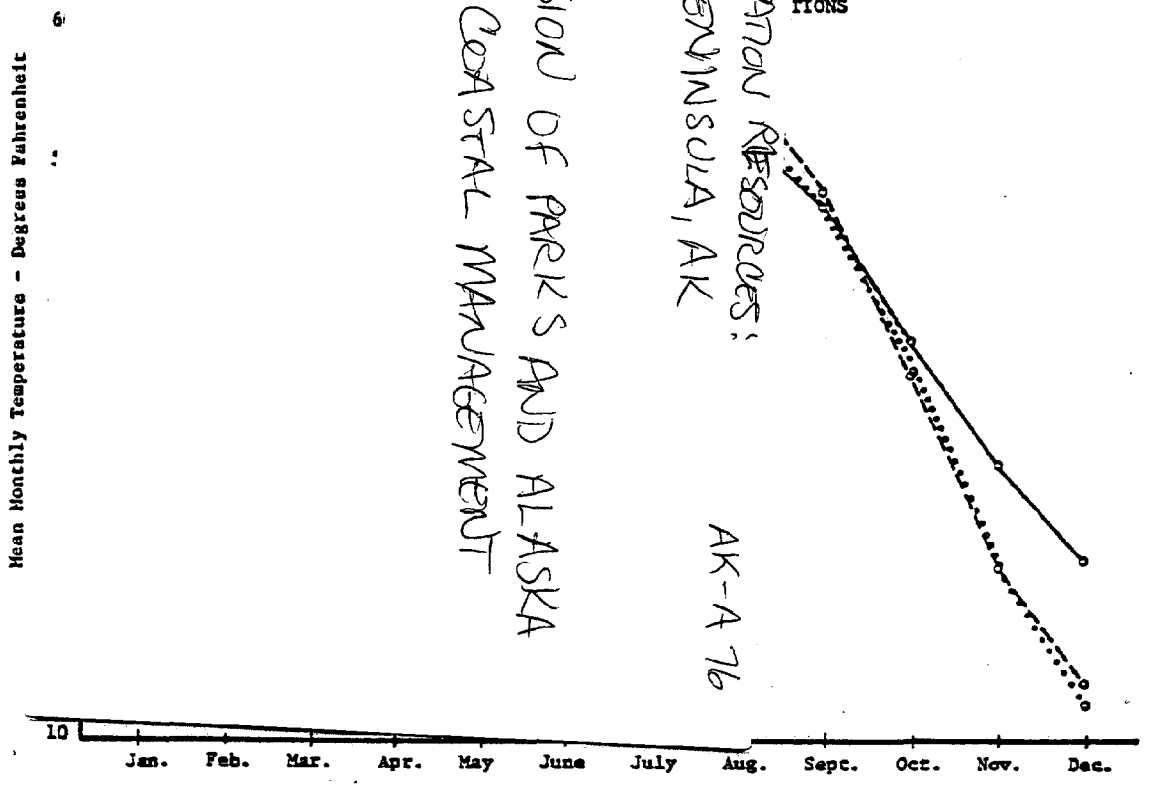
* Generally, 8-10 tenths coverage

** Visibility is reducted to 1/4 mile or less

maximum frequency in

age frequency of

TIONS



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or southeast wind direction from May through August. Occasionally, strong winds (50 to 75 knots) are channeled up the inlet during the winter. These winds originate in the Gulf of Alaska.

The Kasilof area has half as many cloudy days per year as Anchorage (102 versus 235). Whereas, Homer exhibits approximately the same number of cloudy days per year as Anchorage. Cloudiness occurs slightly more often during the summer months than during winter months.

Management Implications

1. Local wind and weather patterns should be considered in the design and location of recreational facilities.

2. Should winter operation of facilities be desirable, facility design considerations should be given to drifting snow, as north or northwesterly winds occur during the winter months.

3. Recreational use of facilities should be located behind primary dune lines as these areas receive significantly less wind than the primary dune and beach area.

[4] Because of the occasionally high winds experienced in the area, any trees near visitor use areas and facilities should be inspected periodically and potentially hazardous trees should be removed.

[5] Cold air drainages should be considered in the location of overnight facilities.

Soil

The following information is generalized from the Soil Conservation Service publications entitled Soil Survey: Kenai-Kasilof Area and Soil Survey: Homer-Ninilchik Area. For detailed site specific soil data, the appropriate publication should be consulted.

Soils found in the study area may be classified into three broad groups. These are: 1) excessively drained to moderately well-drained soils found in upland areas, 2) imperfectly drained to poorly drained mineral soils found in depressions and valley bottoms, and 3) the poorly drained and very poorly-drained soils of the muskegs or bogs. As mentioned in the previous section on geology, loess or windblown silty material overlays much of the uplands. This is the material in which soils have developed. Upland soils are generally infertile and strongly acidic.

Well-drained soils in the area include Napetown, Tustumena, Kachemak, and Mutanala soils. The Napetown and Tustumena soils occur in the area around Soldotna and south to Clam Gulch. The Kachemak and Mutanala soils occur from Anchor Point to Homer and into the Caribou Hills. Cohoe soils occur in the area between Clam Gulch and Anchor Point and is slowly permeable and thus poses restrictions to development. White spruce and birch are

the predominate vegetation types associated with Cohoe soils. However, in flood plains and depressions, balsam poplar, willow, and black spruce, and tall grass comprised of fireweed and horsetails occur. Large areas of muskeg are associated with this area.

Flood plains such as near Anchor Point, Ninilchik, Kasilof River, and the Kenai River are composed of alluvial soils. These soils are comprised of sand, silt, and clay material which ranges from poorly-drained to excessively-drained.

Alders, willow, tall grasses, and cottonwood are associated with these areas. The Salamatoff and Beluga soil types are poorly drained and pose some restrictions to development. Soil areas are shown in Figure 8. Soil descriptions, vegetation associations, probable locations, and associated soil series are shown in Figure 6 & 7.

AREA MAP #		DESCRIPTION	VEG. ASSOC.	LOCATION	ASSOC. SERIES	ASSOC.. SERIES CHARACTERISTICS
Naptowne	1	Well-drained developed in moderately deep silty material underlain w/gravel (poorly drained in flood plains)	uplands white spruce & birch, fire scars black spruce, wet areas balsam poplar, aspen, black spruce, some bluejoint tallgrass fields.		Longmare Kallfonsky	formed in deeper silty deposit poorly-drained, in low areas adjacent to muskeg.
Salamatof	2	Poorly-drained, thick accumulation of raw peat, muskeg with islands & strips of mineral soil	moss peat & dense mat of shrubs, sedges, cottongrass, & horsetails may support spindly black spruce.	Low areas	Doroshin Peat Starichkof Peat	shallower accumulation of peat than Salamatof. more freely divided peat.
Tustumena	3	Well-drained, developed in moderately deep, windlain silt over water laid substratus of gravel or or coarse sand	Young aspen & spruce w/a few birches & willows. Thick cover of shrubs, grasses & forbs hammocky surface	broad, level plains	Kasilof Pincher	shallower & occur mostly on lo terraces immediately adjacent rivers. imperfectly drained w/layered silty and sandy substratum.
Kenai	4	Developed in silty, windlain material over slowly permeable, firm, clayey substratus	uplands forest of white birch & aspen, coastal balsam poplar & alder, drainageways, black spruce and willow	hilly areas irregular choppy topography	Cohoe	slightly better drained.
Cohoe	5	Slowly permeable developed in moderately deep, silty material overlying layered coarse and fine material	uplands white spruce & birch, flood plains & depressions, balsam poplar, black spruce & willow w/tall grass fireweed, & horsetails	nearly level to moderately sloping lands that are broken by strips of more steeply sloping land & by broad muskegs.		

Figure. 6 Soil characteristics

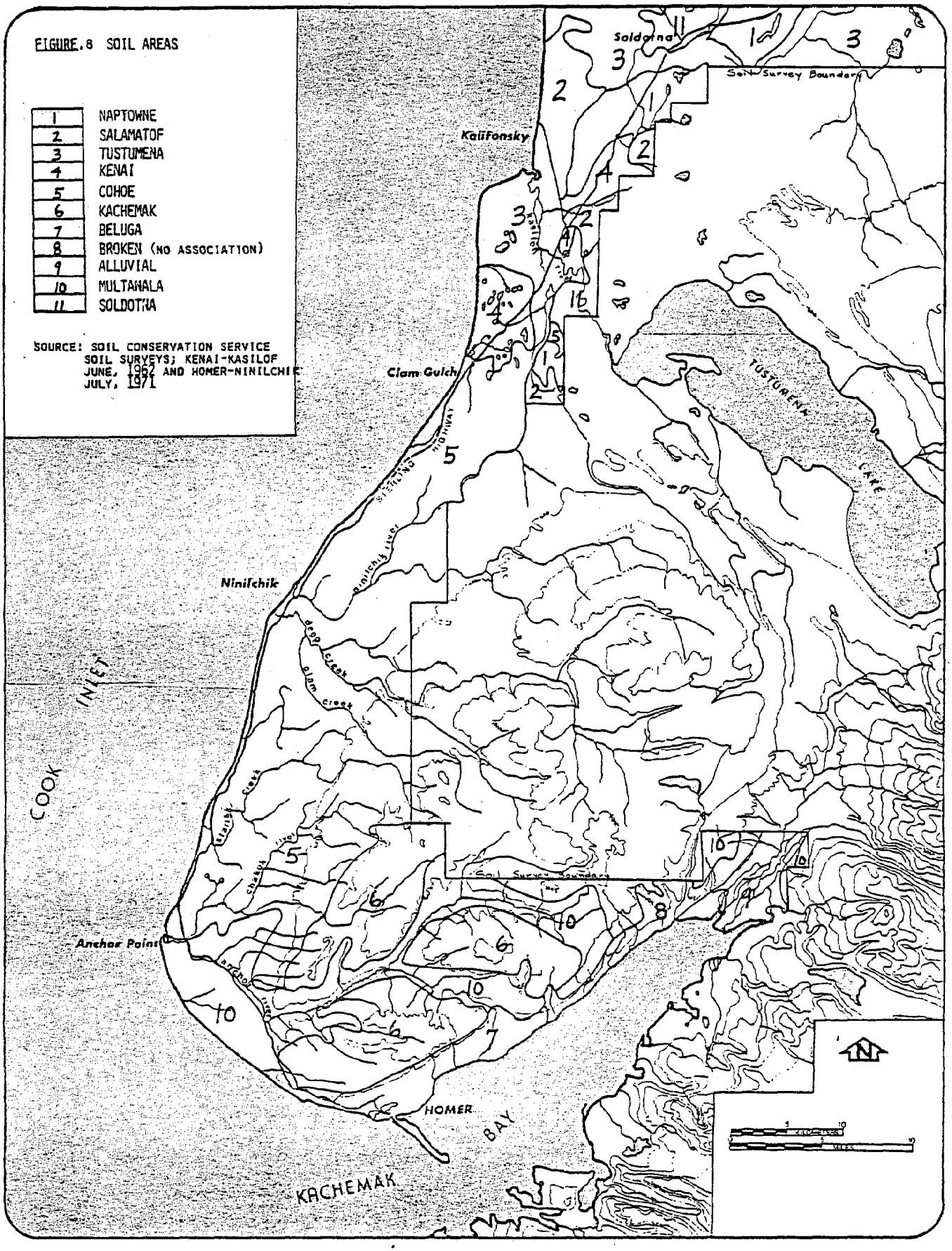
AREA MAP #		DESCRIPTION	VEG. ASSOC.	LOCATION	ASSOC. SERIES	ASSOC. SERIES CHARACTERISTICS
Kachemak	6	Well-drained, varying depth developed in volcanic ash mixed w/wind laid silt below ash or moderately consolidated layers of shale & sandstone	bluejoint reedgrass, forbs, and shrubs Sitka spruce clumps at lower elevations alder & willows in drainages	elevation range is 800'-2,000' Caribou Hills area		
Beluga	7	Poorly-drained mat of partly decomposed litter over a silt loam layer 2 inches thick. Underlaying is stratified layer of mottled siltloam	sparse forest of Sitka spruce, black spruce, paper birch, alder, and in open areas, bluejoint reedgrass, fireweek, and horsetails	near Homer along the the coastline on footslopes	Kachemak Mutrula Samatof	Well-drained Well-drained Muskeg
Broken	8	No well developed soil. Steep and very steep eroded escarpments, sea cliffs and canyon walls				
Alluvial	9	Sandy, silty & clayey material, poorly drained to excessively drained	alders, willows, tall grasses, horsetails & a few scattered cottonwoods	flood plain, Fox River Valley only		
Mutanala	10	Well-drained, formed in a mantle of volcanic ash and other silty wind-laid wind-laid material over gravelly glacial till. Mat of organic material in undisturbed areas	Sitka spruce, white spruce and paper birch	on knolls of moraines between Anchor Pt. Moderately extensive on side side slopes of Caribou Hills. 100' -1,000'	Spenard Salanatof	 muskeg

Figure. 7 Soil characteristics

FIGURE.8 SOIL AREAS

1	NAPTOWNE
2	SALAMATOF
3	TUSTUMENA
4	KENAI
5	COHOE
6	KACHEMAK
7	BELUGA
8	BROKEN (NO ASSOCIATION)
9	ALLUVIAL
10	MULTANALA
11	SOLDOTNA

SOURCE: SOIL CONSERVATION SERVICE
SOIL SURVEYS; KENAI-KASILOF
JUNE, 1962 AND HOMER-NINILCHIK
JULY, 1971



Geology

The study area is underlain by the Kenai formation which consists of marine deposited sand, silt, and clays from the Tertiary age. At a latter date these sediments were acreted to the continental margins through northwestward underthrusting of the oceanic plate beneath the continental plate. These sediments are exposed in only a few areas. In a majority of the area, these Tertiary sediments are overtopped by thick glacial and alluvial deposits.

During periods of glaciation, the study area was filled by a large valley glacier which covered most of the Cook Inlet basin. Deposits left by this and other glaciers include coarse morainic material. This material ranges from sand to boulders and is noncompacted and unsorted. Thick beds of sand and gravel parallel both the Kenai and Kasilof Rivers as these were the two main rivers during the period of glacial retreat.

Colluvium, or soil and rock material moved chiefly by gravity, from the Caribou Hills covers much of the foothills on Katchemak Bay. Strong winds off of the retreating glaciers have deposited loess, or windblown silts, in a mantle over most of the study area ranging in thickness from a few inches to several feet.

Figure 9 shows geologic properties of the area. Figure 11 identifies locatable minerals while Figure 10 shows the general location of leasable minerals.

Management Implications

1. Developments (whether recreational or non-recreational) should avoid areas of poorly drained soil. Low bearing strength exhibited by these soils may cause continual and expensive maintenance. These soils and associated plant life also exhibit a low tolerance to intensive use.

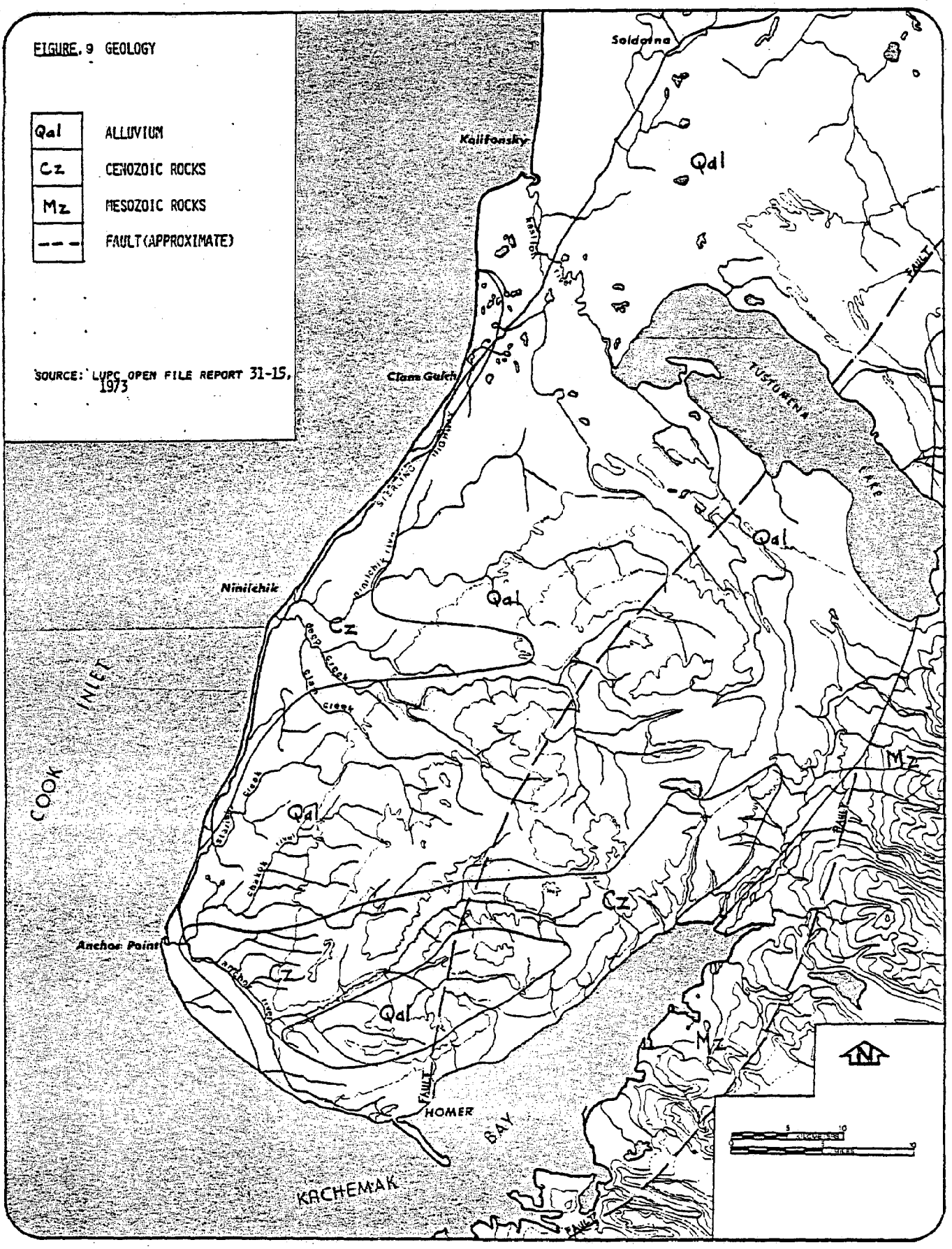
2. Drainfields should not be placed in these areas. Properly sealed and weighted vaults, or small self-contained sewage treatments facilities should be used when necessary.

3. Several faults transect the study area. Facilities should be built to withstand a medium-size quake. Peat and sandy soils should be avoided as these soil types may intensify ground shaking and structural vibrations. Public use facilities should not be sited at the base of bluffs as they may be subject to slumping and mass movements during an earthquake.

FIGURE. 9 GEOLOGY

Qal	ALLUVIUM
Cz	CENOZOIC ROCKS
Mz	MESOZOIC ROCKS
- - -	FAULT (APPROXIMATE)

SOURCE: USGS OPEN FILE REPORT 31-15, 1973



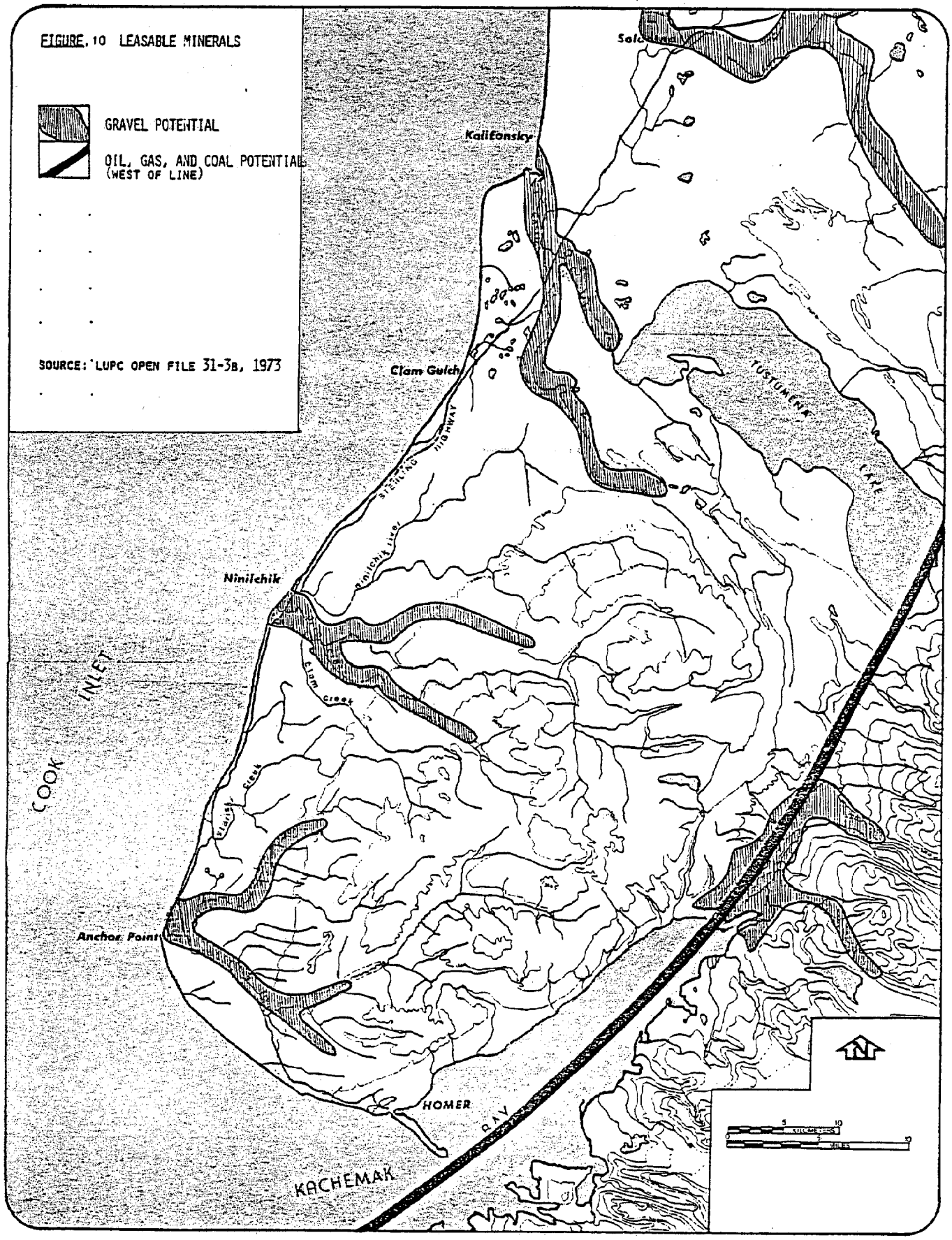


FIGURE. 10 LEASABLE MINERALS
GRAVEL POTENTIAL
OIL, GAS, AND COAL POTENTIAL (WEST OF LINE)
SOURCE: LUPC OPEN FILE 31-3B, 1973
Kalifonsky
Clam Gulch
STERLING HIGHWAY
TUSTUMENA
LAKE
Ninilchik
COOK INLET
Anchor Point
HOMER
BAY
KACHEMAK

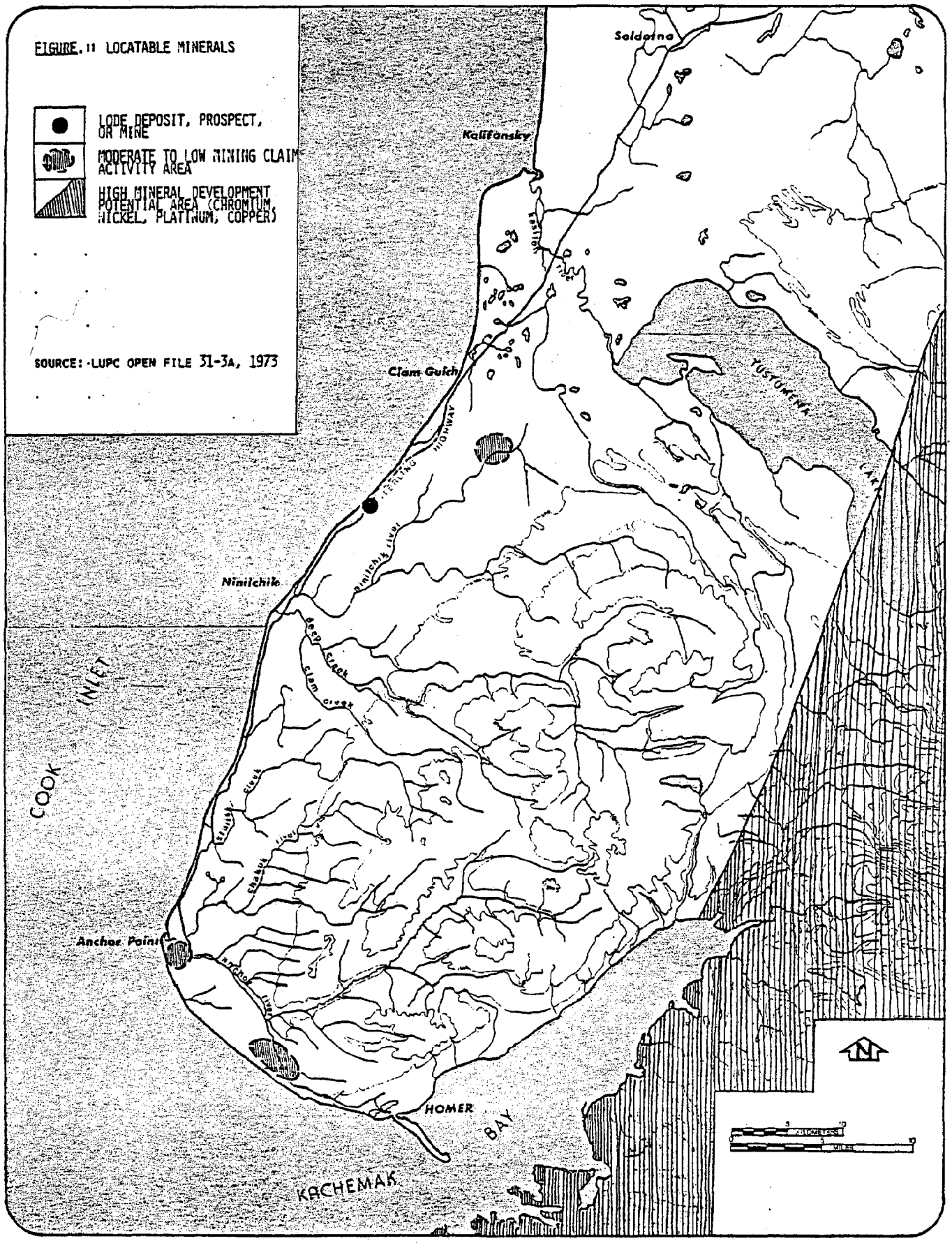


FIGURE. 11 LOCATABLE MINERALS
LODE DEPOSIT, PROSPECT, OR MINE
MODERATE TO LOW MINING CLAIM ACTIVITY AREA
HIGH MINERAL DEVELOPMENT POTENTIAL AREA (CHROMIUM, NICKEL, PLATINUM, COPPER)
SOURCE: LUPC OPEN FILE 31-3A, 1973
Soldotna
Kalifonsky
Clam Gulch
STERLING HIGHWAY
Ninilchik
Ninilchik River
Deep Creek
Clam Gulch
COOK INLET
Anchor Point
Anchor River
HOMER
BAY
KACHEMAK
N

Physical Oceanography

Surface current data for the lower Cook Inlet shows a northwardly flowing floodtide offshore of the study area. Ebb flow tends to hold to the western side of the Cook Inlet channel. Flood tide waters are generally clear, while ebb tide flushes the turbid waters of upper Cook Inlet. The mean diurnal tide range varies from 13.7 feet at the mouth of Cook Inlet to 29.6 feet at Anchorage. The mean diurnal tide range for the study area is 19.1 feet. A strong coriolis force to and in northern latitudes, strong currents, and the Inlet's bathemetry offshore of the study area tend to produce considerable turbulence throughout the entire water profile.

Although no verified information is available on waves or swells in Cook Inlet, fishermen have reported waves in excess of twenty feet during periods of severe weather conditions. Generally, however, these conditions occur in the western portion of the Inlet toward Kamashak Bay as they are usually caused by westerly or southwesterly gale and storm velocity winds.

During the winter, ice conditions occur in the northern portion of the study area and south to Anchor Point. This condition also

occurs along the northern shore of Kachemak Bay. Flow ice does occur throughout the area. Ice formed on tidal flats in the area tends to be broken by the rising and falling in tide and gathers successive layers of ice with each new tide cycle.

Turbidity due to suspended glacial sediments is greatest in the northern portion of the study area and decreases towards the mouth of Cook Inlet and in Kachemak Bay. Water temperatures in Cook Inlet average around 50 degrees F whereas freshwater runoffs from tributaries during the summer range in temperature from 55 degrees F to 58 degrees F.

Surface water circulation along the study area coastline during an incoming or flood tide conditions is shown in Figure 12.

Management Implications

1. Boating facilities such as ramps, should be located in wave protected areas as severe weather conditions can occur on Cook Inlet generating waves up to 20 feet.

2. Boating access facilities should be useable during all phases of the tide cycle as a sudden storm may require boats to be pulled out rapidly.

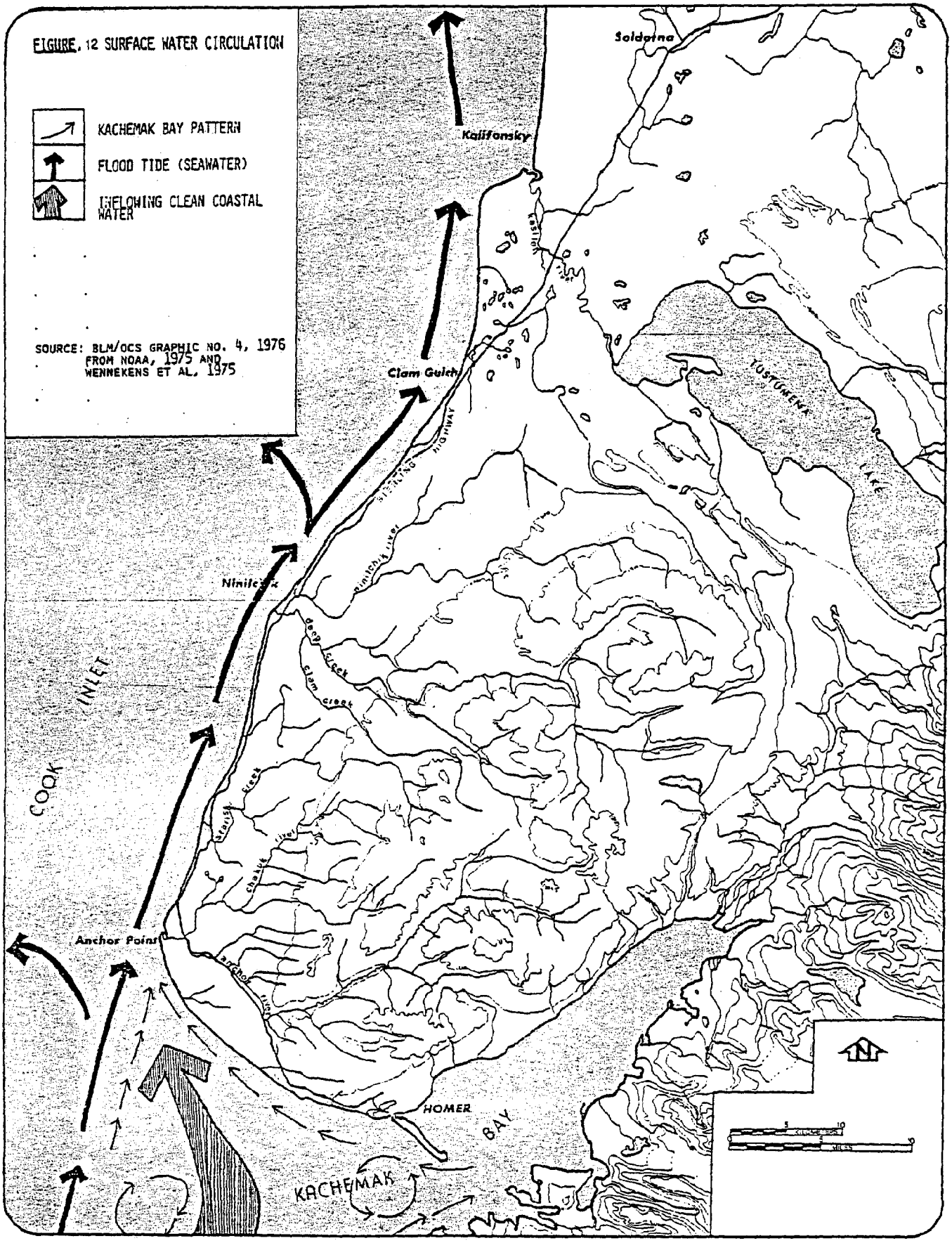


FIGURE. 12 SURFACE WATER CIRCULATION
KACHEMAK BAY PATTERN
FLOOD TIDE (SEAWATER)
INFLOWING CLEAN COASTAL WATER
SOURCE: BLM/OCS GRAPHIC NO. 4, 1976 FROM NOAA, 1975 AND WENNEKENS ET AL, 1975
Soldotna
Kalifonsky
Clam Gulch
Nikolaevsk
Anchor Point
COOK INLET
HOMER
BAY
KACHEMAK
TUSTUMENA
LAKE
N

[3] Facilities located in the intertidal zone must be designed to consider winter ice conditions.

[4] Highly turbid waters which occur in the northern portion of the study area make this area less desirable for fishing.

[5] Because of potential storm conditions and cold water temperatures, boating safety information should be a part of any park interpretive program.

Shoreline Geohydraulic Processes

The shoreline is a result of geohydraulic processes. Although it may appear stable in the short-term, over a long period of time it is quite dynamic. Sediment such as sand and silt are constantly being carried along the shoreline from shoreline bank erosion and upland sources. Material is moved along the shoreline by either wave action or tidal currents. This geohydraulic process is a beach erosion-transportation-acretion process which occurs through a range of intensities on the shorelines in the study area. As illustrated in Figure 13 , longshore currents and wave action erode material into the inter-tidal zone. This material is then moved along a downstream section of beach referred to as a transport zone. Within this zone there is generally no net increase or decrease of beach material, although material is continually moving through the zone. Downstream from the transport zone is the acretion zone where material is finally deposited forming a wide beach spit or mud flat. The deposition of material in this zone is due to a decrease or slowing down of the along-shore current due to deeper water or a deflection of the sediment-laden current. The length of any one of these three zones may vary, as well as the intensity of activy occuring within it. Groins, jetties and breakwaters may have extremely disruptive effects on this process leading to accelerated rates of beach and bank

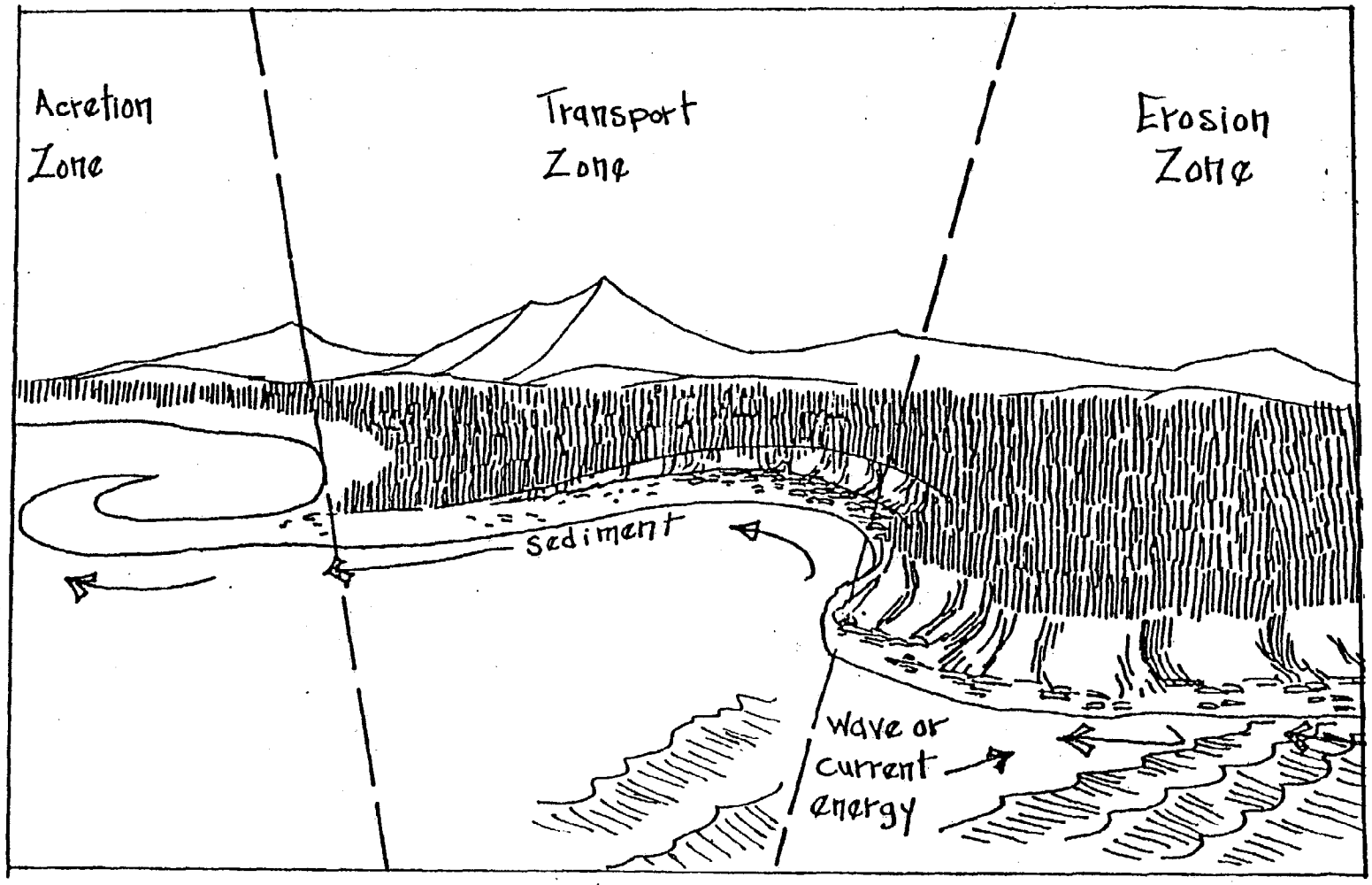


Figure. 13 Diagram of shoreline geohydraulic process

erosion downstream. The net effects of these processes are to cause the shoreline to recede in erosional zones; remain the same in the transport zone; and to be built up in the acretion zone.

Management Implications

1. The placement of structures in the inner-tidal zone must be proceeded by an assessment of the area's shoreline acretion-erosion processes. The indiscriminate placement of jetties, groins, or fills may initiate or accelerate undesirable shoreline erosion processes.

2. Structures or facilities should not be placed directly on the beach or sand or gravel spits. These areas are extremely active portions of the shoreline and are continually shifting in their location.

3. Bulkheading of eroding bluffs should not occur as this practice may starve beaches of material and cause a narrowing of beach width.

Vegetation (Terrestrial)

The study area contains a wide diversity of vegetation types as identified by Spetzman (1963) and Viereck (1972). Vegetatation types and their locations are shown in figure 14. Species found within each of these vegetation types are listed in figures 15 through 20.

Coastal vegetation in the Kasilof area is a combination of upland and lowland spruce-hardwood forests. From south of Kasilof to Anchor Point is a strip of coastal hemlock and Sitka spruce forest. South of Anchor Point a large area of muskeg occurs while near Homer is found a mixture of high brush and coastal hemlock-Sitka spruce.

White spruce comprises the climax forest community on well drained soils in the uplands. Birch and aspen may occur in association with white spruce, however they are eventually out-competed and replaced by white spruce. Understory vegetation in this plant community consists of willow, alder, rose, high bush cranberry, lingonberry, raspberry, and current.

The narrow coastal belt of hemlock and Sitka spruce forests is an

extension of the broad ranging Pacific coast hemlock-spruce forests. Sitka spruce is by far the dominant species in this association. Understory vegetation includes Sitka alder, devil's club, salmonberry, willow, Pacific red elder, rusty menziesia, copperbrush, blueberry, and huckleberry.

Sparse stands of black spruce and white spruce grow on the bottomlands along streams and rivers. Cottonwood occurs in small stands on natural levies adjacent to streams. Willow and alder dominate the understory in these areas. High brush communities occupy those areas with better soil drainage, while low brush bog and muskeg occur in areas of poor drainage conditions. Moist tundra vegetative types occur in the Caribou Hills and the hill slopes north of Homer. Wet tundra occurs in only a few scattered locations.

FIGURE 14 ECOSYSTEMS (VEGETATIVE)

1	COASTAL HEMLOCK-SPRUCE
2	BOTTOMLAND SPRUCE-POPLAR
3	UPLAND SPRUCE-HARDWOOD
4	LOWLAND SPRUCE-HARDWOOD
5	HIGH BRUSH
5A	HIGH BRUSH (BURNED AREA)
6	LOW BRUSH
6A	MUSKEG
7	MOIST TUNDRA
8	WET TUNDRA
9	ALPINE TUNDRA AND BARREN

SOURCE: LUPC CPEN FILE 31-8, 1973

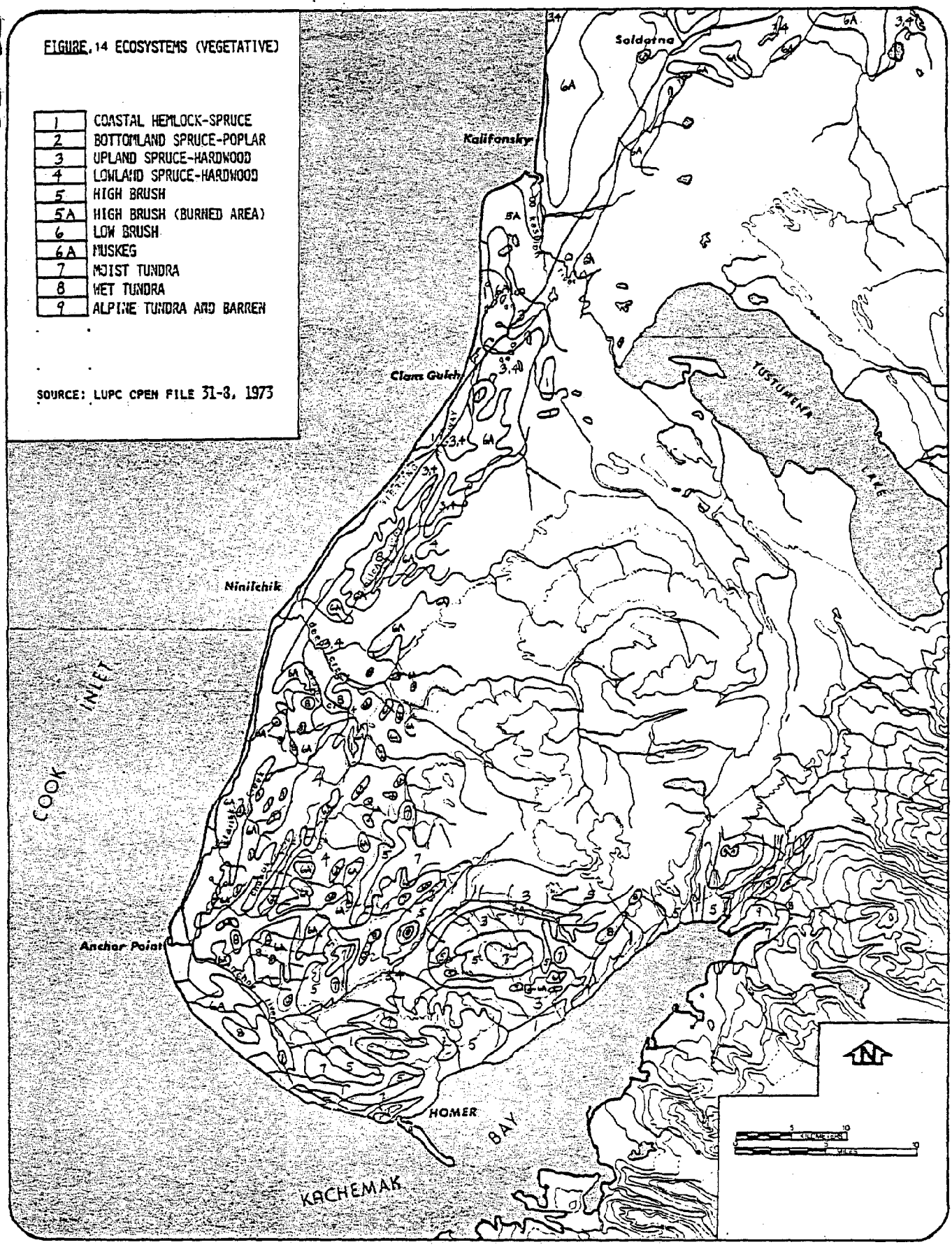


Figure. 15 Species list

Coastal Western Hemlock-Sitka Spruce Forest

Trees

Sitka spruce	Picea sitchensis
Western hemlock	Tsuga heterophylla
Mountain hemlock	T. mertensiana
Alaska cedar	Chamaecyparis nootkatensis
Balsam poplar	Populus balsamifera ssp. balsamifera
Black cottonwood	P. balsamifera ssp. trichocarpa

Shrubs

Sitka alder	Alnus crispa ssp. sinuata
Devil's club	Echinopanax horridum
Salmonberry	Rubus spectabilis
Willow	Salix spp.
Pacific red elder	Sambucus racimosa ssp. pubens
Rusty menziesia	Menziesia ferruginea
Copperbrush	Cladothamnus pyrolaeflorus
Blueberry and huckleberry	Vaccinium spp.

Grasses, herbs and others

Bluejoint	Calmagrostis spp.
Lyme grass	Elymus arenarius
Lichens	
Mosses	
Liverworts	
Mushrooms	

Source: Alaska Regional Profile, Southcentral

Bottomland Spruce-Poplar Forest

Trees

White spruce	Picea glauca
Balsam poplar	Populus balsamifera ssp. balsamifera
Black cottonwood	P. balsamifera ssp. trichocarpa
Alaska paper birch	Betula papyrifera ssp. humilis
Quaking aspen	Populous tremuloides
Black spruce	Picea mariana

Shrubs

American green alder	Alnus crispa ssp. crispa
Thinleaf alder	A. incana ssp. tenuifolia
Willow	Salix spp.
Rose	Rosa spp.
Labrador tea	Ledum palustre ssp. decumbens
Raspberry	Rubus spp.
Blueberry, huckleberry	Vaccinium spp.
Bearberry	Arctostaphylos spp.
Serviceberry	Amelanchier spp.
High bush cranberry	Viburnum edule

Grasses, herbs, others

Bluejoint	Calmagrostis spp.
Fireweed	Epilobium angustifolium ssps.
Horsetail	Equisetum spp.
Wintergreen	Pyrola spp.
Parsley fern	Cryptogramma crispa var. sitchensis
Marsh fern	Thelypteris phegopteris
Lady fern	Athyrium filix-femina
Lichens	
Mosses	
Liverworts	
Mushrooms	
Other fungi	

Source: Alaska Regional Profile, Southcentral

Figure. 16 Species list

Upland Spruce-Hardwood Forest

Trees	
White spruce	Picea glauca
Black spruce	P. mariana
Quaking aspen	Populus tremuloides
Alaska paper birch	Betula papyrifera ssp. humilis
Black cottonwood	Populus balsamifera ssp. trichocarpa
Balsam poplar	P. balsamifera ssp. balsamifera
Shrubs	
Willow	Salix spp.
Alder	Alnus spp.
Rose	Rosa spp.
High bush cranberry	Viburnum edule
Lingonberry	Vaccinium vitis-idaea ssp. minus
Raspberry	Rubus idaeus subsp. melanolasius
Currant	Ribes spp.
Grasses, herbs, others	
Bluejoint	Calamagrostis spp.
Fireweed	Epilobium angustifolium ssps.
Horsetail	Equisetum spp.
Parsley fern	Criptogramma crispa var. sitchensis
Marsh fern	Thelypteris phegopteris
Lady fern	Athyrium filix-femina
Fragile fern	Cystopteris fragilis ssps.
Other ferns	
Lichens	
Mosses	
Mushrooms	
Other fungi	

Source: Alaska Regional Profile, Southcentral

Lowland Spruce-Hardwood Forest

Trees	
Black spruce	Picea mariana
White spruce	P. glauca
Alaska paper birch	Betula papyrifera ssp. humilis
Quaking aspen	Populus tremuloides
Balsam poplar	P. balsamifera ssp. balsamifera
Black cottonwood	P. balsamifera ssp. trichocarpa
Shrubs	
Willow	Salix spp.
Dwarf arctic birch	Betula nana ssp. exilis
Lingonberry	Vaccinium vitis-idaea ssp. minus
Blueberry	Vaccinium spp.
Labrador tea	Ledum palustre ssp. groenlandicum
Crowberry	Empetrum nigrum ssps.
Bearberry	Arctostaphylos uva-ursi ssp. minus
Grasses, herbs, others	
Cottongrass	Eriophorum spp.
Horsetail	Equisetum spp.
Fireweed	Epilobium angustifolium ssps.
Parsley fern	Cryptogramma crispa var. sitchensis
Marsh fern	Thelpteris phegoteris
Fragile fern	Cystopteris fragilis ssps.
Lichens	
Mosses	
Liverworts	
Mushrooms	
Other fungi	

Source: Alaska Regional Profile, Southcentral

Figure. 17 Species list

High Brush

Shrubs	
Sitka alder	Alnus crispa ssp. sinuata
American green alder	A. crispa ssp. crispa
Thinleaf alder	A. incana ssp. tenuifolia
Devil's club	Echinopanax horridum
Willow	salix spp.
Currant	Vaccinium spp.
Blueberry	Rubus spp.
Raspberry	Shepherdia canadensis
Soapberry	Vaccinium vitis-idaea ssp. minus
Lingonberry	Spirea beauverdiana
Alaska spirea	Rubus parviflorus var. grandiflorus
Thimbleberry	R. spectabilis
Salmonberry	Cornus spp.
Dogwood	
Grasses, herbs, others	
Bluejoint	Calamagrostis spp.
Fescue	Festuca spp.
Yarrow	Achillea spp.
Lupine	Lupinus spp.
Jacob's ladder	Polemonium spp.
Horsetail	Equisetum spp.
Fireweed	Epilobium angustifolium ssps.
Parsley fern	Cryptogramma crispa var. sitchensis
Marsh fern	Thelpteris phegopteris
Lady fern	Athyrium filix-femina
Fragile fern	Cystopteris fragilis ssps.
Lichens	
Mosses	

Source: Alaska Regional Profile, Southcentral

Low Brush Bog and Muskeg

Trees	
Western hemlock	Tsuga heterophylla
Alaska cedar	Chamaecyparis nootkatensis
Black spruce	Picea mariana
Shrubs	
Labrador tea	Ledum palustre ssp. groenlandicum
Bog cranberry	Oxycocus microcarpus
Willow	Salix spp.
Crowberry	Empetrum nigrum ssps.
Blueberry	Vaccinium spp.
Resin birch	Betula glandulosa
Dwarf arctic birch	B. nana ssp. exilis
Bog rosemary	Andromeda polifolia
Grasses, herbs, others	
Cottongrass	Eriophorum spp.
Sedges	Carex spp.
Rushes	Juncus spp.
Lichens	
Mosses	
Liverworts	
Mushrooms	
Other fungi	

Source: Alaska Regional Profile, Southcentral

Figure. 18 Species list

Moist Tundra

Shrubs

Willow	Salix spp.
Dwarf arctic birch	Betula nana ssp. exilis
Labrador tea	Ledum palustre ssp. groenlandicum
American green alder	Alnus crispa ssp. crispa
Lapland rosebay	Rhododendron lapponicum
Blueberry	Vaccinium spp.
Lingonberry	V. vitis-idaea ssp. minus

Grasses, herbs, others

Cottongrass	Eriophorum spp.
Polar grass	Arctagrostis latifolia vars. latifolia and arundinacea
Bluejoint	Calamagrostis spp.
Hairgrass	Deschampsia spp.
Fescue	Festuca spp.
Lyme grass	Elymus arenarius
Alpine azalea	Loiseluria procumbens
Mountain avens	Dryas spp.
Bistort	Polygonum spp.
Yarrow	Achillea spp.
Geranium	Geranium spp.
Horsetail	Equisetum spp.
Fireweed	Epilobium angustifdium ssps.
Wood rush	Luzula spp.
Sedges	Carex spp.
Lichens	
Mosses	
Liverworts	
Mushrooms	
Other fungi	

Source: Alaska Regional Profile, Southcentral

Wet Tundra

Shrubs

Willow	Salix spp.
Dwarf arctic birch	Betula nana ssp. exilis
Labrador tea	Ledum palustre ssp. groenlandicum
Shrubby cinquefoil	Potentilla fruticosa
Lingonberry	Vaccinium vitis-idaea ssp. minus
Bog cranberry	Oxycocus microcarpus

Grasses, others

Lyme grass	Elymus arenarius
Pendant grass	Arctophila fulva
Cottongrass	Eriophorum spp.
Bur reed	Sparganium spp.
Mare's tail	Hippuris spp.
Rushes	Juncus spp.
Sedges	Carex spp.
Lichens	
Mosses	
Liverworts	
Lichens	
Mushrooms	
Other fungi	

Source: Alaska Regional Profile, Southcentral

Figure. 19 Species list

Alpine Tundra

Shrubs

Resin birch	Betula glandulosa
Dwarf arctic birch	B. nana ssp. exilis
Arctic willow	Salix arctica ssps.
Crowberry	Empetrum nigrum ssps.
Labrador tea	Ledum palustre ssp. alpinum
Mountain heather	Phyllodoce spp.
Rhododendron	Rhododendron lapponicum
Dwarf blueberry	Vaccinium caespitosum
Alpine blueberry	V. uliginosum ssp. alpinum
Alpine bearberry	ARctostaphylos alpina

Grasses, herbs, others

Mountain avens	Dryas spp.
Moss campion	Silene acaulis ssps.
Arctoc sandwort	Minuartia arctica
Cassiope	Cassiope spp.
Alpine azalea	Loiseuria procumbens
Sedges	Juncus spp.
Lichens	
Mosses	
Misc. fungi	

Source: Alaska Regional Profile, Southcentral

Vegetation (Marine)

Turbid water conditions found in the northern portions of the study area generally inhibit the growth of larger marine plants. Kelps, eelgrass and the larger red and green algaes fail to prosper where light is unable to reach the marine substrate. However, some five miles south of Ninilchik turbid water conditions cease and larger marine plants occur. Marine plants have several ecological functions. They are primary producers and thus a source of food for consumers. Root systems in areas of unstable substrate often help to stabilize or reduce erosion. Marine plants also provide shelter for many fish and invertebrates. Kelp beds occur north and south of Anchor Point as shown in Figure 22.

Estuarine vegetation which grows on land but is tolerant of saltwater inundation include alkali grass, arrow grass and several species of sedges and rushes. Figure 21 shows marine flora which is known to occur along the north gulf coast. As the environmental conditions are somewhat similar in Cook Inlet, it may be assumed that such a list for Cook Inlet would be similar.

Figure 20 lists plants which may be found living under estuarine conditions in southcentral Alaska.

Figure 20 Species list

Estuarine

Ditch grass	*Ruppia spiralis*
Horned pondweed	Zanichellia palustris
Arrow grass	*Triglochin* spp.
Alkali grass	Puccinellia spp.
Sedges	*Carex* spp.
Rushes	Juncus spp.
Reed bent grass	*Calamagrostis* spp.
Hair grass	Deschampsia spp.
Lyme grass	*Elymus arenarius* ssp. mollis, var. mollis
Yarrow	Achillia spp.
Kamchatka fritillary, Sarana	Fritillaria camschatcensis
Shooting star	Dodecatheon pulchellum spp. superbum
Buttercup	Ranunculus spp.
Beach pea	Lathyrus maritimus ssps.
Indian paintbrush	Castilleja spp.
Marsh fivefinger	Oenanthe sarmentosa Potentilla palustris

Source: Alaska Regional Profile, Southcentral

Figure. 21 Marine Flora Occurring Along the North Gulf Coast

Common Name	Generic Name	Description
Kelps	Family Laminariaceae Genera: Nereocystis Macrocystis	Brown algae Large kelps reach 100' in length found in deep water.
	Alaria	Large, leaf-like kelp reaching 70' in length and 2-6' in width. Common in Alaska.
	Laminaria Cymathaera Egregia Alaria Lessoniopsis Costaria Agarum	Kelps growing on rocks between high and low tide or just below low tide.
Rockweeds	Family Fucaceae Genera: Fucus	Occur between high and low tide and often completely cover rocky beaches.
Red algae	Genera: Gigartina Iridaea Porphyra Prionitis Rhodymenia Callopyllis Dasyopsis	Leaf-like body; live in low tide zone.
Green algae	Genera: Ulva	Sea lettuce; grown between high and low tide.
	Enteromorpha	Slender green algae occuring with or near Ulva.
Eelgrass	Genus: Zostera	Narrow ribbon-like leaves with rootstalks in muddy or sandy bottoms; can completely cover beach when exposed at low tide.
Sea basket grass	Genus: Phyllospadix	Rootstalks cling to rocks in heavy surf and exposed areas.
Saltwort	Genus: Salicornia	Fleshy plants abundant in salt marshes.

Source: Rigg, G. B. 1942 as adapted by BLM/OCS 1976.

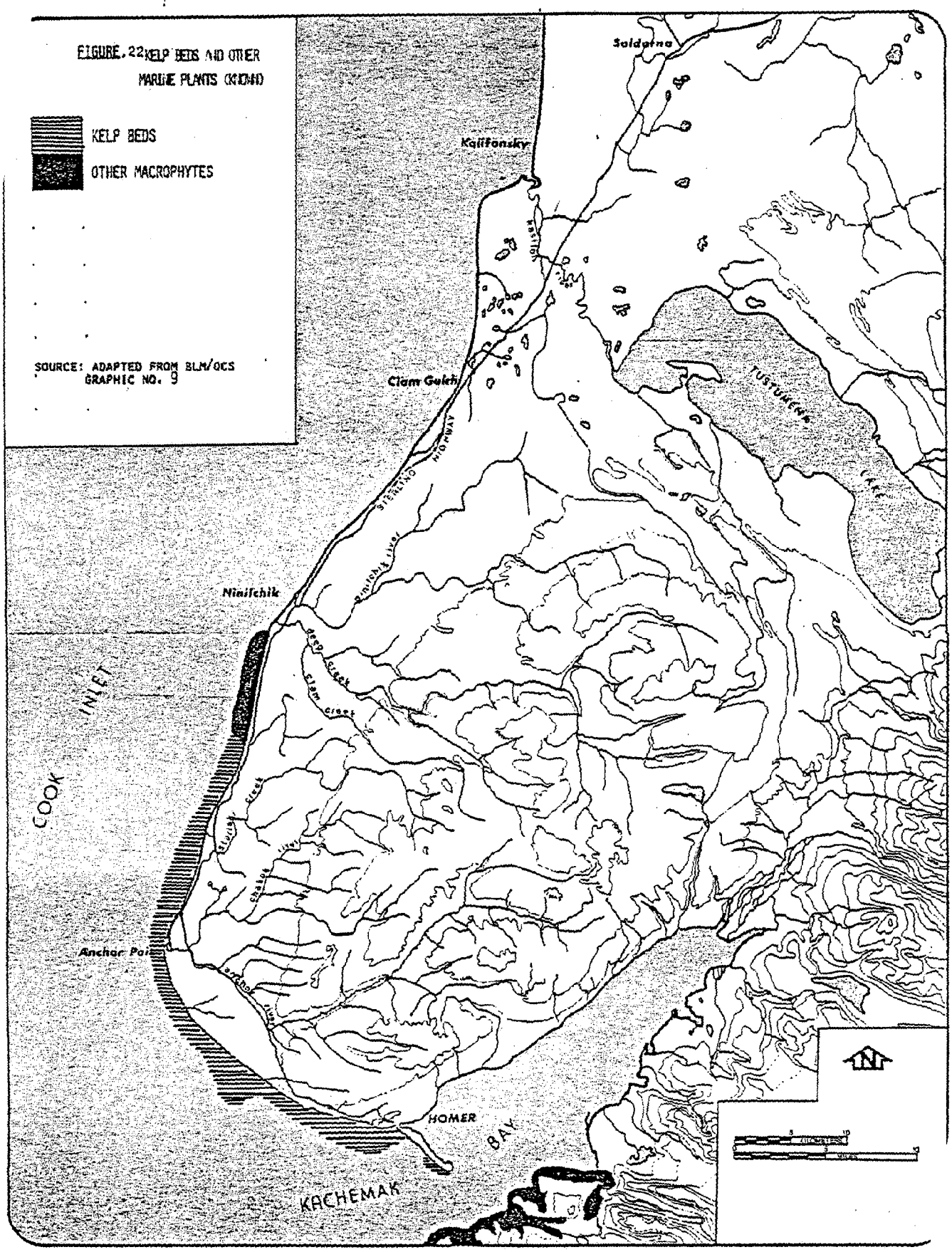


FIGURE. 22 KELP BEDS AND OTHER MARINE PLANTS (KENAI)

Management Implications

1. Vegetation occurring on moist or water laden soil types is most susceptible to foot trampling, off-road vehicle use, or equestrian trampling. The construction of trails in these areas would require a gravel pad or an elevated boardwalk, with the latter being environmentally more preferable. The ideal is to route trails around bog or peat soil/vegetation.

2. Well designed trails can help to prevent random trampling of vegetation.

3. The diversity of vegetation types is more desirable than a single and continuous vegetative community for most recreational activities.

4. Existing vegetation patterns should be considered when designing and locating of facilities. Existing vegetation should be used whenever possible to screen highways or aesthetically unpleasing land uses from recreation activity areas.

5. Thinning or manipulation of vegetative densities may be desirable in some locations for improving viewpoints.

6 The protection of off-shore eelgrass beds and bladder kelp communities is important. Breakwater construction, filling, or intensive boating activities can physically destroy these important marine plants. Probably the most important (economically) fish species associated with eelgrass is the Pacific herring which deposits its eggs on the blades of eelgrass. Aside from the direct harvest of herring, they are also considered to be one of the major fodder animals of the sea, providing food for salmon, waterfowl, sharks, lingcod and sea mammals.

7 Bladder kelp beds, because of their attraction to fish, offer good fishing opportunities. Recreational facilities located in proximity to these beds would be an asset to recreational fishermen.

Mammals (Terrestrial)

Some 38 species of terrestrial mammals have been identified in the Cook Inlet area. The larger mammals to be found in the area include black and brown/grizzly bears, caribou, Dall sheep, moose, wolf (although extremely limited), wolverine, coyotes, wolves, mink, and river otters.

Bears are found during the spring foraging on coastal beaches for carrion, mussels, and crab. During summer periods bears depend on coastal streams where they feed on migrating salmon. Bears also forage on coastal vegetation after emergence from their winter dens. Winter concentrations of moose are found along the Ninilchik River, Anchor River, near Homer Spit and throughout the area around Kasilof, Although population levels have been greatly reduced, caribou are still found in the Kenai-Sterling area as well as the foothills east of Tustemena Lake. Mink, river otter, and wolverine forage along beaches in the inter-tidal zone. The river otter is found both in fresh and salt water where it feeds upon fish, shellfish and birds. Minks are felt to be dependent upon the inter-tidal zone for food, especially during winter months. While wolverines have a much larger range than mink or river otters, they too are part dependent upon the coastal beach

for food. Foxes, wolves and coyotes feed on inter-tidal carrion when available.

Although the present level of development on the Kenai Peninsula has significantly impacted wildlife habitat, these species of terrestrial mammals are still present although they are not as visible and probably occur in lesser numbers.
Figures 23 and 24 show the known ranges of black bear, mountain goat, caribou, and moose.

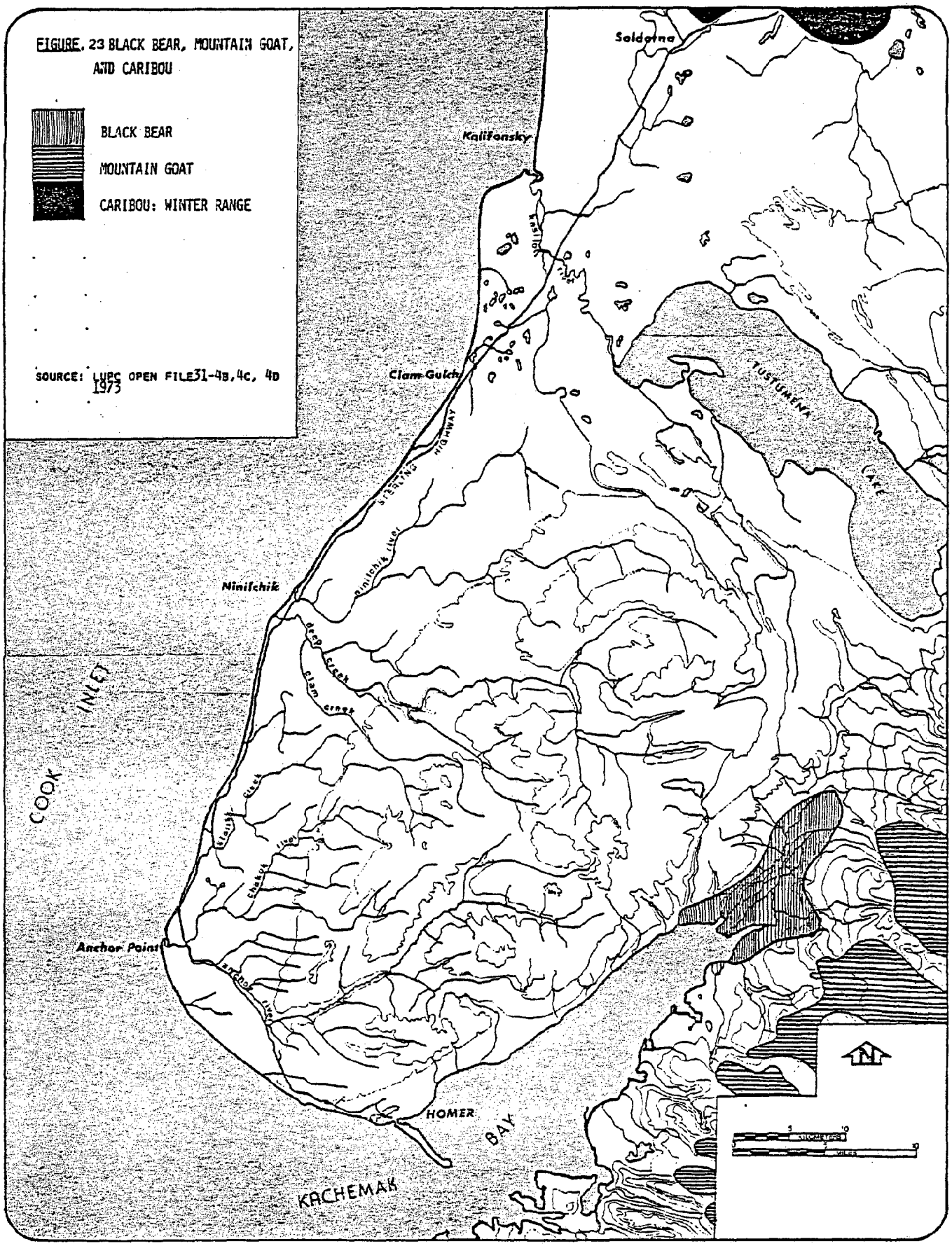


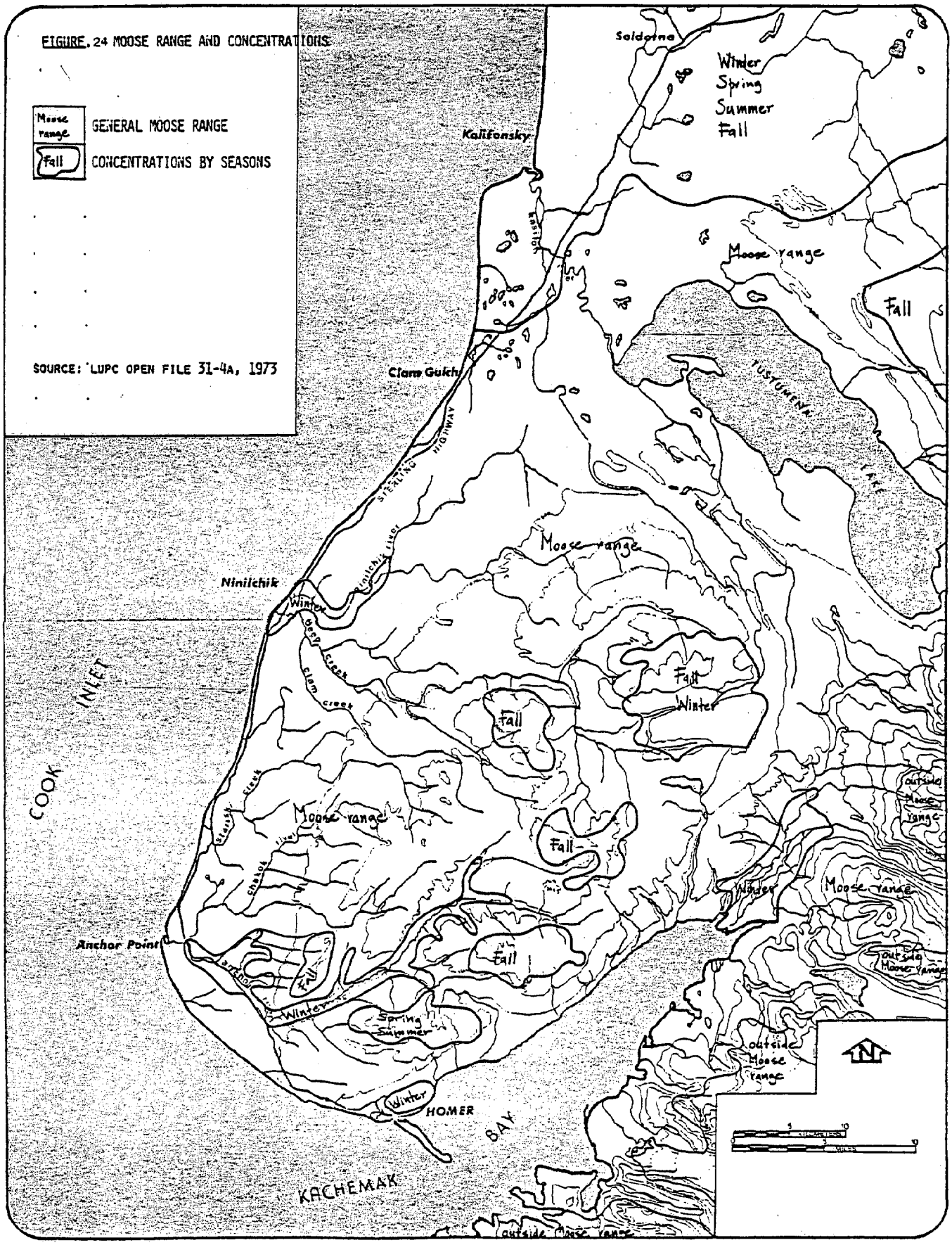
FIGURE. 23 BLACK BEAR, MOUNTAIN GOAT, AND CARIBOU

BLACK BEAR

MOUNTAIN GOAT

CARIBOU: WINTER RANGE

SOURCE: LUEC OPEN FILE 31-4B, 4C, 4D 1973


Moose range
GENERAL MOOSE RANGE
Fall
CONCENTRATIONS BY SEASONS
SOURCE: LUPC OPEN FILE 31-4A, 1973
Soldotna
Winter
Spring
Summer
Fall
Kalifonsky
Moose range
Fall
Clam Gulch
STERLING HIGHWAY
TUSTUMENA LAKE
Moose range
Ninilchik
Winter
Deep Creek
Clam Creek
Fall
Winter
COOK INLET
Fall
Moose range
Stariski Creek
Crooked Creek
outside Moose range
Fall
Winter
Moose range
Anchor Point
Fall
Winter
Spring
Summer
outside Moose range
Winter
HOMER
BAY
KACHEMAK
outside Moose range
N

Managment Implications

1. The management of wildlife for either consumptive or non-consumptive uses should focus on the protection and enhancement of their habitat. Alterations of the landscape may have severe effects upon wildlife populations. Relationships of animals to their environment should be studied in detail prior to facility design and siting decisions.

2. A diversity of vegetation cover should be maintained. It is important that a potential development not be located so as to consume a majority of the area's remaining acreage of one specific vegetation type.

3. Future park acquisitions should consider wildlife habitat values as well as recreational values.

4. Pets should be restricted in those areas where significant wildlife values exists.

5. Smaller, intensely developed park or recreation areas should be closed to the discharge of firearms to insure visitor safety.

Mammals (Marine)

Some eighteen species of marine mammals are known to inhabit the lower Cook Inlet area. The more common species are the sea otter, Stellar sea lion, harbor seal and Beluga whale.

Recovering from near extermination, sea otters are beginning to reappear in the southern portion of the study area as far north as Ninilchik. The present sea otter population near the southern tip of the Kenai Peninsula is approximately 500 to 600. Marine benthic invertebrates including sea urchins, mussels, chitons, crabs, and octopus are their dominant food items. Fish are also taken for food.

Stellar sea lions visit the off-shore waters occasionally, although no hauling grounds are located in the study area. However, hauling grounds are located at English Bay, Elizabeth Island, and Augustine Rocks, as well as the Barren Islands. These sites serve as a base for sea lions which occasionally visit the area. Sea lions feed on a wide variety of fish and benthic invertebrates.

Harbor seals range widely throughout Cook Inlet. River mouths

are used for haul-out, pupping, and foraging. Fish and crustaceans comprise the seal's diet. Beluga whales occur throughout Cook Inlet, with an estimated summer population of 300 to 500 individuals. Fish, crustaceans and squid are the primary components of the Beluga whale's diet. Killer whales have been observed in Kachemak Bay; however, no sightings have been made north of this area. Feeding on marine benthic invertebrates and bottom fishes, Dall and harbor porpoises range throughout the lower Cook Inlet area. The ranges of several species of marine mammals are illustrated in Figure 25.

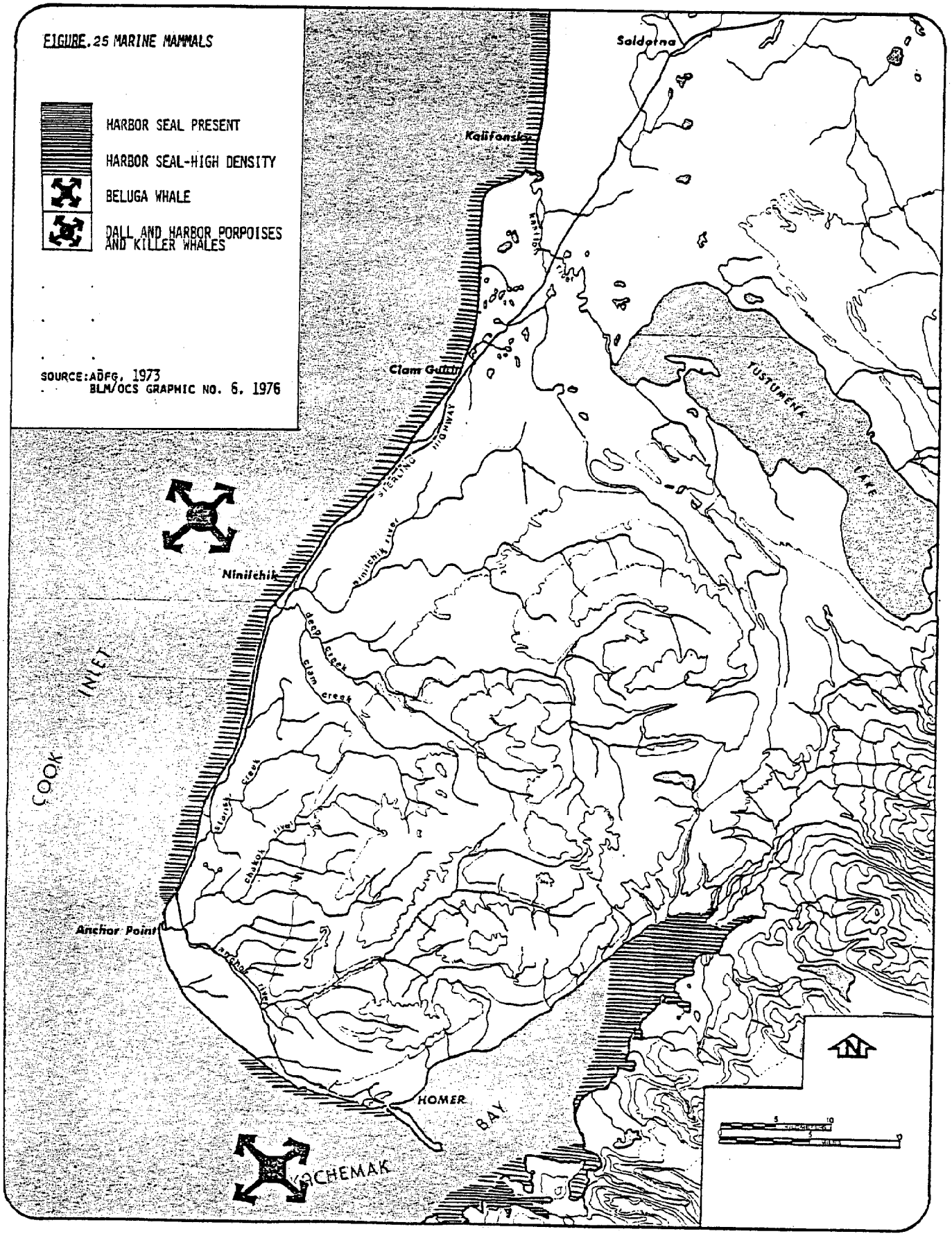


FIGURE. 25 MARINE MAMMALS

Management Implications

1. Observing marine mammals is a unique value in the study area. It should be encouraged in a manner that does not threaten the local condition of these species. Interpretive facilities could be provided to enhance the visitor's understanding of these organisms and their habits.

2. River mouths should be protected from developments or use which may interfere with the activities of harbor seals.

3. The hunting of marine mammals should be discouraged in small park areas along Cook Inlet.

Birds (Marine and Terrestrial)

Approximately 180 species of birds have been identified in the Cook Inlet region. Of these species, about 105 to 110 are regarded as being associated with marine or coastal areas. There is a paucity of data available on birdlife in the study area. However, aerial surveys have been conducted as well as species lists composed for specific sites. One aerial survey conducted off the west shore of the Kenai Peninsula indicated between 10 and 30 birds per square kilometer. Further studies verified this density and showed a decreasing density of birds from the entrance to Lower Cook Inlet moving north. Surveys of the area's coastline are presently being conducted to identify critical coastal bird habitats. Most likely, critical habitat areas include river mouths, coastal wetlands, and off-shore zones of water turbulence.

The study area receives its heaviest bird usage during spring and fall migration and summer breeding and nesting periods. Cook Inlet serves as a flyway for migrating birds moving to and from the interior of Alaska North Slope, and west coast of Alaska breeding grounds. During spring migration Cook Inlet's wetlands are used by over 1.25 million ducks and geese (primarily lesser Canada and Snow) about 25,000 whistling and trumpeter swans,

several thousand cranes, and millions of shorebirds. Fall usage by waterfowl begins in August and peaks in late September. Abundant summer birds include sheerwaters, black-legged kittiwakes, glaucous-winged gulls, puffins, murres, and several species of other waterfowl and shorebirds.

Seabirds, sea ducks and shorebirds generally feed on marine animals such as molluscs, crustaceans, and several species of fish, as well as marine plants. Habitat areas for marine and coastal birds include sea cliffs for nesting, wetlands for nesting and foraging, and upwelling areas for foraging.

Although about 24 seabird colonies have been identified in Lower Cook Inlet, none have been identified in the study area. Kenai River flats and several bays and estuaries in Kachemak Bay have been identified as important coastal wetlands for usage by birds.

Gyrfalcons and golden eagles are known to occupy upland areas in Cook Inlet. Great horned owls, gray great owl and rough-legged hawks are characteristic rapters of the spruce-birch forest in the more northerly portions of Cook Inlet subregion. Shorebirds in the area (as identified in Alaska Regional Profile: Southcentral Region), include American golden and black-bellied plovers; surf birds; ruddy and black turnstones; common snipe; whimbrels;

spotted, solitary, pectoral, Baird's least, semipalmated and western sandpipers; wandering tattlers; greater and lesser yellowlegs; dunlins; shortbilled and longbilled dowitchers; Hudsonian godwits; sanderlings; and northern phalaropes. Other birds include woodpeckers, jays, ravens, chickadees, redpoles, crossbills, water pippits, finches, snowbuntings, longspurs and savanna sparrows. Summer migrants include thrushes, robins, warblers, water threshers, waxwings, swallows, sparrows, junkos, say's, phoebes, and Traill's flycatchers.

Both the American and Arctic peregrine falcon are known to migrate through the area although they are not known to nest in the western Kenai area.

Kachemak Bay is an important nesting and feeding area during spring and fall migration periods.
Figure 26 shows waterfowl habitat areas as well as the locations of known seabird colonies.

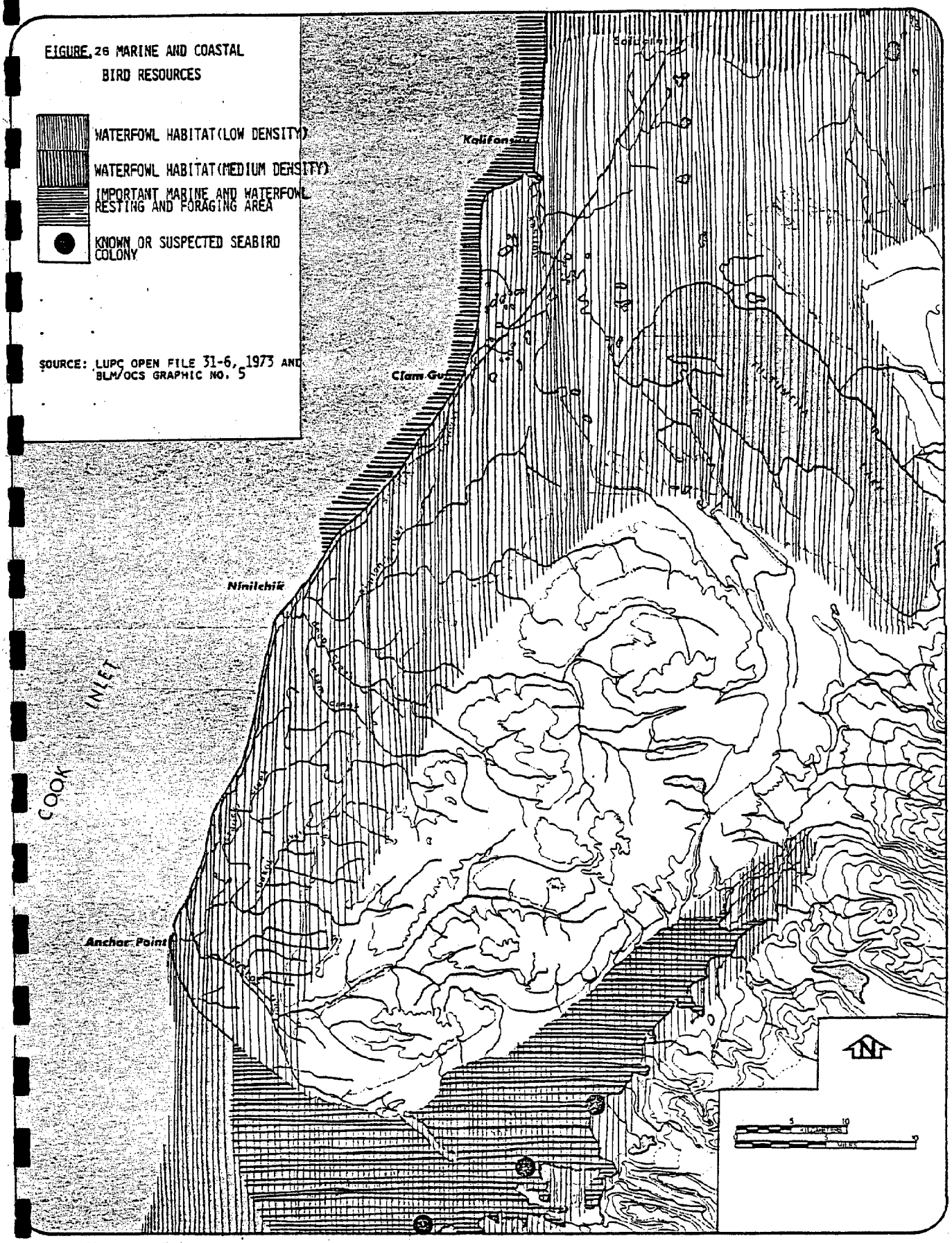


FIGURE 26 MARINE AND COASTAL BIRD RESOURCES

Management Implications

1. As with marine mammals the bird life of the west Kenai area offers excellent opportunities for wildlife observation activities.

2. Since the shoreline zone offers highly favorable edge conditions to wildlife, the management and protection of vegetation immediately adjacent to the shoreline is most critical.

3. Dead snags located within the park areas should remain, if they present no direct threat to visitors, as they provide nesting opportunities for several species of birds.

4. The coastal surveys which are presently being conducted to identify critical coastal bird habitats, should be utilized to identify areas which should be restricted from recreation or non-recreational developments.

4. Estuaries and wetlands, such as those at the mouths of the Kasilof and Anchor rivers and at Deep Creek, should be protected for wildlife habitat.

Fish (Marine/Freshwater)

Pink salmon are the most abundant anadromous species of fish with the greatest numbers arriving to spawn in even numbered years. Sockeye salmon are second in abundance with the greatest populations in the Kenai and Tustemena Lake drainages. Chum and Cohoe salmon are found in most coastal streams. Chinook salmon may be found in Anchor River, and drainages north of this river. Pink and chum salmon may reproduce in intertidal portions as well as fresh water reaches of many streams in the study area. Estuaries and other protected inshore waters host large numbers of young salmon prior to their seaward migration.

Young salmon feed on plankton which is composed of free floating microscopic plant and animal life. Pink, sockeye, and chum salmon continue to eat primarily plankton through their life cycles although they may also eat larger squid and shrimp. Chinook and Cohoe salmon in marine waters feed primarily on herring and other small marine fish as well as some plankton.

Herring spawn in Kachemak Bay. Rather than broadcasting eggs loosely in the water, herring deposit their eggs on solid surfaces; preferring eelgrass, rockweed and seagirdle. Herring occur in

schools of up to 1 million fish or more. Steelhead trout, dolly varden, and eulachons also inhabit the saltwater areas of lower Cook Inlet. Other species found in off-shore Cook Inlet waters include seven species of sculpin; black cod; four species of smelt; skate; ocean perch and rock fish; greenling; lumpfish; eelpouts; pricklebacks; poachers; and four species of codfish; sandfish, twelve members of the right eye flounder family; sand lances; ronquils, lanternfish; and dogfish.

Figures 27 and 28 show areas of both fresh and saltwater fisheries.

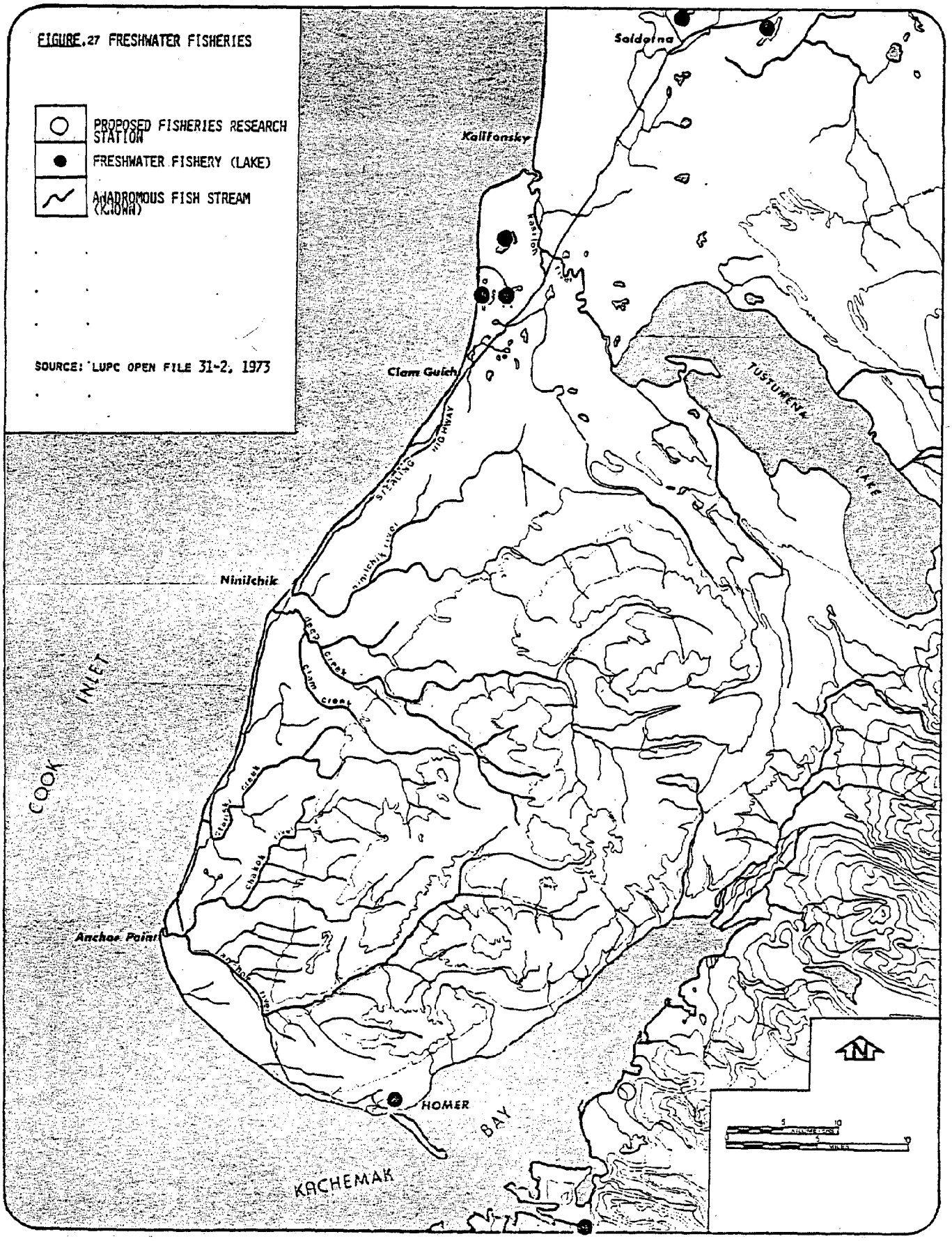


FIGURE 27 FRESHWATER FISHERIES
PROPOSED FISHERIES RESEARCH STATION
FRESHWATER FISHERY (LAKE)
ANADROMOUS FISH STREAM (KNOWN)
SOURCE: LUPC OPEN FILE 31-2, 1973
Soldotna
Kalifonsky
Clam Gulch
Tustumena
Lake
Ninilchik
COOK INLET
Anchor Point
HOMER
BAY
KACHEMAK

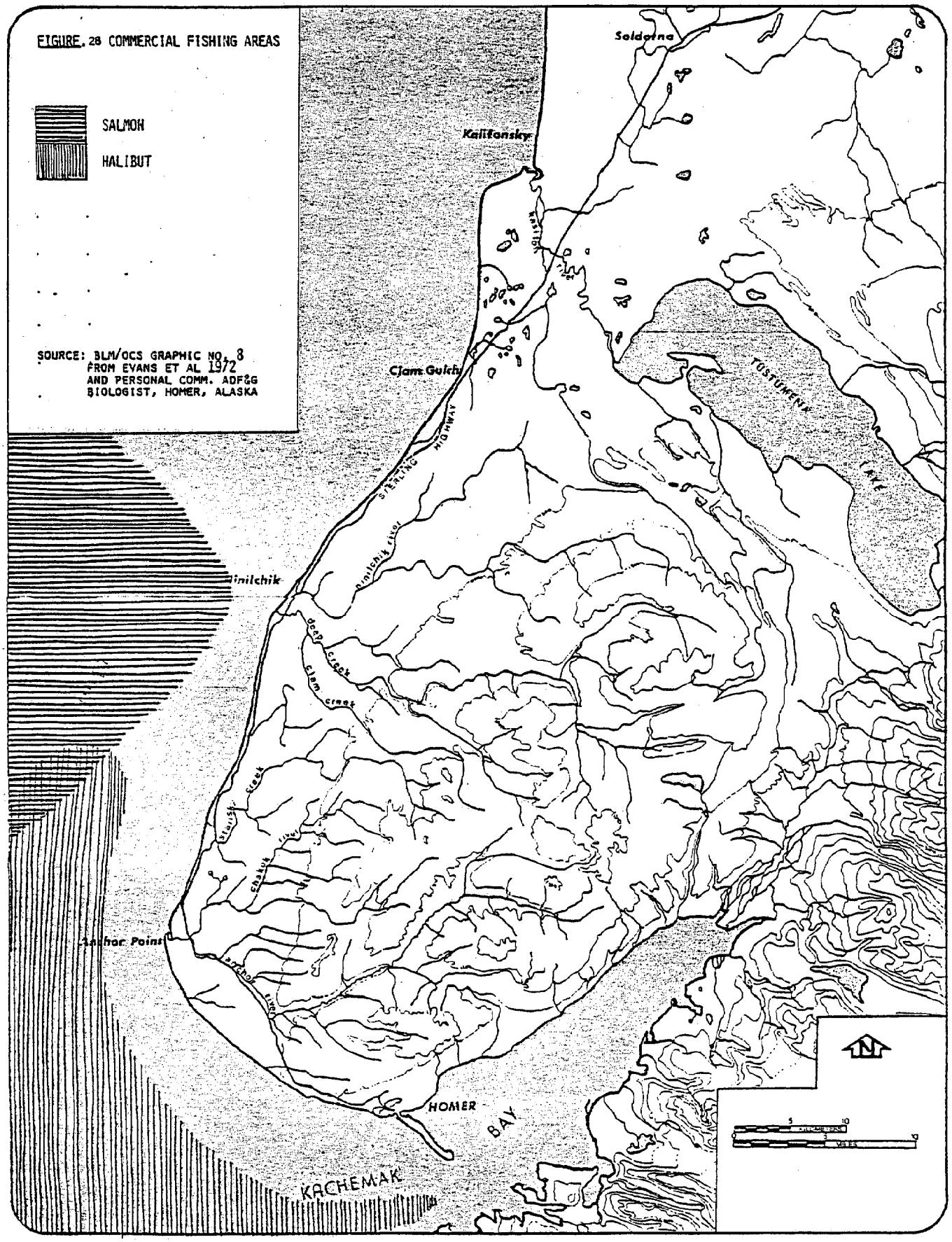


FIGURE 28 COMMERCIAL FISHING AREAS

Management Implications

1. Salmon, as a recreationally and commercially important fish species, should be protected from recreational uses or facilities which may impact their habitat. The siltation of streams through erosion from developments or use of areas poses probably the greatest threat.

2. Recreational fishing for salmon is an important activity on the Kenai Peninsula. There should be areas established for this activity and facilities developed to accomodate the growing number of sport salmon fishermen.

3. Well-designed and located trails along salmon fishing streams should be constructed. However, trails should be planned to avoid concentrating fishing and other activities in areas with limited carrying capacities.

4. Sport fishing regulations should be strictly enforced in park areas to insure the renewability of this important recreational resource.

5. Estuaries should be protected from filling or developments as these areas host large numbers of young salmon prior to their seaward migration.

Benthic Invetebrates

Benthic invertebrates are those animals without backbones which exist in or near the marine substrate. Clams, barnacles, sea pens and numerous species of polychaete worms comprise the filter feeders found in the study area. Snails, brittle stars and sea cucumbers exist in the study area feeding on detritus, or decomposed or decomposing organic matter. Crabs, shrimp, snails and sandfleas are considered scavengers as they feed on carrion or capture their prey alive. King crab are found throughout lower Cook Inlet with their greatest abundance occuring between Augustine and Barren Islands and in and near Kachemak Bay. Snow crab also occur in these areas. However, their abundance is greatest mid-channel between Augustine and Barren Islands. Dungeness crab are distributed in a similar manner; however, they generally occur in shallower waters. Several species of shrimp also occur in the area.

Razor clams occur along the coastline between the Kasilof River and Homer Spit with the greatest abundance between Kasilof Point and four miles south of Clam Gulch. Razor clams in Cook Inlet spawn from mid-July until mid-September. Each female clam two years or older lays six to ten million eggs which are fertilized

in the surf. The eggs hatch into minute floating larvae. After several months, the larvae settle to the sand and begin to form a shell. Exhibiting rapid growth rates, most clams are four inches long by their fourth summer. Razor clams move only vertically and are not capable of lateral movement. Other clams inhabiting the intertidal zone include the littleneck, horse, butter and redneck clams. Generally, clam densities decrease and size increases as one moves south through the study area. Important shellfish areas are illustrated in Figures 29 and 30 .

Scallops have been taken from lower Cook Inlet off-shore waters.

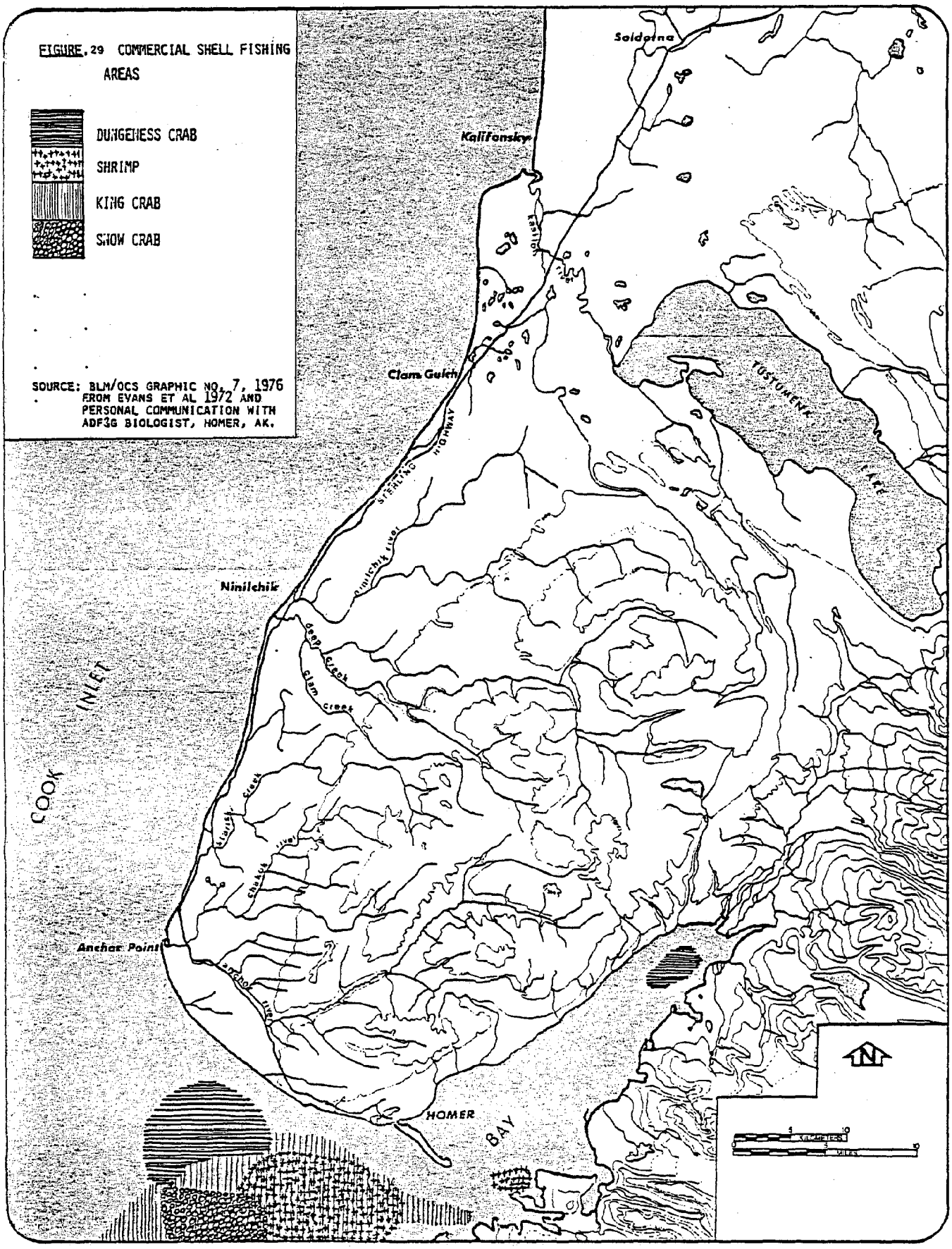


FIGURE 29 COMMERCIAL SHELL FISHING AREAS

DUNGENESS CRAB

SHRIMP

KING CRAB

SNOW CRAB

SOURCE: BLM/OCS GRAPHIC NO. 7, 1976 FROM EVANS ET AL 1972 AND PERSONAL COMMUNICATION WITH ADF3G BIOLOGIST, HOMER, AK.

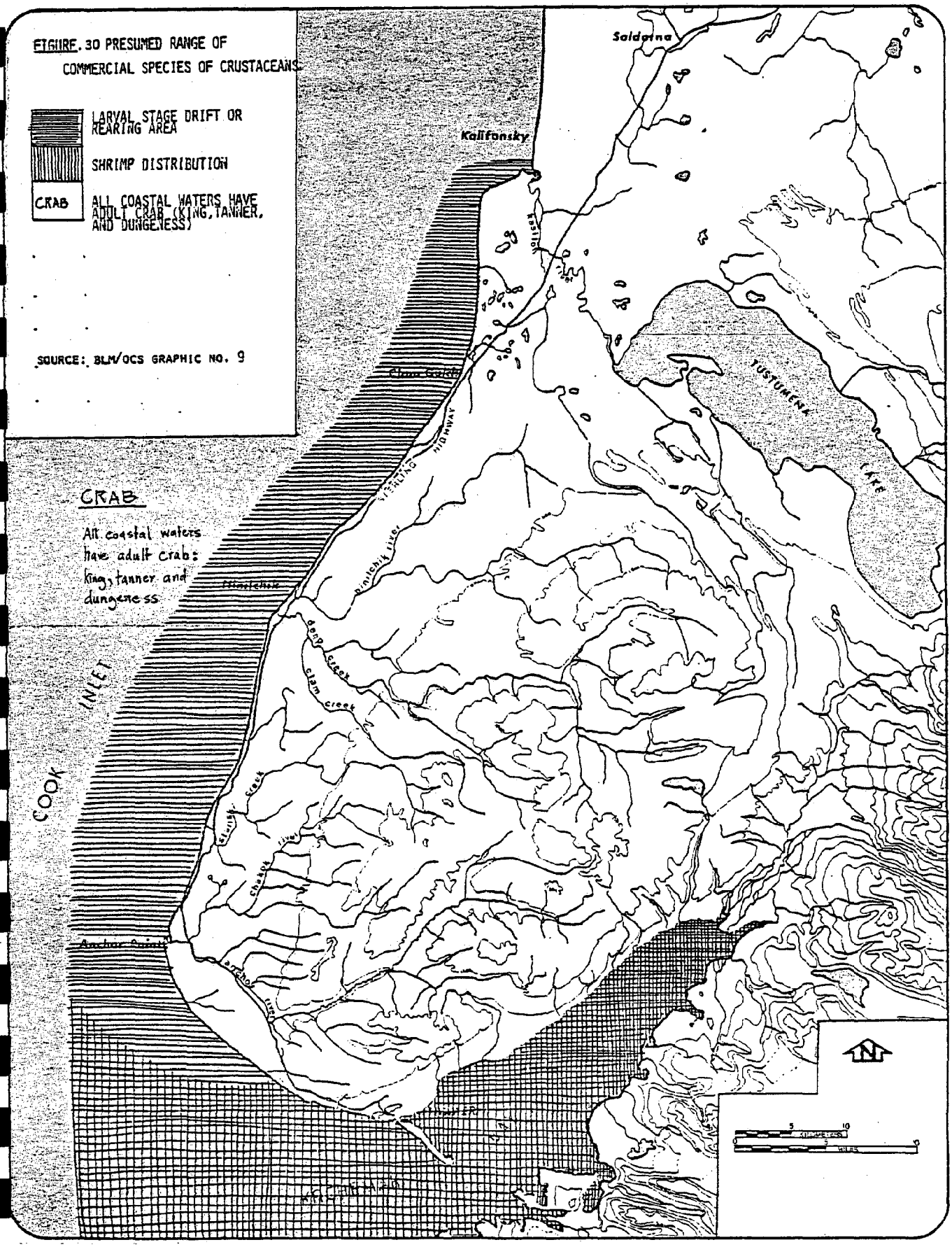


FIGURE. 30 PRESUMED RANGE OF COMMERCIAL SPECIES OF CRUSTACEANS

LARVAL STAGE DRIFT OR REARING AREA

SHRIMP DISTRIBUTION

CRAB — ALL COASTAL WATERS HAVE ADULT CRAB (KING, TANNER, AND DUNGENESS)

SOURCE: BLM/OCS GRAPHIC NO. 9

Management Implications

1. Beaches with large populations of clams offer a valuable recreational resource. However, overharvesting should be avoided through the limiting of facility size and the dispersal of clam diggers through the provision of additional clamming areas.

2. Cooperation between the recreation land management agency responsible for the area and the Alaska Department of Fish and Game to post and enforce bag limits is an important element in the conservation of all marine organisms.

3. Since clams are normally harvested during low or minus tides - which are short in time duration - the result is high concentrations of people in vehicles at public beach access areas, requiring large parking lots, adequate sanitary facilities and litter receptacles. Due to the high cost of low-density campgrounds, and the extreme peak-valley type of use at clam beaches, lower cost but aesthetically pleasing parking lots should be encouraged at popular access points.

3 inventory (sociocultural)

Tradition

Although prehistoric records are unclear, it appears that Pacific Eskimos were the first inhabitants of western Kenai. Research to date shows human habitation of the area extending back in time approximately 3,000 years. It is felt that the archaeological record may extend beyond 6,500 years.

At a time period which is uncertain, the Pacific Eskimos began yielding territory to the Tanaina Athapaskan Indians. It is believed that sometime before the arrival of the Russians in the 18th century the Eskimo culture had receded and the Tanaina held dominance over the west Kenai area.

The existence of numerous shell middens along the coastline suggest that the early peoples were engaged in coastal food gathering. As with present inhabitants of the area, the coastal zone was a prime focus of activity. Presumably, villages were located on the coastline in defensible locations, while fishing and gathering camps were established elsewhere along the coastline. Settlments may have occurred inland; however, archaeologists propose that this is unlikely in view of the more favorable living conditions found along the coast.

Today Pacific Eskimo Natives in the communities of Port Graham and English Bay continue a coastal oriented subsistence lifestyle. Throughout the Eskimo, Tanaina, Russian, and American periods of habitation, the coastal zone has remained a focal point of activity.

Figure 31 shows the present day location of salmon fishing subsistence areas and communities which are composed primarily of native people.

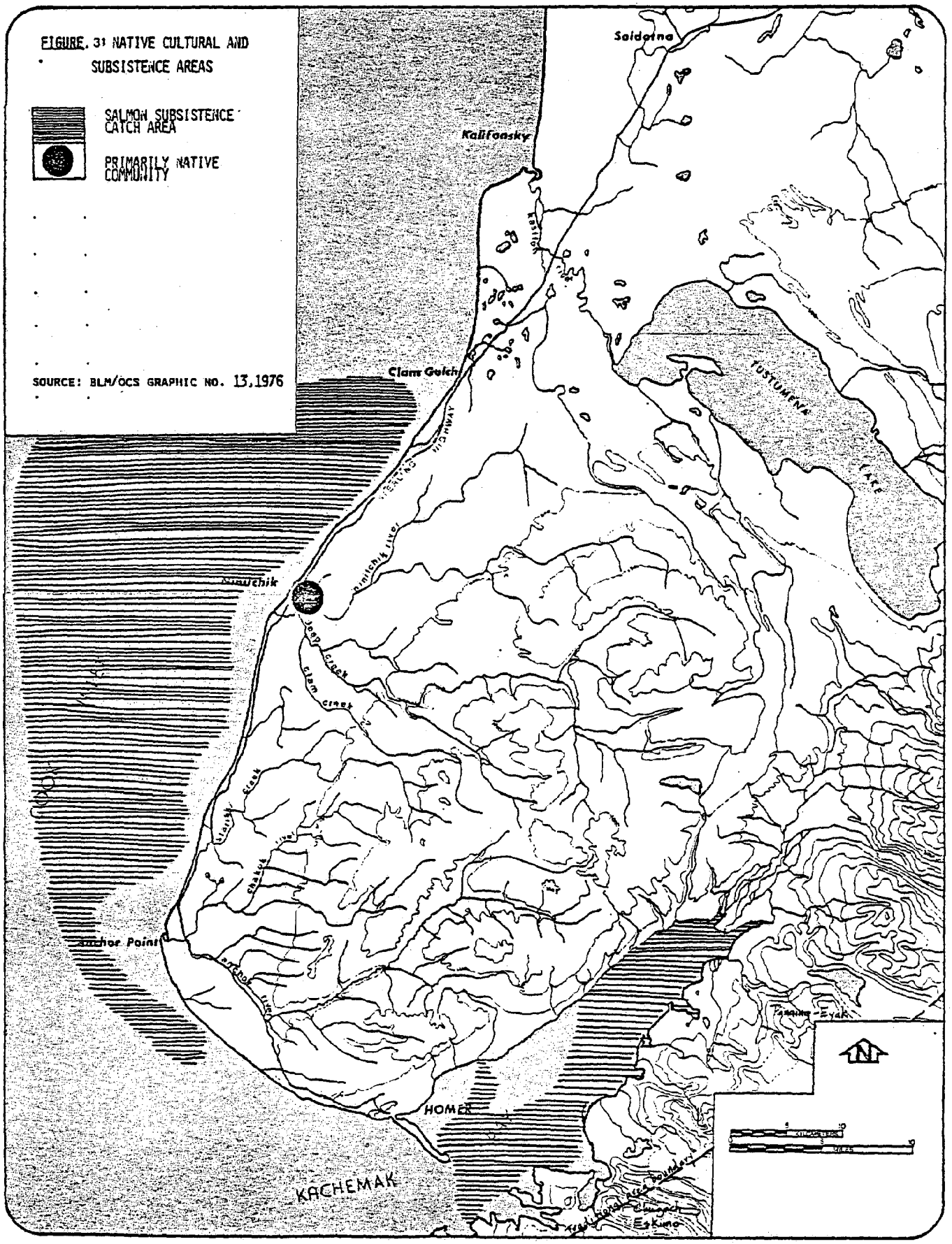


FIGURE. 31 NATIVE CULTURAL AND SUBSISTENCE AREAS
SALMON SUBSISTENCE CATCH AREA
PRIMARILY NATIVE COMMUNITY
SOURCE: BLM/OCS GRAPHIC NO. 13,1976
Soldotna
Kalifonsky
Clam Gulch
TUSTUMENA LAKE
Kasilof
Anchor Point
HOMER
KACHEMAK
Eskimo

Management Implications

1. Park interpretive programs should, in part, focus on prehistoric and historic activities in the area. A possible aim for such an interpretive program would be the coastal orientation of early inhabitants in the area. Additional emphasis could be placed on the use of coastal areas during both the Russian and American development periods.

2. Archaeological surveys should be conducted prior to any recreation area development or redevelopment.

Change

Cultural change stimulated by various factors in a group's environment are important in any discussion of culture. Cultures are never static, they are always changing at varying rates of speed. As the Native culture was once altered by the influence of Russian activities, today's culture will be influenced by large scale oil and gas development in the area. The first known major cultural change in the area was the displacement of Pacific Eskimos by Tanaina Athapaskan Indians.

The arrival of Russian explorers and the ensuing fur trading activity in the 18th century greatly altered the Native culture. As the Russians established trading posts, Native communities were soon to relocate near these trading posts and experienced both material (tools and weapons) and spiritual (the Russian Orthodox Church) changes in their culture. The American influence furthered this cultural change and formally instilled western culture in the midst of Native groups. Although superficially, the Native lifestyle today would appear to have adopted western values. However, subsistence fishing remains a primary pursuit which supports a seasonal lifestyle. Recent testimony at OCS development hearings suggests that Natives of English Bay and Port Graham are extremely concerned over the possible impacts of oil development on their subsistence lifestyle.

Management Implications

1. The effects of an influx of tourists due to recreation area designations and developments can have a profound effect on an area's culture. Consideration should be given to such effects prior to location and design decisions.

Heritage Resources

Archaeological. As previously mentioned, the earliest known inhabitants of the Cook Inlet Region were Pacific Eskimos. However, Frederica de Laguna mentions in her book, the Archaeology of Cook Inlet, Alaska, that the Pacific Eskimo culture reflects certain Thule culture types and reflects influences from Kamchatka and Japan on one hand and the northwest coast of America on the other. To date, de Laguna's work stands as the most comprehensive yet done in the Cook Inlet area. Although de Laguna's work in the 30's is some of the most in-depth research conducted in Alaska, by her own statement it merely scratches the surface.

To date, fifteen archaeological sites have been identified within the Kenai Study Area. All sites known to date are located along the coastline and, although unlikely, the potential for sites inland is acknowledged by archaeologists. The mouth of the Ninilchik River, Deep Creek and Anchor River provide evidence of past habitation. House pits and shell middens are found in these areas. Likewise, house pits and middens are found on the north shoreline of Kachemak Bay in several locations. The majority of these sites contain the remains of early communities which reflect the Alaska Heritage Resource's theme of "Asia discovers Alaska and the New World". The sub-theme of these sites is maritime

subsistence patterns. Other sites are classified under the Alaska Heritage Resource theme "Later Migrations and Cultural Evolution". A listing of sites found within the area, as well as a discussion of their significance follows the next section on Historic resources. Figure 32 shows the relative locations of these sites.

Historical. Historic resources of the study area focus on early Russian and American resource exploitation. Since 1778, when Captain James Cook first sailed into Cook Inlet, furs, minerals and other natural resources of the area have been the focus of outside interests. In the late 1700's, Russian settlements were established at English Bay and on the mouth of the Kasilof River. The latter, named Fort St. George, is within the study area. Missionaries were brought from Russia in an effort the Christianize the local natives. The process of Christianizing the natives involved the destruction of some native cultural traditions, creating strife between the groups and the death of one priest. A third Russian settlement, at Ninilchik, is still inhabitated by descendents of the Russian period of occupation. The Russian Orthodox Church at Ninilchik attests to the Russian Orthodox influence in the area.

The period of American control began with the breaking up of the monopolistic Russian American Company into competing individual companies. Low fur prices and a depletion of the fur bearing resource resulted in an end to the fur trade economy in 1897. The rise of the coal and gold economy was marked by the founding of the town of Homer in 1895.

Following is a listing of the 24 archaeological and historical

sites listed with the Alaska Heritage Resource Survey. By no means is this list a complete listing of all heritage sites in the study area. This list is merely composed of those sites which have been identified through the Heritage Resource Survey.

Heritage Sites

Kenai #1 Theme 2-D. Two storage pits have been located at this site on Kalifonsky beach. Excavation of one of these pits failed to yield information indicating human activity.

Kenai Site #2. Theme 2-D. A single storage pit was found at this site; however, excavation produced no evidence of human activity.

Kenai Site #14. Theme 3A5. Old Village of Kalifonsky. Five house pits have been located. Excavations have yielded small bits of iron and bone. This site was used by Tanaina Indians and was abandoned in 1927.

Kenai Site #30. Theme 3A4. Kasilof Aboriginal Village. In 1937 a village was unearthed here and was thought to be of Eskimo origins. In 1786 the Lebedel-Lastochkin Company built a small post here consisting of two log cabins surrounded by a stockade. A Tanaina Indian settlement was developed around this stockade.

Kenai Site #31. Theme A5. Old Russian Schoolhouse at Ninilchik. The schoolhouse is a small log structure which was reportedly used during the Russian era. This facility also served as one of the first territorial schools.

Kenai Site #32. Theme 4A. Old Ninilchik Village. Though still inhabitated by descendents of the original villagers, this village was originally established by the Russian-American Company for its employees. Several of the original buildings remain today.

Kenai Site #39. Theme 4A. St. George. Established as a fur trading post, 37 foundations remain as well as several house pits.

Kenai Site #41. Theme 5C3. Ninilchik Post. No information available.

Kenai Site #44. Theme 5. One standing log structure constructed in 1900 is present. Significance has not been determined.

Kenai Site #45. Theme 2D. Three middens are present at this site as well as numerous pits and depressions. No artifacts are discovered although the site appears to hold great potential.

Kenai Site #46. Theme 4A. Transfiguration of Our Lord Chapel. A small totally wood structure built by the residents of Ninilchik during the early 1890's or 1900's. The building is intact and still retains much of its original appearance.

Seldovia Site #2. Theme 2D. McNeil Creek. Excavations by de Laguna in the 1930's revealed material of the Yukon Island's three and four phases.

Seldovia Site #4. Theme 3B. Ksnatchin. This site was a former Tanaina Indian camp or settlement.

Seldovia Site #19. Theme #5. Homer. A presently occupied town which was established in November of 1895 by Homer Dennock. Dennock was a prospector who worked the Cook Inlet area.

Seldovia Site #24. Theme 2D. Cape Starischkof. This site contains the ruins of a two-room house and a shell midden. A barbed bone arrowhear and a slender barbed point were collected at this site by de Laguna in the 1930's.

Seldovia Site #28. Theme 2. Eastland Creek. This site contains five layers of shell midden. The thickness of this layer is approximately five inches. A possible house pit is located at this site.

Seldovia Site #29. Theme 5C. Kilscher Ranch. An authentic Alaskan homestead which dates to the 1940's. This homestead is still owned and operated by the original homesteader.

Seldovia Site #30. Theme 2D. Cottonwood Creek. de Laguna in 1934 partially excavated a house and midden. Materials from this site helped to identify the Kachemak three phase. Evidence suggests Tanaina Indians. This site has been excavated on two occasions by archaeologists, and has yielded artifacts.

Seldovia Site #32. Theme 2D. Diamond Creek. Artifacts have been found on the beach near this site.

Seldovia Site #61. Theme 2D. Barbara Point #1. A thin shell midden is evident at this site; however, no artifacts have been found.

Seldovia Site #77. Theme 2D. Homer Spit #1. Extensive developmental disturbances at this site have spread midden remains over some 800 square feet. No artifacts have been found.

Seldovia Site #78. Theme 2D. Homer Spit #2. Two thin shell middens are present at this site.

Seldovia Site #87. Theme 2D. April Site. A shell midden and two house pits have been located at this site.

Seldovia #88. Theme 2D. Anchor River Cemetery. This site is a cemetery which was originally Indian. However, two Christian missionaries are reportedly buried here from the 1930's. Presently the cemetery consists of five graves.

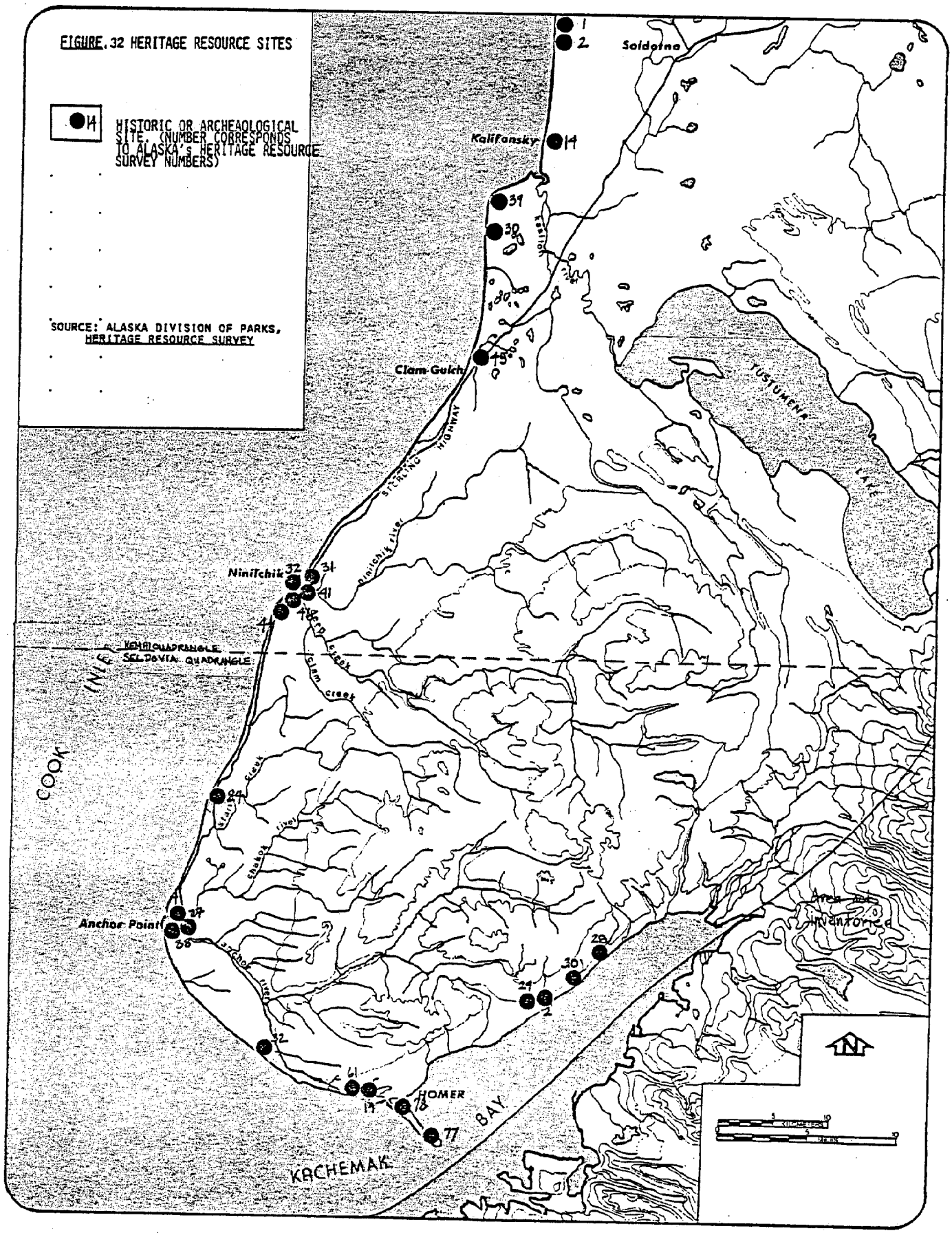


FIGURE. 32 HERITAGE RESOURCE SITES
14 HISTORIC OR ARCHEAOLOGICAL SITE. (NUMBER CORRESPONDS TO ALASKA'S HERITAGE RESOURCE SURVEY NUMBERS)
SOURCE: ALASKA DIVISION OF PARKS, HERITAGE RESOURCE SURVEY
Soldotna
Kalifansky
Clam Gulch
STERLING HIGHWAY
TUSTUMENA LAKE
Ninilchik
KENAI QUADRANGLE
SELDOVIA QUADRANGLE
COOK INLET
Anchor Point
HOMER
KACHEMAK BAY
Area of Inventory

Management Implications

1. The protection of historic and archaeological sites is a prime responsibility of park managers. Vandalism of such sites is an increasing problem and may in part be related to the level of public knowledge concerning such sites.

2. Lands containing important heritage sites should be acquired. Public access to these sites should only be allowed or encouraged when preservation can be insured.

3. Archaeological and Historical surveys should precede the development of recreational facilities.

Demography

Demographic characteristics of the study area by population centers are as follows:

Kenai

The 1970 population of Kenai was 3,533. However, 1975 estimates indicate a population of 5,200. Of this population, approximately 5% is of Native background. The town of Kenai is the most developed town on the Kenai Peninsula. Its economy is primarily related to oil and gas industry.

Homer

In 1975 the population of Homer was 1,538. The non-white population is 2% or 35 persons. Homer is located at the end of the Sterling Highway and serves as a terminal for the Alaska Marine Highway System to Kodiak. To the east of Homer is the small community of Kachemak. In 1970 the population of Kachemak was 76 persons, of which 16% were Native.

Ninilchik

The 1970 population of Ninilchik was 134, of which 13% were of Native background. Ninilchik still retains many persons of Russian background.

Anchor Point

The 1970 population of Anchor Point was 102 persons.

Soldotna

1975 population projections indicate a total population of 4,000 persons. Located at the center of the Peninsula road system, Soldotna is strongly linked economically to oil development in Kenai.

Nikolaevsk

Nikolaevsk has a 1976 population of 275 residents comprising some 40 families. This group is of Russian origin known as the Russian Old Believers. The community is economically based on fishing and agriculture. The goal of this community is to form a self sufficient lifestyle, free of dependence on modern society.

Clam Gulch

Clam Gulch has a population of 47 persons, while Kasilof has a population of 71. The population of Cohoe is 89.

Figure 33 shows the location of populations identified during the 1970 census.

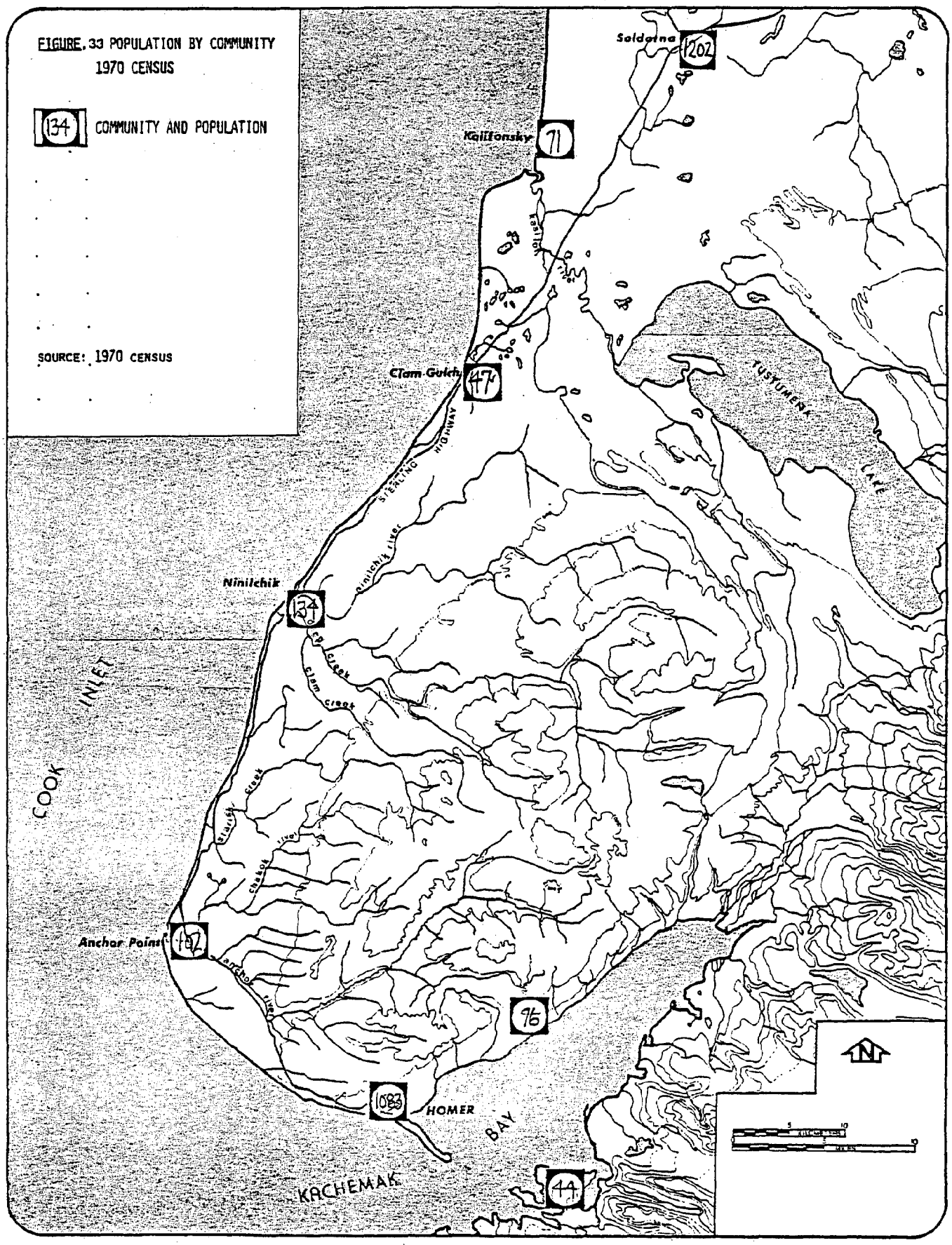


FIGURE. 33 POPULATION BY COMMUNITY
1970 CENSUS
134 COMMUNITY AND POPULATION
SOURCE: 1970 CENSUS
Soldotna
1202
Kalifonsky
71
Kalifonsky Beach
Clam Gulch
47
Tustumena Lake
Sterling Highway
Ninilchik
134
Ninilchik River
Ninilchik
Clam Creek
COOK INLET
Crooked Creek
Chakok River
Anchor Point
187
Anchor River
76
1083
HOMER
KACHEMAK BAY
44
N

Management Implications

1. Local demographic characteristics may be important in the location and design of recreation facilities. However, as a majority of the use of existing recreation facilities on the Kenai is by non-local residents, the influence of local use may be slight. Nonetheless, the needs of local residents must be considered.

Economy

The Kenai-Cook Inlet area has a total labor force of 6,345 persons. With an unemployment rate of 15.6%, the total employment force is 5,375. For 1974, 32% of wages and salaries paid were to government employees; 16% to trades people; 11% to transportation, commerce and public utilities; 17.5% to service, finance, insurance and real estate industries. 16% to the construction industry. The remainder to manufacturing, mining and miscellaneous wage earners.

The petroleum industry is emerging as one of the largest private sector industries in the area. Oil and gas development in the Kenai and Swanson River fields as well as off-shore Cook Inlet drilling and production has spurred rapid growth in the town of Kenai. Since 1972, however, oil production in the Cook Inlet basin has declined significantly. Yet, gas production is rising and will continue to rise in the future. Overall, oil and gas development tends to have a cyclical effect on both employment and the economy as a whole. During development in 1968, peak employment related to hydrocarbon industries was 2,308. In 1974 this figure dropped to 945 persons. Thus, while the development stage is occuring and facilities are being constructed, numerous job opportunities are available. However, once the production

stage has begun, the low level of labor necessary to operate a facility becomes evident.

Tax revenues from oil and gas industry to local and state governments is significant. In 1975 assets of the oil and gas industry comprised 49% of the assessed valuations of the Kenai Borough. In terms of the state government, state assessed properties in the Kenai Borough in 1977 equaled 57% of the total assess valuation for the area.

Commercial Fisheries. Active fisheries from Anchor Point north focus on salmon and razor clams. The majority of the fishery's production occurs in the Barren Island District, Kamishak Bay District and Southern District near Homer. Harvested in the area are five species of salmon and shrimp, Pacific halibut, Pacific herring, King crab, snow crab, dungeness crab and razor clams. Salmon entering tributaries within the study area support a sport fishery which is valued in excess of two million dollars annually for gross expenditures.

Tourism. As tourism continues to play a large role in the statewide economy, Southcentral Alaska and the Kenai Peninsula receive a large portion of visiting tourists. A recent study by the Department

of Environmental Conservation on the effects of tourism on Alaska coastal communities, shows the economic impact of tourism on the towns of Homer, Kenai and Ninilchik to be heavy. While the effects on Soldotna, Kasilof and Anchor Point are moderate. The economic impact of tourism on the town of Kachemak was rated as slight. The existing Sterling Highway which parallels the coastline in the study area is believed to be a major contributor to this effect. A 1973 study showed almost 2.1 million recreation days on the Kenai Peninsula.

Timber. Timber harvesting is generally economically unimportant and occurs primarily on the eastern shores of the Kenai Peninsula. Harvesting also occurs along the western side of Cook Inlet at Tyonek. No major harvesting operations occur within the study area.

Overall, for the Kenai-Cook Inlet area, employment levels fluctuate seasonally primarily due to variations in the fishing, tourism and construction industries. This fluctuation is from an unemployment low of 10.0% in the summer months to a high of 23.7% during the winter months.

Management Implications

1. Recreational land use designations and management should consider the economic contributions of this activity to the Kenai Peninsula economy.

2. As the towns of Homer, Kenai, and Ninilchik presently receive substantial economic contributions from tourism, it may be desirable to consider increasing the tourism economies of other towns on the Peninsula.

3. Although the designation of park areas removes land from the potential tax base, the revenues lost are generally offset by tourism and increased land values in the area due to park amenities.

Land Status

Construction of the Sterling Highway and subsequent post-World War II homesteading activity, has left a majority of the coastal uplands near the Sterling Highway of the west Kenai area in private ownership. Remaining public lands between the Sterling Highway and the shoreline are shown in Figure 36. Much of the remaining State lands in the area have been selected by the Kenai Peninsula Borough. Conveyance of Borough-selected lands from the State to the Borough is presently being held up and litigation over this issue may occur.

Some parcels of remaining unselected State land occurs in school sections 16 and 36. Other lands are State mental health and State university lands. Recent policy of the Department of Education is to lease their lands at fair market rental value.

Concentrations of public lands occur from the mouth of the Kenai River south past the Kasilof River to Clam Gulch. Between Clam Gulch and Anchor Point, public lands are generally small in acreage and only occur occasionally. Several miles south of Anchor Point occur large parcels of State-owned lands, with a high and actively-eroding bluff. Publicly owned uplands in the vicinity of Homer are almost non-existent. From five or six miles northeast of Homer to the Fox River flood plain occur several relatively large parcels of State and Borough selected lands.

Figure 35 shows the locations of native village corporation land selections in the study area. State and Federal as well as native village withdrawal areas are illustrated in Figure 34. The set of maps begining on page 101 show the status of State lands along the study area coastline.

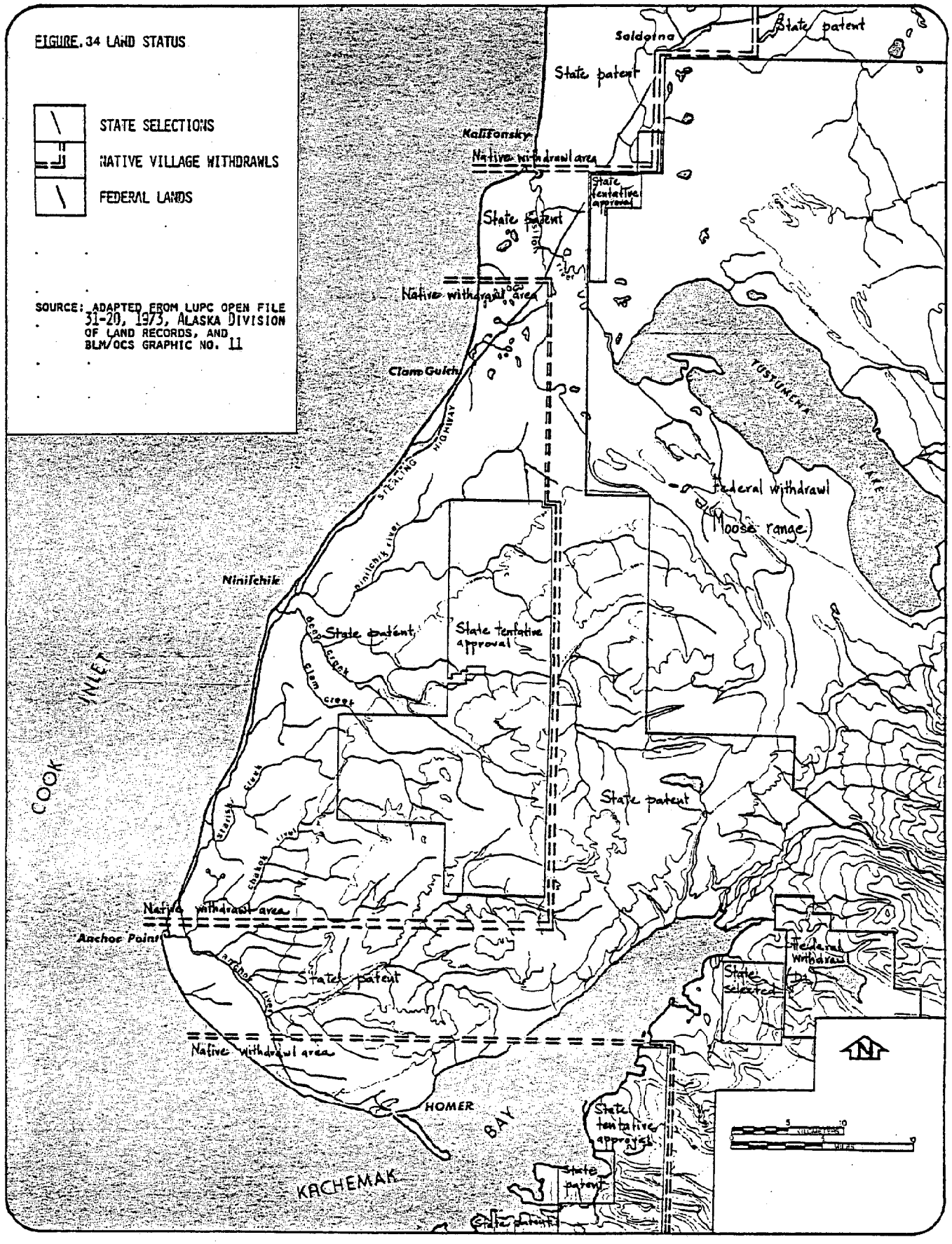


FIGURE. 34 LAND STATUS
STATE SELECTIONS
NATIVE VILLAGE WITHDRAWLS
FEDERAL LANDS
SOURCE: ADAPTED FROM LUPC OPEN FILE 31-20, 1973, ALASKA DIVISION OF LAND RECORDS, AND BLM/OCS GRAPHIC NO. 11
Soldotna
State patent
State patent
Kalifonsky
Native withdrawal area
State tentative approval
State patent
Native withdrawal area
Clam Gulch
STERLING HIGHWAY
TUSTUMENA LAKE
Federal withdrawl (Moose range)
Ninilchik
Ninilchik River
State patent
State tentative approval
Deep Creek
Clam Creek
COOK INLET
Stariski River
Stariski Creek
State patent
Native withdrawal area
Anchor Point
Anchor River
State patent
Native withdrawal area
HOMER
BAY
KACHEMAK
State tentative approval
State patent
State patent
Federal withdrawl
State selected
N
5 KILOMETERS 0
5 MILES 0

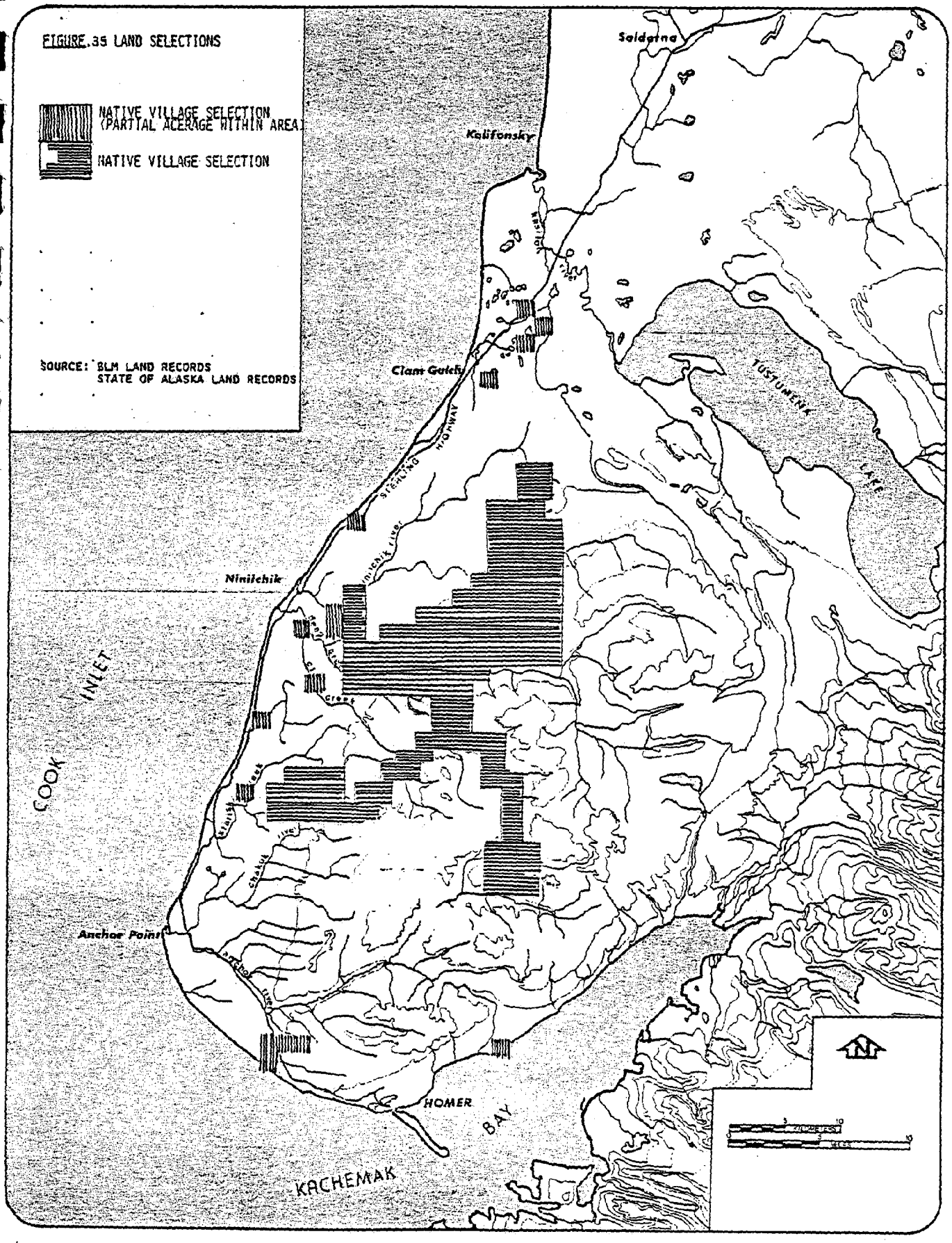
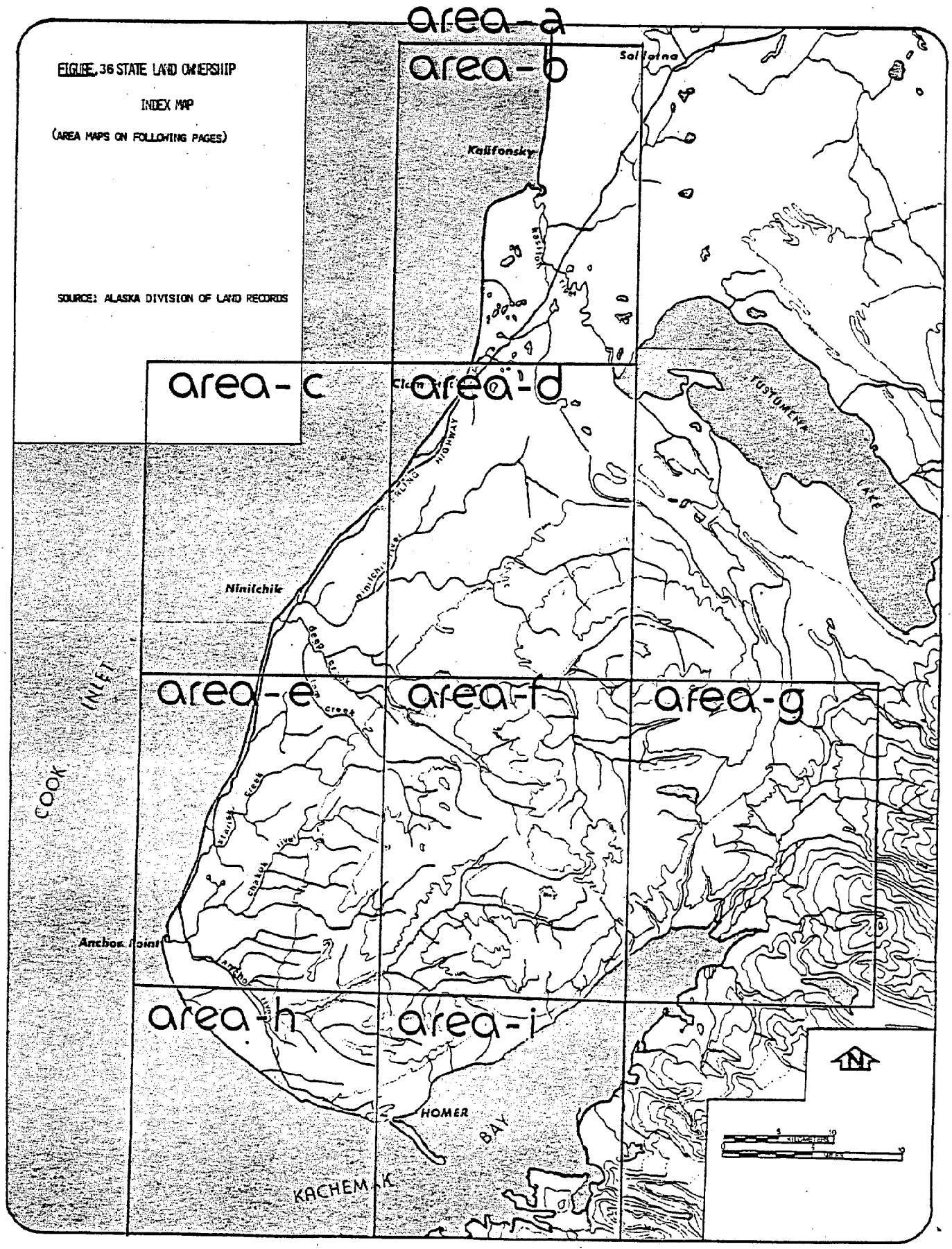
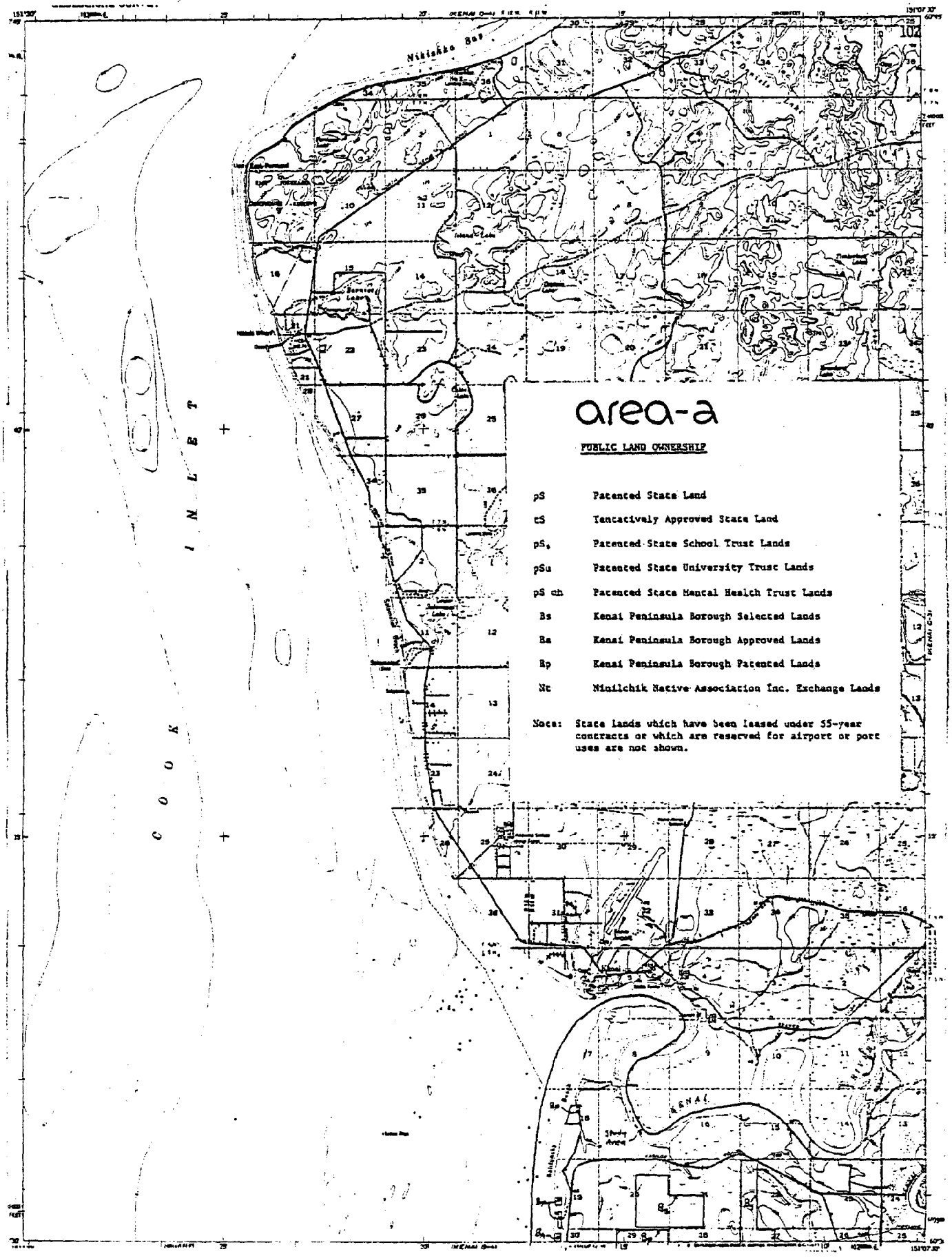


FIGURE 35 LAND SELECTIONS
NATIVE VILLAGE SELECTION (PARTIAL ACERAGE WITHIN AREA)
NATIVE VILLAGE SELECTION
SOURCE: BLM LAND RECORDS
STATE OF ALASKA LAND RECORDS
Soldotna
Kalifonsky
Clam Gulch
TUSTUMENA
LAKE
STERLING HIGHWAY
Ninilchik
COOK INLET
Anchor Point
HOMER
BAY
KACHEMAK


area-a
area-b
area-c
area-d
area-e
area-f
area-g
area-h
area-i
FIGURE 36 STATE LAND OWNERSHIP
INDEX MAP
(AREA MAPS ON FOLLOWING PAGES)
SOURCE: ALASKA DIVISION OF LAND RECORDS
Kalifonsky
Ninilchik
Anchor Point
COOK INLET
HOMER
BAY
KACHEMAK
LAKE
N

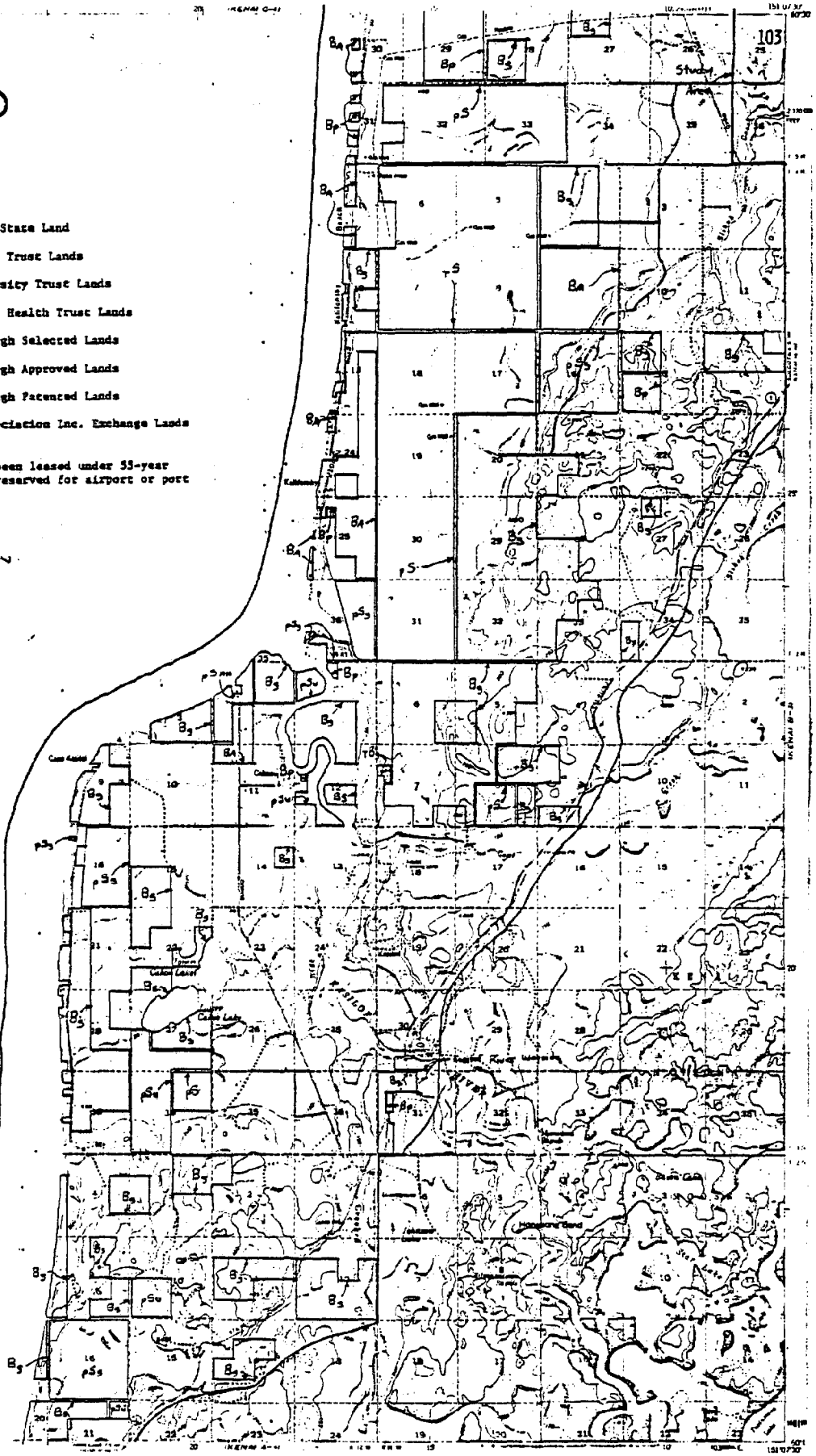

Nikishka Bay
COOK INLET
area-a
PUBLIC LAND OWNERSHIP
pS Patented State Land
tS Tentatively Approved State Land
pS$_s$ Patented State School Trust Lands
pSu Patented State University Trust Lands
pS ch Patented State Mental Health Trust Lands
Bs Kenai Peninsula Borough Selected Lands
Ba Kenai Peninsula Borough Approved Lands
Bp Kenai Peninsula Borough Patented Lands
Nc Ninilchik Native Association Inc. Exchange Lands
Note: State lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.

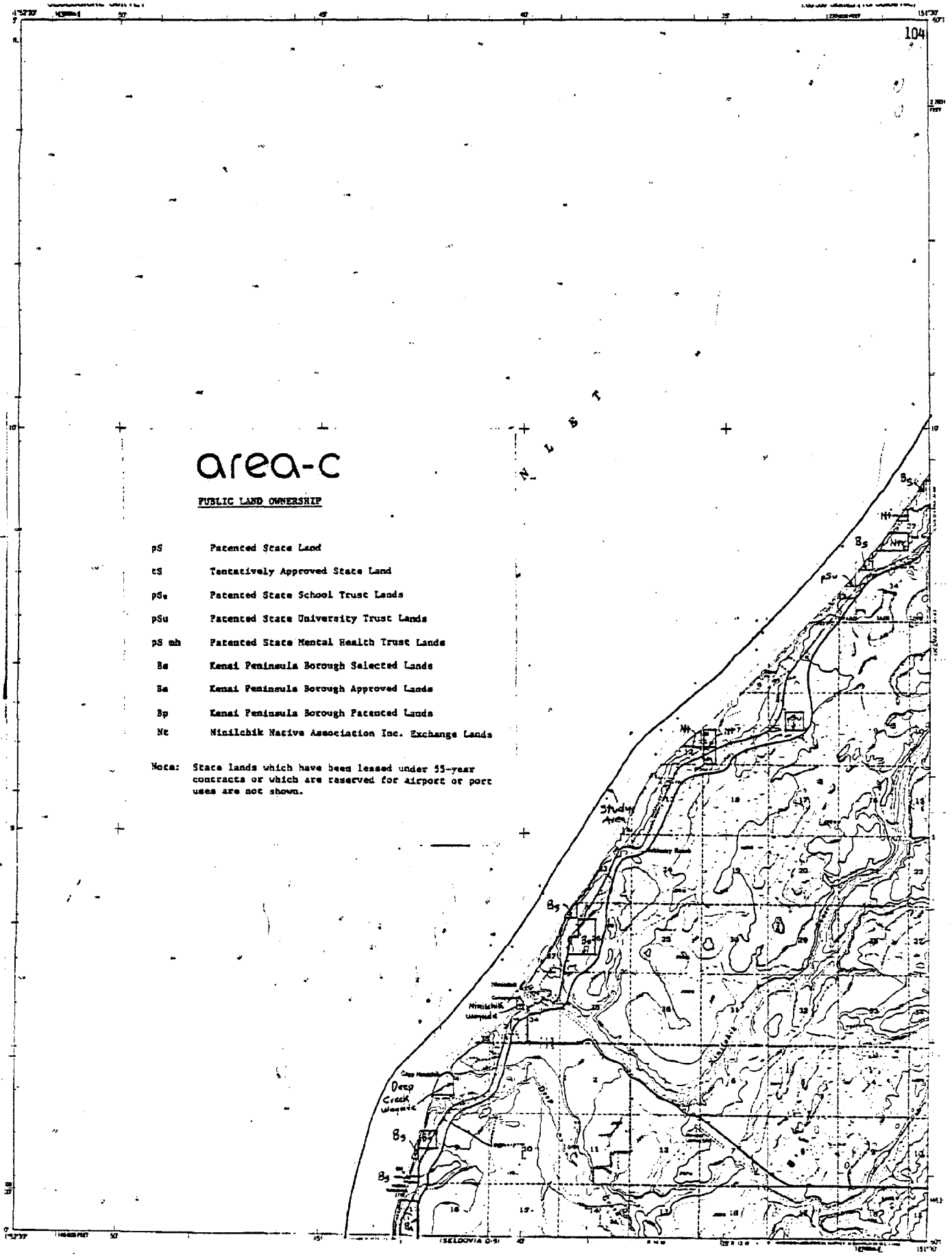
area-b

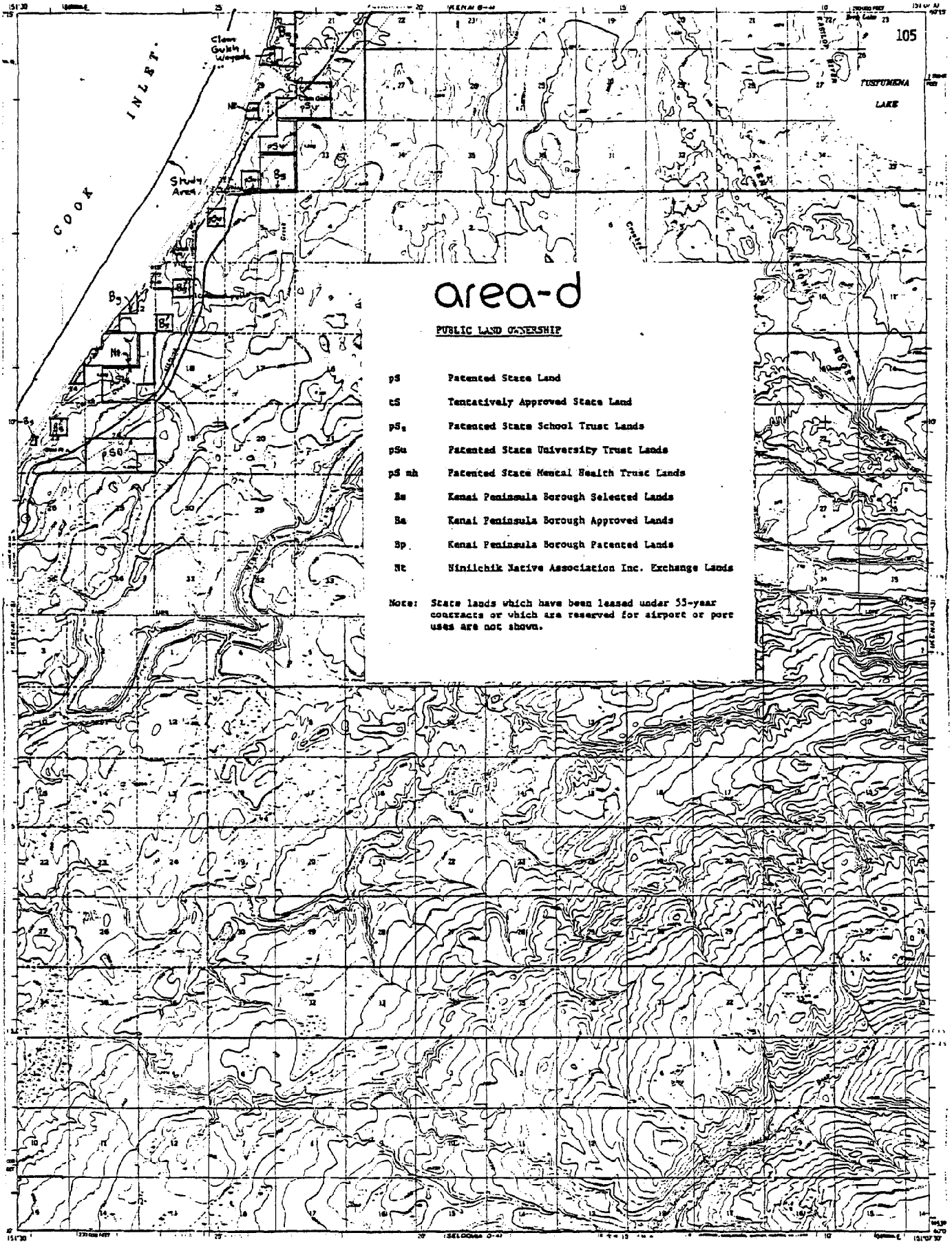
PUBLIC LAND OWNERSHIP

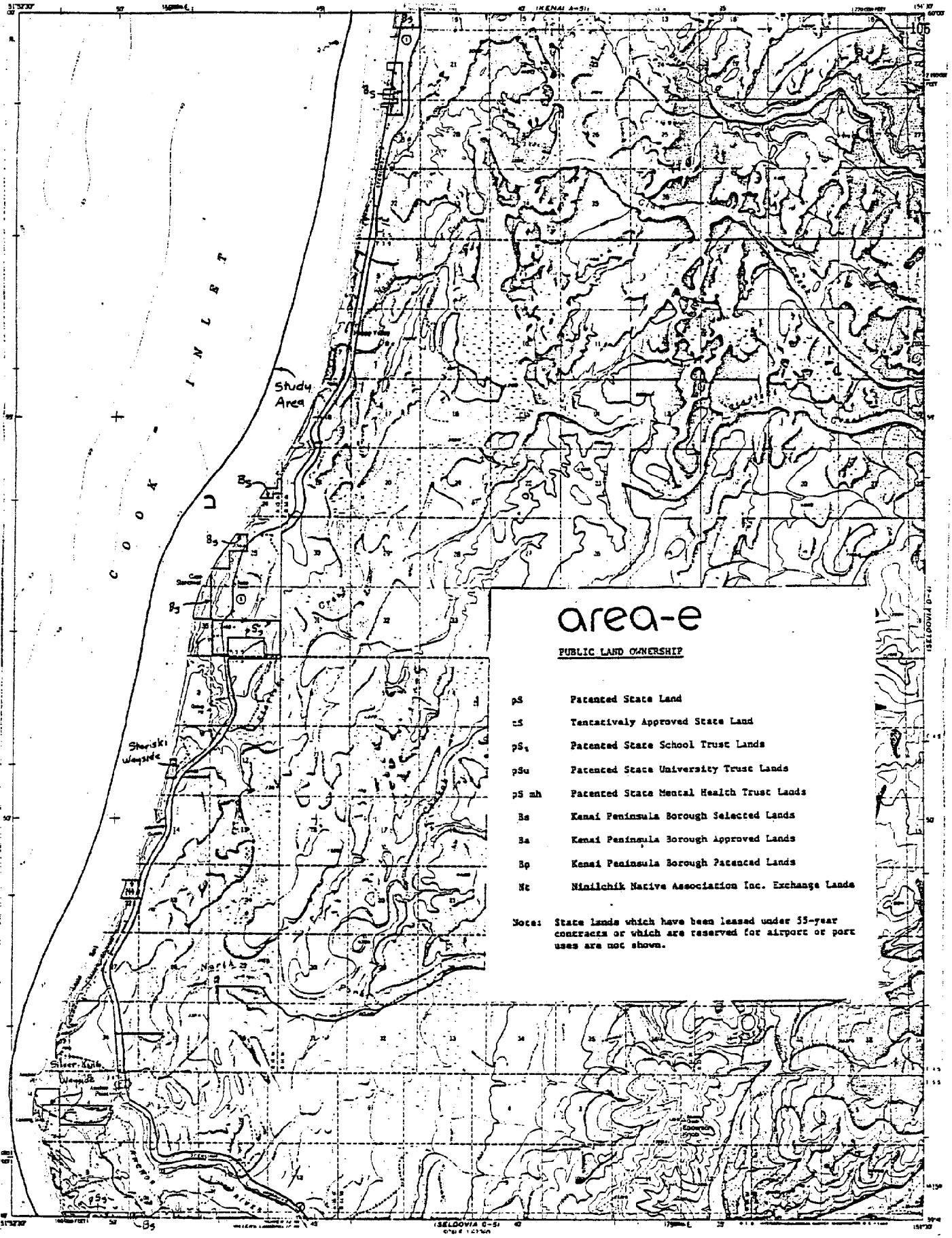
pS	Patented State Land
tS	Tentatively Approved State Land
pSs	Patented State School Trust Lands
pSu	Patented State University Trust Lands
pS mh	Patented State Mental Health Trust Lands
Bs	Kenai Peninsula Borough Selected Lands
Ba	Kenai Peninsula Borough Approved Lands
Bp	Kenai Peninsula Borough Patented Lands
Nt	Ninilchik Native Association Inc. Exchange Lands

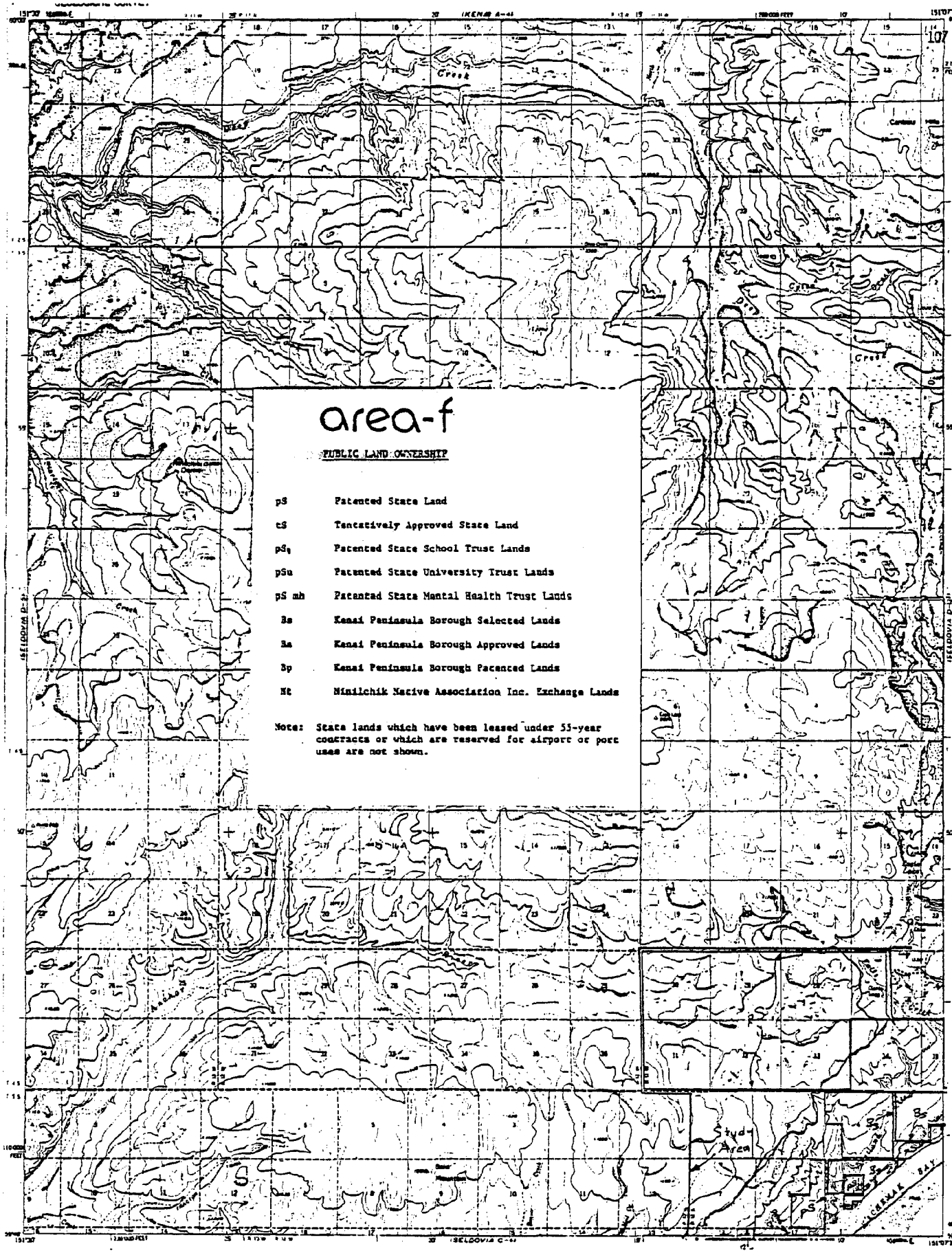
Note: State lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.

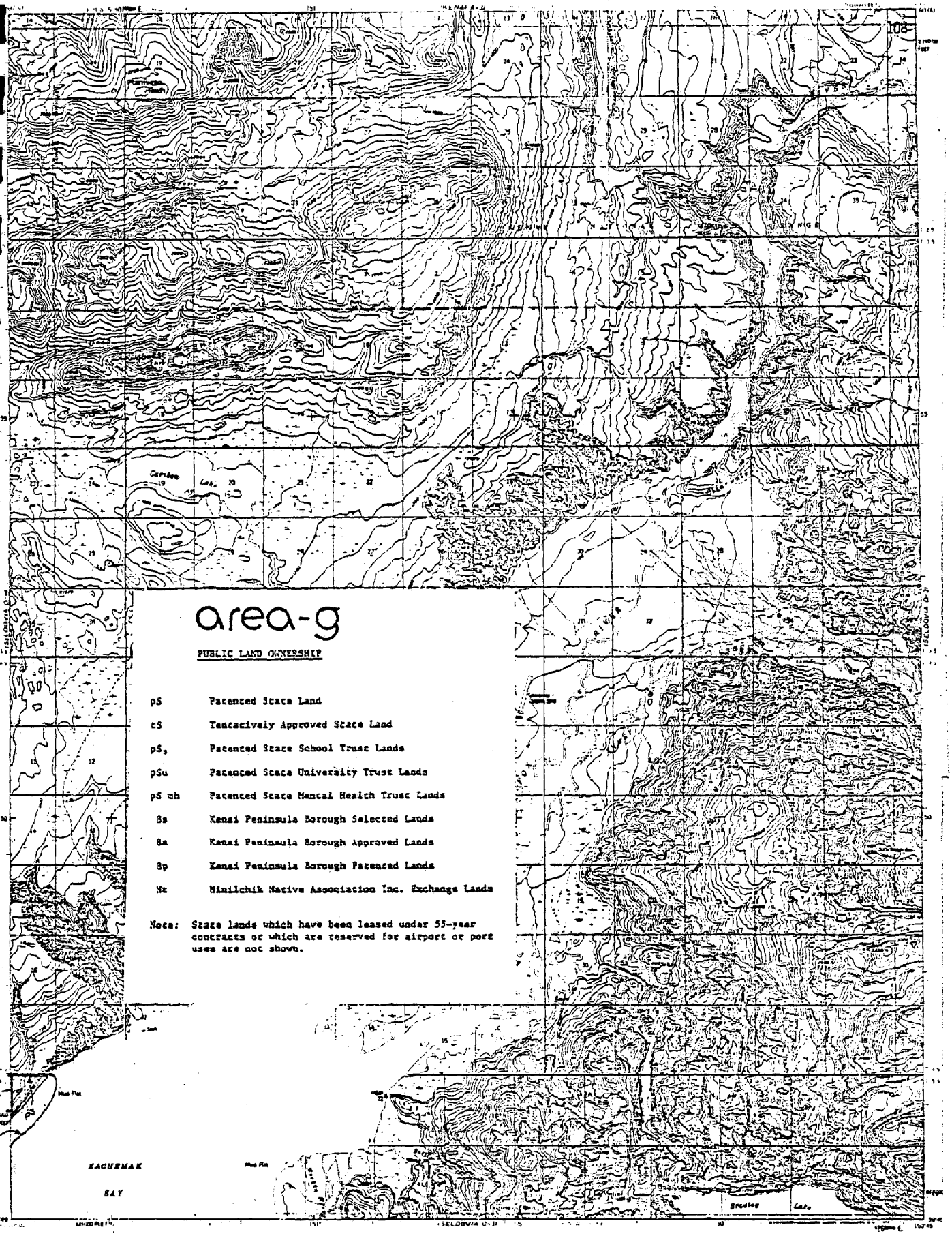


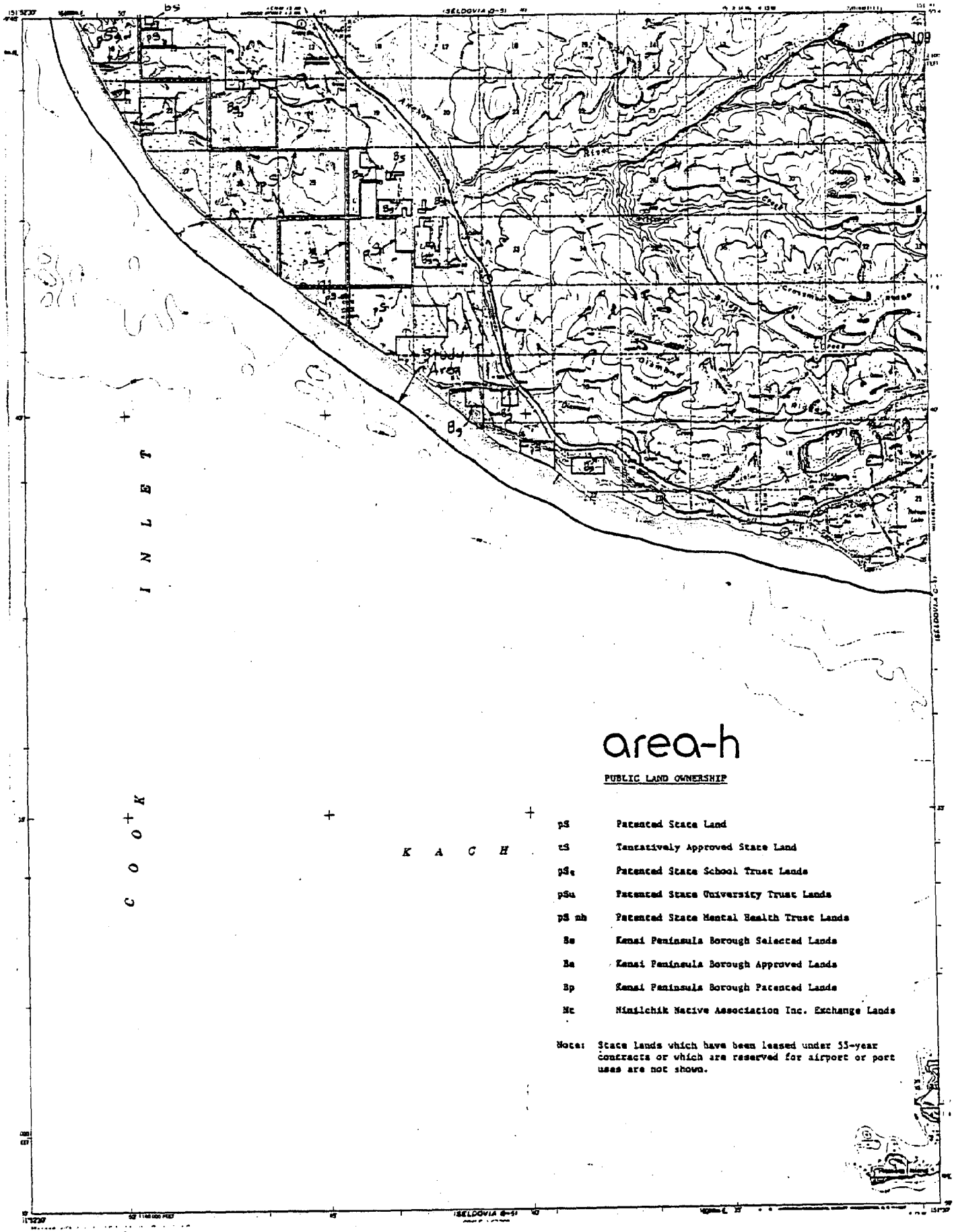

area-c
PUBLIC LAND OWNERSHIP
pS Patented State Land
tS Tentatively Approved State Land
pSs Patented State School Trust Lands
pSu Patented State University Trust Lands
pS mh Patented State Mental Health Trust Lands
Bs Kenai Peninsula Borough Selected Lands
Ba Kenai Peninsula Borough Approved Lands
Bp Kenai Peninsula Borough Patented Lands
Nt Ninilchik Native Association Inc. Exchange Lands
Note: State lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.
Study Area
Deep Creek
Ninilchik


105
COOK INLET
Clam Gulch
Study Area
TUSTUMENA LAKE
area-d
PUBLIC LAND OWNERSHIP
pS Patented State Land
tS Tentatively Approved State Land
pS$_s$ Patented State School Trust Lands
pSu Patented State University Trust Lands
pS mh Patented State Mental Health Trust Lands
Bs Kenai Peninsula Borough Selected Lands
Ba Kenai Peninsula Borough Approved Lands
Bp Kenai Peninsula Borough Patented Lands
Nt Ninilchik Native Association Inc. Exchange Lands
Note: State lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.


COOK INLET
Study Area
Skeiski wayside
Silver Salmon Creek
area-e
PUBLIC LAND OWNERSHIP
pS Patented State Land
tS Tentatively Approved State Land
pSs Patented State School Trust Lands
pSu Patented State University Trust Lands
pS mh Patented State Mental Health Trust Lands
Bs Kenai Peninsula Borough Selected Lands
Ba Kenai Peninsula Borough Approved Lands
Bp Kenai Peninsula Borough Patented Lands
Nt Ninilchik Native Association Inc. Exchange Lands
Note: State lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.


area-f
PUBLIC LAND OWNERSHIP
pS Patented State Land
tS Tentatively Approved State Land
pSs Patented State School Trust Lands
pSu Patented State University Trust Lands
pS mh Patented State Mental Health Trust Lands
Bs Kenai Peninsula Borough Selected Lands
Ba Kenai Peninsula Borough Approved Lands
Bp Kenai Peninsula Borough Patented Lands
Mt Minilchik Native Association Inc. Exchange Lands
Note: State lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.
Study Area
Creek
Bay


area-g
PUBLIC LAND OWNERSHIP
pS Patented State Land
tS Tentatively Approved State Land
pS, Patented State School Trust Lands
pSu Patented State University Trust Lands
pS mh Patented State Mental Health Trust Lands
Bs Kenai Peninsula Borough Selected Lands
Ba Kenai Peninsula Borough Approved Lands
Bp Kenai Peninsula Borough Patented Lands
Nt Ninilchik Native Association Inc. Exchange Lands
Note: State lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.
KACHEMAK
BAY

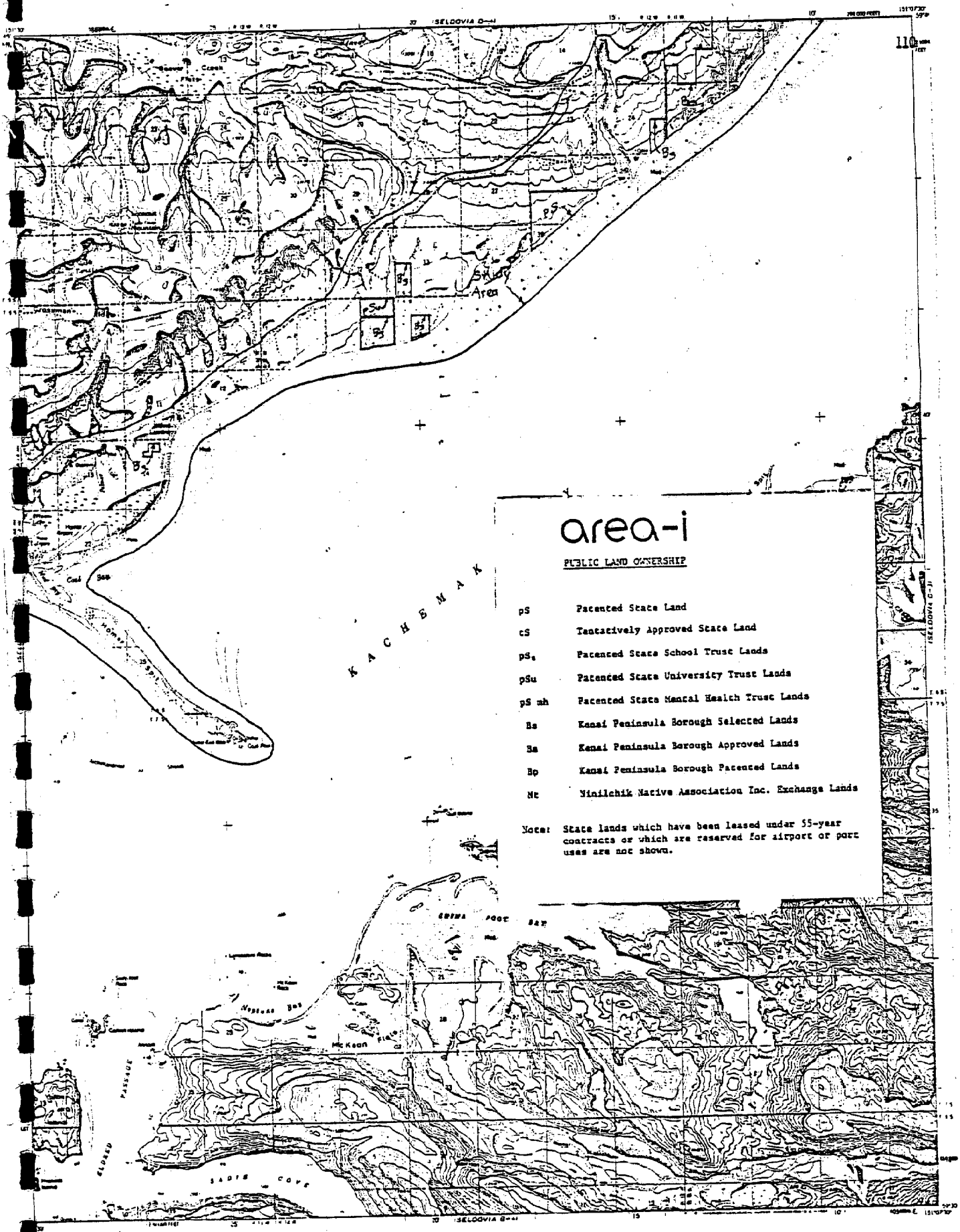


area-h

PUBLIC LAND OWNERSHIP

pS	Patented State Land
tS	Tentatively Approved State Land
pSs	Patented State School Trust Lands
pSu	Patented State University Trust Lands
pS mh	Patented State Mental Health Trust Lands
Bs	Kenai Peninsula Borough Selected Lands
Ba	Kenai Peninsula Borough Approved Lands
Bp	Kenai Peninsula Borough Patented Lands
Nc	Ninilchik Native Association Inc. Exchange Lands

Note: State Lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.


area-i
PUBLIC LAND OWNERSHIP
pS Patented State Land
cS Tentatively Approved State Land
pS$_s$ Patented State School Trust Lands
pSu Patented State University Trust Lands
pS mh Patented State Mental Health Trust Lands
Bs Kenai Peninsula Borough Selected Lands
Ba Kenai Peninsula Borough Approved Lands
Bp Kenai Peninsula Borough Patented Lands
Nt Ninilchik Native Association Inc. Exchange Lands
Note: State lands which have been leased under 55-year contracts or which are reserved for airport or port uses are not shown.
Study Area
KACHEMAK
SELDOVIA

Other Plans/Proposals

The plans and proposals of either public agencies or private interests will have a profound effect on future land use patterns on the Kenai Peninsula. Recreation as a land use will both affect and be affected by these other plans and proposals. Following is a discussion of the plans and proposals by public agencies or private interests which may occur in the study area.

Department of Interior. The Department of the Interior presently proposes to lease 152 off-shore oil and gas tracts in an area of approximately 9 million acres. The estimated recoverable oil and gas resources from this sale are 2.6 billion barrels of oil (maximum) to a minimum of .09 billion barrels. Gas from this field is estimated at 3.3 trillion cubic feet with a minimum estimate of .6 trillion cubic feet. The proposed project would include 84 exploratory wells, 420 development wells, 23 off-shore platforms, 300 miles of pipeline, two on-shore terminals and one liquid natural gas plant and two on-shore treatment plants. These figures are projected by the Department of the Interior utilizing a high-development scenario. Potential sites for support facilities are identified as Kenai, Homer, Port Graham, and English Bay. Potential terminal sites are identified near Port Graham, near Homer, Anchor Point, Nikiski, Cape Douglas, and

FIGURE. 46 POTENTIAL OIL AND GAS FACILITY SITES

POTENTIAL SUPPORT FACILITY SITE

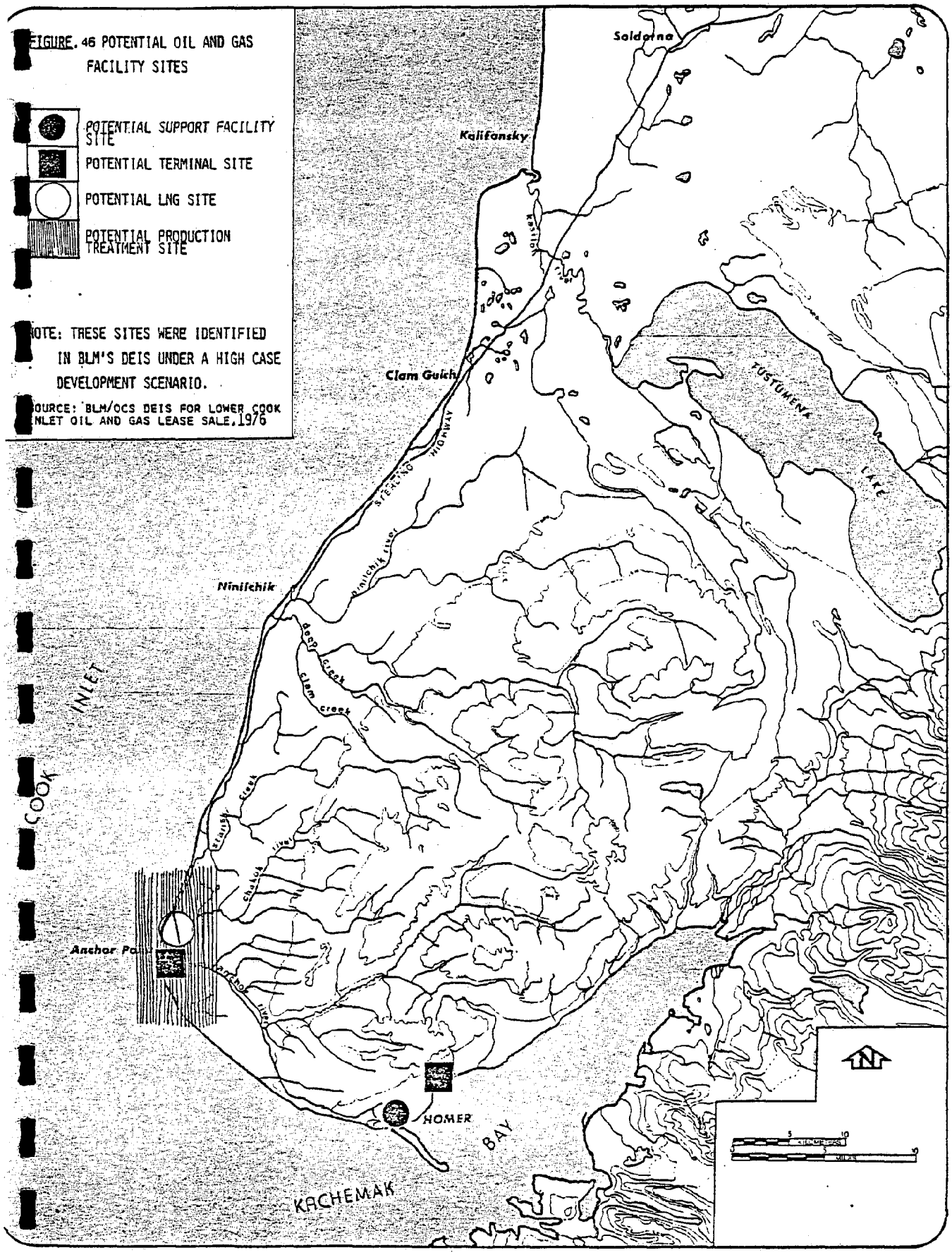
POTENTIAL TERMINAL SITE

POTENTIAL LNG SITE

POTENTIAL PRODUCTION TREATMENT SITE

NOTE: THESE SITES WERE IDENTIFIED IN BLM'S DEIS UNDER A HIGH CASE DEVELOPMENT SCENARIO.

SOURCE: BLM/OCS DEIS FOR LOWER COOK INLET OIL AND GAS LEASE SALE, 1976



near Drift River on the west shore of Cook Inlet. A liquid natural gas plant might be located at Nikiski, Kenai or on the coast north of Anchor River. Potential locations of these facilities within the study area are shown in Figure 46.

Should the lease sale proceed, development activity will begin in the area in 1977. As the majority of the study area's coastline is composed of high bluffs, it is quite possible that oil and gas developments will be competing with parks and other land uses for the low bank and river mouth areas. The mouth of the Anchor River has been identified by the Department of Interior as a possible staging area. This area is presently a State Park (Silver King Wayside) and is used intensively by sport anglers and other recreationists. The exact effects of heavy industry on recreation at this site are difficult to ascertain at this time. However, some form of displacement of recreationists would certainly occur.

Overall, the Department of Interior's lower Cook Inlet oil and gas lease sale will increase recreation demand (by increasing employment in the area) and decrease the land base upon which coastal recreation does or might occur.

State of Alaska. Should the federal off-shore oil and gas lease

occur, it is quite likely that the State will move in a similar direction to prevent the pumping of State oil and gas reserves near the State-Federal three mile boundary. Should this occur, oil and gas impacts will be intensified.

A land use plan for State lands on the Kenai Peninsula to be undertaken by the Division of Lands is pending. State holdings in the southern portion of the Peninsula are extensive and the outcome of such a plan may have a significant effect on the allocation of coastal recreation resources.

Kenai Peninsula Borough. The 1970 comprehensive plan for the Kenai Peninsula proposes a number of recreational facilities and parks located in close proximity to areas of residential development. No Borough or regional parks operated by the Kenai Peninsula Borough are proposed in this document. Under provisions of the Borough Selection Act the Kenai Peninsula Borough has applied for many parcels of land along the study area coastline. The use of these lands by the Borough, should their selections be granted, is uncertain at this time.

Ninilchik Native Association, Incorporated. As Figure illustrates, most Ninilchik Corporation selections are well inland of the coastline. However, two selections by Port Graham and English

Bay Corporations are along the coastline near Homer. Uses of these lands should the Natives receive title is uncertain at this time.

City of Homer. The City of Homer presently operates two camping areas. One of these is located above the Homer business district, while the other is on Homer Spit. The Homer Spit camping area is located on city lands which are classified for industrial staging use. Should off-shore oil development occur and Homer used as a supply base, this camping area will be eliminated. The effect of this action will be to displace a large number of campers. Presumably, these campers will seek out other city and State facilities. At present the City of Homer has no plans for the development of new camping areas.

Private Development. With or without growth stimulated by off-shore oil development, private lands along the study area coastline will continue to be subdivided and developed for private residences and the accompanying commercial development.

Management Implications

1. Resource development such as offshore oil leasing may have a profound effect on recreation. The effects of such resource development will be to generally decrease the supply of undesignated lands and increase levels of recreation demand through population growth.

2. It will be important for recreation use to be fully considered in the upcoming State Division of Lands land use plan for the Kenai Peninsula.

3. As the Kenai Peninsula Borough will become a major land holder in the area, it is important that adequate consideration be given to the designation of Borough coastal lands for park use.

4. As the City of Homer presently receives a large amount of tourist camping activity, it may be desirable for Homer to consider additional City campgrounds. A means for acquiring such property may be to retain tax delinquent coastal property rather than liquidate such parcels for immediate revenue.

4 coastal land units

Definition and Determination

Land units are defined for the purposes of this study as areas of relatively homogeneous ecological characteristics. That is to say that elements such as soil type, vegetation, wildlife or shoreline geohydraulic processes tend to demonstrate similar properties within a given unit type. Although various environmental characteristics can be used to identify land units, coastal land form or geomorphic features are used in this study. The use of land form types is valuable when assessing types of recreational activities which may occur in a given area and for assessing impacts which may be generated from a specific use.

Through the definition and identification of land forms, environmental information may be ascribed to each land form type regarding opportunities and constraints for recreational land use. For example, a rocky headland may present constraints to boating activities and boating facilities, whereas the same area may represent an opportunity for fishing or observing birdlife. Possible environmental impacts from certain activities within

each land unit type may also be identified by this same process. However, it must be remembered that site specific conditions may modify the intensity, duration, or frequency of impacts identified in the generalized situation.

Identification and Description

The identification and description of specific land units was determined through the use of U.S.G.S. topographic maps, aerial photographs, navigation charts, and aerial and on the ground observations. Thus, each section of the shoreline has been identified as to its landform type. When the situation arose where two landform types occurred in the same section of shoreline (i.e., high active bluff and sandspit), both are denoted. Figures 48 through 54 show the location of coastal land units along the study area coastline.

A brief description of each land form type in regard to characteristics, origin, constraints, and opportunities regarding recreational land use is included within this chapter preceeding the land unit maps. Figure 47 serves as an index to the land unit maps.

Active Bluffs

Active bluffs, which are a common occurence along the study area shoreline, are those sections of the shoreline which are actively being eroded. Wave action during high tide and storm conditions erodes the foot of the bluff causing the slumping of material downslope. This type of coastal landform may range in height from several feet to well over several hundred feet. While a low bluff height (between zero and 25 feet) may not physically constrain access to the beach from the upland, a medium or high bluff presents a real constraint on coastal access. Active bluffs, because of their unstable slope conditions, pose constraints to trail construction and maintenance.

Recreational facilities in these areas should be located far enough back from the edge of the bluff to prevent facilities from being undermined by coastal erosion. Small drainages or rivers are possible means of access to the beach area where these landforms exist. However, the practice of filling in small drainages to provide a road surface to the beach should be strongly discouraged due to both environmental and aesthetic impacts. Moreover, periods of high rainfall may cause these roads to be washed out.

Active bluffs occur throughout the study area with the largest bluffs being located northwest of Homer and south of Anchor River.

Stable Bluffs

Stable bluffs occur in those areas along the coastline which are not eroding or have not eroded for some period of time. These areas are most easily recognized by the vegetation which has been able to establish itself due to stable soil conditions. As with active bluffs, stable bluff areas may range in heighth from several feet to several hundred feet. Low stable bluffs (less than 25 feet in heighth) present an opportunity for recreational beach access. However, higher bluffs may require the construction of trails or roadways to the beach. It is possible, due to the shifting of shoreline erosion-acretion processes, for a stabilized bluff to exhibit a small eroding escarpment at the beach elevation. This may be a short-term condition or may signal the beginning of a long-term erosional process. Should a long-term erosional process be occurring, then the bluff will become active and begin sluffing.

Low stable bluff areas should receive a high priority for public recreational use and beach access.

River Mouths

River mouths are an important coastal land unit from both an ecological and recreational viewpoint. As a zone of freshwater and saltwater mixing, these areas form a diversified environment favorable to certain organisms during all or a stage of their life cycle. The congregation of salmon or other anadromous fish at river mouths makes these areas important for sport and commercial fishing. Sediments carried by rivers will tend to form deltas or bars and spits at the river mouth. These lowlying wetlands provide excellent opportunities for beachcombing and observing wildlife. As wildlife habitat is often the highest and best land use designation for these areas, recreational developments and use should only be encouraged if they are compatible with the protection of wildlife habitat. Roads should not be constructed across wetlands as they may severely alter drainage patterns and estuarine characteristics. Beach grasses found in these areas should be protected from trampling and development as they (beach grasses) generally serve to stabilize the land form.

Small Drainage

Small drainageways occur throughout the study area's coastline. These drainages generally form small ravines or canyons perpendicular to the shoreline. An important ecological function of these drainages is their supply of sediment, nutrients, minerals, and organic matter to the coastal waters. Adversely, these drainages may carry pollutants and toxic substances from upland uses. These drainageways should be buffered from upland land uses through the protection of streamside vegetation. Upland wildlife often use these drainages to gain access to the beach area where high bluffs occur.

From the standpoint of recreation, these drainageways may offer the only easy access to the beach in areas of steep bluffs. The practice of constructing road access to the beach through the filling of these drainageways should be discouraged. Properly designed foot trails could be constructed in some of these areas to provide beach access.

Estuary

Estuaries are those areas which are relatively enclosed coastal water bodies that receive a significant freshwater input. Rivermouths are estuaries when the riverbed grade is slight enough that significant tidal action occurs in the river upstream from the river mouth. Estuarine conditions also occur in areas such as the upper portion of Kachemak Bay or upper Cook Inlet. Estuaries are beneficial to marine organisms in that they provide shelter from wave action. Shallow water conditions which allow light penetration to the bottom serve as nutrient storage areas. Water circulation conditions caused by fresh and saltwater mixing establishes beneficial circulation patterns supplying the area with food. These strong circulation patterns also serve to flush wastes from the estuary.

Estuaries often host significant concentrations of waterfowl. Plant and animal diversity is usually high. Overall, these areas provide an excellent opportunity for interpreting the physical and biological processes of the coastal zone.

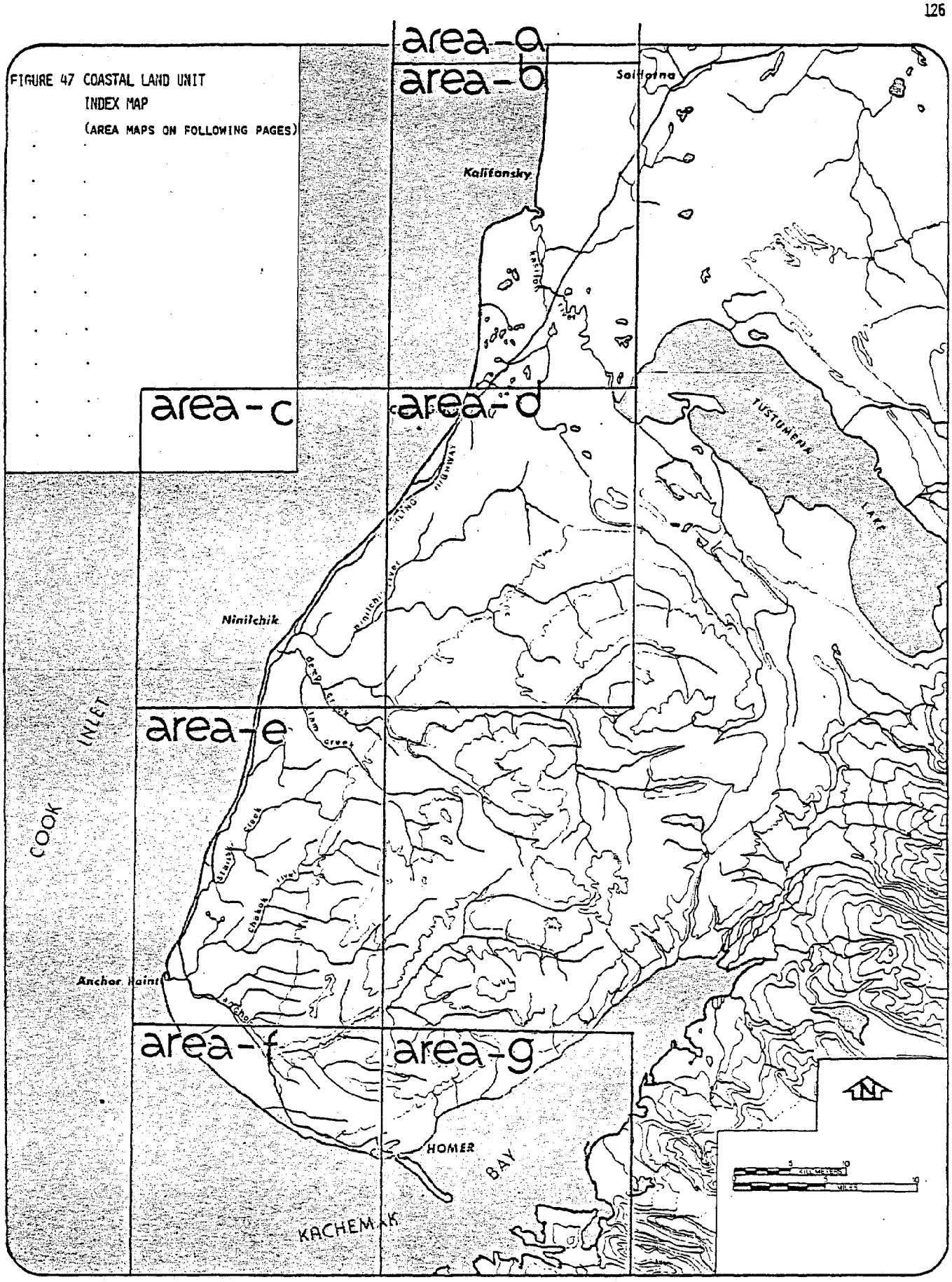
Sandspit

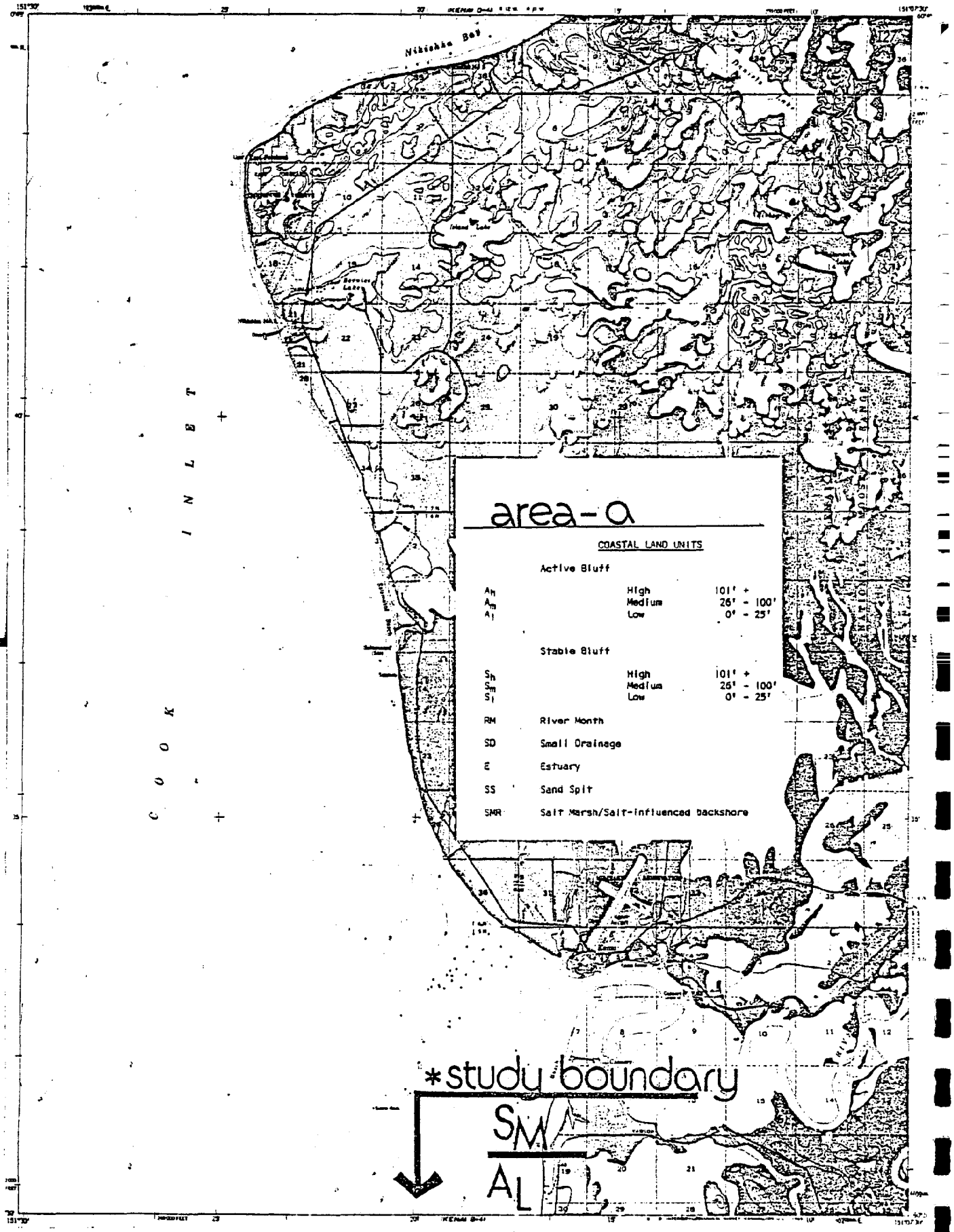
Spits found in the study area are generally composed of sand, although some may be composed of gravel where currents are sufficient. Spits are the end product of the previously discussed shoreline erosion-acretion process. That is to say that the material which forms the spit has been transported by current and wave action from its source (usually a bluff) to the point where the spit is formed. These land forms are highly dynamic in that they frequently shift location and change shape. The shape of spits generally points towards the land mass at their tip and may continue to grow towards the shoreline, forming a saltwater marsh or lagoon directly behind the spit. Such lagoons or quiet water areas may become valuable waterfowl habitat. Spits are found throughout the study area with by far the largest spit being the Homer Spit which extends nearly halfway across the mouth of Kachemak Bay. Smaller spits occur at the mouth of the Ninilchik River, the mouth of Deep Creek, Cape Starikof, the mouth of the Anchor River, and Laida Spit south of Whiskey Gulch. Although spits are generally unsuitable for development because of their dynamic and changing nature, they are an extremely popular coastal recreation landform.

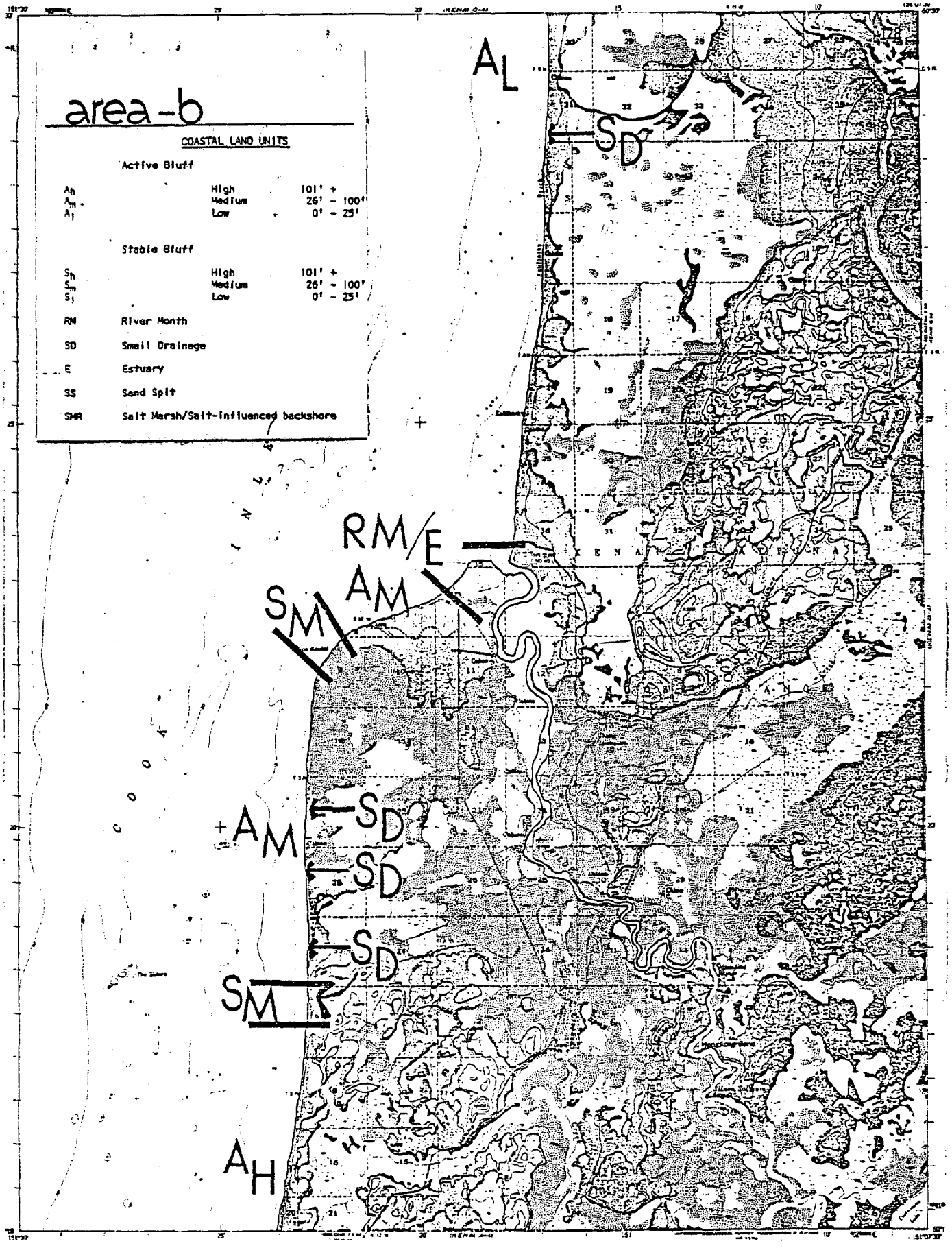
Salt Marsh/Salt-influenced Backshore

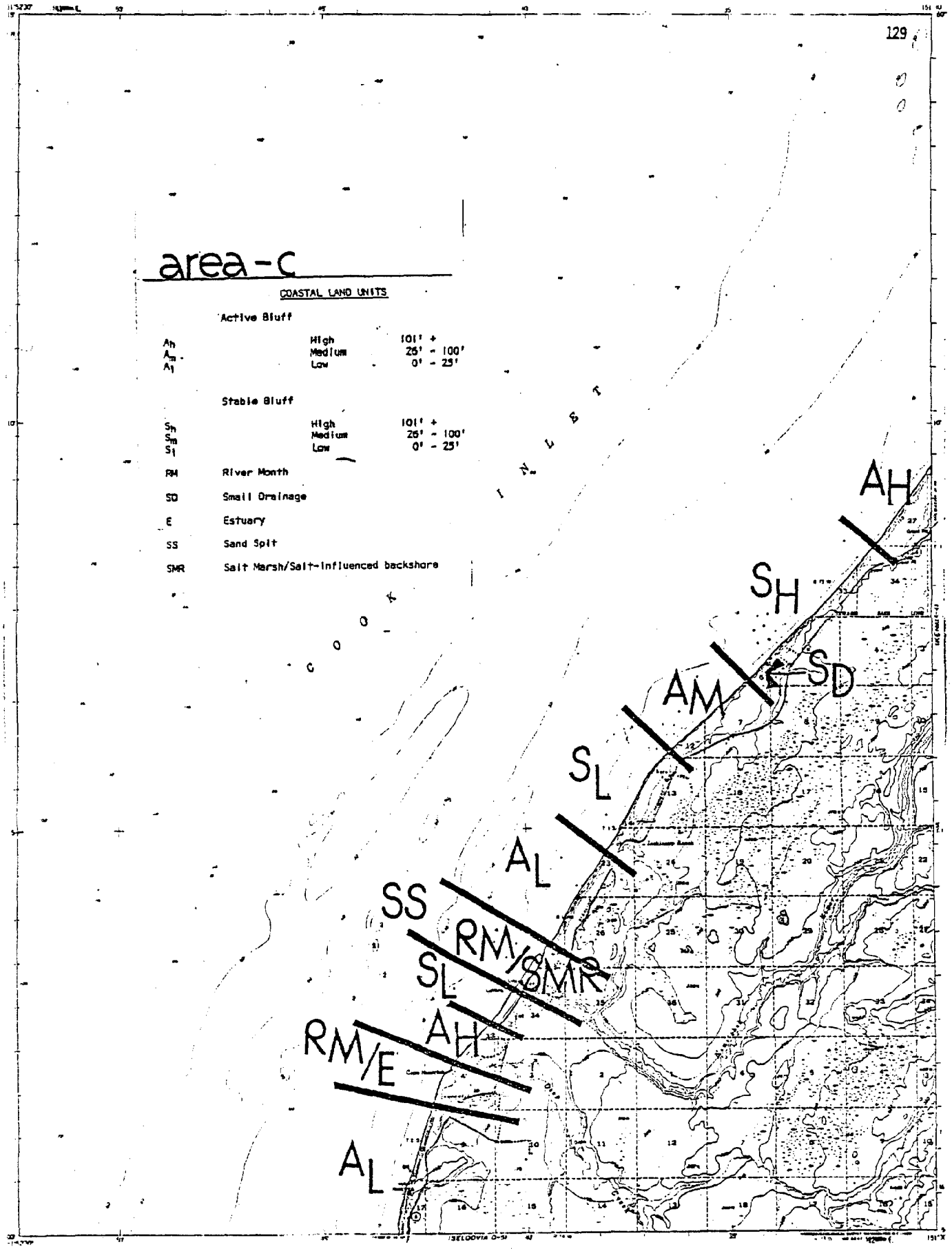
Salt marshes are those areas which are inundated daily by a tidal cycle. Salt-influenced backshore or wetland areas occur above the mean high tide mark and below the yearly high storm level. The vegetation found in these areas is usually salt tolerant. While salt marsh areas are extremely valuable in providing nutrients and habitat to aquatic species, wetland areas are important for waterfowl and help to cleanse water of contaminants from upland sources. Aside from their inherent ecological value, these areas are unsuited to development due to flooding which occurs during high tide and storm conditions. Recreationally these areas are suited to beachcombing, clam digging, fishing, and wildlife observation.

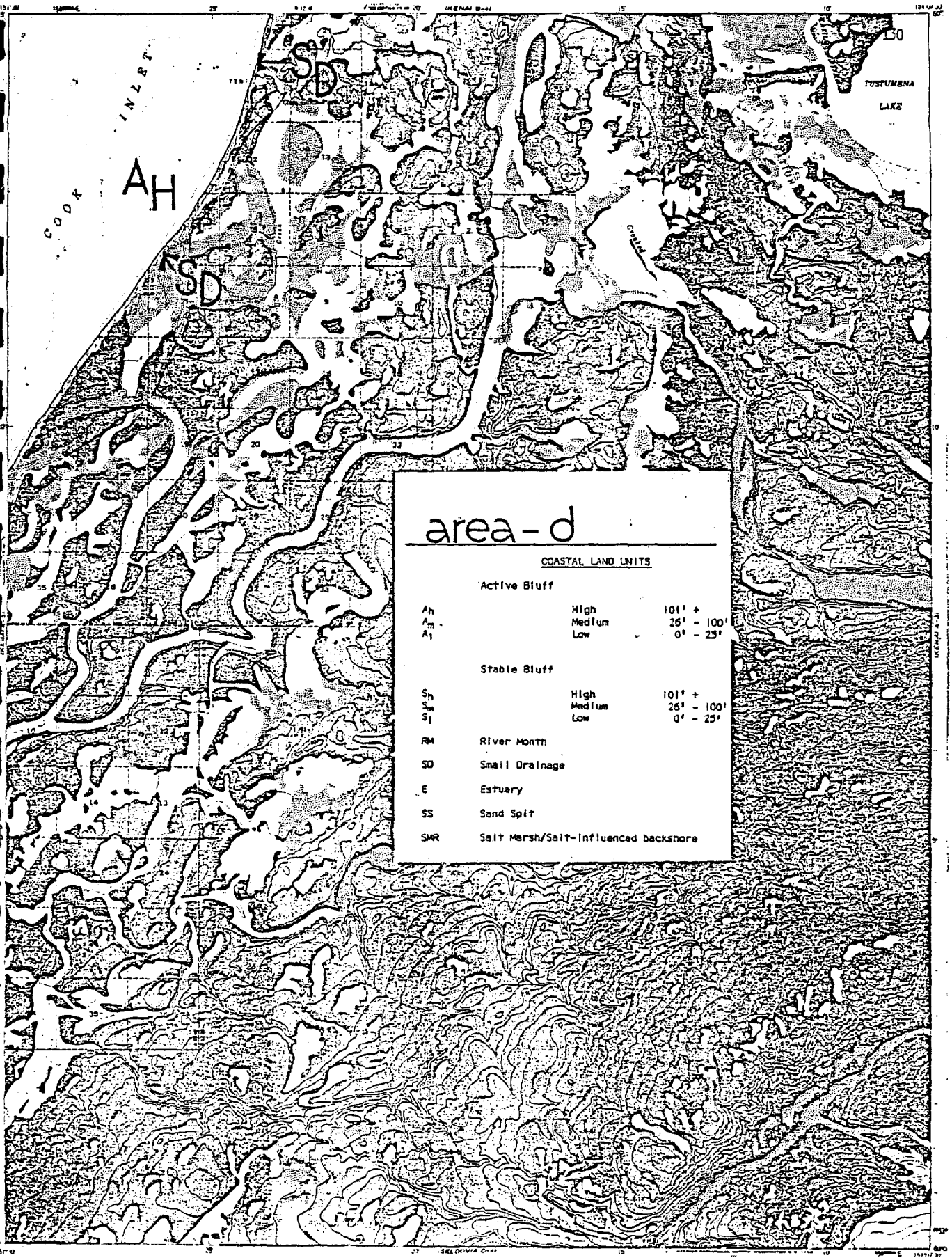
FIGURE 47 COASTAL LAND UNIT
INDEX MAP
(AREA MAPS ON FOLLOWING PAGES)

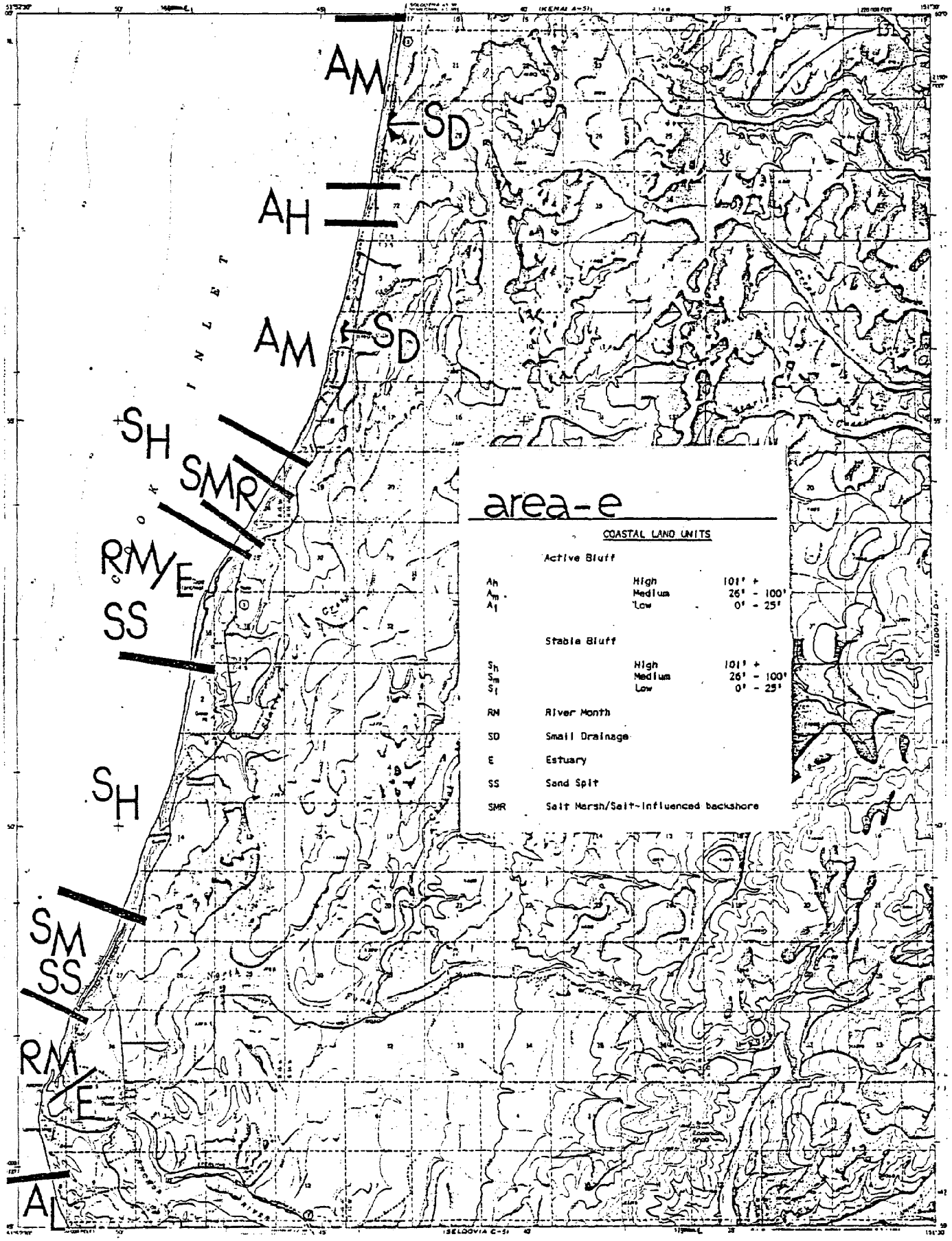


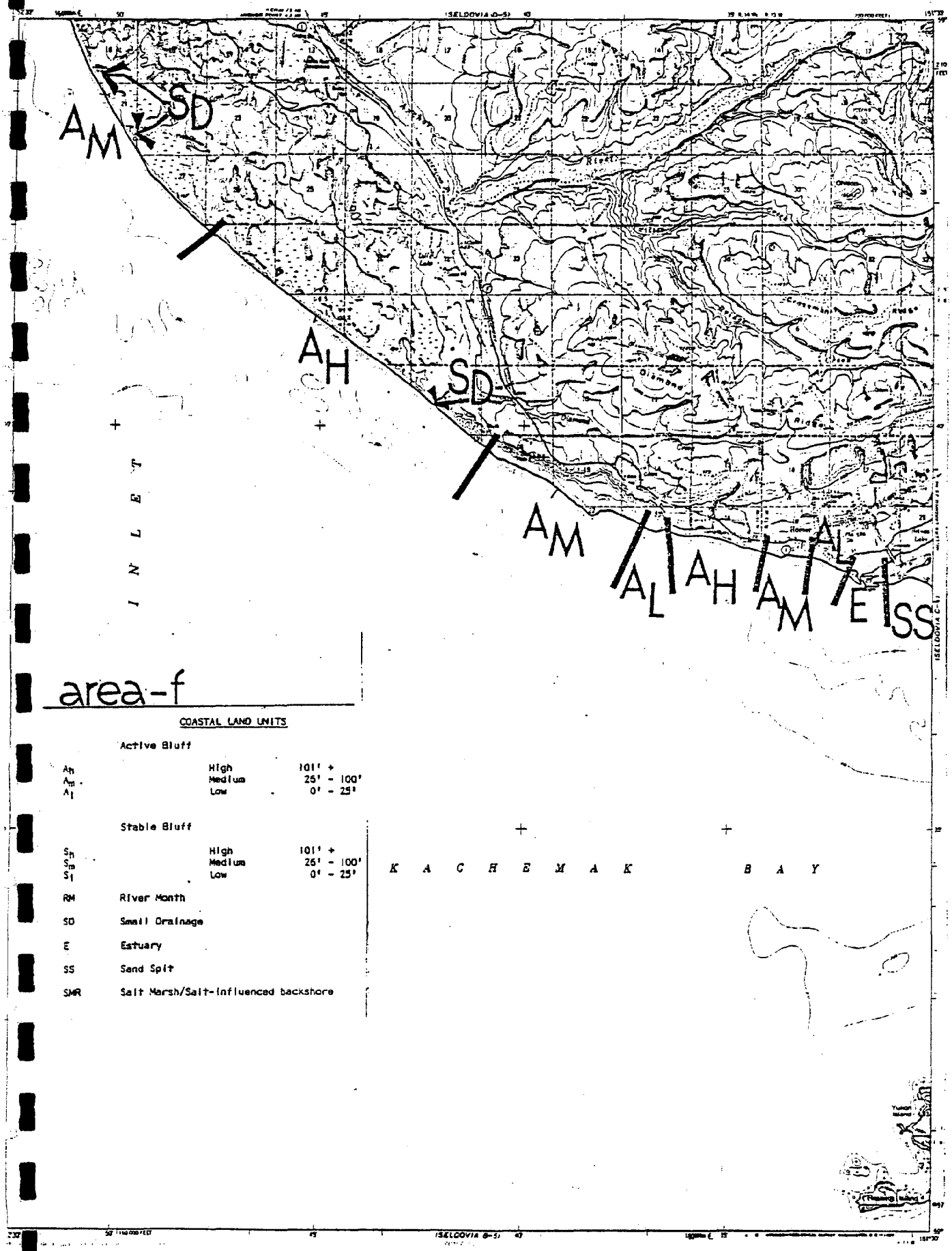

area-a
COASTAL LAND UNITS
Active Bluff
High 101' +
Medium 26' - 100'
Low 0' - 25'
Stable Bluff
High 101' +
Medium 26' - 100'
Low 0' - 25'
RM River Month
SD Small Drainage
E Estuary
SS Sand Spit
SMR Salt Marsh/Salt-influenced backshore
COOK INLET
Nikishka Bay
*study boundary
SM
AL


area-b
COASTAL LAND UNITS
Active Bluff
Ah High 101' +
Am Medium 26' - 100'
Al Low 0' - 25'
Stable Bluff
Sh High 101' +
Sm Medium 26' - 100'
Sl Low 0' - 25'
RM River Month
SD Small Drainage
E Estuary
SS Sand Spit
SMR Salt Marsh/Salt-influenced backshore
AL
SD
RM/E
AM
SM
AM
SD
SD
SD
SM
AH


area-c
COASTAL LAND UNITS
Active Bluff
Ah High 101' +
Am Medium 25' - 100'
Al Low 0' - 25'
Stable Bluff
Sh High 101' +
Sm Medium 25' - 100'
Sl Low 0' - 25'
RM River Month
SD Small Drainage
E Estuary
SS Sand Spit
SMR Salt Marsh/Salt-influenced backshore
AH
SH
SD
AM
SL
AL
SS
RM/SMR
SL
AH
RM/E
AL


COOK INLET
TUSTUMENA LAKE
A_H
SD
SD
area-d
COASTAL LAND UNITS
Active Bluff
A_h High 101' +
A_m Medium 26' - 100'
A_l Low 0' - 25'
Stable Bluff
S_h High 101' +
S_m Medium 26' - 100'
S_l Low 0' - 25'
RM River Mouth
SD Small Drainage
E Estuary
SS Sand Spit
SMR Salt Marsh/Salt-influenced backshore

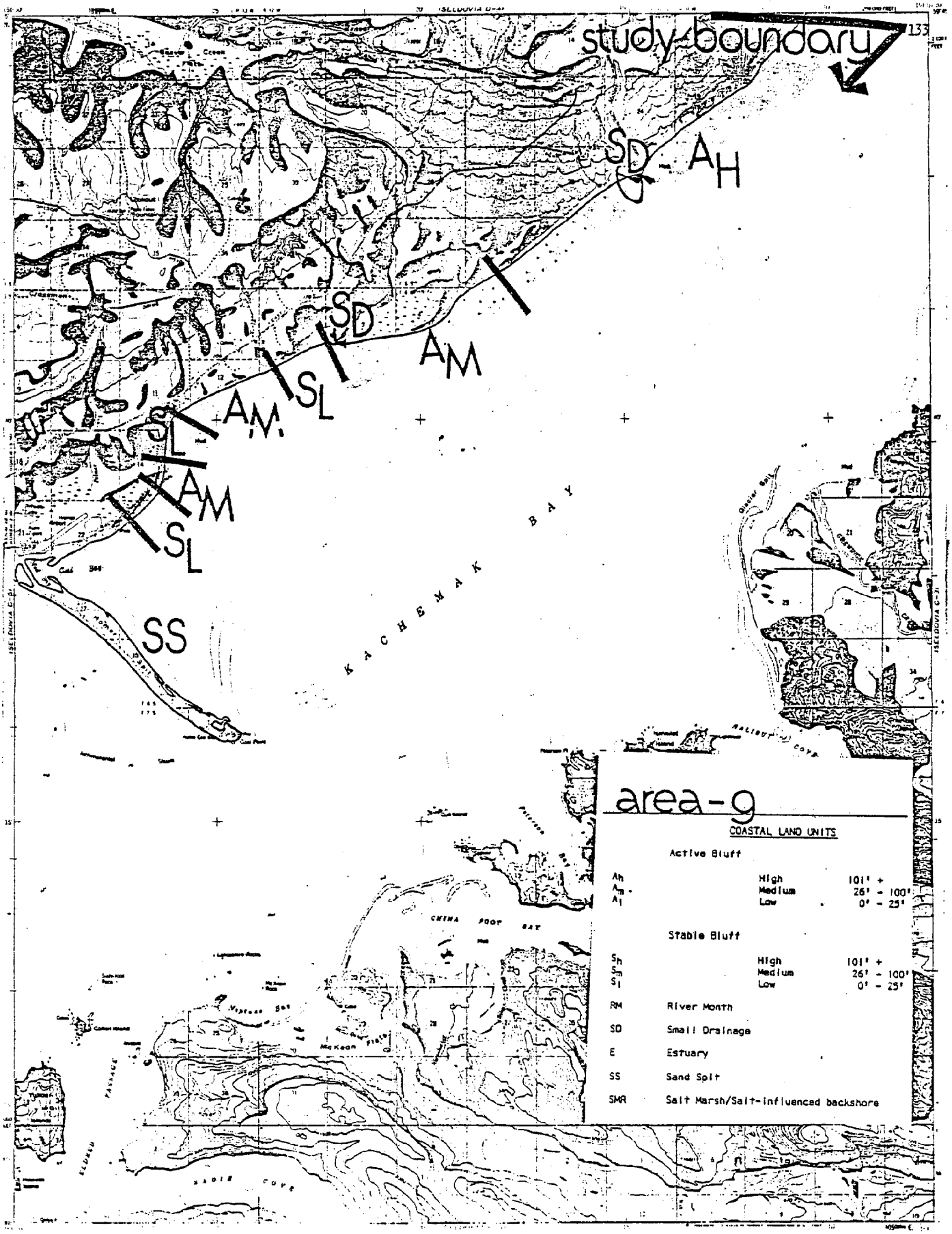

AM
SD
AH
AM
SD
SH
SMR
RM/E
SS
SH
SM
SS
RM/E
AL
area-e
COASTAL LAND UNITS
Active Bluff
Ah High 101' +
Am Medium 26' - 100'
Al Low 0' - 25'
Stable Bluff
Sh High 101' +
Sm Medium 26' - 100'
Sl Low 0' - 25'
RM River Month
SD Small Drainage
E Estuary
SS Sand Spit
SMR Salt Marsh/Salt-influenced backshore



area-f

COASTAL LAND UNITS

	Active Bluff		
A_h		High	101' +
A_m		Medium	25' - 100'
A_l		Low	0' - 25'
	Stable Bluff		
S_h		High	101' +
S_m		Medium	25' - 100'
S_l		Low	0' - 25'
RM	River Mouth		
SD	Small Drainage		
E	Estuary		
SS	Sand Spit		
SMR	Salt Marsh/Salt-influenced backshore		

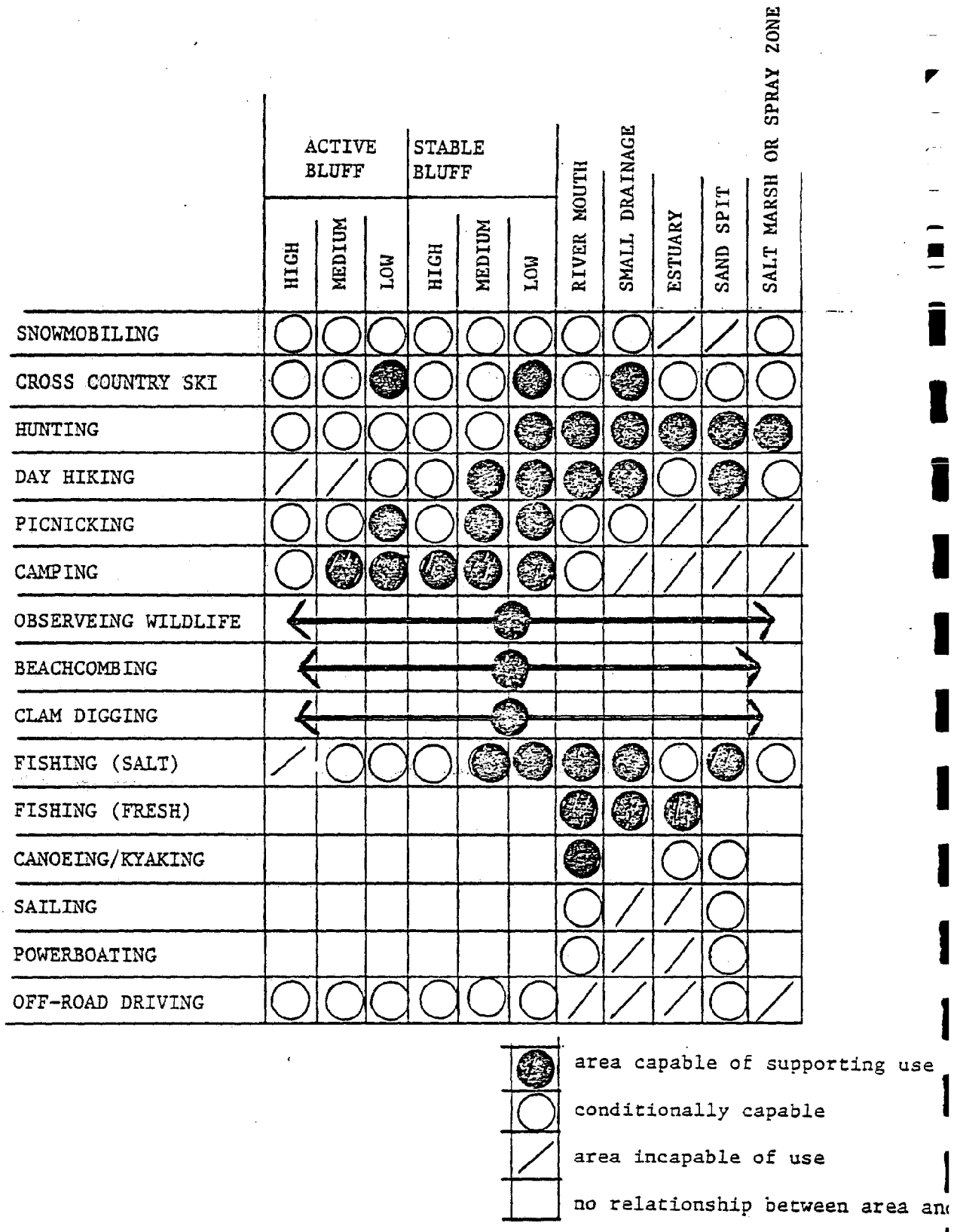

study boundary
SD
AH
SD
AM
SL
AM
SL
SL
AM
SL
SS
KACHEMAK BAY
area-g
COASTAL LAND UNITS
Active Bluff
Ah
Am
Al
High 101' +
Medium 26' - 100'
Low 0' - 25'
Stable Bluff
Sh
Sm
Sl
High 101' +
Medium 26' - 100'
Low 0' - 25'
RM River Month
SD Small Drainage
E Estuary
SS Sand Spit
SMR Salt Marsh/Salt-influenced backshore

Land Unit Capabilities

Prior to the consideration of land areas for specific developments or uses, a review of the land unit's ability to sustain uses and disturbances without the loss of its inherent qualities is paramount to the planning process. This inherent ability or lack of it to sustain uses is defined as a land unit's capability. Assumed in this process is a desire to retain the inherent qualities of the landscape to meet both environmental and recreational needs. It is realized, however, that the landscape can be altered through filling, dredging, excavating, etc., if necessary, to force the landscape into a more capable situation. Yet, since these actions are often costly both economically and environmentally, it is deemed desirable to locate facilities within the inherent capabilities of the landscape.

The capability of each land unit for specific recreational activities is portrayed in matrix form in Figure 55.

Figure. 55 Land Unit Capability matrix



5 coastal recreation land use

The purpose of this part of the study is to assess the nature and extent of coastal recreation activities occurring, or which may possibly occur within the study area. Aside from the obvious need to assess the supply and demand factors of coastal recreation, there is also an important need to look at impacts to the environment and other land uses which may be generated by coastal recreation activities.

Activities

The nature and extent of recreational activities which may occur in or related to the coastal zone are extremely broad. However, since it may not be practical or necessarily desirable to provide for each and every activity which may occur, the more common types of recreation activity are discussed here.

Recreational activities may be segregated into those which are water-dependent and those which are water-related. Water-dependent activities are those which require the presence of water, whereas water-related activities are those which may be complemented or enhanced by the presence of water. When allocating activity space in the coastal zone, it follows that water-dependent activities should be given priority over those activities which are simply

enhanced by the presence of water (or are water-related). For example, a target range should not be located on or adjacent to a high quality clam digging beach when a demand for clam digging is either present or projected. In essence, there are alternative locations for target ranges, but there may not be alternative locations for the activity of clam digging.

Coastal recreation activities which may occur within the study area and their water-dependency or relatedness are shown below.

Water-Dependent	Water-Related
Power boating	Observing wildlife
Sailing	Camping
Canoeing/Kayaking	Picnicking
Fishing	Day hiking
Clam digging	Hunting
Beachcombing	Trapping
Observing wildlife	Backpacking
	Cross country skiing
	Snowmobiling

Existing Areas and Facilities - Recreation Supply

When assessing the need for new recreation areas, the question arises as to what are the existing areas and facilities presently available to meet the needs of both resident and non-resident recreationists. Recreation areas and facilities in the study area are operated by the State Division of Parks, the City of Homer, and the State Department of Highways through the provision of roadside pull-outs and beach access roads.

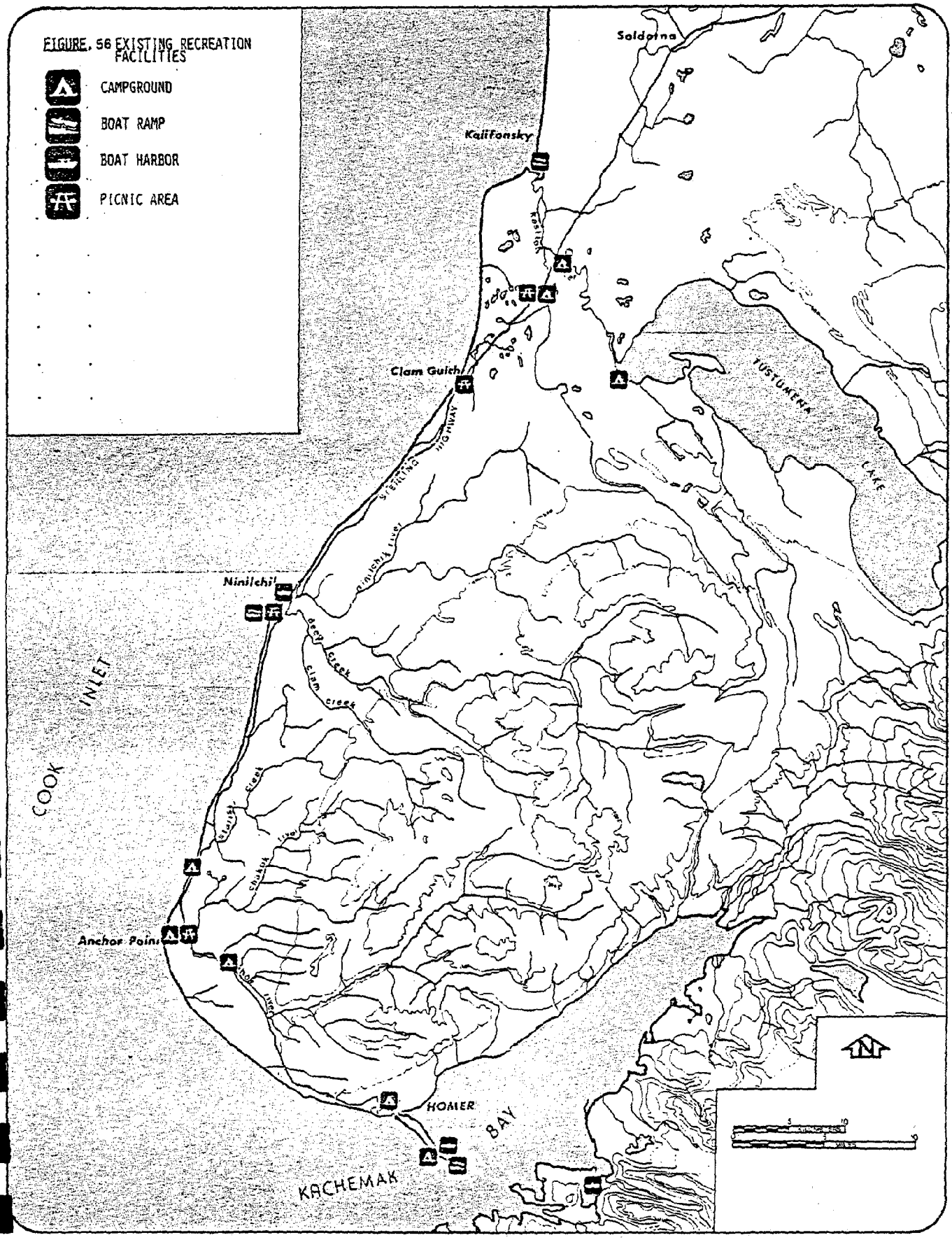


FIGURE. 56 EXISTING RECREATION FACILITIES
CAMPGROUND
BOAT RAMP
BOAT HARBOR
PICNIC AREA
Soldotna
Kalifonsky
Clam Gulch
TUSTUMENA LAKE
STERLING HIGHWAY
Ninilchik
COOK INLET
Anchor Point
HOMER
BAY
KACHEMAK

The State Division of Parks operates nine waysides, of which five have coastal frontage. State Park areas and their respective facilities are shown in Figure 56. Because of the lack of public lands at the time of the establishment of these waysides, all of these coastal waysides with the exception of Silver King Wayside on the Anchor River are less than fifty acres in size with minimal saltwater front footage.

The City of Homer operates two campgrounds. One of these is forty acres in size with thirty camp units and is located in Homer. Camping is also allowed on City-owned parcels at the end of Homer Spit. However, there is the possibility that camping will be eliminated on Homer Spit if this area becomes a staging site for off-shore oil development. The City of Soldotna operates two campgrounds and maintains a boat ramp at the mouth of the Kasilof River. The Kenai National Moose Range operates a twenty unit campground at Tustemena Lake. Privately owned and operated facilities in the area include a private campground on Homer Spit (on land leased from the City of Homer), lodges, motels, and boat and aircraft charter services.

Large recreation areas outside of the study area include Captain Cook State Recreation Area northeast of Kenai, Kachemak Bay State Park and Kachemak Bay State Wilderness Park across Kachemak Bay

from Homer, and the Kenai National Moose Range which is located to the northeast of the study area. The five State operated coastal waysides offer sixty-seven designated camping units. At present, overflow camping occurs in parking areas, picnic sites, along access roads, and on beaches during both peak and normal usage periods. The beach adjacent to the Homer Spit Road is utilized for undesignated camping along the entire length of the Spit.

Recreation Demand

Shoreline recreation demand in the study area is derived from two sources. These are local or resident demand, and non-local demand which is composed of regional, State, and out-of-State recreationists. Although comprehensive recreation demand data is lacking for the Kenai Peninsula specifically, the following information does provide some insight into the types and frequencies of activities people engage in Southcentral Alaska. The Draft Statewide Comprehensive Outdoor Recreation Plan, 1975 shows the following participation rates for Southcentral Alaska:

Activity	Average Annual Participation Days Per Capita (Resident)
Trail-related activities	46.6
Sightseeing	19.5
Driving for pleasure	27.0
Picnicking	11.7
Fishing	10.8
Boating	5.7
Camping	5.3
Swimming	6.1
Hunting	5.8
Outdoor games and sports	6.0
Iceskating	2.7
Snowplay	2.0
Flying for pleasure	1.4
Alpine skiing	1.5

Activities participated in by out-of-State tourists are similar to those participated in by State residents. However, sightseeing, trail-related activities, camping, and picnicking are among the most popular tourist related activities.

A 1976 study conducted by Field Research Corporation for the Alaska Visitor Industry attempts to assess tourist perception and motivation in visiting Alaska. A significant finding of this marketing research is the tourist's strong desire to visit parks and scenic wonders, view wildlife, and learn about different cultures. Thus, it can reasonably be assumed that adequate access to scenic and natural features is a prime component of tourist demand.

Public use figures by specific activities for the Kenai National Moose Range are shown in Figure 57. Primary activities which occurred on the moose range, in order, are non-consumptive wildlife use (observation, photography), freshwater fishing, resident game hunting and trapping, and non-wildlife related recreation. It should be remembered that these are non-marine oriented recreational activities as the majority of areas and facilities on the moose range are well inland of the coastline. Coastal related activities such as saltwater fishing, clam digging, and beachcombing occur elsewhere on the Peninsula.

Regarding coastal recreation activities, the Alaska Department of Fish and Game conducted a creel census in Kachemak Bay during 1973 to determine fishing pressure. The results of this census showed that 25,257 man days of effort were expended on shore

Figure 57 Kenai National Moose Range Public Use Data

	1973		1974		1975	
	Visits	Act. Hrs.	Visits	Act. Hrs.	Visits	Act. Hrs.
Interpretation	1,240	620	1,600	800	2,400	1,100
Environmental Education	2,200	28,400	800	4,700	800	2,600
Hunting - Resident Game	23,500	615,500	30,700	215,600	15,000	150,000
Hunting - Migratory Birds	2,300	17,400	1,500	12,200	1,800	12,000
Fishing	45,300	603,400	71,400	436,400	49,800	536,700
Other Consumptive Activity	1,050	8,400	500	1,300	1,600	3,400
Trapping	10,000	90,000	8,000	30,000	7,000	21,000
Wildlife/Wildland - Non-Consumptive	68,500	1,120,400	166,000	6,679,000	141,000	2,250,000
Recreation Non Wildlife/ Wildland	47,100	3,584,000	10,300	180,900	5,500	110,900
Total Activity Visits	201,190		271,000		224,900	
Total Visits	140,300		156,300		102,000	

% Distribution of Activity

A.	Swanson River Rec. Area	30%
B.	Skilak Loop Rec. Area	55%
C.	Tustumena Lake Rec. Area	10%
D.	Mystery Creek Road	2%
E.	All Other	3%

Note: Due to changes in sampling techniques, statistical validity may vary from year to year.

Source: (USDI, 1975b)

angling and 5,856 man days were spent for shellfish angling for a total of 31,113 man days of angling effort in the area. These figures do not reflect fishing effort from charter and private fishing boats. Clam digging on the beaches between Homer Spit and the Kasilof River is an extremely popular activity. Approximately 45,000 razor clams were harvested in 14,000 man days of clam digging in 1972. In 1973 approximately 682,000 razor clams were harvested during 23,770 man days of digging.

Clams sought by the recreational clam digger include razor clams, cockles, redneck clams, and soft shelled clams. Figure 58A shows the location of sport clam beds in the study area. Aerial surveys, counting persons on the beach, conducted by the State Division of Sport Fisheries during periods of low tide conditions, show Clam Gulch receiving the most clam digging use. The oil pad access site approximately two miles south of Clam Gulch and Happy Valley area receive the second greatest amount of use during an aerial survey conducted in May of 1976 during a -5.7 foot tide. 3,003 clam diggers were counted on the beach at Clam Gulch. Figure 58 shows the results of these aerial surveys conducted since 1971 at six popular clam digging areas in the study area.

A variety of factors will influence recreation demand. However, one of the more prominent factors is population. Regional population

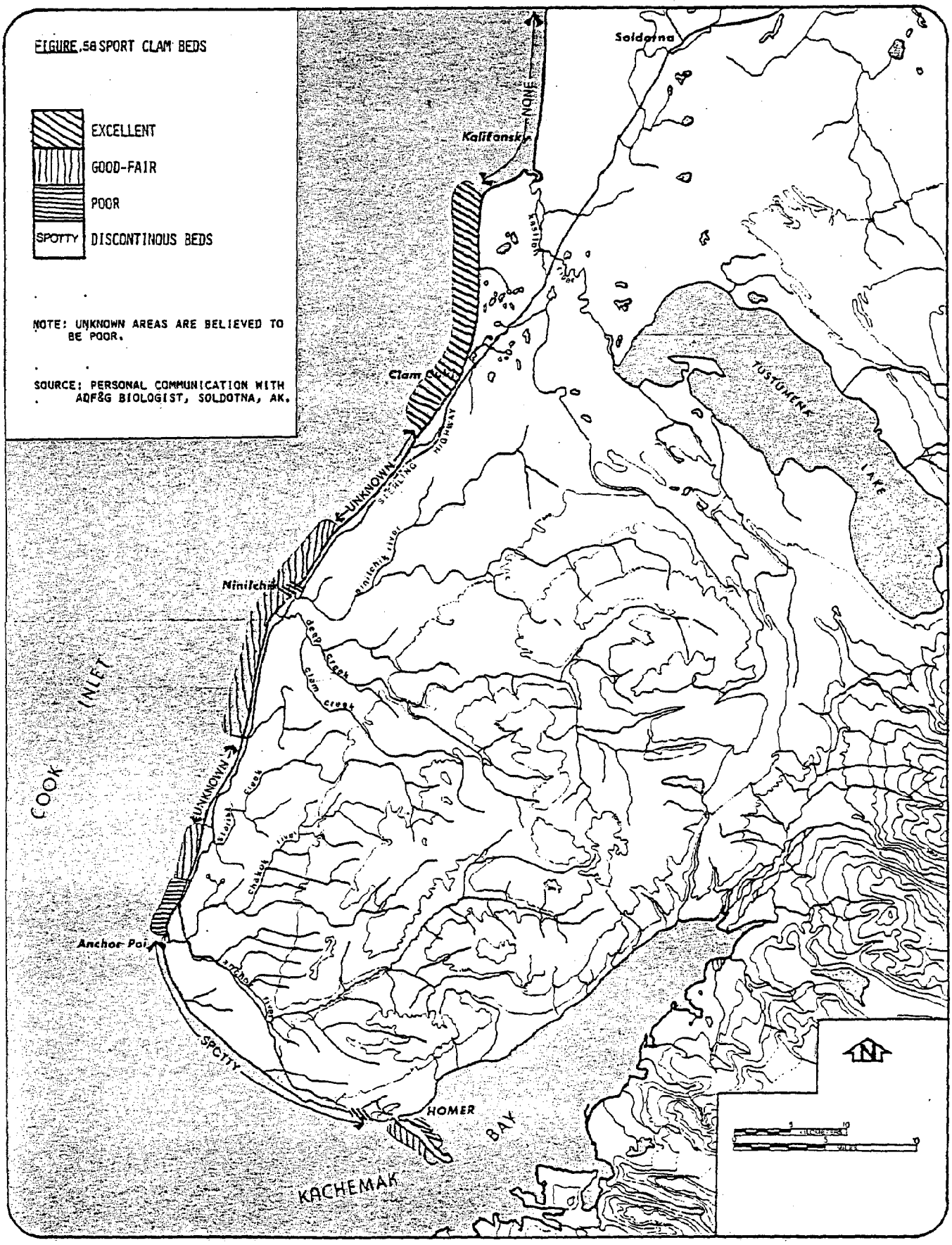


FIGURE 58 SPORT CLAM BEDS
EXCELLENT
GOOD-FAIR
POOR
SPOTTY
DISCONTINOUS BEDS
NOTE: UNKNOWN AREAS ARE BELIEVED TO BE POOR.
SOURCE: PERSONAL COMMUNICATION WITH ADF&G BIOLOGIST, SOLDOTNA, AK.
Soldotna
Kalifonsky
Clam
UNKNOWN
Ninilchik
deep creek
clam creek
COOK INLET
UNKNOWN
Anchor Point
SPOTTY
HOMER
BAY
KACHEMAK
TUSTUMENA
LAKE
N

Figure. 58

Distribution of Cook Inlet Recreational Razor Clam Diggers Enumerated by Aerial Survey.

General Location	Year											
	1971*		1972*		1973*		1974*		1975**		1976***	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Cohoe	9	1.7	121	5.6	199	9.8	94	7.1	157	9.8	221	8.6
Clam Gulch	290	53.5	915	42.4	869	43.0	781	58.6	952	59.1	1,160	65.0
Oil Pad Access	43	7.9	86	4.0	167	8.3	185	13.9	190	11.8	233	9.1
Ninilchik	59	10.9	225	10.4	365	18.0	52	3.9	113	7.0	173	6.8
Happy Valley	106	19.5	483	22.4	295	14.6	171	12.8	182	11.3	217	8.5
Whiskey Gulch	35	6.5	327	15.2	128	6.3	49	3.7	16	1.0	51	2.0
Total	542	100.0	2,157	100.0	2,023	100.0	1,332	100.0	1,610	100.0	2,555	100.0

* Figures presented are the average of two annual surveys - one on a weekend day and one weekday at which time the tide was lower than -4.0'.

** Figures presented are the average of three annual surveys - two on weekend days when tide was -4.0 or lower and one weekday when tide was -3.8'.

*** Figures presented are the average of three surveys - two on weekend days and the third on a weekday.

(No.) is the average number of persons at one time.

projections for Southcentral Alaska show an approximate doubling of the regional population by 1990. A majority of this growth will occur in the Anchorage area. As the Kenai Peninsula presently serves as a major recreation destination for the City of Anchorage, further population increases in Anchorage will have a significant effect upon recreation demand on the Kenai Peninsula. Local population increases may also be expected from off-shore oil development in lower Cook Inlet. The cities of Homer, Soldotna, and Kenai will likely receive the bulk of this growth. The present growth pattern of developments between the Sterling Highway and the Cook Inlet shoreline will most likely continue. Residential development in this zone will further decrease the supply of potential coastal recreation areas while at the same time increase demand due to population increases.

The possible future construction of a Turnagain Arm highway crossing and/or upgrading of the Seward and Sterling Highways would increase accessibility and decrease travel time, placing further pressure on recreational resources in the area.

The demand for recreational or second home sites along the study area's coastline will in all likelihood follow the national trend for this type of development. The effect of this development as with residential development will be to consume more of the landbase which could potentially be used for public recreation.

Recreation Carrying Capacity

Carrying capacity has been defined as "the character of use that can be supported at a specific time by an area developed at a certain level without causing excessive damage to either the physical environment or the experience of the visitor". Carrying capacity may be measured by 1) the environmental or physical capacity of the natural resource, 2) the social, psychological or visitor capacity - a subjective level of satisfactory experience (crowd tolerance), 3) the facility capacity relating to the level of accomodation or man-made facilities. The concept of carrying capacity is best dealt in a qualitative manner as methods for making adequate quantitative determinations are lacking. Either deterioration of the physical environment (soil compaction, erosion, vegetation damage, etc.) or a decrease in visitor satisfaction (overcrowding, complaints, etc.) are signs of a carrying capacity which has been exceeded. When an analysis of recreation carrying capacity in a particular area and set of activities is undertaken, it is important to remember that, as a concept, it is difficult to deal with in absolute terms and is subject to a high level of professional judgment.

Activity Compatibilities

Compatibilities between recreational activities may be defined by the degree to which two activities may occur at the same time in

the same area without resulting in conflicts between uses or appreciation of the recreational experience.

Figure 59 illustrates the relative degree of compatibility between various coastal recreational activities. It should be noted that conditionally compatible refers to the situation where the compatibility may be dependent upon intensity of use or season of use.

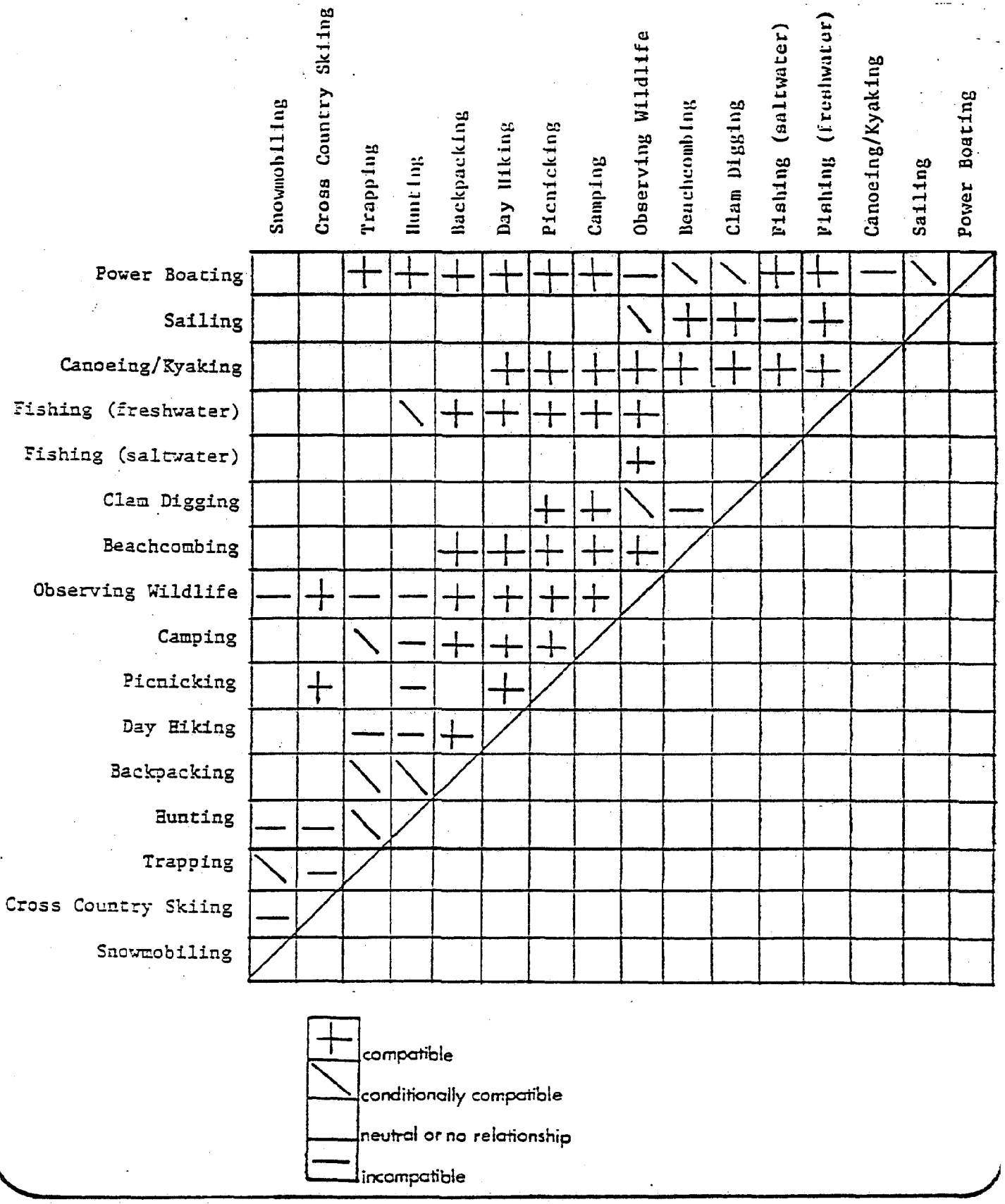
Recreation Impacts

Impacts generated by the recreational use of the western Kenai coastline are of two types. They are those which impact the environment and thus lower environmental quality, and those which restrict or prohibit other land uses. These two categories of impact are discussed separately below.

Impacts on Environmental Quality

Due to the complexities of environmental systems, a complete listing of all impacts which may be expected from various recreational activities is difficult. However, it is possible to discuss those impacts which have been identified from previous coastal recreation uses elsewhere. Yet, it must be remembered that impacts which have been generalized from other situations may have differing characteristics, durations, and intensities, depending upon the actual site conditions and types and levels of

Figure.59 Recreation Activity Compatiability Matrix



use. For example, sewage discharge from recreational water craft may be a serious problem in an enclosed bay with slow flushing characteristics. However, if the same number of boats were to moor in a channel with stronger currents, sewage discharge may exhibit a negligible affect on water quality.

The following three matricies are designed to assist in identification of possible environmental impacts from specific activities and recreational developments.

The first matrix illustrates the types of facilities (horizontal access) required for each of the related recreational activities (vertical access). The second matrix shows the possible impacts to the natural environment which may be ascribed to each type of facility. The third matrix is a composite of the first and second and directly illustrates the possible impacts which may be expected from each recreational activity. It should be noted here that both activity and facility-related impacts are shown. Parking areas, restrooms, and garbage cans, generate facility related impacts while people and their recreational equipment generate activity-related impacts.

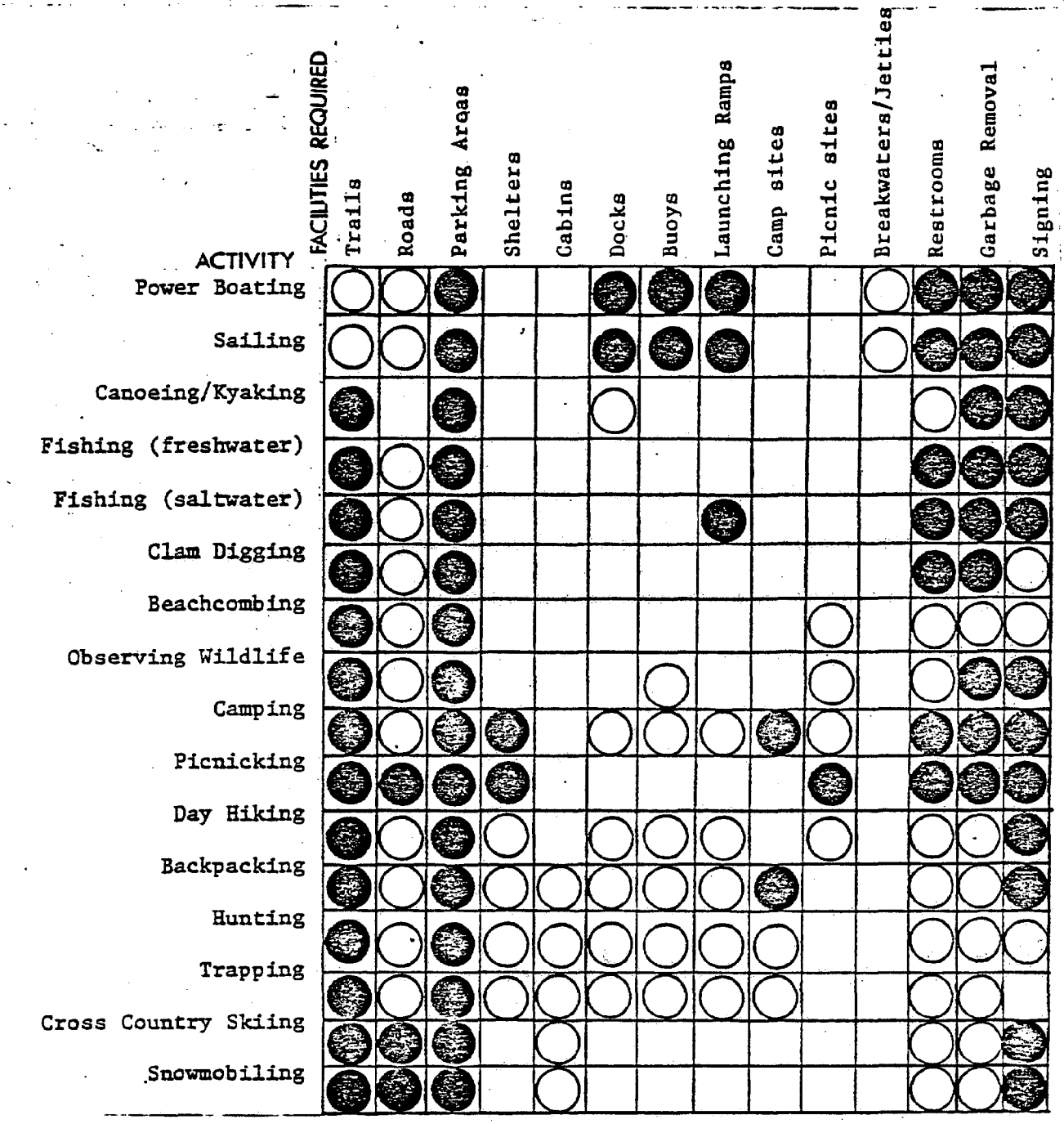


FIG. 60: Potential facility requirements of activities

FIG. 61: Potential Impacts from facilities and use

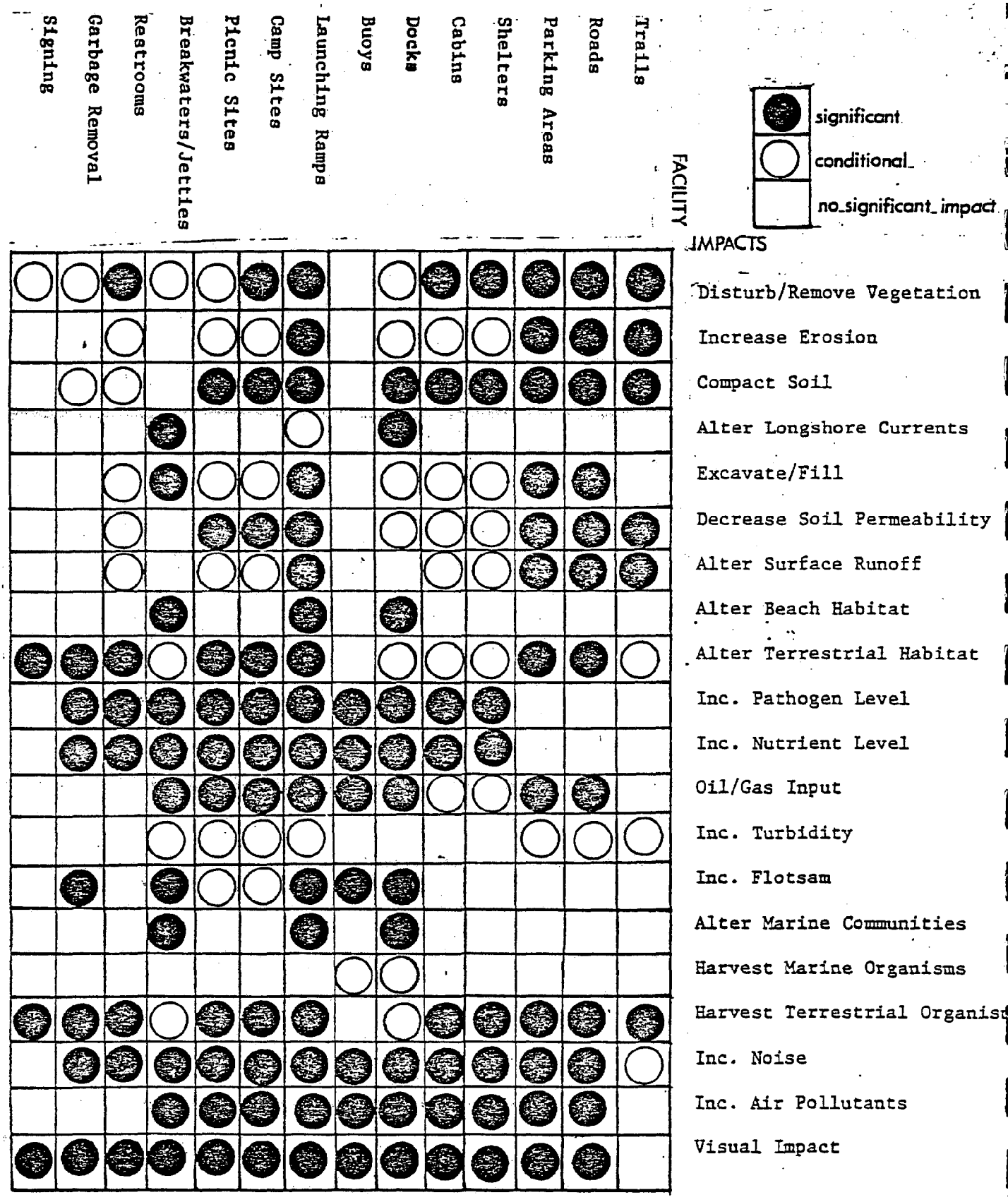
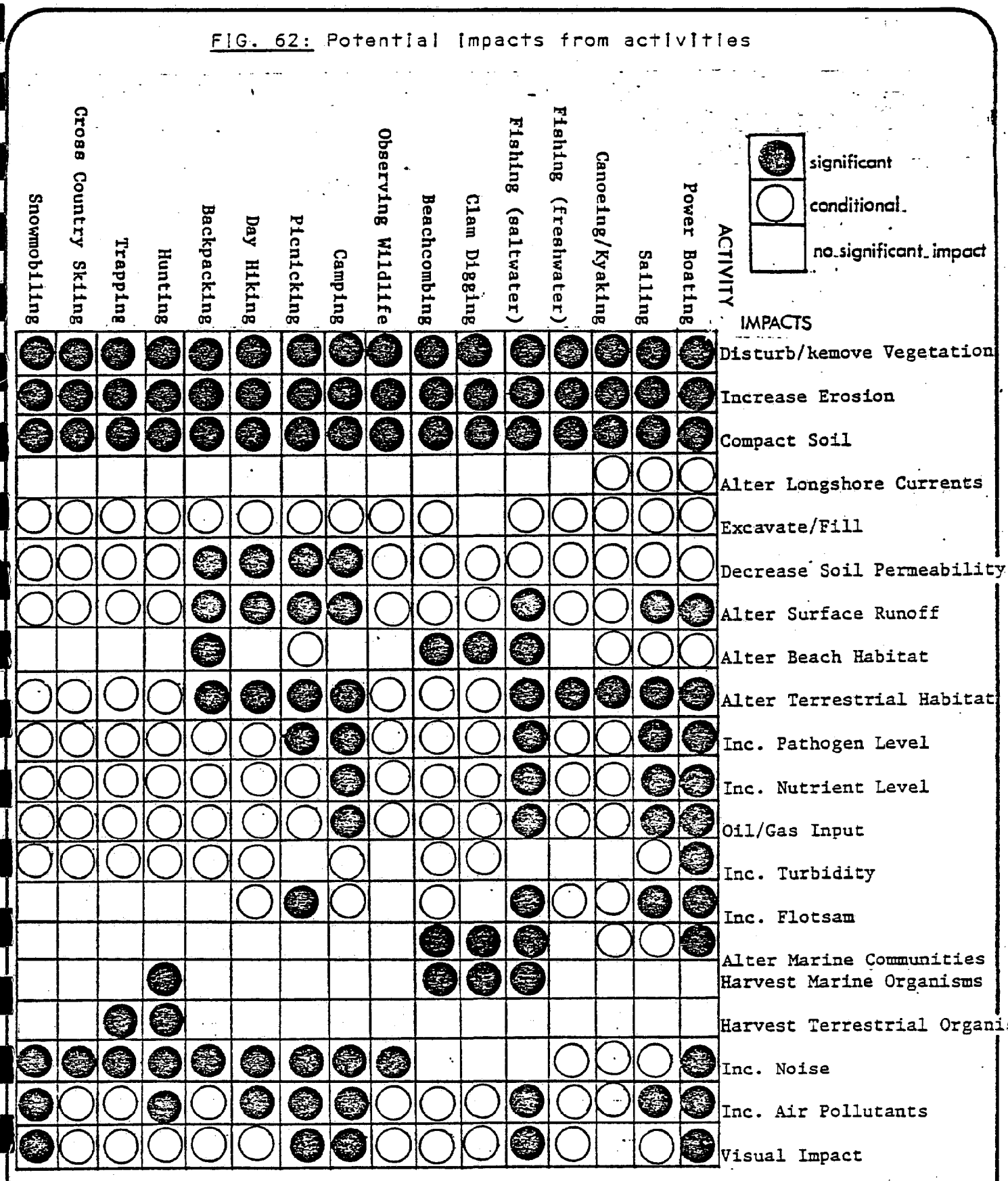


FIG. 62: Potential Impacts from activities



Impacts on Other Land Uses

Park and recreational activities do not operate independently of other land uses. The designation of areas for recreational use may supplant or impact other land uses depending on the nature or intensity of the recreational use. The following is an assessment of the relationships between recreation and present as well as probable land uses in the west Kenai area.

Wildlife Habitat. It has been well established that the health and abundance of wildlife populations are directly correlated with the quality of their habitat. Since recreation often occurs within or near key wildlife habitat areas, it follows that recreational activities may impact wildlife through habitat disruption or modification.

Critical habitat areas should be avoided when siting more intensive forms of recreational use. The clearing of vegetation probably poses the single greatest threat to wildlife from recreational development.

Activity associated impacts such as noise may severely disrupt the breeding and behavioral patterns of many forms of wildlife. An assessment of wildlife populations and behavior patterns prior to development can help a great deal toward minimizing recreational impacts on wildlife. Park regulations pertaining to the leashing

of pets should be enforced in areas with wildlife populations in order to avoid harassment and the subsequent loss of wildlife.

Residential Development. Residential developments are generally enhanced (both aesthetically and economically) by the presence of park or recreation areas. However, the converse may not always be true. Often the protection of park values is difficult when park boundaries adjoin residential developments, especially high-density developments. While a park may be designated for the protection of natural features, adjoining residential development and the potential for adverse uses (off-road vehicles, poaching, firewood cutting, etc.) may lead to a deterioration of park values. The designation of lands for park status will preempt residential development, except for private parcels within park boundaries.

Fisheries. Construction and development within park areas may lead to erosion and siltation of salmon spawning streams which will adversely impact the fisheries resource. However, for parks which are minimally developed or properly designed, this problem will most likely not occur. The harvesting of salmon and shellfish by recreationists most likely does not impose a problem of competition with commercial fishermen.

A possible benefit to fisheries from park designation is through

the preemption of other land uses which may prove to have a far more serious impact on the fisheries resource.

Agriculture. Few areas along the study area's shoreline between the Kenai River and Homer have agricultural uses in the coastal zone. However, the shoreline northeast of Homer has considerable coastal uplands acreage devoted to agricultural use. Park or recreation area designations here would pre-empt agricultural activity.

Oil Facilities/Transportation. The exploration and possible development of lower Cook Inlet oil tracts will require the siting and construction of on-shore support facilities. These facilities will take the form of tank farms, pipeline terminals, warehousing and distribution buildings, and loading and unloading docks. Several sites along the study area shoreline are identified in the lower Cook Inler OCS Environmental Impact Statement for oil-related staging facilities. Quite obviously, on a given parcel of land oil facilities and outdoor recreation are incompatible. However, aside from the possibility of oil spills damaging beach areas, properly buffered, these two land uses may co-exist with little difficulty. During the oil facility siting process, recreation, scenic and heritage values should be considered and weighed appropriately. Presumably, the presence of a park designation would preempt oil-related development on a common site.

6 recommendations

The recommendations set forth on the following pages outline a series of acquisition and development actions that will help to alleviate some of the coastal recreational use problems which are presently occurring on the west Kenai Peninsula. These proposed actions have been grouped according to their intended function in meeting the present demands on the Peninsula's coastal recreational resources and insuring an adequate land base for future recreational needs. The organization of the recommendations is as follows:

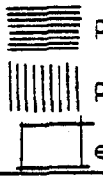
Group A Objective: Meet the needs of present coastal recreation demand levels.

Group B Objective: Meet near-future increases in recreation demand which will be generated by lower Cook Inlet oil development and population growth in Anchorage.

Group C Objective: Meet long-term needs for open space and recreation areas on the west Kenai shoreline.

Group D Objective: Identify present land use policy questions which should be addressed by those responsible for making future public and private land use decisions in the area.

Note: All maps on the following pages showing proposed park areas use the following ownership symbols (excluding Homer Spit which is a zoning proposal).

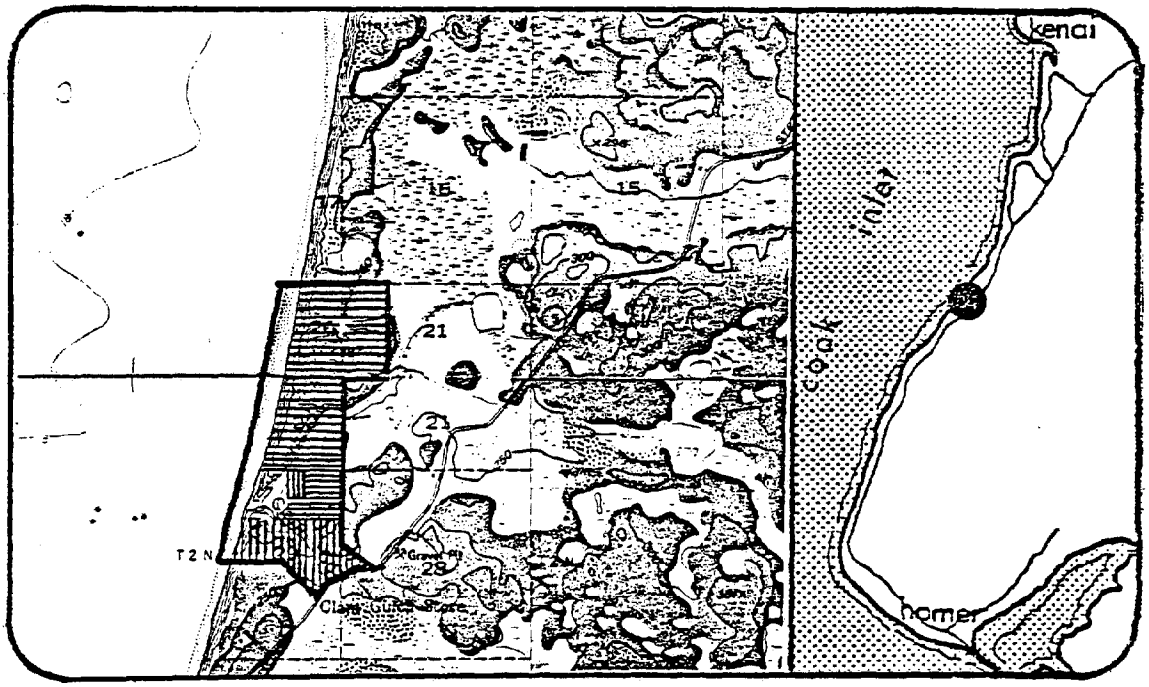


GROUP A OBJECTIVE:

MEET NEEDS OF PRESENT COASTAL RECREATION DEMAND LEVELS

Action 1: Clam Gulch

Clam Gulch Wayside was dedicated to public recreation in 1968 by the State Parks and Recreation Section via a land management transfer from the general State land management domain. The present 36 acre site has been developed with 20 picnic units, toilets, drinking water, and a picnic shelter. Clam Gulch is considered the major access point to the highest quality clam digging on the west Kenai shoreline. During periods of clam digging activity, use of this area far exceeds the carrying capacity of the site and facilities. During spring low tide conditions, over 500 automobiles and camping vehicles have been



parked in the area in conjunction with clam digging. During a -5.7 tide in May of 1976 3,003 persons were observed on the beach at Clam Gulch pursuing this activity. During these periods of high use; automobiles are forced to park up and down the highway; garbage containers overflow; toilets are inadequate creating unsanitary conditions; and vegetation is trampled leading to erosion. During other portions of the year the site is used for picnicking, sunbathing and beachcombing.

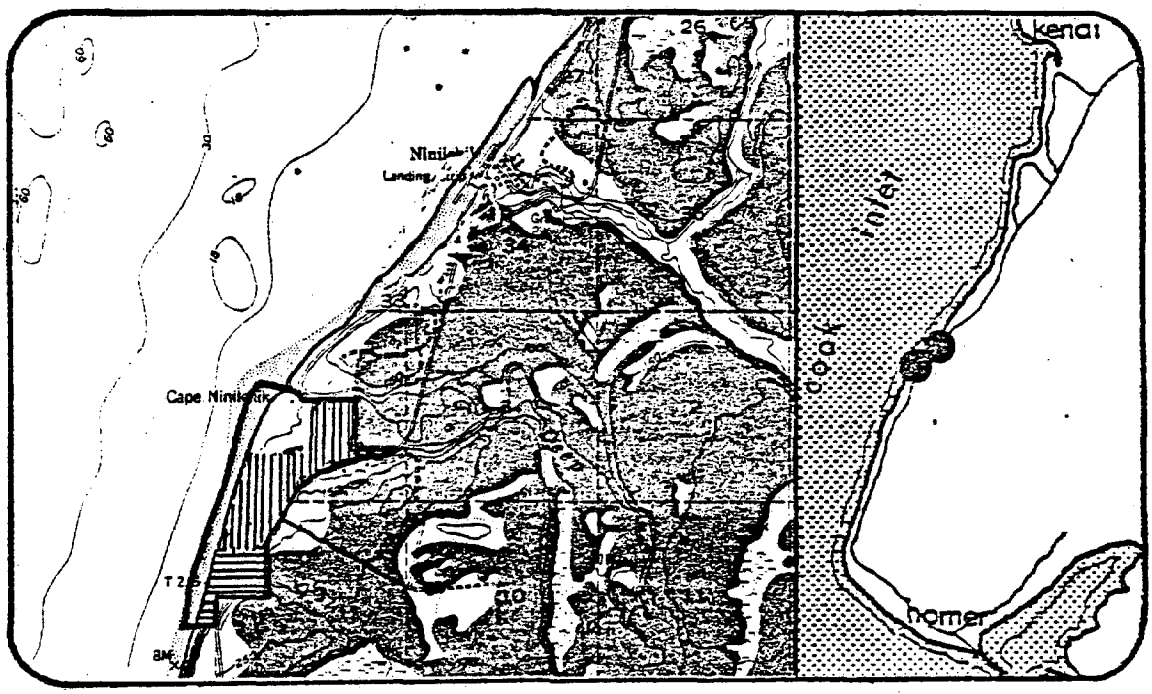
The extremely high use levels at this wayside warrant the acquisition of additional acreage. Additional lands between the existing wayside and the Sterling Highway should be acquired for parking facilities. Parking facilities should not be constructed for peak loads because they will remain empty during the majority of the year. Moreover, construction for peak load use may simply encourage additional use which would increase the problems that now exist. A parking area for some 150 to 250 cars would be fully utilized during clam tides and would be partially used for other activities during the remainder of the year. State-owned land lying north of the existing wayside in Sections 20 and 21 should be dedicated for public recreation use. Although the area is located on a high and unstable bluff, this action would help to preserve the site's natural and scenic values and provide an excellent opportunity for hike-in tent camping. This land has

been selected by the Kenai Peninsula Borough, which does not have park and recreation powers. It will be necessary for the State to either acquire a long-term use permit from the Borough, or offer the Borough selection rights on other State lands in the area if they will rescind this earlier selection.

Acquisition of private lands to the south and east of the present Wayside would prevent incompatible developments (hot dog stands, liquor stores, tackle shops, etc.) from being located on the access road to the Wayside. This road presently crosses private property, though the road itself is assumed to have a public easement. Soil conditions in this area are more favorable for development (e.g., better drainage and bearing strength) than those soils found near the existing facilities which are poorly drained and usually saturated. A parking area near the present picnic site would require a large amount of fill and would detract from the on-site aesthetics during periods of non-clam digging related use. Lands which should be acquired are shown on Page of the appendix. This proposal would expand the size of the present Wayside to 350 acres.

Action 2: Deep Creek

Deep Creek Wayside (presently 44 acres in size) is located at the mouth of Deep Creek south of the town of Ninilchik. Facilities at this site include ten picnic sites, a vaulted latrine, a boat ramp, and a parking area. Summer use estimates extending back to 1972 show peak use levels of 600 vehicles. Although the site is developed as a picnic area, a majority of users camp at this site. Popular activities in this area include fishing, beachcombing, and camping. The present facilities are located on a sandspit. Beach grasses which would normally occur in such areas have been trampled and are almost non-existent.



To help remedy overcrowding and site deterioration problems presently occuring, private land along the Deep Creek Access Road

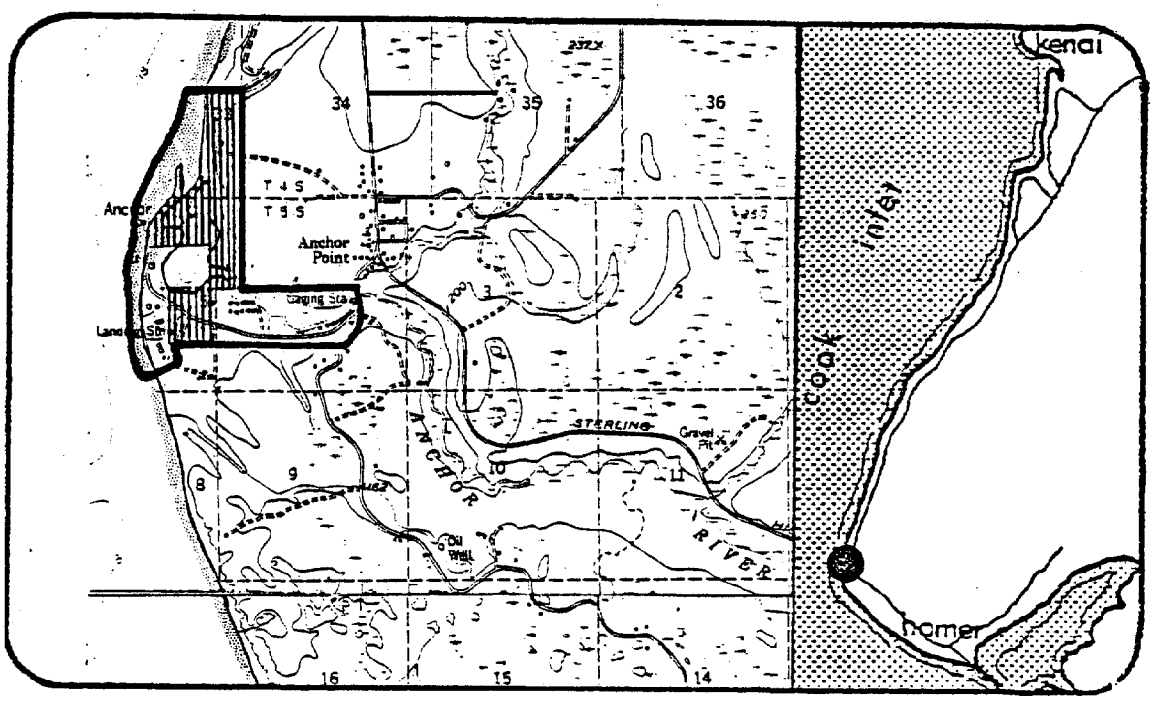
should be acquired to relocate camping and parking facilities. This action would also serve to prevent incompatible developments along this road. A loading and unloading area would be retained on the spit, as well as parking for handicapped persons and senior citizens. The possibility of relocating the Deep Creek boat ramp to the Ninilchik Harbor should be explored. Should this prove unfeasible, then the present ramp should be repaired and upgraded.

Private lands lying to the west of the Wayside should be acquired to protect the Deep Creek estuary from development. Although not included in this proposal, should private lands to the north of Deep Creek become available, their acquisition would provide an area for campground development and access to the north side of Deep Creek.

Management of this area should be retained by the State Division of Parks. Lands to be acquired are shown on page196 of the appendix. The estimated acreage of this proposal is 445 acres.

Action 3: Silver King Wayside

Silver King Wayside is located at the mouth of the Anchor River and is the most westerly point of land in the study area. The present Wayside comprises 174 acres with 40 developed campsites and support facilities. An additional five acres of waterfront is presently being leased from the U. S. Coast Guard. While this facility is a major destination for anglers, it also provides opportunities for camping, beachcombing, photography, and observing wildlife. These non-fishing activities may be expected to increase in the future. A portion of the present campground is being eroded by the river and should be relocated rather than riprapping the stream bank. The latter action is both environmentally and economically costly.

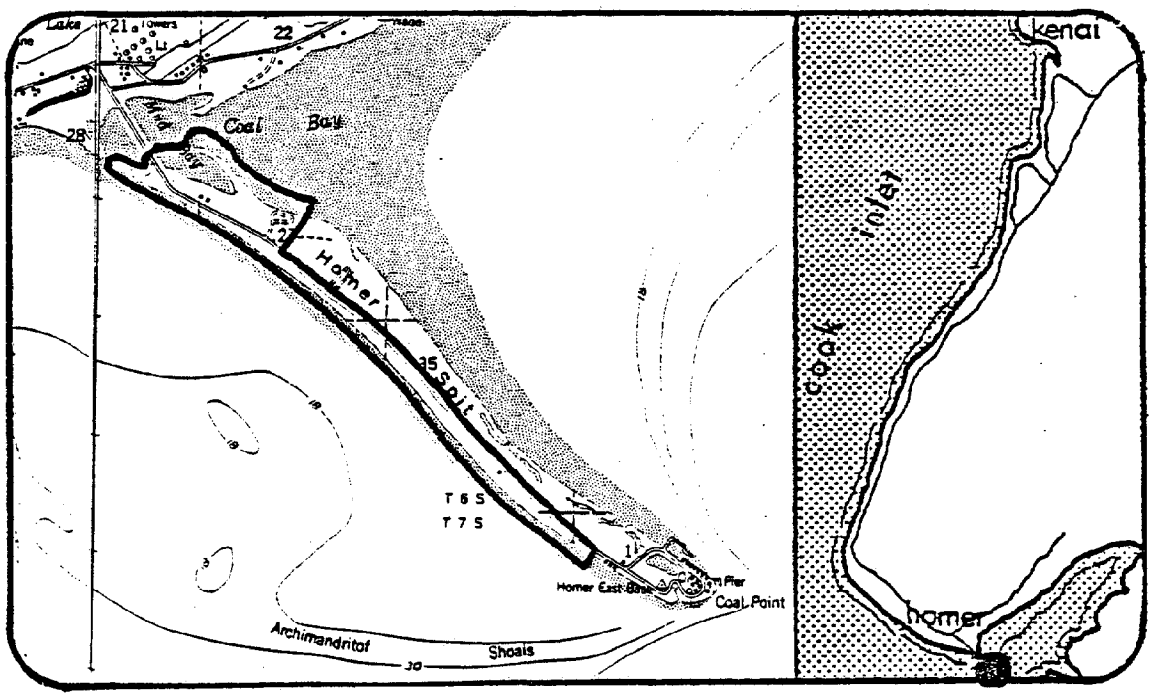


The present size and configuration of the Wayside is inadequate and should be altered to provide additional beach frontage fishing access to Anchor River, a site for the relocation of a portion of the present camping area, and the construction of additional camping facilities. Acquisition of the private subdivision which the Wayside road passes through, would provide an excellent site for the relocation of the existing campground facilities as well as the provision of additional camp units. The acquisition of private lands on the coast to the north of the parcel would provide an excellent site for campground development, increase the Wayside's beach frontage, and protect the area's aesthetic qualities. Public ownership of this land would also facilitate access for anglers to the north side of Anchor River. As the estuary offers important fish and wildlife habitat, it should be protected from development. The random trail pattern which presently occurs in the estuary could be remedied by the construction of wooden boardwalks or gravel-surfaced trails designed for fishing access to the river. Additionally, the parking area near the beach should be barriered and organized to avoid damage to beach vegetation.

Management of this area should be retained by the State Division of Parks. The acquisition of additional lands would increase the size of the Silver King Wayside to 445 acres. Proposed acquisitions are shown on page 190 of the appendix.

Action 4: Homer Spit

Homer Spit, located within the city limits of Homer, annually receives a large amount of use as a prime destination point for recreationists on the Kenai Peninsula. Camping presently occurs on the Spit at a private campground and on City-owned property. Unregulated camping occurs on the beach to the west side of the Spit highway. Recreational activities on the Spit include clam digging, beachcombing, fishing, and camping. A large clam bed occurs on the east side of the Spit near Coal Bay. However, present sport harvesting of the Spit is believed by some biologists to be excessive. As portions of Homer Spit become dedicated to on-shore facilities for off-shore oil development and other industrial uses, it will become increasingly more difficult to protect the recreational opportunities provided in this area.

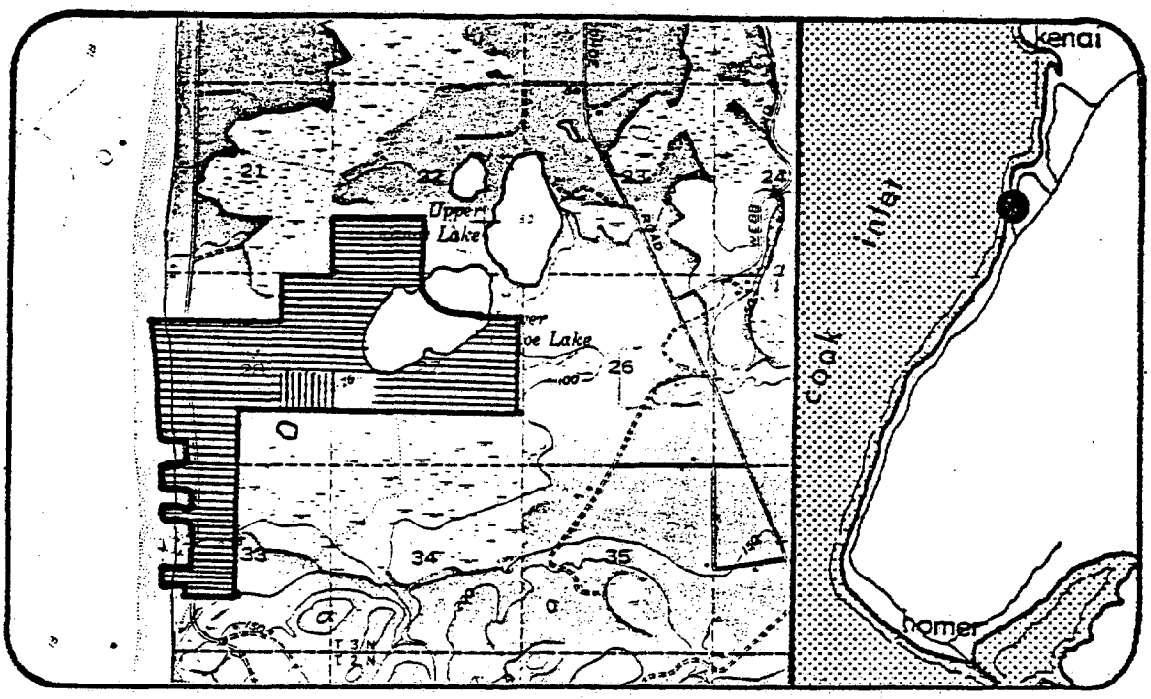


Protection of recreational values of the area can best be obtained through Kenai Peninsula Borough zoning powers. The approximately 224 acre area shown on the above map should be zoned as open space for recreational use.

As some campground area on the Spit will most likely be lost to off-shore oil development activities, the City of Homer should seek to construct new camping areas on other portions of the City's coastline. The new recreational lands could be most readily acquired by holding tax delinquent properties for public campground development rather than re-selling them. In the event that overnight camping on Homer Spit is prohibited, it is important that parking, preferably near the end of the Spit be provided for beach fishing and walking.

Action 4: Cohoe Beach Access

A public access site on the lower portion of Cohoe Loop Road is needed to expand the opportunities for clam digging and beach combing. The provision of beach access in this area would help to alleviate some of the present excessive pressures on Clam Gulch.



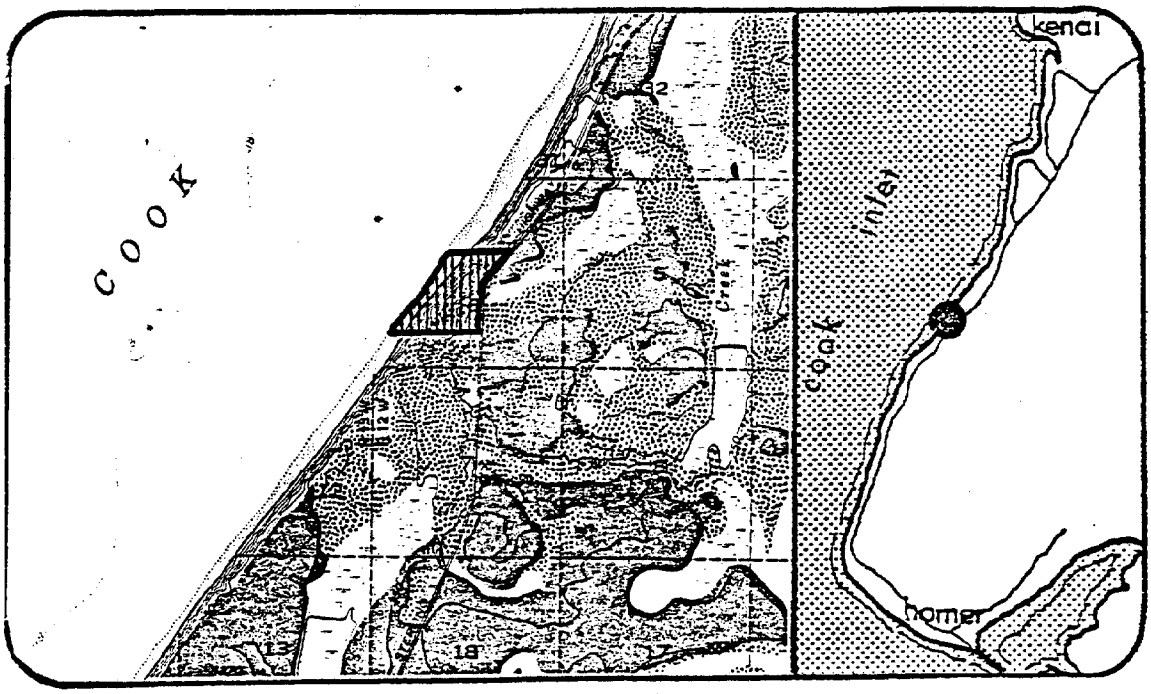
Parking facilities to facilitate beach access could be developed to the east of Cohoe Loop Road in an old gravel pit. A trail from the parking area to the beach could be constructed. This section of the beach presently receives a great deal of clam digging use during low tide conditions. Acquisition of those lands around Lower Cohoe Lake and the wooded area between the

Lake and the road would be highly desirable for the development of camping facilities.

This proposal includes 864 acres, of which 160 acres are privately owned and would have to be acquired. Several residential parcels occur on the coastline within the area, but are not critical acquisitions at this time. These properties should be acquired only if sufficient funds are available. Development and management of this site should be undertaken by the State Division of Parks.

Action 5: Falls Creek Beach Access

The mouth of Falls Creek is located approximately two miles south of Clam Gulch. Although this area is private land, it is used by clam diggers to gain access to the excellent razor clam beds located in this area. The potential exists at this site to help disperse some of the excessive use occuring at Clam Gulch Wayside. The acquisition of this area would allow for the development of parking and picnicking facilities, as well as a beach trail adjacent to Falls Creek. This area is 64 acres in size. Management of this area should be by the State Division of Parks in consultation with the State Division of Sport Fish.

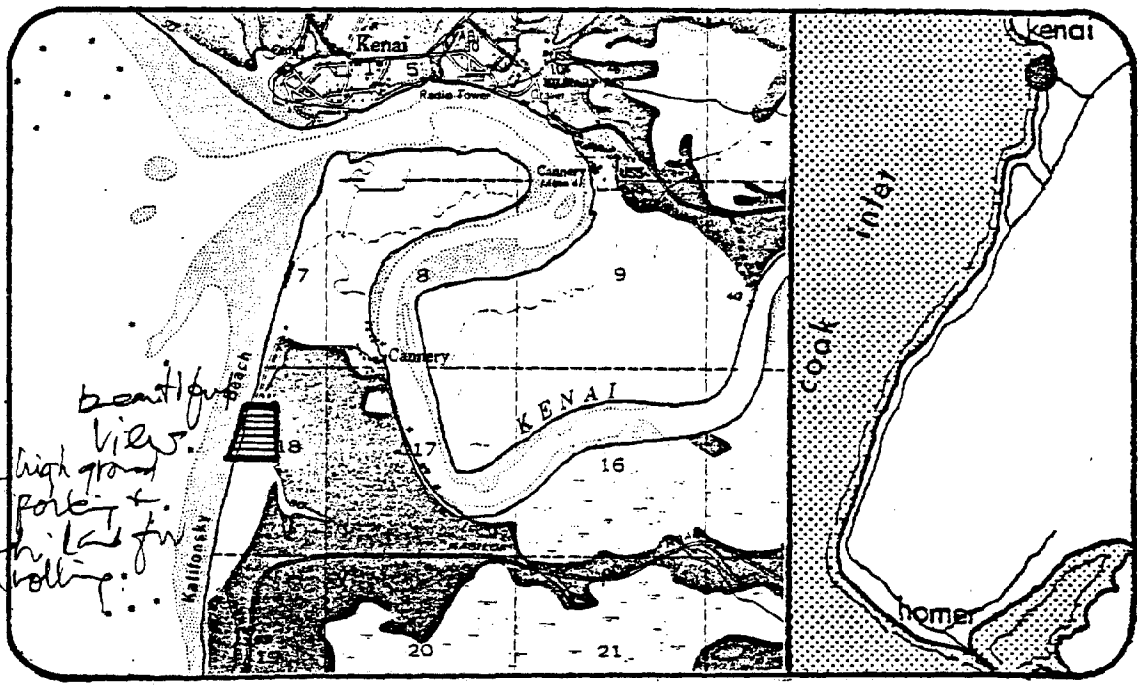


GROUP B OBJECTIVE:

ACQUIRE AND DEVELOP COASTAL PARK AREAS TO MEET INCREASES IN RECREATIONAL DEMAND GENERATED BY OIL AND GAS DEVELOPMENT AND FURTHER POPULATION GROWTH IN ANCHORAGE

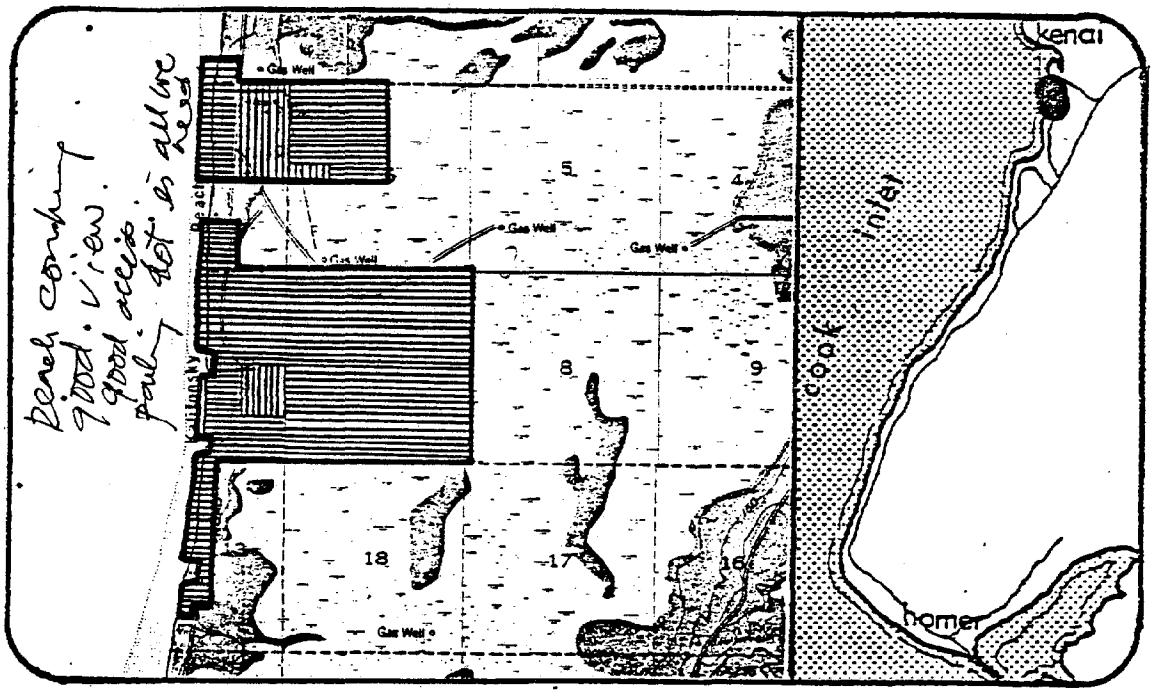
Action 1: Kalifonsky Beach Access Parks

Kalifonsky Beach is located south of the Kenai River mouth and extends to the mouth of the Kasilof River. This beach area is approximately ten miles in length with a low but actively eroding bluff. The acquisition and development of several access points in this area will greatly facilitate public use of this beach. Public lands adjacent to Kalifonsky Beach will provide for the development of three access parks. These areas would be developed primarily for day use with parking, restrooms, and trail facilities. Although campground facilities could be developed at two of these sites. The northernmost site lies just off Kalifonsky Loop Road, while the southern two sites are bisected by the road.



Kasilof Loop Road leads away from the Sterling Highway to Kalifonsky Beach and returns near the mouth of the Kasilof River.

The northern access site presently has a short road constructed to the beach. The upland area, east of the road, has been completely cleared of vegetation. Parking facilities could easily be developed on a portion of this clearing and the remainder revegetated. The vegetated backshore area, between the road and the beach, is comprised of several salt-tolerant plant species and should be protected from development or excessive foot trampling. This area is Borough-patented land. As the Kenai Peninsula Borough is without park and recreation powers, a special land use permit for a 25 year period should be obtained by the State Division of Parks for the development of this facility. This site is 31 acres in size.



The second Kalifonsky Beach Access Site is approximately halfway between the mouth of the Kenai and Kasilof Rivers. This area is approximately 240 acres. A small drainageway to the beach provides the potential for constructing a trail from the uplands to the beach. Some camping could be provided between the Kalifonsky Road and the bluff. Additional camping and parking could be developed east of the road. A portion of this area to the east of Kasilof Road is private land and would have to be acquired. The coastal portion has been selected by the Borough, while the most easterly area is tentatively approved as State land. A radio tower is located on private land to the east of Kasilof Road. Properly fenced to prevent vandalism, the area near the tower could be developed for parking and some camping without conflict between these two uses.

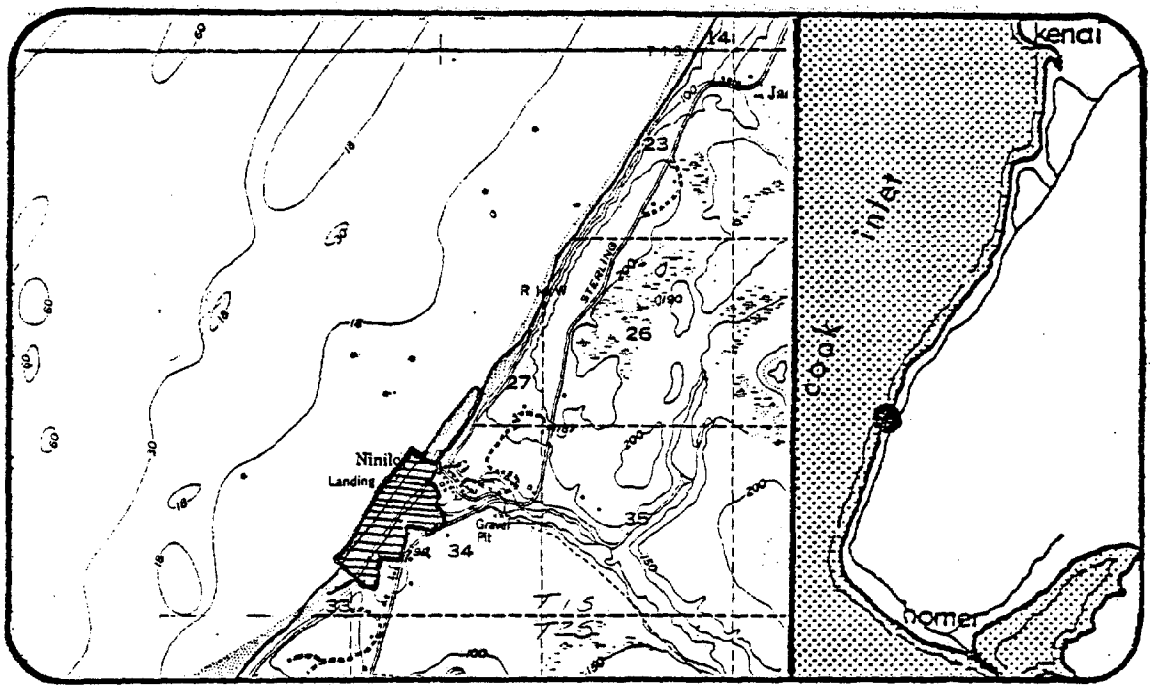
The third Kalifonsky Beach Access Site is approximately 1,050 acres in size. This area will have approximately two miles of coastal bluff; approximately 80 acres of land east of the road which could be utilized for parking and facilities; and nearly 500 acres of muskeg and wetlands which could be reserved from development as open space. As the purpose of this proposal is primarily beach access and open space, several parcels of private land which have been developed for residential use would not need to be immediately acquired. However, should these lands become

available, their acquisition would be advisable.

These last two areas should be acquired, developed, and managed by the State Division of Parks, with the option of turning them over to the Borough at such time as it obtains park and recreation powers.

Action 2: Ninilchik Wayside

The Ninilchik Wayside is located on a bluff overlooking the town of Ninilchik and the Ninilchik River. The existing Wayside is thirteen acres, with only a small portion of the parcel having beach frontage. The lower portion on the beach at Ninilchik is presently subject to a great deal of camping activity. No facilities have been constructed in this area. The upland portion of the Wayside, adjacent to the Sterling Highway, presently receives camping and picnic use.



A portion of the old Ninilchik Airstrip is located on the beach. This should be acquired, as well as a private parcel of land immediately to the south of the Wayside. Acquisition of this additional property will insure that existing public recreation

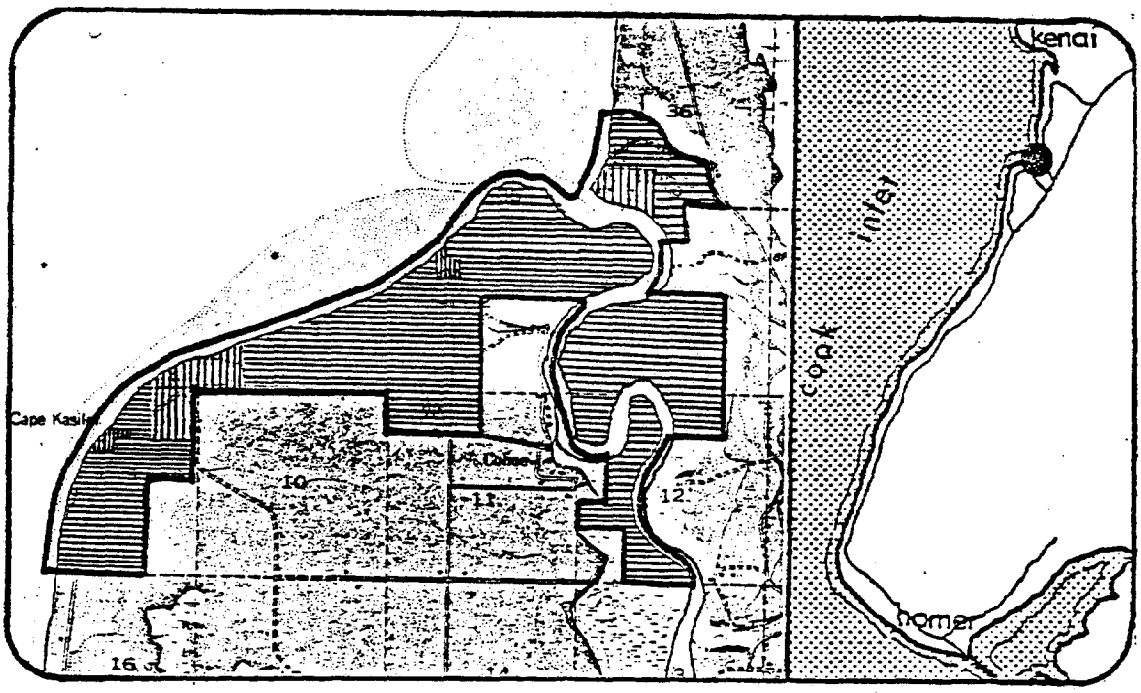
use opportunities are protected. While camping activity should be restricted to the upper portion of the Wayside, the beach section of the Wayside could be developed for limited parking. Tent camping in the lower parking area could be allowed on the margin of the parking area. Areas of vehicular travel should be barriered to prevent further destruction of beach vegetation.

Since the Ninilchik Wayside occurs in an area which, according to the Alaska Department of Fish and Game, provides a wintering ground for moose, area vegetation should be managed to protect winter browse plant species. Facility design should also consider the historic and architectural qualities of Ninilchik Village and avoid locating structures which are in contrast to the village.

Should funds become available or land trades possible, those private lands on the bluff between Ninilchik and Deep Creek waysides should be acquired. Lands to be acquired are shown on page 193 of the appendix.

Action 3: Mouth of the Kasilof River

Existing public lands surrounding the mouth of the Kasilof River are currently being used for public recreation. Present use includes picnicking, beachcombing, boating, fishing, and some camping. Beaches in the area are sand, while the backshore is primarily wetlands. These backshore wetlands and the off-shore waters serve as important marine and waterfowl resting and foraging areas. Anadromous fish utilize the Kasilof River to gain access to Tustemena Lake. Clam digging is good in the vicinity of Cape Kasilof to the south of the river mouth. A commercial and recreational boat ramp and dock facility are presently operated by the City of Soldotna on the northern side of the river mouth.



A parcel of private property should be acquired near the boat ramp. State lands surrounding this private parcel on the north

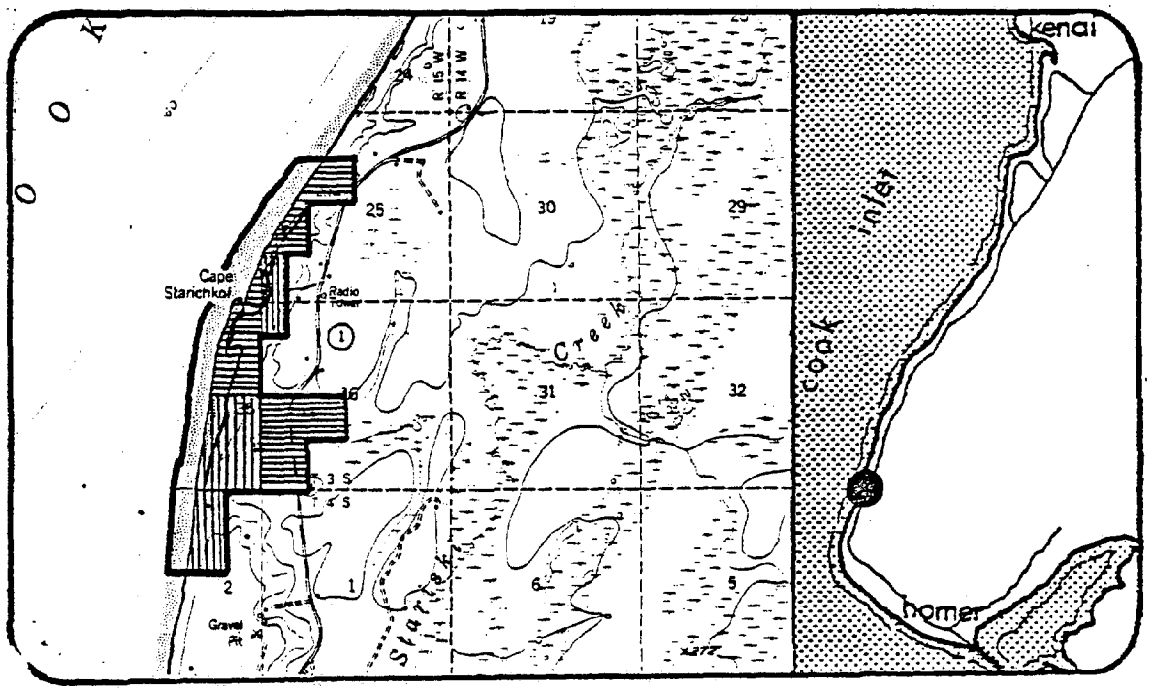
side of the river mouth have been identified by the State Division of Lands in Planning Report #120 as being best suited to public recreation. To the southwest of the river mouth towards Cape Kasilof is what is believed to be the remains of a Russian fort. Park designation of this area will insure the protection of this historic resource and open the possibility for the development of interpretive facilities on this site. Upland areas near Cohoe Loop Road contain sufficient and suitable acreage for campgrounds and other recreational support facilities.

Kasilof Loop Road provides access to the northern portion of this area, while the southern section is accessible by use of the Cohoe Loop Road. Wildlife habitat values of the area's wetlands should be protected from roads or recreational development.

This area is approximately 1,500 acres in size. The boundaries of the proposed area encompass State, Borough-selected, and some private land. Acquisition, development, and operation of this area should be undertaken by the State Division of Parks.

Action 5: Cape Starichkof/Stariski Creek

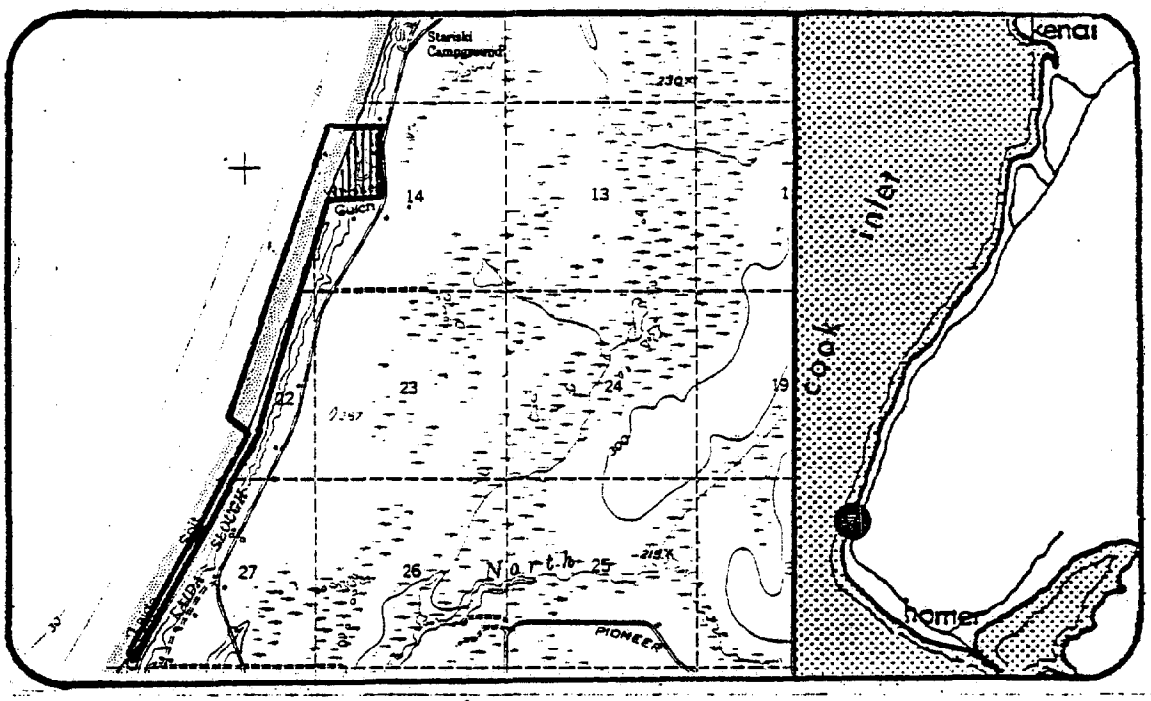
This area possesses a unique one-mile long sandspit with Stariski Creek serving as an estuary immediately behind it. Fishing is excellent at this site and there exists the potential for clam digging, beach combing, and observing wildlife. Camping and picnicking are also possible uses of this area. Brown bear are occasionally seen foraging and fishing along Stariski Creek. The scenic quality of this area is high.



The majority of this area is in public ownership (e.g., both State and Borough-selected lands). However, a portion of private land would have to be acquired. As this private land presently contains a residence, acquisition of this land with life tenure for its residents would be the most logical means to insure protection of the area for future public use without displacement of its present owners. This proposal is 448 acres in size.

Action 6: Whiskey Gulch/Laida Spit

Whiskey Gulch is located approximately three miles south of Cape Starichkof. A road constructed from the uplands to the beach in the Whiskey Gulch area has led to the use of this area and Laida Spit for recreational purposes. Camping on the beach, surf fishing, and beach combing are popular activities. The beach in this area is probably the widest found anywhere on the west Kenai coastline. Moreover, Laida Spit, which is presently stable (not actively eroding or accreting), is nearly two and one-half miles in length.



A wash-out of the access road during the summer of 1976 has presently rendered the beach area inaccessible by automobile. The possibility of reconstructing the beach access road should be carefully considered. Present use of the beach area by automobiles

has not greatly affected beach vegetation; however, increased use levels, which can reasonably be expected in the future, will most certainly damage the fragile beach vegetation. The reconstruction and upgrading of the access road would most likely be extremely costly and thus, unrealistic. An alternative to opening the beach to automobile use would be the construction of upland parking and foot access only. Tent camping facilities could be constructed on the beach. Private land surrounding the Whiskey Gulch access road should be acquired and Laida Spit, which is publicly owned, dedicated for public recreation use. Laida Spit is 40 acres in size. The area to be acquired near the access road is approximately 60 acres. It is important that this area receive adequate protection to preserve public access to this unique beach area.

GROUP C OBJECTIVE:

MEET LONG-TERM OPEN SPACE AND RECREATION NEEDS ON THE WEST KENAI SHORELINE

Action 1: Bluff Point Natural Area

Several miles south of Anchor Point exists the potential for the establishment of a large natural area or greenbelt due to the large amount of consecutive public ownership of lands. This area is predominantly muskeg with scattered sections of spruce forest. This area connects with the old Sterling Highway at four points which would help to disperse public use. Although the bluff in this area is extremely high, several drainages exist where trails could be constructed to the beach. There are a number of creeks and ponds in the area. Trail systems could be developed in forested areas where soil conditions would be more suitable. Where muskeg is crossed, boardwalks should be utilized.

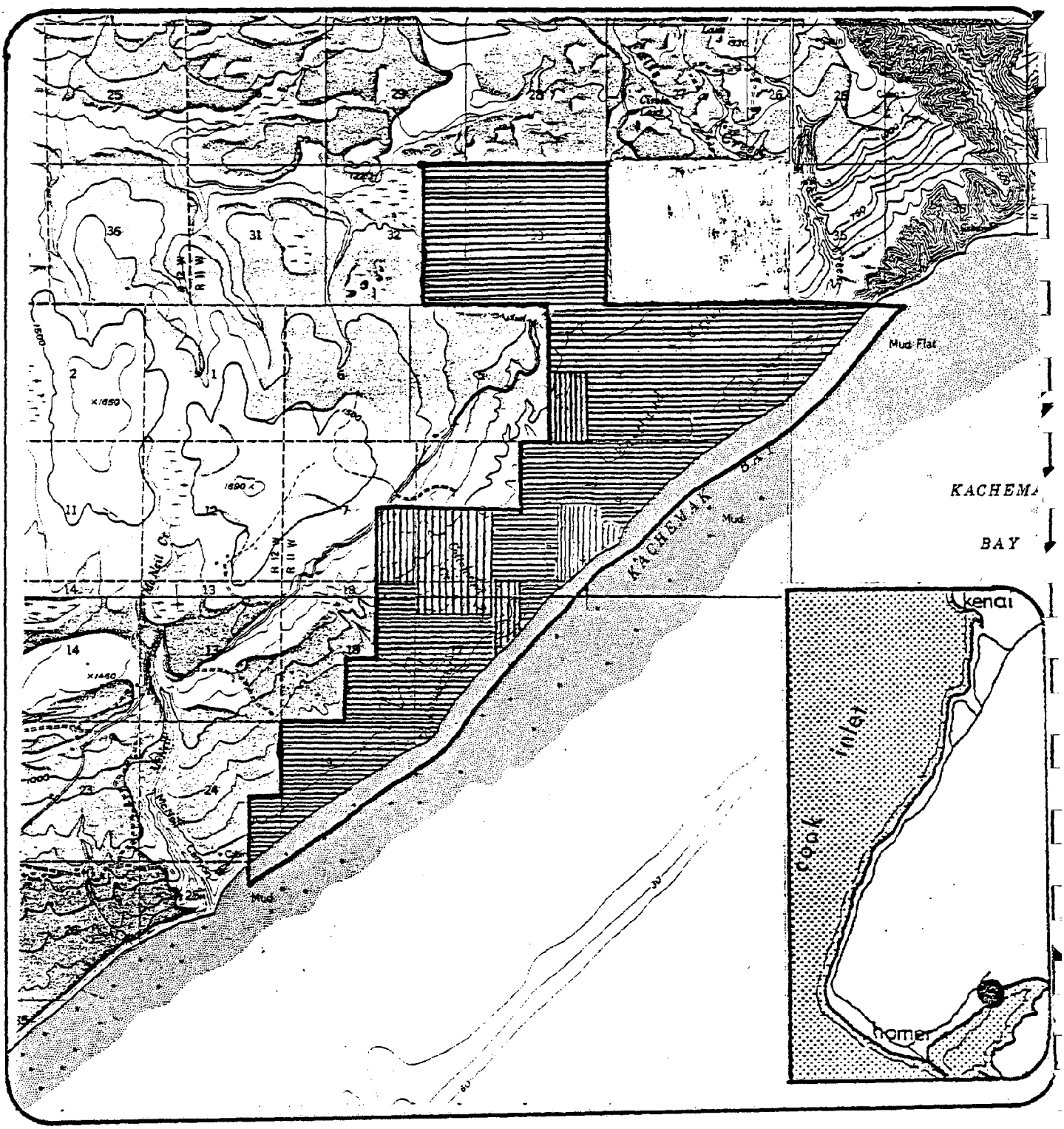
The proposed site is 6,080 acres in size. Acquisition of private parcels near Mutanala Gulch and on a drainageway to the north is desirable but not critical at present.


RIVER
Kenai
Cook Inlet
Homer
Dilly Lake
Bluff

Action 2: Cottonwood and Eastland Creeks

This area is located at the head of Kachemak Bay on the northern shoreline. Several large parcels of publicly owned land occur in the vicinities of both Cottonwood and Eastland Creeks. Cottonwood and Eastland Creek's drainages offer outstanding scenic qualities as well as a means of providing a beach access from the uplands. Several archaeological sites exist in the area, and there is a high probability that additional sites will be identified.

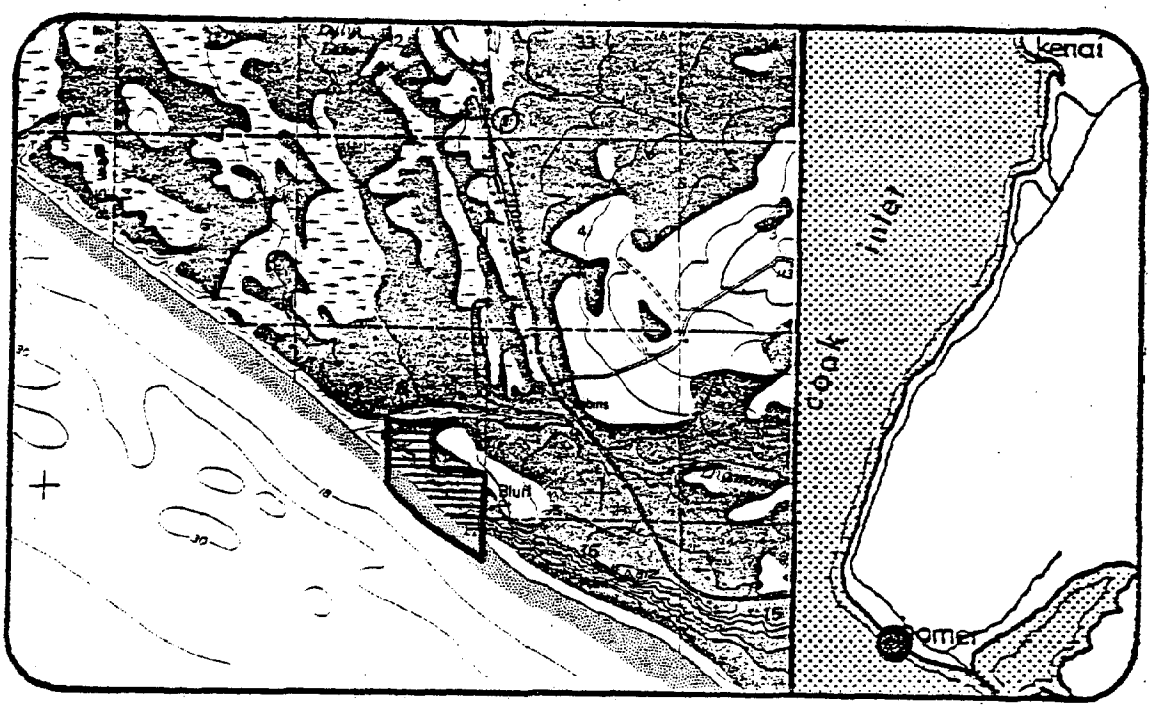
The East End Road from Homer passes through the proposal in two locations, providing the potential for road access. The potential for camping, observing nature, beachcombing, fishing, and hiking, exist. The dedication of these two parcels of public land and the acquisition of private lands between these parcels will insure the protection of recreation, scenic, and historic qualities of this area. The approximate size of the area is 3,960 acres.


Mud Flat
KACHEMAK BAY
KACHEMAK
BAY
Mud
Kenai
Cook Inlet
Homer
R 12 W
R 11 W
T 6 S
T 7 S

Action 3: Diamond Gulch

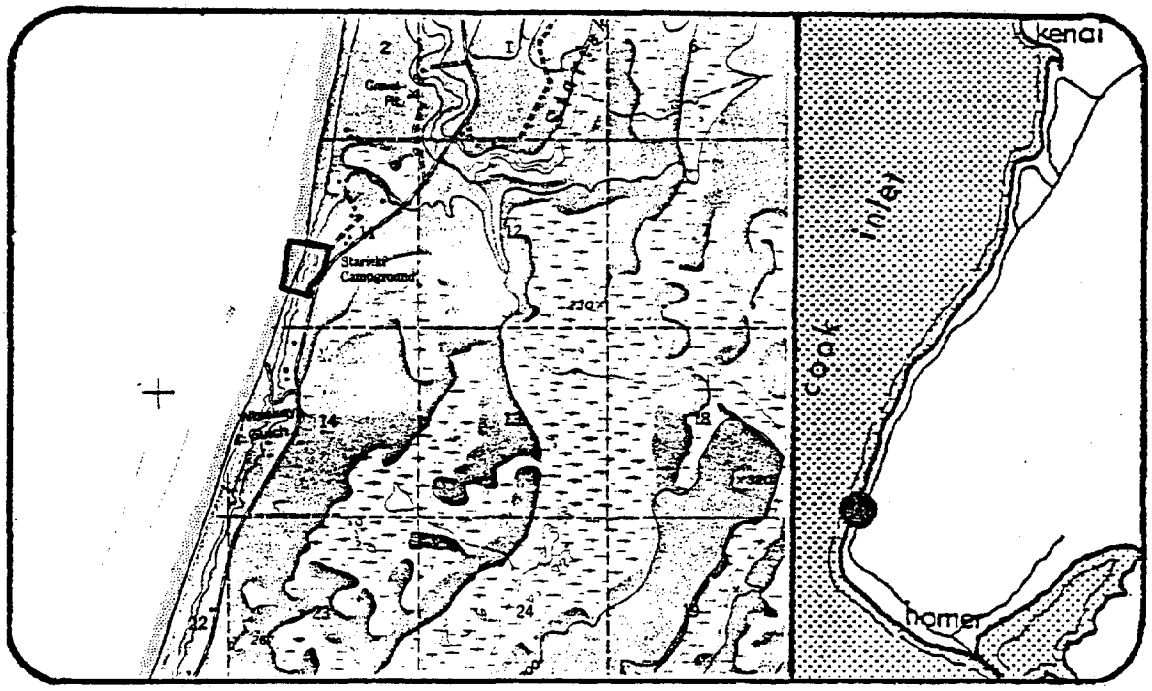
To the south of Diamond Gulch is a parcel of Borough-selected land which has been previously classified by the State for public recreation. With approximately one-half mile of beach frontage, this area could be developed for beachcombing and camping. Trail access from Diamond Gulch Road could be constructed to this area. A right of way would have to be acquired from adjacent property owners. Hike-in campsites could be constructed in the uplands and the small drainages which exist in the area could be used for trail access to the beach. This parcel comprises some 95 acres.

Should land north of this area become available, acquisition would be desirable.



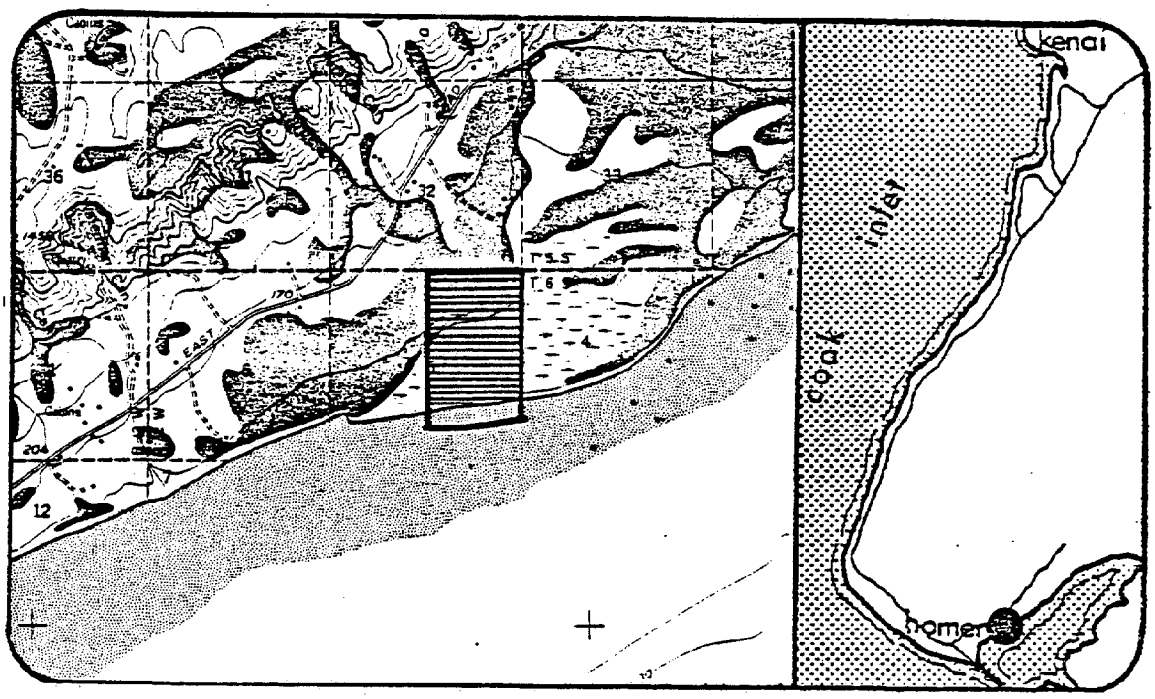
Action 4: Stariski Wayside

Stariski Wayside is approximately 30 acres in size and has been developed with twelve campsites. The campground is located on a high bluff overlooking Cook Inlet and the Alaska Range. A heavily timbered site, Stariski Wayside offers excellent camping opportunities. As the site is located on a high stable bluff, it may be possible to construct a trail or trail and staircase system to provide access to the beach. Additional acreage adjoining the Wayside should be purchased. Until such time as the Wayside could be expanded, limits on the number of persons camping at one time should be enforced to protect the vegetation and avoid soil compaction problems.



Action 5: Fritz Creek

Several miles east of Homer occurs a parcel of State University and Borough-selected lands approximately 220 acres in size near the mouth of Fritz Creek. These lands should be reserved as future recreation and open space. As the level of residential development increases on the East End Road, open space will be necessary to help retain the rural quality of this area. In addition to retaining a portion of the public coastline in this area, the upland portion of this site could be developed for community recreation needs. The lower portion of this site is muskeg and should be reserved from development. Future access to this area by either road or trail would require the purchase of a right of way.



GROUP D OBJECTIVE:

FUTURE GOVERNMENTAL AND PRIVATE LAND USE ACTIONS NECESSARY TO HELP INSURE THE QUALITY AND ACCESSIBILITY OF COASTAL RECREATION RESOURCES IN THE AREA

Public Road-Ends

Public road-ends abutting salt water, whether dedicated by prescriptive easement or through subdivision plats, should be retained for public beach access. Vacation of these roads should only occur after a comprehensive assessment of the road's relationship to either present or future recreation needs. This recommendation should be implemented by the State Division of Parks in conjunction with the State Division of Lands and the Kenai Peninsula Borough which have authority for the vacation of publicly owned roads.

Recreational Access Clause for Tideland Leases

The leasing of State owned tidelands in the area should not occur without proper covenances guaranteeing the ability of recreationists to gain access through the subject lease. Oil drilling directly on the beach, sand, gravel, or mineral extraction, or the construction of bulkheads and filling of intertidal areas all present possible restrictions to public use of tidelands. To the greatest degree possible, a means for public travel through or around these facilities should be guaranteed.

Protection of Park Beaches From Adverse Use

As oil and gas or other leases to public tidelands in front of or adjacent to public coastal parks expire, they should be acquired through an interim land management transfer to the State Division of Parks or other public recreation agency managing the area. Adjoining tidal leases should be acquired for as far up the beach as practical to insure protection of beachcombing, clam digging, and fishing use areas.

Highway Rest Areas and Pullouts

Highway rest areas and pullouts operated and maintained by the State Division of Highways provide an excellent opportunity for the development of interpretive programs at these sites. Future rest areas and pullouts should be located in areas of high scenic quality and which will allow for interpretation of the coastal zone and its many uses.

Private Campgrounds

The development of privately owned and operated campgrounds in the area should be encouraged. Private campgrounds which generally offer a wide variety of services (showers, laundromat, electric hookups, sewage hookups) not only provide a valuable service to the public but also help to alleviate pressures on publicly owned and operated facilities.

7 implementation

Coordination between the State Division of Parks, the Kenai Peninsula Borough, local town governments, and citizen groups will provide the most effective overall means of implementing the recommendations of this study. Since the Kenai Peninsula Borough is without park and recreation powers, initial implementation should be undertaken by the State Division of Parks. This action would not preclude the potential for Borough or city operation of these areas, but simply that the State would take the lead in initial acquisition and development.

The following is a discussion of specific approaches which may be useful:

Interim Land Management Transfer

The interim land management transfer (ILMT) is a means by which the State Division of Lands transfers management authority of State-owned land to other State agencies, in this case the State Division of Parks. ILMT's should be requested for all State-owned lands included in the proposed park areas. Although ILMT's may not be immediately granted by the Division of Lands, ILMT requests are noted on State status plats and serve to "flag" specific areas for specific uses.

Borough Selected Lands

As many of the State lands included in these proposals have been selected by the Kenai Peninsula Borough, the State of Alaska should work closely with the Borough. Possible actions by the Borough would include; withdrawal of specific selections and the selection of other State lands; or the retention of Borough selections (with the prospect of receiving the patent from the State) and the issuing of a special use permit to the State Division of Parks for a period of 25 years. The 25 year period is necessary in order to receive federal funds for recreation area acquisition and development.

Private Lands

Private lands involved in the study's proposals should be acquired first through the means of land trades involving the State Division of Lands and, if necessary, through purchase. Private lands where persons are presently residing should be acquired through a life tenure arrangement. This means of acquisition allows residents to continue to reside on the land although a purchase of their land by the State has been made. Benefits to the private landowner would include payment for the value of their property in the form of either additional lands or cash. Rights to reside on the property would be retained by the owner. Recreation developments would not be constructed near the residence until after the expiration of the life tenure agreement.

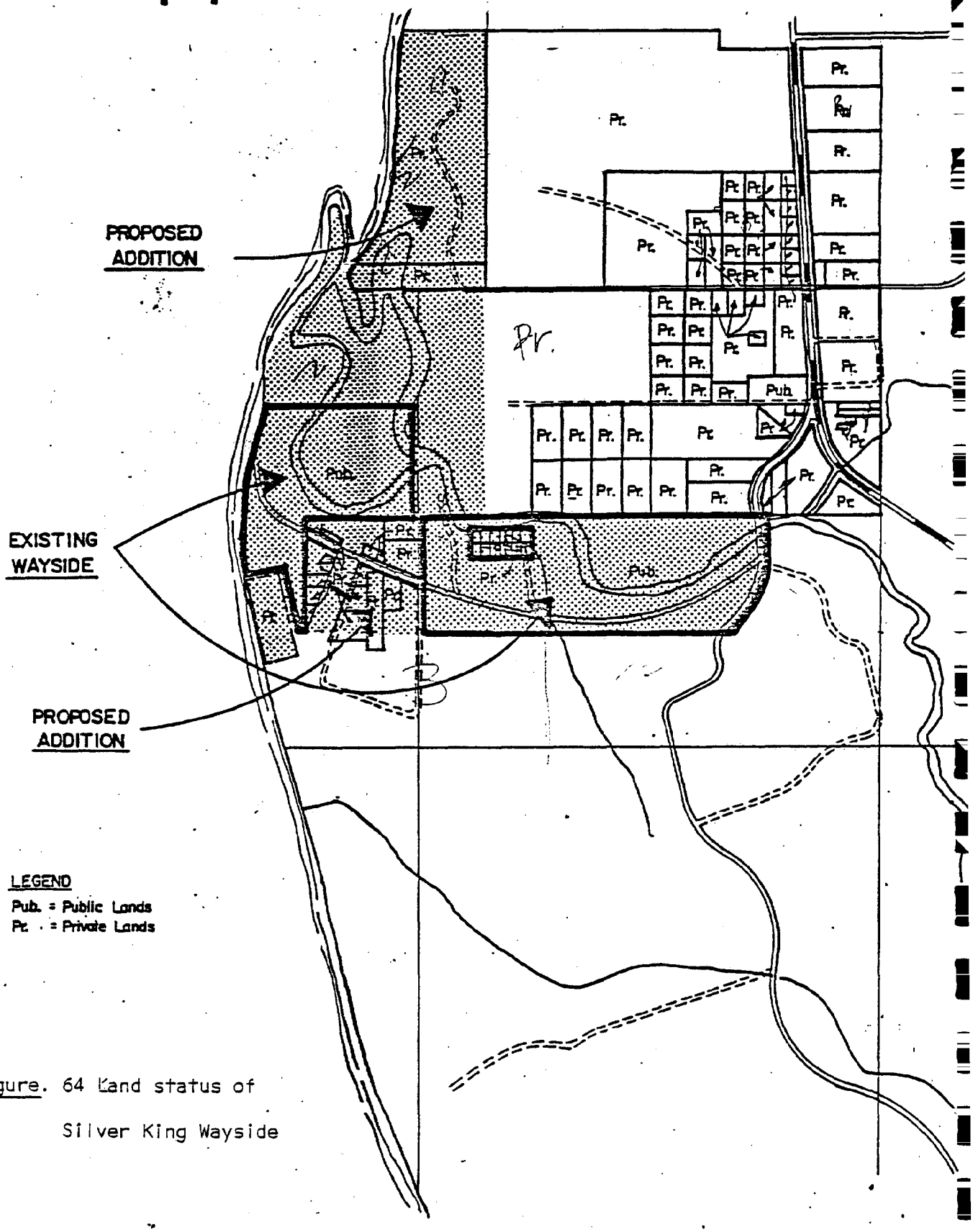


Figure. 64 Land status of Silver King Wayside

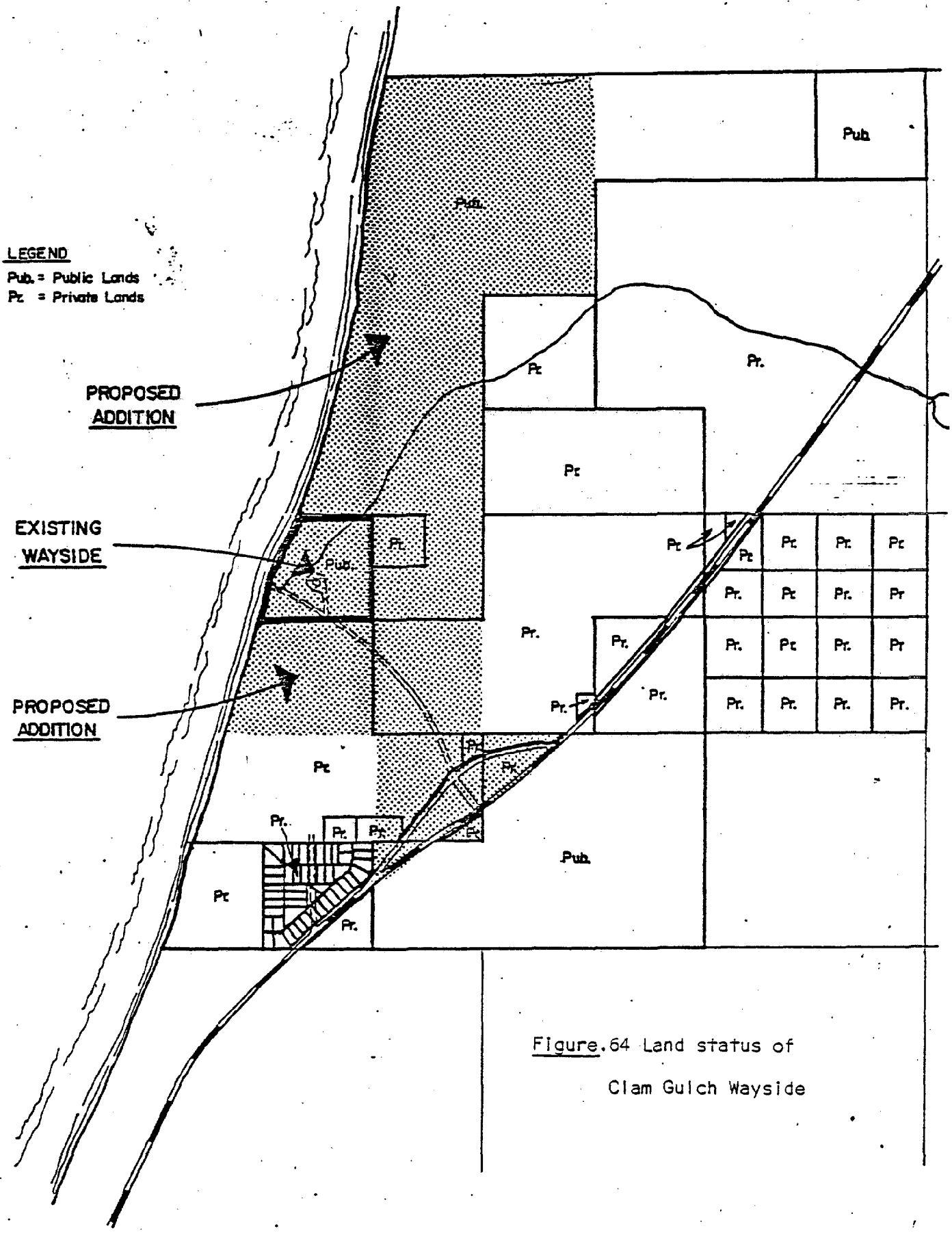


Figure.64 Land status of Clam Gulch Wayside

Figure. 65 Land status of Deep Creek Wayside

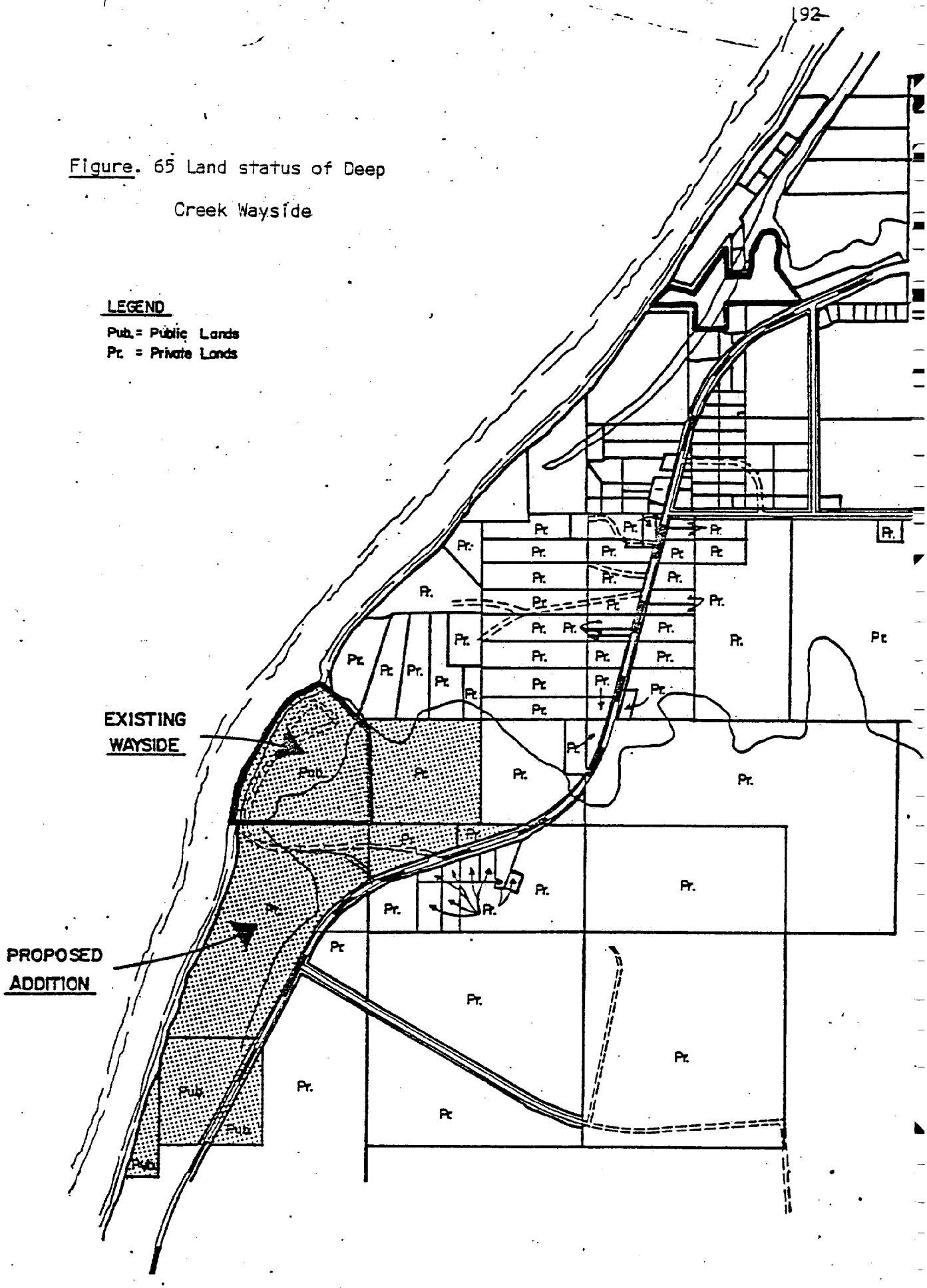
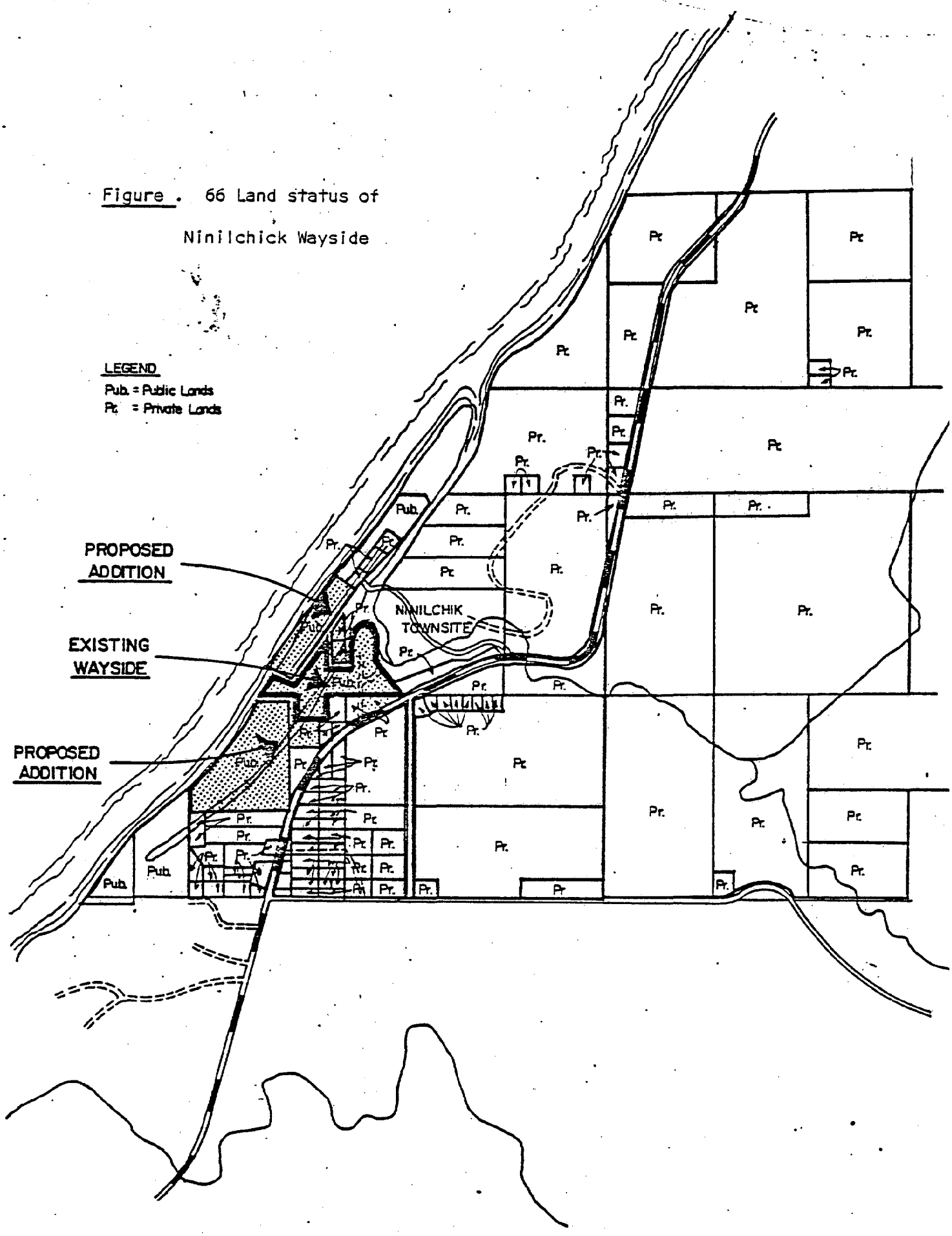


Figure . 66 Land status of Ninilchick Wayside



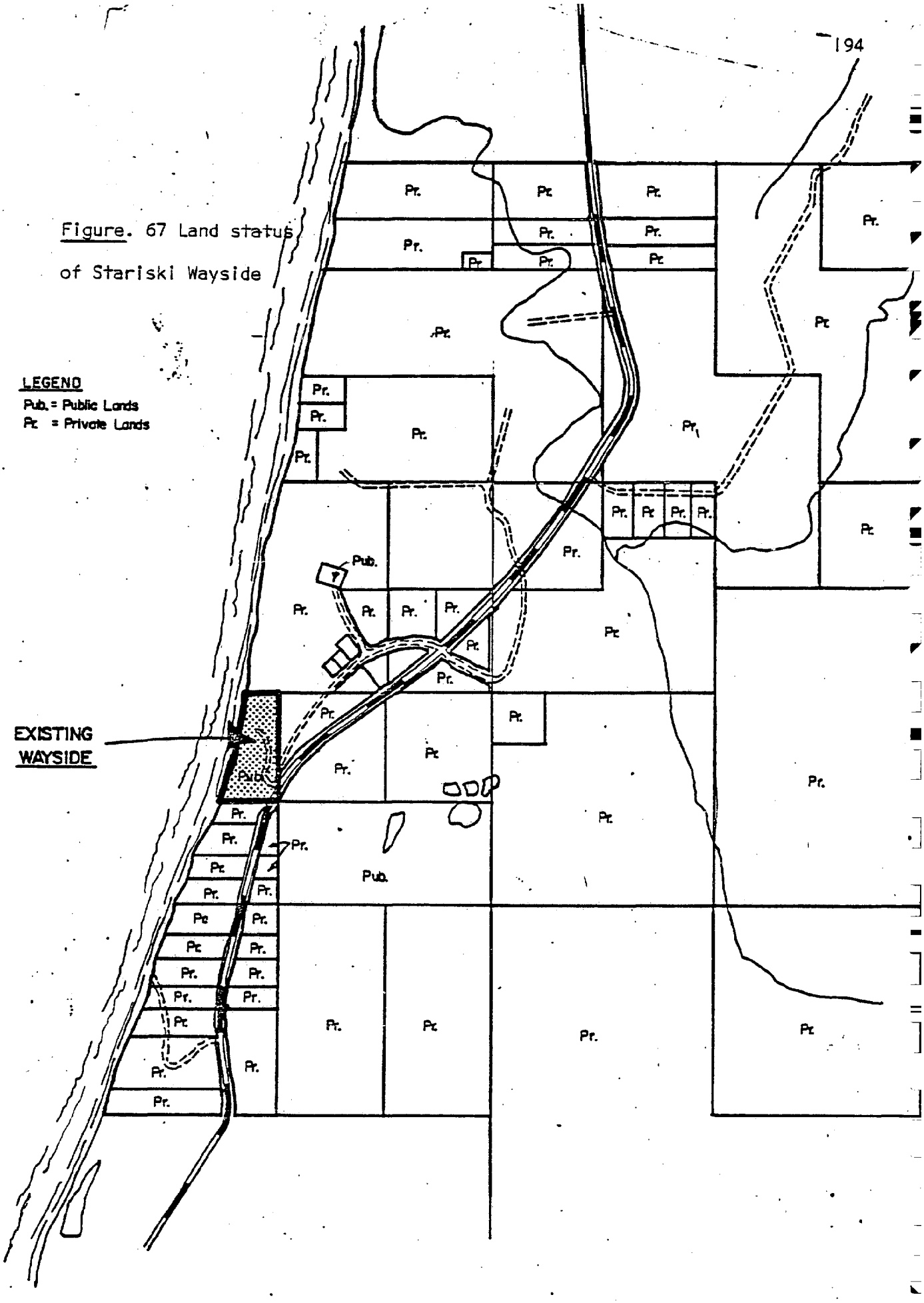


Figure. 67 Land status of Stariski Wayside

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