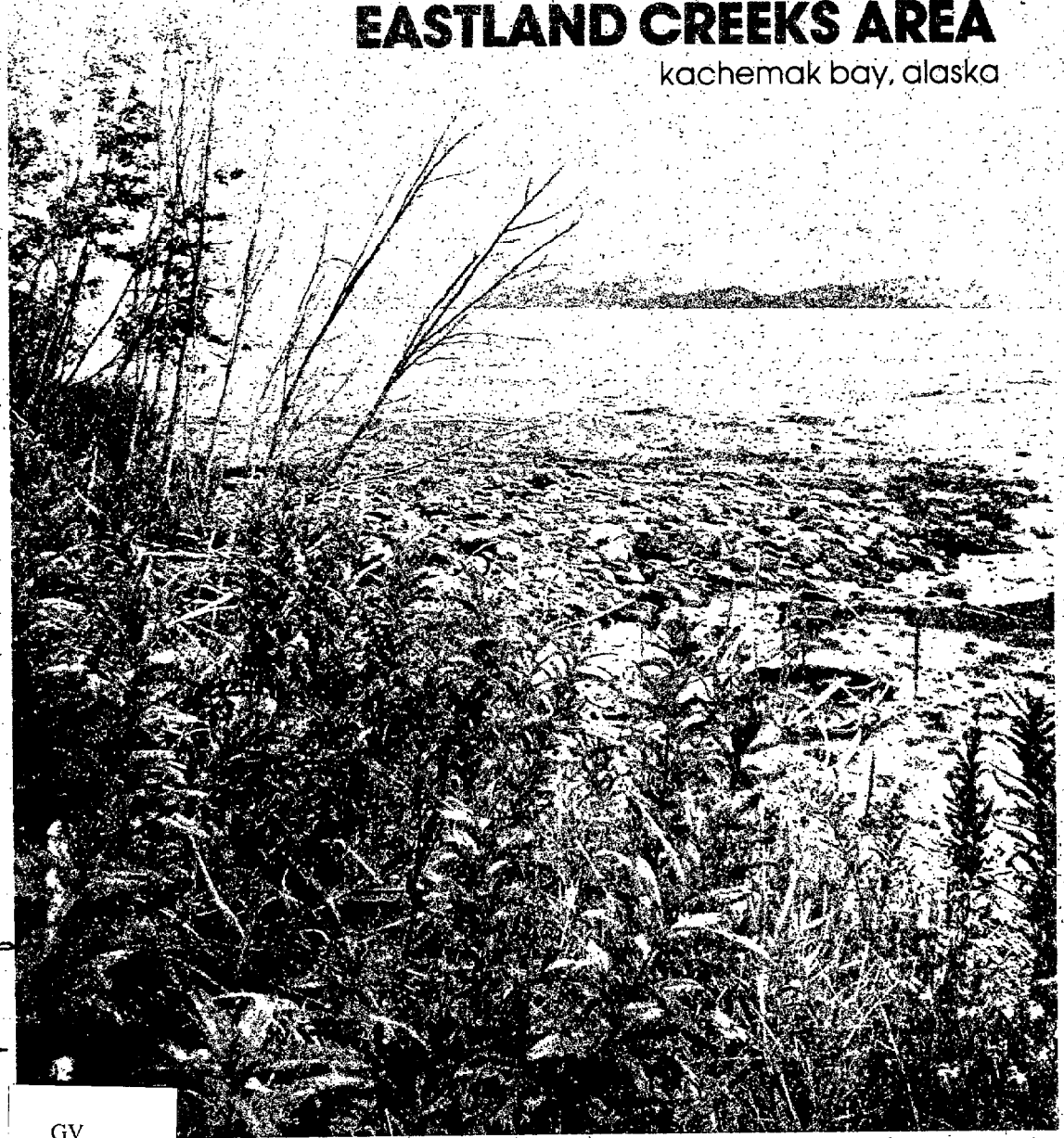
an evaluation of
recreation potential of the lands in the

COTTONWOOD & EASTLAND CREEKS AREA

kachemak bay, alaska



TATE PARKS / DEPARTMENT OF NATURAL RESOURCES 1979

An Evaluation of the Recreation Potential of Lands in the Cottonwood and Eastland Creeks Area

A Report by

Planning Section
Alaska Division of Parks
Department of Natural Resources

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ABSTRACT

This report has been prepared to explore the feasibility of designating publicly owned lands in the vicinity of Cottonwood and Eastland Creeks (northeast of the City of the City of Homer) for public recreation and openspace purposes by the State. The Cottonwood and Eastland Creeks area was first identified by the Alaska Division of Parks for its public recreation potential in the Division's draft 1976 report titled "Coastal Recreation Resources: West Kenai Peninsula, Alaska." Since that time, growing demands for campgrounds and recreation facilities on Homer Spit, in the City of Homer and elsewhere on the Kenai Peninsula has led to a need to more fully explore the possibility of establishing a state recreation or park at this location.

The following subjects are discussed as they relate to the study area: natural and cultural resources; socioeconomic characteristics; regional needs; local attitudes and concerns; recreation use patterns; potential park boundaries and development intensities; and general recommendations pertaining to future management of the area if a park is eventually established.

Recreational opportunities in the area include hiking, camping, picnicking, berry picking, beachcombing and observing wildlife. Over the course of the four month study of this area, the author and the Division of Parks planning staff have determined that the establishment of a recreation area or park at this location is not only feasible but is also desirable. Local residents seem to share this conclusion with over 80% of the persons (31) attending a public meeting in Homer on the matter desiring to see some type of park established. This report recommends that strong consideration be given to the establishment of a 3,020 acre recreation area with the development of low intensity recreational facilities being delayed until 1983. The purpose of a delayed development plan is to allow for a reassessment of adverse social and environmental impacts which may result from recreational use and development in the area.

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INTRODUCTION

This report has been prepared to explore the feasibility of designating publicly owned lands in the vicinity of Cottonwood and Eastlands Creeks (northeast of the City of Homer) for public recreation purposes by the State. The Alaska Division of Parks first identified this area as potential parkland in 1976.

The demand for public recreation lands and facilities with coastal frontage is growing on the Kenai Peninsula. Already, existing coastal recreation areas are being overused. Additionally Kenai Peninsula residents have expressed concern over the protection and maintenance of the areas rural character. To help maintain a vestige of the lower peninsula's rural character and provide lands for future recreation opportunities efforts need to undertaken to evaluate remaining undeveloped lands for their park potential.

This situation has lead the Division of Parks to study lands in the Cottonwood and Eastland Creeks area, among other places, for public recreation and open space uses. This report discusses natural and cultural features found in the area, land ownership and interests, local and regional conerns as they relate to these lands and makes recommendations concerning the area's future management.

Area and Regional Setting

The study area (see Figure 1) is located on the northeast shoreline of Kachemak Bay. Both Cottonwood and Eastland Creeks drain the study area. From the City of Homer, the study area is reached by driving about seventeen miles east on East End Road.

The climate of the area is generally moist with mild weather compared with the rest of Alaska. As a result, the area has a longer growing season than most other parts of Southcentral Alaska. Diverse topographic features exist in the study area. Cottonwood, Eastland and Falls Creeks have eroded deep canyons into the land. In addition, steep coastal bluffs, some over 400 feet high, line the shore of Kachemak Bay. Except for these canyons and bluffs, the land is gently sloping.

The quality of the soils vary, but they are generally capable of supporting roads and structures. The soils are suitable for agriculture in many parts of the study area.

Spruce forests dominate the upland areas, with the exception of small scattered meadows and small thick patches of brush. In the canyons and on the faces of the coastal bluffs, alder is the dominant type of vegetation. Throughout the area wildflowers and berries are abundant.

There are not any lakes or ponds in the study area, but creeks flow year around and provide potable water. Several waterfalls enhance the scenery of the study area.

Wildlife in the area includes black bear, moose, red squirrel, bald eagles, spruce grouse and many species of small birds. Other wildlife thought to occur in the area, but not verified, include lynx, snowshoe hare, mink, weasel, coyotes, wolves, porcupines and red-backed voles. Ducks and seabirds utilize the nearshore waters of Kachemak Bay. Fish are not present in the creeks, but a wide variety of species occur in Kachemak Bay.

The area holds abundant evidence of prehistoric occupation. Known archaeological sites are located near the mouths of both Cottonwood and Eastland Creeks. The Cottonwood Creek site has been nominated to the National Register of Historic Places.

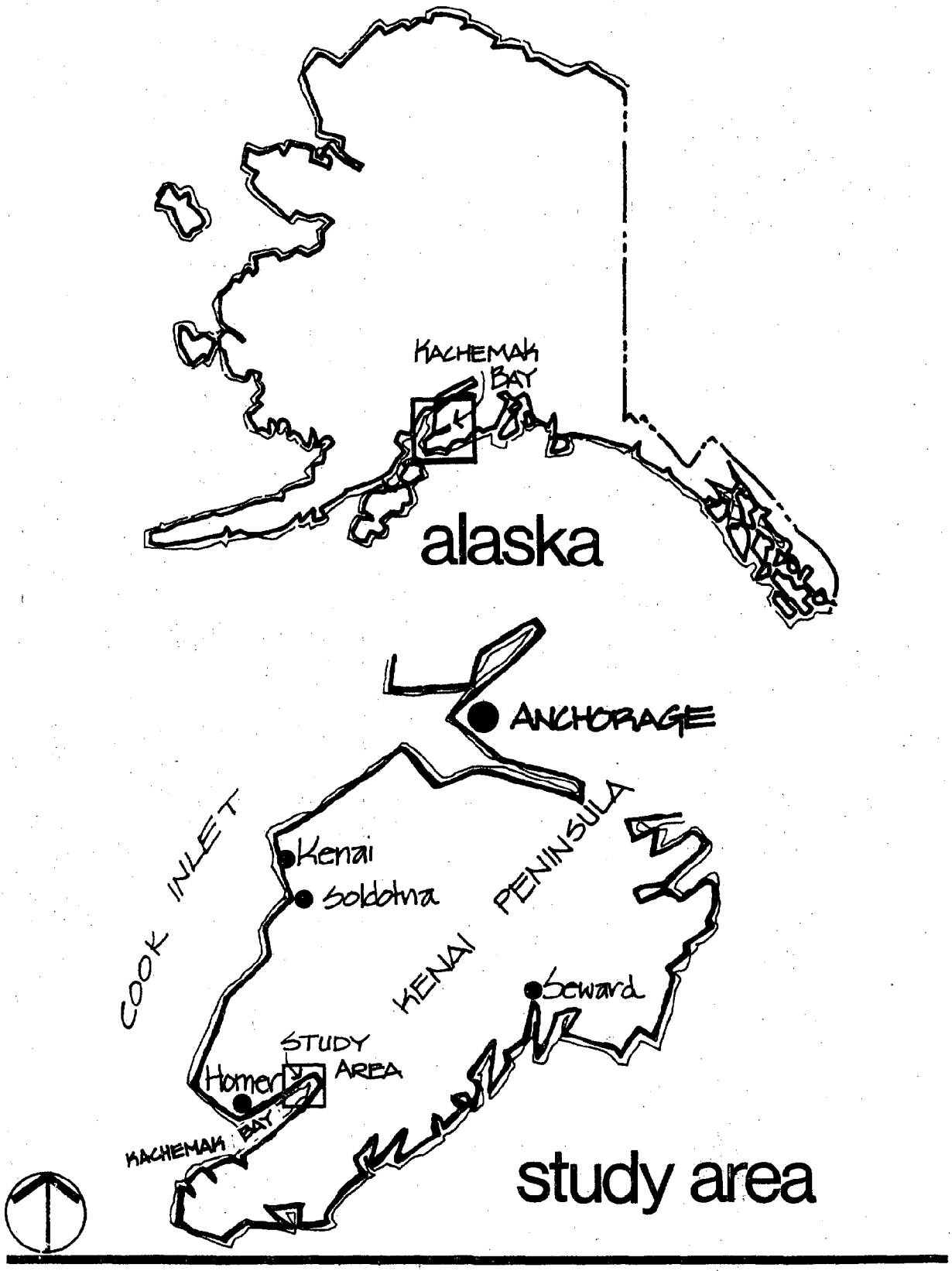

KACHEMAK BAY
alaska
ANCHORAGE
COOK INLET
Kenai
Soldotna
KENAI PENINSULA
Seward
STUDY AREA
Homer
KACHEMAK BAY
study area

FIGURE 1

The City of Homer exerts an economic and social influence on the people living near the study area. Because the area is easily accessible from Homer via East End Road, many people commute from the vicinity of the study area to work and shop in Homer.

Background

The Alaska Division of Parks first identified the Cottonwood and Eastland Creeks area as a possible location for a recreation area in 1976. This is documented in a Division of Parks publication titled "Coastal Recreation Resources: West Kenai Peninsula, Alaska." This report contains an inventory and description of those coastal areas on the West Kenai Peninsula which would be suitable for designation as public recreation areas. The Cottonwood and Eastland Creeks area was one of several areas identified for future study. More recent concerns expressed over overcrowding on Homer Spit, a fourteen percent annual population increase within the City of Homer, and the likelihood of State or Borough land sales in the Cottonwood and Eastland Creeks area has led to the need to more fully assess the recreation use potential of this area.

Goals and Objectives

The goal of this report is to evaluate the recreation potential of the lands in the study area and make recommendations concerning the desirability of withdrawing these lands for recreation purposes. This includes the following objectives: 1) determine if the natural environment is conducive to and capable of supporting recreation uses, 2) determine if the socioeconomic system can support recreation area designation, 3) determine the extent to which recreation area designation may meet regional recreation and open space related needs, 4) determine local attitudes and concerns in regard to recreation area designation, 5) determine present recreation uses of the study area, as they relate to recreation area designation, and 6) recommend alternative boundaries and development concepts for a recreation area including a no action alternative.

Study Approach

The first phase of this study was an inventory of information concerning the natural and socioeconomic environments. This included literature reviews, field studies, discussions with

local residents and a public meeting.

The second phase of the study involved an analysis of the inventory information in view of the study goal and objectives.

The third and final phase involved the development of area boundaries and development concepts as well as general recommendations regarding future management of the area.

NATURAL SYSTEM INVENTORY

Outdoor recreation opportunities largely depend upon the quality and character of the natural system. For the purposes of the following discussion, the natural system includes climate, geology, oceanography, soils, water, vegetation and wildlife. Each of these aspects of the natural system will either provide or place constraints on the recreational opportunities found in the study area. For example, harbor seals frequent the nearshore waters of Kachemak Bay along the study area and the viewing of these seals would be a recreational opportunity provided by the natural system. Recreational opportunities and the constraints on recreational opportunities are discussed at the end of each section under the headings "Implications" and "Recommendations."

Climate

The climate of the Homer/Kachemak Bay area is one of the mildest in Southcentral Alaska. As a result, it is well suited for recreational activities. Early summer is usually sunny and fairly dry. However, in late summer and early fall, cloudy, rainy weather is dominant. Winters are long and moderately cold. In June, July, and August the mean daily temperatures are in the upper 40's and lower 50's. In December, January, and February, the temperatures are in the low 20's. The temperature rarely drops below zero.

The moderate climate results from the marine influence of Kachemak Bay and Cook Inlet. Furthermore, the area is protected by mountain ranges. The Alaska Range protects the area from severe outbreaks of cold air following southward from the interior. Also, the Kenai Mountains to the east block the flow of moist air from the Gulf of Alaska.

Despite the mountains, prevailing winds blow from the northeast, but these winds are seldom strong. Most strong winds that reach the area are channeled up Cook Inlet from a west-southwesterly direction.

Precipitation data is not available for the study area, but data is available for Homer. Homer receives approximately 23 inches of precipitation annually. Because most of the study area is at higher elevations, the precipitation there will probably be slightly greater. Climate data for the Homer area is contained in Figures 2 and 3 .

CLIMATOLOGICAL DATA - HOMER [3]

	Temp.[1] Min. Ave.	Temp Mean Ave.	Temp Max. Ave.	Total[2] Precip.	Snow[2]
JANUARY	14.0	20.7	27.3	1.73	10.4
JULY	44.6	52.4	60.2	1.69	0.0
YEAR	29.2	36.4	43.6	23.0	55.4

1. Degrees Faherenheit
2. Inches
3. Elevation - 67 feet

SOURCE: Evans et al. 1972.

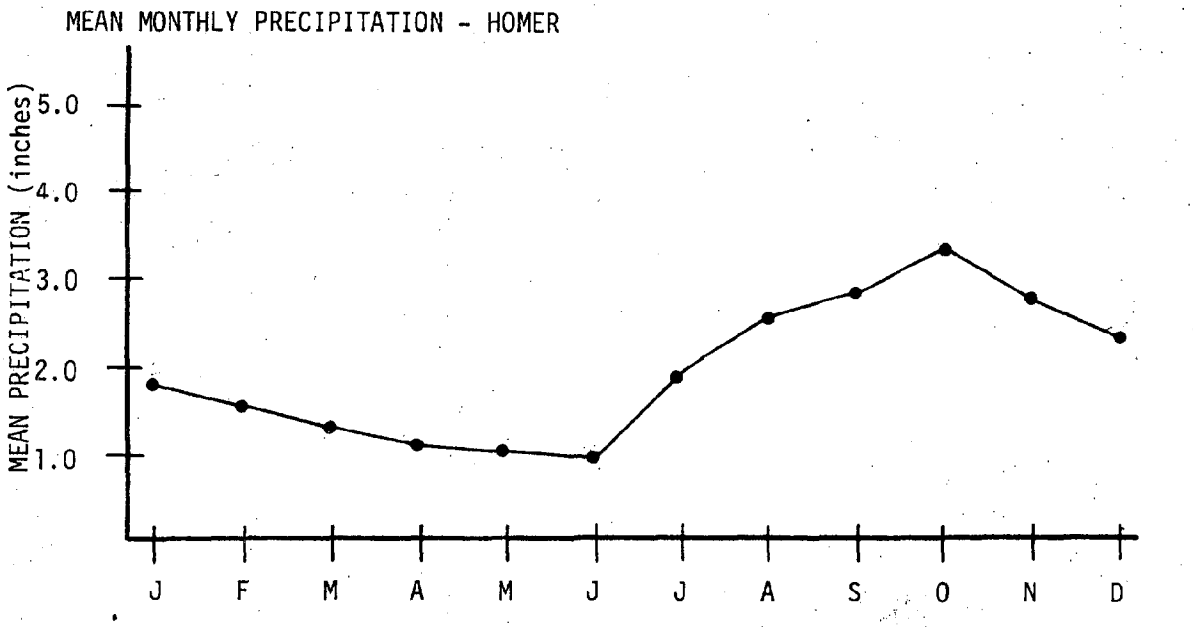


FIGURE 3. CLIMATE DATA

SKY CONDITIONS, FOG AND THUNDERSTORMS - HOMER and ANCHORAGE

STATION	MONTHLY VARIATION OF MEAN TENTHS SKY COVER	Mean Number of Days Per Year			
		CLOUDY*	THUNDER-STORMS	HEAVY FOG**	VISIBILITY LESS THAN ½ MILE
HOMER	5 to 8	223	1	9	10
ANCHORAGE	6 to 8	235	1	28	28

* Generally, 8-10 tenths coverage
** Visibility is reduced to 1/4 mile or less
NOTE: Thunderstorm occurrence is rare with an average frequency of 1 to 3 annually
SOURCE: Swift, W.H. et al. 1974.

MEAN MONTHLY TEMPERATURES - HOMER

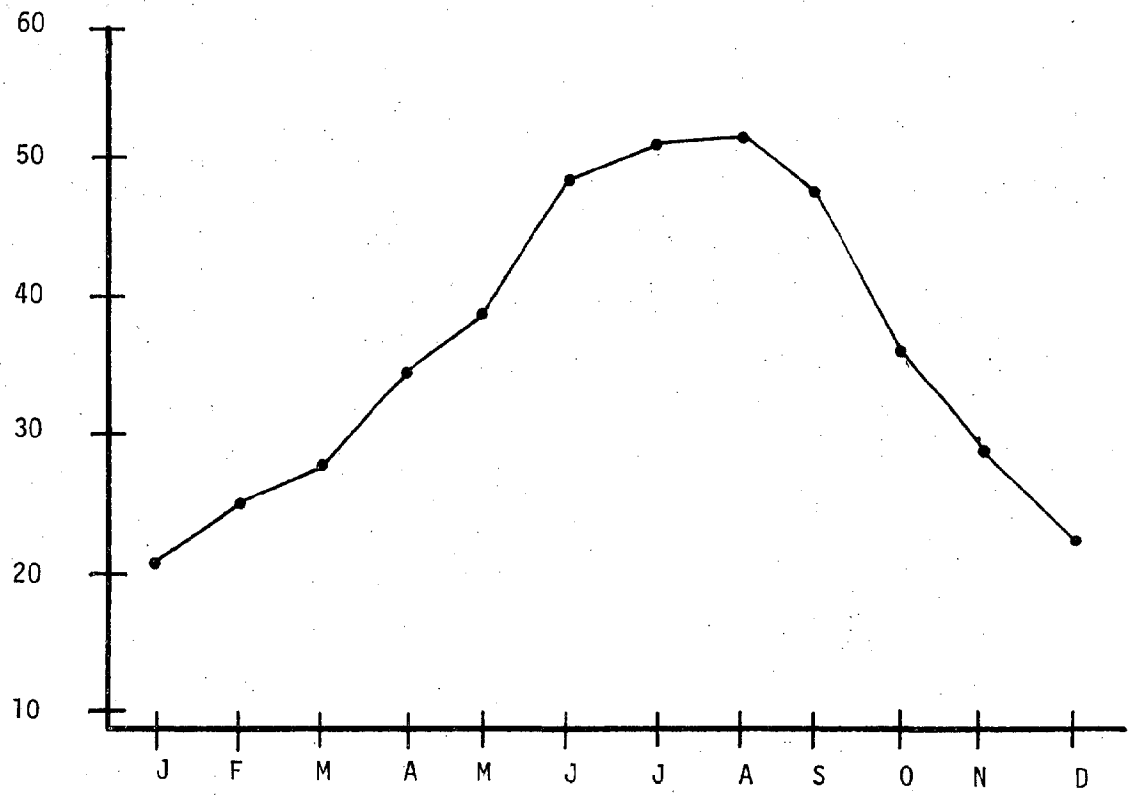


FIGURE 2: CLIMATE DATA

Implications

1. The moist, and mild climatic conditions will probably make cross-country skiing poor, because the snow will melt periodically.

Recommendations

1. Because of the frequent rain storms, visitor shelters should be considered in the planning of recreation facilities.

Geology

The area of Cottonwood and Eastland Creeks is underlain by the Kenai Group which is sometimes called the Kenai formation (Dick Reger, personal communication, 1978). The Kenai Group is a gently folded sedimentary deposit which is several thousand feet thick (Soil Conservation Service, 1971). In the study area, it is exposed at the surface in many places, but it is usually covered by other materials, ranging in thickness from less than a foot to more than 200 feet (Dick Reger, personal communication, 1978). The Kenai formation is exposed at the surface near canyon edges, on canyon walls and along the sea cliffs. There are also a few outcroppings on near level terrain (Reger, 1977). Figure 4 contains a map of the surficial geology of the study area.

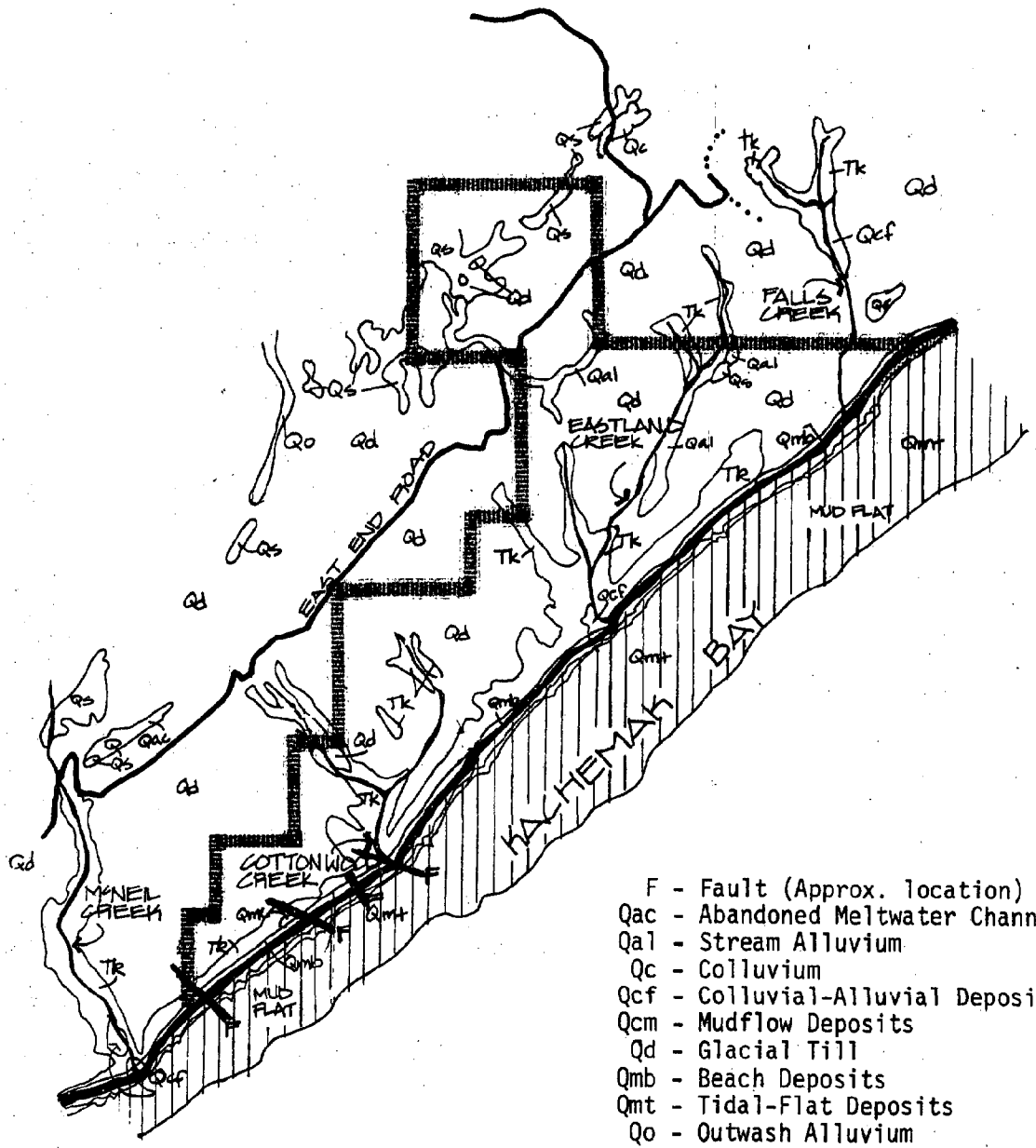
The Kenai Group is composed of silt stone, sand stone, clay stone, coal, Ferrugenous material and iron stone. Ferrugenous material is composed of iron oxides which were transported into the Kenai formation through the ground water system.

Iron stone is a silt stone which is impregnated with an iron oxide called hematite. Iron stone usually occurs in nodules (Dick Reger, personal communication, 1978).

The Kenai Group was formed during the Eocene Age which began 53 million years ago. During the Eocene, the Kenai lowlands were often submerged under freshwater through which layer upon layer of sand, silt, and clay were laid down (Soil conservation Service, 1971).

The Kenai Group also contains coal beds which formed during the Eocene. In the area of the creeks, the coal beds formed in small swamps where trees and plants grew abundantly. As these plants died, they accumulated as layers of organic matter. Periodically, this organic matter was buried by sediment carried in streams. Through the release of volatile components and compression, this organic matter eventually became coal. Geologists have determined that the coal beds were formed in numerous, small swamps because the coal beds occur in numerous, small, thin, lense shaped deposits. The beds contain both bituminous and lignitic coal, both of which have a relatively low energy content (Soil Conservation Service, 1971).

The Kenai Group is covered by more recent deposits including glacial till, outwash, colluvial-alluvial deposits, alluvium,



F - Fault (Approx. location)
Qac - Abandoned Meltwater Channel Fill
Qal - Stream Alluvium
Qc - Colluvium
Qcf - Colluvial-Alluvial Deposits
Qcm - Mudflow Deposits
Qd - Glacial Till
Qmb - Beach Deposits
Qmt - Tidal-Flat Deposits
Qo - Outwash Alluvium
Qs - Swamp Deposits
Tk - Continental Clastic Rocks of the Kenai Group

SOURCE: Adapted from a Photointerpretive map of the surficial Geology of the Southern Kenai Lowlands, Alaska. R.D. Reger

SURFICIAL GEOLOGY

FIGURE 4

and to a very limited degree losses. Glacial till is the most abundant material resting on the Kenai Group. Till is usually heterogeneous, containing clays, gravel, and even boulders. The small particles resulted from abrasion caused by the movement of glaciers over the surface of the earth. The large particles result from rocks which were carried on and in the glaciers, and were deposited when the glaciers melted (Dick Reger, personal communication, 1978).

The glaciers which formed the till occurred in the Pliestocene Epoch (1.5 million years ago to approximately 15,000 years ago). During this period, there were five major glacial advances, and within each major advance there were minor advances. Each time the glaciers pushed down from the high mountains they scoured the ground; sometimes the ground was tertiary bedrock, e.g., the Kenai formation.

Outwash is sand and gravel which is deposited by meltwater from glaciers. Past glaciers left one moderately large deposit of outwash in section 6 (T5S, R11N, S.M.) of the study area (Reger, 1977).

Colluvial-alluvial deposits are also found in the study area. The largest deposits occur at the mouths of McNeil, Cottonwood, and Eastland Creeks. These deposits indicate that huge mudslides occur in the canyons of the study area. Such mudslides can be very destructive; this point will be expanded on later (Reger, 1977; and Dick Reger, personal communication, 1978).

Similar to mudslides, are landslides which also occur in the area of the Creeks. Landslides also have a great destructive force (Dick Reger, personal communication, 1978).

Alluvium is material that is deposited by water. It is found along some stretches of Cottonwood and Eastland Creeks away from the sea cliffs. The alluvial material could contain sand and gravel. Wind deposited materials, losses, are not common in the area of the Creeks (Dick Reger, personal communication, 1978).

Earthquakes: The Kachemak Bay area, like most areas in Southcentral Alaska, is prone to earthquakes. When quakes do occur, they often cause accelerated erosion of the sea cliffs. Several small faults exist in the study area (see Figure 4).

Implications

1. Because glacial till in the study area doesn't contain much pure sand or gravel, it is a poor source of construction materials. However, it packs well and usually supports roads well.

2. There is little sand or gravel suitable for construction material in the study area or in the East End Road area. This may make road construction expensive.

   There are two places where construction material might be found. One is in section 13, the other is in those areas of the creeks where alluvium is found. The area in section 13 is probably a channel which filled with coarse morranic material carried by melt water (Reger, personal communications, 1978.)

3. As mentioned earlier, mudslides and land slides occur in the canyons. These slides may pose a threat to people hiking in the canyons, and the slides have the power to destroy buildings and other structures in their path.

4. Because of the low grade and thin beds of the coal deposits, large scale coal mining probably would not be profitable in the study area.

5. Because of the occurrence of iron compounds in the subsurface layers, ground water and surface water may, to some persons, have a bad taste. However, some local residents have reported good water from their wells.

Recommendations

1. Recreational facilities should not be built in the canyon bottoms because of the landslide and mudslide danger.

2. The quality of ground and surface water varies greatly in the area. Therefore, care should be taken in choosing well sites.

Oceanography

The study area borders Kachemak Bay, an elongated embayment contiguous to the lower portion of Cook Inlet. The north side of the bay which extends from Anchor Point to the mouth of the Fox River contains approximately 47 miles of coastline. About six miles, or thirteen percent of this coastline is contained within the study area.

Kachemak Bay is divided into an inner bay and an outer bay. The inner bay, which borders the study area, extends from Homer Spit to the head of the Bay. The outer bay extends north from Homer Spit to Anchor Point and south from Homer Spit to Point Pogibishi (Trasky, 1977).

Physical Oceanography: Kachemak Bay is relatively shallow. The average depth is 25 fathoms (46 m.; 151 ft.) The bottom of the Bay slopes gently from the north side down to a 30-40 fathom (53-73 m; 174-239 ft.) trench which runs along the south central side.

The flood and ebb of the tide dominates the water movement in the Bay. However, the net circulation, which in part is driven by the tidal currents is characterized by an inflow of clear ocean water on the south side of the Bay and an outflow of slightly turbid water on the north side of the Bay. In addition to the tides and water circulation pattern, there is a net outflow of low salinity water from the inner Bay past the distal end of Homer Spit to the outer Bay. This results because more freshwater runoff and precipitation enters the inner Bay than evaporates from it (Trasky, 1977).

The tides in Kachemak Bay are semidiurnal which means there are two high and two low tides per day. There is a difference of several feet between the two high tides, and there is a difference between the two low tides of the same magnitude. The mean tidal range in Kachemak Bay is 15.4 feet (at Seldovia), but the highest tides exceed 22 feet, and the lowest tides drop to about -6 feet (Trasky, 1977).

Ice rarely forms in outer Kachemak Bay because of the warming influence of the Gulf of Alaska. However, during severe winters, ice related problems in the inner Bay can occur when northerly winds push freshwater ice from the head of the Bay against Homer Spit. Surface water temperatures in the Bay as a whole range from a summer high of 55° F. to a winter low of 28° F. (Trasky, 1977).

The waters of the inner Bay contain more sediment than the fairly clear waters of the outer Bay. Sources of sediment in the inner Bay include glacial and river runoff as well as erosion materials from the bluffs along the north shore of the inner Bay (Trasky, 1977).

Coastal Morphology: The bluff face within the study area consists of friable coal bearing sedimentary rocks of the Kenai Group. This bluff face is slowly eroding.

The low rate of erosion is indicated by the gently sloping beach. The average slope is about 3%. The beach face is composed of extremely fine grained material which also indicates a slow erosion rate. Intertidal mud flats completely line the bluffs except for a narrow strip of gravel at the bluff face (Hayes, 1977).

Chemical Oceanography: The salinity of Kachemak Bay probably averages between 30 and 32 parts per thousand (ppt) during spring, summer and fall. Seasonal runoff of freshwater reduces salinities especially at the surface in the inner Bay (Trasky, 1977).

Oxygen levels are about 8 parts per million (ppm) at the surface of the Bay, and about 6.7 ppm at the bottom. For comparison, oxygen levels in Lower Cook Inlet vary from 11 ppm at the surface to about 7.2 ppm at depth. No Cook Inlet waters are deficient in oxygen (Trasky, 1977).

Implications

Kachemak Bay is an extremely interesting marine environment which provides visitors with many attractions such as waves, tides and beaches.

Soils

The Soil Conservation Service has surveyed the soils of the study area. For planning purposes, the Soil Conservation Service has divided the area into major soil associations. A soil association is considered to be an area that has a distinctive pattern of soils. It normally consists of one or two predominant soils and one or more minor soils. The same soils that occur in one association may occur in another association, but the relative abundance of soils will be different (Soil Conservation Service, 1971).

Figure 5 contains a map showing the locations of these soil types; Figure 6 contains a map showing the construction capabilities in the study area. Recreation planning must take into consideration the construction suitability of the soils in an area for the purpose of trail and building construction.

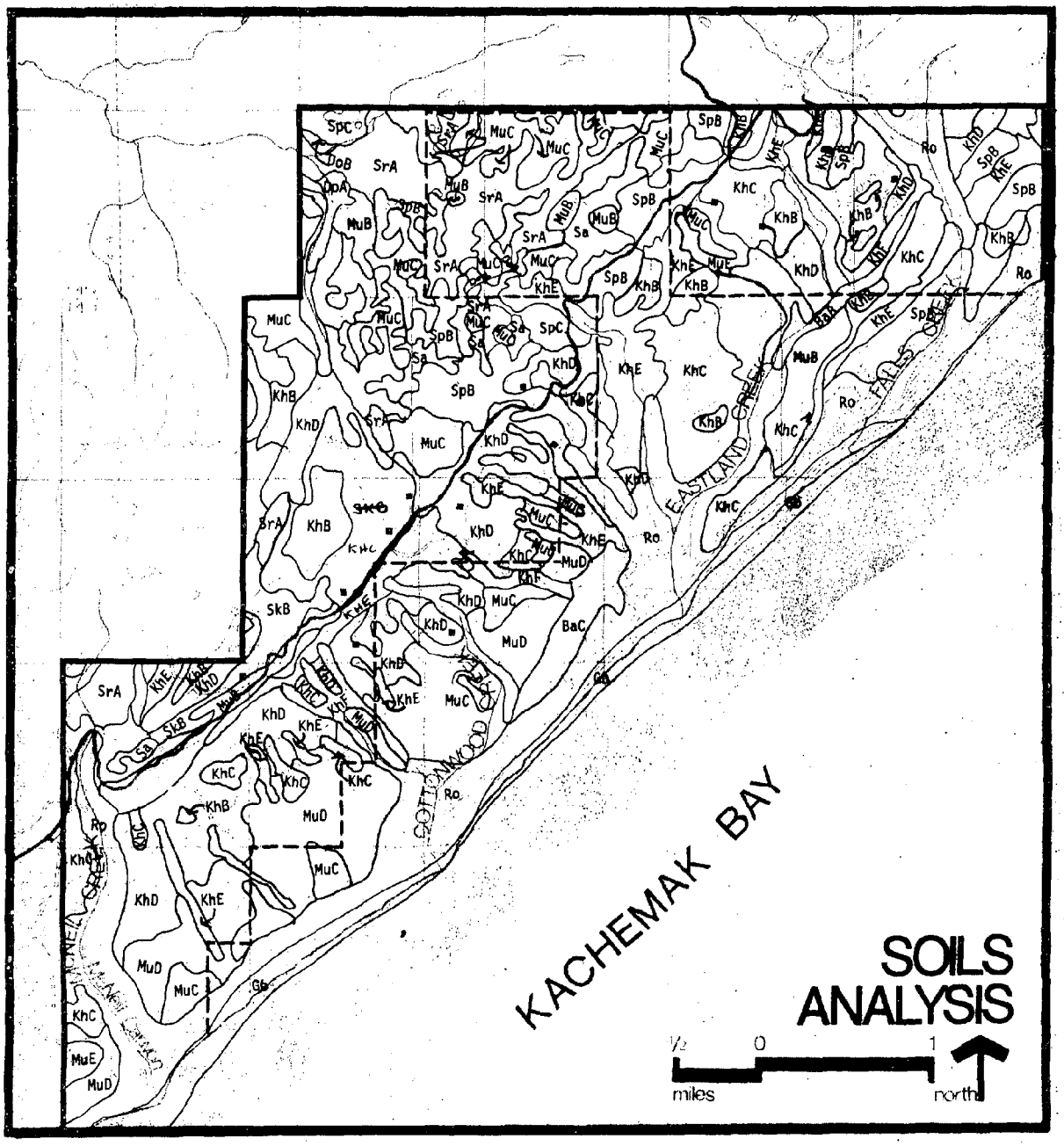
The Soil Conservation Service mentions five factors which determine a soil's suitability for supporting roads and buildings. These are frost action, shrink/swell potential, erosion potential, drainage, and bearing capacity. These factors are often interrelated.

Frost action takes many forms, but the most pertinent is frost heaving. As subsurface ice freezes, it expands and lifts the surface of the ground. This can cause damage to both roads and buildings.

Swelling and shrinking of soil is usually caused by changes in the amount of water present in the soil, but it can also be caused by freezing and thawing. Soils that have a high shrink/swell potential do not offer good support for roads and buildings, because they cause the surface of the ground to be unstable. Perhaps the worst soils for shrinking are the peat soils, e.g., Salamatof and a similar soil, the Starichkof.

Erosion is an important consideration because of possible sediment pollution of streams. Also, erosion is often associated with a loss of vegetation.

Another important consideration is drainage. In some portions of the study area, the water table is near the surface, leading to ponding, bogs, and unstable soil conditions. Roads or trails built in one of these areas can literally



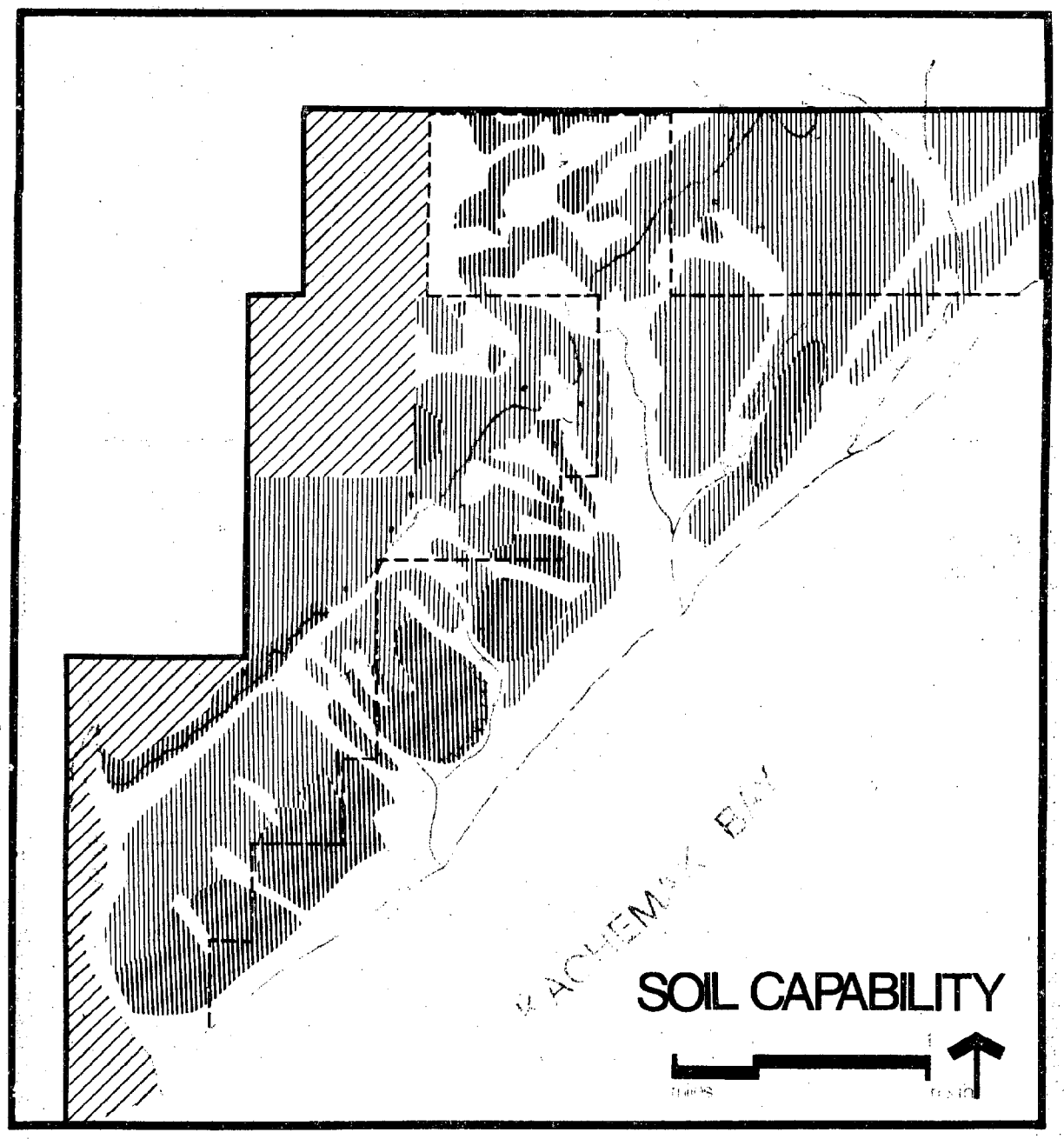
Indicates Soil Type	Indicates Slope
Ba - Beluga Silt Loan	A - Nearly Level
Do - Doroshin Peat	B - Gently Sloping
Kh - Kachemak Silt Loan	C - Moderately Sloping
Mu - Mutnala Silt Loam	D - Strongly Sloping
Ro - Rough Broken Land	E - Moderately Steep
Sa - Salamatof Peat	F - Steep
Sp - Spenard Silt Loam	
Sr - Starichkof Peat	

STUDY AREA BOUNDARY

TENTATIVE PARK BOUNDARY

SOURCE: Soil Conservation Service, Soils Survey

FIGURE 5



Soil Capability evaluated for construction purposes only.

LOW CAPABILITY

MEDIUM CAPABILITY

HIGH CAPABILITY

NOT EVALUATED

STUDY AREA BOUNDARY

TENTATIVE PARK BOUNDARY

FIGURE 6

sink into a puddle of water, if proper engineering and construction techniques are not utilized.

Bearing capacity is related to the factors mentioned previously, and to the type of materials present under the soil. In general, soils with a thick gravelly substratum are able to support more weight than soils with a fine grained substratum.

Within the study area, there are four soil associations:

1) the Mutnala-Salamatof Association,
2) the Kachemak Association,
3) the Beluga Association, and
4) the Rough Broken Land Association.

The Mutnala-Salamatof Association: The Mutnala-Salamatof Association is formed by Mutnala and the Salamatof Soil Series. A soil series is a precisely defined and well understood type of soil. The Mutnala series is a well drained silt-loam that often occurs over gravelly glacial till. It is usually found in uplands. The slope of this soil ranges from nearly level to steep.

The other principle soil series in this association is the Salamatof. This series is a poorly drained, peat soil, and it is usually associated with Muskegs.

In the coastal area, there is a complex pattern of Mutnala and peat soils--Salamatof, and Starichkof. The Matanala occurs on low morraines, while the peat occurs in depressions. Many of the depressions contain small lakes.

The Mutnala soil is typical of area soils in regard to frost action which is moderate to high. Furthermore, it usually is subject to erosion and requires much cutting and filling. This is because it often occurs in hilly areas. In contrast to its undesirable characteristics, the Mutnala soil has a high bearing capacity and a low shrink/swell potential.

The peat soils including the Salamatof and the Starichkof are poor soils to build on. They have a high susceptibility to frost action. As a result of the above characteristics, the peat soils have a low bearing capacity.

The Kachemak Association: The Kachemak Association contains only one abundant series, i.e., the Kachemak. This series contains well drained silt-loams that are shallow to moderately

deep. They occur over soft shale and sandstone, or gravelly glacial drift. They are found in uplands, generally between 800 and 1000 feet.

The Kachemak, like the Mutnala, is erodible when excavated. It has a moderate to very high susceptibility to frost action (in this case, mainly frost heaving). In most places, it has a low bearing capacity, but in some places it has a high bearing capacity because of firm underlying layers. The Kachemak has a low to moderate shrink/swell potential.

The City of Homer, in their Comprehensive Development Plan of 1978, reports that local Kachemak soils are well drained, but because of their high organic matter content and fine mineral grains, they provide very poor road surfaces. In addition, they are unsuitable for septic tanks because of seep water which interferes with septic tank operation. Also, in these cases, septic tank use can cause groundwater pollution.

The Beluga Association: The Beluga Association contains one predominant soil series--the Beluga. This soil series developed in medium textured and moderately fine colluvium, and it is a silt-loam. The Beluga soils are usually poorly drained. However, they can be found on steep grades as well as level ground. This soil is locally important to farming and much of Homer is built on this soil association.

The most conspicuous problem associated with the Beluga soil series is caused by the presence of groundwater at or near the surface. This water must be diverted before construction can take place. In Homer, a ditch above the construction site is used to intercept seep water. This diverts the groundwater around surface developments, and allows the soil to dry. Road ditches can serve as a diversion ditch in some areas (Homer, City of, 1978).

The Beluga Series poses another problem in Homer. Septic tanks and seepage pits do not function efficiently in these soils, and pollution of groundwater and surface water can occur where they are used (Homer, City of, 1978).

The Beluga Series has a moderate to very high susceptibility to frost heaving, but it has a low shrink/swell potential. Presumably, it has an adequate bearing capacity because roads and houses in Homer are built on this type of soil

(Soil Conservation Service, 1978).

Rough Broken Land Association: The Rough Broken Land Association is composed of steep eroded escarpments, sea cliffs and canyons walls. This soil association is often unstable and unvegetated. Landslides and mudslides occasionally occur in this soil association.

Implications

1. One favorable aspect of the soils in the Homer area is the absence of permafrost which if often a major problem in other Alaskan communities.

2. The Mutnala soil series is generally suitable for the construction of trails and buildings because of its high bearing capacity and low shrink/swell potential.

3. The Kachemak soil series is probably less suitable than the Mutnala soil series because its bearing capacity and shrink/swell potential is unpredictable.

4. The Beluga soil series is adequate for construction if it is adequately drained.

5. All the soils in the study area are erodable if the vegetation is removed.

6. The Rough and Broken Land offers a very poor surface for construction because it is steep, unstable and highly erodable.

7. The soils of the area can support all forms of nonmotorized recreation, i.e., hiking and cross country skiing. However, some erosion could occur on improperly designed or constructed hiking trails.

8. Visitor safety is an important consideration in the rough broken soil type. This is becuase of topography more than soil structure. The Rough Broken Soil Association occurs mostly on steep cliffs and canyon walls. The soil near the edges is susceptible to breaking off, which could result in visitor hazards if this condition is not properly advertised.

9. Most forms of motorized recreation would lead to a deterioration of the soils in the area. Operating All Terrain Vehicles (ATV's) and motorcycles causes erosion because the vehicles loosen the soil and destroy surface vegetation, especially on steeper slopes. Also, the impact of this use is normally not confined to trails.

10. Unlike motorcycling and operating ATV's, snowmobiling may not damage the soil because the snow forms a protective

layer over the soil and vegetation. However, some impacts on wildlife and conflicts with other recreationists, most notably cross-country skiers, can occur if the use is not properly managed.

Recommendations

Every effort should be made to:

1. Restrict road construction to the following soils:

   1) Mutnala soils of low to moderate slope,
   2) Kachemak soils that have a gravelly substratum, and
   3) Beluga soils where artificial drainage can be applied.

   Figure 6 shows the areas where these soils are likely to occur.

2. Avoid building roads on peat soils, and unstable Kachemak soils. The probable locations of these soils are also shown in Figure 6 .

3. Do not build septic tanks in water saturated soils, or in areas or shallow unconfined acquifers.

4. Proper construction methods are important to assure the stability of roads and buildings.

5. The road maintenance costs should be figured into the cost of operating the park from the beginning.

6. Trail designs should avoid areas of poor soil stability.

7. Avoid building hiking trails in the Rough Broken Soil Association, because of its high erosion potential and potential for danger to visitors which may stray from designed trails.

8. Warn people of the danger of hiking near the edges of steep canyon walls and sea cliffs. This could be accomplished with signs and leaflets.

9. Prohibit motorcycle and ATV use in the area, unless a park of sufficient size is established to provide for this use in a separate area. Such an area must be capable of supporting the use without serious environmental impacts or impacts to adjacent land owners.

10. Allow snowmobiles if they do not unduly conflict with other recreation uses. Also, other impacts such as noise should be considered.

Water Resources

The water resources of the study consist of groundwater and small creeks.

Groundwater: Groundwater from wells around the study area often has a bad taste because of high iron concentrations. The United States Geological Survey (USGS) has tested the chemical properties of the water from several private wells near the study area. Their records indicate that iron concentrations of these well waters range from about 1.5 mg./L to over 5 mg./L. These concentrations exceed the drinking water standard of .3 mg./L for iron. USGS records indicate that the pH ranges from 6.0 to 7.0. Wells in the area range in depth from 15 feet to over 200 feet. Local residents have reported both good and bad tasting water, in addition to water that causes staining problems.

Surface Water: The surface water resources of the study area consists of several small creeks. The two principal creeks are Cottonwood and Eastland Creeks which flow year around. These creeks become frozen over in some places during the winter.

While bacterial sampling has not taken place, the waters are probably pollution free because there are few houses, or other developments, along the creeks. Even though the water is probably good from a human health standpoint, the Department of Environmental Conservation (DEC) does not allow the use of surface waters for public water supply without some treatment. The minimum treatment probably would be chlorination. The reason for this ruling is that rare bacterial pollution events occur in surface water. When such pollution occurs, people drinking the water can become seriously ill.

Implications

1. It may be difficult to find a source of ground water that does not have an excessive concentration of iron.

2. It may be difficult to use the area's surface water as a public drinking supply. This is because expensive water treatment equipment, such as chlorinators, would have to be installed to meet the requirements of the DEC.

Recommendations

1. A water quality monitoring program should be set up with the DEC to protect the quality of surface waters.

2. If a well with water meeting the standards of the DEC cannot be located, an alternative would be to treat local groundwater or surface water. This, probably, would involve installing equipment to remove the iron from the ground water, or installing chlorination equipment to protect the purity of surface water.

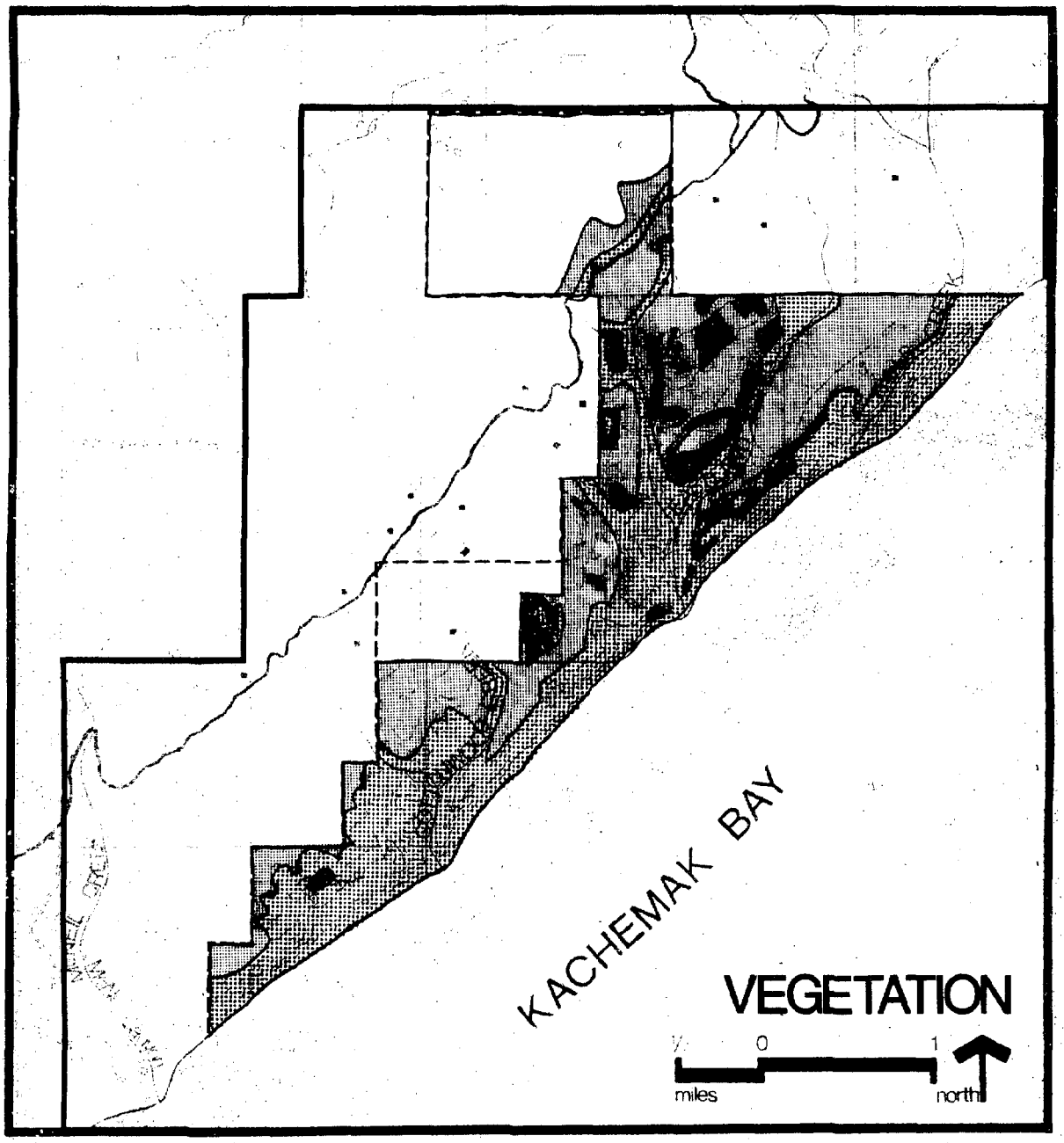
Vegetation

Knowledgeable persons have not published an adequate amount of information on the vegetation of the Kenai Lowlands which includes the study area. However, there are a few sources of general information on the vegetation; these include the following: "Alaska Regional Profiles," "Alaska Trees and Shrubs," and "[The] Soil Survey [of the] Homer Ninilchik Area, Alaska." The following discussion is, in part, based on the dangerous adaptation of this general information to the specific area of Cottonwood and Eastland Creeks. This discussion also contains information from an unpublished vegetation list supplied by an employee of the Pratt Museum in Homer, and from brief field surveys conducted by the Alaska Division of Parks.

The "Alaska Regional Profile" (Selkregg, 1974) indentified a wide belt of land on the north side of Kachemak Bay, including the study area, as a coastal Western Hemlock-Sitka Spruce Forest. This forest community is common on the Pacific coast of North America. It usually contains high brush and meadows as subsystems within the larger forest community. The vegetation in the study area, however, differs significantly from the Western Coastal Hemlock-Sitka Spruce Forest as described in the "Regional Profile." The most obvious difference is that there are no hemlock trees growing in the study area, or if they are present, they are very rare. Another difference is the abundance of the meadow and brush subsystems. These vegetation groups are so abundant in the study area that they can be considered as separate groups.

As a result of these differences, it seems appropriate to drop the "Hemlock-Spruce Classification" and divide the vegetation into four major groups: 1) Sitka Spruce Forests, 2) Dry Meadows, 3) Wet Meadows, and 4) Brush. These vegetation groups and their locations are shown in figure 7, and species likely to be found in each vegetation type are shown in figure 8.

The Spruce Forest: Sitka Spruce is the most abundant vegetation existing above the deep canyons of Cottonwood, Eastland, and Falls Creeks. Stands of Sitka Spruce are more abundant around Eastland and Falls Creeks than around Cottonwood Creek. The Alaska Spruce Beetle is causing some damage to these trees (Soil Conservation Service, 1971). Scattered thinly through the Sitka Spruce are cottonwood and Kenai



Vegetation map adapted from aerial photographs.

BRUSH & UNVEGETATED

SPRUCE WOODS

MEADOWS

NOT EVALUATED

STUDY AREA BOUNDARY

TENTATIVE PARK BOUNDARY

FIGURE 7.

FIGURE 8:
COTTONWOOD CREEK PLANT LIST

A TENTATIVE LIST OF PROBABLE PLANTS

SPRUCE WOODS

Actaea rubra	Baneberry
Anemone richardsonii	Yellow Anemone
Cornus canadensis	Canada Bunchberry
Dryopteris dilatata	Wood Fern
Echinopanax horridum	Devil's Club
Equisetum silvaticum	Woods Horsetail
Gymnocarpium dryopteris	Oak Fern
Grasses	
Impatiens noli-tangere	Touch-me-not
Listera cordata	Twayblade
Linnaea borealis	Twinflower
Lycopodium sp.	Clubmoss
Menziesia ferruginea	Rusty Menziesia
Moneses uniflora	Single Delight
Picea sitchensis	**Sitka spruce**
Populus balsamifera	**Cottonwood**
Pyrola asarifolia	Wintergreen
Pyrola chlorantha	Wintergreen
Pyrola grandiflora	Large-leaved Wintergreen
Pyrola minor	Small-leaved Wintergreen
Rubus pedatus	Trailing Dewberry
Rubus stellatus	Nagoonberry
Rushes	
Salix sp	Willows
Sedges	
Streptopus amplexifolius	Watermelon berry
Vaccinium ovalifolium	Blueberry
Vaccinium vitis-idaea	Lingonberry
Viola Langsdorfii	Alaska Violet

(continued on next page)

COTTONWOOD CREEK PLANT LIST CONTINUED

MEADOWS

Achillea borealis	Yarrow
Aconitum delphinifolium	Monkshood
Alnus crispa	Sitka Alder
Angelica lucida	Wild Celery
Anemone richardsonii	Yellow Anemone
Artemesia Tilesii	Sage
Aruncus sylvester	Burnet
Aster sp	Aster
Athryium felix-femina	Lady Fern
Betula kenaica	Kenai Birch
Botrychium lanceolatum	Grape fern
Botrychium lunaria	Moonwort
Castilleja unalaschcensis	Coastal Paintbrush
Conioselinum chinense	Hemlock Parsley
Draba sp	Mustard
Delphinium glaucum	Larkspur
Epilobium angustifolium	Fireweed
Equisetum arvense	Field Horsetail
Erigeron sp.	Fleabane
Fritillaria camschatcensis	Chocolate Lily
Galium borealis	Northern Bedstraw
Gentiana amarella	Gentian
Geum macrophyllum	Large-leaved Avens
Geranium erianthum	Wild Geranium
Grasses	
Heracleum lanatum	Cow parsnip
Lathyrus palustris	Vetchling
Lupinus nootkatensis	Lupine
Myosotis alpestris	Forget-me-not
Plantathera dilatata	Bog Orchis
Polemonium acutiflorum	Jacob's Ladder
Ranunculus Bongardi	Buttercup
Rhinanthus minor	Yellow Rattle
Rosa acicularis	Wild Rose
Rubus arcticus	Nagoonberry
Rubus idaeus	Raspberry
Rumex acetosella	Sheep sorel
Rushes	
Sambucus racemosa	Elderberry
Sanguisorba stipulata	Burnet
Sedges	
Solidago lepida	Goldenrod
Spiraea beauverdiana	Spiraea
Stellaria sp	Chickweed
Streptopus amplexifolius	Watermelon Berry
Taraxacum officinale	Dandelion
Thalictrum sparsiflorum	Meadow Rue
Trifolium hybridum	Alsike Clover
Trifolium repens	Clover
Trientalis europaea	Starflower
Urtica lyallii	Stinging Nettle
Viola epipsila	Marsh Violet

(continued on next page)

COTTONWOOD CREEK PLANT LIST CONTINUED

MARSHY AREAS

Caltha palustris	Marsh Marigold
Drosera rotundifolia	Sundew
Epilobium glandulosum	Willow Herb
Equisetum fluviatile	Water Pipes (Horsetail)
Eriophorum sp.	Cottongrass
Grasses	
Hippuris vulgaris	Mare's Tails
Iris setosa	Wild Flag
Menyanthes trifoliata	Bog Buckbean
Mimulus guttatus	Monkeyflower
Parnassia palustris	Grass of Parnassus
Ranunculus hyperboreus	
Rubus chamaemorus	Cloudberry
Rushes	
Sedges	
Swertia perennis	Bog Star
Valeriana capitata	Valerian
Veratrum viride	False Helebore
Viola epipsila	Marsh Violet
Rumex sp.	Dock

Source: Griswold, Carol, 1978.

birch trees, The cottonwood trees are probably the largest trees in the study area. Mature cottonwood trees in the Homer area average 60 to 75 feet high and 18 to 36 inches in diameter (Soil Conservation Service, 1971). The understory is composed chiefly of mosses, ferns and lichens; but willow, alder, berries and flowers are also present.

High Brush: High Brush occurs between the beach and upland forest and in the deep canyons containing the creeks. The high brush is usually composed of alder, but stands of almost pure willow are sometimes present. In the alder thickets, devil's club is often present as understory vegetation in abundance. Alder thickets are denser near Cottonwood Creek than around Eastland Creek. Alder thickets are not uncommon elsewhere; they form a subsystem to many vegetation types throughout Cook Inlet (Selkregg, 1974).

Dry Meadows: Dry meadows are scattered throughout the study area, but are most numerous around Eastland Creek. Some of the meadows are fairly large and have trees scattered through them, often cottonwood and Kenai birch. Tall grass, probably bluejoint, is the major plant present in the dry meadows. Other plants include fireweed, monkshood, dandelion, lupin and raspberry.

Some meadows in the area command impressive views. Notable ones are located at the mouth of Cottonwood Creek and upland areas around Eastland Creek.

Wet Meadows: Wet meadows are less common than dry meadows. But, one long thin strip of meadow lies under a powerline passing through the area. Evidently, wet meadow ecosystems often result when trees are cleared for powerline corridors and other purposes. Other wet meadows are located around some of the upper portions of creeks in the area. The most obvious plants in the wet meadows are the wild flowers such at cottongrass and bog star.

Implications

1. A diversity of vegetation types is more desirable than a single and continuous vegetation type for most recreational activities. The study area has this diverse vegetation quality.

Recommendations

1. Existing vegetation should be used to block highways or aesthetically unpleasing land uses from recreational activities. Conversely, buffers of vegetation should be used to block recreational activities which may be considered unaesthetic from the view of residents.

2. Vegetation should be protected by prohibiting off road vehicle use in the area.

Mammals

Mammals inhabiting the area include moose, black bears and red squirrels. Other mammals probably inhabit the area, but this has not been verified. These mammals include the following: snowshoe hares, lynx, mink, weasel, coyotes, voles and porcupines. All these mammals are discussed on the following pages.

Moose: Generally, moose inhabit the Cottonwood/Eastland Creeks area from spring through fall, and leave the area to winter at lower elevations where food is more plentiful. Wintering areas include the Homer vicinity, the Fox River Valley, and probably a large year around concentration center farther to the north between Clam Gulch and Swanson Lakes. However, during mild winters, moose will remain in the area, and even in normal winters the area will not be completely free of moose; a limited number of moose will pass through the area and find some forage (Dave Hardy, personal communication, 1978).

Moose generally feed on brush species. They prefer to eat willow, but they will also eat other plants including cottonwood foliage and grasses. It also seems that moose will occasionally eat alder; however, this is a controversial point (Dave Hardy, personal communication, 1978).

Not only do moose feed in this area, but they also bear their young here in the spring. The bluffs, and particularly those east of Eastland Creek, are important calving areas.

Bears: Black bears are commonly found in the area, and brown bears to a much lesser extent. In November both black and brown bears begin a long period of dormancy which lasts until April or May. In the area of the Creeks, bears can be expected to winter almost anywhere. For example, bears have been known to take over marmots' dens and enlarge them for their own use. More commonly, they dig their own dens, or simply crawl under the dense, low branches of spruce trees (Dave Hardy, personal communication, 1978).

During their winter dormancy, bears lose considerable weight. This weight loss -- especially in the males -- continues until July, even though they have opportunities to feed in the spring. This is because breeding activities, which last from late May until early July, take time away from feeding. When July comes and the breeding season is over, the bears

begin heavy feeding which lasts until October. During this period, they regain the weight which was lost earlier. (Dave Hardy, personal communication, 1978).

Black and brown bears are omnivors which means they will eat both plants and animals. Except when the salmon are running their diet consists mainly of berries, roots, sedges and grasses. For example, in the spring they feed heavily on the new shoots of fiddleheads, a type of fern. During salmon runs, bear are frequently found feeding on salmon in nearby streams.

To feed on salmon, the bears must leave the area because Cottonwood and Eastland Creeks do not support salmon runs. Bears also prey on moose calves, especially in the spring. However, it is interesting to note that bears will rely more on plants for food than on meat.

Snowshoe Hares: Snowshoe Hares prefer forest and wetlands, where they feed on grass, twigs, bark and roots. Breeding is in the spring and summer. Gestation is forty-one to forty-seven days, and the litter size is from one to eight. Hares are prey to a wide variety of predators (e.g., eagles, hawks and coyotes) (Caras, 1967). The snowshoe hare population is currently at a low point in its cycle in the area of Cottonwood and Eastland Creeks (Dave Hardy, personal communication, 1978).

Lynx: The lynx is the only cat native to Alaska. Normally, it is nocturnal, but in Alaska it is sometimes forced to hunt in full light because of the long summer days. Mating occurs in March and April, and one to ten kittens are born two months later.

Lynx usually inhabit spruce forests and wetlands; both habitats exist in the area of the Creeks. Snowshoe hare or varying hare are the lynx's major prey, and a classical predator/prey relationship exists between these two species. When the hare population increases, a corresponding increase takes place in the lynx population. Similarly, when the hare population drops, the lynx population also drops. Currently, the hare population is at a low point, and as a result the lynx population is correspondingly low (Berrie, no date).

Mustelids: Mink, river otter and least weasel may occur in the vicinity of Cottonwood and Eastland Creeks. Mink and

otter prefer stream borders, estuaries and shorelines, while the least weasel prefers brushy areas and open woodlands.

Mink are good swimmers and often feed on intertidal invertebrates, such as sea urchins, dungeness crabs and clams. In the Prince William Sound area, mink winter on a very narrow beach zone. Mink may also prey on birds, rodents and insects (BLM, 1976). Mink are fiercely agressive and emit a strong odor when attacked, but this does not prevent them from falling prey to some animals such as the lynx (Caras, 1967).

Mink breed in January and March, and give birth after a gestation period of 39-76 days. Mink give birth to their young in dens which they establish in any sheltered area (Caras, 1967).

River otters are also opportunistic predators. They can inhabit both fresh and salt water. Their primary foods are fish, shell fish and birds. River otters are well adapted to the aquatic environment; their nose and ears seal tight when diving, and their feet are webbed (Caras, 1967).

River otters breed in the winter and spring. After ten to thirteen months of delayed gestation and development, the female bears one to five young. River otters take over the dens of other animals and burrow into river banks (Caras, 1967).

The least weasel is a small, hyperactive mammal which preys on small rodents, eggs and insects. It is in turn preyed upon by lynx, eagles, owls and minks (Caras, 1967).

The least weasel establishes its den in stumps, logs and rabbit burrows among other places. It breeds during most most months; the gestation period is long, about 279 days, and the litter size varies from three to ten (Caras, 1967).

Canids: Coyotes are possible inhabitants of the Cottonwood/Eastland Creeks area. Coyotes were first noted in Alaska shortly after the turn of the 20th century, and some of the densest populations occur on the Kenai Peninsula (Cornelius, 1977).

Coyotes are opportunistic feeders. Snowshoe hares, small rodents, and carrion comprise the bulk of the coyote's diet. They will also eat marmots, squirrels, birds, fish and insects. Coyotes hunt singly, in pairs, and occasionally in packs (Cornelius, 1977). Coyotes breed in February and

March. Mated pairs stay together through the spring and share parental duties after the pups are born. Shortly before whelping, they prepare one or more dens for the litter. Coyotes give birth to an average of five to seven pups (Cornelius, 1977).

Domestic dogs are also likely inhabitants of the area. They will compete with natural predators for space and prey, displacing some predators to more remote areas.

Rodents: Red squirrels, porcupines and northern red-backed voles probably inhabit the area. Red squirrels are small, highly territorial animals. Both male and female squirrels defend a territory throughout the year. Males enter the female's territory during a very short period, approximately two days, when she is in heat. At this time, females stop defending their territory. The squirrels feed on pine cones and fungi, both of which are stored for the winter.

The size of the squirrel's territory depends on the available food supply. When food is plentiful, squirrels do not have to cover large areas to find food; therefore, they establish small territories. When food is scarce, squirrels must cover more area to find food; and therefore they must establish larger territories. As squirrels establish large territories, weaker individuals are displaced, but the efficient utilization of the food supplies is insured, and the maximum number of squirrels survive (Smith, 1974).

Porcupines are woodland animals. In winter, they feed on spruce bark, and in summer they eat green leaves, buds and aquatic plants. They obtain calcium and phosphorus by chewing on discarded antlers and the bones of dead animals. In some areas porcupines have become a nuisance by destroying valuable timber (Caras, 1967).

Porcupines breed in the fal or early winter. One, or on rare occasions two, young are born 209 to 217 days later in April or June (Caras, 1967). They establish their dens in natural cavities, such as in rocks, under dead falls, and in hollow logs.

Northern red-backed voles resemble common mice, and they fill similar ecological niches. Like mice, voles consume grasses, leaves, insects, etc. Also like mice, voles provide various predators with food. In the Cottonwood and Eastland Creeks area, probable predators include lynx, raptors and

canids. Voles are very prolific animals because their gestation period is short, they breed all year, and females can breed by the time they are 25 days old (Caras, 1967).

Implications

1. The wildlife of the area provide many opportunities to observe and appreciate this important component of the natural system. For example, people have the chance to photograph animals in their natural setting, and bird watchers can view and study the variety of birds found in the area.

2. Unless human use of the area is properly controlled, wildlife in the area may be displaced as human use increases. This process of wildlife displacement is probably occurring on nearby private lands which are undergoing development. In the long run, establishing a park may save wildlife even though it receives heavy use by the public. In other words, a park would contribute to the problem of wildlife displacement to a lesser extent than other types of development.

3. Bears in the area could present some danger to park visitors. It is a fact that bears have a great destructive potential, but in actuality relatively few injuries and fatalities result from bear/human confrontations. Nevertheless, the danger, even though small, is real, and methods to reduce this danger should be investigated. These will be discussed in the next section.

Recommendations:

1. For the near future, hunting away from developed facilities is probably acceptable. There may come a time, however, when firearms should not be allowed in the recreation area. If the area starts receiving high use, the chance of an accidental shooting would become too great.

2. Information on how to prevent bear attacks should be posted in an obvious place. Also this information should be made available in the form of leaflets. Basically, the posters and leaflets should contain the following advice:

   1) Stay clear of bear cubs;
   2) Make lots of noise when hiking in the park. Carry a bell, talk, or invent your own method;
   3) Don't leave odorous food or garbage lying around your camp; and
   4) Keep clothing, face, and hands as clean as possible.

3. Refuse dumpsters, rather than garbage cans, should be utilized at all automobile accessible areas. Pick ups should be frequent and lids on all refuse containers are advisable.

Birds (Marine and Terrestrial)

Many species of birds frequent or inhabit the study area. In the following pages these species have been organized into nine major groups: 1) ducks, 2) shorebirds, 3) gulls, 4) eagles and hawks, 5) owls, 6) titmice, and 9) grouse. Species which have been sighted in the area by knowledgeable persons, or have been indicated as being in the area by an authoritative source book are described. Also, in some sections, those species which are likely to frequent the area but have not been verified in some way are mentioned briefly. All the species of birds mentioned in this report are contained in two bird lists prepared by local birdwatchers. These lists are contained in figures 9 and 10 .

Ducks: Ducks are often the most common birds inhabiting the nearshore marine waters of the study area, especially during the spring and fall migrations. These ducks include the following species: oldsquaw, Barrow's goldeneye, white-winged scoter, surf scoter, black scoter, common eider and Steller's eider (Erickson, 1976).

The scoters appear to be the most common, at least in the summer. All species of scoter and the common eider are year round residents of the Lower Cook Inlet, but the Barrow's goldeneye, Steller's eider, and oldsquaw are only winter residents in Lower Cook Inlet (Erickson, 1976). As a result of the year around and winter resident ducks, there is a high likelihood that ducks can be seen throughout the year from the bluffs and beach in the study area.

Ducks use the north shore waters of Kachemak Bay for staging, resting, and perhaps feeding. Ducks probably do not breed in the nearshore waters of the study area (Erickson, 1976). Ducks feed on mollusks, crusteaceans, fishes, and plant matter (Gabrielson, 1959).

Shorebirds: Shorebirds also frequent the study area. One likely seasonal inhabitant is the semipalmated plover. This bird is a common migratory species in Lower Cook Inlet (Erickson, 1976).

The semipalmated plover usually inhabits rocky shores, beaches and tidal flats (Erickson, 1976). The plover probably feeds on mollusks, crustaceans and marine plants, as do most shore birds. Other shorebirds likely to be found in the area include the following: least sandpiper, Baird's sandpiper,

FIGURE 9: BIRDS OF KACHEMAK BAY AND VICINITY

Shorebirds And Seabirds

semipalmated plover
black-bellied plover
American golden plover
surfbird
ruddy turnstone
black turnstone
western sandpiper
least sandpiper
Baird's sandpiper
pectoral sandpiper
sharp-tailed sandpiper
rock sandpiper
dunlin
lesser yellowleggs
sanderling
dowitcher sp.
greater yellowlegs
wandering tattler
spotted sandpiper
bar-tailed godwit
whimbrel
common snipe
northern phalarope
pelegic cormorant
redfaced cormorant
horned puffin
tufted puffin
common murre
pigeon guillemot
marbled murrelet
Kittlitz's murrelet
glaucous winged gull
blacklegged kittiwake
double crested cormorant

Ducks, Geese, and Swans

whistling swan
Canada goose
black brandt
white fronted goose
snow goose
mallard
gadwall
pintail
green-winged teal
American wigeon
northen shoveller
canvasback
greater scaup
lesser scaup
common goldeneye
Barrow's goldeneye
bufflehead
oldsquaw
harlequin duck
Steller's eider
white-winged scoter
surf scoter
black scoter
red-breasted merganser

Common Land Birds

goshawk
sharp shinned hawk
red-tailed hawk
bald eagle
marsh hawk
merlin
great horned owl
hawk owl

(continued on next page)

Common Land Birds (continued)

shorteared owl
boreal owl
belted kigfisher
hairy woodpeker
downy woodpecker
northern three-toed woodpecker
olive-sided flycatcher
violet-green swallow
tree swallow
bank swallow
cliff swallow
gray jay
Steller's jay
black-billed magpie
common raven
nortwestern crow
black-capped chickadee
boreal chickadee
red-breasted nuthatch
brown creeper
American robin
varied thrush
hermit thrush
gray-cheeked thrush
golden-crowned kinglet
ruby-crowned kinglet
bohemian waxwing
northern shrike
orange-crowned warbler
yellow warbler
yellow-rumped warbler
Townsend's warbler
blackpoll warbler
Wilson's warbler
pine grosbeak
common redpoll
pine siskin
white-winged crossbill
savannah sparrow
dark-eyed junco
white-crowned sparrow
golden-crowned sparrow
fox sparrow
Lincoln's sparrow
song sparrow
spruce grouse
dipper
willow ptarmigan
rock ptarmigan
white-tailed ptarmigan

Source: MacIntosh, Rich, 1974.

FIGURE 10: BIRD LIST OF THE HOMER AND KACHEMAK BAY AREA

common loon
yellow-billed loon
artic loon
red-throated loon
red-necked loon
horned grebe
northern fulmar
sooty shearwater
short-tailed shearwater
fork-tailed storm-petrel
double-crested cormorant
pelagic cormorant
red-faced cormorant
great blue heron
whistling swan
trumpeter swan
Canda goose
brant
emperor goose
white-fronted goose
snow goose
mallard
gadwall
pintail
green-winged teal
American wigeon
northern shoveler
canvasback
greater scaup
lesser scaup
common goldeneye
Barrow's goldeneye
bufflehead
oldsquaw
harlequin duck
Steller's eider
common eider
king eider
white-winged scoter
surf scoter
black scoter
common merganser
red-breasted merganser
goshawk
sharp-shinned hawk
red-tailed hawk
golden eagle
bald eagle
marsh hawk
merlin
spruce grouse
willow ptarmigan
sandhill crane
black oystercatcher
semipalmated plover
American golden plover
black-bellied plover
surfbird
ruddy turnstone
black turnstone
semipalmated sandpiper
western sandpiper
least sandpiper
Baird's sandpiper
pectoral sandpiper
sharp-tailed sandpiper
rock sandpiper
dunlin
red knot
sanderling
short-billed dowitcher
long-billed dowitcher
greater yellowlegs
lesser yellowlegs
solitary sandpiper
wandering tattler
spotted sandpiper
bar-tailed godwit
hudsonian godwit
whimbrel
bristle-thighed curlew
common snipe
northern phalarope
prasitic jaeger
glaucous gull
glaucous-winged gull
herring gull
glaucous-winged herring hybird

(continued on next page)

BIRD LIST OF THE HOMER AND KACHEMAK BAY AREA (continued)

mew gull
Sabine's gull
black-legged kittiwake
artic tern
alleutian tern
common murre
thick-billed murre
pigeon guillemot
marbled murrelet
Kittlitz's murrelrt
ancient murrelet
horned puffin
tufted puffin
great horned owl
snowy owl
hawk owl
boreal owl
saw-whet owl
rufous hummingbird
belted kingfisher
common flicker
downy woodpecker
black-backed three-toed woodpecker
northern three-toed woodpecker
alder flycatcher
western wood pewee
olive-sided flycatcher
Violet-green swallow
tree swallow
bank swallow
gray jay
Steller's jay
black-billed magpie
common raven
northwestern crow
black-capped chickadee
boreal chickadee
red-breasted nuthatch
brown creeper
dipper
winter wren
American robin
varied thrush
hermit thrush
Swainson's thrush
gray-cheeked thrush
golden-crowned kinglet
ruby-crowned kinglet
water pipit
norther shrike
orange-crowned warbler
yellow warbler
yellow-rumped warbler
Townsend's warbler
blackpoll warbler
northern waterthrush
Wilson's warbler
Red-winged blackbird
rusty blackbird
pine grosbeak
gray-crowned rosy finch
common redpoll
pine siskin
red crossbill
white-winged crossbill
savannah sparrow
dark-eyed junco
tree sparrow
white-crowned sparrow
golden-crowned sparrow
fox sparrow
Lincoln's sparrow
song sparrow
snow bunting

SOURCE: Davidson, Mairiis, 1977.

rudy turnstone, black turnstone and common snipe.

Gulls: The glaucous-winged gull is the bird that most people recognize as the common sea gull. It probably frequents the study area quite often because it is found in great abundance in many locations around the study area. For example, Erikson's, Spring of 1976, aerial survey of the Kachemak Bay area revealed 735 glaucous-winged gulls at the head of Kachemak Bay just northeast of the study area. Other locations such as Halibut Cove to the south of the study area also contained gulls (Erickson, 1976). These aerial surveys indicate that the common sea gull at least frequents the study area.

Other possible gulls frequenting the study area include the large gull, herring gull, and mew gull. 'Gulls are abundant year around residents of Lower Cook Inlet (Erickson, 1976).

The sea gull is a colonial bird which feeds mainly on carrion and decaying organic matter. They serve the important ecological function of cleaning the beaches and recycling nutrients back to primary producers, such as algae (Gabrielson, 1959).

Eagles and Hawks: Bald eagles are common resident birds in Lower Cook Inlet (Erickson, 1976). Two eagles were observed in the study area during September of 1978. There are two eagle's nests in the study area, one near the mouth of Cottonwood Creek and one near the mouth of Eastland Creek.

Bald eagles tend to inhabit coastal areas where they feed mainly on carrion in the vicinity of beaches and streams. Bald eagles also may prey upon other birds including gulls and shorebirds. Like gulls, bald eagles aid in cleaning the beaches and recycling nutrients to lower levels of the energy pyramid (Gabrielsen, 1959).

The goshawk is another predatory bird which may frequent the study area, but this has not been adequately confirmed.

Titmice: The most well known members of this family, and common residents of the study area, are the chickadees. There are probably two species of chikadees in the study area; these are the black-capped and boreal chickadees.

Chickadees are forest birds. They make their nests by excavating holes in rotten trees. Chickadees feed on insects,

insect larva, insect eggs and seeds. They serve the valuable ecological function of controlling insect pests (Gabrielson, 1959).

Crows and Jays: Members of this family that probably inhabit the area include the common raven and the black-billed magpie. Ravens occupy coastal areas and are common year around residents of Lower Cook Inlet (Erickson, 1976). Ravens are omnivorus birds eating other bird's eggs, young birds, carrion, berries and insects (Gabrielson, 1959).

Magpies probably inhabit the area as birdwatchers have reported seeing this bird in the East End Road area. Magpies like ravens are omnivorus birds eating carrion, eggs, young birds, fruits and insects (Gabrielson, 1959). Magpies are common year around residents of Lower Cook Inlet (Erickson, 1976).

Woodpeckers: The downy woodpecker and other woodpeckers are probably year around residents of the study area. Local bird watchers have seen these birds in the East End Road area. Woodpeckers feed mainly on insects and insect larva.

Grouse: Spruce grouse inhabit the area year around. They belong to the same family as the quail and ptarmigan. Spruce grouse eat insects, seeds, berries and leaves. The spruce grouse is a valuable game species throughout much of Alaska (Gabrielson, 1959).

Owls: Owls including the great horned owl may frequent the study area. However, this is difficult to confirm because they are nocturnal (i.e., they feed at night and are inactive during the day). Owls are hunters feeding on squirrels, other small rodents, ducks, song birds and domestic poultry. They serve the important ecological function of controlling rodent populations (Gabrielson, 1959).

Implications

1. The birdlife of the study area provides excellent opportunities for wildlife observation.

2. Bald eagle nests located near the mouths of Cottonwood and Eastland Creeks are sensitive to human disturbance.

Recommendations

1. Because the shoreline zone offers highly favorable edge conditions for birds, every effort should be made to protect the vegetation in these areas.

2. Interpretive programs to assist birdwatchers should be considered.

3. Trails or other facilities should not be located in such a manner as may prove disruptive to eagle nesting areas.

4. Dead snags and trees with nests should not be cut, unless they present a direct threat to visitors, as these trees provide important habitat for birds.

Marine Life

Kachemak Bay has been described as one of the most productive Bay and estuary ecosystems in the world. There are an abundance of marine species in the bay. The following is a summary of organisms which represent the major components in the marine ecosystem. These components include the producers, decomposers, consumers, herbivore, first order carnivors and higher order carnivors. The producers (e.g., phytoplankton) convert raw nutrients to compounds necessary for life. They perform the same function in the marine environment as plants do in the terrestrial environment. The decomposers consume decaying plant and animal matter. In so doing, they speed up the recycling of nutrients back to the primary producers. The consumers eat the producers. In terrestrial ecosystems, common consumers are cows and rabbits; in marine ecosystems, common consumers are microscopic, or barely visible, zooplankton. First order carnivors feed on the herbivors, and they in turn are fed upon by higher order carnivors. In reality, the system is much more complex than it is presented here. The following pages will expand on these general principles.

Phytoplankton: Phytoplankton are unicellular photosynthetic organisms. Through photosynthesis phytoplankton convert carbon dioxide and water to glucose and other molecules necessary for life. Light supplies the energy for this conversion. Phytoplankton use the products of their photosynthetic reactions to grow and reproduce.

Phytoplankton are food for larger organisms, and ultimately support most of the marine ecosystem.

Diatoms are the most abundant form of phytoplankton in Cook Inlet including Kachemak Bay. Dames and Moore (1974) identified fifty five species of diatoms in Lower Cook Inlet. Diatoms require silica to form the protective shell around their cellular protoplasm. The waters of Cook Inlet and Kachemak Bay contain high concentrations of silica because glacial rivers carry this substance, which was scraped loose from the earth's surface by glaciers, to marine waters. This in part may explain the abundance of diatoms in Lower Cook Inlet (BLM, 1976). Also, upwelling is important because it keeps the diatoms floating near the surface where they can receive sunlight for photosynthesis.

Zooplankton: Zooplankton are often the second step in the

marine food web. These organisms include three main groups: 1) herbivors which feed on phytoplankton, 2) first order carnivors which feed on zooplankton herbivors and 3) an indistinct group which feeds on the larva and eggs of other organisms. Figure 11 lists those zooplankton likely to be found in Kachemak Bay (BLM, 1976)

Crab: King, tanner and dungeness crabs all have similar life histories. Adult crab spend fall and early winter in deep ocean waters (70-200 fathoms or 128-366 m. or 420-1200 feet). In late winter and early spring, they move into shallower water to spawn. Eggs which were fertilized during the previous year's spawning activities are hatched and released into the water. The larva are planktonic for 40-120 days. During this time, they go through four molts after which the larva metamorphose into the adult form and settle to the bottom. They spend from one to six years in shallow waters and estuaries before reaching maturity (Trasky, 1977).

Crabs feed on marine worms, algae and various other crustaceans; also they scavenge decaying plant and animal matter (BLM, 1976). Crabs perform a valuable function in the marine ecosystem in that they liberate nutrients by metabolizing decaying organic matter. Juvenile crabs are eaten by halibut, cod, herring and various species of diving seals (BLM, 1976).

Post-Larval King Crab are found throughout Kachemak Bay; however, crabs are much more abundant in the outer bay than in the inner bay. The same is true for dungeness and tanner crab. The outer bay is a major king and tanner crab spawning area (ADF&G, 1976).

Shrimp: There are five species of shrimp in Kachemak Bay all of which are commercially important. Their common names ar pink, humpy, spot, side-stripe and coonstripe shrimp. All five species belong to the genus Pandalus (Trasky, 1977).

Shrimp spend their adult phase on mud and sand bottoms where they feed on detritus and benthic organisms (Crow, 1977). Like crabs, they metabolize decaying organic matter and release nutrients in the form of body waste back into the marine environment. Pandalid shrimp generally remain males from their larval stage through their fourth year of life; then there is a sex transformation, and males become females.

FIGURE 11: ZOOPLANKTON RECORDED IN COOK INLET AT NIKISKI

Phylum	Order	Number of Taxon
Protozoa	Radiolaria	2
Collenterata	Hydrozoa	9
	Schyphozoa	1
Ectoproctoa	--	5
Nematoda	--	1
Annelida	--	6
Mollusca	Gastropoda	1
	Unidentified	1
Chordata		2
Anthropoda	Copepoda	6
	Cladocera	1
	Ostracoda	1
	Amphipoda	9
	Isopoda	1
	Mysidacea	4
	Euphausiacea	3
	Decapoda	5
	Cumacea	3
	Pycnogonida	4
		65

SOURCE: Hood, 1968 and Rosenberg, 1969

Spawning occurs in fall, and hatching of the eggs follows in the spring. Shrimp spend 60-90 days as planktonic larva before they matamorphose into the adult form and settle to the bottom (Trasky, 1977). Shrimp are present throughout Kachemak Bay; however, spawning areas are generally restricted to the outer bay (ADF&G, 1976).

Herring: Herring spawn in Kachemak Bay in the spring and summer. Females deposit their eggs on solid surfaces such as eelgrass. After the female deposits the eggs, the male fertilizes them. After hatching, young herring collect in schools and move seaward to the mouths of bays. Most schools move to the open ocean by fall (BLM, 1976). Herring feed and spawn along the entire south shore of Kachemak Bay and around Homer Spit (ADF&G, 1976).

Herring feed on small zooplankton such as copepods. Herring along with smelt, walleye pollock, tom cod, and others are of major ecological importance because they provide the major source of food for marine mammals, birds, and fishes such as salmon (Trasky, 1977).

Flatfish: Halibut, flounder and sole spawn after forming dense schools. They release their gametes directly into the water where fertilization of the eggs occurs. Once fertilized, the eggs become positively buoyant causing them to float at or near the surface. After the eggs hatch, the young remain at on near the surface of the water. When metamorphosis occurs, the young fish return to the ocean bottom where they feed and grow to maturity (Trasky, 1977). Flounder and halibut are present throughout Kachemak Bay (ADF&G, 1976).

Clams: The Alaska Department of Fish and Game has no quantitative information on clam densities in the intertidal zone of the study area. From McNeil Canyon to the head of Kachemak Bay, clam densities probably decrease. However, there could be higher clam densities in deeper waters along the shore. Probable species of clams present include butter clams, cockles and macoma clams (Loren Flagg, personal communication, 1978).

Clams subsist by filtering marine water for food which includes bits of decaying matter and living plankton (BLM, 1976). Clams reproduce by releasing many sperms and eggs into the water where the eggs are fertilized. The eggs hatch into small free swimming larvae. After a few months, the larva settle to the bottom and begin forming a shell

(BLM, 1976).

Salmon: Several species of salmon pass the mouths of Cottonwood and Eastland Creeks as they head to spawning streams at the head of Kachemak Bay. Species of salmon include Coho, Sockeye, Pink and Chum salmon. The principle spawning areas for these species are the Fox River, Fox Creek, Sheep Creek, and the Martin River. None of the creeks in the study area contain salmon runs (ADF&G, 1976).

The species of salmon mentioned above have similar life histories. Adult salmon spend most of their life in open ocean, but return to freshwater to spawn. Spawning occurs from June to September with Pinks spawning first and Cohos spawning last. The females excavate nests, called redds, where they lay their eggs. After the eggs have been deposited, the males fertilize them, and the female covers them with gravel (Trasky, 1977). The period of egg incubation depends primarily on the temperature of the water flowing through the redd. Under normal conditions, the incubation period varies from 80 to 140 days. In the spring--April and May--the eggs hatch and fully formed, free-swimming fry emerge from the gravel. Water temperature also determines the time of hatching (Trasky, 1977).

Seaward migration usually occurs in May to mid-June. Juvenile salmon will generally remain in shallow marine water for several weeks, feeding on plankton and marine invertebrates. The young salmon gradually move to deeper waters as they mature. Total residence time in Kachemak Bay may be as much as 90 days. Adult salmon feed on other fishes such as herring and smelt (Trasky, 1977).

Subsistence set net fishermen in the area report that they have had some success catching salmon. There is at least one subsistence set net fisherman using the intertidal zone within the study area.

Harbor Seal: The harbor seal is the most conspicuous marine mammal in Kachemak Bay near the study area.

In Kachemak Bay, harbor seals breed on isolated sandy beaches, sand bars or rocks along the mainland and offshore islands. Harbor seals give birth to young in June and the first half of July. One pup is born at a time and is nursed for three to four weeks. Harbor seals will sometimes abandon their pups if hunted or disturbed by other human activities (Klinkhart,

1969). There are no breeding areas within the study area; and probably the nearest breeding area is Aurora Lagoon across Kachemak Bay from Cottonwood Creek (Loren Flagg, personal communication, 1978).

Seals frequent the northeast side of the bay (including the vicinity of Cottonwood and Eastland Creeks) and the head of the Bay for the purpose of feeding (Loren Flagg, personal communication, 1978). Harbor seals feed mainly on fish and crustaceans. Species which may be preyed upon by harbor seals in Kachemak Bay including the following: smelt, herring, small crabs, shrimp, salmon and flounder (BLM, 1976).

Other than man, the harbor seal's only major predator appears to be the killer whale although some seals may be taken by sharks and wolves (Klinkhart, 1969).

Other Marine Mammals: Beluga whale, killer whale, and sea otters are present in outer Kachemak. The whales migrate through the area, and the sea otter is a year around resident. Beluga whales may occasionally frequent the north shore of Kachemak Bay near the study area. Killer whales and sea otters do not frequent the north shore waters of inner Kachemak Bay. If one of these species were sighted, it would be extremely unusual.

Implications

1. Because of the salmon migration past the study area, there may be some sport fishing opportunities in the area's marine waters.

2. There is a high likelihood that harbor seals often could be sighted from the beach or bluffs within the study area and on rare occasions beluga whales may be seen from the beach or bluffs within the study area.

Recommendations

1. Opportunities for the public to learn about the marine life should be explored. This might be accomplished by making a small informational booklet available to the public.

SOCIOECONOMIC SYSTEM INVENTORY

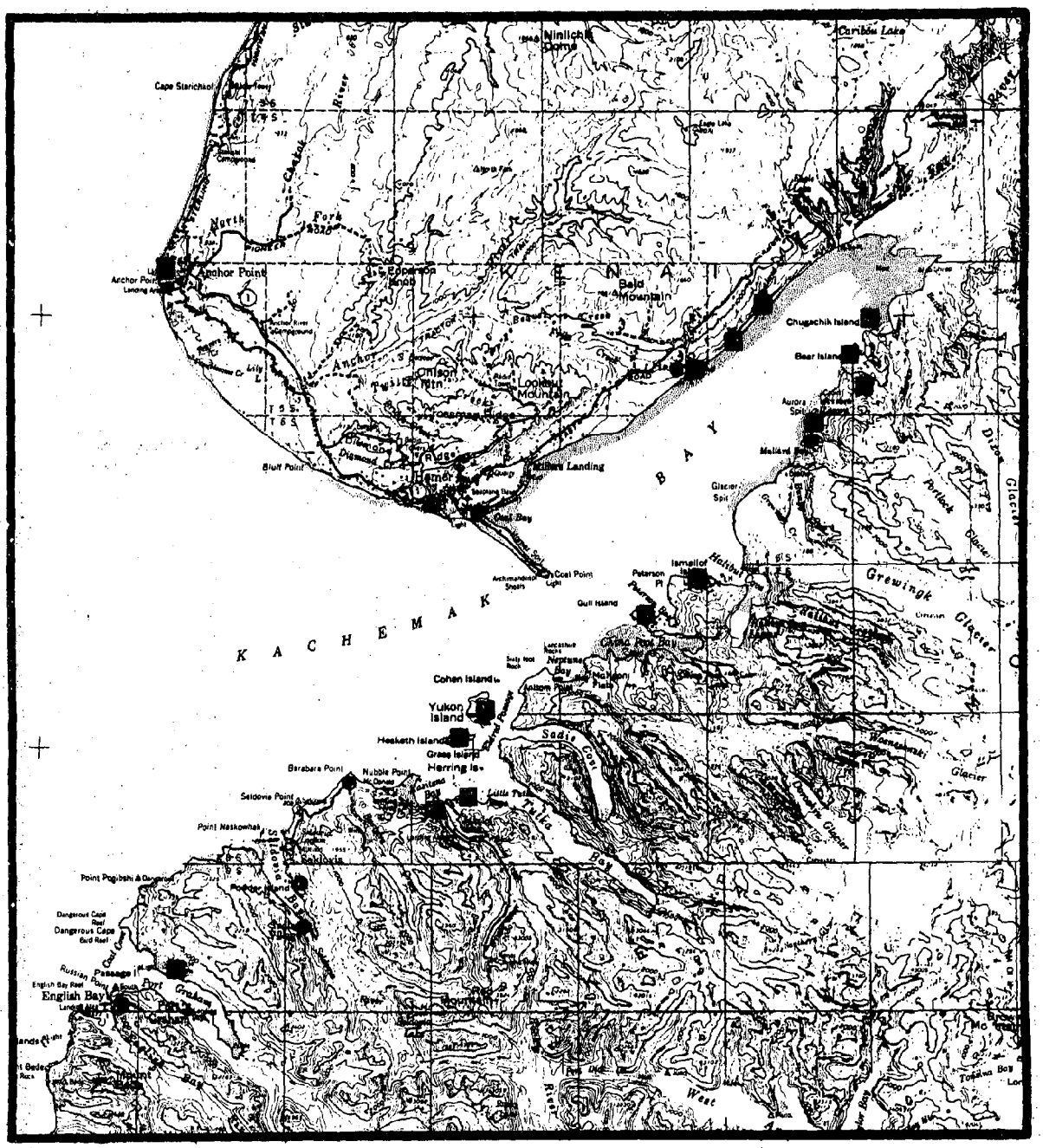
Certain aspects of the socioeconomic system can determine the feasibility of establishing a recreation area. For the purpose of this report, the socioeconomic system includes the following aspects: human history, land use, land status, demography, economy, transportation, and other plans and proposals. Most of these aspects have potentials for, or constraints on recreational opportunities. These potentials and constraints are listed at the end of each of the following sections (i.e., human history, land use, etc.) under the heading "Implications." This listing is by no means complete; it is simply an attempt to highlight the recreational possibilities and constraints.

Archaeology and Native Prehistory: The study area contains two archaeological sites, one at the mouth of Eastland Creek and one at the mouth of Cottonwood Creek. The Cottonwood Creek site is probably more significant than the Eastland Creek site. This is because the Cottonwood Creek site is larger, and therefore probably contains more remains (Workman, 1978 and Alaska Division of Parks, ongoing inventory). Furthermore, the Cottonwood Creek site supplied part of the evidence used by Fredrica de Laguna to formulate her Kachemak III Phase which will be explained later. Experts in Alaskan archaeology consider the Cottonwood Creek site extremely important, and they have expressed this by nominating it to the National Register of Historic Places (ADP, 4/29/76).

The archaeologic record of Kachemak Bay begins with a single, uncertain radiocarbon date of 750 B.C. The Great Midden site on Yukon Island yielded this date which begins a sketchy picture of the Bay's prehistory. Frederica de Laguna (1934) has divided the prehistory of the Bay into four phases: Kachemak I, II, sub III, and III. The Pacific Eskimo was the dominant group during Kachemak times. Then, the Eskimo was replaced by the Athapaskan Tanaina at some time between the end of Kachemak III times and the beginning of the Russian intervention (Workman, 1978).

The Kachemak I phase (second millennium B.C.?) of culture is known only from the lowest levels of the Great Midden site. The inventory of artifacts includes a primitive hand thrown harpoon, barbed bone points, a simple stone lamp, compound fish hook barbs, labrets (an ornament worn in the lip), and naturalistic art. Animal bones indicate that a variety of land and sea animals were exploited including harbor seal, porpoise, marmot and lesser whales. An "Eskimo" dog was also indicated. "Nothing is known about burial practices or housing" (Workman, 1978).

The Kachemak II Phase (? 1200 B.C. to 400 B.C.), like the Kachemak I phase, is known from evidence collected on Yukon Island. Houses were constructed of stone, whale bone and wood. The Pacific Eskimos of this time period made many flaked stone projectile points and tools. Flexed burials (burials with the body placed in the fetal position) are common, and grave goods (possessions such as jewelry buried with body) are often present. Food preferences were evidently the same as they were in the Kachemak I phase (Workman,



HISTORICAL AND ARCHAEOLOGICAL SITES

● **HISTORIC SITE** ■ **PREHISTORIC SITE** (DATED OR UNDATED ARCHAEOLOGICAL SITE LACKING EVIDENCE OF EUROPEAN INFLUENCE)

SOURCE: Alaska Division of Parks, HERITAGE RESOURCE SURVEY

FIGURE 12

1978).

The Kachemak Sub III (400 B.C. to 0 A.D.) Phase was based on finds at Yukon Island and Chugachik Island. Food preferences again appear to be the same, but weapons have improved, e.g., multiple barbed arrow heads. "Analysis of bird remains strongly suggests that the site was occupied in spring and early summer" (Workman, 1978).

The Kachemak III Phase (A.D. 0 to A.D. 800) is based on finds at Cottonwood Creek and Yukon Island. Kachemak III remains are the most common in the Bay area. Characteristics of this phase are exotic burial practices, decorated stone lamps, and semi subterranean houses. The Pacific Eskimos of this period continued to be tied to the sea, which is shown by the remains of shellfish, fish, and marine mammals in their middens (Workman, 1978).

The Cottonwood Creek site has contributed greatly to the understanding of the Kachemak III phase, particularly with regard to burial practices, the biology of the Eskimos, and the diet of the Eskimos. Burial practices can be described as bizarre. For example, a woman in her 50's was buried with 3,000 tiny bone beads which were evidently sewn to a parka. Also, a multiple burial of three women who had parts of their bodies dismembered was found (Workman, 1977).

The Cottonwood site also provided evidence showing that the aborigines endured great hardships. Many skeletons at the site showed signs of degenerative bone diseases. Growth arrest lines and enamel hypoplasia of the teeth, are attributed to periods of malnutrition. There are also indications of cannibalism at the site (Workman, 1978).

Faunal remains at the Cottonwood site are composed almost entirely of shellfish. The absence of large marine mammals is unusual in Pacific Eskimo remains. Because of the absence of large mammals, archaeologists believe that the site was used as a winter and early spring hunger camp. Here Pacific Eskimos supposedly gathered when other areas could not supply food. The use of shellfish as a backup food source makes sound sense because shellfish can be gathered in bad weather, and the number of shellfish would not change greatly with the changes in climate (Workman, 1978).

Some time after Kachemak III times, the Pacific Eskimo was

replaced by the Tanaina Indians. The uncertainty over the time and reason for this replacement results from similarities in the artifacts of the two groups. If the artifacts cannot be distinguished then cultural transition cannot be identified (Reger, personal communication, 1978).

Their artifacts are similar for two main reasons. First, both groups made their livings mainly from the sea where they hunted large marine animals. Therefore, they developed similar implements, such as boats, waterproof clothing and harpoons. Secondly, there was probably some contact between the two groups, which allowed them to learn each other's ways.

Implications

1. The Cottonwood Creek site, an archaeological site of extreme importance, exists in the study area.

Recommendations

1. It is recognized that a complete excavation of the site may never be possible, but archaeologists should undertake to complete as much excavation as possible in the very near future.

2. Recreational facilities should not be constructed in the vicinity of these sites until more complete excavations have been completed.

The Russian and American Occupation: The area of Cottonwood and Eastland Creeks is fairly remote from the areas settled by the Russians. However, the Russians did establish settlements at English Bay and on the mouth of the Kasilof River (Alaska Division of Parks, 1976). They eventually reduced many populations of fur bearing animals to dangerously low levels. Not only did this threaten some species of wildlife, but it also depleted some of the native food supply. The loss of game and the introduction of European diseases disrupted the culture of the local Tanaina Indians (Workman, 1975).

After the Russian trappers established settlements, missionaries from Russia came to Alaska. Again, disruption occurred to the Tanaina culture because the process of Christianizing the natives involved the destruction of some native cultural traditions (Alaska Division of Parks, 1976).

In addition to their trapping, the Russians were involved with mineral extraction. In the late 1700's, they began limited mining of the exposed coastal coal seams along Kachemak Bay for heating and blacksmith forging. On the mouth of McNeil Creek ,there are two long-abandoned mine entrances that could date back to the Russian era. Russian mining activities escalated; they shipped sizable amounts of coal to Kodiak for iron smelting; later, more sizable amounts of coal were shipped to Sitka for forging iron, fueling a brass foundary, generating steam power, building ships and supplying heat. Because the fur trade was continuing to decline, Peter Doroshin, a Petersburg Imperial Mining School Graduate, recommended a shift to coal mining to compensate for economic losses caused by the declining fur trade. Planning to sell their coal to markets in California, the Russians brought in heavy mining equipment and German coal miners. Then they began mining at Port Graham near Kachemak Bay. Despite their investments less than 3,000 tons of coal were mined and the mines closed in 1864, thus ending Russian coal exploitation in Alaska (Kennedy, 1976).

The Russians never had another chance at coal development because Alaska was purchased by the U.S. in 1867, thus beginning the American Occupation. A period of inactivity ensued, with some shift to fisheries, fur-farming, and limited homesteading. However, in 1886 an extensive renewed interest developed in coal with the formation of the Cleaveland Mining District. Four coal companies were organized. One of these companies, the Alaska Coal Company, began a mine near Fritz Creek just southwest of the study area. In 1904,

the North Pacific Mining and Transportation Co. began development in Eastland Canyon. In the late 1800's the largest coal mining company of all, Cook Inlet Coal Fields Company, began mining near Homer. From 1899 to 1902 they built a railroad, a large dock, and constructed 28 buildings on and near Homer Spit. However, the operation failed, and by 1904 all coal mining ventures were inoperative (Kennedy, 1976).

Between 1920 and 1930, 150 homesteads had been staked in the Kachemak Bay Area. Many of these homesteading ventures failed because of the problems commonly associated with agriculture in Alaska such as lack of markets, poor communications, physical hardships and bad roads. Furthermore, many homesteaders moved away because they could not find jobs. When World War II came even more homesteaders left to work in construction and armed forces jobs (Kranich, 1976). The largest era of homesteading followed World War II. Much of this homesteading occurred north and east of the mouth of McNeil Creek on Kachemak Bay (Kennedy, 1976).

One of the World War II era homesteads lying within the study area has been nominated to the National Register of Historic Places. This is Mr. Yule Kilcher's homestead on the west side of McNeil Creek. In 1944, Mr. Kilcher purchased 150 acres near the creek from Harry White who homesteaded this land in 1920. Mr. White had used his land for fox farming. After acquiring Harry White's land, Mr. Kilcher homesteaded an additional 160 acres, adjacent to his purchased property (Kennedy, 1976).

Mr. Kilcher was a State Constitution Delegate in 1955-56 and has served in the State Legislature. Mrs. Kilcher is a poet who has published her work. She now lives in Arizona. Today Yule Kilcher is working towards his original hope of establishing an educational colony and emphasizing arts and functional skills such as weaving, wood work and ceramics. Living off the land and close to nature is an integral part of his philosophy (Kennedy, 1976).

Implications

1. From the beginning of the Russian occupation, human habitation and natural resources development has increased almost steadily in the Kachemak Bay area.

Recommendations

1. The history of the Kachemak Bay area should be interpreted for park visitors.

Land Use

The Joint Federal-State Land Use Planning Commission (JFSLUPC) conducted a general study in which they found large portions of the Cook Inlet area to be favorable for settlement. Their graphics indicate that more than fifty percent of the study area is capable of supporting rural and urban development. Specific land uses are discussed below.

Agricultural Capabilities: The land in the East End Road area, including portions of the study area, is capable of supporting a high level of agricultural development. While there is very little reliable data on crop yields, farmers in the area apparently have attained high yields. Twenty tons of potatoes per acre have been attained with advanced agricultural techniques and good weather (Sours, personal communication, 1978).

The most common crop in the East End Road area is hay. Yields average one ton per acre. Larger yields could be attained, but this is not attempted because the hay cannot dry properly in densely grown fields (Sours, Personal Communication, 1978).

Farmers in the East End Road area supply much of Homer's potatoes and vegetables during the summer (Sours, personal communication, 1978).

One possible constraint on agriculture is the need for and price of fertilizer. Generally, to start farming, nitrogen, phosphorus and potash must be supplied to the soil (Sours, personal communication, 1978). The need for fertilizer should not be overstated because this need is typical for agriculture throughout the state.

Economic factors may also be a constraint on agriculture in the East End Road area. This is largely because of competition from producers in other parts of the United States. Also, the local market may not be large enough to consume more agricultural products. Therefore, while the area is capable of supporting more agricultural development, the economics of increasing the land base under cultivation and increasing yields is generally not favorable.

Residential Capabilities: Portions of the area are capable of supporting residential development for the following

reasons:

1) The soils generally offer firm support for construction.
2) The area is readily accessible by roads.
3) The scenic qualities in the area make it a desirable place to live.
4) People can to a degree make up for the lack of employment opportunities in the area through subsistence activities.

Roads and Transmission Corridors: There are transmission lines in the area. This constitutes a land use because a corridor through the forest is cut to make room for the transmission line (or utility line).

East End Road is the major road in the area, but short private roads connect with East End Road in many places. These roads constitute a significant commitment of land which cannot be used for other purposes.

Grazing: Private land near the study area is being used for grazing cattle and horses. Some of the lands within the study area, if cleared, could be suitable for grazing.

Timber Production: There are no large scale logging operations in the vicinity of the study area, but small scale timbering operations do occur in the area. One local resident cuts logs into boards with a portable power saw. Often sawmilling operations occur in conjunction with some other activity such as clearing trees for transmission corridors, roads or farm land. These cleared trees are salvaged and sawed into lumber, or used for house logs.

Implications

1. Because of the variety and uses that the land can support, land use conflicts are going to arise. These conflicts include the following:

   1) Residential versus Agriculture,
   2) Residential versus Recreational, and
   3) Recreational versus Agriculture.

Land Ownership

Unlike other portions of the state, the East End Road area contains a high percentage of privately owned lands. The majority of these privately owned lands were obtained from the federal government through its homestead program. However, reasonably large tracts of public land do still exist. Two of these publicly owned tracts are the subject of this study. Figure 13 shows the locations of public and privately owned lands in the study area. Land ownership, for the purposes of this study, is divided into private and public surface ownership, subsurface land status, and other interests.

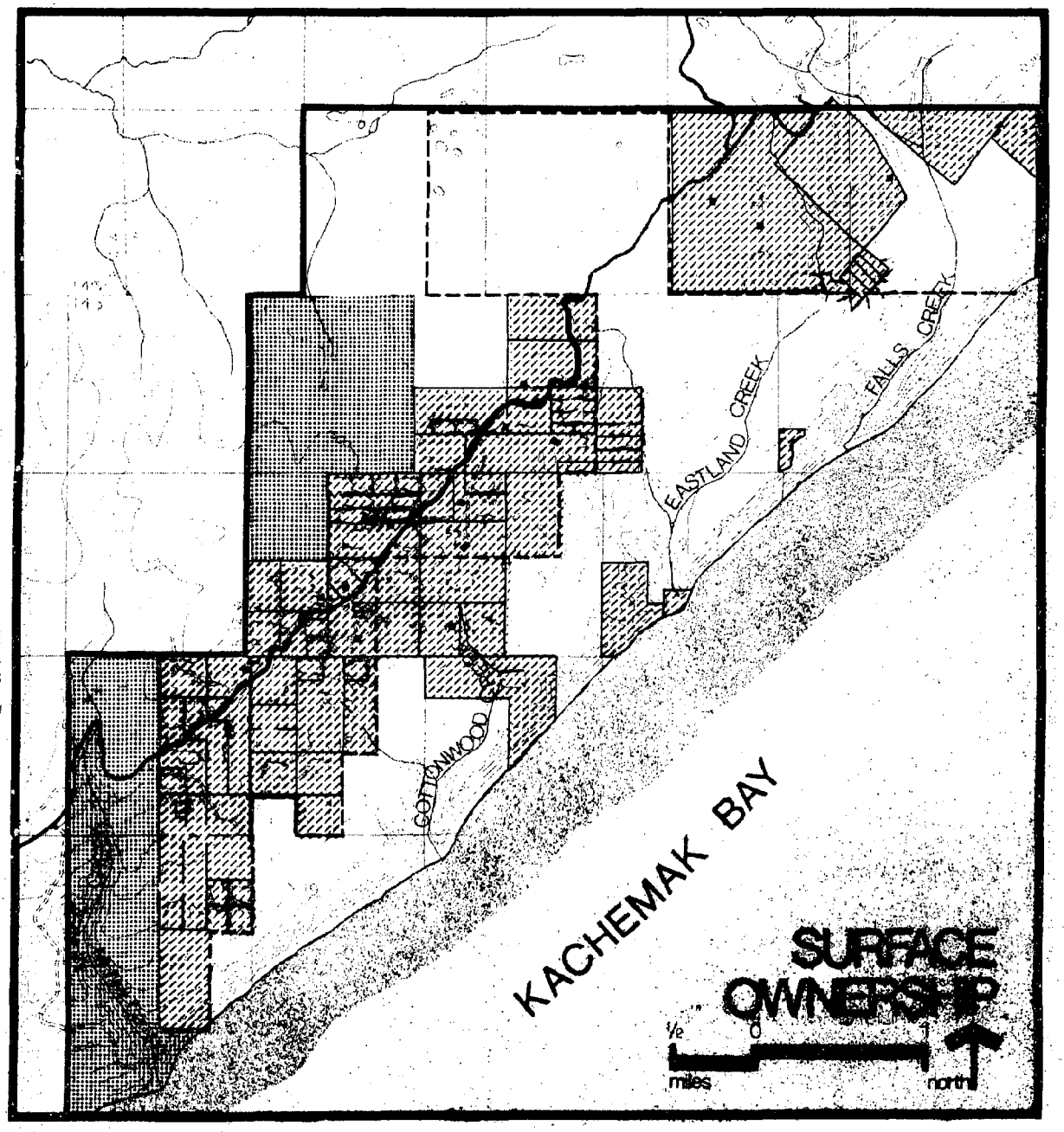
Private Surface Ownership: Privately owned lands in the area are generally still owned in parcels of greater than 40 acres in size. However, several owners in the area are currently in the process of subdividing the lands into smaller residential lots. These lots range in size from 2 to 10 acres in size. Privately owned parcels are shown in figure 13.

Public Surface Ownership: Publicly owned lands within the study area are all state owned. However, the Kenai Peninsula Borough has filed selections on a majority of these lands under the provisions of AS 29.18.190. These selections were filed on September 17, 1971. The recently enacted Municipal Land Selection Act (AS 29.18.201-29.18.213) has fixed the Borough's entitlement at 155,780 acres of state land within the Borough boundaries. While the new selection act honors selections made under the prior statute, AS , makes available to the Borough for selection, lands that were previously Mental Health and School Trust Lands.

Since many of these trust lands, which were not available to the Borough in 1971, are of high value for development, it is reasonable to assume that the Borough may reevaluate the 1971 selections in this area. Borough selections are shown in figure 14.

A 40 acre parcel of University Trust Land is located within the larger parcel of public land at Eastland Creek. A small parcel of School Trust land is also located in this general vicinity.

In 1976, the Division of Parks, after completing its study of the West Kenai Peninsula (ADP, 1976), requested of the



PRIVATE

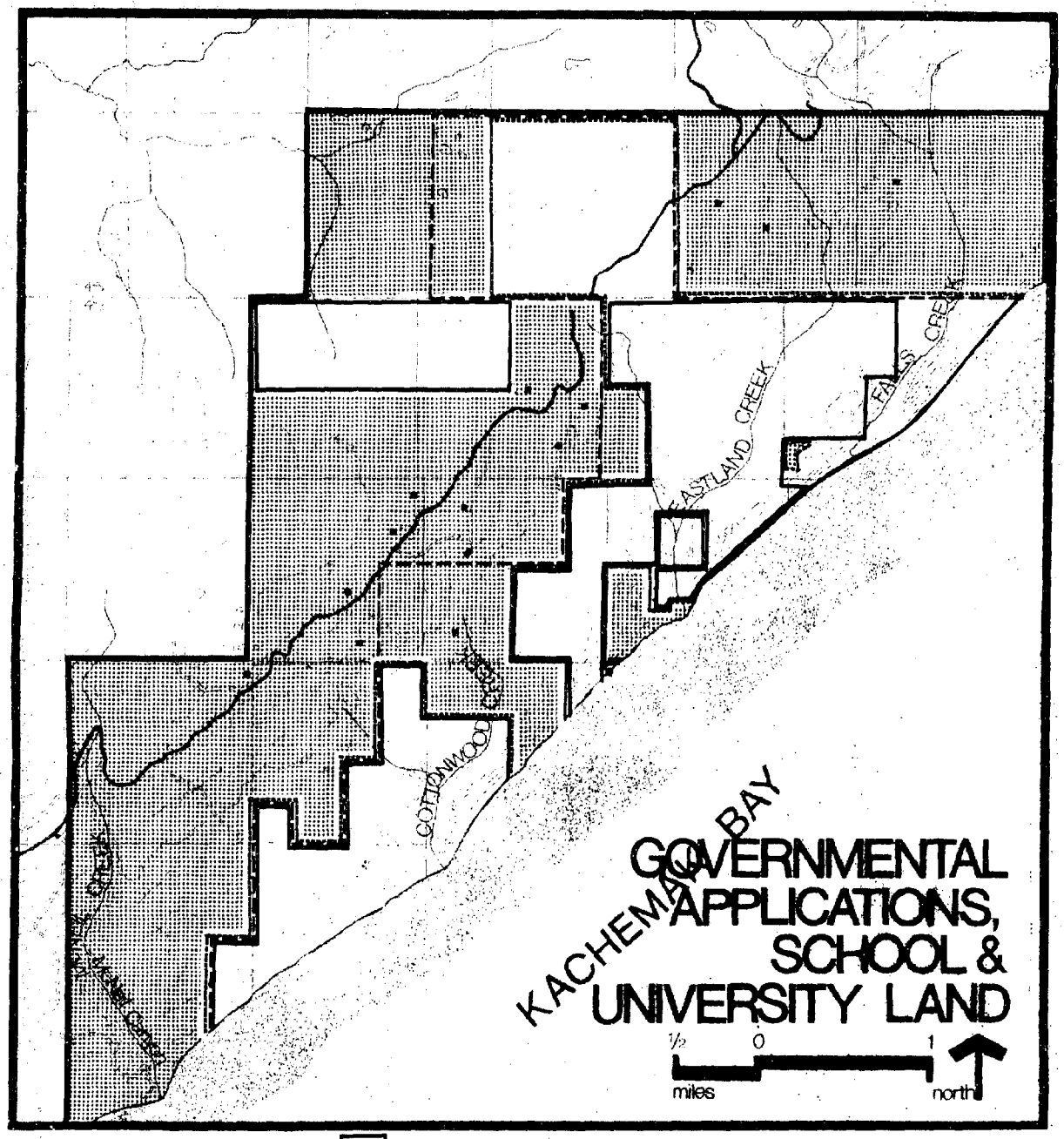
NOT EVALUATED

STUDY AREA BOUNDARY

TENTATIVE PARK BOUNDARY

SOURCE: Kenai Peninsula Borough, Tax Records

FIGURE 13



Public Recreation Request

Borough Selection Application

Area excluded from Borough Selection Application & Public Recreation Request

STUDY AREA BOUNDARY

University Land

TENTATIVE PARK BOUNDARY

School

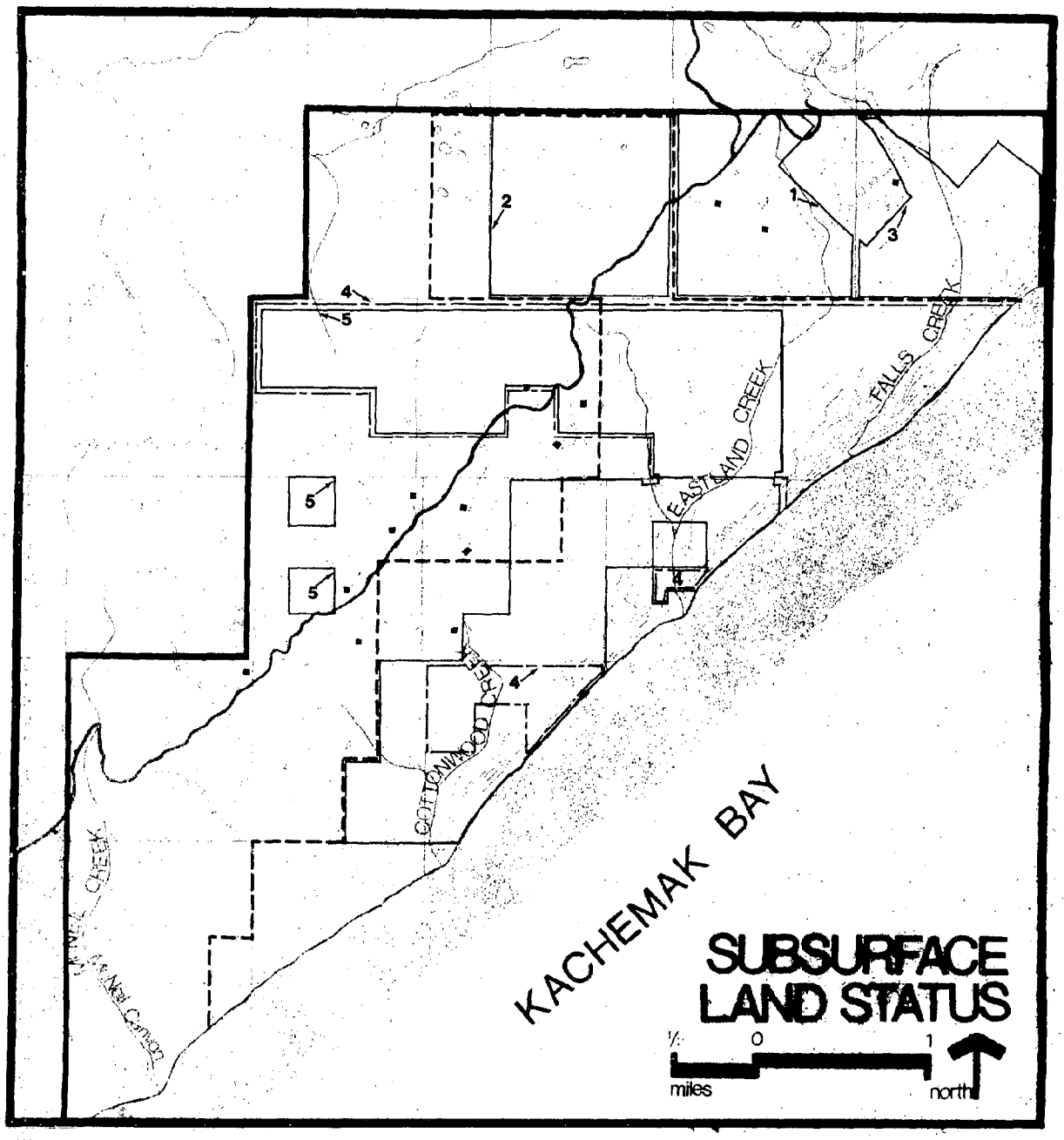
State Division of Lands, Land Status Plats

FIGURE 14

Alaska Division of Lands to classify certain lands in the Cottonwood and Eastland Creek area for public recreation purposes. Figure 14 shows the locations of trust lands and the Division of Parks public recreation classification requests. The Division of Parks made this request on March 14, 1977.

Subsurface Lands: Subsurface ownership of lands in the area involve oil and gas leases and one coal prospecting permit. These subsurface encumbrances focus on lands in the Eastland Creek area. In this area, a majority of the lands have been leased for their potential oil and gas resources. Four leases are involved, each to a different individual. The coal prospecting permit involves lands both east and west of East End Road. Approximately 640 acres within the tentative recreation area boundary are involved. Most lands in the Cottonwood Creek area are free of subsurface encumbrances. Figure 15 illustrates the locations and types of subsurface land interests.

Other Interests: Over the years since the state gained ownership of lands in the area from the federal government, various individuals have formally expressed an interest in having the state sell or lease these public lands. These requests have included land sale and lease applications and grazing lease applications. It should be noted that these applications are only requests and do not vest any interest in the land by the person making the request. Figure 16 shows the locations and types of applications which have been made on public lands in this area.



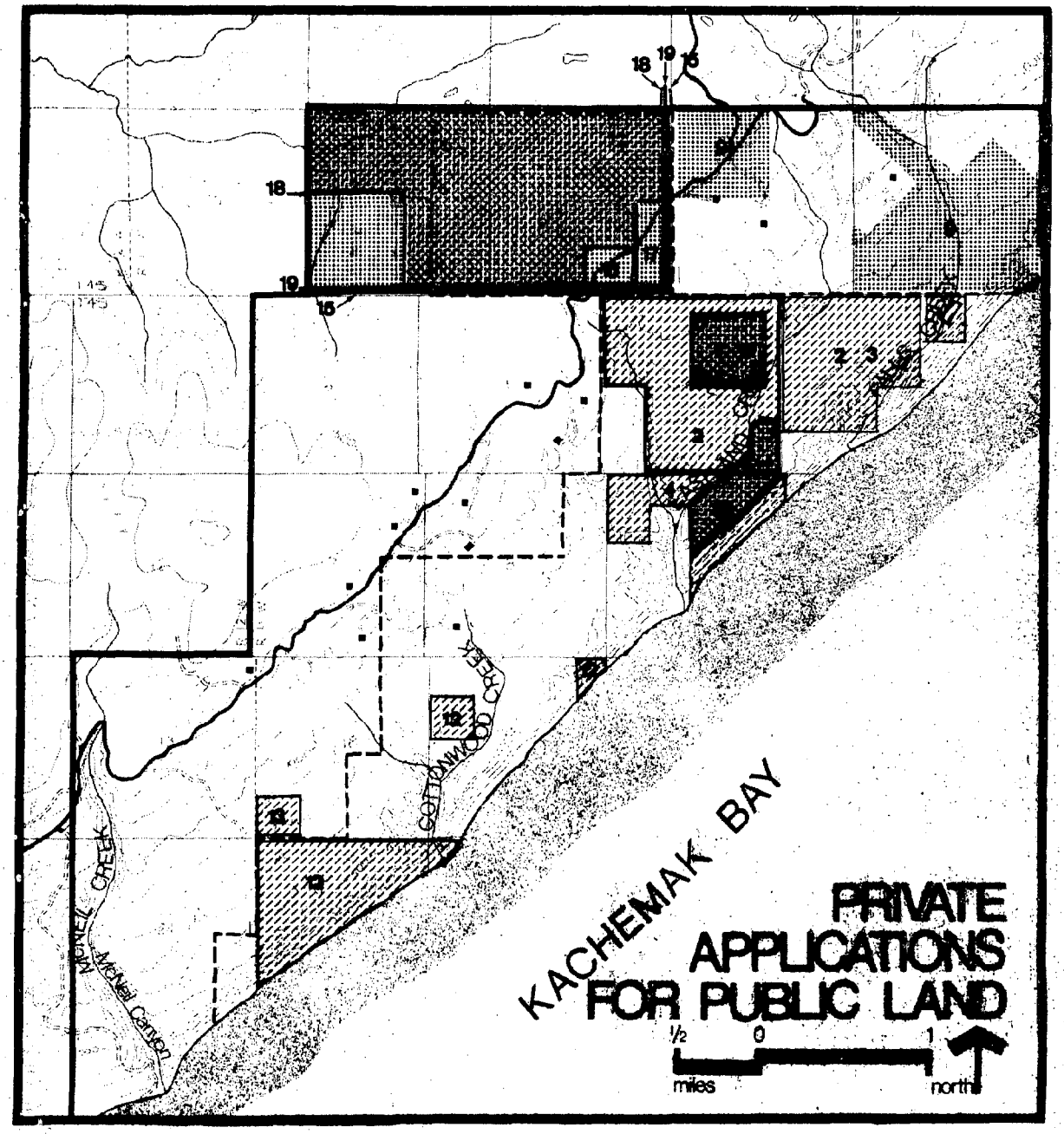
MAP NUMBER	STATUS	NAME
1	Oil & Gas Lease	Buckley
2	Oil & Gas Lease	Langly
3	Oil & Gas Lease	De Junker
4	Oil & Gas Lease	Carson
5	Coal Prospecting Permit	Moening-Grey & Associates, Inc.

STUDY AREA BOUNDARY

TENTATIVE PARK BOUNDARY

SOURCE: State Division of Lands, Land Status Plats

FIGURE 15



1 Land Lease Application
2 Land Sale Application
3 Land Sale Application
4 Land Sale Application(pref.)
5 Land Sale Application
6 Land Sale Application (pref.)
7 Land Sale Application
8 Grazing Lease Application
9 Land Sale Application
10 Land Sale Application
11 Land Sale Application
12 Land Lease Application
13 Land Lease Application
14 Land Lease Application
15 Grazing Lease Application
16 Land Sale Application
17 Land Sale Application
18 Land Lease Application
19 Grazing Lease Application

STUDY AREA BOUNDARY

TENTATIVE PARK BOUNDARY

SOURCE: State Division of Lands, Land Status Plats

FIGURE 16

Demography

City of Homer: Homer is located only fourteen miles from the study area and is the largest city in the lower portion of the Cook Inlet region. Homer is a rapidly growing community. The population of Homer increased by 42% between 1970 and 1976 (BLM, 1976). The City's most recent population estimate is that 2,055 people now live within Homer's city limits (Steve Baker, personal communication, 1978).

Homer's unique location at the end of the Sterling Highway and Marine Highway System make it an important trade center. Because of this, a large portion of Homer's population is employed in the trade sector. In 1976, 160 people, or 21% of Homer's population, was employed in trade related occupations (BLM, 1976). Homer's Comprehensive Development Plan (1978) states that the city serves a trade area of at least 3,000 people, in addition to those living within the city limits.

Homer has a post office, Kenai Borough Schools, a health center, a library, a newspaper, two banks and several hotels. The city has a municipal water system and a sewer system. The Homer Electric Association supplies electricity, and the Glacier State Telephone System supplies phone service.

The East End Road Area: The closest population figures of the countryside that contains the study area are those contained in a 1978 census of the Fritz Creek voting district. This district begins at the City of Kachemak city limits and extends to the head of Kachemak Bay. In this area there were approximately 872 people in 1978. This is an extremely large number of people considering that in 1970 only 27 people lived in this area (Steve Baker, personal communication, 1978 and Alaska Department of Community and Regional Affairs, 1974).

Implications

1. Because of the rapid population growth rate in the Homer/East End Road area, there is a need for more public services including recreation facilities.

Economy

The economy of the East End Road area is closely associated with the economy of Homer. This is because many East End residents work in Homer on a daily, or periodic basis. Furthermore, some residents, such as farmers, sell their products, and/or buy consumer goods in Homer on an intermittent basis. The cornerstone of Homer's economy is fishing. Other important activities (not arranged in any specific order) include the following: tourism, government, construction, manufacture, industry, trades, services and timber.

Commercial Fishing: Homer's economic emphasis on fishing is a natural outcome of its strategic location on Kachemak Bay. This location allows Homer to be the major seaport on the shore of what has been described as the most productive marine area in Alaska (BLM, 1976).

The Southern District of Cook Inlet which contains Kachemak Bay and the waters immediately outside the Bay produces over 60% of the total Cook Inlet shellfish harvest (Trasky, 1977). Figure *17* contains information on the fish harvest of Kachemak Bay. Commercial fishermen earned an estimated $2,931,684 on the 1976 harvest (Trasky, 1977). The fishing industry provides a source of direct and indirect income to the local economy (Homer, 1978).

As many as 120 persons could have been employed in the local fish industry in 1976 (BLM, 1976). Homer's fish processing facilities employ the majority of persons working in local manufacture. The fishing industry is not without drawbacks; namely, its is highly seasonal, like the tourism industry, creating large variations in employment and unemployment statistics (BLM, 1976). The future of Homer's fish industry is bright. The industry will probably be expanded because of the new 200 mile territorial limit, and probable development of the bottomfish industry (Homer, 1978).

Tourism: In recent years the economy of the Kenai Peninsula has shown a strong movement towards tourism. A recent study by the Department of Environmental Conservation showed that the economic benefit of tourism to the towns of Homer, Kenai, Soldotna, and Ninilchik was heavy. Furthermore, a 1973 study showed that there were almost 2.1 million recreation days spent on the Kenai Peninsula that year (Stenmark, 1973). In 1972, sport fishermen spent over two million dollars pursuing salmon in the waterways of the Kenai Peninsula.

FIGURE 17: ESTIMATED VAULE OF 1976 KACHEMAK BAY COMMERCIAL FISH HARVEST

	1976 Catch in Pounds	Average Price Per Pound	Value to Fishermen
King Crab	1,682,702	.75	$1,262,026
Tanner Crab	1,913,140	.30	573,942
Dungeness Crab	131,355	.35	45,974
Trawl Shrimp	5,769,198	.10	567,920
Pot Shrimp	432,055	.40	172,822
Salmon	600,000	.50	300,000
TOTALS	10,528,450		$2,931,684

SOURCE: Trasky, et al., 1977.

Sport fishing is not the only attraction. Other recreational pursuits include canoeing, hiking, beachcombing, picnicking, clamming, camping, hunting and observing wildlife. The Joint Federal-State Planning Commission for Alaska estimates that tourism could rise by 8% a year on the Peninsula (BLM, 1976).

One economic advantage of tourism over other industries is that tourism is highly labor intensive. Because of this, tourism could be expected to produce greater employment than capital intensive industries (BLM, 1976).

As suggested earlier, tourism plays a major role in Homer's economy. Homer operates a forty acre campground containing 34 campsites. Campground fees provide a direct source of municipal revenue. A second campground facility is located at the distal end of the spit where the city has leased land to a private party to operate and maintain a campground and trailer park. Tourists using these facilities spend money in town, and therefore contribute to the support of the city through sales taxes (Homer, 1978).

For the future, Homer has designated an area on the west side of the spit as a future camground site and the city is considering the possibility of expanding the small boat harbor at the end of the spit (Homer, 1978).

The effects of tourism are not all positive. For example, overcrowding by trailers and motorhomes can reduce environmental quality (Homer, 1978). Also, tourism related employment, like fishing, is seasonal.

Government: Government is also an important part of Homer's economy. The City employs thirty one people full time, and it has eighteen Comprehensive Employment Training Act (CETA) employees on a temporary basis. Other State and federal jobs programs become available to the city on an intermittent basis (Homer, 1978).

State and Federal employees are also based in Homer on a full time basis. These include Federal Aviation Administration employees, Alaska Department of Fish and Game employees, and Division of Transportation employees. These people buy consumer goods in Homer, and pay property taxes, and therefore help support City government and the local economy.

Construction: The construction industry is doing well in

Homer. In 1977, a National Bank of Alaska study showed that approximately 10% of Homer's residents who considered themselves full time employed were employed in construction. The City of Homer expects the construction industry to grow in the years to come (Homer, 1978).

Industry: Industrial activity in Homer is presently limited to fish processing and a limited amount of light manufacturing and fabrication (Homer, 1978).

Trades and Services: Trades and services are showing a high rate of growth which would be further increased by OCS development (Homer, 1978). Tourism also plays a part in the trades and services sector of Homer's economy.

Timber: As with the rest of the Kenai Peninsula, timber harvesting is of minor economic importance. Near Homer, some commercial logging is done on a limited basis (Homer, 1978; and BLM, 1976).

Some people in the Homer area are using the area's timber resources without actually buying or selling timber. For example, they may use the trees on their property to build their house. This kind of activity could make timber more valuable than statistics indicate. Also, firewood is used as a primary or secondary heating source in some homes.

Implications

1. Aside from the possibility of an oil related economic boom on the Kenai Peninsula, fishing and tourism will probably remain the mainstays of the Homer area economy.

2. The designation of parklands and the construction of recreation facilities would be an asset to the area's tourism industry.

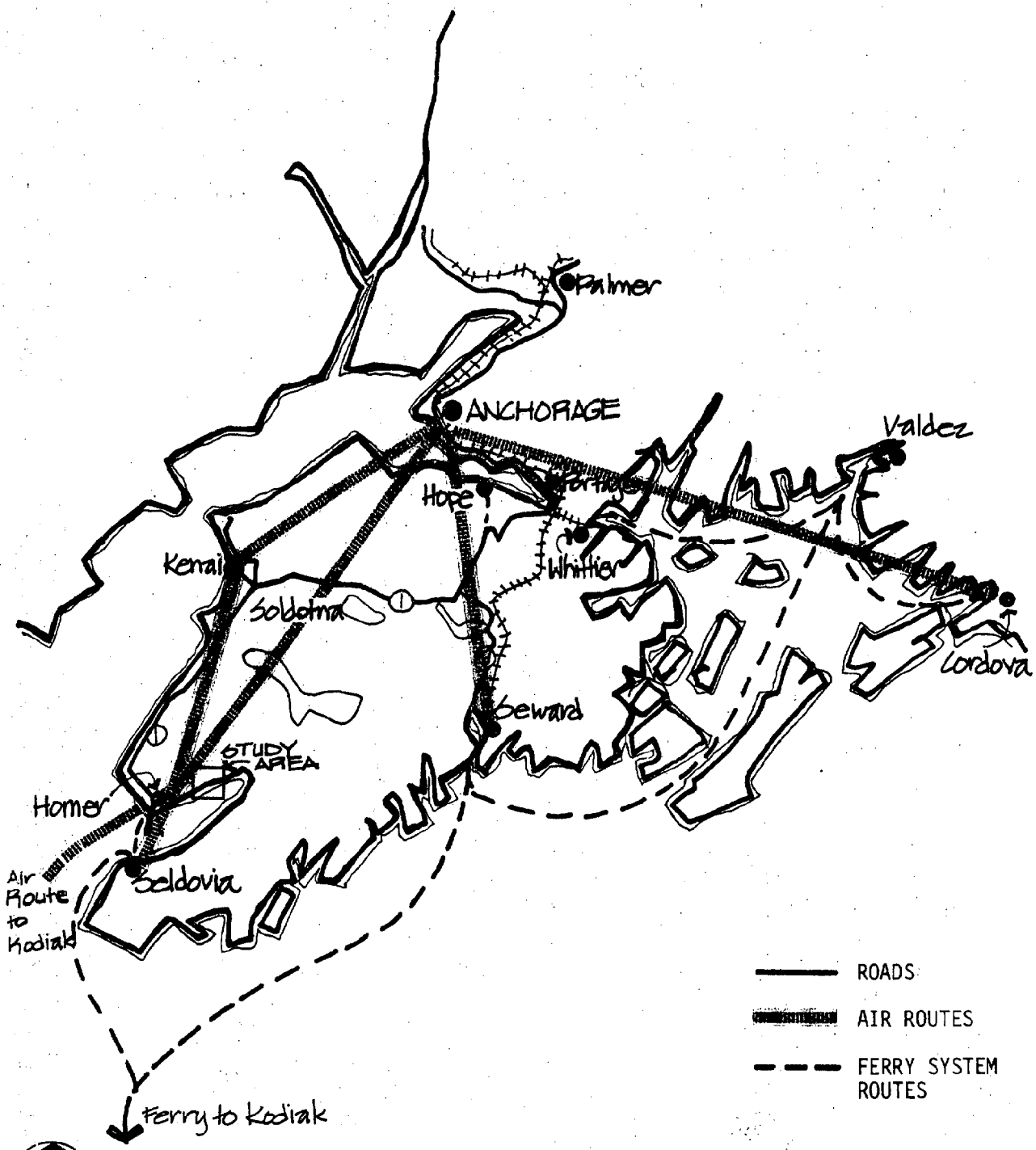
Transportation

The dominant mode of transportation to the Cottonwood and Eastland Creeks area is via East End Road originating in Homer. This road is maintained throughout the year by the Alaska Department of Public Transportation through its maintenance station in Homer.

Homer is accessible by a variety of means. Land transportation to Homer is accommodated by State Route 1, the Sterling Highway. This road is a hard-surfaced, year round highway which connects Homer with Kenai, Soldotna, Anchorage and the Alaska State Highway System. Sea transportation to Homer is provided by the Alaska Marine Highway System. The Tustemena, a large sea going ferry, carries automobiles and walk on passengers between the ports of Homer, Seward, Seldovia, Port Lions, Valdez, Cordova, and Kodiak Island. Because the Tustemena carries automobiles, vehicular traffic can flow from the cities mentioned above to Homer and the Sterling Highway (Homer, 1978). See figure 18.

Air transportation to Homer is provided by two commercial airlines, Alaska Aeronautical Industries (AAI) and Wien Air Alaska. AAI connects Homer with Kenai, Soldotna, Seward, and Anchorage. During the summer there are seven flights into Homer and eight flights out. The additional outgoing plane is provided by a plane which carries freight into Homer airport. During the winter months AAI reduces its service to four or five daily flights. Wien Airlines connects Homer with Anchorage, Kodiak and Seattle, but it only stops in Homer twice per week. Because Homer is connected to world wide air routes passing through Anchorage, tourists from many countries find their way to Homer. In addition to the commercial airlines, many private plane owners use the Homer airport, and several private air charter companies are based in Homer. The private carriers include Cook Inlet Aviation, Homer Air and Kachemak Air Service.

From Homer, the only convenient form of transportation to Cottonwood and Eastland Creeks is by automobile via East End Road. The only direct point of access to the state owned land under study is seventeen miles from Homer. The first ten miles of the road are paved, and the following seven miles are gravel. Because of the gravel surface and some winding sections of the road, the trip to the state owned land (at about mile 17) takes approximately thirty minutes. The gravel road extends past mile 17 for four or five miles.



TRANSPORTATION ROUTES

FIGURE 18

See figure 19. The Alaska Department of Public Transportation currently does not have any plans for paving the gravel portion of East End Road.

Transportation by boat up Kachemak Bay from Homer to the Creeks is not practical because of shallow water and the presence of numerous offshore rocks. Landing along this shoreline would require a long walk through the mud flat which lines the coast (Workman, 1977).

Transportation to the creeks by float plane is not practical because there are no large bodies of water within the study area, and landing in Kachemak Bay would present the same problems as a boat landing. Landing plane on the beach is possible but requires a high degree of skill.


Ninilchik Dome
KENAI
Bald Mountain
Eagle Lake
Chugachik Island
Bear Island
Aurora Spit
Mallard Bay
Glacier Spit
Anchor River Campground
Eveerson Knob
Ohlson Mtn
Lookout Mountain
Crossman Ridge
Diamond Ridge
Bluff Point
Homer
Millers Landing
Seaplane Base
Coal Bay
Homer Spit
Coal Point
Archimandritof Shoals
Peterson Pt
Ismailof Island
Halibut Cove
Gull Island
KACHEMAK BAY
China Poot Bay
Lancashire Rocks
Sixty-foot Rock
Neptune Bay
McKeon Flats
Cohen Island
Yukon Island
Hesketh Island
Grass Island
Herring Is.
Sadie Cove
Barabara Point
Nubble Point
Seldovia Point
Seldovia
Tutka Bay
Jakolof Bay
Indian Village
Grewingk
EAST END ROAD

FIGURE 19

Implications

1. Automobile transportation from Homer to Cottonwood Creek is easy and convenient. As a result, there are no barriers to access to this area for the general public.

2. The numerous air and sea lines through Homer make the Cottonwood and Eastland Creeks area accessible to a wide spectrum of the public.

3. While East End Road is well maintained at current traffic volumes, a strong increase in traffic because of either recreational use generated by a recreation area or increased recreational development in the area could lead to a deterioration of the road or the need for up grading and rebuilding the road.

Recommendations

1. Recreation development by phasing should be closely coordinated with the Department of Transportation to prevent overuse of the East End Road.

Other Plans and Proposals

The plans and proposals of both public agencies and private organizations will have a major effect on future land use patterns in the Homer/East End Road area. Recreation as a land use will both affect and be affected by these other plans and proposals. Plans and proposals of particular importance to the area include the following: off shore oil and gas development, bottom fish exploitation, the Tustemena Loop Road, Homer spit developments, the cross Kenai trail, and City campgrounds development.

Off-Shore Oil and Gas Development: The Department of the Interior leased, in 197 , 152 off-shore oil and gas tracts in an area of approximately nine million acres. The estimated recoverable oil from these tracts ranges from a high of 2.6 billion barrels to a low of .09 billion barrels. The amount of gas in these tracts is estimated at somewhere between 3.3 trillion cubic feet and .6 trillion cubic feet (BLM, 1976).

The Department of the Interior, using a high development scenario, predicts that the project would require the following facilities: 23 off-shore platforms, 84 exploratory wells, 420 development wells, 300 miles of pipe, two on-shore terminals, one liquified natural gas plant, and two on-shore treatment plants. Potential sites for the support facilities include the following towns: Kenai, Homer, Port Graham, and English Bay. Potential terminal sites may be near the following: Port Graham, Homer, Anchor Point, Nikiski, Cape Douglas, and Drift River. Furthermore, a liquified natural gas plant might be located near Nikiski, Kenai, or on the coast north of Anchor River (BLM, 1976).

"...[T]he Department of the 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" (ADP, 1976).

Bottomfish Exploitation: The Office of the Coordinator of the bottomfish industry is considering several locations for the siting of a bottomfish processing plant. Homer is one of these locations. Bottomfish within the 200 mile limit include the following species: yellow-fin sole, pacific ocean perch, black cod and walleyed pollock. The coordinator's goal is to manage the fish resource so as not to deplete one or more species; he also wants people to be employed over a

long period of time.

If a bottomfish processing plant is built in or near Homer, it would boost the economy of the area and increase the area's population. This would increase the demand for recreational facilities as well as other public facilities and services.

The Tustemena Loop Road: The Alaska Division of Highways has a long range planning map indicating proposed extensions of the land transportation system. One section of the proposed road system is referred to as the Tustemena Loop Road. This proposed road begins at the end of East End Road, continues past Tustemena Lake, and eventually joins the Sterling Highway near Clam Gulch (BLM, 1976).

If this road is ever constructed, it would be relatively far in the future, at least five years. However, if it is built, many recreationists would choose to drive this road as an alternative to the Sterling Highway. There would be a strong tendency for these people to pull off the road anywhere -- including off the road onto private property -- to camp unless adequate camping facilities are provided.

City of Homer--Spit Plans, and Recreation Plans: The City of Homer presently operates two camping areas. One of these is located above the Homer business district, while the other is located on Homer Spit. The Homer Spit Camping area is located on City lands which are zoned for industrial use. if off-shore oil development occurred and Homer was used for industrial purposes, this camping area could 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.

The Cross Kenai Trail: The Heritage Conservation and Recreation Service of the Department of the Interior is conducting a study on the feasibility of establishing a hiking trail from Hope to Eagle Lake. The town of Hope is located on the south shore of Turnagain Arm and Eagle Lake is located twenty-one miles northeast of Homer off the East End Road. The trail would cross most of the Kenai Peninsula. Twelve miles of this trail would cross state owned land just north of Eagle Lake (Alan Meiners, personal communication, 1978).

The effect of this trail would be to bring more recreationists

into the Homer/East End Road area. To prevent trespass camping on private land, a recreation area with camping facilities would be desirable.

REGIONAL NEEDS ANALYSIS

The population of Alaska is growing. In 1970, the population of the state was 302,000. In 1976 it had risen to 413,000 (Alaska Department of Labor, 1978). By 1985, the population of Alaska could be as much as 530,000 (Teal, et. al., 1978). Tourism is also growing in the state. In 1975, 260,000 tourists visited the State; the following year the number of out-of-state tourists had risen to 300,000. By 1980, there may be as many as 500,000 tourists visiting Alaska each year (ADP, Alaska Outdoor Recreation Plan, 1976). Because of the growth of Alaska's population and tourist industry, along with other factors, there is a growing need for the following: 1) easily accessible recreation lands, 2) shoreline access, 3) wildlife habitat protection, 4) open space, and 5) economic stabilization and enhancement.

Easily Accessible Recreation Lands

The types of recreation that people participate in most are the ones that require the least time, personal sacrifice and financial investment. These types of recreation include hiking, sightseeing, pleasure driving, picnicking and fishing. Recreational activities which are not of this type include camping (long duration), backpacking (extended trip), hunting and flying for pleasure. These activities require more effort and expense than the previously mentioned ones; and as statistics indicate, these activities are less popular than those first mentioned (see figure 20).

Parks which can provide recreational activities that are easy to enjoy must be accessible by automobile and fairly close to towns, cities or popular tourist areas. There is a need for these parks along the Sterling Highway (State Route 1) and near Homer. For example, during salmon runs, recreation generated traffic could be doubling traffic volumes over the daily average traffic flow on the Sterling Highway (Kenai Peninsula Borough, 1978).

Shoreline Access

Shoreline zones are public domain; yet the public often cannot use these areas unless Federal, State or local governments reserve public lands for road or trail beach access. State Waysides along the Kenai Peninsula presently provide public beach access; however, these recreation areas are far apart. Furthermore, between Homer Spit and the head of Kachemak Bay, there is no beach access suitable for the general public. This is because there are no recreation areas along this stretch of coastline, and places where the public could reach the beach without crossing private land are not common knowledge. In conclusion, beach access needs to be provided for the public, and the designation of recreation areas is one way to satisfy this need.

Wildlife Habitat Protection

As the population of the state, and tourism increases, more pressure is placed on wildlife habitat. While there are large areas such as the Kenai National Moose Range designated for wildlife, habitat protection is important elsewhere. This is because some animals such as eagles are located outside large habitat preserves. Furthermore, large wildlife habitat areas serve their purpose better if human presence

FIGURE 20: RECREATION PARTICIPATION BY ACTIVITY AND REGION

AVERAGE ANNUAL PARTICIPATION DAYS PER CAPITA

(residents only)

Activity	South-eastern	South Centeral	Statewide
Trail-Related Activities	80.9	46.6	60.1
Sightseeing	35.6	19.5	20.9
Driving For Pleasure	35.5	27.0	23.6
Picnicking	16.1	11.7	11.8
Fishing	13.4	10.8	10.1
Boating	11.4	5.7	8.0
Camping	3.2	5.3	4.9
Swimming	8.8	6.1	6.4
Hunting	4.6	5.8	6.4
Outdoor Games And Sports	7.9	6.0	6.0
Ice Skating	1.5	2.7	2.5
Snow Play	1.4	2.0	2.0
Flying For Pleasure	1.5	1.4	1.8
Alpine Skiing	0.7	1.5	1.3

SOURCE: Alaska Division of Parks, Alaska Outdoor Recreation Plan: "Summary," 1970.

is kept to a minimum. Therefore, less critical areas that still offer wildlife viewing opportunities can serve to attract large numbers of people away from large, critical wildlife habitats. There is another drawback to large wildlife areas; namely, they are not always conveniently located. People cannot always drive to one of these large areas to enjoy outdoor recreation because of traveling time and expense. Small natural areas need to be located near population centers and tourist areas for easy accessibility.

In conclusion, as human presence increases, wildlife habitat becomes more threatened, and its protection for recreation, as well as for its own sake, becomes more important. Existing large wildlife areas are not completely satisfactory for habitat protection; therefore, small recreation and wildlife habitat areas need to be established and managed to protect wildlife habitat.

Open Space

Diverse landscapes are scenic and productive. If the edges of cities blend into natural areas, there is a reasonable balance between man and nature. Areas that are completely urban lack outdoor recreation opportunities; areas that are completely natural make physical existence demanding. If neither of these situations is desirable, then it seems logical to strike a compromise between the natural and the man made. Establishing parks or recreation areas as open space is one way to accomplish this.

Economic Stabilization and Enhancement

Long term economic prosperity cannot depend entirely on resources extraction. For example, oil and gas development boosts local economies during the construction of wells, pipelines and shipping facilities, but economic benefits to "oil field communities" decline during the production phase.

Developing industries such as tourism can provide employment on a long term basis. Park or recreation lands help the tourist industry by providing scenic and natural values which tourists are seeking and willing to indirectly pay for. The disadvantage, in the case of tourism, is its seasonal nature. However, trades and services such as restaurants and hotels find the tourist season important because during the profitable summer months they make up for

the slow winter months. On the Kenai Peninsula there is a need for industries such as tourism which can provide long term economic enhancement and diversity.

LOCAL ATTITUDES AND CONCERNS

The attitudes and concerns of local residents are an important component of any land use analysis. During the course of this study, the Division of Parks met and interviewed local residents, and held a public meeting in Homer, which was well attended. The analysis of local concerns has led to the development of four topics. These are the maintenance of rural quality, the desire to see more public lands become available for private ownership, and the adverse social and environmental impacts associated with tourism and recreation. The following is a discussion of these concerns and the probable effect of establishing a recreation area on each concern.

Maintenance of Rural Quality

Some East End Road area residents have commented that the area is becoming too developed. They prefer the self reliance, freedom and openness of rural living over the hurried and crowded conditions of developed areas. Furthermore, some people have commented on the deterioration of the area's wildlife values. For example, as the level of development in the East End Road area has increased, wildlife has been displaced which makes the viewing, or taking, of wildlife more difficult in the area. Another plaguing problem frequently mentioned in the area is the lack of beach access.

Since rural quality is highly dependent on the presence of large relatively undeveloped areas, the area's rural quality will tend to decline as the area becomes more developed. The establishment of a recreation area near Cottonwood and Eastland Creeks would not guarantee or maintain a true rural character in the East End Road area. However, it would preserve an undeveloped area of significant size which would provide opportunities to observe wildlife or simply spend several hours hiking through a natural landscape.

To the extent that the area would be oriented towards nonlocal recreation use, a lessening of the area's rural quality may occur. This effect will be dependent on the type of recreational development (e.g., campgrounds, roads, size, and timing of their development). Should large campgrounds be built before East End Road is upgraded, the resultant increase in traffic volume would result in increased dust and traffic congestion problems. However, should this development occur after paving, the impact of such use would be substantially reduced.

The development of a recreation area may reduce trespass from current nonlocal recreation use.

Transfer of Public Land into Private Ownership

There is currently a demand for land in the Homer East End Road area. Some people have expressed that a recreation area would "lock up" land making land acquisition more costly. Additionally, they conclude that by lessening the supply of land it will allow real estate salemen to make unjustifiable profits on their land sales at the expense of land buyers. Other people believe that a recreation area

will make too much public land unavailable for future agricultural needs.

The demand for private land in the East End Road area will probably always be great. This will result in ever rising land prices. It is assumed in this report that land under consideration for a recreation area, would, if not used for this purpose, be sold by the State, Borough, or possibly the Cook Inlet Region, Inc., should they acquire these lands under the terms of the Cook Inlet Land Exchange.

The establishment of a recreation area would take some land off the future real estate market and would at least for the foreseeable future be unavailable for agriculture. This does not need to be an all or nothing situation; the amount of land included in the recreation area could be decreased to increase the amount of public land available for private acquisition. This effect would most likely be temporary. Regardless of the size of the recreation area, the overall land picture will not change; namely, the demand for land in the East End Road area will probably always exceed the supply. Because of this, it may be better to set aside land in a recreation area to enhance the quality of life for East End Road residents of the future.

Social and Environmental Impacts Associated With Recreation/Tourism

People living near and within the study area have commented that there are many social and environmental problems associated with recreation and tourism. Further, some have said they do not want a recreation area established because of these problems.

The social impacts of recreation and tourism in the area are believed to incude trespass, vandalism and traffic congestion. The environmental problems associated with tourism in the area include noise, dust and to a few individuals, fire. Littering is also a potential problem. Both social and environmental impacts resulting from tourism/recreation will occur from recreation area designation. However, the nature and severity of these problems will be related to the degree to which land is developed for recreation and the level of management of recreation use by the Division of Parks.

Other people living within the study area have commented that having a park off East End Road may actually reduce at

least one of the problems mentioned above. They have experienced tourists camping on their property in the past, and they reason that if people had a recreation area to camp in, then they might not have to trespass to camp out.

The East End Road area is growing. Subdivisions and new residents are commonplace. Residential development is causing problems which are very similar to those associated with tourism. A car driving down East End Road causes the same amount of noise and dust, whether its driven by a tourist or a local resident. While local residents may be expected to have more respect for each other's property than would tourists, vandalism will increase as population increases. For example, a visitor to one person's home may vandalize another person's home.

The fire hazard will increase because of residential development. People living in the area often cut down the trees, which results in fields of grass, and slash piles creating a moderately high fire hazard.

If public lands in the East End Road area are used for recreation, there may be tourism/recreation related impacts such as trespass. However, if these same lands are used for residential purposes, there will also be social and environmental impacts. Additionally, current adverse effects of recreation and tourism in the area will continue and probably increase with or without the establishment of a recreation area.

Tourism and recreation use resulting from a recreation area will be generally a weekend/seasonal occurrence while residential development will be a daily/year around occurrence.

Recreation activities such as hiking and camping pose some fire risk. However, if these activities are properly managed, the fire hazard could be less than on private lands. This is because mature spruce forests would be maintained. These forests conserve moisture and are less susceptible to fire than the grass and slash which is common on private property. Furthermore, campfires sites could be constructed and their use regulated by park rangers in a recreation area.

RECREATION USE ANALYSIS

If the study area was to be designated as a recreation area, then it should "fit" into the overall recreation picture of the vicinity. "Fitting in" has one main requirement; namely, there must be a public desire for the types of recreational activities that the study area can provide. This is not to imply that the public demand for recreation justifies the designation of any state owned land for recreation use. It means that public lands should be designated for recreation uses for which there is a current or anticipated demand.

Current Recreation Use Patterns

The main area considered in this section includes the Kenai Lowlands from Ninilchik to the Caribou Hills then south to the north shore of Kachemak Bay. Other areas included are the Fox River drainage, the south shore of Kachemak Bay and Kachemak Bay State Park. Recreational opportunities sought in these areas include hiking, beachcombing, camping, observing wildlife, boating, clam digging, fishing, hunting, cross-country skiing and snowmobiling.

Recreationists use public lands that are both designated and undesignated for recreation use. Some persons also trespass on private land to camp, hike., fish or hunt. Areas designated for recreation include the State Waysides, Kachemak Bay State Park and the City of Homer's campgrounds. Undesignated public lands used for recreation include the Fox River and Sheep Creek drainages, portions of Homer Spit, the Caribou Hills, the Bald Mountain area and the Anchor River valley. Recreational activities occurring in these areas, designated and undesignated, will be discussed in the following pages.

State Waysides: The State Division of Parks operates nine waysides, five of which have ocean frontage. All the waysides, except for Silver King Wayside, are less than fifty acres in size. As a result, salt water frontage is minimal. Recreational activities at the waysides include fishing, beachcombing, clam digging, boating, canoeing, camping, picnicking and hiking. The five coastal waysides contain sixty-seven designated camping units. During peak and normal usage periods, overflow camping occurs at all five waysides, which results in persons camping on beaches, on other private and public lands and along access roads.

Wayside parks relatively close to the study area are Anchor River, Silver King, Stariski, Deep Creek and Ninilchik Waysides. At Anchor River Wayside, summer recreational activities include salmon fishing, and camping. Fall activities center mainly around steelhead fishing and camping. There is almost no winter recreation such as cross country skiing and snowmobiling at the wayside. Silver King Wayside, during the summer, is used mainly in connection with salmon fishing, but it also provides beachcombing, camping and hiking opportunities. Silver King Wayside is used into the fall or winter for fishing until the river freezes over. Stariski Wayside is used mainly for automobile oriented camping and picnicking of short duration throughout the

summer. Currently, there is no beach access at Stariski. Stariski is the only wayside that is not frequently overused. Deep Creek Wayside is used most heavily in the summer for fishing, boating and camping. In the winter, Deep Creek Wayside is used very little; however, some people use it as a starting point for gathering coal along the beach. Lastly, Ninilchik Wayside is used primarily by salmon fishermen, campers, and to a lesser extent clam diggers during summer. After the slow winter period, spring use starts in May. Ocean trolling for king salmon has traditionally been the first activity to begin the spring season.

City of Homer Recreation Areas: The City of Homer operates a campground north of the downtown area. This campground has 30 campsites. On Homer Spit, the City leases a tract of land to a private campground operator. Also, the City permits camping on city owned property on the spit. The campground above the downtown area is used heavily by nonlocal automobile oriented recreationists. Also adjacent to this campground, there is a City recreation area which is used for community recreational activities such as baseball, football, soccer, and picnicking. The privately operated campground and City owned lots on Homer Spit are overused for camping. This results in overflow camping on the beach that parallels the Homer Spit Road. This beach is not formally designated for camping and sanitation facilities are nonexistent.

Kachemak Bay State Park: Kachemak Bay State Park is undeveloped at this time. However, it does provide hiking, fishing and hunting opportunities. The park is inaccessible by road from Homer or Anchorage. Therefore, it cannot help alleviate the heavy recreational pressure being felt on the Kenai Peninsula from automobile oriented recreationists.

Recreational Activities Occurring in Other Areas: Recreational activities occurring in other areas include cross-country skiing, snowmobiling, hiking, backpacking, fishing and hunting.

Cross-country skiing takes place throughout the area; however, on the Kachemak Bay side of East End Road snow conditions are often poor, according to local residents. Snowmobiling takes place northeast of the East End Road. In the Bald Mountain and Caribou Hills area, snowmobiles are often used for pleasure riding and to gain access to hunt ptarmigan and other wildlife.

Hiking is a recreational activity that takes place almost anywhere that there are trails or easily traversed terrain and scenic opportunities. People hike in the hills above the City of Homer, along the beaches of Kachemak Bay and elsewhere on the Kenai Peninsula.

Recreationists also go backpacking in a few places in the Kachemak Bay Area, including Kachemak Bay State Park, and to a limited extent in the Fox River delta and Kenai Mountains.

Sport fishing is popular in Kachemak Bay, Anchor River, Deep Creek, Ninilchik River, Fox Creek and off Homer Spit. Fish sought include dolly varden, salmon and halibut.

Hunting is common in many areas. Moose are hunted all along East End Road, around Eagle Lake, in the Caribou Hills and in the Bald Mountain area. Black bear are hunted along Swift, Fox and Falls Creeks. Also, black bears are hunted in the Fox River and Sheep Creek River basins. Brown bear hunting is not as widespread as black bear hunting. Brown bears are hunted mainly in the upper portions of the Anchor River. Dall sheep and mountain goat hunting occurs in the mountains bordering the south shore of Kachemak Bay, and the extreme upper portions of the Fox River and Sheep Creek drainages.

Spruce grouse hunting occurs along East End Road and in the Homer vicinity. Ptarmigan are currently at a low point in the population cycle, but they are hunted in the Bald Mountain and Caribou Hills area (Dave Hardy, personal communication, 1978).

Projected Use Patterns

The most popular recreational activities in Southcentral Alaska in order of participation rates are the following: trail-related (e.g., walking for pleasure, bicycling, hiking, snowmobiling, cross-country skiing, etc.), sightseeing, driving for pleasure, picnicking, fishing, boating, camping and hunting. For more detailed information, see figure . In the future these activities will probably continue to be the most popular.

In 1973, the Joint Federal-State Land Use Planning Commission estimated that tourism will increase by eight percent per year (Stenmark, 1974). This estimate is supported by increased levels of tourism in recent years. In 1971 only 130,000 tourists visited the state; however, in 1975 260,000 tourists visited the state (ADP, Alaska Outdoor Recreation Plan, 1976).

Increasing recreation and tourism from Alaska residents and out of State visitors, has shown strong rates of growth at the State waysides. Of the five waysides within a thirty mile radius of the study area, three are being over-used. The ones being overused are Ninilchik Wayside, Deep Creek Wayside and Silver King Wayside. At these waysides, overflow parking and camping occurs every weekend from mid-May to mid-June. The remaining two waysides in this vicinity, Stariski and Anchor River, are being used heavily, but overuse has not become a chronic problem as in the other waysides.

The City of Homer has also experienced the effects of increasing recreation and tourism use. From late May to early September, large numbers of tourists place a heavy demand on city services--including police, sewer, water and medical aid. Furthermore, tourists crowd on to the Homer Spit in such numbers that the Spit becomes unpleasant and almost physically unavailable to Homer residents (Homer, City of, 1978).

In conclusion, increasing numbers of recreationists will continue to come to the lower portion of the Kenai Lowlands. As mentioned earlier, they will seek many types of recreational experiences, especially trail related activities, sightseeing and driving for pleasure. Therefore, more recreational pressure will be placed on all the following areas and facilities: State waysides and parks, city campgrounds, private campgrounds, inns, private land (e.g., trespass camping), public lands and beaches.

Role of the Study Area

Alaskans and out-of-state tourists recreate in many different ways including hiking, fishing, hunting, sightseeing, camping and pleasure driving. Because of the large numbers of recreational activities engaged in, the Alaska State Park System must be diverse. Diversity in a park system means having a wide range of parks from wilderness parks to small, automobile accessible parks.

Large wilderness parks provide for recreational pursuits which have a minimal effect on the environment. These recreational pursuits include backpacking, bird watching, fishing, hunting and photography. Large state parks provide some of the same opportunities as wilderness parks, but they also permit higher impact recreational activities such as automobile oriented camping and snowmobiling. Smaller state parks and state recreation areas are important for recreational activities involving day use or weekend use. These recreation areas and parks are easily accessible, and allow people to recreate without large expenditures of time and money.

At present small accessible parks are the kind most lacking in the state. There are two reasons for this. First, the small automobile accessible park must be located close to roadways and population centers. In these areas parks are "latecomers." Much of these lands have already become private, or have been committed for other land uses, leaving little public land for park designation. This is particularly true of coastal areas which are especially desirable for recreation use.

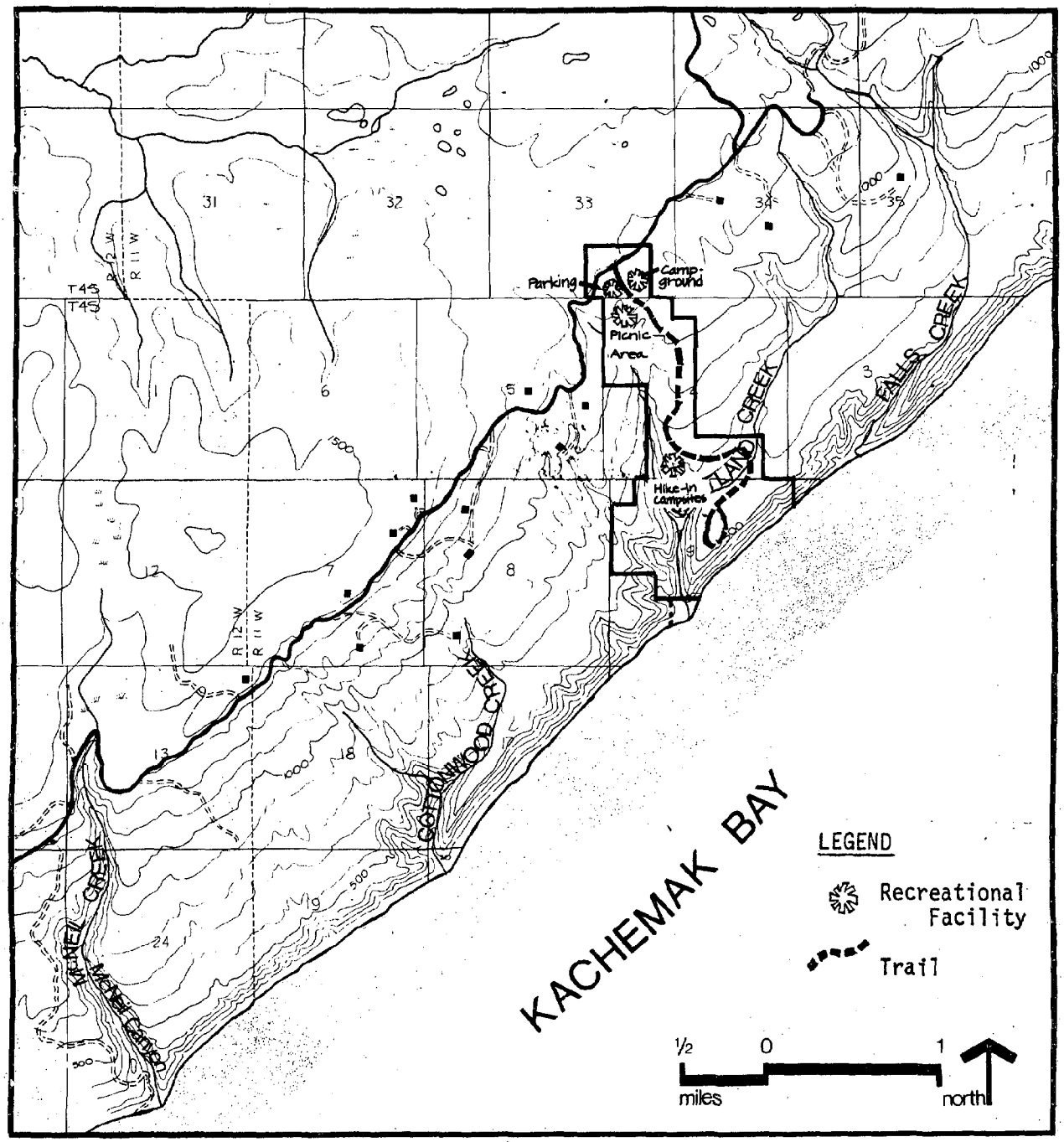
The second reason that easily accessible recreation areas are hard to establish is that establishing a series of small parks often requires many more staff hours of planning effort than establishing one or two large parks. Establishing small parks in populated areas requires a detailed consideration of local attitudes and local socioeconomic factors. This is not true to the same extent in planning parks for more remote areas.

Because the problems mentioned above are never going to disappear, it is important to establish smaller parks now. This is where the Cottonwood and Eastland Creeks study area enters the picture. The study area has the potential to fulfill the need for a small, accessible park. The purpose

is not to turn the entire area into a parking lot for campers, but to provide accessible recreational experiences in a natural setting to a relatively large number of people. The recreational opportunities that the area could provide include hiking, picnicking, camping, observing wildlife, sightseeing and beachcombing.

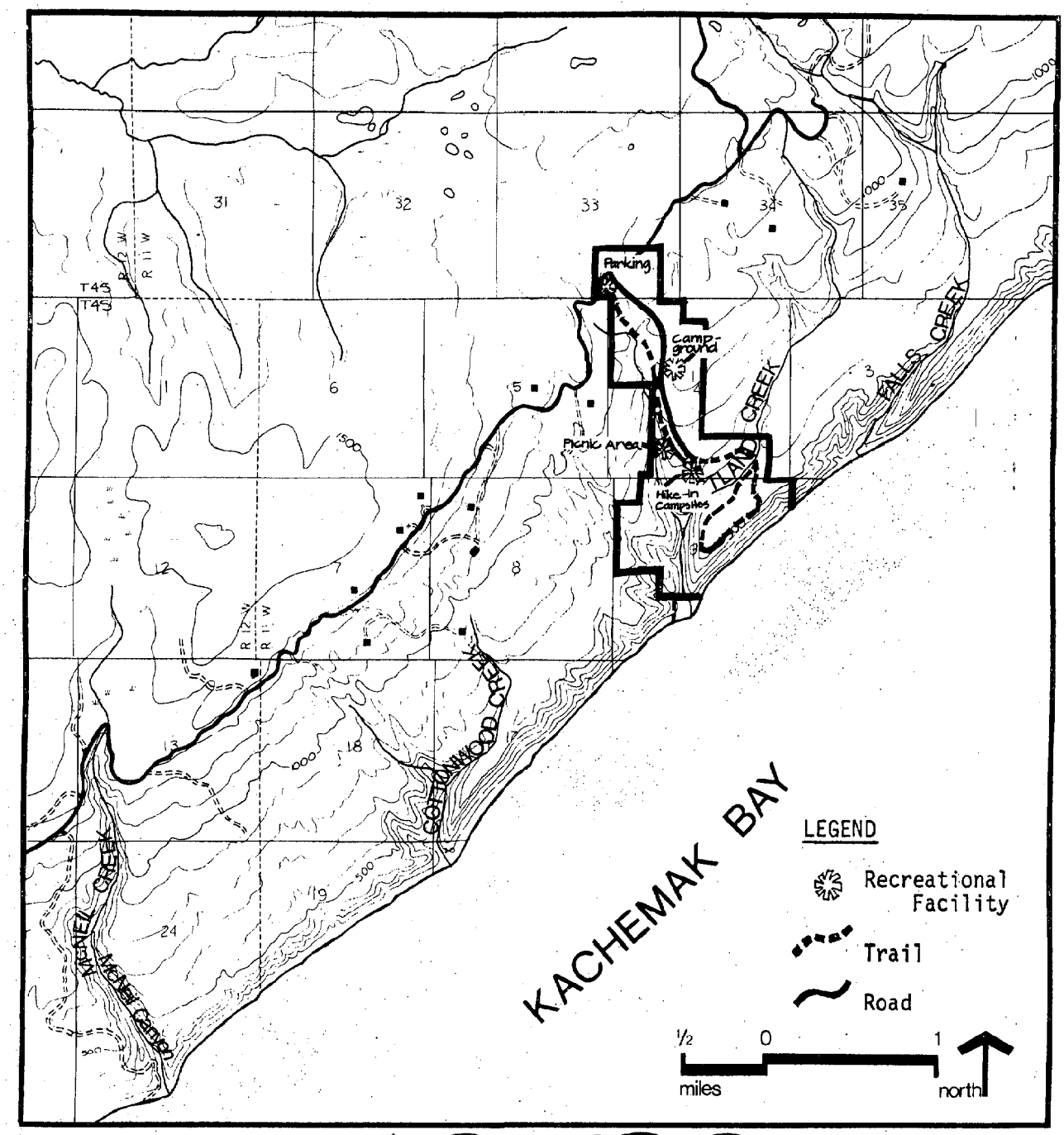
EVALUATION OF ALTERNATIVE BOUNDARIES AND DEVELOPMENT INTENSITIES

The magnitude of the benefits and problems of establishing a recreation area will largely depend on the size and shape of the park boundary chosen. Four possible boundaries--labeled A, B, C and D were considered. They are contained in figures 21 through 28. Alternate A contains the least area at 630 acres; B is the next largest at 1295 acres; and C is the largest at 3020 acres. Alternate D is intermediate in size between B and C at 1925 acres. In addition to these alternate boundaries, "no park" is an alternate which will be considered separately at the end of this section. In order to compare the advantages and disadvantages of each alternate boundary, the various boundaries are considered together in regard to the following: 1) The amount of public land required (which, as a result, will not be available for other uses), 2) Operation and maintenance, 3) Trail systems, 4) Beach access, 5) Wildlife habitat protection, 6) Protection of the Cottonwood Creek archaeological site, and 7) Local public attitudes.



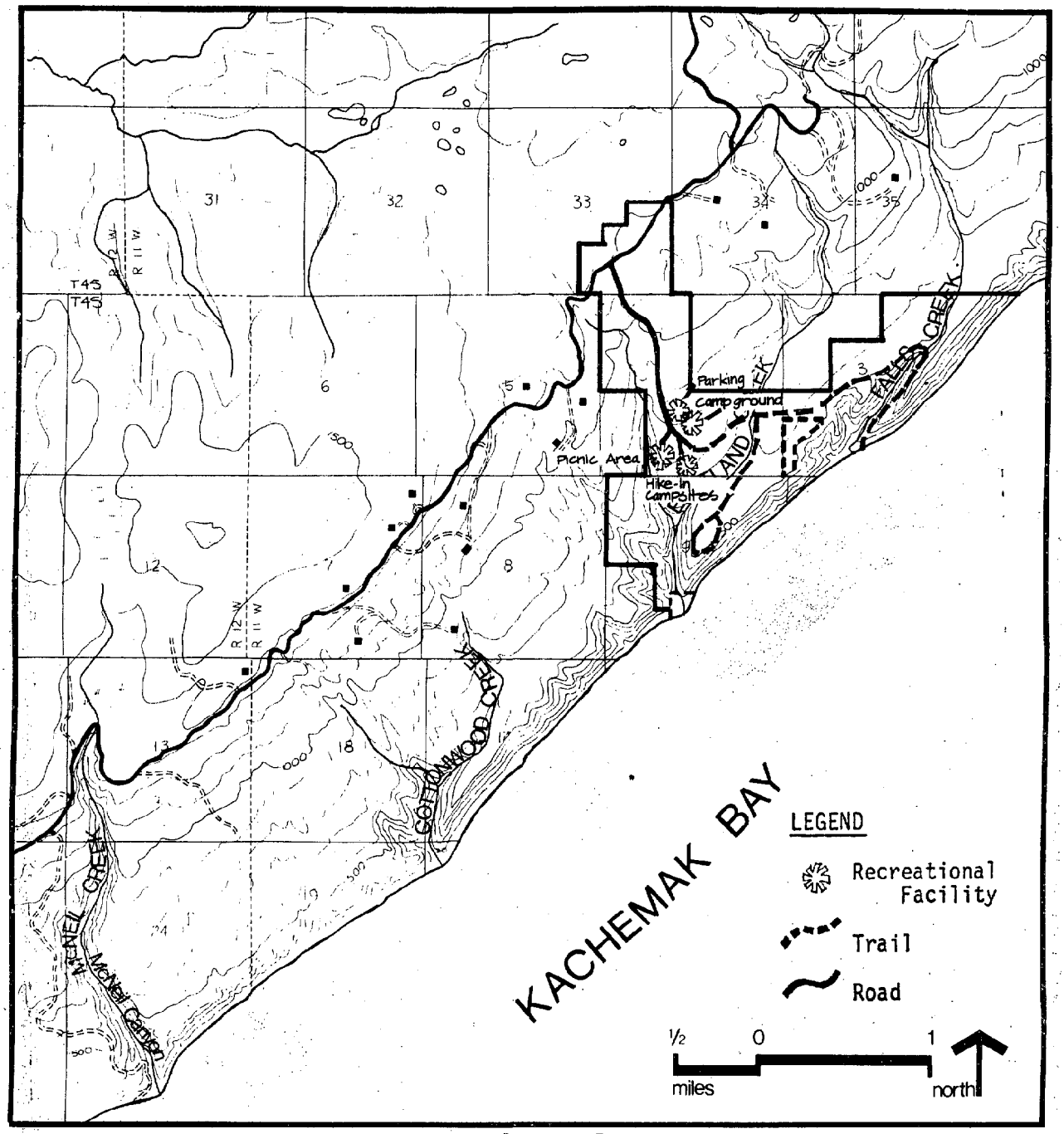
alternate A1 · 630 acres

FIGURE 21



alternate A2 · 630 acres

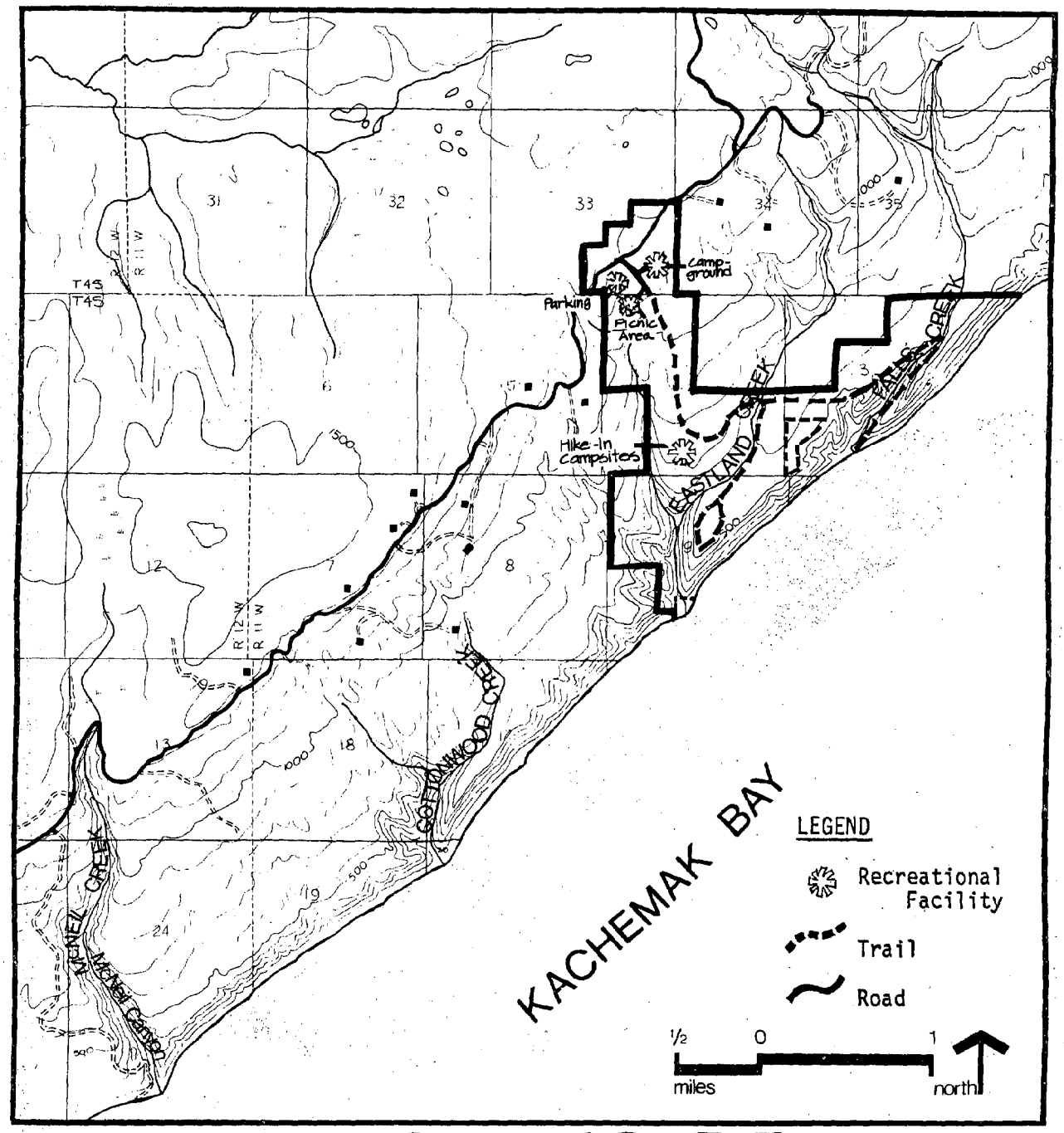
FIGURE 22



alternate B 1-1295 acres

(less 15 acres of private lands)

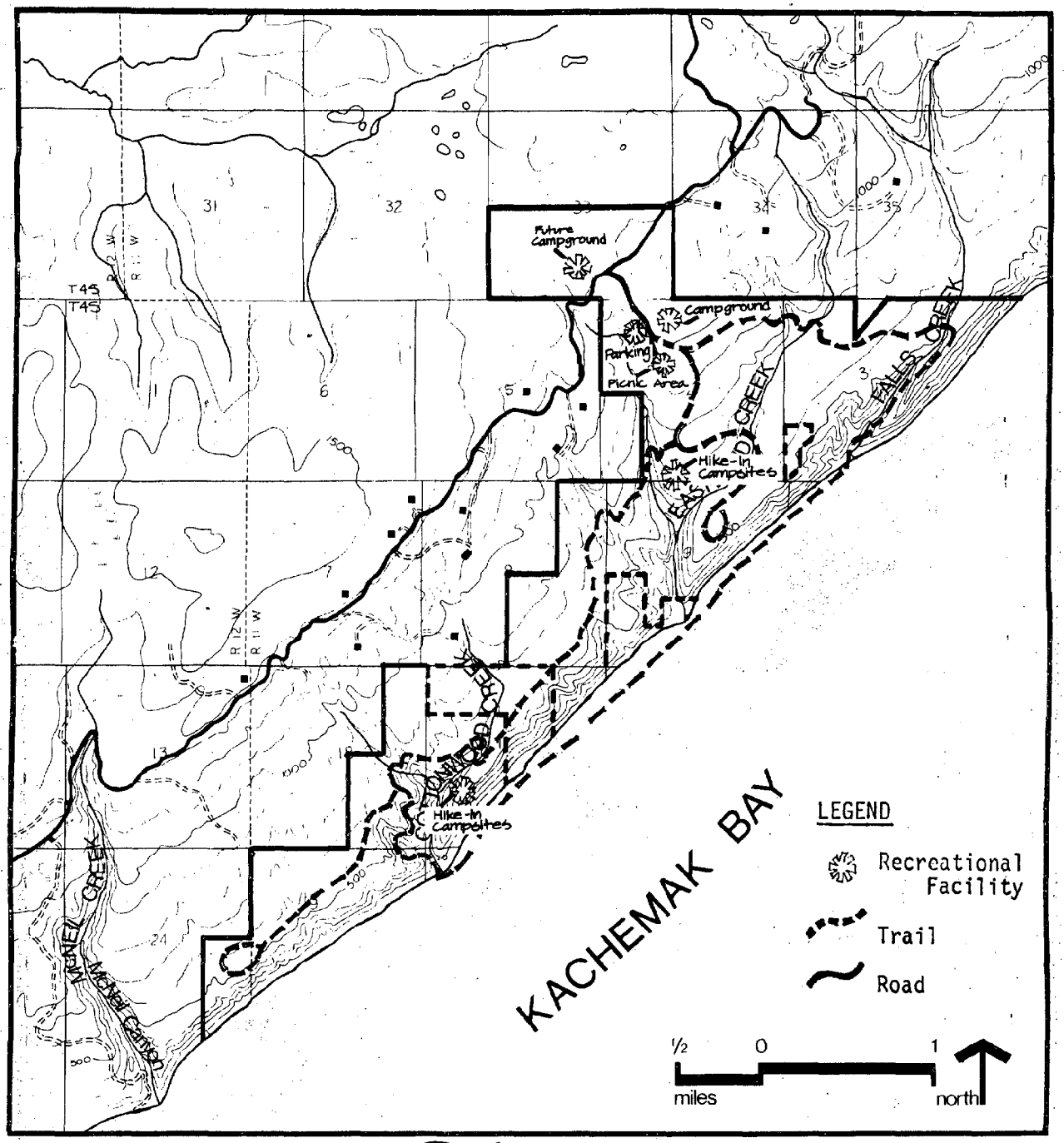
FIGURE 23



alternate B2 - 1295 acres

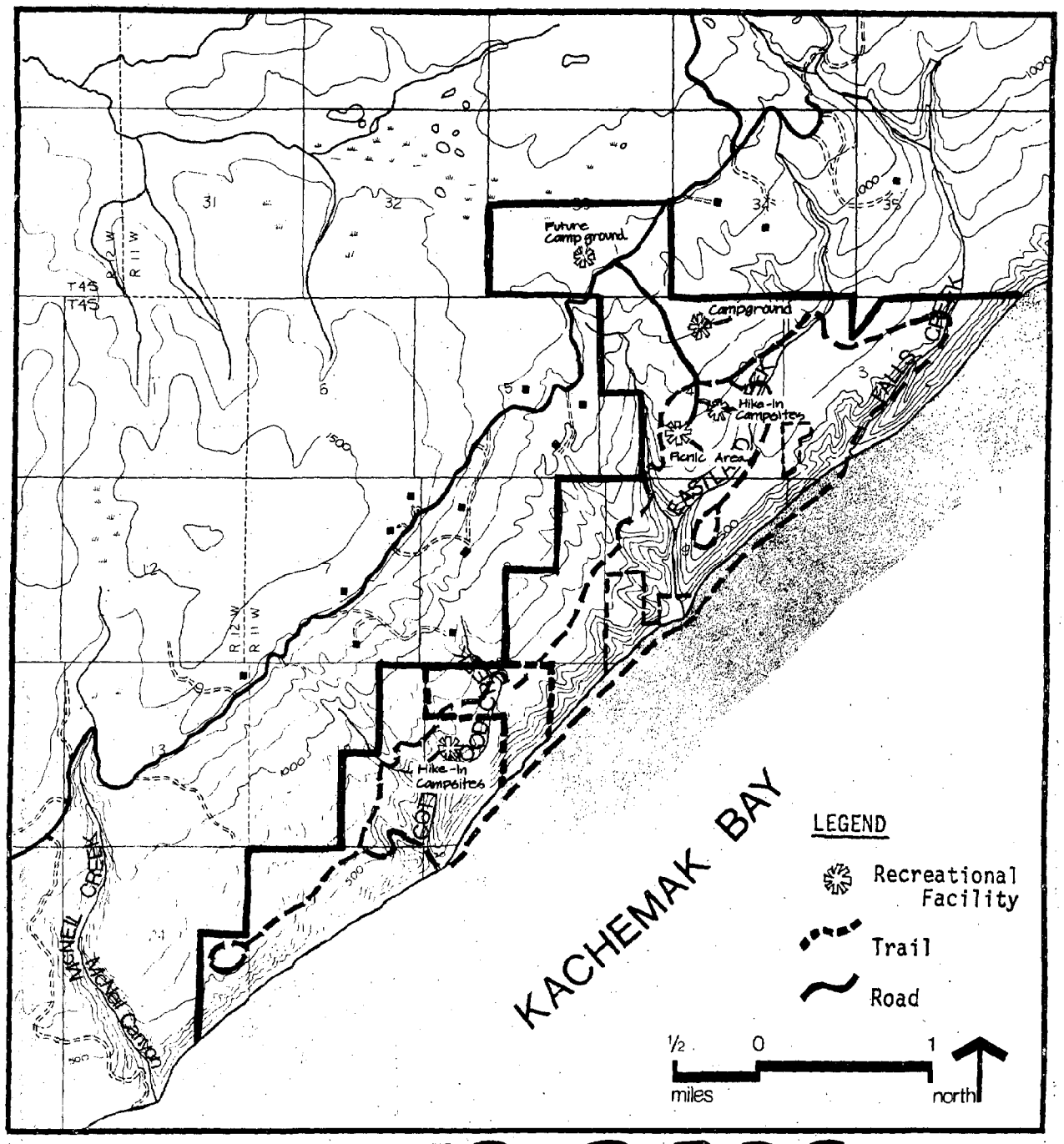
(less 15 acres of private land)

FIGURE 24



alternate C1 - 3,020 acres
(less 270 acres of private lands)

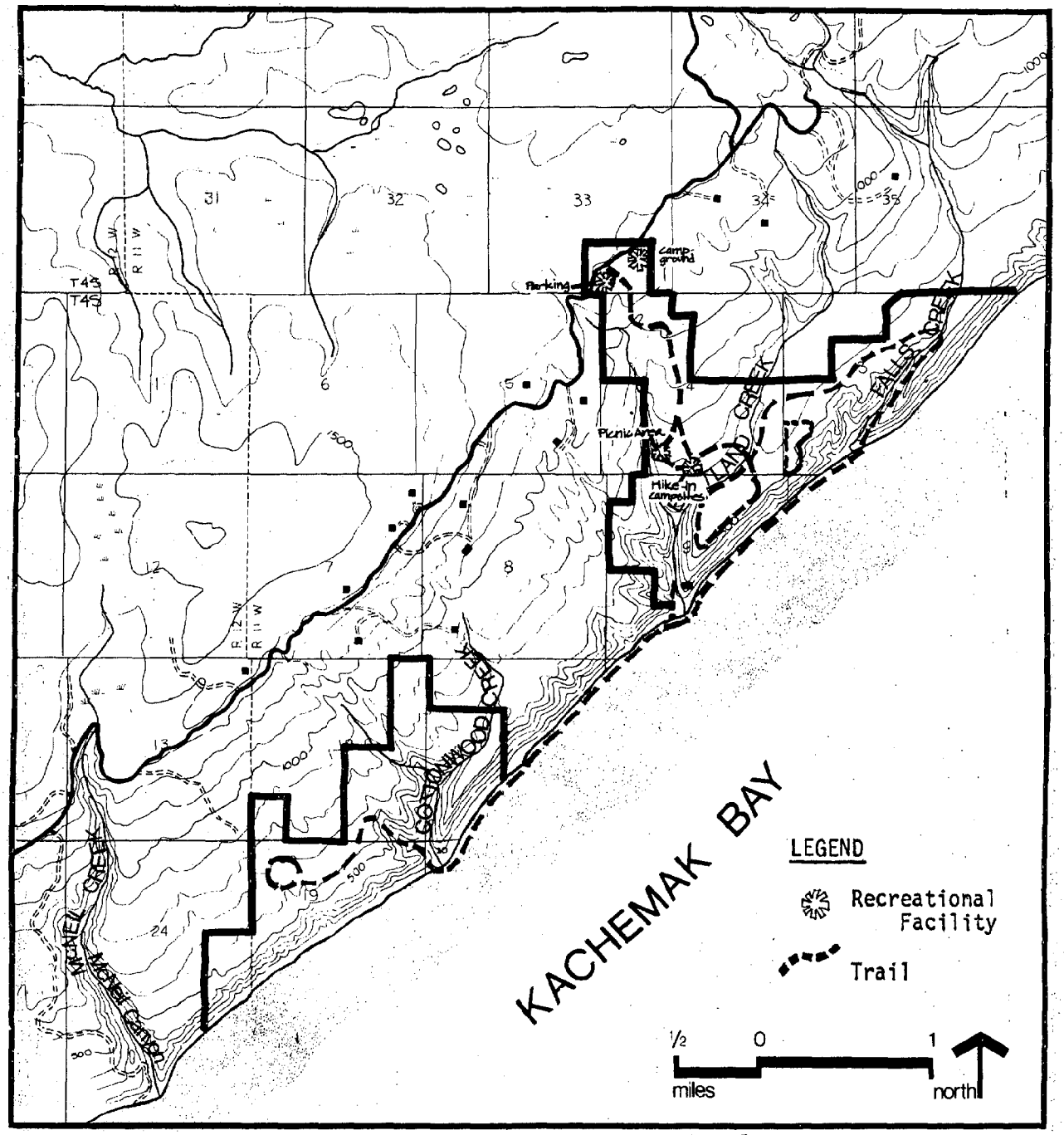
FIGURE 25



alternate C2 - 3,020 acres

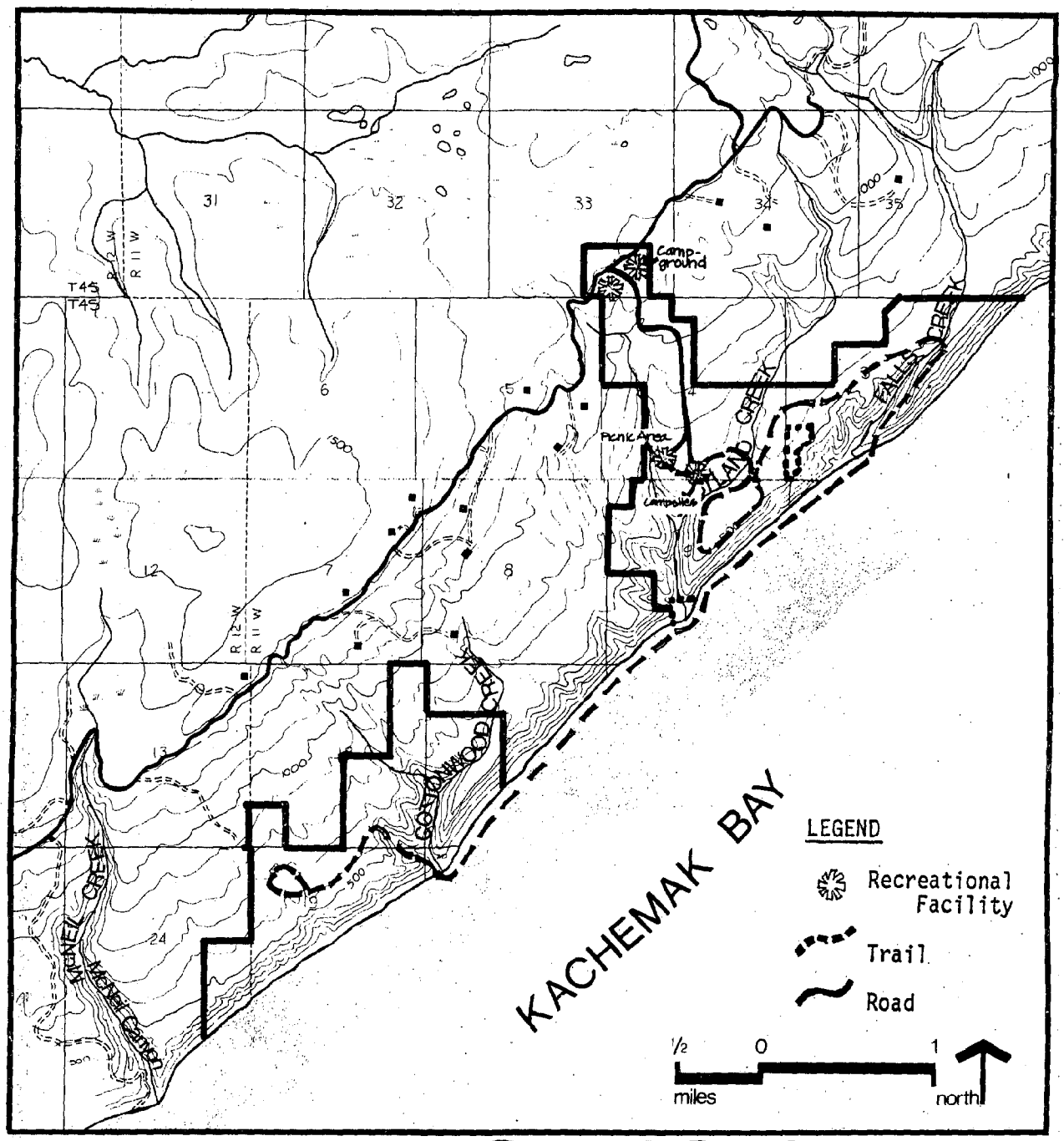
(less 270 acres of private lands)

FIGURE 26



alternate D 1- 1925 acres

FIGURE 27



alternate D2 · 1925 acres

FIGURE 28

The Amount of Public Land Required: The public land under consideration is the last remaining large parcel of state-owned land that has beach frontage and road access on the bay side of East End Road. There are approximately 2,790 acres involved. Many individuals would like to acquire these lands for their own private use. Depending on the boundary chosen, assuming a recreation area is established, some or all of this land would become unavailable for private use. Boundary alternative A (containing 630 acres) includes the least acreage, and therefore leaves the most land available for other uses. Alternative B (containing 1,295 acres) includes the next smallest acreage; Alternative D (containing 1,925 acres) includes more land than B, and Alternative C (containing 3,020 acres) would include almost all the public land under consideration. In conclusion, Alternate A would leave more land available for other uses than the other alternates, and therefore A would be the best choice in this regard.

Operation and Maintenance: Alternate A would probably make operation and maintenance comparatively easy because of its small size and because it does not contain the Cottonwood Creek Archaeological site. The small size would allow rangers to reach any part of the park quickly to respond to

emergencies such as visitor injuries. Not having the Cottonwood Creek Archaeological site within the park would eliminate the responsibility of Alaska State Parks to protect this site on a daily or weekly basis.

Alternate B would be similar to A in regard to operation, but because a trail passes fairly close to a completely enclosed piece of private property in section three, there may be conflicts between the residents and park visitors. Rangers would have to respond to these conflicts, making park operations more difficult.

Alternate C and D would provide the greatest operation and maintenance costs because of their large size, extensive trail system, remote campsites and the archaeological site. All these features would mean more work for park rangers, especially since the archaeological site would require surveillance to prevent artifact looting, if it is not excavated before park development occurs.

In regard to operation and maintenance, A and B would probably be better choices than C and D, and A would probably be the best choice.

Trail Systems: Alternate A would be able to contain approximately two miles of upland hiking trails; Alternate B would be able to provide about four miles of upland trails. Alternate C could provide about eight and one half miles of upland trails without any acquisitions of private land. However, with the acquisition of the property which divides the two parcels of public land, Alternate C could provide about nine miles of trails. Alternate D could provide about seven and one half miles of upland hiking trails. Because Alternate C provides the longest trail system, it would be the best choice in regard to hiking trails. D would be second; B third; and A would provide a minimal trail system.

Beach Access: In all the alternates, beach access will pose some problems because of steep slopes and poor soils. However, trail construction seems possible near each of the creek mouths. Falls Creek would probably be the best because it offers the gentlest slopes. Alternate A does not provide beach access unless the private land blocking the trail route was acquired. Between B, C and D, Alternate C is the best because if an upland trail system could be built from Eastland Creek to Cottonwood Creek, there would be three possible routes to the beach. Such an upland trail system is only possible in Alternate C.

Wildlife Habitat Protection: Alternate C and D would both protect the two bald eagles' nests in the area and provide a large amount of other wildlife habitat protection. Their large size helps in two ways: first it provides more browse and cover, and second it distributes human presence over a larger area, therefore reducing human impact on wildlife habitat as a whole. Alternate D and C without the acquisition of the private land between the two large parcels of public land are divided into two separate blocks. This provides the opportunity to maintain the Cottonwood Creek parcel as a low impact area because people would have to walk all the way down the beach from Eastland Creek to reach Cottonwood Creek.

Alternates A and B would provide less habitat, concentrate visitors into a smaller area., and would not offer any protection to the Eagle's nest near Cottonwood Creek. As a result, Alternates C and D would protect wildlife habitat better than Alternates A and B, and Alternate C would be the best choice in this regard.

Protection of the Cottonwood Creek Archaeological Site: The Cottonwood Creek Archaeological Site is contained within the boundaries of C and D, but not within the boundaries of A

and B. If residential development continues in the area, this site may be very close to residential development, or privately owned land in the future. Establishing Alternates C and D would prevent this and facilitate surveillance of the site by park rangers. As a result, Alternate C or D may offer some protection to the site even though it would also mean recreational use in the area. Therefore, Alternate C or D would be the best choice in regard to protecting the archaeological site.

Local Public Attitude: At a public meeting in Homer concerning the Cottonwood and Eastland Creek Recreation Area feasibility study on September 12, 1978, a questionnaire was passed out to measure public attitudes toward recreation area designation, and the development of facilities in the study area.

The analysis of the returned questionnaires indicated that most of the local residents (over 80%) were in favor of establishing a recreation area. Furthermore, there seemed to be a strong preference for a large park because 56% of the respondents chose Alternate C and 16% of the respondents chose Alternate D. As mentioned previously, C and D are the largest of the Alternates. For more detailed results of the questionnaire, the results are contained in figures 29,

Figure 29 : Attitudes Towards Recreation Area Designation by Place of Residence

Place of Residence	In Favor		Opposed	
	Number	%	Number	%
East End Road	18	82%	4	18%
Homer	5	71%	2	29%
Elsewhere	2	100%	0	0%
TOTALS (% of all respondents)	25	81%	6	19%

Number of Responses -- 31

One response not codable.

Figure 30: Attitudes of Persons Wanting a Park Towards Various Area Boundaries

	Boundary Alternative				
	A	B	C	D	Totals
Number of Respondents	4	3	14	4	25
Percent of Respondents	16%	12%	56%	16%	100%

Number of responses -- 25

One person selected "B or D". This was counted as two responses.

Figure 31 : Attitudes Towards Boundary Alternatives and Development Concepts

Boundary Alternative and Development Concept	Number of Respondents Prefering Each Boundary Alternative and Development Concept	Attitude of Respondents Towards Proposed Levels of Development (# of Respondents)		
		Not Intensive Enough	Just Right	Too Intensive
A1	2	0	1	1
A2	2	1	1	0
B1	0	0	0	0
B2	1	1	0	0
C1	11	3	3	5
C2	2	0	2	0
D1	2	0	1	1
D2	0	0	0	0
Totals	20	5	8	7

Number of codable responses -- 20

Uncodable/no response -- 6

FIGURE 32:
Written Comments Submitted at PARC Public Meeting, September 12, 1978

Most of the people who attended the PARC meeting submitted written comments in the space provided on their questionnaire. The following is a listing of those comments. The number of times the comment was made is given in parenthesis after each comment. The comments are arranged in order from most common to least common.

1) State Parks should provide only foot trails for public access into the park, and no facilities other than vehicle parking near East End Road (8).

2) The Park should be as large as possible (3).

3) No park should be established. But, if a park is established, it should be one with minimal development (2).

4) If a park is established, people's dogs will chase and kill moose, cattle, and horses in the winter. Steps should be taken to prevent this (1).

5) There is a demonstrated lack of land for individuals private use, for agriculture or for whatever purpose. The park would threaten the quality of life now available to residents (1).

(continued)

(FIGURE 32--continued)

6) The designation of these lands as a park is imperative, particularly in light of the current emphasis on private land development by land owners in the East End Road area. Everyone (or at least many people) want to own their piece of land, but realistically there isn't enough to go around. Land set aside for public use makes good sense (1).

7) The park would be good but the impact on East End Road would be too great. Paving East End Road is not a good solution to the problem (1).

8) Properly maintained recreation areas are imperative, but proper surveilance is a must (1).

9) A small park should be established but some land should be left for private ownership and for the borough (1).

10) The land should be left for limited use (1).

11) A wilderness park with no development should be established (1).

12) Some area of the park should be set aside strictly for wildlife preservation (1).

13) Set aside a park so that tourists don't have to camp on private property (1).

14) The park would provide local people with beach access (1).

30, 31 and 32. Therefore, in regard to public attitudes, Alternate C with a low level of development would be the best choice. The public desire for a low level of development was indicated by written comments (Figures 32 ~~and~~) and figure 31.

In summary, Alternate C would provide the best recreation area. This is because it provides the most wildlife habitat protection, the best upland trail system, and more points of beach access. Furthermore, local attitudes support this alternative.

Not Establishing a Recreation Area (The "No Park Alternative): Establishing a recreation area in the East End Road area is not a foregone conclusion. Recreation area designation is a large undertaking with many possible consequences. Certainly, there would be at least one advantage in not having a park in the area; namely, the land would remain available for agricultural and residential uses.

The disadvantages of not establishing a recreation area have already been mentioned. These include a loss of wildlife habitat, open space, and recreational experiences such as hiking and sightseeing. All these losses will result from the present trend of residential development in the area.

Lastly, the trend towards residential development will cause many of the same problems as would recreation area designation. For example, traffic on East End Road will increase as more houses are built off East End Road, and more people move into the area. If a recreation area is designated, traffic will also increase because recreationists will use East End Road to reach the park. The environmental impacts of these two sources of traffic will not be identical; however many of the same impacts (e.g. noise and dust) will occur.

RECOMMENDATIONS

Park Boundary

Based on the previous discussion of the area and its opportunities and constraints for outdoor recreation use, it is recommended that a recreation area be established comprising both the Cottonwood and Eastland Creek drainages as shown in alternate C1 on page 121 in Figure 25.

Park Development

While the development of recreational facilities will provide numerous benefits to the public, it will also result in generating some negative impacts which have been previously discussed. The timing and scope of recreational facility development will greatly affect the nature and extent of these impacts. For example if the recreation area was established but undeveloped, negative impacts such as the introduction of additional traffic on East End Road, increased numbers of non local persons in the area, or the distrubance of wildlife due to hiking activities, etc. will generally be minimal. However, some use of the area will occur simply because it is designated a park or recreation area, although this level of use would be expected to be quite low.

It is recommended that the area not be developed with recreational facilities until 1983. Moreover, the Division of Parks should conduct a new impact assessment at that time to reappraise the probable impacts of such development on the East End Road area. When developed, development alternate C1 is recommended.

Review of the proposed development

should include public meetings held in the Homer Area. The development would include the construction of a 20 unit campground, 7 picnic sites, 5 miles of trail, 1000 feet of gravel road, 10 hike-in camp/picnic sites with tent pads, one water well, several toilets, miscellaneous signs, and related facilities. A cost breakdown for these facilities is found in Appendix B.

Archaeological Sites

It is recommended that the archaeological site at the mouth of Cottonwood Creek be fully evaluated, and excavated if necessary, prior to the development of trails or other facilities in proximity to this site. Should the property at the mouth of Eastland Creek be acquired, similar treatment should also be given to the archaeological site at that location.

Hunting and Trapping

These activities should be allowed to continue until such time as they become a hazard to park visitors or threaten the well being of the wildlife resource.

Trails

Trails should be constructed away from private property (at least 300 to 400 feet) to reduce the possibility of trespass on private property. Trail construction should be in conformance with the Division of Parks Policy Guideline #5 found in Appendix A.

Off-Road Vehicle Use

Motorcycles and all terrain vehicles (ATV's) should not be permitted in the area because of an insufficient land area to avoid conflicts with other park users. Additionally, vegetation and soils could be seriously impacted from such use.

Snow conditions may not be adequate in the area for snowmobiling and skiing. However, snowmobiling should be permitted if there is adequate snow cover to protect vegetation. Because of the relatively small size of the area, conflicts between cross country skiers and snowmobilers may eventually occur. If this does occur, snowmobiling should be restricted to a specific area.

Fire Suppression

Park development should be coordinated with the Forestry Section of the Division of Forest, Land and Water Management which is responsible for fire management on these lands to insure maximum fire protection.

Park Signing

Several natural hazards in the area should be indicated with signs. These include the following:

1) sea cliffs and canyon walls;
2) fire prone areas; and
3) bears.

All park and private land boundaries should also be signed.

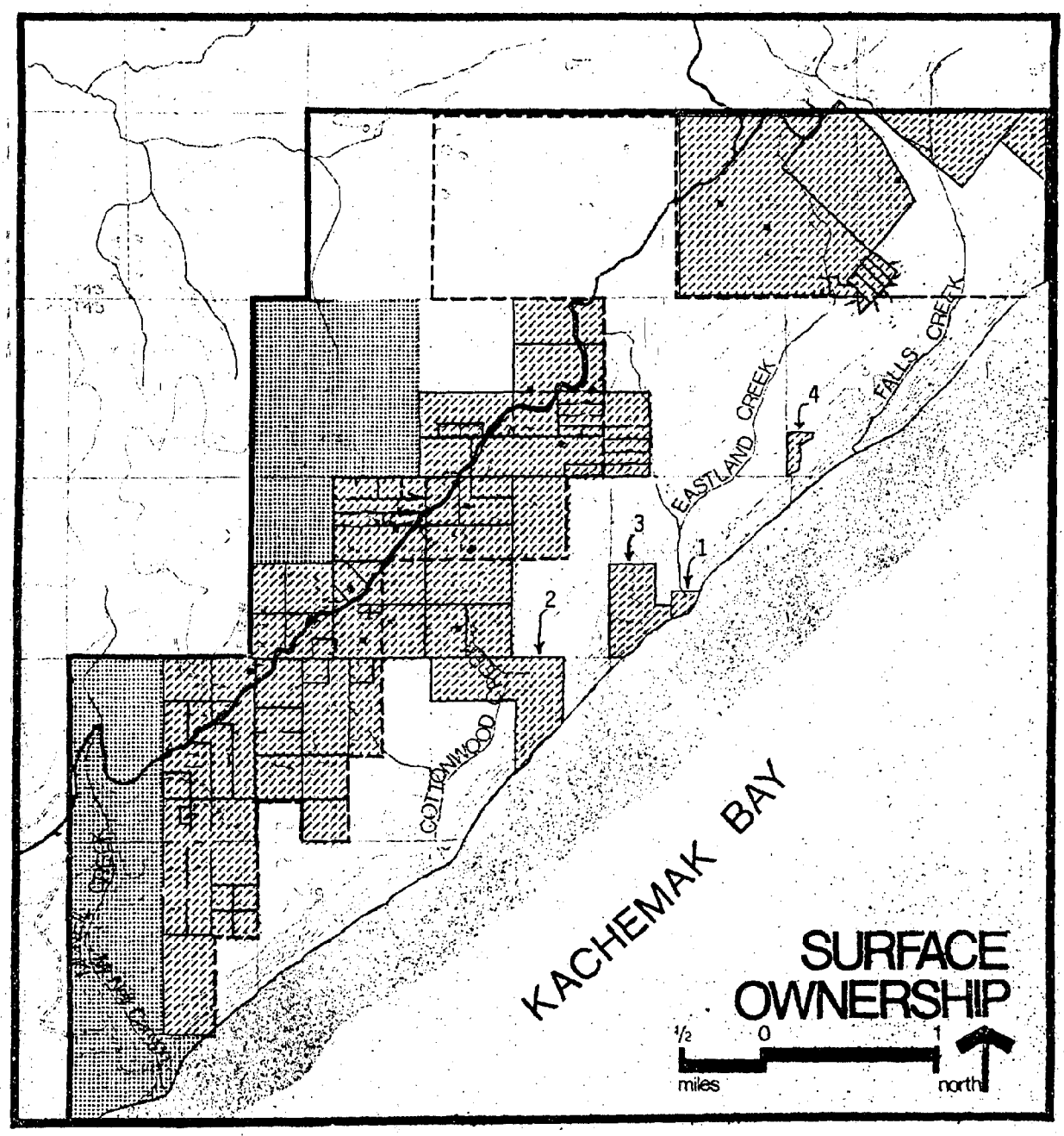
Staffing and Headquarters

Both ranger and maintenance staff will be needed to manage the area. This staff could be based in Homer to serve both the Cottonwood and Eastland Creeks area as well as Kachemak Bay State Park and Kachemak Bay State Wilderness Park.

Acquisition of Private Land

Boundary alternate C can be established with or without the acquisition of private land. Since the Division of Parks is only able to acquire land on a "willing seller basis" every effort should be made to contact landowners early. The Division should consider acquiring "first right of refusal" rights or life tenture arrangements with the owners.

Figure 33 shows the lands to be acquired and the priority in which acquisition should occur.



PRIVATE

NOT EVALUATED

STUDY AREA BOUNDARY

TENTATIVE PARK BOUNDARY

SOURCE: Kenai Peninsula Borough, Tax Records

FIGURE 33

APPENDIX A:

All Employees
Division of Parks

November 4, 1975

Russell W. Cahill
Director

POLICY GUIDELINE NO. 5

In the past, various trails have been constructed to varying configurations and specifications, some with good results and some not so good. The purpose of this guideline is to establish criteria for conformance in trail construction on a statewide basis.

After the need for a trail has been established and the trail is determined to be consistent with planning objectives in the master plan of the park area or the statewide trails program, a field study team should be assembled to locate and mark the desired trail. This field team might consist of the District Superintendent, District Ranger, Chief of Park Development and the supervisor of the trail construction crew.

The following criteria should be adhered to during the location and construction of trails within State parks:

1. Every effort should be made to locate the trail in such a manner that it will blend harmoniously with the natural topography and vegetation of the area.

2. The alignment of a trail should not necessarily be designed for expediency, but rather to provide the opportunity for interesting viewing or to reach an interpretive or natural feature along an aesthetically pleasing route.

3. The grade of a trail should not be steeper than 15%, except in extreme cases, and should when possible, be held to a maximum of 10%. In short stretches of not over 150 feet and in very exceptional cases a grade up to 20% may be permitted, but only after it has been determined that other alternatives are too costly in terms of price or environmental considerations.

4. The attached figure on clearing requirements for trails should be adopted in practice. In some cases, trail width will necessarily vary, due to terrain features or unusual circumstances, but for the most part, the trail should be cleared for a width of four feet.

5. The trail should be cleared as high overhead as can be reached. It is desirable, however, to leave a high overhang of branches whenever the type of forest growth will permit. An occassional low branch or other feature that may enhance the beauty of the trail may be left uncut provided that the feature is not a safety hazard. As in the case of trail width, discretion is needed.

6. Large trees should be cut only when it is impracticable to build around them. Trees and brush should be cut as close to the ground as possible. This practice will discourage resprouting and minimize tripping hazards.

7. Brush and logs from clearing should be disposed of or cut, removed and stock-piled for future usage as firewood, etc. Cut vegetation which cannot be utilized should be disposed of farther into the woods. It is essential that all evidence of construction outside of the trail prism be held to a minimum.

8. Precipitation and run-off characteristics in a locality should be observed to properly determine the methods best suited for the disposal of drainage water. A dip in the grade of a trail is one means of disposing of drainage water. Where it is not practical to dip the grade, water breaks or culverts should be provided.

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Public Response to Draft Report

To facilitate the reviewer's response to the draft report a short questionaire was sent to each person on the mailing list. Also included was a pre addressed and stamped envelop. A copy of the questionaire and tabulation of the responses is shown in this appendix.

Question number four allowed for other comments to be expressed by the reviewer. The responses to this question are listed below:

*I am a property and homeowner living on the west side of McNeil Canyon within a mile of the proposed park lands. I encourage you to actively push for park development and I will support you on the local political level.

*My preferences are for a small park with some road access a short way into the park. A campground area should be built at the end of the road and a trail system from there to the scenic spots. I favor a park strip (green belt) 200-300 yards wide along the bluff between Cottonwood and Eastland Creeks. I don't feel that it needs to be, or should be any wider than that because the main scenic vistas are on the bluff and because if that belt is any wider it will be cutting into good homesite land of which there is little in this area. It is important to protect the bluff's edge from being built on, but it is also important to let folks have land.

*This should be the site for a road to the water's edge. This is necessary to provide access to the water itself and provide opportunities to connect spur roads both east and west. This is some of the best agricultural land in the state with respect to climate, soil and access to a population center and transportation facilities. Also, I'm sure you know that 90% of the visitors to the Homer area depend on roadway to get them within reach of campsites, etc. The Kachemak Bay State Park accross the bay should provide plenty of wilderness experience. On the Homer side we should perhaps have facilities for those of us who are not so agressive. You should be aware that the "lock up" attitude as shared by most of those whose comments you received at your meeting in Homer. I doubt seriously if they are really representitive of Homer or the Southcentral Region. More than a few own land on the park boundary and are looking to the value of their real estate holdings, not the welfare of the people.

*Thank you good folks for the great work you are doing to help the people. Our love and positive desire is with you.

*As owner of adjoining property to Alternative C, I would very much like to have the park developed.... the sooner the better.

*I prefer a small park in this area for a number of reasons. For one thing there just simply is no sound reason for tying up the whole area in park land. People can go backpacking in any part of this state that is a lot more interesting country. The area right around the bluff of Cottonwood and Eastland (creeks) is a good place for a park. The rest of it is much better suited for residential and agricultural purposes. It just doesn't make sense to tie up this much land in a park when people need accessible land to live on in this area. The state should set aside some land in this area for future needs such as schools, disposal sites (garbage dumps), airports, etc. I say keep it small and leave room for something besides parks. This area is growing fast. Let's look to the future and leave room for expansion.

*Keep roads to the least amount.- Possibly have areas for snowmobiling-?? Alternative C seems that it would be possible for snowmobiles, although skiiers may not appreciate that. Maybe different routes could be established?? I like alternate C for the following reasons: 1) amount of acreage 2)less roads 3) less campground 4) beach availability 5) wildlife and archaeological sites.

*Would like to see modified D1 with Cottonwood Creek section remaining wilderness area with no trails. Ideally I would like to see 3,020 acres in State ownership. I would like to see it not developed in anyway. I feel that the State should develop campsites on the Spit rather than on East Road. This is a very poor report for a variety of reasons: 1) It fails to augument the possible influence of the Fox River Land Disposal Project on the proposed park, i.e. will East End Road be continued. Will population density become higher? etc. etc. 2) It fails to mention Dept. of Highways plans for East Road if the State makes a recreation development. 3) It fails to mention that the Bradley Lakes Hydro. Electric Project (sic). Would a recreation development 18 miles on East Road be fuel for a continuation of East Road to Bear Cove accross the head of the bay. I still think your reports or studies are poorly done (see earlier letter to LeReshe and Terry McWilliams. They are very development oriented, and cast the Division of Parks in a very narrow role. Why do you crowd an evaluation of this type with a natural systems inventory when what you obviously seek is a response to the social impact?

*Eventually their should be permanent public exhibits at the archaeological sites. Sorry, I thought I'd sent an answer or at least you had my input from the meeting. The draft repo is in my cabin in Homer and I am out here in California at the moment- hence the vague answers above.

* I favor the largest acreage possible for a park especially to protect moose calving. Also, I choose hiking, camping, only, no roads or motor vehicles.

*I'm in favor of a wilderness park with no development. Once development begins it ruins the original beauty and becomes another "state park". East Road barely is suitable for local traffic now. If R.V. traffic is encouraged, there will be a fatal accident which if the State encourages more traffic, I feel the DNR should be responsible.

*Iprefer that vehicles be kept near the highway.

*My property and home adjoins Eastland Creek, and naturally, I do have some reactions to the plans being proposed. I have walked through the timber and meadows along the bluffs.... it is a beautiful area. The best use of this land would be a low intensity hiking trail network- with a simple pull off for vehicles and facilities near the road for picnicking, etc. Camping probably would not be too good due to the fire hazard. There is a lot of old growth and blowdown trees and high grass. I guess I feel the area is too special to be "ground-under-foot" as is the case with multi-purpose campgrounds and overnight facilities.

*I am a resident near the park. The land is ideal for a park- as state or private development (say for a subdivision) would be costly, as the terrain makes it difficult.

*I don't believe that many park visitors will be attracted without vehicle access to the beach, which would be difficult. I also have reservations about the impact a park might have upon adjacent landowners.

KENAI PENINSULA BOROUGH
BOX 850 · SOLDOTNA, ALASKA 99669
PHONE 262-4441

Division of Parks
AUG 29 1979

DON GILMAN
MAYOR

August 27, 1979

Ms. Terry McWilliams
Director
Alaska State Park System
Suite 210
619 Warehouse Avenue
Anchorage, Alaska 99501

Re: Comments on Preliminary Draft of the Evaluation of Cottonwood and Eastland Creeks Area for Recreation Use.

Dear Ms. McWilliams:

Thanks for the opportunity to review the referenced draft.

The Kenai Peninsula Borough has selected the land which is the subject of the referenced draft. At this time, the Borough has not finalized plans for the use or disposal of the land. If the selection is approved, the Borough will finalize plans for the area under our land management and disposal procedures. Your evaluation of the recreation potential of the area will be considered at that time.

Sincerely,

DONALD E. GILMAN, Mayor
Kenai Peninsula Borough

DEG:IDW:kg

1621 Hollywood #2351
Anchorage Ak 99501
February 23, 1980

Alan Meiers
Division of Parks

Dear Sir,

Am writing these notes in reply to our conversation of Febway 5. My information is derived from three publications, Alaska Agricultural Potential, Alaska Ag Statistics, and Soil Survey - Homer Kenai Kachik. Soil maps show a predominence of soils suitable for hardy vegetables, potatoes, barley & small grains and grasses suitable for pasture. The low elevation and close proximity to Kachemak bay of these parcels insures moderation in temperatures and the maximum possible growing season. As these lands face South - south east, they will reciee a maximum amount of sunlight - a critical factor in Alaska. While large scale projects would be cost prohibitive in terms of the small size of individual feilds, small scale intensive agriculture - generally a low capital /energy input system, would be ideal.

Several individuals in the area are presently engaged in such production. I worked for Bob Jones for several years and have been able to observe his neighbors efforts also. While the present economic picture makes a high profit unlikely, changes in the cost of fuel, farm subsidies in the lower 48, other costs associated with transportation and distribution will make these operations increasingly cost efficient. At some point in the next 30 years the establisment of local agricultural producers in areas such as this will be criticalto our own survival.

I'm not enclosing any maps but will call you this week to set up an appointment to show you what I've got. Until then

Sincerely

Tom Brown

SAMPLE QUESTIONAIRE AND RESULTS FROM QUESTIONAIRE SENT TO REVIEWERS

Cottonwood and Eastland Creeks Park Study Area Questionnaire #2
Alaska Division of Park
December 11, 1979

1) Do you favor a park or recreation area being established in the Cottonwood and Eastland Creeks area?

yes 18

no 1

2) If so, what alternate boundary do you prefer? (please refer to pages 116 to 136 of the report mailed to you this last fall)

Alternate A 7

Alternate B 1

Alternate C 6

Alternate D 1

other, please describe _____

most acres possible 2

3) If you respond yes to question number 1, what development concept do you prefer?

Development Alternate #1 13 (low intensity)

Development Alternate #2 2 (moderate intensity)

Other, please describe _____

4) Please use this space and the backside of the questionnaire for any other comments you may wish to express?

SEE PAGE 144d and e FOR RESPONSE TO THIS QUESTION

Optional
Name _____

Address _____

_____

THANK YOU.

SAMPLE

APPENDIX B: Construction Costs (1979 Dollars)

Development Component	Unit	No. of Units	Cost of Unit		Total Cost of Unit *
Access Road	Gravel Road, 24' wide,	1,040 ft.	$ 128/ft		$133,120
				TOTAL	$133,120
Campground	Campsites **	20	5,750		115,000
	Double Vaulted Latrine	1	9,400		9,400
	Double Entrance Gate	1	1,100		1,100
	Entrance Sign	1	475		475
	Wood Signs	10	25/sq.ft.		250
	Bulletin Board	1	300		300
	Water Well	1	23,000		23,000
				TOTAL	$149,525
Day Use Area	Gravel Parking Spaces	7	1,150		8,050
	Gravel Road (24', 2-way)	20 ft.	128/ft		2,560
	Picnic Shelter	1	14,500		14,500
	Picnic Tables	7	300		2,100
	Fireplaces	7	225		1,575
	Wood Sign	4sq.ft.	25/sq.ft.		100
				TOTAL	$ 28,885
Trail System	Trail (1 1/2ft)	5 miles	3,500/mile		17,500
	Board Walks (20 ft.)	7	200/ft.		1,400
	Boundary/Private Land Signs (every 150 feet)	290	25		7,250
	Interpretive Sign	1	600		600
	Tent Pads	10	50		500
	Benches	20	100		2,000
	Fireplaces	10	225		2,250
	Pit Latrines	2	1,375		2,750
	Bulletin Board	1	300		300
				TOTAL	$ 34,550
Total Construction Cost: Road, Campground, Trail System and Day Use Area ---					$346,080

* Includes materials and installation
** "Campsites" include the cost for the following: 1 table, 1 fireplace, 1 bumper log, 1 pull-in, 1 drain and a portion of interconnecting road.

Additional Costs (1979 Dollars)

Site Planning, 5% of total Construction Costs	$17,304
Design Engineering, 10% of total	$34,608
Construction Engineer, 15% of total	$51,912
Contingencies, 5% of total	$17,304
Total Additional Costs	$121,128
GRAND TOTAL (Additional Costs plus Construction Costs, 1979 Dollars) - - - - - - - -	$467,208

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